Nebraska Legislative Planning Committee 2013 Report

Policy Briefs

Center for Public Affairs Research
University of Nebraska at Omaha

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University of Nebraska at Omaha

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Jerry Deichert, Center for Public Affairs Research
Christopher Kelly, Department of Gerontology
University of Nebraska at Omaha
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Introduction

Members of the baby boom generation, those Americans born between 1946 and 1964, began turning 65 years old in 2011. As a result, the number of persons aged 65 or older in Nebraska will increase during the next 40 years. There are a number of relevant issues related to an aging population that should be of concern to Nebraska's policymakers. One issue concerns the health care needs of this growing population, especially the impact on the state budget if there is a corresponding increase in the number of persons requiring Medicaid or other state support. Additionally, in rural Nebraska there is a shortage of health care professionals to fill these needs.

A large portion of Medicaid expenditures for older Nebraskans goes towards long-term care, of which the most expensive option is nursing home placement. The most effective way to delay or prevent unnecessary nursing home placement is to develop alternatives to nursing home placement with home and community-based services. However, for this to occur Nebraska must have an adequate supply of service providers.

Medicaid Expenditures and Eligibility

Several tables in the Legislature's Planning Committee Reports highlight the Medicaid and CHIP expenditures for the state. These tables demonstrate the current financial impact the state's aging population has on Nebraska's Medicaid system. In this section, we bring in additional information to consider the future impact of this growing population.

In FY 2013, Medicaid expenditures for the Aged category totaled $373.0 million. Table 1 shows that the 2013 value was higher than any of the previous years. However, the Aged category accounted for a smaller proportion of Medicaid expenditures in FY 2013 than in previous years. Expenditures for the Aged represented 20.7% of the total Medicaid expenditures in FY 2013, which was considerably lower than the 26.1% reported in FY 2005.

Despite the fact that Medicaid expenditures for the Aged has declined as a percentage of total expenditures, there are two reasons Nebraska policymakers should still be concerned about future Medicaid expenditures for this population. First, expenditures in this category are relatively high. The average monthly expenditure per eligible person in the Aged category was $1,727 in FY 2013. This was lower than the average monthly expenditure per eligible person in the Blind and Disabled category ($1,821) but was 6.5 times the average monthly expenditure per person for the Children category (see Table 2). Because of the high average monthly expenditure per eligible person in the Aged category, small changes in the number of eligible persons in this category will lead to much larger changes in total Medicaid expenditures. For example, for every 100 person change in the Aged category, total annual Medicaid expenditures will change by more than $2 million.

Table 1. Medicaid and CHIP Vendor Expenditures by Eligibility Category, Nebraska: FYs 2005-2013

	Aged	Blind and Disabled	ADC Adult	Children (includes CHIP)	Total
	(millions)				
FY 2005	$365.0	$566.6	$104.1	$360.9	$1,396.6
FY 2006	$356.2	$580.6	$102.0	$392.1	$1,430.9
FY 2007	$333.4	$586.0	$105.2	$414.2	$1,438.8
FY 2008	$341.1	$610.6	$105.5	$439.5	$1,496.8
FY 2009	$345.6	$639.8	$108.7	$444.4	$1,538.4
FY 2010	$347.3	$655.3	$129.7	$439.7	$1,572.0
FY 2011	$337.7	$664.5	$175.2	$398.4	$1,575.8
FY 2012	$341.7	$711.0	$170.7	$378.9	$1,602.3
FY 2013	$373.0	$803.7	$134.7	$488.1	$1,799.5

Source: Nebraska Department of Health and Human Services; prepared by UNO Center for Public Affairs Research, October 2013

Table 2. Average Monthly Medicaid and CHIP Vendor Expenditures by Eligibility Category, Nebraska: FYs 2005-2013

	Aged	Blind and Disabled	ADC Adult	Children (includes CHIP)
FY 2005	$1,663	$1,644	$367	$235
FY 2006	$1,616	$1,630	$361	$253
FY 2007	$1,526	$1,621	$387	$265
FY 2008	$1,588	$1,664	$423	$276
FY 2009	$1,628	$1,695	$419	$272
FY 2010	$1,633	$1,655	$413	$248
FY 2011	$1,583	$1,595	$460	$220
FY 2012	$1,602	$1,658	$448	$207
FY 2013	$1,727	$1,821	$353	$264

Source: Nebraska Department of Health and Human Services; prepared by UNO Center for Public Affairs Research, October 2013

Second, as Table 3 indicates, even though the number of eligible persons in the Aged category is lower in FY 2013 than in FY 2005, there have been two consecutive annual increases and this trend is likely to continue over the course of the next two decades due to the aforementioned aging of the baby boom generation.

Table 3. Average Monthly Medicaid and CHIP Eligible Persons by Category, Nebraska: FYs 2005-2013

	Aged	Blind and Disabled	ADC Adult	Children (includes CHIP)	Total
FY 2005	18,291	28,724	23,635	128,107	198,757
FY 2006	18,370	29,682	23,556	129,062	200,670
FY 2007	18,204	30,128	22,646	130,030	201,009
FY 2008	17,900	30,585	20,815	132,743	202,043
FY 2009	17,687	31,451	21,595	136,347	207,080
FY 2010	17,717	33,005	26,158	147,580	224,459
FY 2011	17,783	34,708	31,723	151,140	235,353
FY 2012	17,768	35,736	31,742	152,297	237,543
FY 2013	17,996	36,778	31,794	154,071	240,639

Source: Nebraska Department of Health and Human Services; prepared by UNO Center for Public Affairs Research October 2013

Medicaid Expenditures for Long-Term Care Services

Table 4 illustrates that the State of Nebraska's costs for long-term care services under Medicaid totaled $742.5 million in FY 2013, an increase of 12.6% from FY 2012. Expenditures for long-term care services accounted for approximately two out of every five dollars spent on Medicaid in Nebraska. Moreover, nursing facility costs totaled about 18% of all Medicaid expenditures (Nebraska Medicaid Annual Report, 2013). The average annual cost in 2011 for a Nebraska senior in a nursing facility, under Medicaid, was $86,040 (DHHS, Costs of Senior Care, 2011). Clearly, any intervention that delays or prevents unnecessary nursing home placement will have a substantial impact on long-term care costs for Nebraska.

Table 4. Medicaid Expenditures for Long-Term Care Services for Nebraska: FYs 2010-2013

Service	FY 2010	FY 2011	FY2012	FY 2013
Nursing Facilities	$317.00	$299.10	$302.90	$324.60
ICF/MR	$43.00	$20.80	$48.50	$78.00
Developmental Disability (DD) Waivers	$179.40	$195.30	$211.20	$236.20
Aged and Disabled (A&D) Waivers	$35.40	$38.70	$39.00	$41.80
Home Health/Personal Assistance Services	$40.60	$33.30	$31.00	$32.00
Assisted Living	$29.70	$30.20	$26.90	$29.80
Total	$645.00	$617.50	$659.50	$742.50

Source: Nebraska Department of Health and Human Services; prepared by UNO Center for Public Affairs Research, October 2013

As can be seen from Table 4, Nebraska's Department of Health and Human Services (DHHS) is moving in this direction. While Medicaid expenditures on nursing facilities increased from FY 2010 to FY 2013, the proportion of the state's overall Medicaid long-term care spending that went towards nursing homes

decreased, from 49.1% in FY 2010 to 43.3% in FY 2013. This is in part due to the state's expanded use of home and community-based services.

However, as Table 4 also illustrates, Medicaid spending in Nebraska on home and community-based alternatives to nursing home care is low. Two examples of programs that could be expanded are Aged & Disabled Waivers and Home Health/Personal Assistance Services. On its website, the American Health Care Research Organization estimates the following average senior care costs per day by type of service for 2013:

1. Home Care Aide Cost $144 (8 hours per day)
2. Home Health Aide Cost $152 (8 hours per day)
3. Adult Day Care Cost $65
4. Adult Day Health Care Cost $79
5. Assisted Living Facility Cost $115
6. Skilled Nursing Facility Cost $230

The above figures suggest that savings in long-term care costs to the Nebraska Medicaid program can occur whenever placement in a skilled nursing facility can be avoided. However, the availability of these services remains a concern throughout Nebraska, especially in small towns and rural areas, where the supply of direct care workers is limited.

Historical Population and Projections

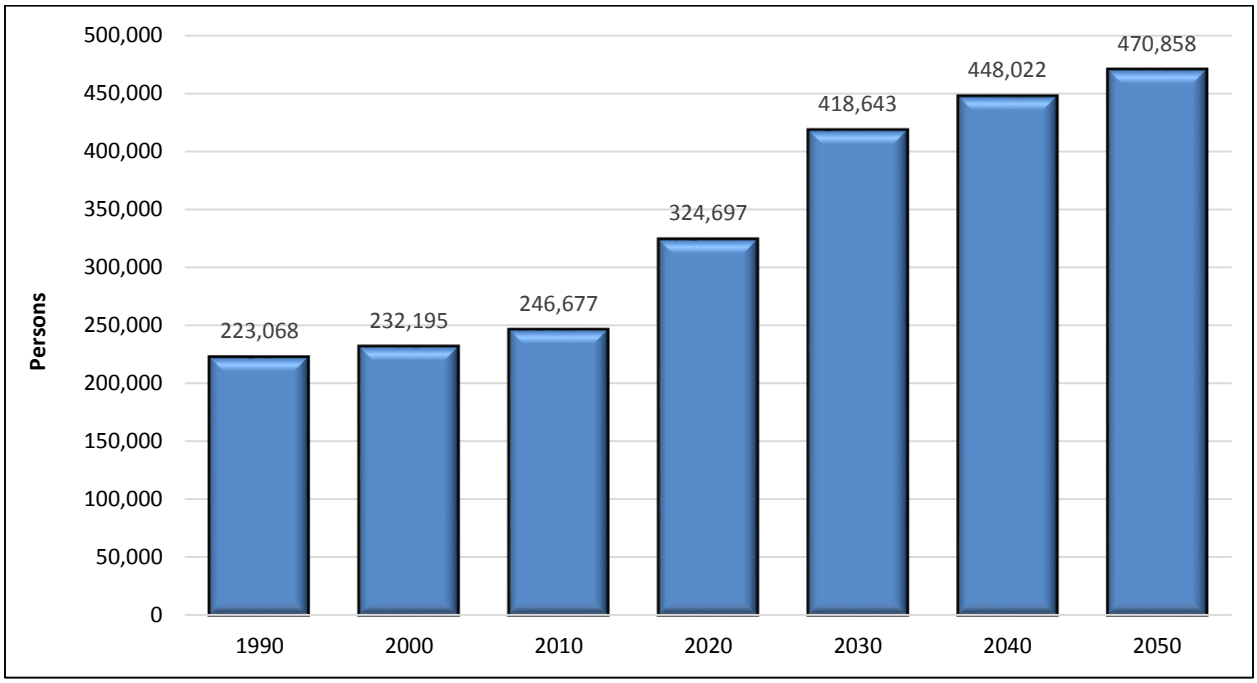
Figure 1 illustrates the population aged 65 years or older in Nebraska by decade since 1990, with projections for 2020 through 2050. As can be seen, the number of persons aged 65 years or older grew slowly between 1990 and 2010 but is projected to increase rapidly between 2010 and 2020 and between 2020 and 2030. The number of persons aged 65 years or older is projected to grow from 246,277 in 2010 to 324,697 in 2020 (a 31.6% increase) and then to 418,643 in 2030 (a 31.6% increase).

The greatest increases are expected in Nebraska's rural counties, which have an older population than the rest of the state. In 2010, 21.0% of the population in the 53 most sparsely populated counties in Nebraska (counties with no town with at least 2,500 persons) was aged 65 years or older. In contrast, only 10.4% of the population in Nebraska's three most densely populated counties (Douglas, Lancaster, and Sarpy) was aged 65 years and older.

If the number of Medicaid-eligible seniors in Nebraska experiences an increase similar to that of the state's overall older population, Medicaid costs in the Aged category could increase by approximately three percent per year. This would translate into annual expenditure increases of more than $10 million. However, as Figure 2 suggests, the pressure on expenditures may not be as great between 2010 and 2020, since much of the growth in Nebraska's elderly population during this period will be in the 65 to 74 years age group. Persons in this category generally have lower Medicaid utilization rates than those in the 75 years and older age groups (especially for the 85 years or older age group). Figure 2 shows that the fastest growing age group between 2020 and 2030 will consist of persons aged 75 to 84 years.

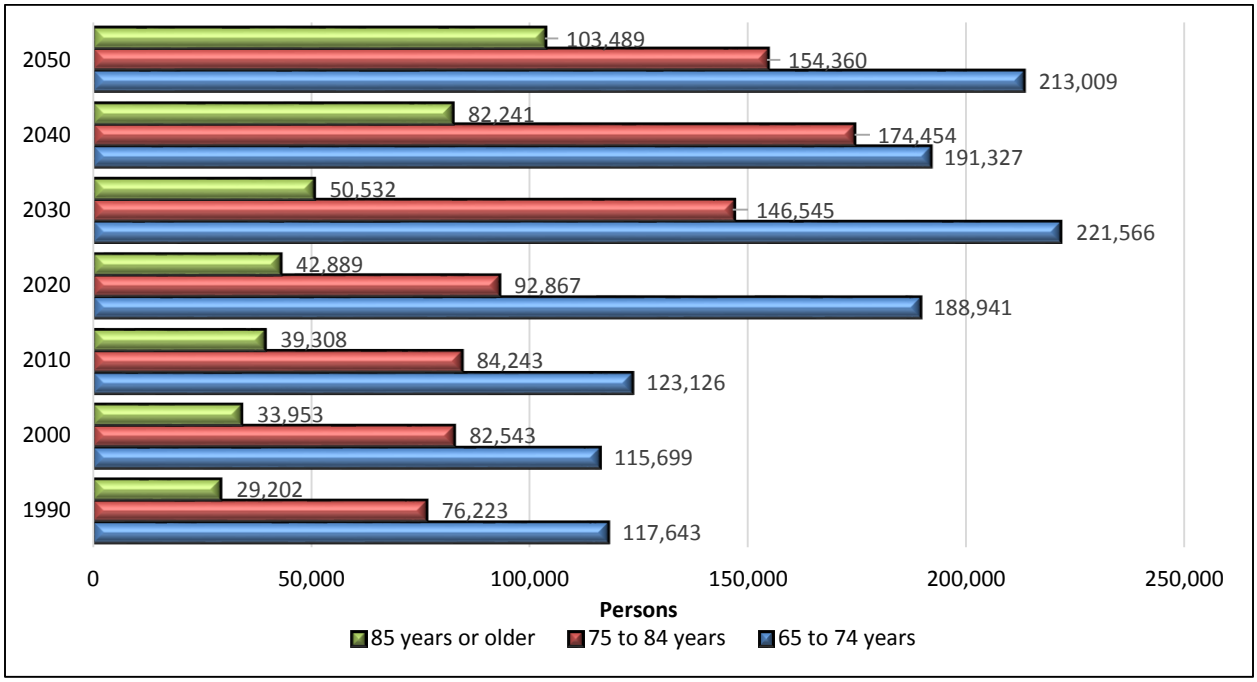
One of the reasons for the decline in the number of Medicaid eligible persons in the Aged category during the past few years is the relatively slow growth in the number of persons aged 65 years or older. As Figure 2 demonstrates, this was due to the decline in the number of persons aged 70 to 74 years and 75 to 79 years between 2000 and 2010. Since the highest Medicaid eligibility rates are in the age groups 80 and older, we may not see the full impact of the aging baby boom generation for another decade.

Figure 1. Nebraska Population Aged 65 Years or Older: 1990, 2000, and 2010 with Projections for 2020 and 2030



Source: U.S. Census Bureau, 1990, 2000, and 2010 Censuses of Population and UNO Center for Public Affairs Research, Projections for 2020 to 2050, prepared August 2013

Figure 2. Nebraska Population Aged 65 Years or Older by Age Group: 1990, 2000, and 2010 with Projections for 2020 and 2030



Source: U.S. Census Bureau, 1990, 2000, and 2010 Censuses of Population and UNO Center for Public Affairs Research, Projections for 2020 to 2050, prepared August 2013

Nursing Home Residence for Persons 65 Years or Older

Table 5 shows that, in 2010, approximately 49 of every 1,000 persons aged 65 years or older in Nebraska resided in a nursing home. It also shows that the residency rates roughly doubled for each successive age group. The highest rate was for persons aged 85 years or older at 168.0 residents per 1,000 persons.

