

EXHIBIT 2  
DATE 1/20/09  
HB 81

Project 2030 Montana's Ageing Population

George W. Haynes

Myles J. Watts

Douglas J. Young

Professors of Economics

Department of Agricultural Economics and Economics

Montana State University

Bozeman, MT 59717

Contact: Myles J. Watts  
406-994-3701  
[mwatts@montana.edu](mailto:mwatts@montana.edu)

or

George Haynes  
406-994-5012  
[haynes@montana.edu](mailto:haynes@montana.edu)

This report is available at <http://www.econedmontana.org>

## ACKNOWLEDGMENTS

We appreciate the financial support of the following donors:

- Blue Cross/Blue Shield of Montana
- Montana Agricultural Experiment Station
- Montana Area Agencies on Aging Association
- Montana Association of Counties
- Montana Bankers Association
- Montana Chamber Foundation
- Montana Extension Service
- NorthWestern Energy
- PPL Montana, LLC

We express our gratitude to Paul Polzin, Gregg Davis, and Brad Eldredge for their review and helpful comments.

We wish to thank Stephanie Fischer, Julia Haraldson, and Austin Owens for research assistance, Stacy Alzheimer and Donna Kelly for administrative assistance, and Bonnie Jackson for editorial assistance.

The authors remain responsible for any errors.

## TABLE OF CONTENTS

INTRODUCTION .....	1
DEMOGRAPHICS .....	1
FISCAL IMPACTS .....	8
<i>Expenditures</i> .....	10
K-12 Education Expenditure.....	11
Higher Education Expenditure.....	13
Corrections Expenditures.....	15
Medicaid Expenditures .....	18
<i>Revenues</i> .....	23
Residential Property Taxes .....	24
Individual Resident Income Taxes.....	27
SUMMARY AND CONCLUSION .....	32
APPENDIX .....	36

## LIST OF TABLES

1. Montana Age Dependency Ratios. ....	5
2. State and Local Government Finances, FY 2006. ....	8
3. K-12 Education in Fiscal Year 2006-07. ....	11
4. University System Instructional Expenditures.....	14
5. Participation and Daily Cost of Corrections. ....	16
6. Probability of Persons in Montana Correctional System (2008). ....	16
7. State Portion of Medicaid Expenditures in 2005 and 2030. ....	19
8. Distribution of Age and Tax Liability by 2005 Income Deciles. ....	30
9. Population Age Distribution and Tax Liability from 2005 to 2030.....	31
10. Summary of Selected Expenditures.....	33
11. Summary of Selected Tax Revenues. ....	33
12. Summary of Revenue and Expenditure Projections. ....	33

## LIST OF FIGURES

1. Montana Population by Age Group.....	2
2. Montana Percentage of Population.....	3
3. Montana Age Dependency Ratios.....	4
4. Youth Dependency Ratio 2010.....	6
5. Youth Dependency Ratio, 2030.....	6
6. Elderly Dependency Ratio, 2010.....	7
7. Elderly Dependency Ratio, 2030.....	7
8. Montana Population Aged 5-17.....	12
9. K-12 Expenditure per Montanan.....	13
10. Montana Population Aged 18-24.....	14
11. Higher Education Expenditure per Montanan.....	15
12. Correctional Expenditure per Person by Age.....	17
13. Correctional Expenditure per Montanan.....	18
14. Elderly and Non-Elderly State Medicaid Expenditures per Montanan.....	20
15. State Elderly Medicaid Expenditures for Residential and Other Care.....	21
16. Montana Elderly Medicaid Expenditures for Residential Facilities, 2005 (\$ per Capita).....	22
17. Montana Elderly Medicaid Expenditures for Residential Facilities, 2030 (\$ per Capita).....	23
18. Head of Household Probability by Age Group.....	25
19. Residential Property Tax by Age.....	26
20. Residential Property Tax per Montanan.....	27
21. Total Income before Taxes.....	28
22. Individual Resident Income Tax Liability per Person.....	32

## **INTRODUCTION**

Montana will become much older in coming decades as the "Baby Boom" generation reaches traditional retirement age. Changing demographics will affect state and local government budgets in a variety of ways. On the revenue side, income taxes may fall as Baby Boomers retire. On the expenditure side, state and local governments pay for a variety of services for the elderly including some health care and residential living facilities. Expenditures on these programs are likely to increase as the elderly population grows. On the other hand, the portion of the population in the usual K-12 and higher education age ranges will decline. Prudent policy should consider projected demographic changes and their impact on budgetary issues.

This report describes how Montana is expected to age in coming decades, and begins the process of analyzing the fiscal impacts by considering expenditures on Medicaid for the elderly, education, and corrections. The relationship between age and selected taxes is also examined. As will be seen, much more analysis could be done; some topics for future research are described in the concluding section.

## **DEMOGRAPHICS**

Figure 1 divides Montana's population into three groups by years of age: 0-17, 18-64, and 65 plus. Most members of the youngest age group ("youth") are not economically active, because they are at home or in school.

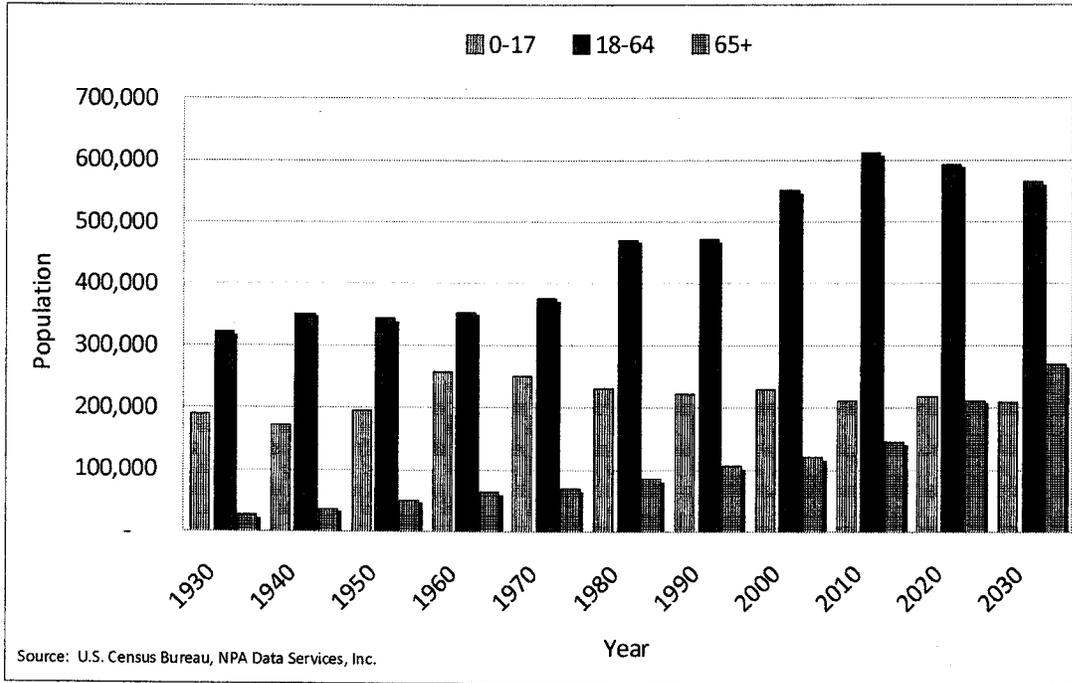


Figure 1. Montana Population by Age Group.

The middle group is sometimes referred to as “working age,” although some of the youngest and oldest members of this group may still be in school or on early retirement. People in the oldest group (“elderly”) are mostly retired. Although these divisions are not perfect, they provide an objective way of describing changes in the age composition of the population. The number of elderly has increased in every decade since 1930. Except for a small decline between 1940 and 1950, the working age population has consistently risen since 1930. However, the working age population is expected to decline after 2010. Youth population peaked in 1960 and future changes are not as large as future changes in the elderly or working age population. While not shown in Figure 1, total population is expected to continue to increase with population projected at 968,598 in 2010, 1,023,735 in 2020, and 1,044,898 in 2030.

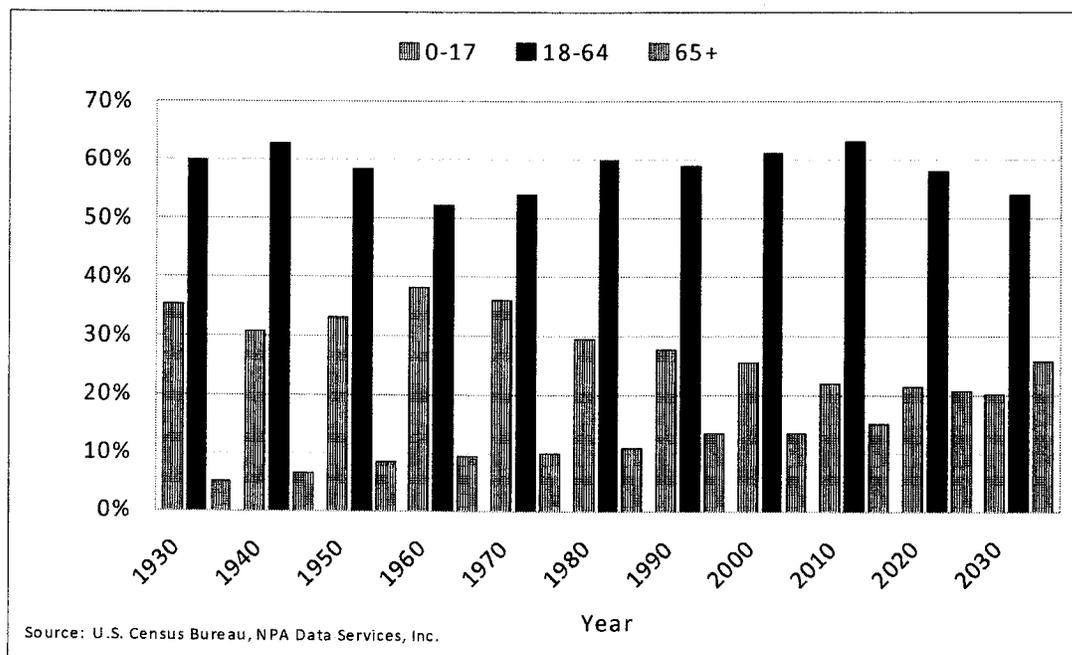


Figure 2. Montana Percentage of Population.

Figure 2 tells a simple but compelling story: the percentage of the Montana population that is elderly doubled between 1940 and 2000 and is projected to double again by 2030. The elderly population is growing for several reasons. First, people are simply living longer. Between 1940 and 2005, life expectancy at age 65 increased from 13 years to 19 years.<sup>1</sup> Second, the Baby Boomers, born between 1946 and 1964, are currently nearing retirement age and will swell the ranks of the elderly in coming decades. Another reason that the elderly are a growing fraction of the population is that birth rates have declined. As fewer children are born, they make up a smaller percentage of the total population. Finally, young adults age 20-29 have been migrating out of Montana for some years. These trends are affecting other states as well, but they are especially strong here. By 2030 Montana is projected to have the fifth highest percentage of population aged 65 plus.<sup>2</sup>

<sup>1</sup> National Vital Statistics Reports, 54-14, April 19, 2006, and <http://www.cdc.gov/nchs/data/hus/07.pdf#027>.

<sup>2</sup> <http://www.census.gov/population/projections/PressTab3.xls>.

