Characteristics and outcome of elderly admissions aged 85 years and over to St. Luke’s Hospital in 1995

A dissertation submitted in partial fulfilment of the Degree of Master of Science in Public Health

by

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Abstract

Elderly people are an important group within the population because of the increasing proportion they constitute within our society. Meeting their health and social needs require the most appropriate type of services. This study looked at elderly persons aged 85 years and over who were admitted to St. Luke’s Hospital in 1995. The main objective was that of describing their characteristics and analysing their outcome.

The main sources of data were the Hospital Activity Analysis (HAA) system which collects data pertaining to St. Luke’s Hospital, and the National Mortality Register.

There were 862 admissions of 652 patients. The age group distribution was similar in male and female admissions and the ratio of male to female admissions was 1:1.6. There were significant differences between male and female admissions with regards to marital status, the method of admission and their destination on discharge. Of the 652 patients admitted, 176 had died by the end of 1995 whilst a further 89 by the end of 1996. The average length of stay was 9.5 days and the readmission rate within a year was 24%.

The very elderly who are admitted to hospital are a heterogenous group who differ in their characteristics and their needs. Males and females differ in certain aspects such as marital status and so may have different social needs. Advanced age is also associated with a longer stay in hospital.

Evaluating the provision of health care for the elderly population is essential if the health and social needs of this sector are to be addressed.
Declaration

I, the undersigned, declare that this dissertation is my original work and was carried out under the supervision of Dr. Hugo Agius Muscat M.D. M.Sc. (Warwick) L.R.S.M., Director of Health Information within the Health Division of the Government of Malta.

[Signature]
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CHAPTER 1

Introduction

The elderly have become an important sector in our society because of the increasing proportion they constitute within it. Our ageing population with its greater needs will create an increasing demand for health care and so providers of health care and social services need to plan and provide health care which will cater for its needs. While many elderly people will remain fit and active into late old age, a large proportion will not. The advent of chronic illnesses, debility and mental deterioration may present multiple health and social problems in this age group, thus resulting in a greater need for help, support or care.

If the best kinds of services are to be developed to meet the needs of the elderly, it is particularly important that a clear picture of their health and social needs is drawn. Unfortunately no single measure or source of data can provide a comprehensive picture of the health and social status of an elderly population and the extent to which these factors translate into their needs. The following study aims to try and use routinely available sources of data to at least start sketching this picture.

The term “elderly” is generally used to refer to people aged either 65 years and over or 75 years and over. However this study concerns the very elderly, that is those aged 85 years and over. Demographic data has shown that this age group has almost doubled in number over the past decade.

There is no single reason behind this demographic shift, but rather a multiplicity of factors are responsible for bringing it about. The popular misconception that there are more old people within our society mainly due to medical advances and consequent
prolongation of life is unfounded. To find the real reasons, one must look back to the
turn of the century when it all started. At that time, due to improvements in living
conditions, nutrition, public hygiene and education, there occurred a marked reduction
in infant and child mortality rates. At the turn of the century families with 10 or more
children were not losing any to fatal diseases like gastroenteritis. Whereas during
previous decades women would bear many children only few of whom would survive
the first few years of life, today’s elderly population is made up of the cohort who
benefitted from this general improvement in living conditions.

The change in fertility rates, which declined in the 1960’s and 1970’s due to the
advent and utilisation of reliable methods of contraception has also contributed to the
demographic shift, in that the proportion of elderly to adults and young people is
greater. The dependency ratio, which compares the number of economically active
persons, usually taken as those aged between 15 and 65 years to the rest of the
population, has remained rather stable throughout this century, despite the greater
numbers of elderly persons. The reason for this is that declining fertility rates have
resulted in a smaller proportion of dependent infants and children, which therefore
compensates for the greater proportion of elderly persons.

There have also been changes in life expectancy during the present century, especially
in life expectancy at birth. In 1901, a male child born in Britain could expect to live a
further 46 years, whereas a male child born in 1991 could expect to live an average of
73 years. For females these figures are 49 years for a child born in 1901, as compared
to 78 years for a child born in 1991. The difference in life expectancy for the two
sexes is largely a consequence of excess male mortality due to coronary heart disease,
carcinoma of the bronchus, cirrhosis of the liver and fatal accidents. Although the gap
between mortality in the different sexes may be diminishing, there is still a discrepancy in the sex composition of the elderly population, especially the very elderly. In fact in Malta the population aged 85 years and over in 1995 consisted of 36% males and 64% females. This must be taken into account in planning health services for the elderly. Elderly women who have outlived their husbands and have poor social support in addition to medical problems, are important clients when one considers the provision of health services.

Much of the care and support given to the elderly within our community is provided by informal structures, mainly grown up children or other relatives. Thus in considering the needs of the elderly, these carers have to be taken into account. Today the situation is such that while the number of elderly continues to increase, the adult population has remained relatively stable, thus resulting in a decreasing pool of potential informal carers. The reduction in family size has also had major implications on this informal support system. Whereas in the first half of this century, women bore many children and therefore had a greater number of potential carers on reaching a ripe old age, today women bear fewer children and therefore are less likely to be cared for by their children on growing old.

**Aims and objectives**

The main reason for carrying out this descriptive study is to discuss the social impact of hospital admission in the very elderly. The Hospital Activity Analysis (HAA) of St. Luke’s Hospital will be used to study the characteristics of this population of elderly admissions. These characteristics include their sex, age distribution, marital status, source of admission and the main discharge diagnosis. Using a unique identification
number, these admissions will be linked with the National Mortality Register so that their outcome may be studied. Other indicators which will be used to assess the outcome of the elderly patient admissions are destination on discharge, readmission rates and length of stay in this group of patients. An analysis of these factors will be carried out.

Another objective of this study is to see if there is any relationship between being admitted to hospital and the setting off of a sequence of events resulting in more morbidity and/or mortality. Moreover by studying the characteristics of this sample, it is possible to assess the health needs of our very elderly population. The value of this is that over the coming years, health services may be provided which are better geared to meeting these needs.
CHAPTER 2

Literature Review

The demographic change which has been taking place in western countries over the past few decades or so can be seen in Malta too with statistics from the “Demographic Review” of 1985, 1990, and 1995 showing a steady rise in the proportion of elderly persons. The greatest change can be seen in the number of the very elderly, those aged 85 years and above. In 1985, the number of persons in this age group amounted to 1,924, whilst in 1995 the figure was almost double that at 3,261. The change is also evident when looking at the proportion of very elderly in the whole male and female population for 1985, 1990 and 1995 (table 1).

Table 1: Changes in population of persons aged 85+ for the years 1985, 1990, 1995

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of males aged 85+ years</th>
<th>% of total male population</th>
<th>No. of females aged 85+ years</th>
<th>% of total female population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>640</td>
<td>0.4</td>
<td>1284</td>
<td>0.7</td>
</tr>
<tr>
<td>1990</td>
<td>864</td>
<td>0.5</td>
<td>1663</td>
<td>0.9</td>
</tr>
<tr>
<td>1995</td>
<td>1169</td>
<td>0.6</td>
<td>2092</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Source: Demographic review 1985, 1990 and 1995

In a paper which discusses the sociological aspect of mortality and morbidity in the elderly (Grundy 1984), the author states that persons aged over 85 years spend on average 12 days per year in hospital, compared to just over 2 days a year for those aged 65 years. The author also claims that mortality among the old seems to be falling at a faster rate than during previous decades, and thus the population structure of the elderly population is affected by this. However there are no evident signs of “compression of morbidity”, this term referring to the hypothesis put forward by Fries (1980) that morbidity would be compressed to a shorter period before death. Fries put
this hypothesis forward because he predicted that the number of very old persons would not increase since man is mortal and natural death may occur without disease. He also predicted that chronic disease would be postponed, with a consequent decrease in the average period of infirmity.

Grundy (1984) however suggests that predictions on the experiences of the current elderly generations should be made with caution, as the cohort effect might introduce differences between future elderly generations.

Measuring outcome in elderly hospital admissions

There is currently much interest in devising standardised methods to assess the outcome of hospital admission of geriatric patients. While mortality is one of the most reliable indicators for measuring outcome, many admissions do not have a fatal outcome and so other methods of measuring outcome should also be used. An observational study carried out by Parker et al. published in 1994 showed that measurement of outcomes using standard instruments is possible as part of clinical routine in care of the elderly. They found that for in-patients, outcome was reflected by measurement of survival, physical function, and social status, each of these indicators showing significant change between admission and discharge.

The hospital length of stay is also used as an outcome indicator for hospital admissions. A study analysing the factors predicting the length of stay for elderly patients admitted to acute medical wards (Maguire et al. 1986), it was found that social circumstances did not predict length of stay but rather that the medical reason for admission did. These included age, stroke, confusion and falls as well as other
factors such as loss of independence in carrying out everyday activities. This study also showed that although there was a correlation between increasing age and length of stay, this was not a major contribution. Furthermore the authors found that contact with members of a geriatric medical unit resulted in a shorter hospital stay, lower mortality, fewer admissions to nursing homes and a better functional state after being discharged from hospital.

A similar study carried out by Barer et al. (1990) assessed the influence of the following characteristics on the elderly patient’s length of stay: age, social circumstances, premorbid disability and the nature of the presenting complaint. Their findings showed that, adjusting for these characteristics, marked differences emerged in age distribution, the nature of the presenting illness and prevalence of previous disability.