Table 6 summarizes the impact that the aging baby boom generation will have on the number of persons living in nursing homes if the 2010 residency rates for each age category remain the same for 2020 to 2050. In 2010, there were 11,977 persons aged 65 or older living in nursing homes. This is projected to increase to 13,667 persons in 2020 (a 14.1% increase) and to 18,081 persons in 2030 (a 30.1% increase).

Table 5. Nebraska Nursing Home Residents per 1000 Population by Age, 2010 Census

	65 years and over	65 to 69 years	70 to 74 years	75 to 79 years	80 to 84 years	85 years and over
Residents per 1000	48.6	9.8	16.0	30.9	63.3	168.0

Source: U.S. Census Bureau, 2010 Census of Population and UNO Center for Public Affairs Research, prepared September 2012

Table 6. Nebraska Nursing Home Residents by Age, 2010 Census with Projections for 2020 to 2050

	65 years and over	65 to 69 years	70 to 74 years	75 to 79 years	80 to 84 years	85 years and over
2010	11,977	675	871	1,433	2,393	6,605
2020	13,667	1,047	1,314	1,696	2,405	7,205
2030	17,782	1,118	1,719	2,691	3,764	8,489
2040	24,234	971	1,476	2,930	5,040	13,816
2050	27,128	1,129	1,566	2,597	4,450	17,386

Source: U.S. Census Bureau, 2010 Census of Population and UNO Center for Public Affairs Research, Projections for 2020 to 2050, prepared October 2013

Conclusion and Policy Options

The aging of Nebraska is a foregone conclusion. As in every state, the baby boom generation represents the largest birth cohort within Nebraska's population, and during the period from 2011 to 2029, Nebraskans of this generation will reach the age of 65, growing the state's older population to nearly 420,000 by 2030. As in several states, particularly in the Midwest, the proportion of older Nebraskans within the state's population will also grow, because other demographic changes such as birth rates and immigration are not projected to keep pace with the aging of Nebraska.

Some of the impacts of an aging Nebraska are already well-known. The state's baby boomers are becoming eligible for federal entitlement programs such as Social Security and Medicare and will produce unprecedented strains on these programs, particularly over the next two decades. Additionally, since Medicare does not meet all the health care expenses of older Americans, particularly long-term care costs, older Nebraskans will pay higher out-of-pocket costs for these services and will increasingly rely upon state-funded programs such as Medicaid when they can no longer meet these expenses. The

specter of future Medicaid long-term care costs to Nebraska that are insurmountable looms quite large, with these expenses to the State already totaling nearly three-quarters of a billion dollars in FY 2013.

Nonetheless, the continued upward spiraling of Medicaid long-term care costs to Nebraska is *not* a foregone conclusion. Today, the highest per diem costs for long-term care (by a considerable margin) to Nebraska's Medicaid program derive from care provided by skilled nursing facilities. Nursing home care in Nebraska (though higher in quality, on average, than care provided throughout the United States) is expensive, averaging more than $75,000 in annual costs per resident. Further, nursing home placement, while necessary for some individuals who need skilled nursing assistance 24 hours a day, seven days a week, is not needed by *everyone* who receives long-term care. In short, the most effective way to save costs to the Nebraska Medicaid program is to delay or prevent unnecessary nursing home placement.

In the past, assisted living (which is the fastest growing category of residential facilities in Nebraska) has been discussed as an alternative to nursing home placement; however, these settings are viewed today as limited in their capacity to meet the current and future long-term care needs of older Nebraskans. Assisted living facilities are not required to provide the professional staffing commensurate to residents with clinical diagnoses such as dementia; in addition, most do not provide personal care assistance to residents with activities of daily living (ADLs), such as bathing, dressing, feeding, and toileting. The supply of assisted living facilities in Nebraska is limited (especially in rural areas). Finally, assisted living is expensive to families (most facilities do not accept Medicaid).

For these reasons, the most effective way to delay or prevent nursing home placement in Nebraska is to develop long-term care alternatives through home and community-based services. The state's Medicaid waiver program entitles those Nebraskans who are "nursing home eligible" (e.g., individuals who are diagnosed with Alzheimer's disease or other types of dementia and/or who have limitations to three or more ADLs), and who are financially eligible, to receive Medicaid support for in-home services such as home health care (for medical needs) and personal services (for non-medical needs). As illustrated above, these services cost roughly one-quarter per day of expenses in skilled nursing facilities. The potential future savings to Nebraska's Medicaid program, in providing long-term care services through these services (and not in skilled nursing facilities), can more than offset the higher costs due to the increased demand for services in the next two decades resulting from the aging of the baby boomers.

Further, the capacity to provide lower-cost home and community-based alternatives to nursing home care, in parts of the State, already exists. In Nebraska's three most populous counties (Douglas, Lancaster, and Sarpy), home health agencies and home care agencies represent two of the fastest growing industries in the private sector. Among the home health and home care options for families in the Omaha and Lincoln metropolitan areas are organizations of high quality (in terms of both regulatory standards and customer satisfaction) and that are national and international in scope. Today, however, the practicality of this option for many Nebraskans, particularly low-income and/or rural elders, is limited. This is reflected in the relatively low utilization of Medicaid waiver services such as home health and home care.

The best option for Nebraska lawmakers (and we believe it is a feasible one), in controlling the State's Medicaid long-term care costs, is to support continued expansion of lower-cost home and community-based services (HCBS) through the Medicaid waiver program. This includes working in continued partnership with public programs delivering HCBS to older Nebraskans, particularly the state's eight Area Agencies on Aging (AAAs), which already deliver low-cost options in services such as home health, home care, and care management, often in conjunction with the Medicaid waiver program. In addition, by working with providers in the private sector (both for-profit and nonprofit) to expand coverage of

underserved populations, Nebraska's lawmakers can begin to contain long-term care costs in the very same areas of the State in which these expenses are projected to grow the fastest.

Finally, and central to efforts to growing HCBS in Nebraska, the State (and its lawmakers) needs to address current and future shortages in its direct care workforce, particularly in rural counties. Two types of aides provide long-term care services in the home: 1) nursing, psychiatric, and home health aides (who perform medical services), and 2) personal and home care aides (who perform nonmedical services). According to data from the 2007-2011 American Community Survey, nonmetropolitan counties in Nebraska are underserved by both types of aides, in comparison to Douglas, Lancaster, and Sarpy counties. This disparity, along with other challenges in providing long-term care to rural elders, is addressed in the recent report by the National Conference of State Legislatures, *Home and Community Based Services: Meeting the Long-Term Care Needs of Rural Seniors*, which is available at the following link: http://www.ncsl.org/research/health/home-and-community-based-services-meeting-the-lon.aspx.

In summary, while the demand for health care and long-term care services among older Nebraskans will continue to increase during the next two decades due to the aging baby boomers, this increased demand will not necessarily lead to a corresponding increase in costs to the State, particularly to the Nebraska Medicaid Program. The key lies in the ability of Nebraska lawmakers, working with providers in both the public and private sectors, to help delay or prevent unnecessary nursing home placement through the expansion of more affordable alternatives, specifically, home and community-based services. The greater availability of options such as home health and home care, especially to Nebraska's underserved low-income and rural populations, will enable us to meet our long-term care challenges in a way that provides more choices for our seniors and is economically sustainable.

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Adult Children with Disabilities Living with Parents: Policy Implications

Karen Rolf, Grace Abbott School of Social Work
Jerome Deichert, Center for Public Affairs Research
University of Nebraska at Omaha
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Introduction

The number of adults with developmental disabilities has grown steadily in Nebraska and the United States over time. Most adult children with a disability live with a family member. These family members represent an important caregiving resource. When they are no longer available, the state provides residential care. Today, however, many caregiving parents are faced with both their own health care challenges and finding suitable care for their adult child with a disability after their own death.

Communities are challenged to provide suitable living arrangements and a continuum of care based on the needs of these adult children. The waiting lists for community living for the developmentally disabled are growing because of: a) the increased incidence and prevalence of individuals with disabilities; b) the Olmstead decision that mandated that both older adults and individuals with disabilities should live in the least restrictive settings; and c) policies such as the Affordable Care Act (2010) that shifted state Medicaid funding from long-term residential services to community based care.

This report uses data from the American Community Survey (ACS) from 2000 to 2010 to highlight trends in the population characteristics of both older adult caregivers and their adult children with disabilities in Nebraska.

Disability can be measured in a number of ways. It can be a condition that affects one's ability to work and/or one's ability to perform an activity of daily living (ADL) such as eating, dressing, socializing, or caring for oneself. Disabilities can range from a moderate condition to severe. In addition, the surveys we use change the measures of disability over time. This report focuses on two measures of disability: one that affects the ability to work and one that affects the ability to perform ADLs. It should be noted that an individual who has a disability that significantly affects ADLs is also likely to have a work disability.

Characteristics of Adult Children with Disabilities

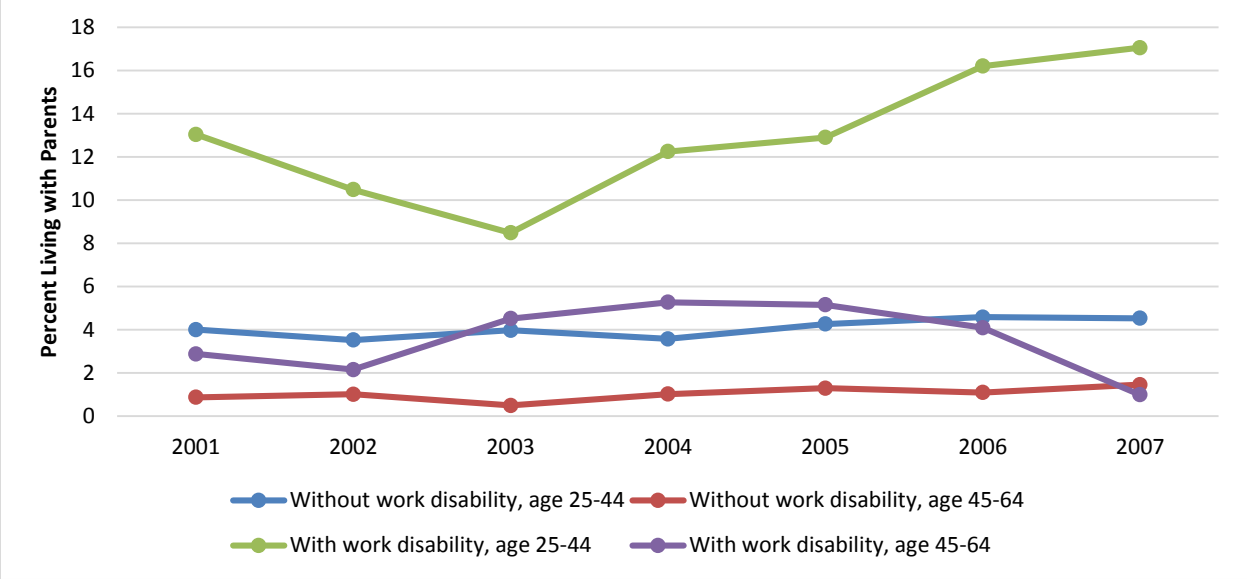
Work Disability

More adult children are living in their parents' homes regardless of their disability status. As expected, an adult child with a disability is more likely to live in his or her parents' homes than an adult child who does not have a disability. While the percentage of adult children without disabilities living with their parents has shown a slight increase since the 1970s, the percentage of adult children with disabilities living with their parents was almost twice as high. This percentage showed a slight dip in 2000. It should be noted that this question was not asked in the 2010 Census.

In order to examine the question whether the percentage of adult children with work disabilities living with their parents has increased over time in Nebraska, the ACS was used. The results from the analysis of this data show that from 2001 to 2007, the percentage of adult children (ages 25 to 44) with a work disability living with their parents rose steadily from 13% to over 17%. Adult children ages 45 to 64 with

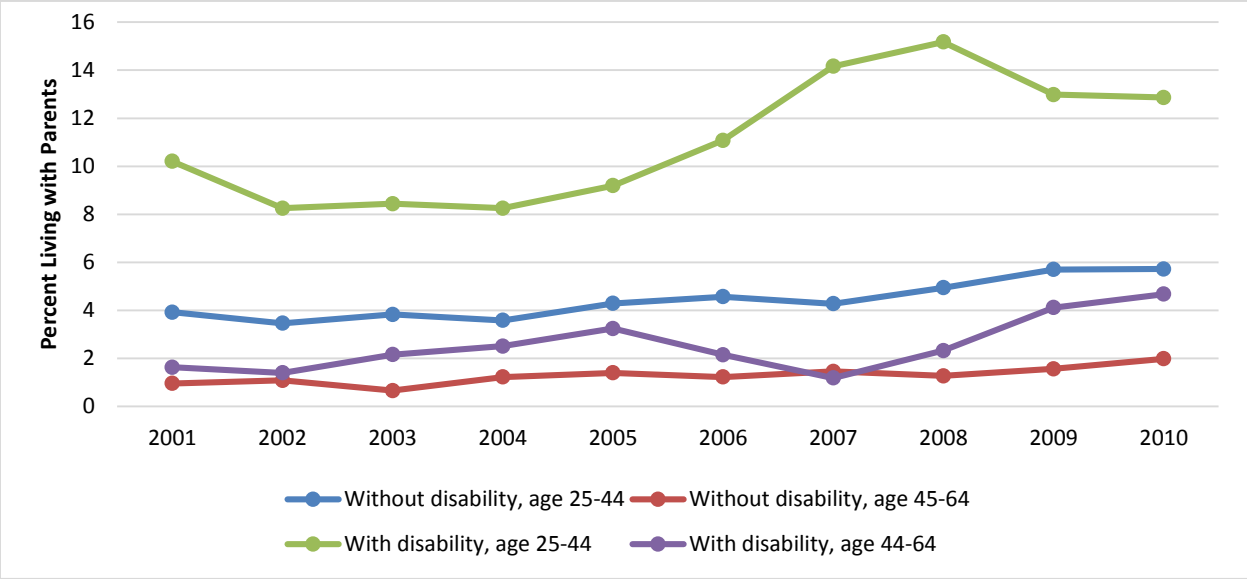
a work disability living with their parents rose from roughly 3% to 5% and then dropped to 1%. These results are shown in Figure 1.

Figure 1. Adult Children Living with Parents by Work Disability Status by Age, Nebraska: 2001-2007



Source: U.S. Census Bureau, American Community Survey, 2001-2007; prepared by the UNO Center for Public Affairs Research, December 2013.

