PICTURE-IM: Portuguese Initiative for Characterizing Hospitalization: A Multicentre Retrospective Report of Internal Medicine – PART 1

PICTURE-IM: Iniciativa Portuguesa para a Caracterização do Internamento: Um Estudo Retrospetivo Multicêntrico de Medicina Interna – PARTE 1

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Abstract

Introduction: Internal Medicine (IM) plays a pivotal role in the management of adults with complex medical conditions, both in hospital and outpatient settings. Its scope encompasses the diagnosis and treatment of acute illnesses as well as the long-term management of chronic diseases. Despite numerous studies conducted on IM departments, few studies have comprehensively characterized the hospitalized population in IM wards in Portugal. This study aims to highlight the importance of IM within the Portuguese healthcare system and to describe the complexity of the patients and conditions managed by internists. Part 1 of this study presents the general characteristics of the hospitalized population.

Methods: We conducted a multicentric, observational, cross-sectional study involving 25 of the 45 IM departments within the Portuguese Health System, coordinated by the Young Internists Group of the Portuguese Society of Internal Medicine. Data were collected on patient demographics, comorbidities, hospitalization characteristics, and outcomes.

Results: A total of 7282 hospitalizations were analysed. The mean patient age was 77 years, and most were women (50.95%). Nearly half of the patients (48.47%) were independent or slightly dependent in daily living activities, while 18.32% were highly dependent. Multimorbidity and cardiovascular risk factors were highly prevalent: 80.34% of patients had multimorbidity, 72.38% hypertension, 52.78% dyslipidemia, and 35.09% diabetes. The majority (52.76%) were discharged home, 13.73% to nursing homes, and 9.76% to the National Network for Integrated Continuous Care. The mean length of stay (LOS) was 23 days, though 15.49% of hospitalizations were prolonged due to social reasons; excluding these, the mean LOS was 15 days. The in-hospital mortality rate was 15.52%. Primary diagnoses most frequently corresponded to ICD-10 groups X (32.18%), IX (23.42%), XIV (10.08%), I (6.41%), and XI (4.41%).

Conclusion: This study underscores the diverse and complex nature of hospitalizations managed by IM departments and highlights their essential contribution to the Portuguese healthcare system. Strengthening support for IM is crucial to meet the evolving needs of an aging and multimorbid population, ensuring high-quality, patient-centred, and sustainable care.

Keywords: Hospitalization; Internal Medicine; Multimorbidity; Portugal.

Resumo

Introdução: A Medicina Interna (MI) desempenha um papel fundamental no tratamento de adultos com doença complexa, tanto em contexto hospitalar como em ambulatório. O seu âmbito de intervenção abrange o diagnóstico e o tratamento de doenças agudas, assim como o tratamento e acompanhamento a longo prazo de doenças crónicas. Apesar dos inúmeros estudos realizados nos Serviços de MI, poucos caracterizaram de forma abrangente e compreensiva a população internada nas enfermarias de MI em Portugal. Este estudo tem como objetivo reforçar a importância da MI no sistema de saúde português e descrever a complexidade dos doentes e das condições geridas pelos internistas. A Parte 1 deste estudo apresenta as características gerais da população internada.

Métodos: Conduzimos um estudo multicêntrico, observacional e transversal que envolveu 25 dos 45 Serviços de MI do sistema de saúde português, coordenado pelo Núcleo de Internos de Medicina Interna da Sociedade Portuguesa de Medicina Interna. Foram recolhidos dados sobre as características demográficas dos doentes, comorbilidades, características do internamento e resultados.

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https://doi.org/10.24950/rspmi.2848

Resultados: Foram analisados um total de 7282 internamentos. A idade média dos doentes foi de 77 anos, sendo a maioria do sexo feminino (50,95%). Quase metade dos doentes (48,47%) eram autónomos ou apresentavam ligeira dependência nas atividades básicas de vida diária, enquanto 18,32% apresentavam elevada dependência. A multimorbilidade e os fatores de risco cardiovasculares apresentaram elevada prevalência: 80,34% dos doentes apresentavam multimorbilidade, 72,38% hipertensão, 52,78% dislipidemia e 35,09% diabetes. A maioria (52,76%) teve alta para o domicílio, 13,73% para Estruturas Residenciais para Pessoas Idosas e 9,76% para a Rede Nacional de Cuidados Continuados Integrados. A duração média do internamento (DM) foi de 23 dias, embora 15,49% dos internamentos tenham sido prolongadas por motivos sociais; excluindo estes, a DM foi de 15 dias. A taxa de mortalidade intra-hospitalar foi de 15,52%. Os diagnósticos primários mais frequentes pertenceram aos grupos X (32,18%), IX (23,42%), XIV (10,08%), I (6,41%) e XI (4,41%) da CID-10.

Conclusão: Este estudo reforça a diversidade e complexidade dos internamentos geridos pelos Serviços de MI e destaca a sua contribuição central para o sistema de saúde português. É fundamental reforçar o apoio à MI para dar resposta às necessidades em constante evolução de uma população a envelhecer e com multimorbilidade, garantindo cuidados de saúde de alta qualidade, centrados no doente e sustentáveis.