In a recent French study (Zureik et al. 1997), a simple index was developed which provided an accurate prediction of the hospitalisation outcome in elderly patients admitted for acute care. This index was developed using various indicators such as presence of a chronic condition, ability to perform toileting, mental status and their living arrangements. This was shown to be a practical way of organising early discharge planning for those at risk thereby effectively reducing their length of stay. An interesting finding of this study was that the most important factor determining whether the elderly patient was discharged home or not was the attitude of the principal carer to the patient returning home.
Readmission rate as an outcome indicator

There has been interest in the use of readmission rates as an outcome indicator in hospitals since at least 1965 when it was suggested that they served as an index of quality of medical care. In a paper by Milne and Clarke (1990), the pros and cons of using readmission rates were examined. The main limitations the authors described included errors in hospital data, random variation due to small numbers, variation among hospitals in case mix and severity and problems with defining the denominator. They also argued that readmission is not a direct objective of hospital care. In fact some readmissions are planned and some unplanned readmissions are unavoidable. They observe that a direct, though limited objective of hospital care, and therefore a true measure of outcome, is the avoidance of those adverse outcomes that lead to readmissions.

In another study (Clarke 1990), it was suggested that the use of readmission rates as an outcome indicator should be avoided. This suggestion was motivated by the fact that this study found few avoidable readmissions, even in surgical readmissions, leading to the conclusion that trying to reduce a readmission rate by improving the standard of care may have little effect. A problem with using readmission rates as an outcome indicator also arises because of the use of different definitions. Other authors also share the view that readmission rates should not be used as outcome indicators (Colledge and Ford 1994). They argue that many readmissions are unavoidable and also depend on other factors such as bed availability and the level of community support.

Contrary to the previously mentioned authors, Henderson et al. (1989) state that readmission rates are one of the few potential measures available from routine statistics.
for assessing outcome of hospitalised patients. However they claim that one should give importance to the method of calculation as well as to their interpretation.

Chambers and Clarke (1990) showed that there was an early excess of readmissions within 28 days after index discharge, which gradually decayed with the progression of time. This pattern supported using a readmission rate at 28 days for comparisons. The authors also found that readmission rates were not only related to age and sex of patients, but also depended on different readmission thresholds. There were also appreciable differences between different specialties, the rates in surgical specialties being lower than in medical specialties. This finding fits with the fact that general medical patients are more likely to be suffering from one or more chronic conditions.

In a matched case control study (Williams and Fitton 1988) to determine those factors which affected unplanned readmission of elderly patients, it was found that there were seven possible principal reasons. These were: relapse of original condition, development of a new problem, carer problems, complication of the initial illness, need for terminal care, problems with medication and problems with services. There were also contributory reasons, such as premature discharge, and it was usual for several to be present in each case. Other differences between the cases studied and the controls included: low income, previous hospital admission, already having nursing care, and admission by general practitioners.

In an earlier study which considered the early readmission of the elderly patient (Victor and Vetter 1985), the authors proposed three sets of factors which contributed to a higher risk of being readmitted. These were the characteristics of the patients, their initial hospital treatment and the care they receive in the community after their initial discharge. Unlike other studies, the authors found that patient characteristics such as
sex, age and social status, showed no significant relationship with readmission. However their degree of physical disability was significantly related to readmission rate. Another finding in this study was that the readmission diagnosis was the same as the initial diagnosis in 77% of cases. This suggests that readmission is attributable to a relapse or breakdown of the patient's original condition rather than to the influence of the patient's social characteristics or to a new medical problem.

Another study which analysed emergency admissions and readmissions of elderly patients to a district general hospital (Townsend et al. 1992) showed that the patients who were randomly allocated to receive modest domiciliary after-care service were less likely to have another emergency readmission or multiple readmissions. The results also showed that elderly patients living alone or having two or more admissions are the ones who need domiciliary assessment and follow up after hospital discharge.

Discussing the use of multiple hospital admissions as indicators which may be used by health care providers and purchasers to purchase care for their residents, Newton and Goldacre (1993) argue that in the elderly, multiple admissions could sometimes be explained by admissions for respite care. As in other studies, the authors found that in general, multiple admission was more common with increasing age and that there was also a difference across the specialties. Again, multiple readmission was more common in the medical specialties than in surgical ones. The authors also give reasons for expecting multiple admissions to increase in the future. These include first of all the fact that there is pressure from managers to reduce length of stay for all patients and also the introduction of measures designed to maximize the use of a decreasing pool of available beds. Another reason is that community services will take on an increasing
share of the care of the elderly sick, leading to a shorter length of stay, however with possibly more frequent hospital stays.

**Hospital services for elderly people**

The appropriate organisation of acute medical care for the elderly is essential so that the delivery of care may provide prompt and accurate assessment, treatment and rehabilitation. Much attention has been given to the way acute services should be organised. A number of models for the provision of acute care have developed over the past decade or so (Donaldson and Donaldson 1993). These models are: the age-defined approach where all patients above a certain age (e.g. 75 years and over) are admitted to a specialist geriatric service, the integrated approach where all acutely elderly people are admitted to an acute medical, surgical or specialty ward and the needs-based approach where there are separate departments of geriatric and general medicine but the decision about which team takes care of the patient is governed by his or her needs.

The provision of effective hospital services for the elderly has been studied extensively. A study which examined a joint admitting policy between a general physician and a physician in medicine for the elderly (McLean et al. 1994), showed that the length of stay in acute medical beds was reduced by 25%. The basis for the co-operation was not related to age but rather to the perceived needs of the patient on admission. Therefore the authors suggest that initial assessment on a medical ward is appropriate, and when there are factors which predict a prolonged stay, the patient should be managed by a physician for the elderly.
Looking at the benefits of having effective hospital services for the elderly, Mitchell et al. (1987) found that having an age-related hospital service in their district general hospital improved the outcome in elderly patients. By increasing the number of beds for patients aged 75 years and over for acute non-surgical admissions, the previously undetected needs of such patients were being met. There was in fact an increase in the number of admissions and this was probably due to the effective hospital care of apparent “social problems” which were actually unrecognised and were due to treatable illness.

In a study which looked into hospital care for the elderly in the final year of life (Henderson et al. 1990), it was found that people who died at advanced ages (85 years and over) were less likely to have been admitted to hospital in the last year of life when compared to those who died at younger ages (65-84 years). However once admitted, the very old tended to spend a longer time in hospital than the younger patients. This rather unexpected finding was explained along the following lines: firstly, doctors may be unwilling to admit very old people to hospital deeming medical and surgical intervention inappropriate; secondly, the very elderly may already be in residential care other than hospital; and thirdly, people who live to a ripe old age may be basically healthy until shortly before death.

It is recognised that some elderly people are admitted to hospital for social rather than medical reasons. Some interesting findings emerged from a survey (Victor and Vetter 1986) studying the characteristics and outcome of these patients. Firstly such patients were very elderly and a disabled subgroup of the elderly population admitted to hospital. Moreover they were more likely to be living with their children than other admissions of the same age. In fact 60% of admissions took place to provide relief for
carers. However one third of admissions were classified as emergencies suggesting a crisis in the care arrangements of the elderly person. Although it is commonly thought that the elderly social cases are “bed blockers” in acute hospitals, this study demonstrated that the mean length of stay was short, being only 8 days. The outcome of these social cases, as measured by mortality, was poor compared with that of other elderly patients admitted for other reasons. One third of the former were dead after three months after discharge compared with the latter group. The authors propose that the provision of respite care for the informal carers should be seen as an important aspect of the care of the elderly in the community.

In a USA randomized control trial (Landefeld et al. 1995) elderly hospitalised patients admitted for medical care were divided into two groups. The intervention group received care from a specialised unit designed to help elderly persons to maintain and achieve independence in self-care activities whilst the other group received the usual type of care. The findings showed that those in the intervention group improved their ability to perform basic activities of daily living at the time of discharge and also had a reduced frequency of discharge to long-term care institutions.

The impact of ageing upon the need for health care and social services has been looked into by several authors. Finding methods which can be used to make accurate predictions for needs assessment for the future is not an easy task. A study performed to assess the need for medical beds (Weinberg 1995) used a method known as the Monte-Carlo simulation. This utilises available data to simulate what would happen in the future. The conclusions derived from this study were that at the district general hospital level, demographic change is unlikely to affect the need for medical beds. As the organization of medical care changes, the likely reductions in length of stay and
admission numbers had a greater effect and suggested that the requirement for acute medical beds will actually continue to fall.

Ebrahim (1995) contends that public health medicine plays a major role in bringing about reforms in health care systems to the advantage of older people. Referring to the NHS in Britain, this author concludes that the massive scale of health needs of older people cannot be ignored or managed within existing resources. Moreover, organisations must ensure that older people are not disadvantaged through age rationing of care. He goes on to say that new methods of monitoring healthy active life-expectancy and a stronger focus on disease prevention in old age are needed so as to prolong a healthy, active life.

