

The Palliative Care Populations of Counties Manukau District Health Board

Dr Sarah Gray
Public Health Medicine Registrar
Public Health Team
CMDHB
2013

Acknowledgements

I would like to thank Graeme Longdell of Franklin Hospice and Helene Britnell of Totara Hospice, Ilya Ratine of the Ministry of Health, Rosie Whittington of CMDHB Decision Support and Dean Papa of CMDHB for their assistance in providing the data for this analysis. I would also like to thank Dr Willem Landman (Snr) and Dr Linda Huggins, Palliative Care Physicians, for their enthusiasm for this project and their support. Finally I would like to acknowledge Doone Winnard and Yvonne Wright who were extremely helpful in providing both supervision and feedback throughout.

Disclaimer

Every effort has been made to ensure that the information in this report is correct. Counties Manukau District Health Board and the author do not accept any responsibility for information which is incorrect and where action has been taken as a result of the information in this report.

This report is better read in colour. Use of a colour printer is recommended for preparing hard copies.

Suggested Citation: Gray S (2013) The palliative care populations of Counties Manukau District Health Board. Auckland: Counties Manukau District Health Board.

Abbreviations

AA	Arranged Admission
AC	Acute Admission
ACH	Auckland City Hospital
ADHB	Auckland District Health Board
AIDS	Auto-Immune Deficiency Syndrome
ARRC	Age Related Residential Care
ASU	Auckland Spinal Unit
AT&R	Active Treatment and Rehabilitation
BDM	Births, Deaths and Marriages
CAU	Census Area Unit
CCNZ	Cancer Control New Zealand
CMDHB	Counties Manukau District Health Board
COPD	Chronic Obstructive Pulmonary Disease
CVA	Cerebrovascular Accident
DHB	District Health Board
DM	Diabetes Mellitus
DOB	Date of Birth
EEPCN	Extended Estimate of Palliative Care Need
ESRD	End Stage Renal Disease
FH	Franklin Hospice
FMH	Franklin Memorial Hospital
HIV	Human Immunodeficiency Virus
HNA	Health Needs Assessment
ICD	International Coding of Disease
IHD	Ischaemic Heart Disease
MB	MeshBlock
MEPCN	Minimum Estimate of Palliative Care Need
MI	Myocardial Infarction
MMH	Middlemore Hospital
MND	Motor Neurone Disease
MoH	Ministry of Health
MORT	The Mortality Collection
MSC	Manukau Super Clinic

NGO	Non-Governmental Organisation
NHI	National Health Index
NMDS	National Minimum Dataset
NZ	New Zealand
NZCR	New Zealand Cancer Registry
NZDep06	New Zealand Deprivation Index 2006
PCC	Palliative Care Council
PUKH	Pukekohe Hospital
Stats NZ	Statistics New Zealand
THSA	Totara Hospice South Auckland
TLA	Territorial Local Authority
WHO	World Health Organization
WN	Waiting List Admission

Executive Summary

This report describes specific demographic characteristics, place of death and the service utilisation of the current and potential palliative care adult populations of Counties Manukau District Health Board (CMDHB) for the CMDHB palliative care model of care project.

Data was obtained from Statistics New Zealand, the Mortality Collection, the National Minimum Dataset (hospital events), Totara Hospice South Auckland (THSA) and Franklin Hospice (FH).

The general demography of the total CMDHB estimated resident adult population 2006 is described and then information on total CMDHB resident adult deaths 2005 – 2009 is provided by year of death, age group, gender, ethnicity, place of death, cause of death and service utilisation in the last year of life.

Two estimated populations of palliative care need and two hospice populations are also then described. The latter provides information on patients that were actually provided palliative care by CMDHB contracted hospices from 2005 to 2009 inclusive. The former provides information on those patients who may have benefited from palliative care input but may or may not have received it. These populations are based on two of three estimated populations of palliative care need described in a national health needs assessment of palliative care undertaken by the Palliative Care Council (PCC) of New Zealand (Palliative Care Council of New Zealand 2011).

The first of these estimated populations of palliative care need, the minimal estimate, is identical in methodology to that used in the PCC and includes patients in 12 key disease groups considered most likely to benefit from palliative care. The selection of these groups acknowledges that while palliative care services have traditionally focused on patients with cancer, it is increasingly being recognised that patients with other terminal illnesses would benefit from palliative health care service input. Patients that died of conditions in these disease groups 2005 – 2009 are included in this population.

In defining the second potential CMDHB population who may benefit from palliative care it was decided that the PCC mid-range and maximal estimates were not applicable to the current CMDHB health care environment. The mid-range estimate misses patients who have conditions for which palliative care may be beneficial, if they die of other causes. In particular patients with heart failure and chronic obstructive pulmonary disease may be undercounted. These conditions are particularly prevalent in the CMDHB population. With respect to the maximal estimate, as noted in the PCC report, there are constraints such as service availability, funding, attitudes to death and dying and patterns of referral that make the maximal estimate currently unfeasible for the NZ health system (Palliative Care Council of New Zealand 2011).

Therefore this report includes analysis of a newly constructed 'extended' estimate. This extended estimate includes patients in the minimal estimate plus patients who had a hospital admission within the last 12 months of life for a condition in one of the 12 disease groups, but who did not die from it and patients who had a separate hospital admission in the last year of life for any condition that was the same as their eventual cause of death.

This report does not attempt derivation and standardisation of rates or statistical analysis of its findings. The intent is instead to provide a snapshot of information on the potential palliative care need of the CMDHB population 2005 – 2009 which can be used to guide and direct further analysis.

The CMDHB estimated resident adult population 2005 – 2009

General Demography: The total CMDHB estimated resident adult population (those aged 15 years and over) in 2006 was 339,305 people. Of these 21% were aged 15 – 24 years, 39% were aged 25 – 44 years, 29% were aged 45 – 64 years, 7% were aged 65-74 years and less than 5% were aged 75 years and over. By ethnicity 14% were recorded as being Maaori, 19% as Pacific, 18% as Asian and 49% as European or Other. The population was relatively deprived with a total of 42% living in NZDep06 Deciles 9 and 10 based on CAU assignment (see report for how this differs from MeshBlock assignment). The number of people in the CMDHB estimated resident adult population is predicted to rise by 45% between 2006 and 2026.

The CMDHB estimated resident adult population can be divided into different localities on the basis of residence and enrolment with primary care services – residential localities and service localities. There are seven residential localities and four service localities identified in CMDHB. The distribution of people by ethnicity, age and deprivation varies widely across localities. These differences influence health service utilisation and need and are important issues to consider in the planning of services.

Deaths: From 2005 to 2009 inclusive an average of approximately 2,180 deaths occurred per year in CMDHB resident adults. The most common causes of death were neoplasms (31%) and ischaemic heart disease (20%). As expected the numbers of deaths varied by age. In total 8% of CMDHB resident adult deaths were in people aged 15 – 44 years at the time of death and 52% were aged 75 years and over. As the CMDHB Maaori, Pacific and Asian populations are relatively youthful and Maaori and Pacific peoples have shorter life expectancies than other populations, the distribution of people that died by ethnicity differed to that of the total adult population with 65% of deaths being recorded as European / Other, 14% Maaori, 16% Pacific and 6% Asian.

Place of death: The most common place of death for CMDHB resident adults 2005 – 2009 was hospital (36%), followed by home (29%), residential care (24%), and hospice (5%). A greater proportion of males compared with females died at home (33% v 26%) with less dying in residential care (19% v 29%). A higher proportion of Maaori and Pacific ethnicities died at home (43% and 42% respectively) than those recorded as being Asian or European / Other (32% and 23% respectively). A relatively small proportion of European / Other people died in hospital and a greater proportion died in residential care than those of other ethnic groups.

Service Utilisation in the last year of life: On average CMDHB resident adults that died 2005 – 2009 had three hospital admissions in their last year of life. The majority of these admissions (64%) were acute. Those in the 45-64 year age group had most admissions per person in their last year of life and those in the 15 – 24 year age group had the least. There was no difference in the total numbers of hospital admissions per person in the last year of life by ethnicity.

The minimal estimate of palliative care need (MEPCN) population

Demography: From 2005 – 2009 inclusive an average of 911 CMDHB resident adults per year died from the 12 conditions that are considered to be potentially amenable to palliative care. This equates to 41.7% of all CMDHB resident adult deaths in the same time period. In total 75% of these deaths were from neoplasms. Almost 50% of these deaths were in adults aged 45 – 74 years. The breakdown by ethnicity was similar to that of all CMDHB adult resident deaths.

Place of death: A total of 11% of the MEPCN population died in a hospice which was higher than in the baseline population (5%). The place of death differed by cause of death for people in this population. Virtually all those dying in a hospice had a neoplasm, although the greatest proportions of people with neoplasms died at home (34%) or in hospital (31%). The majority (66%) of those dying from a neurological condition died in residential care. High proportions of those with either 'Chronic Obstructive Pulmonary Disease (COPD)/Bronchiectasis' or 'Renal Failure/Diabetes Mellitus (DM) with End Stage Renal Disease (ESRD)' died in hospital (47% and 39% respectively).

Service Utilisation in the last year of life: On average the number of total hospital admissions per person in the last year of life for the MEPCN population was higher than the cohort of all deaths 2005 – 2009 at an average of four per person. There was a gradient of reducing numbers of admissions from younger to older age groups with those aged 15 – 24 years having nearly nine admissions per person on average compared with 2.5 admissions per person in those aged 85+ years. The greatest numbers of arranged admissions to Middlemore Hospital (MMH) and Auckland City Hospital (ACH) were under Haematology (65%) and Respiratory Medicine (45%) respectively. A total of 25% of all acute admissions were to ACH which has important implications for service delivery discussions as dialogue will be required with clinicians beyond CMDHB to influence these admissions. Patients who died of a neoplasm were more frequently admitted to hospital in their last year of life than patients with other causes of death.

The extended estimate of palliative care need (EEPCN) population

Demography: During the period 2005 – 2009, a total of 6,409 people may have benefited from palliative care if the methodology for the extended estimate of palliative care need (EEPCN) is applied. This equates to 58.7% of all CMDHB resident adult deaths in this time period. Compared with the MEPCN population the EEPCN population had a slightly higher proportion of people in the 85+ years age group (21.4% v 17.3%), and slightly smaller proportion in the 45 – 64 years age group (21.6% v 24.5%) but was similar with regard to ethnicity and geographical distribution across localities.

Place of death: In total 28% of EEPCN deaths occurred in the home setting 37% in hospitals, and 8% in hospices. Compared with the MEPCN, a relatively high proportion of EEPCN deaths occurred at MMH.

Service utilisation in the last year of life: On average the number of total hospital admissions in the last year of life for the EEPCN was four per person. Specialities for which there was the greatest increase in the number of arranged admissions for the EEPCN population compared with the MEPCN were Geriatric AT&R, Cardiology and Renal Medicine at MMH and Cardiothoracic Surgery and Gastroenterology at ACH. Acute admissions to Cardiology increased by a factor of six compared with the MEPCN population which is

keeping with the fact that approximately 10% of the EPCN population died of ischaemic heart disease.

