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Use of Inpatient Psychiatric Facilities by Medicare Beneficiaries with Dementia

Prepared for
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Office of the Assistant Secretary for Planning and Evaluation

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USE OF INPATIENT PSYCHIATRIC FACILITIES BY MEDICARE BENEFICIARIES WITH DEMENTIA

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About This Report

Inpatient psychiatric facilities (IPFs) are freestanding hospitals or certified psychiatric units in hospitals. IPFs stabilize patients in a psychiatric crisis and provide services to patients with serious mental illnesses and those who may cause harm to themselves or others, including people living with dementia with severe behavioral and psychological symptoms. The goal of this analysis is to better understand the characteristics of Medicare beneficiaries with and without dementia who use IPFs, diagnoses and utilization that precede psychiatric inpatient stays, and outcomes following IPF stays, including health care utilization and mortality.

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Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the U.S. Department of Health and Human Services.

Summary

Alzheimer's dementia, the most common type of dementia, afflicts an estimated 6 million Americans. More than 80 percent of people living with dementia (PLWD) live in the community either with caregivers or alone. As cognitive impairment becomes more severe, behavioral and psychological symptoms of dementia (BPSD) become more difficult to manage, and those with severe or dangerous BPSD may need to be treated in an inpatient psychiatric facility (IPF). The immediate goal of an IPF stay is to stabilize patients in a psychiatric crisis. IPFs primarily serve people with serious mental illness (SMI) and substance use disorders, whose care needs may overlap with but also differ from the needs of PLWD.

Little is known about PLWD who use IPFs. The goal of this research was to conduct exploratory analyses focused on PLWD who use IPFs to (1) characterize the population and compare them with IPF users without dementia, (2) examine characteristics and utilization patterns for different services and settings that may be associated with IPF stays, and (3) analyze outcomes following IPF stays.

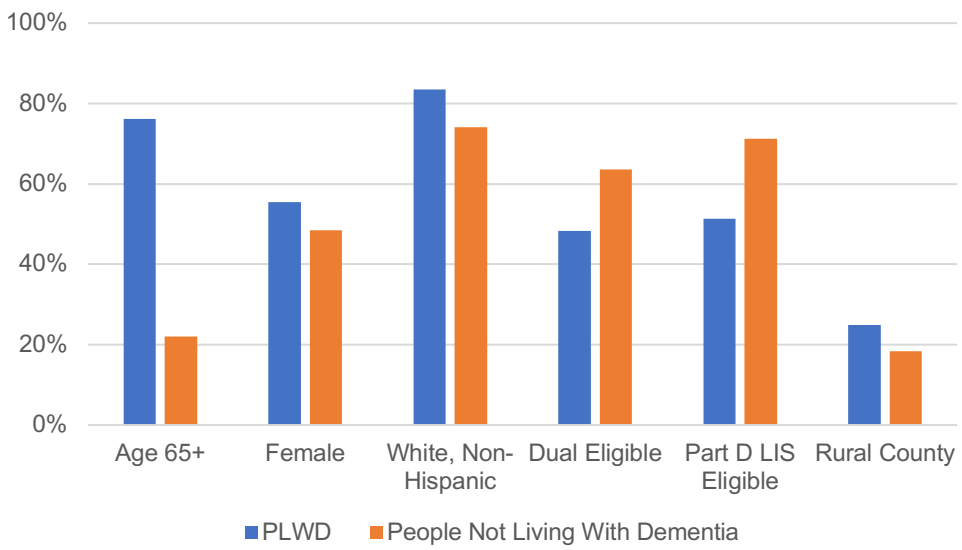
We used Medicare fee-for-service (FFS) data to conduct descriptive analyses characterizing beneficiaries with dementia who experienced an IPF stay in 2018 and compare them with beneficiaries without dementia. We used regression analyses to explore predictors of IPF utilization and service use and outcomes after IPF discharge.

Key Findings

Sociodemographic characteristics. In 2018, approximately 205,000 Medicare FFS beneficiaries had at least one IPF stay. Their mean age was 60, and 56 percent were younger than 65 at the time of their first stay during the year. Slightly more than one-half of beneficiaries with an IPF stay were female. About 78 percent were White, non-Hispanic, 15 percent were Black, non-Hispanic, and a small percentage were Hispanic, Asian, or from another racial or ethnic group. Many IPF users were low-income, as measured by dual eligibility status for Medicare and Medicaid (57 percent) and eligibility for the Medicare Part D Low Income Subsidy (LIS) (63 percent). About 21 percent of IPF users resided in rural counties, and many lived in underserved regions, with 92 percent in counties with at least partial shortages in primary care and 94 percent in counties with at least partial shortages in mental health care.

More than 40 percent of the IPF users had dementia. Compared with IPF users without dementia, IPF users with dementia were older (76 percent versus 22 percent over age 65), more often female (56 percent versus 48 percent), and more often white (84 percent versus 74 percent) (Figure S.1). They were less frequently dually eligible for Medicare and Medicaid (48 percent versus 64 percent) and the Medicare Part D LIS (51 percent versus 71 percent). PLWD were more frequently residents of rural counties (25 percent versus 18 percent) compared with those without dementia.

Figure S.1. Sociodemographic Characteristics That Differ Between IPF Users With and Without Dementia

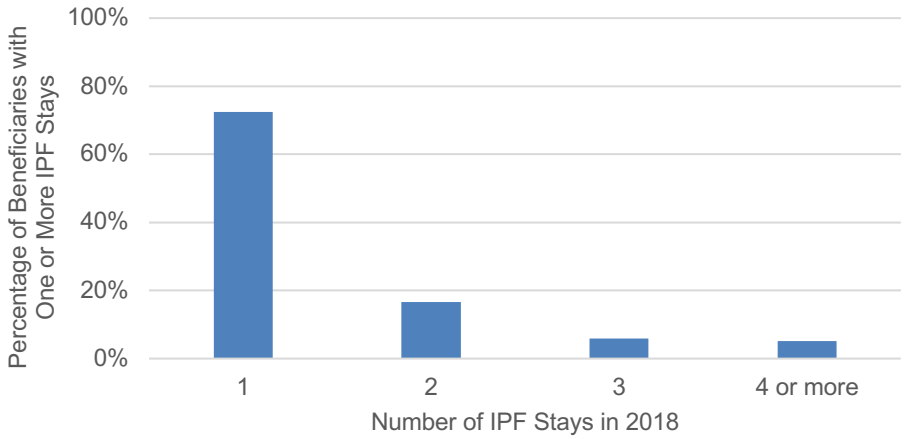


NOTE: IPF = inpatient psychiatric facility; LIS = low-income subsidy; PLWD = people living with dementia.

Health and utilization characteristics. The typical beneficiary admitted to an IPF had a high level of illness burden. Of all IPF users, about 70 percent were mildly, moderately, or severely frail. In addition to more than 40 percent of IPF users having dementia, SMI was common: 43 percent had schizophrenia, 59 percent had bipolar disorder, and 83 percent had major depressive disorder. Multiple physical health comorbidities were also common, including rheumatoid arthritis (71 percent), ischemic heart disease (63 percent), and chronic kidney disease (53 percent).

About 72 percent of beneficiaries with any IPF stay in 2018 had only one IPF stay during the year; the rest had multiple IPF admissions, and 5 percent had four or more stays (Figure S.2).

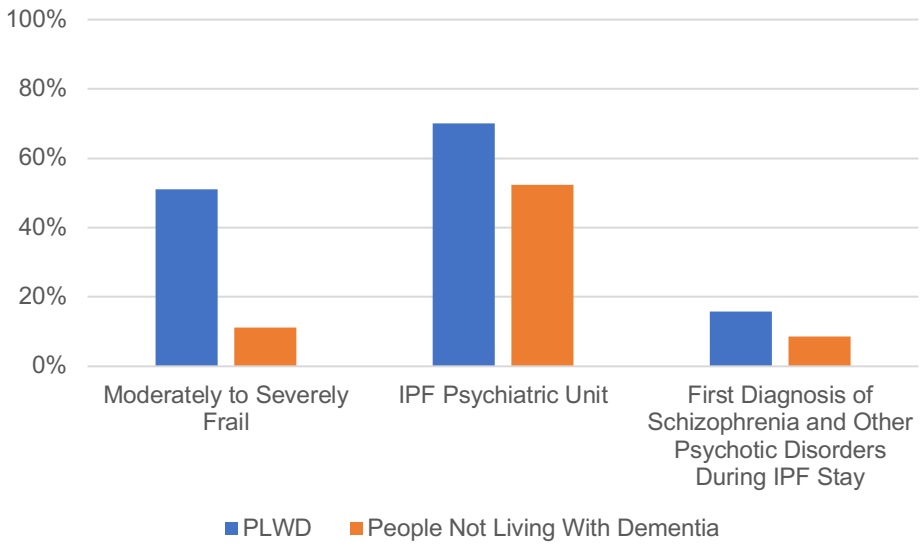
Figure S.2. Distribution of the Number of IPF Stays by Beneficiaries in 2018



NOTE: IPF = inpatient psychiatric facility.

Consistent with their older age, PLWD were frailer compared with those without dementia among IPF users (51 percent versus 11 percent moderately to severely frail) (Figure S.3). IPF users with dementia were more often admitted to hospital psychiatric units than freestanding units (70 percent versus 52 percent) and had longer IPF stays, on average (14.4 versus 11.1 days), compared with people not living with dementia. Although comorbid SMI occurred for PLWD, they more frequently had a first diagnosis of schizophrenia and other psychotic disorders during IPF stays (16 percent versus 9 percent) compared with people not living with dementia, which may be related to the need to justify the use of antipsychotic medications.

Figure S.3. Health Characteristics That Differ Between IPF Users With and Without Dementia

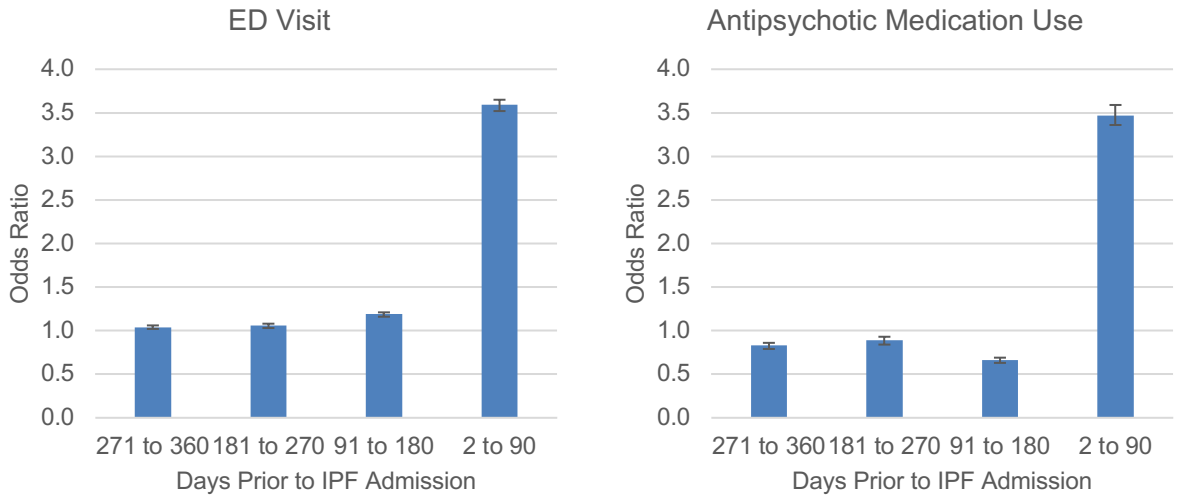


NOTE: IPF = inpatient psychiatric facility; PLWD = people living with dementia.

Predictors of IPF utilization. Among PLWD, key predictors of IPF admission include long-term nursing home residence (odds ratio [OR] = 8.94; 95 percent confidence interval [CI], 8.12 to 9.86), frailty (OR = 5.12; 95 percent CI, 4.98 to 5.28 for moderately to severely frail compared with non-frail or pre-frail), SMI or SUD (e.g., OR = 2.78; 95 percent CI, 2.69 to 2.87 for schizophrenia), emergency department (ED) visit in the first quarter prior to IPF admission (OR = 3.59; 95 percent CI, 3.52 to 3.65), prior IPF stays in the past year (e.g., OR = 3.72; 95 percent CI, 3.21 to 4.33 for a prior IPF stay in the previous quarter), and use of antipsychotic medications in the first quarter prior to IPF admission (OR = 3.47; 95 percent CI, 3.36 to 3.59).

The associations between these types of utilization and IPF admission are stronger immediately before IPF admission. Figure S.4 shows the associations over the four quarters prior to IPF admission for PLWD with ED visits and those with antipsychotic medication use. This pattern holds true for both PLWD and those without dementia; however, the relationship is stronger for PLWD. Furthermore, PLWD with antipsychotic medication use in two to four quarters prior to IPF admission were less likely to have an IPF admission, suggesting that new antipsychotic medication use in the one quarter prior may be a precursor to IPF admission.

Figure S.4. Association Between IPF Admission and ED Visit or Antipsychotic Medication Use by PLWD in Four Quarters Prior to IPF Admission



NOTE: Error bars indicate 95 percent CIs. ED = emergency department; IPF = inpatient psychiatric facility; PLWD = people living with dementia.

Outcomes following IPF stays. PLWD have different patterns following IPF stays compared with people not living with dementia. Most notably, PLWD were less frequently discharged to home or self-care (48 percent versus 87 percent) and were more frequently discharged to skilled nursing facilities (SNFs) (25 percent to 2 percent). Compared with people not living with dementia, PLWD were more likely to use SNFs and less likely to use outpatient services in the 30 days following IPF discharge.

Risk of death after discharge from an IPF was substantial. Overall, about 2 percent of beneficiaries died within 30 days of discharge, and about 7 percent died within six months; these rates were much higher for PLWD (about 4 percent and 15 percent, respectively). Controlling for a variety of factors, including age, chronic conditions, and prior health care service and prior medication utilization, regression analysis of time to death after IPF discharge produced a hazard ratio (HR) of 1.76 (95 percent CI, 1.69 to 1.82) for PLWD compared with those without dementia.

Admission to long-term nursing homes was also more likely for PLWD compared with those without dementia, with an HR of 3.55 (95 percent CI, 3.40 to 3.71). Among beneficiaries who entered a long-term nursing home after IPF discharge, those with dementia were more likely to experience declines in cognition than those without dementia; however, no difference was found for functional status.

Policy Implications

Because IPFs primarily serve patients with SMI and SUD, these facilities may not have adequate resources and training to address BPSD. In addition to challenges in managing severe behavioral

symptoms, PLWD using IPFs are often frail and have comorbid conditions, suggesting that they likely have complex health needs requiring care coordination.