In a summary of the report of a working party of the Royal College of Physicians entitled *Ensuring equity and quality of care for elderly people* (1994) several recommendations for acute services were made. These included admissions for acutely ill patients to be offered without delay regardless of age. Also there should be closer liaison between physicians in geriatric medicine and the accident and emergency departments as this would benefit patients as well as improve the junior medical staff training. Other recommendations were that transfers to different wards should be avoided and admission arrangements should ensure allocation to the most appropriate specialist team as soon as possible. Research in this field so as to determine the most efficient and effective way of providing medical care for the elderly was recommended.
CHAPTER 3

Methods

Background information

The setting for this study is St. Luke’s Hospital, which is an acute general hospital with 850 beds, serving the whole of the population of Malta. It is a public hospital, wholly funded by the Maltese Government. There is no acute hospital for the elderly, and so all acutely ill elderly patients are admitted to this hospital. The care provided is through an integrated approach, since there are no specialized geriatric acute wards. There are also no consultant physicians who are trained in geriatric services based in St. Luke’s Hospital. However geriatricians are usually consulted when an elderly patient’s support structure within the community fails or when the patient is disabled such that he or she is unable to return to pre-admission caring arrangements. In such cases the geriatrician assesses the elderly person with a view to admit him or her to a public residential home.

St. Luke’s Hospital also houses the main facilities for providing full investigations and treatment for both in and out-patients. These include a well-equipped X-ray department, a pathology department, physiotherapy department, occupational therapy department as well as a social worker service.

There is also Zammit Clapp Hospital, a 60 bedded hospital, which provides tertiary care for those aged 60 years and over (Annual report of the Department for the Care of the Elderly, 1995). This service is normally given to elderly persons who have medical problems and are in need of rehabilitation. It also provides respite services for informal carers should they need it. In addition, there is a large state-run residential...
home for the elderly providing nursing and medical care for over 1,000 elderly persons. This is known as St. Vincent de Paule Residence (SVPR). Patients may be admitted directly from the community to SVPR, or more commonly they are transferred there after an acute admission to St. Luke's Hospital when there are problems with caring arrangements should they be discharged home. There are also several Government and private residential homes around the island's towns and villages.

Community services for the elderly in Malta have also developed over the past ten years. The introduction of a home help scheme, a handyman service as well as the telecare service have all helped in keeping a proportion of the elderly population within the community.

Sources of data

The main source of data for this study was the Hospital Activity Analysis (HAA) system, which collects data pertaining to each admission to St. Luke's Hospital. This system was initiated in 1992 so as to provide clinicians and managers with relevant information with regards to the activity taking place within St. Luke's Hospital. It is run by the Department of Health Information and the writer is directly involved in the management of this system.

An HAA form (annex 1) is filled in for every patient admitted to hospital. The form is divided into three parts: the first deals with the patient's identification data, including full name, hospital number, date of birth, age, marital status, and usual locality of residence. The second part records the activity which takes place on admission, including the admitting ward, the date of admission, the source of admission, and the
method of admission, that is whether it is urgent or planned. There is also information about any transfers from one ward to another with the corresponding dates and the date of discharge. The method of discharge and the destination on discharge are also included. The last part of the HAA form records the medical diagnosis or diagnoses on discharge or death of the patient.

Once the form is filled in by the ward staff, it is sent to the Department of Health Information where a specially trained state registered nurse, under the supervision of a medical officer, codes the discharge diagnosis using the WHO International Classification of Diseases 9th Revision (ICD 9).

The identification data are then validated by comparing them to the Patient Master Index, the latter being part of the Health Care Information System which contains up-to-date identification data regarding all persons who have a hospital file. After this, the data is entered into a dBase IV program which has inbuilt validation systems such as the detection of duplicate records. A further validation program is carried out regularly by the medical officer in charge of the system, so as to ensure that the data is reliable and useful. These include age and sex mismatches such as an elderly person being admitted to a paediatric ward as well as diagnoses which are incompatible with the sex of patient. Also admissions with a length of stay exceeding 30 days are checked out by contacting the ward concerned. The date of admission and the date of discharge are thus verified with the ward staff. Dates which do not make any sense, e.g. date of admission subsequent to date of discharge, are corrected appropriately.

Regular monthly reports are issued by the Department of Health Information, which are sent to managers as well as to the ward staff. The number of HAA forms received at this department are compared to the number of admissions to the different wards as
compiled in the daily bed statistics returns to the Medical Records Department. The percentage response rate is calculated on a monthly basis and averaged 85% for 1995. This year was chosen to be studied as the HAA data was fully validated and also the response rate was high when compared to the previous years. Another reason for choosing this year was that 1995 was census year in Malta and so denominator data would be more accurate than other years, when population estimates would have had to be used.

The study population was obtained by using a database query which selected all the admissions for 1995 which had their age recorded as being 85 years or above. This amounted to 862 admissions in the selected age group. This age group was chosen as it is the group of patients on whom hospital admission would have the greatest impact. Another reason was that demographic changes have been most apparent in this age group unlike the “younger” elderly, and so health care planners require information about those who are most likely to use health care services.

All the fields available in the database were saved as an Excel spreadsheet. The data were then analysed by using cross-tabulations so as to describe the various characteristics of this study population. These included: age and sex distribution of this elderly group, their marital status, the locality where they live, their method of admission as well as the source of admission, the average length of hospital stay according to age and sex, the monthly distribution of admissions as well as the type of ward they were admitted to, i.e. medical, surgical or other specialty. The most commonly recorded main discharge diagnoses were derived by looking at the ten most frequent discharge diagnoses encountered. The readmission rates were also calculated by sorting the raw data on the unique patient hospital number. Thus the patient data of
those who had multiple admissions were extracted and used to calculate readmission rates over the year 1995. The direct outcome of the admission, that is whether the patient was discharged on medical advice or whether the patient died away, was also examined according to age groups. The destination of the patient on discharge was looked into. This included calculating the proportion who went home or were discharged to some form of residential care or hospital care.

As was pointed out earlier, whenever the word “elderly” will be used in the context of the study it will refer to those persons aged 85 years and over who were admitted to St. Luke’s Hospital in 1995 and were used as the study population.

The National Mortality Register was also used to obtain information with regards to mortality which was not a direct outcome of the admission. In Malta each person has a unique identification number which is also used as a hospital number, and so it was possible to link the records on elderly admissions in 1995 to the records in the National Mortality Register. Thus every admission which resulted in death could be noted even if the person died at his or her own residence after being discharged from hospital. The age-specific mortality rates experienced by the elderly patients who were admitted were calculated and these were compared to the age-specific mortality rates for those aged 85 years and over in the whole of Malta for 1995. Those who died in Gozo were not included in the age-specific rates as the elderly from this sister island are seldomly admitted to St. Luke’s Hospital, since Gozo has its own acute hospital, Gozo General.

The annual Hospital Activity Analysis report was also used to obtain data with regards to the total number of hospital admissions to St. Luke’s Hospital as well as to compare other results such as the average length of stay in the elderly study population with the average length of stay for all the 1995 hospital admissions.
Statistical analysis was used to determine whether there were any significant differences between variables within the study population and those variables for which data was available for the general population. The Chi square test and the z test for the difference between means and proportions were used to determine the significance or otherwise of differences.
CHAPTER 4

Results and Analysis

Admissions according to age and gender

There were 862 admissions to St. Luke's Hospital aged 85 years and over in 1995. This constituted 2.14% of all the hospital admissions throughout that year, which amounted to 40,243, according to the Hospital Activity Analysis Annual Report for 1995. The ages of these admissions were grouped in 5-year intervals and the distribution was as follows:

Table 2: Age and sex distribution in study population

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Males (%)</th>
<th>Females (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-89</td>
<td>232 (70)</td>
<td>379 (72)</td>
<td>611 (71)</td>
</tr>
<tr>
<td>90-94</td>
<td>85 (26)</td>
<td>134 (25)</td>
<td>219 (25)</td>
</tr>
<tr>
<td>95+</td>
<td>14 (4)</td>
<td>18 (3)</td>
<td>32 (4)</td>
</tr>
<tr>
<td>Total</td>
<td>331 (100)</td>
<td>531 (100)</td>
<td>862 (100)</td>
</tr>
</tbody>
</table>

The age group distribution was not found to be significantly different between the two sexes ($\chi^2 = 0.45, \text{df} = 2, p = 0.8$).

There were 331 male admissions whilst the female admissions amounted to 531. The ratio of male to female admissions was 1 is to 1.6. This contrasted with the sex ratio for the elderly population aged 85 years old and over residing in Malta where the sex ratio was 1 male is to 2.1 females. On comparing the total numbers for the elderly population aged 85 years and above for Malta, it was found that the study population was significantly
different from the population with regards to the sex distribution ($\chi^2 = 10.32$, df = 1, $p = 0.001$).

Table 3: Study population and general population figures by gender

<table>
<thead>
<tr>
<th></th>
<th>Males (%)</th>
<th>Females (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study population</td>
<td>331 (38.4)</td>
<td>531 (61.6)</td>
<td>862 (100)</td>
</tr>
<tr>
<td>Census figures for population aged 85 years and over (Malta)</td>
<td>973 (32.5)</td>
<td>2019 (67.6)</td>
<td>2992 (100)</td>
</tr>
</tbody>
</table>

The age and sex specific admission rates per 1000 elderly aged 85 years and above were calculated using the census figures for the inhabitants of Malta only, since Gozitan elderly patients are rarely admitted to St. Luke's Hospital but would be admitted to Gozo General Hospital. In 1995, out of the total of 862 elderly admissions, only 8 hailed from our sister island. The following table shows the results obtained.

