Appendix – Chapter 2-4

Report: Long-Term Services and Supports for Minnesota's Older Population: Current and Future Utilization and Payments

November 2023

Contents

Appendix – Chapter 2 Methods

Table 2A.1 Definition of the LTSS Population

Our working definition for the LTSS population is intended to capture persons most in need of LTSS and who are using one or more of these services, and for whom we had available data from the Medicaid Management Information System (MMIS) and nursing facility Minimum Data Set (MDS) resident assessments, the primary sources of data about the LTSS population.

The LTSS Population is defined operationally as meeting all three conditions:
- Age 65 or older.
- Meet NF-LOC criteria based on:
    - Long-Term Care Consultation assessment (HCBS)
    - MDS assessment items (Nursing Facility); and
- Using nursing facilities or Medicaid LTSS currently or with a history of LTSS use.

The settings and services used by the LTSS population fall into broad categories:

- Nursing facilities
    - Enrolled in Medicaid
    - Not Medicaid enrolled – private paying, insurance, or other pay source.
- Medicaid Elderly Waiver- Residential, primarily Customized Living in assisted living facilities
- Medicaid-funded home and community-based care
    - Medicaid Elderly Waiver- Community, all non-residential HCBS
    - Alternative Care Waiver
    - Personal Care Assistance without a waiver program
    - Other home and community-based care without a waiver program.

Members of the LTSS Population must also show evidence of documented needs for LTSS through meeting the Medicaid NF-LOC criteria, based on a nursing home Minimum Data Set assessment or a Long-Term Care Consultation screening form.

The LTSS populations does not include people age 65 and older who were:
- Short-term, post-acute nursing facility residents where NF-LOC cannot be established.
- Nursing facility residents who did not meet NF-LOC criteria based on their MDS assessment.
- Medicaid enrollees with no evidence of meeting NF-LOC and no history of LTSS services in the prior 2 years; or
- Medicaid enrollees age 65 and older participating in an Intellectual Disabilities (ID), Community Alternative Care (CAC), Traumatic Brain Injury (TBI) or Community Access for Disability Inclusion (CADI) waiver.

People age 65 and older participating in a disability waiver have significantly different characteristics and service use patterns than EW or AC waiver participants or other members of the LTSS population. People with a disability waiver may be the subject of a separate analysis if time and resources permit.

Table 2A.2 COS codes associated for LTSS services

Service	COS Code
Access	100
Case Management	044
Customized Living	108
HCBS	
Adult Day Care	102
CDCS	021
Chore	093
Companion	094
Home Meals	095
Homemaker	096
Home Health and Skilled Nursing	020, 089, 114, 122
PCA	038, 119
Nursing Facility	011, 017

Table 2A.3 Coding for Harmonized Variables – Major Diagnoses, Dementia/Cognitive Impairment, Behavioral Health Conditions, and ADL Dependencies.

Variable	Label	Values	Data Source
DX_Dementia	Dementia		Claims and MDS
ADLbed_Origin_ltcc	Bed Mobility	0 Bed Mobility Without Help 1 Sits With Occasional Help 2 Sits Always With Help 3 Turns Always Needs Help	LTCC original
ADLtransfer_Origin_ltcc	Transferring	0 Transfers Without Help 1 Transfers With Guidance 2 Transfers With Help Of One 3 Transfers With Help Of Two 4 Remains Bedfast	LTCC original
ADLdress_Origin_ltcc	Dressing	0 Dresses Without Help 1 Dresses With Superivsion 2 Dresses With Others Help 3 Dressed By Others 4 Never Dresses	LTCC original
ADLeat_Origin_ltcc	Eating	0 Eats Without Any Help 1 Eats Minimal Supervision 2 Eats With Assistance 3 Eats With Partial Feeding 4 Eats With Total Feeding	LTCC original
ADLgroom_Origin_ltcc	Grooming	0 Grooms Without Help 1 Grooms With Supervision 2 Grooms With Others Help 3 Groomed By Others	LTCC original
ADLwalk_Origin_ltcc	Walking	0 Walks Without Help 1 Walks With Help Of Device 2 Walks With Help Of One Person 3 Walks With Help Of Two People 4 Unable To Walk	LTCC original

Variable	Label	Values	Data Source
ADLbath_Origin_ltcc	Bathing	0 Bathes Without Any Help 1 Bathes- Minimal Superivsion 2 Bathes - Supervised Only 3 Needs/Receives Help In/Out Tub 4 Needs/Receives Help Washing 5 Bathes by Others (Can't Help)	LTCC original
ADLtoilet_Origin_ltcc	Toileting	0 Toileting Independent 1 Toileting Needs Help 2 Toileting Occas Incontinent 3 Toileting Night Incontinent 4 Toileting Bladder Incontinent 5 Toileting Bowel Incontinent 6 Toileting Both Incontinent	LTCC original
ADLbed_harmonized_ltcc	Bed Mobility	0 Independent, Supervision, or Limited assistance 1 Extensive assistance 2Total dependence	LTCC harmonized
ADLtransfer_harmonized_ltcc	Transferring		LTCC harmonized
ADLdress_harmonized_ltcc	Dressing		LTCC harmonized
ADLeat_harmonized_ltcc	Eating		LTCC harmonized
ADLgroom_harmonized_ltcc	Grooming		LTCC harmonized
ADLwalk_harmonized_ltcc	Walking		LTCC harmonized
ADLbath_harmonized_ltcc	Bathing		LTCC harmonized
ADLtoilet_harmonized_ltcc	Toileting		LTCC harmonized
ADLsum_harmonized_ltcc	The total score of 8 harmonized ADLs		LTCC harmonized
ADLbed_Origin_mds	Bed Mobility	0 Independent 1 Supervision 2 Limited assistance 3 Extensive assistance 4 Total dependence	MDS original
ADLtransfer_Origin_mds	Transferring		MDS original
ADLdress_Origin_mds	Dressing		MDS original
ADLeat_Origin_mds	Eating		MDS original
ADLgroom_Origin_mds	Grooming		MDS original
ADLwalk_Origin_mds	Walking		MDS original
ADLbath_Origin_mds	Bathing		MDS original
ADLtoilet_Origin_mds	Toileting		MDS original

Variable	Label	Values	Data Source
ADLsum_Origin_mds	The total score of 8 original ADLs		MDS original
ADLbed_harmonized_mds	Bed Mobility	0 Independent, Supervision, or Limited assistance 1 Extensive assistance 2 Total dependence	MDS harmonized
ADLtransfer_harmonized_mds	Transferring		MDS harmonized
ADLdress_harmonized_mds	Dressing		MDS harmonized
ADLeat_harmonized_mds	Eating		MDS harmonized
ADLgroom_harmonized_mds	Grooming		MDS harmonized
ADLwalk_harmonized_mds	Walking		MDS harmonized
ADLbath_harmonized_mds	Bathing		MDS harmonized
ADLtoilet_harmonized_mds	Toileting		MDS harmonized
ADLsum_harmonized_mds	The total score of 8 harmonized ADLs		MDS harmonized
ADLbed_harmonized_combined		For the _combined variables, both the LTCC and MDS information was incorporated. For persons with values in both LTCC and MDS, the value = average value in both data files. As a result, there are some values which are not whole numbers.	LTCC and MDS
ADLtransfer_harmonized_combined			
ADLdress_harmonized_combined			
ADLeat_harmonized_combined			
ADLgroom_harmonized_combined			
ADLwalk_harmonized_combined			
ADLbath_harmonized_combined			
ADLtoilet_harmonized_combined			
ADLsum_harmonized_combined			
BehaviorSympYN_ltcc	The person has a frequent history of behavior symptoms.	0 No 1 Yes	LTCC
BehaviorSympYN_mds	Overall presence of behavioral symptoms	0 No 1 Yes	MDS
BehaviorSympYN_combined	Value =0.5 is the mean value of values in LTCC and MDS • BehaviorSympYN_ltcc ==0 & BehaviorSympYN_mds ==1 Or • BehaviorSympYN_ltcc ==1 & BehaviorSympYN_mds ==0		LTCC and MDS

Variable	Label	Values	Data Source
CogImpairedYN_ltcc	The person has impaired cognition.	0 No 1 Yes	LTCC
CogImpairedYN_mds	CFS4gp_mds was used to create this binary variable.	0 Cognitively Intact/Mildly Impaired 1 Moderately Impaired/Severely Impaired	MDS
CogImpairedYN_combined	Value =0.5 is the mean value of values in LTCC and MDS		LTCC and MDS
CFS4gp_mds (Cognitive Performance Scale)	Severity of cognitive impairment (cognitive function scale)	0 Cognitively Intact 1 Mildly Impaired 2 Moderately Impaired 3 Severely Impaired	MDS
DementiaYN_All_ltcc	Either DX_Dementia =1 or CogImpairedYN_ltcc ==1		LTCC
DementiaYN_All_mds	Either DX_Dementia =1 or CogImpairedYN_mds ==1		MDS
DementiaYN_All_combined	Value =0.5 is the mean value of values in LTCC and MDS		LTCC and MDS

Appendix – Chapter 3 Characteristics of LTSS Population at Baseline

Table A3.1 Characteristics of Average Monthly LTSS Population at Baseline (Annually 2016-2019) by detailed LTSS Categories

	Medicaid Nursing Facility	Medicaid Assisted Living	Medicaid HCBS - Elderly Waiver	Medicaid HCBS - PCA w/o waiver	Medicaid HCBS - Alternative Care	Non-Medicaid Nursing Facility	Total
Average Number of Users/Month	12174	8707	15305	2495	2356	6280	47317
Row Percentage	26%	18%	32%	5%	5%	13%	100%
Age Category							
65-74	21%	20%	46%	58%	32%	11%	30%
75-84	30%	34%	38%	29%	36%	27%	33%
85+	49%	45%	16%	13%	32%	62%	37%
Total	100%	100%	100%	100%	100%	100%	100%
Gender							
Female	30%	25%	30%	34%	27%	38%	30%
Male	70%	75%	70%	66%	73%	62%	70%
Total	100%	100%	100%	100%	100%	100%	100%
Marital status							
Married	11%	8%	17%	22%	14%	34%	16%
Widowed	47%	49%	31%	32%	44%	51%	42%
Divorced or separated	28%	29%	39%	33%	29%	6%	29%
Never married	14%	14%	14%	13%	13%	9%	13%
Total	100%	100%	100%	100%	100%	100%	100%
Race/Ethnicity							
Asian Pacific/Islanders	1%	2%	20%	50%	1%	0%	10%
Black/African American	3%	2%	23%	28%	6%	1%	11%
Hispanic	1%	1%	3%	2%	1%	0%	1%
Native American	1%	1%	2%	5%	1%	0%	1%
White/non-Hispanic	94%	94%	52%	16%	91%	99%	77%
Total	100%	100%	100%	100%	100%	100%	100%

	Medicaid Nursing Facility	Medicaid Assisted Living	Medicaid HCBS - Elderly Waiver	Medicaid HCBS - PCA w/o waiver	Medicaid HCBS - Alternative Care	Non-Medicaid Nursing Facility	Total
Residential Location							
Twin Cities	53%	55%	73%	83%	68%	49%	62%
Other MSA	6%	10%	5%	5%	5%	9%	6%
Outlying counties of an MSA	6%	6%	3%	1%	5%	6%	5%
Rural	35%	30%	19%	12%	21%	35%	27%
Total	100%	100%	100%	100%	100%	100%	100%
Dementia							
Yes	70%	71%	38%	46%	35%	62%	56%
No	30%	29%	62%	54%	65%	38%	44%
Total	100%	100%	100%	100%	100%	100%	100%
Behavioral Health Conditions							
Yes	32%	62%	31%	30%	51%	25%	37%
No	68%	38%	69%	70%	49%	75%	63%
Total	100%	100%	100%	100%	100%	100%	100%
Number of ADL Dependencies (Range: 0-16)							
Mean	4.77	3.09	2.49	5.09	2.03	5.66	3.72
Standard Deviation	2.71	2.39	2.41	2.23	2.10	2.34	2.76

Appendix – Chapter 4 – Trends in LTSS Pre-COVID (2018-2019) and COVID Period (2020-2021)

Introduction

The Appendix to Chapter 4 further describes trends between 2018 and 2021 in demographics, functional status, mortality, and service use and Medicaid payments for older people in Minnesota who met nursing facility level of care (NF-LOC) criteria and who were using nursing facilities (both Medicaid enrolled and not enrolled) or Medicaid-funded long-term supports and services (LTSS) in the community. Also, by comparing trends in years before the COVID-19 pandemic with the first year of the pandemic, we have an indication of the effect of COVID-19 on the characteristic of the LTSS population and their service use. The trend analysis is based on comparative cross-sections of the LTSS population on March 1, 2018-2020, before the COVID-19 pandemic began, and March 1, 2021, after a full year of the pandemic. The dates for the cross sections are: March 1 for each year, 2018-2020 immediately before the pandemic began, and March 1 2021 after a full year of the pandemic. We also conducted a longitudinal analysis of mortality, transitions between LTSS settings and programs, and use and cost of LTSS services for members of the LTSS population beginning on the March 1 dates.

Data Sources and Major Variables

Minnesota's Medicaid Management Information System (MMIS) and nursing facility Minimum Data Set (MDS) resident assessments are the primary sources of information about the LTSS population. Among the wide range of variables in these data systems, we selected the following program categories, demographic characteristics, and functional measures that are used in defining nursing facility level of care (NF-LOC), mortality and other outcomes. These definitions are as follows:

- LTSS settings and programs
  - Nursing facility (Medicaid and non-Medicaid)
  - Medicaid Elderly Waiver participation: EW – Residential (primarily assisted living facilities); EW – Community (non-residential HCBS); and Alternative Care Waiver (Medicaid-funded HCBS provided to older people not enrolled in Medicaid but who meet special financial eligibility criteria).
  - Medicaid Personal Care Assistant (PCA) or other non-waiver HCBS services outside of a Medicaid waver.
- Demographics
  - Age (age 65-74, 75-84, 85+)
  - Sex (Male, Female)
  - Race/ethnicity (Asian or Pacific Islander, non-Hispanic Black/African American, Hispanic, Native American, Multiple Races, and white (non-Hispanic)
  - Urban or rural residence (Twin Cities, other metro area, counties adjacent to metro area, and rural)
- Characteristics of nursing facility residents
  - Prior NF use within 2 years before current admission
  - Admission source (home, hospital, or other)
  - Cognitive status (Intact, Mild, Moderate, Severe)
  - ADL dependency (Bed Mobility, Transferring, Eating, and Toileting) (1-4)
  - Daily behavioral problems (y/n)
  - Bladder or bowel incontinence daily (y/n)

- Characteristics of Waiver, PCA, and other HCBS services
    - 4+ ADL needs (any 4 from among dressing, bathing, eating, walking, transferring, bed mobility, or toileting)
    - Critical ADLs (1 or more of eating, transferring, or bed mobility)
    - Clinical Monitoring
    - Cognitive or Behavioral Risk (any of orientation impairment, mental status impairment, behavioral needs, or self-preservation risk)
    - Institutional Risk (combinations of living alone, homeless, or risk of homelessness with history of falls, vision or hearing impairment, or risk of self-neglect or exploitation)
    - Risk of self-neglect (yes/no)
- Longitudinal outcomes
    - Mortality - date of death from Medicaid enrollment files and/or Minnesota vital statistics
    - Transition between nursing home, waiver, PCA, or other LTSS categories
    - Conversion to Medicaid for nursing home residents not enrolled in Medicaid or for AC participants
    - Months of Medicaid LTSS service use and costs
- Medicaid LTSS service use and payments
    - Service category definitions can be found in the Minnesota DHS Provider Manual

Analysis

March 1 of each year was selected for the comparative cross-sections because a single date offered a snapshot of annual Medicaid enrollment and nursing facility use. March was selected because it is at the very beginning of the COVID-19 pandemic in 2020. Members of Minnesota's LTSS population on March 1, 2020, had not yet been touched by the COVID-19 outbreak in Minnesota, whereas members of the LTSS population in March 2021 had a full 12 months of exposure. The trend analysis relies heavily on visualization through tables and graphs comparing numbers and percentages in each year. Any interruptions in the trend between 2018-2020 and 2021, either upward or downward, is an indication of a COVID-19 effect. We should keep in mind, however, that other factors besides the pandemic could have contributed to the changes between periods.

Findings

Trends in Minnesota's LTSS program participation, demographic characteristics, functional status and other criteria associated NF-LOC criteria, mortality, and other outcomes are described in the following sections of the report. The analysis focuses on the trends in key variables on March 1 in 2018-2020 immediately before the spread of the disease in Minnesota, and March 1, 2021, after a full year of exposure to COVID-19. Findings are reported for nursing facility residents, waiver participants, and users of PCA without a waiver. The characteristics of users of other HCBS without a waiver are not reported because the numbers are too small for reliable estimates.

Use of Service by LTSS Status

The numbers and percentages of nursing home residents, waiver participants, and users of PCA by year are presented in Tables 1-2 and Figures 1-4.

Number of Nursing Facility Residents – As noted for nursing facilities we obtained data for both Medicaid and non-Medicaid NF residents and compared the two. The COVID-19 effect on

health outcomes appeared to be stronger for Medicaid nursing facility residents than for non-Medicaid residents. The overall number of Medicaid residents in NFs showed a downward trend from 2018-2020 and then an accelerated decline during the COVID-19 pandemic between March 2020 and 2021 (Table 1, Figure 1). The decline was greatest for residents with a length of stay greater than 90 days.

The number of non-Medicaid NF residents showed a slower downward trend from 2018-2020 (Table 1, Figure 2) than the Medicaid residents. Between 2020 and 2021 the total number of non-Medicaid residents did not show a similar sharp decline; the decline was in line with the prior year's downward trend. However, non-Medicaid residents with longer stays experienced a decline while the number of residents with shorter stays experienced an increase. Nursing Facilities apparently were admitting more post-acute care residents in response to the COVID-19 pandemic, while overall length of stay shortened.

Number of Medicaid Elderly Waiver, AC, and PCA Participants - After experiencing a steady upward trend from 2018-2020, the number of EW – Residential participants (assisted living facility residents) experienced a decline during the pandemic (Table 1 and Figure 3). However, this decline was less pronounced than among the Medicaid long-stay nursing home residents. After experiencing an increase from 2018-2020, the number of EW – Community participants held steady in 2021 (Table 1, Figure 3). The number of AC participants also held relatively steady during the pandemic, while the number of users of PCA services (without a waiver) declined (Table 1, Figure 4).

Percentage distribution across modalities of care - The use of LTSS by type of care as a percentage of the total LTSS population are presented in Table 2. The percentage of nursing facility residents enrolled in Medicaid dropped during the pandemic, from 23% in March 2020 to 19% in March 2021, while non-Medicaid residents increased slightly from 11% to 12%. Over the same period, the percentage of EW -- Residential participants remained steady at 20%, the EW – Community participants increased from 35% to 38%, Alternative Care participants remained stable at 5%, and users of PCA without a waiver dropped slightly from 5% to 4%.

Table 1. Number of Minnesota LTSS Population by LTSS status

	2018	2019	2020	2021
LTSS Category				
MA NF 0-90 Days	1236	1250	1297	811
MA NF 91+ Days	10787	10574	10158	7901
Non-MA NF 0-90 Days	1415	1342	1368	1545
Non-MA NF 91+ Days	4689	4582	4376	4009
EW – Residential	9390	9618	10046	9390
EW – Community	16317	16996	17565	17589
AC	2508	2442	2595	2510
PCA w/o Waiver	2512	2551	2422	1984
Other HCBS w/o Waiver	1251	860	674	502
Total	50105	50215	50501	46241
Grouped by Major Category				
Medicaid NF Residents	12023	11824	11455	8712
Non-Medicaid NF Residents	6104	5924	5744	5554
EW Residential	9390	9618	10046	9390
EW Community, AC, PCA, Other HCBS	22588	22849	23256	22585

Table 2. Percentage of LTSS Population by LTSS status

	2018	2019	2020	2021
Number	50105	50215	50501	46241
LTSS Category				
MA NF 0-90 Days	2%	2%	3%	2%
MA NF 91+ Days	22%	21%	20%	17%
Non-MA NF 0-90 Days	3%	3%	3%	3%
Non-MA NF 91+ Days	9%	9%	9%	9%
EW – Residential	19%	19%	20%	20%
EW – Community	33%	34%	35%	38%
AC	5%	5%	5%	5%
PCA w/o Waiver	5%	5%	5%	4%
Other HCBS w/o Waiver	2%	2%	1%	1%
Grouped by Major Category				
Medicaid NF Residents	24%	24%	23%	19%
Non-Medicaid NF Residents	12%	12%	11%	12%
EW Residential	19%	19%	20%	20%
EW Community, AC, PCA, Other	45%	46%	46%	49%

Figure 1. Number of Medicaid Nursing Facility Residents by Length of Stay on March 1, 2018-2021
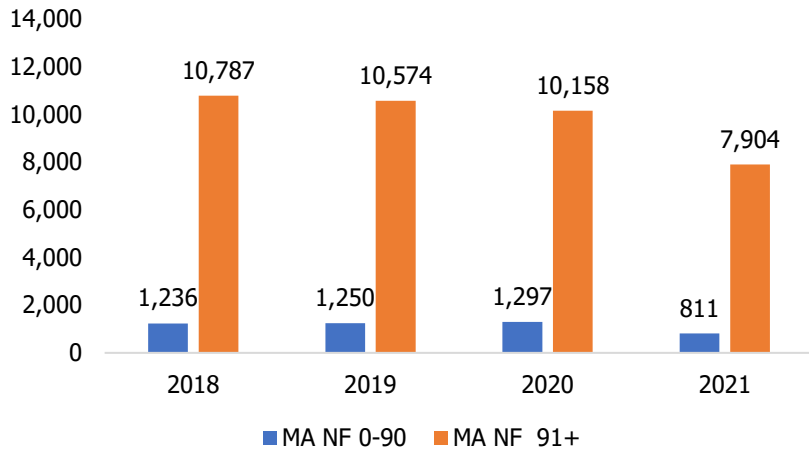
Year	MA NF 0-90	MA NF 91+
2018	1,236	10,787
2019	1,250	10,574
2020	1,297	10,158
2021	811	7,904

Figure 2. Number of Non-Medicaid Nursing Facility Residents by Length of Stay on March 1, 2018-2021

Year	Non-MA NF 0-90	Non-MA NF 91+
2018	1,415	4,689
2019	1,342	4,582
2020	1,368	4,376
2021	1,543	4,014
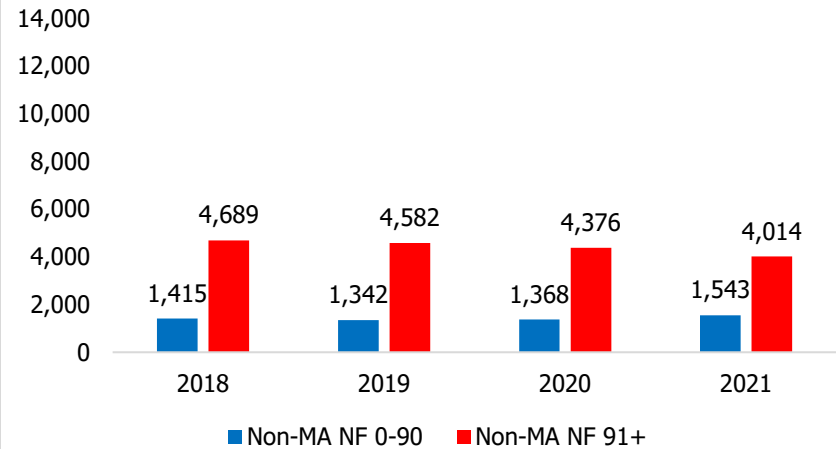
Figure 3. Number of Elderly Waiver Participants on March 1, 2018-2021

Year	EW - Residential	EW - Community
2018	9,390	16,317
2019	9,618	16,996
2020	10,046	17,565
2021	8,873	17,185
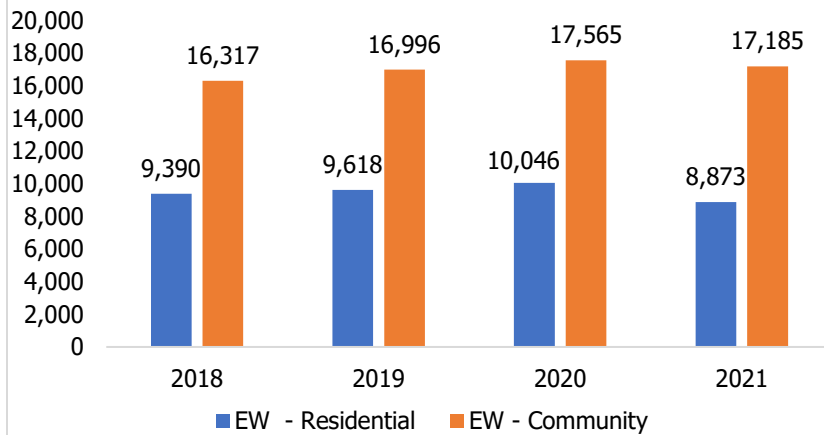
Figure 4. Number of Alternative Care and PCA w/o Waiver Participants on March 1, 2018-2021

Year	AC	PCA w/o Waiver
2018	2,508	2,512
2019	2,442	2,551
2020	2,595	2,422
2021	2,510	2,176

14
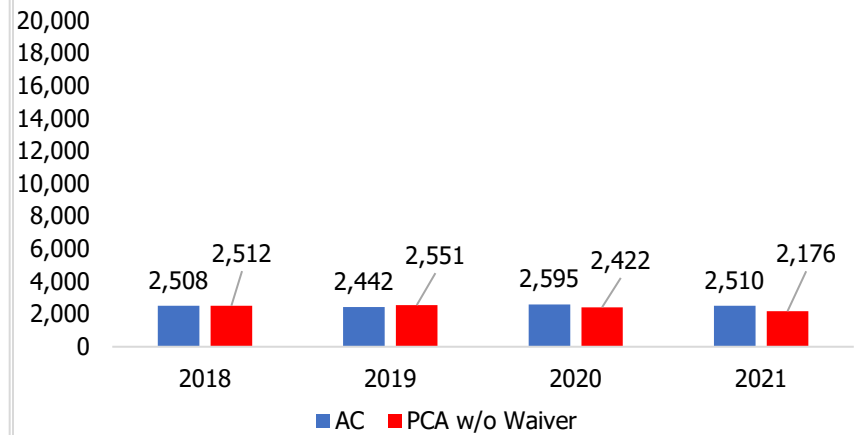
Demographic Characteristics of Nursing Facility Residents

Despite a decline in the use of nursing facilities by residents enrolled in Medicaid, the demographic patterns remained similar between March 2018-2020 and March 2021 (Table 3, Figures 5, 7, 9, 11, 13). Residents were most likely to be age 85 or older, female, widowed, separated or divorced or single never married, white, and residing in nursing facilities in Twin Cities metro area.

Similar demographic patterns held for residents not enrolled in Medicaid (Table 3, Figures 6, 8, 10, 12, 14). The percentage age 85 and older declined and percentage age 65-74 increased over time; otherwise, there were no discernable changes in demographic characteristics over time. Like their Medicaid-enrolled counterparts, residents not enrolled in Medicaid were most likely to be age 85 or older, female, widowed, white, and residing in nursing facilities in Twin Cities metro area.

Table 3. Demographics of Nursing Facility Residents

	2018	2019	2020	2021
Medicaid Residents				
Number of Residents	12023	11824	11455	8715
Age				
65-74	18%	19%	21%	22%
75-84	28%	29%	30%	30%
85+	53%	51%	49%	48%
Gender				
Female	70%	69%	68%	69%
Male	30%	31%	32%	31%
Marital Status				
Married	7%	8%	8%	8%
Widowed	48%	47%	45%	43%
Divorced Separated Single	44%	45%	46%	48%
Race and Ethnicity				
Asian	1%	1%	1%	1%
Black/African American	4%	4%	4%	4%
Hispanic	1%	1%	1%	1%
Native American	1%	1%	1%	1%
Multiple Race	0%	0%	0%	0%
White (non-Hispanic)	93%	93%	93%	92%
Other Race/Ethnicity	7%	7%	7%	8%
County Location				
Twin Cities	53%	53%	54%	53%
Other Metro	6%	6%	6%	6%
Outlying a Metro Area	6%	6%	6%	6%
Rural	35%	34%	34%	34%

	2018	2019	2020	2021
Non-Medicaid Residents				
Number of Residents	6104	5924	5744	5557
Age				
65-74	10%	11%	11%	14%
75-84	24%	24%	25%	27%
85+	66%	65%	64%	60%
Gender				
Female	62%	61%	59%	60%
Male	38%	39%	41%	40%
Marital Status				
Married	31%	33%	33%	33%
Widowed	54%	52%	51%	48%
Divorced Separated Single	15%	15%	16%	19%
Race and Ethnicity				
Asian	0%	0%	0%	0%
Black/African American	1%	1%	1%	1%
Hispanic	0%	0%	0%	0%
Native American	0%	0%	0%	0%
Multiple Race	0%	0%	0%	0%
White (non-Hispanic)	99%	98%	98%	98%
Other Race/Ethnicity	1%	2%	2%	2%
County Location				
Twin Cities	51%	50%	50%	51%
Other Metro	9%	9%	9%	8%
Outlying a Metro Area	6%	6%	7%	7%
Rural	34%	34%	34%	35%

Figure 5. Age of Medicaid Nursing Facility Residents on March 1, 2018-2021

Year	65-74	75-84	85+
2018	18%	28%	53%
2019	19%	29%	51%
2020	21%	30%	49%
2021	22%	30%	48%
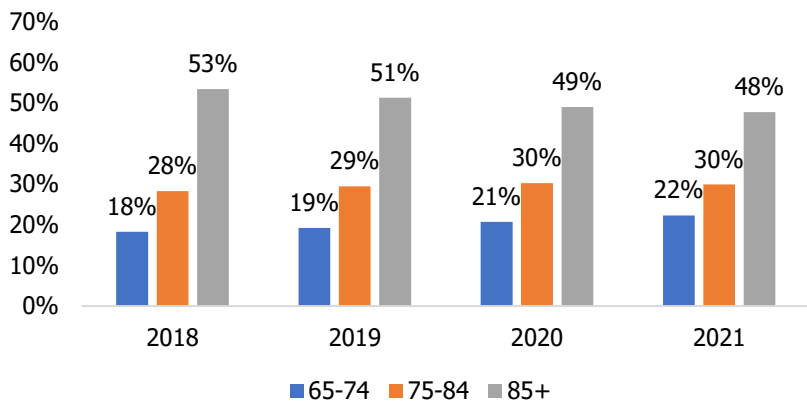
Figure 6. Age of Non-Medicaid Nursing Facility Residents on March 1, 2018-2021

Year	65-74	75-84	85+
2018	10%	24%	66%
2019	11%	24%	65%
2020	11%	25%	64%
2021	14%	27%	60%
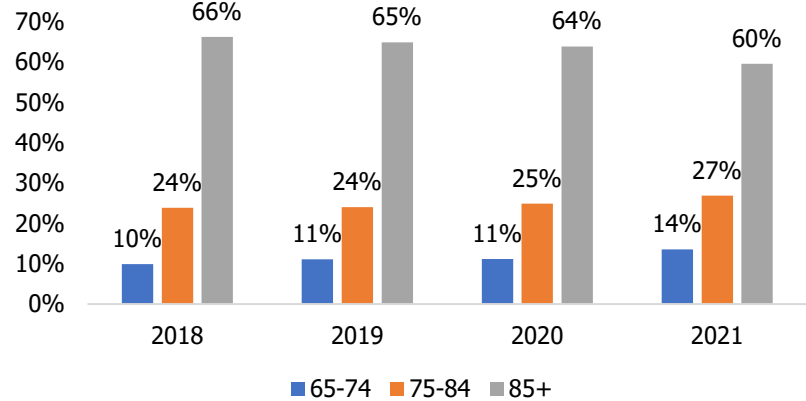
Figure 7. Gender of Medicaid Nursing Facility Residents on March 1, 2018-2021

Year	Female	Male
2018	70%	30%
2019	69%	31%
2020	68%	32%
2021	69%	31%
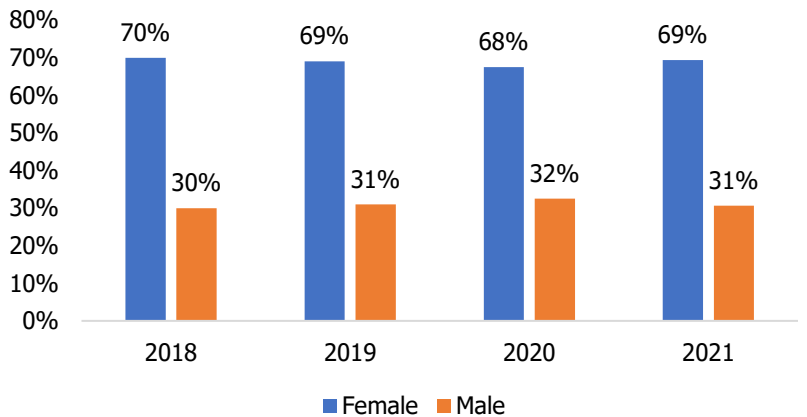
Figure 8. Gender of Non-Medicaid Nursing Facility Residents on March 1, 2018-2021

Year	Female	Male
2018	62%	38%
2019	61%	39%
2020	59%	41%
2021	60%	40%
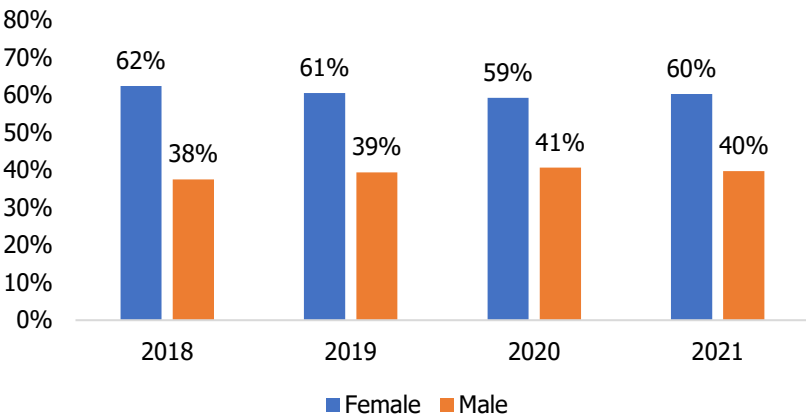
Figure 9. Marital Status of Medicaid Nursing Facility Residents on March 1, 2018-2021

Year	Married	Widowed	Divorced Separated Single
2018	7%	48%	44%
2019	8%	47%	45%
2020	8%	45%	46%
2021	8%	43%	48%
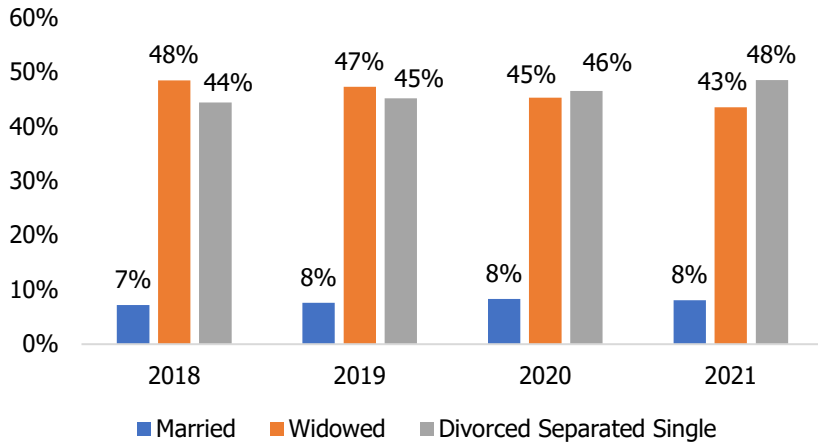
Figure 10. Marital Status of Non-Medicaid Nursing Facility Residents on March 1, 2018-2021

Year	Married	Widowed	Divorced Separated Single
2018	31%	54%	15%
2019	33%	52%	15%
2020	33%	51%	16%
2021	33%	48%	19%
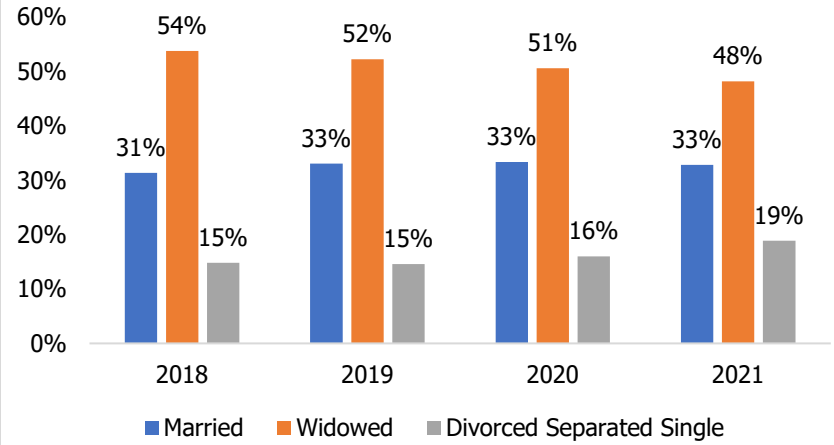
Figure 11. Race/Ethnicity of Medicaid Nursing Facility Residents on March 1, 2018-2021

Year	White (non-Hispanic)	Other Race/Ethnicity
2018	93%	7%
2019	93%	7%
2020	93%	7%
2021	92%	8%
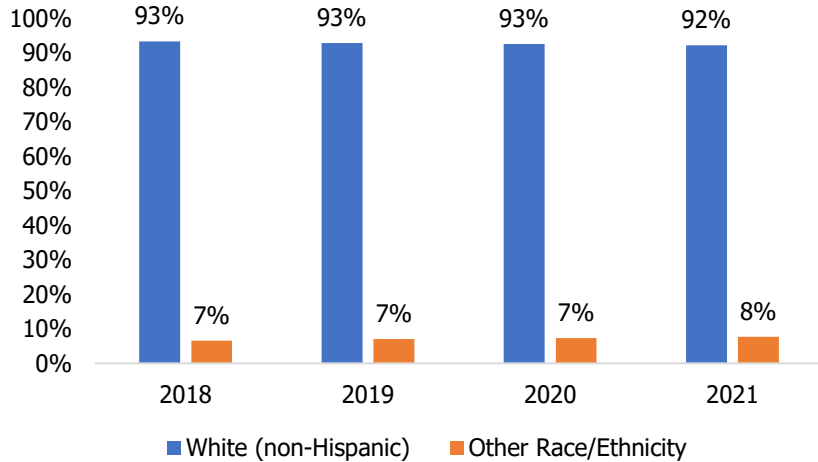
Figure 12. Race/Ethnicity of Non-Medicaid Nursing Facility Residents on March 1, 2018-2021

Year	White (non-Hispanic)	Other Race/Ethnicity
2018	99%	1%
2019	98%	2%
2020	98%	2%
2021	98%	2%

18
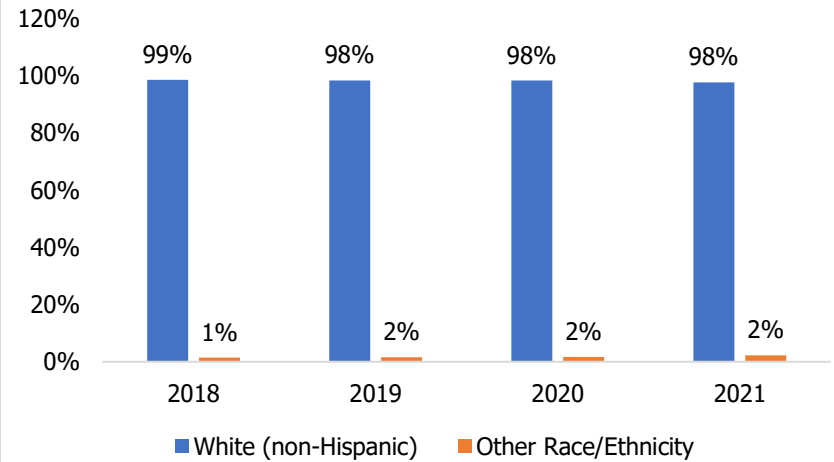
Figure 13. Residential County of Medicaid Nursing Facility Residents on March 1, 2018-2021

	Twin Cities	Other Metro	Outlying a Metro Area	Rural
2018	53%	6%	6%	35%
2019	53%	6%	6%	34%
2020	54%	6%	6%	34%
2021	53%	6%	6%	34%
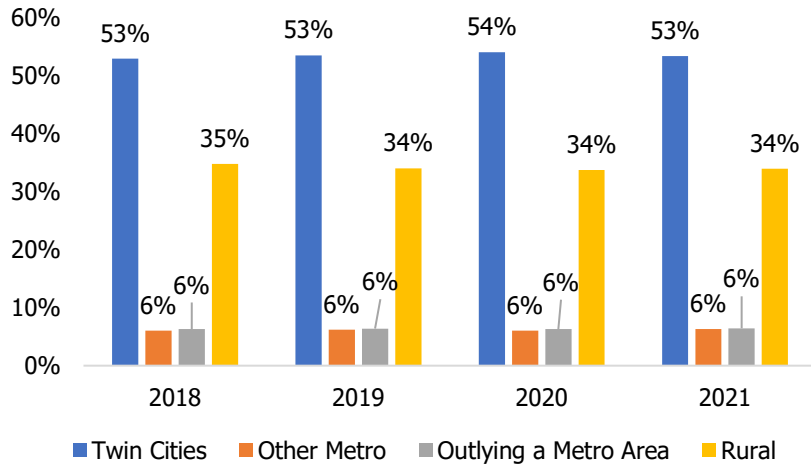
Figure 14. Residential County of Non-Medicaid Nursing Facility Residents on March 1, 2018-2021

	Twin Cities	Other Metro	Outlying a Metro Area	Rural
2018	51%	9%	6%	34%
2019	50%	9%	6%	34%
2020	50%	9%	7%	34%
2021	51%	8%	7%	35%
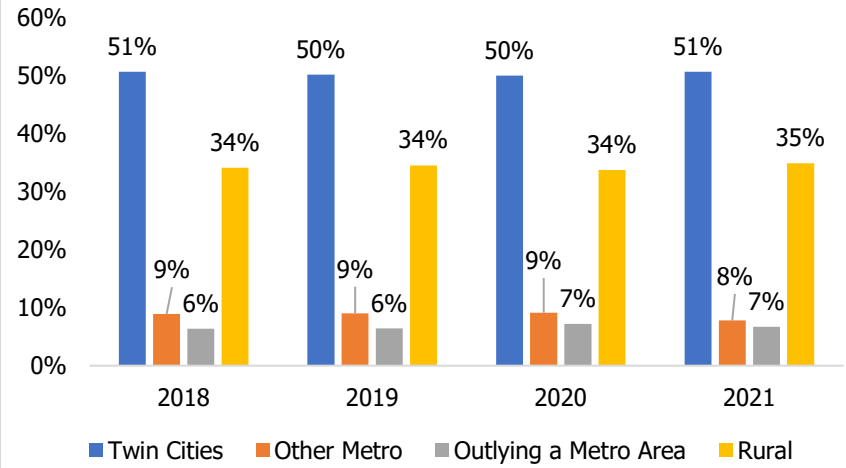
Admission Source and Functional Characteristics of Nursing Facility Residents

The sources of admission and functional characteristics of nursing facility residents, both Medicaid and Non-Medicaid, remained remarkably similar between March 2018-2020 and March 2021 (Table 4). The majority of residents continued to be admitted from acute care hospitals (Figures 15-16); and they were most likely to be cognitively intact or moderately cognitively impaired (Figures 17-18); highly dependent in activities of daily living (ADLs) (Figures 19-22), and experiencing frequent bowel or bladder incontinence (Figures 23-24). About one in five residents was experiencing frequent behavioral problems (Figures 23-24).

Table 4. Admission Source and Functional Characteristics of Nursing Facility Residents

	2018	2019	2020	2021
Medicaid Residents				
Prior NF use before current admission	20%	21%	22%	20%
Admitted from				
Acute care	57%	59%	59%	58%
NF transfer	23%	22%	21%	21%
Directly from the community	16%	17%	17%	18%
Rehabilitation or MH facility	3%	3%	3%	3%
Cognitive Status				
Intact	48%	49%	52%	51%
Mild impairment	1%	1%	1%	1%
Moderate impairment	40%	41%	39%	39%
Severe impairment	10%	9%	9%	9%
ADL Dependency				
Eating	22%	22%	20%	21%
Transferring	81%	82%	81%	82%
Bed mobility	82%	83%	82%	83%
Toileting	88%	88%	88%	88%
Mean ADL dependencies	2.74	2.75	2.72	2.75
Daily behavioral problems	22%	20%	19%	18%
Bladder or bowel incontinence	68%	68%	68%	70%

	2018	2019	2020	2021
Non-Medicaid Residents				
Prior NF use before current admission	28%	28%	28%	29%
Admitted from				
Acute care	61%	61%	60%	63%
NF transfer	23%	24%	24%	22%
Directly from the community	13%	14%	14%	14%
Rehabilitation or MH facility	2%	2%	2%	2%
Cognitive Status				
Intact	48%	49%	50%	51%
Mild impairment	1%	1%	1%	1%
Moderate impairment	41%	41%	40%	40%
Severe impairment	10%	9%	9%	9%
ADL Dependency				
Eating	24%	23%	21%	21%
Transferring	88%	89%	89%	88%
Bed mobility	88%	89%	89%	89%
Toileting	93%	94%	94%	93%
Mean ADL dependencies	2.94	2.95	2.93	2.91
Daily behavioral problems	19%	19%	19%	17%
Frequent bladder or bowel incontinence	67%	66%	66%	68%

Figure 15. Admission Source of Medicaid Nursing Facility Residents on March 1, 2018-2021
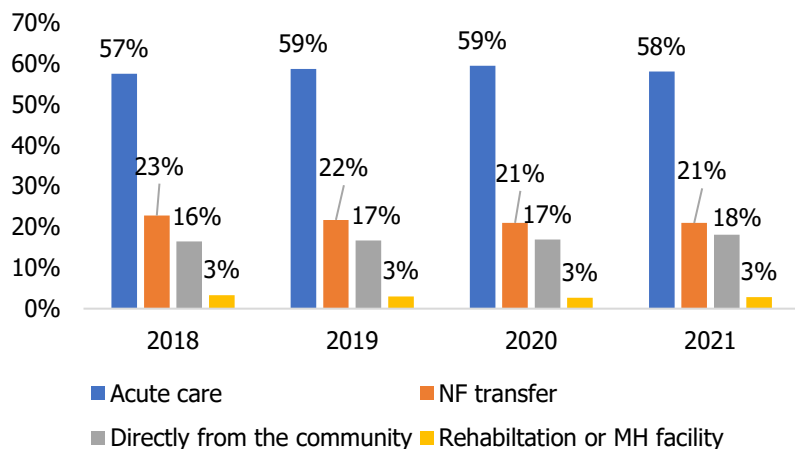
Figure 16. Admission Source of Non-Medicaid Nursing Facility Residents on March 1, 2018-2021
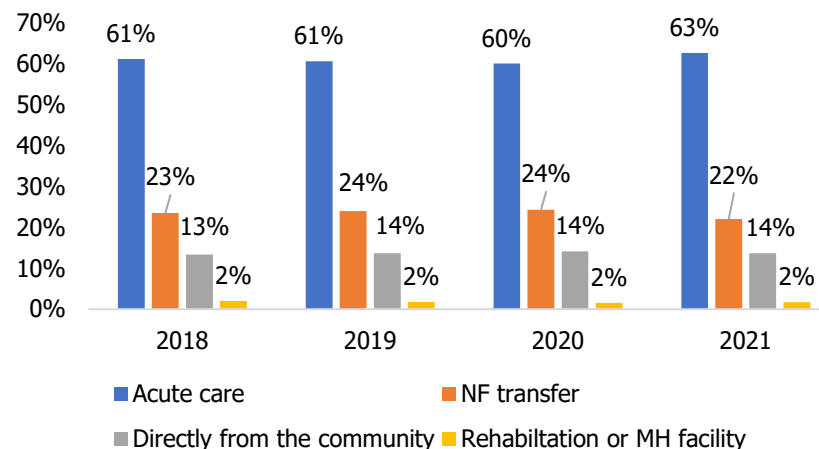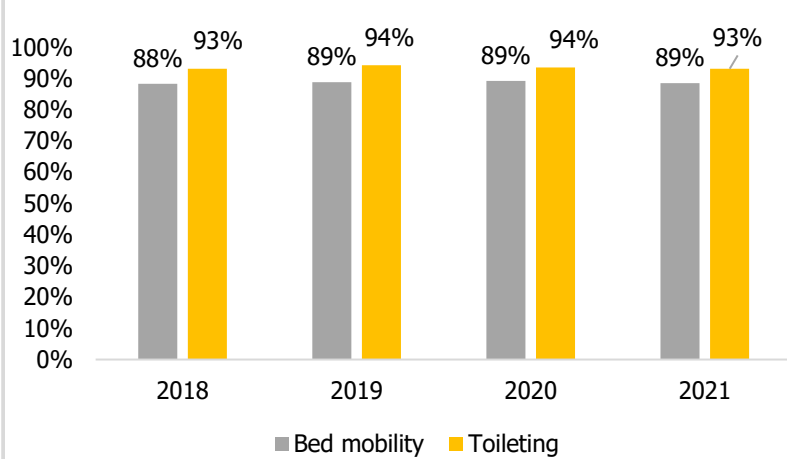

Figure 17. Cognitive Status of Medicaid Nursing Facility Residents on March 1, 2018-2021
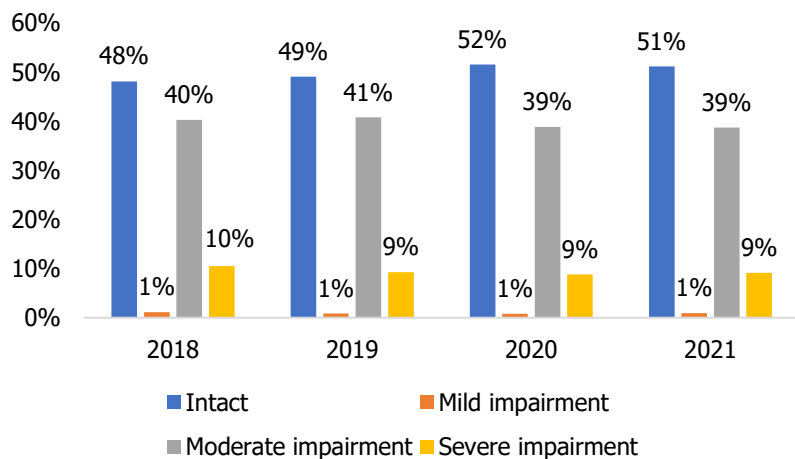
Figure 18. Cognitive Status of Non-Medicaid Nursing Facility Residents on March 1, 2018-2021
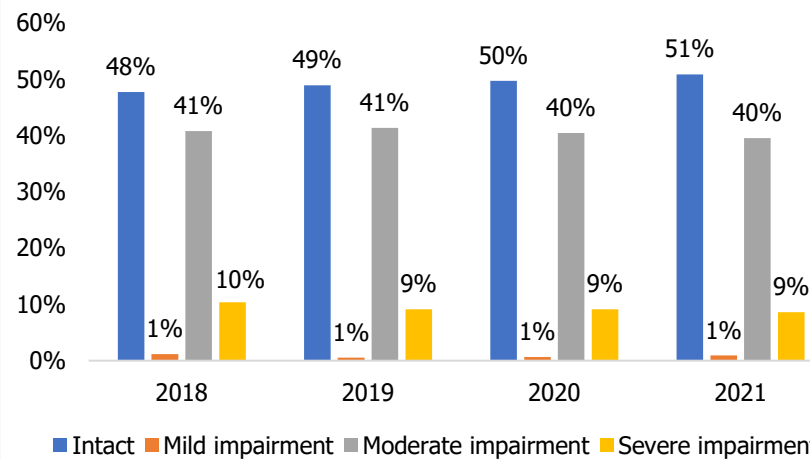
Figure 19. ADL Dependencies of Medicaid Nursing Facility Residents on March 1, 2018-2021

	2018	2019	2020	2021
Eating	22%	22%	20%	21%
Transferring	81%	82%	81%	82%
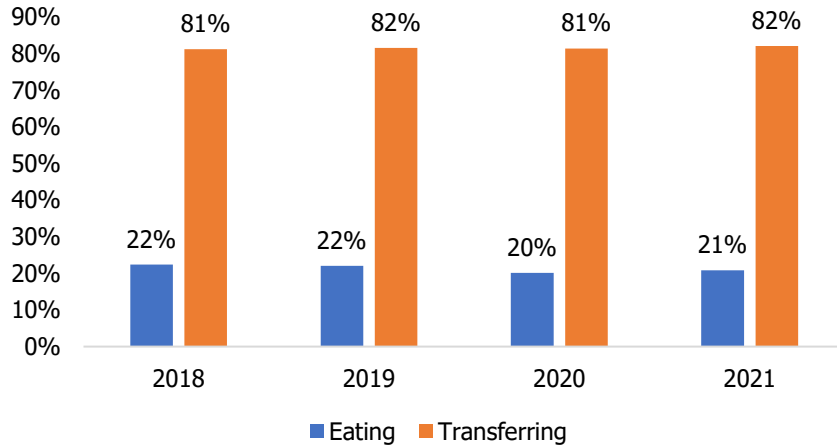
Figure 20. ADL Dependencies of Non-Medicaid Nursing Facility Residents on March 1, 2018-2021

	2018	2019	2020	2021
Eating	22%	22%	20%	21%
Transferring	81%	82%	81%	82%
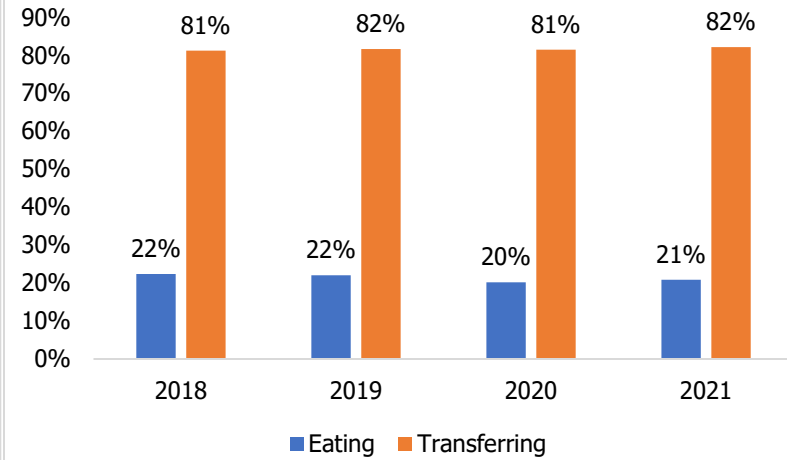
Figure 21. ADL Dependencies of Medicaid Nursing Facility Residents on March 1, 2018-2021

	2018	2019	2020	2021
Bed mobility	82%	83%	82%	83%
Toileting	88%	88%	88%	88%
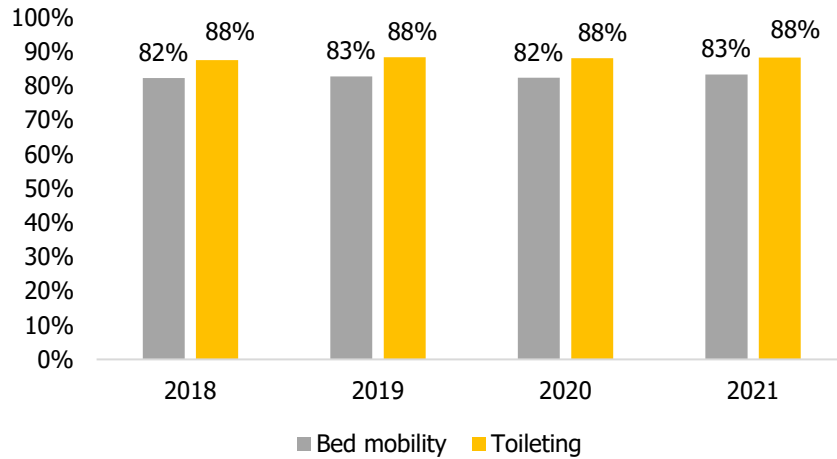
Figure 22. ADL Dependencies of Non-Medicaid Nursing Facility Residents on March 1, 2018-2021

	2018	2019	2020	2021
Bed mobility	88%	89%	89%	89%
Toileting	93%	94%	94%	93%

Figure 23. Behavioral Problems and Incontinence of Medicaid Nursing Facility Residents, March 1, 2018-2021
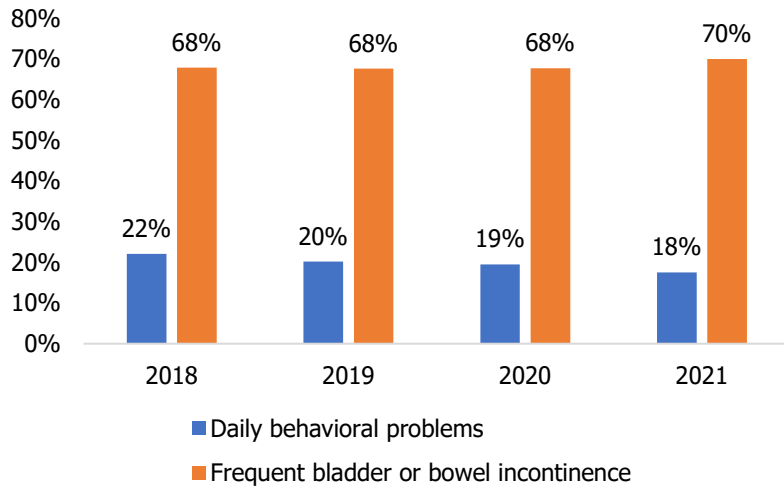
Figure 24. Behavioral Problems and Incontinence of Non-Medicaid Nursing Facility Residents, March 1, 2018-2021
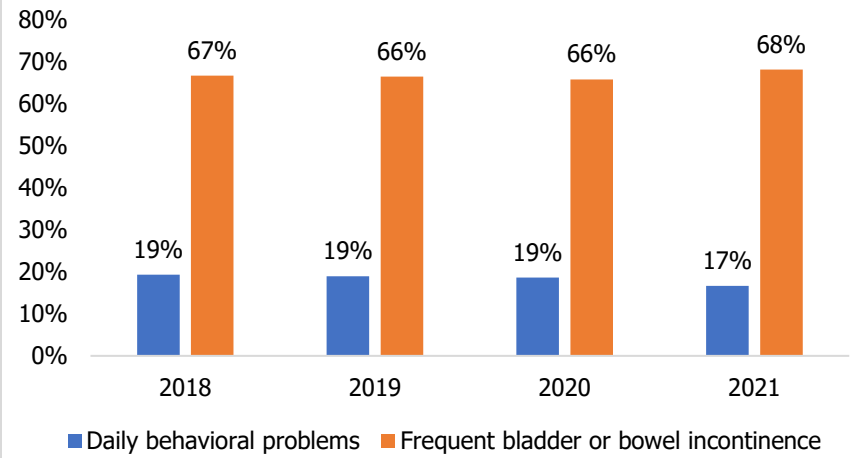
Demographic Characteristics of Elderly Waiver, Alternative Care and PCA (without a Waiver) Participants

For those enrolled in EW, AC, and PCA (without a Waiver), the demographic patterns remained similar between March 2018-2020 and March 2021 (Table 5, Figures 25-44). EW- Residential participants were most likely to be age 85 or older, female, widowed or separated or divorced or single never married, White, and residing in the Twin Cities metro area. EW- Community participants were most likely to be age 65-84, female, divorced or separated or single never married, White, and residing in the Twin Cities metro area. AC participants were spread fairly evenly across age groups and were most likely to be female, widowed or separated or divorced or single never married, White, and residing in the Twin Cities metro area. Participants in PCA without a Waiver were most likely to be age 65-74, female, divorced or separated or single never married, Asian, and living in the Twin Cities metro area.

