The LEWIN GROUP

and

ECONorthwest

Long Term Forecast of Medicaid Enrollment and Spending in Alaska: 2005-2025

Prepared for:

Alaska Department of Health and Social Services

Prepared by:

The Lewin Group and ECONorthwest

February 15, 2006

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Executive Summary

In April 2005 the Alaska Department of Health and Social Services (ADHSS) contracted with the Lewin Group and ECONorthwest to develop a long-term forecasting model of Medicaid spending for the State of Alaska. This document describes the steps undertaken in the development of the forecasting model and provides details on the projected growth in enrollment, utilization, and spending on Alaska's Medicaid program through 2025.

This report is intended to inform ADHSS executives and the Alaska State Legislature of the substantial projected growth in total spending on Alaska's Medicaid program and the projected growth in state matching fund spending on the Medicaid program. The projections of total and state matching fund spending presented in this report assume that the mix of Medicaid services remains constant and that eligibility criteria do not change in the future. These assumptions were necessary to show how Medicaid spending in Alaska would grow under the program's status quo. The statistical models developed for this analysis will be provided to ADHSS staff providing them the ability to update the Medicaid forecast as more timely data become available.

KEY FINDINGS

The Alaska Medicaid program will fundamentally change over the next 20 years from a program that centers on children to one that is dominated by seniors (age 65 and older). This is a result of changes in Alaska's demographic profile, which will include many more seniors. On a per-recipient basis, spending on Medicaid services for seniors is substantially higher than spending for children. As this portion of the population grows rapidly over the next 20 years, Medicaid spending will also grow rapidly. In calendar year 2005, approximately 42% of spending on Medicaid claims was devoted to children and 22% was devoted to seniors. By 2025, we expect that approximately 45% of Medicaid spending will be devoted to seniors and approximately 30% will be devoted to children. As Figure 1 shows, we expect spending on Medicaid claims for the elderly to surpass spending on the working-age population by 2015 and to surpass spending on children by 2018.

Figure 1: Spending on Elderly will Surpass Spending on Other Age Groups by 2018

Forecasted Proportion of Total Spending on Medicaid Claims by Age Group, 2005-2025
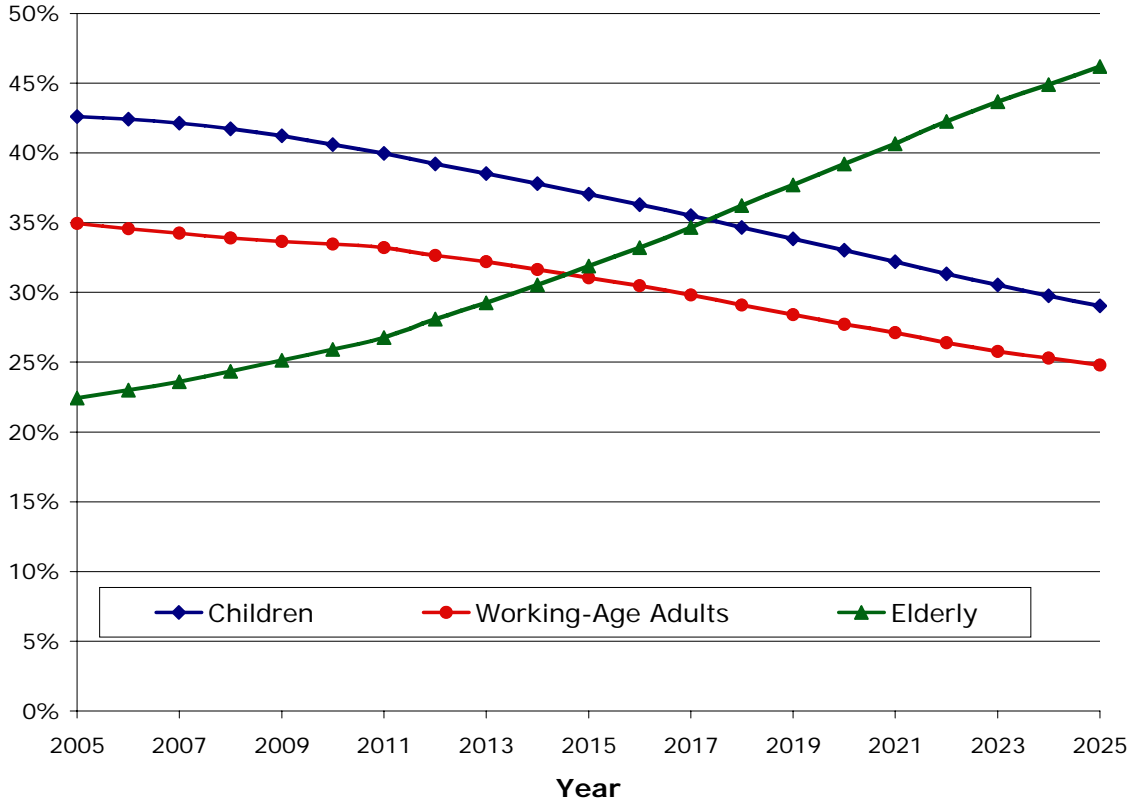
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.
Note: Spending projections are on an incurred service basis.

Among the key findings of this report are the following:

- More important than any of the other factors in our projection of the Alaska population, the 65 and older population is projected to grow rapidly, almost tripling from 43,000 to 124,000 between 2005 and 2025.

- Alaska's Medicaid program has been a program dominated by spending on services for children but it will change to one much more focused on the elderly. This change will affect the mix of benefits that Medicaid provides and, more importantly, the cost. Average per-recipient costs of Medicaid services are much higher for the elderly than for children.

- Projected to grow a little faster than the state's population, we expect Medicaid enrollment—on a full time equivalent basis—to reach 131,000 by 2025 (compared to 95,000 in 2004).

- Total spending on Medicaid claims will increase from approximately $975 million in CY 2005 to approximately $4.7 billion in CY 2025.

- An increasing share of the Medicaid burden will be shifted away from the federal government to the state. State matching funds for Medicaid claims are projected to increase at a faster rate than the total Medicaid program—8.9% versus 7.6% for total funds (see Figure 2).

Figure 2: State Matching Fund Spending on Medicaid to Grow 8.9% Annually

Total Forecasted State Matching Funds for Medicaid Claims (in Millions of Dollars), 2005-2025

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.
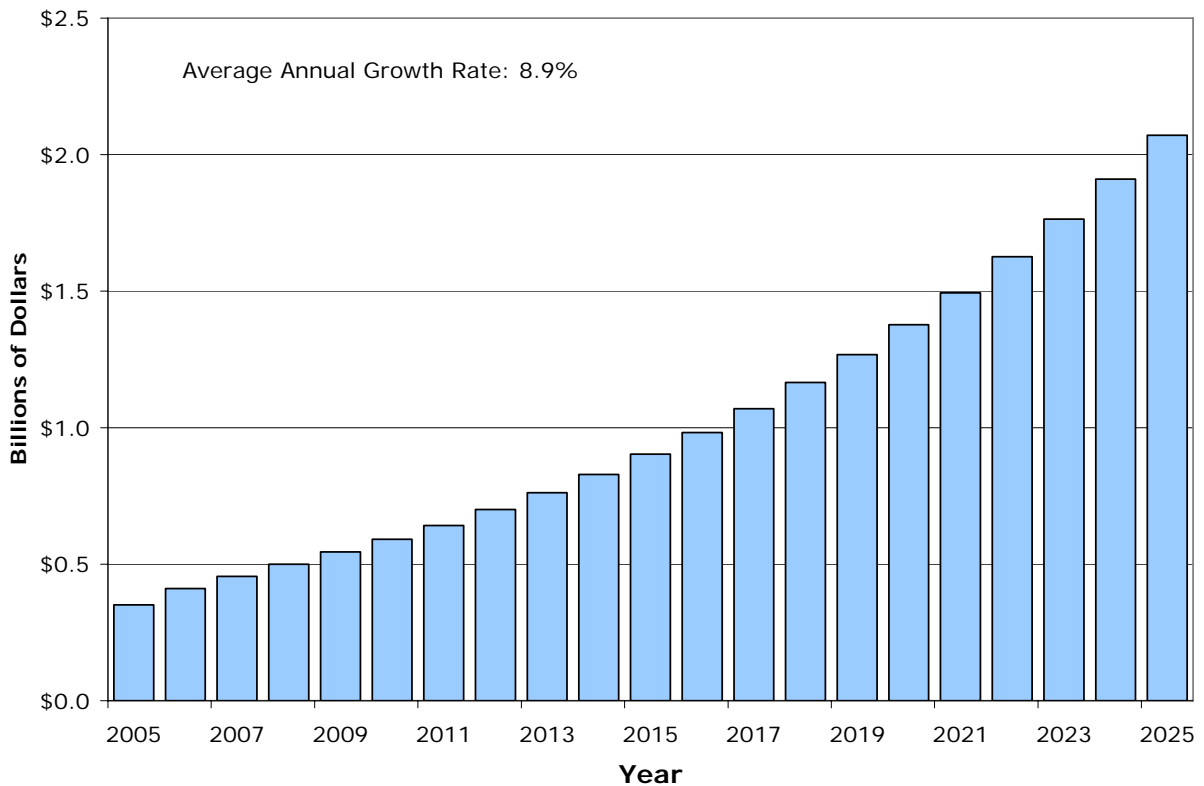Note: Spending projections are on an incurred service basis. Not adjusted for inflation.

Table 1 and Table 2 show projected utilization and spending for the five fastest growing Medicaid service categories. With the exception of Vision Services, these categories are also expected to be among the most expensive Medicaid services provided in 2025. In fact, As Table 2 shows, over half of state matching funds will be spent on just two service categories—Personal Care and HCB Waiver. These are two of the most important Medicaid service categories for Alaska's seniors.

Table 1: Forecast of the 5 Fastest Growing Service Categories by Utilization, 2005-2025

Medicaid Service	Calendar Year					Average Annual % Change (2005-2025)	Rank by Avg. Annual % Change
	2005	2010	2015	2020	2025		
Personal Care	5,029	8,626	14,587	23,617	35,311	9.7%	1
HCB Waiver	4,167	7,004	11,428	17,686	25,263	9.0%	2
Residential Psych./BRS	1,227	1,898	2,766	3,889	5,319	7.3%	3
Therapy/Rehabilitation	9,949	15,240	22,242	31,135	41,529	7.1%	4
Vision	24,288	35,006	47,669	61,614	75,190	5.7%	5
Unduplicated Count of Medicaid Recipients	113,953	130,047	141,184	148,117	150,743	1.4%	NA
Unduplicated Count of Medicaid Enrollees	132,344	151,036	163,971	172,022	175,073	1.4%	NA

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Note: In this analysis we define service utilization as the annual unduplicated count of persons who used a particular Medicaid service during the fiscal year

Table 2: Forecast of the 5 Fastest Growing Service Categories by State Matching Funds (In Millions of Dollars), 2005-2025

Medicaid Service	Calendar Year					Avg. Annual % Change (2005-2025)	Rank by Avg. Annual % Change
	2005	2010	2015	2020	2025		
Personal Care	$48.7	$105.0	$200.6	$367.3	$629.1	12.8%	1
HCB Waiver	$49.0	$100.6	$181.8	$316.1	$520.4	11.8%	2
Residential Psych/BRS	$27.1	$52.9	$88.0	$141.1	$221.5	10.5%	3
Therapy/Rehabilitation	$11.5	$21.7	$35.4	$56.3	$85.9	10.0%	4
Vision	$0.4	$0.8	$1.2	$1.7	$2.4	8.6%	5
All Medicaid Services	$350	$591	$902	$1,377	$2,070	8.9%	NA

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Note: Dollars are not adjusted for inflation.

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- State matching fund spending on claims provided by the Alaska Medicaid program will grow from approximately $350 million in calendar year 2005 to just over $2 billion in calendar year 2025.

- The main factors responsible for growth in spending on Medicaid services are population growth, aging of the population, increasing utilization of Medicaid services by enrollees, and growth in the prices of medical services.

- Growth in total (federal and state funds) spending on claims will slow from the pace of the last decade. On an average annual basis, total spending on Medicaid claims is projected to increase by 7.8%. Comparatively, between 1998 and 2004, spending on Medicaid claims increased by 16.6%.

- In calendar year 2005, state-matching fund spending on Medicaid claims was approximately $500 per Alaskan citizen. We project this will grow to approximately $2,600 by 2025—an 8.0% average annual growth rate. Comparatively, per-capita personal income in Alaska is projected to grow by less than 3.0% per year over this same period.

- By 2025, more than half of state matching fund spending on Medicaid claims is expected to be for Personal Care and HCB Waiver. In CY 2005 these two service categories account for less than 30% of the state's spending on Medicaid claims.

- Medicaid enrollment will grow at almost twice the annual rate of Alaska's population (1.4% vs. 0.86%).

- For the elderly, Medicaid enrollment is also projected to grow at a greater annual rate than the population (6.3% vs. 5.3%).

- Medicaid utilization will grow by approximately 4.3% per year between 2005 and 2010, but this rate of growth will decline to approximately 2.1% between 2020 and 2025.

- We project relatively slow growth in the enrollment rates of eligibility categories specific to children (e.g. Title XIX Kids), but high rates of growth in eligibility

categories geared more heavily toward the elderly (e.g. Long Term Care Non-Cash).

- The elderly population in Alaska will almost triple between 2005 and 2025 from 43,000 to 124,000; while the child population will remain relatively stable growing only from 205,000 to 245,000 in 20 years.

- The Native population will increase on average by 1.71% per year, while the Non-Native population is expected to increase by only 0.67%. The difference between the two growth rates is expected to result in the Native proportion of the population increasing from approximately 17% in 2005 to approximately 21% by 2025.

- Currently, Natives are almost three times as likely to be enrolled in Medicaid as are non-Natives.

- The enrollment of males into the Medicaid program is projected to grow slightly faster than females. Still, due to greater life expectancies, higher rates of poverty, and pregnancy and related needs, we expect the proportion of females in the Medicaid program to remain higher than males.

- The Anchorage/Mat-Su region, with almost half of all Medicaid enrollees in 2005, is expected to increase its Medicaid population by 2.0% per year—the fastest growth of any of the regions.

Introduction—Alaska Medicaid Spending Projection

In this study, we develop long-term forecasts of Medicaid program spending from 2005 through 2025. We project spending for 20 categories of services provided under the Alaska Medicaid program. Although results are presented at state level for all residents, analysis is conducted on a regional basis for demographic subgroups of the population.

In addition to this report, the models constructed for and used in the analysis will be installed on Alaska Department of Health and Social Services (ADHSS) computers. This will provide ADHSS staff the ability to update the forecast as more timely data become available. The models were developed in the Statistical Package for the Social Sciences (SPSS) at the request of agency staff. The SPSS modeling syntax serves as documentation of the analysis, allowing ADHSS staff to operate and, if necessary, modify the models. Indeed, the primary contributions of this project are the development of a methodology and set of statistical models that will allow ADHSS staff to prepare long-term forecasts of Medicaid spending into the future. Neither the demographic profile of Alaska's population, nor the administrative aspects of the Medicaid program are static. It is important, therefore, that ADHSS staff has the ability to inform Medicaid administrators and policy makers about fiscal issues related to the Medicaid program. ADHSS now has a tool that they can use to project the impact of proposed changes to the Medicaid program.

This report presents the findings from our analysis of long-term Medicaid spending in Alaska. It is based on the most currently available data and represents a benchmark for future forecasts, but does not reflect changes in Alaska's Medicaid program made since the last year of historical data (fiscal year 2004). We recognize that changes to the Medicaid program ADHSS has implemented since FY 2004 already have had—and will continue to have—an impact on enrollment, utilization, and spending.[1] With the new long-term forecasting model in hand, these changes will be reflected in ADHSS' future updates of the forecast. Revised projections will have the same validity as the benchmarking projection because they will be based on the same model.

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[1] Examples of changes made to the Medicaid program since FY 2004 include numerous changes implemented to contain costs, the Bring the Kids Home initiative to return children in out-of-state residential psychiatric treatment centers to Alaska, changes to the Personal Care Attendant program, and the launch of Medicare's prescription drug benefits.

SUMMARY OF METHODOLOGY

The main factors responsible for growth in spending on Medicaid services are population growth, aging of the population, increasing utilization of Medicaid services by enrollees, and growth in the prices of medical services. Our methodology, therefore, entailed detailed analysis of each of these factors in order to formulate a series of statistical models to project total spending on Medicaid services. The statistical models of Medicaid enrollment, and service utilization and spending were developed using historical enrollment-level data provided by ADHSS. Population forecasts for five regions of Alaska were based on historical Census population estimates and statewide population forecasts developed by the Alaska Department of Labor and Workforce Development.

The forecast of total spending on Medicaid services depends on the following key demographic, economic, and program-related factors:

- Growth in Alaska's resident population and changes in demographic composition
- Changes in the Medicaid enrollment rate
- Changes in the utilization of Medicaid services by Medicaid enrollees
- Personal health services specific price inflation

The creation of the long-term Medicaid forecasting model for Alaska required the development of five separate modeling tasks. These include:

- **Task 1: Project population of Alaska by regional-demographic grouping:** The first step in determining the demand for Medicaid services in future years is to understand the size of the Medicaid eligible population, its demographic characteristics, and its regional distribution. We do this by projecting Alaska's population through 2025 by the following four characteristics:

  - Region (5)
  - Age Cohort (11)
  - Gender (2)
  - Native/non-Native (2)

This results in 220 subpopulations (5 * 11 * 2 * 2 = 220) that we project for each year from 2005 to 2025. The purpose of projecting Alaska's population at such detail is that eligibility for and consumption of Medicaid services differs greatly by age and gender; the federal match rate varies between Medicaid service categories and by Native/non-Native status; there may be regional differences in the eligibility and participation rates for Medicaid, as well as in the costs of service.

Task 2: Project Medicaid enrollment rate for each of the 220 subpopulations: Using Medicaid enrollment data provided by the Alaska Medicaid program for fiscal years 1997-2004, we estimated regression equations of Medicaid enrollment rates for children (0-19 years of age), working-age adults (20-64 years of age), and the elderly (65+ years of age). These equations included a range of demographic variables designed to measure differences in enrollment for these groups, including age, gender, Native/non-Native status, and region of residence.[2] Coefficient estimates from the regression equations were used to project the proportion of each of the 220 subpopulations enrolled in Medicaid through 2025. Medicaid enrollment is then allocated across the 11 eligibility classes based on historic trends. Medicaid eligibility classifications were determined by ADHSS staff.

Task 3: Project utilization by Medicaid service class for each of the 220 subpopulations: Using historic Medicaid data on utilization of Medicaid services for each of the 20 service classes, we project Medicaid utilization for each of the 20 service classes within each of the 11 eligibility groups and the 220 subpopulations. Service utilization is modeled using logistic regression, a statistical modeling technique used for estimating the probability of an event occurring. For our purposes, the event is the utilization of a particular service within a given year.

Task 4: Forecast the average and total cost per year of Medicaid services by subpopulation: Using linear regression analysis, average spending per recipient of each Medicaid service category was regressed on demographic and other explanatory

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[2] In addition, we examined statewide economic data, including total personal income, per capita personal income, and employment. The statewide data provided no explanatory power in the enrollment rate models and was, therefore, dropped from the models. Regional economic data were not examined because we know of no available long-term forecasts of such data. Statewide economic data from the University of Alaska's Institute for Social and Economic Research (ISER) were also considered in the regression models. The economic data, however, did not provide additional explanatory power and were, therefore, dropped from the models.

variables.[3] One regression model was developed and estimated for each of the 20 service categories. The results obtained from the 20 models were used to project total *real* spending *per Medicaid recipient* through 2025. Using national-level forecasts of medical inflation, we then project total annual *nominal* spending per recipient through 2025.

Task 5: Forecast total state matching fund spending on Alaska's Medicaid program: The State's obligation to cover the cost of an individual's Medicaid costs differs according to the individual's Medicaid eligibility group, category of Medicaid service, provider of Medicaid-related service, and Native/non-Native status. Based on cost share information from ADHSS and our projections of total Medicaid spending by service category, we forecast total state matching fund spending through 2025 by the State of Alaska.

Task 6: Forecast the cost of other payments and offsetting recoveries: This final component of Medicaid spending is not directly tied to individual claims and, therefore, cannot be forecasted by the same methods described above. Rather, for projections of Offsetting Recoveries, future credits are assumed to grow at approximately the same rate as in the past. For the forecasts of Medicare Part A & Part B Premiums, the historical relationship between spending on this program and growth in the elderly population (65 and older) was statistically measured and used as a basis for projecting future spending by ADHSS on Medicare Part A & Part B Premiums. Finally, for the Supplemental Hospital Payments program, the relationship between spending on this program and spending on the Inpatient and Outpatient Hospital services categories was statistically measured and used as a basis for projecting future spending on the Supplemental Hospital Payments program.

MODEL ASSUMPTIONS AND LIMITATIONS

The Lewin Group and ECONorthwest realize that the value of economic analysis depends on the quality of the data and assumptions employed. We have worked carefully to ensure the quality of our work and the accuracy of our data. Throughout this report we identify our sources of information and the assumptions used in the analysis. We have undertaken considerable effort to validate the forecast and to confirm the reasonableness of the data and assumptions on which the forecast is based.

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[3] Note: Annual Medicaid spending for each of the historical years of data is inflation adjusted into 2004 dollars.

Nonetheless, we acknowledge that any forecast of the future is uncertain. The fact that we view the forecasts in this report as reasonable does not guarantee that actual enrollment in, utilization of, and spending on the Alaska Medicaid program will equal the projections in this report. ADHSS administrators and the Alaska's elected representatives must recognize the inherent uncertainty that surrounds forecasts in considering the long-term Medicaid spending projections. The primary benefit of this report to Medicaid administrators and Alaska's policy makers is information on the direction and approximate magnitude of changes in the Medicaid program.

There are many assumptions underlying the forecast, which the Lewin Group and ECONorthwest have deemed to be reasonable. ADHSS established a steering committee of program and financial managers experienced in Medicaid policy to provide guidance throughout the process of developing the forecast models. The steering committee provided valuable feedback on the suitability of our assumptions and the reasonableness of our results. Throughout the analysis, we relied upon the best available information, including historic Medicaid claim data, the State of Alaska's official population forecast, and nationally recognized information on trends in medical prices. In addition, in no instances do we impose any speculation on future Medicaid policies or procedures. Rather, we develop the long-term forecast as if the policies and practices of today will be the status quo throughout the forecast period. Assumptions of particular importance, include, but are not limited to, the following:

- The mix of currently available Medicaid services is assumed to be constant throughout the forecast period. The State of Alaska currently provides Medicaid services not mandated by the federal government. We assume the State will continue to provide these services throughout the forecast period.

- Medicaid eligibility requirements will not change throughout the length of the forecast period.

- With respect to gender and age cohort, Alaska's population will grow at approximately the rate forecasted by the Alaska Department of Labor and Workforce Development in their February 2005 report. Relative population growth by region of the state and by Native/non-Native status will be similar to that experienced between 1990 and 2000.

- The growth rate in the prices of Alaska's Medicaid services will be the same as the projected growth rate in the prices of personal health care services, embodied

in the Center for Medicare and Medicaid services' national personal health care deflator.

- Neither the historical data nor the spending forecast will directly correspond to the ADHSS accounting or budget systems. Additionally, the claims data is based on date of service while the accounting and budget systems are based on dates of payment. There are three reasons for this:

  1. The data used in the forecast of total spending are based on date of service and not on date of payment;

  2. The payment amounts include only claim payments processed through the Medicaid Management Information System (MMIS) and do not included any payments or accounting adjustments not made through MMIS (i.e., the data do not directly correspond to accounting records);

  3. The historical data are based on the State's fiscal year, but the forecasts are on a calendar year basis. This was done to remain aligned with the population forecast.

- Claim data for Fiscal Year 2005 are used as a benchmark for the long-term forecast. These data were not, however, used in the development of the forecast. The reason for this is that the statistical models used in this analysis were developed in Q2 and Q3 2005, and the earliest the FY 2005 claim data became available was a month or more into Q3 2005. Further, because this analysis is on an incurred basis and many claims are not paid for several months or more after the service is incurred, there is currently and will continue to be for several months much missing cost data in the FY 2005 claim data.

- Data for years 1997, 1999, 2001, and 2003 are not shown in historical tables of utilization and spending because of limited space. Average annual growth rates are slightly lower when considering the period 1997-2004.

- Forecast data are only shown for 2005, 2010, 2015, 2020, and 2025. The model, however, forecasts each year from 2005 through 2025.

- The enrollment and claims data provided by ADHSS were from their Juneau Claims and Enrollment (JUCE) database. JUCE contains Medicaid enrollment records and claim-level data on paid claims, adjustments, and voids. JUCE does not include denied claims, claims pending adjudication, payments not processed through MMIS, or administrative costs. For the long-term forecasting model, ADHSS summarized enrollment and paid claims data into one record for each individual enrolled in the Medicaid program for each complete fiscal year available (1997-2004) using the following 10 criteria.

1. Claim date is based on the date the service was provided (incurred), not the date the claim was paid.

2. Only complete fiscal years are included in the data file. Data for fiscal year 2005 are excluded because there is a lag between providing the service and paying the claim. Many of the claims incurred during fiscal year 2005 will not be paid until fiscal year 2006.

3. There is one record per individual for each fiscal year he/she is enrolled in Alaska's Medicaid program, regardless of whether he/she is enrolled for one month during the fiscal year or for the entire fiscal year.

4. Data were grouped so that classifications are consistent with those typically used by ADHSS in budgeting analyses and financial reporting. The list of variables include ID, year, region, gender, race (Native/non-Native), age, months in program, eligibility classification, and service classification.

5. To protect the privacy of clients, no personally identifying information (i.e., name, birth date, social security number) was included in the data file. The Medicaid client identification numbers were recoded by ADHSS to create the ID variable and cannot in any way be used to identify individuals.

6. The race variable is one of two values: Native or non-Native. The Native category includes anyone identified as Alaska Native or American Indian. Race is a self-identified optional field on the enrollment application. Natives who left this item blank would be counted as non-Native.

7. The Months-in-Program variable is the number of months during the fiscal year in which the individual was enrolled in Medicaid. Eligibility is determined on a monthly basis. If a person is eligible for one day in the month, they are eligible for the whole month.

8. When summarizing enrollment data, if multiple values were encountered in the region, gender, race, or age variables, one of the values was chosen randomly by assigning an integer between 1 and 12 (inclusive). The integer represented the month of the fiscal year in which to determine the individual's value for the entire fiscal year.

9. The 11 eligibility classifications are based on groupings of eligibility subtype codes (See Appendix A). If a client's situation changes over time, he/she is reassigned to the eligibility code that best fits. Consequently, there is a great deal of movement between classifications and it is common

for individuals to have more than one eligibility code during the year. If multiple eligibility codes were encountered during a fiscal year, the last value was chosen.

10. Claim data were aggregated into 20 service classifications based on ADHSS categories of service (See Table 9). The net amount of claims paid, including debits, credits, and voids, was summarized for each individual enrolled for each fiscal year. Not all enrollees had claims in all service classifications. In fact, some enrollees did not have any claims at all for a fiscal year.

Chapter 1—Alaska Population Trends

Approximately 23% of growth in national health spending is due to population increases and changes in the demographic mix of the population.[4] Consequently, we began our forecast of Medicaid spending by developing projections of the number of people in the state by demographic characteristic (age, gender, Native/non-Native status) for five regions of the state through 2025. These data provide key underlying trends that will drive enrollment and utilization of health services. It is important to note that we undertook the task of developing long-term population projections for Alaska because we believe such information is critical to developing a long-term cost forecast for Medicaid.

STEPS IN DEVELOPING THE POPULATION FORECAST

In this section we describe in detail the steps we undertook to produce the Alaska population forecast through 2025. Prior to developing the population projection, we researched the availability of official state or federal population forecasts that we could rely on for this analysis. We identified and relied on two sources of data to develop the population projections needed in this analysis.

Decennial U.S. Census data, 1990 and 2000: Our baseline forecast was developed by calculating the average annual growth rate of each of 220 subpopulations for Alaska between 1990 and 2000. The growth rate for each of the subpopulations was then applied to its respective 2000 population and projected through 2025.

Projections for Alaska population 2005-2029, developed by the Alaska Department of Labor and Workforce Development: The Alaska Department of Labor and Workforce Development (ADLWD) provide population projections by age and gender for the state of Alaska through 2029.[5] The ADLWD is in the process of developing sub-state population forecasts by demographic characteristic, but these estimates will not be available until after this report is completed. The currently available state population forecast is nevertheless valuable in the development of our population projection. As the official population forecast for State of Alaska, it provides a control for state-level population growth by age and gender.

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[4] Lewin Group analysis of the Centers for Medicare and Medicaid Services, National Health Expenditures Data.
[5] See *Alaska Economic Trends*. February 2005, Vol. 25:2

As mentioned above, the ADLWD published its long-term (through 2029) statewide forecast by age and gender. This is a valuable source of information for developing the population projections required for this analysis, as age and gender are the two key demographic characteristics related to Medicaid utilization. The ADLWD has not at this time, however, published a population forecast that includes Native/non-Native status or extended its forecast to the sub-state level. Such a forecast is expected within the near future and we recommend updating the long-term Alaska Medicaid forecast based on this official population forecast for the State of Alaska. The lack of official sub-state population forecasts compelled us to develop our own.

Step 1.   Determination of Population Characteristics to Include in Forecast

Prior to developing the long-term population forecasts needed for this analysis, we worked with ADHSS staff to determine the factors of importance for developing the population projections. We found that there are three major factors to consider.

Differences in utilization: Many Medicaid services are specific to a particular gender and age cohort. Because of this, we determined that the population forecast must provide information on these two important demographic characteristics.

Maintaining consistency with Medicaid forecasts performed by the Lewin Group for other states, we determined that 11 age cohorts would provide the necessary level of detail for the analysis.[6] These are:

- Ages 0-4
- Ages 5-9
- Ages 10-14
- Ages 15-19
- Ages 20-24
- Ages 25-34
- Ages 35-44
- Ages 45-54
- Ages 55-64

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[6] We also considered segmenting the 75 and older age category into two age categories: 75-84 and 85 and older. There were not enough historical data, however, to warrant a separate age category for the 85 and older age group. We recommend revisiting this issue at a future date as this portion of the population grows and more data become available.

- Ages 65-74
- Ages 75 and older

Differences in availability of Medicaid services and costs of travel to obtain services: Because the availability of Medicaid services varies across Alaska, as well as the costs incurred by Medicaid in providing travel services to obtain services, we believed it important to consider regional variation in Alaska's population growth.

We initially considered performing the analysis at the census area/borough level. Doing so, however, would have required much more information on future conditions at the regional level than is currently available. It is also doubtful that such detailed regional information would be more beneficial to the Medicaid cost forecast than more aggregate regional information.[7] Working with ADHSS staff, it was determined that it was sufficient to base the analysis on the following five regions.

Anchorage/Mat-Su:
  Matanuska-Susitna Borough
  Municipality of Anchorage
Western:
  Bethel Census Area
  Nome Census Area
  Northwest Arctic Borough
  Wade Hampton Census Area
South Central:
  Aleutians East Borough
  Aleutians West Borough
  Bristol Bay Borough
  Dillingham Census Area
  Kenai Peninsula Borough
  Lake and Peninsula Borough
  Valdez-Cordova Census Area

Northern:
  Denali Borough
  Fairbanks North Star Borough
  North Slope Borough
  Southeast Fairbanks Census Area
  Yukon-Koyukuk Census Area
Southeast:
  Haines Borough
  Juneau Borough
  Ketchikan Gateway Borough
  Prince of Wales-Outer Ketchikan Census Area
  Sitka Borough
  Skagway-Hoonah-Angoon Census Area
  Wrangell-Petersburg Census Area
  Yakutat Borough

Figure 3 shows the regional designations used for the population and Medicaid enrollment and utilization forecasts. The five regions are consistent with U.S. Census Area boundaries and are nearly identical to what ADHSS uses as Direct Service Staff

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[7] It is also likely that projecting individual socio-demographic populations within small regions of Alaska could result in inaccurate and misleading population forecasts due to the very small populations within many census areas and boroughs.

Regions. The only difference being that for the Medicaid forecast, Matanuska-Susitna Borough (Mat-Su) is combined with Anchorage instead of including it with the South Central region.[8]

Figure 3: Alaska Long-Term Medicaid Forecast Regions
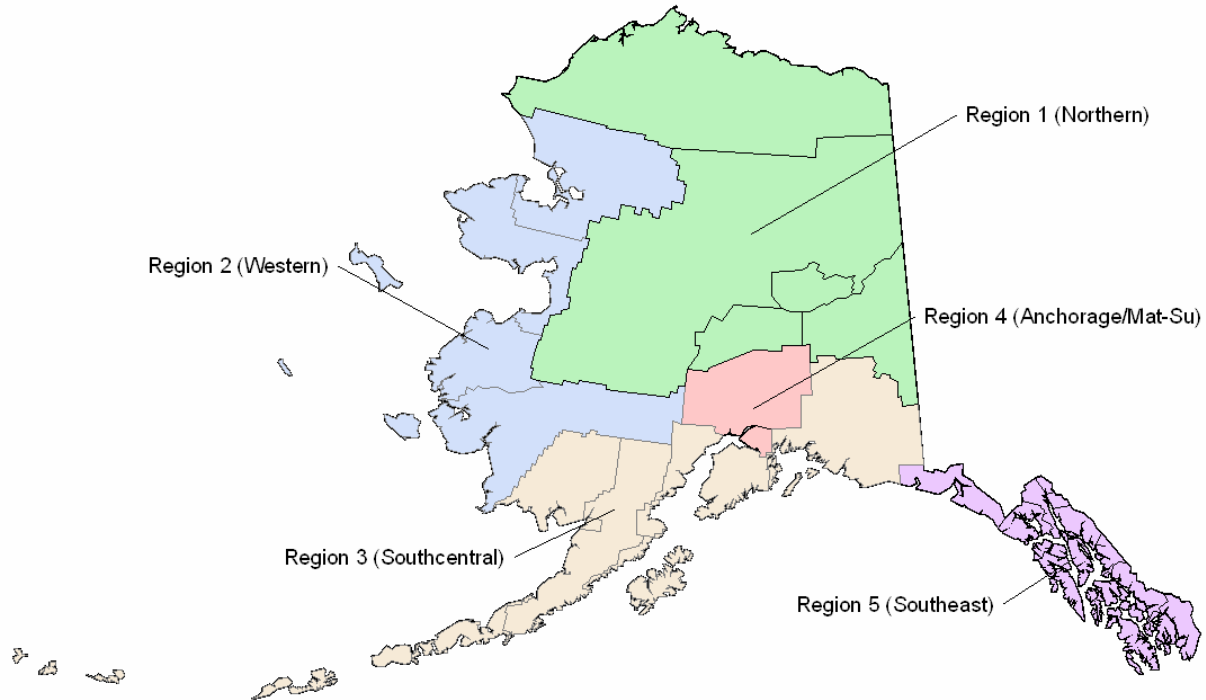
Source: Lewin Group & ECONorthwest based on regional designations determined by ADHSS. Regions are consistent with Census Area boundaries.