Table 4: Age and sex specific admission rates for the elderly Maltese population aged 85 years and over

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Males (per 1000)</th>
<th>Females (per 1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-89</td>
<td>304.9</td>
<td>254.7</td>
</tr>
<tr>
<td>90-94</td>
<td>459.5</td>
<td>303.1</td>
</tr>
<tr>
<td>95+</td>
<td>518.5</td>
<td>202.2</td>
</tr>
</tbody>
</table>

Admissions according to region

The Central Office of Statistics divides the Maltese islands into six geographical regions, and these are used to study any differences which might exist between various localities.
These regions are used in preference to single towns and villages since the populations in the latter are relatively small. The regions are: the inner harbour region, the outer harbour region, the south eastern region, the western region, the northern region and Gozo / Comino. The towns and villages which make up each of these regions may be viewed in annex 2.

The distribution of the admissions according to locality was as follows: 37.2% came from the inner harbour region, 25.5% from the outer harbour region, 9.7% from the south eastern region, 11.2% from the western region, 14.7% from the northern region, 0.9 % from Gozo and Comino and 0.6% were foreigners. The admission rates standardized according to the population of those aged 85 years and over in the different localities may be viewed below:

Table 5: Distribution of admissions according to different regions and age locality specific admission rates per 1000 elderly (85+) persons

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of admissions</th>
<th>Population (85 years and over)</th>
<th>Admission rates per 1000 elderly (85+) persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner harbour</td>
<td>321</td>
<td>1052</td>
<td>305.1</td>
</tr>
<tr>
<td>Outer harbour</td>
<td>220</td>
<td>925</td>
<td>237.8</td>
</tr>
<tr>
<td>South Eastern</td>
<td>84</td>
<td>270</td>
<td>311.1</td>
</tr>
<tr>
<td>Western</td>
<td>97</td>
<td>410</td>
<td>236.6</td>
</tr>
<tr>
<td>Northern</td>
<td>127</td>
<td>335</td>
<td>379.1</td>
</tr>
<tr>
<td>Gozo and Comino</td>
<td>8</td>
<td>439</td>
<td>18.2</td>
</tr>
<tr>
<td>Extraterritorial</td>
<td>5</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

The distribution of admissions was significantly different between the various localities.

This was analysed using the z test for the difference between proportions where a
significance of \( p = < 0.0001 \) was found for each locality.

**Marital status of admissions**

Of the 862 elderly admissions 16% were single, 29% were married, 35% were widowed, 0.3% were separated or divorced and 19% had no marital status recorded on the HAA form. There was a significant difference between the male and female admissions with regards to their marital status, excluding the separated/divorced group and the unspecified group due to their small numbers \( (\chi^2 = 43.0, \text{ df } = 2, p < 0.001) \). The number of admissions according to gender may be seen in table 6.

*Table 6: Marital status in male and female admissions*

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Males (%)</th>
<th>Females (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>34 (10)</td>
<td>104 (19)</td>
<td>138 (16)</td>
</tr>
<tr>
<td>Married</td>
<td>127 (38)</td>
<td>125 (23)</td>
<td>252 (29)</td>
</tr>
<tr>
<td>Widowed</td>
<td>79 (24)</td>
<td>222 (42)</td>
<td>301 (35)</td>
</tr>
<tr>
<td>Separated/Divorced</td>
<td>1 (0.3)</td>
<td>2 (0.4)</td>
<td>3 (0.3)</td>
</tr>
<tr>
<td>Unspecified</td>
<td>90 (27)</td>
<td>78 (15)</td>
<td>168 (19)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>331 (100)</strong></td>
<td><strong>531 (100)</strong></td>
<td><strong>862 (100)</strong></td>
</tr>
</tbody>
</table>

**Admissions by month**

The admissions were analysed according to the month of admission. There were variations in the numbers for the different months of the year, the monthly average number of admissions was 71.8. The highest number of admissions occurred in January with 100
out of the 862, whilst the smallest number of admissions was seen in June and September with 59 admissions occurring in both months. These can be seen in Figure 1.

**Figure 1:** Monthly admissions in study population

Statistical analysis of the monthly admissions comparing the average number of admissions in the colder months of November through to March, with the average number of admissions during the rest of the months, showed that there was a significant difference between these two periods of the year ($z = 2.12, p < 0.05$).

**Method of admission**

The method of admission, that is whether it was planned or booked, or whether it was urgent or an emergency, was analysed. The results show that 625 out of 862 (72%) admissions were urgent or emergencies, whilst 155 (18%) were booked or planned. The remaining 82 (10%) admissions had no method of admission recorded. The ratio of
planned admissions to urgent admissions was 1:4. For the total admissions for 1995, the ratio of booked to urgent admissions was 1.3:1 for all the wards.

Table 7: Ratio of urgent to booked admissions

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Urgent/Emergencies</th>
<th>Booked/Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>85+</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>&lt;85</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>All</td>
<td>1</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Looking at the method of admission in the male and female admissions it was found that there was a difference between the two groups. In male admissions, 24% (79) were booked, whilst in female admissions 14% (76) were booked. Looking at urgent admissions, 58% (193) of male admissions were classified in this way whilst in female admissions the percentage was 81% (432). There was no method of admission recorded in 18% (59) of male admissions and 4% (23) in female admissions ($\chi^2 = 22.07$, df = 1, $p = <0.001$).

Source of admission

The source of admission for the 862 elderly admissions was examined according to the sex of the patient. There were no significant differences between the sexes with regards to where they came from prior to being admitted to hospital. The greater proportion came from their usual residence (74%). Eighteen percent of records had no source of admission recorded, whilst 3% each came from Government owned and private owned residential
homes for the elderly. The remaining 2% came from a temporary residence, Government and private hospital. This data were analysed by grouping the admissions from their usual and temporary residence together, those from residential homes whether private or government owned together and those coming from hospitals, be they private or State run together. No statistical significance was found between male and female admissions, with regards to their source of admission ($\chi^2 = 1.49, p = 0.227$).

**Admissions according to hospital section**

The elderly admissions were studied according to their ward of admission. The bulk of the admissions were to the medical wards, with 58% being first admitted there. These included all the general medical wards as well as the Coronary Care Unit. The second largest proportion was seen in the surgical section with 34% of admissions. The wards included in this section were the general surgical and orthopaedic wards, as well as other wards such as the Endoscopy Unit, the Cardiothoracic Unit and the Burns Unit.

The other two sections which admitted patients aged 85 years and over in 1995 were the ENT and Ophthalmology wards (6% jointly), whilst the Gynaecology department received 2% of the admissions. Of the surgical admissions, 15% were admissions to orthopaedic wards, the rest being admissions to general surgery wards. Of these 15%, the majority were female admissions which numbered 38, whilst only 6 admissions were male.

It was also noted that the study population had no direct admissions to the Intensive Care Unit and the Neurosurgical Unit. Other specialized units like the Coronary Care Unit had
10 admissions in this age group in 1995, whilst the Cardiothoracic Surgery Unit had only one admission.

Figure 2: Admissions according to admitting hospital section

Method of discharge

The direct outcome of the admissions was that 673 (78%) of them were alive on discharge whilst 101 (12%) died in hospital. There were 88 (10%) records where the method of discharge was not specified. Out of the total number of male admissions 249 (75%) were discharged alive whilst 31 (9%) were deceased. Fifty-one (15%) male admissions had no method of discharge recorded. The outcome of female admissions was as follows: 424 (80%) were discharged alive, 70 (13%) died, and 37 (7%) had no record of their method of discharge. No statistical significance was found in the outcome of these admissions for the different sexes.
On linking the records in the study population with the National Mortality Register database for 1995, it was found that of the 862 admissions representing 652 patients aged 85 years and over who were admitted, 176 were dead by the end of 1995. Of these 116 deaths occurred at St. Luke's Hospital.

Table 8: Place of death according to sex for elderly patients admitted to St. Luke's Hospital in 1995

<table>
<thead>
<tr>
<th>Place of Death</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Luke's Hospital</td>
<td>39</td>
<td>77</td>
<td>116</td>
</tr>
<tr>
<td>Usual residence</td>
<td>9</td>
<td>12</td>
<td>21</td>
</tr>
<tr>
<td>St. Vincent de Paule Residence</td>
<td>9</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Not usual residence</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Other Hospitals</td>
<td>6</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>111</td>
<td>176</td>
</tr>
</tbody>
</table>

For the same age group as that of the study population, the total number of deaths which occurred in the whole of the Maltese islands, was 569. Of these 77 took place in Gozo and so for reasons previously mentioned were deducted from the global figure, resulting in 492 deaths occurring in Malta alone. The age-specific mortality rate was therefore calculated for Malta, which was 164 per 1000 persons aged 85 years and over. The mortality rate for the study population during 1995 was 270 per 1000 elderly persons admitted to St. Luke's Hospital. By the end of 1996, a further 89 elderly persons who had formed part of the elderly population were deceased. Thus, by the end of 1996 a total of 265 of the 652 patients were deceased this amounting to 41% of the study population.
After being discharged alive from hospital, the mean time of survival of all those who were deceased by the end of 1996 was 178 days.