Table 5. Demographic Characteristics of Elderly Waiver, Alternative Care, and PCA Users

	2018	2019	2020	2021
Elderly Waiver - Residential				
Number of Participants	9389	9618	10046	9390
Age				
65-74	16%	17%	18%	20%
75-84	33%	33%	33%	34%
85+	51%	50%	48%	46%
Gender				
Female	75%	75%	74%	72%
Male	25%	25%	26%	28%
Marital Status				
Married	5%	4%	5%	6%
Widowed	50%	50%	48%	45%
Divorced Separated Single	45%	46%	47%	49%
Race and Ethnicity				
Asian	2%	2%	2%	2%
Black/African American	2%	3%	3%	3%
Hispanic	1%	1%	1%	1%
Native American	1%	1%	1%	1%
Multiple Race	0%	0%	0%	0%
White (non-Hispanic)	94%	94%	93%	93%
County Location				
Twin Cities	55%	56%	56%	56%
Other Metro	9%	9%	9%	9%
Outlying a Metro Area	6%	6%	6%	6%
Rural	30%	29%	29%	28%
Elderly Waiver Community				
Number of Participants	16317	16996	17565	17589
Age				
65-74	40%	41%	41%	40%
75-84	40%	40%	40%	40%
85+	20%	19%	19%	20%

	2018	2019	2020	2021
Gender				
Female	70%	69%	69%	69%
Male	30%	31%	31%	31%
Marital Status				
Married	15%	13%	14%	15%
Widowed	31%	32%	30%	29%
Divorced Separated Single	54%	55%	56%	56%
Race and Ethnicity				
Asian	20%	20%	21%	21%
Black/African American	24%	24%	26%	27%
Hispanic	3%	3%	3%	3%
Native American	2%	2%	2%	2%
Multiple Race	0%	0%	0%	0%
White (non-Hispanic)	51%	50%	48%	47%
County Location				
Twin Cities	73%	74%	75%	76%
Other Metro	5%	5%	4%	4%
Outlying a Metro Area	4%	3%	3%	3%
Rural	19%	18%	17%	17%
<u>Alternative Care Waiver</u>				
Number of Participants	2508	2442	2595	2510
Age				
65-74	26%	27%	30%	29%
75-84	37%	38%	38%	41%
85+	36%	34%	32%	30%
Gender				
Female	73%	73%	72%	72%
Male	27%	27%	28%	28%
Marital Status				
Married	12%	11%	12%	12%
Widowed	45%	44%	41%	37%
Divorced Separated Single	43%	45%	47%	50%
Race and Ethnicity				
Asian	1%	1%	1%	1%
Black/African American	6%	7%	7%	8%
Hispanic	1%	1%	1%	1%
Native American	1%	1%	1%	1%
Multiple Race	0%	0%	0%	0%
White (non-Hispanic)	91%	90%	90%	88%
County Location				
Twin Cities	68%	70%	72%	74%
Other Metro	5%	5%	4%	4%
Outlying a Metro Area	6%	6%	6%	6%
Rural	21%	20%	18%	17%

	2018	2019	2020	2021
PCA (without a Waiver)				
Number of Participants	2512	2551	2422	1984
Age				
65-74	53%	54%	55%	54%
75-84	32%	30%	29%	30%
85+	16%	15%	15%	16%
Gender				
Female	65%	64%	64%	65%
Male	35%	36%	36%	35%
Marital Status				
Married	20%	19%	21%	24%
Widowed	34%	35%	32%	32%
Divorced Separated Single	45%	46%	47%	45%
Race and Ethnicity				
Asian	49%	47%	48%	51%
Black/African American	28%	29%	28%	26%
Hispanic	2%	2%	2%	2%
Native American	5%	5%	5%	5%
Multiple Race	0%	1%	0%	1%
White (non-Hispanic)	16%	16%	17%	15%
County Location				
Twin Cities	82%	80%	79%	76%
Other Metro	6%	6%	7%	8%
Outlying a Metro Area	1%	1%	1%	1%
Rural	11%	13%	14%	14%

Figure 25. Age of EW-Residential Participants on March 1, 2018-2021
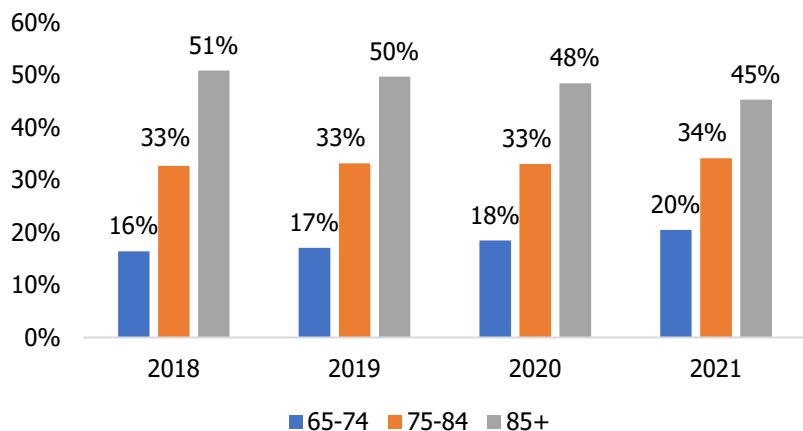
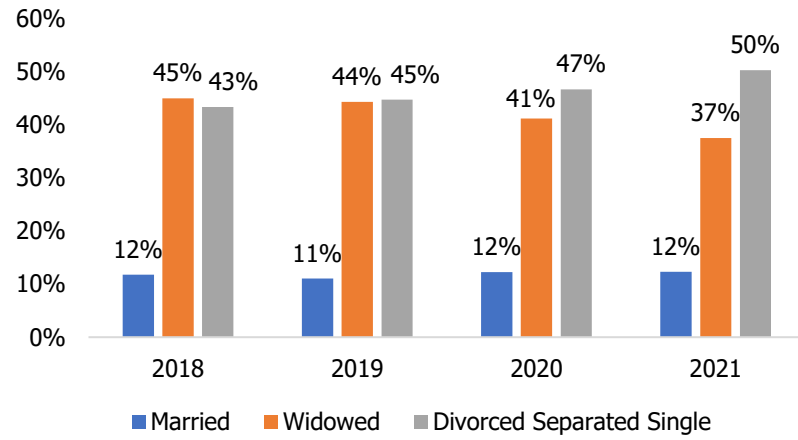Figure 26. Age of Alternative Care Participants on March 1, 2018-2021
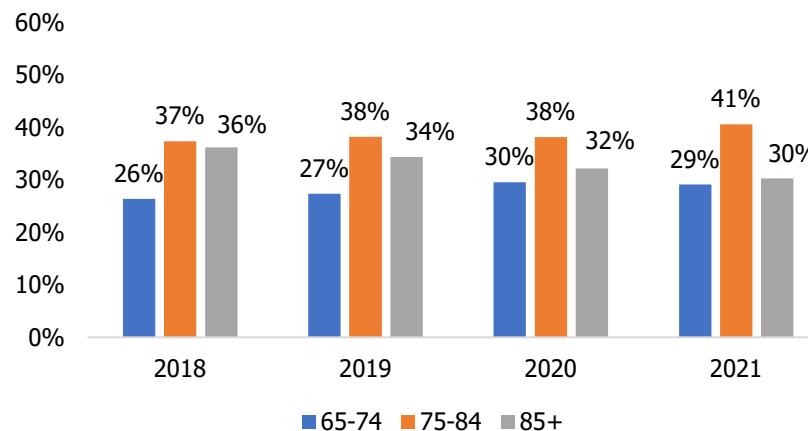
Figure 27. Age of EW-Community Participants on March 1, 2018-2021
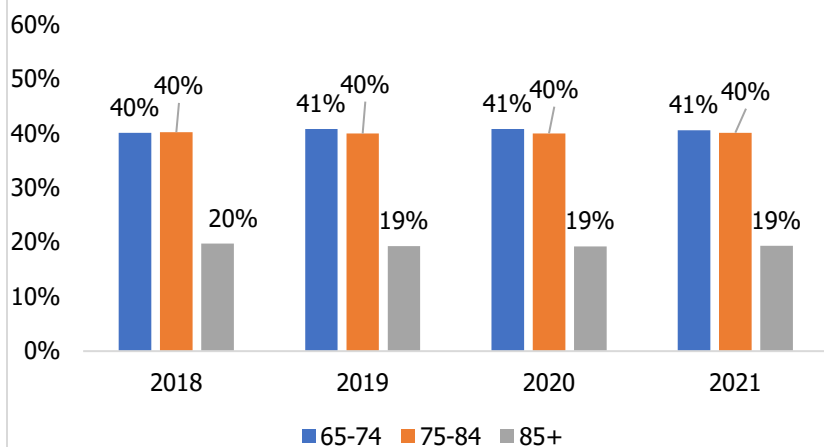
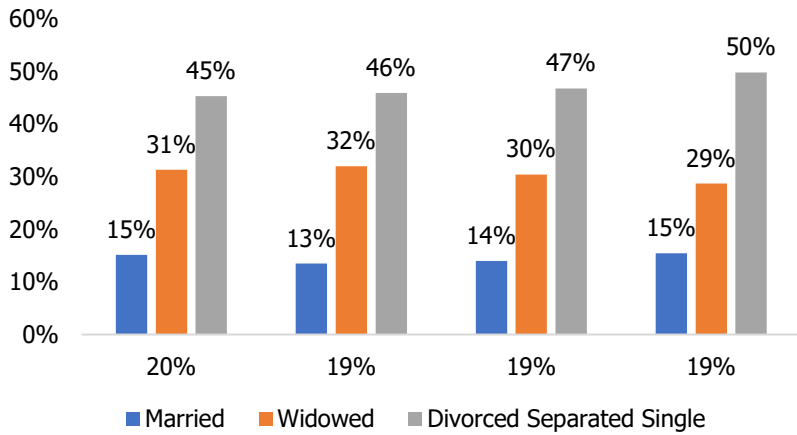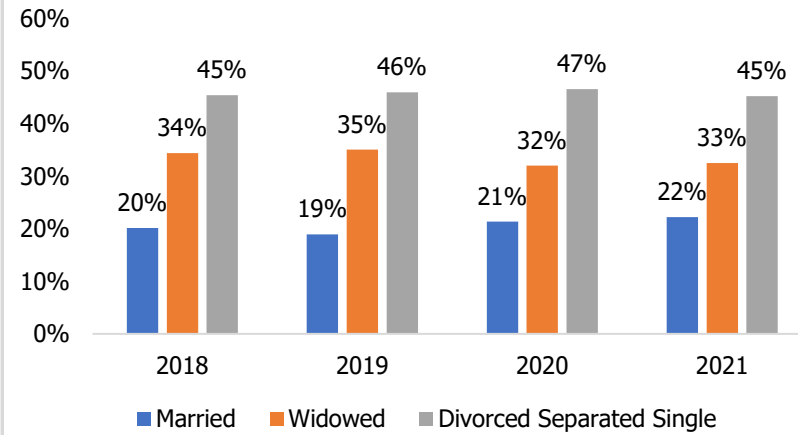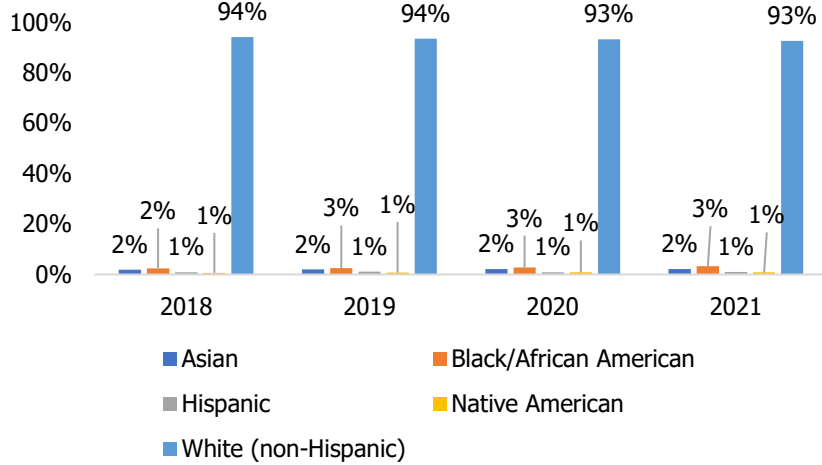Figure 28. Age of PCA w/o Waiver Participants on March 1, 2018-2021
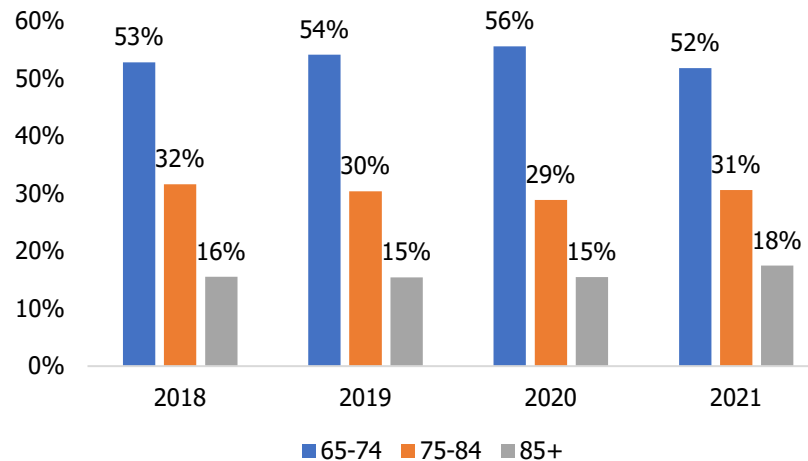
Figure 29. Gender of EW-Residential Participants on March 1, 2018-2021
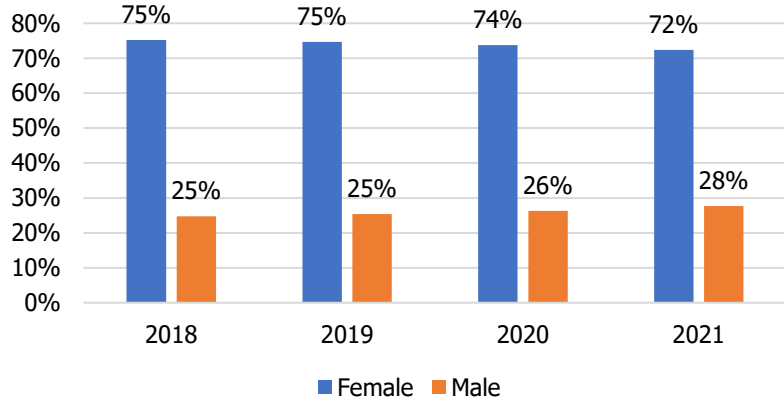
Figure 30. Gender of Alternative Care Participants on March 1, 2018-2021
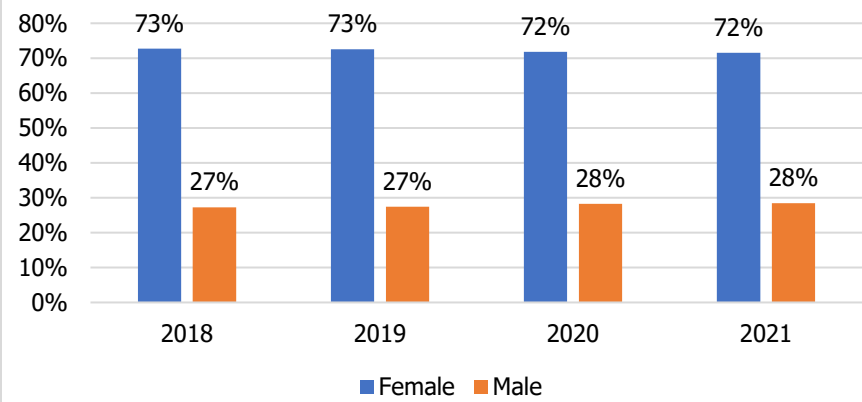
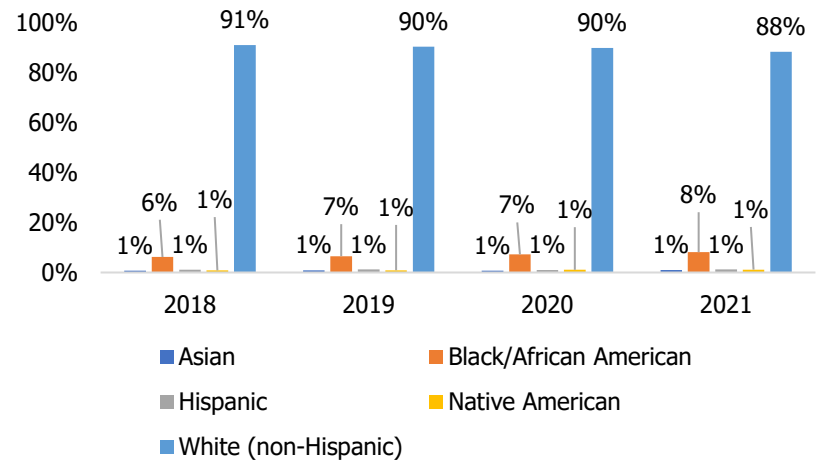Figure 31. Gender of EW-Community Participants on March 1, 2018-2021
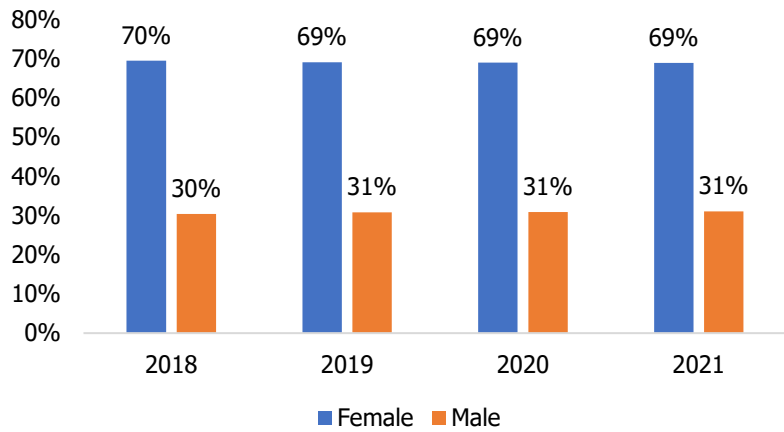
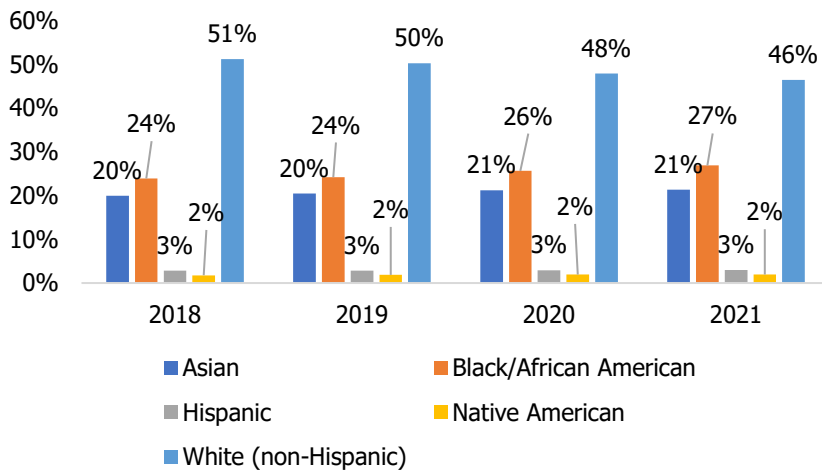Figure 32. Gender of PCA w/o Waiver Participants on March 1, 2018-2021
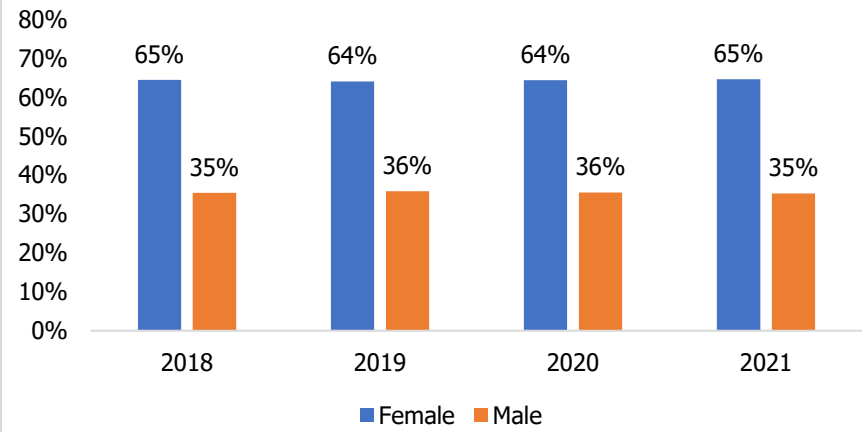
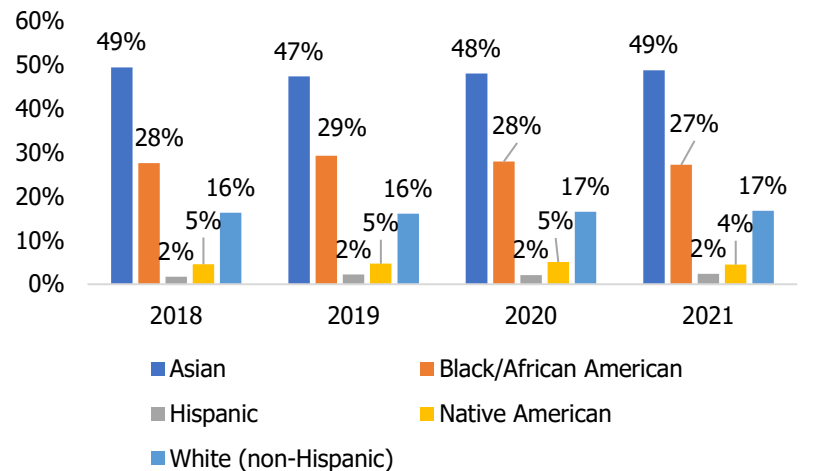**Figure 33. Marital Status of EW-Residential Participants on March 1, 2018-2021**

Year	Married	Widowed	Divorced Separated Single
2018	5%	50%	45%
2019	4%	50%	46%
2020	5%	48%	47%
2021	6%	44%	50%

■ Married ■ Widowed ■ Divorced Separated Single
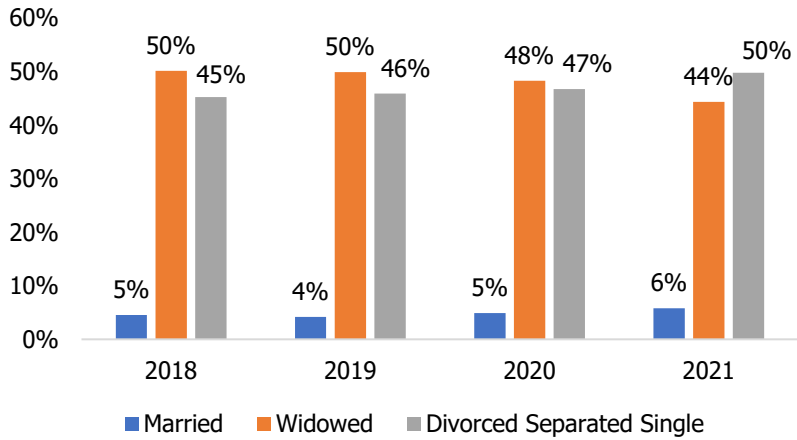
Figure 34. Marital Status of Alternative Care Participants on March 1, 2018-2021

Year	Married	Widowed	Divorced Separated Single
2018	12%	45%	43%
2019	11%	44%	45%
2020	12%	41%	47%
2021	12%	37%	50%

■ Married ■ Widowed ■ Divorced Separated Single

Figure 35 Marital Status of EW-Community Participants on March 1, 2018-2021

Year	Married	Widowed	Divorced Separated Single
20%	15%	31%	45%
19%	13%	32%	46%
19%	14%	30%	47%
19%	15%	29%	50%

■ Married ■ Widowed ■ Divorced Separated Single

Figure 36. Marital Status of PCA w/o Waiver Participants on March 1, 2018-2021

Year	Married	Widowed	Divorced Separated Single
2018	20%	34%	45%
2019	19%	35%	46%
2020	21%	32%	47%
2021	22%	33%	45%

■ Married ■ Widowed ■ Divorced Separated Single

Figure 37. Race/Ethnicity of EW-Residential Participants on March 1, 2018-2021

	2018	2019	2020	2021
Asian	2%	2%	2%	2%
Black/African American	2%	3%	3%	3%
Hispanic	1%	1%	1%	1%
Native American	1%	1%	1%	1%
White (non-Hispanic)	94%	94%	93%	93%

Figure 38. Race/Ethnicity of Alternative Care Participants on March 1, 2018-2021

	2018	2019	2020	2021
Asian	1%	1%	1%	1%
Black/African American	6%	7%	7%	8%
Hispanic	1%	1%	1%	1%
Native American	1%	1%	1%	1%
White (non-Hispanic)	91%	90%	90%	88%

Figure 39. Race/Ethnicity of EW-Community Participants on March 1, 2018-2021

	2018	2019	2020	2021
Asian	20%	20%	21%	21%
Black/African American	24%	24%	26%	27%
Hispanic	3%	3%	3%	3%
Native American	2%	2%	2%	2%
White (non-Hispanic)	51%	50%	48%	46%

Figure 40. Race/Ethnicity of PCA w/o Waiver Participants on March 1, 2018-2021

	2018	2019	2020	2021
Asian	49%	47%	48%	49%
Black/African American	28%	29%	28%	27%
Hispanic	2%	2%	2%	2%
Native American	5%	5%	5%	4%
White (non-Hispanic)	16%	16%	17%	17%

Figure 41. County Location of EW-Residential Participants on March 1, 2018-2021
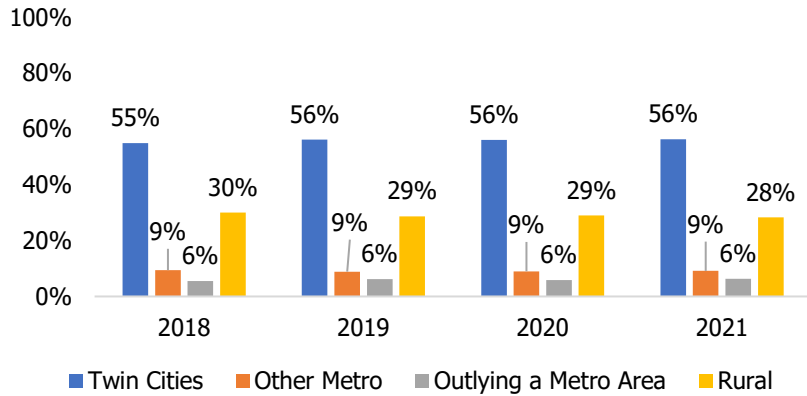
Figure 42. County Location of Alternative Care Participants on March 1, 2018-2021
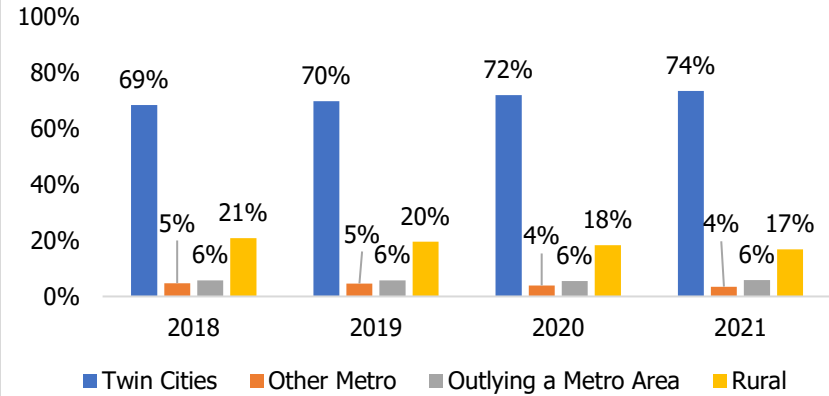
Figure 43. County Location of EW-Community Participants on March 1, 2018-2021
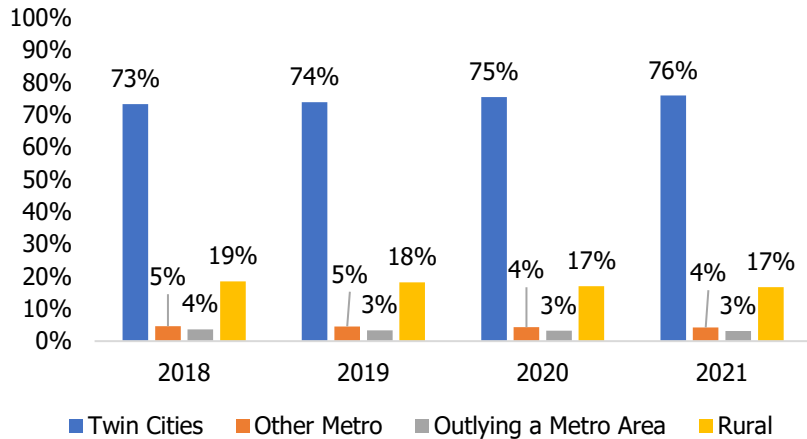
Figure 44. County Location of PCA w/o a Waiver Participants on March 1, 2018-2021
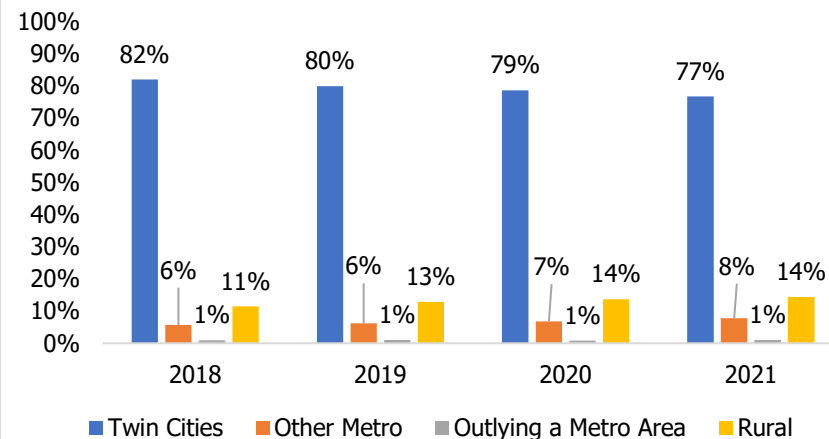
Level of Care (NF-LOC) Criteria for Waiver and other HCBS Participants

Table 6 shows the functional and other characteristics that are considered when determining NF-LOC for Elderly Waiver or Alternative Care participation. Some people who meet NF-LOC may elect to receive PCA other HCBS services without a waiver.

Elderly Waiver – The decline in EW – Residential participation between March 2020 and 2021 was accompanied by lower percentages of participants with 4 or more ADL dependencies (42% to 36%) and with critical ADLs (49% to 43%), and in the average number of criteria met (3.29 to 2.76) (Figure 45). Otherwise, the percentages meeting NF-LOC remained about the same. The percentages meeting NF-LOC criteria among the EW – Community participants remained similar between March 2020 and 2021 (Figure 46). Compared to EW – Community participants, EW – Residential participants were more likely to have Cognitive or Behavioral Risk (92% vs. 69%) and risk of Abuse or Neglect (62% vs. 54%), and less likely to face Institutional Risk (46% vs. 58%) at both time points.

Alternative Care Waiver – All of the percentages meeting NF-LOC among Alternative Care participants remained similar between March 2020 and 2021 (Figure 47). The criteria with the highest percentages in 2021 were Cognitive or Behavioral Risk (85%), Institutional Risk (66%), and Abuse or Neglect (49%). Compared to the Elderly Waiver participants, lower percentages of Alternative Care participants had 4+ ADL dependencies (23%) or Critical ADL dependencies (35%).

PCA without a Waiver – Although the number of people who met NF-LOC yet participated in PCA without a waiver declined between March 2020 and 2021, the percentages meeting NF-LOC criteria changed very little (Figure 48). In comparison to waiver participants at both time points, they had the highest percentage with 4+ ADL dependencies (82%) and Critical ADL dependencies (85%), while their Institutional Risk was the lowest (20%). They also met the highest average number of criteria (3.64).

Table 6. Nursing Facility Level of Care Criteria among Elderly Waiver, Alternative Care, and PCA Users

	2018	2019	2020	2021
Elderly Waiver - Residential				
Number of Participants	9389	9618	10046	9390
4+ ADLs	43%	42%	42%	36%
Critical ADLs	52%	50%	49%	43%
Clinical Monitoring	17%	17%	17%	16%
Cognitive or Behavioral Risk	94%	94%	94%	93%
Institutional Risk	40%	39%	45%	46%
Neglect or Abuse	58%	61%	63%	62%
Number of criteria met	3.26	3.25	3.29	2.76
Elderly Waiver - Community				
Number of Participants	16317	16996	17565	17589
4+ ADLs	35%	37%	38%	38%
Critical ADLs	40%	41%	42%	41%
Clinical Monitoring	5%	5%	5%	5%
Cognitive or Behavioral Risk	69%	70%	70%	69%
Institutional Risk	58%	59%	59%	58%
Neglect or Abuse	49%	52%	54%	54%
Number of criteria met	2.61	2.67	2.71	2.53
Alternative Care Waiver				
Number of Participants	2508	2442	2595	2510
4+ ADLs	24%	24%	24%	23%
Critical ADLs	36%	36%	36%	35%
Clinical Monitoring	14%	13%	14%	14%
Cognitive or Behavioral Risk	83%	85%	85%	85%
Institutional Risk	66%	68%	67%	66%
Neglect or Abuse	47%	51%	51%	49%
Number of criteria met	2.83	2.91	2.95	2.44
Personal Care Assistant w/o a Waiver				
Number of Participants	2512	2551	2422	1984
4+ ADLs	76%	81%	81%	82%
Critical ADLs	79%	85%	85%	85%
Clinical Monitoring	6%	6%	6%	5%
Cognitive or Behavioral Risk	79%	83%	82%	82%
Institutional Risk	19%	22%	22%	20%
Neglect or Abuse	35%	40%	43%	42%
Number of criteria met	3.44	3.66	3.66	3.64

Figure 45. Elderly Waiver - Residential Participants by NF-LOC Criteria on March 1, 2018-2021

	4+ ADLs	Critical ADLs	Clinical Monitoring	Cognitive or Behavioral Risk	Institutional Risk	Neglect or Abuse
2018	43%	52%	17%	94%	40%	58%
2019	42%	50%	17%	94%	39%	61%
2020	42%	49%	17%	94%	45%	63%
2021	35%	42%	16%	92%	46%	62%
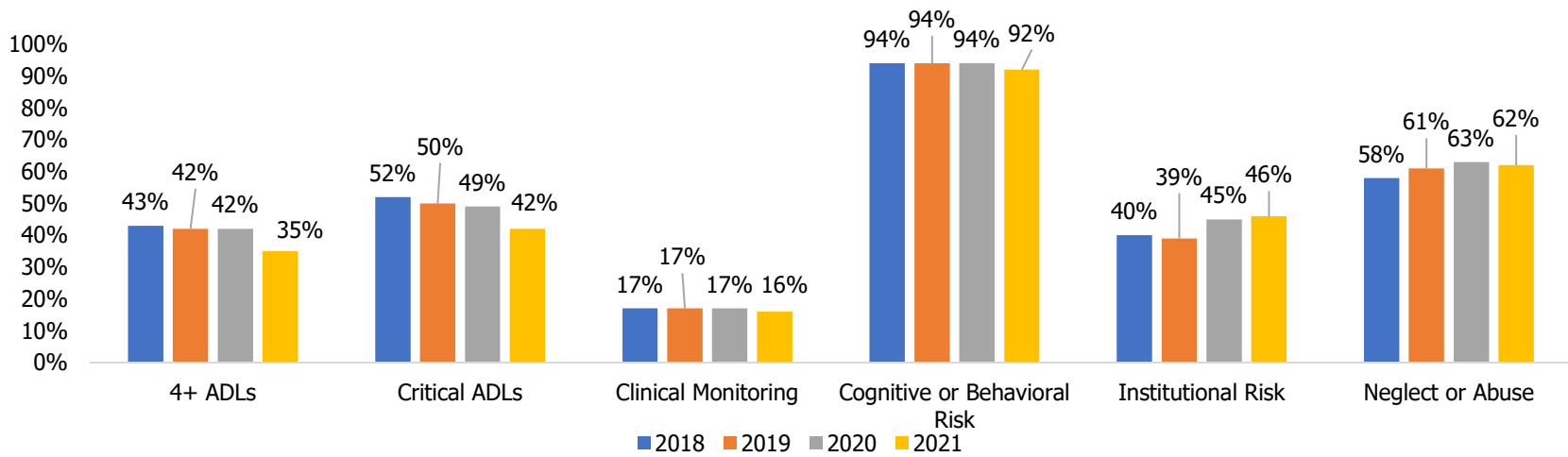
Figure 46. Elderly Waiver - Community Participants by NF-LOC Criteria on March 1, 2018-2021

	4+ ADLs	Critical ADLs	Clinical Monitoring	Cognitive or Behavioral Risk	Institutional Risk	Neglect or Abuse
2018	35%	40%	5%	69%	58%	49%
2019	37%	41%	5%	70%	59%	52%
2020	38%	42%	5%	70%	59%	54%
2021	38%	41%	4%	69%	58%	54%

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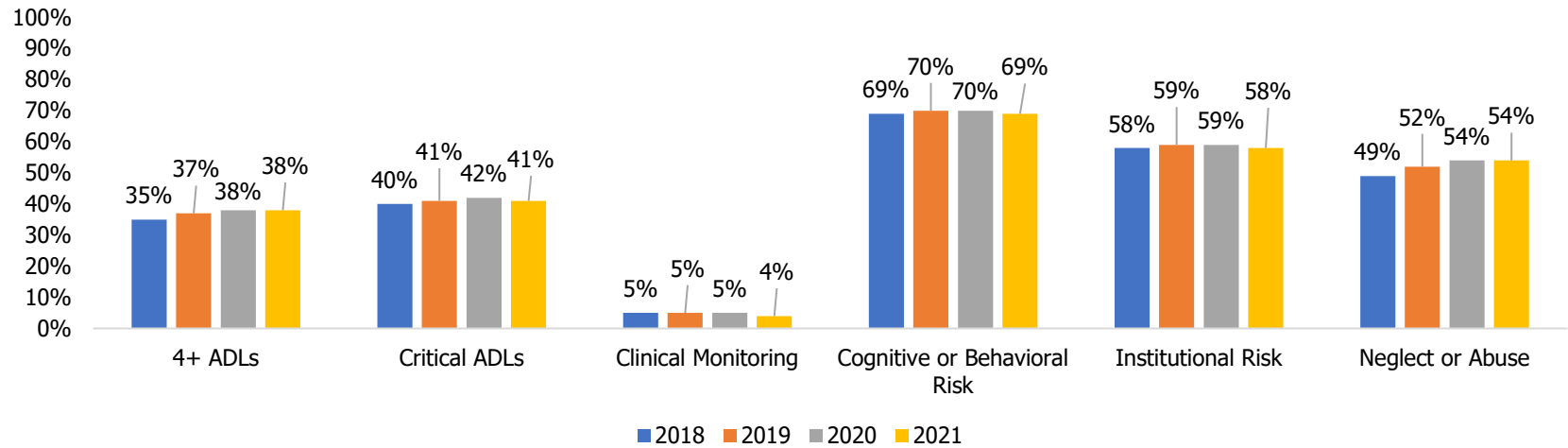
Figure 47. Alternative Care Waiver Participants by NF-LOC Criteria on March 1, 2018-2021

	4+ ADLs	Critical ADLs	Clinical Monitoring	Cognitive or Behavioral Risk	Institutional Risk	Neglect or Abuse
2018	24%	36%	14%	83%	66%	47%
2019	24%	36%	13%	85%	68%	51%
2020	24%	36%	14%	85%	67%	51%
2021	23%	35%	14%	85%	66%	49%
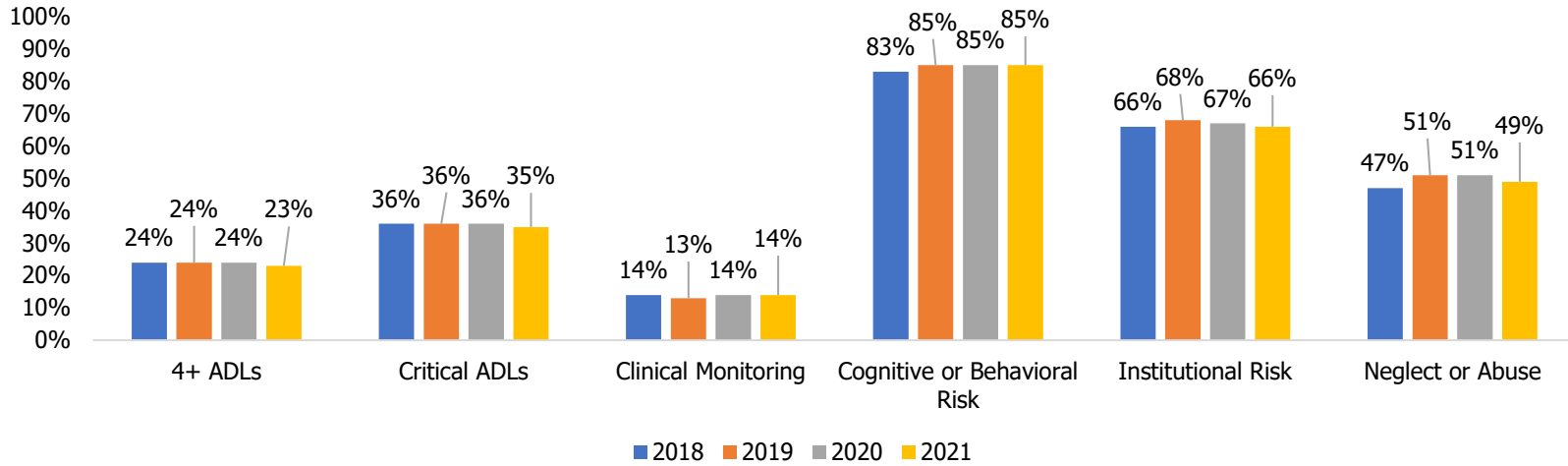
Figure 48. PCA without a Waiver participants by NF-LOC Criteria on March 1, 2018-2021

	4+ ADLs	Critical ADLs	Clinical Monitoring	Cognitive or Behavioral Risk	Institutional Risk	Neglect or Abuse
2018	76%	79%	6%	79%	19%	35%
2019	81%	85%	6%	83%	22%	40%
2020	81%	85%	6%	82%	22%	43%
2021	82%	85%	6%	83%	22%	43%
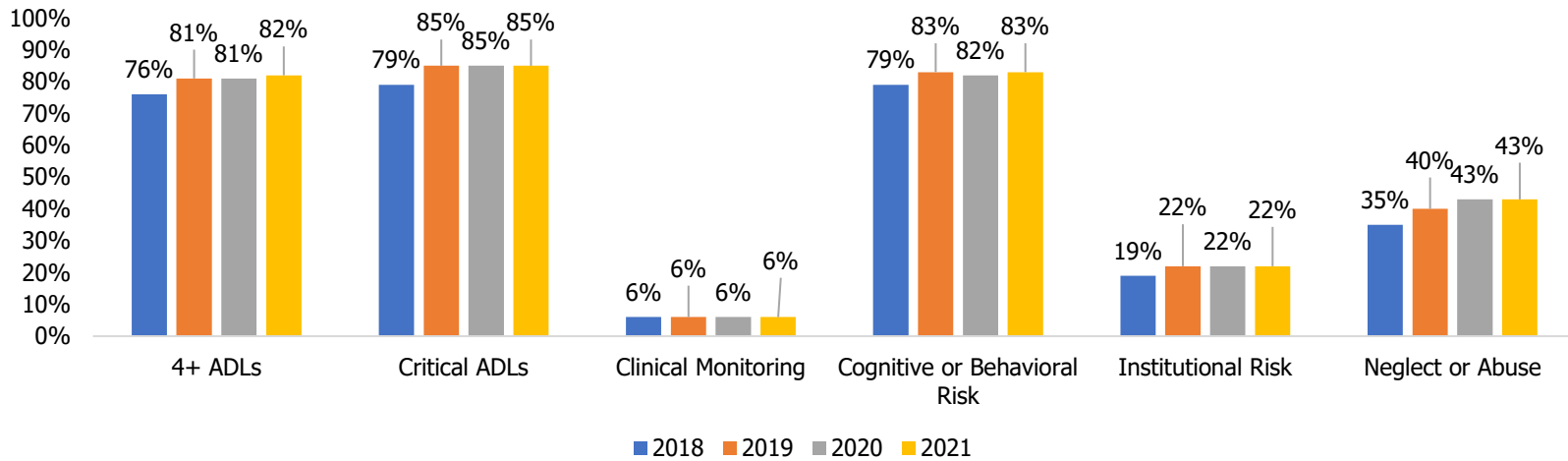
Twelve-Month All-Cause Mortality Rates for LTSS Cohorts beginning in March 2018-2021

The March cohorts were followed for 12 months (through February of the following year) to determine all-cause mortality rates. The excess deaths, or differences in mortality between the pre-COVID-19 and COVID-19 periods, could be attributed to COVID 19 either directly or indirectly. People in all LTSS categories experienced relatively high mortality over the future 24 months both in the 2018 cohort before the COVID-19 pandemic and the 2020 cohort during the pandemic (Table 7, Figures 49-50).

Nursing Facility Residents - The rate of mortality among nursing facility residents, already much higher than for waiver and PCA participants, rose substantially in 2020 during the first 12 months of the COVID-19 pandemic. Mortality rates rose 21% from 335 deaths/1000 population in 2019 to 406/1000 in 2020, then declined to 326/1000 in 2021 to a level similar to the years before the pandemic (Table 7, Figure 49). Mortality rates were highest among nursing facility residents not enrolled in Medicaid who had stays of more than 90 days at the beginning of the cohort. Their mortality rate increased 24% from 363/1000 in 2019 to 449/1000 in 2020. Mortality among Medicaid residents with long stays experienced an increase of 23% from 324/1000 in 2019 to 400/1000 in 2020.

Waiver and PCA Participants - EW- Residential participants had lower mortality rates than nursing facility residents but much higher mortality rates than participants in the EW-Community, Alternative Care, and PCA without a waiver (Table 7, Figure 50). Following the same pattern as among nursing facility residents, mortality rates for EW- Residential participants rose by 23% from 197/1000 in 2019 to 243/1000 in 2020, and then declined to a pre-pandemic level of 207/1000 in 2021.

Mortality rates for participants in the EW- Community, Alternative Care, and PCA without a waiver were relatively low during the pre-pandemic period, yet their percentage increase was similar to the other LTSS categories. Their mortality increased 19% from 68/1000 in 2019 to 81/1000 in 2020. Unlike the other categories, their mortality rates did not return to a pre-pandemic level in 2021; the rate remained at 81/1000.

Table 7. Mortality over 12 Months for Cohorts Beginning in March of 2018-2021 by LTSS Categories

	Deaths				Deaths/1000			
	2018	2019	2020	2021	2018	2019	2020	2021
MA NF LOS 0-90 Days	396	402	462	213	320	321	356	263
MA NF LOS 91+ Days	3329	3426	4058	2442	309	324	400	309
Non-MA NF LOS 0-90 Days	484	455	499	542	342	339	365	351
Non-MA NF LOS 91+ Days	1676	1663	1961	1459	357	363	449	364
EW-Residential	1835	1891	2445	1941	195	197	243	207
EW-Community	1012	1096	1381	1373	62	65	79	78
Alternative Care	225	213	252	246	90	87	97	98
PCA w/o Waiver	187	190	203	161	74	74	84	81
All NF	5885	5946	6980	4656	325	335	406	326
EW Residential	1835	1891	2445	1941	195	197	243	207
EW Community, AC & PCA	1424	1499	1836	1780	67	68	81	81
All LTSS	9144	9336	11261	8377	187	189	226	183

Figure 49. Deaths/1000 of Nursing Facility Residents, March Cohorts Followed for 12 Months
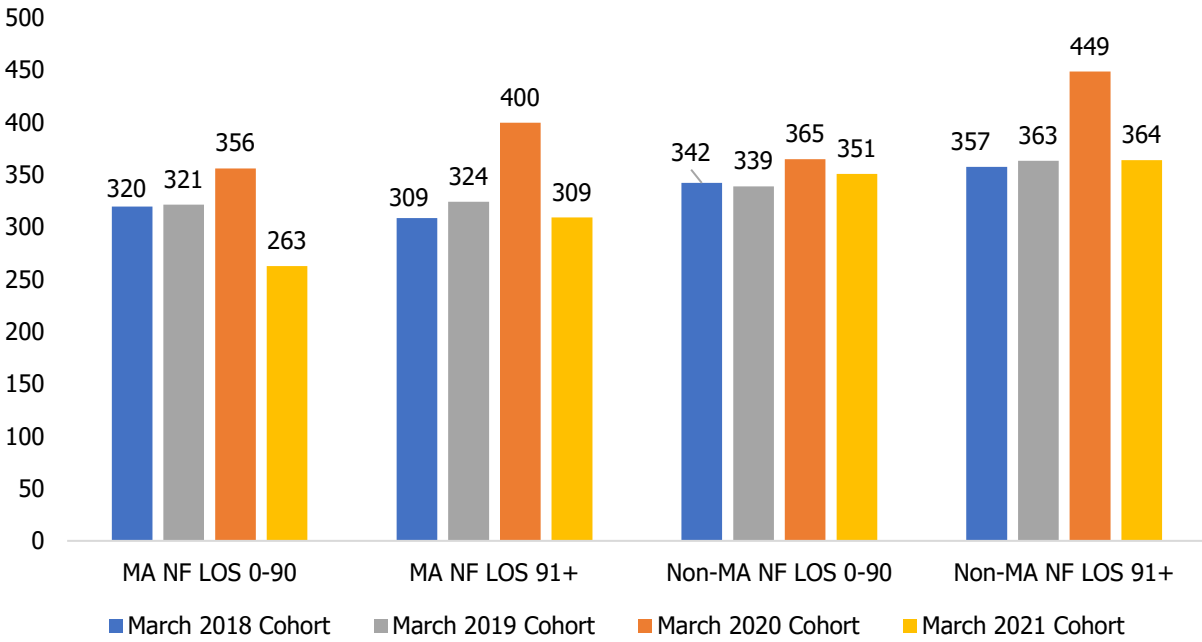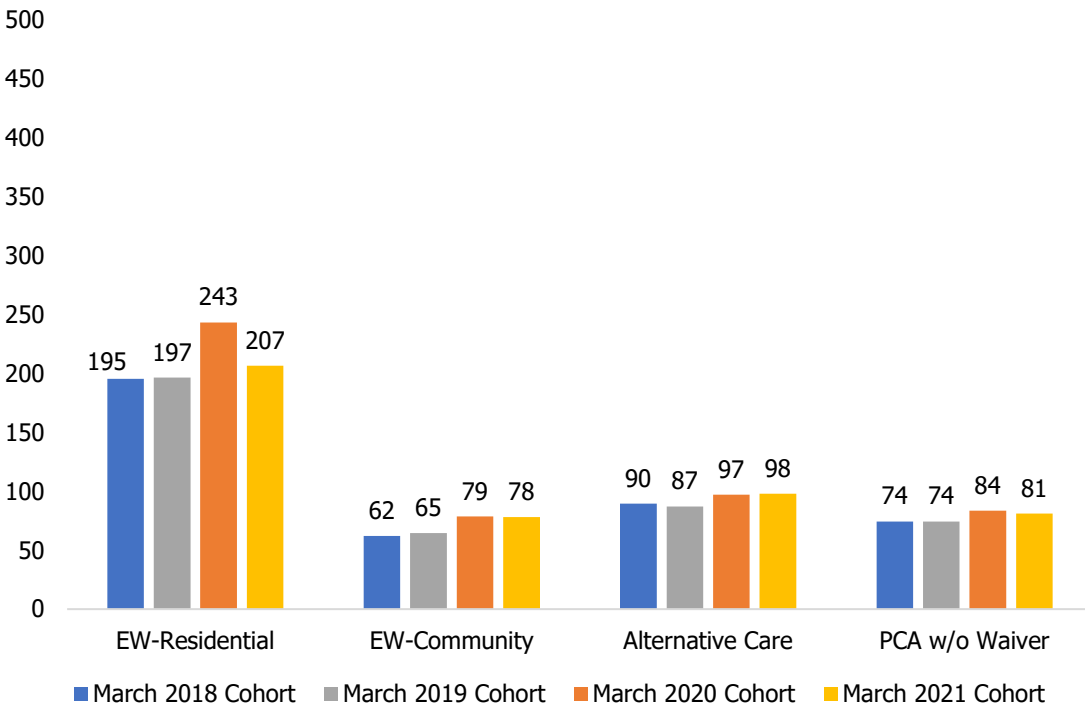

Figure 50. Deaths/1000 of Waiver and PCA Participants, March Cohorts Followed for 12 Months

Number of transitions between LTSS categories for cohorts beginning in March 2018 and 2020

Transitions between the initial and subsequent LTSS categories are shown in Tables 8 and 9 and Figures 51-62. Cohorts beginning in March of 2018 and 2020 were followed for 24 months, through February 2020 and February 2022, respectively. A person could make multiple transitions over the 24 months. For example, people could transition from a nursing facility to a waiver program or transition back into a nursing facility. Also in both periods, before and during the pandemic, a substantial percentage of people in each category died before the end of the 24 months (Table 9).

Table 8 shows the number of transitions into new LTSS categories according to the initial LTSS category in March 2018 or March 2020. Although the majority of people in all of the LTSS categories remained in their initial category, there was variation in the number transitioning to a new category. Medicaid nursing facility residents, particularly long-stay residents, were least likely to make a transition to a new LTSS category. A total of 91% of Medicaid residents in March 2018 and 93% of Medicaid residents in March 2020 remained in the nursing facility until death or the end of the 24 months. Among nursing facility residents not enrolled in Medicaid, the percentage remaining was 83% in March 2018 and 91% in March 2020. Among the other LTSS categories, Alternative Care participants were most likely to make a transition in both periods: 47% of participants in the 2018 cohort and 38% of participants in the 2020 cohort. Next most likely were EW-Residential participants: 45% of participants in the 2018 cohort and 38% of participants in the March 2020 cohort made a transition. Across these and all other initial LTSS categories, the percentage of people making a transition to a new category declined between 2018 and 2020. This could have been the result of higher mortality rates in the 2020 cohort during the COVID-19 pandemic (see Table 9). With shorter life expectancy, there was less opportunity to transition.

Table 8. Number of Transitions to a New LTSS Category over 24 Months for Cohorts in March 2018 and 2020

Starting LTSS Category	Number of Subsequent Transitions			
	None	1	2	3 or More
March 2018				
MA NF LOS 0-90 Days	64%	28%	8%	0%
MA NF LOS 91+ Days	94%	5%	1%	0%
MA NF Total	91%	7%	1%	0%
Non-MA NF LOS 0-90 Days	83%	15%	1%	1%
Non-MA NF LOS 91+ Days	83%	17%	0%	0%
Non-MA NF Total	83%	17%	0%	0%
EW-Residential	55%	33%	12%	0%
EW-Community	73%	22%	4%	0%
Alternative Care	53%	29%	14%	6%
PCA w/o Waiver	67%	30%	3%	0%
March 2020				
MA NF LOS 0-90 Days	70%	22%	7%	1%
MA NF LOS 91+ Days	96%	3%	1%	0%
Non-MA NF LOS 0-90 Days	90%	8%	1%	1%
Non-MA NF LOS 91+ Days	91%	9%	0%	0%
MA NF Total	93%	5%	1%	0%
Non-MA NF Total	91%	8%	0%	0%
EW-Residential	62%	28%	10%	0%
EW-Community	80%	16%	3%	0%
Alternative Care	62%	25%	9%	4%
PCA w/o Waiver	76%	22%	2%	0%

Initial and subsequent LTSS categories for cohorts beginning in March 2018 and March 2020

Table 9 and Figures 51-62 show the percentage of people moving from each initial LTSS category into each subsequent category. Compared to the March 2018 cohort, the March 2020 cohort experienced an increase in mortality. In addition, there were both increases and declines in transitions from initial LTSS categories to new LTSS categories in the subsequent 24 months.

Transitions for people not enrolled initially in Medicaid - Relatively few nursing facility residents not enrolled in Medicaid initially ended up converting to Medicaid over the following 24 months. Their conversion to Medicaid while in the nursing facility was 17% in the March 2018 cohort and 8% in the March 2020 cohort. Only 1% of nursing facility residents not enrolled in Medicaid transitioned to Alternative Care and only 1% converted to Medicaid and entered an EW-Residential setting. Conversion to Medicaid among Alternative Care participants was much higher. Among AC participants in March 2018, 29% converted to Medicaid. Of these people, 21% had nursing facility stay while enrolled in Medicaid, 13% entered an EW-Residential setting, and 8% participated in an EW-Community waiver. The percentages declined in the March 2020 cohort to 16% with a nursing facility stay while enrolled in Medicaid, 11% entering an EW-Residential setting, and 7% participating in the EW-Residential program.

