WHOM DO WE SERVE? DESCRIBING THE TARGET POPULATION FOR POST-ACUTE AND LONG-TERM CARE, FOCUSING ON NURSING FACILITY SETTINGS, IN THE ERA OF POPULATION HEALTH

March 2016

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Acronyms:

ACO - accountable care organization; ADL- Katz Activities of Daily Living; AMDA - American Medical Director Association, the Society for Post-Acute and Long-Term Care Medicine; CHF- congestive heart failure; CMS - Center for Medicare and Medicaid Services; DME - durable medical equipment; FFS - fee for service; HH - home health; HHA - home health agency; IRF - inpatient rehabilitation facility; LTACH - long-term acute care hospital; LTC - long-term care; MDS -Minimum Data Set; NF - nursing facility; PA - post-acute care; PA-LTC- post-acute and long-term care; POS - place of service code(s); RUG - resource utilization group; SNF - skilled nursing facility.

Executive Summary:

It is estimated that a population of 12 million receives long-term services and supports[1]. According to CMS estimates in 2015, Medicare reimbursed post-acute care for 5.6 million beneficiaries[2]. In 2011, Medicaid funded long-term services and supports for 4.8 million people, with 1.4 million institutionalized (of which 87% were residing in a NF)[3]. The location of services evolved since 1999 with 13.4% fewer NF residents (approximately 1.6 million) and increased numbers served by HHA (approximately 3.5 million). Based on clinical measures described below, the NF populations had increasing medical needs.

- In 2013 Medicare reported the following rates of post-acute and long-term care services per 10,000 Medicare beneficiaries: 930 HHA, 670 SNF, 99.7 IRF, and 36.8 LTACH.

- Leading diagnoses are different for each PA-LTC setting:

    o Respiratory conditions predominated in LTACHs, a significant proportion of patients required respiratory support

    o Neurological and musculoskeletal conditions were the dominant NF primary diagnoses.

There was increasing diversity in the NF population with respect to age, gender, marital status, race and ethnicity:

- From 1995 to 2012, there were increasing proportions of younger (8% to 15%) and oldest old adults (38.5% to 43%), but with the majority (42%) aged 65 to 85 y.

- The number of male residents increased by nearly 50%, with no significant change in male: female ratio of 1:2.3.

- The proportion of married NF residents increased from 1973 (12%) to 2012 (33%), with fewer widowed (64% to 44%), and stable single/never married/divorced/separated (24%).

- There was increasing diversity in the race/ethnicity among NF populations from1973 to 2012, with the largest increases in African/Americans (4.6% to 13.6%) and Hispanics (1.1% to 4.9%).

NH populations experienced increasing diversity in the need for ADL assistance

- One in five served in NF required no ADL assistance in 2012, an increase from 2004 (1.6%). At the same time there was a significant decrease in the NF population requiring assistance with 5 or more ADLs (52% to 23%).

- The younger adults (22-30 y) served in NF had the largest variability in ADL assistance with 30% requiring no ADL assistance but 47.5% requiring assistance with 5 ADLS.

NH populations experienced increasing clinical needs as measured by MDS.

- Moderate to severe pain was reported most frequently in the youngest adults 22-30 y (20.8%), with decreased prevalence in older adults 31-64 y (21.6%), 65-74 (18%), 75-84 y (13.3%), 85-94 y (9.7%) and 95+ y (6.9%).
- Severe cognitive impairment was common and more prevalent at the extremes of the age groups, 22-30 y (37.9%) and 95+ y (52.8 %), lower in the 32-64 y (22.3%) and 65-74 y group (25.9%).
- In 2012, approximately one in four NF population experienced a fall.
- Septicemia, respiratory conditions and CHF were the most frequent reasons for potentially preventable hospital readmissions from SNF.
- Older age, cognitive impairment, reduced functional status and a leading diagnosis of stroke, hemi/quadriplegia or seizure disorder were associated with a higher chance to remain in a NF after a SNF stay.
- Younger age, married status, using a walker and admission for a surgical wound were associated with a higher likelihood of discharge from SNF to the community.
- While serving fairly distinct population, practitioners in PA-LTC setting are subject to same cost and quality metrics as well as reporting requirements as practitioners in ambulatory setting.

Objective:

The triple aim of better health, better healthcare and lower cost has heralded a shift in US healthcare delivery model from traditional fee for service reimbursement to value based payments[4-6]. As a result of this shift healthcare organizations need to be more reliable, transparent and accountable. The focus of healthcare is shifting from facility based care to population health management and preventive health. ACO attribution methodologies generally use plurality of primary care visits as the main factor in determining primary care provider assignment. These attribution algorithms pool nursing home visit codes (POS 32) with ambulatory visit codes. In order to inform advocacy, the Public Policy Committee of PALTmed requested a review to characterize the population served in post-acute and long-term care (PA-LTC) settings. This was done through the Population Health Work Group.

Introduction

Post-acute care is comprised of medical, rehabilitation and nursing services aiming to restore maximal medical and functional status of patients discharged from hospitals. Long-term care refers to the services and supports provided for meeting personal care needs of persons with chronic medical conditions and/ disabilities.