Differences in Federal reimbursement rate for Medicaid services: There are differences in the Federal reimbursement rates for Medicaid expenses based on Native/non-Native status. In particular, the Federal government reimburses the State of Alaska for 100% of the cost associated with providing Medicaid services to the Native

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[8] ADHSS Medicaid claims data are geo-coded by Census Area.

population if the provider is a tribal health facility. Because of this, we believe it important to consider population growth within each of these populations.

Considering each of these population characteristics requires forecasting 220 sub-groups of the Alaska population.[9]

Step 2.   Baseline Population Forecast

The baseline population forecast for each of the 220 sub-groups is based on the growth rate of each of the sub-groups between 1990 and 2000. Using decennial U.S. Census data we calculated the average annual growth rate for each subgroup during the 1990s and applied it to the respective 2000 population for each year through 2025.

Step 3.   Controlling for Statewide Population Forecast

In developing the baseline population projections, we understood that at best we would produce a rough approximation of population growth by demographic characteristic through 2025. In this third and final step of the population projection exercise, we adjusted our projections of the 220 subpopulations by Alaska's official state-level population forecast. As stated above, this forecast, produced by the ADLWD, is a projection of the State's population by gender and age through 2029. It provides us with the State's official population forecast for 22 subpopulations (2 genders * 11 age cohorts = 22 subpopulations). Excluded from the official population forecast is information at the sub-state level (i.e., at the level of the five regions considered in this analysis) and information on the Native/non-Native populations. Nevertheless, it was an invaluable source of information in which to improve the accuracy and consistency of our population projection. The ADLWD population projection was integrated into our population projection in the following way:

For each year of the baseline projection (2005-2025), we aggregated the 220 subpopulations by gender and age. Because there are 2 genders and 11 age cohorts, we aggregated the data into 22 groupings. This was done for each year of the projection, thus matching the level of aggregation of the ADLWD statewide population forecast.

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[9] The 220 sub-populations are created by multiplying 2 (gender) * 11 (age groups) * 2 (Native/non-Native) * 5 (regions) = 220.

We calculated the "control" factor to be applied to the baseline forecast so as to make it consistent with the ADLWD forecast. The control factor was computed using the following formula:

$$Baseline\ Population\ _{Gender,\ Age} \div ADLWD\ Population\ _{Gender,\ Age} = Correction\ Factor$$

We applied the correction factor to each of the respective 220 subpopulations for each year of the projection. For example, the control factor for males age 0-4 was applied to Native males age 0-4 for each of the five regions and to Non-native males age 0-4 for each of the five regions. By doing this, we forced our projection of 220 subpopulations to be consistent with the State's official population forecast by age and gender. Throughout this report we refer to the forecast of the 220 subpopulations as the *Alaska Long Term Population Projection* (ALTPP).

PROJECTION OF ALASKA POPULATION

In this section we review the implications of the ALTPP with respect to changes in population by region, Native/non-Native status, gender, and age cohort. It is through reviewing the population forecast by the regional/demographic grouping that we are able to determine if the projection is indeed reasonable.

Figure 4 and Figure 5 show the projected population and population growth rates, respectively, for Alaska for each year through 2025. Although we project positive population growth through 2025, as Figure 5 shows, the rate of population growth is expected to decrease over time. This is consistent with the ADLWD population forecast.

Figure 4: Alaska Statewide Population Forecast, 2005-2025
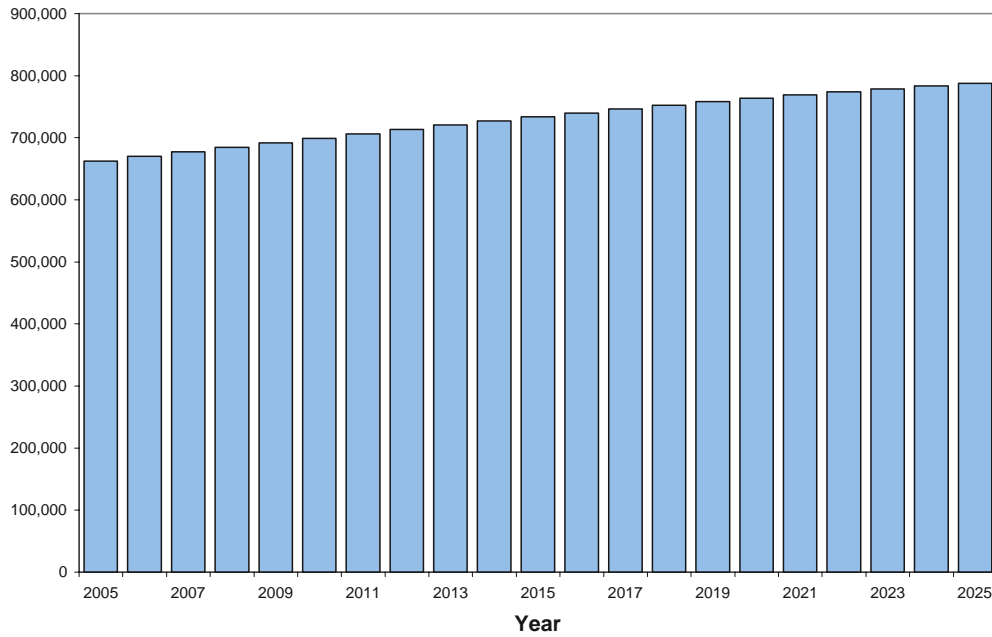
 Source: Alaska Department of Labor and Workforce Development data.

Figure 5: Projected Annual Growth Rates in Alaska Statewide Population Forecast, 2005-2025
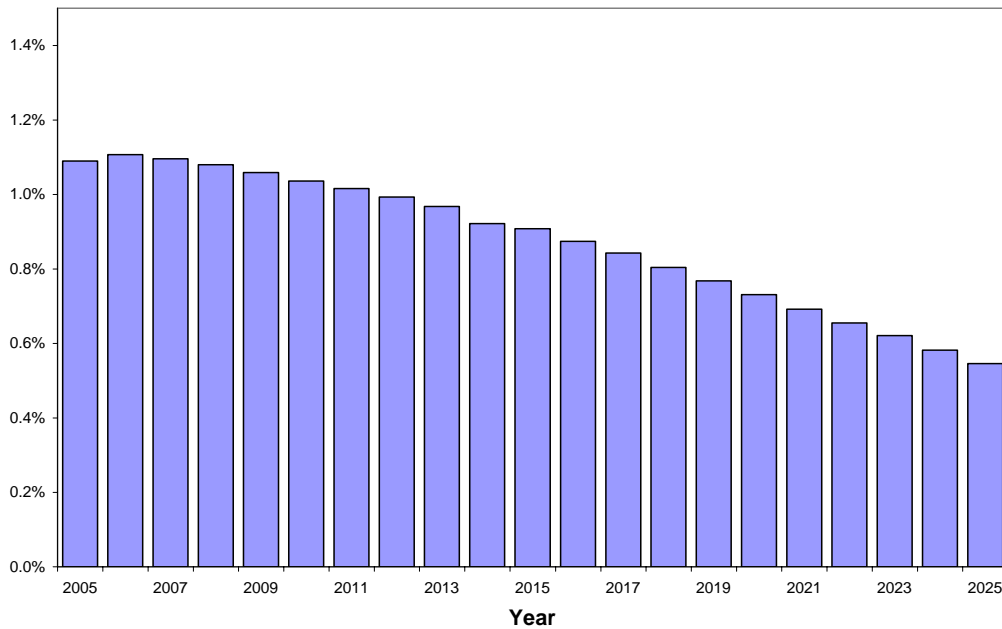
Source: Alaska Department of Labor and Workforce Development data.

Figure 6 through Figure 9 show the ALTPP by demographic characteristic. As Figure 6 shows, we project positive population growth for the Northern, Western, South Central, and Anchorage/Mat-Su regions, but a slight population decline for the Southeast region. The Southeast region experienced the slowest rate of population growth between 1990 and 2000 of any of the five regions, based on U.S. Census Bureau data. In fact, the Southeast region grew at less than one-fourth the rate of the next slowest region (South Central) and added fewer than 1,400 persons during the decade.[10]

Figure 6: Alaska Population Forecast by Region, Selected Years
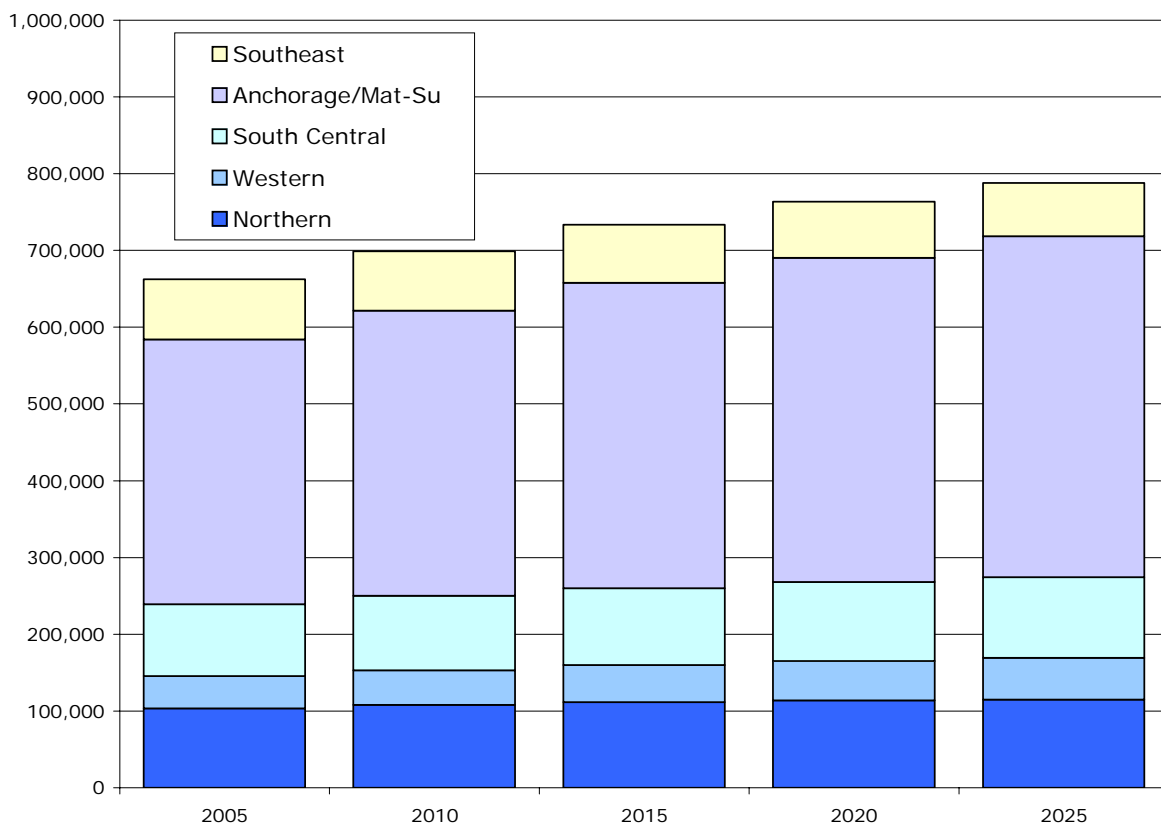
Following national trends, Figure 7 shows that while population growth in the younger age cohorts is expected be low through the forecast period, the 65 and older population is projected to grow rapidly, almost tripling from 43,000 to 124,000 between 2005 and 2025. The projected growth rate by age cohort in the ALTPP is directly tied to the 2005

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[10] We again wish to note that the regional-level forecast is not directly tied to the ADLWD population forecast.

ADLWD population forecast. More important than any of the other factors by which we projected the Alaska population, the extremely large expected growth in the 65 and over population will have an accompanying large impact on the utilization of Medicaid services.

Figure 7: Alaska Population Forecast by Age Cohort, Selective Years
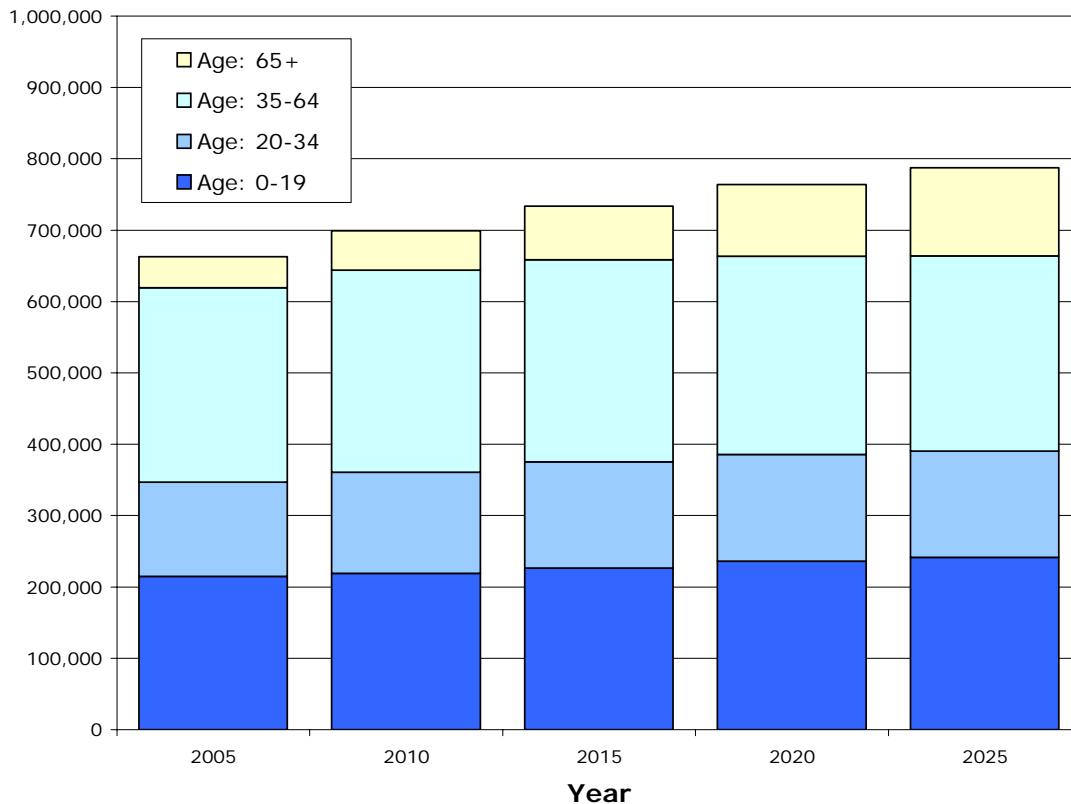
Source: Lewin Group & ECONorthwest analysis of U.S. Census and Alaska Department of Labor and Workforce
    Development data.

Despite its historic reputation as a predominantly male state, the 2005 ADLWD forecast projects the female proportion of the population to increase from 48.7% in 2005 to just over 50% in 2025 (see Figure 8). This continues a long-term trend in Alaska and puts it more closely in line with the gender ratio of the U.S. as a whole.

Figure 8: Alaska Population Forecast by Gender, Selective Years
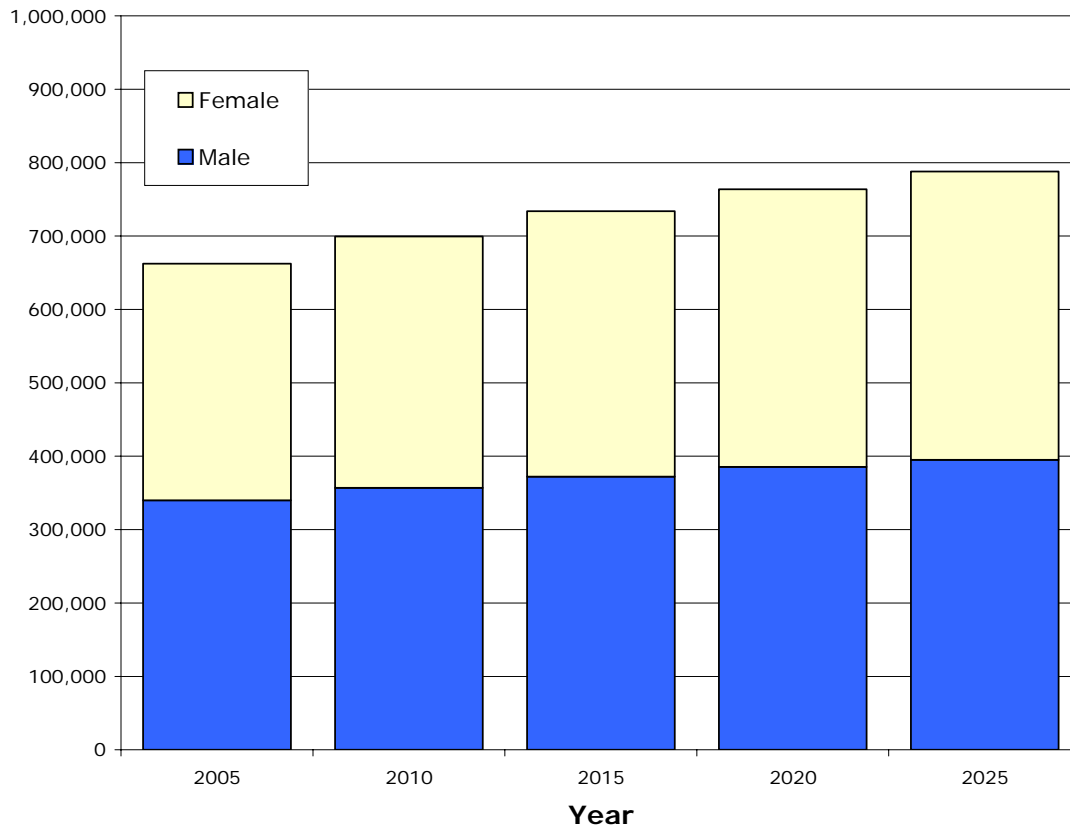
Source: Lewin Group & ECONorthwest analysis of U.S. Census and Alaska Department of Labor and Workforce
Development data.

With respect to population growth within the Native and non-Native populations, we know of no projections to which to compare. However, we are able to compare the projected growth rates of the Native and non-Native populations to historic growth rates. Population growth is projected to be positive for both the Native and non-Native populations (see Figure 9). We project, however, that the Native population will increase on average by 1.71% per year, while the non-Native population is expected to increase by only 0.67%. The difference between the two growth rates is expected to result in the Native proportion of the population increasing from approximately 17% in 2005 to approximately 21% by 2025. Comparatively, between 1990 and 2000 the Native and non-native populations grew by 1.9% and 1.2%, respectively. The greater relative growth rate of the Native population we project through 2025 is consistent with recent historical data and is consistent with the opinions of ADHSS staff, based on conversations during our visit in April 2005.

Figure 9: Alaska Population Forecast by Native/Non-Native, Selective Years
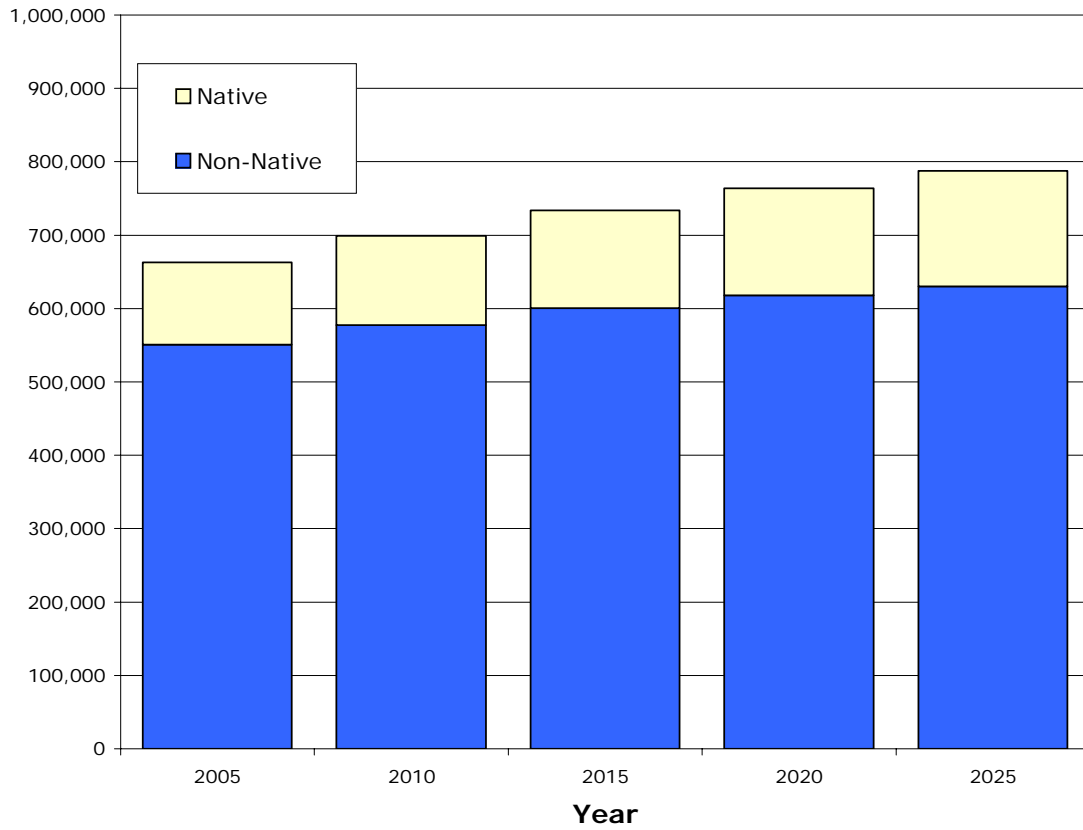
Source: Lewin Group & ECONorthwest analysis of U.S. Census and Alaska Department of Labor and Workforce
Development data.

Chapter 2—Medicaid Enrollment Rates

This chapter discusses recent trends in Medicaid enrollment and explains our methods and forecast for projecting enrollment rates through 2025. Medicaid eligibility varies by age and health status of individuals and eligibility requirements and program emphasis change over time. Figure 10 shows the Medicaid full time equivalent (FTE) enrollment rate for fiscal years 1997 through 2004 for all Alaskans.[11]

Figure 10: Alaska Medicaid FTE Enrollment Rates, Fiscal Years 1997-2004
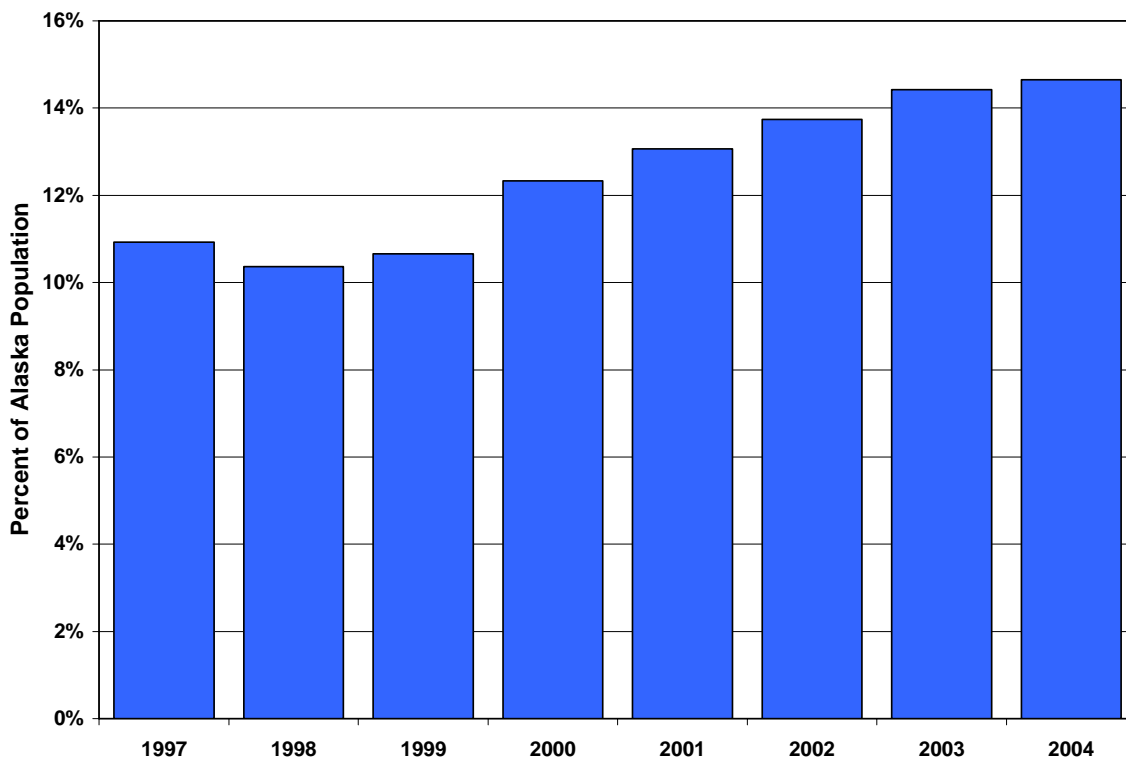
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Although decreasing slightly between 1997 and 1999, Medicaid enrollment grew rapidly beginning in 2000. As Figure 11 shows, the increase is due to the substantial increase in enrollment rates for children, which grew on average by more than 10% per year between 1999 and 2004. Comparatively, enrollment rates were static for working-age adults and the elderly over this period. The increase in enrollment rate for children is due in large part to the implementation of Denali KidCare, which significantly

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[11] FTE enrollment was calculated as: (number of months an individual was enrolled during the fiscal year / 12). This was then summed up for each Medicaid enrollee for each fiscal year of historical data.

increased the enrollment of children in Medicaid between 2000 and 2004.[12] Growth in the enrollment rate for children slowed between 2004 and 2005 as the Alaska State Legislature tightened eligibility requirements as a cost containment measure. We expect this "flattening-out" to continue through 2025.

Figure 11: Medicaid FTE Enrollment Rates by Age Cohort, 1997-2004
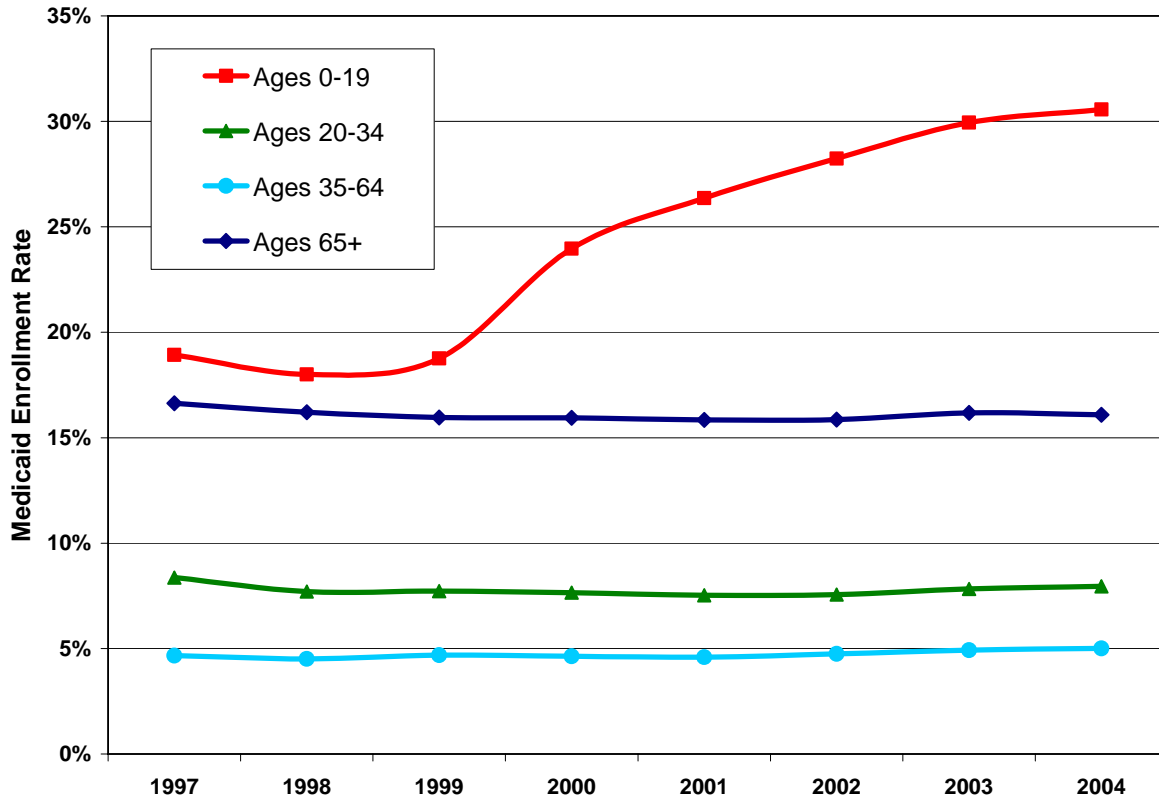
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

With the exception of the Western region, Medicaid FTE enrollment rates were similar across regions between 1997 and 2004 (see Figure 12). Figure 12 also shows the impact that the Denali KidCare program had on Medicaid enrollment rates beginning in 2000.

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12 Enrollment in Denali KidCare, Alaska's Medicaid-expansion State Children's Health Insurance Program (SCHIP), grew very fast in the first years because of high demand and an aggressive outreach effort.

Figure 12: Medicaid Enrollment Rates by Region, 1997-2004
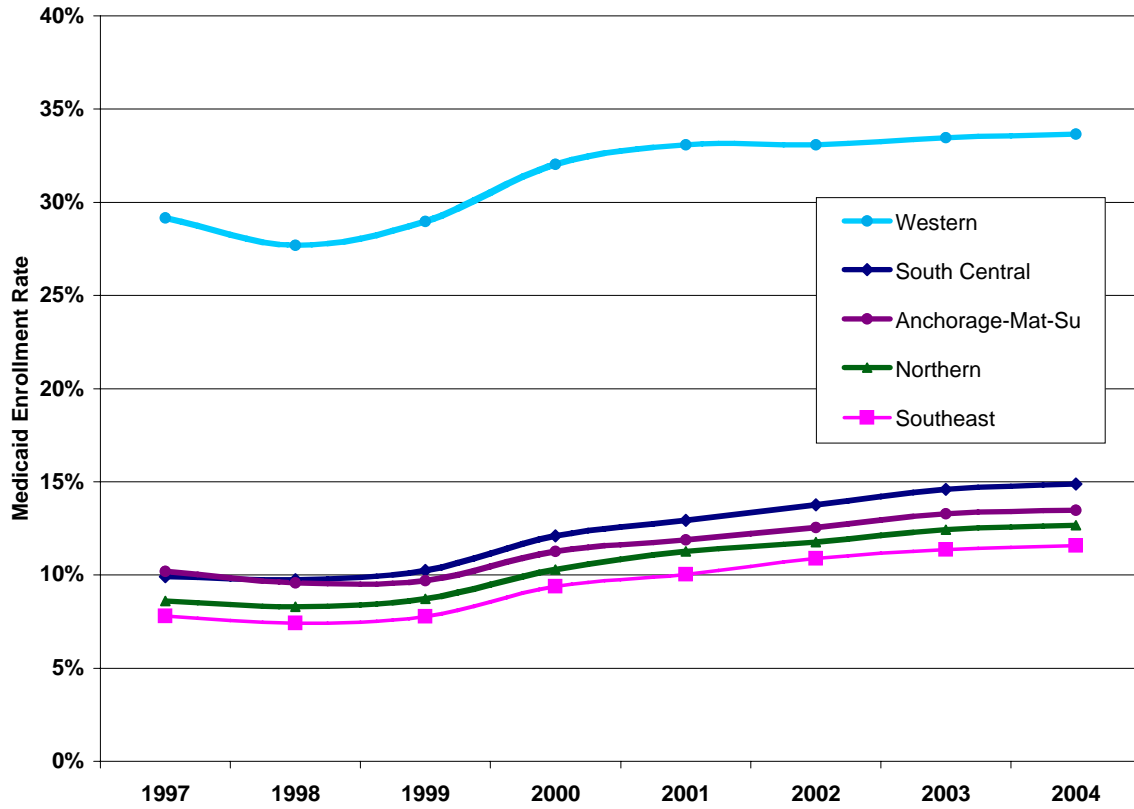
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

As Figure 13 shows, between 1997 and 2004 Medicaid FTE enrollment rates increased at a similar pace for both the Native and non-Native populations. Still, Natives are almost three times as likely to be enrolled in Medicaid as are non-Natives. This is due in large part to the greater proportion of the Native population being under the age of 20 and to the lower average incomes of Natives, relative to the Non-Native population.

Figure 13: Medicaid FTE Enrollment Rates by Native/Non-Native Status, 1997-2004
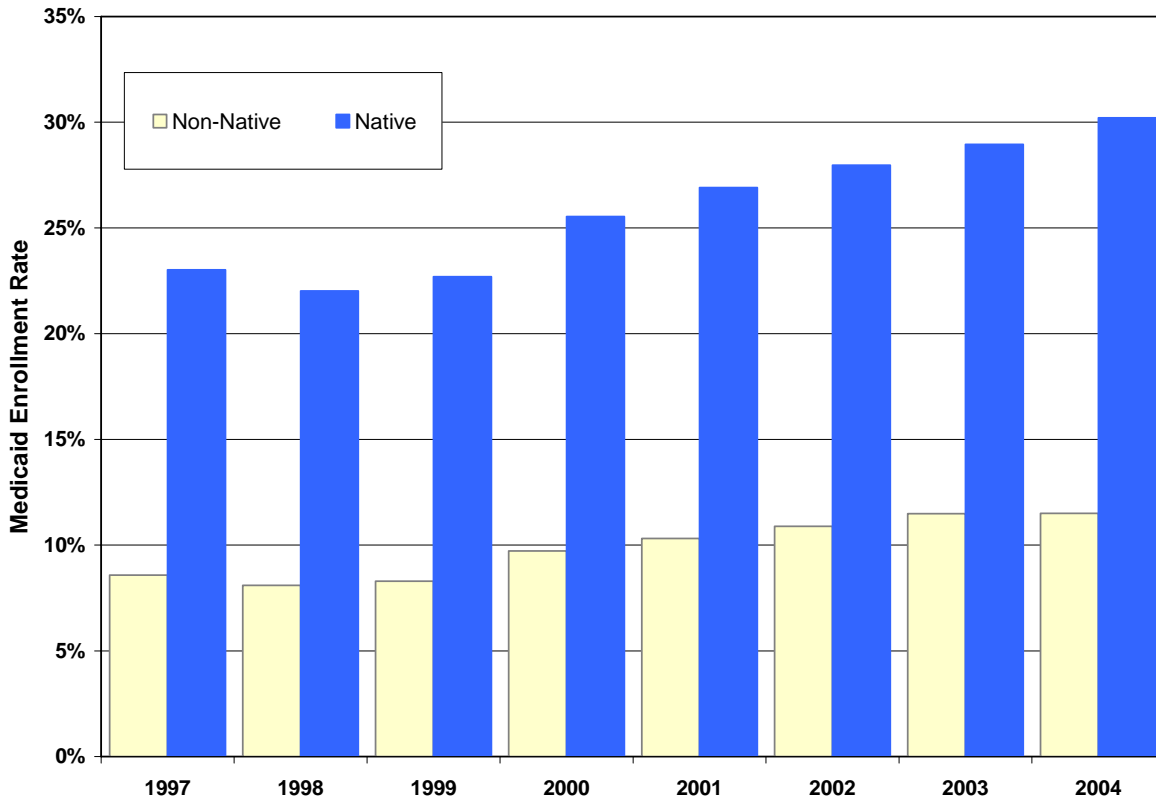
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Females are more likely to be enrolled in Medicaid programs than are males (see Figure 14). The rate of growth in Medicaid enrollment between 1997 and 2004 for males, however, was almost twice that for females (2.76% vs. 4.93%). This is mostly due to the increased enrollment rates for children, which should be gender neutral. Because males had a lower base enrollment rate than females, an approximately equal increase in the level of enrollment has a greater impact on the rate of growth of male enrollment rates than of female. In addition, life expectancy and poverty rates may have grown at a greater rate for men than for women over this period, leading to higher growth rates in Medicaid enrollment for men.

