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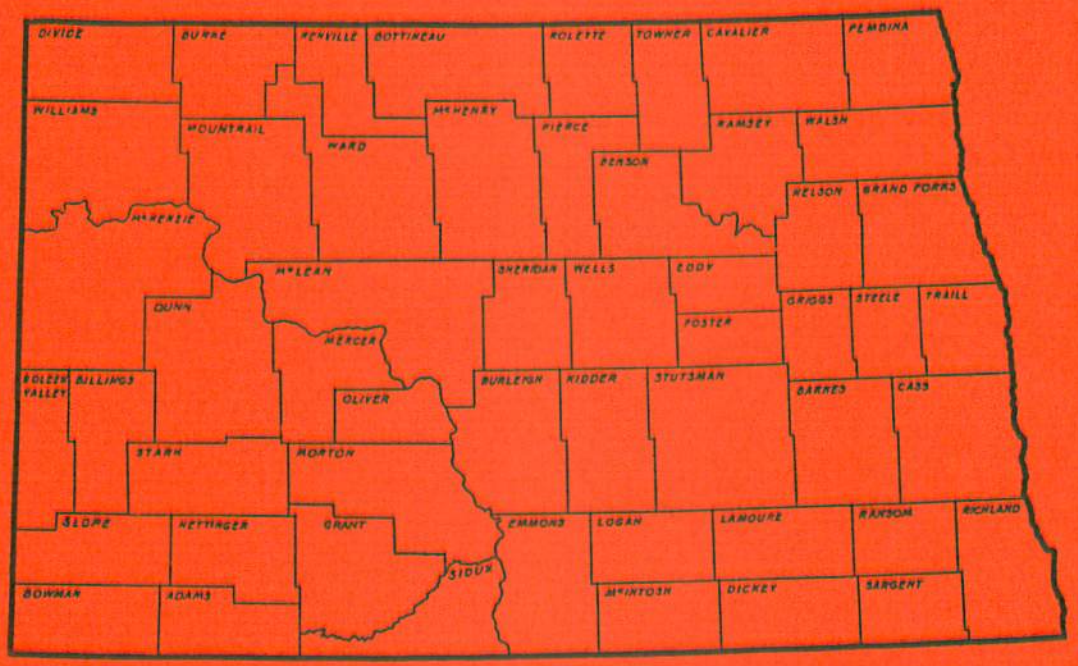
THE AGING POPULATION: PROJECTIONS AND PROBLEMS IN FUNDING HUMAN SERVICES



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FOREWORD

This report is one of a series of miscellaneous demographic reports prepared prior to publication of the 1980 Census. It was developed to analyze prior population projections and assess their reliability for use by organizations and agencies in North Dakota.

ACKNOWLEDGMENTS

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The Aging Population: Projections and Problems in Funding Human Services

by
John P. Smith[1]

Elderly in most societies are honored by family and community for their lives of hard work. The family and the community have traditionally accepted the role of caring for the elderly. The probability of a debilitating illness increases with age. As the life expectancy of the elderly increases, more people have a probability of living longer. As individuals live longer, they outlive their resources. At this point they may become a liability to their family and the community.

This two-fold problem of more elderly with greater longevity has been addressed by state and federal programs. Funds and grants are available for communities to establish health and nursing care facilities as well as nutrition and social services for the elderly. Programs and services for the elderly should be planned on the basis of present and projected population aggregates. The central emphasis of this work is to establish some basic demographic projections for the elderly cohort, those who are aged 65 or over. Central to the decision to initiate services or expand services is the expansion of the aging population. Program development involves planning. This is a systematic process of making decisions through which one makes rational choices among solutions to problems.

There are indications that people are living longer because of advances in medicine and technology. The proportion of individuals reaching age 65 has increased; it now stands at close to 70 percent of those in an age cohort. Another fact to be considered is the process of aging as it affects the post-war baby boom. Those children born from 1946 to 1955 have been called the "baby boom" cohort. As this group of children mature, they have a pronounced impact on social services and institutions. This large aggregate of people will age consistently over time.

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The census classification includes several five year age increments: these are 65-69, 70-74, 75-79, 80-84, and 85 and over. Each five or more year increment is an age cohort. People age and consistently pass from one cohort to another. The cohort is used to provide a reliable age range for population comparisons. One age group can be compared at one time (i.e., 1970) with another time (i.e., 1980) for size and change in size. Those people over 65 are frequently grouped together for the sake of retirement. Hence the age cohort of all people who have reached the age of 65 is used.