The costs of PA-LTC services are mainly supported by Medicare and Medicaid and represent a significant proportion of national health expenditures.

The current report is focused on:

- Trends in PA-LTC utilization;
- Differences in the medical conditions addressed by different PA-LTC settings;
- The demographic characteristics of those served in NF;
- Medicare spending and resource utilization by the PA-LTC population

Methods:

We performed internet literature searches (key words: post-acute and long-term care population, demographics, diagnoses), CMS website and MedPAC reports provided data on PA-LTC settings. The National Nursing Home Survey Summaries (for 1973-74, 1985, 1995, 1997, 1999 and 2004) and the Nursing Home Data Compendium (for 2011-

12) provided NF population demographics compiled from facility-reported Minimum Data Set.

Results:

Post-acute and long-term care is delivered in four distinct settings: home health agencies (HHAs), inpatient rehabilitation facilities (IRFs) long-term care hospitals (LTACHs) and nursing facilities (NFs). Skilled nursing facilities (SNFs) are NFs licensed by Medicare to provide skilled nursing and rehabilitation services. Thus, the population served in NFs can be divided in a subgroup of patients receiving post-acute care after a hospital admission (POS 31) and a second subgroup of residents receiving long-term care and services (POS 32).

The largest proportion of 2013 Medicare PA-LTC patients was treated by HHAs (930 home health users/10,000 fee for service (FFS) beneficiaries, followed by those admitted to SNFs (670 covered admissions per 10,000 FFS. 99.7/10,000 FFS beneficiaries were treated in IRF and 36.8/10,000 FFS users were admitted in LTACHs[7].

The number of SNFs had a very small growth between 2005 and 2014 (Fig.1 A). HHAs grew in number by 50% in the same period, but recorded a small decline in 2014. LTACHs recorded a growth until 2011, after which their numbers started to decrease. There was little, to almost no variation in the number of IRFs[7].

The largest growth in PA-LTC use was recorded in SNF, particularly by aged Medicare beneficiaries (Fig. 1B), followed by Medicare reimbursed HHAs (Fig. 1C). The Medicaid-reimbursed use of NFs and HHAs was relatively constant in the last decade (Fig1. C). There was little to no change in the patients receiving care in LTACHs, and the number of IRF users remained stable between 2007 and 2014 (Fig. 1D).

In 2010, 13% of LTC recipients were residing in NF, representing 2.7% of the US population age 65 y or older, ranging from 1% for 65- 74 y, to 2.4% of people age 75-84y and 9.3% of those older than 85y[8]. ADL assistance in 2010 was greater for long-term care NF residents aged 65+ y than those of similar age residing in residential care or any other institution (81% with three or more ADL assistance compared vs. 50%. Cognitive and motor deficits were significant contributors to institutionalization in NFs[8,9].

Demographic characteristics of PA-LTC population served in NF:

The total number of persons served in NF increased from 1,075,800 in 1973-74 to a maximum of 1,628,300 in 1999, after which it slowly declined to 1,409,749 in 2012 (Fig.2A)[10-16].

Only 11% of the NF population were younger than 65 in 1973-75, decreased to 8% in 1995 and 1997, growing afterward to 15% in 2011 and 2012. There was no change in the percent NF aged 65 to 74 y from 1973 to 2012.

The percent of NF population age 75-84 y steadily declined from 36% in 1973-74 to 27% in 2012. The proportion 85 y and older, recorded at 38.5% in 1973-74, peaked in 1999 at 46.5%, after which it decreased slightly to 43%[10-16].

The number of male NF residents increased from 318,100 recorded in 1973-1974 to 468,050 in 2012 [4,10-16]. The male to female ratio among nursing facility residents did not change at 1:2.3 (Fig. 2B) [10-16]. The number of older males (75-84 y and 85+ y) peaked in 1999 at 144,200 and 457,800 respectively, with a small decline to 120,600 and 430,500 in 2004. Female residents aged 75-84 y, had the highest proportional increase growing from 29% in 1973-74 to 38% in 1995 (and remaining at 37% in 2004) [10-16].

The proportion of married residents increased from 12% in 1973-74 to 33% in 2012 (Fig. 2C)[4,10-16]. The percentage of widowed residents steadily decreased from 64% in 1973 to 44% in 2012. The subpopulation of single, never married, divorced or separated residents remained relatively constant around 24%.

Over time, there was increased diversity in the race/ethnicity of nursing facility residents: the proportion of whites decreased from 93.9% in 1973-43 to 77.1 in 2011, remaining at the same level in 2012[10-16].

African/American and Hispanic subgroups increased serially from 4.6% and 1.1% in 1973-74 to 13.6% and 4.9% in 2012 (Fig. 2D). Asian, Alaska Native/ American Indian and Hawaiian/Pacific Islander subgroups were also represented in small proportions in the 2011 and 2012 Nursing Home Data Compendium[10-16].