The youth and elderly populations are economically dependent on the working age population. Youth are dependent on their parents for food, clothing, shelter, etc., and public schools and other services for youth are financed by taxes that fall primarily on the working age population. Most retirees depend on Social Security, Medicare and other benefits that are largely financed by taxes on workers.<sup>3</sup> Many elderly also rely on their children for time, money and care. The ability of the working age population to support both youth and elderly depends on how many dependents there are for each working age person. The ratio of youth to the working age population – the youth dependency ratio (YDR), measures the number of youth for each person of working age. The ratio of elderly to working age population (EDR), the elderly dependency ratio – measures the number of elderly for each person of working age. The total dependency ratio (TDR) is the sum of the youth and elderly dependency ratios.

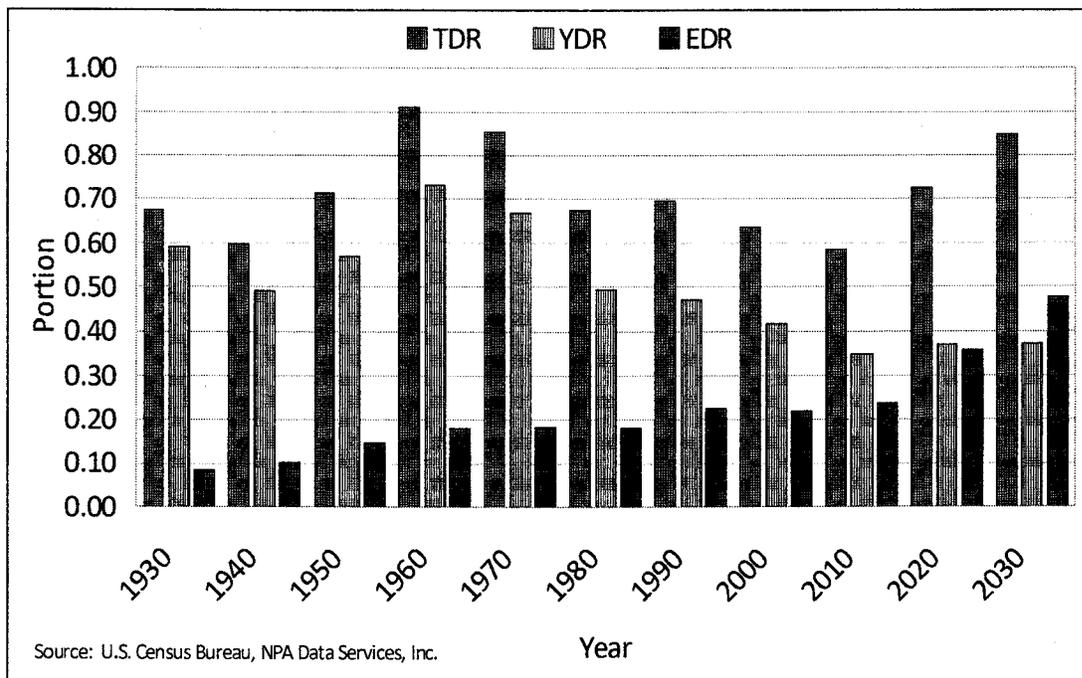


Figure 3. Montana Age Dependency Ratios.

<sup>3</sup> See for example, U.S. Social Security Administration, Annual Statistical Supplement, 2007, Table 3.E3. <http://www.ssa.gov/policy/docs/statcomps/supplement/>.

Table 1. Montana Age Dependency Ratios.

Year	YDR	EDR	TDR
1930	0.59	0.08	0.67
1940	0.49	0.10	0.60
1950	0.57	0.15	0.71
1960	0.73	0.18	0.91
1970	0.67	0.18	0.85
1980	0.49	0.18	0.67
1990	0.47	0.23	0.70
2000	0.42	0.22	0.64
2010	0.35	0.24	0.58
2020	0.37	0.36	0.72
2030	0.37	0.48	0.85

Youth, elderly and total dependency ratios are displayed in Figure 3 and Table 1. The elderly dependency ratio has risen steadily since 1930 and is projected to rise steeply over the next few decades. Currently there are 4.3 people of working age for each elderly person; projections suggest that there will be only about two people of working age for each elderly person by 2030. The youth dependency ratio was high in the 1950s to 1970s when the Baby Boomers were young, but has declined to historically low levels in recent years. It is expected to increase only moderately by 2030, when there will be about three working age people for each youth. The total dependency ratio reflects both of these trends. It peaked around 1960 and is expected to decline to the 1940 level by 2010, then will rise sharply by 2030. Put differently, by 2030 there will be about 1.2 persons of working age for each youth or elderly person. However, only about 78 percent of the working age population is in the labor force, so there will be less than one worker for each dependent person.<sup>4</sup>

Dependency ratio changes will differ substantially across Montana. °Figure 4 illustrates youth dependency ratios by county in 2010 and Figure 5 in 2030. Lighter colors on these maps

<sup>4</sup> The labor force participation rate for ages 18-64 in 2007 was 78 percent (U.S. Bureau of Labor Statistics).

indicate lower dependency ratios and darker colors indicate higher dependency ratios. The youth dependency ratio increase is concentrated in north central Montana and in some counties in southeastern Montana.



Figure 4. Youth Dependency Ratio 2010.

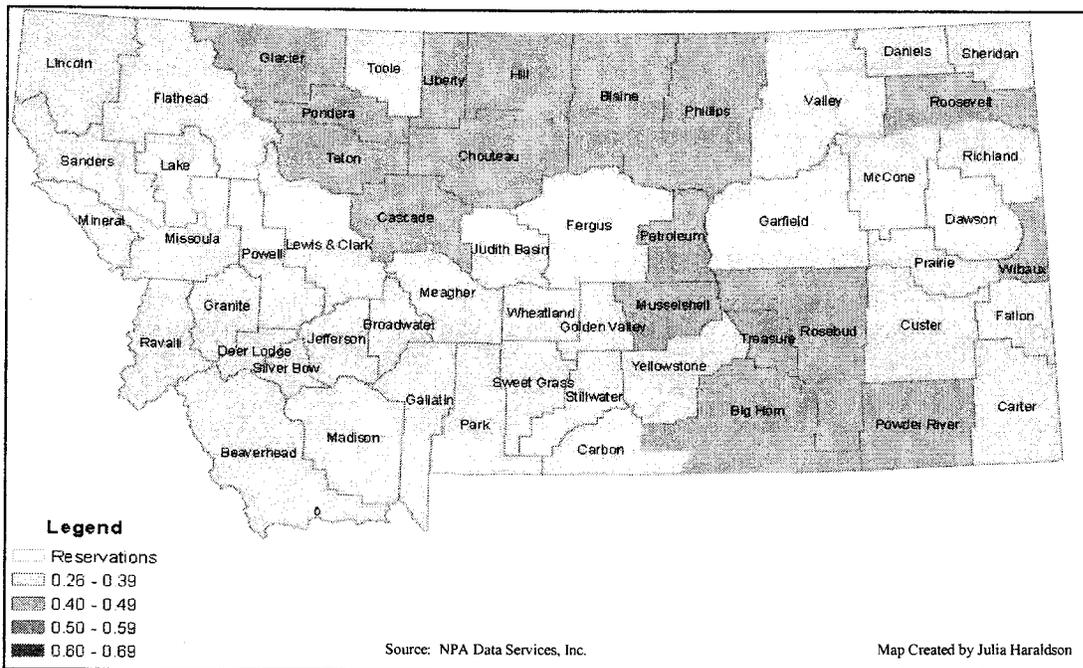


Figure 5. Youth Dependency Ratio, 2030.

Growth in the elderly population will differ more substantially across Montana. Figures 6 and 7 display county-level data on the elderly dependency ratio in 2010 and projected for 2030. Forty-six of Montana's 56 counties are projected to have elderly dependency ratios of 40 percent or higher and 28 counties will exceed 50 percent. The only exceptions are counties that have large university or American Indian populations.

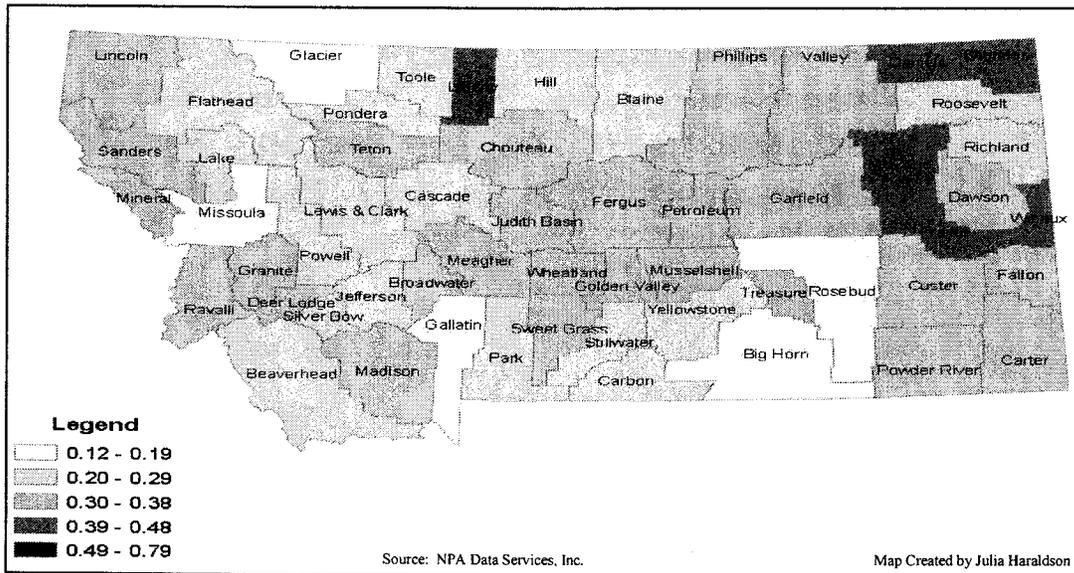


Figure 6. Elderly Dependency Ratio, 2010.

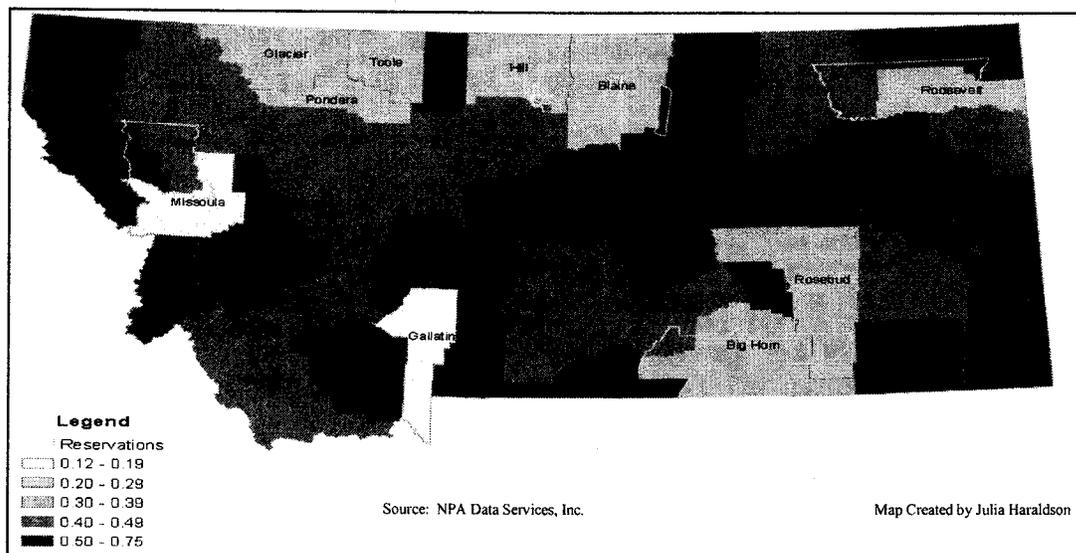


Figure 7. Elderly Dependency Ratio, 2030.