Better understanding of the trajectory and care needs of PLWD could help inform the design of interventions and policies to support PLWD and caregivers coping with BPSD. Prior service and setting utilization associated with IPF admission could be points of intervention for evidence-based programs and policies that support PLWD and caregivers in managing BPSD. For example, we observed increased prevalence of ED visits and psychotropic medication use in the four quarters preceding IPF stays, suggesting possible worsening of BPSD over time. More work needs to be done to identify pathways of worsening BPSD that result in psychiatric crises that require stabilization in IPFs, as well as potential intervention points and strategies.

Similarly, improvements in care transitions and coordination following IPF discharges would support this population. Compared with people not living with dementia, PLWD are more likely to have SNF stays and less likely to have outpatient behavioral health visits for follow-up care after IPF discharges.

Even adjusted for age, comorbidities, utilization of health care service and psychotropic medications prior to IPF admission, and other factors, PLWD are more likely to enter long-term nursing homes and to die following IPF stays compared with people not living with dementia. Further work to better understand their care needs could apply qualitative methods to gather information from patients, caregivers, and providers across different settings regarding unmet needs and necessary resources.

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Chapter 1. Introduction

An estimated 6 million Americans are living with Alzheimer's dementia, the most common type of dementia (Alzheimer's Association, 2021). Neurodegeneration and cognitive decline caused by Alzheimer's disease and related dementias (ADRD) have devastating and costly effects on people living with dementia (PLWD) and their caregivers.

Behavioral and Psychological Symptoms of Dementia

As cognitive impairment becomes more severe, behavioral and psychological symptoms of dementia (BPSD) are more difficult for PLWD, caregivers, and health care providers to manage (Kales, Gitlin, and Lyketsos, 2015; Cerejeira, Lagarto, and Mukaetova-Ladinska, 2012). BPSD include agitation, wandering, depression, psychosis, and aggression. Managing these symptoms may involve a combination of family and friend caregivers, primary care providers, acute care providers, and long-term care (LTC) providers. BPSD are associated with increased inpatient use and nursing home placement for PLWD (Cepoiu-Martin et al., 2016; Toot et al., 2013; Kales et al., 2005; Yaffe et al., 2002). Furthermore, the complex care needed to manage and treat these symptoms can lead to substantial distress and poor health outcomes for caregivers (Van Den Wijngaart, Vernooij-Dassen, and Felling, 2007).

Interventions for BPSD include both nonpharmacological and pharmacological approaches, with evidence-based nonpharmacological interventions as the recommended first line of treatment (Gitlin, Kales, and Lyketsos, 2012). Nonpharmacological interventions include first assessing and managing underlying causes of BPSD (Kales et al., 2019). Other approaches include those targeting PLWD (e.g., psychosocial interventions, such as reminiscence, validation, and simulated presence therapy and sensory interventions involving aromatherapy or light therapy), caregivers (e.g., occupational therapy, training), and environmental factors (e.g., managing stimulants, safety, activities, and routines). A systematic review found that the most effective approaches were music therapy and behavioral management techniques (Abraha et al., 2017).

Although evidence suggests that nonpharmacological interventions are effective in managing BPSD, pharmacological treatments may be used because they are seen as easier for providers to deliver (Gitlin, Kales, and Lyketsos, 2012). Although medications can treat specific symptoms, they carry risks of increased morbidity and mortality (Maust et al., 2015; Kales et al., 2014; Kim et al., 2011; Kales et al., 2007). Several systematic reviews have documented that using psychotropic medications to manage BPSD for PLWD has little or no value and may trigger significant adverse events (Yunusa et al., 2019; Tampi et al., 2016; Schneider, Dagerman, and Insel, 2006; Ballard, Waite, and Birks, 2006; Sink, Holden, and Yaffe, 2005). The American Geriatrics Society Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults cautions against using antipsychotics unless nonpharmacological approaches fail, noting increased risk of stroke, cognitive decline, and mortality associated with their use in PLWD (2019 American Geriatrics Society Beers

Criteria Update Expert Panel, 2019). Nonetheless, inappropriate use of antipsychotics has been documented for PLWD in both community and nursing home settings (Centers for Medicare & Medicaid Services [CMS], 2015; U.S. Department of Health and Human Services, 2021). Although antipsychotic medication use has declined in nursing homes in recent years with increased recognition of the potential harm to PLWD, concerns remain about use of other psychotropic medications, such as mood stabilizers and sedatives, including benzodiazepines, which increase the risk of falls (Maust et al., 2018).

When used, these treatments should be integrated with nonpharmacological interventions and tailored for PLWD and their caregivers (Kales, Gitlin, and Lyketsos, 2015).

Managing BPSD in Inpatient Psychiatric Facilities

More than 80 percent of PLWD reside in the community with caregivers or alone; the remaining live in residential care settings and nursing homes (Lepore, Ferrell, and Wiener, 2017). For community-dwelling PLWD, management of BPSD largely falls to their caregivers, since primary care physicians find it challenging to manage the complexity of behavioral problems (Jennings et al., 2018; Hinton et al., 2007; Boustani, Schubert, and Sennour, 2007).

People with severe or dangerous BPSD may eventually be treated in an inpatient psychiatric facility (IPF). IPFs are freestanding inpatient psychiatric hospitals or certified psychiatric units in acute care hospitals (ACH) and critical access hospitals. The immediate goal of IPFs is to stabilize patients in a psychiatric crisis. The need for acute care in IPFs often arises from danger of self-harm or harm to others as a result of behaviors. The services provided by IPFs include supervision and management of behaviors, drug therapy, psychotherapy, electroconvulsive therapy, coordination, and discharge planning.

Care of PLWD in IPFs is beset with many obstacles. IPFs primarily provide care to patients with serious mental illness (SMI) and those with alcohol- and drug-related conditions, who have a broad range of complex needs that may overlap with, but also differ from, the needs of PLWD, both for care during IPF stays and following discharge. PLWD may require additional nursing care and assistance with activities of daily living (ADL) that may need management during IPF stays. Among Medicare fee-for-service (FFS) beneficiaries, the leading primary diagnoses in IPFs are schizophrenia, major depressive disorder (MDD), bipolar disorder, and Alzheimer's disease (Blair et al., 2019). Many patients with these conditions also have substance use disorder (SUD) and other comorbidities. Medicare beneficiaries with IPF stays include disabled beneficiaries under age 65 (65 percent of IPF discharges) and beneficiaries who are dual eligible for Medicare and Medicaid (56 percent) (Medicare Payment Advisory Commission [MedPAC], 2010).[1]

There is no systematic way to assess and treat BPSD before or during IPF stays. Providers from primary care to IPF settings often are ill-equipped to handle BPSD and rely on the use of medications

[1] For Medicare beneficiaries, Part A covers inpatient psychiatric care, which has a 190-day lifetime limit that can be used in multiple benefit periods (CMS, undated-c). CMS pays IPFs according to the IPF Prospective Payment System.

as chemical restraints. Inpatient care for people with severe BPSD may be inadequate, owing to a lack of expertise in dementia care management in many psychiatric facilities.

Further, many IPFs lack the capacity to meet the needs of people who require this type of care, including PLWD. A decline in IPF capacity has occurred over the past several decades because of closures of state and county psychiatric hospitals as care shifted away from institutions (Salinsky and Loftis, 2017). However, some states require state and county facilities to admit patients if private facilities do not have availability (e.g., the so-called bed of last resort law in Virginia). This has contributed to state psychiatric facilities becoming overcrowded and understaffed, and the staff at these facilities may not be equipped to manage people with BPSD (Pauly, 2019).

When there is inadequate staff and training, physical restraints and medications may be overused to manage challenging combative behaviors, particularly for individuals involuntarily admitted to care. PLWD in IPFs are especially vulnerable to harm resulting from physical containment measures and inappropriate medication use (Shields, Steward, and Delaney, 2018; Shields and Busch, 2020). Containment measures including use of restraints and seclusion may be used to protect patients and staff, but they may also cause confusion and trauma for the patient. Older PLWD and IPF patients who are prescribed medications are at increased risk for falls (Fernando et al., 2017; Shaw, 2002; Estrin et al., 2009) and often experience medical complications following IPF stays (Leung et al., 2010). Moreover, there are anecdotal reports of poor care and outcomes for PLWD staying in IPFs and challenges in finding care for these individuals after they are discharged from IPFs (Albiges, 2019; Rife, 2020).

In 2012, CMS implemented the Inpatient Psychiatric Facility Quality Reporting (IPFQR) program, in which IPFs must participate or receive a 2–percentage-point reduction in their annual rate update (CMS, 2022). The IPFQR program includes the following quality measures relevant to PLWD:

- hours of physical restraint use,
- hours of seclusion use,
- patients discharged on multiple antipsychotic medications with appropriate justification,
- 30-day all-cause unplanned readmission following psychiatric hospitalization in an IPF,
- medication continuation following inpatient psychiatric discharge.

Analyses of the IPFQR program measures have found reductions in reported use of restraint and seclusion since the IPFQR program was implemented (Shields and Busch, 2020). However, 30- day readmissions still occur for 20 percent of Medicare beneficiaries discharged from IPFs (Benjenk, Shields, and Chen, 2020).

Objectives of This Study

Although IPFs are an important care setting for PLWD, especially during psychiatric crises, little is known about the characteristics of the population who use these facilities and the outcomes proximal to the IPF discharge. The goal of this analysis is to better understand the characteristics of Medicare beneficiaries with and without dementia who use IPFs; the diagnoses and care utilization

patterns that precede psychiatric inpatient stays; and the outcomes following IPF stays, including health care utilization and mortality. We explore three research questions (RQs):

1. What are the characteristics of Medicare beneficiaries who use IPFs? How do beneficiaries with and without dementia differ?
2. What diagnoses, service and setting utilization patterns, and provider characteristics predict IPF utilization among PLWD? How do these patterns and provider characteristics compare with those of Medicare beneficiaries who do not have dementia?
3. What are the health, service, and setting utilization and mortality outcomes of PLWD following an IPF stay? How do these compare with Medicare beneficiaries who do not have dementia and use IPFs?

Our exploration relies on two approaches. We provide basic descriptive characteristics to depict the total IPF-using population and two subgroups of Medicare beneficiaries in that population: those with and without dementia. Characteristics considered include beneficiary diagnoses, the services used both before and after IPF use, and the outcomes after discharge from an index IPF stay. We then use regression analyses to explore the predictors of IPF utilization, as well as service use and mortality after IPF discharge, both for the general IPF-using Medicare beneficiary population and for the two subgroups.

Chapter 2. Methods

Data Sources

The files we use are shown in Table 2.1. We used enrollment, claims, prescription drug, and assessment data for Medicare FFS beneficiaries from 2017 to 2019. From the Master Beneficiary Summary File (MBSF), we use the Base Segment to enumerate beneficiaries and identify characteristics, the Chronic Conditions Segment (CCS) and Other Chronic or Potentially Disabling Conditions Segment (CPDCS) to identify diagnosed conditions (including ADRD and common behavioral and physical health conditions), and the Cost and Utilization Segment for annual payments by Medicare, other primary payers, and patients for out-of-pocket costs. We used claims data to identify utilization by service type, with inpatient and skilled nursing facility (SNF) claims from the Medicare Provider Analysis and Review (MedPAR) file, physician visits in the Carrier file, outpatient and emergency department (ED) visits in the Outpatient file, durable medical equipment (DME) in the DME file, and prescription drug fills from the Part D Event (PDE) file. For beneficiaries residing in nursing homes, we used information from the LTC Minimum Data Set (MDS) 3.0 to describe functional status, cognition, and psychotropic medication use in nursing facilities.

We used county-level information on rurality and Health Professional Shortage Areas (HPSAs) from the Area Health Resources file (AHRF) and facility-level quality measures for IPFs from the IPFQR program.

Table 2.1. Data Sources, Calendar Years 2017 to 2019

Data File	Variables
Enrollment data	
MBSF Base Segment	Age, sex, race, ethnicity, zip code, county, reason for entitlement, dual eligibility status
MBSF CCS	Beneficiary chronic conditions, including ADRD
MBSF CPDCS	Beneficiary chronic and potentially disabling conditions
MBSF Cost and Utilization Segment	Annual summaries of payments by service type
Claims data	
MedPAR	ACH, IPF, and SNF utilization, diagnosis codes
Carrier file	Berenson-Eggers type of service (BETOS), provider specialty, diagnosis codes, procedure codes
Outpatient file	Revenue center codes, procedure codes
DME File	Procedure codes
Other data	
PDE File	Psychotropic drug utilization
LTC MDS 3.0	ADL score, Brief Interview for Mental Status (BIMS) score, entry date, assessment dates, discharge dates
AHRF	HPSA indicators (Primary Care, Mental Health), Rural Urban Continuum Code (RUCC)
IPFQR Program Measure Data—by Facility	Hours of physical restraint use, patients discharged on multiple antipsychotic medications with appropriate justification, patients readmitted to any hospital within 30 days of discharge from the inpatient psychiatric facility

NOTE: ACH = acute care hospital; ADL = activities of daily living; ADRD = Alzheimer's disease and related dementias; AHRF = Area Health Resources Files; BETOS = Berenson-Eggers Type of Service; BIMS = Brief Interview for Mental Status; CCS = Chronic Conditions Segment; CPDCS = Other Chronic or Potentially Disabling Conditions Segment; DME = durable medical equipment; HPSA = Health Professional Shortage Area; IPF = inpatient psychiatric facility; IPFQR = Inpatient Psychiatric Facility Quality Reporting; LTC = long term care; MBSF = Medicare Beneficiary Summary File; MDS = Minimum Data Set; MedPAR = Medicare Provider Analysis and Review; PDE = Part D Event; RUCC = Rural-Urban Continuum Codes; SNF = skilled nursing facility.

Population

We focused on Medicare FFS beneficiaries with at least one IPF admission in the 2018 MedPAR file. The 2017 data allow for a one-year look-back period to examine prior health care utilization patterns, and the 2019 data allow for a one-year period to examine outcomes following IPF stays. We limited the analytic sample to beneficiaries with at least six months of continuous Medicare FFS enrollment both before and after an IPF stay (or until time of death if less than six months post discharge).