After reaching a nadir of 1.6% in 2004, the proportion of adults with full ADL independence increased to 20.4% in 2012 (Fig 3.A). The percentage of residents requiring assistance with one, two or three ADLs decreased from 7.9%, 14.6% and 35.3% in 1997 to 6%, 5.4%, and 6.4% in 2012. There was larger variability for residents with higher ADL dependency: the number of adults assisted in four ADLs rose from

27.8% in 2004 to 37.6% in 2012. The NF population with five ADLs assisted peaked at 51.7% in 2004, after which it decreased to 23.3% in 2012. In the most recent data of

2012, the largest part of the youngest residents were either ADL independent (29.8%) or required assistance with five ADLs (Fig. 3B). In contrast, for the NF population aged 31 years and older, ADL independence was less common with the need to have one to three ADLs assisted relatively constant, while the proportion of residents assisted in four or more ADLs increased with age[10-16].

A significant proportion of NF population reported pain in 2012 (Fig. 4A)[16]. The frequency of reported pain decreased with age (from 40-43% for residents younger than 75 years to 36% in 85-94years and 25% in those 95 years and older. The prevalence of mild/infrequent pain has been relatively stable between 18.1 and 23.1% across the age spectrum. Moderate to severe pain was reported most frequently in the youngest adults 22-30 y (20.8%), with decreased prevalence in older adults 31-64 y (21.6%), 65-74 (18%), 75-84 y (13.3%), 85-94 y (9.7%) and 95+ y (6.9%).

Severe cognitive impairment was common and more prevalent at the extremes of the age groups, 22-30 y (37.9%) and 95+ y (52.8 %), lower in the 32-64 y (22.3%) and 65-74 y group (25.9%). Moderate deficits increased in prevalence from 11.4% for ages 22-30 y to 27.7% in the oldest population. The most dramatic prevalence increase was recorded between those aged 22-30 y (11.4%) and those 32-64 y (21.1%).

In 2012, approximately one in four NF population experienced a fall (Fig. 4C)[16].The proportion of falls resulting in injury continuously increased with age, from one in three for residents aged 22-30 y, to more than one in two in residents 75 years or older[16].

Clinical measures obtained from NF MDS reported in 2012:

Incontinence was commonly reported (35%) in NF MDS data (Fig 5A)[16]. Youngest adults were more likely to be incontinent, 54.7% of those aged 22-30y *vs.* 34-36% in all age groups (Fig 5B).The prevalence of pressure ulcers, 5.4% decreased with age from 10.6% for those aged 22-30 y to 4.2% in residents 95 years or older (Fig. 5B).

Unintended weight loss and feeding tubes were reported at 5.7% and 5.8% (Fig 5A). The prevalence of weight loss had a small increase with age from 4.1% for those aged 22-30 y, to 6.2% for those 95 y or older. Feeding tubes were reported for most frequently in the youngest, approximately 1 in 3. The prevalence decreased with age: 1 in 9 for those aged 31-64 y to 1 in 50 for those aged 95 y or older (Fig. 5C)[16].

Physical restraints was the clinical measure with the lowest prevalence (1.7%; Fig 5A). Restraints were more likely to be used for younger adults (4.9%) compared to other age groups for which the prevalence ranged 1.4-1.8% (Fig. 5D)[16].

In contrast, antipsychotic medication was administered, on average to almost one in four NF population (Fig. 5C). Antipsychotic agents were more likely to be prescribed to younger adults, highest (37%) for those aged 31-64 y. For older residents, antipsychotic medication decreased continuously with age from 30.6% for those aged 65-74 y to 13.5% for those aged 95 years or older (Fig. 5D)[16].

Leading diagnoses for different PA-LTC settings:

As observed in Fig. 6, the primary medical conditions treated in 2012 differed by the PA-LTC setting. Primary diagnoses in NF were circulatory (11.9%), respiratory (8.1%) and musculoskeletal system (6.9% , Fig 6.A)[17]. IRF primary diagnoses in 2013 were most frequently neurological or musculoskeletal conditions. Almost one in five patients was admitted for stroke and approximately one in eight inpatient rehabilitation patients was treated primarily for a fracture of the lower extremity or for a neurological disorder other than stroke (Fig. 6B)[7]. The LTACH setting primary diagnoses in 2013 were mainly respiratory conditions and infections associated with multiple comorbidities (Fig. 6C)[7]. One in nine of the LTACHs population had respiratory failure requiring ventilator support more than 96 hours or had been diagnosed with pulmonary edema or respiratory failure without specification for any ventilator support. Multiple comorbidities were associated with six of the seven most prevalent conditions requiring admission to LTACH.

Transitions in PA-LTC care in 2012:

In 2012, 3.9% of all SNF admissions ended in death[9]. Discharge to hospital occurred in almost 25% of SNF admissions with 47.3% of the considered preventable. Of note, hospital readmission causes were septicemia (14.2%), respiratory conditions (11.3%) and CHF (7%), in a population where diseases of the circulatory and respiratory system are among leading diagnoses (Fig. 6D)[9].

For planned discharges, 70.7% of the SNF stays were followed by a discharge home or other community setting with 45.7% receiving home health[9]. Married status, admission into SNF for the care of surgical wounds and the use of a walker made a discharge to the community more likely. NF placement resulted in 29.3% of SNF admissions. Older age, cognitive impairment, lower functional status and neurological conditions (stroke,

hemiplegia hemiparesis or quadriplegia and seizure disorder were more likely to be associated with discharge to NF[9].