## FISCAL IMPACTS

Montana's changing age composition will have a variety of effects on the fiscal affairs of state and local governments in Montana. This report first describes expenditures and revenues as of 2006, and then considers the impact of changing age composition on selected fiscal categories.

Table 2. State and Local Government Finances, FY 2006.  
Dollars per Person; Current and Capital.<sup>5</sup>

<b>General Expenditures</b>		<b>General Revenues</b>	
Education Total	2,322	Taxes Total	3,208
K-12	1,435	Property Taxes	1,125
Higher Education	711	Individual Income Taxes	817
Other Education	176	Corporate Income Taxes	164
Social Services	1,411	Sales Taxes	550
Transportation	814	Other Taxes	552
Public Safety	497	Transfers from Federal Government	2,158
Environment/Comm. Development	602	Charges	995
Administration	450	Miscellaneous General Revenue	490
Interest on General Debt	219	Interest Earnings	299
Other General Expenditures	299		
<b>Other Expenditures</b>		<b>Other Revenues</b>	
Utilities (Water, Electric, Gas)	118	Utility	100
Liquor Stores	53	Liquor Stores	63
Insurance Trusts	594	Insurance Trusts	1,207

Table 2 displays the consolidated finances of state and local governments in Montana for fiscal year 2005-06, the latest available from the U.S. Census Bureau. Duplicative transfers between the state and local governments have been eliminated. For example, income tax revenues received by the state and then transferred from the state to school districts to fund K-12 expenditures are only counted once as revenues and once as expenditures. Dollar figures are divided by total population. The upper portion of the table describes General Expenditures, while the lower portion includes some items that are normally "off-budget," including municipal utilities, liquor stores and the insurance trusts. Note that General Expenditures, as defined by the

<sup>5</sup> U.S. Census Bureau, *Government Finances in FY 2005-06*.

U.S. Census Bureau, include many categories that are outside of Montana's State General Fund. These include funds that Montana considers "special" such as gas taxes. Higher education expenditures include university dormitories and food services, and revenues include student charges for dormitories and food service as well as tuition and fees.

The largest functional category of expenditure is education at \$2,322 per person. Education includes K-12, the university system, and some other spending including libraries. Spending on social services, including both health and welfare, is about \$1,411 per person, and transportation (mostly highways) is \$814 per person. Public safety, including police, fire and corrections, is \$497 per person. Spending on the environment and housing, including parks and recreation, community development, sewerage and solid waste management, is \$602 per person. Government administration, including financial and judicial administration, is \$450 per person. Interest paid on general debt is \$219 per person and other general expenditures amounted to \$299 per person. The largest category of "non-general" expenditures is the insurance trusts, which include unemployment and workman's compensation trust funds, and public employee retirement funds. These funds account for \$594 per person of spending.

The largest source of revenues for state and local governments is taxes at \$3,208 per person. Property taxes account for \$1,125 per person, individual income taxes for \$817 per person, and corporate income taxes for \$164 per person. Montana does not have a general sales tax, but selective sales (or excise) taxes on motor fuel, alcoholic beverages, tobacco, public utilities, life insurance, accommodations and other products and services account for \$550 per person. Other taxes, including vehicle license taxes and severance taxes on natural resources, account for the other \$552 per person in taxes.

Transfers from the federal government to state and local governments were \$2,158 per person. About 40 percent of transfers were to the Department of Public Health and Human Services to partially fund Medicaid and other services. Montana also continues to receive significant transfers for highways, K-12 and higher education, and other programs. Montana state and local governments received \$995 per person in revenue from numerous charges and fees. The largest single recipient is higher education at \$419 per Montanan, including both tuition and charges for auxiliary operations such as dormitories and food service. Charges also include sewerage and solid waste management, parks and recreation, school lunches and many others.

Miscellaneous general revenue was \$490 per person and interest earned was \$299 per person. The largest category of "non-general" revenues is insurance trust receipts. Retirement revenues generally exceed current expenditures as the funds accumulate surpluses to pay for future retirement obligations.

### *Expenditures*

This section evaluates the direct impacts of the changing age distribution on expenditures for K-12 education, higher education, corrections and Medicaid. The analysis is limited to the impact of changes in the age distribution; all other factors are assumed to be constant. Thus, we assume constant real expenditures per student in both K-12 and higher education, constant costs per person involved with the correctional system and constant costs per person for both elderly and non-elderly clients under Medicaid. We also assume constant "participation" rates, e.g. that enrollment in the public schools is a constant percentage of the population ages 5-17. No doubt inflation will affect nominal expenditures for each of these services, citizens may choose to spend more or less per student in real terms, enrollment rates may increase or decrease, and

health care costs may increase faster than the overall rate of inflation. All of these possibilities are worth investigating, but are beyond the scope of this report. Rather, our method isolates the effects of changing age distribution by holding all of these other factors constant. This point is illustrated more fully as each expenditure category is considered below.

### K-12 Education Expenditure

Table 3 describes basic facts on K-12 education in fiscal year 2006-07, which is the base year for the projections. Total expenditures of school districts, plus Office of Public Instruction, were \$1.4 billion dollars.<sup>6</sup> Public school enrollment of 144,418 was 91.9 percent of the population age 5-17, based on U.S. Census Bureau projections of the population for July 1, 2006.<sup>7</sup> Expenditure was \$9,365 per student, or \$1,438 per Montana resident.

Table 3. K-12 Education in Fiscal Year 2006-07.

Expenditure	\$1,352,420,501
Public School Enrollment Fall, 2006	144,418
Participation Rate: Enrollment/Population 5-17	91.9%
Expenditures per Student	\$9,365
Expenditures per Montanan	\$1,438

Expenditures for future years are projected by holding the participation rate and cost per student constant.<sup>8</sup> For example, K-12 enrollment in 2030 is projected to be 91.9 percent times the population age 5-17 in 2030, and total expenditure is projected to be enrollment times \$9,365.

<sup>6</sup> Total expenditure for FY07 for K-12 education is aggregated from 1) Montana Office of Public Instruction, Expenditures by Function by Enrollment Category FY2007 [ftp://opi.mt.gov/School%20Finance/OPICoreDataFiles/PerPupil/perpupil1991\\_2007.xls](ftp://opi.mt.gov/School%20Finance/OPICoreDataFiles/PerPupil/perpupil1991_2007.xls) and 2) Historical Disbursement Information By Agency, Program, Account, SABHRS Data as of 05/13/08 05:53:42 AM. Most current expenditures are included (including debt service), but capital expenditures, adult education and some other accounts are not included. About 15% of revenues come from the Federal government, but this is ignored here.

<sup>7</sup> Source: U.S. Census Bureau, Population Division, Interim State Population Projections, 2005. <http://www.census.gov/population/projections/DownloadFile2.xls>

<sup>8</sup> Montana law requires that the budget proposed by OPI keep up with inflation (MCA 2007: 20-9-326, <http://data.opi.mt.gov/bills/mca/20/9/20-9-326.htm>). This is consistent with our assumption of constant real expenditure per student.

Expenditure per Montanan is obtained by dividing total projected expenditure by projected population in 2030. Thus, changes in total expenditures and expenditure per Montanan depend only on the projected changes in population.

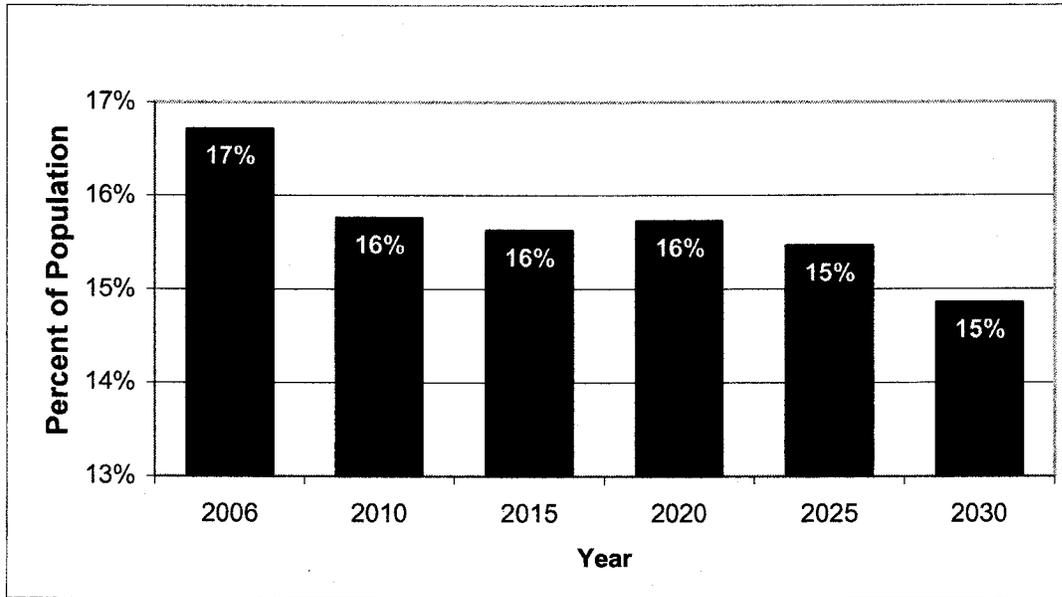


Figure 8. Montana Population Aged 5-17.

Figure 8 displays the projected percentage of the population that will be age 5-17. The school age population has been shrinking in Montana for a number of years, both absolutely and as a percentage of the total population. This percentage trend is expected to continue in the next few years, before flattening out for 15 years, and then declining again by 2030. Consequently, K-12 expenditure per Montana resident follows a similar pattern, as the lower percentage of school age population lowers the per capita burden of paying for schools (Figure 9). The decline from 2010 to 2030 is about \$78 per Montanan.

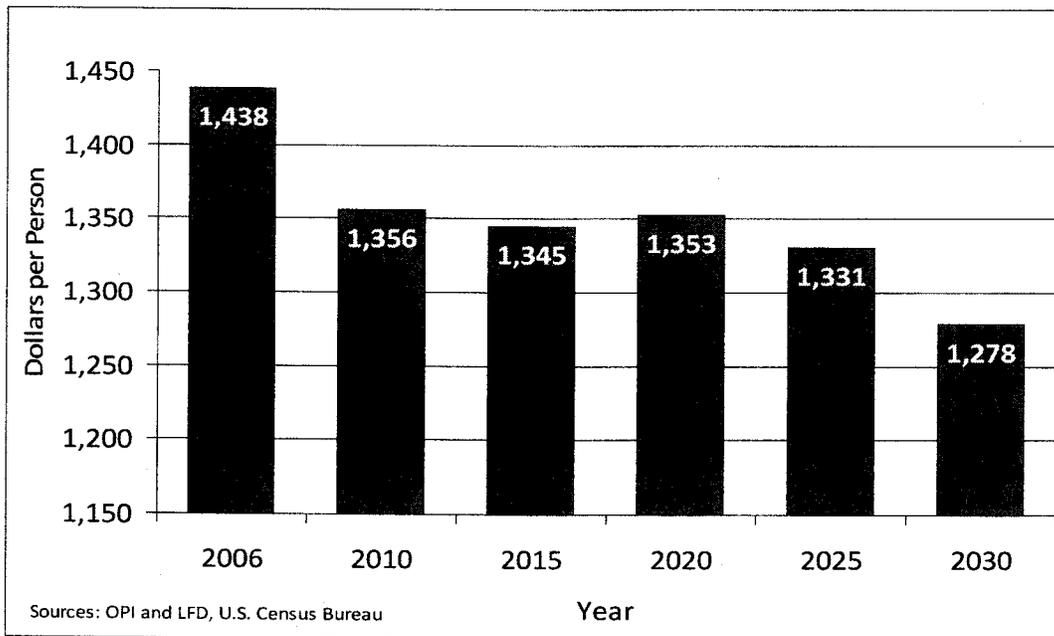


Figure 9. K-12 Expenditure per Montanan.