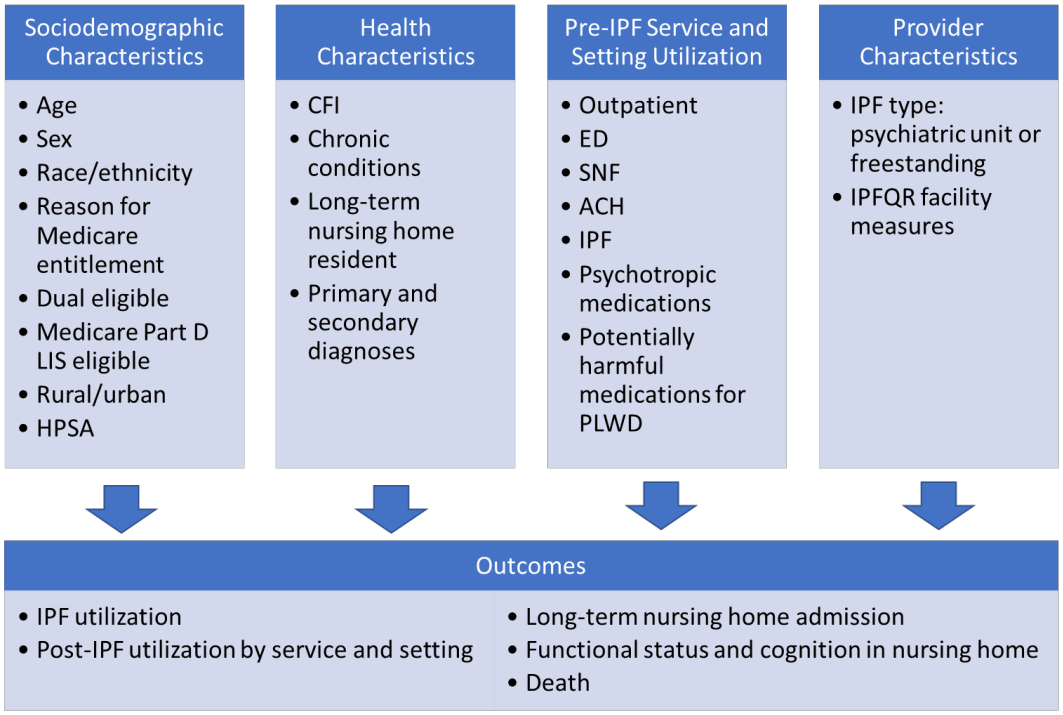
We also used a sample of FFS beneficiaries without IPF utilization as a comparator group in the analyses of predictors of IPF utilization (RQ 2). First, we identified beneficiaries without an IPF stay in 2018. Second, we assigned a random index date as a *pseudo IPF admission/discharge date* that was in proportion to the monthly distribution of IPF admissions in our population of interest. We used this index date to measure utilization and outcomes that can be compared with the prior

utilization and post-outcomes for IPF stayers. Third, we limited this comparator sample to beneficiaries with at least six months of continuous Medicare FFS enrollment before and after the index date. Finally, we retained a sample of FFS beneficiaries for this comparator group, such that the population included three comparators for every IPF stayer (i.e., a 3:1 ratio); we sampled by month, such that the monthly distribution of IPF admission dates and index dates for non-IPF stayers was the same.

Beneficiary, Utilization, Provider, and Outcome Measures

To answer the RQs, we examined the measures shown in Figure 2.1. These measures are described further in the subsequent sections.

Figure 2.1. Conceptual Model of Beneficiary, Utilization, Provider, and Outcome Measures



NOTE: ACH = acute care hospital; CFI = claims-based frailty index; ED = emergency department; HPSA = Health Professional Shortage Area; IPF = inpatient psychiatric facility; IPFQR = Inpatient Psychiatric Facility Quality Reporting; LIS = low-income subsidy; PLWD = people living with dementia; SNF = skilled nursing facility.

Beneficiary Characteristics

We performed descriptive analyses to characterize beneficiaries who use IPFs. The sociodemographic characteristics of beneficiaries used in these analyses are age, sex, and race or ethnicity. We also included dual eligibility for Medicare and Medicaid and eligibility for the Part D LIS in at least one month during the analysis period as proxies for income. To account for geographic variation in health care service availability, our analyses included rurality and HPSA statuses for primary care and mental health.

We examined several health characteristics drawn from information available in the Medicare enrollment, claims, and assessment files. We defined dementia according to the Chronic Conditions Data Warehouse (CCW) algorithm for ADRD diagnoses. In this report, we use the terms *dementia* and *PLWD* to refer to this population defined by CCW ADRD diagnoses.

We also used the CCW algorithms for common chronic conditions to define health conditions as proxies for health status. We included several common chronic conditions as defined in the MBSF CCS and CPDCS according to the CCW algorithms. In addition to ADRD, the chronic behavioral health conditions were schizophrenia, bipolar disorder, MDD, alcohol use disorders (AUDs), substance use disorders (SUDs), and anxiety. We included many physical health conditions that are in the Elixhauser comorbidity index and are associated with increased mortality: acute myocardial infarction (AMI), atrial fibrillation, congestive heart failure (CHF), ischemic heart disease (IHD), peripheral vascular disease (PVD), stroke, chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), diabetes, hip fracture, rheumatoid arthritis (RA), and traumatic brain injury (Southern, Quan, and Ghali, 2004).

We constructed a CFI that is associated with mortality, disability, impairment, and falls (Kim et al., 2019; Kim and Gautam, 2020) as an additional proxy for health status. This CFI is a regression-based approximation of a validated deficit accumulation frailty index. It uses a combination of both diagnosis codes (ICD-9, ICD-10) and procedure codes (Health Care Procedural Coding System [HCPCS] Level I and II) obtained from Medicare claims data.

To determine whether a beneficiary resided in a long-term nursing facility (versus a short- term stay, including SNF stays) before or after the IPF stay, we used MDS 3.0 assessment data to identify nursing home episodes over 100 days. This threshold is consistent with CMS quality reporting methods that use more than 100 days to differentiate long stays from short stays (CMS and RTI International, 2019).[2] We further used discharge status and destination information from the MDS assessments and IPF claims to exclude patients discharged to home or community settings from being assigned as long-term nursing facility residents.

For beneficiaries with an IPF stay, we describe their primary and secondary diagnoses using diagnoses in their inpatient claims.

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[2] Algorithms to differentiate long and short stays in nursing homes have been developed using MDS data, Medicare Part A and B claims data, and a combination of MDS and claims data (Goodwin et al., 2017; Wei et al., 2016).

Although the three methods have similar sensitivities, Goodwin et al. (2017) found that using a combination of MDS and claims data had the highest positive predictive value (85 percent) compared with using MDS data alone (79 percent) or claims data alone (66 percent). For this study, we use the MDS alone to identify long-stay nursing home residents for the sake of simplicity. This likely results in some false positive assignments of long-term nursing home residency status when beneficiaries are in fact short-stay residents; however, the nursing home population in our sample is relatively small, and this bias likely has limited impact on the overall findings. For RQ 2, we believe the consequence of this is minimal because we additionally control for SNF utilization prior to IPF stays. For RQ 3, the false positives are included in the assessment of nursing home outcomes rather than utilization outcomes. In follow- up analyses, the long-stay nursing home identification could be explored further by incorporating the use of both MDS and claims data.

Utilization and Provider Measures

Health care utilization by beneficiaries prior to their IPF admission may help shed light on the circumstances and potential increasing need for care. To characterize pre-IPF service and setting utilization, we constructed several utilization measures to examine its association with IPF stays in the year prior to IPF admission. We hypothesize that health care utilization proximal to the IPF admission would be most strongly associated with IPF admission; however, we chose to examine the prior year to examine whether utilization increases over time, which could indicate worsening symptoms and increased care needs. For convenience, we aggregated utilization by quarters. Specifically, we created indicator variables for each type of utilization in the periods of days 2–90,[3] 91–180, 181–270, and 271–360 before admission to an IPF (or before the index date for the comparator beneficiaries without an IPF stay in 2018). We define the following types of utilization:

- outpatient behavioral health visit,
- visit with a mental health practitioner,
- general office visit,
- ED visit,
- SNF admission,
- ACH admission,
- IPF admission,
- psychotropic medication prescription fills for
  - antipsychotics,
  - antidepressants,
  - benzodiazepine,
  - nonbenzodiazepine hypnotics medications,
  - dementia medications,
- prescription fills for potentially harmful medications for PLWD.

Table A.1 provides additional information on how the types of outpatient office visits are defined. The utilization variables are defined based on procedure codes, provider specialty codes, place of service codes, and drug codes. *Outpatient behavioral health visit* and *visit with a mental health practitioner* are defined based on procedure codes and specialty codes used in the IPFQR program measure specifications for follow-up after hospitalization for mental illness (CMS, undated-a). *Outpatient behavioral health visit* is based on procedure codes for behavioral health visits, while *visit with a mental health practitioner* could have procedure codes for any office- based visit but also requires a mental health provider specialty code on the claim. The psychotropic drug categories are based on National Drug Codes (NDCs) in the 2020 Healthcare Effectiveness Data and Information Set (HEDIS) medication list directory (National Committee for Quality Assurance [NCQA], 2020). For antipsychotics, we included NDCs in any of the following HEDIS medication lists: antipsychotic combination medications, antipsychotic medications, Use of High-Risk Medications in the Elderly

[3] We exclude days 0 and 1 before an IPF admission to avoid care immediately preceding an IPF stay, which often entails an ED visit prior to transfer to an IPF.

antipsychotic medications, and Diabetes Screening for People with Schizophrenia or Bipolar Disorder Who are Using Antipsychotic Medications antipsychotic medications. For potentially harmful medication use for PLWD, we identified prescription drug fills for NDCs from HEDIS's "Potentially Harmful Drugs—Dementia Medications" list (NCQA, 2020) (e.g., chlorpheniramine, paroxetine, trihexyphenidyl) among PLWD who did not have schizophrenia and other psychotic disorders or bipolar disorder based on the CCW chronic conditions algorithms.

In addition to utilization, we examined characteristics of the IPF stays available in the claims data, including the type of IPF (freestanding or psychiatric unit), admission source, diagnoses, length of stay (LOS), and discharge destination. IPFQR program measures at the facility level were also considered (CMS, undated-b); we included two measures—hours of physical restraint use and 30-day readmission rate—that have low levels of missingness.

Outcome Measures

To explore predictors of IPF utilization, we examined IPF admission as the outcome. To describe outcomes following IPF stays, we evaluated a set of post–IPF discharge utilization and outcomes for beneficiaries with an IPF stay. We conducted these analyses at the discharge level following IPF stays.

For people discharged from IPFs to home or self-care, we examined the following utilization types in the 30 days following IPF discharge:

- outpatient behavioral health visit,
- visit with a mental health practitioner,
- general office visit,
- ED visit,
- SNF admission,
- ACH admission,
- IPF admission,
- psychotropic medications.

We also examined the following outcomes following IPF discharge:

- time to long-term nursing home admission[4]
- time to death.

For PLWD in IPFs discharged to long-term nursing facilities, we examined directional changes in

- ADL score
- BIMS score.

[4] For this regression model analyzing time to long-term nursing home admission, we are interested in new long-term nursing home admissions. Thus, we excluded beneficiaries who we identified as long-term nursing home residents prior to the IPF stay.

Statistical Analysis

We performed descriptive analysis to compare the characteristics of people with and without dementia using Chi-squared tests for categorical variables and t-tests for continuous variables.

We also performed descriptive and univariate analyses for the utilization and outcome measures that we examined further in our modeling efforts.

We ran two regression models to examine predictors of IPF utilization. First, we estimated the probability of an IPF admission among PLWD using a multivariable logistic regression model, with the binary outcome of IPF admission. This allowed us to focus on predictors among PLWD (the first part of RQ 2). We included all beneficiaries with dementia, and the unit of analysis was beneficiary-stay. We identified IPF stays using MedPAR records from 2018; a subsequent IPF stay within 30 days after discharge from the prior IPF stay was considered a readmission rather than an admission. Second, we modeled the probability of an IPF admission, including all beneficiaries who have an IPF stay, to compare patterns and characteristics between PLWD and people not living with dementia (the second part of RQ 2). To examine the differences between the predictors of IPF utilization among beneficiaries with and without dementia, we included terms that interact beneficiary chronic conditions and pre-IPF utilization with ADRD status.

To compare beneficiaries with and without dementia, we included the full cohort of beneficiaries who use IPFs. We conducted logistic regression on utilization post–IPF stay to assess utilization patterns following IPF stays for both groups. We estimated Cox proportional hazard models to investigate nursing home admissions and deaths following IPF stays.

For those beneficiaries who were discharged to long-term nursing facilities after an IPF stay, we estimated logistic regression models for ADL and BIMS scores derived from MDS 3.0 items to ascertain factors associated with decreased functional status or cognition between assessments. ADL and BIMS scores were based on the first two MDS 3.0 assessments following IPF discharge. For ADLs, we modeled an increase in the score, which indicates decreased physician function. A one-point change in the ADL represents a clinically meaningful change (Carpenter et al., 2006). For BIMS, we modeled a decrease in the score, which indicates decreased cognition. BIMS scores from 13 to 15 represent no or mild cognitive impairment, 8 to 12 moderate impairment, and 0 to 7 severe impairment (Saliba et al., 2012). For both types of models, beneficiaries were included in the analyses if the required data were available for the appropriate assessments. These models include fixed effects for nursing facilities to account for facility-level differences in quality of care.

Limitations

This study has several limitations. Because we focused on Medicare beneficiaries continuously enrolled in FFS, our findings may not be generalizable to Medicare Advantage (MA) enrollees or to Medicare beneficiaries who switch between FFS and MA. These results also may not be applicable to individuals who are covered by private insurance, those with only Medicaid coverage, or the uninsured. Although we lacked data on MA enrollees, other research has found that MA and

Medicare FFS beneficiaries have similar characteristics and health care experiences (Jacobson et al., 2021).

The analyses of psychotropic medication use were limited to Medicare beneficiaries who had a Part D plan. In 2017–2019, about 70 percent of Medicare beneficiaries were enrolled in Part D, about 47 percent of whom were in standalone Part D plans, 37 percent in MA Part D plans, and 15 percent in employer group Part D plans (Cubanski, Damico, and Neuman, 2019).

Although beneficiaries who are dually eligible for Medicare and Medicaid are included in this analysis, we do not examine use of services paid for by Medicaid. Thus, we underestimate service use by dually eligible enrollees who have services reimbursed by Medicaid—for example, outpatient services for mental health disorders or SUD. We do examine whether characteristics, utilization patterns for Medicare-covered services, and outcomes are different for the dually eligible population (and the Part D LIS population) compared with the rest of the Medicare population.

We do not characterize the severity of dementia, which is likely associated with utilization patterns and outcomes. While there may be heterogeneity in disease severity among beneficiaries identified as having ADRD in the CCW, the dementia population utilizing IPFs is likely to be in later stages of dementia. If dementia severity were included, it is possible that some associations with poor outcomes might exist only for people with severe dementia and not with mild or moderate dementia.

We also do not characterize any caregiver factors, which cannot be linked to Medicare beneficiary data alone. Caregiver distress, rather than BPSD of PLWD, has been shown to be associated with increased health care utilization, such as ED visits and inpatient admissions (Maust et al., 2017). Therefore, the inclusion of caregiver factors may help explain some of the associations we observed between ED visits and IPF admissions.