Figure 2. Adult Children Living with Parents by Status of Disabilities that Affect Activities of Daily Living by Age, Nebraska: 2001 to 2010

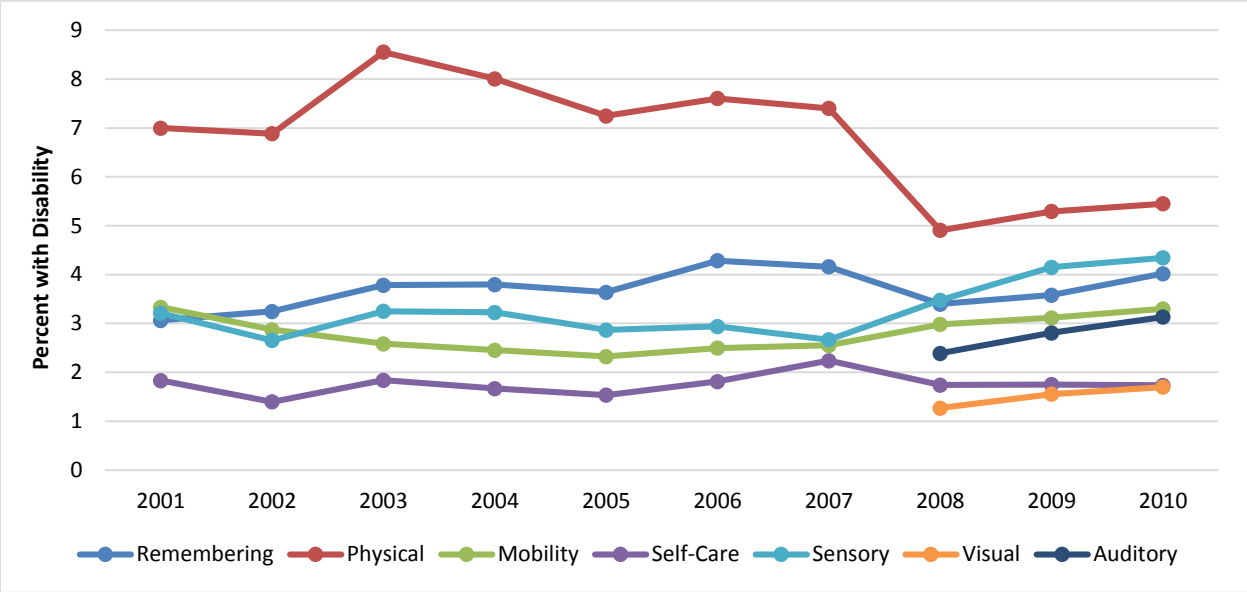


Source: U.S. Census Bureau, American Community Survey, 2001-2010; prepared by the UNO Center for Public Affairs Research, December 2013.

Limitations in Activities of Daily Living

The ACS asked respondents to identify whether they had a disability that caused a limitation in an ADL defined as "getting around inside the home, bathing, dressing and eating" (U.S. Census, 2012). Figure 2 shows that between 2001 and 2010, the percentage of adult children ages 25 to 44 with disabilities affecting ADLs living with their parents showed the greatest increases. Adult children (45 to 64) with a disability affecting ADLs increased from 3% to 5% from 2001 to 2010.

Figure 3. Adult Children Living with Parents by Type of Disability, Nebraska: 2001-2010



Source: U.S. Census Bureau, American Community Survey, 2001-2010; prepared by the UNO Center for Public Affairs Research, December 2013.

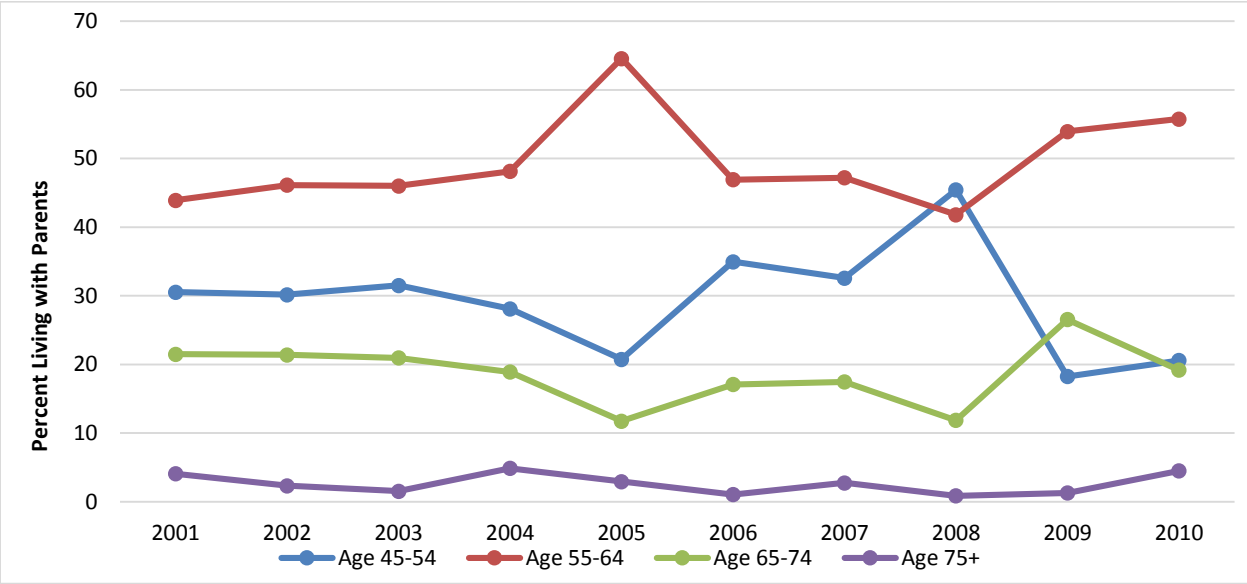
Types of Disabilities of Adult Children

The next set of analyses used the ACS to examine the specific types of disabilities found in adult children living with their parents. Between 2001 and 2010, the most frequently reported disability for adult children living with their parents was a physical disability, ranging from just over 8% to just under 6%. Other disabilities were those related to remembering, self-care, auditory, sensory, mobility, and visual. The breakdown of disabilities for adult children ages 25 to 64 with disabilities living with their parents is shown in Figure 3.

Characteristics of Adult Caregivers

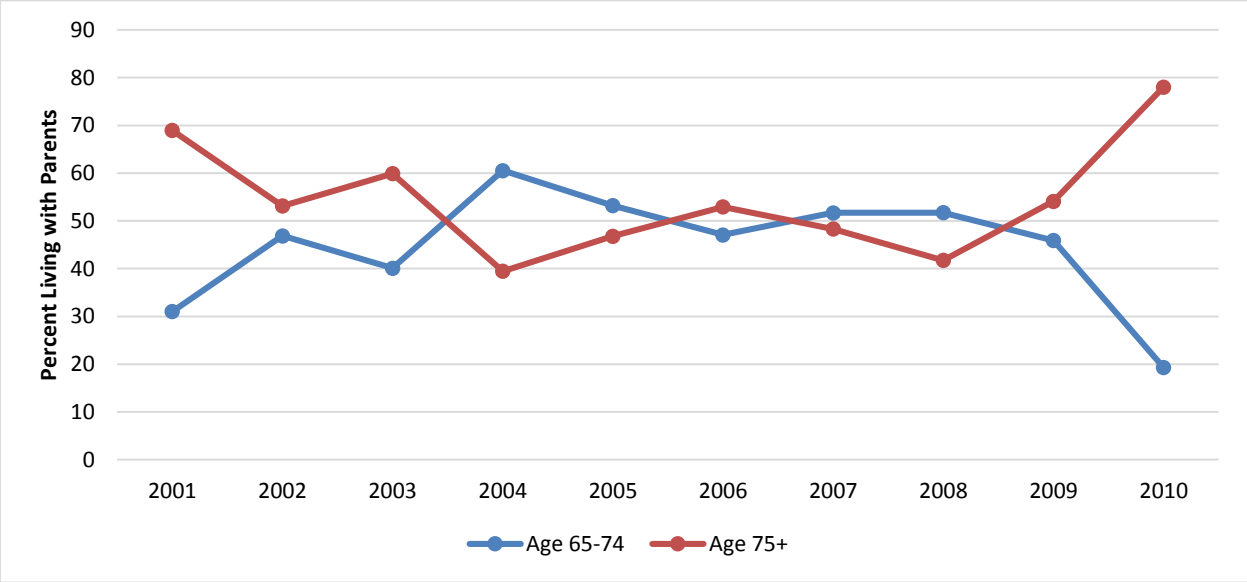
The next set of analyses examined the characteristics of the parent caregivers. Two aspects were examined: parent age and parent disability status. The results from the ACS suggest that adult children with disabilities tend to live with a parent who also has a disability. As expected, the older the child with the disability, the older the parent. As expected, as the age of the parent increases, the probability the parent will have a disability also increases.

Figure 4. Adult Children Ages 25-44 with Disabilities Living with Parents by Parents' Age, Nebraska: 2001-2010



Source: U.S. Census Bureau, American Community Survey, 2001-2010; prepared by the UNO Center for Public Affairs Research, December 2013

Figure 5. Adult Children Ages 45-64 with Disabilities Living with Parents by Parents' Age, Nebraska: 2001-2010



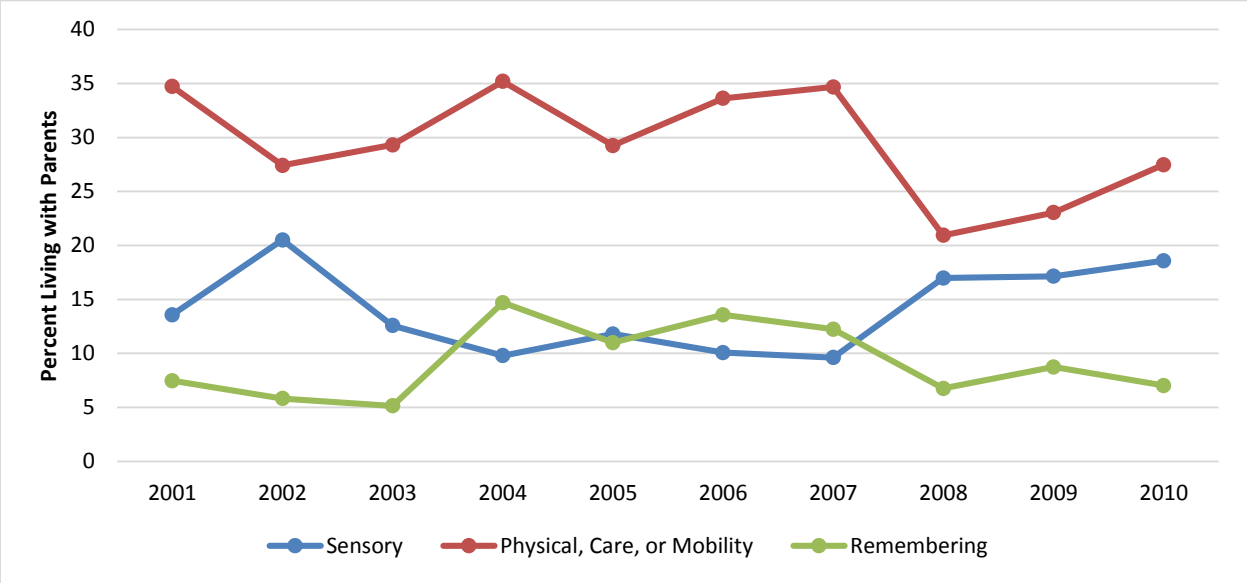
Source: U.S. Census Bureau, American Community Survey, 2001-2010; prepared by the UNO Center for Public Affairs Research, December 2013

Age

Over the last decade, approximately one-half of adult children ages 25 to 64 with disabilities affecting ADLs were living with a parent who was 55 to 64 years of age. Between 10% and 20% of these adult children lived with a parent who was 65 to 74 years of age. The age breakdowns for adult children ages 25 to 44 are shown in Figure 4 on the previous page.

Adult children (ages 45 to 64) with disabilities are more likely to be residing with parents over 60 years of age. This is expected because of the age of the child. Figure 5 on the previous page shows the breakdown of parents' age for adult children ages 45 to 64 with disabilities living with their parent.

Figure 6. Adult Children with Disabilities Living with Parents by Disability of Parents, Nebraska: 2001-2010



Source: U.S. Census Bureau, American Community Survey, 2001-2010; prepared by the UNO Center for Public Affairs Research, December 2013.

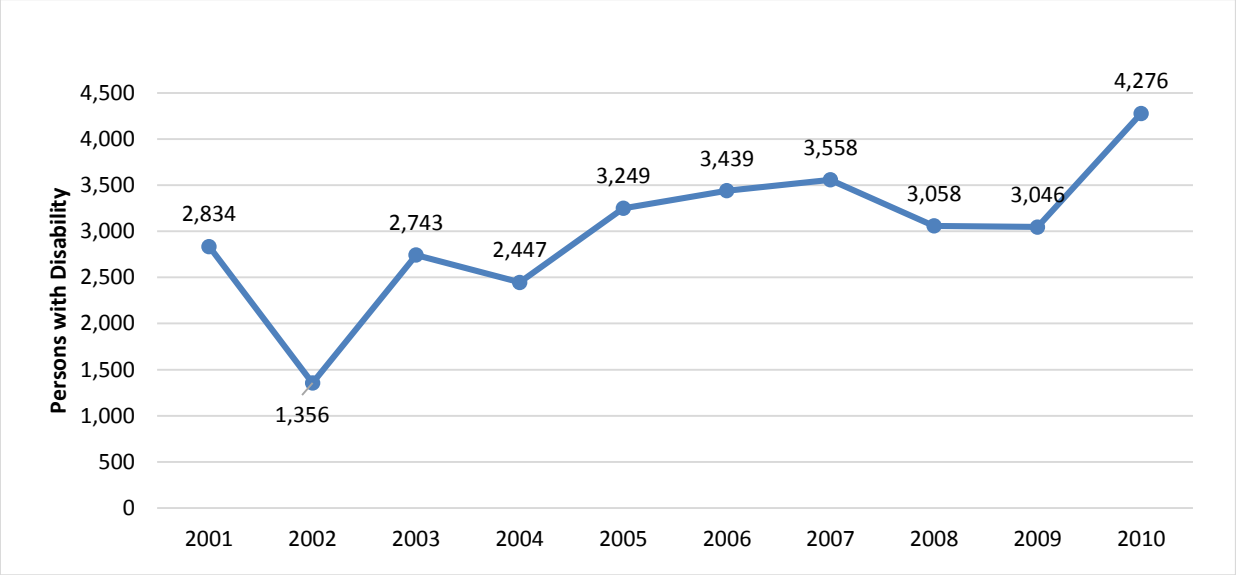
Health of Caregiver

Most adult children with disabilities live with an older adult parent who is also challenged with a disability. The final set of analyses used the ACS to examine the specific types of disabilities found among parents of adults with disabilities ages 25 to 64 who live with their parents. Physical, care, or mobility disabilities were most commonly found among these parents. The breakdown is shown in Figure 6.

Number of Adult Children with Disabilities

The last analysis examined the total number of adult children with disabilities that affected activities of daily living in their parents' homes from 2001 to 2010. Figure 7 shows that this number increased from 2,834 in 2001 to 4,276 in 2010. This represents a 50.9% increase between 2001 and 2010.

Figure 7. Number of Adult Children with Disabilities that Affect Activities of Daily Living with Parents, Nebraska: 2001 to 2010



Source: U.S. Census Bureau, American Community Survey, 2001-2010; prepared by the UNO Center for Public Affairs Research, December 2013.

Conclusions and Implications

This report used American Community Survey (ACS) data to examine adult children with disabilities living with their adult caregivers in Nebraska from 2001 to 2010. The results of these analyses suggest that the population of adult children with disabilities is growing over time and living with caregivers who have health care needs of their own.

In order to plan effectively, more will need to be known about the needs and the capacity of caregivers as well as the capacity of the current structured continuum of care in Nebraska for adults with disabilities. This information will help with planning for the most appropriate services for both older adult caregivers and their adult children with disabilities and will decrease the amount of time spent on waiting lists for adult children with disabilities for group home services, if necessary.

Currently, funding has shifted toward Home and Community Based Waivers to support individuals in their homes through supported living. This can help adult children and their older adult parent caregivers maintain supported living in their communities as long as possible. In addition, the development of housing for adults with disabilities remains a priority for most communities. Finally, Braddock (2009) maintains that universal design that supports older adults and smart technology can benefit both older adults and adults with disabilities through home monitoring and architectural design that is much less costly than residential care.

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Challenges for Water Quality Policy in Nebraska: Short- and Long-Term

Peter Calow, Office of Research and Economic Development
Daniel Snow, Water Sciences Lab, Nebraska Water Center
Shannon Bartelt-Hunt, Department of Civil Engineering
Valery Forbes, School of Biological Sciences
University of Nebraska - Lincoln
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Water is the most important natural resource for Nebraska and the Great Plains. It falls as rain and snow on the land, collects into rivers, streams, ponds, lakes and reservoirs (surface waters) and it seeps into the ground and ultimately into the subsurface to replenish shallow aquifers where it is stored as ground water. We use it in a multitude of ways: as drinking water; in the home; to support agriculture and food production; to support a range of other industries; and as a source of pleasure and recreation. Given pressures from drought, climate change and an increasing demand for food to meet the needs of an expanding world population, much attention is being paid to the amounts of available water. However, also of importance is the quality of available water. Most human uses in some way add contamination to water; and yet most uses also depend on having a supply of water that is not critically contaminated. Much of the High Plains Aquifer System, including the critically important Ogallala Aquifer, lies relatively close to the land surface in Nebraska and so is vulnerable to contamination. The cleanup of contaminated water can be costly; and those bearing the costs are often not those causing the contamination.