Palavras-chave: Internamento Hospitalar; Medicina Interna; Multimorbilidade; Portugal.

Introduction

The European Curriculum of Internal Medicine (IM) defines IM as *"the core medical discipline that is responsible for the care of adults with complex illness, both in the hospital and in the community, being patient centred, scientifically based and committed to ethical and holistic principles of care*.[1] According to this definition, the internist *is a physician trained in the scientific basis of medicine, who specializes in the assessment, diagnosis and management of general medical problems, atypical presentations, multiple problems and consequential complex health issues, and system disorders"* — thus caring for a heterogeneous group of patients.[1,2]

These concepts are closely linked to multimorbidity, defined as the coexistence of two or more chronic diseases at the same time in the same patient. Multimorbidity and ageing are strongly intertwined, forming a complex network that challenges the effectiveness and sustainability of healthcare systems by increasing clinical demands and costs.[3-6] A substantial knowledge gap persists in managing multimorbidity, as most current clinical practice guidelines focus on single diseases, and randomized clinical trials frequently exclude older patients with multiple conditions.[4-7] Addressing this reality requires a paradigm shift from a disease-oriented to a person-oriented model of care, and internists are the experts in this field.[1,6]

The proportion of hospitalized patients with multimorbidity has risen significantly, and these patients are predominantly managed by internists.[6] Approximately 15% of all hospital discharges in Spain and 17% in Canada are handled by IM departments.[8,9] In the United States, IM is recognized for providing inpatient care that is more efficient and cost-effective, while maintaining equal or even higher quality outcomes.[8-11]

Across Europe, and in Portugal in particular, demographic, social, and economic changes — coupled with technological advances and the rising cost of healthcare — have profoundly altered the characteristics of patients currently admitted to IM wards.[2,12] Although many studies have been carried out in this setting, few describe hospitalised patients in a global and systematic way, and even fewer involve and compare different hospitals.[12,13] To our knowledge, this is the first published multicentric study to do so.

With this work, we aim to reinforce the central role of Internal Medicine in the Portuguese Health System and to demonstrate the complexity of the patients and diseases managed by internists. Such knowledge is essential for better planning of healthcare policies, medical curricula, IM training programmes, and lifelong medical education, ultimately improving the quality of patient care.

In Part 1 we set out to describe the overall characteristics of the study population.

Methods

STUDY PARTICIPANTS

We conducted a multicentric, observational, cross-sectional study involving 25 of the 45 IM departments within the Portuguese Health System, as illustrated in Fig. 1. This project was an initiative of the Young Internists Group of the Portuguese Society of Internal Medicine (SPMI). Ethical approval was obtained from the Ethics Committees of all participating hospitals.

Eligible participants were adults aged 18 years or older who were hospitalized in an IM department during two one-week periods: 25-31 August 2022 (Summer) and 1-7 January 2023 (Winter). Patients whose hospital stay was not under the responsibility of IM were excluded.

DATA SOURCE

Data for PICTURE-IM were extracted from electronic health records available in hospital information systems. Variables collected included demographic characteristics (age, sex), functional status (modified Katz Index), and medical comorbidities, namely hypertension, diabetes, heart failure, atrial fibrillation, dyslipidemia, chronic liver disease, chronic kidney disease, dementia, cancer, acute coronary syndrome, cerebrovascular disease, and smoking habits. Information