Financial aspects of care in 2012:

SNFs had the highest rate increase in PA-LTC costs, followed by HHAs (Fig 7A)[7,18]. Among national health expenditures, NF costs were the fourth largest Medicare expenditure, following inpatient hospitalizations, physician/DME payments and reimbursement of outpatient services (Fig. 7B). NF reimbursements were leading among 2012 Medicaid expenses as well (Fig. 7C). HHAs were reimbursed both by Medicare and Medicaid (Fig 7B).

PA-LTC population characteristics driving costs:

Medicare-reimbursed rehabilitation services were a main component of post-acute care costs. While there was relatively little increase in the number of rehabilitation days covered by Medicare, Ultra High and Special Care RUGs utilization doubled between 2007 and 2012 (Fig. 8A). This was associated with a shift between therapy and nursing case mix indices (Fig. 8B).

Conclusions:

Over the last few decades PA-LTC population has increased diversity in age and ethnicity. Nursing Facility physicians and non-physician providers take care of two distinct groups. The PA (SNF) group undergoes a more intense rehabilitation than individuals discharged home with homecare services or outpatient rehabilitation services. As compared to community dwelling corresponding adults, the LTC (NF) population has a significantly lower functional status and requires significant assistance with ADLs. Moreover, four of the five leading preventable readmission causes of Nursing Facility residents correspond to their leading diagnoses in the NF setting, potentially reflecting the frailty and multiple comorbidities of this population.

Given these significant differences in clinical complexity and resource utilization by this population, we propose further research and dialogue is needed to define quality and cost metrics for the providers dedicated to caring for these frailest of the frail.

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18. CMS Fast Facts. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/CMS-Fast-Facts/index.html.