It is worth repeating that these projections do not take account of any future changes in participation (enrollment) rates or real spending per student. Rather, the projections isolate the impact of changing age distribution, assuming that all other factors remain constant.

#### Higher Education Expenditure

Basic data on higher education are displayed in Table 4. Expenditures include only the instructional appropriations for the Montana University System, including the monies for the community colleges from Custer, Dawson and Flathead counties. Appropriations for the Montana Agricultural Experiment Station, Extension Service, Bureau of Mines, Fire School, research, other activities and one time only are excluded.<sup>9</sup> Total appropriations were \$133 million dollars in fiscal year 2006-07. Full time equivalent resident enrollment in the same

<sup>9</sup> Sources: F. Houser, Montana University System, *HISTORICAL FUNDING - EDUCATIONAL UNITS ONLY*, PEPB 2007-2008\Staff Reports\State\_Percent\_Share\_History\_Through\_2009\_Bien (Jan 10, 2008 Updated). County appropriations from IPEDS.

period was 28,296, which represented a participation rate of 32 percent of the population age 18-

24. The appropriation per student was \$4,701 and cost per Montana resident was \$140.

Table 4. University System Instructional Expenditures.

State Appropriation	\$126,231,060
Local Appropriations	\$6,780,690
Total Appropriations	\$133,011,750
FTE Resident Enrollment	28,296
Enrollment/Population 18-24	32.0 %
Cost per Student	\$4,701
Cost per Montanan	\$140

Future expenditures are projected by assuming that the participation rate of 32 percent and cost per student of \$4,701 remain constant. Figure 10 displays the projected percentages of Montana population that will be aged 18-24. A declining percentage of the population of college-going age is projected to result in declining expenditure per Montana resident (Figure 11). The decline from 2010 to 2030 is about \$23 per Montanan, again assuming no other changes except the age distribution of the population.

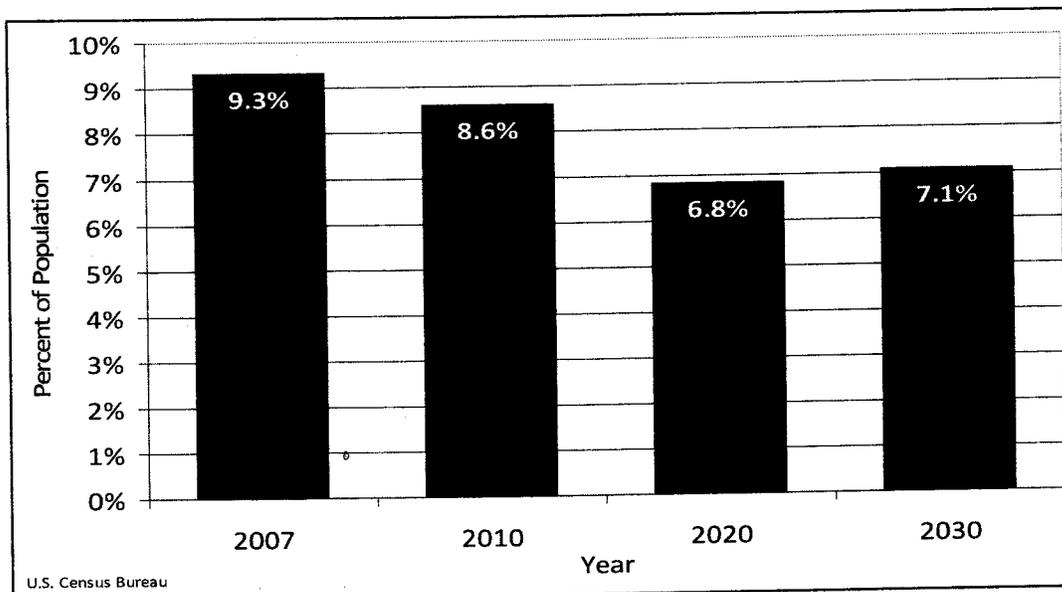


Figure 10. Montana Population Aged 18-24.

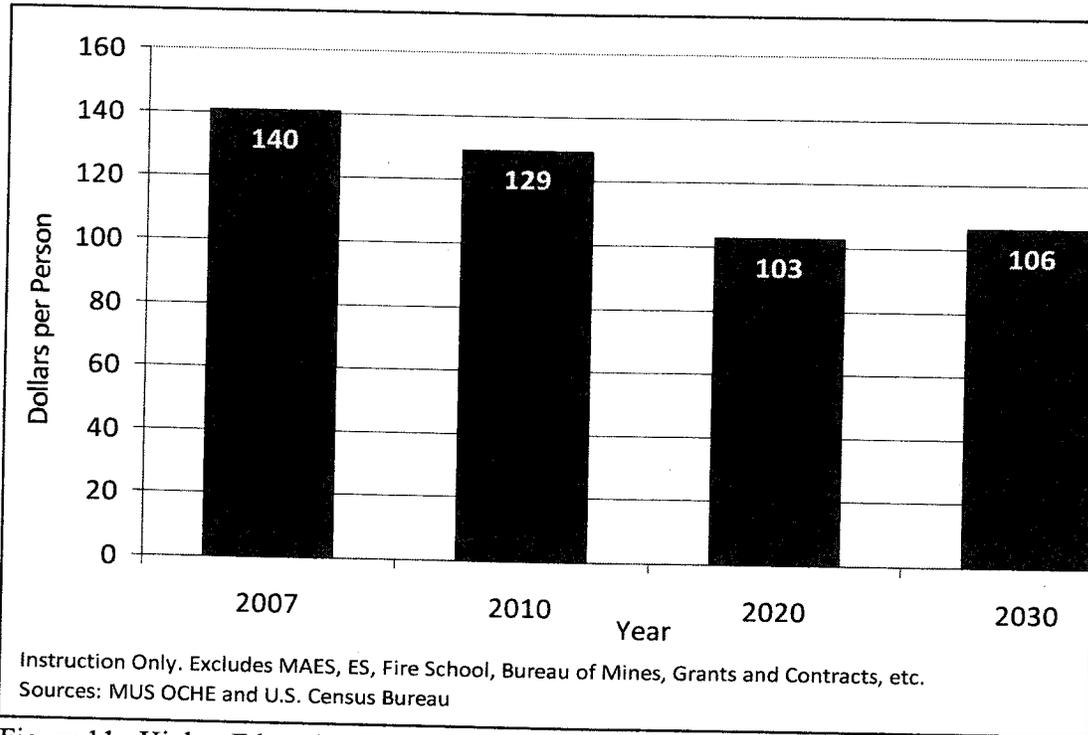


Figure 11. Higher Education Expenditure per Montanan.

Corrections Expenditures

Corrections expenditures are more complicated to analyze than K-12 and higher education, because there are more kinds of programs with varying participation rates by age. Basic data on participation and daily cost for corrections programs are given in Table 5.<sup>10</sup> The 2,814 inmates include those in the state prisons and about 900 prisoners who are “contracted out” to other prisons. There are more than three times as many men and women on parole and probation as inmates, but the cost per participant is much less. Youth Services programs administered by the Department of Corrections include Riverside and Pine Hills Youth Correctional Facilities, and the Youth Transition Centers. The Youth Courts administered by the

<sup>10</sup> Sources: D. Hall, Montana Department of Corrections for participants by age. B. Peake, Montana Department of Justice for youth court participants. Costs from Montana Department of Corrections 2007 Biennial Report <http://www.cor.mt.gov/Resources/Reports/2007BiennialReport.pdf> and Montana Judicial Branch Youth Court Report 2007 [http://www.courts.mt.gov/dcourt/youth\\_court/Youth%20Court%20Report%20Card%202007.pdf](http://www.courts.mt.gov/dcourt/youth_court/Youth%20Court%20Report%20Card%202007.pdf).

Department of Justice include a wide range of youth probation and other services, ranging from AA/NA meetings to Family Services to Life Skills Training to Victim/Offender Mediation, and many other programs. Other Services include Pre-Release programs, START programs, and the Adult Intensive Supervision Program, among others.

Table 5. Participation and Daily Cost of Corrections.

Category	Number July, 2008	Daily Cost 2006
Inmates (Excluding County Jails)	2,814	\$69.83
Probation/Parole	8,395	\$4.57
Youth Services - DOC	158	\$222.61
Youth Courts - DOJ (2007)	6,540	\$2.32
Other Services	1,735	\$49.89

Table 6 displays estimated participation rates for the various programs, cross tabulated by age. These estimates are based on data provided by the Department of Corrections and the Youth Courts. The probability of being an inmate is highest in the 25-44 age group, and very few elderly people are in prison. Probation/parole rates are highest in the 18-44 age group. A striking feature of the table is that one in ten youth age 14-17 is involved with the Youth Courts.

Table 6. Probability of Persons in Montana Correctional System (2008).

Category/ Age Group	10-13	14-17	18-24	25-44	45-64	65+
Inmate	0.0%	0.0%	0.5%	0.7%	0.3%	0.0%
Probation/Parole - DOC	0.0%	0.0%	1.8%	1.9%	0.7%	0.1%
Youth Services	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%
Youth Courts - DOJ (2007)	2.3%	10.1%	0.0%	0.0%	0.0%	0.0%
Other Services	0.0%	0.0%	0.4%	0.4%	0.1%	0.0%
Total	2.3%	10.5%	2.7%	3.0%	1.1%	0.1%

Average correctional expenditure by age is calculated by multiplying the probability of participation by the annual cost of each service and then summing across services. The result is displayed in Figure 12. Costs are highest in the 14-17 age group, because of the expense of the residential youth programs, which include schooling. The next highest cost group is age 25-44

who have the highest probability of being inmates, followed by 18-24 year olds, who are slightly less likely to be inmates or otherwise under the jurisdiction of the courts. Costs diminish markedly for people age 45-64 because their participation rates are relatively low and very few people age 65+ are involved with the correctional system.