Although our analyses contain several proxies of health status with the inclusion of many chronic conditions and the frailty index, we do not explore all possible health conditions that could contribute to IPF utilization.

In addition, we separately examine the nursing home population using measures from the MDS 3.0. The analyses of nursing home residents using the MDS 3.0 may be limited by completeness of the assessments. Based on our assignment of individuals using nursing facility care to long-term nursing homes (rather than short stays), there were relatively few residents who also had an IPF stay. Further, for the BIMS scores, we analyzed only directional changes in the scores and not the magnitude of changes relative to cutoffs between clinically meaningful impairment differences.

Chapter 3. Characteristics of Medicare Beneficiaries Who Use IPFs

In this chapter, we characterize the Medicare beneficiaries who use IPFs. To answer RQ 1, we first describe the overall population who use IPFs and then how these characteristics differ between IPF users with and without dementia.

Characteristics of All Medicare Beneficiaries Who Use IPFs

Sociodemographic Characteristics

In 2018, 204,797 Medicare FFS beneficiaries had at least one IPF stay (Table 3.1). Their mean age was 60. Most beneficiaries were less than 65 years of age at the time of their first stay in 2018 (55.8 percent). Increasing age categories made up progressively smaller portions of beneficiaries with an IPF stay. For example, about 21 percent of those with an IPF stay were in the age category 65 to 74 years. Approximately 15 percent were 75 to 84 years. Only 9 percent were older than 85.

Slightly more than half of beneficiaries with an IPF stay were female (51 percent).

Beneficiaries with an IPF stay were overwhelmingly White, non-Hispanic (78 percent). About 15 percent were Black, non-Hispanic; only a small percentage were Hispanic (3 percent), Asian (1 percent), or from another racial or ethnic group (3 percent).

Slightly more than two-thirds of beneficiaries (68 percent) with an IPF stay were originally eligible for Medicare due to disability; about 31 percent were eligible due to age. Most (57 percent) with an IPF stay were dually eligible for Medicare and Medicaid. Almost two-thirds (63 percent) were eligible for the Medicare Part D LIS.

Approximately 21 percent of beneficiaries with an IPF stay resided in rural counties. Most beneficiaries with an IPF stay resided in a county designated as a whole (6 percent) or partial (87 percent) HPSA for primary care and in a county designated as a whole (24 percent) or partial (70 percent) HPSA for mental health.

Table 3.1. Sociodemographic Characteristics of Beneficiaries Who Used IPFs in 2018

	Beneficiaries with IPF Stay		Beneficiaries with IPF Stay and Dementia		Beneficiaries with IPF Stay and Without Dementia		*p*-value
Number of beneficiaries	204,797	(100%)	83,771	(100%)	121,026	(100%)	
Age, mean (SD)	60	(18)	73	(14)	51	(15)	<0.0001
Age, median (IQR)	61	(46 to 74)	74	(65 to 83)	52	(39 to 63)	<0.0001
Age group, *n* (%)							<0.0001
Age less than 65	114,219	(55.8%)	19,933	(23.8%)	94,286	(77.9%)	
Age 65 to 74	42,773	(20.9%)	22,412	(26.8%)	20,361	(16.8%)	
Age 75 to 84	30,351	(14.8%)	25,045	(29.9%)	5,306	(4.4%)	
Age 85 and older	17,454	(8.5%)	16,381	(19.6%)	1,073	(0.9%)	
Sex, female, *n* (%)	105,064	(51.3%)	46,475	(55.5%)	58,589	(48.4%)	<0.0001
Race or ethnicity, *n* (%)							<0.0001
White, non- Hispanic	159,534	(77.9%)	69,936	(83.5%)	89,598	(74.0%)	
Hispanic	5,968	(2.9%)	1,465	(1.7%)	4,503	(3.7%)	
Black, non- Hispanic	30,827	(15.1%)	9,892	(11.8%)	20,935	(17.3%)	
Asian	2,284	(1.1%)	733	(0.9%)	1,551	(1.3%)	
Other	6,184	(3.0%)	1,745	(2.1%)	4,439	(3.7%)	
Reason for original entitlement, *n* (%)							<0.0001
OASDI	64,058	(31.3%)	46,620	(55.7%)	17,438	(14.4%)	
DIB	140,029	(68.4%)	36,924	(44.1%)	103,105	(85.2%)	
ESRD	339	(0.2%)	93	(0.1%)	246	(0.2%)	
Both DIB and ESRD	371	(0.2%)	134	(0.2%)	237	(0.2%)	
Dual eligible, *n* (%)	117,353	(57.3%)	40,417	(48.2%)	76,936	(63.6%)	<0.0001
Part D LIS eligibility, *n* (%)	129,299	(63.1%)	43,059	(51.4%)	86,240	(71.3%)	<0.0001
Rural county, *n* (%)	43,178	(21.1%)	20,911	(25.0%)	22,267	(18.4%)	<0.0001
HPSA, *n* (%)							
Primary care							<0.0001
Whole county	11,360	(5.5%)	5,863	(7.0%)	5,497	(4.5%)	
Part county	177,639	(86.7%)	70,916	(84.7%)	106,723	(88.2%)	
None	15,798	(7.7%)	6,992	(8.3%)	8,806	(7.3%)	
Mental health							<0.0001
Whole county	48,930	(23.9%)	23,383	(27.9%)	25,547	(21.1%)	
Part county	143,623	(70.1%)	55,452	(66.2%)	88,171	(72.9%)	
None	12,244	(6.0%)	4,936	(5.9%)	7,308	(6.0%)	

NOTE: The *p*-values reflect the difference between beneficiaries with and without dementia. DIB = disability insurance benefits; ESRD = end-stage renal disease; HPSA = Health Professional Shortage Area; IPF = inpatient psychiatric facility; IQR = interquartile range; LIS = low-income subsidy; OASDI = Old Age, Survivors, and Disability Insurance; SD = standard deviation.

Health and Utilization Characteristics

Slightly more than 1 percent of beneficiaries with IPF stays were long-term nursing home residents (Table 3.2). According to the CFI, the most common category was mildly frail (43 percent),

followed by 30 percent who were pre-frail. More than one-quarter (28 percent) were moderately or severely frail, while only 0.1 percent were non-frail.

Overall, 41 percent of beneficiaries with an IPF stay were diagnosed with dementia before or during their IPF stay. Other chronic conditions are prevalent among the IPF-using population.

The most common were MDD (83 percent), anxiety (82 percent), bipolar disorder (59 percent), RA (55 percent), and SUDs (48 percent).

Average annual Medicare payments per beneficiary in 2018 were slightly more than $46,000 (2018 dollars) for the IPF-using population. Total payments from Medicare, other primary payers, and patient out-of-pocket costs were just over $53,000.

The average number of IPF stays per beneficiary was 1.5 stays. While 72 percent of beneficiaries with any IPF stay had one stay in 2018, a small subset of beneficiaries were high IPF users, with 5 percent having four or more stays during 2018.

Table 3.2. Health Characteristics of Beneficiaries Who Used IPFs in 2018

	Beneficiaries with IPF Stay		Beneficiaries with IPF Stay and Dementia		Beneficiaries with IPF Stay and Without Dementia		*p*-value
Long-term nursing home resident, *n* (%)	2,768	(1.4%)	2,557	(3.1%)	211	(0.2%)	<0.0001
CFI, *n* (%)							<0.0001
Non-frail (0–0.10)	274	(0.1%)	35	(<0.1%)	239	(0.2%)	
Pre-frail (0.10–0.19)	60,959	(29.8%)	7,944	(9.5%)	53,015	(43.8%)	
Mildly frail (0.20–0.29)	87,282	(42.6%)	33,048	(39.5%)	54,234	(44.8%)	
Moderately to severely frail (≥0.30)	56,282	(27.5%)	42,744	(51.0%)	13,538	(11.2%)	
Chronic conditions, *n* (%)							
ADRD	83,771	(40.9%)	83,771	(100.0%)	0	(0.0%)	NA
Schizophrenia	88,789	(43.4%)	27,516	(32.8%)	61,273	(50.6%)	<0.0001
Bipolar disorder	120,700	(58.9%)	40,093	(47.9%)	80,607	(66.6%)	<0.0001
MDD	169,380	(82.7%)	69,225	(82.6%)	100,155	(82.8%)	0.4841
AUDs	74,298	(36.3%)	19,583	(23.4%)	54,715	(45.2%)	<0.0001
SUDs	98,644	(48.2%)	24,614	(29.4%)	74,030	(61.2%)	<0.0001
Anxiety	167,755	(81.9%)	67,615	(80.7%)	100,140	(82.7%)	<0.0001
AMI	9,130	(4.5%)	6,271	(7.5%)	2,859	(2.4%)	<0.0001
Atrial fibrillation	20,618	(10.1%)	15,260	(18.2%)	5,358	(4.4%)	<0.0001
CHF	54,057	(26.4%)	35,332	(42.2%)	18,725	(15.5%)	<0.0001
IHD	90,189	(44.0%)	53,141	(63.4%)	37,048	(30.6%)	<0.0001
PVD	47,290	(23.1%)	33,322	(39.8%)	13,968	(11.5%)	<0.0001
Stroke	34,741	(17.0%)	25,311	(30.2%)	9,430	(7.8%)	<0.0001
CKD	83,044	(40.5%)	47,099	(56.2%)	35,945	(29.7%)	<0.0001
COPD	81,567	(39.8%)	40,297	(48.1%)	41,270	(34.1%)	<0.0001
Diabetes	83,428	(40.7%)	43,041	(51.4%)	40,387	(33.4%)	<0.0001
Hip fracture	8,570	(4.2%)	6,740	(8.0%)	1,830	(1.5%)	<0.0001
RA	112,672	(55.0%)	59,750	(71.3%)	52,922	(43.7%)	<0.0001
Traumatic brain injury	10,051	(4.9%)	6,733	(8.0%)	3,318	(2.7%)	<0.0001
Annual cost							
Medicare payments, mean (SD)	$46,097	($40,985)	$56,551	($42,925)	$38,861	($37,936)	<0.0001
Total payments, mean (SD)	$53,014	($46,048)	$64,813	($48,687)	$44,846	($42,242)	<0.0001
Number of IPF stays, mean (SD)	2	(1.2)	1	(1.0)	2	(1.3)	<0.0001

NOTE: The *p*-values reflect the difference between beneficiaries with and without dementia. AMI = acute myocardial infarction; AUD = alcohol use disorder; CFI = claims-based frailty index; CHF = congestive heart failure; CKD = chronic kidney disease; COPD = chronic obstructive pulmonary disease; IHD = ischemic heart disease; IPF = inpatient psychiatric facility; MDD = major depressive disorder; NA = not applicable; PVD = peripheral vascular disease; RA = rheumatoid arthritis; SD = standard deviation; SUD = substance use disorder.

Health care utilization was common prior to IPF stays (Table 3.3). In each of the four quarters prior to IPF admission, the most frequent utilization was outpatient behavioral health visits (74 to 79 percent of beneficiaries) and any psychotropic medication use (62 to 66 percent of beneficiaries). Some types of utilization, such as ED visits, occurred more frequently in the quarter immediately

prior to IPF admission (56 percent of beneficiaries) compared with prior quarters (34 to 39 percent of beneficiaries).

Table 3.3. Service and Setting Utilization Prior to IPF Stays

	Beneficiaries with IPF Stay		Beneficiaries with IPF Stay and Dementia		Beneficiaries with IPF Stay and Without Dementia		*p*-value
<1 quarter (2–90 days) prior							
Outpatient behavioral health visit	161,430	(78.8%)	68,197	(81.4%)	93,233	(77.0%)	<0.0001
Visit with mental health practitioner	116,959	(57.1%)	48,036	(57.3%)	68,923	(56.9%)	0.0772
General office visit	133,704	(65.3%)	53,496	(63.9%)	80,208	(66.3%)	<0.0001
ED visit	113,975	(55.7%)	49,757	(59.4%)	64,218	(53.1%)	<0.0001
SNF stay	13,793	(6.7%)	11,571	(13.8%)	2,222	(1.8%)	<0.0001
ACH stay	53,299	(26.0%)	27,352	(32.7%)	25,947	(21.4%)	<0.0001
IPF stay	12,519	(6.1%)	4,396	(5.2%)	8,123	(6.7%)	<0.0001
Psychotropic medication use							
Antipsychotics	84,622	(41.3%)	33,761	(40.3%)	50,861	(42.0%)	<0.0001
Antidepressant	95,599	(46.7%)	41,057	(49.0%)	54,542	(45.1%)	<0.0001
Benzodiazepine	57,835	(28.2%)	24,272	(29.0%)	33,563	(27.7%)	<0.0001
Nonbenzodiazepine hypnotics	8,745	(4.3%)	2,488	(3.0%)	6,257	(5.2%)	<0.0001
Dementia medications	15,706	(7.7%)	15,320	(18.3%)	386	(0.3%)	<0.0001
Any psychotropic medication	133,860	(65.4%)	56,136	(67.0%)	77,724	(64.2%)	<0.0001
Potentially harmful medication use for PLWD	2,877	(1.4%)	2,877	(3.4%)	NA	(NA)	NA
1–2 quarters (91–180 days) prior							
Outpatient behavioral health visit	155,085	(75.7%)	64,405	(76.9%)	90,680	(74.9%)	<0.0001
Visit with mental health practitioner	106,291	(51.9%)	41,003	(48.9%)	65,288	(53.9%)	<0.0001
General office visit	133,571	(65.2%)	53,510	(63.9%)	80,061	(66.2%)	<0.0001
ED visit	78,424	(38.3%)	31,887	(38.1%)	46,537	(38.5%)	0.0761
SNF stay	10,091	(4.9%)	8,224	(9.8%)	1,867	(1.5%)	<0.0001
ACH stay	36,828	(18.0%)	17,336	(20.7%)	19,492	(16.1%)	<0.0001
IPF stay	20,044	(9.8%)	6,795	(8.1%)	13,249	(10.9%)	<0.0001
Psychotropic medication use							
Antipsychotics	80,577	(39.3%)	29,295	(35.0%)	51,282	(42.4%)	<0.0001
Antidepressant	92,985	(45.4%)	39,057	(46.6%)	53,928	(44.6%)	<0.0001
Benzodiazepine	53,635	(26.2%)	21,153	(25.3%)	32,482	(26.8%)	0.0031
Nonbenzodiazepine hypnotics	8,681	(4.2%)	2,476	(3.0%)	6,205	(5.1%)	<0.0001
Dementia medications	14,304	(7.0%)	13,983	(16.7%)	321	(0.3%)	<0.0001
Any psychotropic medication	131,031	(64.0%)	53,358	(63.7%)	77,673	(64.2%)	0.025
Potentially harmful medication use for PLWD	2,579	(1.3%)	2,579	(3.1%)	NA	(NA)	NA
2–3 quarters (181–270 days) prior							
Outpatient behavioral health visit	154,033	(75.2%)	63,882	(76.3%)	90,151	(74.5%)	<0.0001
Visit with mental health practitioner	104,382	(51.0%)	39,546	(47.2%)	64,836	(53.6%)	<0.0001
General office visit	132,984	(64.9%)	53,854	(64.3%)	79,130	(65.4%)	0.0004
ED visit	74,152	(36.2%)	29,511	(35.2%)	44,641	(36.9%)	0.0001
SNF stay	8,661	(4.2%)	7,039	(8.4%)	1,622	(1.3%)	<0.0001
ACH stay	35,791	(17.5%)	16,280	(19.4%)	19,511	(16.1%)	<0.0001
IPF stay	23,124	(11.3%)	7,824	(9.3%)	15,300	(12.6%)	<0.0001
Psychotropic medication use							