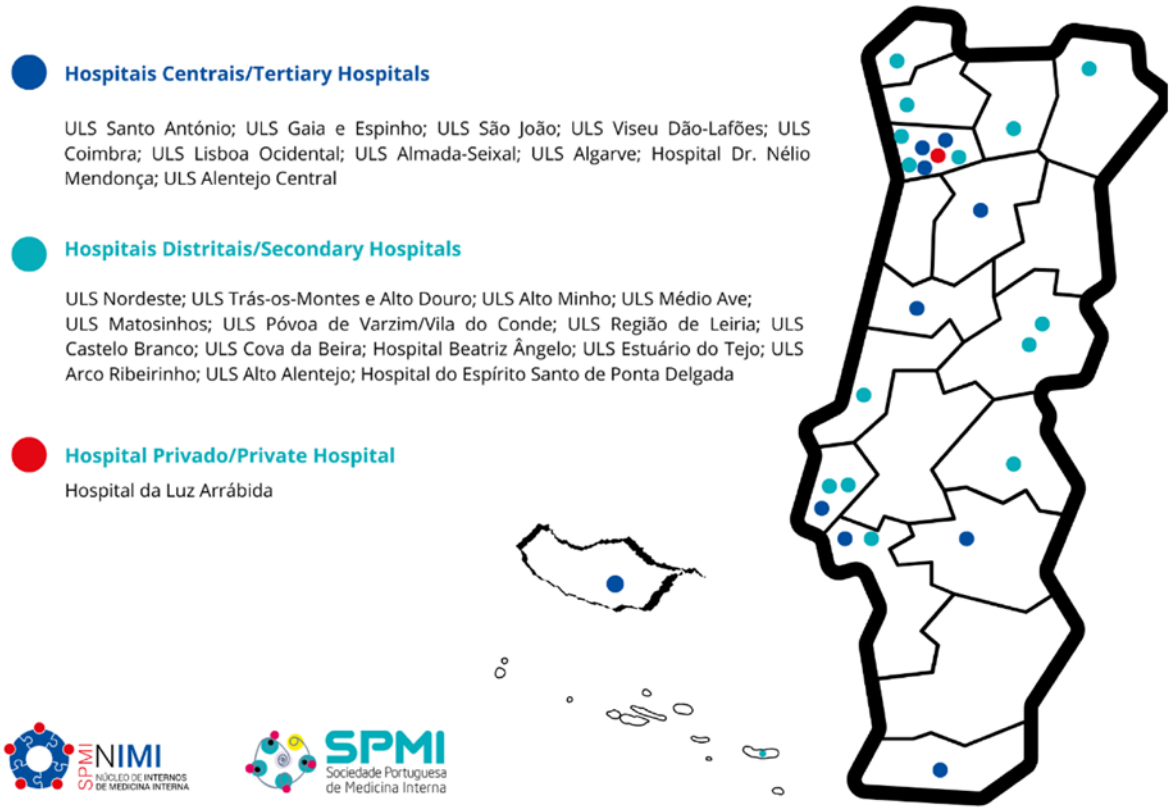


Figure 1: Hospitals participating in the PICTURE-IM study.

regarding polypharmacy, hospitalization parameters (length of stay, patient origin, and discharge destination), and patient outcomes (in-hospital mortality, 30-day mortality, and 30-day readmission) was also collected. The Charlson Comorbidity Index was calculated for each patient. One main diagnosis and up to five secondary diagnoses were retrieved and coded according to the International Classification of Diseases, 10th Revision (ICD-10).

STATISTICAL ANALYSIS

Descriptive statistics, including absolute and relative frequencies, means, standard deviations, and medians, were used to summarize univariate variables. Comparisons between our results and the results from Vilas-Boas *et al* were performed using the two-sample z-test for proportion, while differences in group means were assessed using a student's t-test.

A p-value ≤ 0.05 was considered statistically significant. All statistical analyses were conducted using STATA version 16 (StataCorp LLC, College Station, TX, USA).

Results

Data from 7282 hospitalizations were collected, of which 3324 (46%) occurred during summer and 3958 (54%) during winter. The mean patient age was 77 years, and 3710 (50.95%) were women. Almost half of the patients (n= 2978; 48.47%) were slightly dependent or independent in daily living activities (modified Katz Index scores of 5 and 6), whereas 1126 (18.32%) were highly dependent (modified Katz Index scores of 0). The hospitalized population presented a high prevalence of multimorbidity (80.34%) and cardiovascular risk factors: hypertension in 72.38% (n= 5271), dyslipidemia in 52.78% (n= 3842), diabetes in 35.09% (n= 2555), and past or current smoking in 17.79% (n= 1291) of patients. Additionally, heart failure was present in 31.96% (n= 2327), chronic kidney disease in 17.62% (n= 1283), and cerebrovascular disease in 21.03% (n= 1531). Dementia was identified in 26.44% (n = 1925), and a past or current history of cancer in 16.72% (n= 1217). The mean Charlson Comorbidity Index was 5, corresponding to an estimated 10-year mortality of approximately 21%. Most patients were admitted via the emergency department (n= 6517; 89.49%), while only 60 (0.82%) admissions were planned. At discharge, 3842 (52.76%) patients returned home, 1000 (13.73%) were transferred to nursing homes, and 711 (9.76%) to the National Network for Integrated Continuous Care (NNICC). The mean length of stay (LOS) was 23 days, but in 1128 (15.49%) cases, hospitalization was prolonged due to social reasons. Excluding these cases, the average LOS decreased to 15 days. The in-hospital mortality rate was 15.52% (n= 1130), the 30-day mortality was 4.46% (n= 325), and the 30-day readmission rate was 10.45% (n= 761) (see Table 1).

Nearly 80% (76.5%) of all main diagnoses fell within five ICD-10 categories: group X (32.18%), group IX (23.42%), group XIV (10.08%), group I (6.41%), and group XI (4.41%).

Table 1: Baseline characteristics, comorbidities, and outcomes of hospitalized patients in Internal Medicine departments.