Hospice Populations

Demography: From Jan 2005 to Dec 2009 inclusive 409 patients were under the care of Franklin Hospice (FH) and 2,631 patients under Totara Hospice South Auckland (THSA). These numbers are in keeping with the fact that Franklin Hospice serves a much smaller proportion of the CMDHB estimated resident adult population than THSA. At FH during the selected time period 40.3% of patients were female and 59.7% were male. At THSA 48% were female and 52% male. The proportion of patients in each age group was very similar for the two hospice populations however the hospice patients appeared younger on average than the cohort of all CMDHB resident adult deaths 2005 - 2009. The proportion of deaths in the 85+ age group was 8.8% and 9.7% for FH and THSA populations respectively compared with 25.1% for the total CMDHB population, 17% for the MEPCN population and 21% for the EPCN population in the same time period. The distribution of patients across different ethnic groups was quite different for the two hospices, but again reflects that of the geographical populations they served.

The most common diagnosis was 'neoplasm', (90% at FH and 82% at THSA). THSA patients with COPD / bronchiectasis were most likely to have multiple diagnoses.

Place of death: Slightly more FH patients died at home than THSA patients (52% compared with 44%). In both hospice populations more patients died at home than in the total CMDHB adult population (29%). In total 19% of THSA patient deaths occurred in a hospice compared with 4.6% of total CMDHB deaths. A high proportion of Maaori and Pacific patients under THSA services died either at home or in the hospice (70% and 67% respectively).

Service Utilisation in the last year of life: In total 81% of hospice patients were admitted to CMDHB facilities in their last year of life. The greatest number of arranged admissions was to the speciality of Haematology for both hospice populations. Data on admissions to ACH was not available.

Contents

Executive Summary.....	4
List of Tables	10
List of Figures	14
1 Introduction	16
1.1 Context	16
1.2 Ethical Approval	16
1.3 Aims and Objectives.....	17
2 Background	18
2.1 Palliative Care Definitions	18
2.2 Palliative Care Services.....	19
2.3 Place of Death	20
2.4 Localities Approach	20
3 Methods.....	22
3.1 Data Sources.....	22
3.2 Palliative Health Care Need Population Estimates	25
3.3 Hospice Populations.....	27
3.4 Data Analysis	27
3.5 Variables.....	27
3.6 Data Protection and Storage.....	29
4 CMDHB Estimated Resident Adult Population Demography	30
4.1 Key Points.....	30
4.2 Age Group, Gender and Ethnicity	31
4.3 Residential Locality, CMDHB Service Locality and Decile	32
4.4 Projected Population Increases.....	33
5 Historical Cohort of Deaths in the CMDHB Resident Adult Population	36
5.1 Key Points.....	36
5.2 Age Group, Gender and Ethnicity	38
5.3 Place of death.....	39
5.4 Service Utilisation in the Last Year of Life	41
6 Minimal Estimate of Palliative Care Need Population.....	44
6.1 Key Points.....	44

6.2	Age Group, Gender and Ethnicity	45
6.3	Residential Locality, CMDHB Service Locality and Decile	47
6.4	Place of Death	48
6.5	Service Utilisation in the Last Year of Life	51
7	Extended Estimate of Palliative Care Need Population	62
7.1	Key Findings.....	62
7.2	Age Group, Gender and Ethnicity	63
7.3	Residential Locality, CMDHB Service Locality and Decile	65
7.4	Place of Death	65
7.5	Service Utilisation in the Last Year of Life	68
8	Totara Hospice South Auckland and Franklin Hospice Populations	78
8.1	Key Findings.....	78
8.2	Age Group, Gender and Ethnicity	79
8.3	Diagnoses	83
8.4	Place of Death	86
8.5	Service Utilisation in the Last Year of Life	89
	References.....	99
	Appendices.....	100
	Appendix One: CMDHB Localities	100
	Appendix Two: Minimal Estimate of Palliative Care Need ICD10-AM codes	101
	Appendix Three: Service Localities, by Ethnicity and Age Group, for Baseline (2006) and Projected CMDHB Estimated Resident Adult Populations 2011 - 2026	102
	Appendix Four: Groupings of ICD10-AM Codes into Broad Categories of Causes of Death	106
	Appendix Five: Place of Death, by Gender, for Total CMDHB Resident Adult Deaths and the MEPCN, EEPCN, and Hospice Populations 2005 - 2009	107
	Appendix Six: Residential Locality and Decile for Baseline (2006), MEPCN and EEPCN Populations.....	108
	Appendix Seven: EEPCN Population 2005 – 2009, by Cause of Death	110
	Appendix Eight: Additional Non MEPCN Diagnoses in the THSA Population	111

List of Tables

Table 1: CMDHB estimated resident adult population, by age group, gender and ethnicity, 2006	31
Table 2: CMDHB estimated resident adult population, by residential locality and NZDep06 decile, 2006	34
Table 3: CMDHB estimated resident adult population baseline (2006) and projected population changes 2011 – 2026, by CMDHB service locality.....	34
Table 4: Causes of death of CMDHB resident adults 2005 – 2009	37
Table 5: Place of death of CMDHB resident adults who died 2005 – 2009, by age group	39
Table 6: Place of death of CMDHB resident adults who died 2005 – 2009, by ethnicity	40
Table 7: Hospital admissions in the last year of life for CMDHB resident adults who died 2005 – 2009, by age group.....	41
Table 8: Hospital admissions in the last year of life, by ethnicity, for CMDHB resident adults who died 2005 – 2009.....	42
Table 9: MEPCN population 2005 – 2009, by ICD10-AM code of cause of death	45
Table 10: MEPCN population 2005 – 2009, by year	45
Table 11: MEPCN population 2005 – 2009, by age group and gender.....	46
Table 12: MEPCN population 2005 – 2009, by ethnicity	47
Table 13: MEPCN population 2005 – 2009, by CMDHB service locality.....	47
Table 14: Place of death of MEPCN population 2005 – 2009, by DHB location of death	48
Table 15: Place of death of MEPCN population 2005 – 2009, by age group.....	48
Table 16: Place of death of the MEPCN population 2005 – 2009, by ethnicity	49
Table 17: Place of death of the MEPCN population 2005 – 2009, by category of cause of death.....	50
Table 18: MEPCN population 2005 – 2009 hospital admissions in the last year of life, by age group	51
Table 19: MEPCN population 2005 – 2009 hospital admissions in the last year of life, by ethnicity.....	52
Table 20: MEPCN population 2005 – 2009 with a hospital admission in the last year of life, by cause of death category.....	54
Table 21: MEPCN population 2005 – 2009 arranged admissions to MMH and ACH, by speciality	56
Table 22: MEPCN population 2005 – 2009 arranged admissions to CMDHB facilities (excluding MMH), by speciality.....	57

Table 23: MEPCN population 2005 – 2009 acute admissions to MMH and ACH, by speciality	58
Table 24: MEPCN population 2005 – 2009 waiting list admissions to MMH, MSC and ACH, by speciality.....	59
Table 25: MEPCN population 2005 – 2009 hospital admissions in the last year of life, by cause of death category.....	60
Table 26: EEPCN population 2005 – 2009, by year.....	63
Table 27: EEPCN population 2005 – 2009, by age group and gender	63
Table 28: EEPCN population 2005 – 2009, by ethnicity.....	64
Table 29: EEPCN population 2005 – 2009, by CMDHB service locality	65
Table 30: Place of death of EEPCN population 2005 – 2009, by DHB location of death	66
Table 31: Place of death of EEPCN population 2005 – 2009, by age group	66
Table 32: Place of death of EEPCN population 2005 – 2009, by ethnicity	67
Table 33: Place of death of EEPCN population 2005 – 2009, by category of cause of death	67
Table 34: EEPCN population 2005 – 2009 hospital admissions in the last year of life per person, by age group.....	68
Table 35: EEPCN population 2005 – 2009 hospital admissions in the last year of life per person, by ethnicity	69
Table 36: EEPCN population 2005 – 2009 patients with a hospital admission in the last year of life, by cause of death category	72
Table 37: EEPCN population 2005 – 2009 arranged admissions to MMH and ACH, by speciality	73
Table 38: EEPCN population 2005 – 2009 arranged admissions to CMDHB facilities (excluding MMH and THSA), by speciality	74
Table 39: EEPCN population 2005 – 2009 acute admissions to MMH and ACH, by speciality	75
Table 40: EEPCN population 2005 – 2009 waiting list admissions to MMH, MSC and ACH, by speciality.....	76
Table 41: EEPCN population 2005 – 2009 hospital admissions in the last year of life, by cause of death category.....	77
Table 42: THSA and FH populations 2005 – 2009, by year of death	79
Table 43: THSA and FH populations 2005 – 2009, by age group and gender	79
Table 44: THSA and FH populations 2005 – 2009, by ethnicity.....	82
Table 45: Differences in ethnicity recording between the hospice and CMDHB hospital events databases.....	82
Table 46: FH population 2005 – 2009 with a MEPCN condition.....	84

Table 47: FH population 2005 – 2009 with single / multiple diagnoses.....	84
Table 48: THSA population 2005 – 2009 with a MEPCN condition	85
Table 49: THSA population 2005 – 2009 with single / multiple diagnoses	86
Table 50: THSA and FH populations 2005 – 2009, by place of death.....	87
Table 51: Place of death of THSA population 2005 – 2009, by age group	88
Table 52: Place of death of THSA population 2005 – 2009, by ethnicity	89
Table 53: THSA and FH populations 2005 – 2009 CMDHB hospital admissions in the last year of life, number of admissions.....	90
Table 54: THSA and FH populations 2005 – 2009 CMDHB hospital admissions in the last year of life, bed days and average length of stay	90
Table 55: FH population 2005 – 2009 CMDHB hospital admissions in the last year of life, by age group.....	92
Table 56: THSA population 2005 – 2009 CMDHB hospital admissions in the last year of life, by age group	92
Table 57: THSA population 2005 – 2009 CMDHB hospital admissions in the last year of life, by ethnicity	93
Table 58: THSA and FH populations 2005 – 2009 CMDHB arranged admissions, by speciality	95
Table 59: THSA and FH populations 2005 – 2009 CMDHB acute admissions, by speciality	96
Table 60: THSA and FH populations 2005 – 2009 CMDHB waiting list admissions, by speciality	97
Table 61: THSA and FH populations 2005 – 2009 hospital of admission for CMDHB admissions in the last year of life.....	98
Table 62: CMDHB localities framework	100
Table 63: ICD10 – AM 6 th Edition codes mapping to conditions in the minimal estimate of palliative care need	101
Table 64: Maori baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026.....	102
Table 65: Pacific baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026.....	102
Table 66: Asian baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026.....	103
Table 67: European / Other baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026	104
Table 68: Aged 15 – 44 years baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026	104

Table 69: Aged 45 – 64 years baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026	105
Table 70: Aged 65 years and over baseline (2006) and projected population changes by CMDHB service locality, 2001 – 2026	105
Table 71: Groupings of ICD10 AM coding into broad categories of cause of death .	106
Table 72: Place of death of CMDHB resident adults who died 2005 – 2009, by gender	107
Table 73: Place of death of the MEPCN population 2005 – 2009, by gender	107
Table 74: Place of death of the EEPCN population 2005 – 2009, by gender.....	107
Table 75: Place of death of the FH population 2005 – 2009, by gender	107
Table 76: Place of death of the THSA population 2005 – 2009, by gender.....	107
Table 77: CMDHB estimated resident adult baseline (2006) population by residential locality and NZDep decile	108
Table 78: MEPCN population 2005 - 2009 by residential locality and NZDep decile	108
Table 79: EEPCN population 2005 – 2009 , by residential locality and NZDep decile	109
Table 80: EEPCN population 2005 – 2009, by cause of death	110
Table 81: THSA population 2005 – 2009 most common diagnoses in patients that had no MEPCN condition	111
Table 82: THSA population 2005 – 2009 most common additional diagnoses in patients that had one or more MEPCN condition	112