Sizable percentages of Alternative Care participants transitioned to a nursing facility without converting to Medicaid: 29% of the March 2018 cohort and 26% of the March 2020 cohort. In the 2018 cohort, 9% of Alternative Care participants who entered a nursing home while not enrolled in Medicaid ended up converting to Medicaid while in the facility (figures not reported in the table). That figure dropped to 7% in the March 2020 cohort.

Transitions for people enrolled in Medicaid - Longer-stay nursing facility residents enrolled in Medicaid were unlikely to enter an Elderly Waiver program or other setting. However, 17% of short-stay Medicaid nursing facility residents in March 2018 entered an EW-Residential setting and 21% participated in an EW-Community program. Those figures increased to 18% and 25%, respectively, for the March 2020 cohort. Among EW-Residential participants in March 2018, 33% entered a nursing facility and 24% participated in an EW-Community program. In the March 2020 cohort, 30% of EW-Residential participants entered a nursing facility while 23% participated in an EW-Community waiver. Over the same two periods, the percentage of EW-Community participants entering a nursing facility decreased from 20% to 18% and the percentage entering an EW-Residential waiver dropped slightly from 8% to 7%. Finally, among PCA users without a waiver, 28% transitioned to an EW-Waiver program in the March 2018 cohort and 26% in the March 2020 cohort, and only 9% transitioned to a nursing facility in the March 2018 and 8% in the March 2020 cohort.

Table 9. Mortality and LTSS Categories over 24 Months for Cohorts in March 2018 and 2020

Category in March	Mortality and Use of Care during Next 24 Months						
	Mortality	MA NF	Non-MA NF	EW Residential	EW Community	Alternative Care	PCA w/o Waiver
March 2018							
Non-MA NF Total	55%	17%	100%	1%	0%	1%	0%
Non-MA NF LOS 0-90	48%	15%	100%	2%	1%	3%	0%
Non-MA NF LOS 91+	57%	17%	100%	0%	0%	0%	0%
MA NF Total	51%	100%	0%	4%	3%	0%	0%
MA NF LOS 0-90	46%	100%	0%	17%	21%	0%	1%
MA NF LOS 91+	52%	100%	0%	2%	1%	0%	0%
EW-Residential	35%	33%	0%	100%	24%	0%	0%
EW-Community	12%	20%	0%	8%	100%	0%	2%
Alternative Care	18%	21%	29%	13%	8%	100%	3%
PCA w/o Waiver	14%	9%	0%	1%	28%	0%	100%
March 2020							
Non-MA NF Total	59%	8%	100%	0%	0%	1%	0%
Non-MA NF LOS 0-90	49%	8%	100%	2%	1%	3%	0%
Non-MA NF LOS 91+	63%	8%	100%	0%	0%	0%	0%
MA NF Total	56%	100%	0%	4%	3%	0%	0%
MA NF LOS 0-90	51%	100%	0%	18%	25%	0%	2%
MA NF LOS 91+	58%	100%	0%	2%	1%	0%	0%
EW-Residential	39%	30%	0%	100%	23%	0%	0%
EW-Community	14%	18%	0%	7%	100%	0%	2%
Alternative Care	19%	16%	26%	11%	7%	100%	2%
PCA w/o Waiver	15%	8%	0%	1%	26%	0%	100%

Figure 51. Transitions to Other LTSS Categories in the Next 24 Months for Non-Medicaid Nursing Facility Residents in March 2018

Category	Non-MA NF LOS 0-90	Non-MA NF LOS 91+
MA NF	15%	17%
EW-Residential	2%	0%
EW-Community	1%	0%
Alternative Care	3%	0%
PCA w/o Waiver	0%	0%
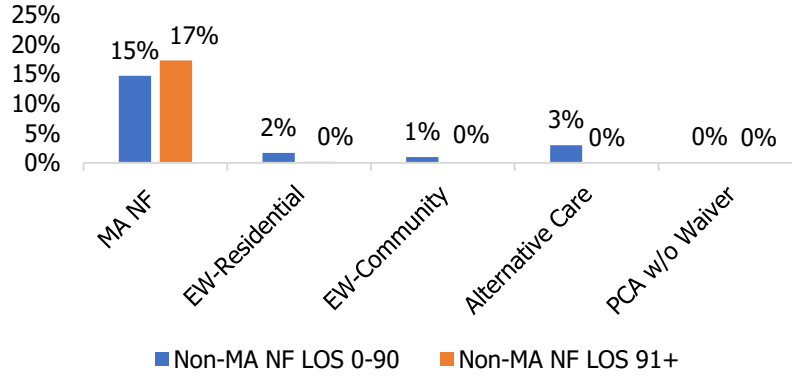
Figure 52. Transitions to Other LTSS Categories in the Next 24 Months for Non-Medicaid Nursing Facility Residents in March 2020

Category	Non-MA NF LOS 0-90	Non-MA NF LOS 91+
MA NF	8%	8%
EW-Residential	2%	0%
EW-Community	1%	0%
Alternative Care	3%	0%
PCA w/o Waiver	0%	0%
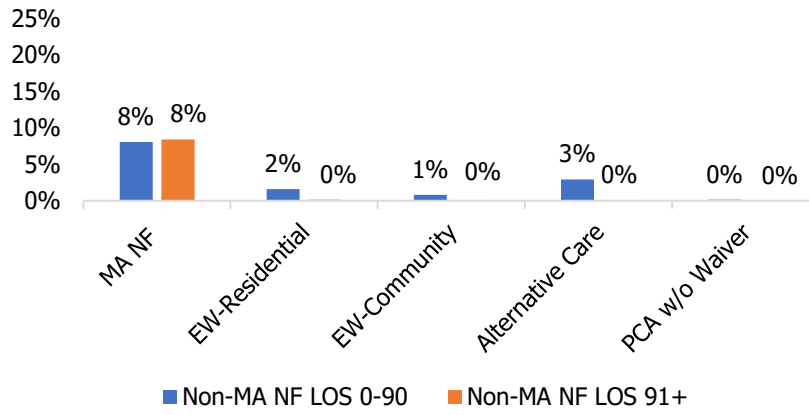
Figure 53. Transitions to Other LTSS Categories in the Next 24 Months for Medicaid Nursing Facility Residents in March 2018

Category	MA NF LOS 0-90	MA NF LOS 91+
EW-Residential	17%	2%
EW-Community	21%	1%
Alternative Care	0%	0%
PCA w/o Waiver	1%	0%

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Figure 54. Transitions to Other LTSS Categories in the Next 24 Months for Medicaid Nursing Facility Residents in March 2020

Category	MA NF LOS 0-90	MA NF LOS 91+
EW-Residential	14%	2%
EW-Community	17%	1%
Alternative Care	0%	0%
PCA w/o Waiver	2%	0%

Figure 55. Transitions to Other LTSS Categories in the Next 24 Months for Elderly Waiver Residential Participants in March 2018

Category	Value
MA NF	33%
EW-Community	24%
Alternative Care	0%
PCA w/o Waiver	0%

Figure 56. Transitions to Other LTSS Categories in the Next 24 Months for Elderly Waiver Residential Participants in March 2020

Category	Value
MA NF	27%
EW-Community	17%
Alternative Care	0%
PCA w/o Waiver	0%

Figure 57. Transitions to Other LTSS Categories in the Next 24 Months for Elderly Waiver Community Participants in March 2018

Category	Percentage
MA NF	20%
EW-Residential	8%
Alternative Care	0%
PCA w/o Waiver	2%
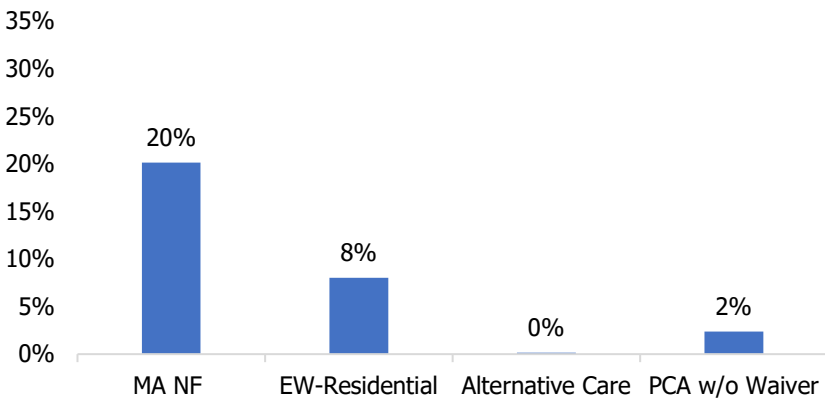
Figure 58. Transitions to Other LTSS Categories in the Next 24 Months for Elderly Waiver Community Participants in March 2020

Category	Percentage
MA NF	15%
EW-Residential	6%
Alternative Care	0%
PCA w/o Waiver	4%
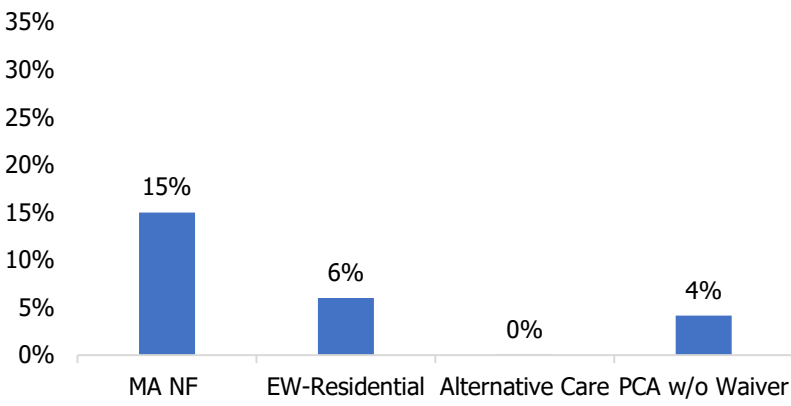
Figure 59. Transitions to Other LTSS Categories in the Next 24 Months for Alternative Care Waiver Participants in March 2018

Category	Percentage
MA NF	21%
Non-MA NF	29%
EW-Residential	13%
EW-Community	8%
PCA w/o Waiver	3%
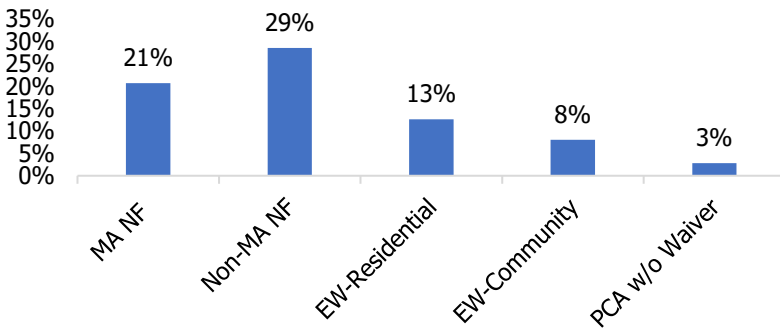
Figure 60. Transitions to Other LTSS Categories in the Next 24 Months for Alternative Care Waiver Participants in March 2020

Category	Percentage
MA NF	12%
Non-MA NF	26%
EW-Residential	11%
EW-Community	6%
PCA w/o Waiver	1%
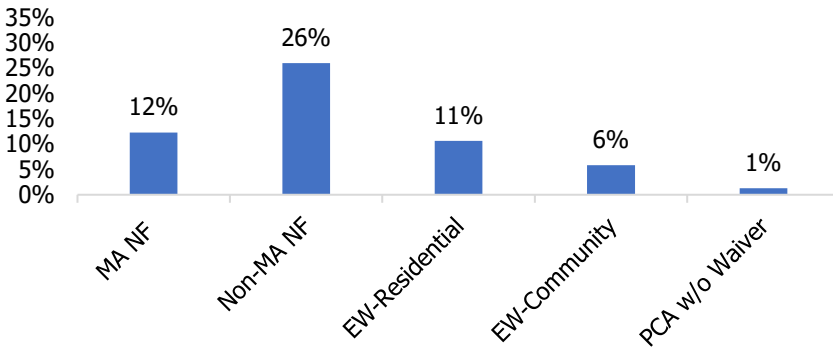
Figure 61. Transitions to Other LTSS Categories in the Next 24 Months for PCA w/o Waiver Participants in March 2018

Category	Percentage
MA NF	10%
EW-Residential	1%
EW-Community	30%
Alternative Care	0%
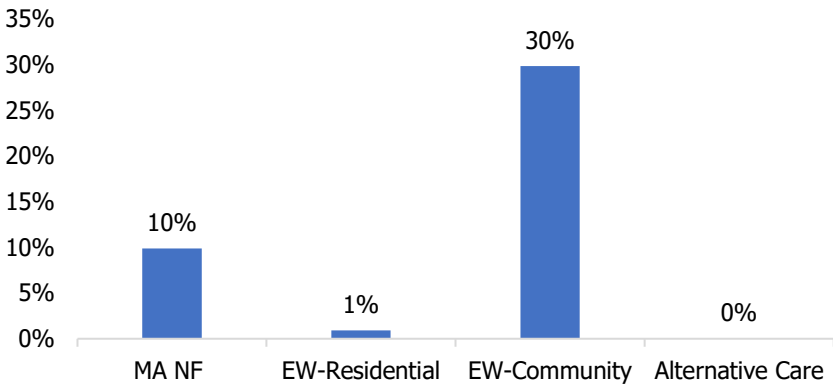
Figure 62. Transitions to Other LTSS Categories in the Next 24 Months for PCA w/o Waiver Participants in March 2020

Category	Percentage
MA NF	6%
EW-Residential	1%
EW-Community	21%
Alternative Care	0%
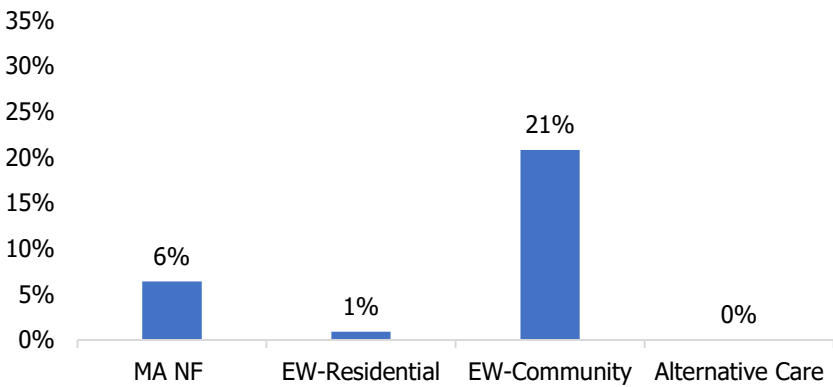
Appendix – Chapter 5 - Baseline Projections

Report: Long-Term Services and Supports for Minnesota's Older Population: Current and Future Utilization and Payments

November 2023

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Appendix – Chapter 5 - Baseline Projections
Long-Term Services and Supports for Minnesota's Older Population: Current and Future Utilization and Payments

Data Sources and Major Variables

Minnesota's Medicaid Management Information System (MMIS) and nursing facility Minimum Data Set (MDS) resident assessments are the primary sources of information about the LTSS population.

Use and Payments for the following LTSS Services are included in these projections.
- Nursing facilities (Medicaid enrollees and privately paying)
- Assisted living (Customized Living)
- Home and Community Services (HCBS) – adult day services, chore, home meals, homemaker, and Consumer-Directed Community Supports
- Personal Care Assistant (with or without an Elderly Waiver)
- Home Health and Skilled Nursing
- Hospice

Service category definitions can be found in the [Minnesota DHS Provider Manual](#):

Demographic projections were made in 2020 for older Minnesotans ages 65-74, 75-84, and 85 and older in five-year intervals – 2020, 2025, 2030, and 2035.
Details of the population projections and data downloads are available at the [Minnesota State Demographic Center](#):

Projection Methods

The projections involved several steps.
1. Determine the number of LTSS users and Medicaid payments for these services for each of the LTSS categories (above) by age group: 65-74, 75-84, 85 and older. For the baseline period we calculated means for number of users and annual Medicaid payments for the years 2016-2019 for each LTSS category and each age group. These figures are shown in Table 5A.1.
2. Estimate the rate of use of LTSS services per 1000 older people in the Minnesota population. Population totals for ages 65-74, 75-84, and 85 and older for the general population in 2019 were employed in estimating the base case rates of LTSS use. Table 5A.2 shows the population figures and the rates of LTSS use.
3. Make annual projections for the total Minnesota population from 2023-2035 relying on data from the State Demographic Center. Because the state population projections were in 5-year intervals (2020, 2025, 2030, 2035) we applied a cubic spline smoothing algorithm to interpolate between years for which projections were made. Figure 5A.1 shows annual population projections. These projections reflect an age cohort effect where the number of people in the 75-84 age range is rapidly increasing as baby boomers move into that age range. In contrast, the 65-74 age range is declining due to fewer members in the post-baby boom age cohorts. The number in the 85 and older age range is increasing but at a less rapid pace than the 75-84 age range. The full effect of the baby boomer cohort will not be felt until future years as they reach 85 or older.
4. Apply base case rates of LTSS utilization (#2) to the annual population projections (#3) in order to arrive at annual projections of the number of LTSS users by age category

from 2023-2035. Figure 5A.2 through Figure 5A.10 and Table 5A.5 show the projected number of people who would use each LTSS in each year by age group. The patterns in these projections follow closely the projections for the total population upon which they are based. The most rapid increases are for the 75-84 age range, followed by age 85 and older, and then age 65-74.

5. Apply figures on annual total Medicaid payments for LTSS to the projected number of users in order to project total annual Medicaid LTSS payments from 2023-2035. Table 5A.7 show projected annual total Medicaid payments by LTSS service category and age group in 2018 dollars. Figure 5A.11 to Figure 5A.19 and Table 5A.8 show payments inflated at 2.5% annually.

6. Estimate the rates of nursing facility utilization and private payments for older people not enrolled in Medicaid. Since we have complete information on all nursing facility utilization (Medicaid and non-Medicaid), we were able to project the number of nursing facility users not enrolled in Medicaid (Figure 5A.3 and Table 5A.3). Since Minnesota requires that non-Medicaid payment rates for nursing facility care be set equal to the Medicaid rate, we were able to apply the Medicaid payment rate to estimate private payments.

Table 5A.1 Baseline Annual Rates of LTSS Use per 1000 People in Minnesota in 2019

LTSS Service	65-74	75-84	85+	Total
Access	15.0	25.6	45.1	21.9
Case Management	10.4	20.4	53.6	18.6
Assisted Living Facility	5.6	14.4	48.8	13.5
HCBS	12.9	23.7	30.0	18.2
Home Health	10.0	18.1	30.8	15.0
Personal Care Assistant	9.6	13.8	16.2	11.7
Hospice	3.2	5.2	23.8	6.3
Medicaid Nursing Facility Care	7.1	21.6	78.7	20.2
Non-Medicaid Nursing Facility Care	3.5	15.3	69.6	15.1

*Total is a weighted average of the other three columns based on age group sizes.

Table 5A.2 Mean Annual Baseline Payments per User of LTSS

LTSS Service	65-74	75-84	85+	Total
Access	$795	$761	$379	$640
Case Management	$1,593	$1,578	$1,256	$1,427
Assisted Living Facility	$20,085	$20,693	$20,414	$20,450
HCBS	$5,634	$5,736	$4,867	$5,615
Home Health	$4,849	$4,873	$4,461	$4,772
Personal Care Assistant	$23,230	$23,451	$26,363	$24,196
Hospice	$14,594	$14,946	$16,760	$15,994
Medicaid Nursing Facility Care	$45,012	$45,348	$47,361	$46,663
Non-Medicaid Nursing Facility Care	$45,012	$45,348	$47,361	$46,663

Table 5A.3 Population Projections by Age Group from Minnesota State Demographic Center

Year	65-74	75-84	85+	Total
2020	554953	263842	111244	930039
2025	628305	323878	110005	1062188
2030	654156	394169	118292	1166617
2035	604498	448268	140086	1192852
2040	542873	464926	165361	1173160
2045	546985	426911	188550	1162446
2050	604670	383225	198869	1186764
2055	630791	386519	190179	1207489
2060	628671	426434	179053	1234158
2065	617449	441279	179272	1238000
2070	614559	439993	190039	1244591
2075	641148	431553	192873	1265574

https://mn.gov/admin/demography/data-by-topic/population-data/our-projections/

Table 5A.4 Population Projections by Age Group 2023-2035 with Interpolation between Years

Year	65-74	75-84	85+	Total
2020	554953	263842	111244	930039
2021	571123	275189	110680	956991
2022	586916	286699	110194	983810
2023	601960	298540	109867	1010368
2024	615880	310878	109778	1036536
2025	628305	323878	110005	1062188
2026	638854	337623	110625	1087102
2027	647124	351861	111702	1110687
2028	652704	366255	113298	1132258
2029	655185	380470	115474	1151129
2030	654156	394169	118292	1166617
2031	649387	407057	121780	1178224
2032	641368	419002	125837	1186208
2033	630767	429913	130330	1191010
2034	618254	439699	135124	1193077
2035	604498	448268	140086	1192852

Interpolation for years not divisible by 5 are based on cubic smoothing spline

LTSS Service Use Projections by Age Group and Year

The projections for number of LTSS users by type of LTSS are shown in the following graphs and tables.

- Use of nursing facilities by people age 75-84 and 85 and older is projected to steadily increase over the period in total for both Medicaid enrollees and those not enrolled in Medicaid (Figure 5A.6-Figure 5A.7). The age 85 and older group is projected to have the highest use. Nursing facility use by people age 65-74 is projected to remain flat across the period.
- The use of assisted living facilities is projected to follow a pattern similar to nursing facilities (Figure 5A.4). However, the number of users age 75-84 is projected to surpass those age 85 and older in the latter years of the period.
- Use of a personal care assistant and other HCBS services is projected to be lowest among people age 85 and older and the number of users is projected to remain flat over the period (Figure 5A.5 and Figure 5A.6). Similarly, the number of users of these services age 65-74 is projected to remain relatively flat, while the number of users age 75-84 is projected to steadily increase.
- Use of access and case management services among people age 75-84 is projected to steadily increase, while use of these services among people age 65-74 and 85 and older is projected to remain flat (Figure 5A.7 and Figure 5A.8).
- Use of home health is projected to be lowest while use of hospice is projected to be highest among people age 85 and older (Figure 5A.9 and Figure 5A.10). There are

projected upward trends in use of these services by people age 75-84 and downward trends among people age 65-74.

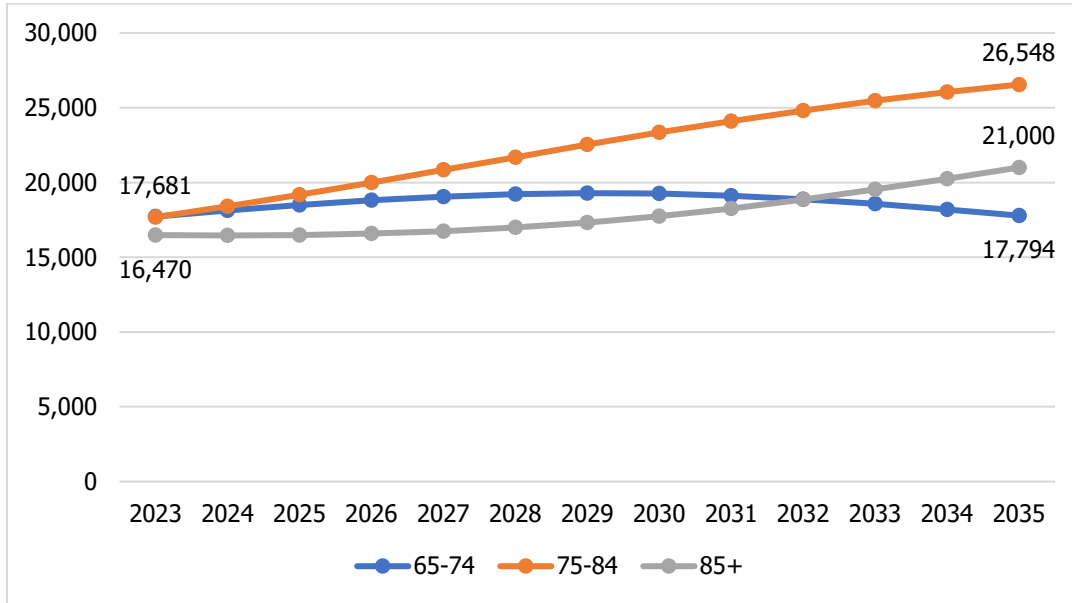**Figure 5A.1 Total Using Any Medicaid LTSS During the Year by Age**

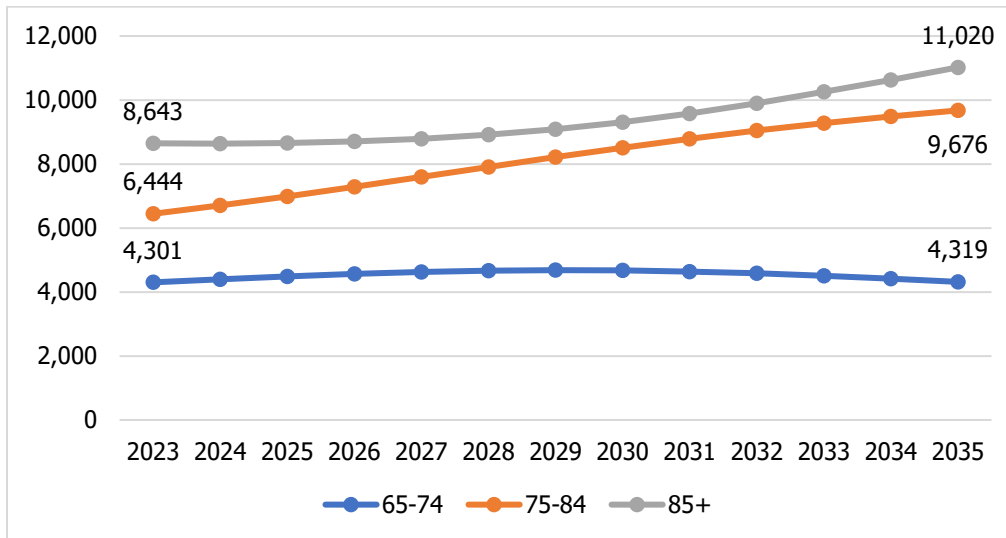**Figure 5A.2 Projected Annual Medicaid Residents of Nursing Facilities**

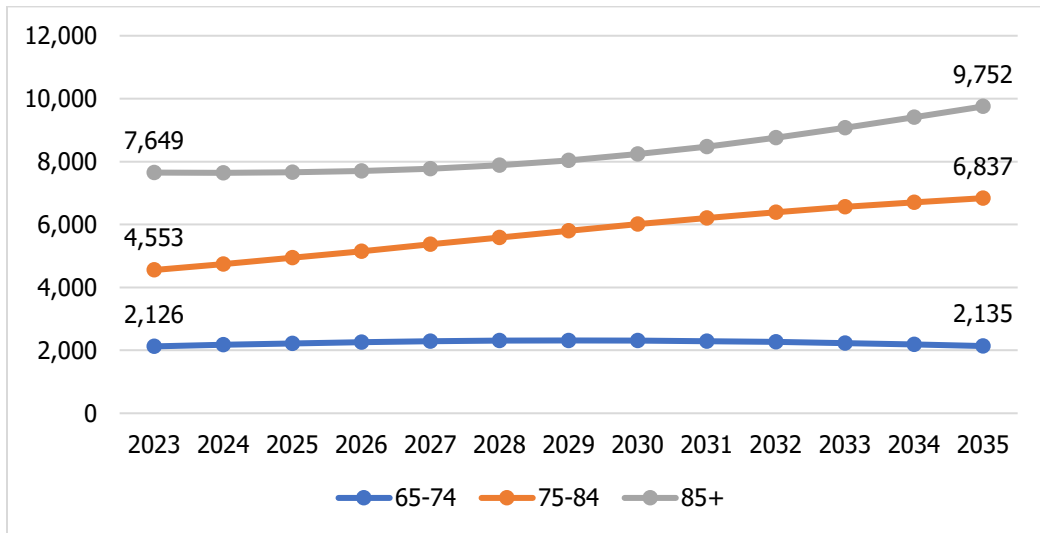**Figure 5A.3 Projected Annual Non-Medicaid Residents of Nursing Facilities**

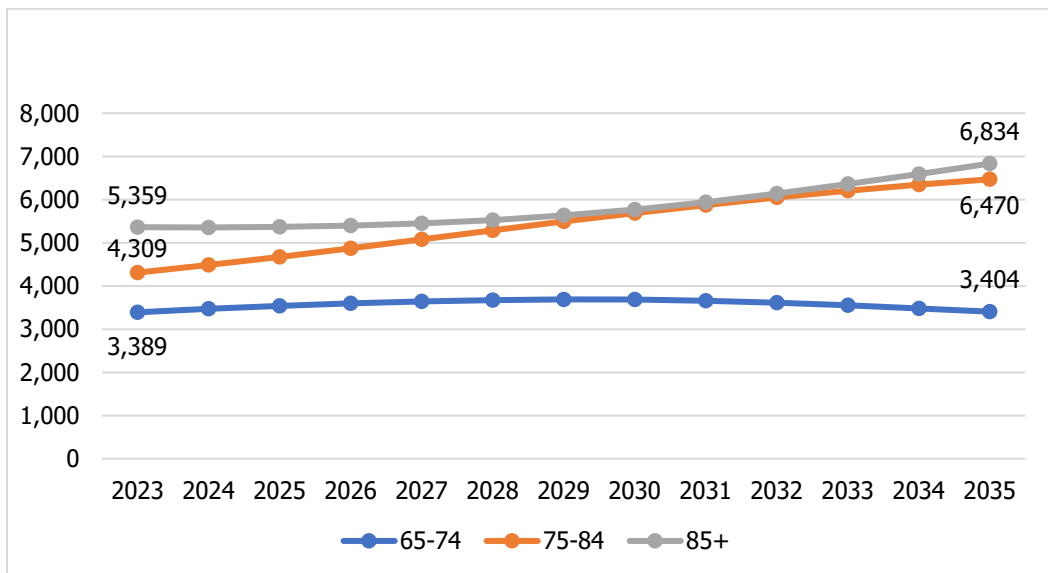**Figure 5A.4 Projected Annual Medicaid Residents of Assisted Living Facilities**
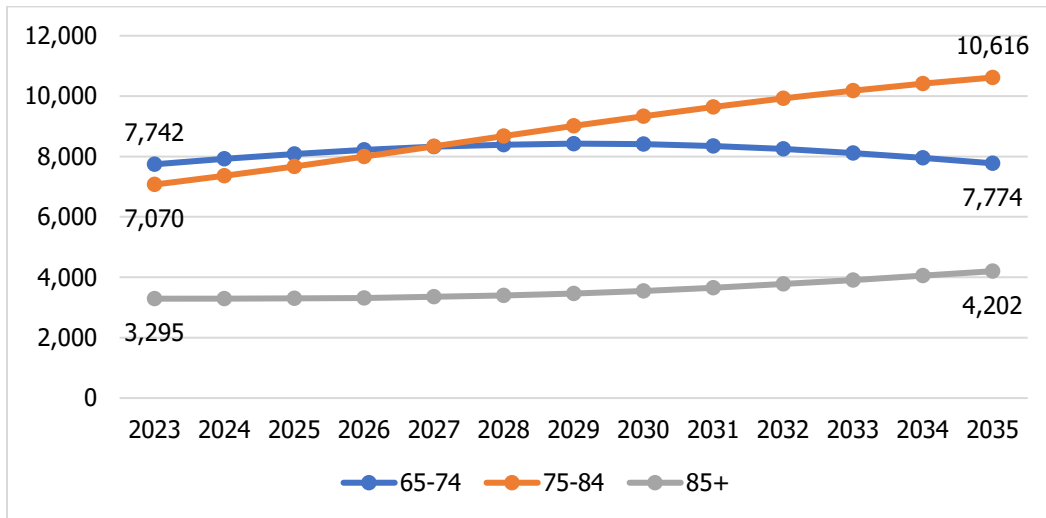
Figure 5A.5 Projected Annual Medicaid Users of HCBS

Figure 5A.6 Projected Annual Medicaid Users of a Personal Care Assistant
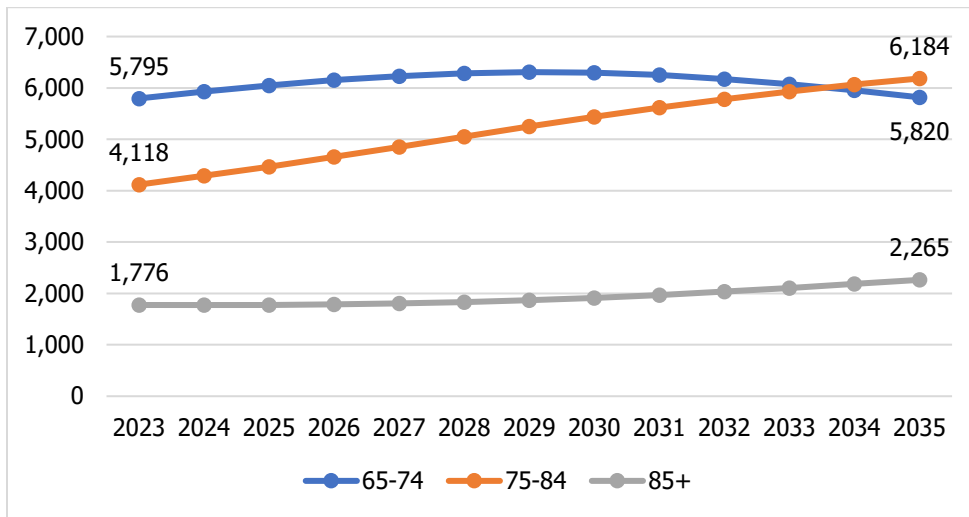
Figure 5A.7 Projected Annual Medicaid Users of Access Services
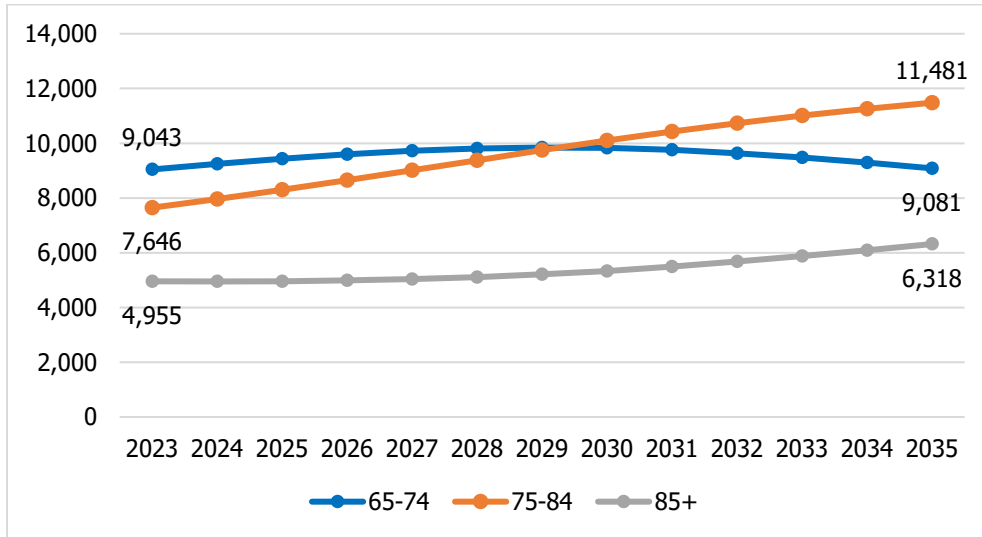
Figure 5A.8 Projected Annual Medicaid Users of Case Management
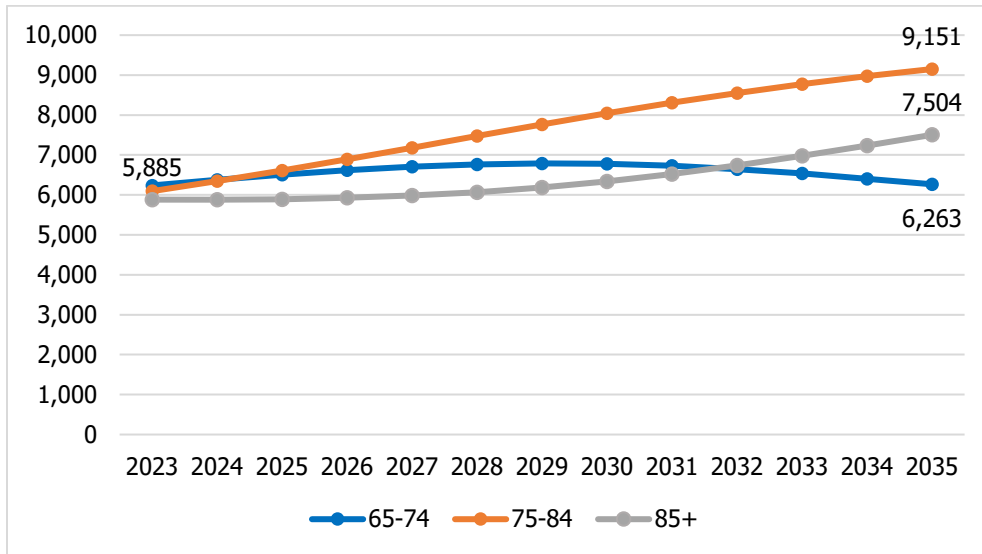
Figure 5A.9 Projected Annual Medicaid Users of Home Health
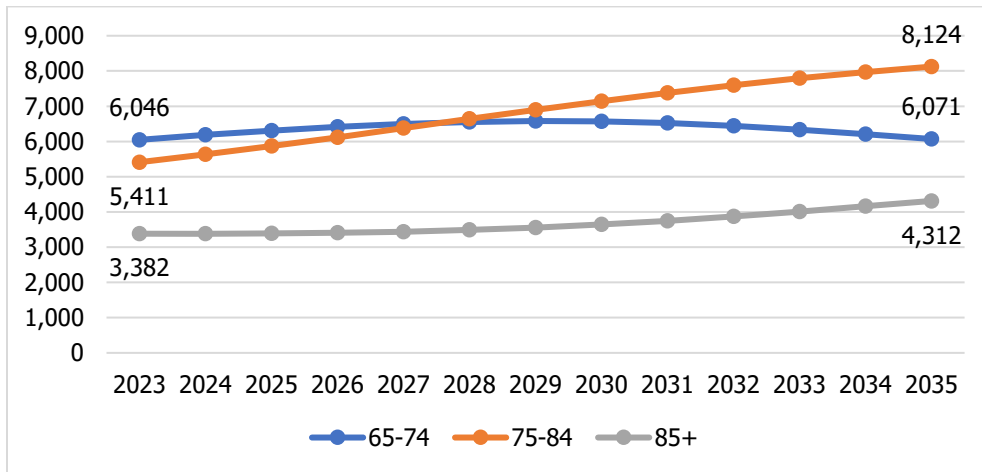
Figure 5A.10 Projected Annual Medicaid Users of Hospice Care
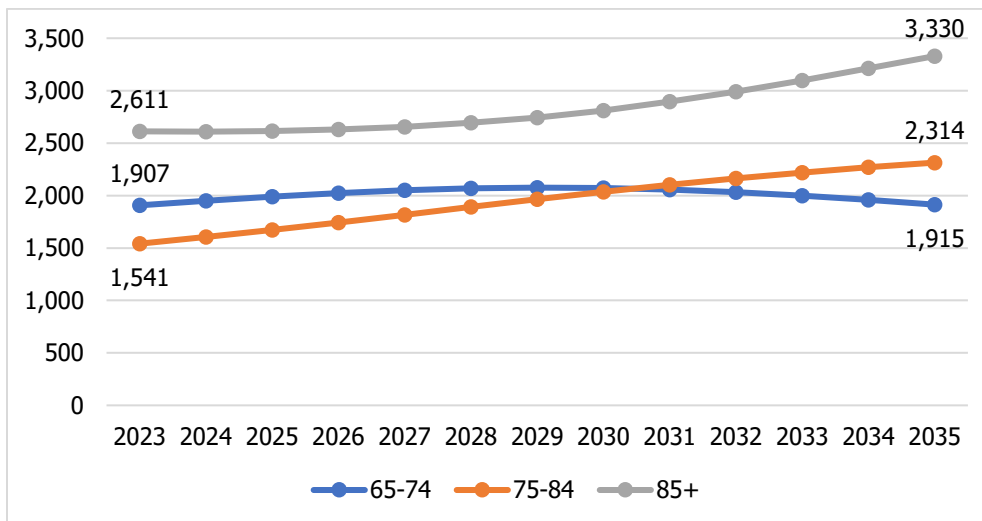
Table 5A.5 Projected Number of Persons Using LTSS Annually from 2023-2035 by Age Category

Access Services

Year	65-74	75-84	85+	Total
2023	9043	7646	4955	21644
2024	9252	7962	4951	22165
2025	9438	8295	4962	22695
2026	9597	8647	4990	23234
2027	9721	9012	5038	23771
2028	9805	9380	5110	24296
2029	9842	9745	5208	24795
2030	9827	10095	5335	25258
2031	9755	10426	5493	25673
2032	9635	10731	5676	26042
2033	9475	11011	5878	26365
2034	9287	11262	6095	26644
2035	9081	11481	6318	26880

Case Management

Year	65-74	75-84	85+	Total
2023	6237	6094	5885	18217
2024	6381	6346	5881	18608
2025	6510	6612	5893	19014
2026	6619	6892	5926	19438
2027	6705	7183	5984	19872
2028	6763	7477	6069	20309
2029	6789	7767	6186	20741
2030	6778	8046	6337	21161
2031	6729	8310	6523	21562
2032	6646	8553	6741	21940
2033	6536	8776	6981	22293
2034	6406	8976	7238	22620
2035	6263	9151	7504	22918

Assisted Living

Year	65-74	75-84	85+	Total
2023	3389	4309	5359	13058
2024	3468	4487	5355	13310
2025	3538	4675	5366	13579
2026	3597	4873	5396	13867
2027	3644	5079	5449	14171
2028	3675	5287	5527	14489
2029	3689	5492	5633	14814
2030	3683	5689	5770	15143
2031	3656	5876	5941	15473
2032	3611	6048	6139	15798
2033	3552	6205	6358	16115
2034	3481	6347	6592	16419
2035	3404	6470	6834	16708

HCBS

Year	65-74	75-84	85+	Total
2023	7742	7070	3295	18108
2024	7921	7362	3293	18576
2025	8081	7670	3300	19051
2026	8216	7996	3318	19530
2027	8323	8333	3351	20006
2028	8394	8674	3398	20467
2029	8426	9011	3464	20901
2030	8413	9335	3548	21296
2031	8352	9640	3653	21645
2032	8249	9923	3774	21946
2033	8112	10182	3909	22203
2034	7951	10413	4053	22418
2035	7774	10616	4202	22593

Home Health

Year	65-74	75-84	85+	Total
2023	6046	5411	3382	14838
2024	6185	5634	3379	15199
2025	6310	5870	3386	15566
2026	6416	6119	3405	15940
2027	6499	6377	3438	16315
2028	6555	6638	3487	16681
2029	6580	6896	3554	17030
2030	6570	7144	3641	17355
2031	6522	7378	3748	17648
2032	6441	7594	3873	17909
2033	6335	7792	4012	18138
2034	6209	7969	4159	18338
2035	6071	8124	4312	18508

Personal Care Assistant

Year	65-74	75-84	85+	Total
2023	5795	4118	1776	11690
2024	5929	4289	1775	11993
2025	6049	4468	1778	12295
2026	6151	4658	1788	12597
2027	6230	4854	1806	12890
2028	6284	5052	1832	13168
2029	6308	5249	1867	13423
2030	6298	5438	1912	13648
2031	6252	5615	1969	13836
2032	6175	5780	2034	13989
2033	6073	5931	2107	14110
2034	5952	6066	2184	14202
2035	5820	6184	2265	14268

Hospice

Year	65-74	75-84	85+	Total
2023	1907	1541	2611	6059
2024	1951	1605	2609	6165
2025	1990	1672	2615	6277
2026	2024	1743	2629	6396
2027	2050	1816	2655	6521
2028	2068	1891	2693	6651
2029	2076	1964	2745	6784
2030	2072	2035	2812	6919
2031	2057	2101	2895	7053
2032	2032	2163	2991	7186
2033	1998	2219	3098	7315
2034	1959	2270	3212	7440
2035	1915	2314	3330	7559

**Nursing Facility
Medicaid Residents**

Year	65-74	75-84	85+	Total
2023	4301	6444	8643	19388
2024	4401	6710	8636	19747
2025	4490	6991	8654	20134
2026	4565	7287	8703	20555
2027	4624	7595	8787	21006
2028	4664	7905	8913	21482
2029	4682	8212	9084	21978
2030	4674	8508	9306	22488
2031	4640	8786	9580	23006
2032	4583	9044	9899	23526
2033	4507	9279	10253	24039
2034	4418	9491	10630	24538
2035	4319	9676	11020	25015

Total Using any Medicaid LTSS

Year	65-74	75-84	85+	Total
2023	17719	17681	16470	51870
2024	18129	18411	16457	52997
2025	18495	19181	16491	54167
2026	18805	19995	16584	55385
2027	19049	20839	16745	56633
2028	19213	21691	16985	57889
2029	19286	22533	17311	59130
2030	19256	23344	17733	60333
2031	19115	24108	18256	61479
2032	18879	24815	18864	62559
2033	18567	25461	19538	63566
2034	18199	26041	20257	64496
2035	17794	26548	21000	65343

Nursing Facility Non-Medicaid Residents

Year	65-74	75-84	85+	Total
2023	2126	4553	7649	14328
2024	2175	4742	7642	14559
2025	2219	4940	7658	14817
2026	2256	5150	7701	15107
2027	2286	5367	7776	15429
2028	2305	5586	7887	15779
2029	2314	5803	8039	16156
2030	2310	6012	8235	16557
2031	2294	6209	8478	16980
2032	2265	6391	8760	17416
2033	2228	6557	9073	17858
2034	2184	6707	9407	18297
2035	2135	6837	9752	18724

Table 5A.6 Annual Inflation Index from 2018 through 2035 at Annual Inflation Rate of 2.5%

Year	Index
2018	1.0000
2019	1.0250
2020	1.0506
2021	1.0769
2022	1.1038
2023	1.1314
2024	1.1597
2025	1.1887
2026	1.2184
2027	1.2489
2028	1.2801
2029	1.3121
2030	1.3449
2031	1.3785
2032	1.4130
2033	1.4483
2034	1.4845
2035	1.5216

Note: 2018 was chosen as the middle of the historical Medicaid payment period

Payment Projections

Because of increases in the older population and after applying a 2.5% annual inflation, annual Medicaid payments for LTSS (i.e., nursing facilities, assisted living facilities, and community LTSS) are projected to increase from $1,977 million in 2023 to $3,379 million in 2035 (Figure 5A.11, Table 5A.8).

- The largest increase in Medicaid LTSS payments is projected to be for people age 75-84 from $660 million in 2023 to $1,333 million in 2035 (Figure 5A.11, Table 5A.8). Payments for people 85 and older are projected to increase from $735 million to $1,261 over the same period. The smallest projected increase is for people age 65-74 from $582 million to $786 million over the period.
- Projected Medicaid nursing facility payments are the largest share of total Medicaid payments. They are projected to rise from $1,013 million in 2023 to $1,758 million in 2035 (Table 5A.8). Nearly half of projected Medicaid payments for nursing facility care are for people age 85 and older (Figure 5A.12, Table 5A.8).
- Assisted living facility payments were projected to rise from $302 million in 2023 to $520 million in 2035 (Table 5A.8). On average, assisted living residents were older than users of personal care assistants; however, they were somewhat younger than nursing facility residents (Figure 5A.13).

- Personal care assistants, with or without a waiver, were projected to rise from $315 million in 2023 to $517 million in 2035 (Table 5A.8). Compared to nursing facilities, these payments were concentrated among people below the age of 85 (Figure 5A.14).
- Projected payments for other HCBS services were projected to increase from $113 million in 2023 to $190 million in 2035 (Table 5A.8). They too were concentrated among people below the age of 85 (Figure 5A.15).
- Projected payments for other Medicaid LTSS ranged from hospice care at $107 million in 2023 and $180 million in 2035 to access services at $17 million in 2023 and $28 million in 2035 (Figure 5A.16 to Figure 5A.19, Table 5A.8).