Variable	
	7282
Age - Mean, in years (SD)	77 (14)
Gender Female - N (%)	3710 (50.95%)
Modified KATZ Index - N (%) *	
0	1126 (18.32%)
1	428 (6.96%)
2	394 (6.41%)
3	629 (10.24%)
4	590 (9.60%)
5	588 (957%)
6	2390 (38.90%)
Comorbidities	
Hypertension - N (%)	5271 (72.38%)
Diabetes mellitus - N (%)	2555 (35.09%)
Heart failure - N (%)	2327 (31.96%)
Atrial fibrillation - N (%)	1778 (24.41%)
Dyslipidemia - N (%)	3842 (52.76%)
Chronic liver disease - N (%)	456 (6.26%)
Chronic kidney disease - N (%)	1283 (17.62%)
Dementia - N (%)	1925 (26.44%)
Cancer - N (%)	1217 (16.71%)
Coronary artery disease - N (%)	899 (12.35%)
Cerebrovascular disease - N (%)	1531 (21.02%)
Tobacco smoking - N (%)	1291 (17.72%)
Charlson Comorbidity Index ** - N (%)	
0	259 (3.56%)
1	273 (3.75%)
2	368 (5.06%)
3	554 (7.61%)
4	1087 (14.94%)
5	1385 (19.03%)
6	1209 (16.61%)
≥7	2142 (29.44%)
Charlson Comorbidity Index - Mean (SD)	5,38 (2.71)
Multimorbidity - N (%)	5850 (80.34%)

Hospitalization	
Planned - N (%)	60 (0.82%)
Patient origin - N (%)	
Emergency Department	6517 (89.50%)
Internal Medicine Appointment	59 (0.81%)
Intensive/Intermediate Care Unit	359 (4.93%)
Another Department	156 (2.14%)
Another Hospital	188 (2.58%)
Domiciliary Hospitalization	3 (0.04%)
Discharge destination - N (%)	
Home	3842 (52.76%)
Nursing Home	1000 (13.73%)
National Network for Integrated Continuous Care	711 (9.76%)
Intensive/Intermediate Care Unit	31 (0.43%)
Another Department	284 (3.90%)
Another Hospital	159 (2.18%)
Domiciliary Hospitalization	103 (1.42%)
Left against medical advice	22 (0.30%)
Hospitalization - N (%)	
Internal Medicine Ward	6936 (95.25%)
Observation Room	105 (1.44%)
Stroke Unit	46 (0.63%)
Intermediate Care Unit	155 (2.13%)
Others	40 (0.55%)
Length of Stay - Mean (SD)	23 (40)
Length of Stay without Delayed discharges due to Social Reasons - Mean (SD)	15 (21)
Delayed discharges due to Social Reasons - N (%)	1128 (15.49%)
In hospital mortality - N (%)	1130 (15.52%)
30 days mortality - N (%)	325 (5.28%)
30 days readmission - N (%)	761 (12.37%)

SD – standard deviation.
* Modified KATZ Index was only available for 6145 patients.
** Data to calculate the Charlson Comorbidity Index was only available from 7277 patients.

Table 2 lists the main diagnoses accounting for 15 or more hospitalizations.

Table 3 summarizes data from patients whose hospitalization was extended for social reasons or who were admitted solely for social reasons. Their mean age was 78 years, and 600 (53,19%) were women. Most were independent (n= 292; 32.27%) or slightly dependent (n= 96; 10.57%) for daily living activities. The average delay between clinical and actual discharge was 44 days. Most patients were discharged to an institution — 407 (36.08%) to the NNICC and 235 (20.83%) to nursing homes. After social readjustments, 308 (27.30%) returned home. The in-hospital mortality was 6.65% (n= 75), 30-day mortality 5.50% (n = 62), and 30-day readmission 9.22% (n= 104). The ten most frequent diagnoses among these patients are listed in Table 3.

Comparison between our results and the results from Vilas-Boas *et al*[13] showed an increase in the mean age (76 *vs* 77 years, $p< 0.001$) and a decrease in institutionalization (18% *vs* 14%, $p< 0.001$), while gender distribution remained stable (52% *vs* 51%, $p= 0.341$). The proportion of patients with a modified Katz Index of 5 or 6 was 48% in our study, and the proportion of patients with an Eastern Cooperative Oncology Group performance status of 0 or 1 in 2015 was 39% ($p< 0.001$). Regarding the main diagnosis, no statistically significant differences were found in the prevalence of pneumonia (18% *vs* 19%, $p= 0.222$), heart failure (9% *vs* 8%, $p= 0.085$) or cerebral infarction (7% *vs* 7%, $p= 1.000$). The average LOS increased from 13 to 23 days ($p< 0.001$), along with the proportion of delayed discharges due to social reasons (9% *vs* 15%, $p< 0.001$).

Table 2: Main primary diagnoses (ICD-10 categories and specific conditions) leading to 20 or more hospitalizations.