Fig.1: Trends in the number of PA-LTC providers and users:
1A: Trends in PA-LTC provider numbers
1B: Medicare use of SNF
1C: NF use by Medicaid and HH use by both Medicare and Medicaid
1D: Trends in the numbers of SNF, HHA and IRF and LTCH users
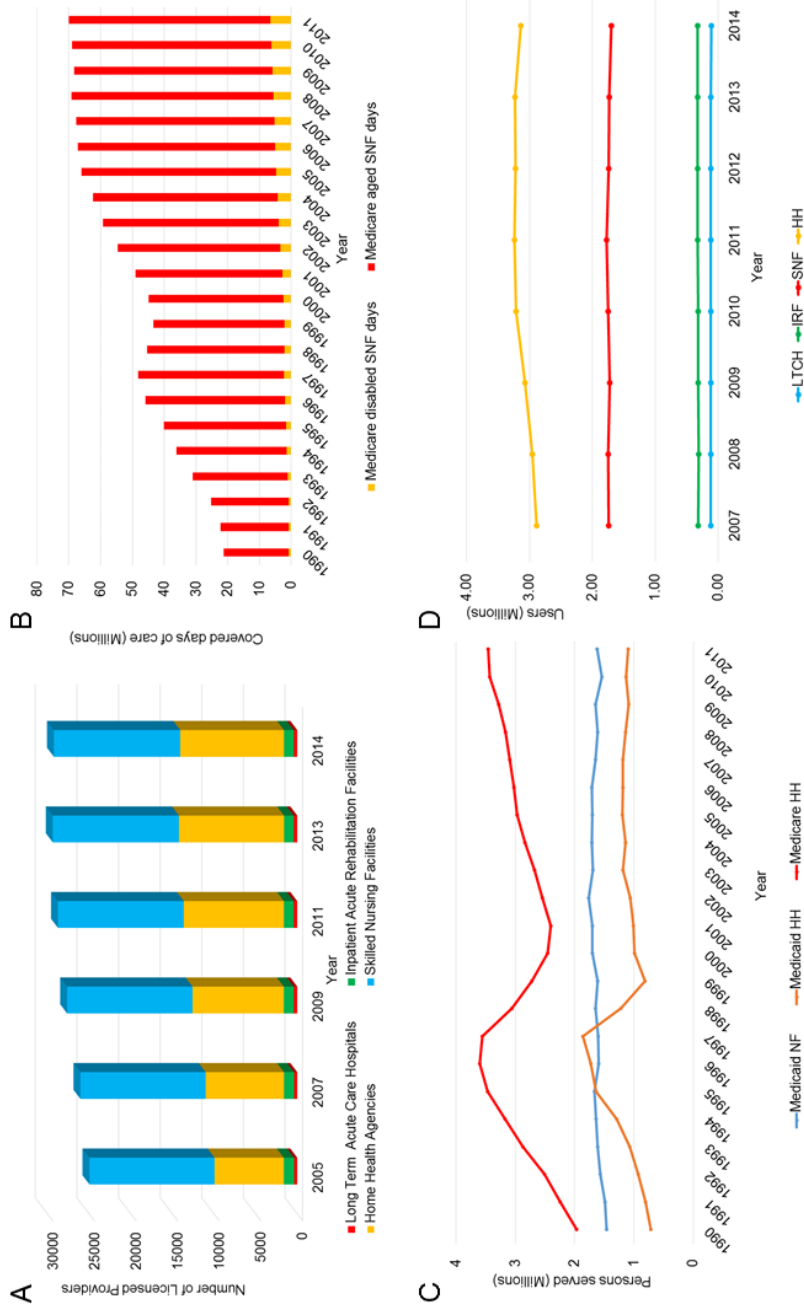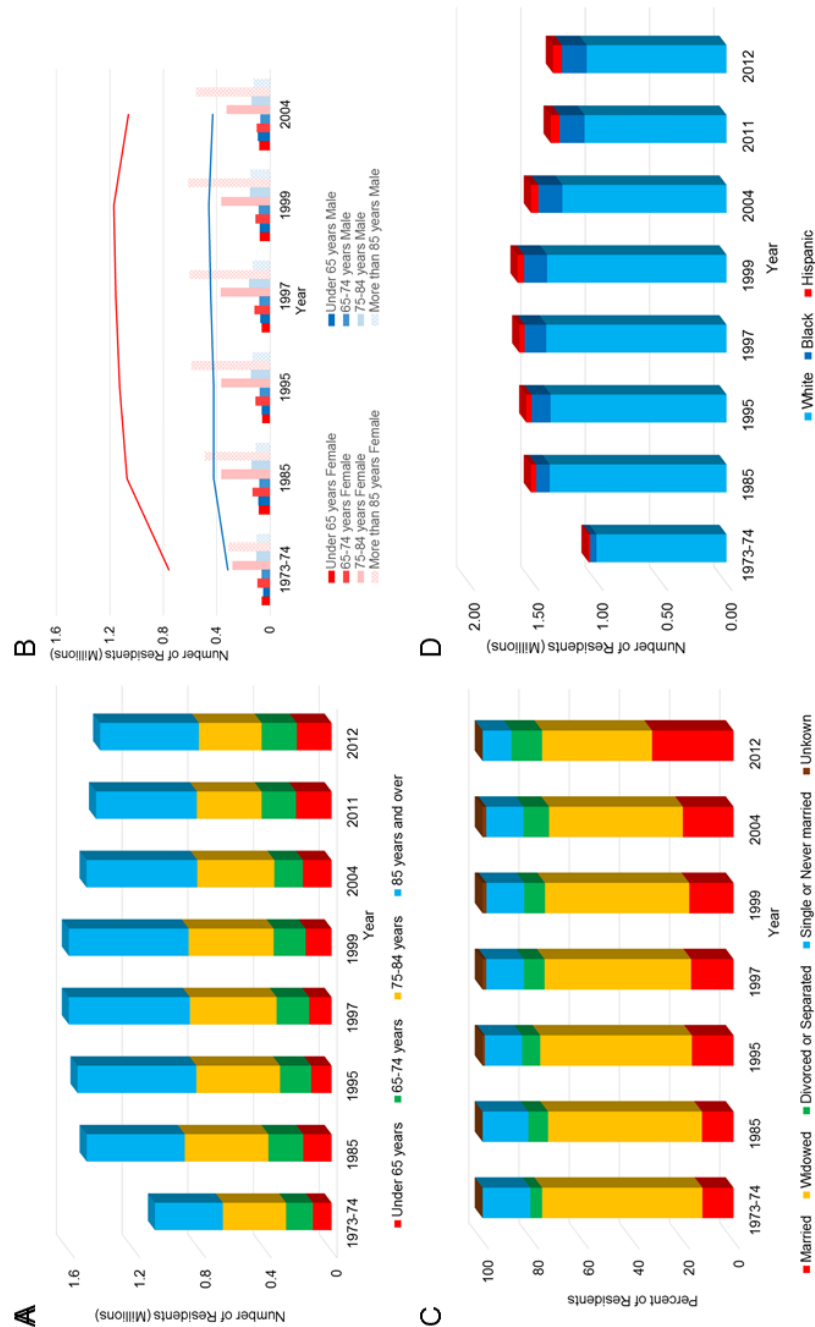
Sources:
- MedPac A Data Book: Health care spending and the Medicare program, June 2015
- CMS Medicare and Medicaid Research Review; Statistical Supplement
- MedPAC: Report to the Congress: Medicare Payment Policy; March 2013

Fig.2: Demographic characteristics of the population served in nursing facilities:

2A: Age distribution of nursing facility residents

2B: Age and gender distribution of nursing facility residents

2C: Marital status distribution of nursing facility residents

2D: Race/Ethnicity distribution of nursing facility residents

Sources:
- National Nursing Home Survey Summaries for 1977, 1985, 1995, 1997, 1999 and 2004
- CMS Minimal Data Set 2012
- Nursing Home Data Compendium 2013 Edition

Fig.3: ADL assistance needs of the population served in nursing facilities:
3A: Distribution of ADL assistance
3B: Distribution of ADL assistance by age group in 2012

Sources:
- National Nursing Home Survey Summaries for 1977, 1985, 1995, 1997, 1999 and 2004
- Nursing Home Data Compendium 2013 Edition