Figure 5A.11 Projected Total Annual Medicaid Payments by Age Group ($ Millions, 2.5% annual inflation)
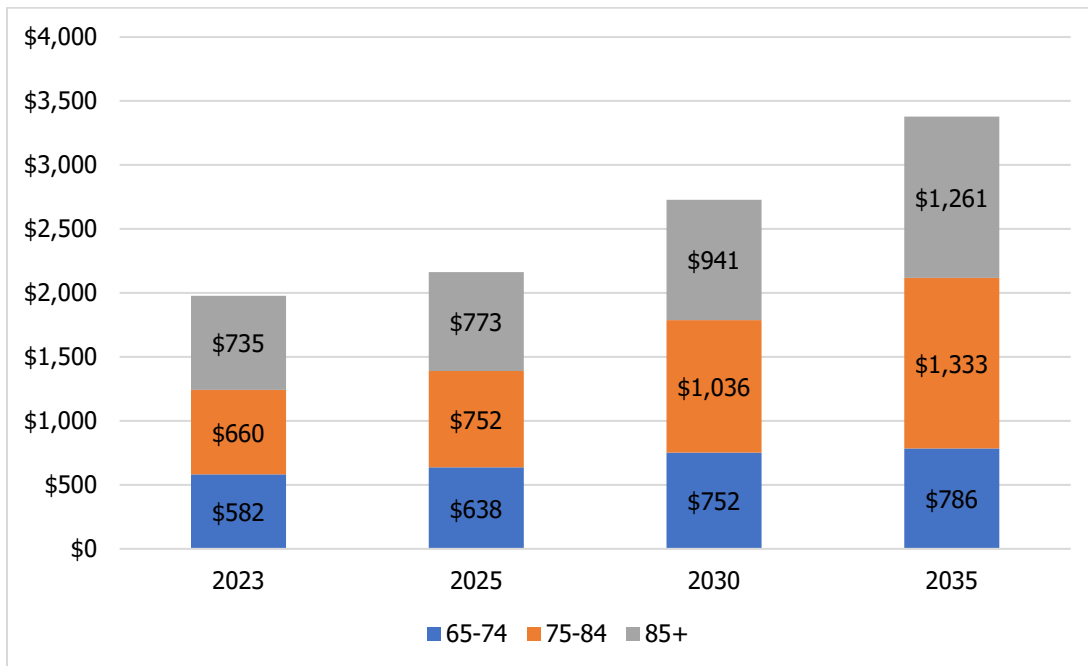
Figure 5A.12 Projected Annual Medicaid Payments for Medicaid Nursing Facilities ($ Millions, 2.5% annual inflation)
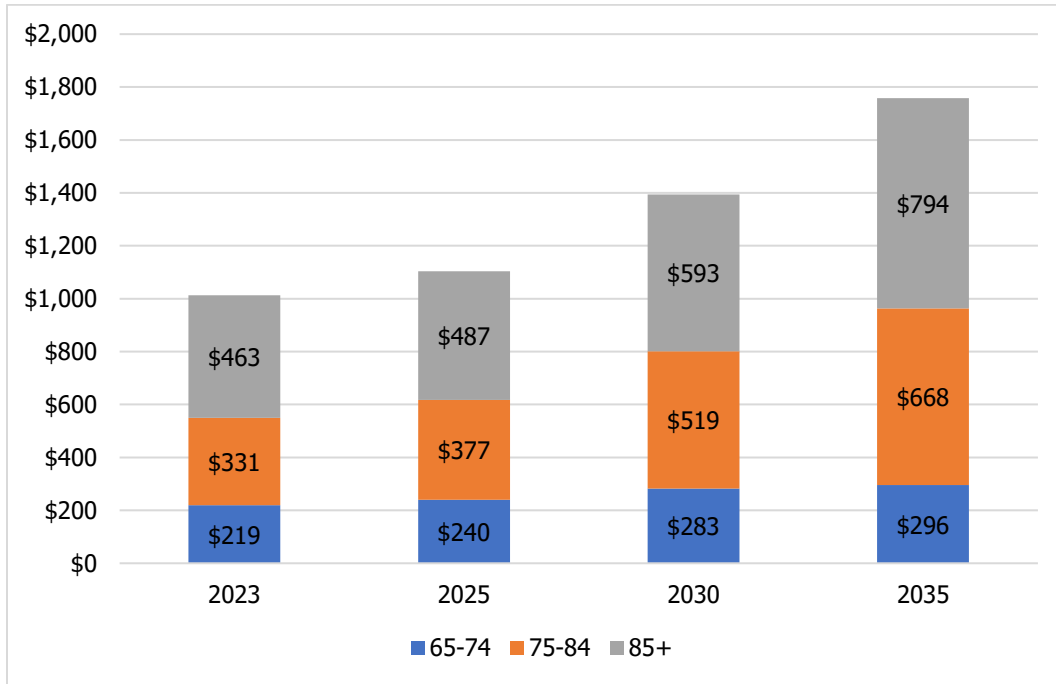
**Figure 5A.13 Projected Annual Medicaid Payments for Assisted Living Facilities ($ Millions, 2.5% annual inflation)**
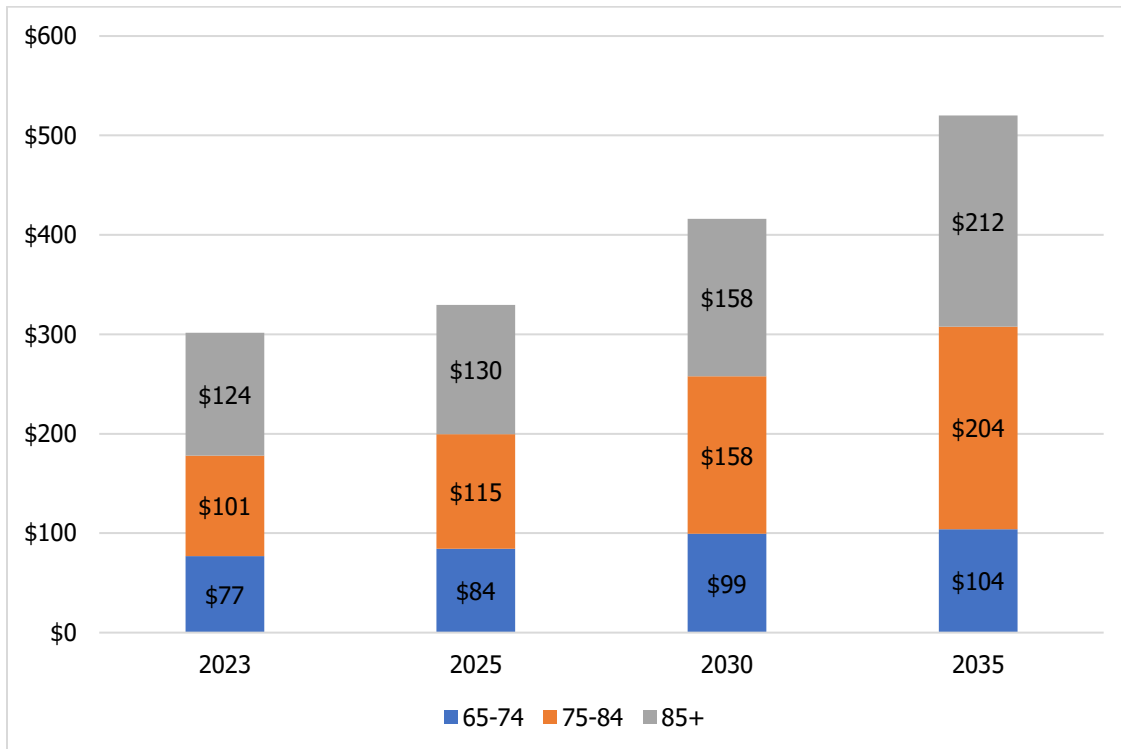
Figure 5A.14 Projected Annual Medicaid Payments for Personal Care Assistants ($ Millions, 2.5% annual inflation)
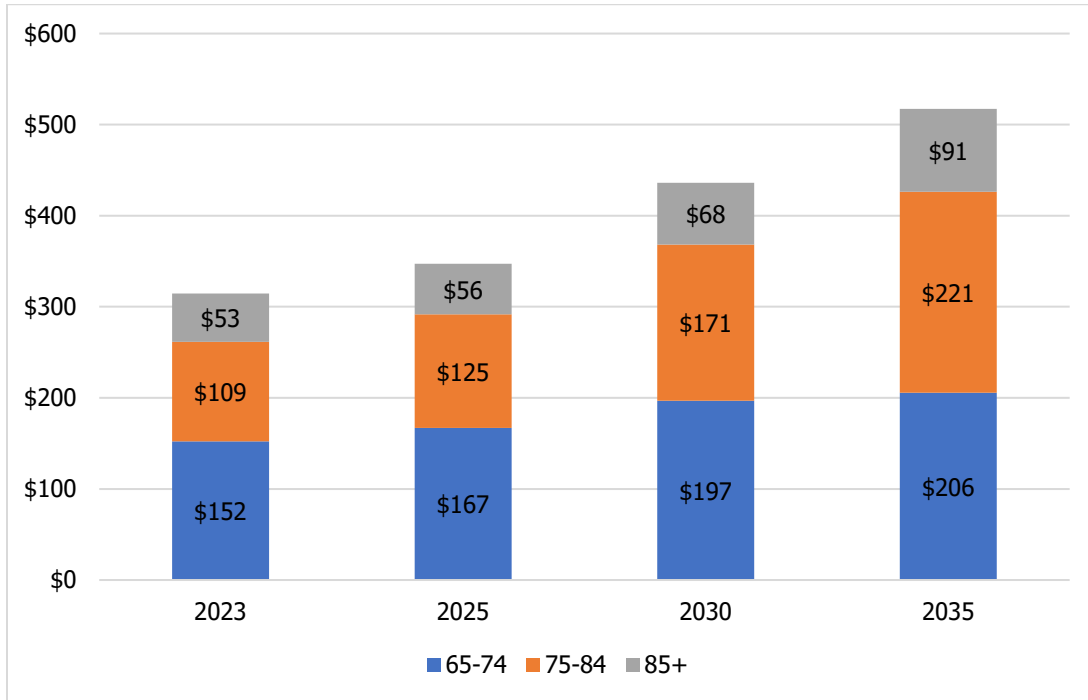
Figure 5A.15 Projected Annual Medicaid Payments for HCBS Services ($ Millions, 2.5% annual inflation)
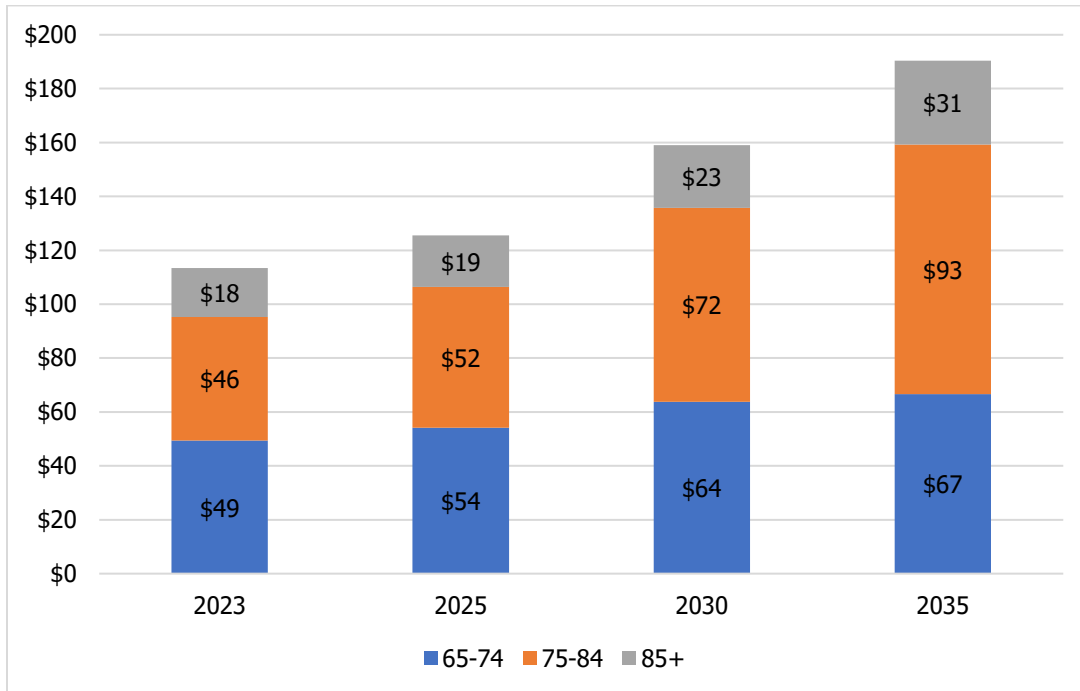
Figure 5A.16 Projected Annual Medicaid Payments for Access Services ($ Millions, 2.5% annual inflation)
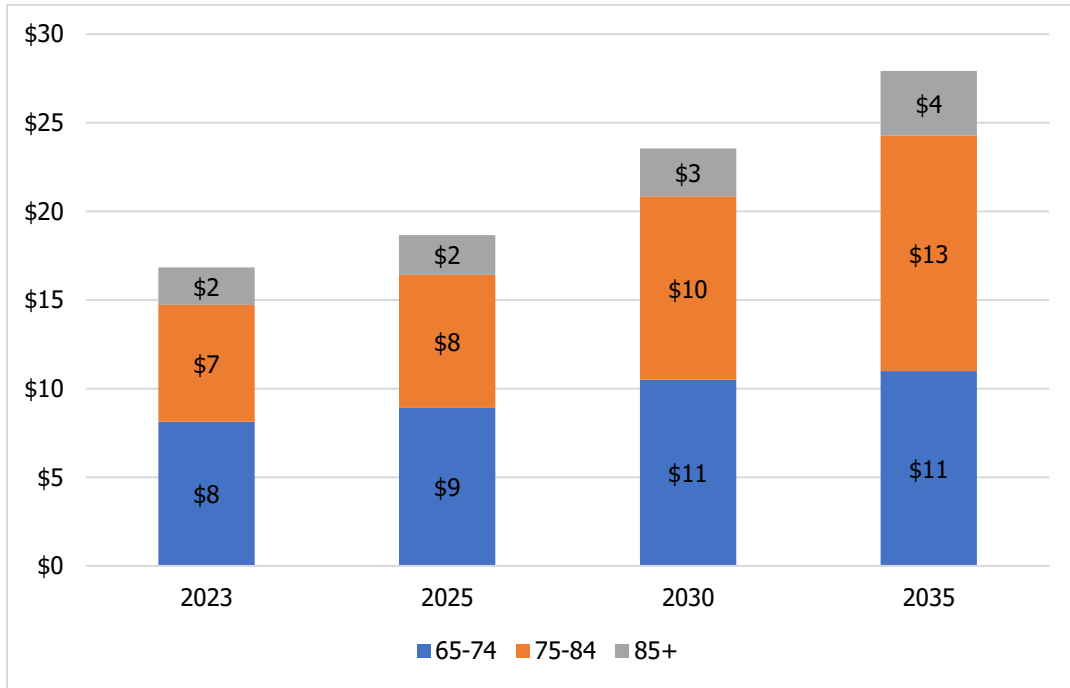
Figure 5A.17 Projected Annual Medicaid Payments for Case Management ($ Millions, 2.5% annual inflation)
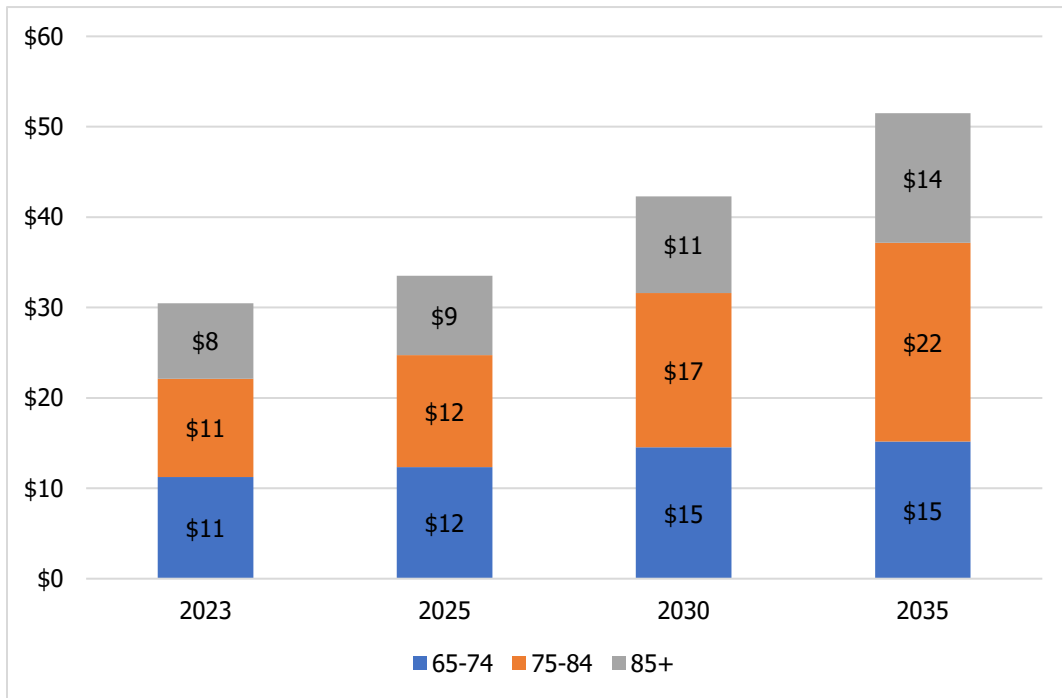
Figure 5A.18 Projected Annual Medicaid Payments for Home Health Services ($ Millions, 2.5% annual inflation)
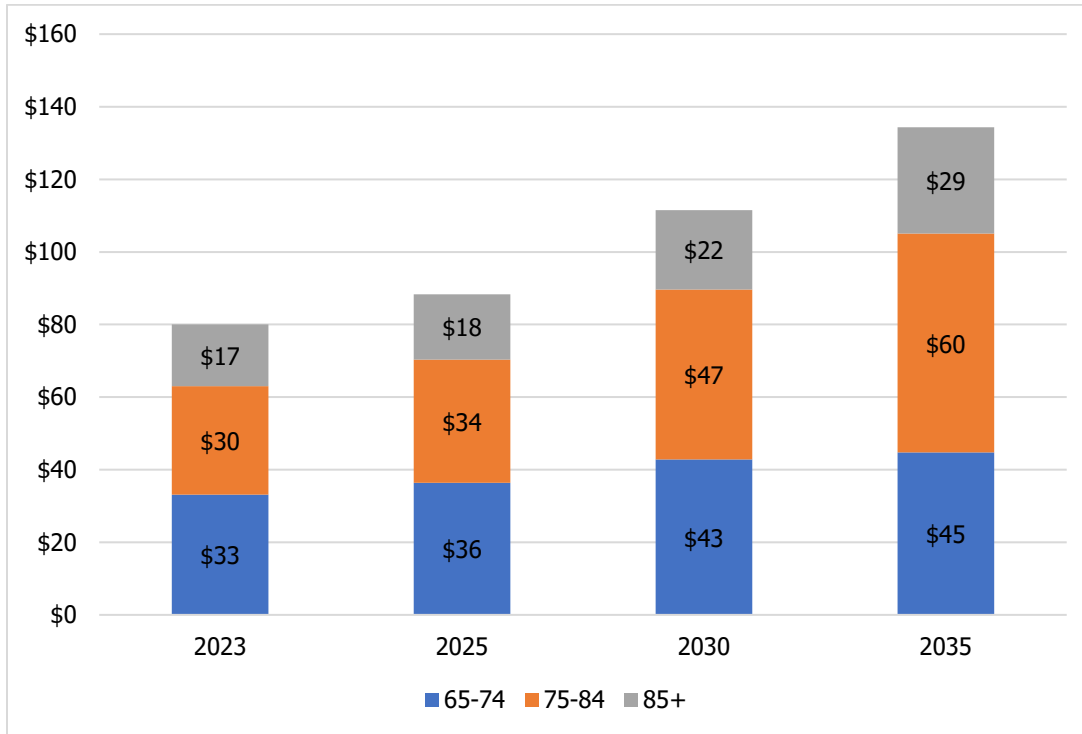
Figure 5A.19 Projected Annual Medicaid Payments for Hospice Services ($ Millions, 2.5% annual inflation)
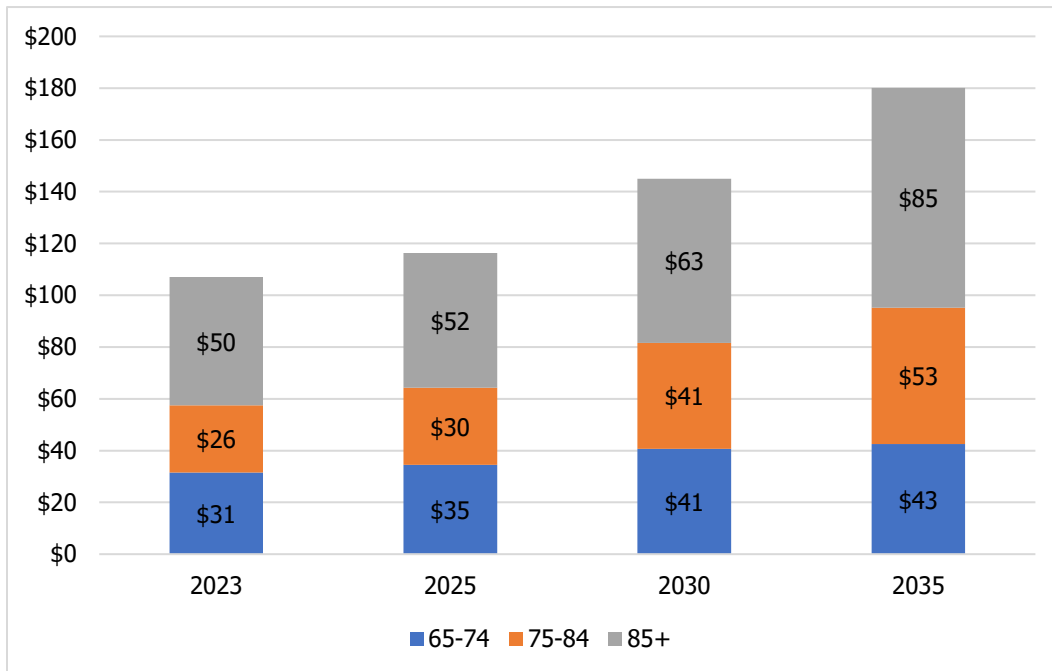
Table 5A.7 Projected Medicaid LTSS Expenditures by LTSS Type 2022-2035 in Un-Inflated 2018 Dollars ($Millions)

Medicaid Nursing Facility

Year	65-74	75-84	85+	Total
2023	$193.6	$292.2	$409.3	$895.2
2024	$198.1	$304.3	$409.0	$911.4
2025	$202.1	$317.0	$409.9	$928.9
2026	$205.5	$330.5	$412.2	$948.1
2027	$208.1	$344.4	$416.2	$968.7
2028	$209.9	$358.5	$422.1	$990.5
2029	$210.7	$372.4	$430.2	$1,013.4
2030	$210.4	$385.8	$440.7	$1,036.9
2031	$208.9	$398.4	$453.7	$1,061.0
2032	$206.3	$410.1	$468.8	$1,085.2
2033	$202.9	$420.8	$485.6	$1,109.3
2034	$198.8	$430.4	$503.4	$1,132.7
2035	$194.4	$438.8	$521.9	$1,155.1

Assisted Living

Year	65-74	75-84	85+	Total
2023	$68.1	$89.2	$109.4	$266.7
2024	$69.7	$92.9	$109.3	$271.8
2025	$71.1	$96.7	$109.5	$277.3
2026	$72.2	$100.8	$110.2	$283.3
2027	$73.2	$105.1	$111.2	$289.5
2028	$73.8	$109.4	$112.8	$296.0
2029	$74.1	$113.6	$115.0	$302.7
2030	$74.0	$117.7	$117.8	$309.5
2031	$73.4	$121.6	$121.3	$316.3
2032	$72.5	$125.1	$125.3	$323.0
2033	$71.3	$128.4	$129.8	$329.5
2034	$69.9	$131.3	$134.6	$335.8
2035	$68.4	$133.9	$139.5	$341.8

HCBS

Year	65-74	75-84	85+	Total
2023	$43.6	$40.6	$16.0	$100.2
2024	$44.6	$42.2	$16.0	$102.9
2025	$45.5	$44.0	$16.1	$105.6
2026	$46.3	$45.9	$16.1	$108.3
2027	$46.9	$47.8	$16.3	$111.0
2028	$47.3	$49.8	$16.5	$113.6
2029	$47.5	$51.7	$16.9	$116.0
2030	$47.4	$53.5	$17.3	$118.2
2031	$47.1	$55.3	$17.8	$120.1
2032	$46.5	$56.9	$18.4	$121.8
2033	$45.7	$58.4	$19.0	$123.1
2034	$44.8	$59.7	$19.7	$124.3
2035	$43.8	$60.9	$20.4	$125.1

Personal Care Assistant

Year	65-74	75-84	85+	Total
2023	$134.6	$96.6	$46.8	$278.0
2024	$137.7	$100.6	$46.8	$285.1
2025	$140.5	$104.8	$46.9	$292.2
2026	$142.9	$109.2	$47.1	$299.3
2027	$144.7	$113.8	$47.6	$306.2
2028	$146.0	$118.5	$48.3	$312.7
2029	$146.5	$123.1	$49.2	$318.8
2030	$146.3	$127.5	$50.4	$324.2
2031	$145.2	$131.7	$51.9	$328.8
2032	$143.4	$135.5	$53.6	$332.6
2033	$141.1	$139.1	$55.5	$335.7
2034	$138.3	$142.2	$57.6	$338.1
2035	$135.2	$145.0	$59.7	$339.9

Access Services

Year	65-74	75-84	85+	Total
2023	$7.2	$5.8	$1.9	$14.9
2024	$7.4	$6.1	$1.9	$15.3
2025	$7.5	$6.3	$1.9	$15.7
2026	$7.6	$6.6	$1.9	$16.1
2027	$7.7	$6.9	$1.9	$16.5
2028	$7.8	$7.1	$1.9	$16.9
2029	$7.8	$7.4	$2.0	$17.2
2030	$7.8	$7.7	$2.0	$17.5
2031	$7.8	$7.9	$2.1	$17.8
2032	$7.7	$8.2	$2.2	$18.0
2033	$7.5	$8.4	$2.2	$18.1
2034	$7.4	$8.6	$2.3	$18.3
2035	$7.2	$8.7	$2.4	$18.4

Case Management

Year	65-74	75-84	85+	Total
2023	$9.9	$9.6	$7.4	$26.9
2024	$10.2	$10.0	$7.4	$27.6
2025	$10.4	$10.4	$7.4	$28.2
2026	$10.5	$10.9	$7.4	$28.9
2027	$10.7	$11.3	$7.5	$29.5
2028	$10.8	$11.8	$7.6	$30.2
2029	$10.8	$12.3	$7.8	$30.8
2030	$10.8	$12.7	$8.0	$31.5
2031	$10.7	$13.1	$8.2	$32.0
2032	$10.6	$13.5	$8.5	$32.5
2033	$10.4	$13.8	$8.8	$33.0
2034	$10.2	$14.2	$9.1	$33.5
2035	$10.0	$14.4	$9.4	$33.8

Home Health

Year	65-74	75-84	85+	Total
2023	$29.3	$26.4	$15.1	$70.8
2024	$30.0	$27.5	$15.1	$72.5
2025	$30.6	$28.6	$15.1	$74.3
2026	$31.1	$29.8	$15.2	$76.1
2027	$31.5	$31.1	$15.3	$77.9
2028	$31.8	$32.3	$15.6	$79.7
2029	$31.9	$33.6	$15.9	$81.4
2030	$31.9	$34.8	$16.2	$82.9
2031	$31.6	$35.9	$16.7	$84.3
2032	$31.2	$37.0	$17.3	$85.5
2033	$30.7	$38.0	$17.9	$86.6
2034	$30.1	$38.8	$18.6	$87.5
2035	$29.4	$39.6	$19.2	$88.3

Hospice

Year	65-74	75-84	85+	Total
2023	$27.8	$23.0	$43.8	$94.6
2024	$28.5	$24.0	$43.7	$96.2
2025	$29.0	$25.0	$43.8	$97.9
2026	$29.5	$26.0	$44.1	$99.7
2027	$29.9	$27.1	$44.5	$101.6
2028	$30.2	$28.3	$45.1	$103.6
2029	$30.3	$29.4	$46.0	$105.6
2030	$30.2	$30.4	$47.1	$107.8
2031	$30.0	$31.4	$48.5	$109.9
2032	$29.7	$32.3	$50.1	$112.1
2033	$29.2	$33.2	$51.9	$114.2
2034	$28.6	$33.9	$53.8	$116.3
2035	$27.9	$34.6	$55.8	$118.3

Total Medicaid LTSS

Year	65-74	75-84	85+	Total
2023	$514.2	$583.4	$649.7	$1,747.3
2024	$526.1	$607.5	$649.2	$1,782.8
2025	$536.7	$632.9	$650.5	$1,820.1
2026	$545.7	$659.7	$654.2	$1,859.7
2027	$552.8	$687.5	$660.6	$1,900.9
2028	$557.5	$715.7	$670.0	$1,943.2
2029	$559.7	$743.4	$682.9	$1,986.0
2030	$558.8	$770.2	$699.6	$2,028.6
2031	$554.7	$795.4	$720.2	$2,070.3
2032	$547.9	$818.7	$744.2	$2,110.8
2033	$538.8	$840.1	$770.7	$2,149.6
2034	$528.1	$859.2	$799.1	$2,186.4
2035	$516.4	$875.9	$828.4	$2,220.7

Table 5A.8 Projected Medicaid LTSS Expenditures by LTSS Type 2022-2035 with an Annual Inflation Rate of 2.5% ($Millions)

Medicaid, Nursing Facility

Year	65-74	75-84	85+	Total
2023	$219.1	$330.6	$463.1	$1,012.8
2024	$229.7	$352.9	$474.3	$1,056.9
2025	$240.2	$376.8	$487.2	$1,104.2
2026	$250.4	$402.6	$502.2	$1,155.2
2027	$259.9	$430.1	$519.7	$1,209.8
2028	$268.7	$458.9	$540.4	$1,268.0
2029	$276.5	$488.6	$564.5	$1,329.6
2030	$283.0	$518.9	$592.7	$1,394.6
2031	$287.9	$549.2	$625.5	$1,462.6
2032	$291.5	$579.5	$662.5	$1,533.4
2033	$293.8	$609.4	$703.3	$1,606.5
2034	$295.2	$638.9	$747.4	$1,681.5
2035	$295.8	$667.6	$794.2	$1,757.7

Medicaid Assisted Living Facility

Year	65-74	75-84	85+	Total
2023	$77.0	$100.9	$123.8	$301.7
2024	$80.8	$107.7	$126.8	$315.2
2025	$84.5	$115.0	$130.2	$329.7
2026	$88.0	$122.9	$134.2	$345.1
2027	$91.4	$131.3	$138.9	$361.6
2028	$94.5	$140.0	$144.4	$379.0
2029	$97.2	$149.1	$150.9	$397.2
2030	$99.5	$158.3	$158.4	$416.3
2031	$101.2	$167.6	$167.2	$436.0
2032	$102.5	$176.8	$177.1	$456.4
2033	$103.3	$186.0	$188.0	$477.3
2034	$103.8	$195.0	$199.8	$498.5
2035	$104.0	$203.7	$212.3	$520.0

HCBS

Year	65-74	75-84	85+	Total
2023	$49.4	$45.9	$18.1	$113.4
2024	$51.8	$49.0	$18.6	$119.3
2025	$54.1	$52.3	$19.1	$125.5
2026	$56.4	$55.9	$19.7	$132.0
2027	$58.6	$59.7	$20.4	$138.6
2028	$60.5	$63.7	$21.2	$145.4
2029	$62.3	$67.8	$22.1	$152.2
2030	$63.7	$72.0	$23.2	$159.0
2031	$64.9	$76.2	$24.5	$165.6
2032	$65.7	$80.4	$26.0	$172.0
2033	$66.2	$84.6	$27.6	$178.3
2034	$66.5	$88.7	$29.3	$184.5
2035	$66.7	$92.7	$31.1	$190.4

Personal Care Assistant

Year	65-74	75-84	85+	Total
2023	$152.3	$109.3	$53.0	$314.6
2024	$159.7	$116.6	$54.3	$330.6
2025	$167.0	$124.5	$55.7	$347.3
2026	$174.1	$133.1	$57.4	$364.6
2027	$180.7	$142.2	$59.5	$382.4
2028	$186.9	$151.7	$61.8	$400.3
2029	$192.3	$161.5	$64.6	$418.3
2030	$196.8	$171.5	$67.8	$436.1
2031	$200.2	$181.5	$71.5	$453.3
2032	$202.7	$191.5	$75.8	$470.0
2033	$204.3	$201.4	$80.4	$486.2
2034	$205.3	$211.2	$85.5	$501.9
2035	$205.7	$220.7	$90.8	$517.2

Access Services

Year	65-74	75-84	85+	Total
2023	$8.1	$6.6	$2.1	$16.8
2024	$8.5	$7.0	$2.2	$17.7
2025	$8.9	$7.5	$2.2	$18.7
2026	$9.3	$8.0	$2.3	$19.6
2027	$9.6	$8.6	$2.4	$20.6
2028	$10.0	$9.1	$2.5	$21.6
2029	$10.3	$9.7	$2.6	$22.6
2030	$10.5	$10.3	$2.7	$23.6
2031	$10.7	$10.9	$2.9	$24.5
2032	$10.8	$11.5	$3.0	$25.4
2033	$10.9	$12.1	$3.2	$26.3
2034	$11.0	$12.7	$3.4	$27.1
2035	$11.0	$13.3	$3.6	$27.9

Case Management

Year	65-74	75-84	85+	Total
2023	$11.2	$10.9	$8.4	$30.5
2024	$11.8	$11.6	$8.6	$32.0
2025	$12.3	$12.4	$8.8	$33.5
2026	$12.8	$13.2	$9.1	$35.2
2027	$13.3	$14.2	$9.4	$36.9
2028	$13.8	$15.1	$9.8	$38.6
2029	$14.2	$16.1	$10.2	$40.5
2030	$14.5	$17.1	$10.7	$42.3
2031	$14.8	$18.1	$11.3	$44.1
2032	$15.0	$19.1	$12.0	$46.0
2033	$15.1	$20.1	$12.7	$47.8
2034	$15.1	$21.0	$13.5	$49.7
2035	$15.2	$22.0	$14.3	$51.5

Home Health

Year	65-74	75-84	85+	Total
2023	$33.2	$29.8	$17.1	$80.1
2024	$34.8	$31.8	$17.5	$84.1
2025	$36.4	$34.0	$18.0	$88.3
2026	$37.9	$36.3	$18.5	$92.7
2027	$39.4	$38.8	$19.2	$97.3
2028	$40.7	$41.4	$19.9	$102.0
2029	$41.9	$44.1	$20.8	$106.8
2030	$42.8	$46.8	$21.8	$111.5
2031	$43.6	$49.6	$23.1	$116.2
2032	$44.1	$52.3	$24.4	$120.8
2033	$44.5	$55.0	$25.9	$125.4
2034	$44.7	$57.6	$27.5	$129.9
2035	$44.8	$60.2	$29.3	$134.3

Hospice

Year	65-74	75-84	85+	Total
2023	$31.5	$26.1	$49.5	$107.1
2024	$33.0	$27.8	$50.7	$111.6
2025	$34.5	$29.7	$52.1	$116.3
2026	$36.0	$31.7	$53.7	$121.4
2027	$37.4	$33.9	$55.6	$126.8
2028	$38.6	$36.2	$57.8	$132.6
2029	$39.7	$38.5	$60.4	$138.6
2030	$40.7	$40.9	$63.4	$144.9
2031	$41.4	$43.3	$66.9	$151.6
2032	$41.9	$45.7	$70.8	$158.4
2033	$42.2	$48.0	$75.2	$165.5
2034	$42.4	$50.4	$79.9	$172.7
2035	$42.5	$52.6	$84.9	$180.1

Total Medicaid LTSS

Year	65-74	75-84	85+	Total
2023	$581.8	$660.0	$735.1	$1,976.9
2024	$610.1	$704.5	$752.9	$2,067.5
2025	$638.0	$752.3	$773.3	$2,163.5
2026	$664.9	$803.8	$797.1	$2,265.8
2027	$690.4	$858.6	$825.0	$2,374.0
2028	$713.7	$916.1	$857.7	$2,487.5
2029	$734.3	$975.5	$896.0	$2,605.8
2030	$751.5	$1,035.8	$940.8	$2,728.2
2031	$764.7	$1,096.5	$992.8	$2,853.9
2032	$774.1	$1,156.9	$1,051.5	$2,982.5
2033	$780.4	$1,216.7	$1,116.3	$3,113.3
2034	$784.0	$1,275.5	$1,186.3	$3,245.7
2035	$785.7	$1,332.8	$1,260.6	$3,379.1

Appendix – Chapter 6 Micro Simulation

Report: Long-Term Services and Supports for Minnesota's Older Population: Current and Future Utilization and Payments

November 2023

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Location of Tables

Table 6A.1 shows the mapping used from the original categorization of LTSS sub-groups to the collapsed categories used in the micro simulation.

Table 6A.1 Collapsing of LTSS Subgroups

Original Category	Collapsed Category
DECEASED	DECEASED
EWC	EWC
EWR	EWR
MA NF 0-29 (CONFIRMED NF-LOC)	MA NF 0-29
MA NF 0-29 (NO NF-LOC)	
MA NF 30+ (NO NF-LOC)	MA NF 30-90
MA NF 30-90 (CONFIRMED NF-LOC)	
MA NF 30-90 (PROBABLE NF-LOC)	
MA NF 91+ (NF-LOC)	MA NF 91+
MA NO LTSS OR NF (NF-LOC)	MA Non-LTSS
MA NON-LTSS (NO NF-LOC)	
MA OTHER LTSS W/O WAIVER (NF-LOC)	MA Other LTSS W/O Waiver (Omitted to reduce complexity due to low sample size)
MA OTHER LTSS W/O WAIVER (NO NF-LOC)	
MA PCA W/O WAIVER (NF-LOC)	MA PCA W/O Waiver
MA PCA W/O WAIVER (NO NF-LOC)	
NON-MA AC (NF-LOC)	NON-MA AC
NON-MA NF 0-29 (CONFIRMED NF-LOC)	Non-MA NF 0-29
NON-MA NF 0-29 (NO NF-LOC)	
NON-MA NF 30+ (NO NF-LOC)	Non-MA NF 30+
NON-MA NF 30-90 (CONFIRMED NF-LOC)	
NON-MA NF 30-90 (PROBABLE NF-LOC)	
NON-MA NF 91+ (NF-LOC)	Non-MA NF 91+
NON-MA NO LTSS OR NF (NF-LOC)	NON-MA No LTSS or NF
NON-MA NON-LTSS (NO NF-LOC)	
NON-MA NF 0-29 (CONFIRMED NF-LOC) UNDER 65	Folded into respective Categories (birthday occurring during cohort initial year).
NON-MA NF 0-29 (NO NF-LOC) UNDER 65	
NON-MA NF 30+ (NO NF-LOC) UNDER 65	
NON-MA NF 30-90 (CONFIRMED NF-LOC) UNDER 65	
NON-MA NF 30-90 (PROBABLE NF-LOC) UNDER 65	
NON-MA NF 91+ (NF-LOC) UNDER 65	
NON-MA NO LTSS OR NF (NF-LOC) UNDER 65	
NON-MA NON-LTSS (NO NF-LOC) UNDER 65	
MA NF 0-29 (CONFIRMED NF-LOC) DISABILITY	Pulled out for separate analysis (entire person record pulled out).
MA NF 0-29 (NO NF-LOC) DISABILITY	

Original Category	Collapsed Category
MA NF 30-90 (CONFIRMED NF-LOC) DISABILITY	
MA NF 30-90 (PROBABLE NF-LOC) DISABILITY	
MA NF 30+ (NO NF-LOC) DISABILITY	
MA NF 91+ (NF-LOC) DISABILITY	
MA NO LTSS OR NF (NF-LOC) DISABILITY	
MA NON-LTSS (NO NF-LOC) DISABILITY	

*An indicator variable was created to note if individual was NFLOC or not.

Semi-Model Overview Details

A Markov model has two components, the group that an individual is in at a particular moment in time and how long they remain in that group. For our purposes the groups in the model are the LTSS categories (e.g., nursing facility, Elderly Waiver – Community, etc.) and the length of time in a group is represented by the months that individuals stay in these categories, as well as the number of months they are alive. The simulation is governed by a set of statistical parameters derived from the analysis of empirical data from the Minnesotans age 65 and older in the LTSS population. These parameters are the probabilities of making a transition from one LTSS category to another (e.g., nursing facility to community or back to the nursing facility) and the probabilities of staying in a LTSS category for different time periods (e.g., nursing facility length of stay).

The simulation begins with each person entering a LTSS category at a point in time and then proceeds for a set period of time. Each individual passing through the simulation results in a unique case history containing a detailed record of demographic and other characteristics and months spent in each LTSS category prior to death. The payment amount for care can be assigned to these case histories based on a payment distribution associated with each LTSS category (e.g., nursing facility per diem payments) at each time point (see Chapter 5 for more detail on payment amounts). By altering the size of a cohort, the age distribution, or the entry status probabilities various scenarios can be tested and compared. By repeatedly simulating cohorts, estimates of variability around the projection can be estimated.

The Markov formulation assumes that the probability of moving to a new group depends on current group membership, but not prior group membership. This formulation performs well at the system level although it may produce some unusual individual trajectories (i.e., the model is able to simulate group membership comparable to the overall observed numbers even if some of the simulated individual trajectories do not occur in the observed data).

Length of Time in an LTSS Category

The second important element of the model is how long individuals remain in a group until moving to a new group. For this work, time is measured on a monthly basis. Simulating individual trajectories of monthly group membership permits payment amounts to be assigned based on projected average monthly payment amounts associated with each group. Using probability distributions for time spent in each group allows the model to let the variability in the data impact the simulated outcomes. By repeating the simulation many times, a range of

possible outcomes and the likelihood of their occurrence can be estimated. This allows for a fuller understanding of what the worst, average, and best-case outcomes might be. By varying some of the model assumptions, such as age at entry or the number of individuals presenting for LTSS over time, the impact of these changes can be estimated. The following sections provide additional detail on the estimation of transition probabilities and holding times needed to generate case histories and provide these estimated parameters which were used in the simulation as they serve as potentially useful references.

Transition Probabilities

Table 6A.2 and Table 6A.3 display the observed transition counts and probabilities respectively. Table 6A.2 gives the absolute number of times a transition occurred in the data and Table 6A.3 gives the relative frequency of that occurrence. For both tables, the row label is the group membership occurring first and the column heading is the group membership occurring second (i.e., the individuals move from the row label to the column label).

For illustration, the box in the second row and second column of Table 6A.2 contains the number 7,597. This indicates that 7,597 individuals moved from EWC due to mortality. The corresponding box in Table 6A.3 is 19%, indicating that for 19% of those who moved out of EWC, it was due to mortality. The most frequent transitions from each group are illustrated Figure 6A.1 illustrates the idea of transition probabilities or the likelihood an individual moves from one LTSS subgroup status to a second LTSS subgroup status. As an example of how to read the figure, the arrow going from the EWC oval to the EWR oval indicate that 32% of those leaving the Elderly Waiver Community subgroup enter into the Elderly Waiver Residential subgroup.

Figure 6A.1. Each oval indicates one of the 13 groups, and each arrow indicates a transition that occurred at least 20% of the time. The percentages next to the arrows indicate the percentage of time an individual moving from the group in the oval at the start of the arrow moved to the group in the oval at the end of the arrow. For example, in the top right of the figure, the arrow running from the oval MA NF 91+ to the oval death indicates that 75% of those leaving a Medicaid NF stay of 91 or more days, died.

Table 6A.6 through Table 6A.17 display the model adjusted transition probabilities from each of the 12 groups from which a transition is possible. For each group, a multinomial regression model was used to adjust transition probabilities based on the individual's initial demographic, health, functioning, and service use characteristics. The same set of characteristics are reported in each table, although some models do not include all characteristics. When a characteristic was dropped from the model, it is noted in the table footer. This was done to avoid model estimation issues and biased predictions (predictions that do not match observed values in a systematic way).

Additional Simulation Method Detail

In January of years 2-5 of each cohort a years' worth of individuals entered into the system (some directly into a service use, most into the non-service use subgroups representing those for which service use begins later in the year). Each cohort was simulated 150 times. An additional cohort was run one time (simulated 150 times) covering the years 2016-2020 with the pandemic effect removed, as a comparison group. All simulations utilize the same transition probability distributions and holding time distributions.

Holding Times

In addition to the transitions between groups, the second major component of the model is the length of time an individual remains in a group, sometimes referred to as the holding time. For the semi-Markov model, each transition path between two groups is modeled separately (e.g., given an individual will transition from EWC to EWR, how many months will they remain in EWC until they make the transition). These holding times are modeled using positive right skewed probability distributions. For each path the best fitting distribution of Gamma, Log-Normal, Weibull, Burr (Type 12), and Pareto (Type 2) was chosen using goodness-of-fit criterion. When model fit was not adversely affected, the scale parameters of the distribution were adjusted using a regression model with the same set of independent variables utilized in the multinomial regression models for transition probabilities. All distributions accounted for censoring (individuals remaining in the group until the end of the data period).

Figure 6A.15 through Figure 6A.86 display the holding time distribution for each transition used in the simulation. For each figure, the distribution parameters, median holding time (50th percentile) and probability of remaining in the original subgroup before transitioning to the next subgroup for at least 2 years are given. For example, Figure 6A. 15 indicates that for the time to transition between EWC and death was modeled using a Weibull distribution (with shape parameter equal to 0.97 and scale parameter equal to 20.73). Of those in EWC who would remain in EWC until death, 50% remained in EWC for 14.22 months or longer and 3.2% remained in EWC for 2 years or more prior to death.

Figure 6A.15 Holding Times: EWC to Death

Table 6A.2 Counts of Transition Occurrences for Collapsed LTSS Subgroup Categories

	DECEASED	EWC	EWR	MA NF 0-29	MA NF 30-90	MA NF 91+	MA Non-LTSS	MA PCA No Waiv	NON-MA AC	Non-MA NF 0-29	NON-MA NF 30-90	NON-MA NF 91+	NON-MA NON-LTSS	Total
EWC	7597	0	12748	10343	794	14	4205	1721	125	57	7	0	2363	39974
EWR	10580	12244	0	8233	121	1	1958	11	13	47	0	0	1096	34304
MA NF 0-29	2318	4044	4086	0	23091	0	3107	345	22	8	98	0	180	37299
MA NF 30-90	2770	1793	2277	531	0	22839	1838	136	28	1	99	54	186	32552
MA NF 91+	25244	838	1707	970	16	0	3234	59	22	7	127	1322	227	33773
MA Non-LTSS	3619	14208	4393	12786	3679	1225	0	3021	349	127	17	6	4639	48069
MA PCA W/O Waiver	1330	3698	84	748	211	0	1884	0	6	6	1	0	612	8580
NON-MA AC	1048	505	608	312	19	0	1304	267	0	1869	118	1	2451	8502
NON-MA NF 30-90	6540	33	66	33	1228	324	103	4	337	838	0	24704	24815	59025
NON-MA NF 91+	15429	15	31	10	527	4691	51	1	37	449	9	0	6026	27276
NON-MA NON-LTSS	27517	3629	7624	2375	208	28	16924	160	5770	128868	9237	978	0	203318
Non-MA NF 0-29	9468	50	108	64	1120	0	253	6	1226	0	47564	0	80792	140651
Total	113460	41057	33732	36405	31014	29122	34861	5731	7935	132277	57277	27065	123387	673323

Table 6A.3 Observed Transition Probabilities for Collapsed LTSS Subgroup Categories

	DECEASED	EWC	EWR	MA NF 0-29	MA NF 30-90	MA NF 91+	MA Non-LTSS	MA PCA No Waiv	NON-MA AC	Non-MA NF 0-29	NON-MA NF 30-90	NON-MA NF 91+	NON-MA NON-LTSS	Total
EWC	19%	0%	32%	26%	2%	0%	11%	4%	0%	0%	0%	0%	6%	39974
EWR	31%	36%	0%	24%	0%	0%	6%	0%	0%	0%	0%	0%	3%	34304
MA NF 0-29	6%	11%	11%	0%	62%	0%	8%	1%	0%	0%	0%	0%	0%	37299
MA NF 30-90	9%	6%	7%	2%	0%	70%	6%	0%	0%	0%	0%	0%	1%	32552
MA NF 91+	75%	2%	5%	3%	0%	0%	10%	0%	0%	0%	0%	4%	1%	33773
MA Non-LTSS	8%	30%	9%	27%	8%	3%	0%	6%	1%	0%	0%	0%	10%	48069
MA PCA W/O Waiver	16%	43%	1%	9%	2%	0%	22%	0%	0%	0%	0%	0%	7%	8580
NON-MA AC	12%	6%	7%	4%	0%	0%	15%	3%	0%	22%	1%	0%	29%	8502
NON-MA NF 30-90	11%	0%	0%	0%	2%	1%	0%	0%	1%	1%	0%	42%	42%	60710
NON-MA NF 91+	57%	0%	0%	0%	2%	17%	0%	0%	0%	2%	0%	0%	22%	25389
NON-MA NON-LTSS	14%	2%	4%	1%	0%	0%	8%	0%	3%	63%	5%	0%	0%	203318
Non-MA NF 0-29	7%	0%	0%	0%	1%	0%	0%	0%	1%	0%	34%	0%	57%	140651
Total	17%	6%	5%	5%	5%	4%	5%	1%	1%	20%	9%	4%	18%	673121

Figure 6A.1 illustrates the idea of transition probabilities or the likelihood an individual moves from one LTSS subgroup status to a second LTSS subgroup status. As an example of how to read the figure, the arrow going from the EWC oval to the EWR oval indicate that 32% of those leaving the Elderly Waiver Community subgroup enter into the Elderly Waiver Residential subgroup.

Figure 6A.1 Markov Model Diagram: Only Transitions Greater than 20% are Pictured
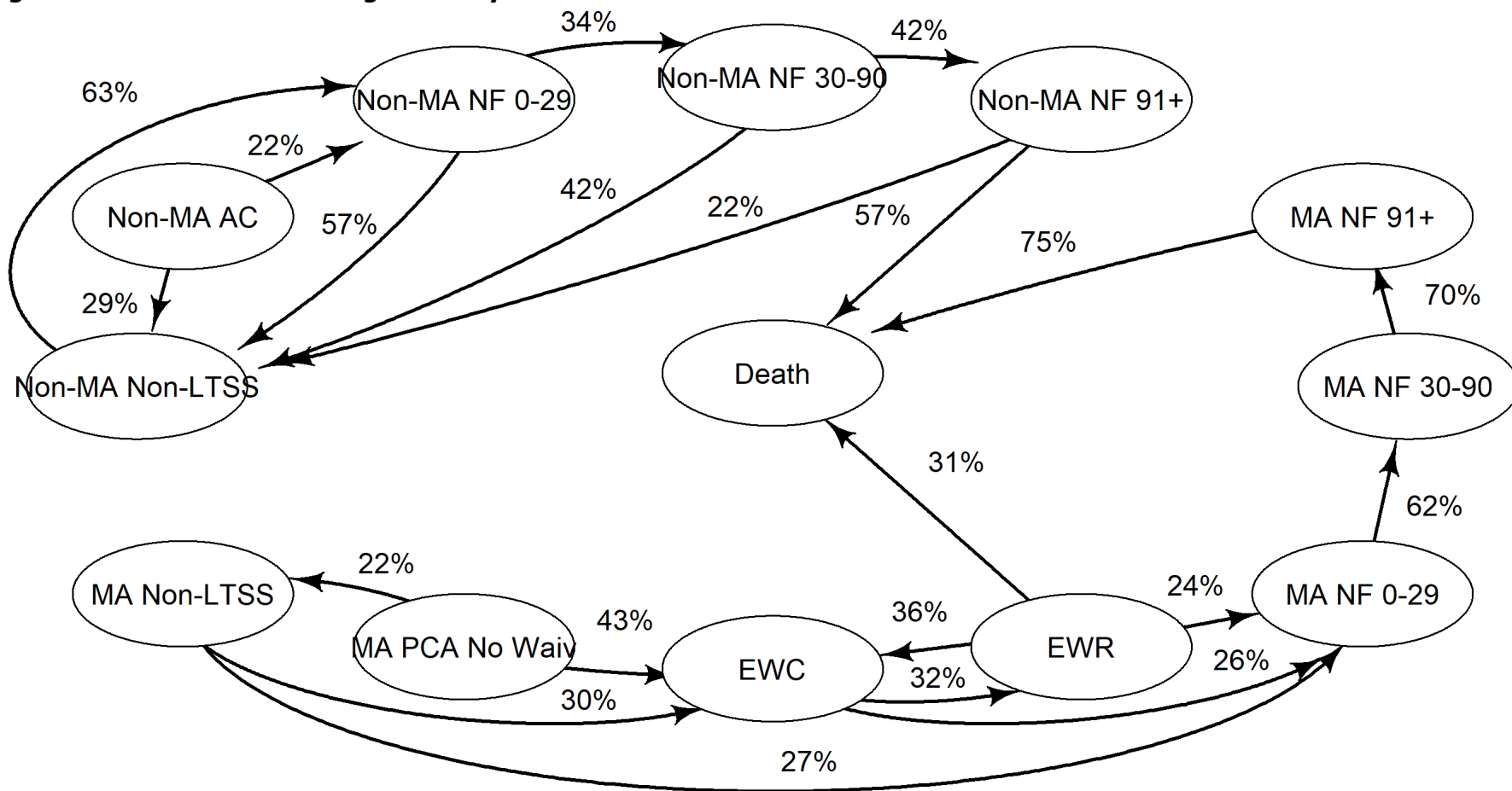
Figure 6A.2 illustrates the idea of transition probabilities or the likelihood an individual moves from one LTSS subgroup status to a second LTSS subgroup status. In this figure, Medicaid enrolled NF stays are collapsed into one group and the non-Medicaid NF stays

are collapsed into a second group. As an example of how to read the figure, the arrow going from the EWC oval to the EWR oval indicate that 32% of those leaving the Elderly Waiver Community subgroup enter into the Elderly Waiver Residential subgroup.

Figure 6A.2 Collapsed Markov Diagram: Only Transitions Greater than 20% are Pictured

Figure 6A.3 displays the observed transition rates between the groups that include Medicaid enrollees, the groups that do not include Medicaid enrollees, and mortality. Approximately 10% of the time, when an individual from a group that does not include Medicaid enrollees transitions to a new group, they enroll in Medicaid.

Figure 6A.3 Observed Transition Rates of Medicaid Conversion and Mortality

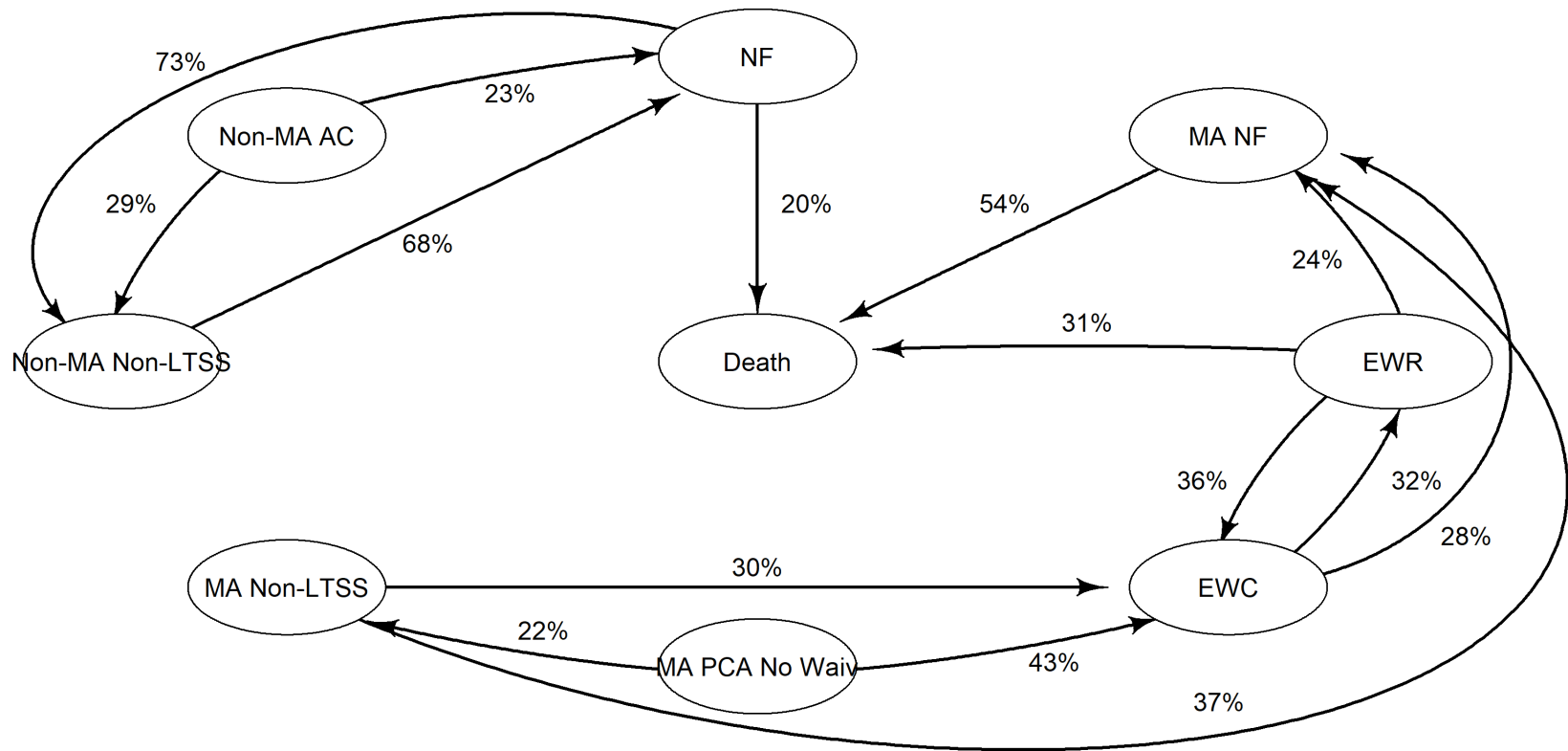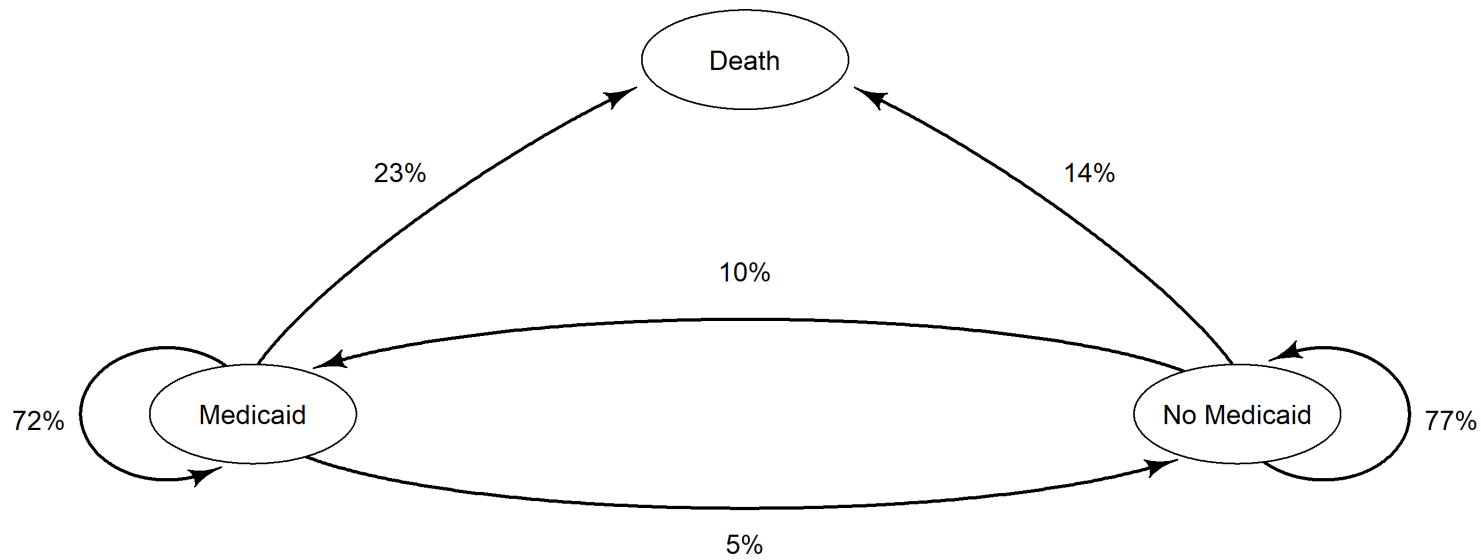Table 6A.4 displays the distribution of entry LTSS subgroup within each age group status assumed for each scenario. These are for the inflows into the system occurring in years 2-5 of each cohort.

Table 6A.4 Distribution of Initial LTSS Subgroup by Age Group for Entry in Year 2 of Cohort or Later

	Base Case			COVID Case/NF Shift Case		
	Age: 65-74	Age: 75-84	Age: 85+	Age: 65-74	Age: 75-84	Age: 85+
EWC	1.1%	0.6%	0.3%	1.3%	0.5%	0.3%
EWR	0.1%	0.3%	0.5%	0.3%	0.5%	0.5%
MA NF 0-29	0.7%	0.7%	0.5%	0.6%	0.5%	0.3%
MA NF 30-90	0.3%	0.0%	0.1%	0.4%	0.0%	0.0%
MA NF 91+	1.6%	0.0%	0.0%	1.6%	0.0%	0.0%
MA Non-LTSS	24.4%	7.3%	2.8%	23.0%	6.5%	2.6%
MA PCA W/O Waiver	4.9%	0.0%	0.1%	5.7%	0.0%	0.1%
NON-MA AC	0.3%	0.3%	0.3%	0.2%	0.3%	0.3%
NON-MA NF 30-90	0.3%	0.3%	0.3%	0.3%	0.3%	0.1%
NON-MA NF 91+	0.3%	0.0%	0.0%	0.3%	0.0%	0.0%
NON-MA NON-LTSS	62.4%	84.7%	88.2%	62.4%	85.5%	88.3%
Non-MA NF 0-29	3.6%	5.9%	7.1%	3.9%	5.9%	7.3%

Table 6A.5 displays the age group distribution of the LTSS population assumed for each simulation year.

Table 6A.5 Assumed Age Group Distribution by Year of LTSS Users

Simulation Year	Age 60-74	Age 75-84	Age 85+
2016	25%	32%	43%
2017	25%	33%	42%
2018	26%	34%	41%
2019	26%	35%	40%
2020	26%	35%	39%
2025	26%	36%	38%
2026	26%	37%	38%
2027	25%	37%	37%
2028	25%	38%	37%
2029	25%	39%	37%
2030	24%	39%	37%
2031	23%	40%	37%
2032	23%	40%	37%
2033	22%	40%	38%
2034	21%	40%	39%
2035	20%	40%	39%
2036	19%	40%	40%
2037	19%	40%	41%
2038	18%	40%	42%
2039	17%	40%	43%

Table 6A.6 Multinomial Model: Marginal Transition Probabilities from EWC

Variable	DECEASED	EWR	MA NF 0-29	MA NF 30-90	MA Non-LTSS	MA PCA W/O Waiver	NON-MA AC	NON-MA NON-LTSS
Baseline	34%	21%	17%	1%	11%	3%	0%	13%
Age 74-84	34%	21%	17%	1%	11%	3%	0%	13%
Age 85+	34%	21%	17%	1%	11%	3%	0%	13%
Div/Sep/Single/Othe	13%	39%	24%	2%	15%	2%	0%	5%
Widowed	17%	44%	21%	2%	9%	2%	1%	5%
Other Metro Area	34%	21%	17%	1%	11%	3%	0%	13%
Outlying Areas	34%	21%	17%	1%	11%	3%	0%	13%
Rural	34%	21%	17%	1%	11%	3%	0%	13%
Unreported Location	34%	21%	17%	1%	11%	3%	0%	13%
Female	34%	21%	17%	1%	11%	3%	0%	13%
Asian/Pacific	34%	21%	17%	1%	11%	3%	0%	13%
Black/African	34%	21%	17%	1%	11%	3%	0%	13%
Hispanic	34%	21%	17%	1%	11%	3%	0%	13%
Multiple Races	34%	21%	17%	1%	11%	3%	0%	13%
Native American	34%	21%	17%	1%	11%	3%	0%	13%
Unreported Race	34%	21%	17%	1%	11%	3%	0%	13%
Does not meet	34%	21%	17%	1%	11%	3%	0%	13%
Prior NF Use	32%	25%	22%	3%	10%	1%	0%	6%
Prior HCBS Use	39%	12%	20%	1%	8%	8%	0%	13%
Dementia	34%	21%	17%	1%	11%	3%	0%	13%
ADL Need Low	34%	21%	17%	1%	11%	3%	0%	13%
ADL Need High	34%	21%	17%	1%	11%	3%	0%	13%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Married, no Prior NF or HCBS use, no dementia diagnosis. Variables not included in the model to avoid estimation errors or biased predictions: Age group, gender, residence location group, race and ethnicity group, meeting NFLOC, ADL assistance need, and pandemic time period.

Table 6A.7 Multinomial Models: Marginal Transition Probabilities from EWR

Variable	DECEASED	EWC	MA NF 0-29	MA NF 30-90	MA Non-LTSS	NON-MA NON-LTSS
Baseline	33%	34%	18%	0%	6%	10%
Age 74-84	41%	27%	18%	0%	5%	9%
Age 85+	51%	21%	17%	0%	4%	7%
Div/Sep/Single/Other	9%	50%	28%	0%	9%	3%
Widowed	14%	45%	27%	0%	8%	5%
Other Metro Area	38%	34%	13%	0%	4%	10%
Outlying Areas	33%	29%	19%	0%	5%	14%
Rural	33%	31%	17%	0%	5%	12%
Unreported Location	3%	40%	0%	0%	33%	25%
Female	33%	34%	18%	0%	6%	10%
Asian/Pacific Islander	24%	57%	10%	0%	3%	6%
Black/African American	17%	46%	18%	0%	7%	11%
Hispanic	29%	36%	17%	0%	7%	10%
Multiple Races	7%	64%	16%	1%	5%	6%
Native American	33%	39%	15%	0%	6%	7%
Unreported Race	44%	38%	1%	0%	2%	15%
Does not meet NFLOC	33%	34%	18%	0%	6%	10%
Prior NF Use	31%	33%	18%	1%	8%	9%
Prior HCBS Use	37%	32%	21%	0%	4%	5%
Dementia	46%	27%	14%	0%	4%	9%
ADL Need Low	25%	42%	15%	0%	5%	13%
ADL Need High	59%	25%	8%	0%	2%	6%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, medium ADL need for assistance, no dementia diagnosis, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: Age group, marital status, meeting NFLOC, ADL assistance need, and pandemic time period.

Table 6A.8 Multinomial Models: Marginal Transition Probabilities from MA NF 0-29

Variable	DECEASED	EWC	EWR	MA NF 30-90	MA Non-LTSS	MA PCA	NON-MA AC	NON-MA NON-LTSS
Baseline	12%	2%	0%	57%	26%	1%	0.1%	2%
Age 74-84	13%	1%	0%	63%	19%	0%	0.1%	2%
Age 85+	17%	1%	0%	67%	13%	0%	0.0%	2%
Div/Sep/Single/Other	4%	1%	0%	62%	32%	0%	0.1%	1%
Widowed	5%	1%	0%	63%	29%	0%	0.1%	1%
Other Metro Area	12%	1%	0%	61%	24%	0%	0.2%	2%
Outlying Areas	14%	2%	0%	65%	17%	0%	0.2%	2%
Rural	11%	2%	0%	65%	20%	0%	0.1%	3%
Unreported Location	12%	2%	0%	57%	26%	1%	0.1%	2%
Female	11%	2%	0%	55%	27%	1%	0.1%	3%
Asian/Pacific Islander	14%	4%	0%	44%	27%	6%	0.0%	5%
Black/African	8%	3%	0%	52%	30%	4%	0.0%	3%
Hispanic	11%	3%	0%	42%	41%	1%	0.0%	1%
Multiple Races	13%	3%	0%	51%	26%	1%	0.0%	5%
Native American	10%	2%	0%	49%	30%	4%	0.0%	5%
Unreported Race	12%	2%	0%	57%	26%	1%	0.1%	2%
Does not meet NFLOC	12%	2%	0%	57%	26%	1%	0.1%	2%
Prior NF Use	11%	2%	0%	65%	19%	1%	0.1%	2%
Prior HCBS Use	15%	3%	0%	59%	18%	3%	0.1%	1%
Dementia	9%	1%	0%	72%	16%	0%	0.1%	1%
ADL Need Low	12%	2%	0%	57%	26%	1%	0.1%	2%
ADL Need High	12%	2%	0%	57%	26%	1%	0.1%	2%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, medium ADL need for assistance, no dementia diagnosis, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: ADL assistance need.