The underlying cause of death of all the 265 elderly persons who died in 1995 and 1996 was examined and the causes were grouped according to the subheadings used in the International Classification of Diseases Revision 10 (ICD-10). The ten most frequent causes of death recorded are shown in Table 9 below:

Table 9: Ten most frequent underlying causes of death

<table>
<thead>
<tr>
<th>Underlying Cause of Death</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic ischaemic heart disease</td>
<td>43</td>
</tr>
<tr>
<td>Acute myocardial infarction</td>
<td>27</td>
</tr>
<tr>
<td>Stroke, not specified as haemorrhage or infarction</td>
<td>25</td>
</tr>
<tr>
<td>Pneumonia, organism unspecified</td>
<td>10</td>
</tr>
<tr>
<td>Unspecified diabetes mellitus</td>
<td>8</td>
</tr>
<tr>
<td>Malignant neoplasm of bronchus and lung</td>
<td>7</td>
</tr>
<tr>
<td>Malignant neoplasm of breast</td>
<td>7</td>
</tr>
<tr>
<td>Malignant neoplasm of colon</td>
<td>6</td>
</tr>
<tr>
<td>Unspecified acute lower respiratory tract infection</td>
<td>5</td>
</tr>
<tr>
<td>Malignant neoplasm of prostate</td>
<td>4</td>
</tr>
</tbody>
</table>

Destination on discharge

The destination on discharge was analysed according to the available data on the HAA forms. The greatest number of admissions 538 in all (63%) were discharged to their usual or a temporary residence. Fifty-four admissions (8%) were discharged to residential care,
private or Government owned. Sixty-four admissions (7%) were discharged to another hospital, again public or private. There were 182 (21%) records with no destination on discharge recorded. However these include the admissions who had a fatal outcome, since in these cases the destination on discharge is not applicable and so is not recorded on the HAA form.

On comparing the destination on discharge between the two sexes it was found that 63% of both groups were discharged to their usual or temporary residence. However 10% of female admissions and 4% of male admissions were discharged to another hospital. With regards to discharge to residential care, 7% of male admissions and 9% of female admissions had such an outcome. There were 26% of male admissions and 18% of female admissions which had no destination on discharge recorded. Statistical significance was found for the difference between the destination on discharge in male and female admissions ($\chi^2 = 15.9$, df = 2, $p = <0.001$).

**Length of stay**

The average length of stay for the whole study population was 9.47 days. The range of the various lengths of stay was 0 - 165 days. There were 49 admissions which had a hospital stay exceeding 30 days. If the latter admissions were not taken into account to calculate the average length of stay, the resulting average length of stay was 6.4 days. This contrasts with the average length of stay for all hospital admissions in 1995 (Hospital Activity Analysis Annual Report 1995) which stood at 2.62 days calculated on all stays.
not exceeding 30 days. The stays exceeding 30 days accounted for almost 6% of the total number of admissions.

*Figure 3: Length of stay for admissions aged 85+ in 1995 (stays above 30 days are not shown)*

The average length of stay according to age group and sex may be seen in the table below. The total refers to the average length of stay for all the male and female admissions, and for the whole study population. A significant difference between the average length of stay in males and females was detected ($z = 11, p < 0.001$).

*Table 10: Average length of stay (LOS) in days for male and female admissions according to age groups*

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Average LOS (days) in Male admissions</th>
<th>Average LOS (days) in Female admissions</th>
<th>Average LOS (days) for both sexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-89</td>
<td>6.9</td>
<td>9.9</td>
<td>8.8</td>
</tr>
<tr>
<td>90-94</td>
<td>7.8</td>
<td>12.3</td>
<td>10.6</td>
</tr>
<tr>
<td>95+</td>
<td>5.9</td>
<td>22.4</td>
<td>14.9</td>
</tr>
<tr>
<td>Total</td>
<td>7.1</td>
<td>10.9</td>
<td>9.5</td>
</tr>
</tbody>
</table>
Readmission rate

As a result of readmissions occurring during 1995, 652 patients in the age group aged 85 years and above accounted for 862 admissions for the whole of the year. The readmission rate was calculated as a percentage of readmissions to the total number of admissions. This was derived to be 24%. The most frequent number of readmissions occurred in patients who were admitted twice during the year and hence had one readmission. The greatest number of readmissions was in a patient who was admitted ten times in 1995.

Table 11: Number of patients in study population having more than one admission 1995

<table>
<thead>
<tr>
<th>No. of admissions during 1995</th>
<th>No. of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>104</td>
</tr>
<tr>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>142</strong></td>
</tr>
</tbody>
</table>

The readmission rates for the medical admissions and for the surgical admissions were calculated separately and were found to be 23% for the former, whilst in the latter group it was 14%.
Discharge diagnoses

The main discharge diagnoses were analysed and grouped according to ICD 9 Chapter headings. The results obtained may be viewed in Table 12 below.

Table 12: Main discharge diagnoses according to broad ICD 9 chapter categories

<table>
<thead>
<tr>
<th>Discharge diagnosis according to ICD 9 chapter</th>
<th>No. of admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious and parasitic diseases</td>
<td>4</td>
</tr>
<tr>
<td>Neoplasms</td>
<td>46</td>
</tr>
<tr>
<td>Endocrine and metabolic diseases and immunity disorders</td>
<td>59</td>
</tr>
<tr>
<td>Diseases of blood and blood-forming organs</td>
<td>38</td>
</tr>
<tr>
<td>Mental disorders</td>
<td>10</td>
</tr>
<tr>
<td>Diseases of the nervous system and the sense organs</td>
<td>50</td>
</tr>
<tr>
<td>Diseases of the circulatory system</td>
<td>180</td>
</tr>
<tr>
<td>Diseases of the respiratory system</td>
<td>93</td>
</tr>
<tr>
<td>Diseases of the digestive system</td>
<td>92</td>
</tr>
<tr>
<td>Diseases of the genitourinary system</td>
<td>42</td>
</tr>
<tr>
<td>Diseases of the skin and subcutaneous tissue</td>
<td>8</td>
</tr>
<tr>
<td>Diseases of the musculoskeletal system and the connective tissue</td>
<td>13</td>
</tr>
<tr>
<td>Symptoms, signs and ill-defined conditions</td>
<td>113</td>
</tr>
<tr>
<td>Injury and poisoning</td>
<td>50</td>
</tr>
<tr>
<td>External causes of injury and poisoning</td>
<td>4</td>
</tr>
<tr>
<td>Supplementary classification of factors influencing health status</td>
<td>13</td>
</tr>
<tr>
<td>No diagnosis recorded</td>
<td>47</td>
</tr>
</tbody>
</table>
They were also analysed according to the main subheadings in the International Classification of Diseases, 9th revision (ICD 9). It was interesting to find that only one admission had the main discharge diagnosis as “social case”, whilst two other admissions had this diagnosis as one of the supplementary diagnoses. The ten most frequent discharge diagnoses may be seen in table 13.

*Table 13: Top ten main discharge diagnoses in study population*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms (including chest pain, dyspnoea, etc.)</td>
<td>108</td>
</tr>
<tr>
<td>Other forms of heart disease (including heart failure, arrhythmia, valvular heart disease etc.)</td>
<td>89</td>
</tr>
<tr>
<td>Other diseases of the respiratory system (including hypostatic pneumonia, pleural effusion etc.)</td>
<td>50</td>
</tr>
<tr>
<td>No diagnosis recorded</td>
<td>46</td>
</tr>
<tr>
<td>Disorders of the eye and adnexa (including cataract, glaucoma etc.)</td>
<td>40</td>
</tr>
<tr>
<td>Ischaemic heart disease/diseases of the pulmonary circulation</td>
<td>39</td>
</tr>
<tr>
<td>Diseases of blood and blood forming organs (including unspecified anaemia)</td>
<td>38</td>
</tr>
<tr>
<td>Cerebrovascular disease (including stroke, cerebral haemorrhage etc.)</td>
<td>35</td>
</tr>
<tr>
<td>Other diseases of the digestive system (including chronic liver disease, GIT haemorrhage, gall bladder disorders etc.)</td>
<td>32</td>
</tr>
<tr>
<td>Diseases of other endocrine glands (inc. Diabetes mellitus)</td>
<td>30</td>
</tr>
<tr>
<td>Fracture of the lower limb (including fracture femur etc.)</td>
<td>30</td>
</tr>
</tbody>
</table>
CHAPTER 5

Discussion

This was a descriptive study with the main source of data being the Hospital Activity Analysis system of St. Luke's Hospital. The study population consisted of 862 admissions aged 85 years and over, but the number of patients was 652, the difference being due to readmissions. This was an event based study where the characteristics were analysed according to admissions. However in calculating death rates the number of patients was used, as mortality is a once only occurrence.

Age and gender distribution

Of the 862 admissions aged 85 years and over, it was found that the distribution within the 5 year age groups was similar in male and female admissions. The greatest percentage of admissions was in the 85-89 year age group, being 70% of the total number of male admissions and 71% of the total female admissions. The smallest proportion was in the oldest age group, that is those over 95 years. This finding was expected, since as the elderly get older the more likely they are to die and hence the smaller numbers in the general population are reflected by fewer admissions in this age group.

It was interesting to note that the age distribution of the study population showed that there was no difference between the sexes. One may attribute this to the hypothesis that males and females who live up to the ripe old age of 85 years and over, experience similar mortality rates as they progress from one age group to another. In fact the life
expectancy for males aged 85 years in 1995 was 5.23 years which was similar to that in females, the latter being 5.67 years (Demographic Review 1995). So even though the number of females reaching this age is greater in number than their male counterparts, they “decrease” in number by a similar rate to them.

The gender distribution in the study population was compared to that in the population aged 85 years and over for 1995. The ratio of male to female admissions was 1:1.6 for the study population whilst it was 1:2.1 females in the general population. This significant difference with regards to gender proportions may be explained by the following reason. Even though there are a greater number of females aged 85 years and over in the general population, their admission rates are not as high as in males. So males within this age group are more likely to be admitted to hospital than females of this age group.