Variable		
Main Diagnosis Group - N (%)		
I	Certain infectious and parasitic diseases	467 (6.41%)
II	Neoplasms	341 (4.68%)
III	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	134 (1.84%)
IV	Endocrine, nutritional and metabolic diseases	252 (3.46%)
V	Mental and behavioural disorders	107 (1.47%)
VI	Diseases of the nervous system	146 (2.00%)
VII	Diseases of the eye and adnexa	4 (0.05%)
VIII	Diseases of the ear and mastoid process	6 (0.08%)
IX	Diseases of the circulatory system	1706 (23.43%)
X	Diseases of the respiratory system	2343 (32.18%)
XI	Diseases of the digestive system	321 (4.41%)
XII	Diseases of the skin and subcutaneous tissue	96 (1.32%)
XIII	Diseases of the musculoskeletal system and connective tissue	85 (1.17%)
XIV	Diseases of the genitourinary system	734 (10.08%)
XV	Pregnancy, childbirth and the puerperium	1 (0.01%)
XVI	Certain conditions originating in the perinatal period	-
XVII	Congenital malformations, deformations and chromosomal abnormalities	-
XVIII	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	217 (2.98%)
XIX	Injury, poisoning and certain other consequences of external causes	63 (0.87%)
XX	External causes of morbidity and mortality	7 (0.10%)
XXI	Factors influencing health status and contact with health services	67 (0.92%)
XXII	Codes for special purposes	185 (2.54%)
Main Diagnosis - N (%)		
J18	Pneumonia, organism unspecified	688 (9.44%)
I50	Heart failure	536 (7.36%)
I63.9	Cerebral infarction, unspecified	520 (7.14%)
J15	Bacterial pneumonia, not elsewhere classified	504 (6.92%)
A41	Other sepsis	279 (3.83%)
N10	Acute tubulo-interstitial nephritis	206 (2.83%)
J20	Acute bronchitis	189 (2.60%)
N39.0	Urinary tract infection, site not specified	188 (2.60%)
U07.1	COVID-19, virus identified	185 (2.54%)
N17	Acute renal failure	145 (1.99%)
I26	Pulmonary embolism	131 (1.80%)
J69.0	Pneumonitis due to food and vomit	130 (1.79%)
J44.1	Chronic obstructive pulmonary disease with acute exacerbation, unspecified	129 (1.77%)
N30.0	Acute cystitis	117 (1.61%)
J09X	Influenza due to identified novel influenza A virus	115 (1.58%)
I21	Acute myocardial infarction	107 (1.47%)
I61	Intracerebral hemorrhage	86 (1.18%)
J12.1	Respiratory syncytial virus pneumonia	84 (1.15%)
E87.1	Hypo-osmolality and hyponatraemia	82 (1.13%)
J44.0	Chronic obstructive pulmonary disease with acute lower respiratory infection	72 (0.99%)
J22	Unspecified acute lower respiratory infection	67 (0.92%)
J12.82	Pneumonia due to COVID-19	61 (0.84%)
C34	Malignant neoplasm of bronchus and lung	59 (0.81%)
L03	Cellulitis	58 (0.80%)
A09	Other gastroenteritis and colitis of infectious and unspecified origin	57 (0.78%)
I11.0	Hypertensive heart disease with (congestive) heart failure	54 (0.74%)
J96.0	Acute respiratory failure	46 (0.63%)
N18	Chronic kidney disease	46 (0.63%)
J13	Pneumonia due to *Streptococcus pneumoniae*	45 (0.62%)
I13	Hypertensive heart and renal disease	44 (0.60%)
R65.21	Severe sepsis with septic shock	44 (0.60%)
G40	Epilepsy	42 (0.58%)
G45	Transient cerebral ischaemic attacks and related syndromes	42 (0.58%)
Z59	Problems related to housing and economic circumstances	40 (0.55%)
I48	Atrial fibrillation and flutter	39 (0.54%)
J20	Influenza due to other identified influenza virus	38 (0.52%)
K92.2	Gastrointestinal haemorrhage, unspecified	36 (0.49%)
A04.7	Enterocolitis due to *Clostridium difficile*	35 (0.48%)
K70.31	Alcoholic cirrhosis of liver with ascites	34 (0.47%)
D50	Iron deficiency anaemia	33 (0.45%)
I33.0	Acute and subacute infective endocarditis	32 (0.44%)
F03	Unspecified dementia	29 (0.40%)
C18	Malignant neoplasm of colon	28 (0.38%)

Variable		
E11.1	Type 2 diabetes mellitus with ketoacidosis	28 (0.38%)
J81	Pulmonary edema	28 (0.38%)
R65.20	Severe sepsis without septic shock	28 (0.38%)
J20.5	Acute bronchitis due to respiratory syncytial virus	27 (0.37%)
K70.3	Alcoholic cirrhosis of liver	27 (0.37%)
J90	Pleural effusion, not elsewhere classified	26 (0.36%)
R50	Fever of other and unknown origin	26 (0.36%)
C71	Malignant neoplasm of brain	22 (0.30%)
E86	Volume depletion	22 (0.30%)
K85	Acute pancreatitis	22 (0.30%)
D64.9	Anaemia, unspecified	21 (0.29%)
J47.0	Bronchiectasis with acute lower respiratory infection	21 (0.29%)
J15.2	Pneumonia due to *staphylococcus*	20 (0.27%)
F05	Delirium due to known physiological condition	19 (0.26%)
I44.30	Unspecified atrioventricular block	19 (0.26%)
F01	Vascular dementia	18 (0.25%)
A46	Erysipelas	17 (0.23%)
N41.0	Prostatitis	17 (0.23%)
R78.81	Bacteraemia	17 (0.23%)
C16	Malignant neoplasm of stomach	16 (0.22%)
K25.0	Acute gastric ulcer with haemorrhage	16 (0.22%)
K83.0	Cholangitis	16 (0.22%)
D70	Neutropenia	15 (0.21%)
J12.9	Viral pneumonia, unspecified	15 (0.21%)
L89	Pressure ulcer	15 (0.21%)
S06.0	Concussion	15 (0.21%)