	Beneficiaries with IPF Stay		Beneficiaries with IPF Stay and Dementia		Beneficiaries with IPF Stay and Without Dementia		*p*-value
Antipsychotics	79,633	(38.9%)	28,237	(33.7%)	51,396	(42.5%)	<0.0001
Antidepressant	91,499	(44.7%)	37,927	(45.3%)	53,572	(44.3%)	<0.0001
Benzodiazepine	53,244	(26.0%)	20,872	(24.9%)	32,372	(26.7%)	<0.0001
Nonbenzodiazepine hypnotics	8,832	(4.3%)	2,540	(3.0%)	6,292	(5.2%)	<0.0001
Dementia medications	13,522	(6.6%)	13,230	(15.8%)	292	(0.2%)	<0.0001
Any psychotropic medication	129,878	(63.4%)	52,350	(62.5%)	77,528	(64.1%)	<0.0001
Potentially harmful medication use for PLWD	2,408	(1.2%)	2,408	(2.9%)	NA	(NA)	NA
3–4 quarters (271–360 days) prior							
Outpatient behavioral health visit	150,641	(73.6%)	63,314	(75.6%)	87,327	(72.2%)	<0.0001
Visit with mental health practitioner	100,640	(49.1%)	38,174	(45.6%)	62,466	(51.6%)	<0.0001
General office visit	130,980	(64.0%)	54,003	(64.5%)	76,977	(63.6%)	<0.0001
ED visit	70,164	(34.3%)	27,912	(33.3%)	42,252	(34.9%)	<0.0001
SNF stay	7,498	(3.7%)	6,095	(7.3%)	1,403	(1.2%)	<0.0001
ACH stay	34,340	(16.8%)	15,635	(18.7%)	18,705	(15.5%)	<0.0001
IPF stay	23,877	(11.7%)	8,154	(9.7%)	15,723	(13.0%)	<0.0001
Psychotropic medication use							
Antipsychotics	78,041	(38.1%)	27,272	(32.6%)	50,769	(41.9%)	<0.0001
Antidepressant	89,503	(43.7%)	36,907	(44.1%)	52,596	(43.5%)	0.0073
Benzodiazepine	52,714	(25.7%)	20,496	(24.5%)	32,218	(26.6%)	<0.0001
Nonbenzodiazepine hypnotics	8,847	(4.3%)	2,597	(3.1%)	6,250	(5.2%)	<0.0001
Dementia medications	12,744	(6.2%)	12,487	(14.9%)	257	(0.2%)	<0.0001
Any psychotropic medication	127,441	(62.2%)	51,208	(61.1%)	76,233	(63.0%)	<0.0001
Potentially harmful medication use for PLWD	2,358	(1.2%)	2,358	(2.8%)	NA	(NA)	NA

NOTE: For people with multiple IPF stays in 2018, this table includes only the first IPF stay in 2018. The first set of *p*-values reflects the difference between beneficiaries with and without IPF stays among those with dementia. The second set of *p*-values reflects the difference between beneficiaries with and without dementia. ACH = acute care hospital; ED = emergency department; IPF = inpatient psychiatric facility; NA = not applicable; PLWD = people living with dementia; SNF = skilled nursing facility.

Characteristics and Diagnoses of IPF Stays

In 2018, 59.6 percent of IPF stays occurred in psychiatric units, and 40.4 percent occurred in freestanding facilities (Table 3.4). The most common admission source was physician referral (44.6 percent), followed by transfers from ACH (21.6 percent). The most common behavioral health diagnoses were MDD, schizophrenia, and bipolar disorder, ranging from 14 to 25 percent of admissions. ADRD was the admission diagnosis for 12.5 percent of IPF stays. The average LOS in IPFs was 12.4 days (SD = 13.7 days).

Table 3.4. Characteristics and Diagnoses of IPF Stays

	Beneficiaries with IPF Stay		Beneficiaries with IPF Stay and Dementia		Beneficiaries with IPF Stay and Without Dementia		*p*-value
IPF type, *n* (%)							<0.0001
Freestanding	82,717	(40.4%)	25,075	(29.9%)	57,642	(47.6%)	
Psychiatric unit	122,080	(59.6%)	58,696	(70.1%)	63,384	(52.4%)	
Admission source, *n* (%)							<0.0001

	Beneficiaries with IPF Stay		Beneficiaries with IPF Stay and Dementia		Beneficiaries with IPF Stay and Without Dementia		*p*-value
Clinic referral	21,286	(10.4%)	8,261	(9.9%)	13,025	(10.8%)	
Court or law enforcement	7,476	(3.7%)	2,317	(2.8%)	5,159	(4.3%)	
Physician referral	91,433	(44.6%)	35,087	(41.9%)	56,346	(46.6%)	
Transfer from ACH	44,332	(21.6%)	15,603	(18.6%)	28,729	(23.7%)	
Transfer from same facility	18,834	(9.2%)	9,743	(11.6%)	9,091	(7.5%)	
Transfer from SNF or IPF	8,097	(4.0%)	7,282	(8.7%)	815	(0.7%)	
Transfer from ambulatory surgery centers or hospice	42	(<0.1%)	17	(<0.1%)	25	(<0.1%)	
Transfer from undefined health care facility	9,352	(4.6%)	4,061	(4.8%)	5,291	(4.4%)	
Unknown	3,945	(1.9%)	1,400	(1.7%)	2,545	(2.1%)	
Admission diagnosis, *n* (%)							<0.0001
Schizophrenia	41,161	(20.1%)	10,883	(13.0%)	30,278	(25.0%)	
Bipolar disorder	29,451	(14.4%)	7,720	(9.2%)	21,731	(18.0%)	
MDD	50,220	(24.5%)	16,300	(19.5%)	33,920	(28.0%)	
ADRD	25,683	(12.5%)	25,640	(30.6%)	43	(<0.1%)	
Alcohol or drug abuse or dependence	12,257	(6.0%)	1,702	(2.0%)	10,555	(8.7%)	
Primary diagnosis, *n* (%)							<0.0001
Schizophrenia	51,990	(25.4%)	14,014	(16.7%)	37,976	(31.4%)	
Bipolar disorder	36,995	(18.1%)	9,732	(11.6%)	27,263	(22.5%)	
MDD	50,574	(24.7%)	16,810	(20.1%)	33,764	(27.9%)	
ADRD	31,693	(15.5%)	31,692	(37.8%)	<11	(<0.1%)	
Alcohol or drug abuse or dependence	12,831	(6.3%)	1,884	(2.2%)	10,947	(9.0%)	
Secondary diagnosis, *n* (%)							<0.0001
Schizophrenia	1,865	(0.9%)	662	(0.8%)	1,203	(1.0%)	
Bipolar disorder	2,457	(1.2%)	775	(0.9%)	1,682	(1.4%)	
MDD	6,497	(3.2%)	2,739	(3.3%)	3,758	(3.1%)	
ADRD	24,367	(11.9%)	24,364	(29.1%)	<11	(<0.1%)	
Alcohol or drug abuse or dependence	21,037	(10.3%)	2,888	(3.4%)	18,149	(15.0%)	
First diagnosis of schizophrenia and other psychotic disorders during IPF stay, *n* (%)	23,683	(11.6%)	13,181	(15.7%)	10,502	(8.7%)	<0.0001
Length of IPF stay, mean (SD)	12.4	(13.7)	14.4	(13.8)	11.1	(13.4)	<0.0001
IPF stay in a facility with IPFQR program measure							
Hours of physical restraint use per 1,000 patients, mean (SD)	0.47	(2.5)	0.58	(3.2)	0.39	(1.8)	<0.0001
Missing, *n* (%)	7,927	(3.9%)	3,744	(4.5%)	4,183	(3.5%)	<0.0001
30-day readmission rate, mean (SD)	20.5	(3.0)	20.5	(3.0)	20.4	(3.0)	<0.0001
Missing, *n* (%)	9,511	(4.6%)	4,279	(5.1%)	5,232	(4.3%)	<0.0001

NOTE: For people with multiple IPF stays in 2018, this table includes only the first IPF stay in 2018. ACH = acute care hospital; ADRD = Alzheimer's disease and related dementias; IPF = inpatient psychiatric facility; IPFQR = Inpatient Psychiatric Facility Quality Reporting; MDD = major depressive disorder; SD = standard deviation; SNF = skilled nursing facility.

Comparison of Characteristics of Beneficiaries With and Without Dementia

Of the 204,797 beneficiaries who used IPFs in 2018, 83,771 (41 percent) had diagnosed dementia. Compared with those without dementia, beneficiaries with dementia were older (average age 73 versus 51). The dementia subgroup was more frequently female (56 percent versus 48 percent), White (84 percent versus 74 percent), originally eligible for Medicare due to age (56 percent versus 14 percent), residing in a rural county (25 percent versus 18 percent), and long-term nursing home residents (3 percent versus <1 percent). IPF utilizers with dementia were less frequently dually eligible (48 percent versus 64 percent) or enrolled in the Part D LIS (51 percent versus 71 percent).

Consistent with their older age, beneficiaries with dementia were more likely to be moderately to severely frail (51 percent versus 11 percent) and had higher rates of chronic conditions, including IHD (63 percent versus 31 percent), RA (71 percent versus 44 percent), PVD (40 percent versus 11.5 percent), CHF (42 percent versus 16 percent), and CKD (56 percent versus 30 percent). In contrast, beneficiaries who used IPFs but did not have dementia had higher rates of AUDs (45 percent versus 23 percent), SUDs (61 percent versus 29 percent), and SMIs, including bipolar disorder (67 percent versus 48 percent) and schizophrenia (51 percent versus 33 percent).

Of IPF-using beneficiaries, PLWD exhibited some different patterns of service and setting utilization prior to IPF stays (Table 3.3). Most notably, PLWD were more frequent users of SNFs compared with people not living with dementia (13.8 versus 1.8 percent in the quarter prior to IPF admission), and their SNF use was increasingly frequent closer to the IPF admission in the four quarters prior to IPF admission.

PLWD more frequently stayed in hospital psychiatric units compared with people not living with dementia (70 percent versus 52 percent). Although PLWD most frequently had ADRD as their admission and primary diagnoses, diagnoses of MDD, schizophrenia, and bipolar disorder were also common. Compared with people not living with dementia, PLWD more often had their first diagnosis of schizophrenia and other psychotic disorders during the IPF stay (16 percent versus 9 percent). Length of IPF stay was about three days longer for PLWD compared with people not living with dementia (14.4 versus 11.1 days). The IPFQR program measures for physical restraint use and admission rate were similar for the facilities that served PLWD and people not living with dementia.

Chapter 4. Predictors of IPF Admission

This chapter discusses the results for RQ 2. We examine characteristics associated with IPF admission among all Medicare FFS beneficiaries living with dementia; we also highlight how characteristics and utilization patterns compare with those of beneficiaries who had an IPF stay but were not living with dementia.

Characteristics Associated with IPF Admission Among PLWD

Table 4.1 shows the estimated odds ratio (OR) for IPF admission associated with diagnoses, services, utilization patterns, and provider characteristics among PLWD.

Table 4.1. Estimated Associations with IPF Admission Among PLWD

	OR (95% CI)
Age (reference: 65 to 74)	
Age less than 65	0.97 (0.93, 1.01)
Age 75 to 84	0.92 (0.90, 0.94)*
Age 85 and older	0.74 (0.72, 0.76)*
Female versus male	0.64 (0.63, 0.65)*
Race or ethnicity (reference: White, non-Hispanic)	
Hispanic	0.85 (0.80, 0.90)*
Black, non-Hispanic	0.93 (0.90, 0.96)*
Asian	0.96 (0.90, 1.03)
Other	0.98 (0.93, 1.04)
Original reason for Medicare eligibility DIB and/or ESRD	0.90 (0.88, 0.93)*
Dual eligible	0.93 (0.89, 0.97)*
Part D LIS	0.84 (0.80, 0.87)*
Rural (reference: urban)	1.23 (1.20, 1.26)*
Primary care providers (reference: county without shortage)	
Partial county in shortage	1.00 (0.97, 1.04)
Whole county in shortage	0.98 (0.94, 1.02)
Mental health providers (reference: county without shortage)	
Partial county in shortage	0.99 (0.96, 1.03)
Whole county in shortage	1.02 (0.98, 1.06)
CFI (reference: non-frail or pre-frail)	
Mildly frail	2.95 (2.88, 3.02)*
Moderately to severely frail	5.12 (4.98, 5.28)*
Chronic condition	
Schizophrenia	2.78 (2.69, 2.87)*
Bipolar disorder	2.31 (2.26, 2.36)*
MDD	1.97 (1.93, 2.00)*
AUDs	1.35 (1.31, 1.39)*