Table 6A.9 Multinomial Models: Marginal Transition Probabilities from MA NF 30-90

Variable	DECEASED	EWC	EWR	MA NF 0-29	MA NF 91+	MA Non-LTSS	MA PCA W/O Waiver	NON-MA AC	NON-MA NON-LTSS
Baseline	19%	6%	3%	3%	48%	16%	0%	0%	4%
Age 74-84	23%	4%	4%	3%	52%	11%	0%	0%	3%
Age 85+	29%	2%	3%	2%	56%	6%	0%	0%	2%
Div/Sep/Single/Oth	6%	6%	8%	3%	58%	17%	0%	0%	1%
Widowed	9%	5%	7%	3%	58%	16%	0%	1%	1%
Other Metro Area	16%	9%	4%	2%	47%	16%	0%	0%	5%
Outlying Areas	19%	6%	2%	3%	48%	14%	0%	0%	9%
Rural	18%	7%	2%	2%	52%	13%	0%	0%	5%
Unreported	19%	6%	3%	3%	48%	16%	0%	0%	4%
Female	19%	8%	4%	4%	48%	14%	1%	0%	3%
Asian/Pacific	13%	14%	1%	5%	39%	18%	7%	0%	3%
Black/African	17%	11%	2%	3%	44%	16%	4%	0%	2%
Hispanic	13%	9%	3%	3%	41%	26%	1%	0%	4%
Multiple Races	20%	6%	3%	2%	44%	25%	0%	0%	0%
Native American	18%	7%	1%	5%	39%	23%	2%	0%	5%
Unreported Race	40%	8%	20%	0%	32%	0%	0%	0%	0%
Does not meet	9%	0%	0%	2%	79%	9%	0%	0%	1%
Prior NF Use	17%	5%	3%	4%	51%	14%	0%	0%	6%
Prior HCBS Use	25%	13%	5%	3%	43%	8%	1%	0%	2%
Dementia	16%	4%	4%	2%	63%	9%	0%	0%	1%
ADL Need Low	19%	6%	3%	3%	48%	16%	0%	0%	4%
ADL Need High	19%	6%	3%	3%	48%	16%	0%	0%	4%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, medium ADL need for assistance, no dementia diagnosis, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: ADL assistance need.

Table 6A.10 Multinomial Models: Marginal Transition Probabilities from MA NF 91+

Variable	DECEASED	EWC	EWR	MA NF 0-29	MA Non-LTSS	MA PCA W/O Waiver	NON-MA AC	Non-MA NF 91+	NON-MA NON-LTSS
Baseline	49%	5%	14%	5%	19%	0%	0%	6%	1%
Age 74-84	68%	2%	7%	4%	12%	0%	0%	6%	1%
Age 85+	83%	1%	3%	2%	6%	0%	0%	6%	0%
Div/Sep/Single/Oth	49%	5%	14%	5%	19%	0%	0%	6%	1%
Widowed	49%	5%	14%	5%	19%	0%	0%	6%	1%
Other Metro Area	49%	6%	16%	4%	17%	0%	0%	6%	2%
Outlying Areas	53%	6%	12%	4%	17%	0%	0%	6%	1%
Rural	54%	7%	11%	3%	17%	0%	0%	7%	1%
Unreported	49%	5%	14%	5%	19%	0%	0%	6%	1%
Female	50%	6%	13%	5%	17%	0%	0%	7%	1%
Asian/Pacific	36%	12%	13%	3%	24%	4%	0%	6%	2%
Black/African	29%	12%	15%	7%	27%	2%	0%	6%	2%
Hispanic	37%	7%	10%	5%	36%	2%	0%	3%	1%
Multiple Races	42%	0%	21%	0%	21%	0%	0%	12%	4%
Native American	42%	5%	10%	7%	26%	2%	0%	7%	1%
Unreported Race	49%	5%	14%	5%	19%	0%	0%	6%	1%
Does not meet	33%	2%	1%	9%	47%	0%	0%	2%	4%
Prior NF Use	49%	5%	14%	5%	19%	0%	0%	6%	1%
Prior HCBS Use	50%	8%	14%	5%	18%	0%	0%	4%	1%
Dementia	49%	5%	14%	5%	19%	0%	0%	6%	1%
ADL Need Low	49%	5%	14%	5%	19%	0%	0%	6%	1%
ADL Need High	49%	5%	14%	5%	19%	0%	0%	6%	1%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior HCBS use, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: marital status, prior NF use, ADL need for assistance, cognitive status.

Table 6A.11 Multinomial Models: Marginal Transition Probabilities from MA Non-LTSS

Variable	DECEASED	EWC	EWR	MA NF 0-29	MA NF 30-90	MA NF 91+	MA PCA W/O Waiver	NON-MA AC	Non-MA NF 0-29	NON-MA NF 30-90	NON-MA NON-LTSS
Baseline	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
Age 74-84	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
Age 85+	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
Div/Sep/Single/Other	7%	34%	5%	22%	6%	1%	7%	1%	0%	0%	16%
Widowed	9%	26%	8%	25%	9%	2%	8%	2%	0%	0%	13%
Other Metro Area	14%	21%	4%	19%	5%	1%	12%	1%	0%	0%	22%
Outlying Areas	14%	22%	4%	24%	7%	1%	3%	2%	0%	0%	23%
Rural	15%	22%	3%	24%	6%	1%	7%	1%	0%	0%	21%
Unreported Location	6%	15%	0%	0%	0%	0%	10%	0%	0%	0%	68%
Female	9%	35%	3%	14%	4%	1%	12%	1%	0%	0%	20%
Asian/Pacific Islander	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
Black/African	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
Hispanic	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
Multiple Races	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
Native American	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
Unreported Race	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
Does not meet	5%	35%	2%	27%	3%	1%	10%	1%	0%	0%	15%
Prior NF Use	28%	9%	2%	18%	18%	4%	2%	1%	0%	0%	18%
Prior HCBS Use	11%	21%	1%	9%	5%	1%	28%	1%	0%	0%	23%
Dementia	14%	25%	7%	22%	6%	2%	8%	1%	0%	0%	14%
ADL Need Low	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%
ADL Need High	12%	29%	2%	18%	5%	1%	12%	1%	0%	0%	21%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, medium ADL need for assistance, no dementia diagnosis, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: Age group, race and ethnicity, prior NF use, prior HCBS use, and ADL assistance need.

Table 6A.12 Multinomial Models: Marginal Transition Probabilities from PCA without a Waiver

Variable	DECEASED	EWC	EWR	MA NF 0-29	MA NF 30-90	MA Non-LTSS	NON-MA NON-LTSS
Baseline	20%	38%	1%	11%	5%	17%	9%
Age 74-84	20%	38%	1%	11%	5%	17%	9%
Age 85+	20%	38%	1%	11%	5%	17%	9%
Div/Sep/Single/Other	10%	37%	5%	22%	7%	16%	4%
Widowed	16%	29%	7%	23%	6%	14%	5%
Other Metro Area	19%	24%	1%	6%	4%	32%	15%
Outlying Areas	15%	37%	1%	9%	12%	13%	13%
Rural	23%	28%	1%	10%	4%	21%	13%
Unreported Location	1%	10%	0%	0%	0%	28%	62%
Female	16%	43%	1%	10%	6%	16%	8%
Asian/Pacific Islander	22%	49%	0%	2%	0%	18%	9%
Black/African American	12%	50%	0%	4%	1%	24%	10%
Hispanic	24%	41%	0%	3%	1%	20%	12%
Multiple Races	12%	35%	0%	1%	0%	35%	17%
Native American	29%	28%	0%	8%	1%	25%	9%
Unreported Race	19%	15%	0%	0%	0%	24%	41%
Does not meet NFLOC	14%	41%	1%	7%	2%	26%	9%
Prior NF Use	19%	22%	1%	22%	18%	13%	6%
Prior HCBS Use	24%	38%	0%	9%	3%	17%	8%
Dementia	28%	32%	2%	13%	6%	11%	8%
ADL Need Low	20%	38%	1%	11%	5%	17%	9%
ADL Need High	20%	38%	1%	11%	5%	17%	9%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, medium ADL need for assistance, no dementia diagnosis, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: Age group, race and ethnicity, and ADL assistance need.

Table 6A.13 Multinomial Models: Marginal Transition Probabilities from Alternative Care

Variable	DECEASED	EWC	EWR	MA NF 0-29	MA NF 30-90	MA Non-LTSS	MA PCA W/O Waiver	Non-MA NF 0-29	NON-MA NF 30-90	NON-MA NON-
Baseline	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Age 74-84	22%	5%	3%	2%	0%	7%	2%	30%	2%	28%
Age 85+	24%	4%	3%	2%	0%	7%	3%	27%	1%	28%
Div/Sep/Single/	15%	3%	3%	4%	0%	12%	5%	32%	4%	22%
Widowed	18%	2%	2%	4%	0%	11%	6%	31%	4%	21%
Other Metro	13%	8%	2%	2%	0%	12%	2%	26%	2%	33%
Outlying Areas	23%	5%	2%	1%	0%	8%	1%	28%	2%	30%
Rural	15%	8%	2%	2%	0%	10%	2%	23%	1%	36%
Unreported	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Female	15%	8%	2%	1%	0%	7%	3%	30%	2%	33%
Asian/Pacific	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Black/African	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Hispanic	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Multiple Races	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Native American	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Unreported Race	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Does not meet	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Prior NF Use	24%	4%	2%	2%	0%	9%	3%	35%	4%	18%
Prior HCBS Use	19%	5%	2%	2%	0%	7%	3%	28%	2%	32%
Dementia	17%	8%	3%	2%	0%	10%	4%	22%	2%	32%
ADL Need Low	14%	8%	2%	1%	0%	9%	1%	18%	1%	45%
ADL Need High	33%	4%	0%	0%	0%	1%	1%	7%	1%	53%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, medium ADL need for assistance, no dementia diagnosis, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: Race and ethnicity, prior HCBS use, and pandemic time period.

Table 6A.14 Multinomial Models: Marginal Transition Probabilities from Non-Medicaid Nursing Facility Stay 0-29 Days

Variable	DECEASED	EWC	EWR	MA NF 0-29	MA NF 30-90	MA Non-LTSS	MA PCA W/O Waiver	NON-MA AC	NON-MA NF 30-90	NON-MA NON-LTSS
Baseline	8%	0%	0%	0%	2%	1%	0%	32%	28%	29%
Age 74-84	11%	0%	0%	0%	2%	1%	0%	25%	32%	29%
Age 85+	15%	0%	0%	0%	3%	0%	0%	19%	37%	24%
Div/Sep/Single/	6%	0%	1%	0%	6%	2%	0%	43%	23%	19%
Widowed	6%	0%	0%	0%	4%	1%	0%	43%	25%	21%
Other Metro	8%	0%	0%	0%	2%	0%	0%	21%	38%	31%
Outlying Areas	9%	0%	0%	0%	2%	1%	0%	26%	37%	25%
Rural	10%	0%	0%	0%	3%	1%	0%	22%	43%	21%
Unreported	8%	0%	0%	0%	2%	1%	0%	32%	28%	29%
Female	5%	0%	0%	0%	2%	1%	0%	35%	26%	31%
Asian/Pacific	10%	1%	0%	0%	2%	3%	0%	12%	34%	38%
Black/African	6%	0%	0%	0%	2%	2%	0%	43%	25%	22%
Hispanic	7%	1%	0%	0%	2%	2%	0%	29%	30%	29%
Multiple Races	9%	0%	0%	0%	2%	0%	0%	59%	14%	16%
Native American	9%	0%	0%	1%	3%	3%	0%	18%	30%	37%
Unreported	15%	0%	0%	0%	0%	0%	0%	20%	25%	41%
Does not meet	5%	0%	0%	0%	0%	0%	0%	0%	24%	71%
Prior NF Use	8%	0%	0%	0%	3%	1%	0%	28%	36%	25%
Prior HCBS Use	8%	0%	0%	0%	2%	1%	0%	49%	23%	15%
Dementia	8%	0%	0%	0%	2%	1%	0%	32%	28%	29%
ADL Need Low	8%	0%	0%	0%	2%	1%	0%	32%	28%	29%
ADL Need High	8%	0%	0%	0%	2%	1%	0%	32%	28%	29%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: Dementia, ADL.

Table 6A.15 Multinomial Models: Marginal Transition Probabilities from Non-Medicaid Nursing Facility 30-90 Day Stay

Variable	DECEASED	EWC	EWR	MA NF 0-29	MA NF 30-90	MA Non-LTSS	MA PCA W/O Waiver	NON-MA AC	NON-MA NF 30-90	NON-MA NON-LTSS
Baseline	9%	0%	0%	0%	1%	0%	0%	0%	2%	26%
Age 74-84	11%	0%	0%	0%	1%	0%	0%	0%	2%	30%
Age 85+	16%	0%	0%	0%	1%	0%	0%	0%	1%	38%
Div/Sep/Single/Oth	9%	0%	0%	0%	4%	1%	1%	1%	2%	29%
Widowed	9%	0%	0%	0%	2%	1%	1%	1%	2%	30%
Other Metro Area	8%	0%	0%	0%	1%	0%	0%	0%	1%	27%
Outlying Areas	10%	0%	0%	0%	1%	0%	0%	0%	2%	31%
Rural	10%	0%	0%	0%	1%	0%	0%	0%	1%	36%
Unreported	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Female	6%	0%	0%	0%	1%	0%	0%	0%	2%	22%
Asian/Pacific	9%	0%	0%	0%	1%	0%	0%	0%	2%	26%
Black/African	9%	0%	0%	0%	1%	0%	0%	0%	3%	31%
Hispanic	7%	0%	0%	0%	0%	0%	1%	0%	3%	25%
Multiple Races	9%	0%	0%	0%	1%	0%	0%	0%	9%	20%
Native American	15%	0%	0%	0%	1%	0%	1%	1%	2%	23%
Unreported Race	10%	0%	0%	0%	0%	0%	0%	0%	1%	14%
Does not meet	6%	0%	0%	0%	1%	0%	0%	0%	1%	51%
Prior NF Use	9%	0%	0%	0%	1%	0%	0%	0%	2%	34%
Prior HCBS Use	15%	0%	0%	1%	5%	1%	1%	11%	2%	27%
Dementia	9%	0%	0%	0%	1%	0%	0%	0%	2%	26%
ADL Need Low	9%	0%	0%	0%	1%	0%	0%	0%	2%	26%
ADL Need High	9%	0%	0%	0%	1%	0%	0%	0%	2%	26%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: Dementia, ADL.

Table 6A.16 Multinomial Models: Marginal Transition Probabilities from Non-Medicaid Nursing Facility 91+ Day Stay

Variable	DECEASED	EWC	EWR	MA NF 0-29	MA NF 30-90	MA NF 91+	MA Non-LTSS	NON-MA AC	Non-MA NF 0-29	NON-MA NF 30-90	NON-MA NON-LTSS
Baseline	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Age 74-84	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Age 85+	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Div/Sep/Single/Oth	49%	0%	1%	0%	0%	21%	0%	0%	3%	0%	25%
Widowed	68%	0%	0%	0%	0%	14%	0%	0%	1%	0%	16%
Other Metro Area	66%	0%	0%	0%	0%	5%	0%	0%	2%	0%	27%
Outlying Areas	69%	0%	0%	0%	0%	5%	0%	0%	2%	0%	24%
Rural	69%	0%	0%	0%	0%	5%	0%	0%	1%	0%	25%
Unreported	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Female	61%	0%	0%	0%	0%	6%	0%	0%	2%	0%	30%
Asian/Pacific	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Black/African	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Hispanic	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Multiple Races	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Native American	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Unreported Race	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
Does not meet	37%	0%	0%	0%	2%	1%	0%	0%	3%	0%	57%
Prior NF Use	75%	0%	0%	0%	0%	7%	0%	0%	1%	0%	16%
Prior HCBS Use	59%	1%	1%	0%	0%	12%	1%	1%	4%	0%	22%
Dementia	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
ADL Need Low	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%
ADL Need High	67%	0%	0%	0%	0%	4%	0%	0%	2%	0%	26%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: Dementia, ADL.

Table 6A.17 Multinomial Models: Marginal Transition Probabilities from Non-Medicaid Non-LTSS

Variable	DECEASED	EWC	EWR	MA NF 0-29	MA NF 30-90	MA NF 91+	MA Non-LTSS	NON-MA AC	Non-MA NF 0-29	NON-MA NF 30-90	NON-MA NON-LTSS
Baseline	23%	11%	6%	2%	0%	0%	14%	0%	7%	31%	5%
Age 74-84	27%	8%	11%	2%	0%	0%	10%	0%	6%	31%	5%
Age 85+	33%	5%	13%	2%	0%	0%	7%	0%	4%	29%	6%
Div/Sep/Single/Oth	7%	11%	17%	3%	0%	0%	27%	0%	20%	11%	2%
Widowed	14%	10%	19%	3%	0%	0%	22%	0%	7%	19%	4%
Other Metro Area	23%	11%	6%	2%	0%	0%	14%	0%	7%	31%	5%
Outlying Areas	23%	11%	6%	2%	0%	0%	14%	0%	7%	31%	5%
Rural	23%	11%	6%	2%	0%	0%	14%	0%	7%	31%	5%
Unreported	23%	11%	6%	2%	0%	0%	14%	0%	7%	31%	5%
Female	18%	14%	8%	2%	0%	0%	14%	0%	10%	30%	4%
Asian/Pacific	5%	26%	1%	1%	0%	0%	52%	6%	3%	5%	1%
Black/African	10%	23%	1%	1%	0%	0%	41%	3%	8%	11%	2%
Hispanic	10%	21%	4%	1%	0%	0%	40%	1%	8%	12%	1%
Multiple Races	13%	28%	7%	2%	0%	0%	22%	2%	7%	17%	2%
Native American	12%	21%	4%	2%	1%	0%	32%	3%	6%	16%	2%
Unreported Race	26%	9%	7%	0%	0%	0%	8%	2%	12%	33%	1%
Does not meet	13%	1%	0%	1%	0%	0%	4%	0%	1%	75%	4%
Prior NF Use	32%	5%	5%	2%	1%	0%	11%	0%	4%	26%	12%
Prior HCBS Use	20%	19%	9%	2%	0%	0%	28%	3%	7%	9%	2%
Dementia	23%	11%	6%	2%	0%	0%	14%	0%	7%	31%	5%
ADL Need Low	23%	11%	6%	2%	0%	0%	14%	0%	7%	31%	5%
ADL Need High	23%	11%	6%	2%	0%	0%	14%	0%	7%	31%	5%

Div/Sep/Single = Divorced or Separated or Single Never Married. NFLOC = Nursing Facility Level of Care, NF = Nursing Facility, HCBS = Home and Community Based Care, ADL = Activity of Daily Living. Baseline: Age 65-74, Married, Meets NFLOC, Twin Cities, Male, White (non-Hispanic), no Prior NF or HCBS use, medium ADL need for assistance, no dementia diagnosis, pre-Pandemic period. Variables not included in the model to avoid estimation errors or biased predictions: Location group, dementia, ADL assistance need.

Uncertainty in Survival and Mortality Rates

Figure 6A.4 through Figure 6A.11 gives the 5-year survival curves across all scenarios for a give LTSS subgroup with a simulated 95% Confidence Interval. Figure 6A.12 through Figure 6A.14 gives the same information for Medicaid conversion (also across all scenarios). The pooling of scenarios was done because the differences in both mortality and Medicaid conversion were stable across scenarios (very little difference).

Figure 6A.4 Survival Rate over a 60 Month Period for those Beginning in Alternative Care
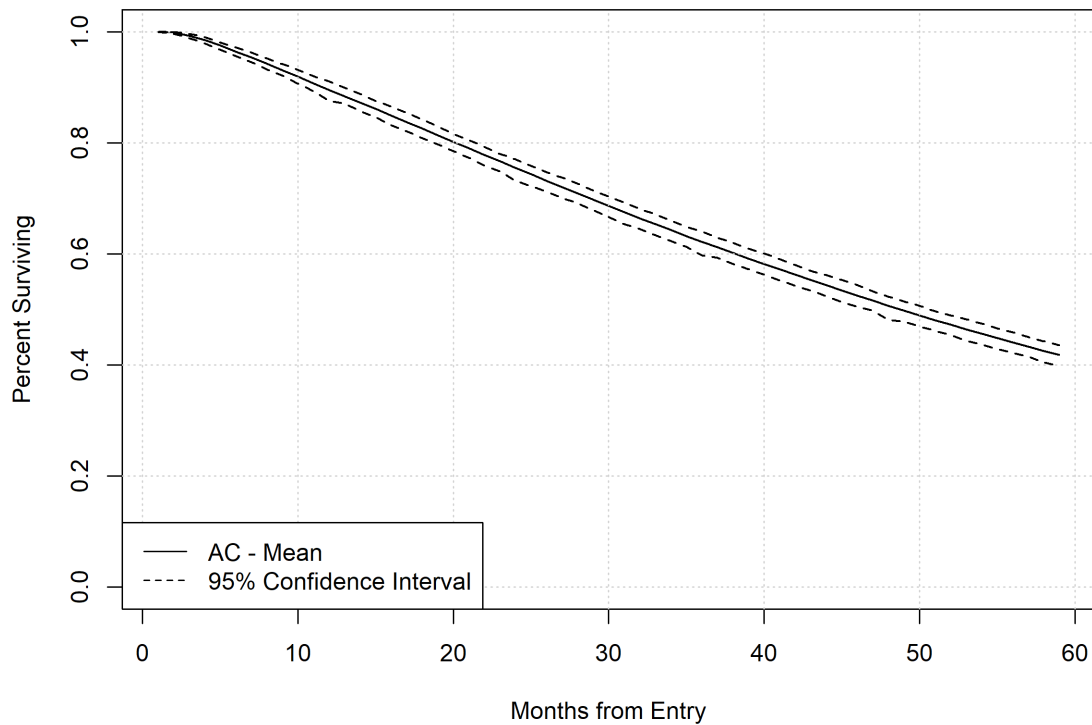
Figure 6A.5 Survival Rate over a 60 Month Period for those Beginning in EW Community
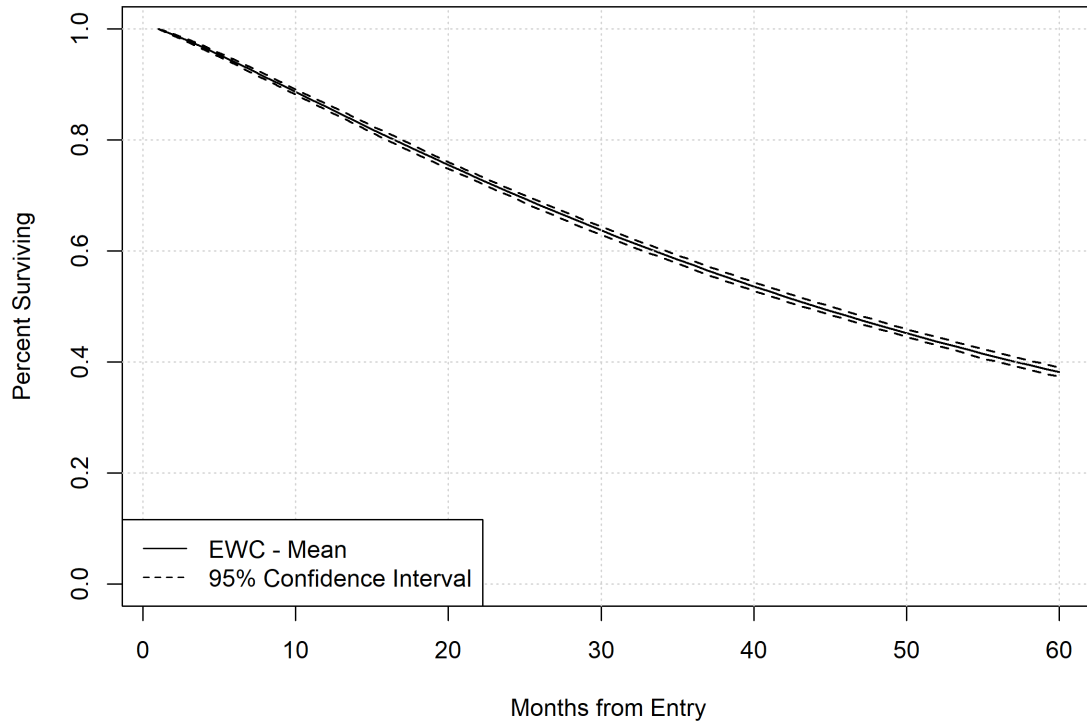
Figure 6A.6 Survival Rate over a 60 Month Period for those Beginning in EW Residential
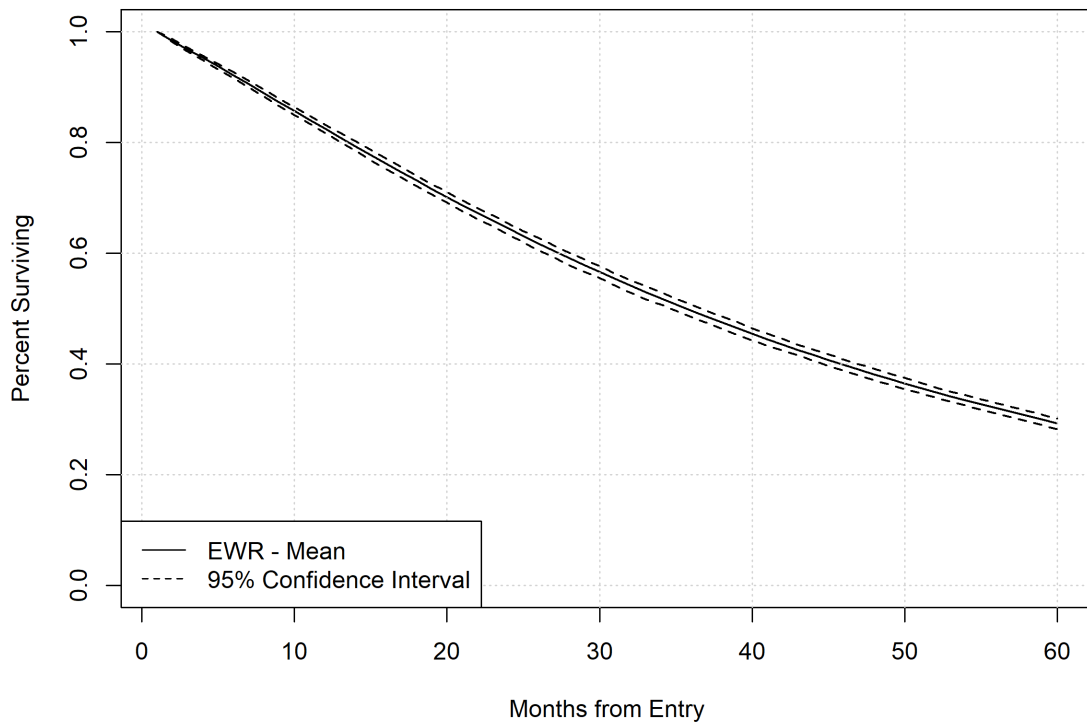
Figure 6A.7 Survival Rate over a 60 Month Period for those Beginning in a Medicaid NF Stay

Survival Rate over a 60 Month Period for those Beginning in a Medicaid NF Stay
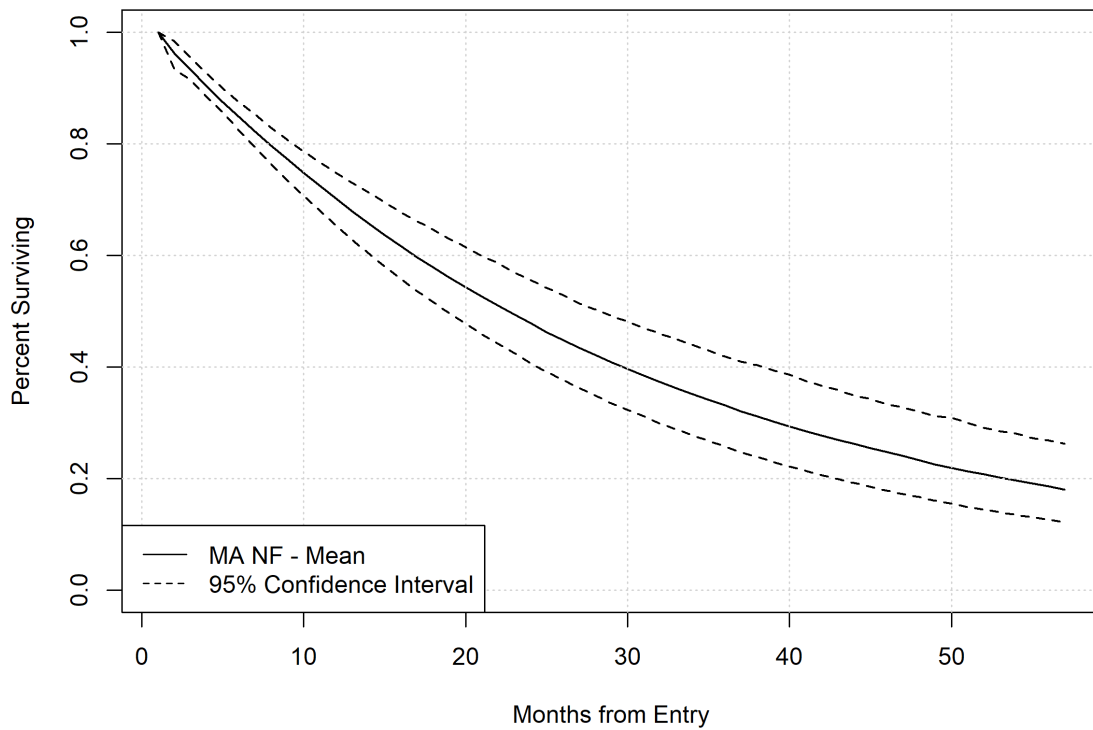
Figure 6A.8 Survival Rate over a 60 Month Period for those Beginning Enrolled in Medicaid with no LTSS
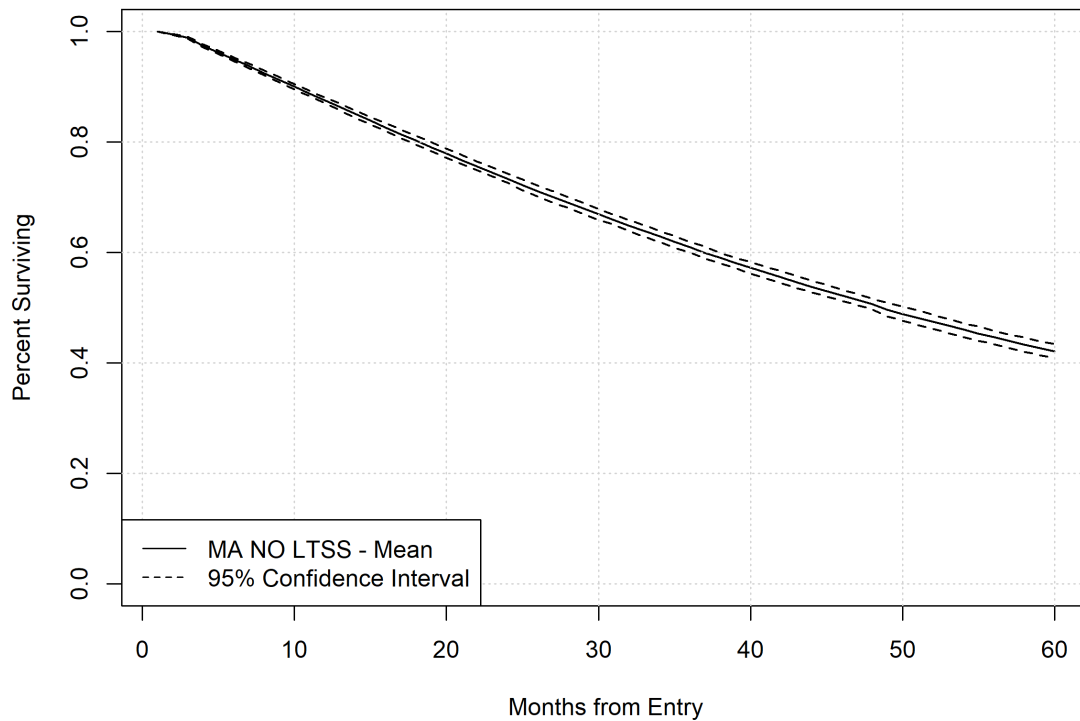
Figure 6A.9 Survival Rate over a 60 Month Period for those Beginning in a NF without MA
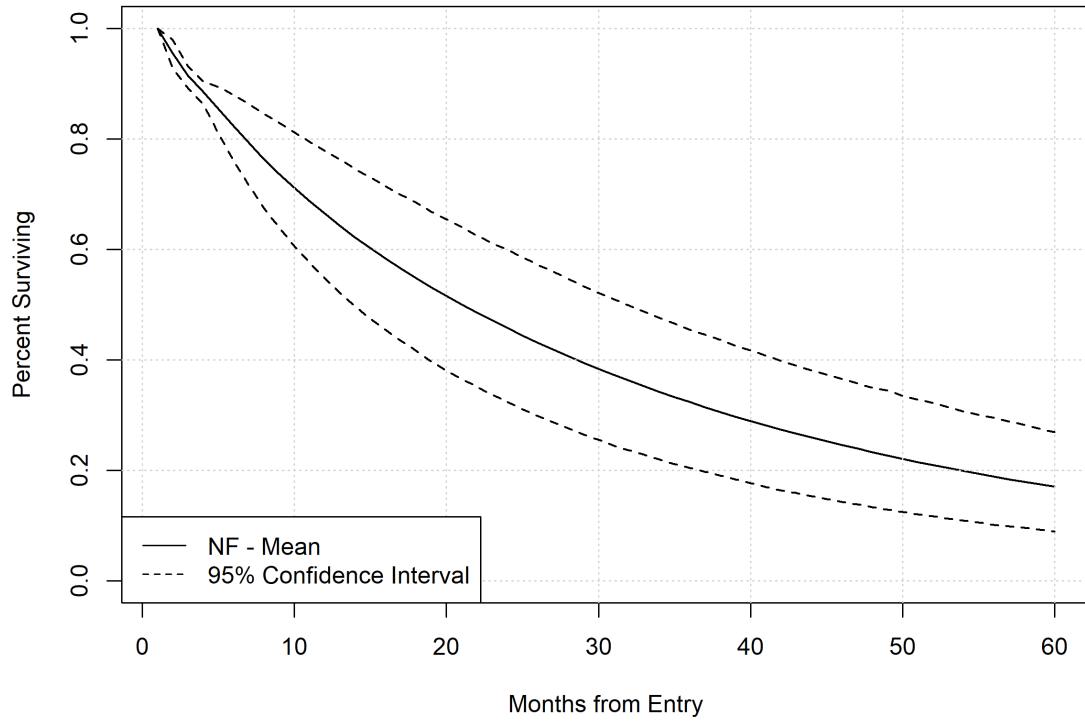
Figure 6A.10 Survival Rate over a 60 Month Period for those Beginning without MA or LTSS
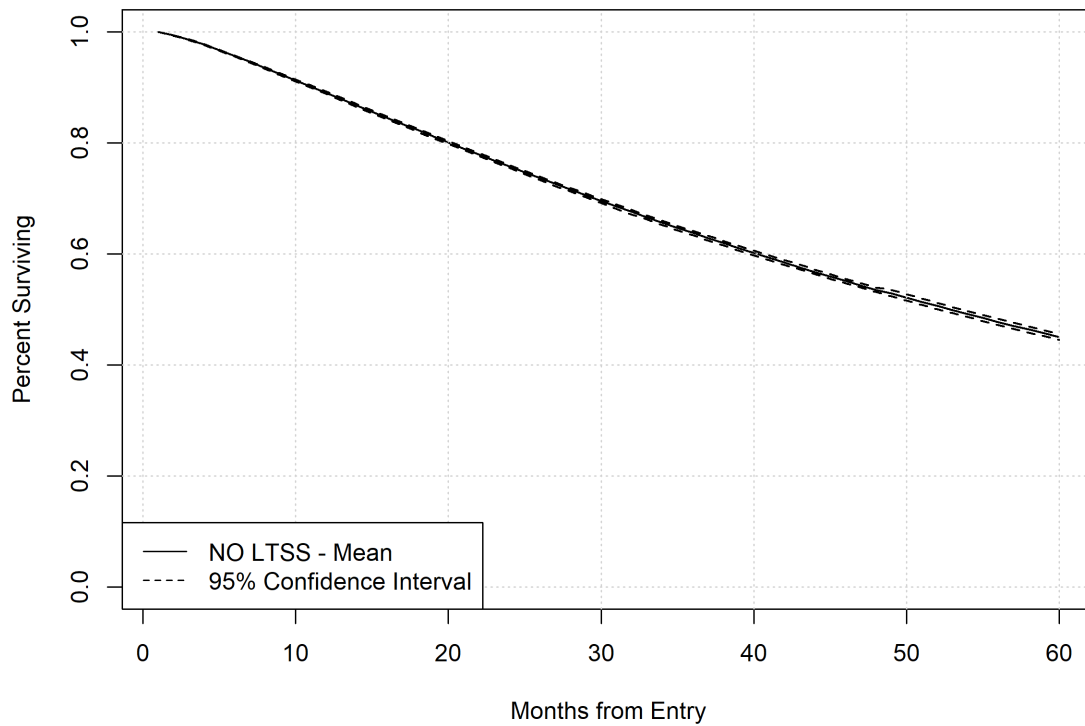
Figure 6A.11 Survival Rate over a 60 Month Period for those Beginning with PCA and not enrolled in a Waiver Program
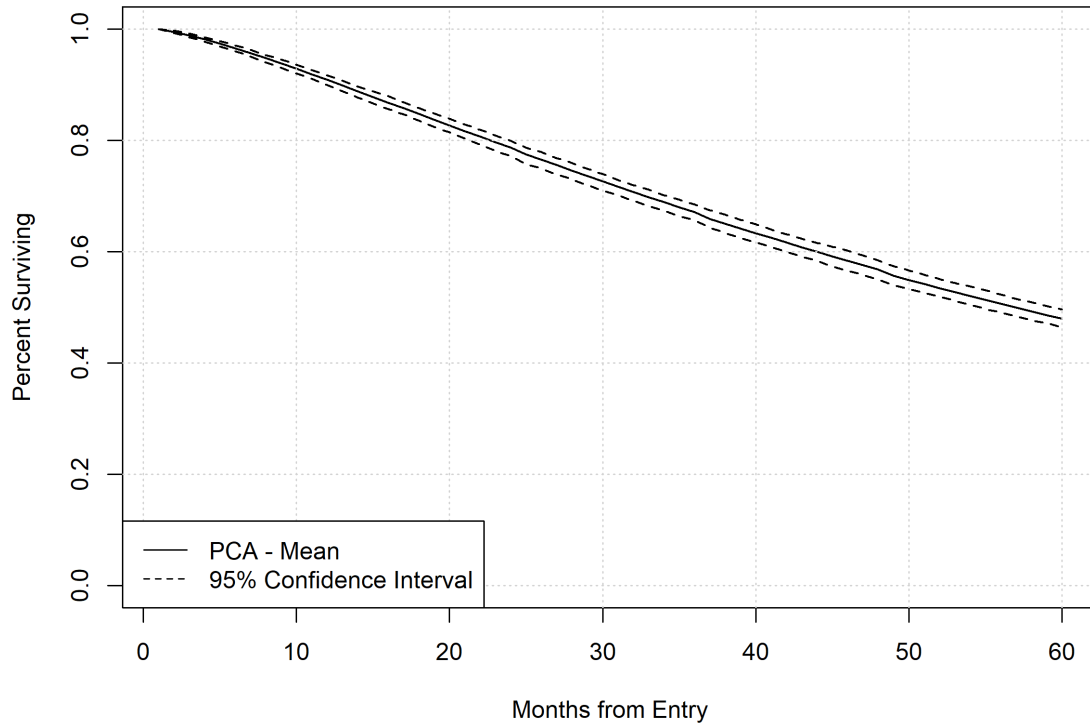
Figure 6A.12 Medicaid Conversion Rate over 60 Months for those Beginning in Alternative Care
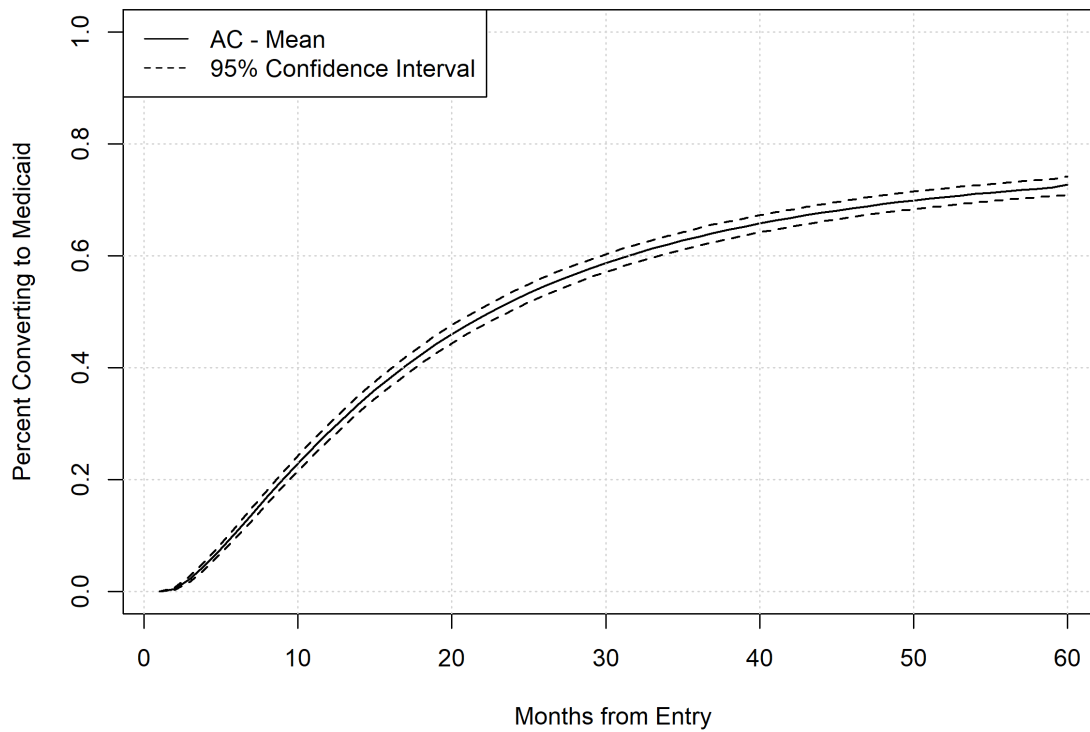
Figure 6A.13 Medicaid Conversion Rate over 60 Months for those Beginning in a NF
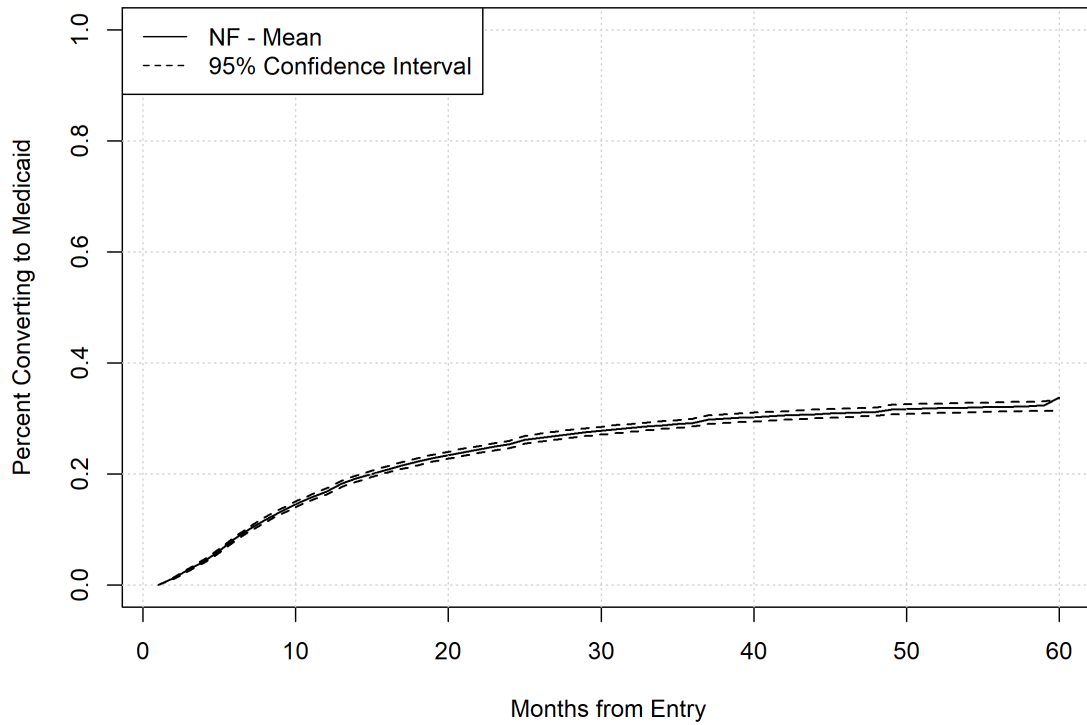
Figure 6A.14 Medicaid Conversion Rate over 60 Months for those Beginning without MA or LTSS
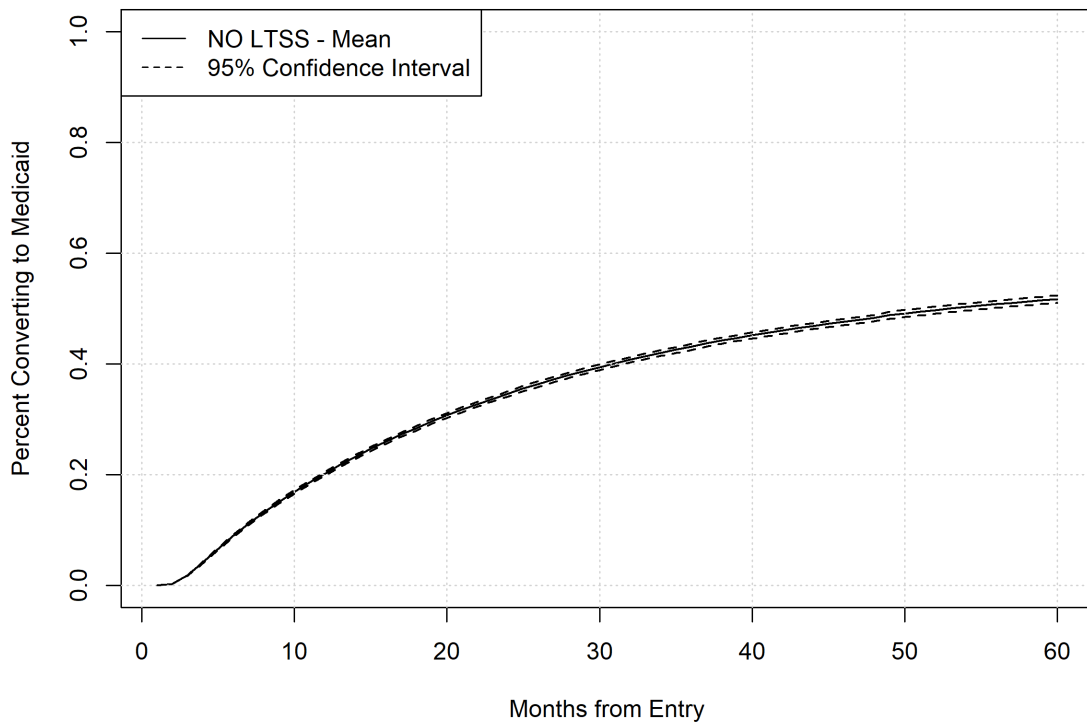
Table 6A.18 Simulated 95% Confidence Intervals for Average Monthly Total Person Months of LTSS by Subgroup, Scenario, and Cohort

		2025 Cohort		2030 Cohort		2035 Cohort	
	Scenario	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
EW Community	Baseline	17,658	17,902	19,625	19,872	20,730	21,021
EW Residential	Baseline	14,256	14,511	15,914	16,149	17,308	17,578
MA NF	Baseline	15,684	15,954	17,407	17,666	18,989	19,296
PCA	Baseline	3,989	4,133	4,358	4,506	4,483	4,623
AC	Baseline	4,587	4,718	5,123	5,272	5,577	5,733
Non-MA NF	Baseline	7,987	8,112	8,941	9,065	9,977	10,103
EW Community	COVID	12,925	13,133	14,135	14,365	13,994	14,239
EW Residential	COVID	10,479	10,706	11,530	11,765	11,777	11,994
MA NF	COVID	10,653	10,891	11,649	11,861	11,896	12,104
PCA	COVID	2,982	3,100	3,198	3,324	3,067	3,185
AC	COVID	3,270	3,383	3,595	3,721	3,652	3,773
Non-MA NF	COVID	5,727	5,832	6,305	6,414	6,584	6,691
EW Community	NF Shift	18,201	18,479	20,222	20,517	21,425	21,714
EW Residential	NF Shift	14,830	15,072	16,519	16,789	17,996	18,287
MA NF	NF Shift	15,069	15,316	16,679	16,954	18,187	18,513
PCA	NF Shift	4,216	4,340	4,592	4,732	4,722	4,862
AC	NF Shift	4,605	4,750	5,154	5,302	5,606	5,763
Non-MA NF	NF Shift	8,064	8,182	9,032	9,150	10,082	10,212

Table 6A.19 Simulated 95% Confidence Intervals for annual Mean Payment* Amounts by LTSS Subgroup, Scenario, and Cohort (Million Dollars)

	Scenario	2025 Cohort		2030 Cohort		2035 Cohort	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
EW Community	Baseline	510	517	642	650	767	778
EW Residential	Baseline	582	592	735	746	904	918
MA NF	Baseline	1498	1524	1881	1909	2320	2358
PCA	Baseline	204	211	252	260	293	302
AC	Baseline	64	66	81	83	100	102
Non-MA NF	Baseline	1	1	1	1	2	2
EW Community	COVID	373	379	462	469	517	526
EW Residential	COVID	427	437	532	543	615	626
MA NF	COVID	1019	1042	1260	1284	1455	1481
PCA	COVID	152	158	185	192	200	208
AC	COVID	46	47	57	59	65	67
Non-MA NF	COVID	1	1	1	1	1	1
EW Community	NF Shift	526	534	661	670	792	803
EW Residential	NF Shift	605	615	762	775	940	955
MA NF	NF Shift	1441	1465	1805	1835	2226	2265
PCA	NF Shift	215	222	265	273	308	318
AC	NF Shift	64	66	81	84	100	103
Non-MA NF	NF Shift	1	1	1	1	2	2

* Medicaid payments for MA services.

Holding Times

In addition to the transitions between groups, the second major component of the model is the length of time an individual remains in a group, sometimes referred to as the holding time. For the semi-Markov model, each transition path between two groups is modeled separately (e.g., given an individual will transition from EWC to EWR, how many months will they remain in EWC until they make the transition). These holding times are modeled using positive right skewed probability distributions. For each path the best fitting distribution of Gamma, Log-Normal, Weibull, Burr (Type 12), and Pareto (Type 2) was chosen using goodness-of-fit criterion. When model fit was not adversely affected, the scale parameters of the distribution were adjusted using a regression model with the same set of independent variables utilized in the multinomial regression models for transition probabilities. All distributions accounted for censoring (individuals remaining in the group until the end of the data period).

Figure 6A.15 through Figure 6A.86 display the holding time distribution for each transition used in the simulation. For each figure, the distribution parameters, median holding time (50th percentile) and probability of remaining in the original subgroup before transitioning to the next subgroup for at least 2 years are given. For example, Figure 6A.15 indicates that for the time to transition between EWC and death was modeled using a Weibull distribution (with shape parameter equal to 0.97 and scale parameter equal to 20.73). Of those in EWC who would remain in EWC until death, 50% remained in EWC for 14.22 months or longer and 3.2% remained in EWC for 2 years or more prior to death.