Discussion

PATIENTS CHARACTERISTICS

The inpatient population currently managed by IM is markedly aged. Although recent comparative data across Europe are limited, our findings suggest that hospitalized IM patients in Portugal are older than those in other European countries.[2,9,14] Data from a tertiary Portuguese hospital showed a mean patient age of 58 years between 1992-1994 and 76 years between 2012-2014, indicating a rapid ageing trend in patients admitted to IM wards.[12] This tendency is expected to continue: by 2050, projections indicate that over one-third of Portugal's population will be aged 65 years or older, and one in eight will be over 80 years old.[15,16]

Regarding functional status, nearly half (49%) of our patients were independent or only slightly dependent, and a similar proportion (53%) were discharged home. These comparable figures reflect the close relationship between autonomy and discharge destination. Nonetheless, a substantial proportion of patients were discharged to nursing homes (14%) or to the NNICC (10%), emphasizing the importance of social and post-acute care structures in the patient care continuum.

Table 3: Baseline characteristics, comorbidities, and outcomes of hospitalized patients in Internal Medicine departments.

Variable	
	1128
Age - Mean, in years (SD)	78 (12)
Gender Female - N (%)	600 (53.19%)
Modified KATZ Index - N (%) *	
0	162 (17.86%)
1	72 (7.94%)
2	76 (8.38%)
3	119 (13.12%)
4	90 (9.92%)
5	96 (10.58%)
6	292 (32.20%)
Hospitalization	
Number of Days between Clinical and Hospital Discharge	
Minimum	1
Maximum	464
Mean (SD)	44 (75)
Discharge destination - N (%)	
Home	308 (27.31%)
Nursing Home	235 (20.83%)
National Network for Integrated Continuous Care	407 (36.08%)
Intensive/Intermediate Care Unit	-
Another Department	75 (6.65%)
Another Hospital	26 (2.30%)
Domiciliary Hospitalization	2 (0.18%)
Left against medical advice	-
In hospital mortality - N (%)	75 (6.65%)
30 days mortality - N (%)	62 (5.89%)
30 days readmission - N (%)	104 (9.88%)
10 Most Frequent Main Diagnosis - N (%)	
I63.9 - Cerebral infarction, unspecified	149 (13.21%)
J18 - Pneumonia, organism unspecified	80 (7.09%)
J15 - Bacterial pneumonia, not elsewhere classified	68 (6.03%)
I50 – Heart failure	53 (4.70%)
A41 - Other sepsis	41 (3.64%)
N39.0 - Urinary tract infection, site not specified	39 (3.46%)
U07.1 – COVID-19, virus identified	34 (3.01%)
I61 - Intracerebral haemorrhage	32 (2.84%)
Z59 - Problems related to housing and economic circumstances	31 (2.75%)
N30.0 – Acute cystitis	26 (2.30%)

SD – standard deviation.
* The modified KATZ Index was only available for 907 patients.

DIVERSITY AND COMPLEXITY OF CONDITIONS

IM is the backbone of acute hospital care for adult.[2,9,17] Its adaptability to different levels of care and its broad clinical scope are evidenced by the operation of IM within specialized units, such as Intermediate Care Units and Stroke Units, and by its leadership in innovative models of care like Home Hospitalization and Rapid Diagnostic Units.[9]

The diversity of IM practice is reflected in the diagnostic heterogeneity of our cohort. No single main diagnosis accounted for more than 10% of admissions, nearly all ICD-10 categories were represented, and 80.34% of patients presented multimorbidity. Furthermore, the ten most frequent main diagnoses represented less than half of all admissions, underscoring the breadth of IM's scope. Notably, 32.18% and 23.42% of main diagnoses corresponded to ICD-10 groups X and IX, respectively – categories typically associated with conditions leading to hospitalization, namely respiratory failure.

Comparable diagnostic distributions have been reported in Spain, Toronto, and other European centres, reinforcing the consistency of IM's role across different health systems.[2,8,9]

COMPARISON WITH 2015

Vilas-Boas *et al* conducted a comparable study including IM inpatients hospitalized on 17 December 2015. Relative to their findings, the mean age of our patients increased, while institutionalization decreased. Although different instruments were used, the results suggest a better functional status nowadays.

Regarding the main diagnosis, no statistically significant differences were found in the prevalence of pneumonia, heart failure or cerebral infarction. However, the average LOS increased from 13 to 23 days, largely explained by a higher proportion of delayed discharges due to social reasons.[13]

These comparisons indicate that while the IM inpatient population continues to age, this is not accompanied by loss of autonomy or increased institutionalization. The rise in LOS primarily reflects social delays in discharge rather than worsening clinical conditions. Importantly, many prolonged hospitalizations occur among functionally independent patients, revealing systemic inefficiencies in the transition to social or post-acute care. This issue should be a priority for health policy, as it represents a potential source of avoidable healthcare expenditure.