Units of observations for age cohorts are the counties and regions in North Dakota. There are 53 counties and eight state regions in North Dakota. Why choose these units of observations? Because counties are the basic unit of services for many programs for the elderly. Each county is expected to have a county mill levy of one mill to provide a source of local revenue. The source of this fund is local property tax, voted upon by the taxpayer. This fund is matched by state and federal funds. The programs and projects have local elected councils that report to the county commissioners for the application for funds. Federal funds in some categories (e.g., poverty) are allocated to county units. State planning regions were developed with one central regional growth center that contains key services for the region.

Demographic Methods

Three demographic tools are used in this report, the population projection, the population estimate, and the population report. The census is taken every ten years. It contains an enumeration of detailed characteristics of the population for each state, county, and subdivision. Population projections are analytic tools for predicting the characteristics of populations based upon past population trends. This projection can be for five and ten year intervals into the future. It is reliable for larger aggregates of population and for periods of time and areas where rapid change does not occur. Population estimates are reported by the Department of Commerce (Bureau of the Census) for states, counties, and civil divisions. They are based on past census reports and school attendance figures, car license registrations and other administrative records. Federal estimates for North Dakota have been developed for 1975 and 1978.

Murdock and Ostenson (1976) developed a three factor demographic model to project state and county populations for five year intervals. Age and sex categories were developed for each five year period until 2000. Initial levels for the projections were drawn from the 1970 Census Reports for counties. Three key population processes (migration, mortality, and fertility) set the levels and populations for each county. The migration rate was projected from the 1960-1970 rate of migration for the states. Three levels of migration were considered for the projections. These were the 1960 to 1970 migration rate; one-half the 1960-70 migration rate; zero migration rate. Three fertility rates were used for the projections: 2.5, 2.1, and 1.8 births per female in the fertile years (15 to 44). Finally, mortality rates established by Ludtke and Blair (1974) for each county were used.

Two assumptions were made for this analysis from the Murdock and Ostenson projections. First, the low birth rate level (1.8 births per female) was selected because of the decreasing number of births in the state from 1970 to 1976. Second, a migration rate equivalent to one-half the 1960-70 migration rate was selected. North Dakota has probably lost some population through migration. Energy and irrigation impacts of recent years may have had some effect on reducing the outflow of people.

Population of Elderly (1970 and 1980)

One first examines changes in the aged cohort from 1970 to 1980, and also deals with either a projection or an estimate, since the 1980 Census results will not be available until 1981 or 1982 for detailed characteristics. The 1970 Census Reports gave reliable age distributions by five year aggregates or cohorts. Figures for each county and region are developed from the 1970 Census. The Murdock-Ostenson projections provide one method of generating population figures for 1980, given the two assumptions above.

Table 1 provides the total number of people and the number of elderly (65+) for 1970 and 1980. There is also a percentage change for each county. The figures were developed from 1970 Census data and the 1980 population projection from Ostenson and Murdock.

All counties are projected to have an increase in the number of elderly. The Murdock and Ostenson analysis suggests a natural increase due to longevity.

TABLE 1. 1970 AND 1980 ESTIMATED TOTAL POPULATION, NUMBER OF ELDERLY, AND CHANGE IN PER CENT IN ELDERLY OF TOTAL POPULATION