	OR (95% CI)
SUDs	1.43 (1.40, 1.47)*
Anxiety	2.03 (1.99, 2.07)*
Cardiovascular diseases (CVDs)	0.72 (0.70, 0.73)*
PVD	0.71 (0.70, 0.78)*
Stroke	0.76 (0.75, 0.78)*
CKD	0.90 (0.89, 0.92)*
COPD	0.82 (0.81, 0.83)*
Diabetes	0.85 (0.84, 0.86)*
Hip fracture	0.68 (0.67, 0.70)*
RA	0.74 (0.72, 0.75)*
Traumatic brain injury	1.00 (0.97, 1.03)
Long-term nursing home residence prior to IPF admission	8.94 (8.12, 9.86)*
Outpatient behavioral health visit	
2 to 90 days prior to IPF admission	1.04 (1.01, 1.07)*
91 to 180 days prior to IPF admission	0.87 (0.84, 0.91)*
181 to 270 days prior to IPF admission	0.87 (0.84, 0.90)*
271 to 360 days prior to IPF admission	0.81 (0.78, 0.84)*
Visit with mental health practitioner	
2 to 90 days prior to IPF admission	1.59 (1.56, 1.62)*
91 to 180 days prior to IPF admission	1.00 (0.98, 1.02)
181 to 270 days prior to IPF admission	0.96 (0.94, 0.98)*
271 to 360 days prior to IPF admission	0.96 (0.94, 0.98)*
General office visit	
2 to 90 days prior to IPF admission	0.84 (0.82, 0.86)*
91 to 180 days prior to IPF admission	1.01 (0.98, 1.04)
181 to 270 days prior to IPF admission	1.02 (0.99, 1.06)
271 to 360 days prior to IPF admission	1.10 (1.06, 1.14)*
ED visit	
2 to 90 days prior to IPF admission	3.59 (3.52, 3.65)*
91 to 180 days prior to IPF admission	1.19 (1.16, 1.21)*
181 to 270 days prior to IPF admission	1.06 (1.03, 1.08)*
271 to 360 days prior to IPF admission	1.04 (1.02, 1.06)*
SNF stay	
2 to 90 days prior to IPF admission	0.92 (0.90, 0.95)*
91 to 180 days prior to IPF admission	1.15 (1.11, 1.19)*
181 to 270 days prior to IPF admission	0.99 (0.95, 1.03)
271 to 360 days prior to IPF admission	0.97 (0.94, 1.01)
ACH stay	
2 to 90 days prior to IPF admission	0.98 (0.96, 1.00)
91 to 180 days prior to IPF admission	0.70 (0.67, 0.72)*
181 to 270 days prior to IPF admission	0.74 (0.72, 0.76)*
271 to 360 days prior to IPF admission	0.71 (0.69, 0.74)*
IPF stay	
2 to 90 days prior to IPF admission	3.72 (3.21, 4.33)*
91 to 180 days prior to IPF admission	6.08 (5.45, 6.79)*
181 to 270 days prior to IPF admission	4.83 (4.42, 5.28)*
271 to 360 days prior to IPF admission	4.59 (4.25, 4.97)*

	OR (95% CI)
Use of antipsychotics	
2 to 90 days prior to IPF admission	3.47 (3.36, 3.59)*
91 to 180 days prior to IPF admission	0.66 (0.63, 0.69)*
181 to 270 days prior to IPF admission	0.89 (0.84, 0.93)*
271 to 360 days prior to IPF admission	0.83 (0.79, 0.86)*
Use of antidepressant	
2 to 90 days prior to IPF admission	1.19 (1.16, 1.22)*
91 to 180 days prior to IPF admission	0.93 (0.90, 0.96)*
181 to 270 days prior to IPF admission	0.87 (0.84, 0.90)*
271 to 360 days prior to IPF admission	0.75 (0.73, 0.77)*
Use of benzodiazepine	
2 to 90 days prior to IPF admission	2.11 (2.04, 2.17)*
91 to 180 days prior to IPF admission	0.86 (0.83, 0.90)*
181 to 270 days prior to IPF admission	0.84 (0.81, 0.88)*
271 to 360 days prior to IPF admission	0.79 (0.76, 0.82)*
Use of nonbenzodiazepine hypnotics	
2 to 90 days prior to IPF admission	1.27 (1.17, 1.39)*
91 to 180 days prior to IPF admission	0.92 (0.83, 1.01)
181 to 270 days prior to IPF admission	0.87 (0.79, 0.96)*
271 to 360 days prior to IPF admission	0.83 (0.76, 0.90)*
Use of dementia medications	
2 to 90 days prior to IPF admission	1.17 (1.13, 1.21)*
91 to 180 days prior to IPF admission	0.89 (0.86, 0.93)*
181 to 270 days prior to IPF admission	0.99 (0.94, 1.03)
271 to 360 days prior to IPF admission	0.93 (0.89, 0.96)*
Potentially harmful medication use for PLWD	
2 to 90 days prior to IPF admission	0.82 (0.78, 0.86)*
91 to 180 days prior to IPF admission	0.89 (0.84, 0.83)*
181 to 270 days prior to IPF admission	0.91 (0.86, 0.86)*
271 to 360 days prior to IPF admission	0.95 (0.91, 1.00)

NOTE: AUD = alcohol use disorder; CFI = claims-based frailty index; CI = confidence interval; CKD = chronic kidney disease; COPD = chronic obstructive pulmonary disease; CVD = cardiovascular disease; DIB = disability insurance benefits; ESRD = end-stage renal disease; IPF = inpatient psychiatric facility; LIS = low-income subsidy; MDD = major depressive disorder; OR = odds ratio; PLWD = people living with dementia; PVD = peripheral vascular disease; RA = rheumatoid arthritis; SUD = substance use disorder; *$p < 0.05$.

Among beneficiaries with dementia, all behavioral health diagnoses were significantly associated with increased odds of IPF admission, with the greatest likelihood for schizophrenia (OR = 2.78; 95 percent CI, 2.69 to 2.87). Conversely, all physical health conditions were significantly associated with lower odds of IPF use, with the lowest odds occurring for beneficiaries with a history of hip fracture (OR = 0.68; 95 percent CI, 0.67 to 0.70).

While having outpatient behavioral health visits in the quarter immediately prior to the index date was associated with a small increase in the odds of an IPF stay (OR = 1.04; 95 percent CI, 1.01 to 1.07), such utilization in other quarters in the year prior to the index date was associated with lower odds of an IPF stay, with the lowest odds occurring in the fourth quarter before the index date (OR = 0.81; 95 percent CI, 0.78 to 0.84). A similar pattern exists for visits with a mental health practitioner.

ED use also exhibited this pattern. In each of the quarters in the year prior to the index date, a visit to the ED was associated with increased likelihood of IPF admission, with admission in the first quarter prior to the index date having a larger impact (OR = 3.59; 95 percent CI, 3.52 to 3.65) than admission in the other quarters and the lowest odds occurring in the fourth quarter pre-index (OR = 1.04; 95 percent CI, 1.02 to 1.06).

An antipsychotic medication fill in the first quarter before the index date was associated with higher odds of IPF admission (OR = 3.47; 95 percent CI, 3.36 to 3.59), while use in the other three quarters before the index date was associated with lower odds of IPF admission (e.g., second quarter OR = 0.66; 95 percent CI, 0.63 to 0.69). The same pattern was observed for the use of antidepressants, benzodiazepine, nonbenzodiazepine hypnotics, and dementia medications before IPF admission (see Table 4.1).

PLWD who were long-term nursing home residents had much higher odds of IPF admission (OR = 8.94; 95 percent CI, 8.12 to 9.86). Any IPF admission in the year prior to the index date was associated with higher odds of IPF utilization (e.g., first quarter prior OR = 3.72; 95 percent CI, 3.21 to 4.33). The opposite relationship holds for PLWD who had an ACH admission in the year before the index date; that is associated with lower odds of IPF utilization for PLWD (e.g., two quarters prior OR = 0.70; 95 percent CI, 0.67 to 0.72).

Comparison of Medicare Beneficiaries With and Without Dementia

Table 4.2 shows the estimated odds ratios for an IPF admission for beneficiaries with dementia compared with those without, as well as for dementia patients with comorbid chronic conditions and certain health care utilization prior to IPF admission.

Beneficiaries with dementia had much higher odds of IPF utilization (OR = 9.53; 95 percent CI, 9.06 to 1.04) compared with beneficiaries without dementia. PLWD with behavioral health conditions had much greater odds of IPF utilization than beneficiaries with the same conditions but no dementia, including schizophrenia, bipolar disorder, anxiety, MDD, AUD, and SUDs.

The relationship between services used and IPF admission is also different for PLWD compared with those without dementia. This holds true for all the service and settings examined. IPF admission is most strongly associated with prior IPF admission and ED visit in the quarter prior to IPF admission. The more-proximal utilization prior to IPF admission was frequently most strongly associated with IPF admission; this was the case most notably for ED visits and psychotropic medication use.

Table 4.2. Estimated Associations Between IPF Admission and Dementia, Comorbidities, and Health Care Utilization by PLWD

	OR (95% CI)
ADRD	9.53 (9.06, 10.04)*
ADRD and comorbid chronic condition	
Schizophrenia	22.67 (21.23, 24.20)*
Bipolar disorder	19.79 (18.64, 21.01)*
MDD	17.82 (16.87, 18.82)*
AUDs	12.46 (11.71, 13.25)*
SUDs	13.16 (12.35, 14.02)*
Anxiety	18.70 (17.70, 19.76)*
CVDs	7.16 (6.78, 7.57)*
PVD	6.62 (6.25, 7.02)*
Stroke	7.34 (6.94, 7.77)*
CKD	8.85 (8.37, 9.36)*
COPD	8.11 (7.66, 8.59)*
Diabetes	7.69 (7.26, 8.13)*
Hip fracture	6.78 (6.35, 7.23)*
RA	7.63 (7.23, 8.07)*
Traumatic brain injury	8.87 (8.27, 9.52)*
ADRD and outpatient behavioral health visit	
2 to 90 days prior to IPF admission	9.53 (8.92, 10.19)*
91 to 180 days prior to IPF admission	8.04 (7.47, 8.65)*
181 to 270 days prior to IPF admission	7.94 (7.37, 8.56)*
271 to 360 days prior to IPF admission	7.58 (7.03, 8.17)*
ADRD and visit with mental health practitioner	
2 to 90 days prior to IPF admission	14.35 (13.51, 15.24)*
91 to 180 days prior to IPF admission	9.54 (8.98, 10.14)*
181 to 270 days prior to IPF admission	9.30 (8.74, 9.89)*
271 to 360 days prior to IPF admission	9.17 (8.62, 9.75)*
ADRD and general office visit	
2 to 90 days prior to IPF admission	7.88 (7.36, 8.43)*
91 to 180 days prior to IPF admission	9.76 (9.07, 10.50)*
181 to 270 days prior to IPF admission	9.97 (9.25, 10.74)*
271 to 360 days prior to IPF admission	10.43 (9.67, 11.24)*
ADRD and ED visit	
2 to 90 days prior to IPF admission	33.43 (31.54, 35.42)*
91 to 180 days prior to IPF admission	11.36 (10.69, 12.07)*
181 to 270 days prior to IPF admission	10.16 (9.56, 10.80)*
271 to 360 days prior to IPF admission	9.82 (9.23, 10.44)*
ADRD and SNF stay	
2 to 90 days prior to IPF admission	9.21 (8.59, 9.87)*
91 to 180 days prior to IPF admission	11.05 (10.23, 11.93)*
181 to 270 days prior to IPF admission	9.50 (8.77, 10.28)*
271 to 360 days prior to IPF admission	9.49 (8.77, 10.27)*
ADRD and ACH stay	
2 to 90 days prior to IPF admission	9.57 (8.96, 10.22)*
91 to 180 days prior to IPF admission	6.62 (6.17, 7.11)*

	OR (95% CI)
181 to 270 days prior to IPF admission	7.04 (6.55, 7.56)*
271 to 360 days prior to IPF admission	6.89 (6.41, 7.39)*
ADRD and IPF stay	
2 to 90 days prior to IPF admission	38.66 (30.64, 48.79)*
91 to 180 days prior to IPF admission	59.05 (49.84, 69.96)*
181 to 270 days prior to IPF admission	46.92 (40.81, 53.94)*
271 to 360 days prior to IPF admission	44.89 (39.68, 50.77)*
ADRD and use of antipsychotics	
2 to 90 days prior to IPF admission	27.85 (25.93, 29.92)*
91 to 180 days prior to IPF admission	6.45 (5.91, 7.03)*
181 to 270 days prior to IPF admission	8.43 (7.69, 9.23)*
271 to 360 days prior to IPF admission	8.18 (7.52, 8.90)*
ADRD and use of antidepressant	
2 to 90 days prior to IPF admission	10.98 (10.26, 11.75)*
91 to 180 days prior to IPF admission	9.09 (8.44, 9.79)*
181 to 270 days prior to IPF admission	8.35 (7.74, 8.99)*
271 to 360 days prior to IPF admission	7.49 (6.98, 8.04)*
ADRD and use of benzodiazepine	
2 to 90 days prior to IPF admission	18.72 (17.45, 20.09)*
91 to 180 days prior to IPF admission	8.22 (7.60, 8.89)*
181 to 270 days prior to IPF admission	8.11 (7.49, 8.78)*
271 to 360 days prior to IPF admission	7.70 (7.14, 8.29)*
ADRD and use of nonbenzodiazepine hypnotics	
2 to 90 days prior to IPF admission	11.45 (10.03, 13.07)*
91 to 180 days prior to IPF admission	9.01 (7.76, 10.46)*
181 to 270 days prior to IPF admission	8.19 (7.06, 9.50)*
271 to 360 days prior to IPF admission	7.90 (6.91, 9.03)*
ADRD and use of dementia medications	
2 to 90 days prior to IPF admission	11.27 (10.45, 12.15)*
91 to 180 days prior to IPF admission	8.75 (8.03, 9.53)*
181 to 270 days prior to IPF admission	9.59 (8.78, 10.47)*
271 to 360 days prior to IPF admission	9.14 (8.44, 9.91)*
ADRD and potentially harmful medication use for PLWD	
2 to 90 days prior to IPF admission	7.74 (7.10, 8.45)*
91 to 180 days prior to IPF admission	8.44 (7.66, 9.29)*
181 to 270 days prior to IPF admission	8.43 (7.63, 9.31)*
271 to 360 days prior to IPF admission	9.06 (8.26, 9.94)*

NOTE: Logistic regression models were adjusted for age, sex, race and ethnicity, reason for Medicare entitlement, dual eligibility, Part D LIS eligibility, rurality, HPSA for primary care and mental health, CFI, chronic conditions, long- term nursing home resident, health care utilization in the quarter prior to IPF admission, and interactions between ADRD and utilization. Full model results are available from the authors upon request. ACH = acute care hospital; ADRD = Alzheimer's disease and related dementias; AUD = alcohol use disorder; CFI = claims-based frailty index; CI = confidence interval; CKD = chronic kidney disease; COPD = chronic obstructive pulmonary disease; CVD = cardiovascular disease; ED = emergency department; HPSA = Health Professional Shortage Area; IPF = inpatient psychiatric facility; LIS = low-income subsidy; MDD = major depressive disorder; OR = odds ratio; PLWD = people living with dementia; PVD = peripheral vascular disease; RA = rheumatoid arthritis; SNF = skilled nursing facility; SUD = substance use disorder.
*$p < 0.05$.

Chapter 5. Beneficiary Outcomes Following IPF Stays

In this chapter, we describe outcomes proximal to IPF discharges for RQ 3. We evaluated utilization of different outpatient service types, ACH stays, IPF readmission, SNF admission, and psychotropic medication use within 30 days of IPF discharge. We also assessed long-term nursing home admission and deaths following IPF discharge through our study period. For beneficiaries discharged to long-term nursing homes, we assessed changes in ADL scores and BIMS scores. Below, we first show descriptive results and then regression model results for how outcomes for PLWD differ from those of beneficiaries with IPF stays without dementia.