Figure 6A.15 Holding Times: EWC to Death

Distribution: Weibull
Shape - 0.97
Scale - 20.73
Median - 14.22 Months
Remain 2 Years - 3.2%

Figure 6A.16 Holding Times: EWC to EWR

Distribution: Pareto
Shape - 2.13
Scale - 10.4
Median - 4 Months
Remain 2 Years - 0.8%
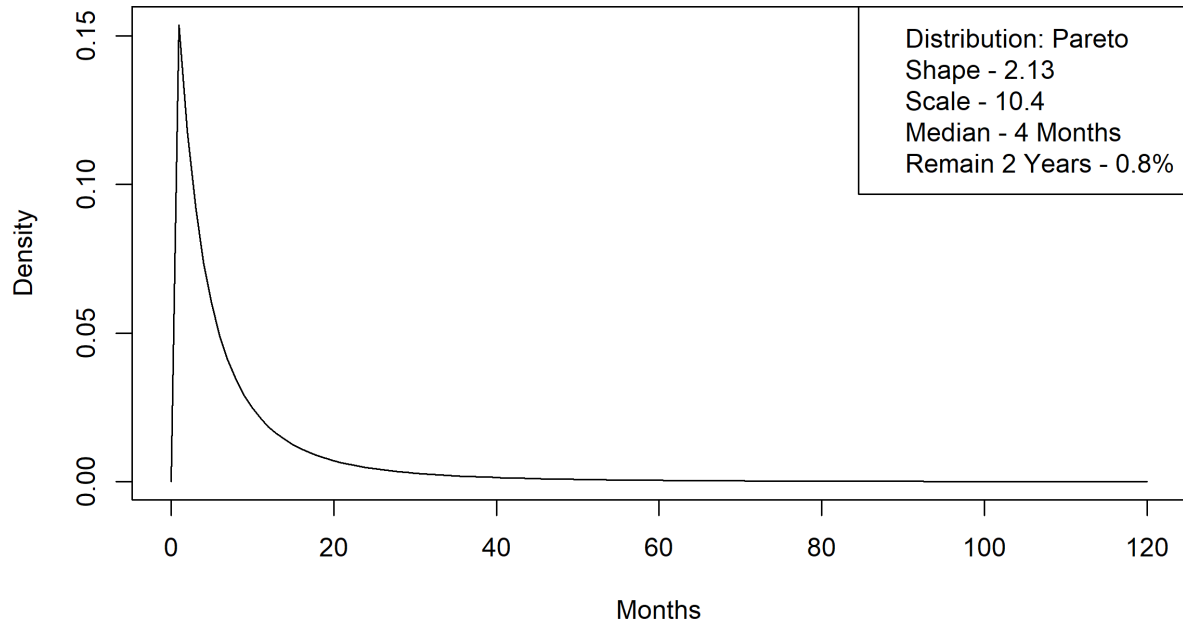
Figure 6A.17 Holding Times: EWC to MA NF 0-29

Distribution: Log Normal
Shape - 2.19
Scale - 1.23
Median - 8.95 Months
Remain 2 Years - 2.1%
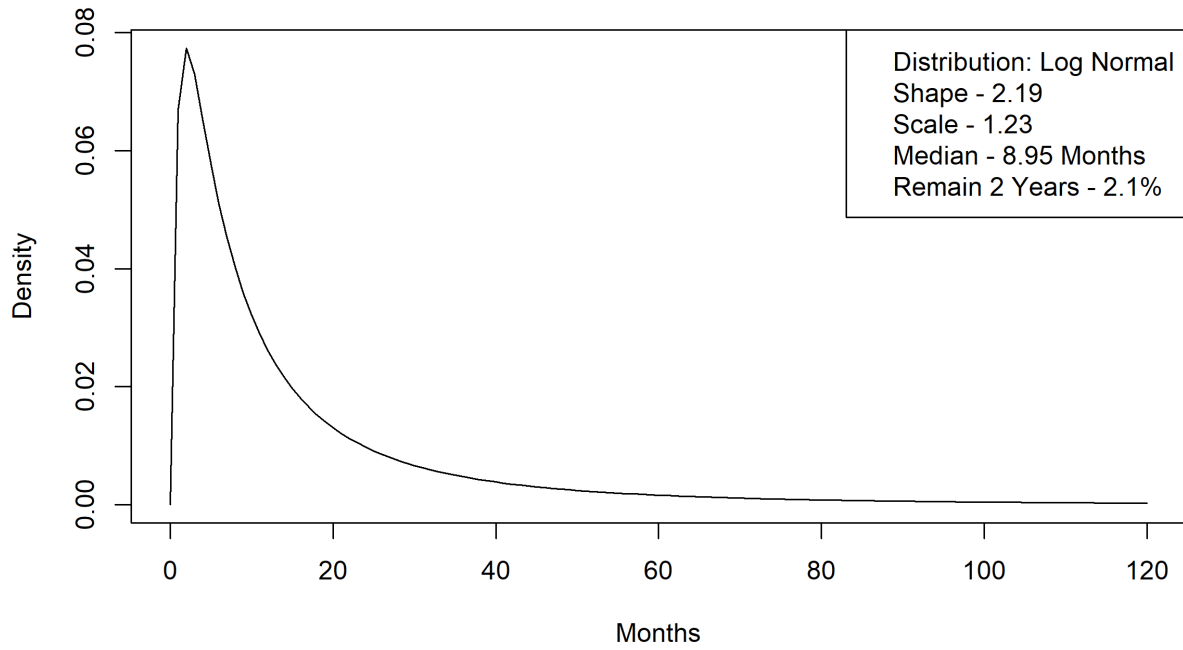
Figure 6A.18 Holding Times: EWC to MA NF 30-90

Distribution: Gamma
Shape - 1.69
Scale - 7.97
Median - 10.95 Months
Remain 2 Years - 1.4%
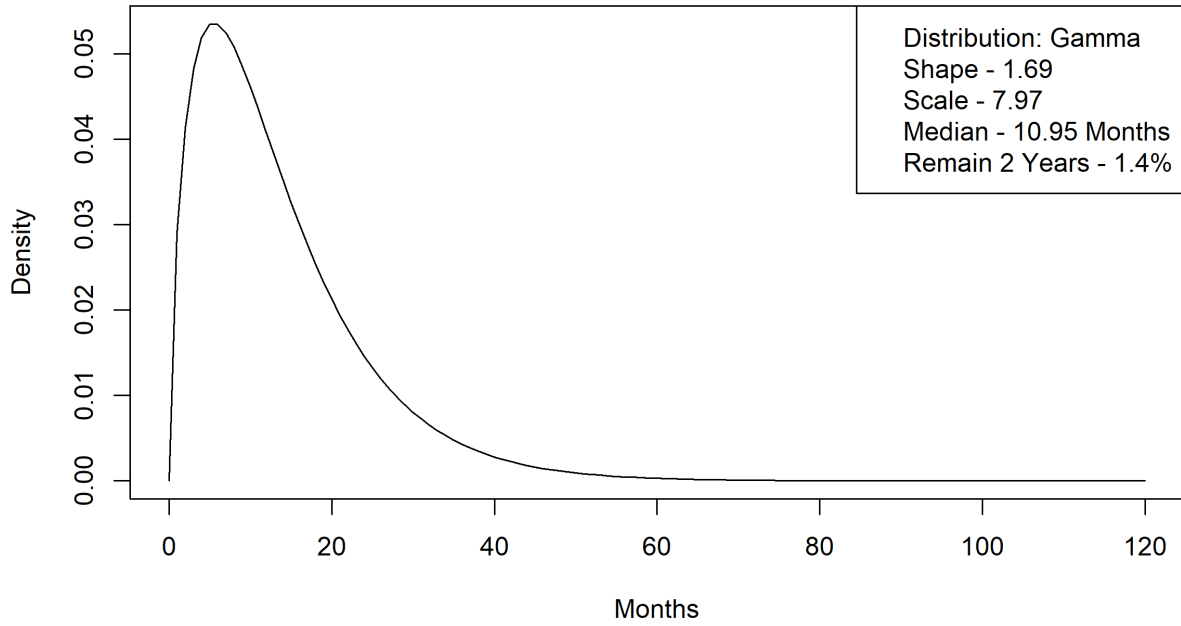
Figure 6A.19 Holding Times: EWC to MA NF 91+

Distribution: Weibull
Shape - 5.96
Scale - 4.02
Median - 3.78 Months
Remain 2 Years - 0%
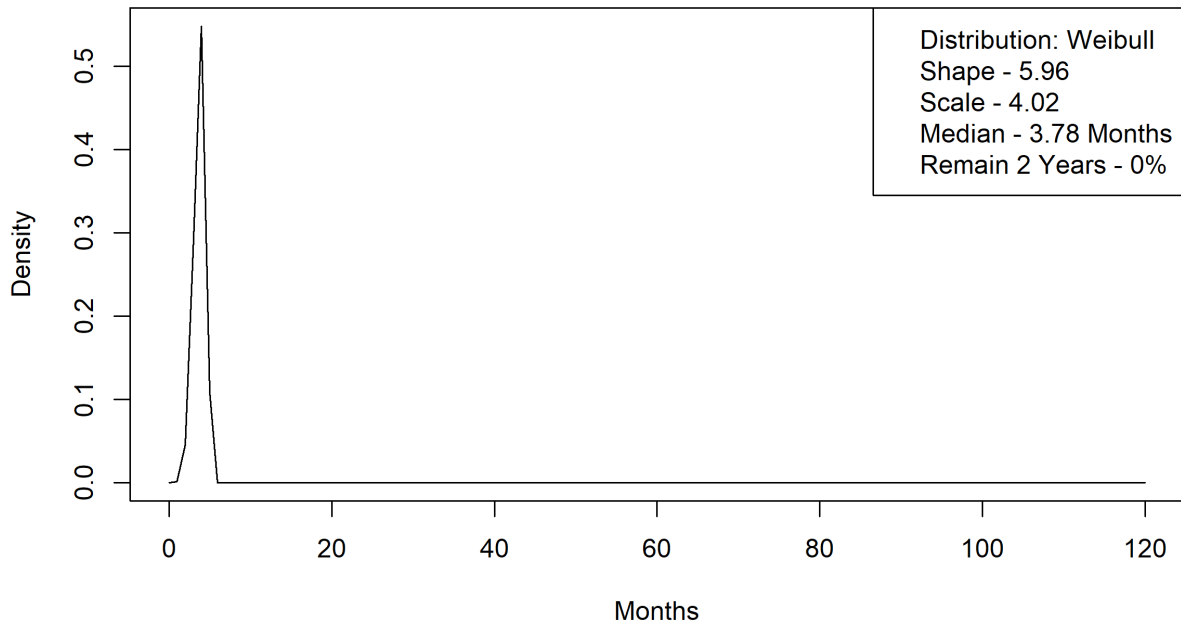
Figure 6A.20 Holding Times: EWC to MA No LTSS

Distribution: Log Normal
Shape - 2.3
Scale - 1.05
Median - 9.98 Months
Remain 2 Years - 2%
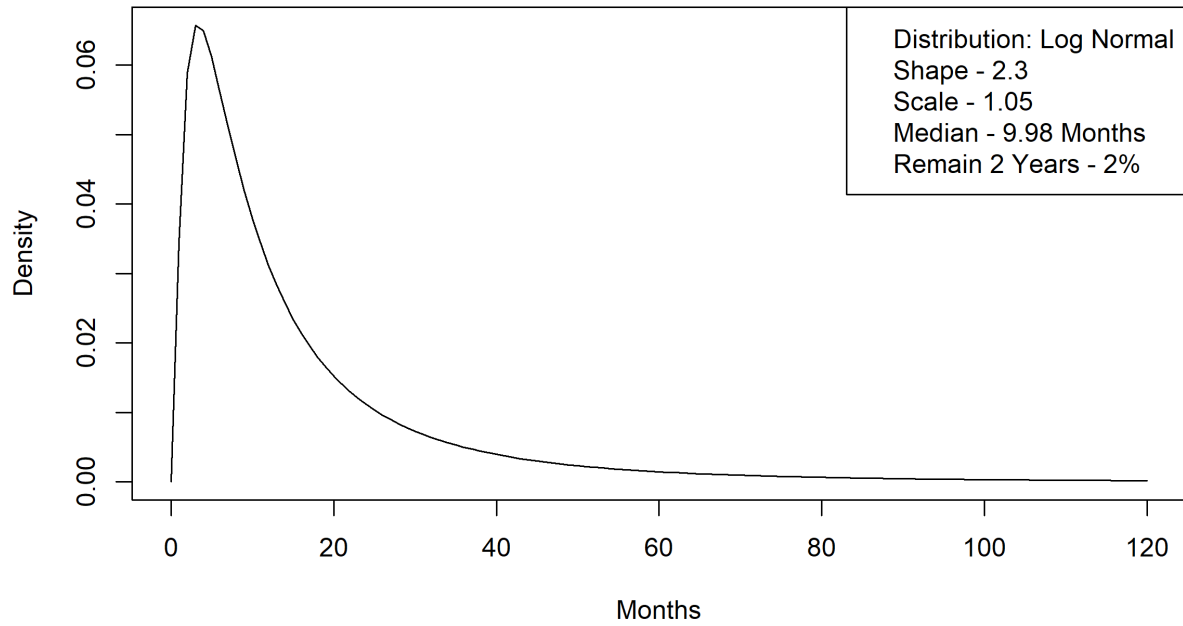
Figure 6A.21 Holding Times: EWC to PCA

Distribution: Gamma
Shape - 1.85
Scale - 11.13
Median - 17.06 Months
Remain 2 Years - 3.2%
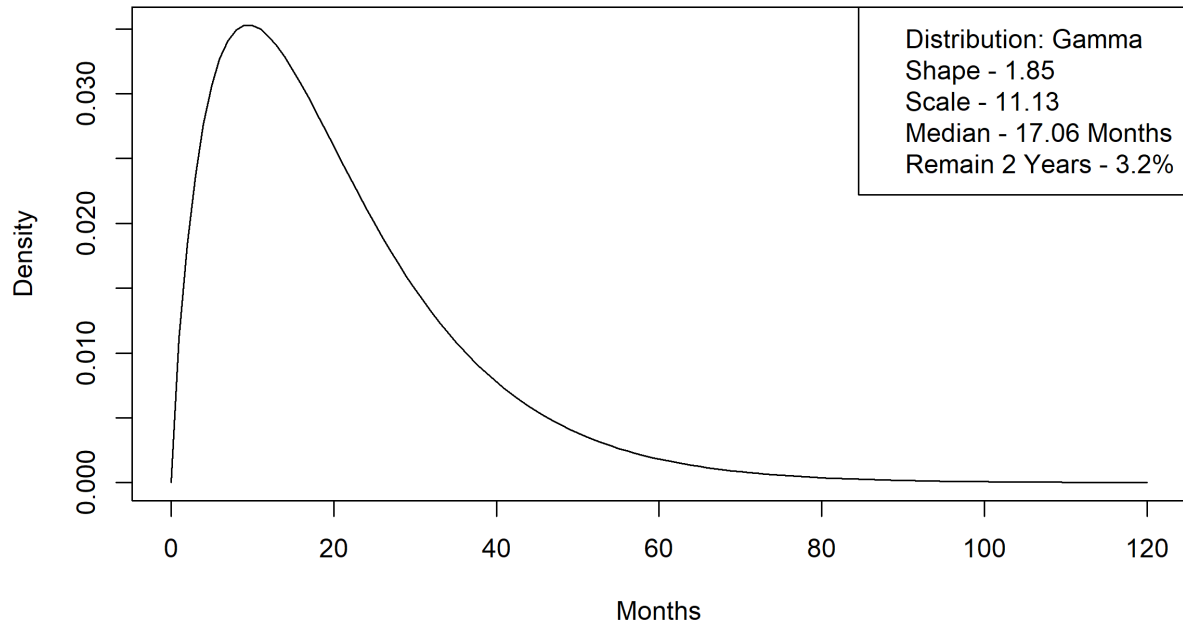
Figure 6A.22 Holding Times: EWC to AC

Distribution: Burr Type 12
Shape - 0.01
Scale - 1.97
Median - 4.09 Months
Remain 2 Years - 0.9%
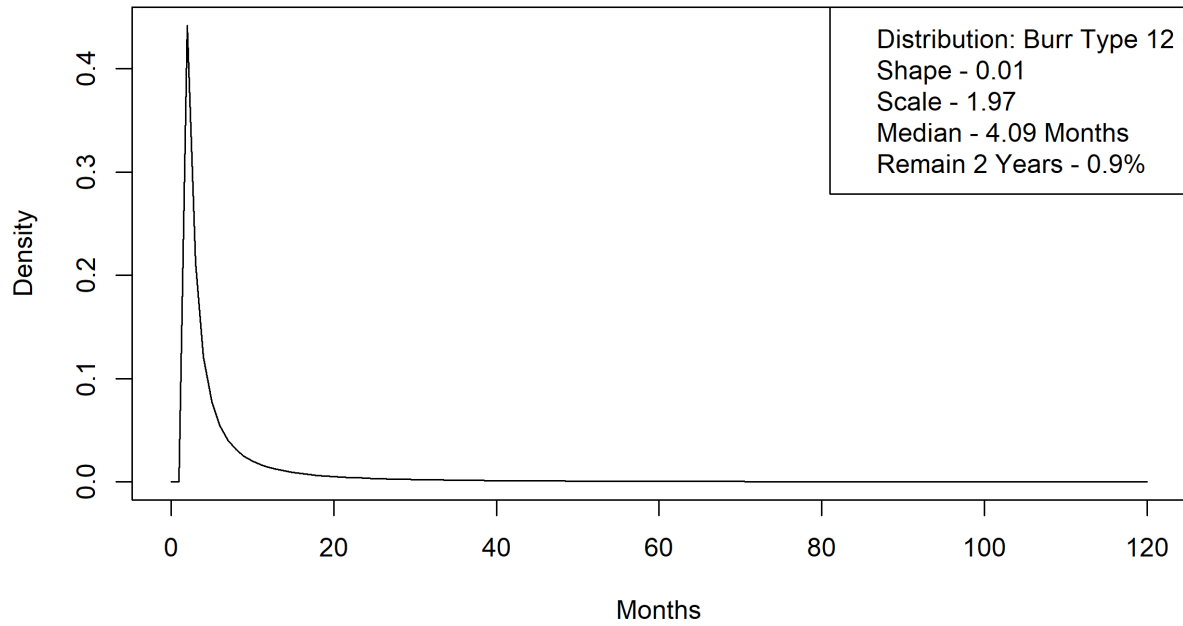
Figure 6A.23 Holding Times: EWC to No LTSS

Distribution: Gamma
Shape - 2.38
Scale - 1.02
Median - 2.11 Months
Remain 2 Years - 0%
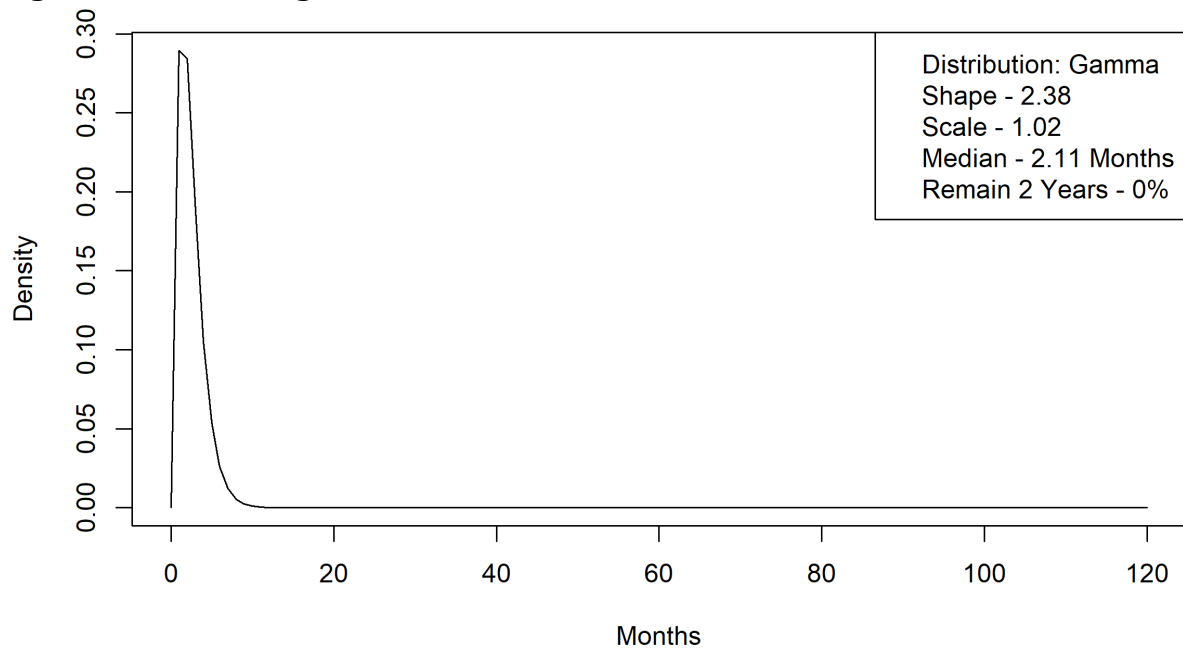
Figure 6A.24 Holding Times: EWR to Death

Distribution: Pareto
Shape - 3616
Scale - 67192
Median - 12.88 Months
Remain 2 Years - 2.7%
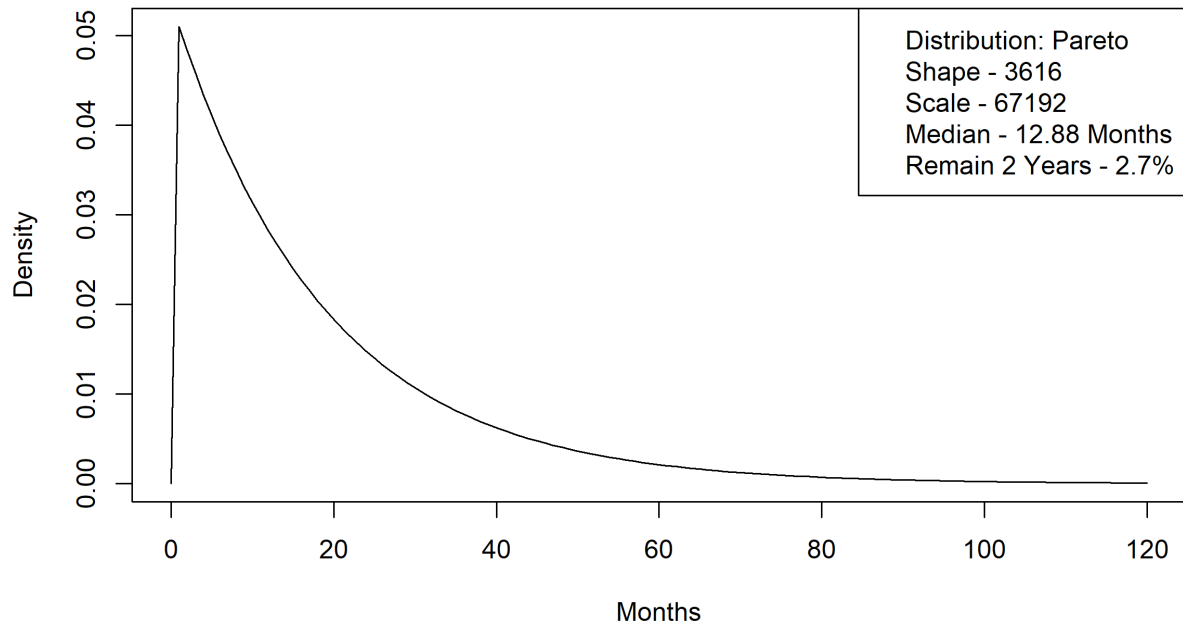
Figure 6A.25 Holding Times: EWR to EWC

Distribution: Log Normal
Shape - 2
Scale - 1.09
Median - 7.37 Months
Remain 2 Years - 1.4%
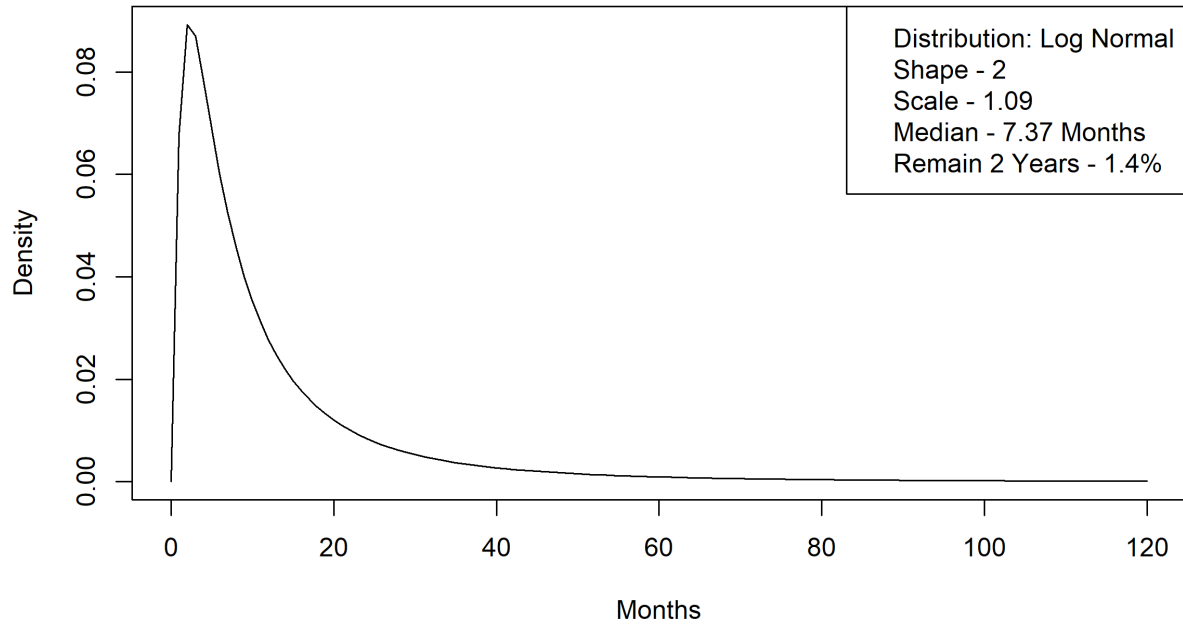
Figure 6A.26 Holding Times: EWR to MA NF 0-29

Distribution: Log Normal
Shape - 2.26
Scale - 1.02
Median - 9.62 Months
Remain 2 Years - 1.8%
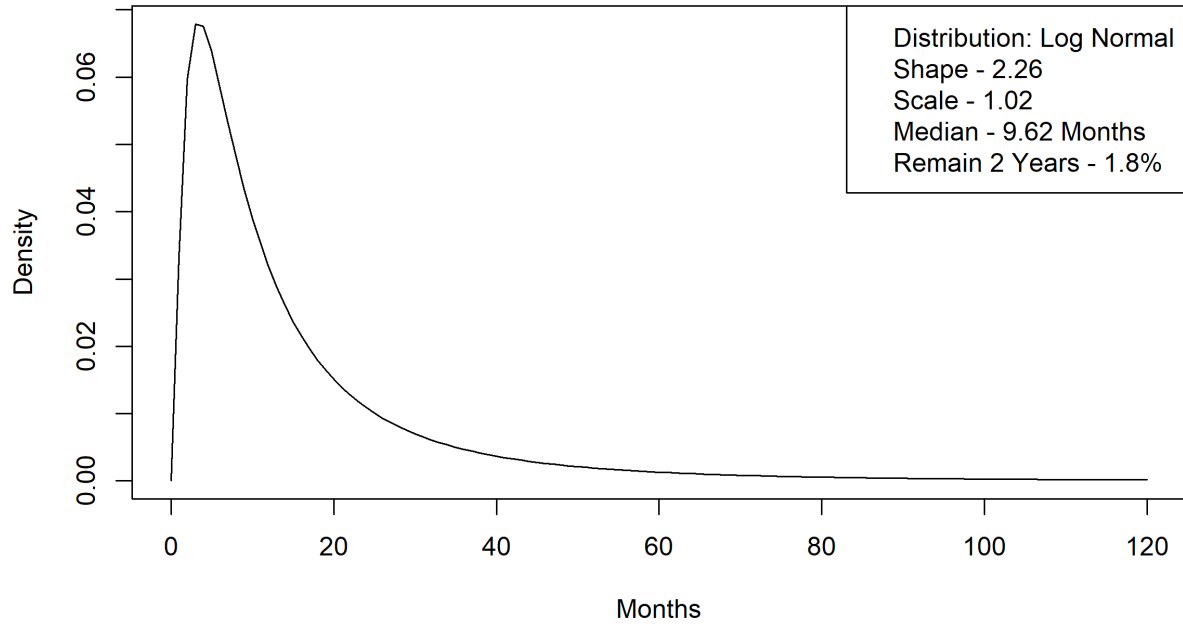
Figure 6A.27 Holding Times: EWR to MA NF 30-90

Distribution: Log Normal
Shape - 2.41
Scale - 0.79
Median - 11.12 Months
Remain 2 Years - 1.7%
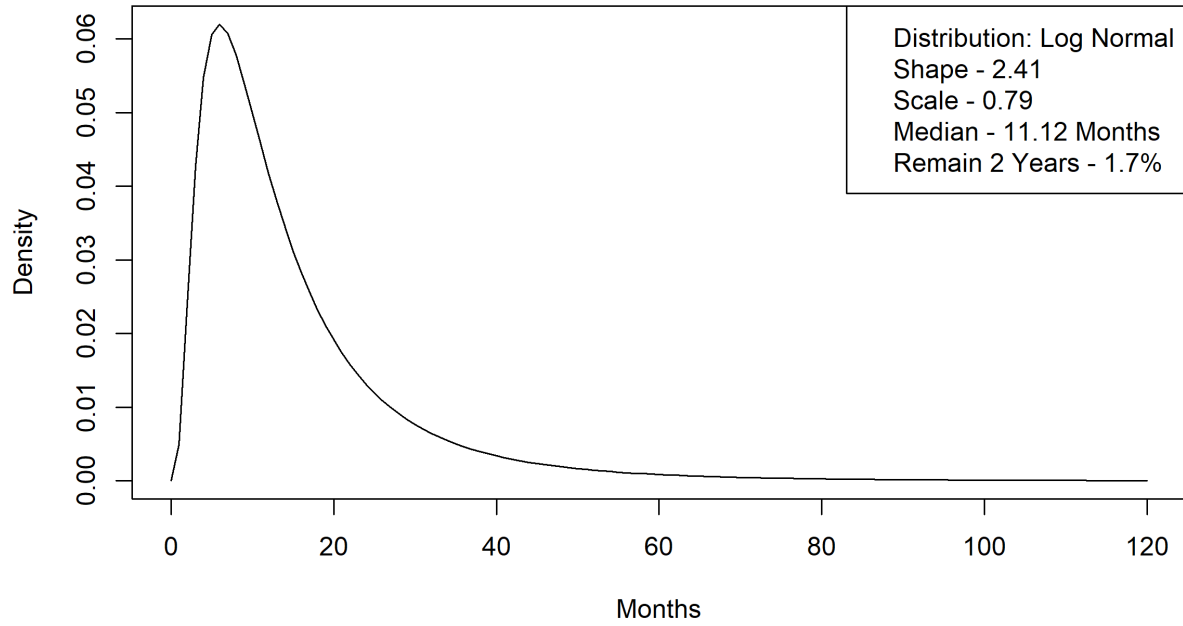
Figure 6A.28 Holding Times: EWR to MA No LTSS

Distribution: Log Normal
Shape - 2.19
Scale - 0.96
Median - 8.95 Months
Remain 2 Years - 1.5%
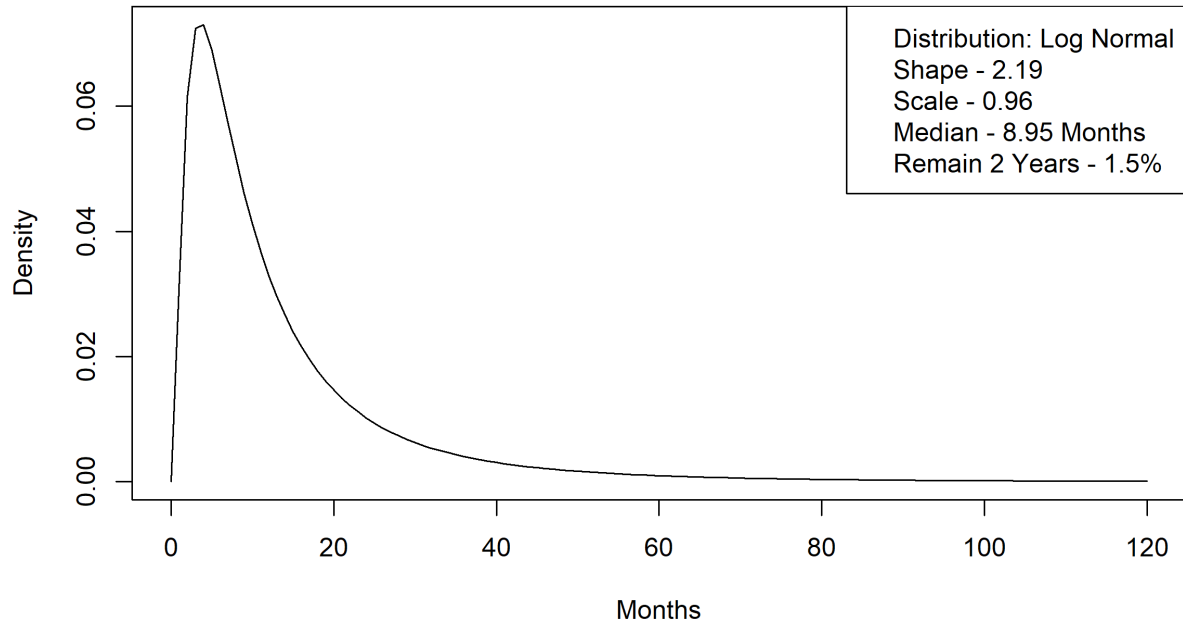
Figure 6A.29 Holding Times: EWR to No LTSS

Distribution: Log Normal
Shape - 2.07
Scale - 0.8
Median - 7.9 Months
Remain 2 Years - 0.8%
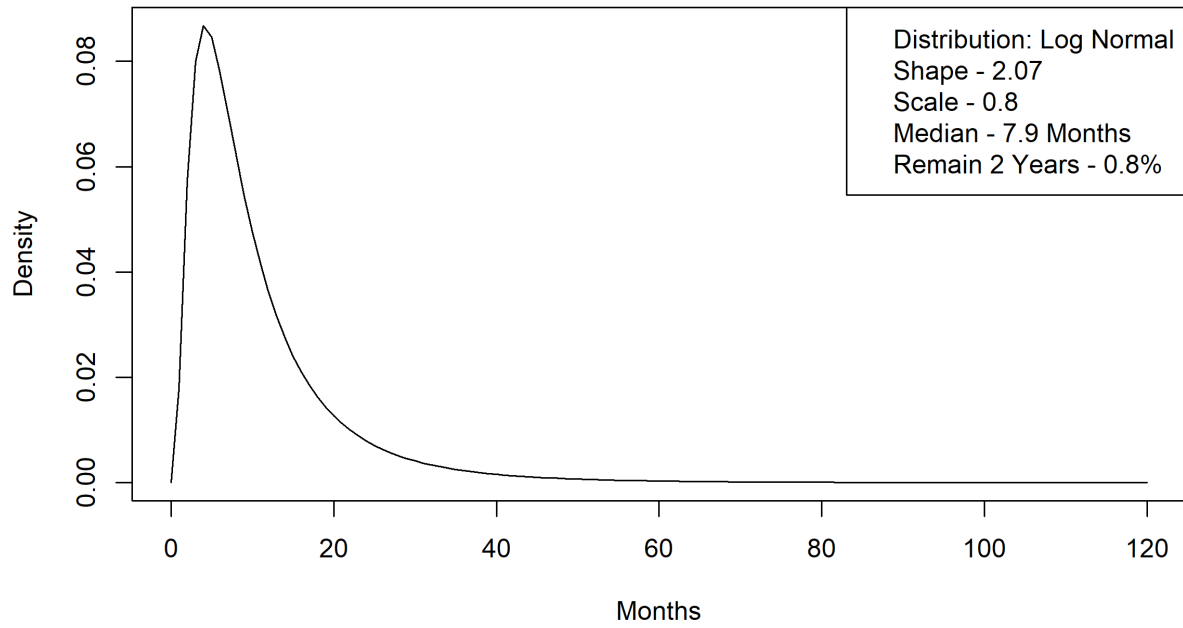
Figure 6A.30 Holding Times: MA NF 91+ to Death

Distribution: Pareto
Shape - 5063
Scale - 99413
Median - 13.61 Months
Remain 2 Years - 2.9%
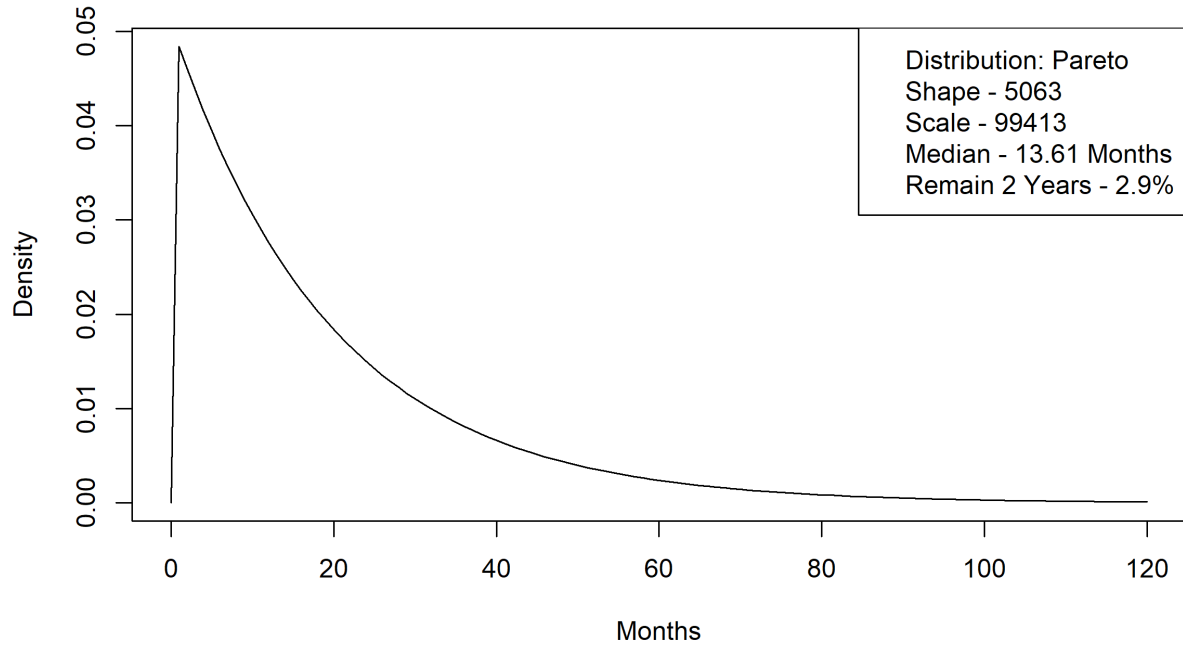
Figure 6A.31 Holding Times: MA NF 91+ to EWC

Distribution: Log Normal
Shape - 0.79
Scale - 1.55
Median - 2.21 Months
Remain 2 Years - 0.6%
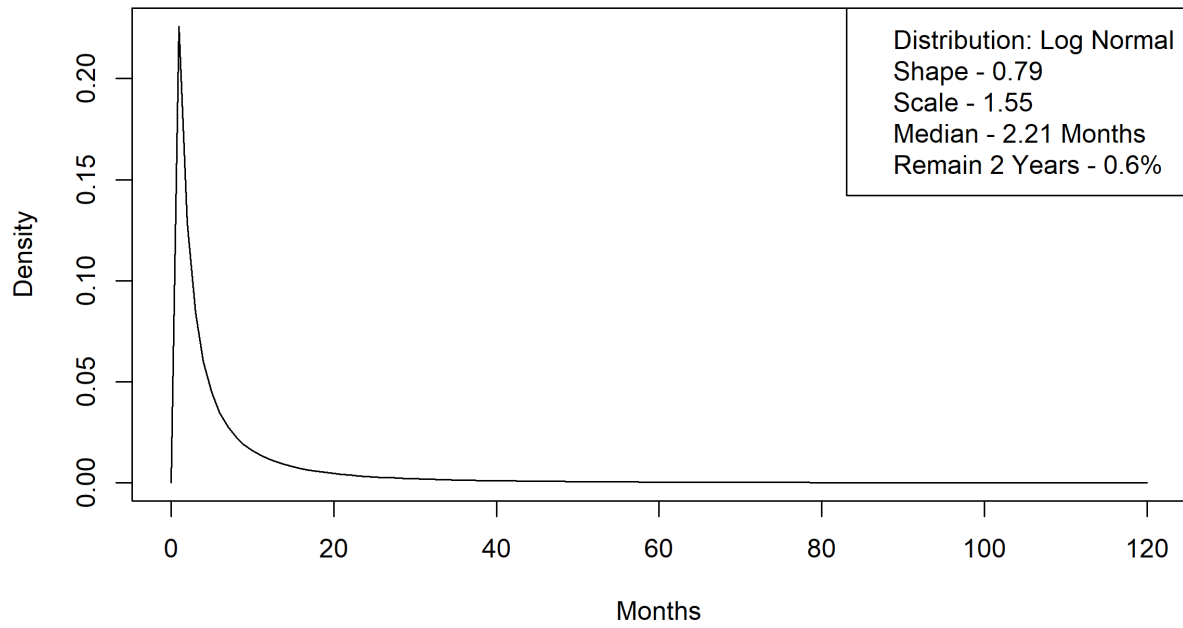
Figure 6A.32 Holding Times: MA NF 91+ to EWR

Distribution: Log Normal
Shape - 1.71
Scale - 0.94
Median - 5.52 Months
Remain 2 Years - 0.6%

Months
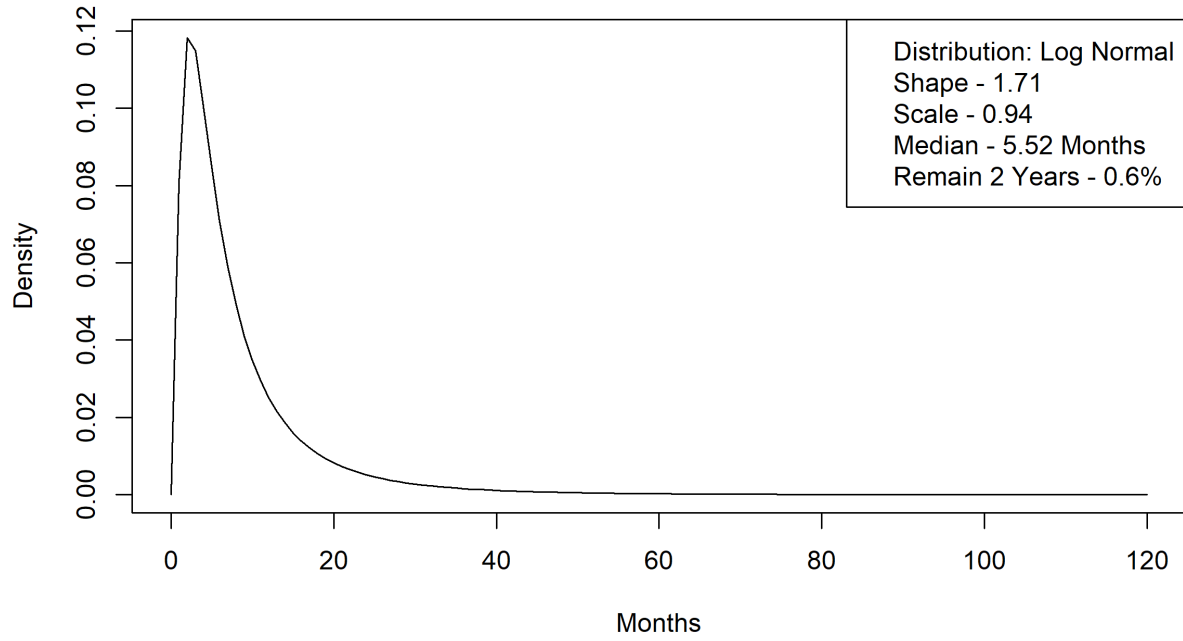
Figure 6A.33 Holding Times: MA NF 91+ to MA NF 0-29

Distribution: Log Normal
Shape - 2.38
Scale - 1.03
Median - 10.81 Months
Remain 2 Years - 2.2%

Months
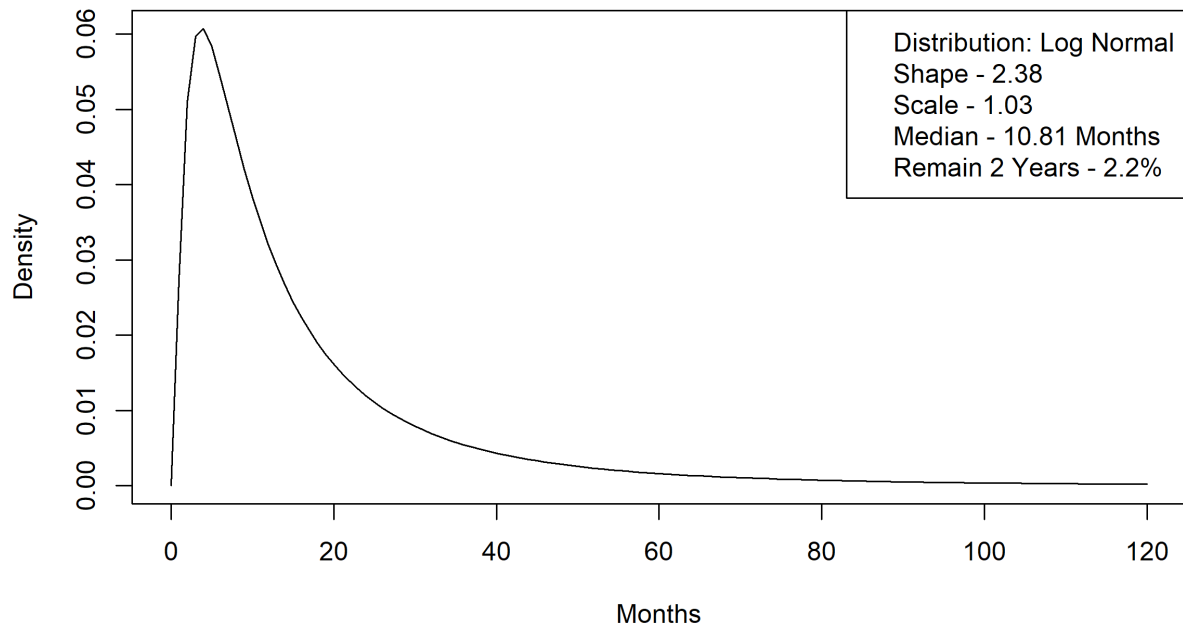
Figure 6A.34 Holding Times: MA NF 91+ to MA No LTSS

Distribution: Log Normal
Shape - 2.09
Scale - 1.09
Median - 8.08 Months
Remain 2 Years - 1.6%
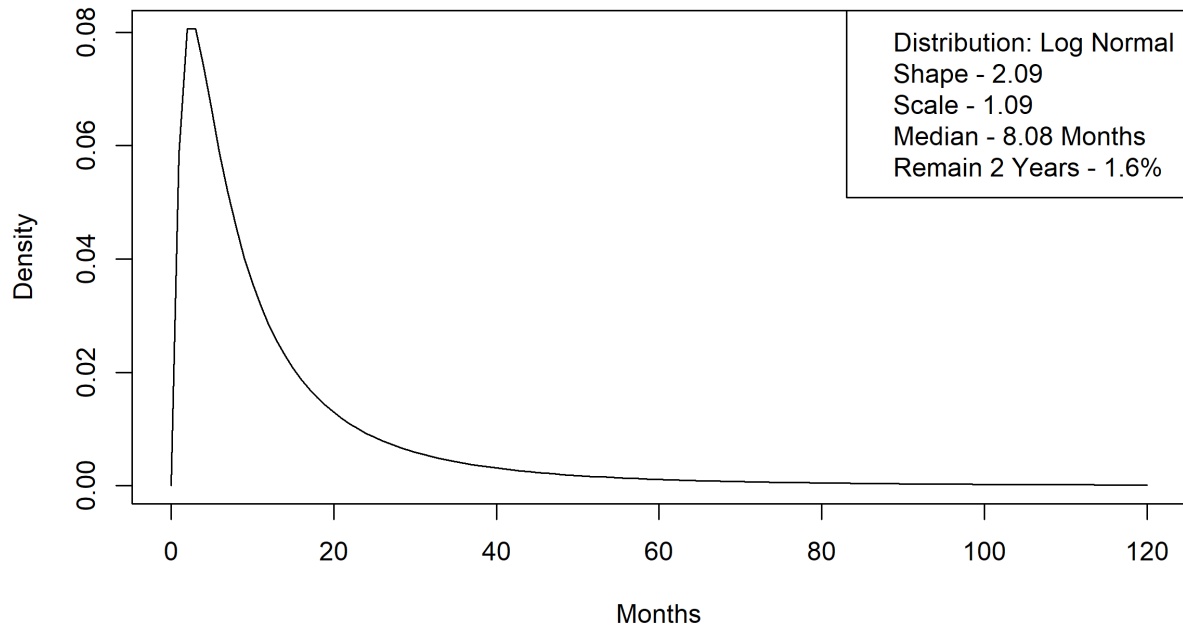
Figure 6A.35 Holding Times: MA NF 91+ to PCA

Distribution: Burr Type 12
Shape - 0
Scale - 1
Median - 2.3 Months
Remain 2 Years - 0.7%
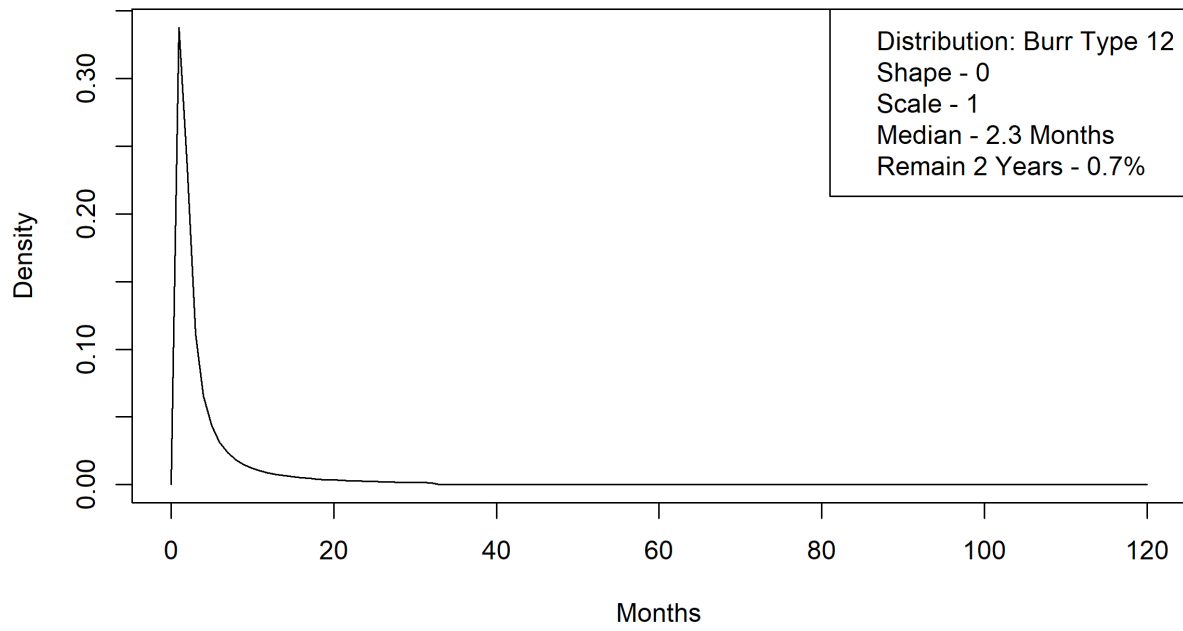
Figure 6A.36 Holding Times: MA NF 91+ to AC

Distribution: Burr Type 12
Shape - 0.13
Scale - 1.63
Median - 2.69 Months
Remain 2 Years - 0.3%
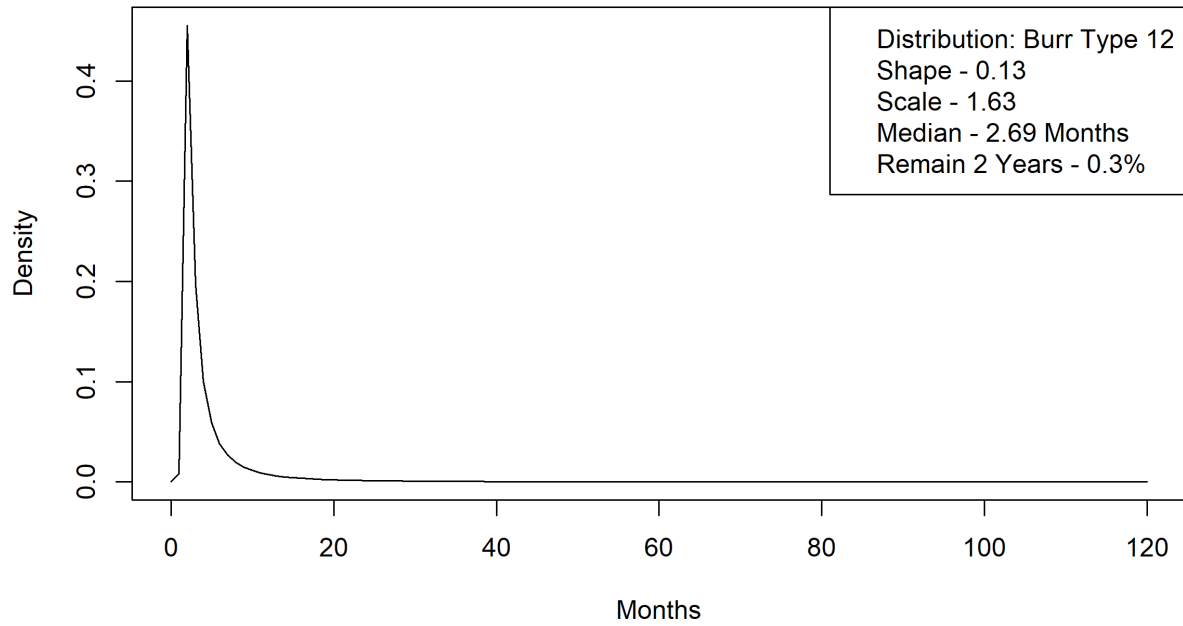
Figure 6A.37 Holding Times: MA NF 91+ to No LTSS

Distribution: Log Normal
Shape - 2.09
Scale - 0.84
Median - 8.05 Months
Remain 2 Years - 1%
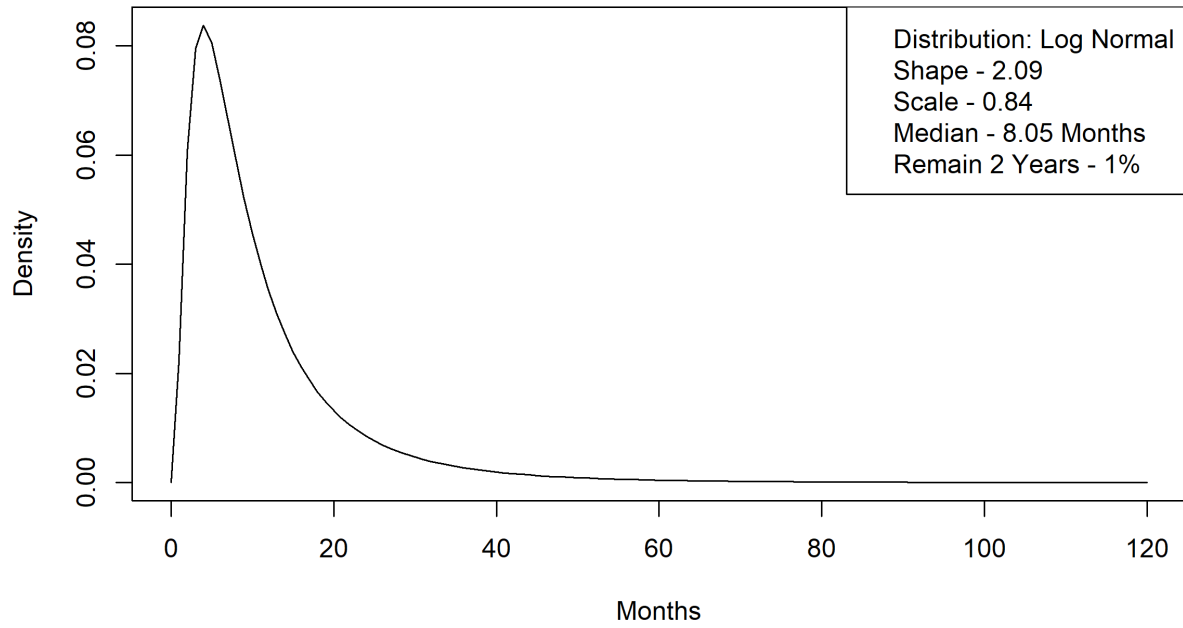
Figure 6A.38 Holding Times: MA No LTSS to Death

Distribution: Pareto
Shape - 2.68
Scale - 19.77
Median - 5.83 Months
Remain 2 Years - 1.2%
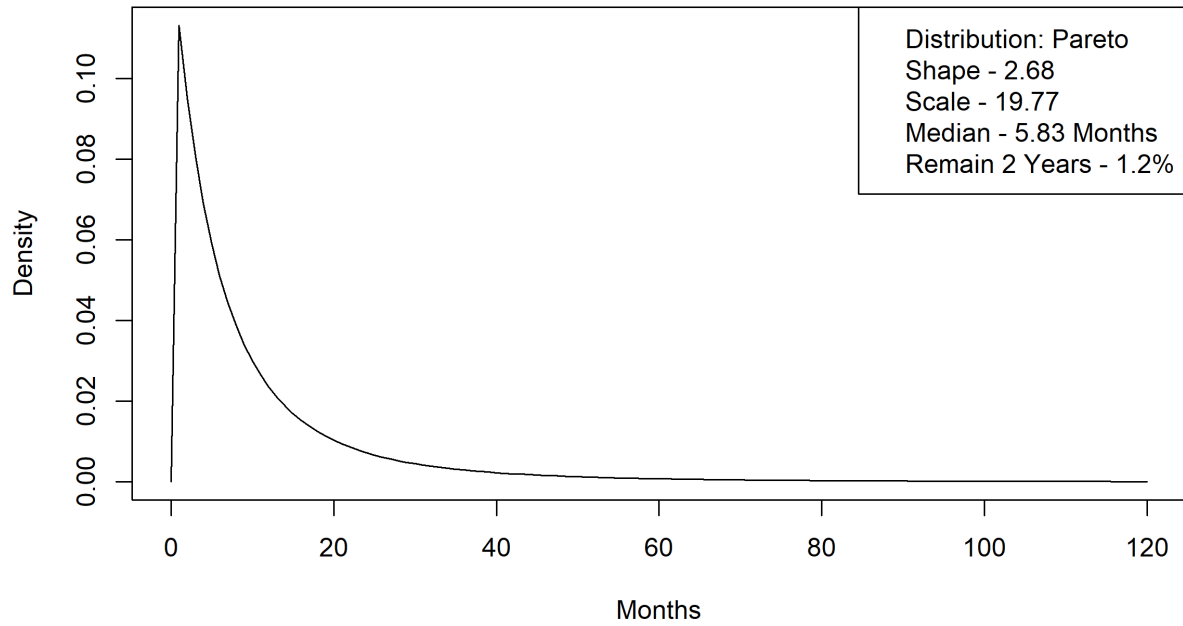
Figure 6A.39 Holding Times: MA No LTSS to EWC

Distribution: Log Normal
Shape - 0.89
Scale - 0.86
Median - 2.43 Months
Remain 2 Years - 0%
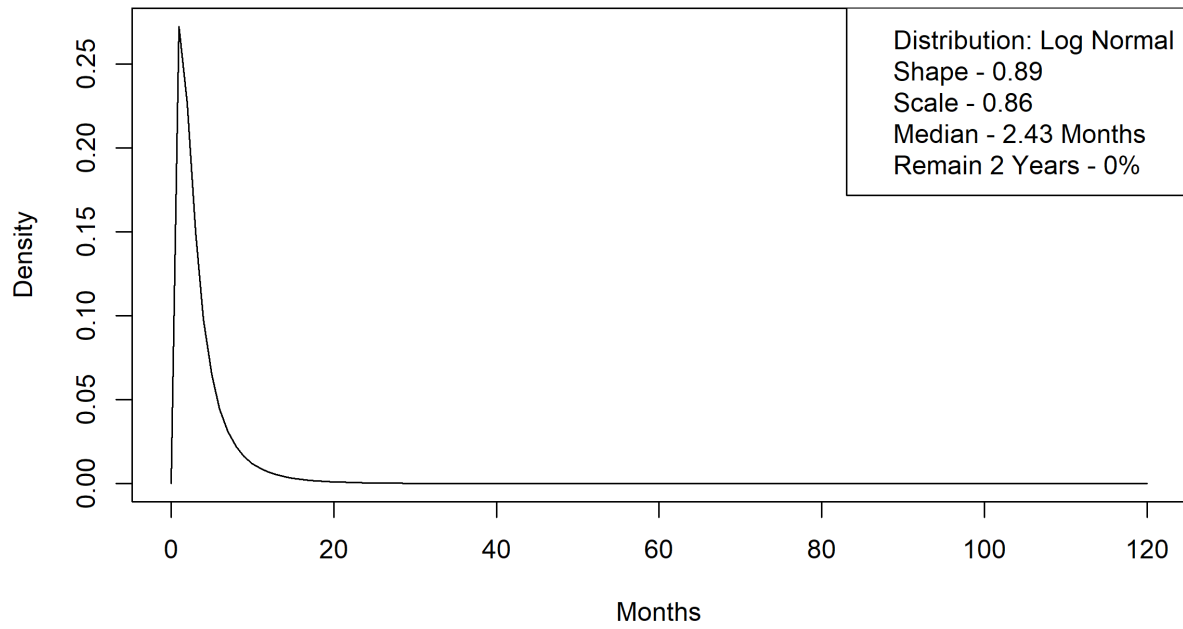
Figure 6A.40 Holding Times: MA No LTSS to EWR

Distribution: Log Normal
Shape - 0.95
Scale - 0.79
Median - 2.59 Months
Remain 2 Years - 0%
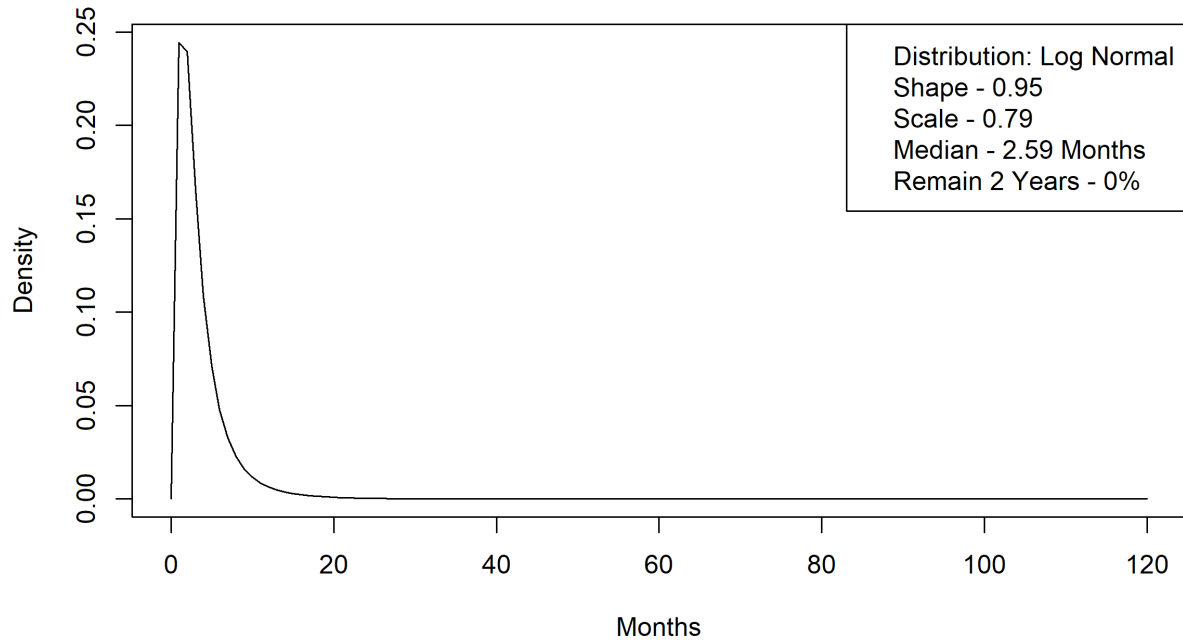
Figure 6A.41 Holding Times: MA No LTSS to MA NF 0-29