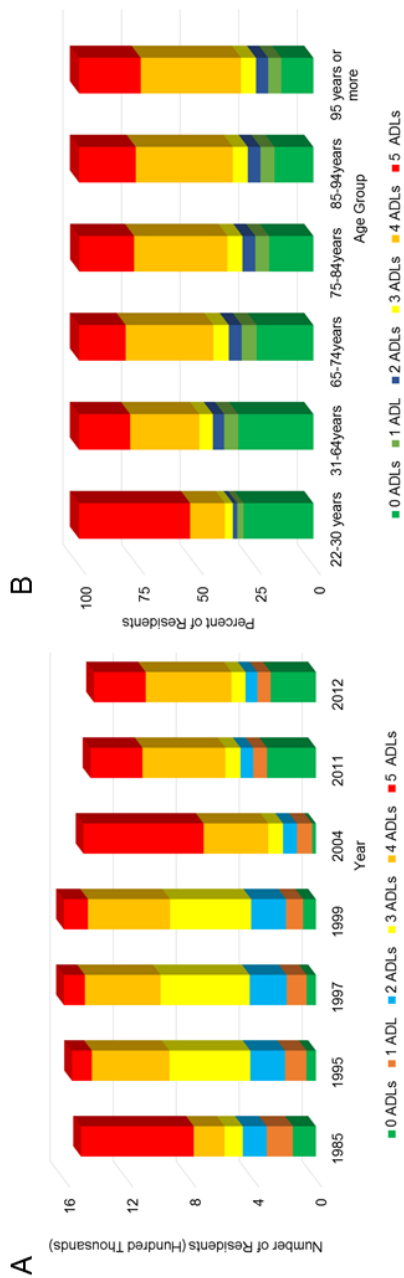**Fig.4: Prevalence of pain, cognitive impairment and falls in nursing facility residents in 2012:**
4A: Pain
4B: Cognitive Impairment
4C: Falls

Sources:
- Nursing Home Data Compendium 2013 Edition

B

Percent of Residents — 100, 75, 50, 25, 0

Age Group: 22-30 years, 31-64 years, 65-74 years, 75-84 years, 85-94 years, 95 years or more

Legend: None to Mild, Moderate, Severe

A

Percent of Residents — 100, 75, 50, 25, 0

Age Group: 22-30 years, 31-64years, 65-74years, 75-84years, 85-94years, 95 years or more

Legend: No pain, Mild/Infrequent pain, Moderate or Severe Pain

C

Percent of Residents — 100, 75, 50, 25, 0

Age Group: 22-30 years, 31-64years, 65-74years, 75-84years, 85-94years, 95+ or more years

Legend: No Falls, One or more falls, no Injury, One or more injurious falls

15

![PALTmed — Post-Acute and Long-Term Care Medical Association logo]