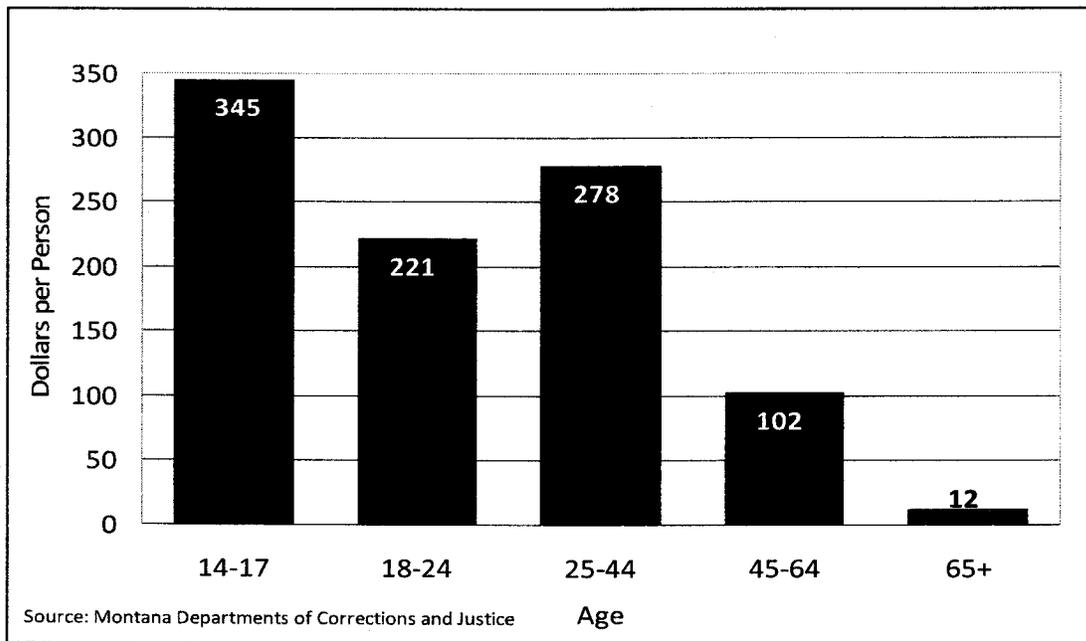


Figure 12. Correctional Expenditure per Person by Age.

Population projections suggest that correction expenditures per resident will decline in coming years (Figure 13). The overall decline from 2010 to 2030 is \$17 per Montanan.

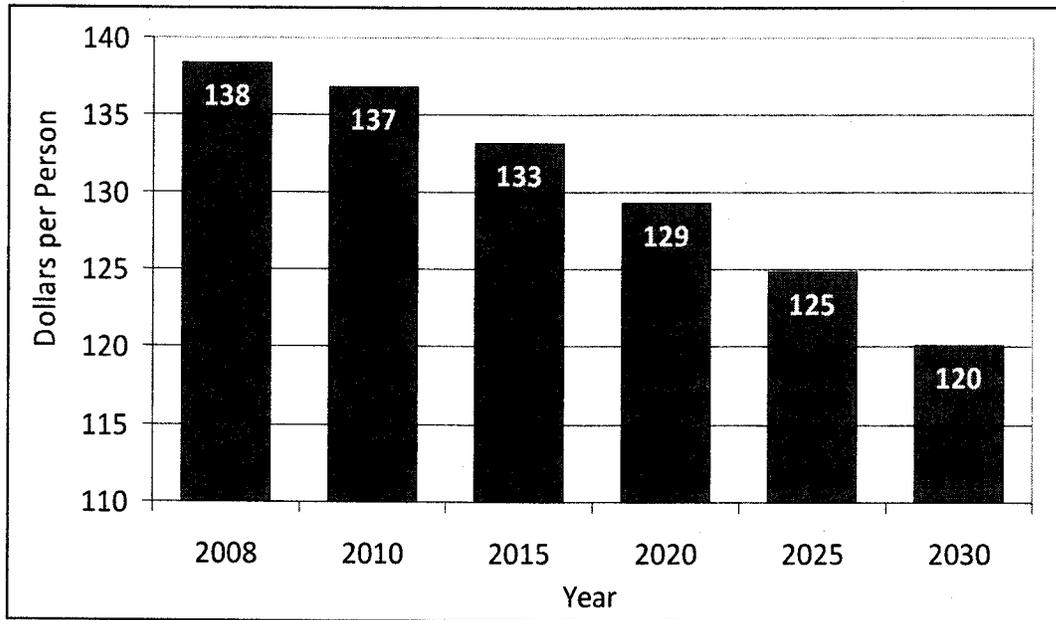


Figure 13. Correctional Expenditure per Montanan

Medicaid Expenditures

Medical expenses increase as people grow older and these expenses are typically paid by private or public insurance. Private insurance, Medicare (a Federal government program) and Medicaid (a Federal and State government program) share in covering the medical expenses of the elderly. This section examines the expenditures paid by State government for the elderly, people 65 years of age and older.

This study uses population data provided by the U.S. Census Bureau at the state level, NPA Data Services, Inc. at the county level, and expenditure data for the elderly obtained from the Montana Medicaid Program.<sup>11</sup> Expenditures for nursing homes, assisted living and swing bed care were obtained from the Senior and Long-Term Care Division staff in the Montana Department of Public Health Human Services (MDPHHS).

<sup>11</sup> Montana Medicaid Program, State Fiscal Years 2005/2006, Report for the 2007 Legislature. The state share of Medicaid is assumed to be 28% in 2005, 32% in 2010 and 2020, and 34% in 2030, as currently scheduled.

Medicaid expenditures do not include the costs of administering (or managing) the Medicaid programs for the elderly (Table 7). In 2005, Federal and State Medicaid expenditures totaled nearly \$675 million with 24 percent (\$162 million) of these expenditures paid to the elderly. The State portion of these expenditures totaled nearly \$189 million (28 percent of total Federal and State expenditures) with \$45 million paid for the elderly. Medicaid expenditures per capita are computed by dividing the \$45 million of expenditures by the number of elderly in the Montana population in 2005 (129,243). Likewise, per capita Medicaid expenditures for others (non-elderly) are computed by dividing the remaining \$144 million by the non-elderly population (806,427). Per capita Medicaid expenditures for the elderly (\$351) are nearly two-times higher than per capita Medicaid expenditures for the non-elderly (\$178).

Table 7. State Portion of Medicaid Expenditures in 2005 and 2030.

Categories	Base Year - 2005				Projected Year - 2030			
	Medicaid Expenditures	Total Population	Medicaid per capita	Total Population	Medicaid Expenditures	Medicaid per capita		
	(\$ million)	%	(#)	(\$)	(#)	(\$ million)	%	(\$)
Elderly (65+)	45	24	129,243	351	269,558	115	41	426
Non-elderly	144	76	806,427	178	775,340	168	59	216
Total	189	100	933,005	203	1,044,898	283	100	270

Note: Medicaid expenditures for the elderly do not include payments to the blind and disabled.

These per capita 2005 Medicaid expenditure calculations are the basis for the 2030 projections. The projected number of elderly in 2030 (269,558) is multiplied by the Medicaid per capita for the elderly in 2005 (\$351) and the State Medicaid share is increased to 34 percent to estimate 2030 Medicaid expenditures on the elderly (\$115 million). Likewise, the projected number of non-elderly in 2030 (775,340) is multiplied by the Medicaid per capita for the non-elderly in 2005 (\$178) and the State Medicaid share is increased to 34 percent to estimate 2030

Medicaid expenditure for the non-elderly (\$168 million). State Medicaid expenditures for the elderly and non-elderly are projected to total \$283 million, or \$270 per capita, in 2030. The percentage of State Medicaid expenditures for the elderly increases from 24 percent in 2005 to over 40 percent in 2030. State Medicaid expenditures for the elderly increase from nearly \$49 per Montana resident in 2005 to nearly \$110 per Montanan in 2030, an increase of over 124 percent. Figure 14 shows the State Medicaid expenditures per capita for the elderly and non-elderly from 2005 through 2030.

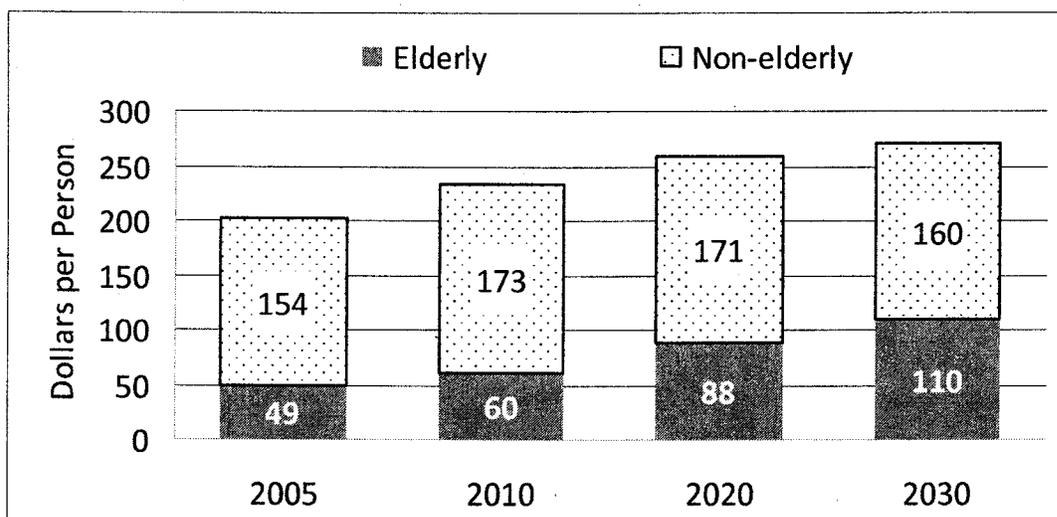


Figure 14. Elderly and Non-Elderly State Medicaid Expenditures per Montanan.

The largest share of State Medicaid expenditures for the elderly is paid to nursing home, assisted living and swing bed facilities. Expenditures paid to these types of facilities were provided by the Senior and Long-Term Care Division in the MDPHHS. Expenditure information for nursing homes is for fiscal years 2003 through 2005, and assisted living and swing bed facilities is for fiscal year 2007. These expenditures were adjusted to estimate residential care expenditures in fiscal year 2005. Given that all those in residential care are not elderly, this study assumes that 90 percent of State Medicaid expenditures for nursing homes and

swing bed care are for the elderly, while only 50 percent of State Medicaid expenditures for assisted living facilities are for the elderly. Based on this information supplied for all residential facilities by county, these facilities receive nearly 80 percent of all State Elderly Medicaid expenditures. Figure 15 shows the State Elderly Medicaid expenditures per capita apportioned between residential and all other care. State Medicaid expenditures for residential care are projected to increase from \$38 to \$85 per capita from 2005 through 2030.

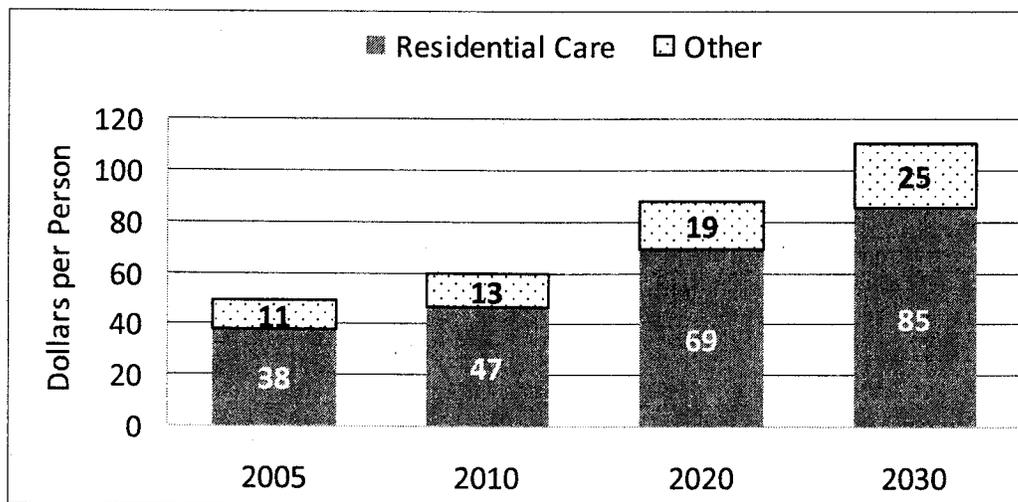


Figure 15. State Elderly Medicaid Expenditures for Residential and Other Care.