List of Figures

Figure 1: Proportions of CMDHB estimated resident adult population, by age group, 2006	32
Figure 2: Proportions of CMDHB estimated resident adult population, by ethnicity, 2006	32
Figure 3: Proportions of all CMDHB resident adults who died 2005 - 2009, by age group,	38
Figure 4: Proportions of all CMDHB resident adults who died 2005 - 2009, by ethnicity,	38
Figure 5: Place of death of CMDHB resident adults who died 2005 – 2009, by age group	40
Figure 6: Place of death of CMDHB resident adults who died 2005 – 2009, by ethnicity	41
Figure 7: Average number of hospital admissions in the last year of life per patient for CMDHB resident adults who died 2005 – 2009, by age group	42
Figure 8: Average number of hospital admissions in the last year of life per patient, by ethnicity, for CMDHB resident adults who died 2005 – 2009	43
Figure 9: Proportions of the MEPCN population 2005 – 2009, by age group	46
Figure 10: Proportions of the MEPCN population 2005 – 2009, by ethnicity	46
Figure 11: Place of death of the MEPCN population 2005 – 2009, by age group	49
Figure 12: Place of death of the MEPCN population 2005 – 2009, by ethnicity	49
Figure 13: Place of death of the MEPCN population 2005 – 2009, by category of cause of death.....	50
Figure 14: MEPCN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by age group.....	51
Figure 15: MEPCN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by ethnicity.....	52
Figure 16: MEPCN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by cause of death category	55
Figure 17: Proportions of EPCN population 2005 – 2009, by age group.....	64
Figure 18: Proportions of EPCN population 2005 – 2009, by ethnicity.....	65
Figure 19: Place of death of EPCN population 2005 – 2009, by age group.....	66
Figure 20: Place of death of EPCN population 2005 – 2009, by ethnicity.....	67
Figure 21: Place of death of EPCN population 2005 – 2009, by category of cause of death	68
Figure 22: EPCN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by age group.....	69

Figure 23: EEPCN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by ethnicity	70
Figure 24: EEPCN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by cause of death category	72
Figure 25: Proportions of the FH population 2005 – 2009, by age group	80
Figure 26: Proportions of the THSA population 2005 – 2009, by age group.....	80
Figure 27: Proportions of the FH population 2005 – 2009, by ethnicity	81
Figure 28: Proportions of the THSA population 2005 – 2009, by ethnicity.....	81
Figure 29: Proportions of FH population 2005 – 2009 with single and multiple diagnoses, by MEPCN category	84
Figure 30: Proportions of THSA population within each MEPCN category with single/multiple diagnoses	86
Figure 31: Place of death of THSA population 2005 – 2009, by age group	88
Figure 32: Place of death of THSA population 2005 – 2009, by ethnicity	89
Figure 33: FH and THSA populations 2005 – 2009 average number of CMDHB hospital admissions in the last year of life per person	91
Figure 34: FH population 2005 – 2009 average number of CMDHB hospital admissions in the last year of life per person, by age group	91
Figure 35: THSA population 2005 – 2009 average number of CMDHB hospital admissions in the last year of life per person, by age group	92
Figure 36: THSA population 2005 – 2009 CMDHB hospital admissions in the last year of life per person, by ethnicity.....	93

1 Introduction

1.1 Context

Currently, in mid-2012, there is no service delivery framework to guide palliative care service planning, delivery and evaluation in CMDHB. The development of an updated palliative care 'model of care' has therefore been commissioned to address current and future population need encompassing a 'localities' approach.

At a national level the Palliative Care Council (PCC) was established in 2008 by Cancer Control New Zealand to provide independent and expert advice to the Minister of Health, and to report on New Zealand's performance in providing palliative and end-of-life care. Phase one of a national health needs assessment (HNA) for palliative care was completed by the PCC in June 2011 (Palliative Care Council of New Zealand 2011). The aim of this phase of the HNA was to establish the number of people who may benefit from palliative care in New Zealand. It also provided an analysis of New Zealand population demographic data relevant to palliative care.

The PCC HNA report described the characteristics of the palliative care need populations for the country as a whole in some detail but did not carry out an in-depth analysis at District Health Board (DHB) level. It is recognised that the characteristics of populations within each DHB vary considerably with respect to many of the underlying determinants of health and health care need. It was therefore decided that it would be useful to analyse the palliative care need of the CMDHB local population in more detail to inform the development of the CMDHB palliative care 'model of care'. In addition to looking at basic demography of patients who could potentially benefit from palliative care in CMDHB, it was seen as useful to have an initial look at the place of death and service utilisation in the last year of life of this group of patients.

The focus of this CMDHB based report is therefore to describe specific demographic characteristics, place of death and the service utilisation in the last year of life of the current and potential palliative care adult populations of CMDHB for the CMDHB palliative care model of care project. It should be noted that this report does not contain statistical comparisons of the different populations described. It does provide information that can be used to direct further work in this area.

1.2 Ethical Approval

A protocol outlining the methodology to be used during the preparation of this report was submitted to the Northern Regional X Ethics Committee for review. Specific aspects that were felt may require ethical approval were that potentially identifiable patient data would be used during this study and linked across different databases, although results would only be presented in aggregated form. The Chairperson and Deputy Chairperson of the Upper South B Regional Ethics Committee who reviewed the protocol found that use of information in this way for the purposes of this project did not require ethical approval.

1.3 Aims and Objectives

The aim of this report is to inform the development of a palliative care 'model of care' for Counties Manukau District Health Board (CMDHB).

The objectives are:

- To describe the demographic characteristics of the total CMDHB population (both baseline(2006) and projected) as relevant to palliative care
- To describe the potential CMDHB population need for adult palliative care services by analysing characteristics of a historical cohort of patients who it is deemed may have benefited from palliative care services based on their cause of death and / or their utilisation of health care services during their last year of life
- To describe the demographic characteristics, place of death and service utilisation in the last year of life of the CMDHB population referred to CMDHB contracted hospice services 2005 – 2009

2 Background

2.1 Palliative Care Definitions

Palliative care services have traditionally focused on patients with cancer but it is increasingly being recognised that patients with other terminal illnesses would benefit from palliative health care service input.

The World Health Organization (WHO) defines palliative care as:

“An approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual”.

Palliative Care:

- *Provides relief from pain and other distressing symptoms*
- *Affirms life and regards dying as a normal process*
- *Intends neither to hasten nor postpone death*
- *Integrates the psychological and spiritual aspects of patients’ care*
- *Offers a support system to help patients live as actively as possible until death*
- *Offers a support system to help the family cope during the patient’s illness and in their own bereavement*
- *Uses a team approach to address the needs of patients and their families, including bereavement counselling, if indicated*
- *Will enhance quality of life, and may also positively influence the course of illness*
- *Is applicable early in the course of the illness, in conjunction with other therapies that are intended to prolong life, such as chemotherapy or radiation therapy, and includes those investigations needed to better understand and manage distressing clinical complications*

(World Health Organization 2002)

In 2007 the Palliative Care Subcommittee of the New Zealand Cancer Treatment Working Party developed a working definition of palliative care for New Zealand that takes into consideration issues of particular relevance to the New Zealand context. These include the place of the Treaty of Waitangi, including its fundamental principles of Partnership, Participation and Protection; the evolving nature of palliative care practice in New Zealand; the diversity of cultures present in our society; the importance of primary care in the New Zealand health care system and the need to integrate specialist and generalist palliative care (Palliative Care Subcommittee 2007).

The New Zealand definition of palliative care is:

Care for people of all ages with a life-limiting illness which aims to:

1. *Optimise an individual’s quality of life until death by addressing the person’s physical, psychosocial, spiritual and cultural needs.*

2. Support the individual's family, whaanau, and other caregivers where needed, through the illness and after death.

Palliative care is provided according to an individual's need, and may be suitable whether death is days, weeks, months or occasionally even years away. It may be suitable sometimes when treatments are being given aimed at improving quantity of life.

It should be available wherever the person may be.

It should be provided by all health care professionals, supported where necessary, by specialist palliative care services.

Palliative care should be provided in such a way as to meet the unique needs of individuals from particular communities or groups. These include Maaori, children and young people, immigrants, refugees, and those in isolated communities.

(Palliative Care Subcommittee 2007)

2.2 Palliative Care Services

In New Zealand the model of providing palliative care is through an integrated approach using a combination of generalist and specialist services.

'Generalist palliative care is palliative care provided for those affected by life-limiting illness as an integral part of standard clinical practice by any healthcare professional who is not part of a specialist palliative care team'(Palliative Care Subcommittee 2007).

'Specialist palliative care is palliative care provided by those who have undergone specific training and/or accreditation in palliative care/medicine, working in the context of an expert interdisciplinary team of palliative care health professionals' (Palliative Care Subcommittee 2007).

The Palliative Care Subcommittee stated that 'Generalist and specialist services need to be part of an integrated framework of care provision which may be facilitated through local and regional networks, with defined formal linkages to key services including community primary care, local acute hospitals, regional cancer centres, and other regional palliative providers'(Palliative Care Subcommittee 2007).

Palliative Care is delivered to the people of Counties Manukau District Health Board (CMDHB) by a range of multi-disciplinary teams of primary and secondary providers. These include: hospital clinical teams; hospital palliative care clinicians; district nursing, Totara Hospice South Auckland (THSA); Franklin Hospice (FH); primary care providers; aged residential care providers; and non-governmental organisations (NGOs).

Specifically in CMDHB Specialist Hospice Services are contracted to Totara Hospice South Auckland (THSA) and Franklin Hospice (FH). Currently in 2012 Totara Hospice South Auckland includes a nine bed inpatient facility and serves over 80% of the CMDHB population. Franklin Hospice is a smaller palliative care provider which provides community-based care only, although some patients are able to be admitted to Franklin Memorial Hospital or Pukekohe Hospital if they require in-patient palliative care. Patients may be provided with hospice

support whilst at home, as an inpatient at THSA or in residential care facilities. The CMDHB District Nursing Service may also provide support to hospice patients through Shared Care Arrangements with both hospices. This HNA does not attempt to document the contribution of the CMDHB District Nursing Service.

2.3 Place of Death

There is widespread belief that people would rather die at home than in hospital, however the validity of this belief and the degree to which it can be realised are unclear (Escobar Pinzon, Claus et al. 2011; Neergaard, Jensen et al. 2011). This report seeks to establish the current situation in CMDHB about the actual 'place of death' for patients referred to hospice services, the potential population who may benefit from palliative care services and the total CMDHB population. It is recognised that preferences on 'place of death' are influenced by many factors including, but not limited to ethnicity, age, gender, diagnosis, presence of a care giver at home, length of illness and capacity of services to provide support (Taylor, Ensor et al. 2012). This report will analyse 'place of death' by some but not all of these variables. Specifically data was not available in a format that could easily be analysed for presence of a care giver at home, length of illness and capacity of services to provide support but research into the influence of these factors on place of death could be considered in the future to better inform local service delivery models.