Figure 14: Medicaid FTE Enrollment Rates by Gender, 1997-2004
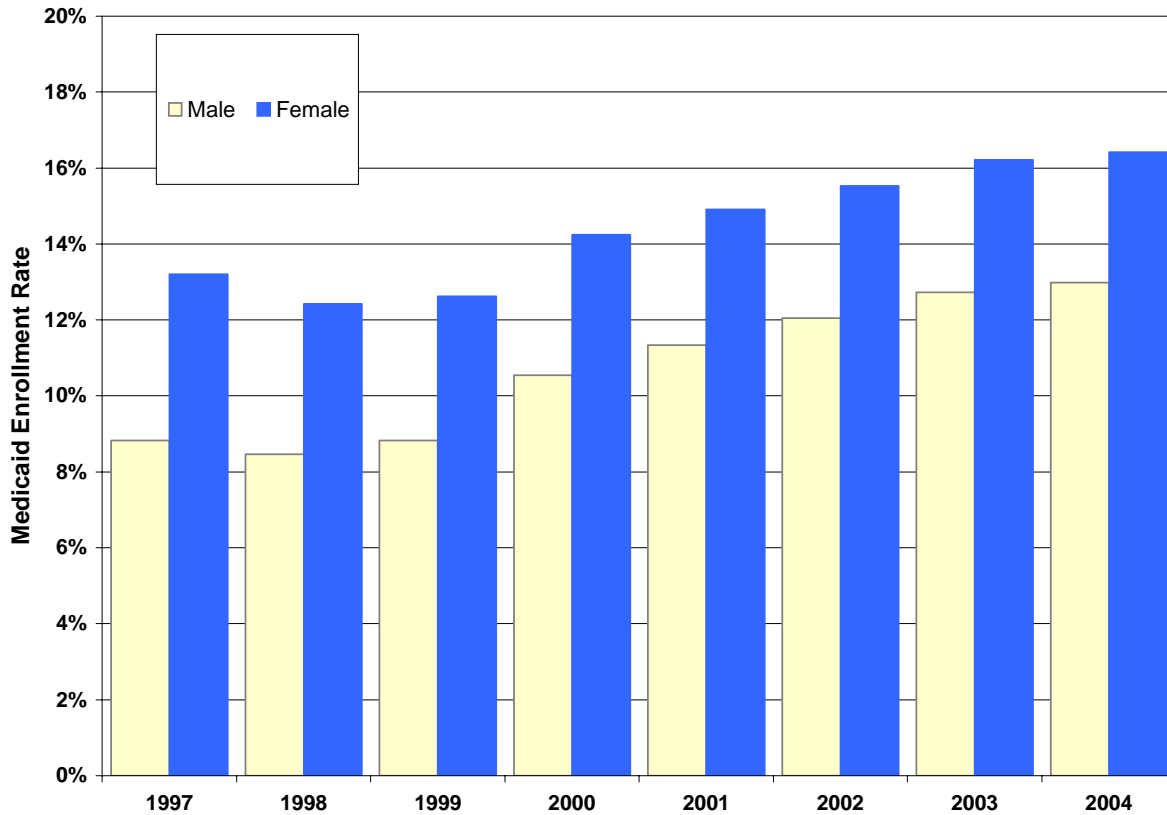
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

STEPS IN DEVELOPING THE MEDICAID ENROLLMENT FORECAST

In this section we describe in detail our steps to produce the Medicaid enrollment forecast for Alaska through 2025. The enrollment forecast is based on historic enrollment data provided by the Alaska Medicaid program and Alaskan population data for the same time period. We used linear regression techniques (described below) to estimate time-series equations of the proportion of the population enrolled in the Medicaid program between 1997 and 2004. The regression equations include a range of demographic variables intended to measure trends in Medicaid enrollment. The estimated coefficients are then applied to the forecasted demographic data derived in Chapter 1 to project the number of persons enrolled in Medicaid through 2025.

Step 1.   Calculate the number of persons enrolled in Medicaid

The individual-level Medicaid enrollment data obtained from ADHSS for the years 1997-2004 consists of almost 900,000 records and constitutes a complete census of

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Medicaid enrollment in Alaska for the years 1997-2004. Each record represents information for one Medicaid recipient for one fiscal year. The information provided in the enrollment database includes:

- **ID** is a randomly assigned unique identifier[13];
- **Year** is the fiscal year in which the person was enrolled in Medicaid;
- **Census Area Code** is the U.S. Census-defined identifier of the area of residence;
- **Gender** is an indicator variable for male or female;
- **Native/Non-Native Status** is an indicator variable for Native or non-Native;
- **Age** is the age in years of the individual;
- **Months of Medicaid Enrollment** is the number of months the individual was enrolled in Medicaid during the fiscal year.

Using these data, we calculated the proportion of each fiscal year that an individual was enrolled in Medicaid.[14] This "weighted enrollment" was then summed up for each of the 220 demographic sub-groups for each of the eight years (1997-2004) to produce FTE enrollment.[15] By calculating the number of persons enrolled in Medicaid in this manner, we account for the fact that many individuals spend only a portion of the year enrolled in the Medicaid program.[16] We believe that enrollment on an FTE basis provides a more comprehensive picture of Medicaid enrollment and so all tables, figures, and discussion in this section are on an FTE basis. The individual Medicaid enrollment data are then aggregated by

- Region (5),
- Native/Non-Native Status (2),
- Gender (2),
- Age Grouping (11),
- Year (fiscal) (8).

The result is 1,760 groups (220 regional-demographic groupings * 8 Years = 1,760) of the weighted average total number of persons enrolled in Medicaid. The 1,760 groups

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[13] The ID for each individual was assigned by ADHSS staff and does not in any way indicate the identity of the actual individual.

[14] Please note that the data are based on the Alaska state fiscal year, which extends from June$_{t-1}$-July$_t$, where t is denotes the current fiscal year.

[15] The "weighted enrollment" was calculated as: (number of months enrolled during the fiscal year / 12). Thus, the weighted enrollment for an individual ranged from zero to one.

[16] Note: actual enrollment ("unduplicated count") $\geq$ weighted average enrollment ("FTE").

provide us with information across regions, as well as through time. This form of data (cross-sectional, time-series) is generally referred to as "panel" data and provides more information than would be available in just cross-sectional or time-series data.

Step 2. *Calculate the proportion of persons enrolled in Medicaid*

Using the enrollment numbers derived in Step 1 and the (*estimated*) historic population numbers derived in Chapter 1, we calculated the Medicaid enrollment rates for each of the 220 subpopulations for each year 1997-2004.[17] Population estimates are based on straight-line interpolation between Census years 1990 and 2000 and the ALTPP estimated population for 2005. The data in Table 3 show the FTE number of persons enrolled in Medicaid at the state-level, the unduplicated count of enrollment, the estimated population, and the Medicaid enrollment rate for each year 1997-2004.

Table 3: Medicaid FTE Enrollment, Population, and Medicaid Enrollment Rates for Alaska, 1997-2004

Year	Medicaid Enrollment (FTE)	Medicaid Enrollment (Unduplicated Count)	Estimated Population	Enrollment Rate (FTE)
1997	64,788	90,130	592,973	10.9%
1998	62,390	88,725	601,831	10.4%
1999	65,151	95,834	611,371	10.7%
2000	76,663	110,264	621,623	12.3%
2001	82,274	116,255	629,897	13.1%
2002	87,362	121,605	636,113	13.7%
2003	92,711	126,661	642,918	14.4%
2004	95,277	129,549	650,338	14.7%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services, U.S. Census, and Alaska Department of Labor and Workforce Development data.

Step 3. *Formulate and estimate Medicaid enrollment rate forecasting models*

Because medical utilization differs substantially by age, we formulated separate Medicaid enrollment forecasting models for each of the following three age cohorts:[18]

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[17] Because the historic population numbers were based on calendar year, rather than fiscal year, they were converted into fiscal year population by averaging the population across consecutive calendar years.

[18] The 11 age groupings developed in Chapter 1 are maintained as explanatory variables in the three age cohort models.

- **Children** (ages 0-19);
- **Working-age Adults** (ages 20-64);
- **Elderly** (ages 65+).

For each age cohort we estimated a multivariate regression equation in which we regressed the *ln(odds)* of Medicaid enrollment on regional and demographic variables.[19] For each model we also considered statewide economic data (e.g. employment and income data), but these variables provided no statistically significant explanatory power. Each equation was estimated using ordinary least squares (OLS) using the following functional form and specification.

Ln(odds) = f(demographic characteristics, regional economic variables, time)

Where:
- **Ln(odds)** is the log of the odds ratio of Medicaid enrollment *(P(enrolled)/(1-P(enrolled))*;
- **F(.)** denotes "a function of";
- **Demographic Characteristics** include gender, age, and Native/non-Native status variables;
- **Regional Economic Variables** are a set of four indicator variables, each representing one of the four regions: Northern, Western, South Central, Southeast. The Anchorage/Mat-Su Region represents the "baseline" and is implicitly represented in the constant term of each of the regression models;
- **Time** is a counter variable that equals 1 in 1997 and increases by 1 for each year through 2004.

Step 4.   *Project Medicaid enrollment through 2025*

The estimated coefficients from each model estimated in Step 3 were used in conjunction with the population forecast derived in Chapter 1 to project the FTE

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[19] The *ln(odds),* read as "log-odds," is the natural logarithm of the "odds ratio" (p/(1-p)),where p = the Medicaid enrollment rate (or, as in our case, the probability that a randomly drawn individual within that population is enrolled in Medicaid). The log of the odds ratio (the "log-odds") is the natural logarithm of the odds ratio and, because of its convenient mathematical properties, is a commonly used transformation of proportions and probabilities in statistical analysis. Of particular importance in the context of ordinary least squares regression (OLS), the *ln(odds)* transformation results in a dependent variable that can be less than, equal to, or greater than zero. This eliminates the truncation and censoring problems associated with bounded (in this case by zero) dependent variables.

enrollment rate of each of the 220 subpopulations through 2025. This is discussed in greater detail later in this chapter.

Step 5.   Estimate the proportion of persons by Medicaid eligibility class

The final step in the forecast of Medicaid enrollment is to estimate the proportion and number of persons in each of the 220 sub-groups enrolled in each of 11 Medicaid eligibility classes. Table 4 provides a brief description of each of the Eligibility classes.

Table 4: Alaska Medicaid Eligibility Classes[20]

Eligibility Class	Description
AFDC & Related	Eligible for AFDC-based Family or Transitional Medicaid
Title XIX Kids	Children under age 19 not eligible for coverage under M-SCHIP
Title XXI Kids	Children under age 19 eligible for coverage under M-SCHIP
Pregnancy/Post Partum	Eligible during pregnancy and for 60 days after giving birth
Kids in Custody	Children in custody of ADHSS
Alien (Foreign)	Illegal, sponsored, or amnesty alien
SSI/APA/LTC Cash	Eligible for SSI or other state cash supplement
LTC Non-cash	Elderly or disabled individual not receiving SSI or cash supplement
Other Disabled	Working disabled or eligible due to breast/cervical cancer screening
Medicare	Eligible for Medicare cost-sharing assistance only
Exams	Disability, waiver, or pregnancy determination pending

Source: Alaska Department of Health and Social Services

Table 5 shows the proportion of FTE enrollees by Medicaid eligibility class for each year 1997-2004. Of particular note is the relationship between the *AFDC & Related*, *Title XIX Kids*, and *Title XXI Kids* eligibility classes (rows 1, 2, and 3). Over the past eight years, enrollment in the *AFDC & Related* eligibility class has declined on an average annual basis by 9%; by 2004 enrollment was half of its 1997 level. Over the same period, enrollment in *Title XIX Kids* and *Title XXI Kids* has grown rapidly. In fact, when the three eligibility classes are considered in aggregate, there has been essentially no change in the rate of Medicaid enrollment—maintaining approximately a 75% proportion of total Medicaid enrollment each year. Rows 1, 2, and 3 simply show that many children have been moved out of the *AFDC & Related* eligibility class and into the *Title XIX Kids* or *Title XXI Kids* eligibility classes.

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[20] Please see Appendix A for a detailed listing of the Eligibility codes contained in each Eligibility class.

Table 5: Proportion of Medicaid FTE Enrollment by Eligibility Class

Row #	Eligibility Class	1997	1998	1999	2000	2001	2002	2003	2004
1	AFDC & Related	62.9%	61.2%	54.0%	41.1%	35.4%	32.7%	30.7%	29.6%
2	Title XIX Kids	13.3%	14.1%	17.4%	24.8%	28.1%	29.5%	32.1%	33.7%
3	Title XXI Kids	0.0%	0.0%	4.1%	10.7%	13.2%	13.9%	12.8%	12.0%
4	Pregnancy/Post Partum	4.5%	4.6%	4.6%	5.1%	5.1%	5.2%	5.3%	5.3%
5	Kids in Custody	2.2%	2.5%	2.5%	2.5%	2.5%	2.6%	2.8%	2.9%
6	Alien (Foreign)	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7	SSI/APA/LTC Cash	15.3%	15.8%	15.4%	14.0%	13.8%	13.7%	13.8%	14.0%
8	LTC Non-cash	1.0%	1.1%	1.1%	1.0%	1.1%	1.3%	1.4%	1.3%
9	Other Disabled	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.2%	0.3%
10	Medicare	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
11	Exams	0.6%	0.7%	0.8%	0.8%	0.7%	0.7%	0.7%	0.7%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Table 5 also shows that enrollment rates for the other eligibility classes have changed little over the past eight years and that many of the eligibility groups constitute a very small fraction of total Medicaid enrollment.

Based on our analysis of these data and our assumption that enrollment rates by eligibility class will remain relatively static for the foreseeable future, we apply the average enrollment rate by eligibility class over the past three years (2002-2004) to the projected Medicaid enrollment through 2025.

PROJECTION OF MEDICAID ENROLLMENT

In this section we review the implications of the Medicaid enrollment projections with respect to regional and demographic factors. First, however, we describe how the coefficients from the three enrollment forecasting models are used to produce the enrollment rate forecast.

In this section we present the three Medicaid enrollment regression models (one each for children, working-age adults, and the elderly) and describe each of the regression equations. The model results, including coefficient estimates and statistical significance, as well as model diagnostics are presented in Appendix B.[21]

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[21] Each of the regression models intentionally excludes certain indicator variables in order to avoid perfect collinearity with the constant term. For example, an indicator variable for male gender is included in each of the models, but an indicator variable for female gender is excluded. Had we included indicator variables for each gender, the presence of these two variables would be perfectly collinear with the constant term and the model could

a) Children Model

Ln(odds) = b_0 + b_1(Native Status) + b_2(Gender) + b_3(Northern) + b_4(Western) + b_5(South Central) + b_6(Southeast) + b_7(Ages 0-4) + b_8(Ages 5-9) + b_9(Ages 10-14) + b_{10}(Child Enrollment Program) + b_{11}(Time) + u

Where:
- *$Ln(odds)$* is the log of the odds ratio of Medicaid enrollment *(P(enrolled)/(1-P(enrolled))*;
- *b_0* is the *y*-intercept;
- **Native Status** is an indicator variable (1 = Native status);
- **Gender** is an indicator variable (1 = Male);
- **Northern** is an indicator variable (1 = Northern region);
- **Western** is an indicator variable (1 = Western region);
- **South Central** is an indicator variable (1 = South Central region);
- **Southeast** is an indicator variable (1 = Southeast region);
- **Ages 0-4** is an indicator variable (1 = ages 0-4);
- **Ages 5-9** is an indicator variable (1 = ages 5-9);
- **Ages 10-14** is an indicator variable (1 = ages 10-14);
- **Child Enrollment Program** is an indicator variable intended to account for the expansion in children's eligibility beginning in 2000 (1 = years 2000-2004);
- **Time** is a time trend intended to account for changes in Medicaid enrollment not explained by the demographic and regional variables (1 = 1997, 2 = 1998, …, 8 = 2004);
- *b_1 - b_{11}* are regression coefficients to be estimated;
- *u* is the random error term.

b) Working-Age Adults Model

Ln(odds) = b_0 + b_1(Native Status) + b_2(Gender) + b_3(Northern) + b_4(Western) + b_5(South Central) + b_6(Southeast) + b_7(Ages 20-24) + b_8(Ages 25-34) + b_9(Ages 35-44) + b_{10}(Ages 45-54) + b_{11}(Time) + u

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not be estimated. Likewise with all other sets of indicators. It is important to note that the excluded indicator variables are still present in the model through the estimated constant term, b_o.

Where:

- *Ln(odds)* is the log of the odds ratio of Medicaid enrollment *(P(enrolled)/(1-P(enrolled))*;
- b_0 is the *y*-intercept;
- **Native Status** is an indicator variable (1 = Native status);
- **Gender** is an indicator variable (1 = Male);
- **Northern** is an indicator variable (1 = Northern region);
- **Western** is an indicator variable (1 = Western region);
- **South Central** is an indicator variable (1 = South Central region);
- **Southeast** is an indicator variable (1 = Southeast region);
- **Ages 20-24** is an indicator variable (1 = ages 20-24);
- **Ages 25-34** is an indicator variable (1 = ages 25-34);
- **Ages 35-44** is an indicator variable (1 = ages 35-44)
- **Ages 45-54** is an indicator variable (1 = ages 45-54);
- **Time** is a time trend intended to account for changes in Medicaid; enrollment not explained by the demographic and economic variables (1 = 1997, 2 = 1998, …, 8 = 2004);
- $b_1 - b_{11}$ are regression coefficients to be estimated;
- *u* is the random error term.

c) Elderly Model

Ln(odds) = b_0 + b_1(Native Status) + b_2(Gender) + b_3(Northern) + b_4(Western) + b_5(South Central) + b_6(Southeast) + b_7(Ages75+) + b_8(Age-Native Interaction) + b_8(Time) + u

Where:

- *Ln(odds)* is the log of the odds ratio of Medicaid enrollment *(P(enrolled)/(1-P(enrolled))*;
- b_0 is the *y*-intercept;
- **Native Status** is an indicator variable (1 = Native status);
- **Gender** is an indicator variable (1 = Male);
- **Northern** is an indicator variable (1 = Northern region);
- **Western** is an indicator variable (1 = Western region);
- **South Central** is an indicator variable (1 = South Central region);
- **Southeast** is an indicator variable (1 = Southeast region);
- **Ages 75+** is an indicator variable (1 = ages 75 or greater);

- **Age-Native Interaction** is an indicator variable (1 = IF (ages 75+ = 1 AND Native Status = 1));
- $b_1 - b_8$ are regression coefficients to be estimated;
- u is the random error term.

The estimated coefficients from the regression models of Medicaid enrollment are used in conjunction with the demographic information for each of the 220 subpopulations to project Medicaid enrollment rates for each year from 2005 through 2025. The formula for calculating enrollment rates is

$$Enrollment_{it} = \frac{1}{\left(1 + e^{-X}\right)}$$

Where:

$Enrollment_{it}$ is the enrollment rate for subpopulation i in time period t (i=1-220, t=2005-2025);

e is the exponential function and is equal to 2.718. It is the base for the natural logarithm ("ln") and, because of its unique properties, is a common function for the analysis of population growth and studies of probabilities

X is the regression equation for children, working-age adults, or the elderly.

As an example of how the Medicaid enrollment equation is calculated, the regression equation for children is as follows:

$$X = b_0 + b_1 * Native + b_2 * Male + b_3 * Reg_1 + b_4 * Reg_2 + b_5 * Reg_3 + b_6 * Reg_5 + b_7 * Age_1 + b_8 * Age_2 + b_9 * Age_3 + b_{10} * 0 + b_{11} * Time$$

Where:

- $b_0 - b_{12}$ are the regression coefficients shown in Table B 1 in Appendix B;
- *Native* is a 0-1 indicator variable for Native identity;
- *Male* is a 0-1 indicator variable for male gender;
- Reg_1 is a 0-1 indicator for Region 1 (Northern region);
- Reg_2 is a 0-1 indicator for Region 2 (Western region);
- Reg_3 is a 0-1 indicator for Region 3 (South Central region);
- Reg_5 is a 0-1 indicator for Region 5 (Southeast region);
- Age_1 is a 0-1 indicator for ages 0-4;
- Age_2 is a 0-1 indicator for ages 5-9;
- Age_3 is a 0-1 indicator for ages 10-14;

- *Time* equals 1 for 1997 and increases by 1 for each year thereafter.

Once the enrollment rates are projected for each of the 220 subpopulations for each year 2005-2025, they are multiplied by the population projections to derive enrollment projections. Figure 15 through Figure 19 show the projected enrollment for the state, the regions, and the demographic groupings. Figure 15 shows the population and Medicaid enrollment projections for 2005 through 2025 for all Alaskans.

Figure 15: Projected Alaskan Population and Medicaid FTE Enrollment, Selected Years
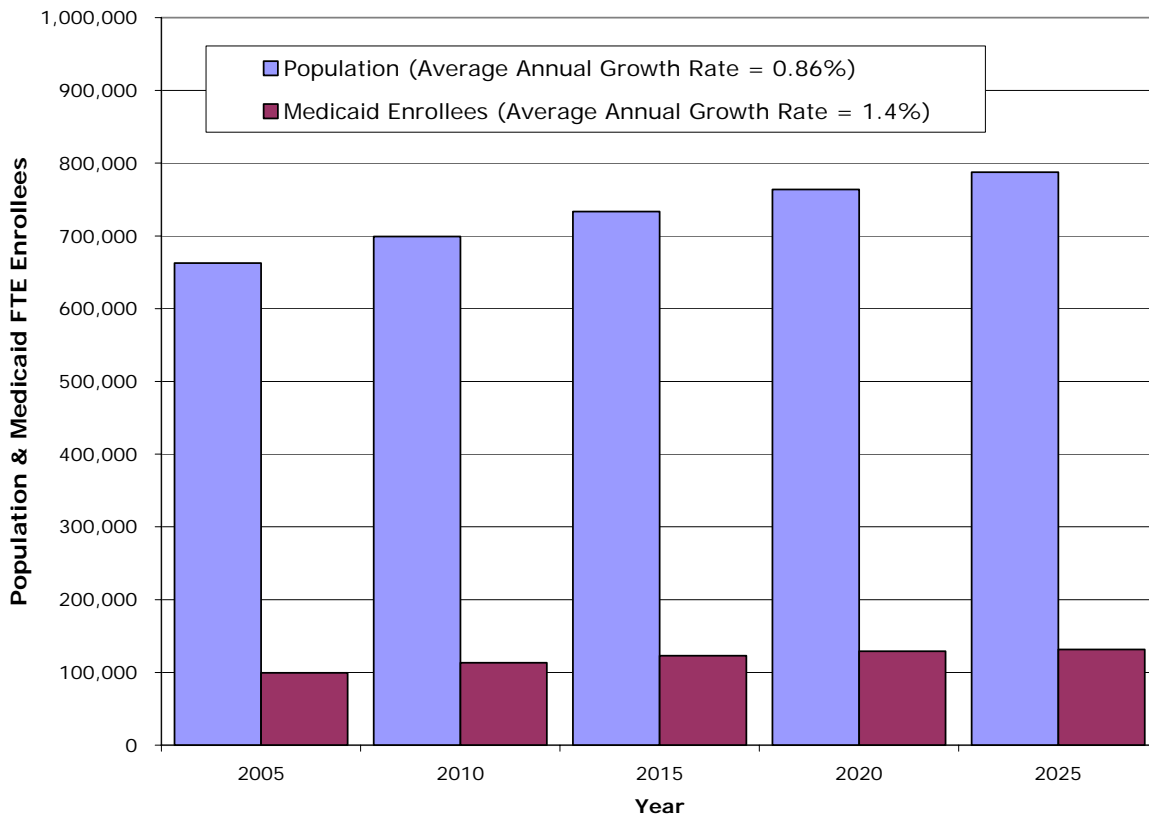
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Projected to grow a little faster than the state's population, we expect Medicaid FTE enrollment to reach approximately 131,000 by 2025 (compared to 95,000 in 2004).[22] On an average annual basis, we forecast Medicaid FTE enrollment to increase by about

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[22] Note 1: The 2025 estimate is a calendar year estimate, whereas the 2004 Medicaid enrollment is for the fiscal year. On a calendar year basis, the 2004 Medicaid enrollment is probably between 97,000 and 98,000.
Note 2: the Medicaid enrollment projection assumes, of course, that Medicaid enrollment policy does not radically change over the next 20 years and that the population forecast approximates actual population growth fairly accurately.

1.4% per year and population to increase by about 0.9%. The greater expected growth in the Medicaid FTE enrollment, relative to the general population, may seem worrisome. Compared to recent historical trends, however, the difference between the two growth rates is relatively minor. Between fiscal years 1997 and 2004, Medicaid enrollment increased on average by 5.5%per year. Alaska's population over this period increased on average by only 1.3% per year.

Figure 16: Projected Medicaid FTE Enrollment by Age Cohort, Selected Years
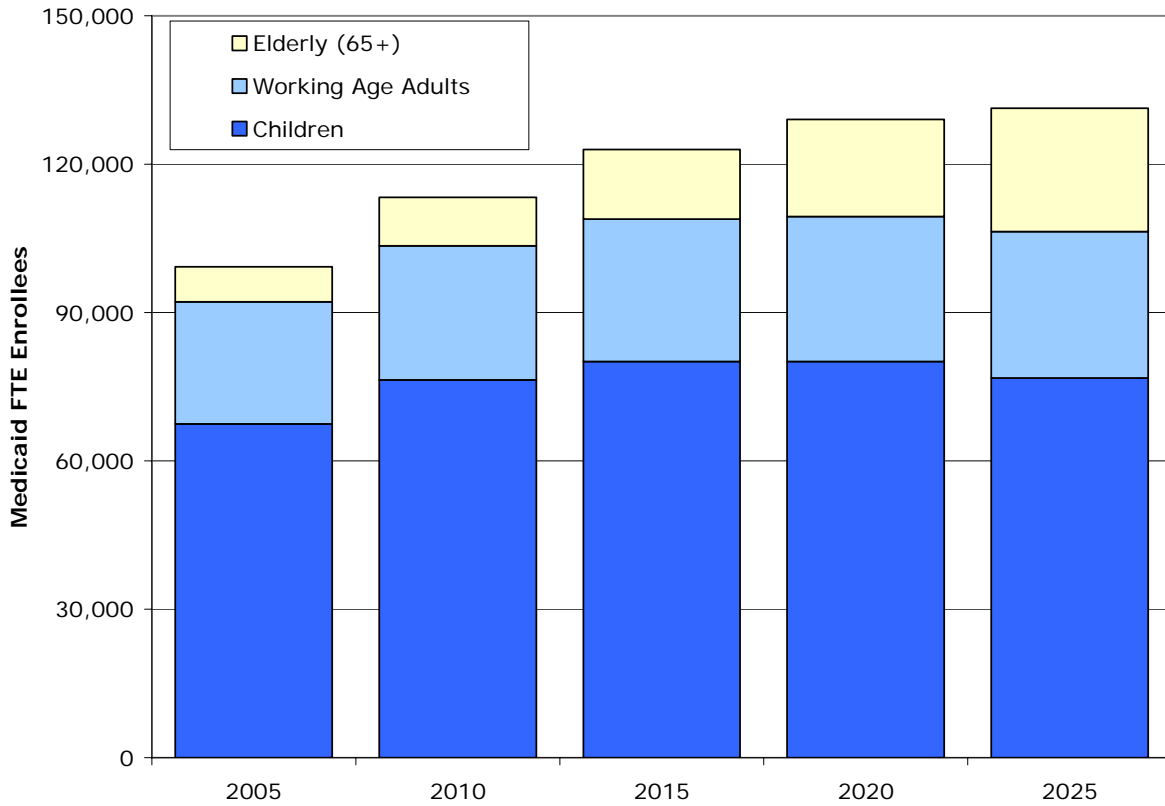
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

As Figure 16 shows, most of the growth in the Medicaid population is expected to occur in the elderly population (65+ years of age). Enrollment of children into the Medicaid program, which increased by almost 8% per year on average, drove up total Medicaid enrollment in the historical period (1997-2004). Over the next 20 years, it will be growth in the enrollment rates of the elderly, which we expect to increase by about 6.3% per year, which will drive growth in overall Medicaid enrollment. Comparatively, growth in enrollment into Medicaid of other ages will be relatively flat, growing by about 0.8% for children and by about 1.1 % for the working-age population.

At the regional level, Anchorage/Mat-Su, with almost half of all Medicaid enrollees in 2005, is expected to increase its Medicaid population by 2.0% per year—the fastest growth of any of the regions. Comparatively, the Northern region is expected to be the next fastest growing region at 1.2% per year and the Medicaid population in the Southeast region is projected to decrease by about 0.5% per year. It's important to note that the projected decline in Medicaid enrollment in the Southeast region is not due to a decline in the *rate* of Medicaid enrollment, but rather to the projected decline in the population in that region.[23]

Figure 17: Projected Medicaid FTE Enrollment by Region, Selected Years
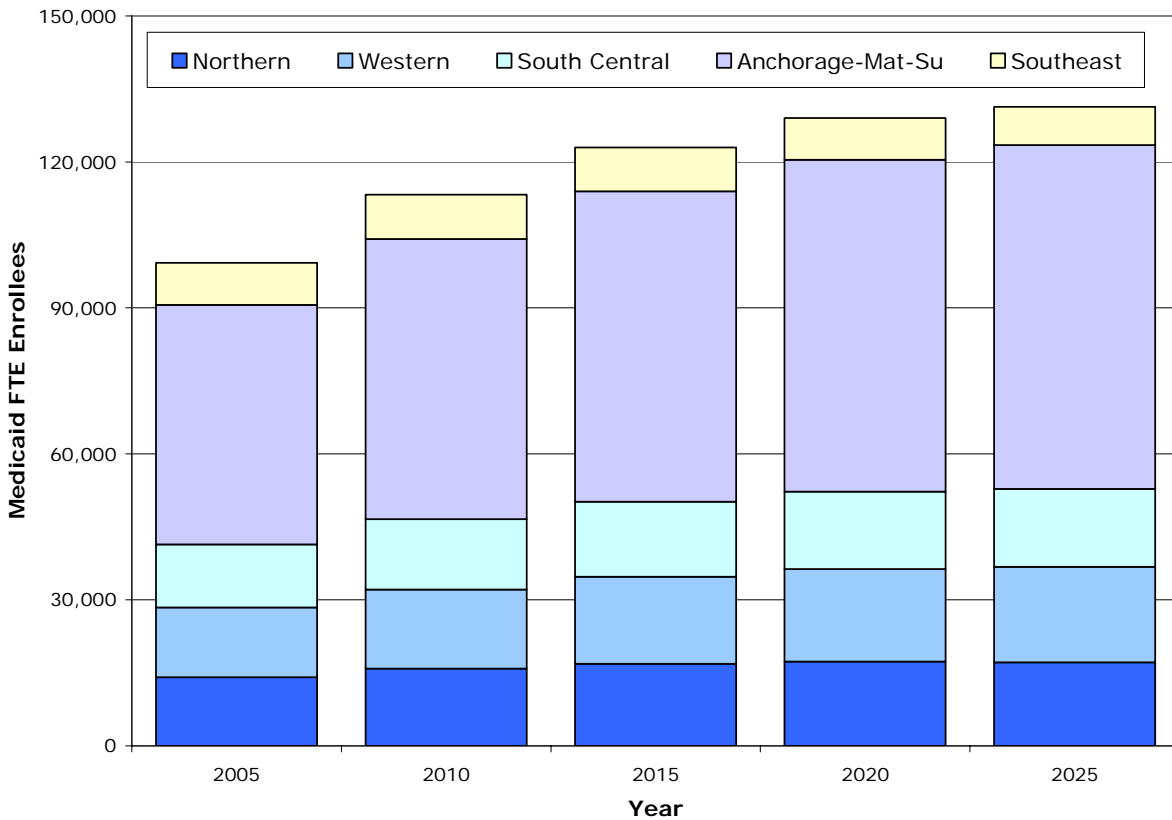
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Due to the higher relative birth rates and poverty rates of the Native population, we project that Medicaid enrollment in the Native population will grow faster than the non-Native population (1.9% vs. 1.4%—see Figure 18). Composing about 34% of all

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[23] Again we note that the forthcoming ADLWD population forecast for the Southeast region may not project a declining population through 2025.

Medicaid enrollees in 2004, we project that that the Native percentage of Medicaid enrollment will increase slightly to just over 36%.