Elderly Medicaid recipients occupied about 1.2 million bed days in nursing home, assisted living and swing bed facilities in 2005. With the increase in the elderly population, it is estimated that elderly Medicaid recipients will occupy over 2.2 million bed days by 2030, an increase of nearly 80 percent.

The MDPHHS data on residential facilities are available for all counties in Montana. State Elderly Medicaid expenditures on residential facilities varied between over \$100 per capita in Wibaux, McCone, Fallon, and Sheridan counties to under \$30 per capita in Ravalli, Missoula and Gallatin counties in 2005 (Figure 16). Counties with zero expenditures in 2005 were not

projected to 2030. With the elderly population growing and the state share of Medicaid increasing to 34 percent, State Elderly Medicaid expenditures for residential facilities are expected to increase to over \$250 per capita in the more elderly Eastern Montana counties, such as Wibaux and McCone, and remain under \$30 in younger counties, such as Gallatin and Missoula. Figure 17 shows the projected State Elderly Medicaid expenditures on residential facilities for all Montana counties for 2030.

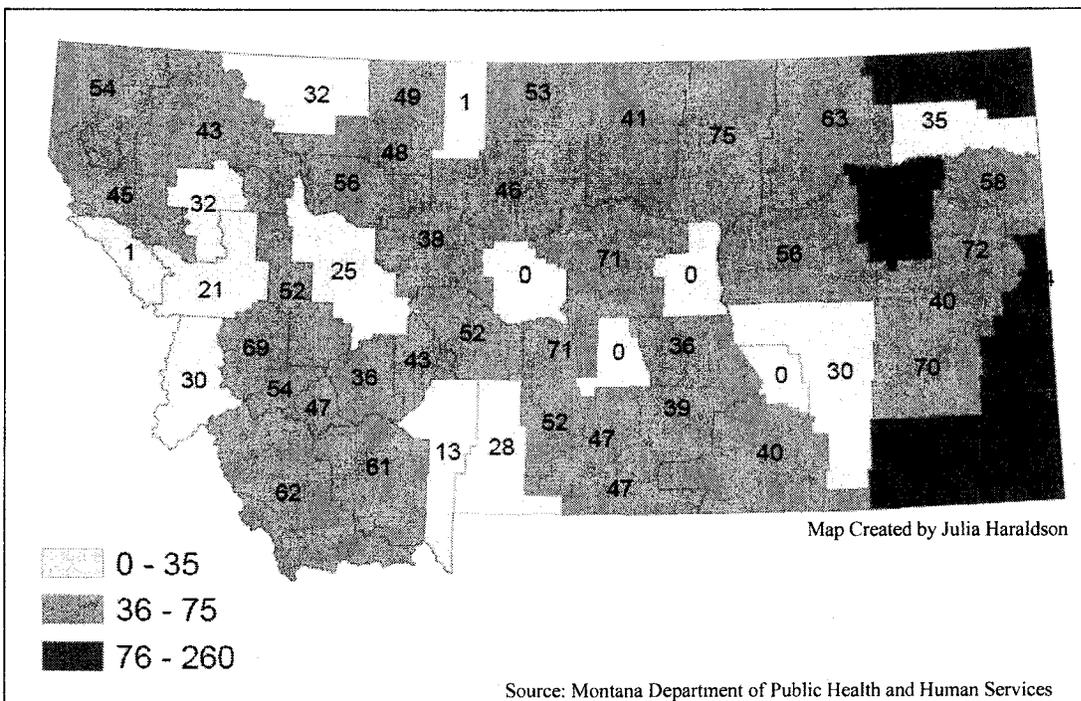


Figure 16. Montana Elderly Medicaid Expenditures for Residential Facilities, 2005 (\$ per Capita).

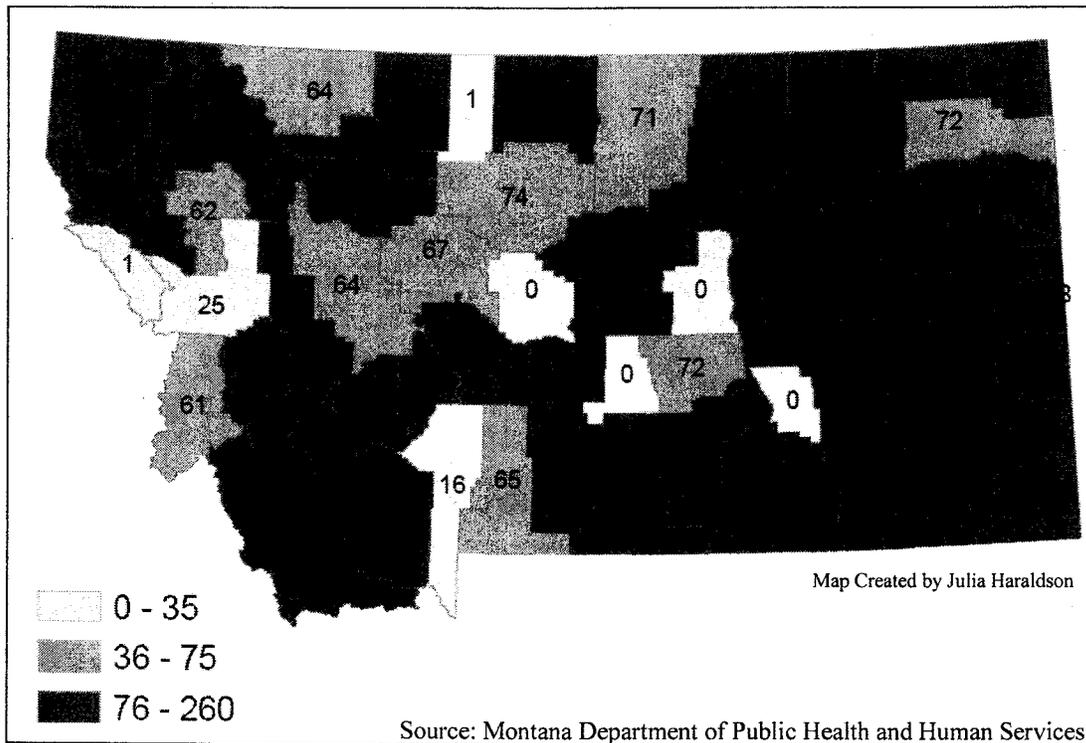


Figure 17. Montana Elderly Medicaid Expenditures for Residential Facilities, 2030 (\$ per Capita).

In summary, the elderly population in Montana is projected to use a larger portion of the State Medicaid budget in 2030 than in 2005. Nearly 80 percent of these benefits are expected to be paid to residential care facilities throughout the State. These projections only account for the substantial increase in the elderly population and the expected increase in the share of Medicaid expenditures paid by the State. These projections do not include adjustments for inflation in medical care costs, changes in the mixture of residential and home care services available to the elderly, changes in the physical or mental well-being of the elderly or other changes.

*Revenues*

Tax revenues will also be affected by population aging, because individuals pay different amounts of taxes over the life-cycle. The very young (school age) population pays almost

nothing in taxes. Young adults typically have low incomes and often live in moderate or group housing. Incomes typically peak in older middle age and then decline in the retirement years. Thus, changes in the age distribution may affect tax revenues.

Our methods for projecting the impact of age distribution on tax revenues are similar to those for expenditures. Real (inflation-adjusted) taxes per person by age are assumed to remain constant over the projection period. All other factors, such as per capita incomes, house values, and tax rates, are held constant. Thus, the results isolate the effects of changes in the age distribution on tax revenues.

### Residential Property Taxes

Property taxes are about 35 percent of tax revenues in Montana and residential property taxes are about 47 percent of all property taxes.<sup>12</sup> There are two significant problems in estimating residential property taxes. First, tax data by age are not currently available in Montana. Consequently, national data from the Bureau of Labor Statistics (BLS) are used instead and the results are scaled to Montana totals.<sup>13</sup> Secondly, the available tax data report residential property taxes only for homeowners, ignoring the taxes that are paid by landlords on behalf of renters. However, the BLS data report both rent payments for renters and *estimated* rental values for homeowners. These data are used to estimate property taxes for renters based on the rents that they pay.

A third consideration in estimating property taxes by age is the probability that a person will be a head of household and thus be recorded as paying property taxes. The ratio of

---

<sup>12</sup> Source: Montana Department of Revenue, Historical Trend of Estimated Property Taxes Levied by Property Tax Class 1994 through 2007. Residential includes Class 4 – Residential plus 3.4 percent of Class 4 - Commercial to account for multifamily housing in the latter classification.

<sup>13</sup> US Bureau of Labor Statistics, *Consumer Expenditure Survey 2006*, Table 4. Age of Reference Person <http://www.bls.gov/cex/csxann06.pdf>

household heads in a particular age group to total population in that age group is an estimate of that probability. As Figure 18 shows, only about 28 percent of persons age 18-24 are heads of household, because many live in group quarters or with their families. The probability rises to 50 percent by age 25-34 and continues to increase through age 65-74. There are offsetting effects at older ages, with surviving spouses classified as household heads unless they move in with their children or into group quarters such as nursing homes.

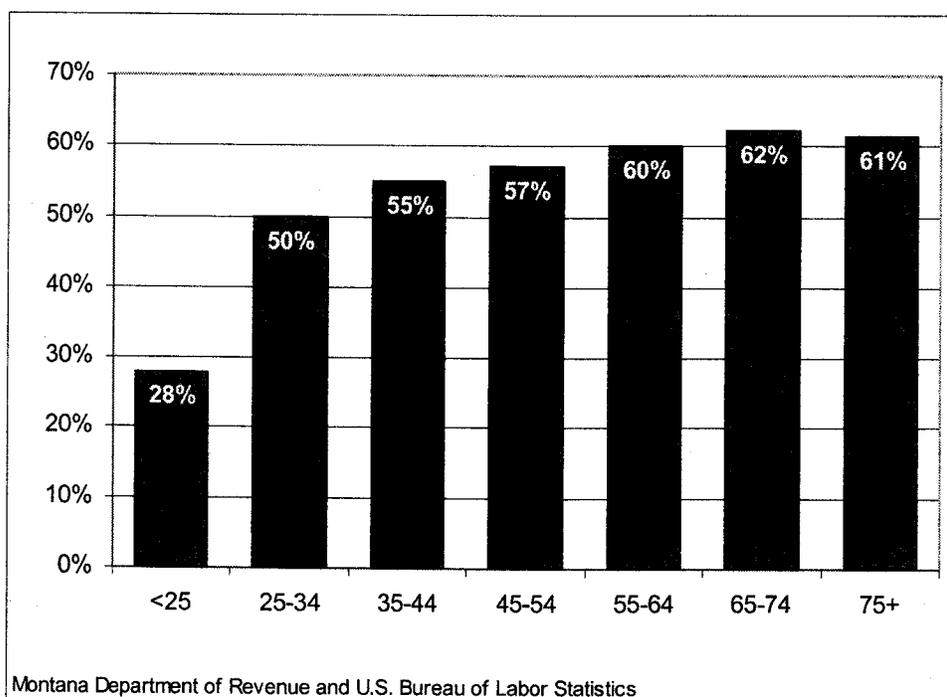


Figure 18. Head of Household Probability by Age Group.

As mentioned previously, property tax data are available only for homeowners, not renters. However, “rents” are available for both renters and homeowners, where the latter are the “estimated monthly rental value of owned home.” The ratio of rents reported by renters to these estimated rents of homeowners averages about 0.5, indicating that renters typically live in less expensive housing than homeowners. Property taxes for renters are estimated by multiplying the property taxes of homeowners by the rent ratio just discussed, with both sets of data tabulated by

age. Average property taxes for all individuals in an age group are a weighted average of renter and owner property taxes, with the weights varying by age according to the probabilities of household headship and home ownership.