2.4 Localities Approach

The demographic characteristics of the populations of different areas within the CMDHB geographical boundaries are quite distinct and the underlying rationale for dividing up the CMDHB population into different localities is to enable the future development of healthcare services, including new initiatives such as Integrated Family Health Centres and Whaanau Ora Centres, to meet the specific needs of the local populations. CMDHB currently recognises its population can be divided up into two different types of localities: residential localities and service localities.

2.4.1 Residential localities

The population of CMDHB can be mapped according to the locality in which people live (their residential locality). The CMDHB residential locality boundaries have been aligned to the Auckland Council boundaries where possible, as the previous determination of the number and boundaries of the wards and local board by the Local Government Commission took into account work on communities of interest. Exceptions to this have occurred when a Census Area Unit (CAU) sits across more than one ward or board, in which case the CAU is 'forced' to aggregate into one ward or board only. Exceptions have also occurred when the DHB boundaries do not match the Council ones. For example, the CMDHB southern boundary did not change when Auckland City was formed, at which time the southern parts of Franklin were assigned to the Waikato District and Hauraki District rather than incorporated into Auckland City. This means the CMDHB boundary now extends beyond the Auckland Council boundary, and the CMDHB Franklin area includes parts of the Waikato District and Hauraki District. The Otahuhu part of the Mangere-Otahuhu local board is in the Auckland DHB region and the Otara-Papatoetoe Board has been divided using the natural boundary of State Highway 1. These divisions give seven CMDHB residential localities:

Mangere, Otara, Papatoetoe, Howick, Manurewa, Papakura and Franklin (Winnard D. et al 2012)

2.4.2 Service Localities

For the development of localities for health service provision, the CMDHB area has been divided into four localities. The boundaries for these localities take into account primary care provider affiliations and networks of interest as well as the physical addresses of primary care services. The service localities comprise of Mangere/Otara (including northern Papatoetoe), Eastern (Howick plus the Maraetai/Beachlands and Clevedon), Manukau (Manurewa, Papakura and the majority of Papatoetoe) and Franklin.

The populations of these service localities can be defined by residential status (mapped by domicile codes of where CMDHB residents live) or according to enrolment status (each person is mapped to the locality of the Primary Care practice they are enrolled with). Differences in the sizes and demographic make-up of the populations within each individual locality are evident, however, depending on which methodology is used. These differences occur as not all residents enrol in practices close to their homes. The enrolled population of Otara notably comes from a variety of residential localities, both in the CMDHB area and also beyond the CMDHB area. Conversely many CMDHB residents are enrolled in practices outside of CMDHB. Important for health services planning are the implications that a significant proportion of CMDHB residents will be missed if there is only consideration of the CMDHB enrolled patients group, and at the same time the enrolled patients group will include a significant number from outside the CMDHB population. Both resident and enrolled population numbers are important to consider. In particular projections of future service utilisation will need to take into consideration how demand on services may change over time as people respond to the location and type of services provided in each locality.

This report undertakes an analysis according to residential status of the population as information on residents of other DHBs who may be enrolled in CMDHB primary care practices was not available.

A table showing how the different types of locality relate to each other and to ward and DHB boundaries is given in Appendix One.

3 Methods

3.1 Data Sources

Data was obtained from five sources:

1. DHB Demographic Data Pivot Tables as based on Census Data from Statistics New Zealand
2. The Mortality Collection (MORT)
3. The National Minimum Dataset (NMDS) (hospital events)
4. The Totara Hospice South Auckland (THSA) and Franklin Hospice (FH) databases
5. The CMDHB live database of CMDHB hospital events

3.1.1 DHB Demographic Data Pivot Tables

Data from specifically constructed pivot tables containing demographic data on the New Zealand population, by DHB, were used to describe the demography of the total CMDHB estimated resident adult population (Wang 2012). These pivot tables were based on data obtained from Statistics New Zealand. A baseline population (2006) and projected populations for 2011, 2016, 2021 and 2026 are described. The 'estimated resident' population was used in preference to the 'usually resident' population as, although both are based on the 2006 census night population data, the former adjusts for residents who are temporarily overseas and census undercount as well as residents who are temporarily elsewhere in New Zealand on census night and is the basis for DHB funding allocation and planning.

3.1.2 The Mortality Collection

The Mortality Collection (MORT) is held by National Collections and Reporting, Information Delivery and Operations, National Health Board, Ministry of Health. The data obtained from this database was used in particular to establish cause of death and place of death. This database classifies the underlying cause of death for all deaths registered in New Zealand, including all registered foetal deaths (stillbirths), using the ICD-10-AM 6th Edition and the WHO Rules and Guidelines for Mortality Coding. The mortality statistics are compiled according to the year the death is registered. Each month Births, Deaths, and Marriages (BDM) sends National Collections and Reporting electronic death registration and electronic stillbirth information data (for the previous month's registrations), Medical Certificates of Causes of Death (BDM 50 and BDM 167), and Coroners' reports (Ministry of Health 2012).

Additional information on underlying cause of death is obtained from electronic hospital discharge data from the National Minimum Dataset (NMDS) and private hospital discharge returns, the New Zealand Cancer Registry (NZCR), the Department for Courts, the Police, the Land Transport Safety Authority, Water Safety NZ, Media Search, and from writing letters to certifying doctors, coroners, and medical records officers in public hospitals (Ministry of Health 2012).

Data was obtained from the MORT on all CMDHB resident deaths registered in 2005 – 2009 inclusive. This time period was chosen to allow some comparison with the national HNA (which analysed data from 2005 – 2007), with 2008 and 2009 added because of the potential for small numbers in some categories of death and to ensure that data being used was as up

to date as possible (due to the time incurred to confirm cause of death 2009 was the most recent data available from the Ministry of Health for this analysis). Individual records requested did not include any personally identifiable information and were uniquely identified by an encrypted NHI number.

Fields requested included:

- Master Encrypted NHI
- Age at death
- Age group
- Gender
- Prioritised ethnicity (level 2)
- Ethnicity 1 (level 2)
- Ethnicity 2 (level 2)
- Ethnicity 3 (level 2)
- Domicile code
- New Zealand deprivation index quintile 2006 (based on domicile code)
- Territorial Local Authority (TLA) of domicile
- Facility
- Place of death*
- Underlying cause of death (diagnosis type 'D')
- Other relevant diseases present (B1) (diagnosis type 'F')†
- Other contributing causes (B2) (e.g., medical misadventure) (diagnosis type 'G')†
- Date of death
- Year of death

*Place of death category was derived using a combination of facility type and the free text 'location of death field'

† All recorded diagnoses of type 'F' and 'G' were provided.

3.1.3 National Minimum Dataset (Hospital Events)

The National Minimum Dataset (NMDS) (Hospital Events) is a national collection of hospital discharge information, including clinical information, for inpatients and day patients. Unit record data is collected and stored. Individual records do not include any personally identifiable information and are uniquely identified by an encrypted NHI number (Ministry of Health 2011). In CMDHB this data is held by a CMDHB analyst who is able to use the encrypted NHI to link hospital event data to other data sources such as the Primary Healthcare Organisation (PHO) enrolment data to establish service locality by enrolment status and to CAU to determine residential locality.

Data was obtained on all hospital admissions in the last year of life for all CMDHB residents who died 2005 – 2009 inclusive. A statistical hospital admission is defined as an inpatient admission of 3 hours or longer.

This database was used to obtain information on hospital admissions to both CMDHB facilities and other DHB facilities for the total CMDHB population, together with the two estimated populations of palliative care need.

Fields requested included:

- Master Encrypted NHI
- Event start date (admission date)
- Event end date (discharge date)
- Clinical code (ICD 10 code of reason for hospital admission)
- Specialty of admission
- Hospital/Facility name
- Length of Stay
- CMDHB Service locality (4 localities)
- Residential locality (7 localities)
- Ethnicity group to level 2

3.1.4 Totara Hospice South Auckland and Franklin Hospice databases

Hospice Services contracted by CMDHB are Totara Hospice South Auckland (THSA) and Franklin Hospice (FH). These two hospices collect demographic and clinical data on all patients who they see and treat. These databases do include personally identifiable information such as NHI and DOB and use of the NHI was necessary to link the population information to hospital utilisation.

Data was obtained from both these hospices on patients who died 2005 – 2009 and who were under hospice care at the time of their death. This time period was chosen to allow comparison with the estimated palliative care need populations but may not reflect the current situation in 2012.

Fields requested included:

- NHI
- Hospice (Franklin or Totara)
- Gender
- DOB / age at death
- Ethnicity group (to level 2 if possible, otherwise level 1)
- Date of referral
- Date of primary assessment
- Date of death
- Place of death
- Diagnosis

3.1.5 The CMDHB live database of CMDHB Hospital Events

CMDHB decision support collects information on all hospital admissions to CMDHB facilities for electronic submission to the Ministry of Health, for subsequent inclusion in the National Minimum Dataset (Hospital Events). This CMDHB database includes personally identifiable information such as NHI and DOB.

Data was obtained on all hospital admissions in the last year of life for patients identified by hospice services as being cared for by their services and dying in 2005 – 2009. The NHI listed in the hospice databases was used as the identifier for these records. This database only

collates information on admissions to CMDHB facilities therefore admissions to facilities in other DHBs were not available for hospice patients.

Fields requested included:

- NHI
- Event start date (admission date)
- Event end date (discharge date)
- ICD 10 code of reason for hospital admission – principle diagnosis
- Admission admit type
- Admission end type
- Specialty of admission
- Hospital/Facility name
- Length of Stay
- CMDHB service locality (4 localities)
- Residential locality (7 local wards)
- Prioritised ethnicity group to level 2

3.2 Palliative Health Care Need Population Estimates

3.2.1 Palliative Care Council Estimates

The Palliative Care Council (PCC) National Health Needs Assessment (HNA) for Palliative Care was based on a framework developed for the National Council of Palliative Care in the United Kingdom (Tebbit P 2004), but modified by the addition of an Australian model for estimating the palliative care population (Rosenwax, McNamara et al. 2005). This approach identified three estimates of palliative health care need— a minimal, mid-range and maximal estimate (Palliative Care Council of New Zealand 2011).

The different estimates were constructed as follows:

- **Minimal estimate** —is condition specific and includes deaths from specific diseases/ conditions considered likely to benefit from palliative care (Appendix Two)
- **Mid-range estimate** —includes people who had a publicly funded hospital discharge within the last 12 months of life for the same condition as that recorded as the underlying cause of death on the death certificate
- **Maximal estimate** —includes all causes of death, except those regarded as clearly not amenable to palliative care (deaths attributable to pregnancy, childbirth and the puerperium, originating during the perinatal period, and resulting from external causes)

(Palliative Care Council of New Zealand 2011)

3.2.2 CMDHB Estimates

When defining the potential CMDHB populations who may benefit from palliative care, it was decided that the maximal estimate was not applicable to the current CMDHB health care environment because, as noted in the PCC report, there are constraints such as service availability, funding, attitudes to death and dying and patterns of referral that make this estimate currently unfeasible for the NZ health system (Palliative Care Council of New Zealand 2011). The validity of the mid-range estimate was also felt to be sub-optimal as a

trial of this methodology on CMDHB 2008 data suggested that this methodology appears to result in the exclusion of a significant number of patients who suffered from long term conditions for which palliative care may have been beneficial, but in the inclusion of patients who had not suffered from long-term life limiting conditions. This report therefore includes an in- depth analysis of a minimal estimate as per the methodology used in the PCC HNA, along with an analysis of a newly constructed 'extended' estimate the methodology of which is described below.