Figure 18: Projected Medicaid FTE Enrollment by Native/Non-Native Status, Selected Years
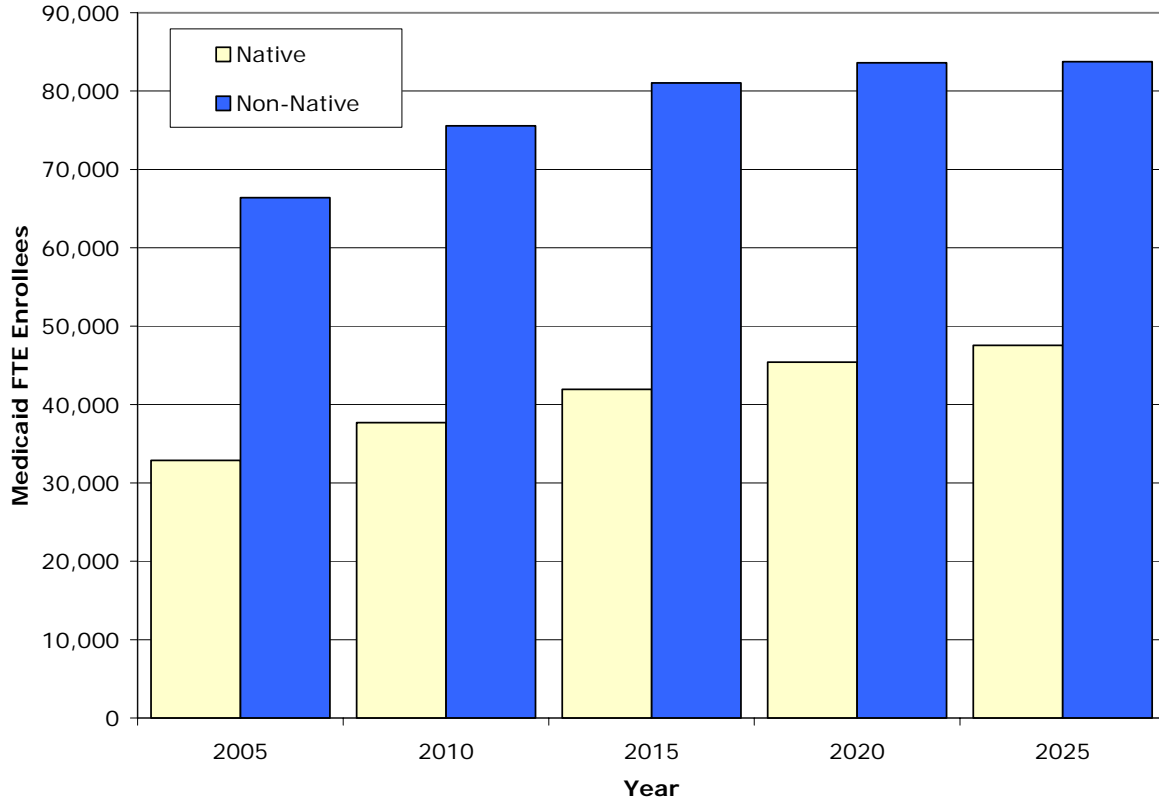
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Continuing the trend observed in the recent historical data, we project the enrollment of males into the Medicaid program to grow slightly faster than females (1.6% vs. 1.5%—see Figure 19). Still, due to greater life expectancies, higher rates of poverty, and pregnancy and related needs, we expect the proportion of females in the Medicaid program to remain higher than males.

Figure 19: Projected Medicaid FTE Enrollment Rates by Gender, Selected Years
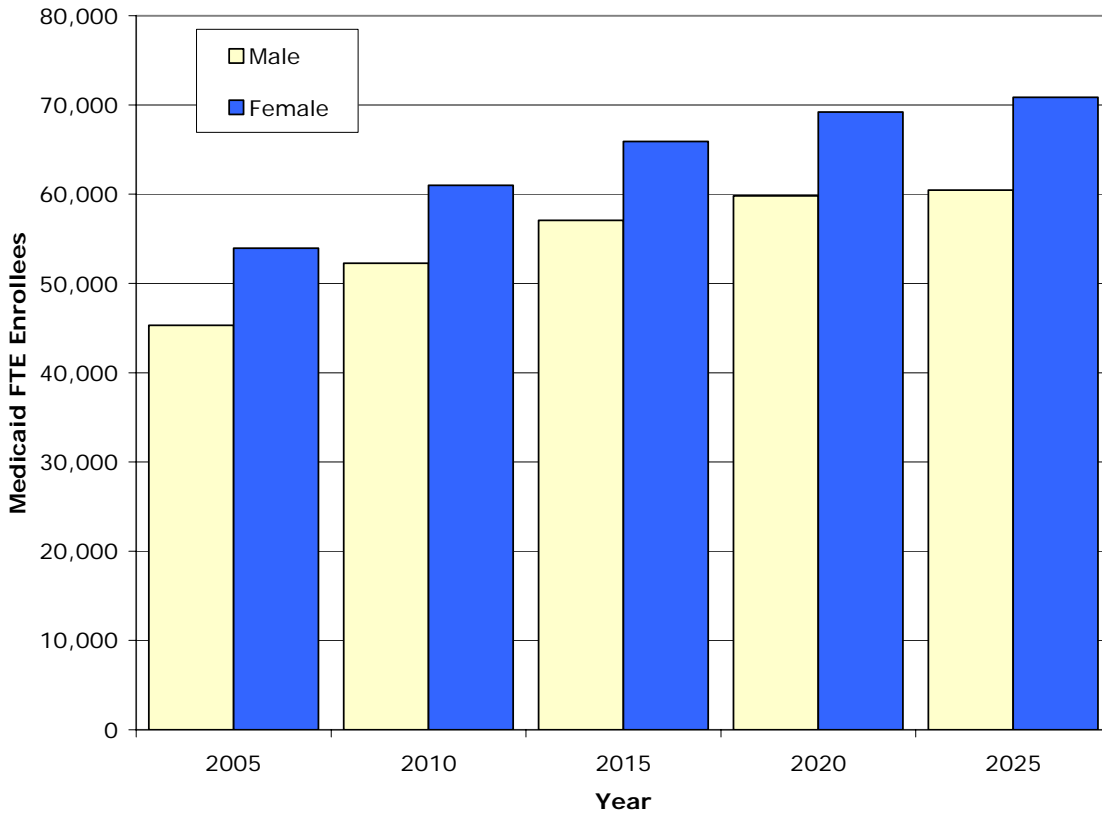
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

The discussion so far has emphasized Medicaid FTE enrollment levels and growth in the enrollment levels. In doing so, we've implicitly combined the population forecast (the ALTPP) and the Medicaid enrollment rate forecast. Growth (or decline) in the Medicaid enrollment rates of the overall population or within a particular region or demographic group can be thought of as growth (or decline) in the Medicaid population beyond that explained by population growth. For example, as was discussed above, Alaska's Medicaid population is expected to grow by about 1.4% per year, whereas the general population is expected to grow by about 0.87 % per year. The difference, 0.53%, is the forecasted growth rate in the Medicaid enrollment rate (see row 1 of Table 6).

Table 6: Proportion of Demographic and Regional Groups Projected to be Enrolled in Medicaid on a FTE Basis, Selected Years

Subpopulation	2005	2010	2015	2020	2025	Average Annual Percent Change (2005-2025)
State	0.15	0.16	0.17	0.17	0.17	0.53%
Gender						
Male	0.13	0.15	0.15	0.16	0.15	0.69%
Female	0.17	0.18	0.18	0.18	0.18	0.38%
Native Status						
Native	0.29	0.31	0.31	0.31	0.30	0.13%
Non-Native	0.12	0.13	0.13	0.14	0.13	0.49%
Region						
Northern	0.14	0.15	0.15	0.15	0.15	0.47%
Western	0.34	0.36	0.37	0.37	0.36	0.29%
South Central	0.14	0.15	0.15	0.15	0.15	0.47%
Anchorage-Mat-Su	0.14	0.16	0.16	0.16	0.16	0.55%
Southeast	0.11	0.12	0.12	0.12	0.11	0.12%
Age						
0-4	0.43	0.46	0.46	0.44	0.42	-0.12%
5-9	0.34	0.37	0.38	0.37	0.35	0.11%
10-14	0.29	0.33	0.33	0.32	0.30	0.19%
15-19	0.20	0.23	0.23	0.22	0.20	-0.06%
20-24	0.09	0.09	0.09	0.09	0.09	0.39%
25-34	0.08	0.08	0.08	0.09	0.09	0.67%
35-44	0.06	0.06	0.07	0.07	0.07	0.86%
45-54	0.04	0.04	0.04	0.04	0.04	0.26%
55-64	0.06	0.06	0.06	0.06	0.06	0.30%
65-74	0.15	0.17	0.18	0.19	0.19	1.12%
75+	0.18	0.20	0.21	0.21	0.22	0.91%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Table 7 shows the actual FTE enrollment forecast by demographic group and region. Directly tied to projected decreases in population over the next 20 years, Medicaid enrollment in the Southeast region—on an FTE basis—is projected to decline by about 0.5% per year over the same period. With respect to age cohort, slow to moderate growth is expected for children and working-age adults (note the projected decline for the 45-54 age group), but substantial growth in Medicaid enrollment for the elderly.

Table 7: Medicaid FTE Enrollment by Demographic and Regional Groupings, Selected Years

Subpopulation	2005	2010	2015	2020	2025	Average Annual Percent Change (2005-2025)
State	99,258	113,277	122,979	129,017	131,305	1.40%
Gender						
Male	45,306	52,278	57,061	59,818	60,439	1.44%
Female	53,952	61,000	65,918	69,199	70,865	1.36%
Native Status						
Native	32,879	37,716	41,940	45,405	47,544	1.84%
Non-Native	66,379	75,561	81,039	83,612	83,761	1.16%
Region						
Northern	14,097	15,874	16,890	17,304	17,144	0.98%
Western	14,353	16,247	17,846	19,030	19,618	1.56%
South Central	12,969	14,452	15,399	15,917	16,000	1.05%
Anchorage-Mat-Su	49,174	57,595	63,818	68,181	70,690	1.81%
Southeast	8,665	9,110	9,027	8,586	7,853	-0.49%
Age						
0-4	22,767	25,553	26,910	26,429	24,954	0.46%
5-9	17,391	20,987	21,976	22,215	21,336	1.02%
10-14	16,220	17,515	19,303	19,232	18,895	0.76%
15-19	11,110	12,314	11,930	12,250	11,572	0.20%
20-24	3,733	4,280	4,298	4,138	4,499	0.93%
25-34	6,824	7,581	8,590	9,073	8,883	1.32%
35-44	6,257	6,036	6,291	6,871	7,676	1.02%
45-54	4,237	4,330	3,945	3,612	3,590	-0.83%
55-64	3,630	4,875	5,613	5,605	4,981	1.58%
65-74	4,012	5,879	9,102	12,650	14,711	6.50%
75+	3,078	3,927	5,020	6,944	10,207	5.99%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Finally, Table 8 shows the projected FTE enrollment in the Alaska Medicaid Program by eligibility category. Over the course of the forecast period, we project enrollment to increase in each eligibility category relative to its 2005 level, though some categories are projected to experience slightly declining enrollment after 2015. Differences in projected growth rates among the eligibility categories are explained mostly by differences in the projected growth rates of the different demographic groups. For example, we project relatively slow growth in the enrollment rates of eligibility categories specific to children (e.g. Title XIX Kids), but high rates of growth in eligibility categories geared more heavily toward the elderly (e.g. LTC non-cash).

Table 8: Projected FTE Enrollment in Alaska Medicaid Program by Eligibility Category, Selected Years

Eligibility Group	2005	2010	2015	2020	2025	Average Annual Percent Change
AFDC & Related	32,272	35,827	37,829	38,501	38,256	0.85%
Title XIX Kids	3,810	4,223	4,449	4,549	4,589	0.93%
Title XXI Kids	29,837	33,676	35,265	35,057	33,397	0.56%
Pregnancy/Post Partum	12,826	14,493	15,151	15,075	14,361	0.56%
Kids in Custody	2,663	3,053	3,275	3,376	3,346	1.14%
Alien (Foreign)	6	8	9	11	14	3.71%
SSI/APA/LTC Cash	15,376	18,973	23,343	28,033	32,052	3.67%
LTC Non-cash	1,397	1,769	2,208	2,769	3,462	4.54%
Other Disabled	131	177	241	311	361	5.08%
Medicare	179	206	226	236	235	1.35%
Exams	759	873	982	1,098	1,232	2.42%
Total (FTE) Enrollment	99,258	113,277	122,978	129,017	131,305	1.40%
Unduplicated Count Enrollment	132,344	151,036	163,971	172,022	175,073	1.40%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Note: Based on the historical relationship, the unduplicated count of enrollment is assumed to equal (FTE Enrollment / 0.75) for all forecast years.

Chapter 3—Utilization of Medicaid Services

Using claim-level data provided by ADHSS on the utilization of Medicaid services for all Alaskans during fiscal years 1997-2004, utilization rates of Medicaid services were projected through 2025. For the purpose of this analysis, ADHSS grouped Medicaid services into 20 basic service categories.[24] The categories are presented in Table 9 along with common descriptors used by the ADHSS.

Table 9: Medicaid Service Codes and Descriptions

Service Category	Description
Dental	Dental services for children and adults
DME/Supplies	Durable medical equipment (DME), medical supplies, prosthetics, and orthotics
EPSDT	Early, periodic screening, diagnosis and treatment (EPSDT) including preventive health checkups, health screenings and immunizations
HCB Waiver	Home and community based long-term care services offered through Medicaid Waivers including Alaska Pioneer Homes, assisted living homes, respite care, adult day care, chore services, residential and day habilitation, nutrition, and meals.
Health Clinic	Health clinic services including rural health clinics, federally-qualified health clinics and tribal health clinics
Home Health/Hospice	Home health services, hospice care, nutrition services, and private duty nursing
Inpatient Hospital	Inpatient hospital services
Inpatient Psychiatric	Inpatient psychiatric hospital services
Lab/X-ray	Laboratory, x-ray and diagnostic services
Nursing Home	Skilled nursing and intermediate care facilities including intermediate-care facilities for the mentally retarded; and temporary long-term care services
Other Services	Other services not classified elsewhere
Outpatient Hospital	Outpatient hospital services, outpatient surgery services, and end-stage renal disease services
Outpatient Mental Health	Outpatient mental health services, psychology services, and drug abuse centers
Personal Care	Personal care attendant services including agency-based and consumer-directed programs
Pharmacy	Prescription drugs
Physician/Practitioner Services	Physician, podiatrist, advanced nurse practitioner, and midwifery services
Residential Psychiatric/BRS	Residential psychiatric treatment centers and behavioral rehabilitation services (BRS)
Therapy/Rehabilitation	Outpatient rehabilitation, physical therapy, occupational therapy, speech therapy, audiology, and chiropractic services
Transportation	Emergency and non-emergency medically necessary transportation and accommodation
Vision	Optometrist services and eyeglasses

Source: Alaska Department of Health and Social Services.

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[24] These Medicaid service categories are used in the organizational structure of ADHSS and do not align to the standard categories of service used by Centers for Medicare and Medicaid Services (CMS).

In this analysis we define *service utilization* as the annual unduplicated count of persons who used a particular Medicaid service during the fiscal year.[25] These persons are referred to as "recipients" or "beneficiaries". Recipients are counted as utilizing the service category if they had a paid claim amount greater than zero. Recipients are counted only once per fiscal year whether they used a service category once or multiple times during the fiscal year, so in this report, *utilization* measures the number of individuals who used a service but does not measure the quantity of those services that the individuals used. The quantity of the services will be forecasted in the next chapter when we forecast the cost of the services. Before discussing the development of the forecasts of the utilization of Medicaid services, we present several tables showing historic utilization of Alaskan Medicaid services. Table 10 shows utilization by Medicaid service category for fiscal years 1998, 2000, 2002, and 2004.[26]

Between 1998 and 2004 the utilization of *All Medicaid Services* grew by 9.3% on an average annual basis.[27] Growth rates for individual service categories, however, varied greatly, with Home Health/Hospice declining slightly over the period (-0.6% per year) and Residential Psychiatric/BRS growing on average by almost 25% per year. Over this same period, the unduplicated count of Medicaid enrollment grew on an average annual basis by 6.3%, 3.0 percentage points per year slower than the rate of growth in utilization. Thus, not only did Medicaid enrollment grow substantially between 1998 and 2004, but the average number of Medicaid services utilized by each enrollee also grew.

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[25] The ADHSS Medicaid utilization and spending data contains information on total spending by Medicaid service category for each Medicaid enrollee. The data does not, however, contain any information about the number of times during the fiscal year the enrollee used each of the services. The calculation of average spending per service category is based only on those enrollees with a dollar amount greater than zero during the fiscal year (i.e., "recipients"), without regard for the number of times during the year the service was used.

[26] Note: data for years 1997, 1999, 2001, and 2003 are not shown in Table 10 or in many of the tables throughout the remainder of this report because of limited space. Average annual growth rates are slightly lower when considering the period 1997-2004.

[27] By *All Medicaid Services* we mean the sum of all service categories utilized during the fiscal year. Because many Medicaid enrollees utilize Medicaid services from more than one service category, *All Medicaid Services* is significantly higher than the unduplicated count of Medicaid enrollees or recipients.

Table 10: Utilization of Medicaid Services, Alaska Medicaid Program 1998-2004

Service Category	Fiscal Year				Average Annual Percent Change (1998-2004)	Rank by Avg. Annual Percent Change
	1998	2000	2002	2004		
Dental	19,921	28,203	36,282	38,983	11.2%	7
DME/Supplies	6,006	7,695	10,275	10,072	8.6%	13
EPSDT	606	1,016	1,826	1,360	13.5%	6
HCB Waiver	1,641	2,746	3,888	4,258	15.9%	4
Health Clinic	7,572	17,932	17,595	23,011	18.5%	3
Home Health/Hospice	579	381	460	557	-0.6%	20
Inpatient Hospital	10,673	12,843	13,519	14,658	5.3%	16
Inpatient Psychiatric	478	606	673	722	6.9%	14
Lab/X-ray	12,282	10,096	12,496	13,465	1.5%	19
Nursing Home	877	890	861	1,045	2.9%	18
Other Services	378	315	603	504	4.8%	17
Outpatient Hospital	35,441	46,237	54,229	59,762	8.7%	11
Outpatient Mental Health	8,014	9,822	10,640	12,033	6.8%	15
Personal Care	1,096	1,343	1,868	3,539	19.5%	2
Pharmacy	43,789	58,896	69,234	75,515	9.1%	9
Physician/Practitioner	51,250	67,881	80,196	87,487	8.9%	10
Resident Psychiatric/BRS	221	469	737	985	24.9%	1
Therapy/Rehabilitation	3,554	5,173	7,072	8,293	14.1%	5
Transportation	12,672	15,791	19,012	21,323	8.7%	12
Vision	10,793	15,208	17,200	20,323	10.5%	8
Unduplicated Count of Medicaid Recipients	70,135	91,734	103,805	111,621	7.7%	NA
Unduplicated Count of Medicaid Enrollees	88,725	110,264	121,605	129,549	6.3%	NA

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.
Note: the values in this table are the unduplicated number of persons who used each of the Medicaid Services during the specific fiscal year.
Note: The range of historical data used in the Alaska long-term Medicaid forecast extends from FY 1997 through FY 2004. Due to space limitations, the table only presents data for 1998, 2000, 2002, and 2004.

STEPS IN DEVELOPING THE SERVICE UTILIZATION FORECAST

In this section we describe in detail the two steps followed to produce the forecasts of utilization of Medicaid services. These forecasts are based on historic, claim-level data obtained from ADHSS for fiscal years 1997-2004. There is much variation between Medicaid enrollees in their utilization of Medicaid services, with many enrollees using none of the 20 Medicaid services during a given fiscal year and a few using services in 10 or more categories (see Figure 20). Over the eight years of historical data, the most

frequent rates of Medicaid service utilization were two, three, and four services per year. As Figure 20 shows, there was little year-to-year variation in the distribution of service utilization.

Figure 20: Service Utilization by Fiscal Year
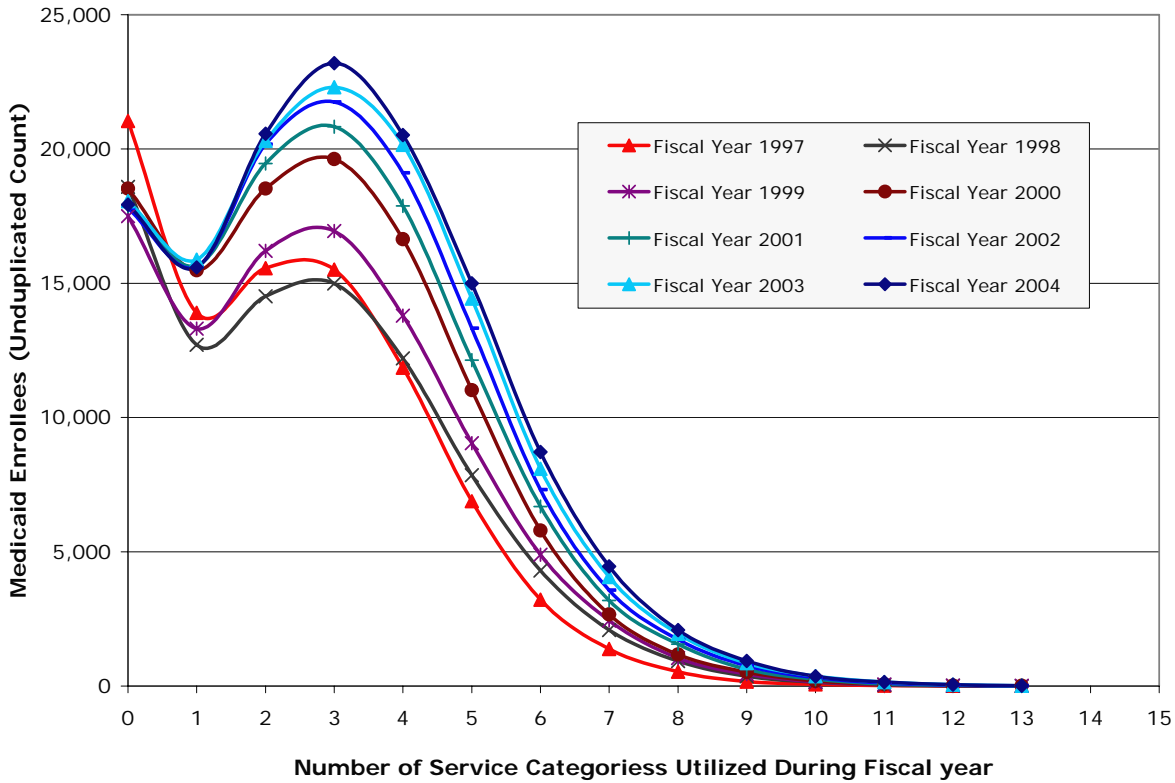
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Table 11 shows that, even as the distribution of Medicaid service utilization has stayed relatively constant over the historical period, the average number of service categories used per Medicaid enrollee increased on an average annual basis by 4.0% between fiscal years 1998 and 2004. During this same time, the number of Medicaid enrollees grew on an *unduplicated count* basis by 5.2% per year and on an *FTE* basis by 5.5% per year. At 6.9%, the unduplicated count of Medicaid recipients increased even faster than did the unduplicated count of Medicaid enrollment.

Table 11: Average Number of Alaskan Medicaid Service Categories Utilized and Total Number of Medicaid Recipients and Enrollees, Fiscal Years 1997-2004

Year	Average Number of Medicaid Service Categories Utilized Per Enrollee (Unduplicated Count)	Medicaid Recipients (Unduplicated Count)	Medicaid Enrollees (Unduplicated Count)	Medicaid Enrollees (FTE)
1997	2.3	69,087	90,130	64,788
1998	2.6	70,135	88,725	62,390
1999	2.7	78,335	95,834	65,151
2000	2.8	91,734	110,264	76,663
2001	2.9	98,385	116,255	82,274
2002	2.9	103,805	121,605	87,362
2003	3.0	108,603	126,661	92,711
2004	3.1	111,621	129,549	95,277
Average Annual Growth Rate	4.0%	6.9%	5.2%	5.5%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Step 1.   Probability of Utilizing a Medicaid Service: Logistic Regression Analysis

Service utilization differs by Medicaid eligibility category and, in fact, an enrollee's eligibility category provides information about the Medicaid services he or she may utilize. We take advantage of this information by creating indicator variables based on Medicaid eligibility categories. These indicator variables are used as predictors in the service utilization regression models discussed below. Table 12 shows the five eligibility groups formed by combining Medicaid eligibility categories.

Table 12: Eligibility Groups Used in *Probability-of-Service* Logistic Regression Models[28]

Eligibility Groups	Eligibility Categories
Child & Family	AFDC & Related; Title XIX Kids; Title XXI Kids
Pregnancy	Pregnancy/Post Partum
LTC Non-Cash	Long Term Care, Non-Cash Assistance
Low income or Disabled	SSI/APA/LTC Cash; Medicare; Other Disabled
Other	Kids in Custody; Alien; Exams

Source: Alaska Department of Health and Social Services

Using data obtained from ADHSS on expenditures for Medicaid services for the years 1997-2004 we constructed indicator variables of service usage for each of the 20 Medicaid service categories. Each of these indicator variables was then used as the dependent variable in a logistic regression equation of the form:

$$P(event) = \frac{1}{1 + e^{-Z}}$$

Where

P(event) is the probability of an event occurring (i.e., did the Medicaid enrollee use a particular service during the fiscal year);

e is the exponential function and is equal to 2.718. It is the base for the natural logarithm ("*ln*") and, because of its unique properties, is the most common function for the analysis of population growth and studies of probabilities.

Z = b_0 + b1(Gender) + b_2(Native Status) + b_3(Age) + b_4(Northern) + b_5(Western) + b_6(South Central) + b_7(Southeast) + b_8(Time) + b_9(Child & Family) + b_{10}(Pregnancy) + b_{11}(LTC Non-Cash) + b_{12}(Low Income or Disabled) + b_{13}(Age*Gender) + b_{14}(Age*Native) + b_{15}(Age*Child & Family) + b_{16}(Age*Pregnancy) + b_{17}(Age*LTC Non-Cash) + b_{18}(Age*Low Income or Disabled) + u.

And where

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[28] Note 1: Similar eligibility categories from Chapter 2 were combined to form the five Eligibility Groups. This allowed for a more parsimonious specification of the *probability-of-service* logistic regression models, while maintaining all information embodied in the Eligibility Category indicators.
Note 2: The eligibility categories contained within the "Other" grouping use eligibility criteria sufficiently different from the other categories to merit their own grouping.

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- b_0 is the *y*-intercept to be estimated;
- *Gender* is an indicator variable (1 = Male);
- *Native Status* is an indicator variable (1 = Native status);
- *Age* is the age in years of the individual;
- *Northern* is an indicator variable (1 = Northern region);
- *Western* is an indicator variable (1 = Western region);
- *South Central* is an indicator variable (1 = South Central region);
- *Southeast* is an indicator variable (1 = Southeast region);
- *Time* is a time trend intended to account for changes in Medicaid enrollment not explained by the demographic and regional variables (1 = 1997, 2 = 1998, …, 8 = 2004);
- *Child & Family* is an indicator variable of enrollment in the "Child & Family" eligibility meta-group—see Table 12 (1 = enrolled);
- *Pregnancy* is an indicator variable of enrollment in the "Pregnancy" eligibility meta-group—see Table 12 (1 = enrolled);
- *LTC Non-Cash* is an indicator variable of enrollment in the "LTC Non-Cash" eligibility meta-group—see Table 12 (1 = enrolled);
- *Low Income or Disabled* is an indicator variable of enrollment in the "Low Income or Disabled" eligibility meta-group—see Table 12 (1= enrolled);
- *Age*Gender* is an interaction variable between Age and Gender;
- *Age*Native* is an interaction variable between Age and Native Status;
- *Age*Child & Family* is an interaction variable between Age and Child & Family;
- *Age*Pregnancy* is an interaction variable between Age and Pregnancy;
- *Age*LTC Non-Cash* is an interaction variable between Age and LTC Non-Cash;
- *Age*Low Income or Disabled* is an interaction variable between Age and Low Income or Disabled;
- *e* is the random error term;
- b_1 - b_{18} are regression coefficients to be estimated.

Logistic regression analysis is used to predict whether an event will occur or will not occur. As such, the dependent variable can have only one of two possible values (usually 0 or 1). For example, in each of the 20 Medicaid service utilization models, the

dependent variable equals 0 if the Medicaid enrollee did not use the service and equals 1 if the enrollee did use the service. The regression coefficients estimated from each of the logistic regression models (i.e., $b_1 - b_{18}$) can be used to estimate the probability that an individual—or a group of individuals with the same or similar characteristics—will use a particular Medicaid service category. The fact that the estimated coefficients can be applied to a group of individuals of similar characteristics is especially important. This is because the forecast is based on the 220 subpopulations—individuals with similar demographic characteristics.

All of the historic enrollment-level data on Medicaid eligible individuals were used to estimate logistic regression equations for each of the service categories. The resulting set of coefficient estimates from each of the logistic regression models were then applied to the characteristics of each of the 220 Alaskan subpopulations to produce *unadjusted* estimates of the proportion of enrollees projected to utilize each of the Medicaid services for each year 2005-2025.[29]

With a few exceptions, the logistic regression equations specified for each of the 20 Medicaid service categories contained the same explanatory variables (those listed above). The results of each of the estimated regression equations are presented in Appendix C.

Step 2. Control Growth in Service Utilization to National Forecast of Medical Services Utilization

As discussed in Step 1, a time trend was included in each of the service utilization models. The purpose of a time trend variable is to explain time-related variation in the dependent variable, not explained by the other explanatory variables (e.g. gender, age, and region). As a *proxy* for the factors affecting changes in the Medicaid utilization rate over time, the time trend is an important variable in each of the service utilization models. The estimated coefficient from the time trend variable is the driver that determines the rate of growth or decline in utilization of the particular service category. As such, it has the potential of resulting in a rate of growth in utilization that is

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[29] The "characteristics of each Alaskan sub-population" include the demographic indicator variables that represent the sub-population (i.e., region, gender, Native status, and age), as well as the proportion of the sub-population forecasted to be enrolled in each of the Medicaid eligibility categories (see Table 12) and a continuation of the time-trend used in the logistic regression.

unreasonable in the mid- or long-term (e.g. beyond just a few years). Thus, although we use the estimated coefficient from the time trend variable (as well as the other estimated coefficients) to project utilization of each Medicaid service category, this results in an *unadjusted* forecast of service utilization.

To the best of our knowledge there is only one published source that estimates growth in the utilization of medical services—the Centers for Medicare and Medicaid Services (CMS) national forecast of growth in personal health care expenditure (see Heffler et al. 2004). In the CMS study, growth in personal health care expenditures is broken down into four factors:

- Medical Prices
- Population (change)
- Age-Sex Mix (demographic change)
- Utilization

Of interest to us, is the utilization component, which includes the intensity of use and the mix of services.[30] For the years 2004-2013, the authors project utilization to increase on an average annual basis by 2.2%.[31] It is important to acknowledge that the present and future demand for medical services by Alaska's Medicaid population is not the same and will not necessarily be the same as demand for medical services by all Americans. That said, we believe it is reasonable to believe that long-term growth in utilization of medical services—regardless of the mix of services—will be similar. Thus, even if Alaska's Medicaid population's mix and intensity of medical services is different from and remains different from the mix and intensity of medical services of the "typical American," we believe that change in that mix and intensity will be very similar. The CMS forecast calls for utilization of medical services to increase on average by 2.2% per year through 2013 (Heffler et al., 2004). We are not aware of any forecast that projects service utilization beyond 2013 and, therefore, hold constant this growth

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[30] Heffler et al. (2004) also state in their notes accompanying Exhibit 6 that utilization is a residual measure that includes any errors in measuring prices or total spending.

[31] The 2.2% annual growth in utilization is in addition to growth in Medicaid service spending due to population and demographic changes (1.24%).

rate through the entire forecast period.[32] The forecast of Medicaid service utilization was developed in the following four steps.

1) Create the *gross unadjusted* forecasts of Medicaid utilization by applying the coefficient estimates derived in Step 1 to the demographic characteristics, Medicaid eligibility characteristics, and time variable (discussed in Step 1).

2) Calculate the growth rate in utilization of all Medicaid services for each year of the forecast. This is based on a weighted average of all 20 Medicaid service groups.

3) Subtract the portion of each year's growth rate that is due to Medicaid enrollment growth.

4) Adjust the remainder of the growth rate—the *net unadjusted* change in Medicaid service utilization per unduplicated count—by controlling to the CMS medical services utilization forecast. In doing so, the growth rate of each Medicaid service category is also adjusted so that the weighted average growth rate of all service categories is equal to the CMS forecast.[33]

PROJECTION OF MEDICAID UTILIZATION OF SERVICES

The resulting *adjusted* forecast results in an average annual increase in Medicaid utilization of approximately 3.15% per year through 2025.[34] This growth in Medicaid utilization is composed of growth in Medicaid enrollment and growth in the utilization of Medicaid services on a per enrollee basis. We project that growth in Medicaid utilization will be approximately 4.3% per year between 2005 and 2010, but will decline to approximately 2.1% between 2020 and 2025. Table 13 shows the forecasted utilization of Medicaid services by category. For all but two service categories (Inpatient Psychiatric and Lab/X-ray), we project positive growth in Medicaid utilization. Of particular note, we project much greater than average growth in Personal Care, HCB

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[32] In fact, because forecasted changes in the mix of the Medicaid service categories result in changing "intensity" of service, we constrain utilization of Medicaid services to 1.8% per year and allow the residual between 2.2% and 1.8% to be accounted for in the spending forecast, developed in Chapter 4.

[33] Again, note that we actually adjusted utilization to a growth rate of 1.8%, allowing the residual (2.2% - 1.8% = 0.4%) to be accounted for in the spending forecast developed in Chapter 4.

[34] This is *somewhat* comparable to the 2.2% utilization growth plus 1.24% population and demographic growth (total 3.46%) forecasted by Heffler et al. (2004). However, because of the different methods used in the two analyses, these two estimates are not directly comparable.

Waiver, Residential Psychiatric/BRS, and Therapy/Rehabilitation. As will be discussed in Chapter 4, these are among the most expensive of the Medicaid service categories.

Table 13: Forecast of Utilization of Medicaid Services, Selected Calendar Years

Medicaid Service	Calendar Year					Average Annual % Change (2005-2025)	Rank by Avg. Annual % Change
	2005	2010	2015	2020	2025		
Dental	40,730	53,453	64,487	73,175	79,209	3.3%	11
DME/Supplies	8,454	11,715	15,707	20,333	25,150	5.5%	7
EPSDT	1,118	1,490	1,870	2,245	2,615	4.3%	8
HCB Waiver	4,167	7,004	11,428	17,686	25,263	9.0%	2
Health Clinic	26,697	38,066	51,461	66,408	81,477	5.6%	6
Home Health/Hospice	701	799	905	1,018	1,119	2.3%	14
Inpatient Hospital	15,404	16,432	17,015	17,319	17,324	0.6%	18
Inpatient Psychiatric	780	818	812	781	733	-0.3%	20
Lab/X-ray	14,095	14,482	14,476	14,258	13,883	-0.1%	19
Nursing Home	1,116	1,357	1,677	2,100	2,607	4.2%	9
Other Services	299	362	421	478	537	2.9%	12
Outpatient Hospital	63,512	77,243	88,609	97,172	102,324	2.4%	13
Outpatient Mental Health	12,962	14,431	15,571	16,497	17,169	1.4%	15
Personal Care	5,029	8,626	14,587	23,617	35,311	9.7%	1
Pharmacy	78,867	93,458	103,871	110,241	112,626	1.8%	16
Physician/Practitioner	91,928	105,140	113,440	117,796	118,652	1.3%	17
Residential Psych./BRS	1,227	1,898	2,766	3,889	5,319	7.3%	3
Therapy/Rehabilitation	9,949	15,240	22,242	31,135	41,529	7.1%	4
Transportation	22,509	28,590	35,209	42,142	48,752	3.9%	10
Vision	24,288	35,006	47,669	61,614	75,190	5.7%	5
Unduplicated Count of Medicaid Recipients*	113,953	130,047	141,184	148,117	150,743	1.4%	NA
Unduplicated Count of Medicaid Enrollees	132,344	151,036	163,971	172,022	175,073	1.4%	NA

Note: the values in this table are the unduplicated number of persons who used each of the Medicaid Services during the specific fiscal year.

