

LONG TERM CARE MODEL

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The Long Term Care (LTC) Model projects demand for nursing home (NH) and home health (HH) care in terms of NH average daily census and annual HH care patients. It was developed by the Veterans Health Administration Office of Policy and Planning in consultation with subject matter experts from the Geriatrics and Extended Care Strategic Healthcare Group, the Agency for Health Care Policy and Research, and the University of Michigan.

1. **Attributes:** Projections may be generated

- for any VA parent facility, Veterans Integrated Service Network (VISN), or nation
- for any target year between 2002 – 2010
- by Priority level (1a, 1b, 2, 3, 4, 5, 6, 7)
- based on the projected enrollee population of the facility
- based on the age (21-64, 65-74, 75-84, 85+) and disability level of VA enrollees
- using national (non-VA) surveys as the underlying standard

2. **Underlying assumptions:**

- Historical VA LTC data are not completely adequate for projecting future LTC requirements for reasons specified below.
- NH and HH requirements depend on both the age and disability level of the population at risk.
- The population at risk is the VA enrollee population.
- Enrolled veterans will require NH and HH care at the same age- and disability-adjusted rates as do US males, as measured by national surveys.
- The 1996 Medical Expenditure Panel Survey of NH is representative of national NH use.
- The 1998 National Home and Hospice Care Survey is representative of national HH care use.
- VA will be unable to provide LTC to all enrollees who request it, consequently, an affordable market share (MS) is required.

3. **Why non-VA surveys are used:**

Since VA long term care budgets for both nursing home and home health care have been historically constrained, any projections based purely on VA experience would merely perpetuate the current situation. Furthermore, not only would a VA NH model be required, so would separate models or approaches for community and state NH. Finally, such models would only be able to project future workload for geographic areas with existing NH programs.

For home health care, VA experience is even less indicative of true demand, since VA has historically referred the preponderance of HH demand to Medicare.

4. **Overview of the Model:** The LTC Model essentially calculates the product of three variables.

- LTC Use Rates for males
- Enrollee Population projected for each facility
- Market Share percentage VA will provide

This calculation occurs for every possible combination of age, disability level, and Priority level of the Enrollee Population.

5. **Data Sources for the three variables in the LTC Model:**

- a. **LTC Use Rates** for males, by age and disability level are derived from national, non-VA surveys.
 - for NH from the 1996 Medical Expenditure Panel Survey.
 - for HH care from the 1998 National Home and Hospice Care Survey.

- b. **Enrollee Populations** are based on actuarial estimates distributed into disability levels based on the results of a telephone survey of 27,000 enrollees conducted in February 1999.
- c. **Market Shares** are based on a combination of historical precedent, legislative mandate, LTC program policy, resource availability, and budgetary policy.

6. Definitions of Terms and Variables:

a. **NH Use Rate** =
$$\frac{\text{male NH residents (by age and disability) on January 1, 1996}}{\text{male residents of the US (by age and disability) in 1996}}$$

b. **HH Use Rate** =
$$\frac{\text{male HH care recipients* (by age and disability) during 1998}}{\text{male residents of the US (by age and disability) in 1998}}$$

* receiving one or more visits from any health care provider (physician, visiting nurse, nurse aide, therapist, home health aide, homemaker, or social worker)

c. Enrollee Population Attributes:

Priority Levels are as defined in Eligibility Reform legislation, except as noted below.

- 1a = 70%+ Service Connected (SC)
- 1b = 50-69% SC
- 2
- 3
- 4
- 5
- 6
- 7

Age groups

- 21-64
- 65-74
- 75-84
- 85+

Disability levels for both NH and HH programs are defined in terms of Activities of Daily Living (ADL) deficiencies. For the HH program only, disability levels are also defined in terms of Instrumental Activities of Daily Living (IADL) deficiencies.