Minimal estimate: This estimate includes 12 key disease groups considered most likely to benefit from palliative care. The 12 disease groups were established through focus groups and key informant interviews, and then further refined by a literature review (Palliative Care Council of New Zealand 2011). Specific ICD-10-AM codes for these diseases were used as the criteria for this estimate and are listed in Appendix Two. Disease groups included:

- Neoplasm
- HIV/AIDS
- Motor neuron disease
- Parkinson's disease
- Huntington's disease
- Alzheimer's disease
- Heart failure
- Renal failure
- Diabetes mellitus with end stage renal failure
- Chronic obstructive pulmonary disease
- Bronchiectasis
- Liver failure

Extended Estimate: This estimate includes patients in the minimal estimate group plus:

- Patients who were admitted to hospital in their last year of life one or more times with a diagnosis that falls into one of the minimal estimate 12 disease groups but who did not have this diagnosis recorded as their cause of death
- Patients who had a hospital admission within the last 12 months of life for the same condition as that recorded as the underlying cause of death on the death certificate, but excluding hospital admissions that resulted in death

The rationale for the extended estimate is that is likely to pick up extra patients compared with the minimal estimate who may benefit from palliative care services. Patients with heart failure and chronic obstructive pulmonary disease, in particular, not uncommonly have other causes of death recorded such as an acute myocardial infarction or pneumonia and therefore would be missed with the minimal estimate methodology. Including patients who had a hospital admission within the last 12 months of life (separated in time from the date of death) for the same condition as that recorded as the underlying cause of death on the death certificate, will also pick up extra patients with long term terminal conditions. The basis for excluding admissions that resulted in death was to reduce the number of patients whose conditions were more likely to be acute in onset and who were relatively less likely to have benefited from palliative care input.

Admission diagnosis being the 'same' as cause of death is defined as the letter and first numerical digit of the ICD10 AM codes being identical. This means for some ICD10 subgroups codes were included where digits after the first numerical digit were different.

3.3 Hospice Populations

As virtually all patients who are under hospice services die rather than being discharged from these services, the number of patient deaths under hospice services was taken as a proxy for the number of patients seen by hospice services for this report.

3.4 Data Analysis

Data was analysed using Microsoft Excel 2003 as this is the version currently available on CMDHB workstations. Microsoft Excel 2010 was used to compile the Figures in this document to make use of the additional features available in the 2010 version.

The total CMDHB population data was analysed according to age group, gender, ethnicity, locality (residential and service localities), quintile of NZDep06 for the baseline (2006) and projected populations 2011, 2016, 2021, 2026.

A historical cohort of total CMDHB resident adult deaths 2005 – 2009 was analysed by year of death, age group, gender, ethnicity, place of death, cause of death and service utilisation in the last year of life.

The two estimated populations of palliative care need and two hospice populations were also analysed by the demographic variables listed above. In addition hospital service utilisation in the form of hospital admissions were analysed in greater depth (by speciality) for these populations as was cause of death (estimated populations) and diagnosis (hospice populations).

Data from the Mortality collection and NMDS (Hospital events) was linked using the master encrypted NHI. Data from Hospice Services and the live CMDHB hospital admissions database was linked using patient NHI.

3.5 Variables

3.5.1 Age Group and Gender

Gender was as recorded on the databases. Age groupings utilised were 15-24, 25-44, 45-64, 65-74, 75-84, 85+ years. The total population was analysed by age group to provide baseline information on the make-up of the CMDHB estimated resident adult population. In the analyses of potential palliative care need populations and of the hospice populations age at death was calculated from the dates of death and dates of birth. Throughout this report the term 'adult population' refers to the estimated population aged 15 years and over. People aged 14 years and under were excluded from this study as it is recognised that the provision of palliative care to this age group presents quite different challenges compared with the adult population (Palliative Care Council of New Zealand 2011).

3.5.2 Ethnicity

Ethnicity was prioritised to level 1 of the Statistics NZ ethnicity coding with 'NZ European' and 'Other' combined to avoid issues of small numbers in the "Other" group. Thus in this report each respondent is allocated to a single ethnic group using the priority system

(Maaori, Pacific, Asian, European / Other). For some of the larger analyses a more detailed breakdown of the Pacific and Asian ethnic groups was possible to level 2. This provides information on the Pacific and Asian sub groups. In some analyses the Asian ethnic group has been divided into Indian and “Other Asian”, with Indian being a proxy for South Asian.

3.5.3 Residential and CMDHB Service Localities

Each CMDHB resident is allocated a domicile code according to where they live. These were mapped to the seven residential localities approximating to local government wards and local boards in our area (as described previously) and some analyses carried out by these residential localities.

CMDHB have also divided the DHB into four discrete service localities each with a defined population. These populations can be defined by residential status (mapped by domicile codes of where CMDHB residents live) or according to enrolment status (each person is mapped to the locality of the primary care practice they are enrolled with) also described previously. As the data obtained for this report was according to CMDHB residency status rather than CMDHB enrolment status, residential status has been used for this report.

3.5.4 Deprivation

The NZ Deprivation 2006 Index (NZDep06) is the common measure of socioeconomic deprivation used by the health system in New Zealand. The deprivation index applies to areas, not individual people but is used as a proxy for individual socioeconomic status. This has limitations as not everyone living in a poor area will be poor themselves, and living in a wealthy area does not automatically mean a person is wealthy. It does however provide an indication of socioeconomic gradient.

NZDep06 is a census based, small area index of socioeconomic deprivation, with a relative deprivation score assigned to each Meshblock (MB) in New Zealand. Meshblocks are geographical units, defined by Statistics New Zealand. They are the smallest area units used to collect and present statistical information from Stats NZ (containing a median of 87 people in 2006). Meshblocks can be aggregated to Census Area Units (CAUs). The medium size of CAUs is 2,000 people.

At present how the NZDep06 score is derived differs across various health data sets. The current ‘gold standard’ for NZDep06 is MB level assignment however this is not routinely available across health datasets (Winnard D, et al 2012). Using a CAU based NZDep06 overestimates the volumes for higher deprivation areas compared with using a MB based method for the CMDHB population. A recent report found that when MB analysis is used, 34% of the CMDHB population were in Deciles 9 and 10 in 2006 compared with 42% if CAU is used. (CMDHB, 2012)

In this report NZDep06 score has been assigned according to CAU area as MB information was not available for many of the health service datasets.

3.5.5 Place of Death

Although the NMDS database contains facility codes which can be used to categorise place of death for people who die in a facility such as a hospital or hospice, no further information is accessible from this database on people whose deaths occur elsewhere. In contrast the MORT database is able access additional information provided in a free text ‘location of

death field' to further categorise place of death for individuals where this is otherwise unknown. This extra information was used by The Ministry of Health analytical services to construct a specific 'place of death' field and many deaths with 'facility not recorded' in the facility code field were then able to be categorised in more detail.

Place of death and cause of death were therefore obtained from the MORT collection for the historical cohort of CMDHB deaths 2005 – 2009 and two estimated populations of palliative care need 2005 – 2009. Where there was inconsistency between facility code and place of death field, the place of death field was generally deferred to.

Place of death was not available for some deaths occurring in late 2009 as these were not actually registered in 2009 and were therefore not in the MORT database although the deaths were recorded in the NMDS. This is noted in the relevant parts of this report.

3.5.6 Cause of Death and Hospice Diagnosis

Cause of death was obtained from the MORT database for the cohort of total CMDHB resident adult deaths and palliative care need population estimates. These are recoded using the ICD10 –AM 6th edition coding. Both primary and secondary diagnoses were available but just the primary diagnosis was used to categorise cause of death. As for place of death, the cause of death was not available for late 2009 deaths as these were not recorded in the MORT database. In general cause of death was analysed according to the 12 groupings listed in the minimal estimate but in some analyses these groupings have been further combined (as described in the relevant narrative) to avoid issues with small numbers.

In the hospice databases diagnoses are recorded by description and READ codes rather than by ICD10-AM codes and for each patient multiple diagnoses were frequently recorded. There was no clear division into which were the primary and secondary diagnoses; patients were therefore categorised into broad diagnostic groups related to groupings used in the minimal estimate of palliative care need and analyses carried out for these groupings.

3.5.7 Service Utilisation in Last Year of Life

Hospital admission data was analysed by admission type. Hence information is provided separately for arranged, acute or elective (from a waiting list) admissions for each speciality. Total number of admissions, total bed days and average length of stay are tabulated. The speciality of the admission is that documented at the point of discharge.

CMDHB in-patient facilities included Middlemore hospital (MMH) and Manukau Super Clinic (MSC). Other regional facilities include Pukekohe Hospital (PUKH), Franklin Memorial Hospital (FMH), Auckland Spinal Unit (ASU) and Totara Hospice South Auckland (THSA). As at November 2012 Pukekohe Hospital has 30 beds, the majority of which were long-stay Age Related Residential Care (ARRC) beds along with some Active Treatment and Rehabilitation (AT&R) beds and palliative care beds. Franklin Memorial Hospital has 18 beds comprising a mix of Hospital Level Residential Care, Active Treatment and Rehabilitation and Palliative Care beds.

3.6 Data Protection and Storage

All data was placed in password protected files on the CMDHB document management system.

4 CMDHB Estimated Resident Adult Population Demography

4.1 Key Points

- *Age Groups: Those aged 15-24 years = 21% of the total. 25-44 years = 39%, 45-64 years = 29%, 65-74 = 7% and 75 years and over = <5%*
- *Ethnicity: Maaori = 14%, Pacific = 19%, Asian = 18%, European / Other = 49%*
- *Deprivation: 42% of the CMDHB estimated resident adult population live in NZDep06 Deciles 9 and 10 (based on CAU assignment)*
- *Residential Localities: Smallest locality = Otara, Largest = Howick. In both Mangere and Otara 83% of the CMDHB estimated resident adult population live in Deciles 9 or 10 (most deprived)*
- *Service Localities: The distribution of ethnicities and age groups varies widely across localities*
- *The CMDHB estimated resident adult population is predicted to rise by 45% between 2006 and 2026*
- *The largest rise will likely be in the "Eastern" Service locality (approx. 59% increase)*

4.2 Age Group, Gender and Ethnicity

The total CMDHB estimated resident adult (those aged 15 years and over) population in 2006 was estimated to be 339,305 people. Table 1 gives the breakdown of the 2006 CMDHB estimated resident adult population by age group, gender and ethnicity.

