

# Gastrointestinal Diseases: Projected Burden of Care on Acute Public Hospitals

## Abstract:

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## Abstract

The burden of care on acute public hospitals pertaining to Diseases of the digestive system and Procedures on the digestive system in Ireland was estimated using hospital discharge data for 2006 and population projections for 2021 and 2031. Age-specific rates derived from 2006 acute hospital discharge data and census figures for the same year were applied to population projections for 2021 and 2031 to estimate the case numbers. In 2031, the number of discharges for Diseases of the digestive system is estimated to increase by 69978 (60%) while the number of procedures is estimated to increase by 86228 (65%). For people aged 65+ years, episodes of discharges for diseases of the digestive system are estimated to increase by 38535 (128%) in 2031 while the number of procedures is estimated to increase by 47324 (125%). These will significantly increase the burden of care on acute hospitals and the cost of providing care.

## Introduction

Diseases of the digestive system are the most frequently diagnosed in acute public hospitals in the Republic of Ireland. This ranking excludes Pregnancy, childbirth and the puerperium and Factors influencing health status and contact with the health service. It also excludes Symptoms and signs and abnormal clinical and laboratory findings not elsewhere classified. Furthermore, Procedures on the digestive system are the second most common group of procedures performed in Ireland (excluding Non-invasive, cognitive and other interventions not elsewhere classified). Naughton et al. estimated the prevalence of gastrointestinal (GI) conditions among people aged 70 years+ in Ireland to be 24%. A review of reasons for hospitalisation among member countries of the Organisation for Economic Cooperation and Development (OECD) show that Diseases of the digestive are the third (10%) most common reason for hospitalisation. Acute public hospital care in Ireland accounts for the largest proportion of government spending on direct patient care. This burden of care is expected to increase with changing demographics and increasing costs. Therefore, the objectives of this study are: to review available data pertaining to the diagnosis and treatment of Diseases of the digestive system in acute public hospitals for 1996, 2001 and 2006; to describe the prevalence of Diseases of the digestive system based on age specific rates derived from the data and to estimate expected case numbers in 2021 and 2031 based on age specific data in 2006.

## Methods

Hospital Inpatient Enquiry (HIPE) is a database of acute hospital discharges coded according to the International Classification of Disease (ICD). Data are collated by the Economic and Social Research Institute (ESRI) on behalf of the Department of Health (DoH) formerly known as Department of Health and Children. Data collected include but not limited to: clinical diagnoses (1 principal and up to 19 secondary diagnoses) and clinical procedures (1 principal and up to 19 secondary procedures). A principal diagnosis is defined as the diagnosis established after study to be chiefly responsible for occasioning the episode of admitted patient care. A principal procedure is defined as a clinical intervention that is surgical in nature, carries a procedural risk and/or carries an anaesthetic risk and/or requires specialised training and/or requires special facilities or equipment only available in an acute care setting. For the year 2006, HIPE coverage was estimated at 96.7%. Data on Diseases of the digestive system and Procedures on the digestive system for 1996, 2001 and 2006 were requested from the ESRI. The data requested were limited to principal diagnoses and principal procedures only because these data are complete for every patient discharged. Not all patients discharged had secondary diagnoses documented and/or secondary procedures performed.

HIPE data for 1996 and 2001 were coded using the 9th Revision of ICD: Clinical Modification (ICD-9-CM). By 2006, the coding standard had changed to the 10th Revision of ICD-Australian Modification (ICD-10-AM). To ensure comparability of data requested over the period of the study, ICD-10-AM was mapped to ICD-9-CM by comparing inclusions and exclusions in both versions to eliminate data discrepancies resulting from the transition. No discrepancies were found between ICD-9-CM and ICD-10AM for Diseases of the digestive system, but additional data for the following Procedures on the digestive system (with their numeric codes) were requested for years 1996 and 2001 based on the outcome of the mapping exercise: Digital examination of rectum (89.34); Dilatation of anal sphincter (96.23); Manual reduction of rectal prolapse (96.26); Replacement of Gastrostomy tube (97.02); Removal of gastrostomy tube (97.51) and Removal of intraluminal foreign body from oesophagus without incision (98.02). The mapping exercise, for procedures on the digestive system yielded a total of 568 additional cases for 1996 and 683 more cases for 2001.

Census data for 1996, 2001 and 2006 were sourced from the Central Statistics Office (CSO). Population projections for 2021 and 2031 were also sourced from the CSO. The population projections were based on assumptions about mortality, fertility and migration. The CSO identifies three levels of migration [M0, M1 and M2], M0 is zero net migration; M1 is highest net migration, while M2 is moderate levels of positive net migration. The CSO also identifies fertility rates [F1 and F2], F1 being the higher fertility rate. Different combinations of these assumptions have been used for population projections. The population projections for 2021 and 2031 using the M2F2 pairing of assumptions were considered to be conservative; this coupled with the fact that Ireland was experiencing a net outward migration at the time of this study made the M2F2 population estimates the reasonable choice for this study. Case numbers were also calculated using M1F1 population projections (highest net migration and higher fertility assumptions) for comparison with estimated case numbers using M2F2 population projections.

Age-specific rates (ASR) were derived from HIPE and census data while variability in rates of discharge [(ASR in 2006 minus ASR in 1996)/10] is expressed as per 1,000 population per year. Estimated future case numbers were computed by applying the ASR for 2006 to population projections for 2021 and 2031. The estimation of future case numbers was based on the following assumptions: that there would be no major shift in the incidence of digestive diseases for the projected years compared to trends in 2006; that the trend of discharges from acute public hospitals for Procedures on the digestive system would remain largely unchanged for the projected years relative to 2006 and that CSO's population estimates (with M2F2 assumptions) for 2021 and 2031 would hold true.