	1970		1980		
	Number of Total Population	Number of Elderly	Number of Total Population	Number of Elderly	Elderly % +/-
Region I					
Divide	4,564	605	4,161	742	+22.6
McKenzie	6,127	606	6,376	768	+26.7
Williams	19,301	1,851	18,808	2,341	+26.5
Region II					
Bottineau	9,496	1,339	8,916	1,581	+18.1
Burke	4,739	586	4,316	772	+31.7
McHenry	8,977	1,110	8,353	1,430	+28.8
Mountrail	8,437	990	8,426	1,174	+18.6
Pierce	6,323	792	5,979	1,032	+30.3
Renville	3,828	405	3,702	569	+40.5
Ward	58,560	4,023	66,940	5,158	+28.2
Region III					
Benson	8,245	1,049	8,365	1,212	+15.5
Cavalier	8,213	1,082	8,332	1,265	+16.9
Eddy	4,103	659	3,815	774	+17.5
Ramsey	12,915	1,743	12,791	1,990	+14.2
Rolette	11,549	902	13,339	1,128	+25.1
Towner	4,645	640	4,281	746	+16.6
Region IV					
Grand Forks	61,102	4,584	73,101	5,186	+13.1
Nelson	5,776	1,125	5,137	1,146	+ 1.9
Pembina	10,728	1,602	10,604	1,725	+ 7.7
Walsh	16,251	2,272	15,678	2,536	+11.6
Region V					
Cass	73,653	7,240	79,540	8,462	+16.9
Ransom	7,102	1,248	6,846	1,353	+ 8.4
Richland	18,089	2,590	17,890	2,784	+ 7.5
Sargent	5,937	799	5,806	880	+10.1
Steele	3,749	509	3,380	543	+ 6.7
Traill	9,571	1,653	8,986	1,821	+10.2
Region VI					
Barnes	14,669	2,130	13,788	2,370	+11.3
Dickey	6,976	1,111	6,587	1,200	+ 8.0
Foster	4,832	606	4,685	681	+12.4
Griggs	4,184	667	3,858	771	+15.6
LaMoure	7,117	992	6,631	1,169	+17.8
Logan	4,245	400	4,021	575	+43.8
McIntosh	5,545	810	4,910	972	+20.0
Stutsman	23,550	2,867	22,675	3,381	+17.9
Wells	7,845	1,067	7,332	1,242	+16.4

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TABLE 1. 1970 AND 1980 ESTIMATED TOTAL POPULATION, NUMBER OF ELDERLY, AND CHANGE IN PER CENT IN ELDERLY OF TOTAL POPULATION (CONT.)

	1970		1980		
	Number of Total Population	Number of Elderly	Number of Total Population	Number of Elderly	Elderly % +/-
Region VII					
Burleigh	40,714	3,200	45,706	4,416	+38.0
Emmons	7,200	717	6,780	915	+27.6
Grant	5,009	453	4,752	649	+43.3
Kidder	4,362	436	4,263	561	+28.7
McLean	11,251	1,346	10,660	1,698	+26.2
Mercer	6,175	667	5,979	935	+40.2
Morton	20,310	2,075	20,889	2,497	+20.3
Oliver	2,322	170	2,403	256	+50.6
Sheridan	3,232	358	2,971	464	+29.6
Sioux	3,632	175	4,242	235	+34.3
Region VIII					
Adams	3,882	491	3,621	592	+20.6
Billings	1,198	75	1,186	141	+88.0
Bowman	3,901	431	3,952	538	+24.8
Dunn	4,895	406	4,505	576	+41.9
Golden Valley	2,611	363	2,476	427	+17.6
Hettinger	5,075	487	4,789	677	+39.0
Slope	1,484	116	1,939	210	+81.0
Stark	17,613	1,730	20,419	2,227	+28.7

Blair has noted that there have been slight decreases in the age specific death rates for cancer and heart disease among the elderly in North Dakota.[1] The number of elderly may contain errors from migration. Among the migrants are "snowbirds." The "snowbirds" are the elderly who have sold, leased, or rented their farms or businesses and moved to retirement areas in the South for the winter. The leaner economic conditions of the late 1970's may have minimized such seasonal migration.

Slope, Grant, Logan, Billings, Dunn, Oliver, and Renville are counties projected to have the greatest percentage increases in elderly. The Western Regions (State Region I, VII, and VIII) show the largest increases in percentages. Care must be taken here because the 1970 bases were small. The Eastern Regions (State Regions IV and V) show the smallest increases in the percentage increases

[1]Discussion with State Demographer Richard Blair (March, 1980).

of the elderly. This technique of population projection shows decreasing population size for most counties with a state total projected to be around 640,000. This might be on the low side as a figure for the state population. The aging population for each county and for the state is increasing. The proportion of elderly (65 and over) will probably be close to 12.4 percent of the state's population on the 1980 Census.

County Ranks for Percentages of Elderly

It is important to assess any changes among counties and regions. Funds for aging programs are allocated on the bases of population density and assessed need.