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

* Assumes constant ratio of 0.86 between Recipients and Enrollees, based on analysis of historical data.

Chapter 4—Total Spending on Medicaid Claims

In Chapter 4 we develop a forecast of total spending on Medicaid claims by Medicaid service category.[35] Projection of the State's share of Medicaid spending will be developed in Chapter 5, based on the forecast of total spending developed in this chapter. Total spending is the product of the utilization of Medicaid services, developed in Chapter 3, and average spending per Medicaid service, developed below. The projection of total spending includes only payment amounts processed as claims. In Chapter 6 we will project both the total and State's share of funding for other types of Medicaid payments which are not claims-based. Neither the historical data nor the spending forecast will directly correspond to data from the ADHSS accounting or budget systems. Additionally, the claims data is based on date of service while the accounting and budget systems are based on dates of payment.

Using claim-level data provided by ADHSS on the utilization and cost of Medicaid claims for all Alaskans during the period 1997-2004, we develop forecasts of total spending for each of the 20 Medicaid service categories.[36] These forecasts are then used in conjunction with the forecasts of utilization of Medicaid services, developed in Chapter 3, to produce forecasts of total spending by Medicaid service category. For each service category, the forecasts are developed at the subpopulation level (i.e., for each of the 220 subpopulations). Total spending on all claims is presented by demographic and regional groupings.

Between 1998 and 2004, average spending increased for practically every Medicaid service category (see Table 14). Over this same period, average spending per Medicaid recipient increased by more than 50% and average spending per enrollee increased by more than 60%. Table 14 also shows that there was much variation between the different service categories in the rate of growth in average spending, with some service categories experiencing essentially no growth or even slightly declining growth in average spending (e.g. Other Services, EPSDT, Vision, and Outpatient Mental Health). In contrast, other service categories experienced strong growth in average spending per unduplicated count (e.g. Health Clinic, Personal Care, and Therapy/Rehabilitation).

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[35] Total spending includes spending on Medicaid services by both the federal government and the State of Alaska.

[36] The ADHSS Medicaid utilization and spending data contain information on total spending by Medicaid service category for each Medicaid Enrollee. The data do not, however, contain any information about the number of times during the fiscal year the enrollee used each of the services.

Some of the fastest growing service categories also have the highest average cost per recipient (e.g. Inpatient Hospital, Residential Psychiatric/BRS, and Personal Care).

Table 14: Average Historical Spending Per Recipient on Medicaid Claims[37]

Service Category	Fiscal Year				Average Annual Percent Change (1998-2004)	Rank by Avg. Annual Percent Change
	1998	2000	2002	2004		
Dental	$408	$480	$484	$514	3.8%	11
DME/Supplies	$922	$1,005	$953	$1,115	3.2%	13
EPSDT	$117	$131	$137	$118	0.1%	17
HCB Waiver	$18,06	$19,22	$24,09	$26,278	6.2%	9
Health Clinic	$512	$834	$976	$1,093	12.6%	3
Home Health/Hospice	$2,099	$2,760	$3,343	$2,621	3.7%	12
Inpatient Hospital	$5,633	$5,767	$8,561	$10,321	10.1%	6
Inpatient Psychiatric	$16,91	$15,88	$20,24	$18,795	1.8%	14
Lab/X-ray	$90	$96	$104	$130	6.1%	10
Nursing Home	$52,39	$54,81	$68,75	$57,553	1.6%	15
Other Services	$245	$186	$187	$246	0.1%	18
Outpatient Hospital	$707	$727	$957	$1,185	8.6%	8
Outpatient Mental Health	$4,803	$4,485	$4,343	$4,755	-0.2%	19
Personal Care	$4,890	$5,681	$8,198	$18,539	22.2%	1
Pharmacy	$729	$870	$1,156	$1,494	12.0%	5
Physician/Practitioner	$834	$787	$833	$877	0.8%	16
Residential Psychiatric/BRS	$24,84	$34,68	$42,25	$51,437	12.1%	4
Therapy/Rehabilitation	$829	$862	$2,170	$2,476	18.2%	2
Transportation	$1,073	$1,287	$1,640	$1,902	9.5%	7
Vision	$142	$174	$185	$124	-2.2%	20
Per Unduplicated Count of Medicaid Recipient	$4,719	$4,986	$6,464	$8,012	8.8%	NA
Per Unduplicated Count of Medicaid Enrollees	$3,730	$4,148	$5,518	$6,903	10.3%	NA

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

The result of increasing Medicaid enrollment (discussed in Chapter 2), increasing utilization of Medicaid services (discussed in Chapter 3), and increasing average cost of service is, of course, very strong growth in the *total* cost of providing Medicaid services. Between 1998 and 2004, total spending on *All Medicaid Services* far more than doubled.[38] Table 15 shows total spending by Medicaid service category for 1998, 2000, 2002, and

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[37] Table 14 shows the average cost of each service per unduplicated count of recipients using such service one or more times during the year.

[38] In fact, between 1997 and 2004 total spending on *All Medicaid Services* practically tripled.

2004, as well as average annual growth rates in total spending over the period. Total spending on *All Medicaid Services* increased by 16.6% per year between 1998 and 2004, which is equal to the growth rate in the unduplicated count of Medicaid enrollment (6.3%, see Table 10) plus the growth rate in the average cost per unduplicated count of Medicaid enrollees (10.3%, see Table 14).

Table 15: Total Historical Spending on Medicaid Claims, Fiscal Years 1998-2004 (in Millions of Dollars)

Service Category	Fiscal Year				Average Annual Percent Change (1998-2004)	Rank by Avg. Annual Percent Change
	1998	2000	2002	2004		
Dental	$8.1	$13.5	$17.6	$20.0	15.0%	10
DME/Supplies	$5.5	$7.7	$9.8	$11.2	11.8%	12
EPSDT	$0.1	$0.1	$0.2	$0.2	13.6%	11
HCB Waiver	$29.6	$52.8	$93.7	$111.9	22.1%	5
Health Clinic	$3.9	$15.0	$17.2	$25.2	31.2%	4
Home Health/Hospice	$1.2	$1.1	$1.5	$1.5	3.1%	20
Inpatient Hospital	$60.1	$74.1	$115.7	$151.3	15.4%	9
Inpatient Psychiatric	$8.1	$9.6	$13.6	$13.6	8.6%	14
Lab/X-ray	$1.1	$1.0	$1.3	$1.7	7.6%	16
Nursing Home	$46.0	$48.8	$59.2	$60.1	4.5%	19
Other Services	$0.1	$0.1	$0.1	$0.1	4.9%	18
Outpatient Hospital	$25.1	$33.6	$51.9	$70.8	17.3%	8
Outpatient Mental Health	$38.5	$44.1	$46.2	$57.2	6.6%	17
Personal Care	$5.4	$7.6	$15.3	$65.6	41.7%	1
Pharmacy	$31.9	$51.2	$80.0	$112.8	21.0%	6
Physician/Practitioner	$42.7	$53.4	$66.8	$76.7	9.8%	13
Residential Psychiatric/BRS	$5.5	$16.3	$31.1	$50.7	37.0%	2
Therapy/Rehabilitation	$2.9	$4.5	$15.3	$20.5	32.4%	3
Transportation	$13.6	$20.3	$31.2	$40.6	18.2%	7
Vision	$1.5	$2.7	$3.2	$2.5	8.3%	15
All Medicaid Services	$330.9	$457.4	$671.0	$894.3	16.6%	NA

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

The relative importance of many of the service categories changed substantially between 1998 and 2004. For example, spending on Nursing Home Services constituted about 16% of the total Medicaid budget in 1998, but had dropped to only 7% of the total budget by 2004. This decline in relative importance was despite the fact that spending on Nursing Home Services increased by 4.5% per year over the period. Comparatively, spending on Residential Psychiatric/BRS Services constituted only 1.0% of total Medicaid spending in 1998, but had grown to 5.7% by 2004. Likewise, spending on HCB

Waivers, which provide services that allow a person who needs nursing home level of care to remain in their own home and/or community, increased from 9.0% of total spending to 12.5%.

STEPS IN DEVELOPING TOTAL SPENDING FORECAST

In this section we describe in detail the three steps followed to produce the forecasts of total spending (federal and state shares) for Medicaid claims. These forecasts are based on historic, claim-level data obtained from ADHSS for fiscal years 1997-2004.

Step 1.   Convert annual cost of Medicaid Claims per recipient into REAL cost

The data provided by ADHSS (and shown in Table 14 and Table 15) are in nominal or "current year" dollars. That is, the data include the actual cost of services incurred in each of the fiscal years. Conceptually, these costs are composed of two different components: the "*real*" cost of service and "*medical price inflation*". Medical price inflation can be further decomposed into *general price* inflation and *medical-specific* inflation. For the purposes of this analysis, we will be concerned only with medical price inflation as a whole and not its two component parts.

Typically, when analyzing financial time-series data, economists convert the financial data from *nominal* dollars into *real* dollars. By converting the data from *nominal* into *real* dollars, inflation is "netted out" of the data series, allowing trends in the *real* data to be more accurately analyzed. This is the procedure followed in this analysis. For reporting purposes, the forecasted data are presented in both *real* and *nominal* dollars. Converting between *real* and *nominal* dollars requires a simple transformation using an appropriate price deflator—for our purposes, the Centers for Medicare and Medicaid Services (CMS) personal health care price deflator ("the CMS deflator"). Although there are other candidate indexes that could be used for converting medical service spending between nominal and real (or vice versa) dollars, we chose the CMS deflator because it encompasses virtually all categories of personal health care spending and because it publishes a peer-reviewed forecast of the index.

Table 16: CMS Personal Health Care Price Deflator for Fiscal Years 1998-2004

	Fiscal Year							Average Annual Percent Change (1998-2004)
	1998	1999	2000	2001	2002	2003	2004	
CMS Deflator	0.802	0.823	0.848	0.879	0.913	0.947	1.018	4.0%

Source: Centers for Medicare & Medicaid Services, Office of the Actuary.
Note 1: The Personal Health Care Price Deflator was estimated by The Lewin Group and ECONorthwest for calendar years 1996 and 1997 based on the CMS medical inflation rate between 1998 and 1999.
Note 2: Fiscal year estimates of the Medical Price Deflator were calculated by averaging consecutive calendar year rates of the CMS Implicit Medical Price Deflator.
Note 3: Calendar Year 2004 = 1.00.

The CMS personal health care price deflator ("the CMS deflator") for years 1998-2004 is simply an index of medical inflation as measured by CMS over the period. It is presented in Table 16. Medical price inflation is a weighted average of the increases in prices of medical services not explained by increased utilization or intensity, and can be thought of in the same way as price inflation in other goods and services (such as energy prices). [39]

Table 17 shows total spending by Medicaid services in *real* dollars.[40] The effect of the transformation into *real* dollars is to "flatten" the average annual growth rate of each Medicaid service by the average annual rate of medical inflation over the period—4.0% (see Table 16). Thus, the average annual change in *real* spending (12.6%) is exactly 4.0 percentage points less than the average annual change in *nominal* spending (comparing the last row of Table 17 to the last row of Table 15).

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[39] The CMS personal health care chain-type index is constructed from the producer price index for hospital care, nursing home input price index for nursing home care, and consumer price indices specific to professional services related to personal health care, and retail outlet sales of medical products. See Exhibit 2 of Heffler et al. (2005) for more information regarding the CMS personal health care price deflator.

[40] Calendar year 2004 is the "base" year (note, however Table 16 shows the medical price deflator by fiscal year). By applying the index, Medicaid spending is converted—with respect to medical price inflation—into year 2004 equivalent dollars. Please note that deflating by the CMS deflator is not equivalent to deflating by a general price deflator (e.g. All Urban CPI). Thus, the *real* dollars presented in Table 17 are in dollars specific to medical services spending and not general economy spending.

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Table 17: Total Historical *Real* Spending on Medicaid Claims in Millions of Dollars, Fiscal Years 1998-2004

Service Category	Fiscal Year				Average Annual Percent Change (1998-2004)	Rank by Average Annual Percent Change
	1998	2000	2002	2004		
Dental	$10.1	$16.0	$19.2	$19.7	11.0%	10
DME/Supplies	$6.9	$9.1	$10.7	$11.0	7.8%	12
EPSDT	$0.1	$0.2	$0.3	$0.2	9.6%	11
HCB Waiver	$37.0	$62.3	$102.6	$109.9	18.1%	5
Health Clinic	$4.8	$17.6	$18.8	$24.7	27.2%	4
Home Health/Hospice	$1.5	$1.2	$1.7	$1.4	-0.9%	20
Inpatient Hospital	$75.0	$87.4	$126.8	$148.6	11.4%	9
Inpatient Psychiatric	$10.1	$11.4	$14.9	$13.3	4.6%	14
Lab/X-ray	$1.4	$1.1	$1.4	$1.7	3.7%	16
Nursing Home	$57.3	$57.5	$64.8	$59.1	0.5%	19
Other Services	$0.1	$0.1	$0.1	$0.1	0.9%	18
Outpatient Hospital	$31.3	$39.7	$56.8	$69.6	13.3%	8
Outpatient Mental Health	$48.0	$52.0	$50.6	$56.2	2.6%	17
Personal Care	$6.7	$9.0	$16.8	$64.4	37.8%	1
Pharmacy	$39.8	$60.4	$87.6	$110.8	17.1%	6
Physician/Practitioner	$53.3	$63.0	$73.1	$75.4	5.8%	13
Residential Psych/BRS	$6.8	$19.2	$34.1	$49.8	33.1%	2
Therapy/Rehabilitation	$3.7	$5.3	$16.8	$20.2	28.4%	3
Transportation	$17.0	$24.0	$34.1	$39.8	14.2%	7
Vision	$1.9	$3.1	$3.5	$2.5	4.3%	15
All Medicaid Services	$412.9	$539.5	$735.0	$878.4	12.6%	NA

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.
Note: Deflated by the CMS Medical Price Deflator (Calendar Year 2004 = 1.00)

Step 2. *Estimate the relationship between REAL spending on Medicaid Claims and demographic factors*

Total *real* spending by Medicaid service was summed-up for each of the 220 subpopulations for each of the eight years of historic data (220 * 8 = 1,760 observations)[41]. For the smaller regions, however, there were no recipients of certain service categories within some subpopulations. Because of this, *real* spending by Medicaid service was further summed-up to the state level for each demographic group (i.e., male/female, Native/non-Native, age grouping). This resulted in 44 demographic groups (2 * 2 * 11 = 44) for each year of data or 352 total observations (44 * 8 = 352

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[41] Note that for each of the 1,760 observations, we compute average *real* spending for each of the 20 Service categories.

observations).[42] Average *real* spending was then computed for each of the 352 records by dividing total *real* spending by the unduplicated count of Medicaid recipients. Average *real* spending for each of the Medicaid service categories is the dependent variable in the following regression equation of Medicaid service spending:

> *Ln(Avg. Real Spending) = b_0 + b_1(Gender) + b_2(Native Status) + b_3(Age) + b_4(Time) + b_5Ln(Avg. Real Spending$_{t-1}$) + e.*

Where:
- ***Ln(Avg. Real Spending)*** is the natural log of average *real* spending by each subpopulation for each year 1997-2004;
- ***b_0*** is the *y*-intercept to be estimated;
- ***Gender*** is an indicator variable (1 = Male);
- ***Native Status*** is an indicator variable (1 = Native status);
- ***Age*** is the mid-point age in years of the subpopulation;
- ***Time*** is a time trend intended to account for changes in *real* spending on Medicaid services not explained by the demographic and regional variables (1 = 1997, 2 = 1998, …, 8 = 2004);
- ***Ln(Avg. Real Spending$_{t-1}$)*** is the one-year lag of the natural log of average *real* spending by each subpopulation for each year 1997-2004;
- ***b_1 - b_5*** are regression coefficients to be estimated;
- ***e*** is the random error term and represents the difference between the actual and estimated value of the dependent variable.

The 20 models of Medicaid service spending were estimated using ordinary least squares regression. Explanatory variables in these models include demographic variables, time, and a first-order autoregressive term, *Ln(Avg. Real Spending$_{t-1}$).*[43] The reason for including the auto-regressive term is two-fold. First, economic theory indicates that—all else equal—the price of a good or service tends to be highly correlated period-to-period and so the average price last year is often a good predictor

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[42] Note that for some of the 44 demographic groups, there were still no recipients of certain services (e.g. no male recipients of Other Services).

[43] Only applicable in time-series analysis, an auto-regressive term (variable) is simply the value of the dependent variable from the previous period. By using a first-order (i.e., one period—one year in our case) auto-regressive term in the equation, we effectively reduce the length of the historical series by one year. For example, since fiscal year 1997 is the first year of data, the value of the auto-regressive term for 1997 is missing (as opposed to zero), and cannot be estimated. The value of the dependent variable for 1997 does, however, enter into the model as the value of the auto-regressive term for 1998. The first order autoregressive term is denoted by the subscript "$_{t-1}$," which indicates "one period back in time".

of the price this year. Second, when such a relationship in the dependent variable does exist and is not accounted for through the inclusion of a lagged value of the dependent variable, the statistical properties of the estimated coefficients are adversely affected.[44]

For each of the spending models, we first estimated the models without the autoregressive term and then tested to ascertain that positive autocorrelation was present.[45] We then re-estimated each model, including the auto-regressive term and re-tested for autocorrelation.[46] Results of the regression models of service spending are presented in Appendix D.

Step 3. Forecast Total Medicaid Spending by Service Category through 2025

Total spending on claims per service category is a function of three factors: (1) Medicaid utilization, (2) average annual *real* spending per service utilization, and (3) medical service price inflation.[47] In Step 3 we combine these three factors to produce the forecast of total Medicaid spending. This is done using the following formula:

$$TS_{s,t} = AvgSpend_{s,t} * Utilization_{s,t} * CMS_t$$

Where:
- *TS*$_{st}$ is total spending on Medicaid service *s* in time period *t*;[48]
- *AvgSpend*$_{st}$ is the forecasted average annual *real* spending per user on service *s* in year *t*;
- *Utilization*$_{st}$ is the total number of utilizations of service "*s*" in year "*t*";
- *CMS*$_t$ is the CMS implicit medical price deflator for year *t*.

Total forecasted *real* spending per Medicaid service is computed by multiplying *AvgSpend*$_{st}$ by *Utilization*$_{st}$. *CMS*$_t$ then converts *real* spending into nominal dollars—the

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[44] This is referred to as "(first order) autocorrelation" and is actually a relationship (correlation) between consecutive values of the estimated error term. Autocorrelation does not bias the value of the estimated coefficients, but it does adversely affect the value of the standard errors, making them inefficient and invalidating the t-statistics.

[45] This was done using the Durbin Watson test (also referred to as the "DW" or "Durbin D" test).

[46] Testing for autocorrelation in a regression model with an auto-regressive term should not be done with the Durbin Watson test. Instead, the Durbin H or Durbin M test should be used. We used the Durbin H test.

[47] This of course assumes no change in eligibility requirements or service array.

[48] In fact, this computation is done for each of the 20 Medical services and 220 sub-populations for each of the 21 years of the forecast (20 * 220 * 21 = 92,400 calculations). Total spending by Medicaid service is then computed by summing across the 220 sub-populations for each of the 21 years of the forecast. Alternatively, total spending by sub-population is computed by summing across the 20 Medicaid service categories for each of the 21 years.

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actual amount (forecasted) to be spent on Medicaid claims in the particular year. Total annual spending on *All Medicaid Services* is derived by summing-up the spending forecast for each service category. The results of these computations are presented in two ways: (1) total spending by Medicaid service category and (2) total spending by subpopulation.

Table 18: Forecast of Total *Real* Spending on Medicaid Claims in Millions of Dollars, Selected Calendar Years (in 2004 Dollars)

Medicaid Service	Calendar Year					Average Annual Percent Change (2005-2025)	Rank by Avg. Annual Percent Change
	2005	2010	2015	2020	2025		
Dental	$19.2	$23.6	$26.5	$27.9	$28.3	1.9%	12
DME/Supplies	$9.8	$12.7	$15.7	$18.8	$22.0	4.1%	6
EPSDT	$0.1	$0.1	$0.1	$0.1	$0.2	3.0%	9
HCB Waiver	$106.2	$163.7	$244.1	$349.6	$473.9	7.5%	2
Health Clinic	$27.1	$35.7	$44.0	$51.7	$58.4	3.8%	7
Home Health/Hospice	$1.1	$1.1	$1.2	$1.2	$1.2	0.7%	15
Inpatient Hospital	$145.2	$143.0	$133.9	$121.9	$109.6	-1.4%	20
Inpatient Psychiatric	$13.2	$13.2	$12.4	$11.2	$10.0	-1.4%	18
Lab/X-ray	$1.8	$1.8	$1.6	$1.5	$1.4	-1.4%	19
Nursing Home	$50.2	$57.7	$67.2	$79.8	$95.4	3.2%	8
Other Services	$0.1	$0.1	$0.1	$0.1	$0.1	2.0%	11
Outpatient Hospital	$77.7	$88.1	$93.9	$95.7	$94.6	1.0%	13
Outpatient Mental Health	$55.2	$57.8	$57.7	$56.3	$54.2	-0.1%	16
Personal Care	$105.6	$170.9	$269.3	$406.2	$573.0	8.5%	1
Pharmacy	$128.8	$141.7	$149.9	$154.3	$155.0	0.9%	14
Physician/Practitioner	$72.7	$77.4	$77.5	$74.4	$70.0	-0.2%	17
Residential Psych/BRS	$59.7	$87.6	$120.2	$158.6	$205.1	6.2%	3
Therapy/Rehabilitation	$24.5	$35.1	$47.3	$61.9	$77.8	5.8%	4
Transportation	$41.8	$50.0	$57.6	$64.5	$69.9	2.6%	10
Vision	$1.0	$1.4	$1.7	$2.1	$2.3	4.3%	5
All Medicaid Services	$941	$1,163	$1,422	$1,738	$2,103	4.0%	NA

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

PROJECTION OF TOTAL *REAL* SPENDING FOR MEDICAID CLAIMS

Table 18 shows the forecast of spending by Medicaid service category for selected years 2005-2025. On an average annual basis, total *real* spending on Alaska's Medicaid claims is projected to increase by 4.0%. Comparatively, between 1998 and 2004, *real* spending

on Alaska's Medicaid claims increased by 12.6%. Much of this historic growth, however, is due to the implementation by ADHSS of the Denali KidCare program, which resulted in very high growth in the Medicaid program between 2000 and 2003. Perhaps more comparable, between 1997 and 1998 *real* spending in the Alaska Medicaid program grew by 6.0% and between 2003 and 2004 *real* spending grew by only 4%.

We do not forecast growth in *real* spending to be constant between 2005 and 2025. Rather, we project real spending to grow at a greater rate in the early years (4.1% per year between 2005 and 2010; 3.8% per year between 2010 and 2015) and at a slower rate in the out years (3.7% per year between 2015 and 2020; 3.5% per year between 2020 and 2025). Projected differences in real spending over the forecast period are due to projected differences in enrollment growth stemming from declining population growth and from demographic change.

Spending on claims by service category is projected to vary greatly, with average annual *real* growth rates forecast to be negative for Inpatient Hospital, Lab/X-ray, Physician/Practitioner Services, Inpatient Psychiatric, and Outpatient Mental Health. Comparatively, real spending growth in HCB Waiver, Personal Care, and Residential Psychiatric/BRS are forecast to grow at 7.50%, 8.5%, and 6.2%, respectively. As a historical comparison, *real* spending on these three service categories grew by 33.1%, 18.1%, and 37.8% respectively between fiscal years 1998 and 2004.

Table 19 shows forecasted *real* spending by demographic grouping and region. Growth in *real* spending is projected to be about the same for males and females, but differ substantially between Natives and non-Natives. At an average annual rate of 4.3%, *real* spending on Medicaid services for non-Natives is projected to grow by about 0.9 percentage point faster than for Natives.

All five regions of the state are projected to experience growth in total *real* spending in Medicaid services. The Anchorage-Mat-Su and South Central regions are expected to experience the greatest growth in *real* spending. Although we forecast slight population decline in the Southeast region over the next 20 years, we nevertheless project positive growth in *real* spending on Medicaid services.

Table 19: Forecast of Total *Real* Spending On Alaska's Medicaid Program by Demographic Group and Region in Millions of Dollars, Selected Calendar Years (in 2004 dollars)

Subpopulation	Calendar Year					Average Annual Percent Change (2005-2025)
	2005	2010	2015	2020	2025	
State	$941	$1,163	$1,422	$1,738	$2,103	4.0%
Gender						
Male	$391.9	$488.8	$601.9	$736.8	$889.5	4.1%
Female	$549.1	$673.8	$819.9	$1,001.2	$1,213.0	4.0%
Native Status						
Native	$285.0	$343.2	$409.6	$485.9	$564.2	3.4%
Non-Native	$656.0	$819.4	$1,012.1	$1,252.1	$1,538.3	4.3%
Region						
Northern	$131.3	$160.5	$193.7	$233.1	$275.9	3.7%
Western	$113.1	$132.8	$154.3	$176.8	$197.7	2.8%
South Central	$142.2	$177.4	$220.8	$276.0	$341.3	4.4%
Anchorage/Mat-Su	$461.7	$586.8	$736.4	$924.4	$1,151.2	4.6%
Southeast	$92.7	$105.1	$116.5	$127.6	$136.3	1.9%
Age						
0-4	$125.0	$144.8	$161.3	$171.4	$178.8	1.8%
5-9	$94.3	$118.1	$131.2	$143.5	$151.9	2.4%
10-14	$102.8	$116.2	$136.9	$148.8	$162.5	2.3%
15-19	$79.0	$92.9	$97.5	$110.4	$117.2	2.0%
20-24	$31.4	$37.1	$39.0	$39.9	$47.2	2.0%
25-34	$58.7	$67.8	$80.7	$90.9	$96.6	2.5%
35-44	$71.6	$71.6	$78.4	$91.3	$110.4	2.2%
45-54	$74.5	$80.6	$79.4	$80.2	$90.0	0.9%
55-64	$92.6	$131.8	$164.0	$179.6	$177.0	3.2%
65-74	$89.5	$139.4	$233.7	$356.5	$457.1	8.2%
75+	$121.7	$162.1	$219.7	$325.4	$514.0	7.2%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

PROJECTION OF TOTAL ACTUAL (*NOMINAL*) SPENDING FOR MEDICAID CLAIMS

Table 20 shows forecasted nominal (i.e., "current year" or "actual") spending by Medicaid service. For *All Medicaid Services*, spending is projected to increase by 7.8% on an average annual basis—3.8 percentage points higher than the growth rate in *real* spending. This difference is the forecasted average annual rate of medical price inflation expected over the next 20 years.[49] In dollars terms, we project that total spending on

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[49] The CMS deflator is projected through 2014. To extend the series through 2025 we assumed a constant inflation rate for years 2015-2025 equal to the average rate of inflation for the years 2012-2014.

Medicaid claims will increase from approximately $975 million in calendar year 2005 to approximately $4.7 billion in 2025.

Table 20: Forecast of Total *Nominal (Actual)* Spending by Medicaid Service Category in Millions of Dollars, Selected Calendar Years

Medicaid Service	Calendar Year					Average Annual % Change (2005-2025)	Rank by Avg. Ann. % Change
	2005	**2010**	**2015**	**2020**	**2025**		
Dental	$19.9	$29.4	$39.9	$51.2	$62.9	5.8%	12
DME/Supplies	$10.1	$15.8	$23.7	$34.5	$48.9	7.9%	6
EPSDT	$0.1	$0.1	$0.2	$0.3	$0.3	6.8%	9
HCB Waiver	$110.1	$203.7	$368.2	$640.2	$1,053.7	11.3%	2
Health Clinic	$28.1	$44.4	$66.4	$94.6	$129.8	7.7%	7
Home Health/Hospice	$1.1	$1.4	$1.8	$2.2	$2.7	4.5%	15
Inpatient Hospital	$150.5	$177.8	$201.9	$223.2	$243.6	2.4%	20
Inpatient Psychiatric	$13.7	$16.4	$18.7	$20.5	$22.3	2.4%	18
Lab/X-ray	$1.9	$2.2	$2.5	$2.8	$3.1	2.4%	19
Nursing Home	$52.0	$71.8	$101.3	$146.2	$212.2	7.0%	8
Other Services	$0.1	$0.1	$0.2	$0.2	$0.3	5.8%	11
Outpatient Hospital	$80.5	$109.5	$141.6	$175.3	$210.5	4.8%	13
Outpatient Mental Health	$57.2	$71.8	$87.1	$103.2	$120.5	3.7%	16
Personal Care	$109.4	$212.6	$406.2	$743.9	$1,274.1	12.3%	1
Pharmacy	$133.5	$176.3	$226.0	$282.5	$344.7	4.7%	14
Physician/Practitioner	$75.3	$96.3	$116.8	$136.3	$155.6	3.6%	17
Residential Psych/BRS	$61.9	$109.0	$181.3	$290.5	$456.1	10.0%	3
Therapy/Rehabilitation	$25.4	$43.6	$71.3	$113.4	$173.1	9.6%	4
Transportation	$43.3	$62.2	$86.9	$118.1	$155.5	6.4%	10
Vision	$1.0	$1.7	$2.6	$3.8	$5.2	8.1%	5
All Medicaid Services	$975	$1,446	$2,144	$3,182	$4,675	7.8%	NA

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

With respect to the 20 individual Medicaid service categories, we believe all will see increases in nominal (i.e., actual) spending on claims. For some services, spending growth will be less than the CMS personal health care price deflator and may even grow slower than economy-wide price inflation (for example: Inpatient Hospital and Lab/X-Ray). For other services, such as Residential Psychiatric/BRS, HCB Waiver, and Personal Care, growth in spending is expected to be much greater than general inflation.

Table 21: Forecast of Total *Nominal* (Actual) Spending On Alaska's Medicaid Program by Demographic Group and Region in Millions of Dollars, Selected Calendar Years

Subpopulation	Calendar Year					Average Annual Percent Change (2005-2025)
	2005	2010	2015	2020	2025	
State	$975.1	$1,446.2	$2,144.4	$3,182.8	$4,675.1	7.8%
Gender						
Male	$406.1	$608.0	$907.8	$1,349.3	$1,978.0	7.9%
Female	$569.0	$838.2	$1,236.6	$1,833.6	$2,697.1	7.8%
Native Status						
Native	$295.4	$426.9	$617.8	$889.8	$1,254.6	7.2%
Non-Native	$679.7	$1,019.3	$1,526.6	$2,293.1	$3,420.5	8.1%
Region						
Northern	$136.0	$199.6	$292.2	$426.9	$613.6	7.5%
Western	$117.2	$165.2	$232.7	$323.7	$439.7	6.6%
South Central	$147.4	$220.7	$333.0	$505.5	$759.0	8.2%
Anchorage-Mat-Su	$478.4	$730.0	$1,110.8	$1,692.9	$2,559.7	8.4%
Southeast	$96.0	$130.7	$175.7	$233.7	$303.2	5.7%
Age						
0-4	$129.5	$180.1	$243.3	$313.9	$397.5	5.6%
5-9	$97.7	$146.9	$197.9	$262.8	$337.7	6.2%
10-14	$106.5	$144.6	$206.5	$272.4	$361.2	6.1%
15-19	$81.8	$115.6	$147.0	$202.2	$260.5	5.8%
20-24	$32.5	$46.1	$58.8	$73.1	$104.9	5.9%
25-34	$60.8	$84.4	$121.8	$166.5	$214.7	6.3%
35-44	$74.2	$89.1	$118.2	$167.1	$245.5	6.0%
45-54	$77.2	$100.3	$119.7	$147.0	$200.0	4.8%
55-64	$95.9	$164.0	$247.4	$328.9	$393.5	7.1%
65-74	$92.8	$173.4	$352.5	$652.8	$1,016.5	12.0%
75+	$126.1	$201.7	$331.3	$596.0	$1,142.9	11.0%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Table 21 shows the forecasted increase in Medicaid *nominal* spending by demographic group and region. Growth rates in Medicaid spending by gender are expected to be similar, whereas growth in spending on claims for non-Natives is expected to outpace spending growth on Natives by 0.9 percentage points (8.1% vs. 7.2%). Among the five regions, spending growth is forecasted to be highest for Anchorage/Mat-Su and lowest for the Southeast. Differences between the regions in their forecasted spending growth rates are driven mostly by differences in their forecasted population growth rates.

Among the 11 age cohorts, growth in spending is expected to be much greater for the 65 and older population.

Consistent with the State's population forecast and with higher historic and forecasted relative per-person Medicaid expenditures, we project that spending on the elderly population (65+ year of age) will grow much faster than spending on children or the working-age population. In fact, we project that the proportion of Medicaid spending devoted to the elderly will increase from 22% in 2005 to 46% by 2025 (see Figure 21). Over this same time period, the proportion of total Medicaid spending on children will shrink from 43% to 29% and the proportion of total spending on working-age adults will shrink from 35% and 25%.

Figure 21: Forecasted Proportion of Total Spending on Medicaid Claims by Age Cohort, 2005-2025
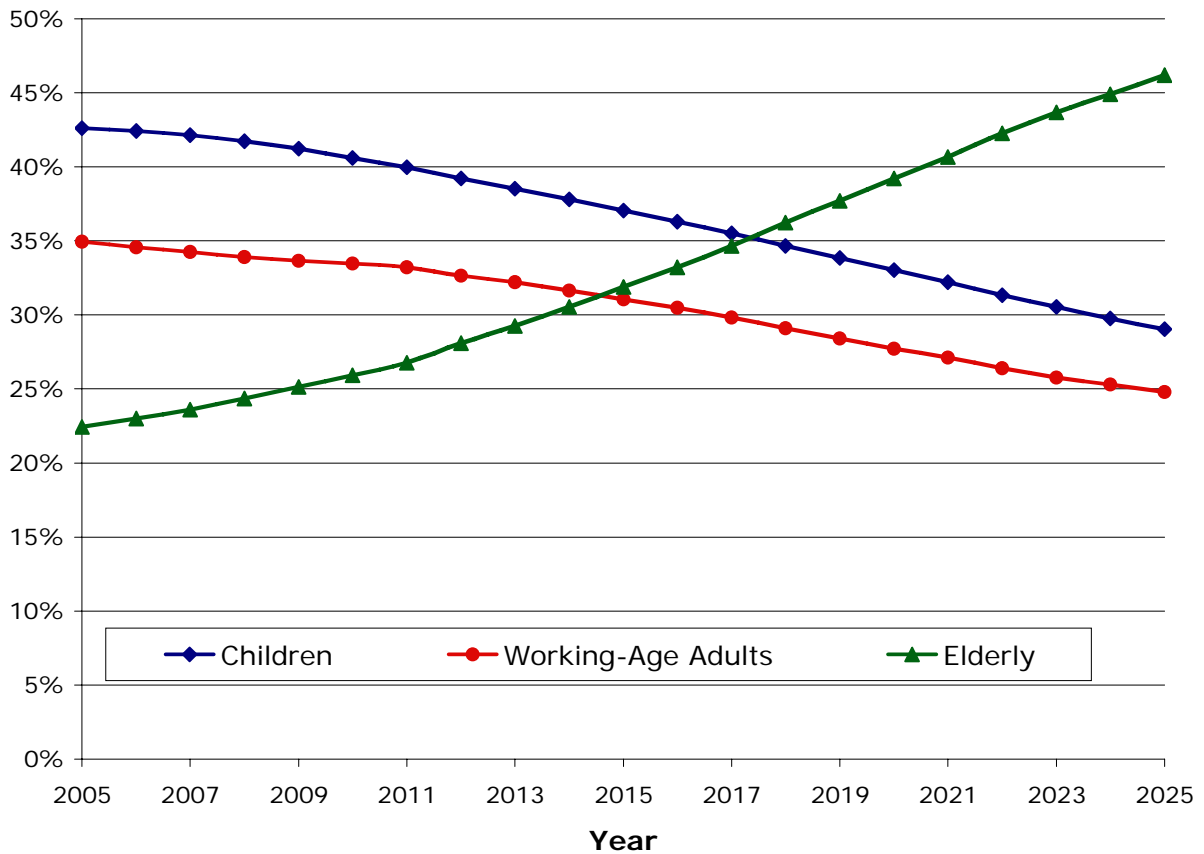
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Figure 22 shows total forecasted spending on Medicaid claims for each of the three major age cohorts (children, working-age adults, and elderly). Currently, more dollars are spent on Medicaid services for children than for either working-age adults or the elderly. In fact, spending on children's services is almost twice that for the elderly. Over the next twenty years, however, the rate of growth in spending on children and working-age adults is expected to grow on an average annual basis by only 5.9% and 6.1%, respectively. Comparatively, spending on the elderly is expected to grow on an average annual basis by 11.4%. By 2015 spending on Medicaid claims for the elderly is expected to surpass spending on working-age adults and by 2018, elderly spending will surpass spending on children.