PATIENTS OUTCOMES

Our in-hospital mortality rate (16%) must be interpreted in the context that over 60% of deaths in Portugal occur in hospital settings.[18] Nevertheless, this rate is lower than reported in other Portuguese studies.[19-21] The 30-day readmission rate (12%) was also lower than in most published series, even though unplanned readmissions are typically more frequent in older, multimorbid populations.[8,14,22-24] Areas for improvement include: clinical management – systematic assessment of comorbidities during hospitalization; care transition – developing comprehensive biopsychosocial discharge plans; follow-up – ensuring early post-discharge reassessment; medication management – reinforcing understanding of therapeutic regimens among patients and caregivers; and advanced care planning – involving palliative care teams early in the inpatient process.[6,22] The holistic, integrative perspective characteristic of IM is ideally suited to implementing these improvements.

The average LOS in our cohort (23 days) exceeds recent international reports, 6 days in Europe and 10 days in Spain, and has increased compared with Portuguese data from 2015.[2,9,13] Between 2005 and 2013, Spanish IM hospitalizations reported only 3.2% with LOS over 30 days, reflecting both reduced LOS and higher transfers to nursing homes or post-acute facilities.[23] Although advanced age, multimorbidity, and functional dependence contribute to prolonged stays, Barba *et al* found that extended LOS was more frequent among younger patients, those with multiple comorbidities, and those admitted from home.[24-26]

A Portuguese study likewise noted a rise in both mean LOS and high-LOS outliers, linking these trends to increased hospital and patient complexity.[27] In our data, 0.55% of patients were hospitalized solely for social reasons, and almost 1 out of 6 experienced extended stays due to social constraints. Given the retrospective nature of this study, LOS may be overestimated, and the proportion of delayed discharges due to social reasons may be underestimated, as discrepancies between clinical and administrative discharge dates might have gone unrecorded. Therefore, our findings suggest that LOS is influenced by patient complexity, multimorbidity, limited post-acute care availability, and a high proportion of hospitalizations prolonged due to social reasons. These factors should influence healthcare management decisions, particularly regarding resource allocation and cost control.[27,28]

ECONOMIC EFFICIENCY

IM wards not only improve patient outcomes but also enhance healthcare system efficiency.[8,11,23] A Portuguese cost-benefit analysis found that IM care was associated with lower costs and that increasing the number of internists could yield significant savings.[28]

By managing a wide spectrum of conditions within a single department and preventing complications through comprehensive care, internists optimize resource utilization, reduce unnecessary referrals, and minimize inter-service transfers, thereby improving the cost-effectiveness of hospital care.[8] This is supported by the low transfer rate to another service or hospital observed in our study.

FUTURE DIRECTIONS

Internal Medicine ensures continuity of care within hospitals and is uniquely positioned to assume leadership roles in multidisciplinary management. IM specialists are particularly

well prepared to coordinate care for patients with acute and chronic diseases, complex patients with multimorbidity, and both common and rare conditions.[29-31]

However, IM wards face persistent challenges, including high patient volumes, resource limitations, and the need for ongoing adaptation to evolving healthcare demands.[30] Continued investment in infrastructure, training, and professional support is essential to maintain quality and sustainability for healthcare professionals working in these wards.

AREAS FOR FUTURE RESEARCH

Further research in Portugal is needed to better understand the determinants and consequences of the patterns observed in this study. In particular, prospective studies should clarify the contribution of complexity, multimorbidity, and social determinants to prolonged length of stay, as well as their impact on healthcare costs and patient outcomes.

Additionally, studies evaluating interventions to improve care transitions, such as integrated discharge planning, coordination with post-acute care services, and early post-discharge follow-up, are warranted. Finally, given the central role of Internal Medicine in managing complex patients, research focusing on models of care delivery, such as multidisciplinary teams and community-based alternatives to hospitalization, may further contribute to optimizing patient outcomes and healthcare system efficiency.

LIMITATIONS AND STRENGTHS

This study has several limitations. Its retrospective design relies on the accuracy of hospital discharge summaries, and ICD-10 coding – primarily used for administrative rather than clinical purposes – may introduce classification bias.

Nevertheless, it has important strengths. The study includes data from secondary and tertiary hospitals, as well as private institutions, covering both summer and winter periods across the country. This broad scope enables nationwide generalization of results, making them highly representative of the Portuguese IM inpatient population throughout the year.

Conclusion

Our findings reaffirm the central role of Internal Medicine in building an effective and efficient healthcare system. The study provides comprehensive insight into the diversity of hospitalizations under IM responsibility and their impact on patient outcomes.

Internal Medicine is crucial in managing a wide range of conditions, coordinating multidisciplinary care, enhancing patient outcomes, promoting medical education, and ensuring economic sustainability. Strengthening IM wards and supporting internists will be vital to meet the evolving healthcare needs of Portugal's ageing population, guaranteeing the delivery of high-quality, patient-centred care, and contributing to the long-term sustainability of the national health system. ■

Acknowledgments

The authors acknowledge the valuable contribution of the Young Internists Group of the Portuguese Society of Internal Medicine – also members of the PICTURE-IM Group -, which contributed to conceive the study and to data collection: Beatriz Castro Silva, Carlos Gonçalves, Filipa Ferreira Rodrigues, Filipe Alfaiate, Flávia Freitas and Ricardo Ascenção.