The results are displayed in Figure 19. Younger persons pay less in property taxes both because they are less likely to be heads of household and because they live in less expensive homes if they are heads. Property taxes peak at age 45-54 and then decline by about 25 percent by age 75+. The latter pattern reflects both downsizing of homes after children leave and residential property tax reductions that are commonly offered to the elderly and/or those who have lived in their homes for a long time.

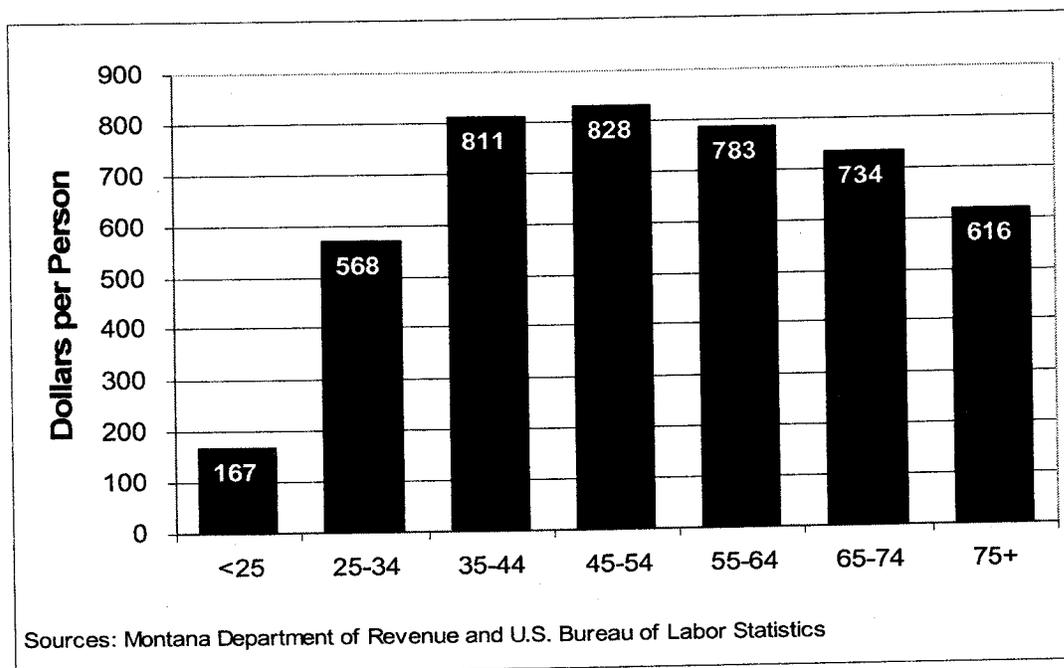


Figure 19. Residential Property Tax by Age.

Projected property tax revenues per Montanan are reported in Figure 20. The main effect of the changing age distribution will be to reduce the percentage of young people, who pay relatively little in property taxes. The percentage of elderly rises and they pay less than middle

aged people, but this effect is outweighed by the decline in the young. The overall increase in residential property tax revenue between 2010 and 2030 is projected to be about \$19 per person.

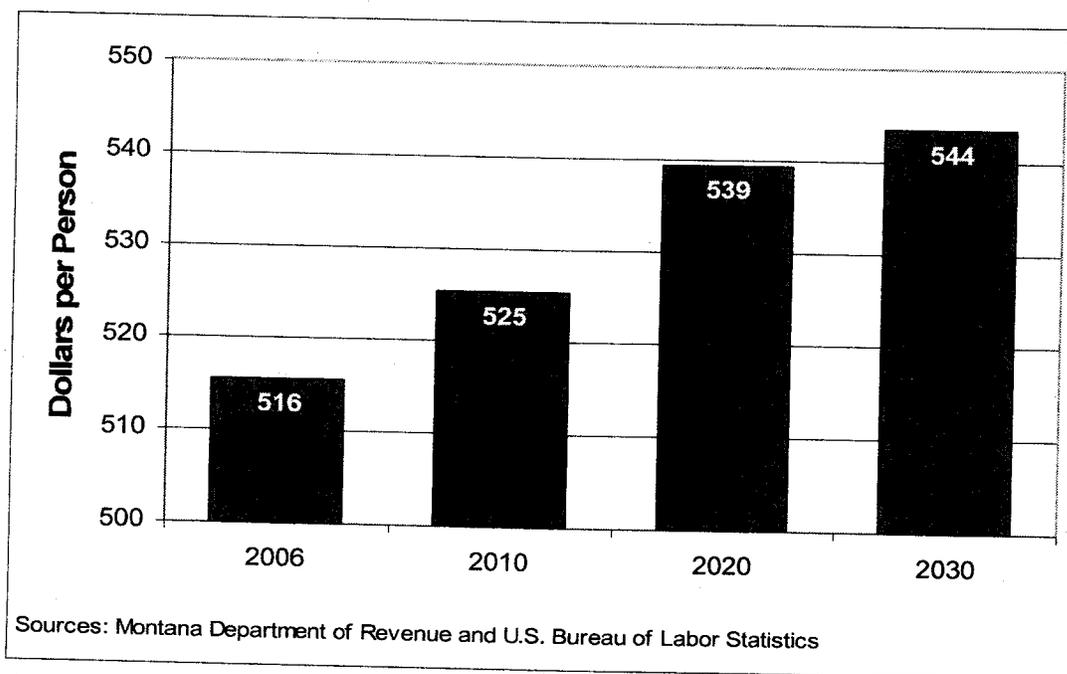


Figure 20. Residential Property Tax per Montanan.

### Individual Resident Income Taxes

Individual income tax liabilities are affected by demographics. Older and younger people usually have lower incomes than middle age people. The demographic influence on income taxes is complicated by a variety of income tax provisions that include tax rate progressivity and tax exempt status of certain Social Security benefits. Figure 21 illustrates the relationship between age and family income in the United States. Mean income refers to the simple average of incomes, while median income refers to the family at the 50<sup>th</sup> percentile of the distribution. Mean incomes are higher than median incomes, because the distribution of income is “skewed to the right” with relatively few people having very large incomes. The skewness of the distribution is important for projecting income taxes, because those taxpayers with the highest

incomes pay most of the income taxes. For example, the ten percent of resident taxpayers with the highest incomes (the top decile) pay 58 percent of all the resident income taxes in Montana. In contrast, the 50 percent of taxpayers with the lowest incomes (lowest five deciles) pay less than 5 percent of all income taxes.<sup>14</sup>

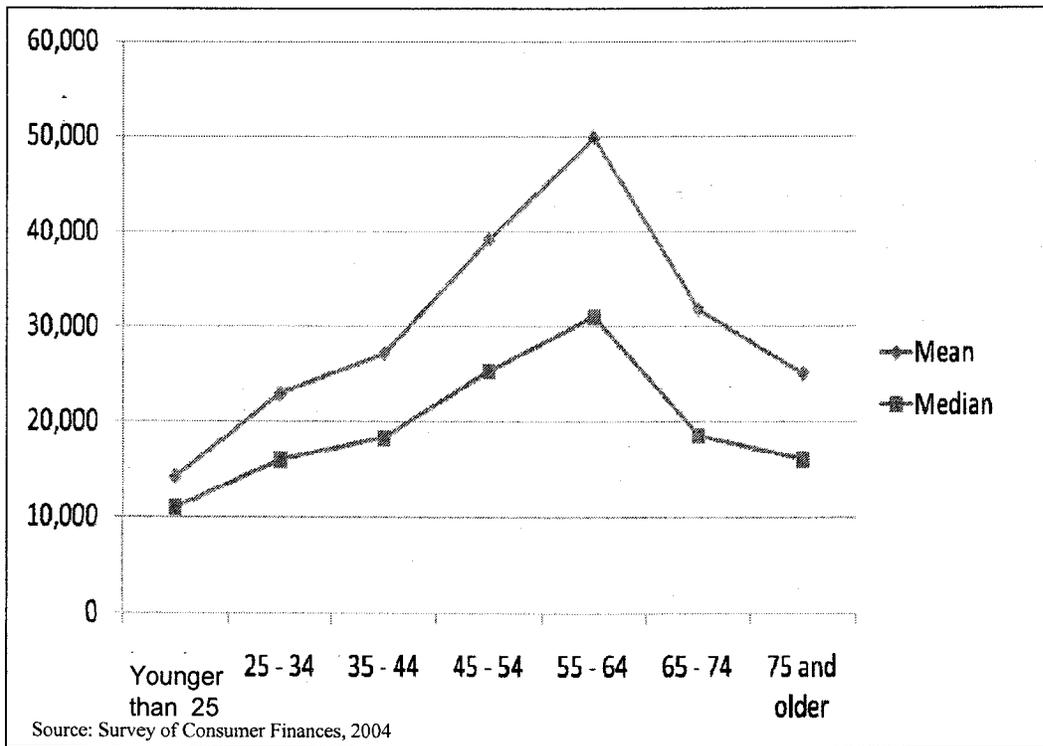


Figure 21. Total Income before Taxes.

Calculating the effect of future changing age distribution on income taxes is complicated, because Montana resident income tax liability by age is unavailable. However, detailed data are available on the national distribution of income by age.<sup>15</sup> It is assumed that the national and Montana income distributions are *congruent*. This means that the Montana income distribution

<sup>14</sup> Montana Department of Revenue, *Biennial Report July 1, 2004 to June 30, 2006*, p. 29.

<sup>15</sup> Annual Demographic Survey, BLS and U.S. Census Bureau, 2005;  
[http://pubdb3.census.gov/macro/032005/perinc/new01\\_001.htm](http://pubdb3.census.gov/macro/032005/perinc/new01_001.htm)

has the same shape (but not necessarily the same average) as the national income distribution. For example, 24.1 percent of those older than 64 fall into the lowest income decile in the national data, so it is assumed that the same is true in Montana.

Data from the Montana Department of Revenue show average income tax liabilities for each decile of taxpayers.<sup>16</sup> Using the proportion of each age group that is in each decile, one can calculate the average income tax liability by age. Specifically, the process to develop Montana income tax liability by age is:

1. For each national age group, calculate the portion that fall into each aggregate income decile group (defined below as “ $q_{a,k}$ ”).
2. Calculate the per person income tax liability for each age by using the following formula

$$z_a = r \sum_{k=1}^{10} q_{a,k} t_k$$

where:

$q_{a,k}$  = proportion in age group “a” that fall into income decile “k” (a = 1,5 and k = 1,10)

$t_k$  = 2005 tax liability for income decile “k”

r = adjustment factor to per capita liability from per taxpayer liability (some taxpayers file joint returns representing more than one individual)

Table 8 shows the proportion of each age group falling into each 2005 adjusted gross income decile, “ $q_{a,k}$ ”. The 0-14 age group is not listed in Table 8 since all 0-14 year olds are assumed to pay no taxes. (The Annual Demographic Survey suggests that 0-14 income on

---

<sup>16</sup> See footnote 14.

average is trivial.) For further discussion of the calculation of the portions in Table 8, see the Appendix.

Table 8. Distribution of Age and Tax Liability by 2005 Income Deciles.