Figure 22: Forecasted Actual (Nominal) Spending by Age Cohort, Calendar Years 2005-2025
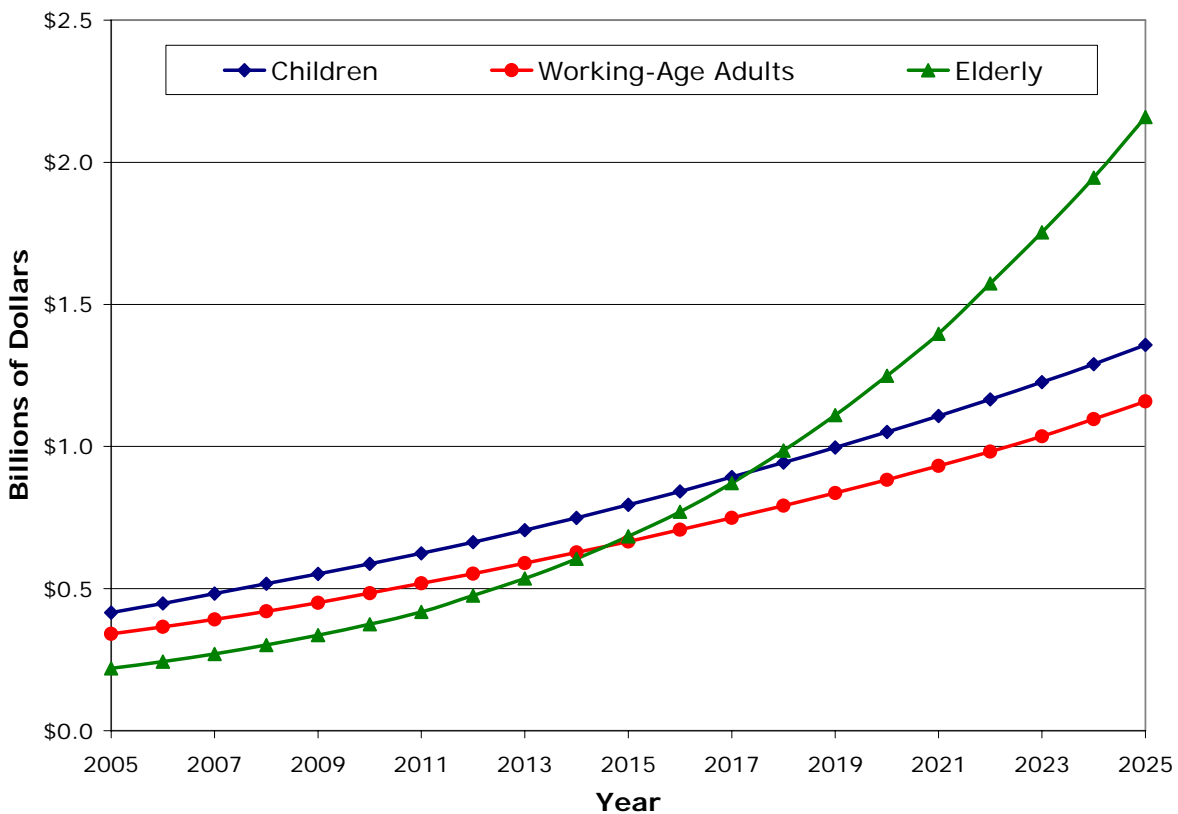
Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Comparison of Total Medicaid Spending to Economic Output

We project spending on Medicaid claims for CY 2005 to be just less than $1 billion; to grow on an average annual basis by 7.8% over the next 20 years; and to reach almost

$4.7 billion by 2025. How does this compare to national forecasts of spending on Medicaid services and for all medical services? Although we know of no forecast of medical spending that extends to 2025, Heffler et al. (2005) project total spending in the U.S. on all medical services and on Medicaid through 2014.[50] Between 2005 and 2014, Heffler et al. projects spending on all medical services in the U.S. will grow by 6.9% per year and spending on Medicaid will grow by 7.5% per year (see Table 22). Comparatively, over this same period, we project Medicaid spending in Alaska will increase by 7.8% per year, much lower than the 16.6% growth rate experienced between 1998 and 2004.

How does the Alaska forecast compare to the national forecast with respect to spending as a percent of gross domestic product (GDP) or gross state product (GSP)? For 2005, Heffler et al. estimates that total spending on all medical services as a share of U.S. GDP to be 15.7% and all-U.S. Medicaid spending as a share of GDP to be 2.6%.[51] Comparatively, we estimate spending on Alaska's total Medicaid services as a share of GSP to be 2.8%.[52] As Table 22 shows, for both the U.S. and Alaska, spending on all medical services and especially spending on Medicaid services will grow faster than total economic output (as measured by GDP and GSP). By 2014, Heffler et al. estimates total spending on all medical services in the U.S. will constitute 18.7% of GDP, of which 3.2 percentage points will be due to spending on Medicaid services. Over this same period, we project spending on Alaska's Medicaid claims will rise to 4.1% of the Alaska's GSP.[53]

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[50] We know of no other comparable forecast of total spending on personal health services for Alaska.

[51] Note that Medicaid spending is a sub-set of total spending, thus the 2.6 percentage points is the portion of the 15.6% attributable to U.S. Medicaid spending.

[52] This is total spending on Alaska's Medicaid program by both the state and federal government. Actual spending by the state will be less than the 2.8% of GSP.

[53] Alaska's total GSP was estimated by applying the Institute of Social and Economic Research (ISER) forecasted growth rates of Alaska's GSP "net of oil and mining" to the U.S. Bureau of Economic Analysis' (BEA) estimate of total GSP for 2004. The ISER GSP data were obtained from Economic Projections for Alaska and the Southern Railbelt, prepared for Chugach Electric Association, November 1, 2004. The series excludes the value of oil and mining activity in its forecast of GSP. The BEA estimate of Alaska's GSP includes the value of all economic activity for the state of Alaska. It is likely a conservative assumption on our part to apply the growth rate of Alaska's GSP excluding oil and mining activity for the years 2005-2025 and, therefore, our estimates of future total GSP for Alaska may be understated. This would then result in an overstatement of the ratio of Medicaid spending to the value of economic activity shown in Table 22. The actual ratio of Medicaid spending to GSP could, in fact, be lower.

Table 22: Comparison of Actual (*Nominal*) Spending on U.S. and Alaska Medicaid Services, in Millions of Dollars, Selected Years

Medical Service Forecast	Calendar Year			Average Annual Percent Change (2005-2014)
	2005	**2014**	**2025**	
U.S. All Medical Services: Total Spending (Public & Private)	$1,936,500.0	$3,585,700.0	NA	6.85%
U.S. Medicaid Services: Total Spending by Federal & All State Governments	$316,200.0	$618,500.0	NA	7.45%
Alaska Medicaid Services: Total Spending (federal and state share)	$975	$1,980	$4,675	7.87%
Measure of Value Economic Output				
U.S. Gross Domestic Product (GDP)	$12,375,500.0	$19,179,900.0	NA	4.87%
Alaska Gross State Product (GSP)	$35,509.0	$48,578.0	$74,433	3.48%
Ratio of Medical Spending to Value of Economic Output				
U.S. Total Medical Spending as a % of GDP	15.7%	18.7%	NA	
U.S. Total Medicaid Spending as a % of GDP	2.6%	3.2%	NA	
Alaska Total Medicaid Spending as a % of GSP	2.8%	4.1%	6.3%	

Sources: Lewin Group & ECONorthwest calculations based on data from Heffler et al. (2005); Institute of Social and Economic Research, Anchorage, Alaska; U.S. Bureau of Economic Analysis.

Chapter 5—State Spending on Medicaid Claims

In Chapter 5 we estimate the portion of total forecasted spending on Medicaid claims paid for through state-matching funds. Since Medicaid is paid with a combination of both federal and state funds, and not all services have the same federal financial participation rate (FFP), forecasting only the total Medicaid expenditures does not fully identify the impacts on the state budget.

For most subgroups and services, the share of state Medicaid benefits paid by the federal government is called the Federal Medical Assistance Percentage, or FMAP. There are higher reimbursement rates, however, for particular Medicaid eligibility subgroups and services. Where possible, the state takes advantage of reimbursement rates that are higher than the regular FMAP.

The State's obligation to cover a recipient's Medicaid service costs differs according to the recipient's Medicaid eligibility group, category of Medicaid service, provider of Medicaid-related service, and Native/non-Native status. Table 23 shows the historic federal match rate for the six major FFP types. As row one shows, qualifying Indian Health Service (IHS) claims receive a 100% match from the federal government. In contrast, for some services there is no federal match—the state pays the full cost. For the other FFP types, the federal match varies from 90% for qualifying family planning claims, to as low as 50% for regular Federal Medical Assistance Percentage.

Table 23: Federal Financial Participation Rate by Type, 1998-2004

	State Fiscal Year			
FFP Type	**1998**	**2000**	**2002**	**2004**
Indian Health Services (100%)	100.0%	100.0%	100.0%	100.0%
Family Planning (90%)	90.0%	90.0%	90.0%	90.0%
SCHIP (enhanced FMAP)	71.9%	71.9%	70.7%	70.9%
Breast and Cervical Cancer (enhanced)	71.9%	71.9%	70.7%	70.9%
Regular Medicaid (regular FMAP)	50.0%	59.8%	58.1%	61.3%
State Only (0%)	0.0%	0.0%	0.0%	0.0%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.
Note: The federal match rates in this table differ from other published statutory rates because these rates are based on the State's fiscal year, not the federal fiscal year.

To qualify for 100% federal reimbursement under IHS, an American Indian or Alaska Native tribal member or other qualified recipient must receive services in or through a health care facility that is owned or leased by IHS or a tribal organization that has a 638 contract. A 638 contract is a contract between a tribe and IHS stating that the tribe assumes responsibility for providing health care to all of the tribe's members. In Alaska, all IHS services are delivered through tribal 638 facilities.

Services available for the 90% family planning rate include those which either prevent or delay pregnancy (such as counseling, education, examinations, treatment and procedures, diagnostic tests, and pharmaceutical supplies), contraceptives, and some sterilizations.

Some claims are not eligible for any federal reimbursement and are paid entirely with state funds. ADHSS refers to these types of claims as "state-only Medicaid". One type of state-only Medicaid claim is for the extension of medical assistance benefits to those who are ineligible for Medicaid because of additional income from the Alaska Permanent Fund Dividend or Alaska Longevity Bonus.[54] These persons are eligible to receive medical assistance, equal to their lost benefits, for up to four months during which time the state must pay the full cost of the claims. Additionally, federal law prohibits the use of federal funds to pay for abortions except when continuation of the pregnancy would endanger the mother's life. However, Alaska is required to provide therapeutic abortion procedures to Medicaid eligible women under a 2000 Alaska Superior Court decision.[55] Federal funds, therefore, are rarely used to pay for Medicaid-funded abortions.

There are two Federal Medical Assistance Percentage rates, or FMAP, which change each federal fiscal year: regular FMAP for Medicaid and enhanced FMAP for the State Children's Health Insurance Program, or SCHIP. The regular FMAP is the "default" reimbursement rate for Medicaid benefits. It is based on a three-year average of per capita personal income, ranked among states. While each state has its own FMAP, the regular rate can be no lower than 50% and no higher than 65%. For the enhanced FMAP, the federal share is increased by reducing each state's own Medicaid contribution by 30%. The costs of services under the enhanced FMAP are reimbursed at

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[54] The Alaska Longevity Bonus was discontinued in 2003 and replaced with the Senior Assistance Program, now under the SeniorCare program.
[55] Alaska Superior Court decision *Planned Parenthood of Alaska v. Karen Perdue*, Case No. 3-AN-98-07004 Civil.

between 65% and 83%. The enhanced FMAP is also applied to breast and cervical cancer treatment for women identified under Centers for Disease Control and Prevention screening.

Table 24: Historical Alaska State-Matching Fund Spending on Medicaid Claims— by Service Category (in Millions of Nominal Dollars), 1998-2004

Service Category	State Fiscal Year				Avg. Annual Percent Change (1998-2004)	Rank by Avg. Annual Percent Change
	1998	2000	2002	2004		
Dental	$3.5	$4.3	$5.1	$5.7	8.38%	10
DME/Supplies	$2.8	$3.1	$4.1	$4.3	7.41%	12
EPSDT	$0.0	$0.0	$0.0	$0.0	-1.86%	20
HCB Waiver	$14.7	$21.0	$38.9	$42.6	17.75%	4
Health Clinic	$1.0	$1.4	$1.1	$1.6	7.66%	11
Home Health/Hospice	$0.6	$0.4	$0.6	$0.5	-1.98%	21
Inpatient Hospital	$24.9	$21.3	$27.1	$26.7	1.17%	18
Inpatient Psychiatric	$4.0	$3.7	$5.5	$5.0	3.45%	14
Lab/X-ray	$0.6	$0.4	$0.5	$0.7	3.27%	15
Nursing Home	$21.6	$18.5	$23.6	$22.1	0.41%	19
Other Services	$0.0	$0.0	$0.1	$0.1	17.48%	5
Outpatient Hospital	$8.1	$7.6	$11.9	$14.5	9.78%	9
Outpatient Mental Health	$18.2	$15.6	$17.5	$20.1	1.68%	17
Personal Care	$2.0	$2.6	$6.2	$25.2	42.04%	1
Pharmacy	$15.7	$18.7	$29.3	$37.8	14.65%	6
Physician/Practitioner	$20.5	$19.3	$24.5	$26.0	3.92%	13
Residential Psychiatric/BRS	$2.8	$6.2	$12.7	$19.2	32.34%	2
Therapy/Rehabilitation	$1.7	$1.9	$6.6	$7.7	24.85%	3
Transportation	$5.6	$4.5	$8.4	$10.3	10.06%	7
Vision	$0.7	$1.0	$1.2	$0.9	3.01%	16
Total State Funds	$149.0	$151.5	$224.9	$271.0	9.97%	8

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

The State Children's Health Insurance Program, or SCHIP, uses an enhanced FMAP. SCHIP provides coverage to children whose families earn too much to qualify for Medicaid, but not enough to get private coverage.[56] SCHIP funding is capped, that is, the amount reimbursed at the enhanced FMAP is limited to the state's total SCHIP allotment. Since Alaska operates its SCHIP as an expansion of Medicaid instead of a

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[56] In Alaska, the SCHIP program is administered through the Denali KidCare office.

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stand-alone program, any claims in excess of the allotment can be reimbursed at the regular FMAP.

Table 24 shows Alaska's state matching fund dollars by Medicaid service category for 1998, 2000, 2002, and 2004 and Table 25 shows the State's *share* of total spending for the same years. Between 1998 and 2004, spending on Medicaid claims by the State of Alaska increased on average by about 10% per year. In contrast, as Table 15 in Chapter 4 shows, total spending by both the state and federal government grew by almost 17% per year over this period. In effect, growth in Alaska's Medicaid program was largely "subsidized" by reimbursements from the federal government.

Table 25: State of Alaska's Historical Share of Total Spending on Medicaid Claims—by Service Category, 1998-2004

Service Category	Fiscal Year				Average Annual Percent Change (1998-2004)
	1998	2000	2002	2004	
Dental	42.5%	31.4%	28.8%	28.6%	-6.64%
DME/Supplies	50.0%	40.0%	41.5%	38.4%	-4.38%
EPSDT	50.0%	31.9%	18.8%	19.8%	-15.42%
HCB Waiver	49.4%	39.8%	41.5%	38.1%	-4.36%
Health Clinic	25.3%	9.1%	6.6%	6.2%	-23.50%
Home Health/Hospice	49.8%	39.4%	41.8%	36.8%	-5.03%
Inpatient Hospital	41.5%	28.8%	23.4%	17.7%	-14.21%
Inpatient Psychiatric	50.0%	38.6%	40.1%	36.6%	-5.19%
Lab/X-ray	50.0%	39.7%	41.4%	38.4%	-4.38%
Nursing Home	46.9%	37.9%	39.8%	36.8%	-4.07%
Other Services	50.0%	75.3%	100.0%	100.0%	11.56%
Outpatient Hospital	32.2%	22.7%	22.9%	20.5%	-7.55%
Outpatient Mental Health	47.3%	35.5%	37.8%	35.2%	-4.92%
Personal Care	37.7%	33.9%	40.5%	38.3%	0.29%
Pharmacy	49.2%	36.5%	36.6%	33.5%	-6.39%
Physician/Practitioner Services	48.0%	36.2%	36.7%	33.9%	-5.83%
Residential Psychiatric/BRS	50.3%	38.1%	40.7%	38.0%	-4.70%
Therapy/Rehabilitation	59.0%	42.5%	43.0%	37.6%	-7.51%
Transportation	41.2%	21.9%	26.9%	25.3%	-8.16%
Vision	48.8%	37.0%	38.5%	35.5%	-5.31%
Total	45.0%	33.1%	33.5%	30.3%	-6.60%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Table 25 more clearly shows this shift in spending from the state to the federal government. In 1998, 45% of the total cost of Medicaid services was borne by the state. This dropped precipitously over the next two years, as the state's share of total costs of Medicaid claims was only 33% by 2000. Over the next four years the state's share continued to drop slowly, reaching 30.3% by 2004. As shown below, 2004 represents the low point in the state's expected share of the total cost of Medicaid claims.

The decline in the effective state matching rates for Medicaid services reflects changes in the FMAP rate, the addition and growth of eligibility categories with higher match rates, like the SCHIP and breast and cervical cancer groups, and the increased participation of tribal health providers eligible for 100% federal match.

Table 26 shows the projected federal match rate by FFP type.[57] For each of the Federal Medical Assistance Percentages (FMAPs), the percent of federal match is expected to decline over the next few years, reaching their respective minimum levels by 2008 and staying at those levels through the end of the forecast period. The other types of FFP are expected to remain at their current levels.

Table 26: Projected Federal Match Rate by Medicaid FFP Type, Calendar Years 2005-2025

FFP Type	Calendar Year			
	2005	2006	2007	2008-2025
Indian Health Services (100%)	100.0%	100.0%	100.0%	100.0%
Family Planning (90%)	90.0%	90.0%	90.0%	90.0%
SCHIP (enhanced FMAP)	69.0%	65.3%	65.6%	65.0%
Breast and Cervical Cancer (enhanced)	69.0%	70.3%	70.3%	65.0%
Regular Medicaid (regular FMAP)	55.7%	57.6%	57.6%	50.0%
State Only (0%)	0.0%	0.0%	0.0%	0.0%

Source: Alaska Department of Health and Social Services.
Note: The federal match rates in this table differ from other published rates and those in Table 23 because these rates are based on calendar year, not state or federal fiscal year.

FFP rates are set at the federal level, and are largely outside of state control. IHS, Family Planning, and State Only are fixed percentages and not subject to adjustment without changes in federal law. The regular and enhanced FMAP rates vary from year to year. Alaska benefits from special legislation that adjusts the FMAP to better reflect Alaska's high cost of living. The federal budget reconciliation bill for FFY 2006 allows

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[57] Projected Federal match rates were provided to The Lewin Group and ECONorthwest by ADHSS.

Alaska to keep the FFY 2005 FMAP (57.58% regular/70.31% enhanced) for FFY 2006 & FFY 2007. The omnibus budget bill of 2000, which expired September 30, 2005, reduced Alaska's per capita personal income by 5% before calculating the FMAP for federal fiscal year 2001-2005. Prior to that, Alaska's FMAP was set in the Budget Balancing Act of 1997.

STEPS IN DEVELOPING STATE SPENDING FORECAST

The forecast of state matching-fund spending was derived in three steps.

1. Based on historical data, the proportion of spending on each Medicaid service category that falls within each of the six FFP types was calculated. Since all Medicaid service claims are covered by one of the six FFP types, the proportions calculated for each Medicaid service category sums to 1.0. For each service category, however, the proportion of total spending by FFP type will differ.

2. The six proportions calculated in Step 1 for each service category are then multiplied by the projected *federal match rates by Medicaid FFP type* shown in Table 26. This calculation is done for each year of the forecast. This results in a proportion of total spending for each Medicaid service category that is projected to be paid for by the federal government. The proportion of total spending by service category is calculated for each year of the forecast. Finally, each of these proportions is subtracted from 1.0 to derive the proportion of total spending by service category to be paid by the State of Alaska ("state-proportion"). There is, therefore, a state-proportion for each service category, for each year of the forecast.

3. The state-proportions developed in Step 2 are multiplied by the forecast of total spending by service category developed in Chapter 4. This results in the forecast of state-matching fund spending by Medicaid service category shown in Table 27.

Table 27: Forecast of Nominal (Actual) State Matching Funds of Medicaid Claims (In Millions of Dollars), Selected Years

Medicaid Service	Calendar Year					Avg. Annual % Change (2005-2025)	Rank by Avg. Annual % Change
	2005	**2010**	**2015**	**2020**	**2025**		
Dental	$6.4	$10.5	$14.2	$18.3	$22.4	6.3%	11
DME/Supplies	$4.5	$7.8	$11.7	$17.1	$24.2	8.4%	6
EPSDT	$0.0	$0.0	$0.0	$0.1	$0.1	7.4%	9
HCB Waiver	$49.0	$100.6	$181.8	$316.1	$520.4	11.8%	2
Health Clinic	$2.0	$3.5	$5.3	$7.5	$10.3	8.2%	7
Home Health/Hospice	$0.5	$0.7	$0.9	$1.1	$1.3	5.1%	15
Inpatient Hospital	$33.3	$43.6	$49.5	$54.7	$59.7	2.9%	19
Inpatient Psychiatric	$5.9	$7.8	$8.9	$9.8	$10.6	3.0%	18
Lab/X-ray	$0.9	$1.1	$1.2	$1.4	$1.5	2.9%	20
Nursing Home	$22.3	$34.0	$48.1	$69.3	$100.7	7.5%	8
Other Services	$0.1	$0.1	$0.2	$0.2	$0.3	5.9%	12
Outpatient Hospital	$19.7	$29.7	$38.4	$47.6	$57.1	5.3%	14
Outpatient Mental Health	$23.4	$32.5	$39.4	$46.7	$54.6	4.2%	16
Personal Care	$48.7	$105.0	$200.6	$367.3	$629.1	12.8%	1
Pharmacy	$52.3	$76.6	$98.2	$122.8	$149.8	5.3%	13
Physician/Practitioner	$29.7	$42.1	$51.1	$59.6	$68.0	4.1%	17
Residential Psych/BRS	$27.1	$52.9	$88.0	$141.1	$221.5	10.5%	3
Therapy/Rehabilitation	$11.5	$21.7	$35.4	$56.3	$85.9	10.0%	4
Transportation	$12.8	$20.4	$28.5	$38.6	$50.9	6.9%	10
Vision	$0.4	$0.8	$1.2	$1.7	$2.4	8.6%	5
All Medicaid Services	$350.6	$591.5	$902.5	$1,377.3	$2,070.8	8.9%	NA

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.
Note: Spending projections are on an incurred service basis.

Projection of State Spending on Medicaid Claims

As Table 27 shows, state matching fund spending on Medicaid services is projected to grow by almost 9.0% per year between 2005 and 2025. This is more than 1.0 percentage points faster than the projected rate of growth in total Medicaid spending growth (see Table 20), indicating that an increasing share of the Medicaid burden will be shifted away from the federal government to the state. With respect to *rank by average annual percent change*, growth in spending by Medicaid service category is projected to be about the same for state matching fund spending as it is forecasted to be for total spending (comparing Table 27 and Table 20). By 2025, more than half of all state matching fund

spending on Medicaid claims is expected to be for Personal Care and HCB Waiver. Currently, these two service categories account for less than 30% of the State's spending on Medicaid claims.

Figure 23: Projected Per Capita State Matching Fund Spending on Medicaid Claims (in Nominal Dollars and in 2004 Dollars), Calendar Years 2005-2025
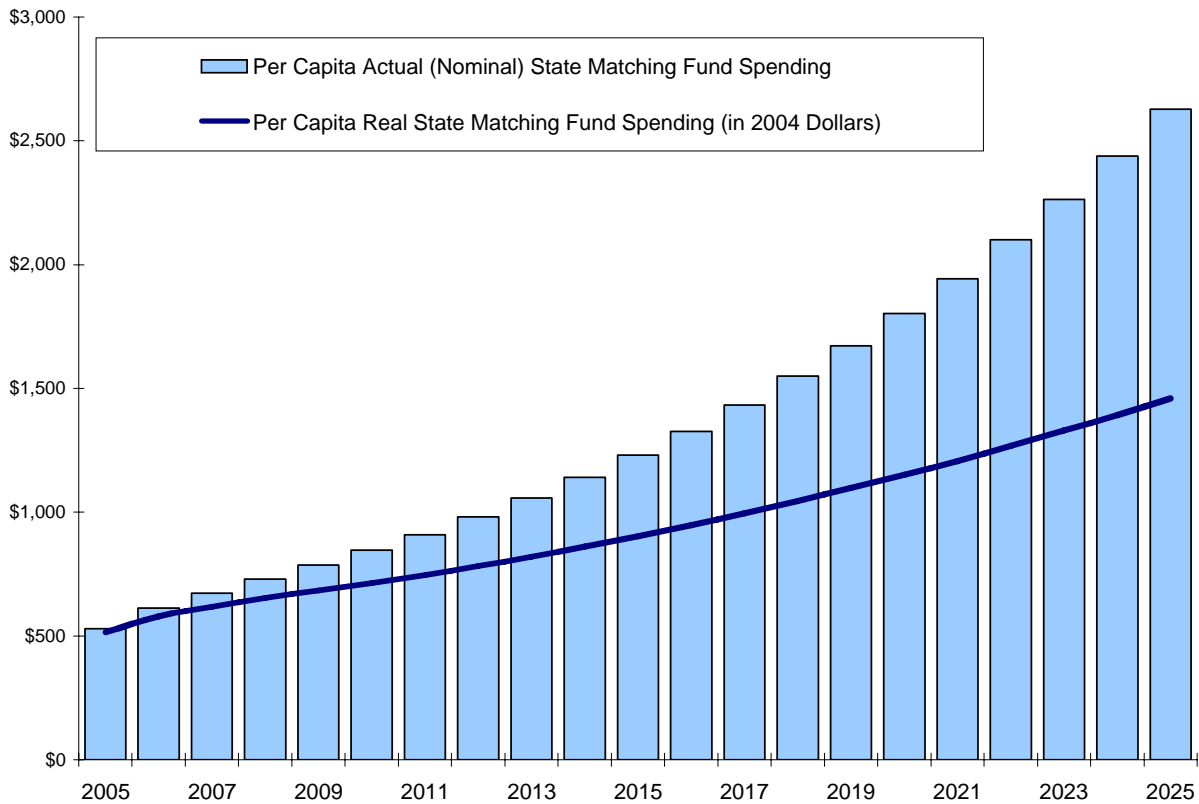
Source: Lewin Group & ECONorthwest analysis of data from the Alaska Department of Health and Social Services, the Alaska Department of Labor and Workforce Development, and the Institute of Social and Economic Research, Anchorage, Alaska; U.S. Bureau of Economic Analysis.
Note: Spending projections are on an incurred service basis; "per capita" refers to the total population of Alaska, not just the population of Medicaid enrollees in Alaska.

Figure 23 shows projected state matching fund spending per Alaskan citizen in both *nominal* and *real* terms. In calendar year 2005, state-matching fund spending on Medicaid claims amounted to approximately $500 per Alaskan citizen, but will grow to approximately $2600 by 2025—an 8.0% average annual growth rate. In *real* terms (i.e., net of inflation) state-matching fund spending will grow to $1,460 per capita (in 2004 dollars)—a 5.2% growth rate.

As Figure 23 shows, *nominal* per-capita state matching funds spending on Medicaid claims is projected to increase more than five-fold between 2005 and 2025 and *real* per-capita spending is projected to almost triple.

Figure 24: Projected State Matching Fund Spending on Medicaid Claims as a Percent of Alaska's Total Personal Income and Gross State Product
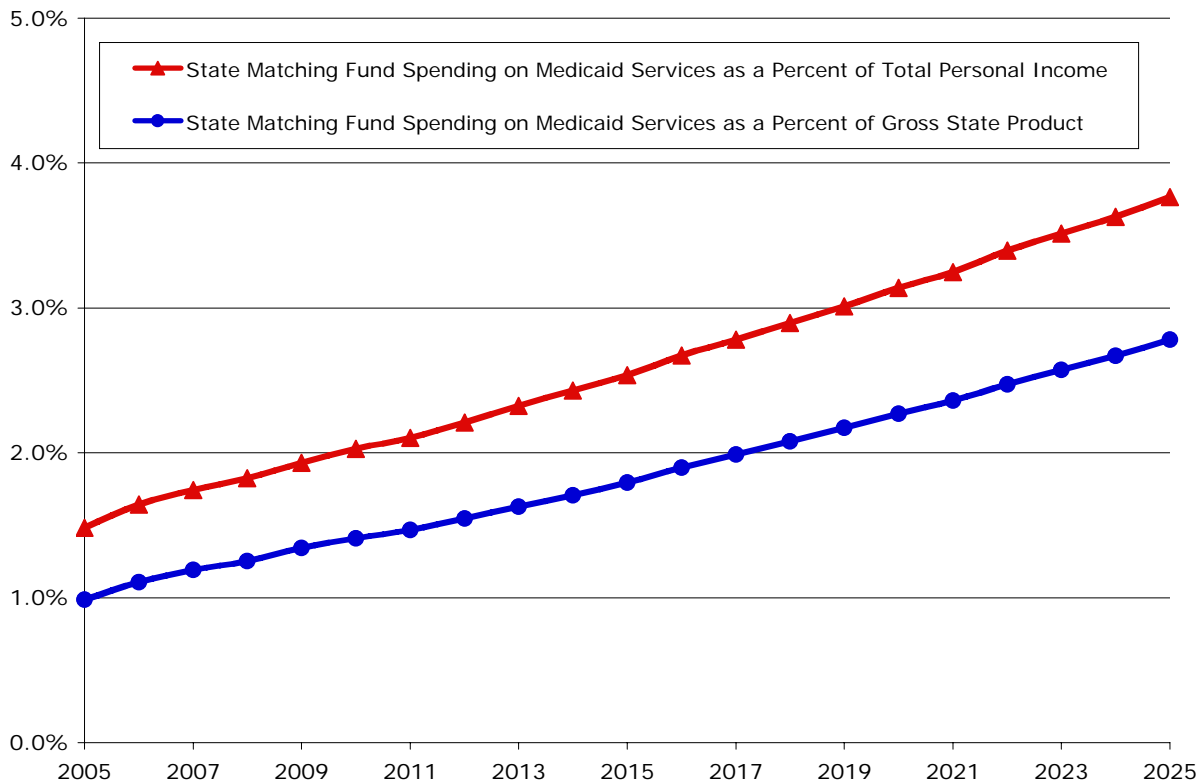
Source: Lewin Group & ECONorthwest analysis of data from the Alaska Department of Health and Social Services, the Alaska Department of Labor and Workforce Development, and the Institute of Social and Economic Research, Anchorage, Alaska; U.S. Bureau of Economic Analysis.

Figure 24 shows projected state-matching fund spending on Medicaid claims as a percent of Alaska's total personal income (TPI) and as a percent of gross state product (GSP). Currently equaling only 1.5% of TPI, state-matching fund spending on Medicaid claims is expected to grow to 3.8% by 2025. Similarly, state-matching fund spending is equal to about 1.0% of GSP in 2005, but will grow to 2.8% by 2025. The implications of these comparisons are that not only will the state of Alaska spend more in the future for Medicaid services, but it will also spend more *relative* to the state's industrial output (including oil, gas, and mining output) and more *relative* to the total income (including earned income, interest and dividends, and transfer payments) of its residents.

Chapter 6—Other Medicaid Payments and Offsets

In Chapter 6 we estimate future total and state matching spending on other payments and offsetting recoveries for Medicaid services. For the purposes of this analysis, these other sources of Medicaid spending will be forecasted in aggregate. In Chapters 3, 4 and 5 we analyzed claim payment data provided by ADHSS to project utilization and costs of direct benefits provided to enrollees. These claim payments made up approximately 90% of all the medical service expenditures in Alaska's Medicaid program in State FY 2004. The remaining 10% were comprised of other payments and offsetting recoveries that are not processed through the Medicaid Management Information System.[58] While only a small portion of the total cost of Medicaid, we need to include these other payments and offsets in our projections in order to get a complete picture of Alaska's Medicaid services. The federal financial participation rate for nearly all these programs is the regular FMAP. These other service costs can be broadly classified into three categories:

- Offsetting Recoveries including third-party liability collections and drug rebates,
- Premiums for Medicare Part A and Part B, and
- Supplemental Hospital Payments including disproportionate share hospital and upper payment limit programs.

Historic spending and credits associated with these three categories is shown in Table 28. Offsetting recoveries has seen very high growth and have served to help mitigate growth in Medicare Part A & Part B premiums and supplemental hospital payments.

Forecasts of spending on the 20 Medicaid service categories discussed in earlier chapters were built-up based on population forecasts, enrollment forecasts, utilization forecasts, *real* spending forecast, and finally medical inflation forecasts. This logical and systematic structure is not amenable to forecasting "other payments" and offsetting recoveries. Rather, because of their "lumpy" nature and their sensitivity to policy changes, it is necessary project future costs on simple historical relationships. This will be discussed for each of the three categories in more detail below.