The aim of this briefing paper will be to draw attention to policy challenges in attending to the quality of water, recognizing the delicate balance between human use and contamination of this key resource.

Need for integrated management

The interconnections between surface waters and ground water and human interactions with them call for an integrated management approach. This is fundamental to the law (LB 962, 198th Legislature, 2004) governing the quantity of water extracted for irrigation and other major uses; but also needs to be taken into account in assessing and managing water quality (Fig. 1). Thus contamination of surface water can affect ground water and ultimately drinking water quality.

Effective management requires sound understanding of what chemical contaminants are in water and of their effects on the ecological systems and humans that are exposed to the waters, and this depends, in turn, on sound monitoring programs.

Since the early 1970s management and monitoring programs of waters have been driven by federal legislation overseen by the US Environmental Protection Agency (USEPA). There are two main legal instruments: the Safe Drinking Water Act (1974) and the Clean Water Act (1972) both of which have been subject to complex amendments. Responding to this legislation and local requirements, the State of Nebraska has established its own monitoring and management programs. These programs center on the Nebraska Department of Environmental Quality (NDEQ) for management of ground and surface waters and the Nebraska Department of Health and Human Services (NDHHS) for drinking water. The

Nebraska Department of Natural Resources (NDNR), the 23 Natural Resource Districts (NRDs), the Nebraska Department of Agriculture, US Geological Survey, and the Army Corps of Engineers also play critical roles in management of the quality of Nebraska's water resources. There is a range of databases available on a variety of chemical and biological quality measurements undertaken in Nebraska. Coverage is comprehensive in terms of what is monitored and geographical extent; but the data are scattered and in general are not easily accessed. ***Better integration of databases could lead to better management and it would be in the best interests of the State for this to be encouraged by the Legislature.*** Some attempt has been made to bring specific data together for ground water in a *quality-assessed agrichemical database*, and this so-called Clearinghouse database could provide a model for a more integrated approach to water in general. There are clear benefits to more integrated water quality data collection and assessment. At the national scale, the U.S. Geological Survey is already engaged in a project compiling forms of historic and current monitoring data from all sources (local, state, and federal) for addressing regional, multi-state, and national scale water-resources issues as part of the NAWQA (National Water-Quality Assessment) Program (Rowe et al 2013). At both the national and state level, readily available water-quality data from multiple sources can clearly be used more effectively to address environmental issues, such as energy development, nutrient enrichment, land use, and climate change.

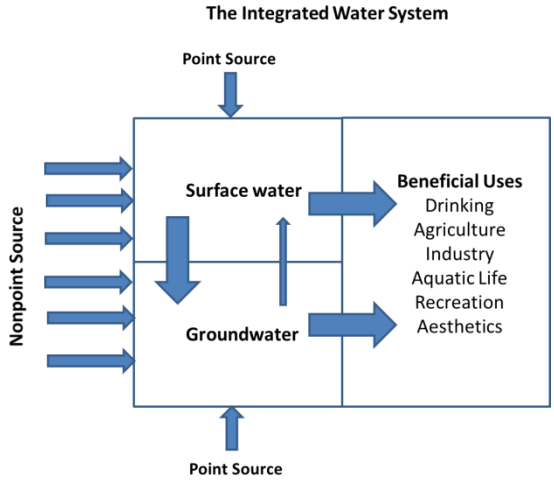

Fig. 1. The interconnected water system. The blue arrows represent the inputs and flows of contaminants.

Current state of ground water and surface waters in Nebraska

The NDEQ organizes a ground water cooperative monitoring program that involves data collected from the numerous Nebraska Natural Resource Districts and other agencies from thousands of samples. ***Nitrate has been found in more than 90% of these samples and the herbicide atrazine and its degradation products in around 10% of the samples.*** There is a recognized bias in that samples are often taken from presumed problem areas. Data for nitrate show little trend over time (Fig. 2). The measured concentrations of nitrate range from one-third to two-thirds the standard (10 milligrams per liter, abbreviated as mg/l) required in the State of Nebraska (this being equivalent to the standard required by USEPA for safe drinking water). The data shown in Fig. 2 are mid-range (median) values that may obscure local hot spots. Moreover, once contaminated, ground water may take years to become clean. Most other substances contained in the Clearinghouse database are either below detection limits or within recommended water quality guidelines, suggesting that widespread contamination of ground water by the majority of these well-characterized chemicals is not a statewide issue.

The NDEQ also carries out a comprehensive and extensive surface water monitoring program that involves physical, chemical and biological assessments at both fixed and randomly selected sites, primarily to meet Clean Water Act regulatory requirements. Amongst other things, the Clean Water Act requires NDEQ to prepare a list of impaired waters that do not support the assigned beneficial uses for: primary contact recreation; aquatic life; drinking, agriculture and industrial uses; and aesthetic pleasure. The assessments summarized in the database demonstrate that many of the sites monitored are impaired according to this definition. ***For rivers and streams the most common impairments are: (1) for primary contact recreation from bacteria potentially due to inadequate domestic sewage treatment and runoff from organic wastes applied to land as fertilizers; and (2) for aquatic life from high levels of nutrients and chemicals.*** Selenium, a natural contaminant related to the geology of the drainage areas, but which may also be derived from agricultural sources, can be a cause of impairment for aquatic life in Nebraska. The herbicide, atrazine is another cause of impairment for aquatic life and is regularly

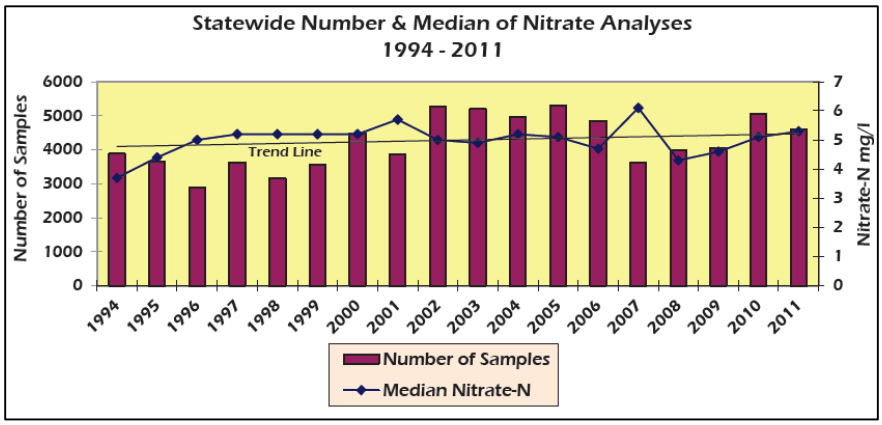

Fig. 2. All 76,004 analyses and median nitrate-nitrogen levels for Nebraska, 1994-2011.
(Source: Quality-Assessed Agrichemical Database for Nebraska Ground Water, 2012)

detected, especially in areas prone to surface water run-off such as the Elkhorn, Lower Platte, and Big Blue watersheds of eastern Nebraska. ***For lakes the commonest impairments are due to bacteria and artificial enrichment, for example by nitrates and phosphates from agricultural sources.*** Artificial enrichment can lead to poor water clarity and low oxygen causing "suffocation" of aquatic organisms including fish. For rivers and streams there has not been any sign of improvement over the past 10 years, and for lakes and ponds the situation seems to have gotten worse with time. For both kinds of systems Nebraska performs poorly as compared with neighboring states.

Agriculture is a major source of contamination of waters in Nebraska

Given the extent and intensity of agriculture in Nebraska, it is inevitable that chemicals used in agricultural production are likely to be a major source of contamination of waters in the state. Of major concern are the nitrates and phosphates from fertilizers. Residues of pesticides and even traces of pharmaceuticals can also be of concern. Bacteria from organic wastes applied as fertilizer are also found in both surface- and ground water. ***The challenge for management is not just understanding and controlling the quantitative magnitude of these sources but that they are spatially spread – diffuse - and hence the activities behind them are not easily identified, monitored or managed.***

That said there are controls associated with the use of pesticides and fertilizers designed to limit applications to the extent that concentrations of these contaminants do not reach levels in water that will cause harm to humans or ecosystems. For example, the Nebraska Department of Agriculture Pesticide Program is responsible for regulating the distribution, storage, and use of pesticides in Nebraska. This program was created by statute to protect citizens and the environment from the harmful effects of pesticides by ensuring these products are handled, stored, and used properly, safely, and effectively. Its functions are primarily to provide education and training combined with a vigorous inspection and enforcement program. The Pesticide Program works in close cooperation with the U.S. Environmental Protection Agency (EPA) in enforcing the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as well as the Nebraska Pesticide Act, in addition to implementing national and regional programs related to pesticide sale and use.

Interestingly, ***veterinary pharmaceuticals are not subject to the same level of assessments and controls for impacts on the environment***, and potentially for impacts to human health. Hence they are currently not regularly monitored in surface or ground water. This is despite the fact that, being biologically active, they may have impacts at low concentrations. In contrast, environmental exposures and occurrence of human and veterinary pharmaceuticals are increasingly subject to regulation in other jurisdictions around the world.

Proactively, NDEQ has identified several ground water management areas in the state (see Fig. 3) which are particularly susceptible to nonpoint ground water contamination primarily determined from increasing nitrate concentrations. Management occurs by working with the Natural Resource Districts to characterize the extent of contamination and help control additional inputs to prevent further contamination in these areas. However, as will be discussed below, this kind of management, that seeks to achieve better balance between inputs of fertilizer to crops and yields, is not without some costs and these tend to militate against widespread application of these programs.

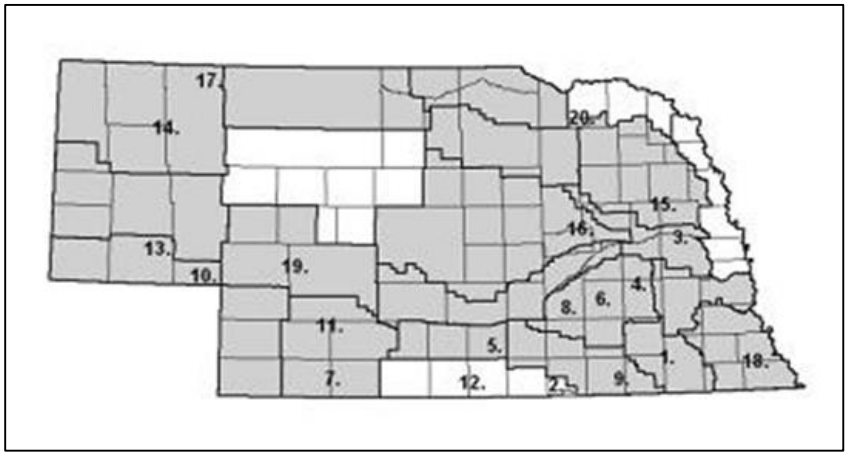

Fig 3. Location of Ground Water Management Areas in the State. Source: http://www.deq.state.ne.us/GroundW.nsf/Pages/GWMA-2

Point sources of contamination are more easily managed

Industrial effluents typically enter surface waters in pipes as point sources (cf. with the diffuse/nonpoint contamination from agricultural sources). USEPA requires the reporting of the annual release of certain

potentially toxic contaminants to freshwater, and these are compiled into toxic release inventories (TRIs) from these point sources. Data from the TRI program are summarized in the database reports. They show that ***Nebraska has the highest toxic releases to surface waters as compared with neighboring states.*** However, most of the problems in Nebraska can be attributed to release of nitrates in food processing effluents from a few dischargers.

In principle these point sources may be readily managed by the application of end-of-pipe treatment technology. There is a natural tendency to want to apply controls given the tractability of end-of-pipe solutions. However some caution is needed because they may not be the main source of contamination in a watershed; and only requiring clean-up of point sources may not always be a cost-effective way of achieving reductions in total environmental loads. Regional comparison of the magnitude of these releases with the previously discussed non-point source contamination may help in determining which sources provide the most economical and effective management solutions at particular sites.

Drinking water quality will come under increasing pressure

Much of the drinking water in Nebraska is from ground water and hence the quality of drinking water is intimately related to the quality of ground water. Drinking water derived from surface sources, and ground water directly influenced by surface water, is similarly influenced by changes in quality of the source water.

The challenges associated with the quality of these public water supplies are dealt with in a separate policy brief (*Policy Challenges for Drinking Water Quality in Nebraska*, 2013). ***The immediate, recurring concerns involve bacteria in distribution systems and nitrate contamination of source water.*** There are a number of reasons for expecting the quality of drinking water to come under even greater pressure on the longer term. First, global food shortages are likely to encourage ever-more intensification of agriculture, with the potential consequence of increasing release of associated contaminants into the ground water unless steps are taken to minimize losses. Second, global climate change, leading to more variable rainfall may exacerbate this release. For example, residual levels of soil nutrients from fertilizers used in crop production may increase during dry conditions and so be lost to run-off and leaching in greater extents when wet conditions return. Already this has very likely caused problems in terms of nitrate spikes in drinking water in Iowa (Pitt, 2013). Finally there is a possibility that nitrates, a predominant contaminant in waters in Nebraska, may have chemical effects (oxidization) on other naturally occurring but toxic chemicals, such as arsenic and uranium, and so cause them to more easily dissolve with the increased risk of them turning up in drinking water. These kinds of problems have already been recorded in California (Jurgens et al, 2010; Landon et al 2011) and the developing world (Buschmann et al 2007; Harvey et al, 2002).

Costs and benefits of management

Under Executive Order 13563, *Improving Regulation and Regulatory Review* (supplementing Executive Order 12866) the USEPA is required to consider the costs and benefits of any provisions under the Safe Drinking Water Act and the Clean Water Act.

The costs of improved water quality come from those involved in changes in practices to reduce contamination at source (e.g. managing fertilizer application), the capital expenditure on clean-up technology (e.g. of contaminated drinking water) and their operating costs together with monitoring costs, all of which can be borne by both public and private sectors. But there may be broader costs; for

example from jobs lost as a result of increasing pressures on business sectors affected. The benefits of improving water quality come from improved health and ecology, and economists have developed techniques for assessing the values that we put on these so that they can be expressed in dollars just like the costs. In principle, then, both costs and benefits can be compared. In practice this is not without difficulty and debate. Nationally USEPA has reported costs and benefits associated with the management of water quality in terms of tens of billions of US dollars per year and purported to show that benefits exceed costs (USEPA, 1997 & 2000) – but this is not without dispute (Johnson 2004). NDEQ follows this example of the USEPA and makes the presumption that the ecological and societal benefits of managing water quality are greater than costs. It expresses costs in a limited way in terms of the availability and use of grants and loans for improvement projects of various kinds (e.g. see NDEQ (2012)).

The likely complex interplay of pressures on agriculture to intensify while reducing ecological impact, the pressures on the drinking water supply, together with the costs of dealing with more complex contamination in all parts of the water system, argue for making the costs and benefits of decisions and policies more explicit. An interesting recent study in California on nitrate contamination has emphasized the integrated nature of the problem; linking farm practice in fertilizer use with the need for clean-up of drinking water sources (Harter & Lund, 2012). Changes in farm practice to ensure a better balance of application to yield and hence less contamination involved significant costs (up to 0.6% of net farm revenues) as did the installation of cleanup technologies to achieve appropriate nitrate standards (up to $1 million per year for small community public water systems). Cleanup of contaminated ground water was infeasible. It is difficult to generalize from this work since the solutions are so situation specific depending on such things as soil types and farming practices, so a similar study could be warranted for Nebraska given the critical importance of water quality for the state.