The ADL deficiencies include difficulties in

- eating
- bathing
- dressing
- getting in and out of bed or chairs
- using or getting to toilet
- walking across a room

The ADL deficiency score represents the total number of these activities a patient or enrollee receives help doing.

The IADL deficiencies include difficulties in

- using the telephone
- managing money
- shopping for personal items
- getting around the community
- preparing meals
- doing light housework

The IADL deficiency score is only considered in the HH program and then only if the ADL score equals zero.

d. Historical Market Shares:

The VA NH Market Share (MS) is defined as follows:

$$\frac{\text{ADC treated in VA, Community, and State NH under VA auspices}}{\text{Total NH ADC estimated for enrollee population by the LTC Model}}$$

where the numerator and denominator both pertain to the same time period. The MS represents the percentage of the anticipated total enrollee demand provided by VA.

The overall nursing home MS for FY00 is computed as follows:

$$\begin{aligned} \text{MS NH} &= \text{FY00 ADC} / \text{estimated FY00 enrollee NH demand based on LTC Model} \\ &= 31,090 / 146,000 \\ &= 21\% \end{aligned}$$

Although the MS over all Priority levels was 21% in FY00, the NH MS for Priority 1a enrollees (Service Connected rating of 70% or more) was 35%, and for Other enrollees was 16%.

The numerator of the home health MS is the patient load treated in either VA HH programs or in contract programs paid for by VA. The denominator is the LTC Model projection for the corresponding year. In FY00, the HH MS was 10%, with no special MS provision for Priority 1a enrollees. HH patients VA cannot treat due to resource constraints are referred to Medicare.

e. Future Market Shares: Future MS do not necessarily have to equal the historical MS. In general, they require policy decisions based on a combination of historical market share precedent, legislative mandate, program policy, resource availability, and budgetary policy. VHA corporate and VISN level targets and rates are subject to policy and budget decisions. The Model is intended to be flexible and to accommodate VHA policy.

Nursing Home Care

- For NH care, the Millennium Bill mandates that VA provide needed NH care to any Priority 1a enrollee who requests it. However, since not all Priority 1a enrollees needing NH care will request it from VA, the Model incorporates a planned MS for Priority 1a enrollees that increases from 35% to 85% by 2008.
- The future MS for Other Priorities is discretionary. The relevant policy decisions have not yet been made.

Home Health Care

- The Federal Advisory Committee on Long Term Care recommended tripling, from 8% MS to 24% MS, the VA expenditure on home and community-based care over five years, with FY99 as a baseline. This MS can be adjusted per VHA policy decisions.
- VHA budgetary policy is currently under consideration.

7. Output of the Model: The LTC Model generates projections of

- Nursing home Average Daily Census (ADC)
- Home Health care annual patients

required by enrolled veterans by age, disability level, and Priority; for any parent facility, VISN, or the nation; for any year between 2002 – 2010.

- a. The ADC for NH care is a combined total of VA, community and state ADC.
- b. The annual patient load for HH care represents the patient workload in the following programs:
 - Home Based Primary Care
 - Contract Home Health Care
 - VA Adult Day Health Care
 - Contract Adult Day Health Care
 - Homemaker/Home Health Aide

To permit maximum flexibility, any of the variables in the LTC Model can be adjusted for analytical or planning purposes. In addition, any combination of facilities or any combination of VISNs can be grouped together and treated as a single facility or VISN.

Nursing Home Component of LTC Model

$$NH_{\text{fac}} = \dot{a}_{\text{age}} \dot{a}_{\text{ADL}} \dot{a}_{\text{Priority}} UR_{\text{age ADL}} \times \text{Pop}_{\text{facility}} \times \text{Mkt Share}_{\text{Priority}} \text{year}$$

NH_{im} = projected NH ADC for **facility i** in **year m**

UR_{jk} = males nursing home residents by age j and ADL level k in 1996 MEPS
male resident population of US by age j and ADL level k in 1996