Table 1: CMDHB estimated resident adult population, by age group, gender and ethnicity, 2006

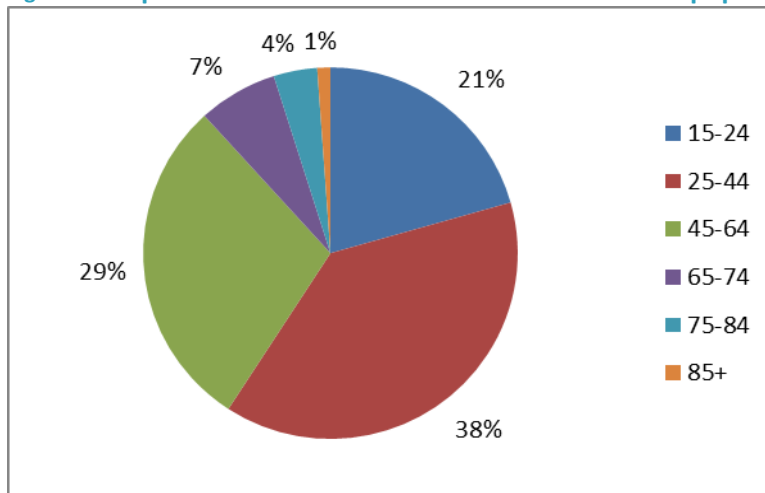
Age Group	Ethnicity	Female	Male	*Total number	(%)
15-24	Maaori	7,350	6,730	14,080	(20)
	Pacific	8,920	8,620	17,540	(25)
	Indian	2,765	2,700	5,465	(8)
	Other Asian	4,320	4,705	9,025	(13)
	Total Asian	7,085	7,405	14,490	(21)
	European/Other	11,630	12,480	24,110	(35)
	Total		34,985	35,235	69,810
25-44	Maaori	11,420	9,360	20,780	(16)
	Pacific	14,390	12,840	27,230	(21)
	Indian	5,885	5,930	11,815	(9)
	Other Asian	8,200	6,375	14,575	(11)
	Total Asian	14,085	12,305	26,390	(20)
	European/Other	28,940	27,390	56,330	(43)
	Total		68,835	61,895	130,730
45-64	Maaori	5,830	5,110	10,940	(11)
	Pacific	7,290	6,880	14,170	(14)
	Indian	3,015	3,330	6,345	(6)
	Other Asian	5,480	4,710	10,190	(10)
	Total Asian	8,495	8,040	16,535	(17)
	European/Other	28,540	28,340	56,880	(58)
	Total		50,155	48,370	98,525
65-74	Maaori	970	780	1,750	(8)
	Pacific	1,460	1,260	2,720	(12)
	Indian	480	490	970	(4)
	Other Asian	1,050	960	2,010	(9)
	Total Asian	1,530	1,450	2,980	(13)
	European/Other	8,180	7,610	15,790	(68)
	Total		12,140	11,100	23,240
75-84	Maaori	270	180	450	(4)
	Pacific	590	450	1,040	(8)
	Indian	155	110	265	(2)
	Other Asian	355	290	645	(5)
	Total Asian	510	400	910	(7)
	European/Other	5,750	4,610	10,360	(81)
	Total		7,120	5,640	12,760
85+	Maaori	40	20	60	(2)
	Pacific	140	50	190	(5)
	Indian	25	20	45	(1)
	Other Asian	85	30	115	(3)
	Total Asian	110	50	160	(4)
	European/Other	2,350	1,070	3,420	(89)
	Total		2,640	1,190	3,830
Grand Total		170,995	163,430	339,305	-

Source: Wang, K. (2012). NZ DHB and CAU Estimated Population 1991-2031 Pivot Tables

* Data may not sum exactly as individual cells are rounded to the nearest 5

Of this population, 21% were aged 15-24 years, 39% were aged 25-44 years, 29% were aged 45-64 years and less than 5% were aged 75 years and over (Figure1).

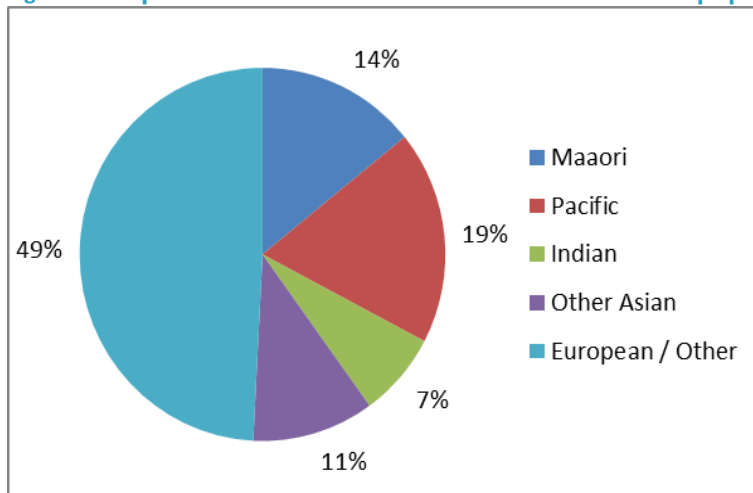
Figure 1: Proportions of CMDHB estimated resident adult population, by age group, 2006



Source: Wang, K. (2012). NZ DHB and CAU Estimated Population 1991-2031 Pivot Tables

Slightly under half (48%) of the population were male and slightly over half (52%) were female. In total, by ethnicity, 48,060 (14%) were Maaori, 62,890 (19%) were Pacific, 61,465 (18%) were Asian and 166,890 (49%) were European / Other (Figure 2). Of note, the Maaori and Pacific populations are relatively youthful compared to other ethnic group populations so a high proportion of the “aged less than 15 years” sub population in CMDHB were of these two ethnicities. This explains why the total CMDHB population, referred to in other situations, has a higher proportion of Maaori and Pacific than the 15 years and over CMDHB sub population which is the focus of this report.

Figure 2: Proportions of CMDHB estimated resident adult population, by ethnicity, 2006



Source: Wang, K. (2012). NZ DHB and CAU Estimated Population 1991-2031 Pivot Tables

4.3 Residential Locality, CMDHB Service Locality and Decile

The adult populations of each of the seven residential localities are given in Table 2. These populations range in size with the smallest residential locality population being Otago,

closely followed by Papakura. The largest residential locality is Howick which has more than three times the population of Otara and Papkura.

CMDHB has a disproportionate number of adult residents (42% in 2006) living in CAU's categorised as NZDep06 Decile 9 and 10 compared with NZ as a whole, however the distribution of the population according to Decile varies between residential localities. The numbers and percentages of the adult population by NZDep06 Decile and residential locality for 2006 are also given in Table 2. In total 83% of adult residents in both Mangere and Otara lived in CAUs categorised as Decile 9 or 10 compared with none in Howick and only 15% in Franklin. Conversely 67% of adult residents in Howick lived in CAUs categorised as Deciles 1 to 4 compared with none in Mangere, Otara or Paptotote. Of note it may be that a small number of people in Howick lived in Meshblocks (MBs) that are Decile 9 or 10 or that a small number of people in Mangere, Otara or Paptotote lived in MBs that are Deciles 1-4. NZDep06 assigned at CAU level is a much cruder estimate of deprivation than when it is assigned at MB level.

The distribution of the 2006 CMDHB estimated resident adult population into the four CMDHB service localities is given in Table 3. The largest population was in Manukau and the smallest population in Franklin. The distribution of ethnicities and age groups across the four service localities varied widely. For example 82% of Franklin and 61% of Eastern were recorded as being of European / Other ethnicity compared with just 18% of Mangere / Otara. In contrast 56% of Mangere / Otara were recorded as Pacific compared with just 1% and 2% of the total Franklin and Eastern populations. Eastern also had a large proportion of its population recorded as Asian (33%). More detail of the breakdown of these service locality populations by ethnicity and age group is provided in Appendix Three.

4.4 Projected Population Increases

The CMDHB estimated resident adult population is predicted to rise by 45% between 2006 and 2026. The largest rise will likely be in the service locality of 'Eastern' where an increase of 59% is predicted. Further information on ethnicity and age group specific population increases over time (2011, 2016, 2021 and 2026) is given in Appendix Three.

Table 2: CMDHB estimated resident adult population, by residential locality and NZDep06 Decile, 2006

Locality	Deciles 1-2		Deciles 3-4		Deciles 5-6		Deciles 7-8		Deciles 9-10		Total	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	% of total
Franklin	22,520	(42)	7,650	(14)	15,670	(29)	-	-	7,950	(15)	53,790	(100)
Howick	46,965	(50)	16,035	(17)	22,005	(24)	8,200	(9)	-	-	93,205	(100)
Mangere	-	-	-	-	2,485	(6)	4,645	(11)	35,235	(83)	42,365	(100)
Manurewa	4,635	(8)	5,720	(10)	9,170	(15)	-	-	39,760	(67)	59,285	(100)
Otara	-	-	-	-	-	-	4,105	(17)	20,055	(83)	24,160	(100)
Papakura	3,640	(12)	-	-	5,285	(18)	6,930	(23)	14,095	(47)	29,945	(100)
Papatoetoe	-	-	-	-	375	(1)	9,935	(27)	26,225	(72)	36,535	(100)
Total	77,760	(23)	29,410	(9)	54,985	(16)	33,810	(10)	143,320	(42)	339,285	(100)

Source: Wang, K. (2012). NZ DHB and CAU Estimated Population 1991-2031 Pivot Tables

* Data may not sum exactly as individual cells are rounded to the nearest 5

Table 3: CMDHB estimated resident adult population baseline (2006) and projected population changes 2011 – 2026, by CMDHB service locality

CMDHB Service locality	2006		2011		2016		2021		2026		
	Number	% of total	Number	% change from 2006	Number	% change from 2011	Number	% change from 2016	Number	% change from 2021	% change from 2006
Franklin	42,835	(13)	44,680	4%	46,330	4%	48,015	4%	48,975	2%	14%
Eastern	101,040	(30)	115,070	14%	130,900	14%	145,915	11%	160,880	10%	59%
Mangere/ Otara	72,660	(21)	82,675	14%	92,740	12%	101,760	10%	112,220	10%	54%
Manukau	122,755	(36)	134,465	10%	144,810	8%	156,815	8%	171,225	9%	39%
Total	339,285	(100)	376,890	11%	414,780	10%	452,505	9%	493,300	9%	45%

Source: Wang, K. (2012). NZ DHB and CAU Estimated Population 1991-2031 Pivot Tables

* Data may not sum exactly as individual cells are rounded to the nearest 5

5 Historical Cohort of Deaths in the CMDHB Resident Adult Population

5.1 Key Points

Demography:

- *There was an average of 2,184 deaths per year in CMDHB resident adults from 2005 to 2009 inclusive*
- *The most common causes of death were neoplasms (31%) and Ischaemic Heart Disease (20%)*
- *Age Group: Those aged 15 – 44 years = 8% of these deaths. 75 years and over = 52% of deaths*
- *Ethnicity: Maaori = 14% of deaths, Pacific = 16%, Asian = 6%, European/Other = 65%*

Place of death:

- *The most common place of death was hospital (36%), then home (29%), residential care (24%), and hospice (5%)*
- *More males than females died at home (33% v 26%) and less died in residential care (19% v 29%)*
- *A greater proportion of Maaori / Pacific died at home than Asian or European / Other. A smaller proportion of European / Other died in hospital and a greater proportion died in residential care than those of other ethnic groups*

Service Utilisation in the last year of life:

- *On average patients had 3 hospital admissions in their last year of life*
- *The majority of these admissions (64%) were acute*
- *Age group: Those aged 45-64 years had most admissions per patient and those aged 15 – 24 years had the least*
- *Ethnicity: There were similar numbers of admissions across ethnicities. European Other had on average more arranged admissions than Maaori / Pacific*

There was a total of 10,922 deaths in CMDHB adult residents (those aged 15 years and over) from 2005 – 2009 inclusive. The number of deaths per year ranged from 2,050 (2005) to 2,243 (2008) with the average annual number of deaths in this five year period being 2,184. Cause of death can be divided into broad groupings according to ICD-10 AM coding. The mappings of ICD-10 AM codes to each of these causes of death groupings and sub-groupings are tabulated in Appendix Four. The numbers and proportions of patients within each of 15 such groupings are shown in Table 4. The most common causes of death were attributable to Circulatory System causes at 36%, (in particular ischaemic heart disease at 20%) and Neoplasms (31%).