Challenges for better policies

- Recognize the importance of water quality as well as quantity for both human health and ecology.
- Encourage an integrated approach to management with the development of integrated databases.
- Note that nutrients (nitrates and phosphates), largely from agriculture, are the single most important cause for concern.
- Recognize that nonpoint pollution is going to be dominant but difficult to manage.
- Pay attention to point sources of pollution just because they can more easily be managed – but note that management here might bring costs without commensurate benefits in reducing total environmental loads.
- Realize that the quality of drinking water is likely to come under increasing pressure as agriculture intensifies and drought complicates the dynamics of the water system.
- Make decisions with a more explicit understanding of their costs and benefits.

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Glossary of Terms

arsenic	A chemical element that is highly toxic to humans and other animals
atrazine	A commonly used herbicide. It can have adverse effects on people and wildlife. For example it has been implicated as an endocrine disruptor – i.e. interfering with normal hormonal controls in a way that impairs sperm production. It is also said to cause cancer.
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
mg/l	A way to express concentration; i.e. of milligrams of a substance in a liter of water. It is often represented as parts per million (ppm).
NAWQA	National Water-Quality Assessment Program
NDEQ	Nebraska Department of Environmental Quality
NDHHS	Nebraska Department of Health and Human Services
NDNR	Nebraska Department of Natural Resources
NRD	Natural Resource Districts
nitrates	Produced by microbial action on nitrogen products such as manure and nitrogen-based fertilizers. Nitrogen is essential to all life but at high concentrations can have negative effects on health such as “blue baby syndrome” and cancer. Can artificially enrich natural waters leading to excessive algal growth and fouling.
phosphates	Phosphorus, from which phosphates form, is essential to life and hence is often included in fertilizers. Can artificially enrich natural waters leading to excessive algal growth and fouling.
selenium	A chemical element essential to life; but at high concentration can be toxic to humans and wildlife. It occurs naturally but also may derive from agricultural sources.
uranium	Radioactive chemical and as such can have adverse effects on humans and wildlife. It occurs naturally and often in insoluble form so it does not enter water systems. However, oxidation can make it more soluble such that it does enter water systems.
TRI	Toxic Release Inventory
USEPA	US Environmental Protection Agency
USGS	US Geological Survey

Policy Challenges for Drinking Water Quality in Nebraska

Daniel Snow, Water Sciences Lab, Nebraska Water Center
Peter Calow, Office of Research and Economic Development
Shannon Bartelt-Hunt, Department of Civil Engineering
Valery Forbes, School of Biological Sciences
University of Nebraska - Lincoln
December 2013

Introduction

Public drinking water accounts for a very small percentage of all water used, but very likely represents the most costly and heavily regulated use in the state. Moreover, there is a very real public expectation for a high level of service from utilities and the state to ensure that drinking water meets minimum guidelines for safety. Approximately 1300 public water systems provide drinking water to approximately 80% of Nebraska's residents. Roughly 20% obtain drinking water from private domestic wells not regulated or monitored under federal regulations (NDHHS, 2012). This policy brief indicates that currently there are recurring issues of the supplies through public water systems, including compliance with microbial, chemical and radiological contamination. There is a large uncertainty about the quality of water from private wells in Nebraska, many potentially impacted from both agricultural and natural sources of contaminants. Historically, poor water quality in private wells has also been attributed to deficiencies in construction or improper location or inadequate maintenance, though many of these issues are gradually being addressed through improved education and regulation of the well industry. Landowners are ultimately responsible for maintaining wells on their property but may lack sufficient knowledge or incentives to fulfill this role. This brief argues that there are likely to be increasing pressures on the quality of drinking water from all sources as a result of intensifying agriculture and potential impacts from drought and climate change, and then provides some introductory remarks about policies to help in dealing with these issues.

Requirements for disinfection treatment not obvious

EPA requires disinfection of public drinking water supplies using surface water sources under Safe Drinking Water Act amendments. These regulations seek to prevent waterborne diseases caused by bacteria, viruses, Legionella, and Giardia lamblia, and require that water systems filter and disinfect water from surface water sources and *ground water under the direct influence of surface water*.

Unfortunately, it is not always obvious when a ground water supply is under the influence of surface water. Legally this has been defined as "Any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as Giardia lamblia or Cryptosporidium, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions (Federal Register 40 CFR 141).

Many municipalities are still undergoing extensive testing to determine if their wells fall in this category and require disinfection treatment methods.

Monitoring programs key for management

Public water systems are classified and regulated according to the number and permanence of the populations they serve (Figure 1). Community Water Systems (CWS) with continuous service to at least 25 residents, Non-Transient Non-Community (NTNC) such as a manufacturing company or school, and

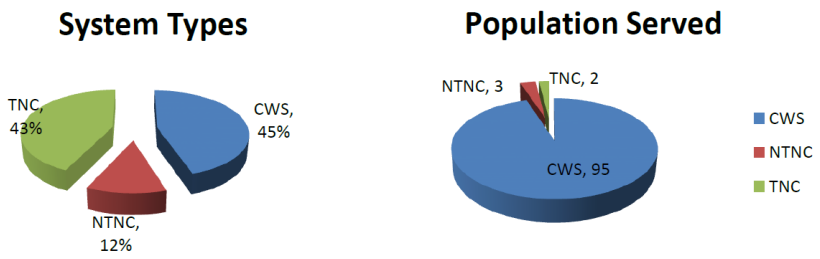

Figure 1. Distribution of system type and population served from public supplies in Nebraska (NDHHS, 2012)

Transient Non-Community water systems (TNC) such as a restaurant, rest area or state park with fewer than 25 residents continuously served by the supply. Community water systems (CWS) account for approximately 95% of the population served by public water systems.

The vast majority of public drinking water systems in Nebraska obtain water from ground water sources. Most of these systems are small, serving communities and non-community supplies of less than 1000 individuals. Seven public water systems in Nebraska obtain drinking water directly from a surface water source, such as the Florence Water Works on the Missouri River. An additional six public water systems pump ground water under the influence of surface water and include the Ashland well field used to supply the City of Lincoln. Because these systems supply water for metropolitan areas, about 57% of the state's population is served by public water systems supplied directly, or under the influence of surface water. Nationally, about 23% of the CWS serving 71% of the population obtain water from surface water or ground water under the influence of surface water. All public water supplies in the U.S. using surface water or ground water under the direct influence of surface water must use disinfection as part of the treatment process (see sidebar).

Under the Safe Drinking Water Act (SDWA), the USEPA sets legal limits on allowable concentration of contaminants in drinking water. These maximum contaminant levels (MCLs) are estimates designed to protect human health from potential exposure through drinking water. Besides prescribing these legal limits, USEPA rules set water-testing schedules and methods that water systems must follow. All public water systems are required to monitor for 91 contaminants under the SDWA, including chemical, radioactive and microbiological contaminants (Table 1). The list of drinking water contaminants has changed over time and new drinking water contaminants are periodically evaluated under USEPA's Unregulated Contaminant Monitoring Rule program. Human health effects for low-level exposure to regulated and unregulated contaminants are nearly impossible to measure directly and typically rely on expensive and complex epidemiological studies. It will be even more important to monitor for the occurrence of these chemicals, and conduct research on their potential human health effects, as the number of chemical and microbial contaminants in water supplies may change due to changes in land use, water supplies and distribution systems. It is not practical nor economical to treat drinking water to remove all contaminants at all points of use, thus monitoring is the only method for managing safe drinking water.

All public water systems must monitor for and verify that a given contaminant does not exceed the MCL. Monitoring schedules vary by contaminant, size and type of water system, and previously reported contaminant concentrations. An *acute violation* occurs when a contaminant MCL is exceeded. Monitoring violations occur when a public water system fails to take and/or report monitoring results. In 2012, 88 systems (~6.8%) in Nebraska were reported to have such monitoring violations (NDHHS, 2012).

The record of contaminant concentrations or occurrence for a given supply can vary considerably between systems and even between wells for an individual system.

National Primary Drinking Water Regulations	
Microbiological	Cryptosporidium, Giardia lamblia, Heterotrophic plate count (HPC), Legionella, Total Coliforms (including fecal coliform and E. Coli), Turbidity, Viruses (enteric)
Disinfectants and Disinfection By-Products	Chloramines (as Cl2), Chlorine (as Cl2), Chlorine dioxide (as ClO2) – Bromate, Chlorite, Haloacetic acids (HAA5), Total Trihalomethanes (TTHMs)
Inorganic Chemicals	Antimony, Arsenic, Asbestos, Barium, Beryllium, Cadmium, Chromium, Copper, Cyanide, Fluoride, Lead, Mercury, Nitrate, Nitrite, Selenium, Thallium
Organic Chemicals	Acrylamide, Alachlor, Atrazine, Benzene, Benzo(a)pyrene (PAHs), Carbofuran, Carbon tetrachloride, Chlordane, Chlorobenzene, 2,4-D, Dalapon, 1,2-Dibromo-3-chloropropane (DBCP), o-Dichlorobenzene, p-Dichlorobenzene, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Dichloromethane, 1,2-Dichloropropane, Di(2-ethylhexyl) adipate, Di(2-ethylhexyl) phthalate, Dinoseb, Dioxin (2,3,7,8-TCDD), Diquat, Endothall, Endrin, Epichlorohydrin, Ethylbenzene, Ethylene dibromide, Glyphosate, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, Hexachlorocyclopentadiene, Lindane, Methoxychlor, Oxamyl (Vydate), Polychlorinated biphenyls (PCBs), Pentachlorophenol, Picloram, Simazine, Styrene, Tetrachloroethylene, Toluene, Toxaphene, 2,4,5-TP (Silvex), 1,2,4-Trichlorobenzene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl chloride, Xylenes (total)
Radioactivity	Alpha particles, Beta particles and photon emitters, Radium 226 and Radium 228 (combined), Uranium

Table 1. Contaminants currently regulated by USEPA under the Safe Drinking Water Act

Microbial contamination in Nebraska public water systems

Coliform bacteria are widely present in the environment, though most forms are not directly associated with human health effects. USEPA requires monitoring for total coliforms as an inexpensive and rapid screening method for potential contamination from other more harmful pathogenic microorganisms. All public water systems must monitor regularly for total coliform bacteria and the frequency of sampling is proportional to the population served, ranging up to several hundred samples per month. A non-acute violation occurs when only total coliform bacteria are determined, while acute violations occur when fecal coliform bacteria are detected.

The number of systems with non-acute coliform violations has declined steadily over the past 10 years from near 200 to 147 in 2012 (Figure 2). Between 5 and 20 systems were reported with acute (fecal) coliform violations during this same period (NDHHS, 2012). Seven systems with acute violations were reported in 2012, requiring a public notice and boil water advisory until additional testing shows that the supply meets safe drinking water standards. Distribution system problems are a potential cause for acute coliform violations, though multiple causes for repeated total coliform violations are quite likely. Cases of "cross-connections", where drinking water pipes are directly connected to wastewater pipes, and "back-flow" events, instances where wastewater is drawn through a tap into a drinking water system, are regularly reported. Similarly, cracked or leaking water mains can provide conduits for contamination by surrounding wastewater or run-off (USEPA, 2007).

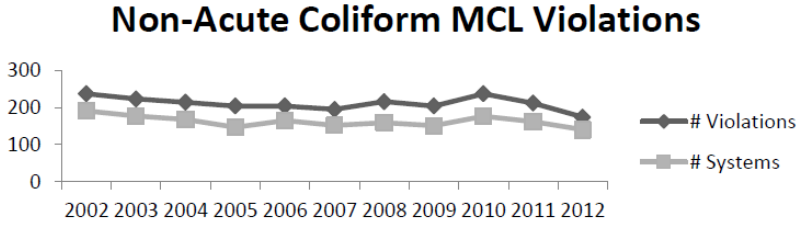

Figure 2. Non-acute coliform violations public water systems between 2002 and 2012. (NDPHHS, 2012).

Disinfection through chlorination, addition of chloramines, ozone or other chemicals is required for public

water supplies using surface water and ground water under the influence of surface water. Two sets of USEPA regulations enacted in the last 10 years (Long Term 2 Enhanced Surface Water Treatment Rule and Stage 2 Disinfectants and Disinfection By-products Rule) were developed simultaneously to address risk tradeoffs between control of pathogens and limiting exposure to disinfection by-products (DBPs) in drinking water. While some states have mandatory disinfection requirements for public water supplies regardless of the source of the water supply, Nebraska does not.

Future pressures and challenges related to disinfection of public drinking water supplies include 1) determining which supplies are under the direct influence of surface water in order to meet regulatory disinfection requirements; 2) installing and implementing cost-effective disinfection treatment systems; and 3) upgrading and repairing aging drinking water distribution systems especially under the potential stresses imposed through drought and other weather extremes.

Nitrate contamination of drinking water in Nebraska

In addition to regularly monitoring of total coliform bacteria, all public water systems must monitor for nitrate and nitrite nitrogen (Table 1). The frequency of sampling required is at least annually, but may be quarterly depending on previously reported concentrations and any trends observed in previous years' samples. The nitrate-nitrogen MCL is 10 ppm (parts per million, equivalent to milligrams per liter), and public water systems with concentrations at half of this level are required to monitor quarterly. Water systems reporting nitrate concentrations in excess of 10 ppm receive an Administrative Order from the Nebraska Department of Health and Human Services. The number of public water systems with nitrate violations and the annual number of violations between 2002 and 2012 has remained relatively constant (Figure 3), while the number of systems required to monitor for nitrate has increased significantly.

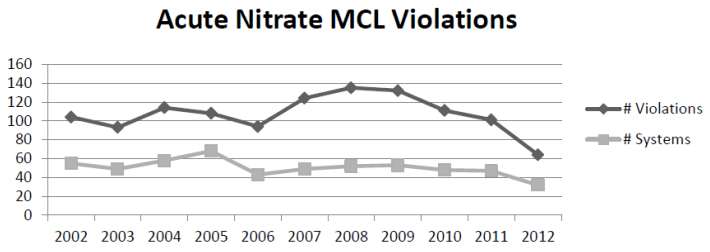

Figure 3. Number of public water systems and acute violations with nitrate concentrations in excess of 10 ppm in Nebraska (NDHHS, 2012).

The number of violations typically accounts for the majority of total health-based violations reported for Nebraska each year. In 2011, 100 of the 144 (69%) health-based violations were due to nitrate. Eleven public water supplies were on administrative order in 2011 because nitrate-nitrite concentrations exceeded the MCL. These systems are distributed across Nebraska and do not necessarily correspond to regions prone to nitrate contamination (Figure 4). Many public water supplies in Nebraska, especially those with larger populations have been proactively responding to increasing nitrate by blending, installing new wells, or purchasing treatment systems. Increased system costs to providing safe drinking water are generally passed on to the residents. Community and non-community systems which cannot afford new wells or expensive treatment technologies will continue to struggle to meet regulations for providing safe drinking water.

Nitrate levels in public water supplies will increase, continue to remain high or very gradually decline in most areas as the legacy of previous fertilizer use in the state impacts previous use for drinking water. While better fertilizer management may reduce leaching from current and future use, climate extremes may still result in increasing levels of ground water nitrate and additional public water supplies faced

with nitrate violations. For example, drought conditions can lead to higher levels of residual soil nitrogen in fertilized crops, while increased precipitation can increase nitrate leaching rates and run-off.

Figure 4. Public water supplies on administrative order for nitrate-nitrite concentrations above 10 mg/L in 2011 (NDEQ, 2012).

Other states are attempting to understand and determine policies to deal with nitrate contamination in drinking water. For example, the California legislature is now responding to a UC Davis report predicting that ground water nitrate problems will likely increase in the highly agricultural Salinas Valley and Tulare Lake Basin aquifers (Harter and Lund, 2012). Suggested solutions to nitrate contamination in California included a number of actions at state, regional and local levels with emphasis on dealing with affected areas. The report emphasized continuing efforts to promote practices that reduce sources of nitrate contamination as well as improved monitoring and assessment of ground water and drinking water in affected areas. Nebraska is in a good position to better identify and manage areas with a high nitrate contamination using the current monitoring and Nebraska Clearinghouse database program. Improvements to managing nitrate in ground water can include collection of additional data on water quality in private wells and strengthening natural resource district efforts to manage nitrogen. As in California, efforts in Nebraska may also be directed toward educating producers about impacts of fertilizer use on ground water quality and the resulting costs to neighboring communities.