Pop_{ijklm} = enrollee pop of facility i, age j, ADL k, Priority l in year m

Age j = 21-64, 65-74, 75-84, 85+

ADL k = 0, 1, 2, 3, 4, 5, 6

Priority l = 1a, 1b, 2, 3, 4, 5, 6, 7

Mkt Share l = for Priority 1a, rises to 85% by 2008; under debate for Priorities 1b - 7

Year m = 2002 - 2010

Home Health Care Component of LTC Model

$$HH_{\text{fac}} = \dot{\text{a}}_{\text{Year}} \dot{\text{a}}_{\text{Age}} \dot{\text{a}}_{\text{ADL Priority}} UR_{\text{age ADL}} \times \text{Pop}_{\text{facility age ADL Priority Year}} \times \text{Mkt Share}_{\text{Priority}}$$

HH_{im} = projected HH patients at **facility i** in **year m**

UR_{jk} = males in age j and ADL level k receiving HH visits in 1998 NHHCS
male resident population of US by age j and ADL level k in 1998

Pop_{ijklm} = enrollee pop of facility i, age j, ADL k, Priority l in year m

Age j = 21-64, 65-74, 75-84, 85+

ADL k = 0, 1, 2, 3, 4, 5, 6, or IADL Only

Priority l = 1a, 1b, 2, 3, 4, 5, 6, 7

Mkt Share l = 16%

Year m = 2002 - 2010

Market Share Primer

Item 6d of the paper defines market share in the context of the LTC Model, but perhaps the simplest way to explain the definition of market share is with a diagram.

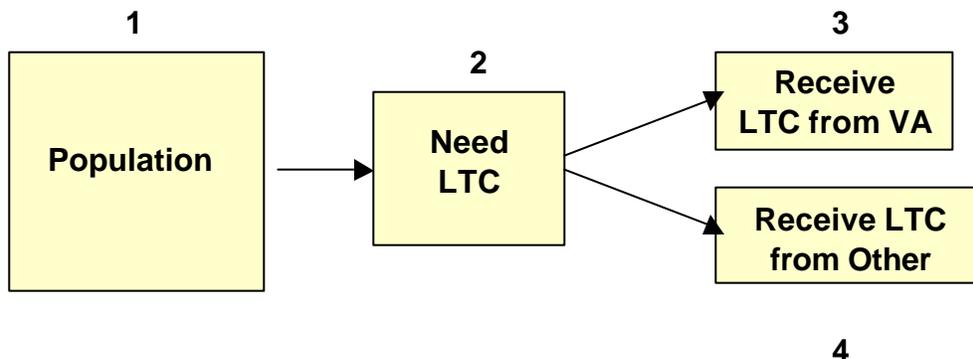
In the diagram below,

1. Box 1 represents a population.
2. Box 2 represents members of the population who “need” LTC, according to the Model.
3. Box 3 represents members needing LTC who actually receive LTC from VA.
4. Box 4 represents members needing LTC who presumably receive LTC from other sources.

Market share, as used in the LTC Model, equals the fraction formed with a numerator consisting of Box 3; and a denominator consisting of Box 2, with “members” replaced by “average daily census.” This is the classical definition of market share.

A simple, real-world analogy may be illustrative: market shares of cola bottlers. One definition of Coke’s market share is [ounces of Coke sold / ounces of all colas sold]. Pepsi’s market share would have the same denominator, but a numerator equal to ounces of Pepsi sold. Other cola bottler market shares would be computed analogously. The sum of all numerators equals the denominator, accounting for 100% of the total market demand.

The LTC Model uses precisely the same methodology for market shares. In the context of cola market share, the VA market share numerator (NH average daily census “sold” by VA) corresponds to ounces of Coke sold. Similarly, the market share denominator (NH average daily census expected to be “sold” by all sources to the enrollee population) corresponds to total ounces of cola sold.



$$\text{VA Market Share} = \frac{\text{Box 3}}{\text{Box 2}}$$