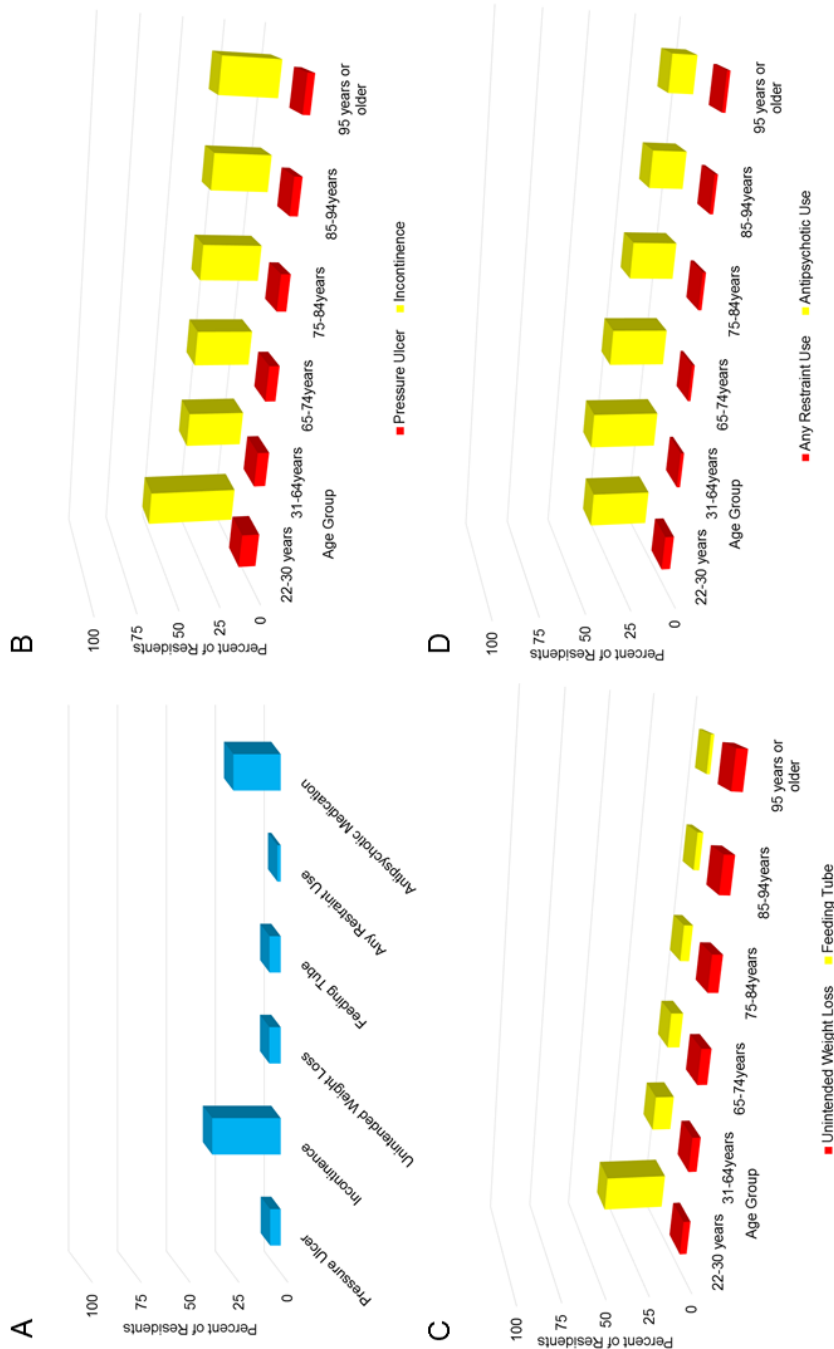## POST-ACUTE AND LONG-TERM CARE MEDICAL ASSOCIATION

Fig 5: Prevalence of clinical measures in nursing facilities in 2012:

4A: Prevalence of clinical measures

4B: Age distribution of pressure ulcers and incontinence

4C: Age distribution of unintended weight loss and feeding tubes

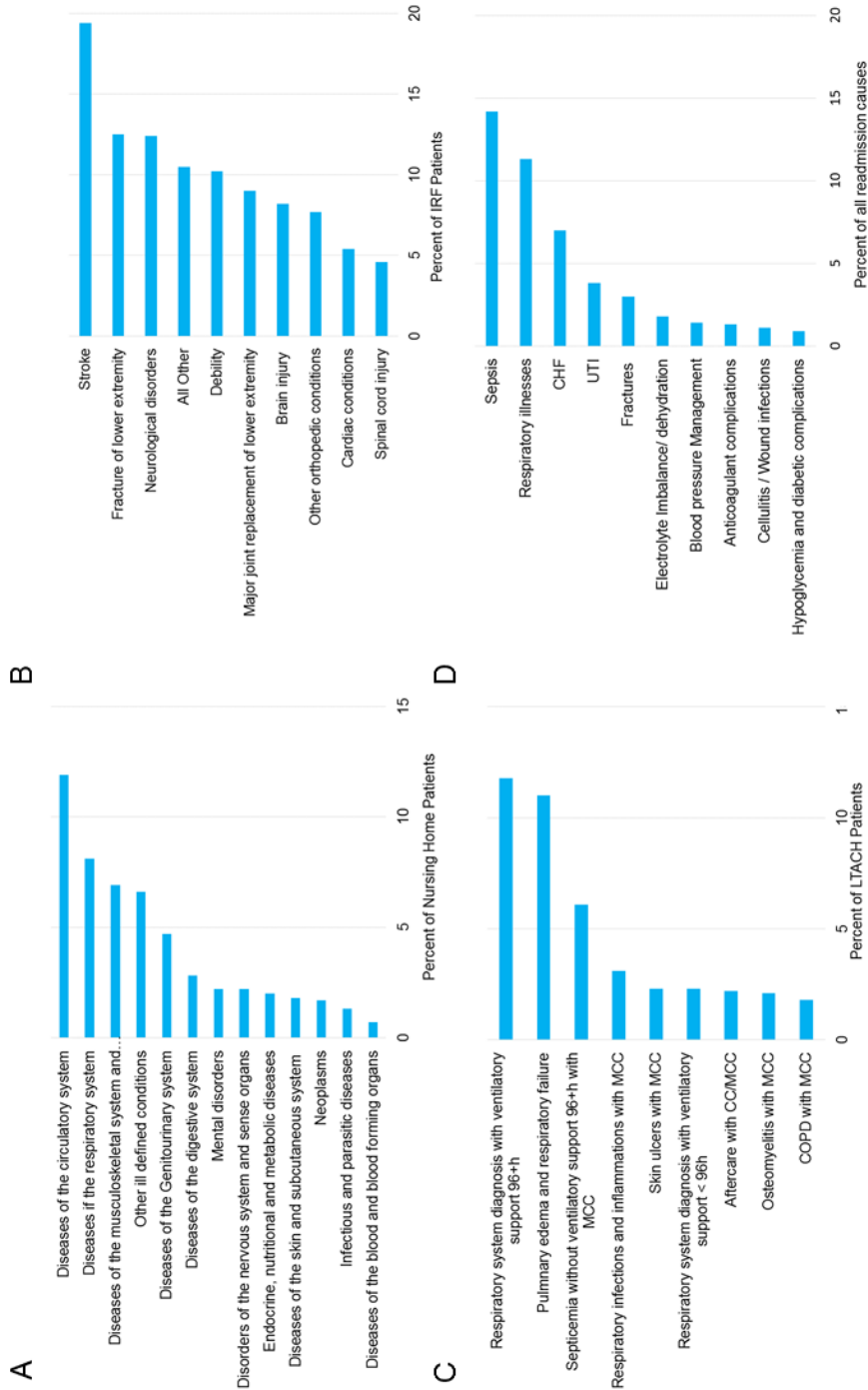4D: Age distribution of restraints and antipsychotic medication