Treating other contaminants in Nebraska drinking water

The frequency of sampling for other contaminants listed in Table 1 depends on the population served, contaminant group, previous detections and concentrations relative to an MCL, and whether the system is classified as ground water or surface water (USEPA, 2004). Required sampling frequency ranges from quarterly to every four years. In 2012, arsenic and selenium concentrations exceeded the MCLs in 14 and 5 CWS respectively (NDHHS, 2012). Four (4) systems exceeded the MCL for uranium and one (1) system was in violation for radium in Nebraska. All of these contaminants are most likely from natural sources in the ground water supplies, with elevated concentrations potentially caused by changes in ground water flow and/or geochemical conditions leading to their mobilization. Arsenic, selenium and uranium, in particular are particularly sensitive to changes in oxidation conditions. Because of the relatively low allowable MCLs for these contaminants, treatment options can be very costly both to install and operate. As with nitrate, smaller CWS with limited resources are those typically affected by contamination.

One (1) system was found to have exceeded the MCL for a volatile organic solvent (trichloroethylene) and no systems were reported to have issues with non-volatile synthetic organics, including pesticides. Chlorinated solvents have been found in the ground water at a large number of locations across Nebraska generally from previous industrial activities.

Administrative orders, essentially requesting that the CWS take action to correct this problem, are issued by the NDHHS when a public water system is significantly out of compliance (such as continued samples exceeding the MCL). MCL violations continue to be issued, but no other formal enforcement is initiated while the administrative order for violating that particular maximum contaminant level is in

effect (NDHHS, 2012). While new wells may be the solution in some cases, very often a community will have to determine the most cost-effective treatment technologies to install and implement.

Future treatment and infrastructure costs for public systems

Nebraska is not alone in dealing with contamination of its public drinking water supplies. Many communities across the U.S. are struggling with the increasing costs associated with providing safe drinking water. Rural communities will have the most difficult time in financing the costs for maintaining drinking water systems in the near future. A recently released USEPA survey report estimates that $384 billion will be needed nationwide to make repairs or upgrades to the public water supplies across the country (USEPA 2013). These costs include:

- Distribution and transmission: $247.5 billion to replace or refurbish aging or deteriorating lines
- Treatment: $72.5 billion to construct, expand or rehabilitate infrastructure to reduce contamination
- Storage: $39.5 billion to construct, rehabilitate or cover finished water storage reservoirs
- Source: $20.5 billion to construct or rehabilitate intake structures, wells and spring collectors

States like Nebraska and California with intensive row-crop agriculture and abundant ground water from shallow aquifers are heavily impacted by increasing nitrate concentrations and associated treatment costs for this contaminant. Similarly, implementation of disinfection treatment is increasingly necessary for CWS using ground water supplies which may be under the influence of surface water. Problems with distribution systems may also increase the need for disinfection, however, the causes of recurring non-acute and acute coliform need to be evaluated and corrected before implementing disinfection. Problems may become more severe with increasing climate variations leading to excessive changes in soil moisture (foundation cracking, water mains breaking, etc). Training of operators and education of water users will help minimize contamination due to cross-connections, backflow, and improper storage facilities. Other problems leading to coliform violations, such as broken or leaking water mains and inadequate separation of drinking water and sewer systems must be dealt with through infrastructure improvements.

Estimated costs for a public water supply are quite variable. Assuming uncontaminated ground water is in close proximity, drilling a deeper well and blending supplies is often the least expensive alternative for public water systems faced with chemical contamination. Installation of a new high capacity well, pump, and piping can run as high as $50,000-100,000 depending on depth and aquifer materials. Construction costs for treating high nitrate, arsenic, selenium or uranium in source water using methods such as reverse osmosis or ion exchange are in the range of $300,000 to $5 million for small CWS. Operating costs for these systems can become quite high especially when considering discharge or disposal of process water. While construction costs can be offset by federal grants or loans, ultimately the water users must cover the increased costs for drinking water through higher water supply rates. Increased service rates in smaller rural communities for water treatment, contaminant management, and infrastructure improvement come at a time when these communities are also facing other increases to living costs and reduced employment opportunities.

Domestic well water quality a cause for concern

As mentioned at the beginning of this brief, approximately 20% of Nebraska's population obtains drinking water from unregulated and only voluntarily monitored sources. A national survey of domestic well water quality found a variety of contaminants at concentrations greater than health–based benchmarks including radon, several trace elements (including arsenic and uranium), nitrate, and fluoride. Each of these was individually greater than its benchmark in about one to seven percent of wells nationally (using the higher of two USEPA proposed MCLs for radon). Except for nitrate, these contaminants in ground water all originate primarily from natural geologic sources. Regional patterns in concentrations were apparent for many contaminants, such as radon, as the result of the geographic distributions of natural sources (Desimone et al 2009). Using USGS data and statistical models, recent USEPA estimates for the probability of nitrate contamination in drinking water for each state show Nebraska near the top with 17% of its total area likely to have nitrate concentrations > 5 mg/L (USEPA, 2013). Natural and anthropogenic sources of contaminants are clearly significant in Nebraska, and depending on the location may seriously impact sources for domestic well water across the state. While regional ground water monitoring programs carried out by Nebraska Natural Resource Districts help evaluate current contamination of nitrate and pesticides, these studies do not necessarily measure domestic well water quality and do not include monitoring for other contaminants. Collection of shallow domestic well water quality data is a promising management practice for identifying and protecting ground water quality especially for domestic self-supplied households' drinking water needs in areas at risk for nitrate contamination (Harter and Lund, 2012). To obtain mortgages, homeowners with private wells may be required to provide nitrate and coliform test results before selling a property. Installation requirements for new wells in Nebraska include nitrate, chloride and total coliform testing. Beyond this, few regulations or policies have been developed to protect drinking water quality in privately-owned wells.

Drinking water policy options

Drinking water policies should be responsive to the following issues:

- Nitrates and rising treatment costs are likely to be an increasing problem, especially for smaller systems in Nebraska.
- Bacterial contamination is recurrent and could become more of a problem under the joint influence of aging infrastructure and weather extremes.
- Improved understanding of the causes for water quality changes include identification and remediation or control of contaminant sources.
- Because monitoring is voluntary, drinking water quality in private (domestic) wells is at risk of exceeding health-based guidelines.
- Public expectations for clean and safe water are high, but the costs of maintaining a safe drinking water supply will increase; economic and social costs are uncertain.
- It is not practical or economical to treat drinking water to remove all contaminants at all points of use, thus monitoring is the only method for managing safe drinking water.
- Improved source water and distribution system management will likely be the most cost-effective methods for providing safe drinking water in Nebraska's rural communities.

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Glossary of Public Water System Terms and Abbreviations – USEPA Drinking & Ground Water Website <www.epa.gov/drink>	
Public Water System	Provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year. Includes Community Water Systems (CWS), Non-Transient Non-Community (NTNC) and Transient Non-Community water systems (TNC).
Community Water Systems (CWS)	Any water system that supplies water to the same population year-round.
Non-Transient Non-Community (NTNC)	Any system that regularly supplies water to at least 25 of the same people at least six months per year, but not year-round. Some examples are schools, factories, office buildings, and hospitals which have their own water systems.
Transient Non-Community water systems (TNC)	A water system that provides water in a place such as a gas station or campground where people do not remain for long periods of time.
Safe Drinking Water Act (SDWA)	Federal law originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986. Under SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. SDWA does not regulate private wells which serve fewer than 25 individuals.
Maximum Contaminant Level Goal (MCLG)	The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
Maximum Contaminant Level (MCL)	The highest level of a contaminant that is allowed in drinking water under SDWA. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
Disinfection By-Products (DBP)	Potentially hazardous chemicals formed from the reaction of a disinfectant (chlorine, hypochlorite, etc) and natural organics or dissolved ions in the source water. DBPs include trihalomethanes (chloroform, etc) haloacetic acids (dichloroacetic acid), bromated and chlorite.

Tax Comparisons for Nebraska

John R. Bartle, Dean
College of Public Affairs and Community Service
University of Nebraska Omaha
December 2013

This policy brief provides two perspectives on taxes. The first is an analysis of state and local revenue collections over time, with comparisons to the nation and the region. This shows patterns of growth in each of these revenue sources, as well as Nebraska's relative position compared to the nation and the region. The second is an analysis of the tax burden on representative Nebraska families in 2011, also with comparisons to the nation and the region. This shows both the distribution of the tax burden at different income levels, as well as the importance of four different taxes on the family budget.

Revenue Comparisons Over Time

U.S. Census Bureau data is used to compare per capita state and local revenue collections from 2004 to 2011. It compares Nebraska to both the U.S. average and the average for the West North Central (WNC) region. This region includes: North Dakota, South Dakota, Nebraska, Kansas, Missouri, Iowa and Minnesota. It does not include the adjacent states of Colorado and Wyoming, although an Appendix includes data on these two states.

It is important to keep in mind that taxes are a subset of revenue. In Nebraska, an important non-tax revenue is utility revenue from public power. More generally, all states receive significant revenue from intergovernmental aid, fees and charges, interest, and other miscellaneous sources. Intergovernmental aid is not included in this analysis.

Figure 1: State and Local Revenue Per Capita, 2004-2011

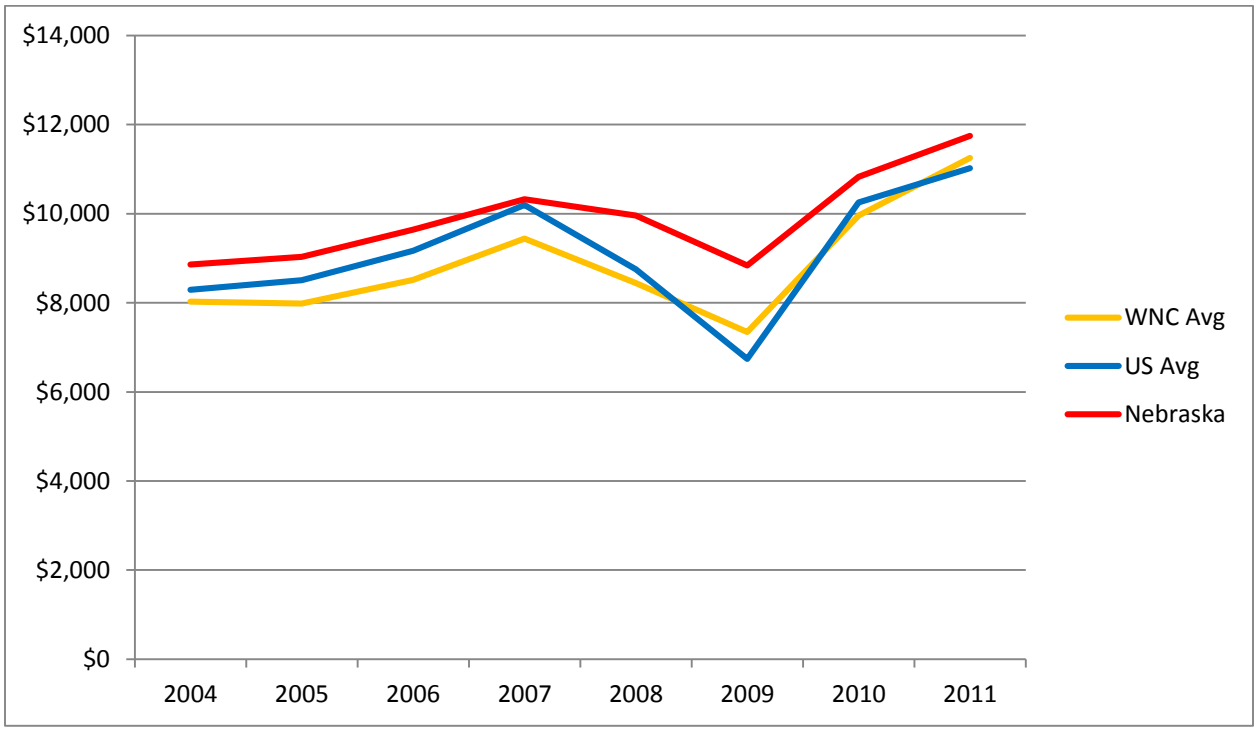


Figure 1 shows that state and local government revenue in Nebraska has been higher than both the national and regional average throughout this period. In 2008-2009, there was a large drop in pension revenue due to unrealized losses in these accounts, causing total revenue to drop. While this is the correct treatment from an accounting perspective, the size of the unrealized losses is unprecedented, disrupting the trend data. As Figure 1 shows, the recession did not hit Nebraska governments as hard as others.

Historically, Nebraska was typically lower than the national average in revenue collections. In 1965, Nebraska's total general revenue was 88% of the national average. This percentage has increased slowly over time to move above the U.S. average. While Nebraska's state and local government revenues are higher, total tax collections have historically been less than the national average, and this is still true. The principle difference is revenue from public power utilities.

Figure 2: Personal Income Tax Revenue Per Capita, 2004-2011

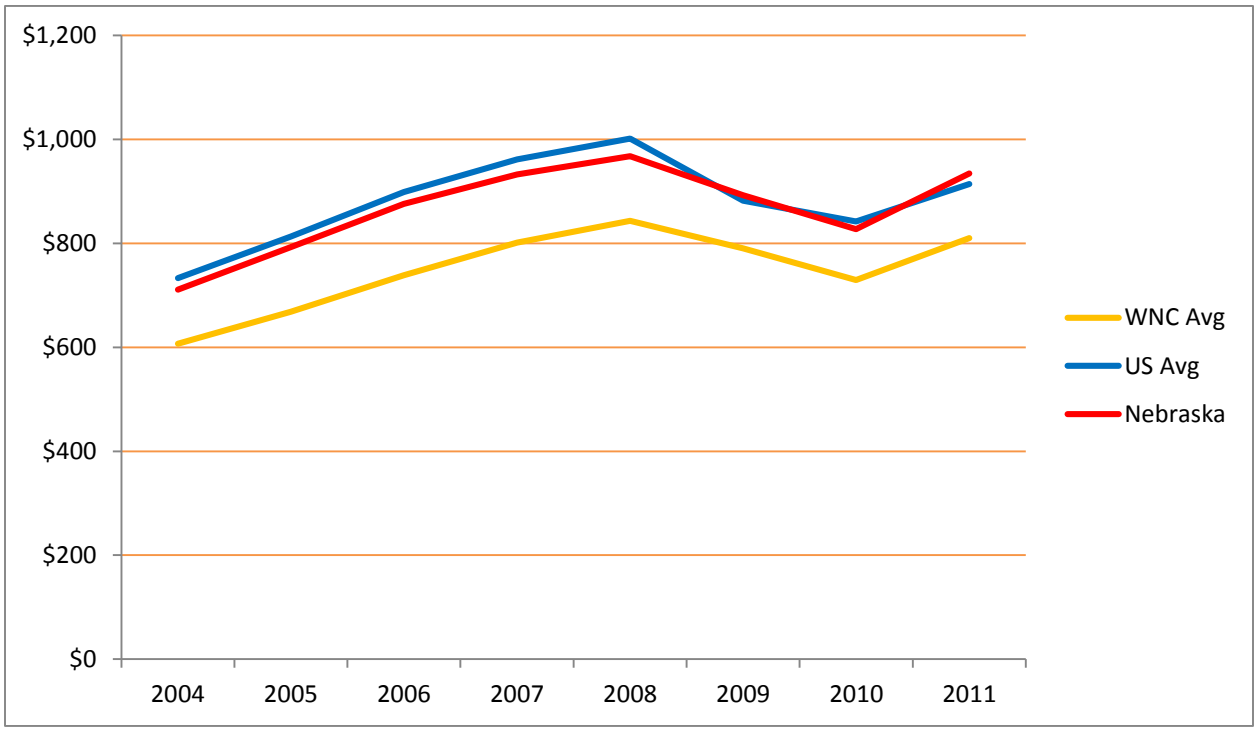


Figure 2 shows that Nebraska is significantly above the regional average in personal income tax collections, and close to the national average throughout this period. The deviation from the regional average is in part because South Dakota does not have an income tax and North Dakota's income tax is quite low. State income tax collections are 12 % above average, but there is no local income tax in Nebraska. As a result, the combined state and local total is close to the average.