This point should be kept in mind when planning the provision of health care services for the elderly. The number of acute beds available for males and females aged 85 years and over should not be based on the population figures alone, but one should also consider the admission rates in the two sexes. Looking at population data one would assume that for every one bed for a male admission, one would need two beds for female admissions. However this study showed that for every two male admissions there were approximately three females admitted in this age group.

Admissions according to region

The division of the Maltese Islands into six geographical regions is useful in that data from various towns and villages are grouped and so would be more significant in
number (annex 2). The way that the regions have been delineated is by geographic
location and this system has been used since 1967 by the Central Office of Statistics for
publishing census data as well as the yearly “Demographic Review”. The regions do
not demarcate areas where people of different social classes conglomerate but rather
there is a mix of socioeconomic groups within each region. The greatest number of
very elderly persons is concentrated in the inner harbour regions. The historical
reasons for this lie in the fact that after the Second World War, many people returned
to live in these areas after they had been evacuated during the air-raid years. Whereas
their offspring would have moved out of these areas on reaching adulthood, these
people continued living in the inner city housing provided and have remained there
until today.

The statistically significant difference that was found for the age-specific rates for the
localities, cannot be attributed to a particular reason. One can see that those elderly
hailing from the northern region had a higher admission rate than those coming from
other regions. However since in the northern region the total number of elderly
persons aged 85 years and over is relatively small, a change in the number of
admissions hailing from this region would produce a bigger deflection in the age- and
locality-specific admission rate for the region.

As for the very low rates for the Gozo and Comino region, it has already been
mentioned that very few elderly persons are admitted to St. Luke’s Hospital for acute
care, since there is an acute general hospital in Gozo.
The author has not identified any published local studies which have tried to elucidate whether there are differences in health status indicators between the different regions in Malta and so one cannot compare the findings of this study with other findings.

Marital status

It was interesting to note the distribution of marital status within the study population. The greatest proportion of the total admissions were widowed. This is an expected finding in that the likelihood of the loss of spouse increases with age given that spouses are usually of a similar age. However on looking at the distribution of marital status within the gender groups, it was found that there was a statistically significant difference between the two groups. Whereas in females the greatest proportion of admissions were widowed, in males the greatest proportion were married. This finding can be explained in three ways. Firstly, since life expectancy in females is greater than in males, it is more likely that elderly males still have a living spouse. Conversely, females are more likely to outlive their husbands and so remain widowed. Secondly, wives are usually younger than their husbands and so again are more likely to be still alive when their husbands die. Thirdly, elderly females who are widowed tend to lose their reason for living. Often being left alone and feeling isolated, they may be more prone to illness and so experience higher morbidity rates.

Social support in the lives of elderly persons has been studied by sociologists who have found that it was essential for maintaining independence as well as for preserving psychological well-being. Elderly people who live alone were consistently found to have a poorer psychological health than those elderly who have regular social contact
Despite living alone (Grundy in Blane 1991). Although one cannot assume that those elderly who are single or widowed live alone, they are more likely to do so. Using marital status as a proxy indicator for the elderly person's living arrangements is not ideal, but this is the only available relevant information in routinely gathered data.

In a study by Choi and Wodarski (1996) it was found that a higher level of social support resulted in better health outcomes in elderly persons. They also state that elderly people who lived with spouses were more likely to have available social support systems than those who did not.

However it would still be useful to have information about living arrangements so as to permit a comparative study of the outcome of those elderly persons with some form of social support versus those without any.

The number of HAA forms which had no record of the marital status of the elderly person admitted consisted of 19% of the total. Unfortunately one could not obtain this information from other sources, and so one cannot speculate with regards to the marital status of these admissions. However, one may question whether a proper social history is taken for every single admission or whether such essential information is being overlooked and going unrecorded.

Admissions according to month of the year

On analysing the number of admissions occurring each month, it was found that the mean was 71.8 for the study population. There was a significant difference between the number of admissions in the colder months of November through to March as
compared with the rest of the year. This difference was not detected in the total monthly admissions for 1995 (Hospital Activity Analysis Annual Report 1995).

The reason for this difference is probably due to the increase in respiratory and chest infections which are associated with the cold weather. Since elderly persons are more vulnerable than younger people and their reserves are much more limited, a viral respiratory infection can have serious consequences, such as a pneumonia with or without heart failure.

Thus when considering the provision of acute hospital beds for the care of the elderly, the fluctuation in monthly admissions should be taken into consideration to avoid overloading the system in the colder months.

**Method of admission**

The method of admission for the study population showed that the majority of admissions (72%) were classified as being urgent or emergencies. The ratio of booked or planned admissions to urgent or emergency ones was 1:4. This finding contrasts with the information pertaining to all admissions to St. Luke’s Hospital in 1995 where the majority of admissions were booked, the ratio of booked to urgent admissions was 1.3:1 (Hospital Activity Analysis Annual Report 1995). However this report also showed that the situation was different in the medical wards where the ratio of booked to urgent admissions was 1:5. As the greater proportion of admissions in the study population were to a medical ward, the ratio for admissions to medical wards concurs with the findings of this study.
The method of admission was also found to be significantly different between male and female admissions. In male admissions the percentage which were booked was 24% whilst in female admissions it was 14%. Conversely, 58% were urgent for male admissions and 81% for female admissions. The proportion of unrecorded method of admission was 18% for male admissions and 4% for female admissions.

The reason or reasons for this difference are difficult to postulate. On looking at the discharge diagnoses of the booked admissions in both males and females, no major differences were found which could have attributed to the greater proportion of booked admissions in males. One of the commonly encountered discharge diagnosis in both male and female admissions was cataract.

However, the number of booked admissions was almost equal in male and female admissions (79 and 76 respectively), whilst the urgent admissions were more than double in females (193 in males and 432 in females). Thus the proportion of booked admissions when compared to the total admissions in males, was much higher than that in females.

**Source of admission**

The majority of admissions (74%) lived at their usual residence prior to being admitted to hospital. Three percent lived in residential homes, both privately and publicly owned whilst 2% came from a private or public hospital or a temporary residence (18% of records had no source of admission recorded). These findings show that prior to being admitted, most of the elderly aged 85 years and over lived within the community. This reflects that these elderly persons were either relatively independent
or that they were receiving adequate support from formal and/or informal carers so as to be able to remain living within the community. Unfortunately the full 1995 census data have not been published to date, thus rendering impossible any comparison of the source of admission of the study population with data pertaining to the number of elderly persons residing in their own homes or in residential homes in the general population.

There was no significant difference between the source of admission for male and female admissions. Again it would have been interesting to compare this finding with the gender distribution with regards to living arrangements for all the elderly within the general population.

Admissions according to hospital section

The greater proportion of admissions were to the general medical wards (58%), whilst the surgical wards saw 34% of the admissions. The remaining percentages consisted of 6% of admissions who went to the ENT and Ophthalmology sections and 2% who were admitted to the Gynaecology section. Of those admitted to the surgical wards, 15% were admitted to orthopaedic wards, the greater number of whom were females (38 admissions were females whilst 6 were male admissions). On looking at the main discharge diagnoses of the female orthopaedic admissions, it was found that 27 out of the 38 admissions was for fracture of the femur.

The way the admissions were distributed in the diverse sections of the hospital reflect the main pathologies experienced by the very elderly. Medical conditions were the
prime reason for an acute admission. Conditions affecting the circulatory system were found to be the commonest source of complaints in this age group.

On the other hand, surgical admissions constituted a smaller proportion of all the admissions. The reason for this could be that in this age group elective surgery is usually avoided because of the poor functional reserve in older persons. So a general practitioner might opt to treat certain conditions conservatively and would not refer the elderly person to a surgeon.

The orthopaedic admissions reflect the common pathology experienced by frail old ladies, namely fracture femur. This is a major threat to life and to independence in elderly females. Prevention is one of the best ways of fighting this condition because once it occurs the road to recovery is long and full of other potential sequelae. The resources consumed with regards to acute hospital care, physiotherapy and occupational therapy, rehabilitation in a tertiary care hospital etc. are difficult to assess, but if costed would certainly amount to a very significant sum of money.

The ophthalmic and ENT group of admissions consisted mainly of admissions to the former section (45 admissions to Ophthalmic ward and 8 to ENT ward). The main discharge diagnosis in the ophthalmic ward was cataract. This is a common condition in the elderly and since it can be treated by a surgical intervention under local anaesthetic, it has helped several elderly persons to regain their vision and consequently their independence. The Gynaecology department had a few admissions (15) aged 85 years and over and on looking at the discharge diagnoses, they were found to be varied.
The fact that there were no direct admissions to the Intensive Care Unit and neither to the Neurosurgical Unit may bring a few questions to mind. Are elderly persons less likely to need such type of care? Or are health care professionals making tacit decisions with regards to rationing health care when it comes to elderly patients? More often than not the reason lies in that such intensive care and/or invasive treatment might only prolong life for a few weeks without any improvement in the quality of life. Such treatment would be unethical if the patient is going to be even more distressed whilst receiving treatment.

The moral issues involved in the care of the acutely ill very elderly persons have not been addressed fully in Malta and more often than not it is the hospital doctor who has to shoulder the responsibility of taking decisions of whether to treat or not. Expert advice should be available for the hospital doctor so that he or she may discuss the problems encountered when dealing with such situations.