Outcomes in 30 Days Following IPF Discharge Among PLWD

Outcomes in PLWD

PLWD were most often discharged to home or self-care following their IPF stay (48 percent) (Table 5.1). Discharges to SNFs were also common (25 percent). Discharges to intermediate care facilities (8 percent), short-term general hospitals (6 percent), and home health (4 percent) were less common. A small percentage of PLWD (0.3 percent) died during their IPF stay.

Utilization of outpatient services was common in the 30 days following IPF stays. In the 30 days post–IPF discharge, 69 percent had at least one outpatient behavioral health visit, 49 percent had a visit with a mental health practitioner, 38 percent had a general office visit, and 28 percent had at least one visit to an ED.

Following discharge from IPF, 11 percent were readmitted to an IPF within 30 days. In the same period following IPF discharge, 17 percent had an ACH stay, 8 percent had an SNF stay, and 3 percent had a long-term nursing home admission.

Psychotropic medication use was also common among PLWD in the 30 days following their IPF discharge (55 percent). The use of antipsychotics (39 percent) and antidepressants (37 percent) was most common, followed by benzodiazepine (17 percent) and dementia medications (14 percent). The use of nonbenzodiazepine hypnotics was relatively uncommon (1.6 percent). Potentially harmful medication use for PLWD was experienced by 1 percent of PLWD in the 30 days following IPF discharge.

Four percent of PLWD died within 30 days of being discharged from an IPF, while 15 percent died within six months of their IPF discharge.

Of beneficiaries discharged to long-term nursing homes, about 4 percent exhibited declining physical function as measured by ADLs and cognitive decline as measured by BIMS.

Table 5.1. Unadjusted Outcomes Following IPF Stays

	Beneficiaries with IPF Stay and Dementia		Beneficiaries with IPF Stay and Without Dementia		*p*-value
Discharge destination, *n* (%)					<0.0001
Home or self-care	39,838	(47.6%)	105,318	(87.0%)	
Home health organization	3,668	(4.4%)	1,511	(1.2%)	
SNF	20,718	(24.7%)	2,305	(1.9%)	
Intermediate care facility	6,998	(8.4%)	1,470	(1.2%)	
Short-term general hospital for inpatient	5,334	(6.4%)	2,596	(2.1%)	
Psychiatric hospital or unit	764	(0.9%)	1,546	(1.3%)	
Other discharge or transfer	4,443	(5.3%)	2,269	(1.9%)	
Undefined type of health care institution	1,158	(1.4%)	1,668	(1.4%)	
Left against advice	598	(0.7%)	2,318	(1.9%)	
Expired	252	(0.3%)	25	(<0.1%)	
30-day utilization following IPF discharge, *n* (%)					
Outpatient behavioral health visit	57,459	(68.6%)	86,368	(71.4%)	<0.0001
Visit with mental health practitioner	41,380	(49.4%)	68,410	(56.5%)	<0.0001
General office visit	31,781	(37.9%)	63,578	(52.5%)	<0.0001
ED visit	23,801	(28.4%)	35,349	(29.2%)	<0.0001
SNF stay	6,675	(8.0%)	1,435	(1.2%)	<0.0001
ACH stay	14,365	(17.1%)	15,582	(12.9%)	<0.0001
IPF stay	9,553	(11.4%)	15,747	(13.0%)	<0.0001
Long-term nursing home admission	2,633	(3.1%)	359	(0.3%)	<0.0001
Psychotropic medication use					
Antipsychotics	32,335	(38.6%)	51,606	(42.6%)	<0.0001
Antidepressant	31,023	(37.0%)	47,820	(39.5%)	<0.0001
Benzodiazepine	14,143	(16.9%)	23,422	(19.4%)	<0.0001
Nonbenzodiazepine hypnotics	1,372	(1.6%)	4,137	(3.4%)	<0.0001
Dementia medications	11,734	(14.0%)	457	(0.4%)	<0.0001
Any psychotropic medication	46,373	(55.4%)	74,352	(61.4%)	<0.0001
Potentially harmful medication use for PLWD	1,009	(1.2%)	14	(<0.1%)	<0.0001
Deaths within 30 days of IPF discharge	3,723	(4.4%)	575	(0.5%)	<0.0001
Deaths within 6 months of IPF discharge	12,709	(15.2%)	2,504	(2.1%)	<0.0001
Functional status or cognitive decline following IPF discharge to long-term nursing home, *n* (%)					
ADL score increase	3,274	(3.9%)	258	(0.2%)	<0.0001
BIMS score decrease	3,430	(4.1%)	307	(0.3%)	<0.0001

NOTE: ACH = acute care hospital; ADL = activities of daily living; BIMS = Brief Interview for Mental Status; ED = emergency department; IPF = inpatient psychiatric facility; PLWD = people living with dementia; SNF = skilled nursing facility.

Comparison of PLWD with Those Not Living with Dementia

Table 5.1 also shows the outcomes for people not living with dementia. Comparing the unadjusted values to people not living with dementia, PLWD were much less likely to be discharged to home or self-care (48 percent versus 87 percent). A larger percentage of PLWD were discharged to an SNF (25 percent versus 2 percent), an intermediate care facility (8 percent versus 1 percent), or a short-term general hospital (6 percent versus 2 percent).

The 30-day readmission rate was very similar between those with (11 percent) and without (13 percent) dementia. PLWD had higher utilization within 30 days following discharge than those without dementia for acute hospital admissions (17 percent versus 13 percent), SNF stays (8 percent versus 1 percent), and long-term care nursing home admissions (3 percent versus 0.3 percent). Compared with those without dementia, PLWD had lower outpatient utilization in the 30 days following an IPF discharge including outpatient behavioral health visits (69 percent versus 71 percent), visits with mental health practitioners (49 percent versus 57 percent), and general office visits (38 percent versus 53 percent); ED use was similar (28 percent versus 29 percent). Compared with those without dementia, PLWD had lower use of psychotropic medications (55 percent versus 61 percent), including antipsychotics (39 percent versus 43 percent), antidepressants (37 percent versus 40 percent), benzodiazepines (17 percent versus 19 percent), and nonbenzodiazepine hypnotics (2 percent versus 3 percent). The use of dementia medications was higher among PLWD (14 percent versus 0.4 percent).

A larger percentage of PLWD than those without dementia died both within 30 days of an IPF stay (4 percent versus 0.5 percent) and within six months of an IPF stay (15 percent versus 2 percent).

Of those discharged to long-term nursing homes, PLWD were more likely to experience decreased physical functioning or cognitive decline compared with beneficiaries without dementia (about 4 percent versus less than 1 percent).[5]

Odds of Utilization in 30 Days Following IPF Discharge

In multivariable analyses, PLWD were more likely than those not living with dementia to have an SNF stay within 30 days of the IPF discharge (OR = 1.90; 95 percent CI, 1.68 to 2.16).

In contrast, PLWD were less likely to have an outpatient behavioral health visit (OR = 0.89; 95 percent CI, 0.86 to 0.92), visit with a mental health practitioner (OR = 0.91; 95 percent CI, 0.88 to 0.94), general office visit (0.83; 95 percent CI, 0.80 to 0.86), or ED visit (OR = 0.96; 95 percent CI, 0.93 to 0.99) compared with Medicare beneficiaries not living with dementia (Table 5.2). Similarly, PLWD were less likely to use psychotropic medications following their IPF stay (OR = 0.95). There was no significant difference in ACH admissions or subsequent IPF stays between the two groups.

[5] Based on the BIMS score in the first MDS assessment following all IPF discharges to long-term nursing homes, 33 percent had no or mild cognitive impairment (score 13–15), 28 percent had moderate impairment (score 8–12), and 40 percent had severe impairment (score 0–7). ADL scores ranged from 4 (total independence) in 21 percent of this population to a score of 16 in 20 percent and scores of 17 or 18 (total dependence) in 2 percent of this population.

Table 5.2. Utilization in 30 Days Following IPF Stays by PLWD Compared with People Not Living with Dementia

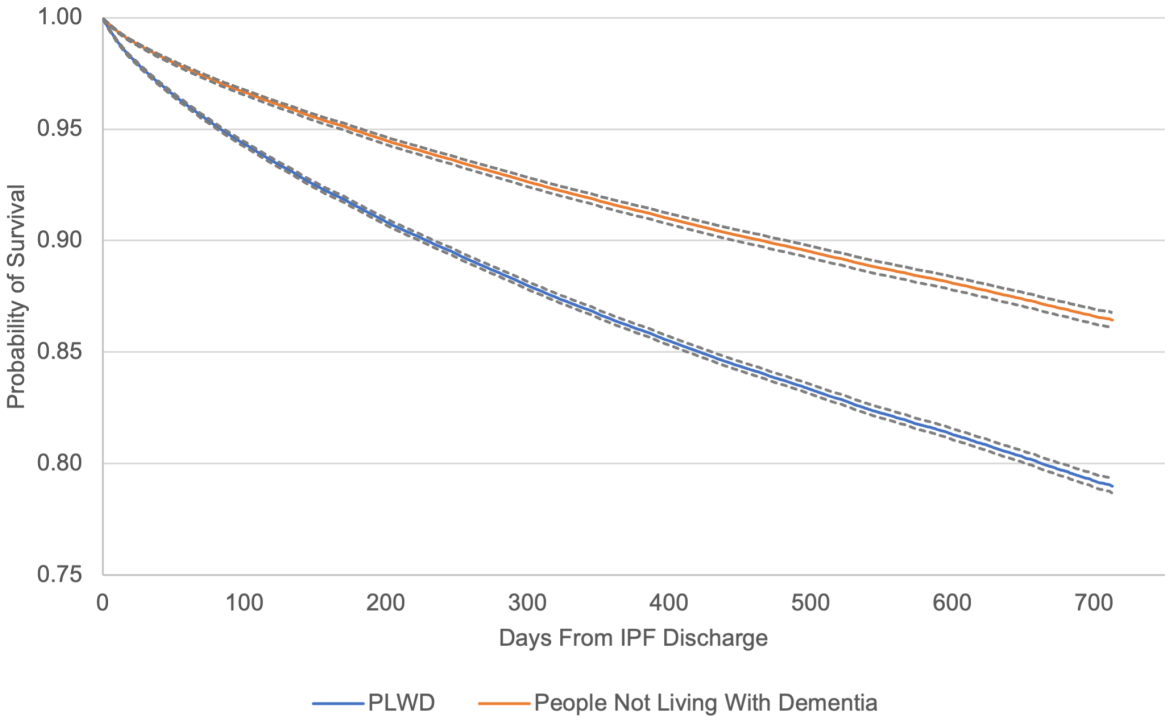
	OR (95% CI)
Outpatient behavioral health visit	0.89 (0.86, 0.92)*
Visit with mental health practitioner	0.91 (0.88, 0.94)*
General office visit	0.83 (0.80, 0.86)*
ED visit	0.96 (0.93, 0.99)*
SNF stay	1.90 (1.68, 2.16)*
ACH stay	1.02 (0.97, 1.06)
IPF stay	0.96 (0.91, 1.00)
Psychotropic medication use	0.95 (0.91, 0.98)*

NOTE: Logistic regression models were adjusted for age, sex, race or ethnicity, reason for Medicare entitlement, dual eligibility, Part D LIS eligibility, rurality, HPSA for primary care and mental health, CFI, chronic conditions, health care utilization in the quarter prior to IPF admission, IPFQR program facility-level measures for physical restraint use and 30-day readmission rate, and LOS in IPF. Full model results are available from the authors upon request. ACH = acute care hospital; CFI = claims-based frailty index; CI = confidence interval; ED = emergency department; HPSA = Health Professional Shortage Area; IPF = inpatient psychiatric facility; IPFQR = Inpatient Psychiatric Facility Quality Reporting; LIS = low-income subsidy; LOS = length of stay; OR = odds ratio; PLWD = people living with dementia; SNF = skilled nursing facility. *$p < 0.05$.

Time to Death and Time to Long-Term Nursing Home Admission

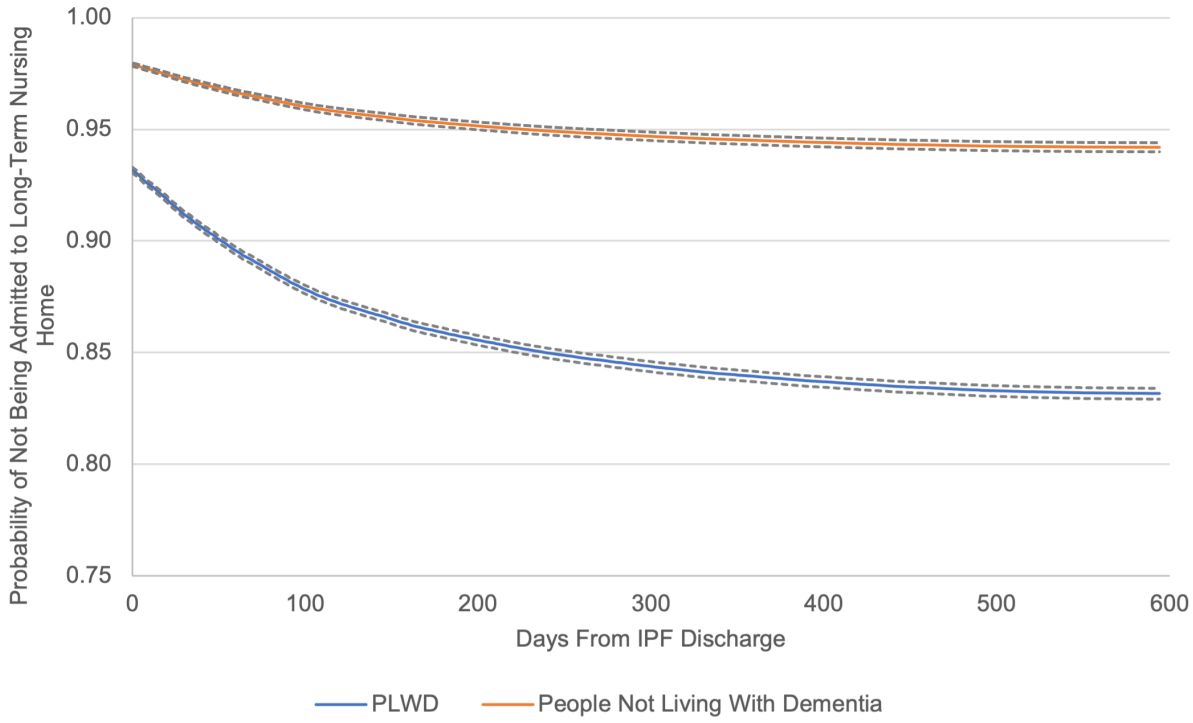
PLWD post–IPF had higher death rates than those without dementia after their IPF stay (hazard ratio [HR] = 1.76; 95 percent CI, 1.69 to 1.82). In addition to dementia, risk of death increased with age, frailty, long-term nursing home residency, and discharge to SNF; death was also moderately associated with ED visits, SNF stays, ACH stays, antipsychotic use, and benzodiazepine use in the quarter prior to IPF admission (Table B.1). Similarly, PLWD had higher rates of being admitted to long-term nursing homes (HR = 3.55; 95 percent CI, 3.40 to 3.71). These patterns persist over time (Figures 5.1 and 5.2).