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[58] These are medical benefits and do not include administrative costs. While the payment methodologies for these programs may involve claim data, payments and recoveries are generally made periodically on an aggregate amount and not on a claim-by-claim basis.

Table 28: Historical Offsetting Recoveries, Medicare Premiums, and Supplemental Hospital Payments, 1998-2004, (in Millions)

Recovery/Other Spending	Funding Source	Fiscal Year			
		1998	2000	2002	2004
Offsetting Recoveries	Federal	($0.3)	($6.9)	($9.6)	($17.3)
	State Matching	($0.3)	($4.7)	($6.9)	($10.9)
	Total	($0.6)	($11.6)	($16.5)	($28.2)
Medicare Part A & Part B Premiums	Federal	$3.1	$4.5	$5.0	$6.7
	State Matching	$3.1	$3.0	$3.6	$4.3
	Total	$6.2	$7.5	$8.6	$11.0
Supplemental Hospital Payments	Federal	$6.5	$19.8	$35.3	$78.4
	State Matching	$6.5	$13.3	$15.1	$24.4
	Total	$13.0	$33.1	$50.3	$102.8

Source: Alaska Department of Health and Social Services.
Note: Offsetting recoveries are shown as credits.

PROJECTION OF OFFSETTING RECOVERIES

Offsetting recoveries are credits that reduce expenditures. The two main types of offsetting recoveries are collections for third-party liability on claims and drug rebates. One of the tenants of Medicaid is that Medicaid is the payer of last resort, therefore, the department does not pay medical claims that are payable by a third party. The department contracts for the collection of medical expenses already paid by Medicaid from potential third-parties.

The other major offset, drug rebates, have played a more and more important role in mitigating the increasing cost of prescription drugs. In SFY 2000 the $9.4 million in rebates represented 18% of pharmacy claims. By SFY 2004 the number had grown to $22.3 million or 26% of pharmacy claims.[59]

To project total offsetting recoveries in the future we first estimated the relationship between historical *real* offsetting recovery amounts and a simple timeline (i.e., FY 1997=1, FY 1998=2, …, FY 2004=8). The estimated coefficients defining this relationship

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[59] The forecast of offsetting recoveries does not include any adjustments for the new Medicare Part D program. Additionally, the estimates do not reflect increased drug rebates resulting from implementation of the Preferred Drug List (PDL) in CY 2004. With implementation of PDL, Alaska joined a multi-state drug purchasing group that negotiates discounts (supplemental rebates) from pharmaceutical manufacturers. With lower prescription drug costs due to Medicare Part D, states may lose negotiating power to retain the current level of rebates. However, the impact of Medicare Part D on drug rebates is uncertain.

were then used to project future offsetting recoveries.[60] Finally, to convert the forecast into nominal dollars, we assumed that the actual amount of offsetting recoveries received would grow 3.8% faster than the *real* rate of growth.[61] See Table 30 for the spending forecast for selected years.

PROJECTION OF MEDICARE PART A & PART B PREMIUMS

The federal government requires that Medicaid pay the Medicare Part A and Part B[62] premiums for certain eligibility categories of special beneficiaries. By paying the premiums for Medicare Part A and Part B, the department is able to shift costs for medical benefits from the state to the federal government.

Medicare is a federal program that provides health insurance to people age 65 or older, people under age 65 with certain disabilities, and people of all ages with End Stage Renal Disease. The program is voluntary and beneficiaries must pay monthly premiums. If Medicare beneficiaries have low-income, they may also be eligible for benefits under Medicaid. Because Medicaid is the payer of last resort, Medicare pays for 'dual-eligible' beneficiaries' claims before Medicaid does. Medicaid pays the premium for low-income Medicare Part A and Part B beneficiaries who cannot afford to pay for the insurance themselves. The cost to Medicaid of paying the Medicare insurance premiums is substantially less than the cost of paying the claims.

Table 29: Historical Medicare Monthly Premiums per Person

Medicare Program	Calendar Year			
	1998	**2000**	**2002**	**2004**
Part A Premium	$309	$301	$319	$343
Part B Premium	$44	$46	$54	$67

Source: Alaska Department of Health and Social Services
Note: Medicare premium rates change every year in January.

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[60] Due to the explosive growth in this category between fiscal years 1997 and 2004 and the belief that such growth cannot continue, for the forecast we changed the growth function of the time variable from increasing in linear increments of "1" to a function that grows by 0.2% per year.

[61] The 3.8% is the same as the CMS rate of personal medical spending inflation.

[62] Medicare Part A is hospitalization insurance and covers inpatient hospital care and skilled nursing care. Part B is medical insurance and covers doctors' services and outpatient care.

There has been a steady growth in premium costs in Alaska. As shown in Table 30, Part A premiums grew from $301 in FFY 2000 to $375 in FFY 2005 while Part B increased from $46 in FFY 2000 to $78 in FFY 2005.

To project total spending on Medicare Part A & Part B ("Part A&B") spending in the future we first estimated the statistical relationship between historical *real* Part A&B spending and historical data on the senior (65 and older) population. The estimated coefficients defining this relationship and the forecast of the senior population were then used to project future real Part A&B spending. Finally, to convert the forecast into nominal dollars, we assumed that the actual amount of Part A&B spending would grow 3.8% faster than the *real* rate of growth.[63] See Table 30`for the spending forecast for selected years.

PROJECTION OF SUPPLEMENTAL HOSPITAL PAYMENTS

Supplemental hospital payments are an important part of Alaska's Medicaid program. The federal government recognizes that Medicaid rates do not reimburse hospitals for the full cost of care and it has established several programs that address the issue.

The Medicaid reimbursement system allows a payment adjustment for hospitals which serve a disproportionate number of low income patients. This reimbursement is called the Medicaid disproportionate share hospital payment adjustment, or DSH. The DSH payment is in addition to the regular Medicaid payment rate. The amount of DSH funds available for distribution by the state is limited to the annual federal allotment plus the state match amount.

The upper payment limit program allows supplemental payments to hospitals to fill the gap between Medicare and Medicaid rates for hospital services. The upper payment limit is based on a projection of the amount that Medicare would pay for the same hospital services. Medicare typically pays a slightly higher rate than Medicaid. In Alaska, the upper payment limit program is known as ProShare and has been in place since SFY 2000. Similar to the upper payment limit program, the state created a program, FairShare, in SFY 2002 for tribal-owned hospitals. Tribal hospitals are eligible to receive supplemental payments for the difference between the regular Medicaid hospital rate and the higher Indian Health Service rate.

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[63] The 3.8% is the same as the CMS rate of personal medical spending inflation.

The future for these programs is difficult to predict. Some of the programs have been in place for only a few years and the expenditures can vary widely from year to year. These programs are also under close scrutiny from the Centers for Medicare and Medicaid services making their outlook uncertain. As an example of the volatility of this category, the department suspended the FairShare program October 1, 2005 due to an unfavorable ruling from the Ninth Circuit Court of Appeals.[64]

To project Supplemental Hospital Payments (SHP) spending in the future we first estimated the relationship between historical *real* SHP and historical *real* spending on Medicaid hospital services (Inpatient + Outpatient spending). The estimated coefficients defining this relationship and the forecast of *real* Medicaid spending on hospital services were then used to project future real SHP spending. Finally, to convert the forecast into nominal dollars, we assumed that the actual amount of SHP spending would grow 3.8% faster than the *real* rate of growth.[65] See Table 30 for the spending forecast for selected years.

Table 30: Projected Offsetting Recoveries (Credits), Medicare Premiums, and Supplemental Hospital Payments, Various Years (in Millions)

Medicaid Service	Spending Source	Calendar Year					Avg. Annual % Change (2005-2025)
		2005	2010	2015	2020	2025	
Offsetting Recoveries	Federal	($19.6)	($26.5)	($35.9)	($48.4)	($65.2)	6.0%
	State Match	($13.1)	($17.7)	($23.9)	($32.3)	($43.5)	6.0%
	Total	($32.7)	($44.2)	($59.8)	($80.6)	($108.7)	6.0%
Medicare Part A & Part B Premiums	Federal	$6.7	$10.5	$17.5	$28.6	$43.0	9.3%
	State Match	$4.5	$7.0	$11.7	$19.1	$28.7	9.3%
	Total	$11.2	$17.4	$29.2	$47.7	$71.7	9.3%
Supplemental Hospital Payments	Federal	$54.4	$69.5	$82.3	$92.7	$101.2	3.1%
	State Match	$36.3	$46.4	$54.8	$61.8	$67.5	3.1%
	Total	$90.7	$115.9	$137.1	$154.5	$168.7	3.1%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.
Note: Spending projections are on an incurred service basis.

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[64] As with all the other projection models in this report, any changes to the programs after SFY 2004 are not included. The estimate for Supplemental Hospital Payments, therefore, does not reflect that the FairShare program does not continue past October 1, 2005.

[65] The 3.8% is the same as the CMS rate of personal medical spending inflation.

As Table 30 shows, we project offsetting recoveries to grow on average at 6.0% per year, significantly faster Supplemental Hospital Payments, but not as fast Medicare Part A & Part B Premiums. There is significant uncertainty around this projection as the implications of the new Medicare drug benefit are still unclear. This forecast is done under the assumption of the status quo. That is, under the assumption that the Medicare drug benefit program will not affect offsetting recoveries. This will likely not be the case, but it will take at least another year of data to get an understanding of the effect. The forecasts for the other two categories are also done under great uncertainty, but are a reasonable approximation of long-term growth. The relatively high rate of growth forecasted for Medicare Part A & Part B Premiums is consistent with the forecasted high rate of growth in the senior population, which is the major recipient of this benefit.

Accurately projecting offsetting recoveries and these two categories of Medicaid spending over the next couple years would be difficult under the best of circumstances. Accurately projecting into the distant future is near impossible. We believe it is important to characterize the forecast presented in Table 30 as a conservative and reasonable "guess" at how these three categories will grow through 2025.

Chapter 7—Forecast Summary & Conclusions

In this final chapter, we discuss some of the measures Alaska may wish to consider in order to reduce the growth in state matching fund spending on Medicaid services, while still providing a high level of quality medical and related services to the people of Alaska.

FORECAST SUMMARY

Total spending on the Medicaid program by the State of Alaska and the federal government will be a little more than $1 billion for calendar year 2005. We project that total spending will grow on an average annual basis by 7.6% over the next 20 years and will top $4.8 billion by calendar year 2025. Growth in total spending through 2025 is due to growth in the following four primary components of spending on Medicaid claim:

- Population Growth—expected to average 1% per year.[66]
- Medicaid Enrollment Rate Growth—expected to average 0.5% per year.[67]
- Medicaid Service Utilization Growth—expected to average 2.2% per year.
- Medical Price Inflation Growth—expected to average 3.8% per year.
- Increased intensity—approximately 0.3% per year.[68]

Imbedded in the growth rate of each of these components, are changes in the demographic profile of Alaska—namely the aging of the population. Whereas total population growth is expected to average 1% per year through 2025, the Alaska Department of Labor and Workforce Development project the 65-and-over population will grow by almost 6% per year. Medicaid enrollment rates are greater for this portion of the population than for the general population, and their rate of service utilization, their average cost per service, and intensity of use are also greater.

State Spending on Medicaid Services Will Grow Faster Than Total Spending

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[66] The forecast of Alaskan population growth is from the Alaska Department of Labor and Workforce Development.
[67] Growth in the Medicaid enrollment rate is in addition to population growth and demographic changes.
[68] Increased intensity is the residual of total average annual growth minus the sum of population growth, Medicaid enrollment rate growth, Medicaid service utilization growth, Medical price inflation growth (7.8% – 1.0% – 0.5% – 2.2% – 3.8% = 0.3%)

Table 31 shows the forecast of total spending on Alaska's Medicaid program by the State of Alaska and the federal government. Table 31 includes the forecast of total spending on Medicaid claims, developed in Chapters 4 and 5, and the forecast of total Medicaid spending on non-claim programs, developed in Chapter 6. Over the 20-year forecast period, growth in state matching spending on Medicaid claims is expected to outpace federal spending by 1.8 percentage points per year (8.9% vs. 7.1%). We expect spending by the state and the federal government on non-claim related programs to grow at 3.2% per year.

Total state matching fund spending is projected to grow on an average annual basis by 8.6%. Comparatively, we project federal spending will grow by only 7.0%. In the near term, this difference will be even greater. Between CY 2005 and CY 2010, we expect state matching spending to grow by 10.1% on an average annual basis and federal spending to grow by only 6.2%. This substantial difference is largely the result of decreases in the FMAP that are expected to occur over the next few years. Between 2010 and 2025, state matching fund spending is expected to grow by 8.1% per year and federal spending by 7.2%.

Table 31: Forecast of Total Spending on Alaska's Medicaid Program, Various Years (in Millions)

Medicaid Service	Spending Source	Calendar Year					Avg. Annual % Change (2005-2025)
		2005	2010	2015	2020	2025	
Claim-Related Spending	Federal	$624.50	$854.70	$1,241.90	$1,805.50	$2,604.30	7.1%
	State Match	$350.60	$591.50	$902.50	$1,377.30	$2,070.80	8.9%
	Total	$975.10	$1,446.20	$2,144.40	$3,182.80	$4,675.10	7.8%
Non-Claim Related Spending[69]	Federal	$41.50	$53.50	$63.90	$72.90	$79.00	3.2%
	State Match	$27.70	$35.70	$42.60	$48.60	$52.70	3.2%
	Total	$69.20	$89.10	$106.50	$121.60	$131.70	3.2%
Total Spending	Federal	$666.0	$908.2	$1,305.8	$1,878.4	$2,683.3	7.0%
	State Match	$378.3	$627.2	$945.1	$1,425.9	$2,123.5	8.6%
	Total	$1,044.3	$1,535.3	$2,250.9	$3,304.4	$4,806.8	7.6%

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.
Note: Spending projections are on an incurred service basis.

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[69] *Non-Claim Related Spending* includes offsetting recoveries (which are actually credits), Medicare Part A & Part B premiums, and supplemental hospital payments. These three categories were discussed in Chapter 6.

POTENTIAL PROGRAM CHANGES

As we showed in Chapter 5, Medicaid spending by the state is projected to grow at a faster rate than the Alaskan economy (as measured by GSP) and faster than total personal income in the state. On a per capita basis, real spending on Medicaid services by the State of Alaska will more than double over the next 20 years and, in nominal terms, spending will increase 5-fold.

It is clear that Alaska, like all of the other states, will need to continually assess spending growth on its Medicaid program in order to insure that the medical needs of Alaska's most vulnerable citizens are able to be met both today and into the future. Alaska is certainly not alone in its desire to rein in the costs of its Medicaid program. With projected growth in state matching fund spending on Medicaid of 8.6% per year through 2025, state officials have a strong incentive to carefully scrutinize growth in each service category, as well as potential changes to Medicaid eligibility requirements.

The Kaiser Commission on Medicaid and the Uninsured published *Medicaid Budgets, Spending, and Policy Initiatives in State Fiscal Years 2005 and 2006: Results from a 50-State Survey* (hereafter referred to as "Smith et al.") in October 2005. This publication is an excellent source of information on the measures other states have taken to slow the growth in spending on their Medicaid programs.[70] The consensus view of the states is that, despite several years of cost-containment efforts, budgets are still tight and the rate of growth in state spending on Medicaid may not be sustainable. Areas of particular concern were the ability to continue to cut cost growth, the aging of the population, decreasing rates of private insurance coverage, and the potential impact on the states of federal initiatives to control federal Medicaid spending. State Medicaid officials did, however, express greater optimism about the future of Medicaid than they did in past surveys. Below are excerpts and anecdotes discussed in Smith et al. For a more detailed examination of the changes implemented by other state's Medicaid programs, we recommend one review the Smith et al. publication in its entirety.

Cuts or Restrictions on Benefits

Among the most obvious ways of reducing cost in the Medicaid program is to restrict or eliminate specific state-optional Medicaid services. Such measures became common in

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[70] Please note, however, that many of the cost containment measures are from states with managed-care programs, which Alaska does not have.

the early 2000s as the economy slowed and Medicaid enrollment rose. According to Smith et al., the number of states that cut or reduced benefits for Medicaid services declined in 2005, due in part to the improving economy, but also due to the fact that many state-optional services had already been restricted or cut in previous years. Among the Medicaid services restricted or cut by policy makers were: podiatry, outpatient mental health, vision, dental, methadone clinic services for adults, and over-the-counter drug coverage. In addition, one or more states imposed limits on inpatient hospital stays in any hospital or non-public hospitals.

Eligibility Changes

Eligibility reductions are one of the most difficult cost containment measures that states can undertake to rein in Medicaid costs because such changes negatively impact the ability of the low-income and economically vulnerable portion of the population to access needed health and long-term care services (Smith et al.). Nevertheless, states have taken steps to reduce eligibility into Medicaid in an effort to reduce the growth in the Medicaid enrollee population. Such steps have included closing enrollment into the Standard waiver program (Oregon) and freezing enrollment of non-pregnant adults into the medically needy program (Tennessee). There were also a number of states that either expanded eligibility or restored former eligibility standards.

Co-payment Requirements

States are increasingly relying on new or higher co-pays as a component of their strategy of cost containment. According to Hudman and O'Malley (2003), however, even a "nominal" co-payment amount, which Federal Medicaid Law generally defines as $3.00 or less per service, can deter low-income individuals from receiving necessary care. According to Smith et al., in fiscal year 2005, eight states imposed new or higher co-payments for Medicaid services; for fiscal year 2006, 13 states have or will pose higher co-payment amounts. Comparatively, in fiscal years 2003 and 2004, the number of states imposing new or higher co-payment amounts was 17 and 20, respectively.

Fraud and Abuse Controls

States report the increased use of fraud and abuse detection activities. These include, enhancements to Surveillance and Utilization Review Systems (SURS), audits, increased

staffing, and the sharing of information with other agencies. Pharmacy fraud and abuse control was a primary focus for many states.

Managed Care Initiatives

Given Alaska's relatively small population and expansive geography, managed care is probably not a viable option for the State or at least not for the population outside of the Anchorage/Mat-Su region.

Long-Term Care and Home and Community-Based Services

Long term care (LTC) recipients are among the most vulnerable of Medicaid recipients and, because of this, states find it difficult to make cuts or slow the growth in LTC spending. Nevertheless, LTC represents more than one third of Medicaid spending for most states. Currently, spending in Alaska on Medicaid LTC services is considerably less than one third of total Medicaid spending, however the rate of growth in LTC spending, 12% to 13% per year, is significantly greater than spending growth for the entire Medicaid program (about 9%).[71]

Steps to control growth in LTC spending, cited by Smith et al., include tightening eligibility criteria for nursing home care, reducing payments for bed holds within nursing home facilities, validation of patient assessments, and reductions in the reimbursement for Medicare nursing home coinsurance costs.

Within the home and community based (HCB) waiver program, several states implemented one or more of the following measures:

- Reduced the number of waiver slots;
- Placed lower limits on waiver services;
- Implemented a more rigorous utilization review program for HCB Services;
- Lowered caps on monthly expenditures;
- Measures to reduce spending growth in Personal Care services, which is an optional service category provided by Alaska and many other states, include

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[71] More precisely, this is state matching fund spending. Most future LTC spending is projected to occur in the HCB Waiver and the Personal Care service categories.

measures to reduce eligibility and benefits, as well as increased review of service utilization.

In recent years, state Medicaid programs have gone to great lengths to reduce costs within their Medicaid program. In the past couple years, these efforts, along with a recovering national economy, have been successful in reducing the rate of growth in Medicaid spending. Nevertheless, with an aging population, the greater utilization of medical services by the elderly population, and continual advances in medical technology, demand for Medicaid services will continue to grow nationally and in Alaska. The projections of total and state matching fund spending presented in this report assume that the mix of Medicaid services remains constant and that eligibility criteria do not change in the future. These assumptions were necessary to show how Medicaid spending in Alaska would grow under the program's status quo.

ISSUES TO CONSIDER GOING FORWARD

This study reveals, under current law, how spending on Medicaid is likely to grow; it provides a view of emerging demographic trends and identifies those service categories that will be most affected by those trends. By looking significantly farther into the future than is typically the case, policy makers and ADHSS executives can be more proactive and less reactive. There are many issues to consider going forward. These include, but are not limited to the following:

- Alaska's Medicaid program has been a program dominated by children but it will become a program for the elderly. This change will affect the mix of benefits that Medicaid provides and, more importantly, the cost. On a per recipient basis, Medicaid costs are much greater for the elderly than they are for children. Alaska will have to pay close attention to services for elderly, especially long-term care.

- Alaska has unique challenges; expansive geography and a small population limit access to care; high unemployment in rural areas translates into a high percentage of the population on Medicaid; high costs of living mean high medical costs.

- Federal Medicaid reform is always on the horizon. What changes will be made at the federal level remains to be seen, but it is unlikely that the federal government will opt to pay more of the total costs of the Medicaid program.

- Working with Native communities to provide health care for their tribal members is a current strategy of the ADHSS. By working with tribal health providers to increase services, such as long-term care (LTC), ADHSS can reduce state fund spending without reducing services. Such participation between ADHSS and Native communities should continue. Currently, tribes are not very active in LTC, but they have expressed and interest in LTC for their members.

- The ADHSS is currently conducting a long-term care and cost study, the final results of which will not be published before this report is complete. The findings from the long-term care study and this study should be examined together before considering changes to programs or eligibility.

- A considerable aid for controlling state matching funds would be a change to the FMAP formula that takes into account Alaska's high cost of medical care. FMAP is affected by the level of and changes in per capita personal income (PCPI), but is not affected by differences in cost of living. This has a negative effect on Alaska, which although having a PCPI that is a little higher than the national average, also has a significantly higher cost of living than the rest of the nation.

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Appendices
APPENDIX A: ELIGIBILITY CLASSIFICATIONS

Eligibility Classification Short Descriptions:

Row #	Eligibility Class	Description
1	AFDC & Related	Eligible for AFDC-based Family Medicare or Transitional Medicaid
2	Title XIX Kids	Children under age 19 not eligible for coverage under M-SCHIP
3	Title XXI Kids	Children under age 19 eligible for coverage under M-SCHIP
4	Pregnancy/Post Partum	Eligible during pregnancy and for 60 days after giving birth
5	Kids in Custody	Children in custody of ADHSS
6	Alien (Foreign)	Illegal, sponsored, or amnesty alien
7	SSI/APA/LTC Cash	Eligible for SSI or other state cash supplement
8	LTC Non-cash	Elderly or disabled individual not receiving SSI or cash supplement
9	Other Disabled	Working disabled or eligible due to breast/cervical cancer screening
10	Medicare	Eligible for Medicare cost-sharing assistance only
11	Exams	Disability, waiver, or pregnancy determination pending

ELIGIBILITY CLASSIFICATION	ELIGIBILITY SUBTYPE
AFDC & RELATED	
Loss of AF due to excess child support income	4M
Family Medicaid, AFDC related	AF
Eligible for AFDC if not institutionalized	EO
Under 21 in ICF/MR, AFDC related	IF
Inpatient Psychiatric, under 21, AFDC related	IP
Transitional Medicaid - 1st 6 months	T1
Transitional Medicaid - 2nd 6 months	T2
Under 21 Medicaid, AFDC related	TO
TITLE XIX KIDS	
Newborn coverage whose mother is eligible on DOB	BA
Children under 19, income >133% & =< 150% FPL, with insurance	H1
Healthy child up through the age of 5, income =< 133% FPL	HC
Newborn coverage	NB
Children ages 6-18, income > 100% FPL and = < 133% FPL, with insurance	S1
Children ages 6-18 (Six Up)	SU
TITLE XXI KIDS	
Children under 18, no insurance, income >150% & =<175% 2003 FPL (pre 9-1-03 >150 & =< 200% FPL)	CP
Children under 18, income >133% % =< 150% FPL, without insurance	H2
Children ages 6-18, income > 100% FPL and = < 133% FPL, without insurance	S2
PREGNANCY & POST PARTUM	
Post Partum (eligible 60 days after newborn's date of birth)	PB
Post Partum (elig. 60 days after newborn's DOB), income >133% & =<175% 2003 FPL (Pre 9-1-03 >150% & =< 200% FPL)	PC
Pregnant Woman, (inactive code)	PG
Postpartum Coverage (inactive code)	PP
Pregnant woman Medicaid	PR
Pregnant woman (inactive code)	PW
Pregnant Woman, income >133% and =< 175% 2003 FPL (Pre 9-1-03 > 133% & =< 200% FPL)	PX
KIDS IN CUSTODY	
AFDC foster care children, Title IV-E	FC
Title IV-E subsidized adoption, AFDC related	IV
Juvenile, court-ordered into State custody, AFDC related	JC
Subsidized Adoption (State only, not Title IV)	SO
Children in voluntary custody of the State	VO
ALIEN (FOREIGN)	
Illegal Alien	AE
Illegal alien, emergency services	AL
Amnesty Alien, Under 18	AU
Illegal Alien, APA related	IL
Sponsored Alien	SA
SSI/APA/LTC CASH	
Individual lost SSI/APA eligibility from 1977 SSA COLA	BB
Under 18 receiving SSI, APA related	DC
SSI eligibles who have not applied for SSI	NS
SSI "1619" eligible	PM

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ELIGIBILITY CLASSIFICATION	ELIGIBILITY SUBTYPE
Refused Cash (APA only)	RC
Receiving APA and SSI	SI
Receiving APA (State supplement) no SSI	ST
LTC NON-CASH	
Waiver recipients receiving assisted living services	AS
Disabled child at home not receiving SSI, TEFRA option	DK
Under 21 in IDC/MR, APA related	IC
300%er, institutionalized or HCB waiver	IN
Nursing home, eligible even outside of nursing home, APA related	NH
OTHER DISABLED	
Breast/Cervical Cancer	BC
Disabled - working, income > 250% FPL, APA related	DW
MEDICARE	
Eligible for Part A Medicare payment premium only	QD
Eligible only as a QMB (Medicaid pays MCR coinsurance + deductible only)	QM
Specified low income Medicare beneficiary (SLMB)	SL
EXAMS	
Blindness Exam	BE
Disability and/or HCB Waiver determination	DE
Incapacity Determination	ID
Pregnancy Determination	PD
Waiver determination	WD

APPENDIX B: REGRESSION RESULTS FROM ENROLLMENT MODELS

Table B 1, Table B 2, and Table B 3 contain the estimated coefficients, associated statistical information, and goodness of fit measures for the Medicaid enrollment regression models for the children, working-age adults, and elderly age cohorts, respectively. These three models were estimated using ordinary least squares regression methods.

Table B 1: Regression Results for Children Medicaid FTE Enrollment Model

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-3.140	0.057	-54.818	0.000
Native Status	1.194	0.030	39.167	0.000
Gender	-0.069	0.030	-2.262	0.024
Northern Region	0.311	0.048	6.522	0.000
Western Region	0.567	0.049	11.520	0.000
South Central Region	0.385	0.047	8.152	0.000
Southeast Region	0.555	0.047	11.737	0.000
Ages 0-4	1.176	0.044	26.849	0.000
Ages 5-9	0.721	0.043	16.695	0.000
Ages 10-14	0.487	0.043	11.239	0.000
Child Enrollment Prog.	0.144	0.034	4.256	0.000
Time	0.125	0.007	16.890	0.000
R^2	0.822	**Adjusted R^2**		0.819
F-Statistic	255	**Sum of Squares (Regression)**		400.2
F-Stat Significance	0.00	**Sum of Squares (Residual)**		86.6

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Table B 2: Regression Results for Working-Age Adults FTE Medicaid Enrollment Model

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-2.855	0.068	-41.890	0.000
Native Status	0.573	0.035	16.203	0.000
Gender	-0.859	0.035	-24.265	0.000
Northern Region	0.191	0.056	3.417	0.001
Western Region	1.145	0.056	20.431	0.000
South Central Region	0.203	0.056	3.629	0.000
Southeast Region	0.291	0.056	5.208	0.000
Ages 20-24	0.344	0.056	6.139	0.000
Ages 25-34	0.259	0.056	4.631	0.000
Ages 34-44	0.014	0.056	0.242	0.809
Ages 45-54	-0.384	0.056	-6.866	0.000
Time	0.010	0.008	1.291	0.197
R^2	0.666	Adjusted R^2		0.661
F-Statistic	142	Sum of Squares (Regression)		391
F-Stat Significance	0.00	Sum of Squares (Residual)		196.4

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

Table B 3: Regression Results for Elderly FTE Medicaid Enrollment Model

Variable	Coefficient	Std. Error	t-Stat	P-Value
(Constant)	-2.208	0.098	-22.636	0.000
Native Status	0.767	0.077	9.960	0.000
Gender	-0.179	0.055	-3.288	0.001
Northern Region	0.405	0.083	4.915	0.000
Western Region	1.014	0.098	10.358	0.000
South Central Region	0.129	0.083	1.564	0.119
Southeast Region	-0.440	0.083	-5.327	0.000
Ages 75+	0.374	0.081	4.608	0.000
Age-Native Interaction	-0.665	0.110	-6.062	0.000
Time	0.040	0.012	3.338	0.001
R^2	0.60	Adjusted R^2		0.58
F-Statistic	46.4	Sum of Squares (Regression)		91.0
F-Stat Significance	0.00	Sum of Squares (Residual)		61.9

Source: Lewin Group & ECONorthwest analysis of Alaska Department of Health and Social Services data.

APPENDIX C: REGRESSION RESULTS FROM UTILIZATION MODELS

Table C 1 - Table C 20 contain the estimated coefficients, associated statistical information, and goodness of fit measures for the Medicaid utilization regression models. One model was estimated for each of the 20 Medicaid service categories and logistic regression methods were used in each category. Logistic regression analysis is used to predict whether an event will occur or will not occur. As such, the dependent variable can have only one of two possible values (usually 0 or 1). The coefficients estimated from each of the logistic regression models (i.e., b_1 – b_{18}) are used to estimate the probability that an individual—or a group of individuals with the same or similar characteristics—will use a particular Medicaid service category.