The authors acknowledge the valuable contribution of the PICTURE-IM Group, which was responsible for collecting the data: Adriana Guedes, Ana Beatriz Silva, Ana Isabel Oliveira, Ana Isabel Rodrigues, Ana Mota Magalhães, Ana Patrícia Nunes, Ana Paula Rezende, Ana Raquel Figueiredo, Ana Rita Sária, Ana Sofia Reis, Ana Sofia Silva, Ana Teresa Rocha, André Carmo, Andreia Mandim, Angélica Lopes, António Sousa, Bárbara Lemos, Bárbara Silva, Beatriz Ferreira, Beatriz Ribeiro, Bruno Campos, Carolina Anjo, Carolina Câmara, Carolina Gomes, Carolina Roias, Catarina Forra, Catarina Silva, Cláudia Diogo, Carolina Queijo, Catarina Veiga, Catarina Silva, Cristiana Teles, Daniel Aparício, Daniela Cruz, Daniela Duarte, Daniela Mateus, Desirée Farinha, Diana Brites, Diogo Dias, Duarte Lima, Fábio Barbosa, Fabíola Figueiredo, Filipa Pinto Monteiro, Francisca Pereira, Francisco Gonçalves, Gabriel Ferreira, Guilherme Salavisa, Helena Antunes, Helena Greenfield, Hugo Ventura, Inês Albergaria, Inês Ferreira, Inês Peneda Ferreira, Inês Miranda, Inês Moreira, Inês Pereira, Inês Pinheiro, Inês Pintassilgo, Inês Rento, Inês Santos, Jéssica Abreu, Jéssica Oliveira, Jerina Nogueira, Joana Reis Aguiar, Joana Costa, Joana Cunha, Joana Moniz, Joana Pereira, João Barroso, João Filipe Lopes, Lueji Gumbe, Luís Mendes, Mafalda Ferreira, Marta Quaresma, Mariana Abegão, Mariana Antão, Mariana Laranjeira, Mariana Marques, Mariana Oliveira, Marina Pereira, Marta Carinhas, Mauro Marques, Micaela Sousa, Miguel Ângelo Sousa, Miguel Oliveira, Miguel Rodrigues, Mónica Jardim, Monique Alves, Nídia Oliveira, Nuno Cerejeira, Patrícia Fernandes, Pedro Simões, Renato Gonçalves, Ricardo Raposo, Ricardo Veiga, Rita Albergaria, Rita Bragança, Rita Diz, Rita Menezes, Rita Noversa de Sousa, Rita Xavier, Rui Parente, Rui Salvador, Sara Gomes, Sérgio Madureira, Sofia Almada, Sofia Cruz, Sofia Pereira, Sofia Ramalho, Soraia Pinho, Tânia Mendes, Tatiana Cardoso, Tatiana Correia and Tiago J. Sampaio-Cunha.

Awards and previous presentations

This work was presented at the 30th National Congress of Internal Medicine, which took place in Vilamoura, Portugal, between 23 and 26 May 2024 and received the award of Best Oral Communication in the Retrospective/Prospective Studies category.

Contributorship Statement

ARR - supervision, data collection, statistical analysis, writing and review
AVB, LEG, NBV, LS - study conception and manuscript review.
All authors approved the final version to be published.

Declaração de Contribuição

ARR - Supervisão, recolha de dados, análise estatística, redação e revisão do manuscrito.
AVB, LEG, NBV, LS - conceção do estudo e revisão do manuscrito.
Todos os autores aprovaram a versão final a ser publicada.

Ethical Disclosures

Conflicts of Interest: The authors have no conflicts of interest to declare.

Financing Support: This work has not received any contribution, grant or scholarship

Confidentiality of Data: The authors declare that they have followed the protocols of their work center on the publication of patient data.

Protection of Human and Animal Subjects: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and those of the Code of Ethics of the World Medical Association (Declaration of Helsinki as revised in 2024).

Provenance and Peer Review: Not commissioned; externally peer-reviewed.

Responsabilidades Éticas

Conflitos de Interesse: Os autores declaram a inexistência de conflitos de interesse na realização do presente trabalho.

Fontes de Financiamento: Não existiram fontes externas de financiamento para a realização deste artigo.

Confidencialidade dos Dados: Os autores declaram ter seguido os protocolos da sua instituição acerca da publicação dos dados de doentes.

Proteção de Pessoas e Animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pela Comissão de Ética responsável e de acordo com a Declaração de Helsínquia revista em 2024 e da Associação Médica Mundial.

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Recebido / Received: 14/02/2026

Aceite / Accepted: 02/05/2026

Published Online / Publicado Online: 12/08/2026

Published / Publicado: 30/10/2026

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