Figure 5.1. Predicted Probability of Survival Post–IPF Discharge for People With and Without Dementia



NOTE: Cox proportional hazard models were adjusted for age, sex, race or ethnicity, reason for Medicare entitlement, dual eligibility, Part D LIS eligibility, rurality, HPSA for primary care and mental health, CFI, chronic conditions, health care utilization in the quarter prior to IPF admission, IPFQR program facility-level measures for physical restraint use and 30-day readmission rate, LOS in IPF, and post–IPF discharge status. The gray dotted lines indicate 95 percent CIs. Full model results are available from the authors upon request. CFI = claims-based frailty index; CI = confidence interval; HPSA = Health Professional Shortage Area; IPF = inpatient psychiatric facility; IPFQR = Inpatient Psychiatric Facility Quality Reporting; LIS = low-income subsidy; LOS = length of stay; PLWD = people living with dementia.

Figure 5.2. Predicted Probability of Not Being Admitted to Long-Term Nursing Home Post–IPF Discharge for People With and Without Dementia



NOTE: Cox proportional hazard models were adjusted for age, sex, race or ethnicity, reason for Medicare entitlement, dual eligibility, Part D LIS eligibility, rurality, HPSA for primary care and mental health, CFI, chronic conditions, health care utilization in the quarter prior to IPF admission, IPFQR program facility-level measures for physical restraint use and 30-day readmission rate, and LOS in IPF. The gray dotted lines indicate 95 percent CIs. Full model results are available from the authors upon request. CFI = claims-based frailty index; CI = confidence interval; HPSA = Health Professional Shortage Area; IPF = inpatient psychiatric facility; IPFQR = Inpatient Psychiatric Facility Quality Reporting; LIS = low-income subsidy; LOS = length of stay; PLWD = people living with dementia.

Change in ADL and BIMS Scores

Among those with multiple post-acute care assessments after their IPF discharge, PLWD were more likely than those without dementia to experience a decrease in their BIMS score (OR = 1.28; 95 percent CI, 1.10 to 1.49). There was no significant difference between the two groups in the likelihood of experiencing an increase in their ADL score.

Chapter 6. Discussion

PLWD may need substantial care to manage their BPSD. However, managing severe BPSD is extremely challenging for PLWD, their caregivers, and health care providers. These symptoms can lead to crisis situations resulting in inpatient psychiatric care. Little is known about the population of PLWD who use IPFs. This report presents the results of exploratory analyses we conducted on the characteristics of the PLWD population who use IPFs, factors associated with IPF admissions, and outcomes following IPF discharges.

PLWD who use IPFs are older, have more comorbidities, and are frailer than IPF users without dementia. This suggests that care needs for PLWD are likely complex and require coordination. PLWD who use IPFs are also more likely to enter long-term nursing homes and to die sooner after discharge compared with people not living with dementia.

ED visits and new antipsychotic medication use often precede IPF admission for PLWD. We found that increased utilization of EDs and new psychotropic medication use (particularly antipsychotics) prior to IPF stays by PLWD were associated with IPF admission. This could indicate increasing severity of BPSD that culminates in an IPF admission. This likely occurs in conjunction with increasing caregiver distress (Maust et al., 2017) and challenges in navigating care in a health care system without providers trained to manage BPSD. To a lesser degree but consistent with prior work (Maust et al., 2019), we also observed increased utilization of outpatient behavioral health visits and visits with mental health practitioners in the quarter preceding IPF admission; however, these visits may be underutilized in earlier periods and following discharge. Further work is needed to examine the trajectory of these patients and identify resources and points suitable for intervention to prevent situations requiring psychiatric stabilization in IPFs.

There are PLWD who are high utilizers of IPFs. The average 30-day readmission rate of IPF stays for those with dementia in this analysis was 11.4 percent. Indeed, we observed that about 5 percent of the beneficiaries had four or more stays during 2018; similar trends exist for both PLWD and people not living with dementia. In multivariable regression analysis, we found that prior IPF use among PLWD is associated with subsequent IPF admission.

During IPF stays, PLWD can receive new diagnoses that may provide a rationale for prescribing antipsychotic medications. Although we observed that PLWD in IPFs frequently had comorbid SMIs, we also found that about 16 percent of IPF users with dementia had a new diagnosis of schizophrenia and other psychotic disorders during their IPF stay, while this occurred for about 9 percent of IPF users without dementia. In 2017, CMS expanded regulations to decrease use of antipsychotic medications in SNFs, including requiring documentation of the clinical rationale for the use of antipsychotic drugs (Stefanacci, 2017), such as a diagnosis of schizophrenia. There are concerns that schizophrenia diagnoses during stays are increasing to justify antipsychotic medication use for PLWD (CMS, 2023).

Discharge planning and care coordination are likely important for PLWD discharged from IPFs. As PLWD who use IPFs have substantial comorbidity, they likely have complex care needs that would benefit from care coordination. We observed that PLWD were frequently discharged from IPFs to SNFs, which requires clear communication to support the care transition (Gilmore-Bykovskyi et al., 2020). Furthermore, PLWD tend to have longer stays in IPFs than people not living with dementia, which could correlate to stabilization taking longer and is consistent with anecdotal reports of difficulty finding placements for PLWD after IPF stays. Future research on discharge planning and care coordination following IPF stays would be useful to examine unmet needs of patients and caregivers and where resources are lacking.

Further analysis is needed to assess whether recommended outpatient behavioral health visits for follow-up care after IPF discharge occur for PLWD. Nearly half of PLWD were discharged from IPFs to home or self-care, and there may be low utilization of outpatient care among PLWD (Kales et al., 1999). We found that approximately 69 percent of PLWD had a behavioral health service within 30 days post-discharge, and less than one-half (49 percent) had a visit with a mental health practitioner. Follow-up care after psychiatric hospitalization is critical to improving patient outcomes and reducing readmissions (Kurdyak et al., 2018). However, follow-up outpatient care for PLWD may be difficult due to challenges in accessing care (Boyd et al., 2022), and training for providers and other interventions would likely be needed to ensure broad access to care and to adequately meet the needs of PLWD.

Appendix A. Specifications for Outpatient Office Visits

Table A.1 shows the definitions for the three types of outpatient office visits that we analyzed. The visits are defined based on procedure, BETOS, and provider codes.

Table A.1. Outpatient Office Visit Types

Outpatient Office Visit Type	Service Included
General office visit	Office visits with an HCPCS code on a claim line found in either the M1A or M1B category (Evaluation and Management visits for new and established patients) of the BETOS coding system
Behavioral health visit	Office visits with an HCPCS Level I or Level II code on a claim line indicating an office-based behavioral health service (e.g., 99211, H0031) used in the IPFQR program for the "follow-up after hospitalization for mental illness" measure
Visit with a mental health practitioner	Office visits with an office-based behavioral health service HCPCS code based on the IPFQR program for the "follow-up after hospitalization for mental illness" measure or an HCPCS code in the BETOS M1A or M1B category AND where the performing provider on a claim had a mental health specialty (clinical social worker, psychologist, psychiatrist)

NOTE: BETOS = Berenson-Eggers Type of Service; HCPCS = Health Care Procedural Coding System; IPFQR = Inpatient Psychiatric Facility Quality Reporting.

Appendix B. Supplemental Results

Table B.1 shows the model results from the time to death analysis using a Cox proportional hazard model. We find that PLWD are more likely to die sooner after IPF discharge compared with people not living with dementia (HR = 1.76; 95 percent CI, 1.69 to 1.82). Other factors associated with higher risk of death after IPF discharge include frailty (HR = 2.26; 95 percent CI, 2.15 to 2.39 for moderately to severely frail compared to non-frail or pre-frail), discharge from IPF to SNF (HR = 2.06; 95 percent CI, 1.99 to 2.14), and older age (HR = 1.91; 95 percent CI, 1.84 to 1.99 for age over 85 compared with age 65 to 74).

Table B.1. Risk of Death After IPF Discharge

	HR (95% CI)
ADRD	1.76 (1.69, 1.82)*
Age (reference: 65 to 74)	
Age less than 65	0.69 (0.66, 0.72)*
Age 75 to 84	1.35 (1.31, 1.40)*
Age 85 and older	1.91 (1.84, 1.99)*
Female versus male	0.66 (0.64, 0.67)*
Race or ethnicity (reference: White, non-Hispanic)	
Hispanic	0.77 (0.70, 0.85)*
Black, non-Hispanic	0.77 (0.73, 0.80)*
Asian	0.71 (0.61, 0.82)*
Other	0.83 (0.77, 0.91)*
Original reason for Medicare eligibility DIB and/or ESRD	0.89 (0.86, 0.92)*
Dual eligible	1.04 (0.98, 1.10)
Part D LIS	0.95 (0.90, 1.01)
Rural versus urban	0.99 (0.96, 1.03)
Primary care providers (reference: county without shortage)	
Partial county in shortage	0.97 (0.92, 1.01)
Whole county in shortage	0.98 (0.92, 1.04)
Mental health providers (reference: county without shortage)	
Partial county in shortage	1.02 (0.96, 1.08)
Whole county in shortage	1.09 (1.02, 1.16)*
CFI (reference: non-frail or pre-frail)	
Mildly frail	1.74 (1.66, 1.83)*
Moderately to severely frail	2.26 (2.15, 2.39)*
Chronic condition	
Schizophrenia	0.70 (0.68, 0.73)*
Bipolar disorder	0.79 (0.77, 0.81)*
MDD	0.81 (0.79, 0.84)*
AUDs	0.94 (0.91, 0.97)*
SUDs	0.88 (0.85, 0.91)*
Anxiety	0.91 (0.88, 0.94)*

	HR (95% CI)
CVDs	1.12 (1.09, 1.15)*
PVD	1.14 (1.11, 1.17)*
Stroke	1.05 (1.02, 1.08)*
CKD	1.17 (1.14, 1.20)*
COPD	1.13 (1.11, 1.16)*
Diabetes	0.98 (0.96, 1.01)
Hip fracture	1.13 (1.09, 1.18)*
RA	0.95 (0.93, 0.98)*
Traumatic brain injury	0.97 (0.92, 1.02)
Long-term nursing home residents prior to IPF admission	1.75 (1.63, 1.88)*
2 to 90 days prior to IPF admission	
Outpatient behavioral health visit	1.08 (1.04, 1.13)*
Visit with mental health practitioner	0.93 (0.90, 0.95)*
General office visit	0.80 (0.78, 0.83)*
ED visit	1.06 (1.03, 1.09)*
SNF stay	1.18 (1.14, 1.22)*
ACH stay	1.13 (1.09, 1.16)*
IPF stay	0.97 (0.91, 1.02)
Use of antipsychotics	1.10 (1.07, 1.13)*
Use of antidepressant	0.97 (0.94, 0.99)*
Use of benzodiazepine	1.08 (1.05, 1.11)*
Use of nonbenzodiazepine hypnotics	0.94 (0.87, 1.01)
Use of dementia medications	1.12 (1.09, 1.16)*
Potentially harmful medication use for PLWD	0.98 (0.92, 1.05)
IPF discharge status	
SNF versus home or community	2.06 (1.99, 2.14)*
Long-term nursing facility versus home or community	0.97 (0.93, 1.01)
Other destination versus home or community	1.95 (1.89, 2.01)*
IPFQR program facility measure	
Hours of physical restraint use per 1,000 patients	1.00 (1.00, 1.01)
30-day readmission rate	1.00 (1.00, 1.01)
Length of stay in IPF	1.00 (1.00, 1.01)

NOTE: *$p < 0.05$. ACH = acute care hospital; ADRD = Alzheimer's disease and related dementias; AUD = alcohol use disorder; CFI = claims-based frailty index; CI = confidence interval; CKD = chronic kidney disease; COPD = chronic obstructive pulmonary disease; CVD = cardiovascular disease; DIB = disability insurance benefits; ED = emergency department; ESRD = end-stage renal disease; HR = hazard ratio; IPF = inpatient psychiatric facility; IPFQR = Inpatient Psychiatric Facility Quality Reporting; LIS = low-income subsidy; MDD = major depressive disorder; PLWD = people living with dementia; PVD = peripheral vascular disease; RA = rheumatoid arthritis; SNF = skilled nursing facility; SUD = substance use disorder.

Abbreviations

ACH	acute care hospital
ADL	activities of daily living
ADRD	Alzheimer's disease and related dementias
AHRF	Area Health Resources File
AMI	acute myocardial infarction
AUD	alcohol use disorder
BETOS	Berenson-Eggers Type of Service
BIMS	Brief Interview for Mental Status
BPSD	behavioral and psychological symptoms of dementia
CCS	Chronic Conditions Segment
CCW	Chronic Conditions Data Warehouse
CFI	claims-based frailty index
CHF	congestive heart failure
CI	confidence interval
CKD	chronic kidney disease
CMS	Centers for Medicare & Medicaid Services
COPD	chronic obstructive pulmonary disease
CPDCS	Other Chronic or Potentially Disabling Conditions Segment
CVD	cardiovascular disease
DME	durable medical equipment
ED	emergency department
ESRD	end-stage renal disease
FFS	fee-for-service
HCPCS	Health Care Procedural Coding System
HEDIS	Healthcare Effectiveness Data and Information Set
HPSA	Health Professional Shortage Area
HR	hazard ratio
IHD	ischemic heart disease
IPF	inpatient psychiatric facility
IPFQR	Inpatient Psychiatric Facility Quality Reporting
LIS	low-income subsidy
LOS	length of stay
LTC	long-term care
MA	Medicare Advantage
MBSF	Master Beneficiary Summary File

MDD	major depressive disorder
MDS	Minimum Data Set
MedPAC	Medicare Payment Advisory Commission
MedPAR	Medicare Provider Analysis and Review
NCQA	National Committee for Quality Assurance
NDC	National Drug Code
OR	odds ratio
PDE	Part D Event
PLWD	people living with dementia
PVD	peripheral vascular disease
RA	rheumatoid arthritis
RQ	research question
RUCC	Rural Urban Continuum Code
SD	standard deviation
SMI	serious mental illness
SNF	skilled nursing facility
SUD	substance use disorder

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