Table 4: Causes of death of CMDHB resident adults 2005 – 2009

Cause of Death Grouping	Sub Grouping	Number (%)	Total number (%)
Infectious and Parasitic			71 (<1)
Neoplasms	Malignant	3,333 (31)	3,395 (31)
	Benign / Uncertain / unknown	62 (<1)	
Endocrine, Nutritional and Metabolic	Diabetes	463 (4)	621 (6)
	Other	158 (1)	
Mental / Behavioural Disorders			216 (2)
Nervous System			371 (3)
Circulatory System	Hypertensive Disease	215 (2)	3,906 (36)
	Ischaemic Heart Disease	2,137 (20)	
	Other Forms of Heart Disease	455 (4)	
	Cerebrovascular Disease	919 (8)	
	Diseases of arteries / capillaries	180 (2)	
Respiratory System	Respiratory infections	158 (1)	859 (8)
	Chronic lower respiratory Disease	623 (6)	
	Other	78 (<1)	
Digestive System			295 (3)
Skin Infections			27 (<1)
Musculoskeletal System and Connective Tissue			92 (1)
Genitourinary System			186 (2)
Pregnancy, Childbirth and the Puerperium			14 (<1)
Congenital Malformations / Chromosomal Abnormalities			49 (<1)
External Causes of Morbidity and Mortality	Transport Accidents	182 (2)	706 (6)
	Other Accidental Injury	212 (2)	
	Intentional Self-harm	248 (2)	
	Assault / Undetermined intent	45 (<1)	
	Other external causes	19 (<1)	
Other*			52 (<1)
Unknown			64 (<1)
Total			10,922 (100)

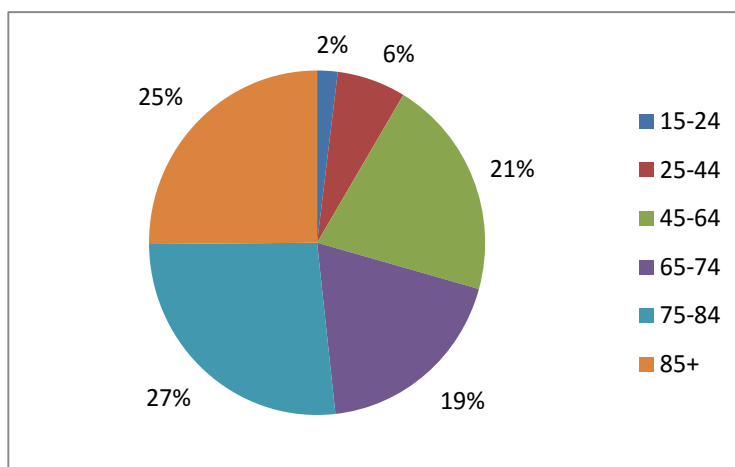
Source: MORT database

*Other = Diseases of the eye and adnexa, Symptoms, signs and abnormal clinical findings not elsewhere classified, Other diseases of the skin and subcutaneous tissue, Diseases of veins, lymphatic vessels and lymph nodes not elsewhere classified, Diseases of the blood and blood forming organs and certain disorders involving the immune mechanism

5.2 Age Group, Gender and Ethnicity

As might be expected the distribution by age of the cohort of adults who died in the years 2005 – 2009 inclusive was markedly different from the distribution by age of the total 2006 estimated resident adult population. The proportions of deaths by age group are shown in Figure 3. Only 2% (n=215) of deaths in the CMDHB resident adult population 2005 – 2009 were in the 15-24 year age group with a further 6% (n=722) of deaths being in the 25-44 year age group. The 45-64 year age group and 65-74 year age group held 21% and 19% of the total deaths respectively. More than half of all adult deaths were in those aged 75 years and over, with 25% of all adult deaths in those aged 85 years and over. Slightly over half of all adult deaths were male (n=5,629, 52%) and slightly under half were female (n=5,293, 48%).

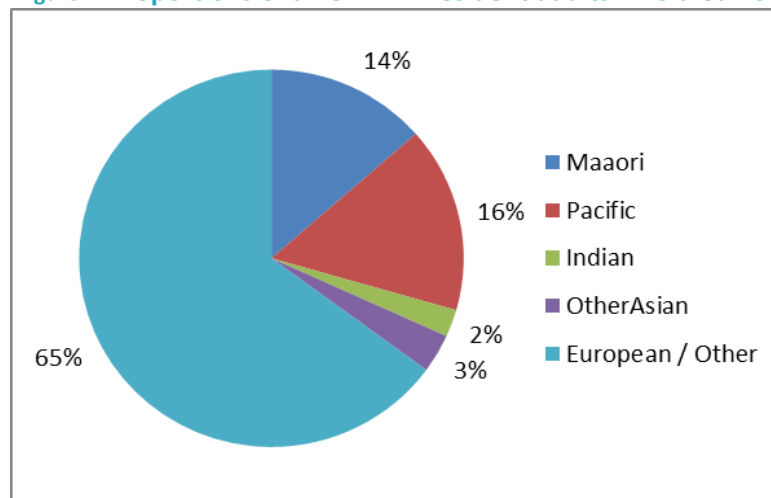
Figure 3: Proportions of all CMDHB resident adults who died 2005 - 2009, by age group,



Source: CMDHB Mortality Data

A total of 14% of the deaths were recorded as being of Maori ethnicity, 16% were Pacific, 6% were Asian and 65% were European / Other (Figure 4).

Figure 4: Proportions of all CMDHB resident adults who died 2005 - 2009, by ethnicity,



Source: CMDHB Mortality Data

The differences in the proportions of each ethnicity in the CMDHB resident adult deaths cohort 2005 – 2009 compared with the total CMDHB estimated resident adult population

2006 reflects the unequal distribution of the different ethnicities across different age groups. The average age of the European/Other CMDHB adult population ethnic group is much higher than any of the other ethnic groups and therefore it is unsurprising that this ethnic group had relatively more deaths than the Maaori, Pacific or Asian groups than would be expected from looking at crude population numbers alone.

5.3 Place of death

Most deaths occurred in hospital with 36% of the deaths in the CMDHB resident adult population 2005 – 2009 occurring in this location. The second most common place of death was home (29%) closely followed by residential care (24%). Overall only 5% of this population cohort died in a hospice and for 5% the place of death was ‘other or unknown’ (Table 5).

Deaths at Pukekohe Hospital and Franklin Memorial Hospital were categorised as occurring in hospital.

There was no difference in the proportions of males and females dying in the hospice or hospital locations (Table 72 in Appendix Five). In the time period analysed a higher proportion of males than females died at home (33% v 26%) and a lower proportion died in residential care (19% v 29%). Of note, for many elderly people residential care will be the person’s place of normal residence and therefore emotionally equivalent to their ‘home’, although in this report it is classed as “residential care”.

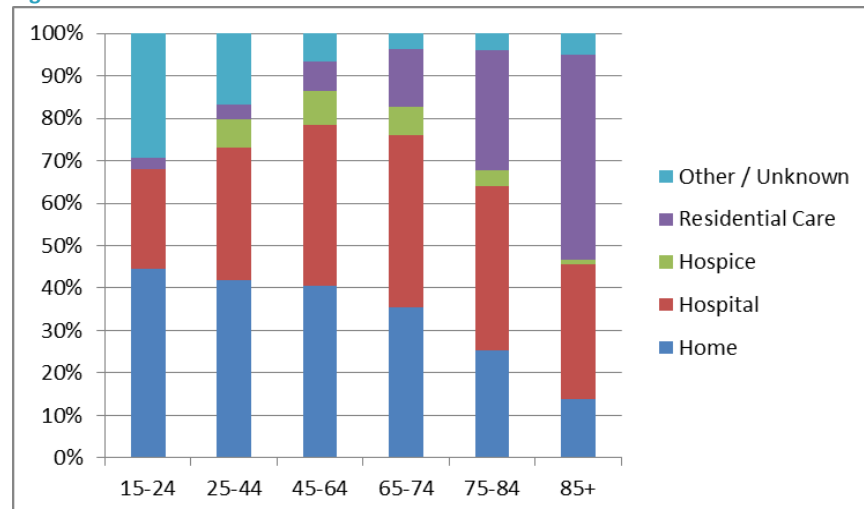
Place of death by age group and ethnicity is given in Tables 5 and 6 respectively. The proportions of deaths in different locations are also shown by age group in Figure 5 and ethnicity in Figure 6.

Table 5: Place of death of CMDHB resident adults who died 2005 – 2009, by age group

Age Group	Home Number (%)	Hospital Number (%)	Hospice Number (%)	Residential Care Number (%)	Other / Unknown Number (%)	Total Number (%)
15-24	96 (45)	50 (23)	0 (0)	6 (3)	63 (29)	215 (100)
25-44	303 (42)	224 (31)	49 (7)	24 (3)	122 (17)	722 (100)
45-64	921 (41)	857 (38)	179 (8)	162 (7)	148 (7)	2,267 (100)
65-74	733 (35)	839 (41)	139 (7)	277 (13)	79 (4)	2,067 (100)
75-84	739 (25)	1,119 (38)	111 (4)	826 (28)	113 (4)	2,908 (100)
85+	382 (14)	871 (32)	29 (1)	1,325 (48)	137 (5)	2,744 (100)
Total	3,174 (29)	3,960 (36)	507 (5)	2,620 (24)	661 (6)	10,922(100)

Source: MORT database

Figure 5: Place of death of CMDHB resident adults who died 2005 – 2009, by age group



Source: MORT database

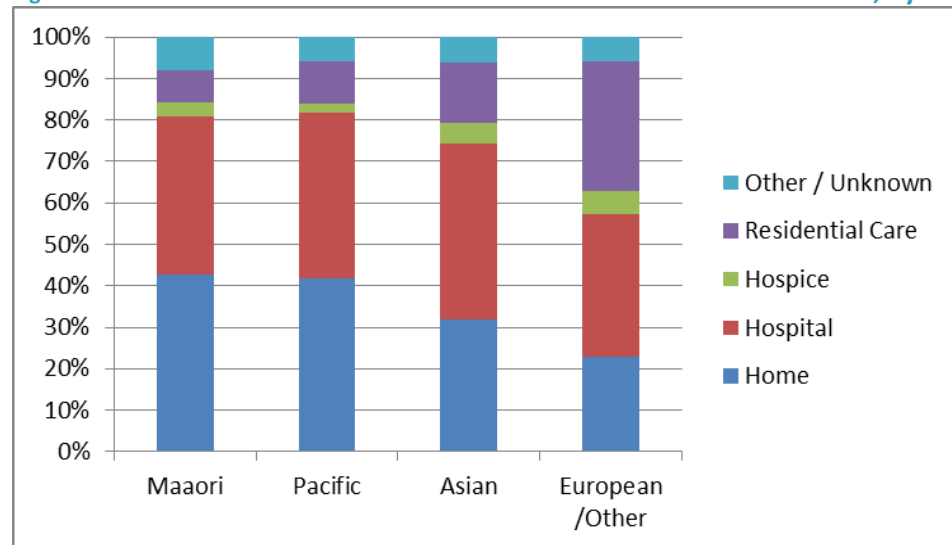
A greater proportion of Maaori and Pacific people were recorded as dying at home compared with those of Asian or European / Other ethnicity (Table 6). Conversely a greater proportion of European / Others died in residential care compared with other ethnicities (32% compared with 8% - 14%) in the time period studied. This is likely once again to reflect the much larger numbers of European / Others in the older age group (more than half of all deaths in residential care occurred in persons aged 85 years and over). Relatively greater proportions of those in the younger age groups died at home. When comparing place of death of the different age and ethnic groups it must be remembered that in this report no statistical tests of significance of differences between groups have been undertaken.