Table C 1: Logistic Regression Results—Inpatient Hospital

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-2.621	0.039	4412.5	0.000
Male Indicator	-0.234	0.010	513.5	0.000
Native Indicator	-0.015	0.011	1.7	0.191
Age	-0.006	0.002	13.6	0.000
Northern Region Indicator	0.044	0.010	17.6	0.000
Western Region Indicator	-0.105	0.012	74.4	0.000
South Central Region Indicator	0.041	0.010	15.8	0.000
South East Region Indicator	0.109	0.012	84.0	0.000
Time	-0.027	0.002	302.9	0.000
Kids Eligibility	0.748	0.039	376.5	0.000
Pregnancy Eligibility	2.728	0.056	2347.6	0.000
LTC Eligibility	0.592	0.071	69.6	0.000
Low Income/Disabled Eligibility	1.002	0.043	531.7	0.000
Interaction: Age & Male Indicator	-0.006	0.000	410.3	0.000
Interaction: Age & Native Indicator	0.003	0.000	100.9	0.000
Interaction: Age & Kids Eligibility	-0.017	0.002	88.2	0.000
Interaction: Age & Pregnancy Eligibility	-0.007	0.002	8.8	0.003
Interaction: Age & LTC Eligibility	0.018	0.002	88.1	0.000
Interaction: Age & Low Income/Disabled Eligibility	0.015	0.002	76.5	0.000
Hosmer-Lemeshow Test (X^2) df=8	2,302	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 2: Logistic Regression Results—Outpatient Hospital

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-0.644	0.019	1150.764	0.000
Male Indicator	-0.064	0.006	99.9	0.000
Native Indicator	0.393	0.007	2983.7	0.000
Age	-0.020	0.001	504.8	0.000
Northern Region Indicator	-0.236	0.007	1133.3	0.000
Western Region Indicator	0.063	0.008	68.5	0.000
South Central Region Indicator	0.082	0.007	147.1	0.000
South East Region Indicator	0.083	0.008	111.3	0.000
Time	0.066	0.001	4406.6	0.000
Kids Eligibility	-0.411	0.018	518.1	0.000
Pregnancy Eligibility	1.236	0.046	738.0	0.000
LTC Eligibility	-0.147	0.042	12.4	0.000
Low Income/Disabled Eligibility	0.768	0.024	1037.7	0.000
Interaction: Age & Male Indicator	-0.013	0.000	3154.4	0.000
Interaction: Age & Native Indicator	-0.002	0.000	61.6	0.000
Interaction: Age & Kids Eligibility	0.036	0.001	1657.0	0.000
Interaction: Age & Pregnancy Eligibility	-0.003	0.002	2.0	0.161
Interaction: Age & LTC Eligibility	0.028	0.001	713.5	0.000
Interaction: Age & Low Income/Disabled Eligibility	0.024	0.001	705.1	0.000
Hosmer-Lemeshow Test (X^2) df=8	1,803	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 3: Logistic Regression Results—Nursing Home

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-11.227	0.249	2027.485	0.000
Age	0.092	0.005	330.3	0.000
Northern Region Indicator	0.419	0.045	87.0	0.000
South Central Region Indicator	0.248	0.043	33.4	0.000
South East Region Indicator	0.255	0.048	28.3	0.000
Time	-0.103	0.007	229.1	0.000
LTC Eligibility	8.108	0.259	977.5	0.000
Low Income/Disabled Eligibility	5.595	0.259	465.2	0.000
Interaction: Age & LTC Eligibility	-0.036	0.005	48.4	0.000
Interaction: Age & Low Income/Disabled Eligibility	-0.056	0.005	117.6	0.000
Hosmer-Lemeshow Test (X^2) df=8	11.2	**Significance**		0.2

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 4: Logistic Regression Results—Clinic

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-3.214	0.025	16113.716	0.000
Male Indicator	-0.185	0.010	365.7	0.000
Native Indicator	2.040	0.010	39862.8	0.000
Age	0.014	0.001	232.3	0.000
Northern Region Indicator	-0.179	0.009	358.2	0.000
Western Region Indicator	-1.978	0.012	25316.9	0.000
South Central Region Indicator	-0.829	0.011	5584.4	0.000
South East Region Indicator	-0.225	0.011	453.3	0.000
Time	0.145	0.001	9334.3	0.000
Kids Eligibility	0.007	0.023	0.1	0.777
Pregnancy Eligibility	0.855	0.060	202.8	0.000
LTC Eligibility	-0.407	0.080	25.7	0.000
Low Income/Disabled Eligibility	0.807	0.031	677.1	0.000
Interaction: Age & Male Indicator	-0.005	0.000	263.5	0.000
Interaction: Age & Native Indicator	-0.010	0.000	866.2	0.000
Interaction: Age & Kids Eligibility	0.001	0.001	0.8	0.361
Interaction: Age & Pregnancy Eligibility	-0.017	0.002	52.6	0.000
Interaction: Age & LTC Eligibility	-0.009	0.002	34.6	0.000
Interaction: Age & Low Income/Disabled Eligibility	-0.009	0.001	88.5	0.000
Hosmer-Lemeshow Test (X^2) df=8	746	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 5: Logistic Regression Results—Dental

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-0.297	0.021	201.027	0.000
Male Indicator	-0.087	0.007	156.8	0.000
Native Indicator	0.020	0.008	6.2	0.013
Age	-0.056	0.001	1931.7	0.000
Northern Region Indicator	-0.184	0.008	539.4	0.000
Western Region Indicator	0.078	0.009	84.2	0.000
South Central Region Indicator	0.053	0.007	51.4	0.000
South East Region Indicator	0.054	0.009	37.4	0.000
Time	0.085	0.001	5816.9	0.000
Kids Eligibility	-0.738	0.020	1378.3	0.000
Pregnancy Eligibility	-0.547	0.077	50.1	0.000
LTC Eligibility	-0.896	0.047	356.5	0.000
Low Income/Disabled Eligibility	-0.433	0.028	246.6	0.000
Interaction: Age & Male Indicator	0.001	0.000	17.4	0.000
Interaction: Age & Native Indicator	-0.007	0.000	315.5	0.000
Interaction: Age & Kids Eligibility	0.042	0.001	1085.7	0.000
Interaction: Age & Pregnancy Eligibility	-0.017	0.003	26.8	0.000
Interaction: Age & LTC Eligibility	0.030	0.002	369.4	0.000
Interaction: Age & Low Income/Disabled Eligibility	0.026	0.001	378.3	0.000
Hosmer-Lemeshow Test (X^2) df=8	5,303	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 6: Logistic Regression Results—Lab/X-ray

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-1.321	0.032	1661.646	0.000
Male Indicator	-1.006	0.015	4510.4	0.000
Native Indicator	-0.850	0.019	1917.2	0.000
Age	0.004	0.001	17.8	0.000
Northern Region Indicator	-0.167	0.011	230.5	0.000
Western Region Indicator	-3.164	0.041	5909.5	0.000
South Central Region Indicator	-0.058	0.011	29.7	0.000
South East Region Indicator	-0.333	0.013	617.3	0.000
Time	-0.050	0.002	913.1	0.000
Kids Eligibility	-1.080	0.032	1156.9	0.000
Pregnancy Eligibility	1.917	0.054	1256.2	0.000
LTC Eligibility	-0.527	0.088	35.9	0.000
Low Income/Disabled Eligibility	1.524	0.037	1720.0	0.000
Interaction: Age & Male Indicator	0.002	0.000	15.3	0.000
Interaction: Age & Native Indicator	-0.007	0.001	104.3	0.000
Interaction: Age & Kids Eligibility	0.055	0.001	2674.4	0.000
Interaction: Age & Pregnancy Eligibility	-0.013	0.002	39.4	0.000
Interaction: Age & LTC Eligibility	-0.015	0.002	68.7	0.000
Interaction: Age & Low Income/Disabled Eligibility	-0.023	0.001	448.6	0.000
Hosmer-Lemeshow Test (X^2) df=8	1,965	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 7: Logistic Regression Results—Other Services

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-4.989	0.173	827.964	0.000
Male Indicator	-4.105	0.237	299.7	0.000
Native Indicator	-0.675	0.083	65.9	0.000
Age	-0.014	0.007	3.8	0.051
Northern Region Indicator	-1.403	0.090	244.5	0.000
Western Region Indicator	-2.426	0.169	206.6	0.000
South Central Region Indicator	0.795	0.038	449.1	0.000
South East Region Indicator	0.173	0.054	10.2	0.001
Time	0.039	0.007	28.2	0.000
Kids Eligibility	-0.611	0.171	12.8	0.000
Pregnancy Eligibility	2.715	0.244	123.9	0.000
LTC Eligibility	-1.850	0.961	3.7	0.054
Low Income/Disabled Eligibility	1.597	0.207	59.4	0.000
Interaction: Age & Male Indicator	0.010	0.009	1.3	0.247
Interaction: Age & Native Indicator	0.002	0.003	0.6	0.439
Interaction: Age & Kids Eligibility	0.053	0.007	52.6	0.000
Interaction: Age & Pregnancy Eligibility	-0.064	0.010	37.5	0.000
Interaction: Age & LTC Eligibility	-0.018	0.024	0.5	0.465
Interaction: Age & Low Income/Disabled Eligibility	-0.038	0.008	23.9	0.000
Hosmer-Lemeshow Test (X^2) df=8	596	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 8: Logistic Regression Results—EPSDT

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-3.698	0.079	2208.398	0.000
Male Indicator	-0.044	0.028	2.5	0.112
Native Indicator	-0.473	0.036	170.6	0.000
Age	-0.052	0.006	86.8	0.000
Northern Region Indicator	-1.692	0.067	633.4	0.000
Western Region Indicator	1.162	0.033	1222.7	0.000
South Central Region Indicator	-0.131	0.034	15.2	0.000
South East Region Indicator	-0.551	0.049	124.6	0.000
Time	0.050	0.005	117.9	0.000
Kids Eligibility	0.056	0.073	0.6	0.444
Pregnancy Eligibility	1.988	1.300	2.3	0.126
LTC Eligibility	-0.873	0.286	9.3	0.002
Low Income/Disabled Eligibility	0.122	0.149	0.7	0.416
Interaction: Age & Male Indicator	0.006	0.003	4.1	0.043
Interaction: Age & Native Indicator	0.021	0.003	48.0	0.000
Interaction: Age & Kids Eligibility	-0.052	0.005	89.7	0.000
Interaction: Age & Pregnancy Eligibility	-0.295	0.070	17.9	0.000
Interaction: Age & LTC Eligibility	-0.026	0.021	1.5	0.213
Interaction: Age & Low Income/Disabled Eligibility	-0.076	0.009	69.8	0.000
Hosmer-Lemeshow Test (X^2) df=8	318	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 9: Logistic Regression Results—Practitioner Services

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	1.130	0.019	3490.803	0.000
Male Indicator	-0.055	0.007	72.0	0.000
Native Indicator	-0.761	0.007	11040.9	0.000
Age	-0.019	0.001	720.9	0.000
Northern Region Indicator	-0.170	0.007	567.9	0.000
Western Region Indicator	-0.480	0.008	3931.3	0.000
South Central Region Indicator	-0.133	0.007	356.1	0.000
South East Region Indicator	-0.221	0.008	745.4	0.000
Time	0.071	0.001	4763.5	0.000
Kids Eligibility	-0.483	0.018	709.9	0.000
Pregnancy Eligibility	0.583	0.054	117.1	0.000
LTC Eligibility	-0.042	0.047	0.8	0.373
Low Income/Disabled Eligibility	0.276	0.026	114.6	0.000
Interaction: Age & Male Indicator	-0.014	0.000	3382.2	0.000
Interaction: Age & Native Indicator	-0.002	0.000	43.7	0.000
Interaction: Age & Kids Eligibility	0.016	0.001	477.3	0.000
Interaction: Age & Pregnancy Eligibility	0.007	0.002	12.7	0.000
Interaction: Age & LTC Eligibility	0.021	0.001	445.3	0.000
Interaction: Age & Low Income/Disabled Eligibility	0.019	0.001	625.3	0.000
Hosmer-Lemeshow Test (X^2) df=8	2,472	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 10: Logistic Regression Results—Home Health/Hospice

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-5.559	0.177	989.683	0.000
Male Indicator	-0.182	0.063	8.3	0.004
Native Indicator	-0.065	0.078	0.7	0.407
Age	0.004	0.006	0.6	0.457
Northern Region Indicator	-0.400	0.059	46.6	0.000
Western Region Indicator	-2.509	0.180	193.9	0.000
South Central Region Indicator	0.843	0.037	509.7	0.000
South East Region Indicator	-0.099	0.058	2.9	0.088
Time	-0.078	0.007	121.4	0.000
Kids Eligibility	-0.628	0.175	12.9	0.000
Pregnancy Eligibility	-0.417	0.495	0.7	0.400
LTC Eligibility	2.543	0.200	162.0	0.000
Low Income/Disabled Eligibility	1.948	0.179	118.9	0.000
Interaction: Age & Male Indicator	-0.004	0.001	8.0	0.005
Interaction: Age & Native Indicator	-0.010	0.002	27.6	0.000
Interaction: Age & Kids Eligibility	0.008	0.006	1.6	0.210
Interaction: Age & Pregnancy Eligibility	0.000	0.019	0.0	0.997
Interaction: Age & LTC Eligibility	0.000	0.006	0.0	0.959
Interaction: Age & Low Income/Disabled Eligibility	0.000	0.006	0.0	0.968
Hosmer-Lemeshow Test (X^2) df=8	27	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 11: Logistic Regression Results—Inpatient Psychology

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-2.894	0.065	2000.435	0.000
Male Indicator	0.329	0.043	59.6	0.000
Native Indicator	0.126	0.046	7.6	0.006
Age	-0.030	0.003	101.3	0.000
Northern Region Indicator	-0.854	0.053	257.7	0.000
Western Region Indicator	-0.853	0.054	246.4	0.000
South Central Region Indicator	-0.671	0.050	176.8	0.000
South East Region Indicator	-1.000	0.067	220.9	0.000
Time	0.005	0.006	0.6	0.426
Kids Eligibility	-2.322	0.052	2017.3	0.000
Pregnancy Eligibility	3.879	0.912	18.1	0.000
LTC Eligibility	-2.039	0.270	57.1	0.000
Low Income/Disabled Eligibility	0.484	0.082	34.7	0.000
Interaction: Age & Male Indicator	0.000	0.002	0.0	0.962
Interaction: Age & Native Indicator	0.017	0.002	54.5	0.000
Interaction: Age & Kids Eligibility	0.022	0.003	56.7	0.000
Interaction: Age & Pregnancy Eligibility	-0.370	0.049	56.2	0.000
Interaction: Age & LTC Eligibility	-0.003	0.008	0.2	0.692
Interaction: Age & Low Income/Disabled Eligibility	-0.066	0.004	285.0	0.000
Hosmer-Lemeshow Test (X^2) df=8	540	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 12: Logistic Regression Results—Vision

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-1.656	0.026	3989.635	0.000
Male Indicator	-0.255	0.010	632.8	0.000
Native Indicator	-0.236	0.012	413.8	0.000
Age	-0.030	0.001	495.4	0.000
Northern Region Indicator	0.079	0.010	66.8	0.000
Western Region Indicator	-0.656	0.013	2476.9	0.000
South Central Region Indicator	0.118	0.009	156.8	0.000
South East Region Indicator	0.024	0.011	4.5	0.034
Time	0.106	0.001	5199.6	0.000
Kids Eligibility	-1.157	0.025	2189.6	0.000
Pregnancy Eligibility	-1.121	0.088	161.6	0.000
LTC Eligibility	-0.462	0.057	65.3	0.000
Low Income/Disabled Eligibility	-0.105	0.031	11.8	0.001
Interaction: Age & Male Indicator	0.000	0.000	0.2	0.661
Interaction: Age & Native Indicator	0.002	0.000	33.2	0.000
Interaction: Age & Kids Eligibility	0.060	0.001	1971.2	0.000
Interaction: Age & Pregnancy Eligibility	0.014	0.004	15.4	0.000
Interaction: Age & LTC Eligibility	0.029	0.002	342.8	0.000
Interaction: Age & Low Income/Disabled Eligibility	0.034	0.001	628.7	0.000
Hosmer-Lemeshow Test (X^2) df=8	961	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 13: Logistic Regression Results—Residential Psychology

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-3.629	0.068	2815.726	0.000
Male Indicator	0.203	0.045	20.5	0.000
Native Indicator	-0.220	0.049	19.9	0.000
Age	-0.027	0.003	106.8	0.000
Northern Region Indicator	-0.512	0.050	103.7	0.000
Western Region Indicator	-1.313	0.074	311.3	0.000
South Central Region Indicator	-0.369	0.048	58.6	0.000
South East Region Indicator	-0.315	0.055	32.7	0.000
Time	0.176	0.007	585.3	0.000
Kids Eligibility	-2.642	0.051	2735.1	0.000
Pregnancy Eligibility	3.003	1.145	6.9	0.009
LTC Eligibility	-2.296	0.307	56.0	0.000
Low Income/Disabled Eligibility	0.174	0.097	3.2	0.073
Interaction: Age & Male Indicator	0.010	0.002	18.4	0.000
Interaction: Age & Native Indicator	0.018	0.002	54.2	0.000
Interaction: Age & Kids Eligibility	0.027	0.003	116.0	0.000
Interaction: Age & Pregnancy Eligibility	-0.393	0.064	38.0	0.000
Interaction: Age & LTC Eligibility	-0.028	0.013	4.3	0.038
Interaction: Age & Low Income/Disabled Eligibility	-0.095	0.005	352.0	0.000
Hosmer-Lemeshow Test (X^2) df=8	128	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 14: Logistic Regression Results—HCB Waiver

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-6.550	0.090	5321.400	0.000
Male Indicator	0.383	0.039	97.3	0.000
Native Indicator	0.413	0.048	74.2	0.000
Age	0.078	0.002	2342.8	0.000
Northern Region Indicator	-0.635	0.026	608.8	0.000
Western Region Indicator	-1.366	0.041	1099.2	0.000
South Central Region Indicator	-0.067	0.022	9.7	0.002
South East Region Indicator	-0.217	0.025	75.8	0.000
Time	0.135	0.003	1552.9	0.000
Kids Eligibility	-2.218	0.114	378.6	0.000
Pregnancy Eligibility	-0.306	0.272	1.3	0.261
LTC Eligibility	7.054	0.093	5693.5	0.000
Low Income/Disabled Eligibility	3.561	0.086	1700.8	0.000
Interaction: Age & Male Indicator	-0.011	0.001	248.8	0.000
Interaction: Age & Native Indicator	-0.012	0.001	193.7	0.000
Interaction: Age & Kids Eligibility	-0.029	0.003	69.1	0.000
Interaction: Age & Pregnancy Eligibility	-0.030	0.009	10.2	0.001
Interaction: Age & LTC Eligibility	-0.094	0.002	3109.8	0.000
Interaction: Age & Low Income/Disabled Eligibility	-0.064	0.002	1612.6	0.000
Hosmer-Lemeshow Test (X^2) df=8	65	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 15: Logistic Regression Results—Personal Care

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-8.344	0.256	1066.107	0.000
Male Indicator	-0.332	0.061	29.3	0.000
Native Indicator	0.000	0.082	0.0	0.999
Age	0.045	0.005	90.2	0.000
Northern Region Indicator	0.050	0.029	3.0	0.083
Western Region Indicator	0.304	0.031	95.1	0.000
South Central Region Indicator	0.346	0.026	177.2	0.000
South East Region Indicator	-0.017	0.032	0.3	0.598
Time	0.170	0.004	1630.8	0.000
Kids Eligibility	-2.085	0.282	54.5	0.000
Pregnancy Eligibility	-3.882	2.402	2.6	0.106
LTC Eligibility	5.309	0.259	421.4	0.000
Low Income/Disabled Eligibility	3.285	0.254	167.1	0.000
Interaction: Age & Male Indicator	-0.002	0.001	2.4	0.118
Interaction: Age & Native Indicator	-0.008	0.001	41.6	0.000
Interaction: Age & Kids Eligibility	0.039	0.006	44.1	0.000
Interaction: Age & Pregnancy Eligibility	0.017	0.083	0.0	0.833
Interaction: Age & LTC Eligibility	-0.036	0.005	54.7	0.000
Interaction: Age & Low Income/Disabled Eligibility	-0.009	0.005	3.7	0.054
Hosmer-Lemeshow Test (X^2) df=8	47	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 16: Logistic Regression Results—Outpatient Mental Health

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-0.396	0.023	300.754	0.000
Male Indicator	0.179	0.013	199.8	0.000
Native Indicator	-0.078	0.014	29.5	0.000
Age	-0.028	0.001	807.4	0.000
Northern Region Indicator	-0.438	0.013	1156.4	0.000
Western Region Indicator	-0.914	0.017	2940.9	0.000
South Central Region Indicator	-0.004	0.011	0.1	0.754
South East Region Indicator	-0.012	0.013	0.9	0.344
Time	0.016	0.002	84.4	0.000
Kids Eligibility	-2.774	0.021	18280.1	0.000
Pregnancy Eligibility	-2.888	0.120	579.0	0.000
LTC Eligibility	-1.777	0.064	765.6	0.000
Low Income/Disabled Eligibility	0.702	0.026	708.6	0.000
Interaction: Age & Male Indicator	-0.008	0.000	432.6	0.000
Interaction: Age & Native Indicator	-0.001	0.000	7.6	0.006
Interaction: Age & Kids Eligibility	0.067	0.001	4293.7	0.000
Interaction: Age & Pregnancy Eligibility	0.026	0.005	30.0	0.000
Interaction: Age & LTC Eligibility	0.023	0.001	254.1	0.000
Interaction: Age & Low Income/Disabled Eligibility	-0.005	0.001	23.4	0.000
Hosmer-Lemeshow Test (X^2) df=8	5,013	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 17: Logistic Regression Results—Pharmacy

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	0.571	0.019	896.924	0.000
Male Indicator	-0.031	0.006	23.6	0.000
Native Indicator	-0.231	0.007	1011.5	0.000
Age	-0.033	0.001	1530.4	0.000
Northern Region Indicator	-0.332	0.007	2267.3	0.000
Western Region Indicator	-1.054	0.008	17203.1	0.000
South Central Region Indicator	-0.199	0.007	846.4	0.000
South East Region Indicator	-0.308	0.008	1475.9	0.000
Time	0.081	0.001	6394.9	0.000
Kids Eligibility	-0.885	0.018	2385.4	0.000
Pregnancy Eligibility	0.034	0.046	0.5	0.459
LTC Eligibility	-0.052	0.046	1.3	0.258
Low Income/Disabled Eligibility	0.607	0.026	524.7	0.000
Interaction: Age & Male Indicator	-0.018	0.000	4598.7	0.000
Interaction: Age & Native Indicator	-0.003	0.000	124.1	0.000
Interaction: Age & Kids Eligibility	0.058	0.001	4741.6	0.000
Interaction: Age & Pregnancy Eligibility	0.024	0.002	172.8	0.000
Interaction: Age & LTC Eligibility	0.067	0.001	2906.3	0.000
Interaction: Age & Low Income/Disabled Eligibility	0.046	0.001	2675.1	0.000
Hosmer-Lemeshow Test (X^2) df=8	1,672	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 18: Logistic Regression Results—Transportation

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-3.871	0.031	15891.745	0.000
Male Indicator	-0.074	0.010	54.1	0.000
Native Indicator	1.186	0.012	10018.0	0.000
Age	0.007	0.001	29.9	0.000
Northern Region Indicator	0.965	0.011	7379.3	0.000
Western Region Indicator	2.331	0.010	49568.9	0.000
South Central Region Indicator	1.161	0.011	11457.3	0.000
South East Region Indicator	1.071	0.012	7907.8	0.000
Time	0.058	0.001	1553.1	0.000
Kids Eligibility	-0.296	0.028	109.6	0.000
Pregnancy Eligibility	0.921	0.061	230.8	0.000
LTC Eligibility	1.896	0.052	1331.1	0.000
Low Income/Disabled Eligibility	1.173	0.034	1157.5	0.000
Interaction: Age & Male Indicator	-0.005	0.000	242.1	0.000
Interaction: Age & Native Indicator	-0.013	0.000	1674.8	0.000
Interaction: Age & Kids Eligibility	0.015	0.001	119.1	0.000
Interaction: Age & Pregnancy Eligibility	-0.001	0.002	0.1	0.791
Interaction: Age & LTC Eligibility	-0.001	0.001	0.2	0.619
Interaction: Age & Low Income/Disabled Eligibility	0.005	0.001	11.4	0.001
Hosmer-Lemeshow Test (X^2) df=8	1,446	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 19: Logistic Regression Results—Therapy/Rehabilitation

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-1.495	0.031	2266.387	0.000
Male Indicator	0.226	0.015	229.0	0.000
Native Indicator	0.079	0.017	21.3	0.000
Age	-0.061	0.002	803.9	0.000
Northern Region Indicator	-0.331	0.016	418.7	0.000
Western Region Indicator	-1.174	0.025	2246.5	0.000
South Central Region Indicator	0.262	0.013	384.3	0.000
South East Region Indicator	-0.174	0.018	97.5	0.000
Time	0.098	0.002	1855.5	0.000
Kids Eligibility	-2.396	0.028	7146.2	0.000
Pregnancy Eligibility	-1.626	0.160	102.7	0.000
LTC Eligibility	0.812	0.048	286.4	0.000
Low Income/Disabled Eligibility	-0.806	0.036	496.1	0.000
Interaction: Age & Male Indicator	-0.010	0.000	510.1	0.000
Interaction: Age & Native Indicator	-0.008	0.001	210.2	0.000
Interaction: Age & Kids Eligibility	0.076	0.002	1210.8	0.000
Interaction: Age & Pregnancy Eligibility	0.013	0.007	3.4	0.064
Interaction: Age & LTC Eligibility	0.033	0.002	205.0	0.000
Interaction: Age & Low Income/Disabled Eligibility	0.060	0.002	752.2	0.000
Hosmer-Lemeshow Test (X^2) df=8	19.6	**Significance**		0.01

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table C 20: Logistic Regression Results—DME/Supplies

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	-2.787	0.039	5160.592	0.000
Male Indicator	0.201	0.015	175.3	0.000
Native Indicator	-0.102	0.018	33.0	0.000
Age	-0.011	0.002	40.2	0.000
Northern Region Indicator	-0.239	0.013	316.1	0.000
Western Region Indicator	-0.779	0.019	1762.9	0.000
South Central Region Indicator	-0.190	0.013	207.9	0.000
South East Region Indicator	-0.266	0.015	298.6	0.000
Time	0.058	0.002	901.9	0.000
Kids Eligibility	-0.949	0.037	655.6	0.000
Pregnancy Eligibility	-1.409	0.098	208.8	0.000
LTC Eligibility	2.917	0.052	3158.9	0.000
Low Income/Disabled Eligibility	1.240	0.040	954.8	0.000
Interaction: Age & Male Indicator	-0.010	0.000	844.0	0.000
Interaction: Age & Native Indicator	-0.009	0.000	423.6	0.000
Interaction: Age & Kids Eligibility	0.031	0.002	306.7	0.000
Interaction: Age & Pregnancy Eligibility	0.058	0.004	250.3	0.000
Interaction: Age & LTC Eligibility	0.005	0.002	8.0	0.005
Interaction: Age & Low Income/Disabled Eligibility	0.024	0.002	196.0	0.000
Hosmer-Lemeshow Test (X^2) df=8	207	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

APPENDIX D: REGRESSION RESULTS FROM AVERAGE-PER-RECIPIENT SPENDING MODELS

Table D 1 through Table D 20 contain the estimated coefficients, associated statistical information, and goodness of fit measures for the Medicaid average-per-recipient spending models, which were estimated for each of the 20 service categories. These models were estimated using ordinary least squares regression methods, however they differ in a fundamental way from those models presented in Appendix B. Unlike the enrollment rate models, the spending models have an auto-regressive specification, which simply means that the average-per-recipient spending in period t is assumed to be a function of, among other explanatory variables, average-per-recipient spending in period t_{-1}.[72] This is generally referred to as and "AR1" ("auto-regressive one-period") model. The purpose for specifying these models as AR1 is to take advantage of the information contained in the dependent variable during the prior period. That is, it is reasonable to assume that average spending per recipient in the current period is closely related to average spending in the prior period. Further, there are statistical tests designed specifically to measure the degree to which this is the case. For each of the 20 average-per-recipient spending models, either the Durbin-Watson (DW) or Durbin H statistic is provided, depending on whether the final model was specified as an auto-regressive or traditional OLS model.[73]

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[72] In fact, as the reader can verify, most of the 20 regression models in Appendix D are specified as AR1. There are, however, several models that are specified as either AR2 (i.e., contain average spending information on periods t-1 and t-2) or are not specified as auto-regressive models.

[73] For more information on the appropriate use of the DW and Durbin H statistic, please reference any basic econometric textbook.

Table D 1: Average Spending Regression Results—Inpatient Hospital

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	1.835	0.283	6.488	0.000
Time	0.006	0.009	0.673	0.502
Native Indicator	0.072	0.037	1.965	0.050
Male Indicator	0.035	0.038	0.923	0.357
Age	-0.003	0.001	-3.750	0.000
1-Period Lag of Dependent Variable	0.802	0.031	25.997	0.000
R-Square	0.72	**Durbin H**		1.27
F-Statistic	153.6	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 2: Average Spending Regression Results—Outpatient Hospital

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	0.578	0.145	3.979	0.000
Time	-0.008	0.005	-1.648	0.100
Native Indicator	0.054	0.018	2.981	0.003
Male Indicator	-0.009	0.018	-0.483	0.630
Age	0.000	0.000	1.343	0.180
1-Period Lag of Dependent Variable	0.924	0.023	40.186	0.000
R-Square	0.87	**Durbin H**		2.97
F-Statistic	393.4	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 3: Average Spending Regression Results—Nursing Home

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	10.052	0.156	64.541	0.000
Time	-0.003	0.022	-0.137	0.891
Native Indicator	-0.046	0.103	-0.446	0.656
Male Indicator	0.016	0.103	0.156	0.876
Age	0.014	0.002	6.335	0.000
R-Square	0.15	**Durbin Watson**		1.86
F-Statistic	10.1	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.
Note: Based on Durbin Watson statistic, fail to reject the null hypothesis of nonautocorrelated error.

Table D 4: Average Spending Regression Results—Clinic

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	1.923	0.182	10.571	0.000
Time	-0.036	0.008	-4.515	0.000
Native Indicator	0.219	0.029	7.624	0.000
Male Indicator	-0.059	0.028	-2.080	0.038
Age	-0.001	0.001	-1.320	0.188
1-Period Lag of Dependent Variable	0.732	0.030	24.460	0.000
R-Square	0.76	**Durbin H**		1.13
F-Statistic	190.1	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 5: Average Spending Regression Results—Dental

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	4.316	0.279	15.474	0.000
Time	0.002	0.006	0.249	0.804
Native Indicator	-0.208	0.028	-7.403	0.000
Male Indicator	0.054	0.025	2.128	0.034
Age	-0.005	0.001	-8.238	0.000
1-Period Lag of Dependent Variable	0.314	0.043	7.288	0.000
R-Square	0.59	**Durbin H**		3.11
F-Statistic	82.3	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 6: Average Spending Regression Results—Lab/X-ray

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	0.665	0.156	4.271	0.000
Time	0.028	0.008	3.696	0.000
Native Indicator	-0.025	0.030	-0.832	0.406
Male Indicator	0.001	0.030	0.018	0.985
Age	0.000	0.001	0.704	0.482
1-Period Lag of Dependent Variable	0.820	0.034	24.162	0.000
R-Square	0.67	**Durbin H**		0.13
F-Statistic	122.8	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 7: Average Spending Regression Results—Other Services

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	2.827	0.781	3.619	0.001
Time	0.070	0.045	1.559	0.124
Native Indicator	0.461	0.193	2.392	0.020
Male Indicator	-0.538	0.289	-1.866	0.067
Age	0.004	0.007	0.553	0.582
1-Period Lag of Dependent Variable	0.159	0.121	1.313	0.194
2-Period Lag of Dependent Variable	2.827	0.781	3.619	0.001
R-Square	0.43	**Durbin H**		NA
F-Statistic	8.1	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 8: Average Spending Regression Results—EPSDT

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	2.428	0.406	5.976	0.000
Time	-0.028	0.008	-3.389	0.001
Native Indicator	-0.007	0.030	-0.248	0.805
Male Indicator	0.013	0.030	0.441	0.660
Age	-0.006	0.003	-2.428	0.017
1-Period Lag of Dependent Variable	0.527	0.087	6.028	0.000
R-Square	0.31	**Durbin H**		0.04
F-Statistic	9.6	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 9: Average Spending Regression Results—Practitioner Services

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	0.550	0.150	3.665	0.000
Time	0.004	0.005	0.856	0.392
Native Indicator	-0.040	0.021	-1.920	0.056
Male Indicator	-0.022	0.021	-1.088	0.278
Age	0.001	0.000	1.556	0.121
1-Period Lag of Dependent Variable	0.911	0.022	42.352	0.000
R-Square	0.87	**Durbin H**		1.52
F-Statistic	400.6	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 10: Average Spending Regression Results—Home Health/Hospice

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	4.063	0.429	9.468	0.000
Time	0.016	0.032	0.507	0.613
Native Indicator	-0.104	0.132	-0.791	0.430
Male Indicator	0.067	0.130	0.513	0.608
Age	-0.003	0.003	-1.076	0.283
1-Period Lag of Dependent Variable	0.447	0.054	8.344	0.000
R-Square	0.23	**Durbin H**		-1.78
F-Statistic	15.8	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 11: Average Spending Regression Results—Inpatient Psychology

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	9.580	0.146	65.502	0.000
Time	0.007	0.026	0.290	0.772
Native Indicator	0.363	0.118	3.085	0.002
Male Indicator	0.047	0.118	0.397	0.692
Age	-0.019	0.003	-6.549	0.000
R-Square	0.27	**Durbin Watson**		1.39
F-Statistic	15.2	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.
Note: Based on Durbin Watson statistic, reject the null hypothesis of nonautocorrelated error. The Durbin H statistic, however, indicates that AR1 is not appropriate specification.

Table D 12: Average Spending Regression Results—Vision

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	4.615	0.186	24.855	0.000
Time	-0.051	0.006	-8.120	0.000
Native Indicator	-0.145	0.023	-6.421	0.000
Male Indicator	0.025	0.023	1.104	0.271
Age	-0.002	0.000	-5.288	0.000
1-Period Lag of Dependent Variable	0.144	0.038	3.804	0.000
R-Square	0.36	**Durbin H**		2.162
F-Statistic	33.0	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 13: Average Spending Regression Results—Residential Psychology

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	10.240	0.119	86.147	5.16E-89
Time	0.112	0.014	7.898	6.22E-12
Native Indicator	0.016	0.064	0.253	0.801004
Male Indicator	0.046	0.064	0.720	0.473524
Age	-0.017	0.007	-2.273	0.025367
R-Square	0.42	**Durbin H**		1.79
F-Statistic	16.8	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.
Note: Based on Durbin Watson statistic, fail to reject the null hypothesis of nonautocorrelated error.

Table D 14: Average Spending Regression Results—HCB Waiver

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	2.360	0.299	7.887	0.000
Time	0.022	0.010	2.224	0.027
Native Indicator	0.029	0.039	0.758	0.449
Male Indicator	0.059	0.039	1.503	0.134
Age	-0.002	0.001	-2.469	0.014
1-Period Lag of Dependent Variable	0.758	0.030	25.103	0.000
R-Square	0.73	**Durbin H**		-0.44
F-Statistic	162.6	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 15: Average Spending Regression Results—Personal Care

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	4.162	0.509	8.181	0.000
Time	0.089	0.020	4.323	0.000
Native Indicator	-0.104	0.083	-1.256	0.210
Male Indicator	0.007	0.078	0.096	0.924
Age	-0.001	0.002	-0.633	0.527
1-Period Lag of Dependent Variable	0.514	0.058	8.920	0.000
R-Square	0.38	**Durbin H**		3.62
F-Statistic	35.2	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 16: Average Spending Regression Results—Outpatient Mental Health

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	1.677	0.312	5.377	0.000
Time	0.025	0.014	1.757	0.080
Native Indicator	0.013	0.056	0.235	0.814
Male Indicator	0.100	0.057	1.735	0.084
Age	-0.003	0.001	-2.237	0.026
1-Period Lag of Dependent Variable	0.782	0.035	22.585	0.000
R-Square	0.75	**Durbin H**		0.54
F-Statistic	181.7	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 17: Average Spending Regression Results—Pharmacy

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	0.450	0.117	3.844	0.000
Time	0.028	0.006	4.384	0.000
Native Indicator	-0.059	0.026	-2.274	0.024
Male Indicator	0.020	0.027	0.747	0.456
Age	0.003	0.001	3.784	0.000
1-Period Lag of Dependent Variable	0.915	0.021	43.082	0.000
R-Square	0.95	**Durbin H**		0.69
F-Statistic	1280	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 18: Average Spending Regression Results—Transportation

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	2.293	0.294	7.798	0.000
Time	0.016	0.005	2.993	0.003
Native Indicator	0.030	0.018	1.632	0.104
Male Indicator	0.003	0.018	0.148	0.882
Age	0.000	0.000	0.433	0.666
1-Period Lag of Dependent Variable	0.677	0.043	15.787	0.000
R-Square	0.62	**Durbin H**		-0.57
F-Statistic	97.4	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 19: Average Spending Regression Results—Therapy/Rehabilitation

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	3.016	0.312	9.676	0.000
Time	0.030	0.016	1.952	0.052
Native Indicator	-0.059	0.060	-0.974	0.331
Male Indicator	0.100	0.059	1.702	0.090
Age	-0.004	0.001	-3.276	0.001
1-Period Lag of Dependent Variable	0.568	0.045	12.632	0.000
R-Square	0.51	**Durbin H**		1.36
F-Statistic	63.1	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

Table D 20: Average Spending Regression Results—DME/Supplies

Variable	Coefficient	Std. Error	t-Stat	P-Value
Constant	1.603	0.255	6.284	0.000
Time	0.019	0.010	1.981	0.048
Native Indicator	0.001	0.039	0.020	0.984
Male Indicator	0.070	0.042	1.662	0.098
Age	-0.002	0.001	-2.405	0.017
1-Period Lag of Dependent Variable	0.759	0.035	21.780	0.000
R-Square	0.72	**Durbin H**		1.34
F-Statistic	153.6	**Significance**		0.00

Source: Lewin Group & ECONorthwest analysis of the of Alaska Department of Health and Social Services data.

APPENDIX E: GLOSSARY

ADHSS ....Alaska Department of Health and Social Services
ADLWD.....................Alaska Department of Labor and Workforce Development
AFDC........................Aid to Families with Dependent Children
ALTPP ....Alaska Long Term Population Projection
APA...........................Adult Public Assistance
BCC...........................Breast and Cervical Cancer
BEA...........................Bureau of Economic Analysis
BRS...........................Behavioral Rehabilitation Services
CMS ....Center for Medicare and Medicaid Services
CPI ....Consumer Price Index
CY ....Calendar Year
DME...........................Durable Medical equipment
DSH...........................Disproportionate Share Hospital
EPSDT ....Early & Periodic Screening, Diagnosis and Treatment
FFP............................Federal Financial Participation
FFY ....Federal Fiscal Year
FMAP........................Federal Medical Assistance Program
FTE ....Full Time Equivalent
FY ....Fiscal Year
GDP...........................Gross Domestic Product
GSP ....Gross State Product
HCB ....Home and Community Based
IHS ....Indian Health Services
ISER..........................Institute for Social and Economic Research
JUCE.........................Juneau Claims and Eligibility System
LTC...........................Long Term Care
MMIS........................Medicaid Management Information System
PCPI..........................Per Capita Personal Income
PDL...........................Preferred Drug List
SCHIP ....State Children's Health Insurance Program/Denali KidCare
SFY ....State Fiscal Year
SHP ....Supplemental Hospital Payments
SSI.............................Supplemental Security Income
SURS.........................Surveillance and Utilization Review System
Title XIX...................Medicaid
Title XXI...................SCHIP/Denali KidCare
TPI............................Total Personal Income
TPL ....Third Party Liability

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