**Outcome of study population**

The direct outcome of the elderly admissions showed that 78% (673) were alive on discharge whilst 12% (101) died in hospital (10% of outcomes were unrecorded). The direct outcome for male and female admissions showed no statistical difference. From this it can be inferred that males and females aged 85 years and over had similar direct outcomes. The survival rate at the time of hospital discharge for the study population was of 84% of the admissions.

Using the patients' hospital number to link with the National Mortality Register, it was found that by the end of 1995, 176 of the elderly patients admitted to St. Luke's
Hospital in 1995 were deceased. By the end of 1996 there were 89 more elderly persons who died. The survivors at the end of 1996 thus amounted to 387 and the survival rate decreased to 59% of the study population.

The decline in the survival rate subsequent to discharge from hospital may be attributed to several reasons. Firstly the condition for which the elderly person was admitted in 1995 may have been a chronic one and so worsened as time passed, resulting in a fatal outcome. Secondly the elderly person may have developed a new acute condition which resulted in death. Thirdly the elderly person may have been relatively independent prior to being admitted, however after discharge from hospital he / she was clinically well but was still weak and fragile following hospitalisation. So where before he / she managed to cook, go out shopping, bathe, and so on, after discharge he /she could not cope with activities of daily living. This could have serious consequences. The resulting poor nutrition as well as the possible lack of compliance with the medication prescribed after hospitalisation, could lead to the elderly person being readmitted or dying at home. The importance of social support is vital for the elderly person living in the community and should not be underestimated or taken for granted when planning the discharge of elderly patients.

Another reason for the decrease in survival rates after discharge could be that some patients were transferred to another hospital such as Zammit Clapp Hospital. These patients were thus in need of further care and so could have succumbed to their illness during this period.

The average time of survival of those patients who were discharged alive but died later on in 1995 or in 1996 was 178 days. One cannot really comment on the length or
otherwise of this time span as it may be relative to several other factors including the quality of life. Since this study involved the use of routine data alone, one cannot have any information about the quality of life these patients experienced after being discharged.

On analysing the place of death for all the patients who formed part of the study population and died during 1995, it was found that there were 116 deaths which occurred at St. Luke’s Hospital. This means that the difference between the deaths recorded on the HAA form and the data from the National Mortality register was of 15. These were therefore either included with the forms which had no record of discharge recorded or no HAA form was filled in by the ward staff for their final admission to hospital.

On comparing the age-specific mortality rate for all the 85 year olds and over for Malta with the mortality rate experienced by the study population for 1995, it was evident that the mortality rate in the latter was slightly more than one and a half times that in the former. The rates were 164/1000 in the general population and 270/1000 in the study population. This finding is not unexpected as many elderly persons are admitted to hospital in their final year of life during their final illness. However, in a study which looked at hospital care in the final year of life (Henderson 1990), it was found that the very elderly, that is those aged 85 years and over, were less likely than the younger age groups to be admitted to hospital. However no such studies have been carried out locally to assess the situation in Malta. It would be interesting to study whether the Maltese people in general would prefer their elderly relatives to die in hospital rather than at home, as this might be important when studying the number of moribund elderly patients who are admitted to hospital and die within a few days.
One may also argue that an elderly person may be admitted to hospital with a curable illness but due to the consequences of hospital admission other problems might appear, triggering off a sequence of events resulting in increased morbidity or which might even prove to be fatal. For example a relatively well-kept 85 year old lady may be admitted with an acute gastroenteritis requiring intravenous rehydration. Due to the intravenous therapy as well as to the lethargy brought about by the infection, she remains in bed. She goes on to develop a chest infection which in turn compromises her cardiac reserve, finally resulting in heart failure which may be fatal.

One of the problems encountered when analysing data with regards to the method of discharge were the number of HAA forms which had this item of data missing. Although since these consisted of only 10% of the admissions, the information obtained from the 90% was still considered to be valid.

**Causes of death**

The most frequent cause of death in the elderly persons who formed part of study population and had passed away by the end of 1996 was chronic ischaemic heart disease. Myocardial infarction was the second most frequent and stroke was the third. These are all diseases of the circulatory system and are classified as a single chapter in the International Classification of Diseases Revision 9 and 10. The discharge diagnoses for the whole study population also showed a predominance of diseases of the circulatory system.

The causes of death in the general population also showed that diseases of the circulatory system were the most frequent, followed by neoplasms.
Destination on discharge

In elderly persons discharge back to the community represents an important landmark which is closely related to other measures of functional independence. Therefore the proportion of patients returning home could serve as a measure of effectiveness of the service (Barer 1990).

The majority of admissions resulted in the elderly persons being discharged to their usual residence (63%). The percentage going to some form of residential care was 8%. The percentage of admissions who were admitted to hospital from residential homes was 6%, which is in fact not very different from the 8% discharged into residential care. However one cannot conclude that those who came from residential care are the same ones who were discharged to residential care as a proportion of the latter might have died at St. Luke’s Hospital. It would have been interesting to know how many of those discharged to residential homes were new residents. Unfortunately this type of information cannot be obtained from the existing routine data.

There were 7% of admissions who were discharged to another hospital. Most of these admissions were to Government hospitals including Zammit Clapp Hospital which is a 60 bed hospital providing tertiary care for the elderly. The number of admissions to this hospital originating from St. Luke’s Hospital in 1995 were 481 (Annual Report of the Department for the Elderly and Special Needs 1995). This number includes all admissions aged 60 years and over, this being the minimum age for eligibility to being admitted to Zammit Clapp Hospital.

It was interesting to see the destination on discharge in the two sexes. The difference between male and female admissions was mainly in that fewer male admissions were
discharged to another hospital or to residential care. This could be attributed to several reasons. Firstly due to the frequent discharge diagnosis of fracture femur in female admissions, many of these admissions would be discharged to Zammit Clapp Hospital for rehabilitation. Secondly, the higher percentage of females going to residential care might be due to many females in this age group being widowed or single and hence were less likely to have relatives to care for them.

**Length of stay**

With the increasing number of elderly persons in the population and the concentration of illness in old age, the problem of prolonged hospital stays, especially in general medical beds are a major concern to both clinicians and paramedical staff, as well as to managers (Maguire et al 1986). However the interpretation of the length of stay should be undertaken with caution as a patient who is admitted and dies would seem to have the most efficient outcome (Barer et al 1990). On the other hand, an elderly person who has a prolonged stay but is fully rehabilitated would be considered as having had an inefficient outcome. Another confounding factor in the interpretation of the length of stay is early readmission. In such cases, premature or inappropriate discharge could be interpreted as efficiency.

The findings of this study showed that the mean length of stay for all the study population was 9.5 days, the range being from 0 - 165 days. This value stood at 6.4 days when stays exceeding 30 days were not included. On comparing the latter value with the length of stay for all admissions to St. Luke’s Hospital in 1995, the length of stay (excluding stays greater than 30 days) was 2.62 days. This difference could be
attributed to the fact that as a person gets older the recovery process is slower than that in younger persons. In addition the elderly person might have multiple rather than single health problems hence delaying their discharge from hospital.

The distribution of the length of stay shows that the majority of patients stayed at hospital for less than 30 days. On the other hand the long stay patients amounted to 6% of the study population. On looking at these long stay patients it was found that 28% of them were transferred to a Government owned residential home whilst 16% went to another public hospital on discharge. There were also 20% who were discharged to their usual residence and 29% died. The remaining were discharged to private residential homes or had no destination on discharge recorded.

From the routine data available, one cannot describe all long stay patients as “bed blockers”. This term can only be used if in the opinion of the medical and nursing staff, the patient no longer requires the facilities provided in hospital (Coid and Crome 1986). These authors found that “bed blockers” tended to have severe residual handicaps leaving them unable to return to the community, unless they had relatives who were willing to dedicate a considerable amount of time in caring for them. Thus patients who are in this situation have no alternative but to wait until arrangements to go into a residential home are made, in the meantime occupying an acute hospital bed. Even though the numbers of both Government-owned and privately owned residential homes have increased over the past 5 years, the demand for places in residential care is still not being satisfied.

The average length of stay was analysed according to 5 year age groups and according to gender. The findings showed that the average length of stay increased steadily with
age up to the 95 + years group. The association between a prolonged length of stay and advancing age has been shown by Maguire et al (1986) as well as by Barer et al (1990).

However age is not the only factor involved as the above authors found that the diagnosis as well as the level of functional ability were more important than other factors in determining the length of hospital stay in the elderly.

The statistically significant difference in the length of stay between males and females is probably due to a number of factors many of which cannot be explained by looking at routine data. The difference in diagnoses as well as the functional disability experienced by male and female admissions may be exerting a major influence on the length of stay. Another reason for the shorter average length of stay is that there were more male patients who were admitted and discharged on the same day (46) than females thus admitted (30) despite there being an overall excess of 200 female admissions. These admissions were not entirely due to day cases, such as admissions for cataract removal. In fact there were also a few admissions where the elderly person was admitted to hospital and died on the same day.

**Readmissions in the study population**

The early readmission of elderly patients following hospital discharge is a problem which is commonly encountered and can be frustrating to both patient as well as to health care workers. Readmissions are often considered as “failures” and are presumed to be brought about by poor clinical management and discharge planning or by the lack of follow up or community support (Colledge and Ford 1994). However
due to the multiple factors which influence readmission rates one cannot label every readmission as a failure. Very often these may be unavoidable and they may also be planned. Other factors which play a part are the readmission thresholds of different hospitals, the availability of beds, as well as the pressure exerted by hospital management to decrease the length of stay of patients, possibly resulting in some cases of premature discharge.