Sources:
- Nursing Home Data Compendium 2013 Edition

Fig 6: Distinct Diagnoses recorded in different sites of PA-LTC

6A: Nursing Facilities (2012)
6B: IRF(2013)
6C: LTACH (2013)
6D: Leading diagnoses responsible for potentially avoidable readmissions from SNFs

Sources:
- Medicare & Medicaid Research Review/ 2013 Statistical Supplement
- MedPac A Data Book: Health care spending and the Medicare program, June 2015
- Development of potentially avoidable readmission and functional outcome SNF quality metrics; 2014
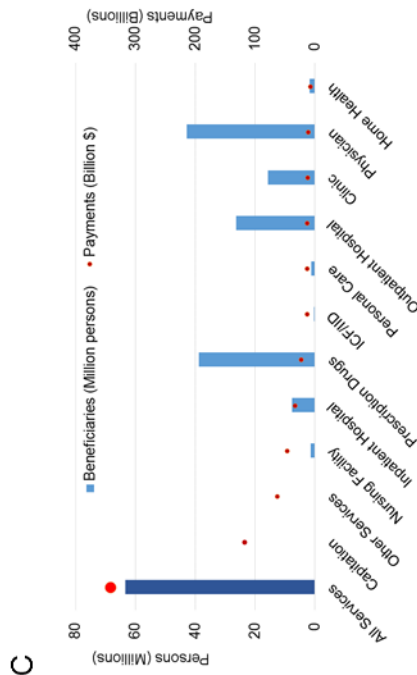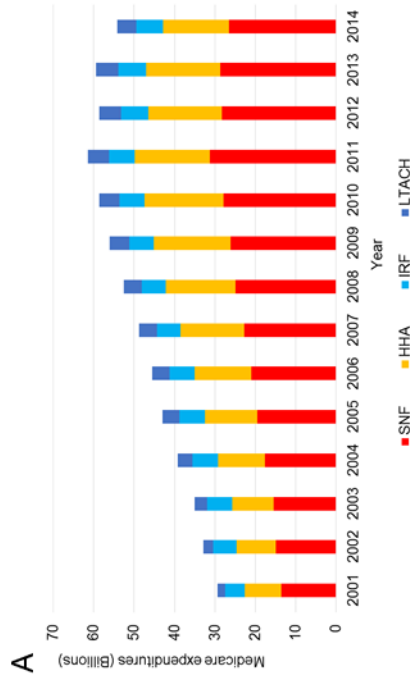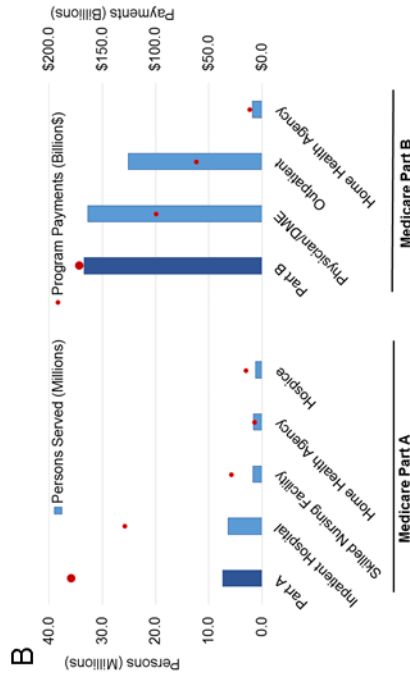

A

Percent of Nursing Home Patients (0–15)

- Diseases of the circulatory system
- Diseases if the respiratory system
- Diseases of the musculoskeletal system and...
- Other ill defined conditions
- Diseases of the Genitourinary system
- Diseases of the digestive system
- Mental disorders
- Disorders of the nervous system and sense organs
- Endocrine, nutritional and metabolic diseases
- Diseases of the skin and subcutaneous system
- Neoplasms
- Infectious and parasitic diseases
- Diseases of the blood and blood forming organs

B

Percent of IRF Patients (0–20)

- Stroke
- Fracture of lower extremity
- Neurological disorders
- All Other
- Debility
- Major joint replacement of lower extremity
- Brain injury
- Other orthopedic conditions
- Cardiac conditions
- Spinal cord injury

C

Percent of LTACH Patients (0–10)

- Respiratory system diagnosis with ventilatory support 96+h
- Pulmnary edema and respiratory failure
- Septicemia without ventilatory support 96+h with MCC
- Respiratory infections and inflammations with MCC
- Skin ulcers with MCC
- Respiratory system diagnosis with ventilatory support < 96h
- Aftercare with CC/MCC
- Osteomyelitis with MCC
- COPD with MCC

D

Percent of all readmission causes (0–20)

- Sepsis
- Respiratory illnesses
- CHF
- UTI
- Fractures
- Electrolyte Imbalance/ dehydration
- Blood pressure Management
- Anticoagulant complications
- Cellulitis / Wound infections
- Hypoglycemia and diabetic complications

Fig. 7: Medicare and Medicaid expenditures:

7A: Medicare post-acute care expenditures

7B: Medicare expenditures 2014

7C: Medicaid expenditures 2012

Sources:
- CMS Facts, February 2016;
- Medpac – A data Book

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