## Results

### Diseases of the digestive system: 1996, 2001 and 2006

In 2006, 117,244 cases with a primary diagnosis of diseases of the digestive system were discharged from all acute public hospitals. This represents a 14% increase from 2001 and 31% increase from 1996. The ASR for 1996, 2001 and 2006 are shown in Figure 1. The rates increased moderately from 1996 to 2006. For people aged 65+ years, there was more than 1 discharge for every 20 persons in the population every year. Variability in rates of discharge within age groups expressed as discharges/1000 population per year ranged from -0.85 for age group 0-4 years to 1.66 for age group 70-74 years, indicating that hospital attendance rate among age group 70-74 increased more rapidly than for any other age group. Age group 0-4 years experienced a decline in hospital attendance over the 11 year period. There was an increase in the proportion of cases treated as day cases over the study period. In 1996, 40% of all cases discharged were day cases, this proportion increased to 49% in 2001 and 55% in 2006.

*Diseases of the digestive system: 2021 and 2031*

Table 1 shows the results of case number estimates by 2021 and 2031. Total case numbers are estimated to increase by 37% by 2021 and 60% by 2031. By comparison, the results from case number estimations using M1F1 population projections are 43% increase by 2021 and 72% increase by 2031. For people aged 65+ years, case numbers are estimated to increase by 64% and 128% by 2021 and 2031 respectively. In 2021, there will be a population decline for age groups 20-24 and 25-29. These population declines are estimated to be accompanied by -12% case number declines for both age groups in that year. Age groups 0-4, 20-24, 25-29 and 30-34 will also experience population declines by 2031. These are estimated to be accompanied by case number declines of -6%, -2%, -12% and -5% respectively. The number of cases among people aged 85+ years is estimated to be tripled by the year 2031.

*Procedures on the digestive system: 1996, 2001 and 2006*

The ASR for years 1996, 2001 and 2006 are shown in Figure 2. The number of principal procedures performed increased by 14% in 2001 and 39% in 2006 relative to 1996 case numbers. After the age of 55 years, there was more than 1 discharge for every 20 persons in the population every year. The variability in rates of discharge within age groups ranged from -0.17 for age group 25-29 to 2.39 for age group 80-84 years. Age groups 0-4, 5-9, 10-14, 25-29 and 30-34 experienced declines in rates over the study period. There is an upward trend in the proportion of procedures performed as day cases. In 1996, 52% of all procedures on digestive system were performed as day cases, this proportion increased to 59% in 2001 and 63% in 2006.

*Procedures on the digestive system: 2021 and 2031*

Table 2 shows the results of estimated case numbers in 2021 and 2031 for procedures on the digestive system. Total case numbers are estimated to increase by 39% by 2021 and 65% by 2031. By comparison, the results from case number estimations using M1F1 population projections are 44% increase by 2021 and 75% increase by 2031. For people aged 65+ years, case numbers are estimated to increase by 64% and 125% in 2021 and 2031 respectively. In 2021, there will be population declines for age groups 20-24 and 25-29. These population declines are estimated to be accompanied by -12% case number declines for both age groups in that year. In 2031, it is expected that age groups 0-4, 20-24, 25-29 and 30-34 years will experience population declines relative to 2006 census figures. These are estimated to be accompanied by case number declines of -7%, -2%, -12% and -5% respectively. The number of cases among people aged 85+ years is estimated to be tripled by 2031.

## Discussion

There is an upward trend in acute hospital attendance rates per unit of population for the diagnoses and treatment of diseases of the digestive system. The projected case numbers show that dramatic increases are expected in 2021 and 2031. The observed trend between 1996 and 2006 and the estimated future case number increases are in accordance with other international studies<sup>15,21</sup>. The results reflect the aging of the Irish population which is expected to accelerate according to the M2F2<sup>13</sup> population projections. There are some differences between future case number estimates using M2F2 population projections compared with estimates using M1F1 population projections. The results of this study have implications for policy on primary prevention, resource allocation and acute hospital bed capacity. OECD data for 2007 show that Ireland has 30% fewer acute hospital beds per capita<sup>22</sup> compared to other<sup>23</sup> OECD countries. The number of acute hospital beds in the country has been reducing progressively for over two decades<sup>22</sup>. The estimated case numbers will also impact hospital admission policies, clinical intervention practices and specialist personnel. It may also require increased emphasis on illness prevention; improved primary care; ambulatory care; capacity and availability of responsive community based services to avoid unnecessary admissions to acute care and to facilitate earlier discharge and a return to independence<sup>22</sup>.

The three data points and model of disease projections are the limitations of this study. More precise future case number estimations may be achieved with simple and log linear regression modelling<sup>16,24,25</sup> of individual/ specific diagnoses and clinical procedures by using data from 10 or more different time points (10 years or more) so as to allow time trend analysis. Furthermore, the model used in this study did not include non demographic factors such as changes in health technologies, medical and surgical practices, health care financing sources and modalities, health care cost inflation and population coverage of health services. These are likely to change in the future thus impacting the precision of the outcome of this study relative to future reality. Notwithstanding these limitations, the projections are important indicators of current and future burden of care on acute hospitals in Ireland.

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