The personal income tax was adopted in 1968 as a flat 10% of federal liability. In 1987, the tax structure was changed to the current approach where liability is based on federal adjusted gross income. Historically, personal income tax collections in Nebraska have been below the national average, but in the period shown here, Nebraska mirrored the national average, and slightly exceeded it in 2011. This recent increase is notable given Nebraska's historical position.

Figure 3: Corporate Income Tax Revenue Per Capita, 2004-2011

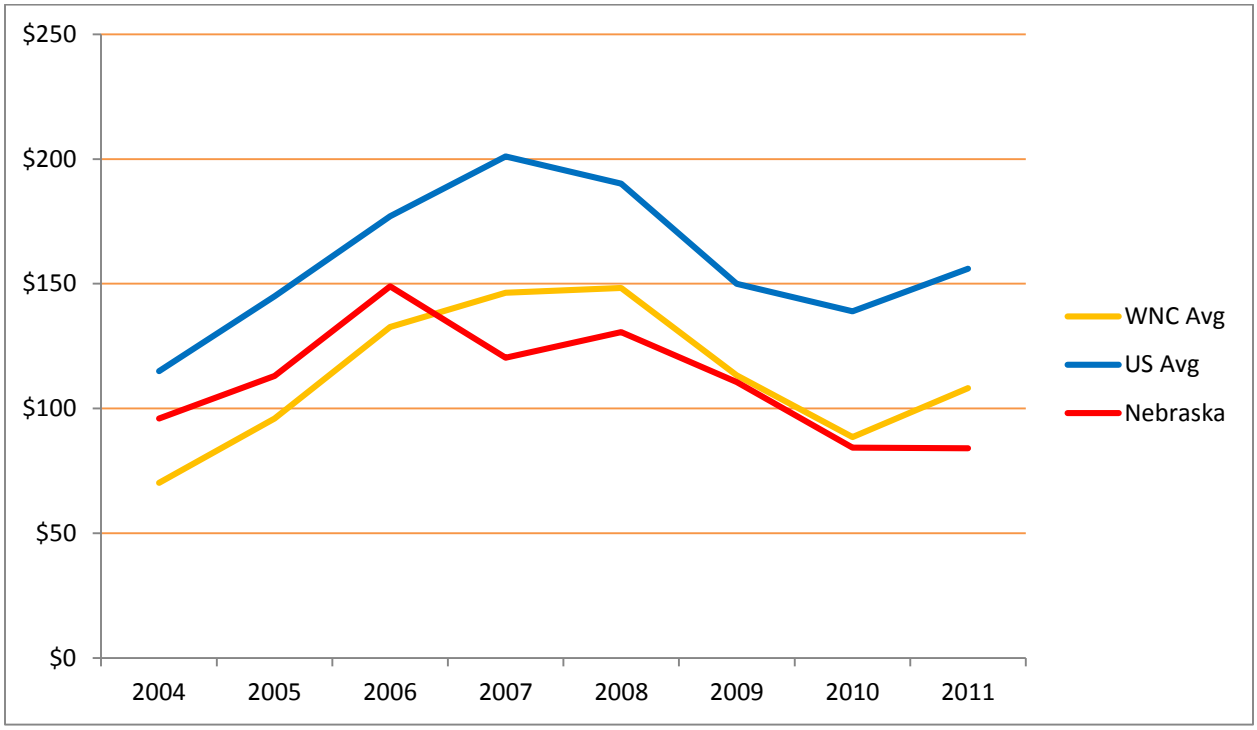


Figure 3 shows the trend in corporate income tax revenue since 2004. Throughout this period, Nebraska is below the national average, and recently has also dipped below the regional average. This tax was adopted in 1968 along with the personal income tax. It has declined in absolute and relative terms since 2006 and revenues have been volatile. Collections decreased six times in the 22 years from 1986 to 2007 while personal income tax revenues decreased only twice during this period. This instability is a concern, and occurred despite a stable tax rate. The top rate of 7.81% has been in place since 1991, indicating that the volatility is due to fluctuations in corporate profits, or refunds.

Figure 4 displays the recent trend in collections from the general sales tax and selective sales (excise) taxes. Nebraska is slightly, but consistently below the national average since 2006. The regional average is also higher throughout this period. The trends for all three are similar and the recession had a minor effect on revenues.

The state general sales tax adopted in 1967 at a 2.5% rate. The local option sales tax was first allowed in 1969 at 0.5%. The state sales tax rate is now 5.5% with local rates up to 2%, for a maximum combined rate of 7.5%. Compared to neighboring states, Kansas and Iowa's state rates are currently higher, while all other neighboring states rates are lower.

The major excise taxes are the taxes on motor fuels, alcoholic beverages, and cigarettes and tobacco. The gasoline tax was adopted in 1925, and is now 26.3 cents per gallon. This rate is currently higher than all neighboring states. Alcohol beverage taxes were adopted in 1935. Currently, the tax rates on wine and beer are above the median, while the distilled spirits tax is at the median. Cigarette and tobacco taxes were adopted in 1947. The current cigarette tax rate of 64 cents per pack is below the median of 136 cents per pack.

Figure 4: General and Selective Sales Tax Revenue Per Capita, 2004-2011

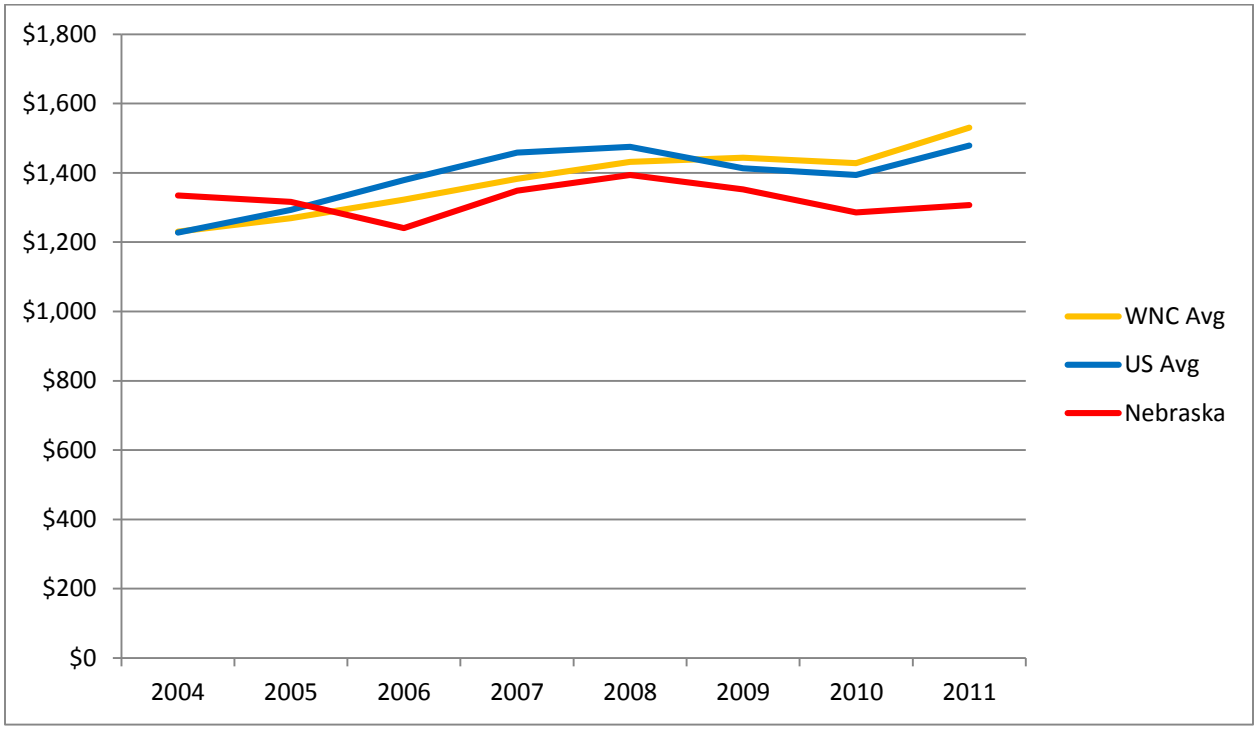


Figure 5: Property Tax Revenue Per Capita, 2004-2011

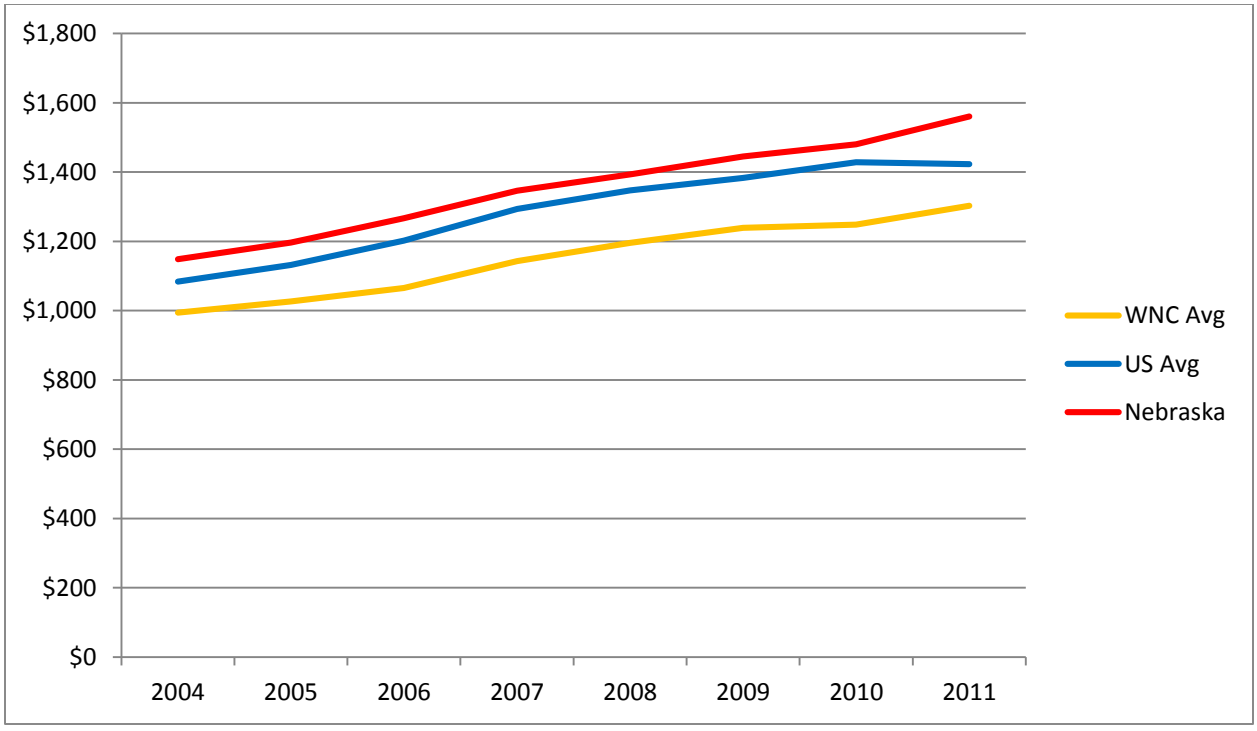
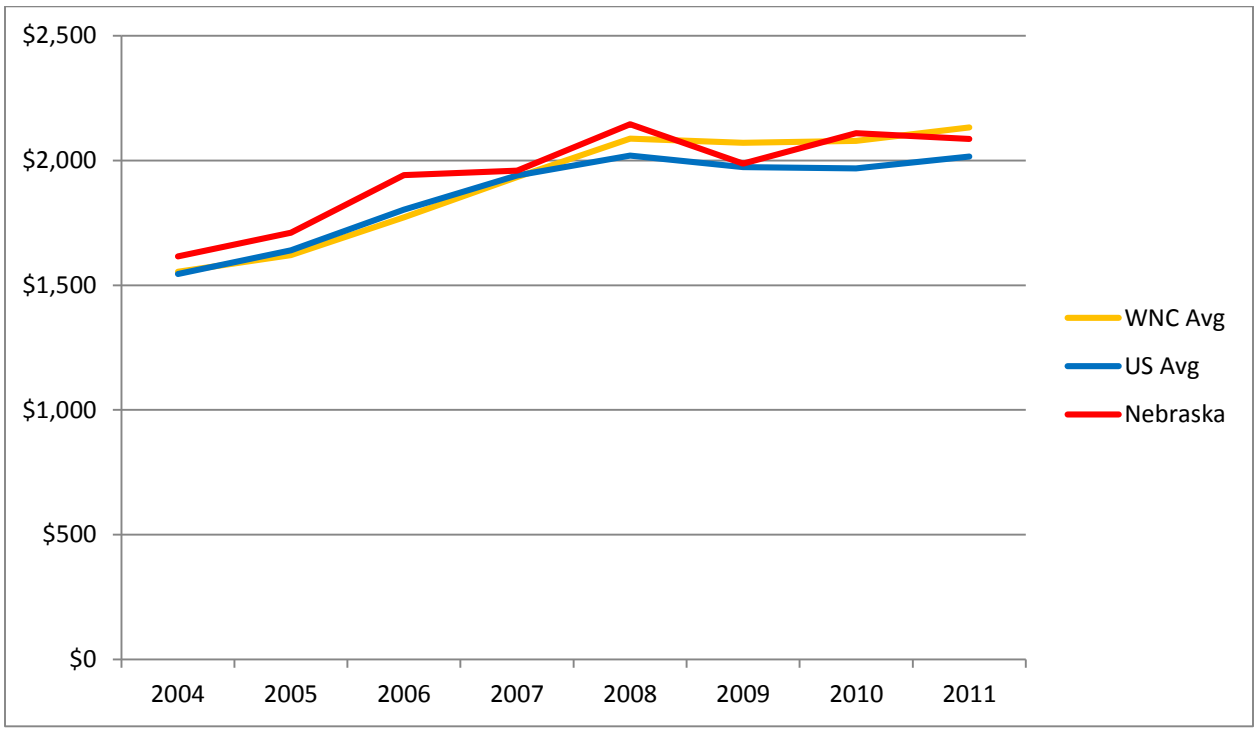


Figure 5 shows that the recent trend in the property tax has been very stable for the state, region and the nation over this period. Currently, Nebraska property tax collections are 9.7% above the national average. Nebraska is the highest in the region, 19.8% above the regional average.

The property tax is the oldest tax in the state, having been adopted by the Territorial Legislature in 1857, ten years before statehood. It was originally a broad tax used by both state and local governments on property wealth (including livestock, personal property and intangible wealth). Over time, it was narrowed to be a local tax on real estate land and structures. In 1965, property tax revenues were 34% above the national average and were perceived to be too high. Tax reform in 1966-67 abolished the state tax, and eliminated intangible property and household goods from the tax base. The general sales tax was adopted to replace the revenue lost to the state. Two years later the state income tax was adopted. The burden of the tax on agricultural property has been an ongoing issue. It has been reduced by several reforms such as the exemption of farm machinery and inventories (1977), a constitutional amendment (1990) that provided for agricultural land to be assessed and taxed by "a method other than actual or market value" (Nebraska Legislature, Committee on Revenue, p. 52), and a statutory setting of the assessment for agricultural property at 80% of actual value (1991).

Figure 6: State and Local Charges, Interest and Miscellaneous Revenue Per Capita, 2004-2011



Revenues from charges, fines, interest and miscellaneous revenue are shown in Figure 6. Charges for government services are the largest component of this category. Charges for hospitals, state universities, airports, toll roads, sewerage and solid waste are some of the largest sources of fee revenue. Nebraska is slightly above the national average throughout this period, and close to the regional average.

Findings I

The following conclusions can be drawn from this data:

- State and local government revenue in Nebraska are higher than the regional and national average in part because of non-tax revenues from public power.
- Nebraska is above the regional average and slightly above the national average for personal income tax collections. This is a historic reversal in Nebraska's position.
- Corporate income tax revenue is below the U.S. and slightly below the regional average. On a per capita basis, revenue from this source has been declining since 2006.
- General and selective sales taxes are slightly below both the national and regional averages, however there is variation among the taxes in this grouping.
- Property tax revenues are significantly higher than both the national and regional average. The upward trend was not disrupted by the recent recession.
- In the category of charges, interest and miscellaneous revenues, Nebraska was above the national and regional averages until 2009. Now the state is slightly lower than the region, and still above the national average.