Decile Group	Income Range	Proportion of Each Age in Each Decile				Tax Liability per Taxpayer
		15-24	25-44	45-64	Over 64	
1 <sup>st</sup> (lowest)	Less than 3,514	0.187	0.051	0.047	0.241	0.11
2 <sup>nd</sup>	3,515-7,630	0.243	0.065	0.067	0.126	17.33
3 <sup>rd</sup>	7,631-12,023	0.156	0.069	0.078	0.165	76.93
4 <sup>th</sup>	12,024-16,688	0.144	0.101	0.096	0.070	190.53
5 <sup>th</sup>	16,689-21,653	0.104	0.105	0.087	0.122	371.84
6 <sup>th</sup>	21,654-27,683	0.071	0.118	0.100	0.085	636.43
7 <sup>th</sup>	27,684-35,222	0.049	0.129	0.111	0.056	952.56
8 <sup>th</sup>	35,223-45,106	0.026	0.130	0.120	0.055	1,348.77
9 <sup>th</sup>	45,107-63,379	0.013	0.122	0.139	0.044	2,033.89
10 <sup>th</sup> (highest)	More than 63,379	0.006	0.110	0.156	0.044	7,818.70
Per Person Tax Liability by Age		196.17	1078.00	1320.05	480.19	

For example in the above table, 18.7 percent (the “q” value) of the 15-24 year olds fall into the lowest adjusted gross income decile paying \$0.11 (the value for “t”) tax liability per taxpayer. Furthermore the per person tax liability in age group “15-24” is the sum of the multiples of the proportions under the column labeled “15-24” and the value in the same row under the “Tax Liability Per Taxpayer” column and “r” the previously defined adjustment factor. The number of 2005 Montana taxpayer exemptions is 469,284 and the number of spousal exemptions is 203,176 and so  $r = 469,284 / (469,284 + 203,176) = 0.6979$ . The working age, population (25-64) pay substantially more taxes than the young (less than 25) or the elderly (over 64).

The U.S. Census Bureau projections of population by age group are then applied to the tax liabilities per person shown in the bottom row of Table 8. The results are displayed in Table 9.

Table 9. Population Age Distribution and Tax Liability from 2005 to 2030.

Year	Age Group Population Proportions by Year					Tax Liability
	0-14	15-24	25-44	45-64	Over 64	Per Capita
2005	0.189	0.139	0.252	0.282	0.139	736.85
2010	0.183	0.122	0.249	0.296	0.150	755.30
2020	0.179	0.102	0.247	0.264	0.207	734.70
2030	0.167	0.105	0.213	0.257	0.258	713.24

The accuracy of this method is dependent on the degree to which the national income probability distribution is congruent (has the same shape but not necessarily the same mean) as Montana adjusted gross income distribution by age. If this method produces a reasonable estimate then the estimated 2005 State Tax Liability Per Capita of \$736.85 (Table 9) should be close to actual taxes collected in 2005 of \$685,967,399<sup>17</sup> divided by the 2005 population of 933,005 which is \$735.22. At least by this measure the above method appears to be quite accurate.

As shown in Figure 22, the tax liability per capita increases from 2005 to 2010 and then declines to 2030. The decline between 2010 and 2030 is \$42 or 5.6 percent.

<sup>17</sup> Montana Department of Revenue, *Biennial Report July 1, 2004 to June 30, 2006*, p. 29.

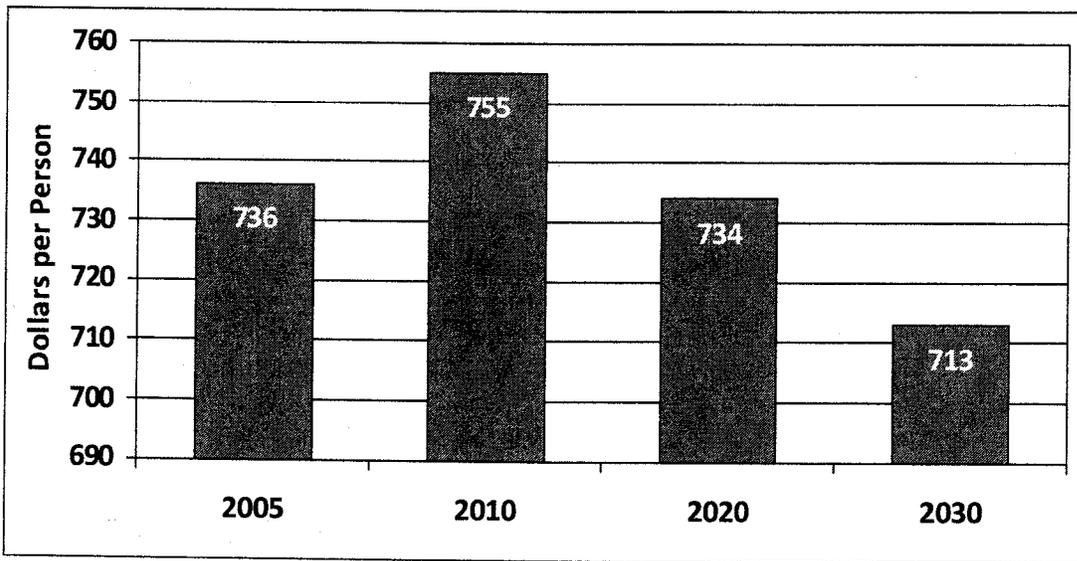


Figure 22. Individual Resident Income Tax Liability per Person.

### SUMMARY AND CONCLUSION

Montana will become much older in coming decades as the “Baby Boom” generation reaches traditional retirement age. Changing demographics will affect state and local government budgets in a variety of ways. This report has made a “first cut” at analyzing some of the fiscal impacts. Our analysis focuses on changes in the age distribution by holding all other factors constant: expenditures per student, per capita incomes, tax rates and so forth. Thus, the projected changes described here stem solely from the expected changes in the age composition of the Montana population.

Table 10 summarizes the results for the expenditure side of the budget. Between 2010 and 2030, expenditures on K-12 education are projected to fall by about \$78 per Montana resident. Expenditures on higher education are expected to fall by \$23 per Montanan, and corrections expenditures by \$17. The state’s share of Medicaid spending is projected to increase

by \$37 per Montanan. Taken all together, expenditures are projected to decrease by \$81 per Montana resident.

Table 10. Summary of Selected Expenditures.  
Dollars per Montana resident

	<b>2010</b>	<b>2030</b>	<b>Change</b>
K – 12 Education	1,356	1,278	-78
Higher Education	129	106	-23
Corrections	137	120	-17
Medicaid	233	270	37
Total	1,855	1,774	-81

Table 11 summarizes the results for selected tax revenues. Residential property taxes are expected to increase by \$19 per Montana resident, while income taxes are expected to fall by \$42 per Montanan. The total effect is a decline in tax revenues of \$23 per resident.

Table 11. Summary of Selected Tax Revenues.  
Dollars per Montana resident

	<b>2010</b>	<b>2030</b>	<b>Change</b>
Property Taxes	525	544	19
Income Taxes	755	713	-42
Total	1,279	1,255	-23

Table 12 combines the projected changes in revenues and expenditures. The decline in total tax revenues of \$23 is more than offset by reduced expenditures of \$81, so state and local government moves toward a surplus of \$58.

Table 12. Summary of Revenue and Expenditure Projections.  
Dollars per Montana resident

	<b>2010</b>	<b>2030</b>	<b>Change</b>
Tax Revenues	1,279	1,255	-23
Expenditures	1,855	1,774	-81
Net			58

It is worth repeating that these projections hold all factors other than the age distribution constant. Thus, the projections are not forecasts of actual revenues and expenditures, because they will be affected by changes in per capita income, spending per student, health care costs and other factors. What the projections do tell us, however, is that the impacts of more elderly on Medicaid spending and income tax revenues are largely offset by the impacts of fewer young people on education and corrections expenditures, and on residential property tax revenues.

The expenditure projections are undoubtedly extremely conservative, because they do not account for any increased costs. In contrast, the Congressional Budget Office (CBO) reports that Medicaid spending per beneficiary grew 2.2 percent per year faster than income per person during the 1975-2004 period.<sup>18</sup> If these trends continue, Medicaid costs will be more than 50 percent higher than those projected here. In addition, projected costs for Medicaid and Medicare will put severe strains on the Federal budget. One result may be further increases in the share of Medicaid that is paid from state sources.

Future efforts could improve this study in a number of ways. First, Montana data on income taxes and residential property taxes would be better than relying on national data. An inventory could be compiled of other age-related revenues and expenditures. One could incorporate trends in income, consumption and costs. For example, increases in per capita income will increase tax revenues, but they are also likely to increase costs for teachers, health care workers, and others. Cost increases for health care such as those described by the CBO could also be incorporated. Additional regional breakdowns could be performed, especially with regard to school-age populations. There is some evidence that the U.S. Census Bureau's population projections, which were released in 2005, are already off the mark. Thus, a

---

<sup>18</sup> Congressional Budget Office, *The Long-Term Budget Outlook*, December, 2007, p. 23.  
<http://www.cbo.gov/ftpdocs/88xx/doc8877/12-13-LTBO.pdf>

reassessment of the demographic forecast would be useful. Finally, changes in the age distribution are likely to have many other impacts on the overall economy and government.

## **APPENDIX: Calculation of the Portion of Each Age Group**

### **Falling in Each Income Decile**

The Annual Demographic Survey publishes the distribution of income by age. The age groups are different than those published earlier in the text. The lower age group is 15 to 24 rather than with an age group break at 18. Many adjustments could be made to the income data to more accurately reflect Montana adjusted gross income (MAGI). However, this study focuses on Social Security because Social Security benefits are mostly available to the elderly. For those over 64 an adjustment to income was made to reflect the tax exempt nature of Social Security. We assumed that all residents over 64 received \$10,000 of Social Security (about the average Social Security benefit.) For those over 64 and with less than \$11,000 of income, the \$10,000 is subtracted from their income. If their income is between \$11,000 and \$17,000, \$5,000 is subtracted from their income. If their income is greater than \$17,000, then \$1,500 is subtracted from their income to reflect that 15 percent of their Social Security benefits are not taxed. These adjustments for Social Security are admittedly unrefined. Other adjustments could be made to reflect exemptions and other tax complications. However the important concern is the relative ordinal ranking of income levels across age groups. Since in the Annual Demographic Survey incomes are grouped in \$2,500 increments and that the decile group breaks do not occur at the \$2,500 increments, some interpolation was necessary to calculate the portion of each age group falling in each income decile.

The model efficacy was further tested in the following manner. If the method is accurate in the sense that the national income distribution by age is representative of the Montana distribution, then the sum of the multiple of the age group portion in each decile, "q", and the 2005 portion in each age group, "p", should equal 0.10. Table 13 provides this calculation.

Table 13. 2005 Calculated Portion in each Decile.

Income Decile	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
Calculated Portion	0.106	0.107	0.104	0.101	0.100	0.098	0.096	0.096	0.096	0.097

Notice that the calculated portions are close to the expected value of 0.10.

# **Project 2030 Donors**

- Blue Cross/Blue Shield of Montana
- Montana Agricultural Experiment Station
- Montana Area Agencies on Aging Association
- Montana Association of Counties
- Montana Bankers Association
- Montana Chamber Foundation
- Montana Extension Service
- NorthWestern Energy
- PPL Montana

# Project 2030 Montana Ageing

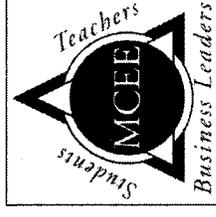
George Haynes  
Myles Watts  
Doug Young

Department of Agricultural Economics and Economics  
Montana State University

December 2008

This presentation and the associated report can be found at

<http://www.econedmontana.org>



# Project Outline

1. Ageing Population
2. Selected Government Expenditures
3. Selected Tax Revenues