The number of elderly, the percentage of elderly in 1970 and 1980 (projected) and the rank for each county is presented in Table 2. Each county is ranked for the percentage of elderly (65+) in the population for the 1970 Census and the 1980 projected population. Nelson county has the highest percentage of elderly for both 1970 and 1980 (projected). Sioux County has the lowest percentage of elderly (65+) for both times. Some counties show little change in rank for percentage of elderly. Some counties, like Burke, Grant, and Sargent, show great changes in rank. All counties are showing increases in the number of elderly and the percentage of elderly as part of the total. Some counties are increasing more rapidly while the total population may be increasing or decreasing at various stages.

Reliability and Stability of Rankings

Assessing the stability in ranks between the 1970 Census and the 1980 projection is important. Rankings of percentages of aging populations show some changes. The issue is whether the slippages in ranks are sufficient to imply that the emerging order to counties according to the 1980 rankings are significantly different from the 1970 Census rankings. To assess the problem of slippages in rank, it is necessary to establish the reliability of each rank order by an independent third ranking.

A Spearman's Rank Order Correlation procedure was used.[2] Each county was ranked from high elderly per cent to low per cent of elderly for 1970 and

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[2]The formula for this Spearman's Rank Order Correlation is:

$$r = \frac{1-6\sum d^2}{N(N^2-1)}$$

Where d^2 is the differences in ranks squared and N is the number of counties

TABLE 2. NUMBER OF ELDERLY, PERCENTAGE OF ELDERLY, RANK OF EACH COUNTY BY PERCENTAGE FOR EACH COUNTY BY EACH REGION, 1970 AND 1980 ESTIMATE

	1970			1980		
	Number of Elderly	Per Cent of Elderly	Rank	Number of Elderly	Per Cent of Elderly	Rank
Region I						
Divide	605	13.3%	20	742	17.8%	9
McKenzie	606	9.9	38	768	12.1	42
Williams	1,851	9.6	41.5	2,341	12.5	41
Region II						
Bottineau	1,339	14.1	11	1,581	17.7	10
Burke	586	12.4	26.5	772	17.9	8
McHenry	1,110	12.4	26.5	1,430	17.1	16
Mountrail	990	11.7	30	1,174	13.9	35
Pierce	792	12.5	24.5	1,032	17.3	13
Renville	405	10.6	34	569	15.4	27
Ward	4,023	6.9	51	5,158	7.7	51
Region III						
Benson	1,049	12.7	23	1,212	14.5	31.5
Cavalier	1,082	13.2	21	1,265	15.2	28.5
Eddy	659	16.1	4	744	19.5	6
Ramsey	1,743	13.5	18.5	1,990	15.6	24.5
Rolette	902	7.8	47.5	1,128	8.5	50
Towner	640	13.8	15	746	17.4	11
Region IV						
Grand Forks	4,584	7.5	49	5,186	7.1	52
Nelson	1,125	19.5	1	1,146	22.3	1
Pembina	1,602	14.9	7	1,725	16.3	18.5
Walsh	2,272	14.0	12	2,536	16.2	20
Region V						
Cass	7,240	9.8	39.5	8,462	10.6	48
Ransom	1,248	17.6	2	1,353	19.8	2.5
Richland	2,590	14.3	10	2,784	15.6	24.5
Sargent	799	13.5	18.5	880	15.2	28.5
Steele	509	13.6	16.5	543	16.1	21
Traill	1,653	17.1	3	1,821	20.3	2
Region VI						
Barnes	2,130	14.5	9	2,370	17.2	15
Dickey	1,111	15.9	5.5	1,200	15.2	7
Foster	606	12.5	24.5	681	14.5	31.5
Griggs	667	15.9	5.5	771	20.0	3
LaMoure	992	13.9	13.5	1,169	17.3	13
Logan	400	9.4	43	575	14.3	33
McIntosh	810	14.6	8	972	19.8	4.5
Stutsman	2,867	12.2	28	3,381	14.9	30
Wells	1,067	13.6	16.5	1,242	16.9	17

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TABLE 2. NUMBER OF ELDERLY, PERCENTAGE OF ELDERLY, RANK OF EACH COUNTY BY PERCENTAGE FOR EACH COUNTY BY EACH REGION, 1970 AND 1980 ESTIMATE (CONT.)