Distribution: Burr Type 12
Shape - 0.01
Scale - 0.98
Median - 1.66 Months
Remain 2 Years - 0.2%
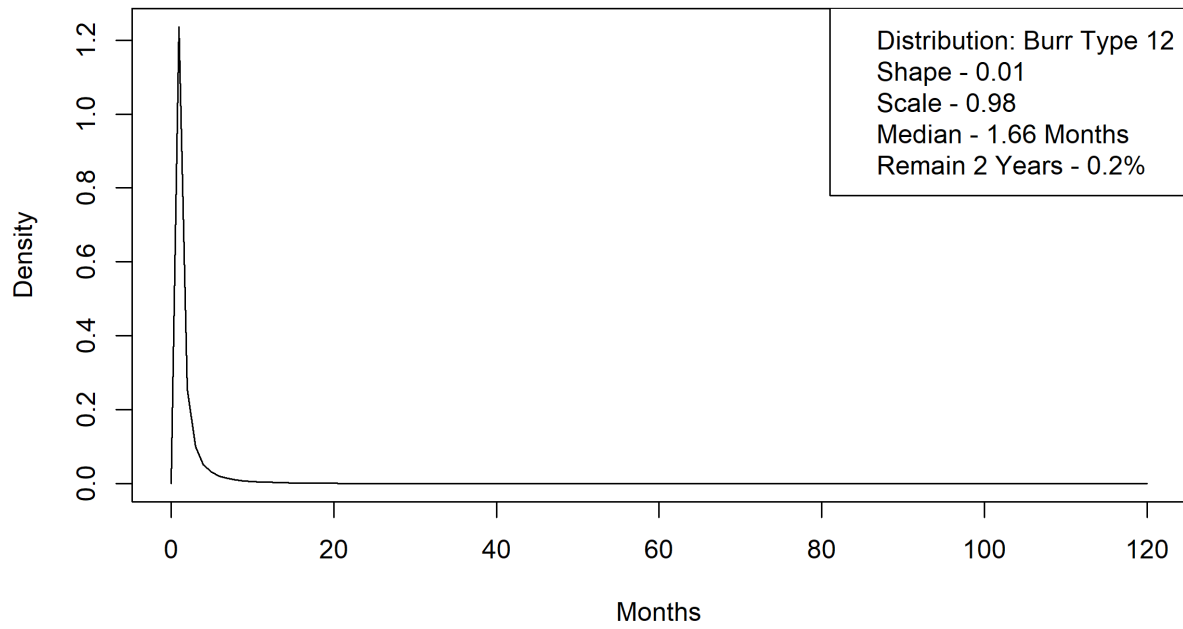
Figure 6A.42 Holding Times: MA No LTSS to MA NF 30-90

Distribution: Log Normal
Shape - 0.69
Scale - 0.6
Median - 1.99 Months
Remain 2 Years - 0%
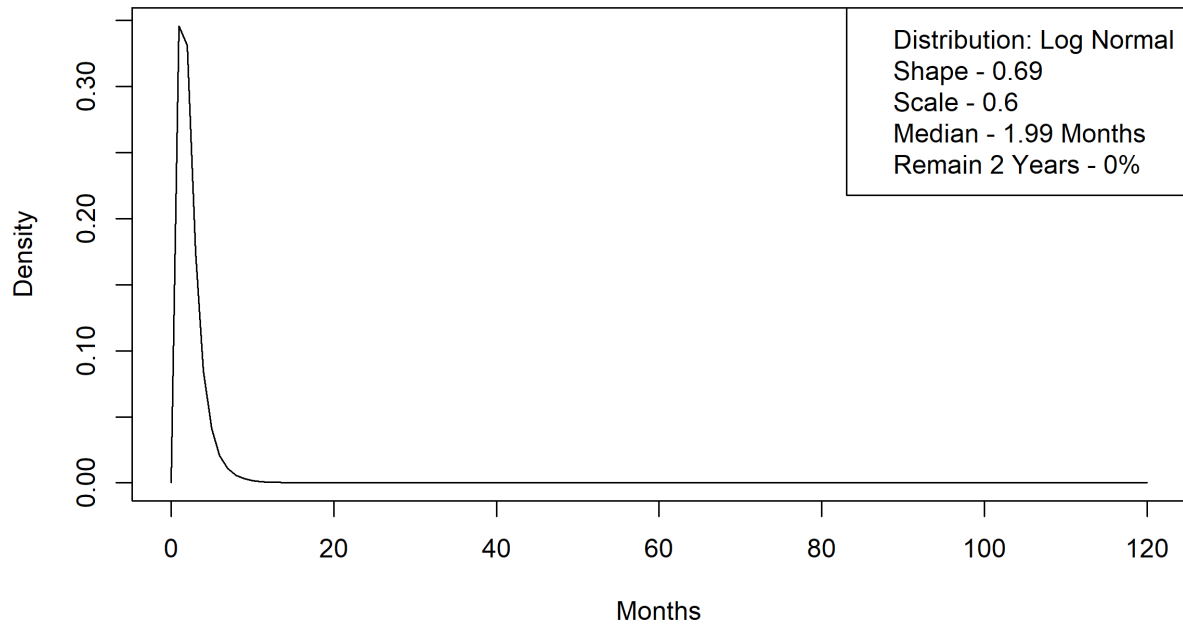
Figure 6A.43 Holding Times: MA No LTSS to MA NF 91+

Distribution: Burr Type 12
Shape - 2.43
Scale - 4.31
Median - 3.44 Months
Remain 2 Years - 0%
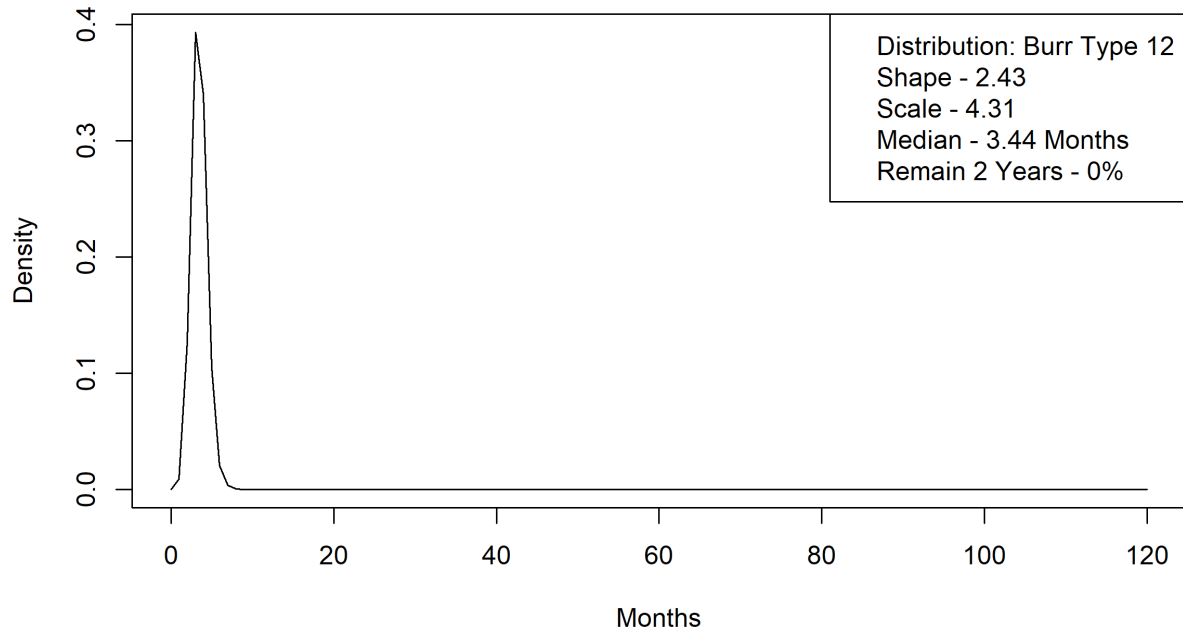
Figure 6A.44 Holding Times: MA No LTSS to PCA

Distribution: Log Normal
Shape - 1.53
Scale - 0.87
Median - 4.63 Months
Remain 2 Years - 0.3%
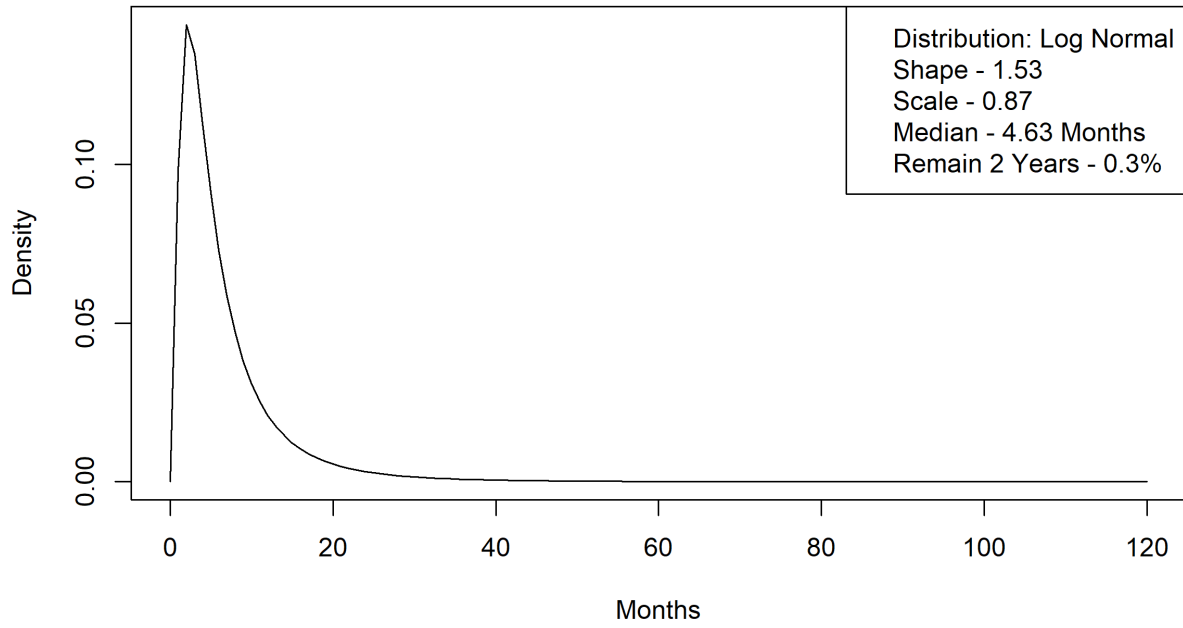
Figure 6A.45 Holding Times: MA No LTSS to AC

Distribution: Burr Type 12
Shape - 0.01
Scale - 1.39
Median - 2.63 Months
Remain 2 Years - 0.5%
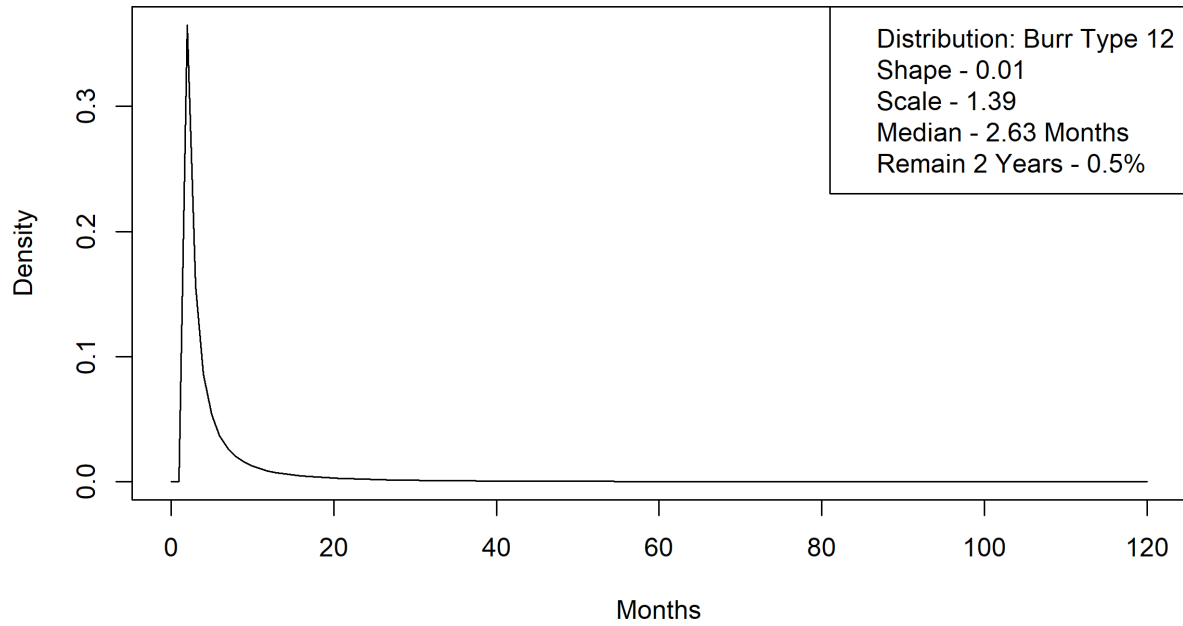
Figure 6A.46 Holding Times: MA No LTSS to NF 0-29

Distribution: Burr Type 12
Shape - 0.1
Scale - 1.34
Median - 3.04 Months
Remain 2 Years - 0.9%
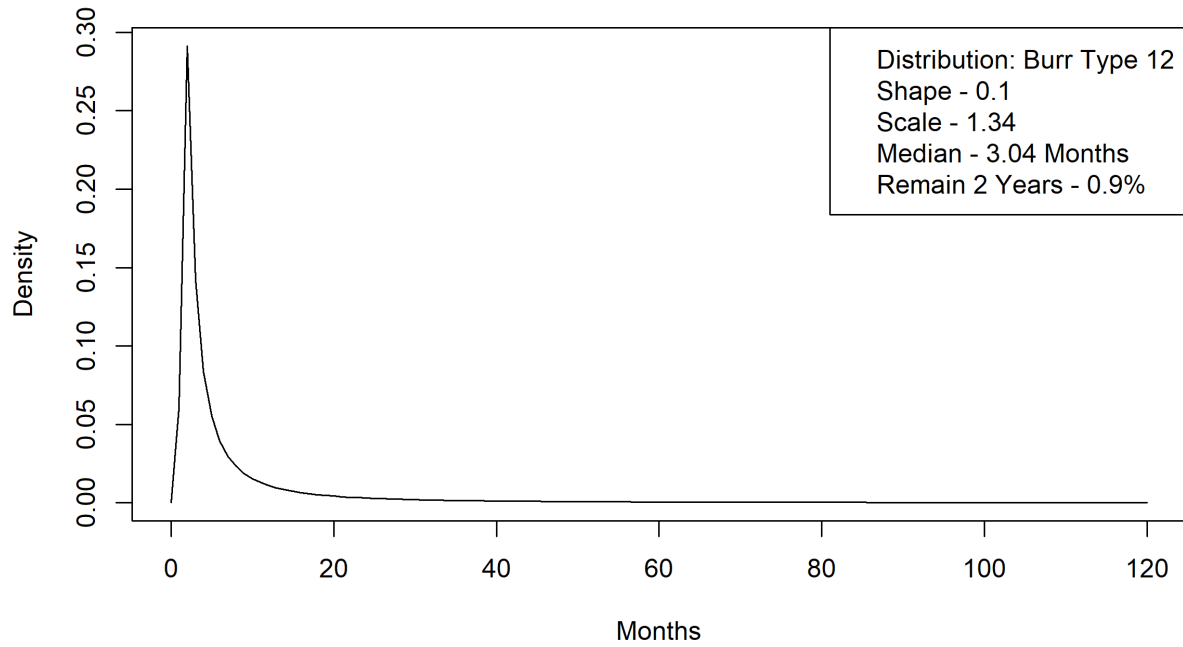
Figure 6A.47 Holding Times: MA No LTSS to NF 30-90

Distribution: Burr Type 12
Shape - 0
Scale - 1
Median - 2.71 Months
Remain 2 Years - 1.1%
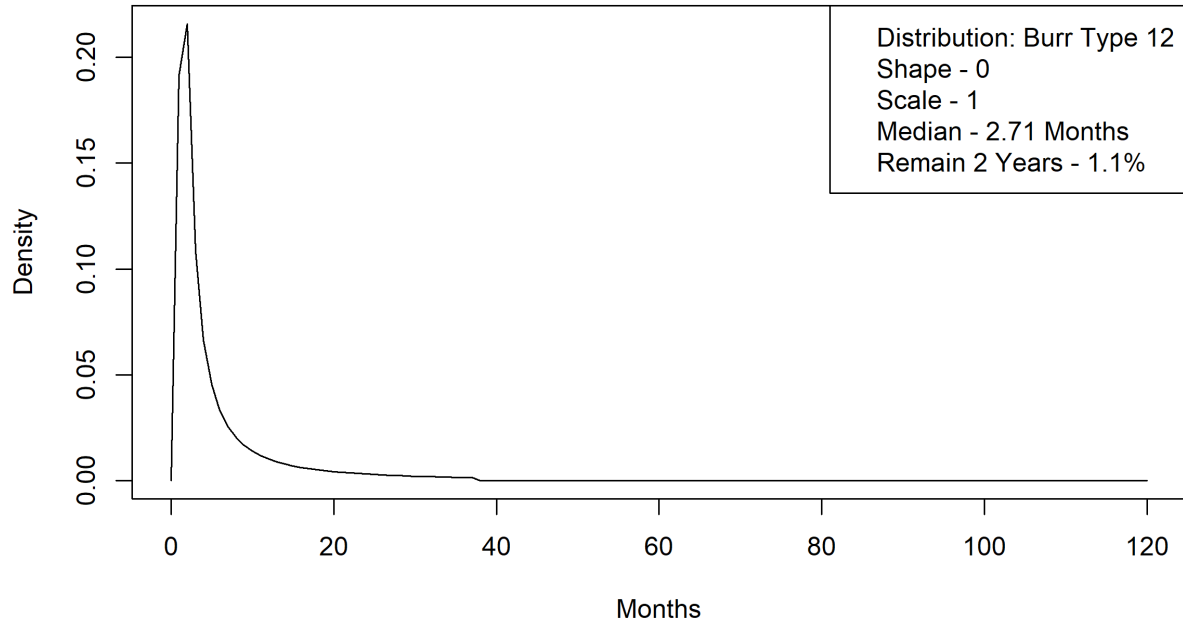
Figure 6A.48 Holding Times: MA No LTSS to No LTSS

Distribution: Log Normal
Shape - 1.74
Scale - 1.04
Median - 5.68 Months
Remain 2 Years - 0.8%
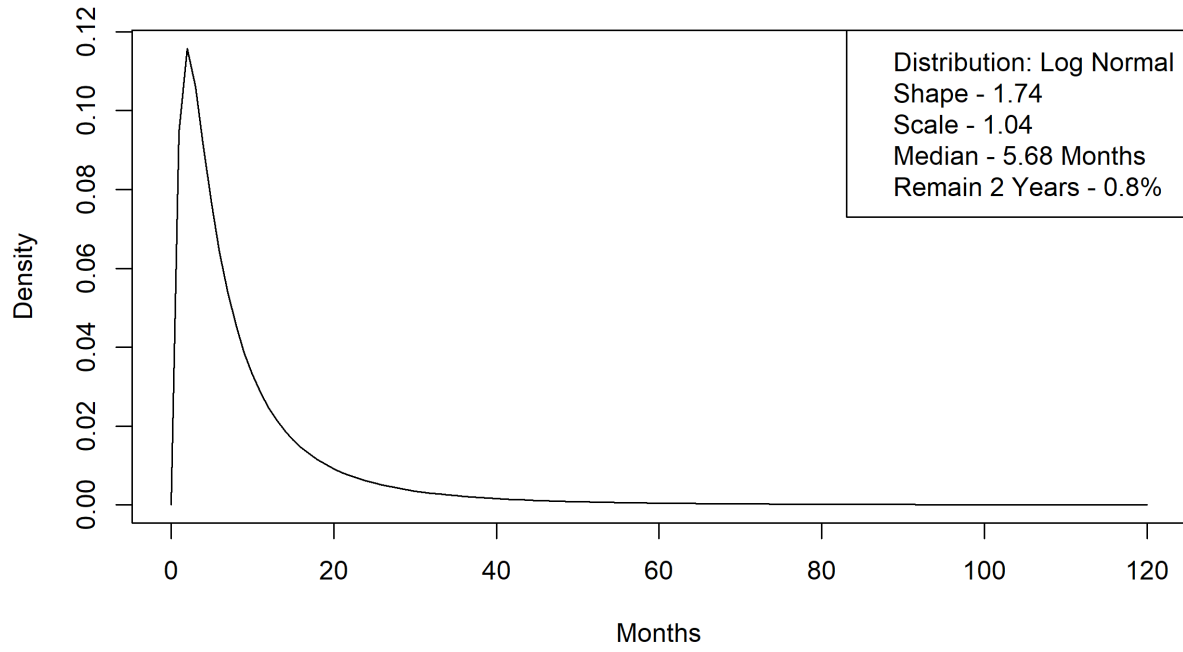
Figure 6A.49 Holding Times: PCA to Death

Distribution: Gamma
Shape - 1.15
Scale - 18.56
Median - 15.5 Months
Remain 2 Years - 3.3%
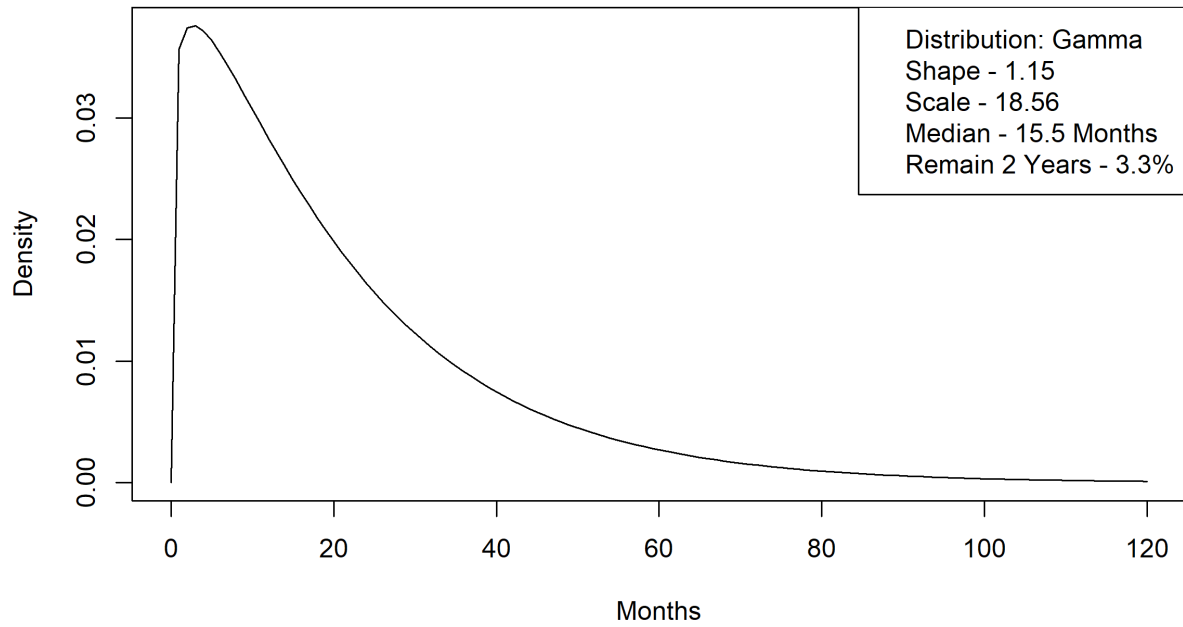
Figure 6A.50 Holding Times: PCA to EWC

Distribution: Pareto
Shape - 643.97
Scale - 9787
Median - 10.54 Months
Remain 2 Years - 2.1%
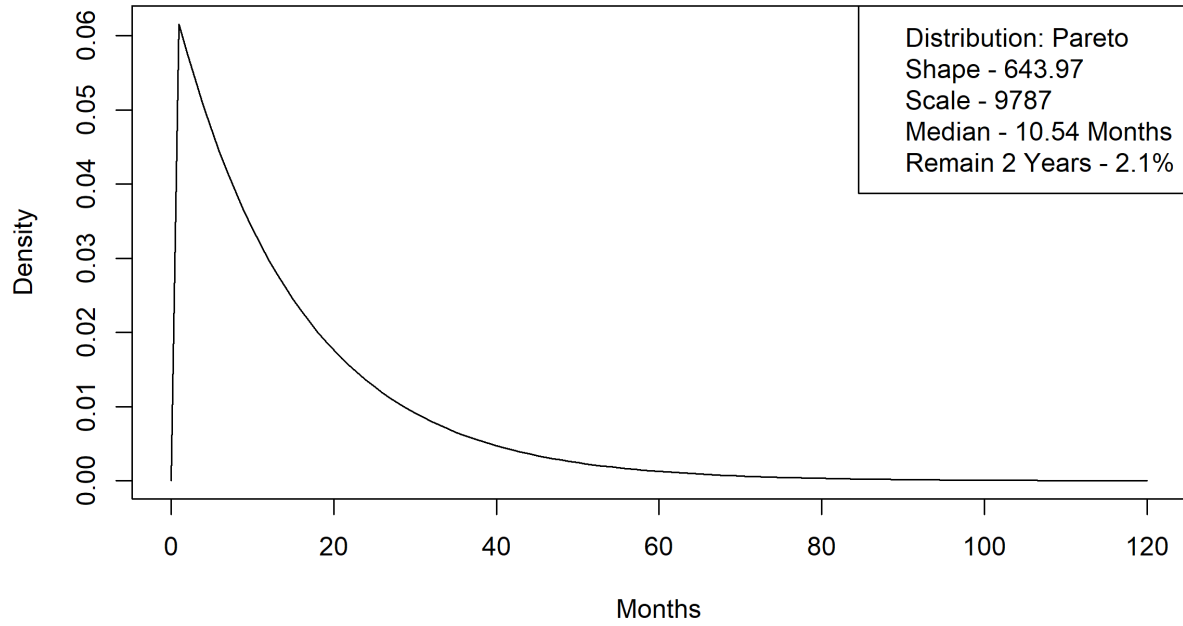
Figure 6A.51 Holding Times: PCA to EWR

Distribution: Burr Type 12
Shape - 0.01
Scale - 6.12
Median - 13.28 Months
Remain 2 Years - 2.9%
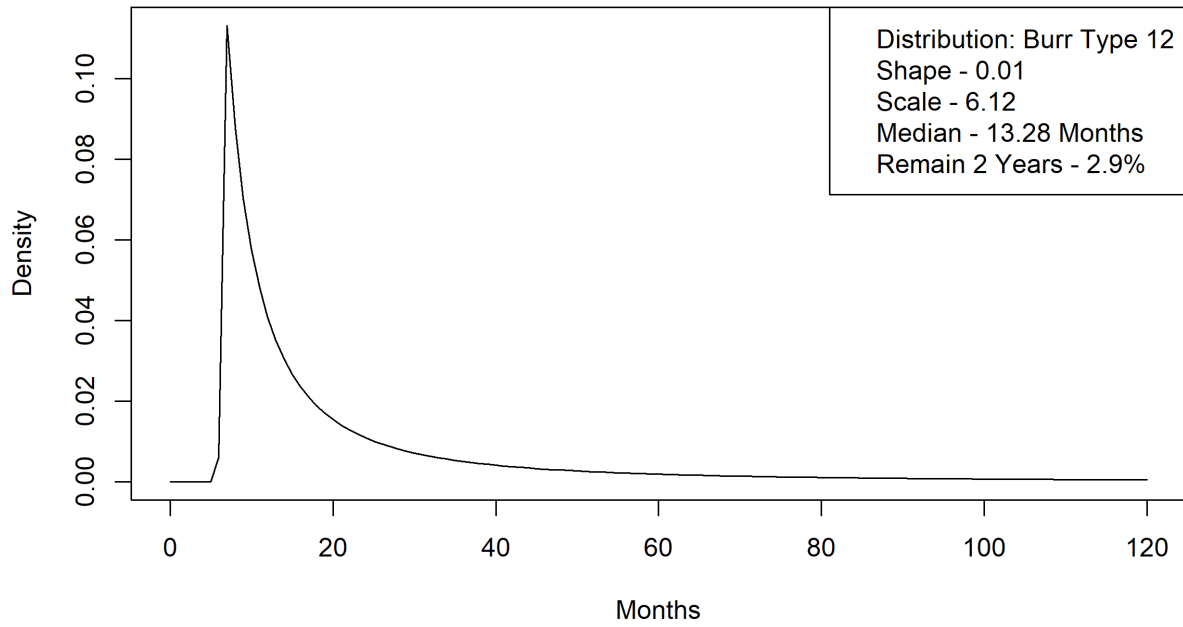
Figure 6A.52 Holding Times: PCA to MA NF 0-29

Distribution: Pareto
Shape - 8.97
Scale - 110.36
Median - 8.87 Months
Remain 2 Years - 1.7%

Density

Months
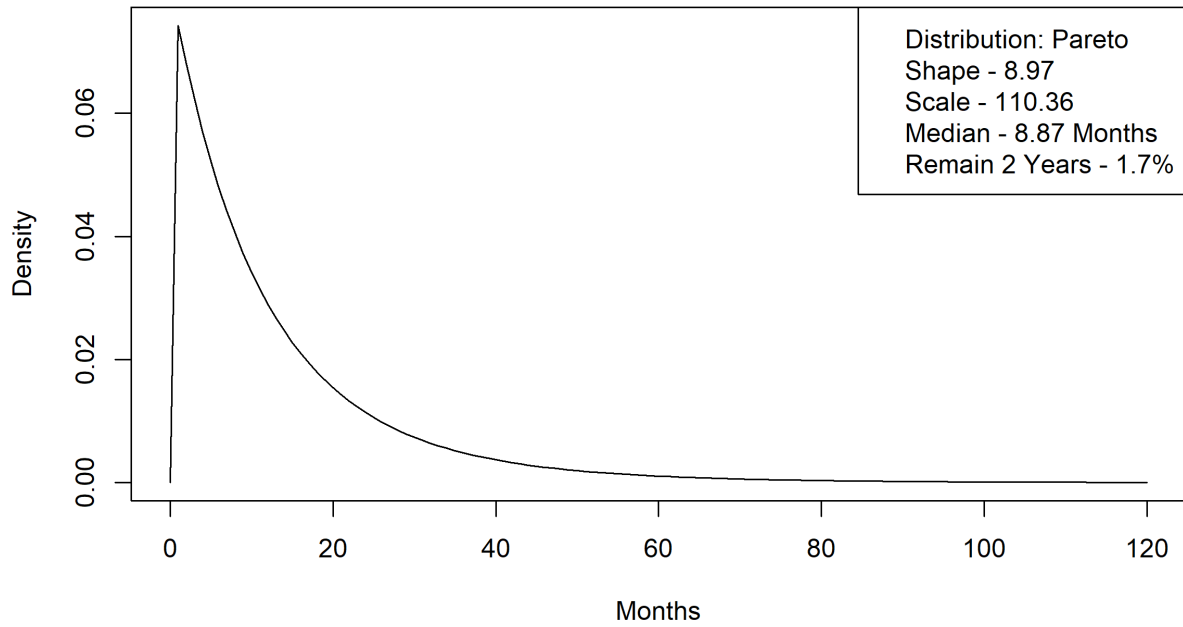
Figure 6A.53 Holding Times: PCA to MA No LTSS

Distribution: Log Normal
Shape - 2.05
Scale - 1.1
Median - 7.73 Months
Remain 2 Years - 1.5%

Density

Months
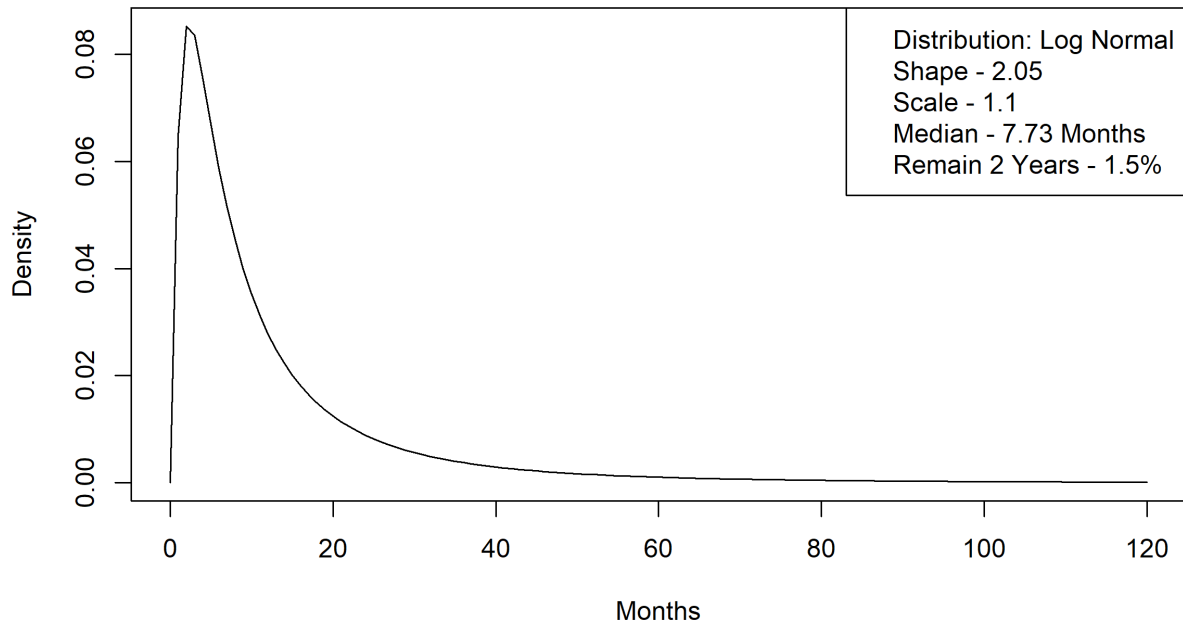
Figure 6A.54 Holding Times: PCA to No LTSS

Distribution: Log Normal
Shape - 2.1
Scale - 1.02
Median - 8.2 Months
Remain 2 Years - 1.5%
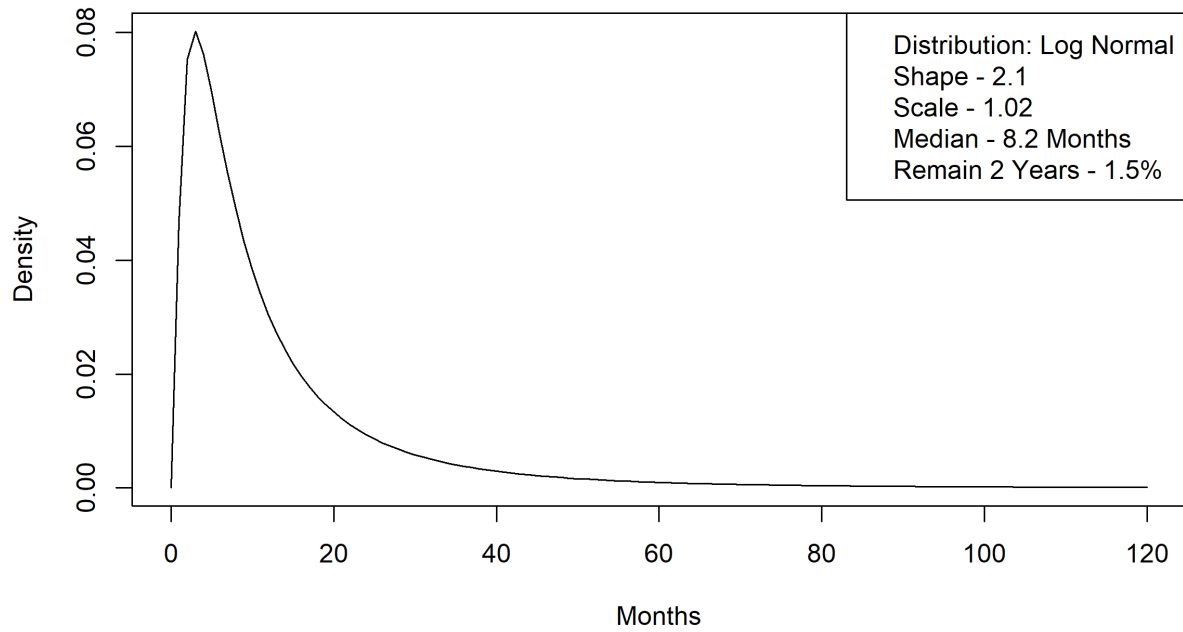
Figure 6A.55 Holding Times: AC to Death

Distribution: Log Normal
Shape - 2.38
Scale - 1.03
Median - 10.79 Months
Remain 2 Years - 2.2%
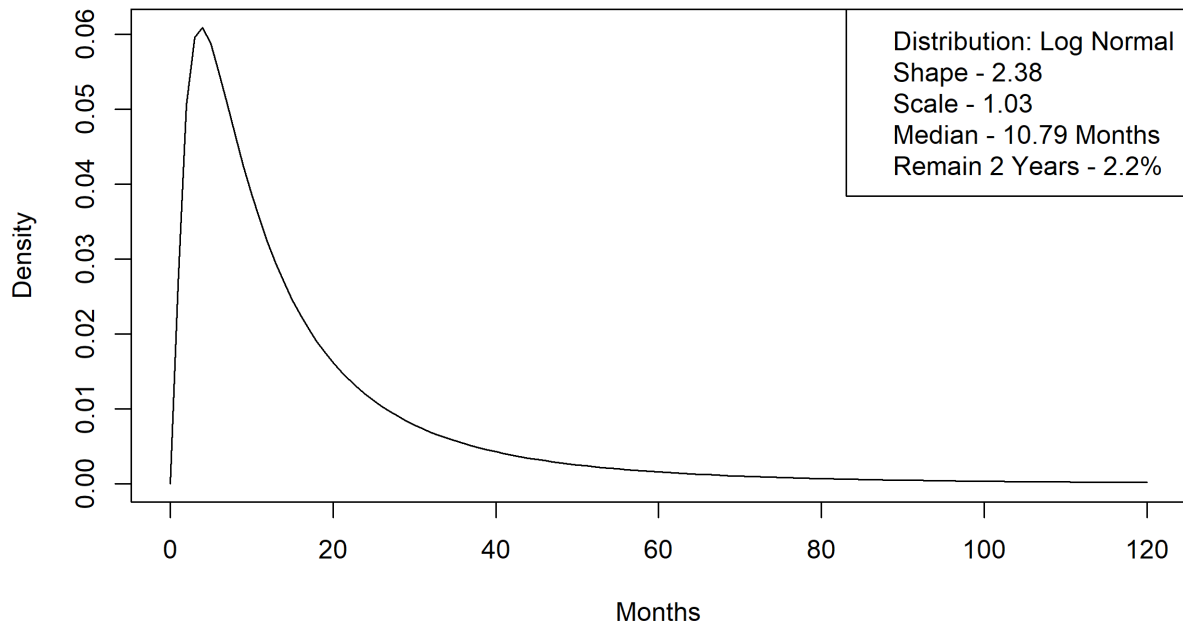
Figure 6A.56 Holding Times: AC to EWC

Distribution: Log Normal
Shape - 2.08
Scale - 0.99
Median - 8.01 Months
Remain 2 Years - 1.3%
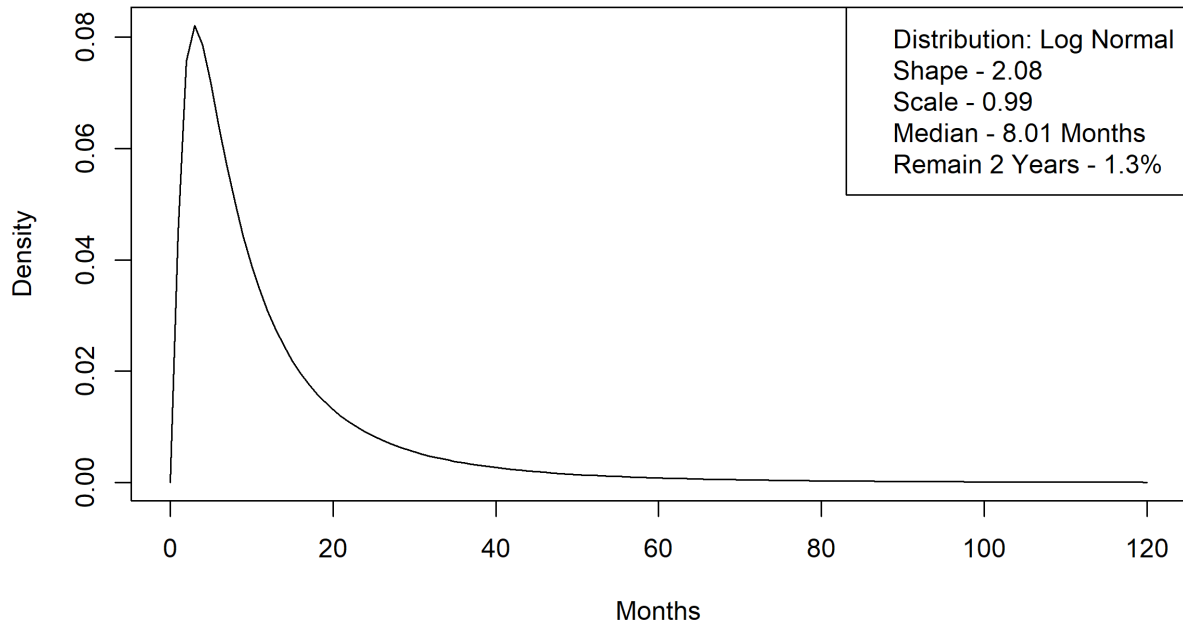
Figure 6A.57 Holding Times: AC to EWR

Distribution: Log Normal
Shape - 2.39
Scale - 0.98
Median - 10.9 Months
Remain 2 Years - 2.1%
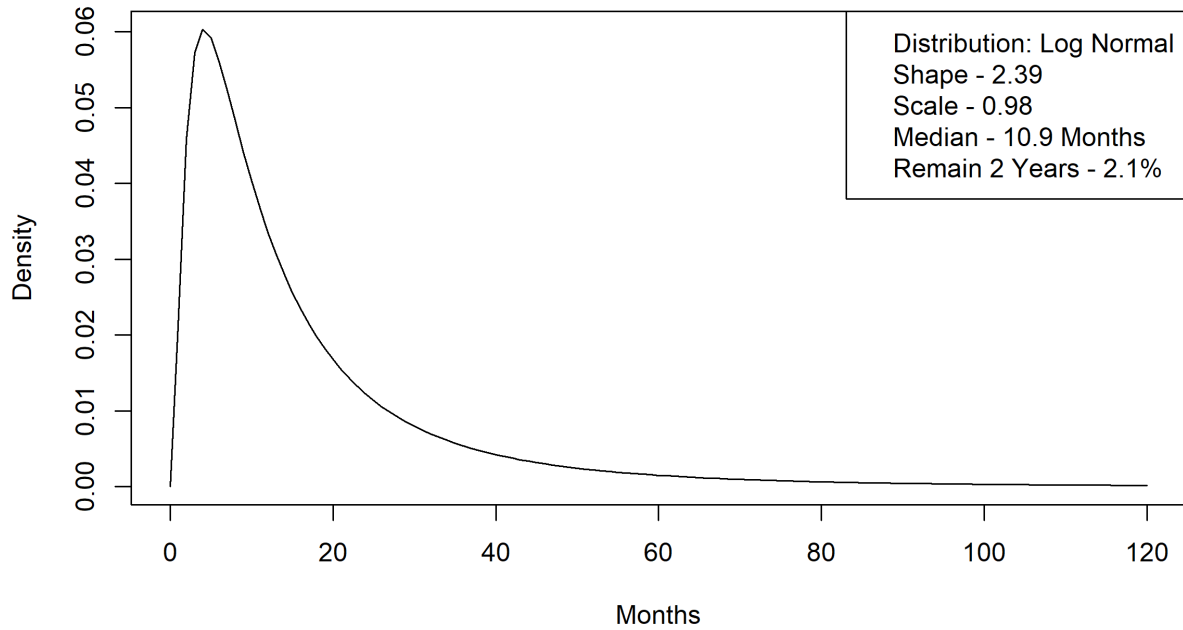
Figure 6A.58 Holding Times: AC to MA NF 0-29

Distribution: Log Normal
Shape - 2.3
Scale - 0.93
Median - 9.99 Months
Remain 2 Years - 1.7%
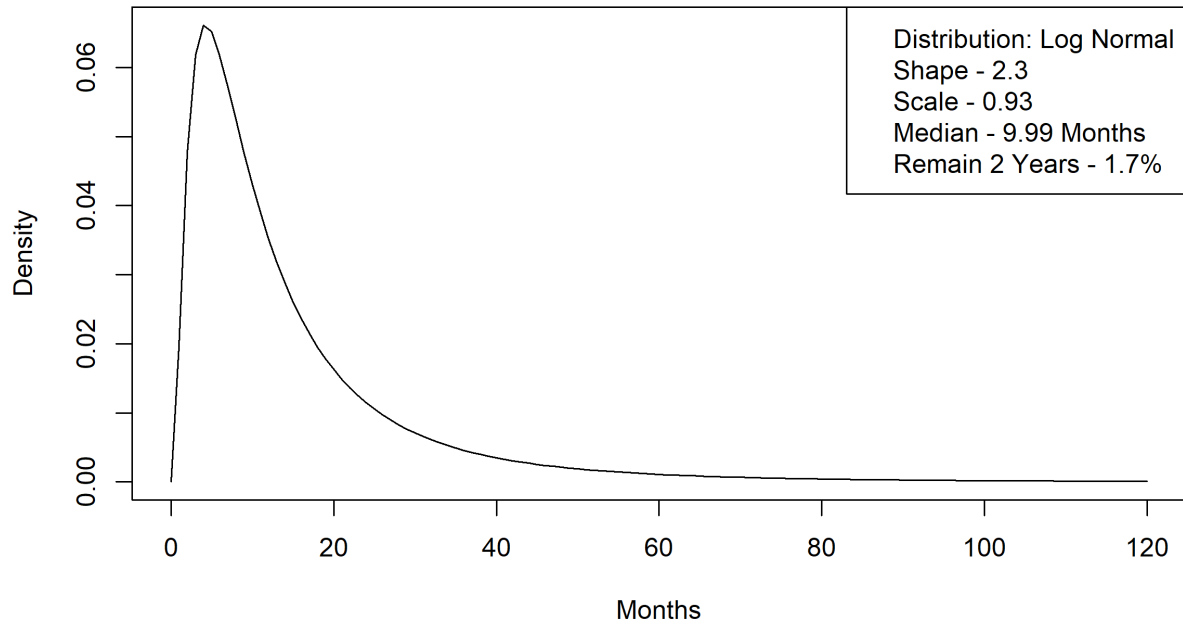
Figure 6A.59 Holding Times: AC to MA NF 30-90

Distribution: Log Normal
Shape - 2.39
Scale - 0.77
Median - 10.94 Months
Remain 2 Years - 1.5%
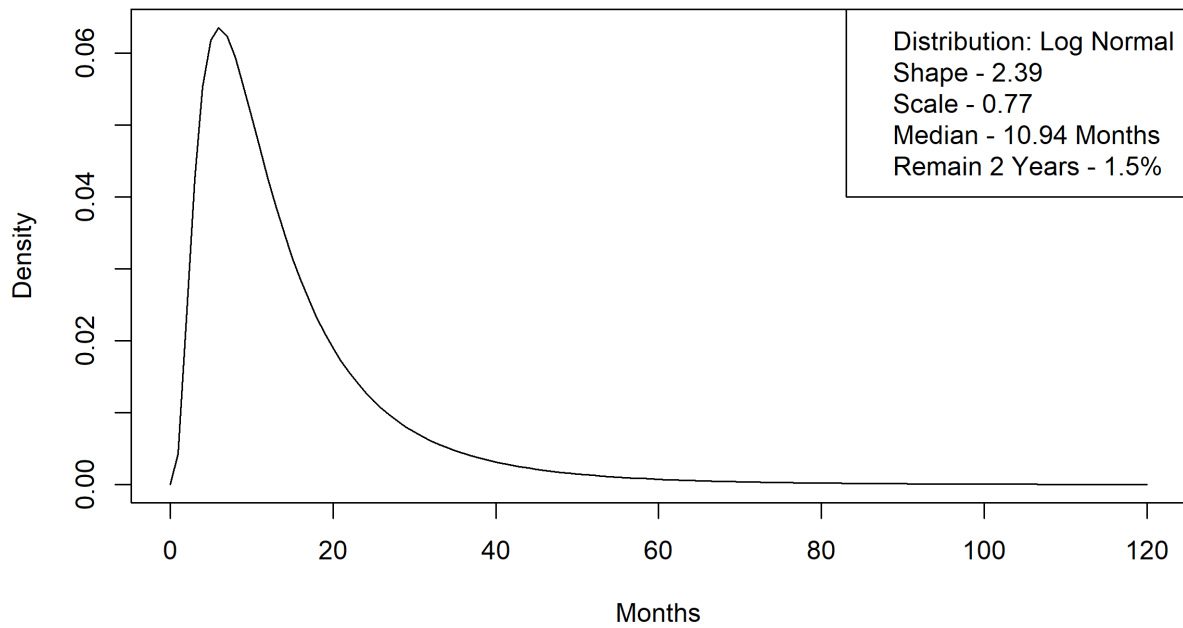
Figure 6A.60 Holding Times: AC to MA No LTSS

Distribution: Log Normal
Shape - 2.21
Scale - 1.04
Median - 9.1 Months
Remain 2 Years - 1.8%

Density

Months
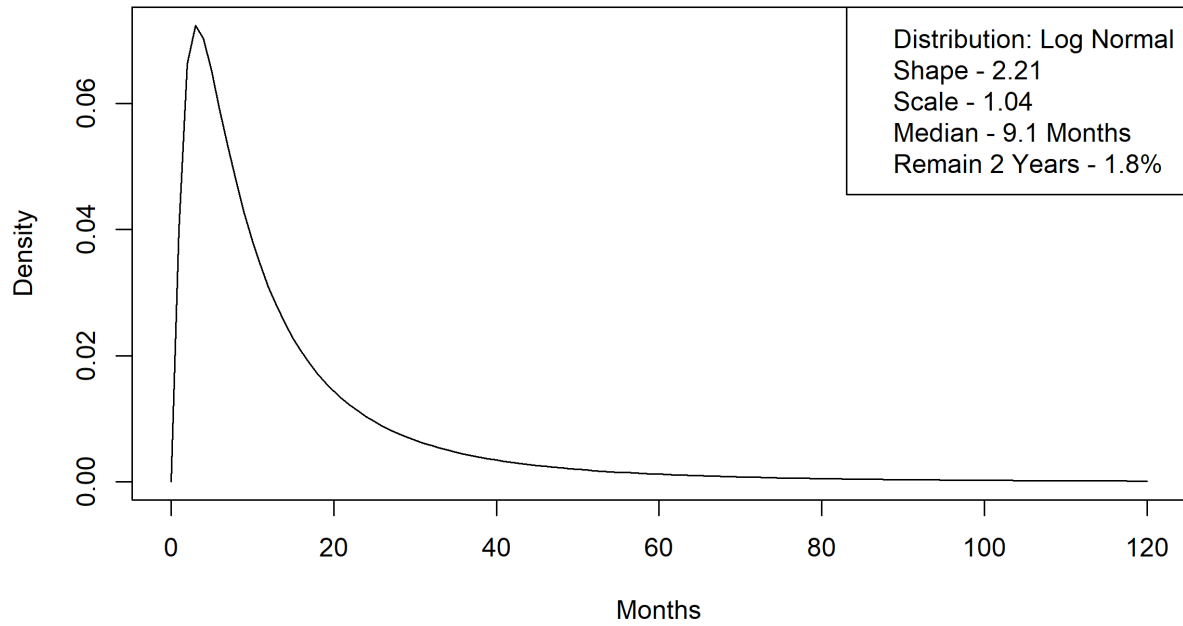
Figure 6A.61 Holding Times: AC to PCA

Distribution: Log Normal
Shape - 2.53
Scale - 0.88
Median - 12.51 Months
Remain 2 Years - 2.3%

Density

Months
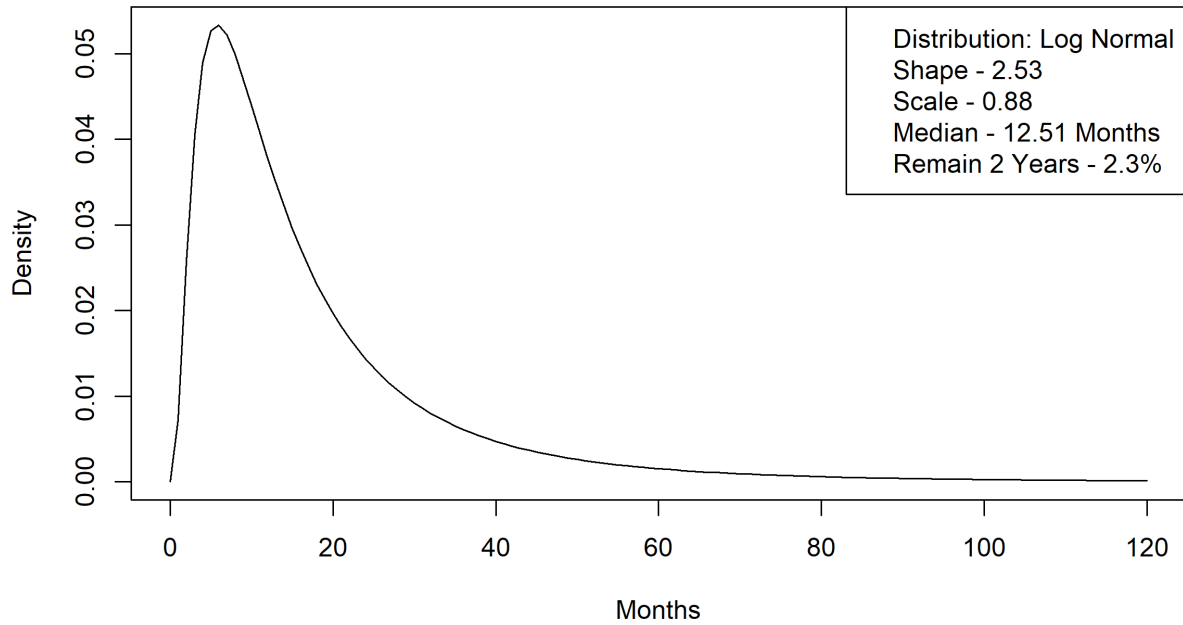
Figure 6A.62 Holding Times: AC to NF 0-29

Distribution: Log Normal
Shape - 2.3
Scale - 1.05
Median - 9.98 Months
Remain 2 Years - 2%
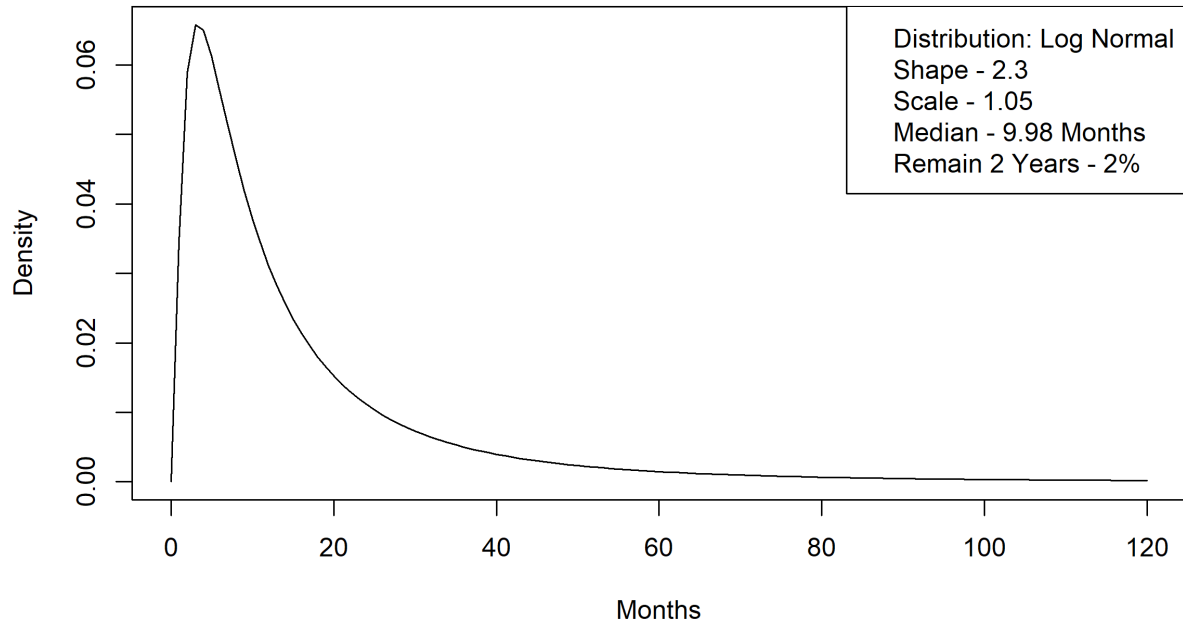
Figure 6A.63 Holding Times: AC to NF 30-90

Distribution: Log Normal
Shape - 2.3
Scale - 0.88
Median - 9.93 Months
Remain 2 Years - 1.6%
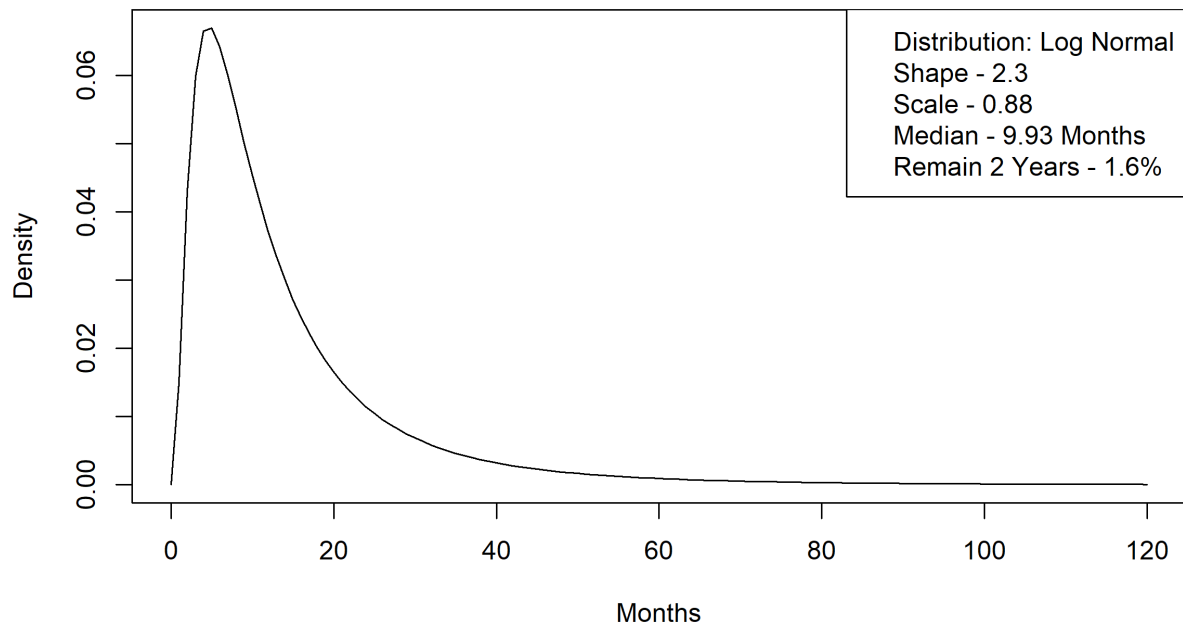
Figure 6A.64 Holding Times: AC to No LTSS