Tax Burden Study

The District of Columbia Office of Finance does an annual study comparing the tax burdens on families for the largest city in each state and Washington D.C. The most recent report uses 2011 data. It looks at taxes on a family of three, and makes assumptions about spending, home values, income, and auto ownership. Four taxes are included: property tax, general sales tax, personal income tax and auto taxes. It is a useful comparison of the tax burden by state, and within any state it shows the distribution of the tax burden by income level.

Figure 7 shows Omaha's tax burden compared to the national median and the regional average. Omaha is lower than both the nation and the region at the lowest income level, very close to the national average in the mid-range but above the region, and above both the region and the nation at the highest income level. Omaha's tax burden is roughly proportional, while the regional average is regressive.

For all income categories, Omaha's tax burden ranking dropped over the last four years, even though the actual tax burden increased for all income levels, except the $100,000 level (see Appendix). This indicates that the burden of these four taxes have gone up nationally.

Figure 8 indicates that at most income levels the representative city for Nebraska (Omaha), is very close to Minneapolis, Kansas City, Des Moines, and Wichita. However, Sioux Falls and Fargo are lower at all income levels, and significantly so at the higher levels. The absence of the personal income tax in South Dakota explains this difference. While North Dakota has a state personal income tax, it is low.

Figure 9 shows the breakdown for the four taxes for Omaha. Clearly, the personal income tax is the only progressive tax. The property, sales and auto taxes are all regressive. Taken together, the burden is proportional. If Nebraska were like South Dakota and did not have an income tax, the overall tax burden would be regressive unless the other taxes were structured significantly differently. It should also be noted that for most taxpayers, the property tax is highest.

Figure 7: Tax Burden by Income, 2011

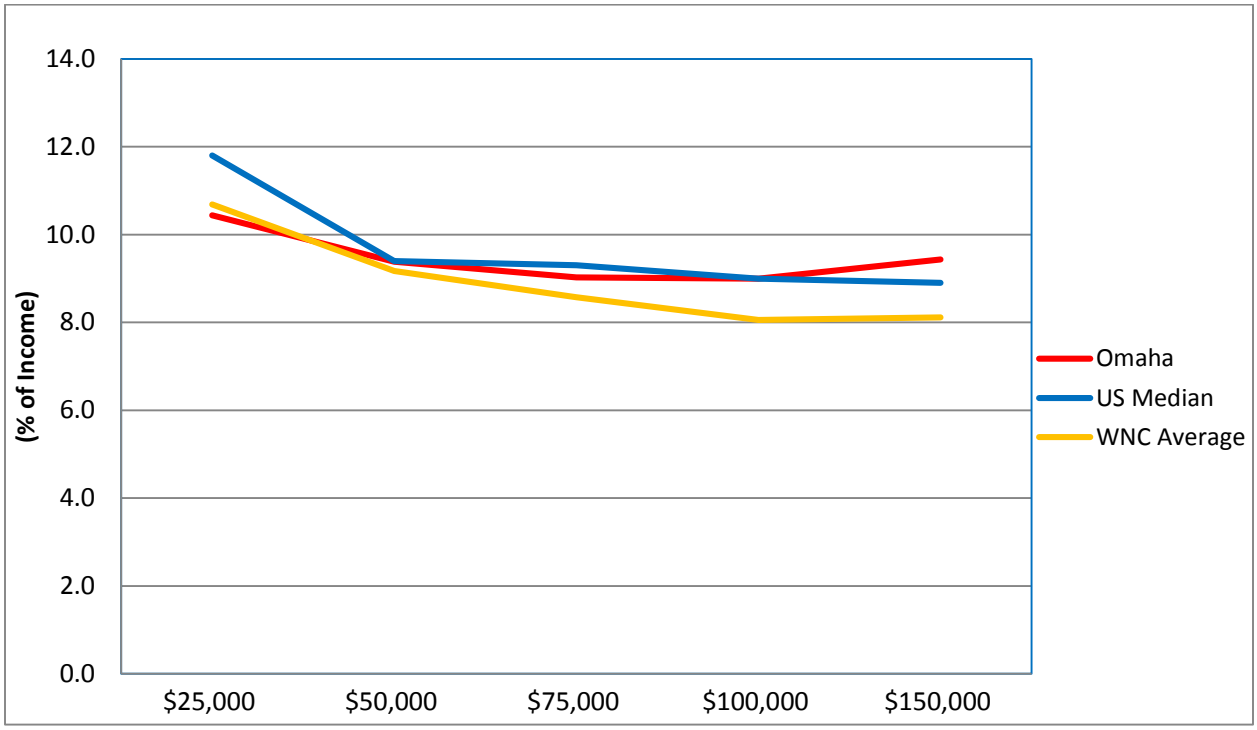


Figure 8: Tax Burden by Income, West North Central Region, 2011

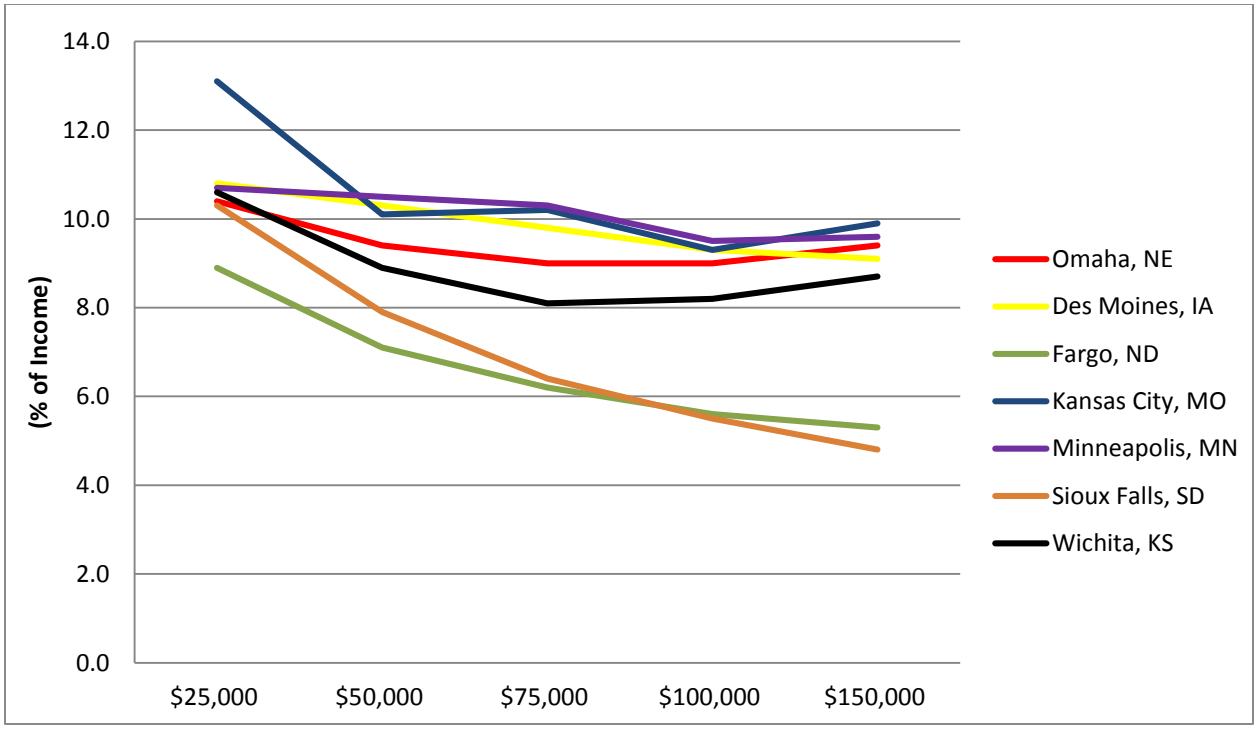
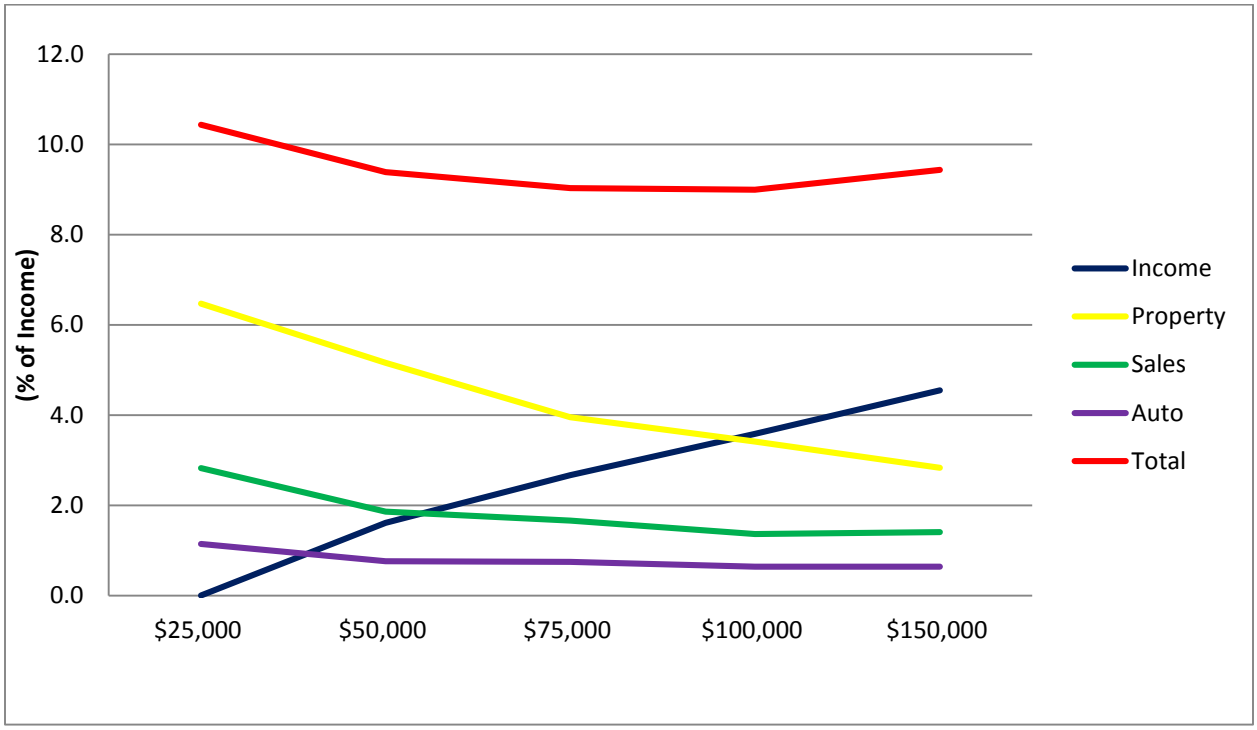


Figure 9: Omaha Tax Burden by Tax, 2011



Findings II

The tax burden study leads to the following conclusions:

- The Omaha tax burden is lower than the national median at the lowest income level, about the same in the middle income levels, and slightly above the median at the higher income levels. Compared to the region, Omaha is above the WNC average at all but the lowest level.
- Minneapolis and Kansas City are higher than Omaha at all income levels, while Fargo and Sioux Falls taxes are lower.
- Omaha's total tax burden is generally proportional. The property tax and sales tax are regressive in Omaha while the income tax is progressive.
- The degree of reliance on the income tax and the progressivity of that tax are the main determinants of progressivity.
- There are other ways to reduce the regressivity of the property tax, such as the circuit breaker which provides an income tax refund to taxpayers with low incomes and high property tax burdens. Similarly, the regressivity of the sales tax can be reduced by providing an income tax credit or deduction to large, low-income families. These strategies would reduce the need to rely on the income tax to balance out other regressive taxes.

Conclusions

Taken together, these two analyses point to the following conclusions:

- Personal income tax revenue is growing and is now slightly above the national average, which is a historic shift if it continues. Nebraska is above the regional average, in part because South Dakota has no personal income tax and North Dakota's is low. While there is a legitimate concern about the level of the tax, its progressivity keeps the overall tax burden from being regressive, and it meets the goals of revenue productivity and stability.

- The property tax is 9.7% above the national average and the highest in the region. It is a regressive tax and a burden on low income taxpayers. Historically, Nebraska is a high property tax state, in large part because of the preference for local control and a relatively large number of local governments. In addition, spending on highways and education are both high, and these two functions of government rely on the property tax at the local level.

- The corporate income tax and cigarette/tobacco taxes are low.

- The overall tax burden is higher than the region at most income levels.

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Appendix

Estimated Burden of Major Taxes for a Family of Three/Four*, Omaha, Nebraska: 1997-2011

	Annual Income									
	$25,000		$50,000		$75,000		$100,000		$150,000	
	Rank	Percent of Income	Rank	Percent of Income	Rank	Percent of Income	Rank	Percent of Income	Rank	Percent of Income
1997	22	8.3%	21	8.6%	20	9.7%	18	10.0%	16	10.6%
1998	24	7.8%	25	8.4%	23	9.4%	20	9.8%	17	10.4%
1999	30	7.5%	28	8.1%	26	9.1%	26	9.4%	21	10.1%
2000	38	6.7%	36	7.1%	35	8.1%	33	8.6%	25	9.4%
2001	24	7.2%	25	8.4%	23	9.4%	23	9.7%	21	10.3%
2002	23	7.2%	26	8.3%	21	9.5%	20	9.8%	19	10.2%
2003	17	7.6%	23	8.4%	20	9.5%	19	9.9%	18	10.2%
2004	15	7.7%	22	8.7%	20	9.8%	17	10.2%	15	10.4%
2005	33	10.6%	24	8.8%	23	9.4%	18	9.5%	16	9.7%
2006	35	10.1%	21	8.7%	24	9.3%	22	9.2%	18	9.5%
2007**	31	11.1%	10	10.7%	11	10.4%	10	10.9%	10	11.3%
2008	39	9.6%	20	8.5%	20	8.5%	15	9.3%	13	9.2%
2009	39	9.7%	23	9.0%	20	9.2%	14	10.1%	16	9.6%
2010	41	9.6%	26	9.0%	26	9.0%	18	9.4%	16	9.5%
2011	44	10.4%	26	9.4%	28	9.0%	25	9.0%	19	9.4%
Median 2001 to 2011	33	9.6%	23	8.7%	21	9.4%	18	9.7%	16	9.7%
2011 Comparison States										
Cheyenne	47	9.7%	51	4.3%	51	3.7%	51	3.1%	51	3.1%
Denver	27	11.8%	41	7.3%	40	7.4%	40	7.0%	39	7.2%
Des Moines	37	10.8%	18	10.3%	21	9.8%	20	9.3%	22	9.1%
Fargo	50	8.9%	44	7.1%	46	6.2%	43	5.6%	42	5.3%
Kansas City	15	13.1%	20	10.1%	18	10.2%	16	9.5%	13	9.9%
Minneapolis	40	10.7%	16	10.5%	16	10.3%	18	9.5%	16	9.6%
Sioux Falls	45	10.3%	37	7.9%	44	6.4%	45	5.5%	44	4.8%
Wichita	41	10.6%	30	8.9%	35	8.1%	34	8.2%	32	8.7%
US Median		11.8%		9.4%		9.3%		9.0%		8.9%

*Ranking comparisons are for the largest city in each state and the District of Columbia. Beginning in 2005, taxes were calculated for a family of three. Previously they used a family of four.

**2007 rankings and percentages for Omaha, Des Moines, and Wichita increased considerably from previous years. Most of this was because of a very large increase in property taxes. Subsequent years returned to the previous pattern. Therefore, 2007 values should be viewed with caution.

Source: "Tax Rates and Tax Burdens In the District of Columbia: A Nationwide Comparison, 2011." Government of the District of Columbia, Office of Chief Financial and Officer, September 2012. Similar reports for previous years; prepared by UNO Center for Public Affairs Research, December 2013