	1970			1980		
	Number of Elderly	Per Cent of Elderly	Rank	Number of Elderly	Per Cent of Elderly	Rank
Region VII						
Burleigh	3,200	7.9%	46	4,416	9.7%	49
Emmons	717	10.0	36.5	915	13.5	38
Grant	453	9.0	44	649	13.7	36
Kidder	436	10.0	36.5	561	13.2	39
McLean	1,346	12.0	29	1,698	15.9	22
Mercer	667	10.8	33	935	15.6	24.5
Morton	2,075	10.2	35	2,497	12.0	43
Oliver	170	7.3	50	256	10.7	47
Sheridan	358	11.1	31	464	15.6	24.5
Sioux	175	4.8	53	235	5.5	53
Region VIII						
Adams	491	12.8	22	592	16.3	18.5
Billings	75	6.3	52	141	11.9	44
Bowman	431	11.0	32	538	13.6	37
Dunn	406	8.3	45	576	12.8	40
Golden Valley	363	13.9	13.5	427	17.3	13
Hettinger	487	9.6	41.5	677	14.1	34
Slope	116	7.8	47.5	210	10.8	46
Stark	1,730	9.8	39.5	2,227	10.9	45

1980 projected. In case of a tie, the median rank was given and the next rank deleted. The ranks were correlated at a .894 level, relative to a range of .000 to 1.000. This indicates a high degree of similarity between ranks. The counties with high percentages of elderly as part of the total population in 1970 were probably going to retain their rank for high percentage of elderly in 1980.

A second issue of importance is the reliability of the Murdock-Ostenson projection. A population projection was developed for each county based upon the birth rates, migration rates, and death rate. The latter two rates (migration and death) have pertinence for the elderly. Death rates are decreasing slightly for the higher aged cohorts. The greater source of error for those projections for the elderly might be migration, especially to the South, after retirement.

Each county was ranked according to its projected size of 1980 total population. The assumption was low birth rate (i.e., 1.8 births) and a migration rate of one-half the 1960-70 migration rate for the county. This rank in size was compared to the estimated population for each county as of 1977, which was based on the 1978 Estimates of Population of North Dakota and Metropolitan Areas. These two sources are relatively exclusive. Murdock and Ostenson rely on three variables (births, deaths, and migration) to develop their long range projections. The estimate of populations rely upon multiple indicators that include number of registered motor cars, school enrollment for grades 1 through 8, and various other administrative records. The two rank orders for size were compared. There was a .993 correlation between ranks. This indicates a high degree of similarity of ranks, hence stability.

Implications

Several suggestions follow from the methodological procedures above. The Murdock and Ostenson projection procedure shows a high degree of reliability when comparing total county population for 1980 with the estimates of population for 1977. There also is a great deal of similarity in ranks for the actual percentage of the elderly for 1970 and the projected percentage for 1980. This similarity in ranking suggests that the percentages derived from Murdock and Ostenson are reliable and these projected percentages have a relatively high degree of stability.

The issue of program resources based upon the number of elderly and the percentage of elderly requires some discussion. The key to funding senior citizen services in North Dakota is the Senior Citizen mill levy. Mill levy legislation for senior citizen activity originated during the 1971 legislature. At that time, a county or a city was permitted a one mill levy after the passage of a voted measure with a 60 percent majority vote. The 1979 legislature passed a measure to match local mill levy funds with state appropriations for the 1979-81 biennial budget. Funds acquired could be spent on a variety of federal programs based upon a local assessment of needs and interests.

Only 28 counties have passed such an appropriation. Eight counties in the top 20 ranked counties (based on high percentage of elderly) have no county mill levy and no basis to acquire state matching funds. These counties are: Burke,

McHenry, Eddy, Barnes, McIntosh, Wells, Adams, and Golden Valley. The city of Bottineau, in Bottineau County, has passed such a measure, but the county has not.

The number of elderly in North Dakota will continue to rise. The rise is predictable and looks relatively steady. The visibility and concentration of the elderly might not be so evident. Many elderly choose to live in smaller towns and hamlets, comprising a very high proportion of the residents of such towns. In some rapidly growing counties (i.e., the energy impact area) the position of the elderly is weakened. Their numbers are rising. They are less visible because of the population influx. They become a shrinking percentage of the population. In those counties with shrinking populations and out-migration, the situation is reversed. The elderly are concentrated in smaller towns and the open country side. They become more visible. The availability of services is limited in this context. The services should be funded from property tax through county mill levy for the program. It is difficult to get such permissive legislation passed in a context of shrinking populations. It is the role of the aging programs to provide services to these elderly as well as those in areas with population expansions.