Distribution: Log Normal
Shape - 2.1
Scale - 1.02
Median - 8.2 Months
Remain 2 Years - 1.5%
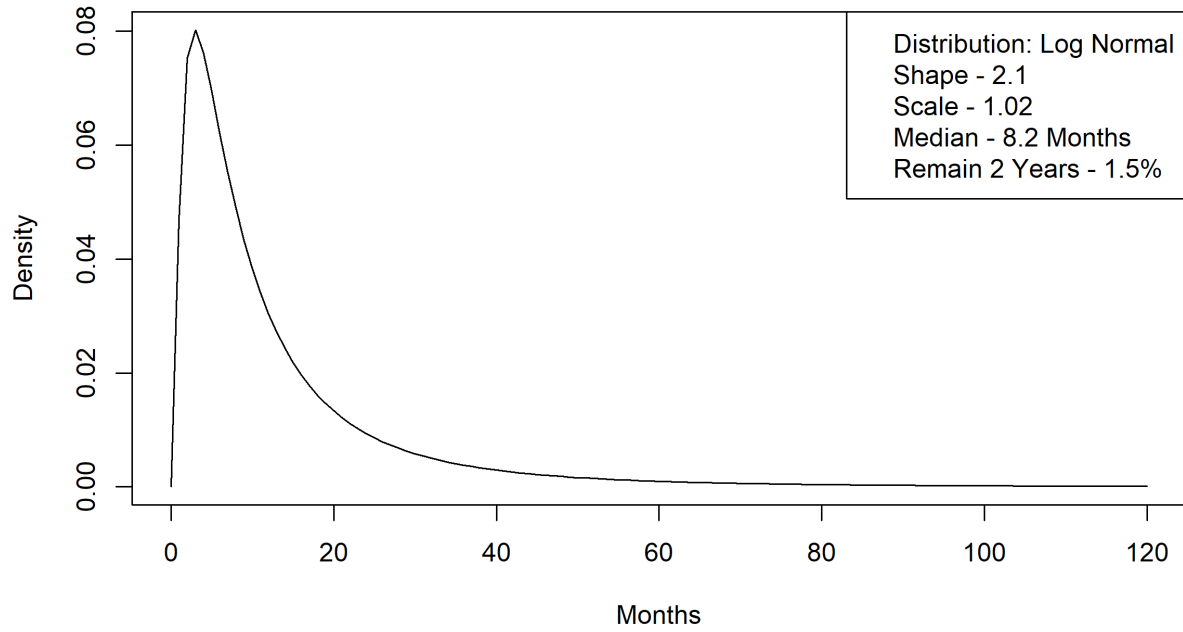
Figure 6A.65 Holding Times: NF 91+ to Death

Distribution: Log Normal
Shape - 2.05
Scale - 1.14
Median - 7.73 Months
Remain 2 Years - 1.6%
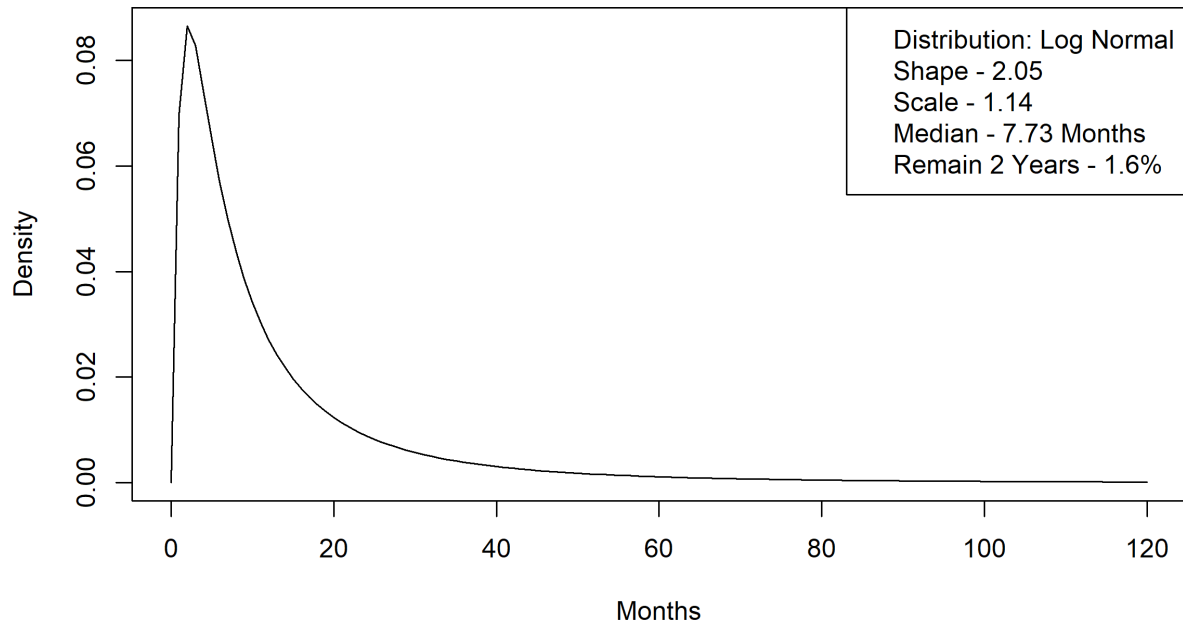
Figure 6A.66 Holding Times: NF 91+ to EWC

Distribution: Burr Type 12
Shape - 0
Scale - 1
Median - 1.55 Months
Remain 2 Years - 0.1%
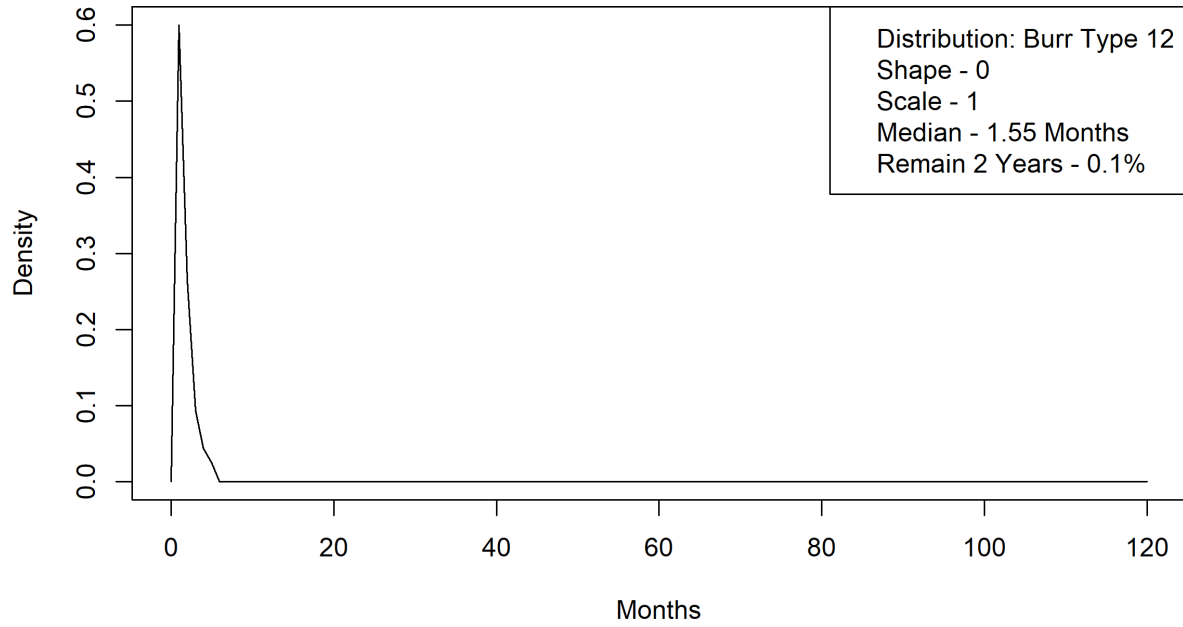
Figure 6A.67 Holding Times: NF 91+ to EWR

Distribution: Burr Type 12
Shape - 0
Scale - 1
Median - 1.75 Months
Remain 2 Years - 0.2%
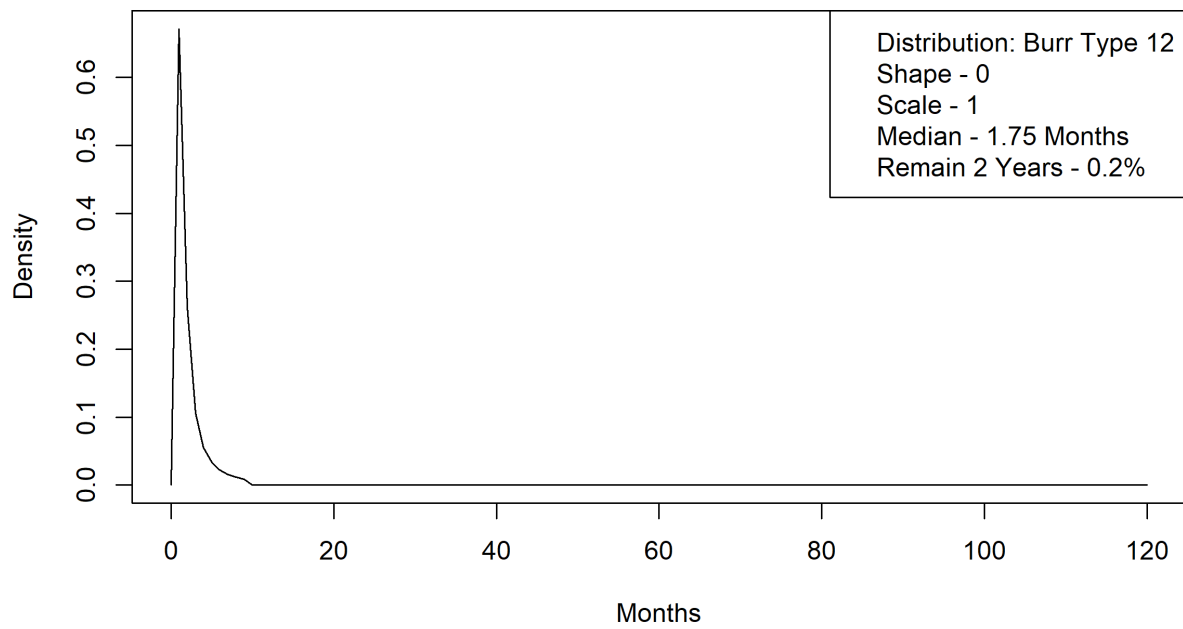
Figure 6A.68 Holding Times: NF 91+ to MA NF 0-29

Distribution: Burr Type 12
Shape - 0
Scale - 1
Median - 2.79 Months
Remain 2 Years - 1.2%
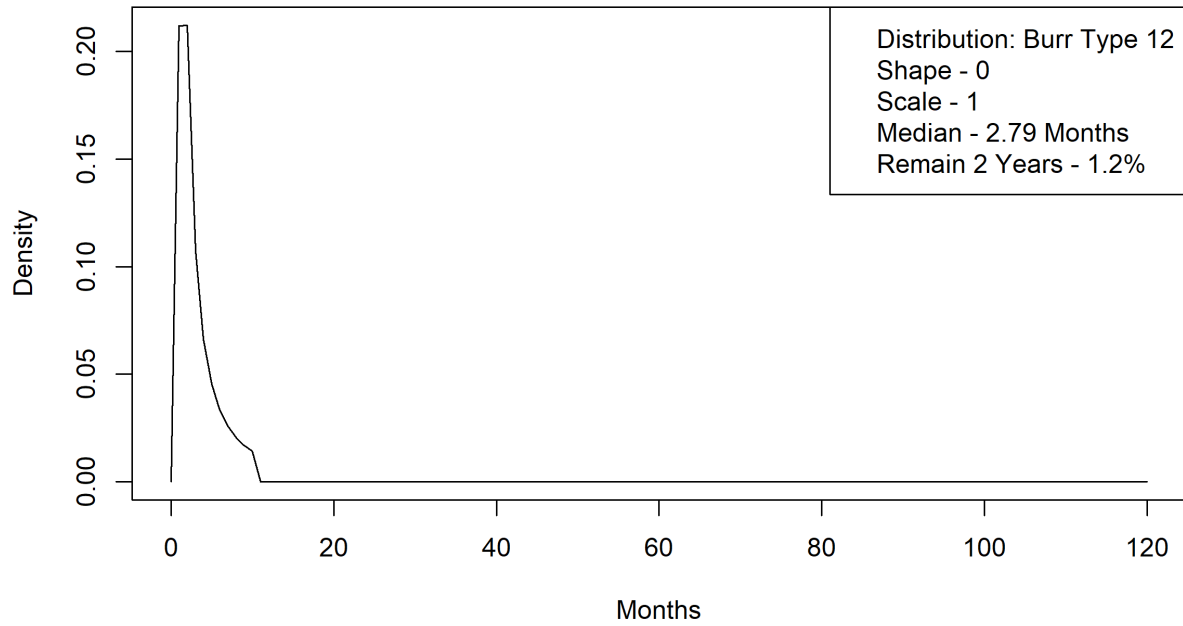
Figure 6A.69 Holding Times: NF 91+ to MA NF 30-90

Distribution: Burr Type 12
Shape - 0
Scale - 0.99
Median - 2.8 Months
Remain 2 Years - 1.2%
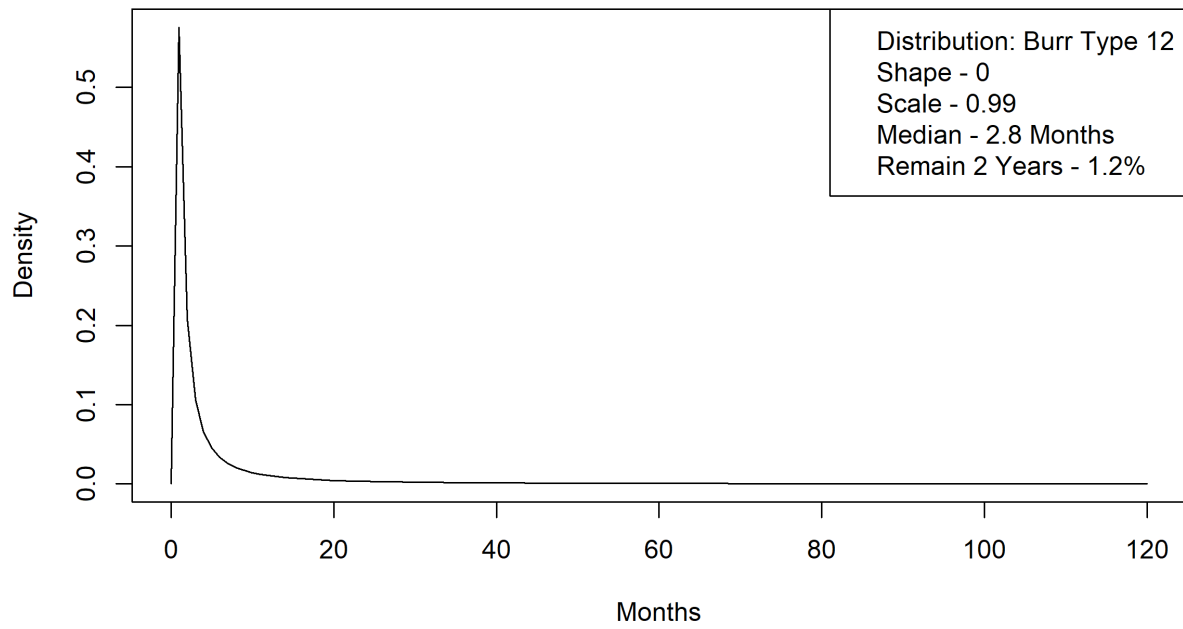
Figure 6A.70 Holding Times: NF 91+ to MA no LTSS

Distribution: Burr Type 12
Shape - 0
Scale - 1
Median - 1.83 Months
Remain 2 Years - 0.3%
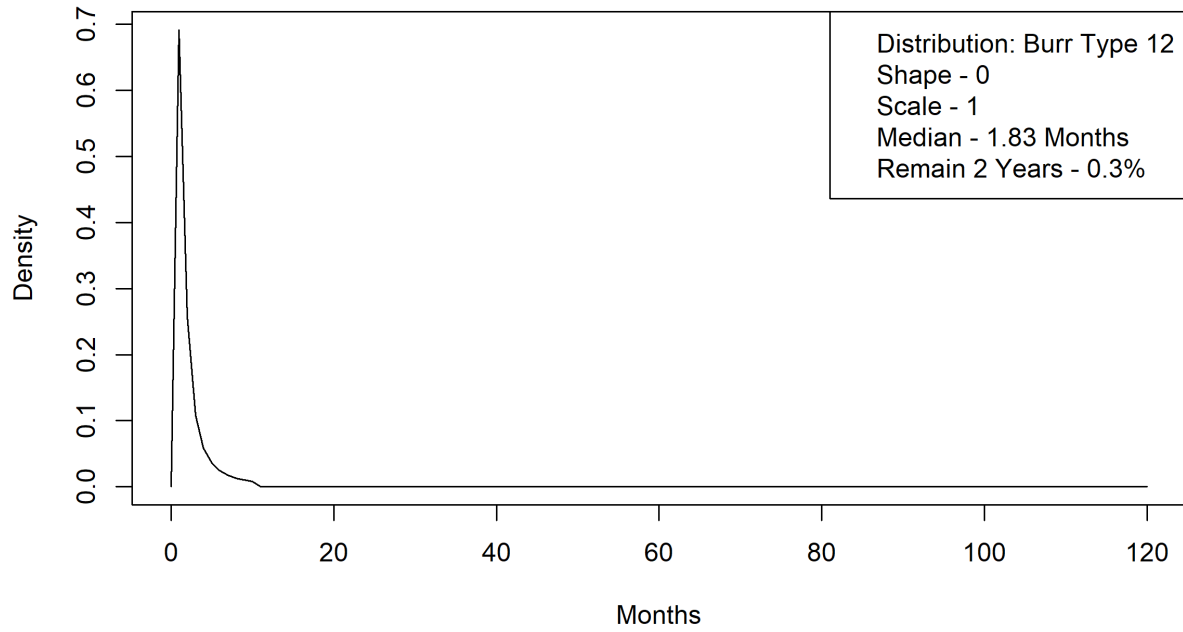
Figure 6A.71 Holding Times: NF 91+ to AC

Distribution: Burr Type 12
Shape - 0
Scale - 1
Median - 1.58 Months
Remain 2 Years - 0.1%
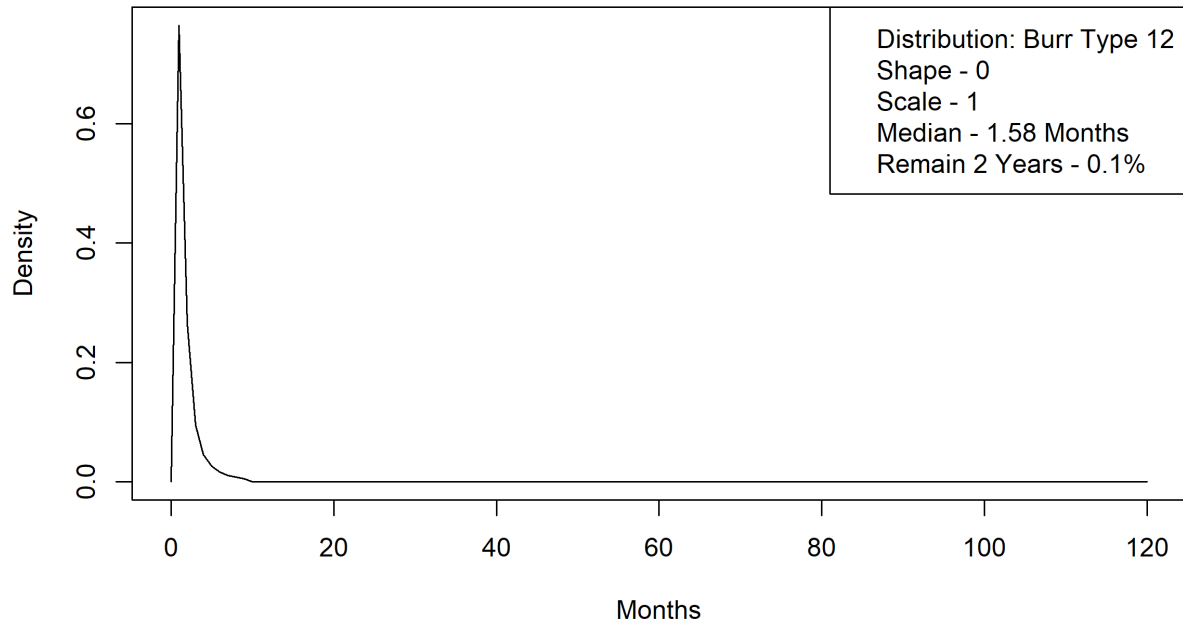
Figure 6A.72 Holding Times: NF 91+ to NF 0-29

Distribution: Log Normal
Shape - 1.83
Scale - 0.87
Median - 6.22 Months
Remain 2 Years - 0.6%
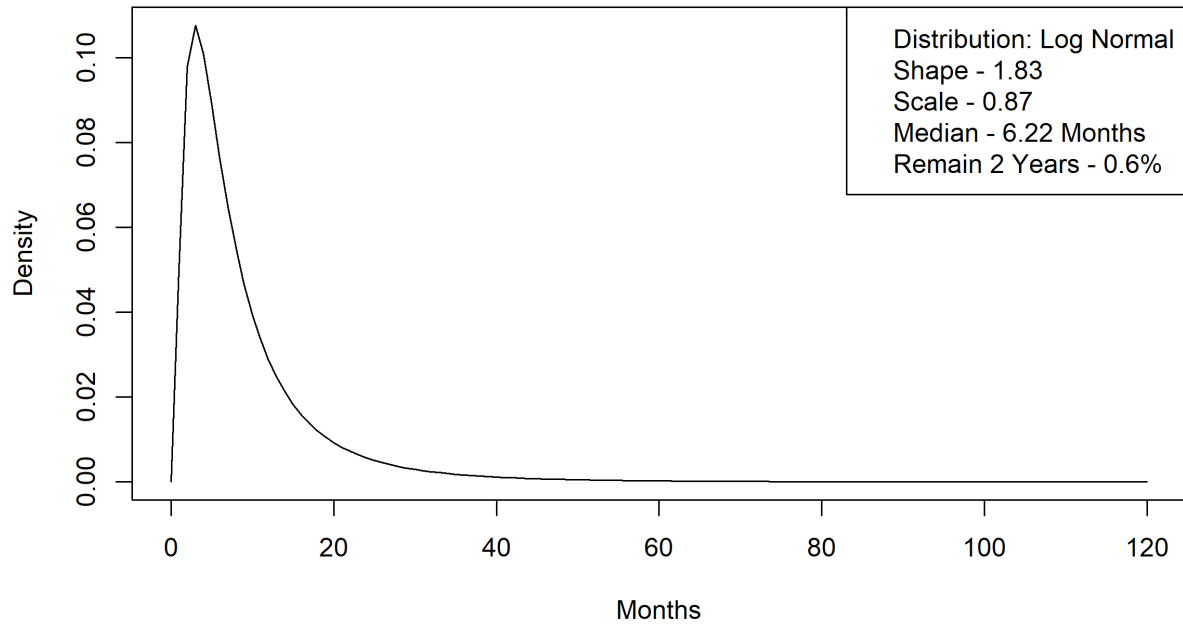
Figure 6A.73 Holding Times: NF 91+ to NF 30-90

Distribution: Burr Type 12
Shape - 0.08
Scale - 1.96
Median - 4.93 Months
Remain 2 Years - 1.5%
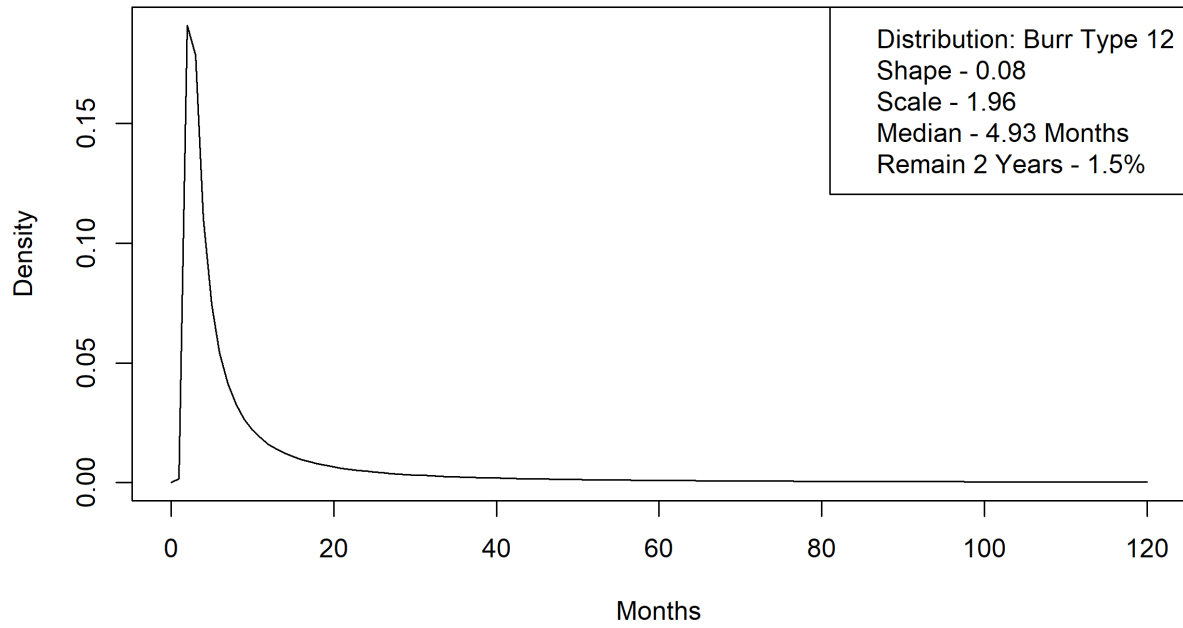
Figure 6A.74 Holding Times: NF 91+ to No LTSS

Distribution: Burr Type 12
Shape - 0.01
Scale - 0.97
Median - 2.07 Months
Remain 2 Years - 0.5%
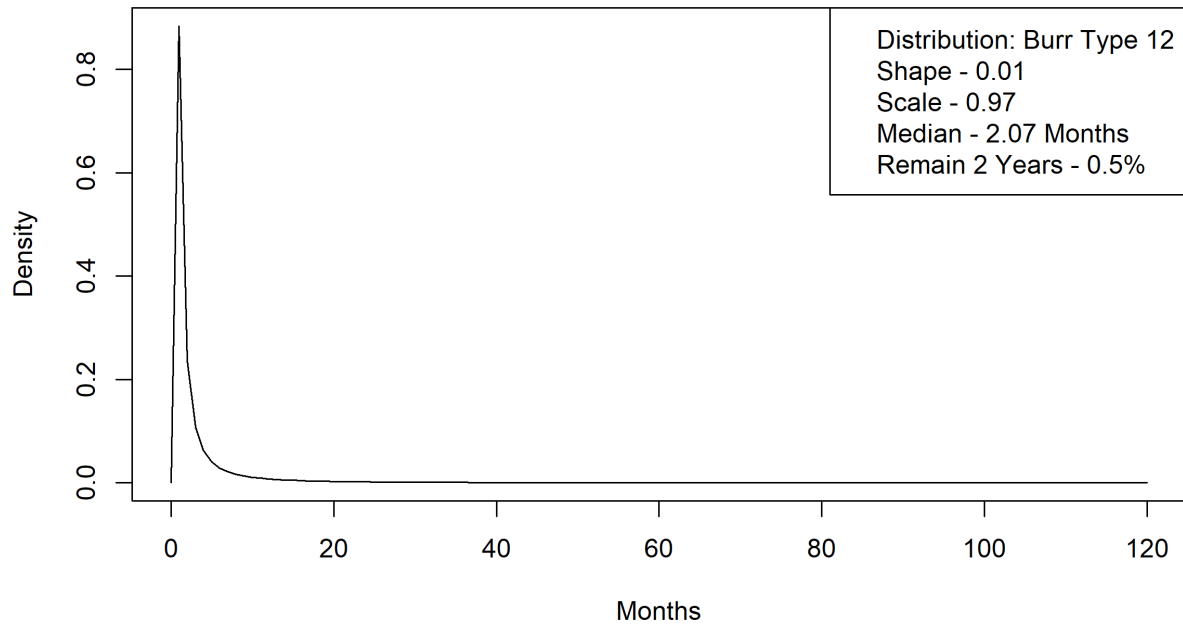
Figure 6A.75 Holding Times: NF 91+ to No LTSS to Death

Distribution: Pareto
Shape - 4082
Scale - 67610
Median - 11.48 Months
Remain 2 Years - 2.3%
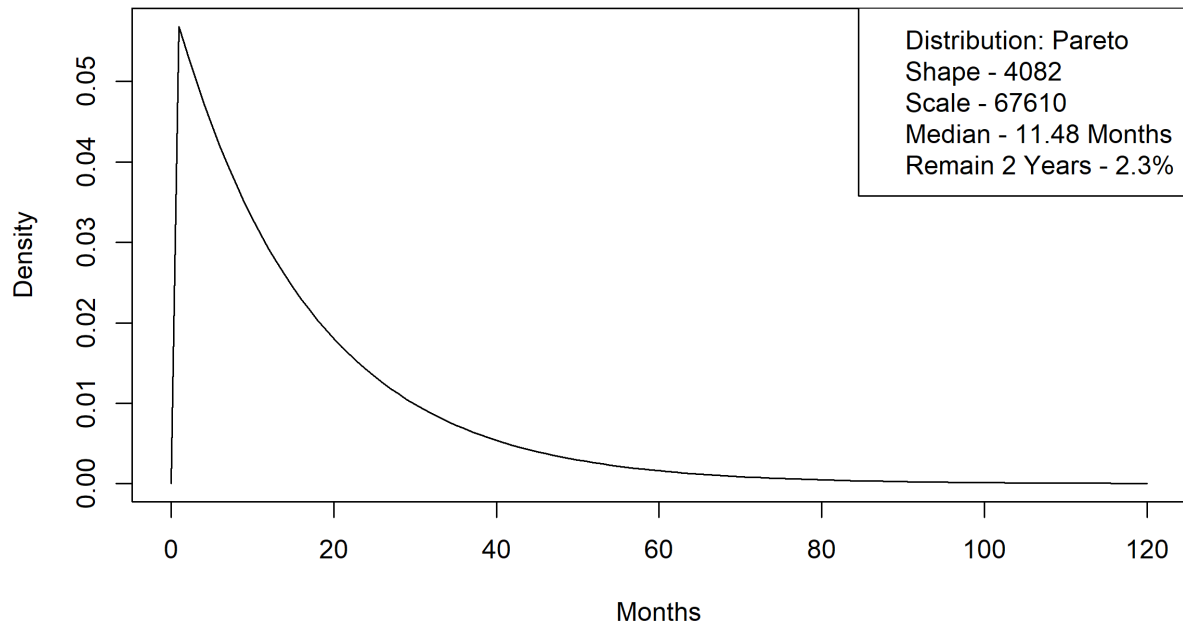
Figure 6A.76 Holding Times: NF 91+ to No LTSS to EWC

Distribution: Log Normal
Shape - 1.82
Scale - 0.72
Median - 6.18 Months
Remain 2 Years - 0.3%

Months
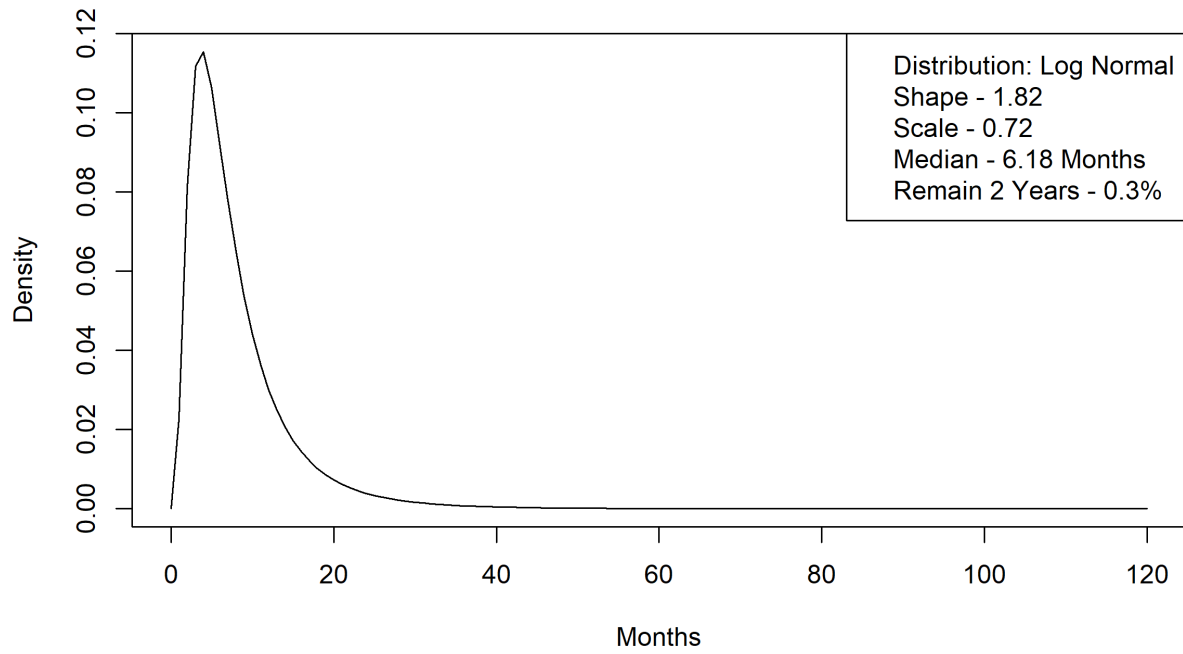
Figure 6A.77 Holding Times: NF 91+ to No LTSS to EWR

Distribution: Log Normal
Shape - 1.91
Scale - 0.79
Median - 6.78 Months
Remain 2 Years - 0.5%

Months
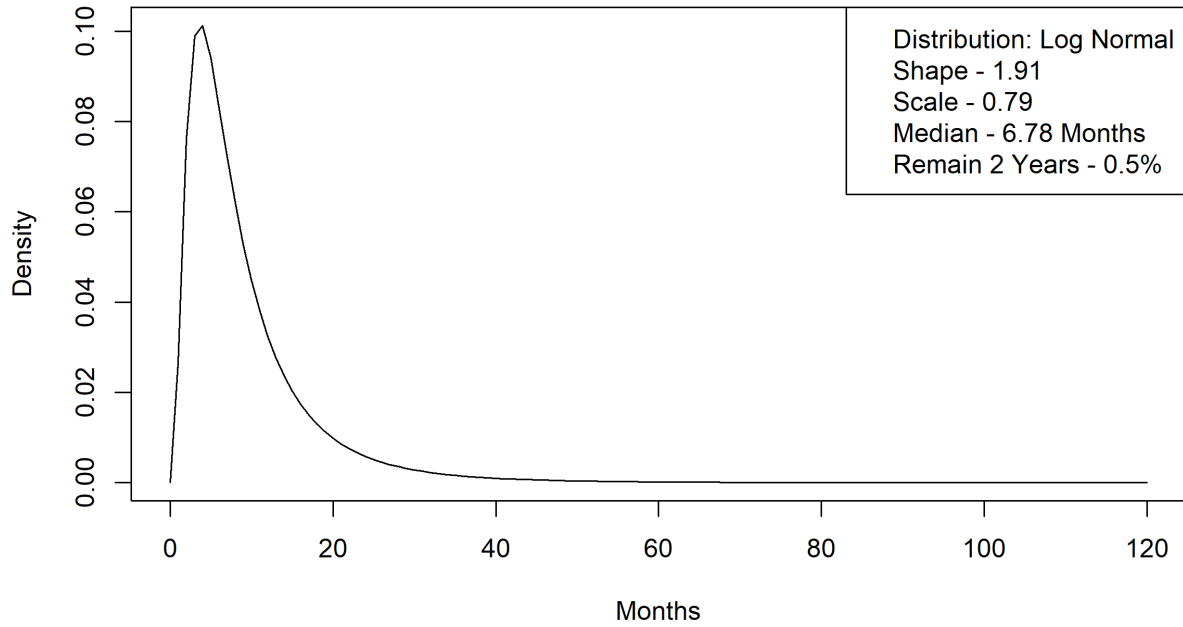
Figure 6A.78 Holding Times: NF 91+ to No LTSS to MA NF 0-29

Distribution: Log Normal
Shape - 1.84
Scale - 0.71
Median - 6.31 Months
Remain 2 Years - 0.3%

Months
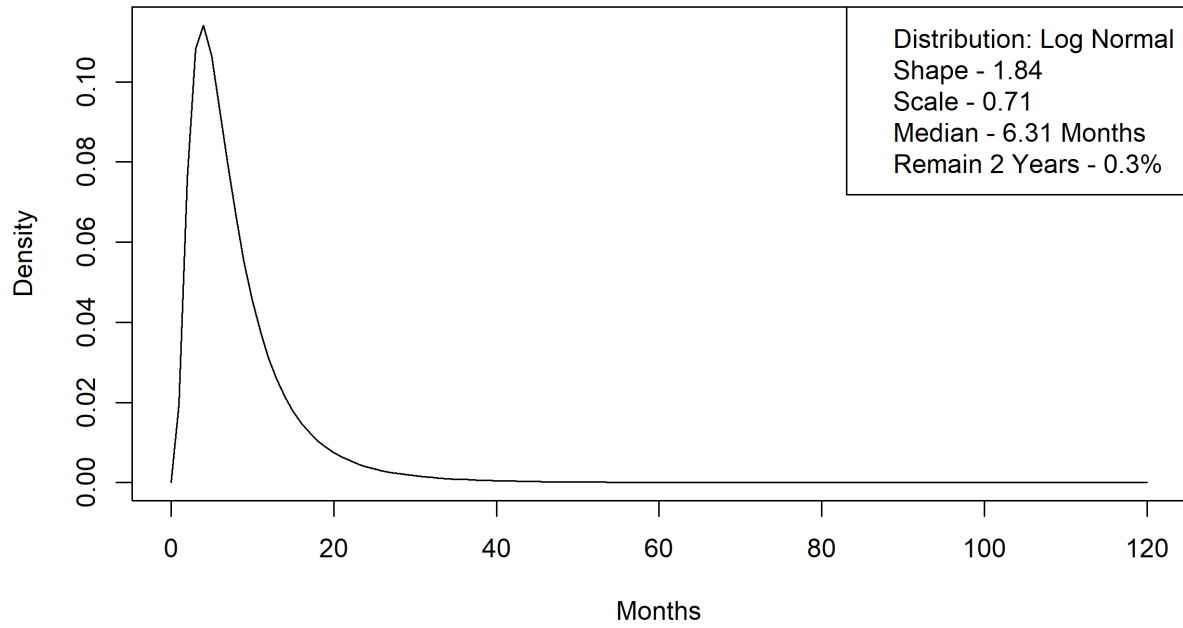
Figure 6A.79 Holding Times: NF 91+ to No LTSS to MA NF 30-90

Distribution: Burr Type 12
Shape - 0.1
Scale - 1.85
Median - 4.31 Months
Remain 2 Years - 1.2%

Months
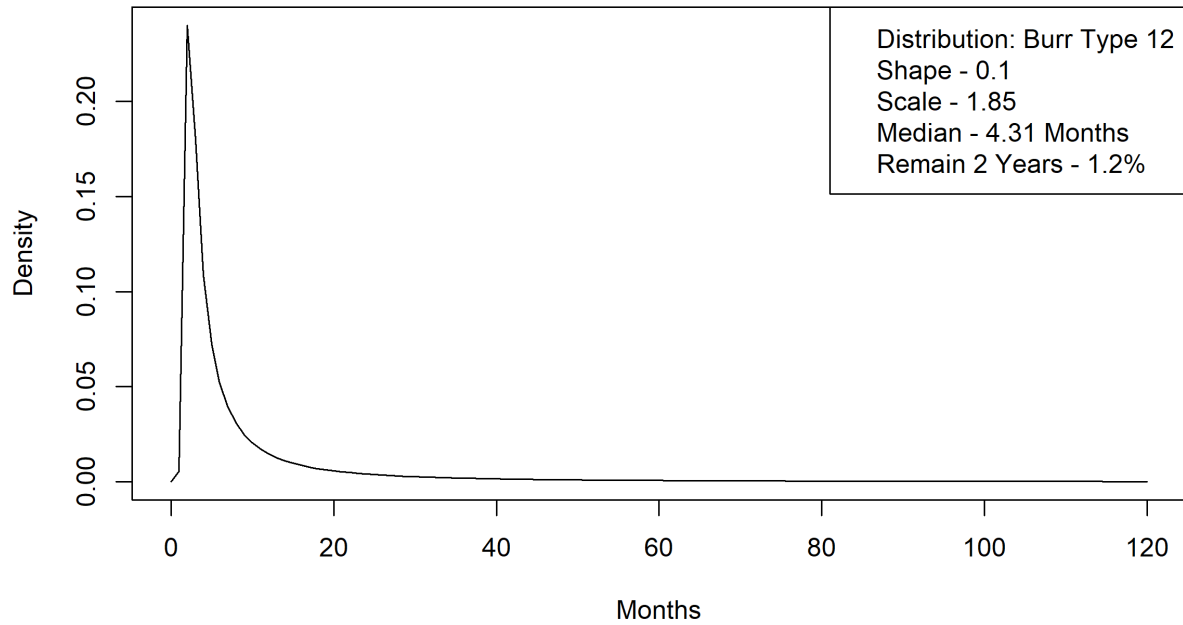
Figure 6A.80 Holding Times: NF 91+ to No LTSS to MA NF 91+

Distribution: Burr Type 12
Shape - 0.21
Scale - 2.83
Median - 3.5 Months
Remain 2 Years - 0%
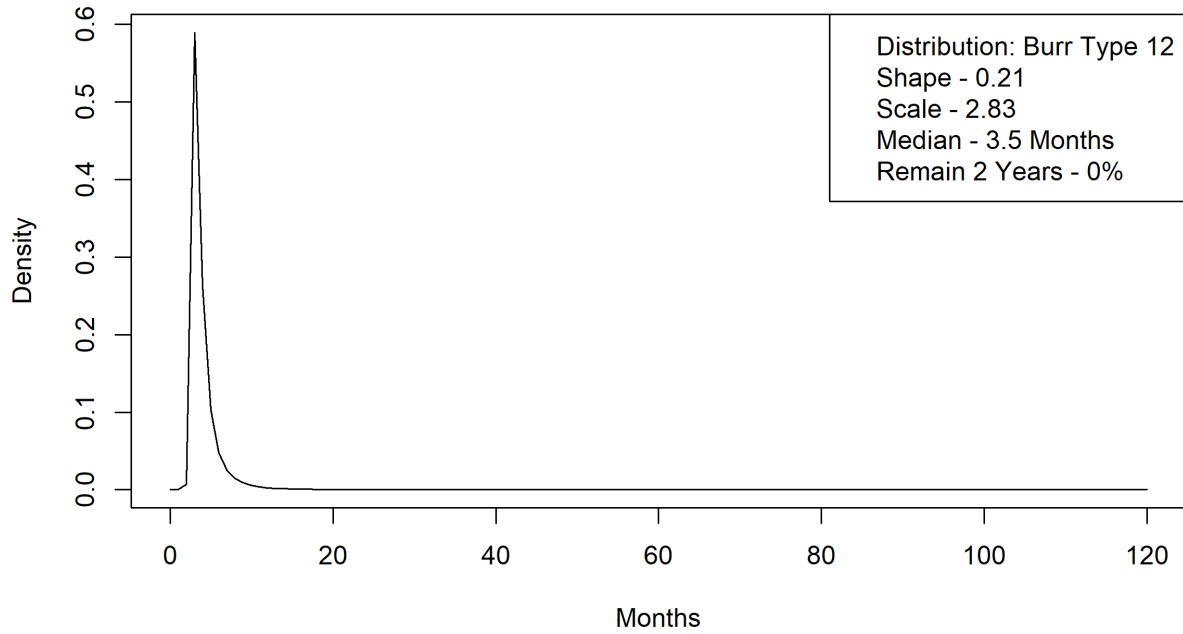
Figure 6A.81 Holding Times: NF 91+ to No LTSS to MA no LTSS

Distribution: Log Normal
Shape - 1.71
Scale - 0.81
Median - 5.53 Months
Remain 2 Years - 0.4%
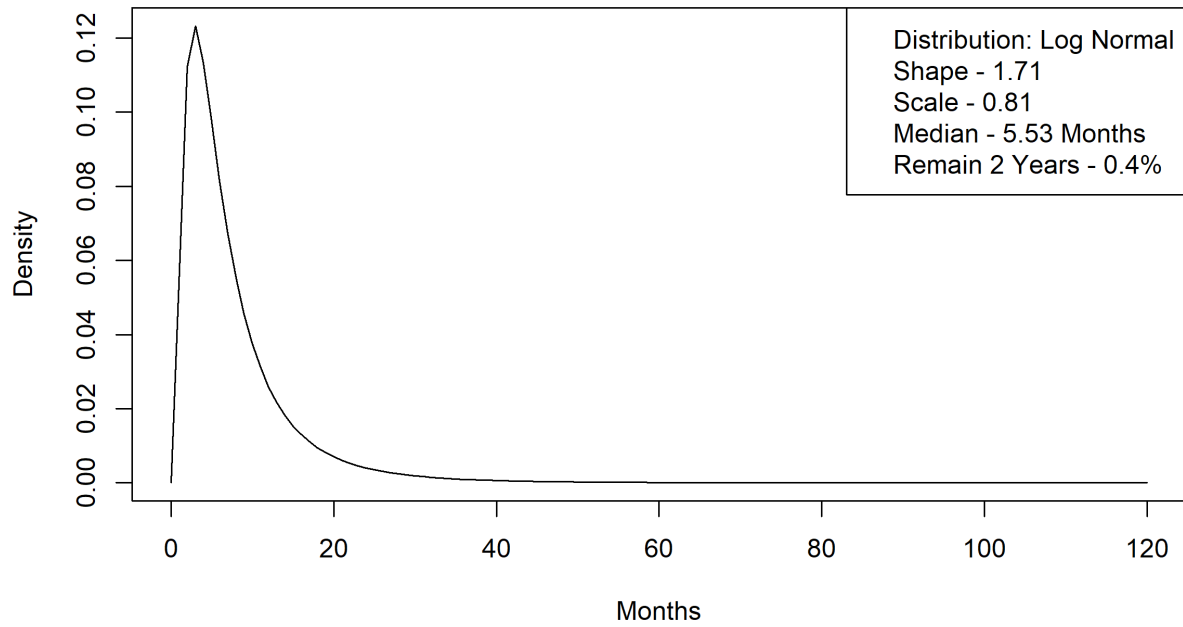
Figure 6A.82 Holding Times: NF 91+ to No LTSS to PCA

Distribution: Log Normal
Shape - 1.6
Scale - 0.53
Median - 4.93 Months
Remain 2 Years - 0%
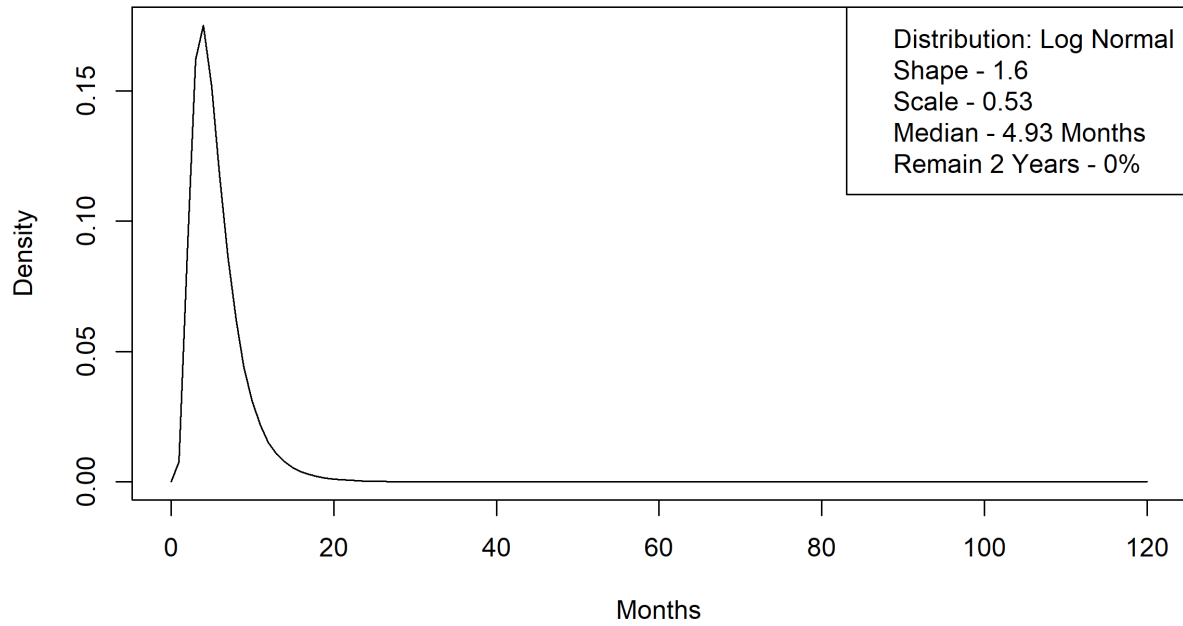
Figure 6A.83 Holding Times: NF 91+ to No LTSS to AC

Distribution: Log Normal
Shape - 1.85
Scale - 0.75
Median - 6.37 Months
Remain 2 Years - 0.4%
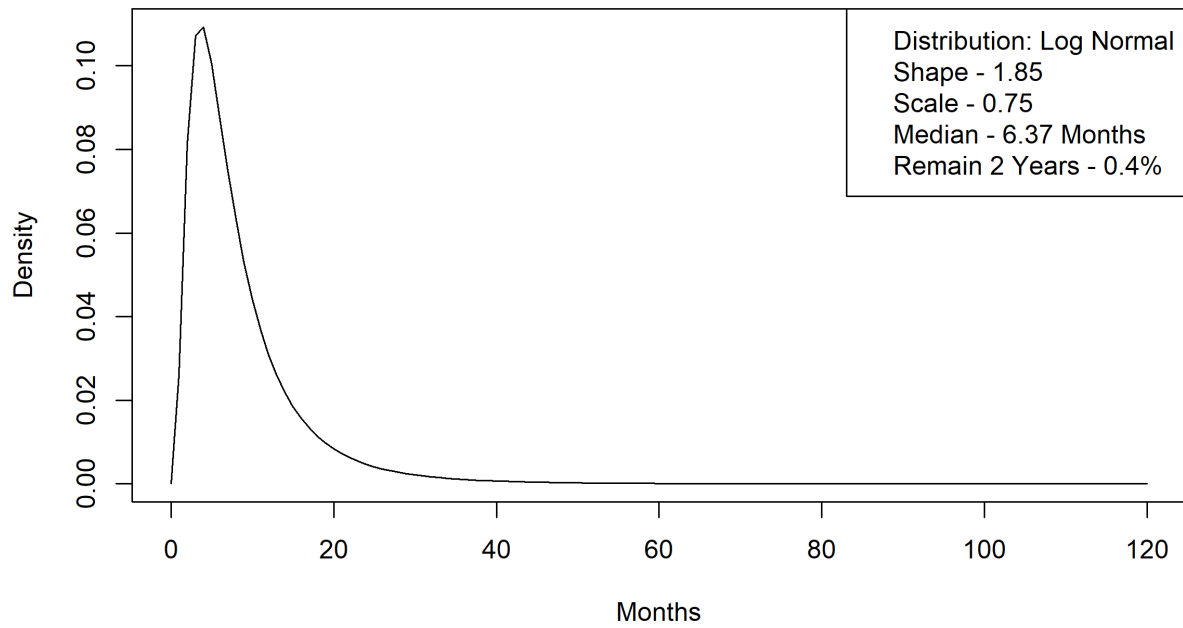
Figure 6A.84 Holding Times: NF 91+ to No LTSS to NF 0-29

Distribution: Burr Type 12
Shape - 1.41
Scale - 7.46
Median - 5.85 Months
Remain 2 Years - 0.4%
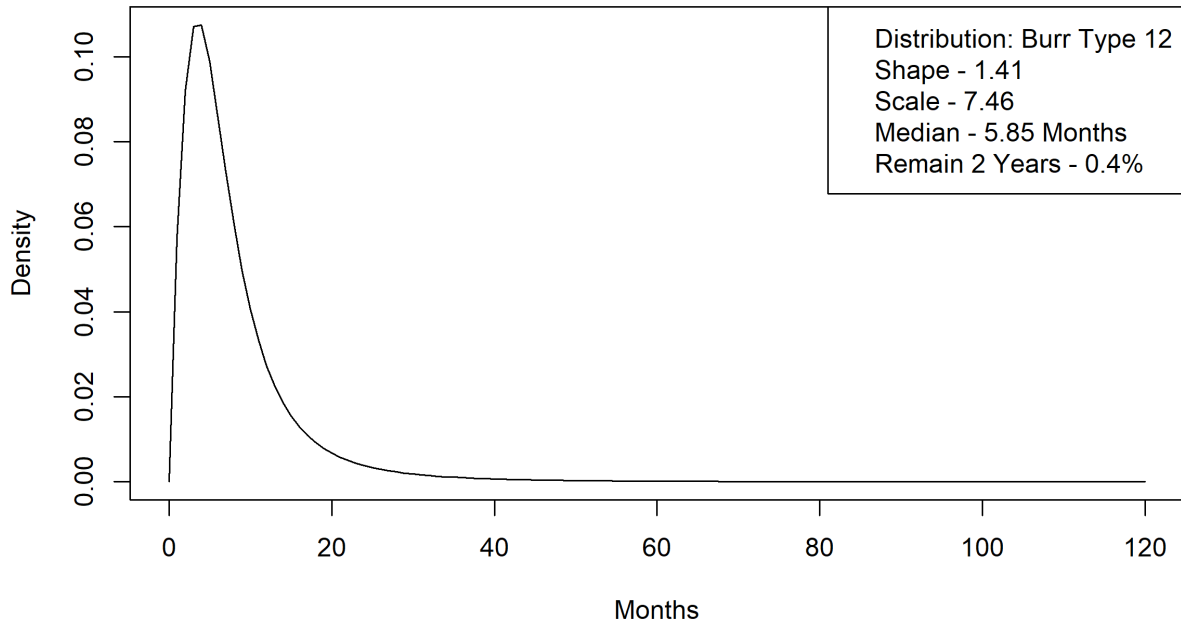
Figure 6A.85 Holding Times: NF 91+ to No LTSS to NF 30-90

Distribution: Log Normal
Shape - 1.93
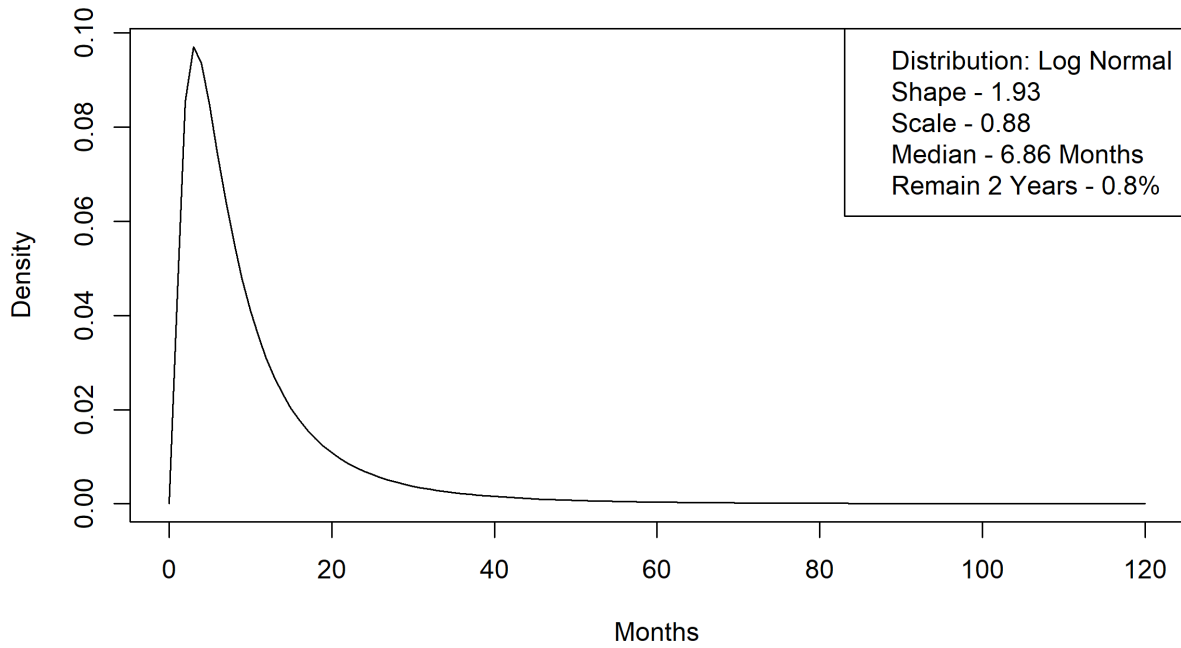Scale - 0.88
Median - 6.86 Months
Remain 2 Years - 0.8%

Figure 6A.86 Holding Times: NF 91+ to No LTSS to NF 91+

Distribution: Burr Type 12
Shape - 0.38
Scale - 2.9
Median - 3.66 Months
Remain 2 Years - 0%