The definition of readmission rates varies widely and there is no standard practice as to how to measure readmissions. Several authors advocate the use of readmission rates at 28 days post discharge from hospital (Chambers and Clarke 1990, Henderson et al 1989). They also suggest that the denominator should include all those who were discharged alive within the reference period.

In this study the readmission rate was calculated over a period of one year, that is the number of readmissions during 1995 was the numerator, whilst the total number of discharges alive or dead were taken as the denominator. The reason for including all the discharges was that since the reference period was one year long, there was a considerable chance that a patient could have been admitted 2 to 3 times before his/her final admission to hospital. This was found to be the case when the data pertaining to those who died was viewed on the database file.

The readmission rate thus calculated for the study population was 24%. This compares with a study by Graham and Livesley which was quoted in Colledge and Ford (1994), were the readmission rate to a hospital geriatric unit was 25% during the previous year. Almost three fourths of the patients who had readmissions had only one readmission during 1995 whilst one elderly patient was admitted 10 times. This patient
was an 89 year old lady who was admitted to the same general medical ward 9 times and once to another medical ward. The main discharge diagnosis of heart failure was the same in 5 out of the 10 admissions.

Readmission rates were found to differ according to specialty (Chambers and Clarke 1990) where surgical specialties have a lower readmission rate than the medical ones. This difference was also found in this study. In the general medical wards the readmission rate was of 23% whilst in the surgical wards it was 14%. The reason for this is because many medical conditions are chronic and relapses requiring readmission to hospital are common.

There are a number of limitations when using readmission rates to compare outcomes between different hospitals or different sections. Firstly the method of calculating the readmission rates may differ; secondly due to the variation in case-mix and severity, the numbers of planned or unavoidable readmissions would differ. Thirdly there may be problems in defining the denominator (Milne and Clarke 1990). However the authors go on to say that their value lies in that they are easily obtainable from routine statistics and for want of a better outcome indicator than mortality rates, they are useful.

It would be interesting to study the relationship between the lack of social support and readmission rates in Malta. In a randomised controlled study in the UK it was found that having a care attendant service after being discharged from hospital resulted in a reduction in the readmission rate, particularly in the long run, and this benefit was greatest for those living alone and those over 85 years old (Townsend et al 1988).
The setting up of such a service to those who are more likely to benefit from it is highly recommended for our country, as the number of readmissions could be lowered by such a service.

**Discharge Diagnoses**

The main discharge diagnoses of the study population were analysed and grouped according to the International Classification of Diseases (ICD-9). The greatest proportion (21%) of the diagnoses came from the chapter that covers diseases of the circulatory system. However on looking at the more specific diagnosis, the most frequently encountered diagnosis was where a symptom was recorded as a diagnosis. This subheading of the ICD-9 includes such terms like chest pain, dyspnoea, syncope etc. Such a discharge diagnosis is in fact not a diagnosis at all and indicates that no diagnosis was reached prior to discharge. This finding is not peculiar to the study population because in the Hospital Activity Analysis Annual Report for 1995, the commonest diagnosis in the medical ward section was symptoms of the respiratory system and other chest symptoms.

The presence of only one admission having the main discharge diagnosis as “social case” and two admissions having this diagnosis as a supplementary diagnosis was an unexpected finding. The idea that the very elderly are often admitted to hospital because of social problems was not evident from this study, however one may query whether this is the true picture, or whether the doctor filling in the discharge diagnosis prefers to justify such an admission by using a clinical diagnosis rather than a social one.
Conclusion

One of the aims of the World Health Organisation's "Health for All" target number 6 is that by the year 2000, people aged 65 years and over should have a significant increase in the health-related quality of their life and in the number of years lived free from disability. The emphasis on the quality of life is rightly made because what would be the scope of living a very long life with a very poor quality of life?

This study was limited to looking at the very elderly who were admitted to hospital and what becomes of them. However based as it was on routine data sources, it did not cover quality of life after discharge. Future research into the quality of life experienced by the elderly following an acute hospital stay would be highly commendable. This would be useful so as to complete the picture with regards to the outcome of elderly persons admitted to hospital.

Other aspects of hospitalisation of elderly persons also merit research. These include the patient's satisfaction or otherwise whilst in hospital, as well as the existence or lack of social support once the elderly person is discharged from hospital. Acute health care for the elderly should therefore have as its main objective the restoration or maintenance of functional ability so that the elderly person may return to living a fulfilling life within the community. When this is impossible to achieve due to disability, then every endeavour should be made so that the elderly person is supported, rehabilitated and assisted so as to allow him or her to live a comfortable life.

The fast and hectic lifestyle that many younger adults live today may mean that caring for an elderly relative is difficult, due to work and family commitments. However
providing care for such persons cannot be left up to the State alone. Relatives, friends, voluntary organisations as well as private enterprises should all share in shouldering the responsibility for caring for the elderly community.

The organisation of acute health care at St. Luke's Hospital is presently in the form of the integrated approach where elderly patients are cared for in the general wards together with the younger age groups. This approach has its advantages including the fact that medical staff are in touch with all age groups and maximising scope in the use of beds. However the main disadvantage of such a set up is that specific services which would benefit the elderly person might not be developed to the full because of the demands of the younger patients.

Studies have suggested that the age-defined approach for acute care of the elderly is more beneficial to the patient (Rai et al 1985, Mitchell et al 1987). In such an approach, all patients above a certain age (e.g. 75+) are admitted to an acute geriatric unit within the general hospital. The main advantages of this would be that a specialist geriatric team would care for the patient. Also nursing care, physiotherapy, occupational therapy as well as social workers, would all be trained to deal with the acute problems encountered by the elderly patient.

Another advantage is that this multidisciplinary team can organise discharge planning for their patients so that their return to the community can be effected in a smooth way. This would be difficult in an acute medical ward where the demand for beds is constantly high and health professionals are under pressure to discharge patients as soon as possible.
The main disadvantage in this type of care is that by setting an age limit for admission to the geriatric unit, one may be discriminating against the younger elderly (e.g. aged 60-74) who are a few years younger but who would benefit if they were admitted to such a unit.

Further research to determine which model of acute care for the elderly would be more efficient and effective in the Maltese situation is recommended. Evaluation of the services currently being provided and planning accordingly so as to improve upon them, should be given priority by health care providers. The needs of the elderly are going to escalate in the future and the health care system should be prepared for this when the “baby boomers” reach old age in the first and second decade of the 21st century.
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# Annex 1

**HOSPITAL ACTIVITY ANALYSIS**

- **Patient Details**
  - Surname, name: ____________________________
  - Sex: [ ] Male, [ ] Female
  - Hospital file no.: ____________________________
  - Date of Birth: ____________________
  - Usual locality of residence: ____________________________

- **ADMISSION**
  - To Ward: ____________________________
  - Date: ____________________________
  - Admitting Consultant’s Medical Council Registration No.: [ ] [ ] [ ] [ ]

- **Method**
  - [ ] 1. Booked/planned/ elective, [ ] 2. Urgent/emergency

- **Source**
  - [ ] 5. Government residential home (including SVRPI), [ ] 6. Private hospital/clinic, [ ] 7. Private residential home
  - [ ] 8. Medical institution abroad, [ ] 9. No previous address (newborn baby)

- **TRANSFERS** (if any)
  - To Ward: ____________________________
  - Date: ____________________________
  - To Ward: ____________________________
  - Date: ____________________________
  - To Ward: ____________________________
  - Date: ____________________________

- **DISCHARGE**
  - Discharge Date: ____________________________

- **Method**

- **Destination**
  - [ ] 5. Government residential home (including SVRPI), [ ] 6. Private hospital/clinic
  - [ ] 7. Private residential home, [ ] 8. Medical institution abroad, [ ] 9. No previous address (newborn baby)

- **CLINICAL DATA** (to be filled in by discharging physician)

  **MAIN DIAGNOSIS/CONDITION TREATED**

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  **OTHER DIAGNOSES/CONDITIONS TREATED** (if any)

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  **OPERATIONS/PROCEDURES** (if any)

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  Physician’s signature: ____________________________
Annex 2

Localities included in each region

**Inner Harbour Region**
- Valletta
- Floriana
- Sliema
- Gzira/Ta’Xbiex
- Msida
- G’Mangia/Pieta
- Hamrun
- Marsa
- Paola
- Cospicua
- Senglea
- Vittoriosa
- Kalkara
- Sta. Lucia

**Outer Harbour Region**
- St. Julians
- San Gwann
- Birkirkara
- Sta. Venera
- Qormi
- Luqa
- Tarxien
- Fgura
- Zabbar

**South Eastern Region**
- Qrendi
- Mqabba
- Zurrieq
- Safi
- Kirkop
- Gudja
- Ghaxaq
- Birzebbugia
- Marsaxlokk
- Zejtun
- Zejtun
Western Region
Dingli
Rabat
Mdina
Siggiewi
Zebbug
Attard
Lija
Balzan

Northern Region
Mellieha
St. Paul's Bay
Mgarr
Mosta
Naxxar
Gharghur

Gozo & Comino
San Lawrenz
Gharb
Ghasri
Kercem
Munxar
Fontana
Victoria
Zebbug
Xaghara
Xewkija
Sannat
Gh'Sielem & Comino
Nadur
Qala