Table 6: Place of death of CMDHB resident adults who died 2005 – 2009, by ethnicity

Ethnicity	Home	Hospital	Hospice	Residential Care	Other / Unknown	Total
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	
Maaori	632 (43)	560 (38)	51 (3)	117 (8)	117 (8)	1,477 (100)
Pacific	725 (42)	698 (40)	36 (2)	180 (10)	99 (6)	1,738 (100)
Asian	196 (32)	263 (43)	31 (5)	89 (14)	38 (6)	617 (100)
European /Other	1,621 (23)	2,439 (34)	389 (5)	2,234 (32)	407 (6)	7,090 (100)
Total	3,174 (29)	3,960 (36)	507 (5)	2,620 (24)	661 (6)	10,922 (100)

Source: MORT database

Figure 6: Place of death of CMDHB resident adults who died 2005 – 2009, by ethnicity



Source: MORT database

5.4 Service Utilisation in the Last Year of Life

The total number of hospital admissions the last year of life, as recorded in the NMDS hospital admissions database, was 32,257 for CMDHB resident adults who died 2005 – 2009. This equates to an annual average number of 6,451 admissions. The total number of hospital admissions the last year of life, by admission type, is shown by age group and ethnicity in Tables 7 and 8 respectively. The average number of hospital admissions by age group and ethnicity are also shown in Figures 7 and 8. Admissions to CMDHB facilities and other DHB facilities are all included.

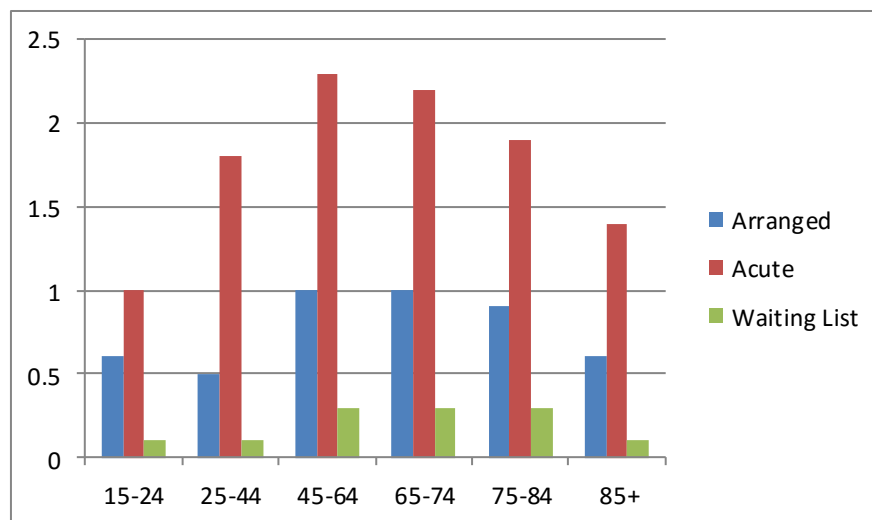
On average these patients had three admissions to hospital in their last year of life, the majority (64%) being acute admissions. The number of admissions shows a trend by age group with those in the 45-64 year age group having on average most admissions per patient and the 15 – 24 year age group having, on average, the least. This may reflect the types of conditions that people most commonly die of in these age groups. Overall there was no difference seen in number of admissions of each type by gender.

Table 7: Hospital admissions in the last year of life for CMDHB resident adults who died 2005 – 2009, by age group

Age Group	Arranged		Acute		Waiting List	
	Total number	Average per patient	Total number	Average per patient	Total number	Average per patient
15-24	132	0.6	210	1.0	13	0.1
25-44	395	0.5	1,273	1.8	76	0.1
45-64	2,187	1.0	5,307	2.3	612	0.3
65-74	2,129	1.0	4,518	2.2	646	0.3
75-84	2,522	0.9	5,592	1.9	754	0.3
85+	1,756	0.6	3,729	1.4	406	0.1
Total	9,121	0.8	20,629	1.9	2,507	0.2

Source: NMDS (Hospital Events) database

Figure 7: Average number of hospital admissions in the last year of life per patient for CMDHB resident adults who died 2005 – 2009, by age group



Source: NMDS (Hospital Events) database

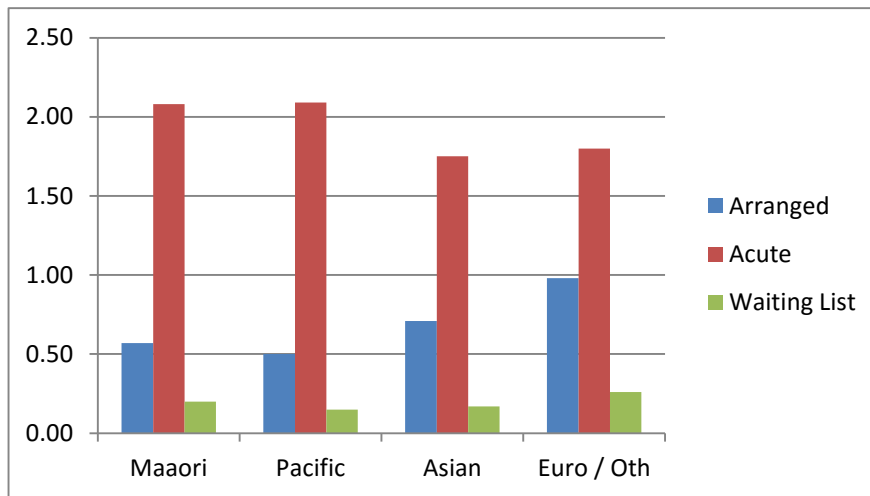
Across all ethnicities acute admissions were more common than arranged admissions with waiting list admissions least numerous. The average number of total hospital admissions in the last year of life was the same across all ethnicities although European /Other appeared to have more arranged admissions than people of other ethnic groups. People from European / Other and Asian groups also appeared to have slightly fewer acute admissions per person than Maaori and Pacific people.

Table 8: Hospital admissions in the last year of life, by ethnicity, for CMDHB resident adults who died 2005 – 2009

Ethnicity	Arranged		Acute		Waiting List	
	Total number	Average per patient	Total number	Average per patient	Total number	Average per patient
Maaori	856	0.6	3,072	2.1	313	0.2
Pacific	872	0.5	3,626	2.1	264	0.2
Asian	437	0.7	1,082	1.8	109	0.2
European / Other	6,956	1.0	12,849	1.8	1,821	0.3
Total	9,121	0.8	20,629	1.9	2,507	0.2

Source: NMDS (Hospital Events) database

Figure 8: Average number of hospital admissions in the last year of life per patient, by ethnicity, for CMDHB resident adults who died 2005 – 2009



Source: NMDS (Hospital Events) database

6 Minimal Estimate of Palliative Care Need Population

6.1 Key Points

Demography:

- From 2005 to 2009 inclusive an average of 911 CMDHB resident adults per year died from conditions that may have benefited from palliative care according to the Minimal Estimate categorisation
- This equates to 41.7% of all CMDHB resident adult deaths
- 50% of these deaths were in adults aged 45 – 74 (compared with 40% of total adult resident deaths)

Place of death:

- A total of 11% of the MEPCN population died in a hospice which was a higher proportion than for total CMDHB resident adults (5%)
- Virtually all those dying in a hospice had a neoplasm, although of people with neoplasms the greatest proportions died at home (34%) or in hospital (31%)
- The majority (66%) of those dying from a neurological condition died in residential care
- High proportions of those with COPD / Bronchiectasis and Renal Failure / DM with ESRD died in hospital (47% and 39% respectively)

Service utilisation in the last year of life:

- The number of total hospital admissions in the last year of life per person for the MEPCN population was higher than for the cohort of all deaths 2005 – 2009 at an average of four per person
- There is a gradient of reducing numbers of admissions from younger to older age groups with those aged 15 – 24 years having nearly 9 admissions on average compared with 2.5 admissions per person in those aged 85+ years.
- The greatest number of arranged admissions to MMH and ACH were under the specialities of Haematology (65%) and Respiratory Medicine (45%) respectively
- A total of 25% of all acute admissions were to ACH
- A higher proportion of patients who died of a neoplasm were admitted to hospital in their last year of life than patients with other causes of death

During the period 2005 – 2009, a total of 4,556 deaths in the CMDHB resident adult population had a cause of death in a pre-determined list of conditions (as described in the national palliative care health needs analysis; see further page13) that indicated that they may have benefited from palliative care. This is termed the minimal estimate of palliative care need (MEPCN) population and equates to 41.7% of all CMDHB resident adult deaths in this time period. The breakdown of causes of death contributing to this total is given in Table 9 below.

Table 9: MEPCN population 2005 – 2009, by ICD10-AM code of cause of death

ICD description	ICD 10 code	Number	(%)
Neoplasm	C00-D48	3,395	(74.5)
Heart Failure	I110, I130, I132, I500, I501, I509	129	(2.8)
Liver failure	K704, K711, K721, K729	*<5	(<1)
Chronic Obstructive Pulmonary Disease	J40, J410, J411, J418, J42, J430, J431, J432, J438, J439, J440, J441, J448, J449	529	(11.6)
MND	G122	39	(<1)
Parkinson's	G20	66	(1.4)
Huntington's	G10	*<5	(<1)
Alzheimer's	G300, G301, G308, G309	153	(3.4)
HIV/AIDS	B20-B24	*<5	(<1)
DM with ESRD	E1023, E1123, E1323	77	(1.7)
Bronchiectasis	J47	61	(1.3)
Renal failure	I120, I131, N180, N188, N189, N19	98	(2.2)
Total		4,556	(100)

Source: MORT database

*rounded for anonymity

The numbers in the MEPCN population by year are shown in Table 10. The average annual number in the MEPCN population in this five year period was 911.

Table 10: MEPCN population 2005 – 2009, by year

Year	Number
2005	883
2006	939
2007	915
2008	912
2009	907
Total	4,556

Source: CMDHB Mortality data

6.2 Age Group, Gender and Ethnicity

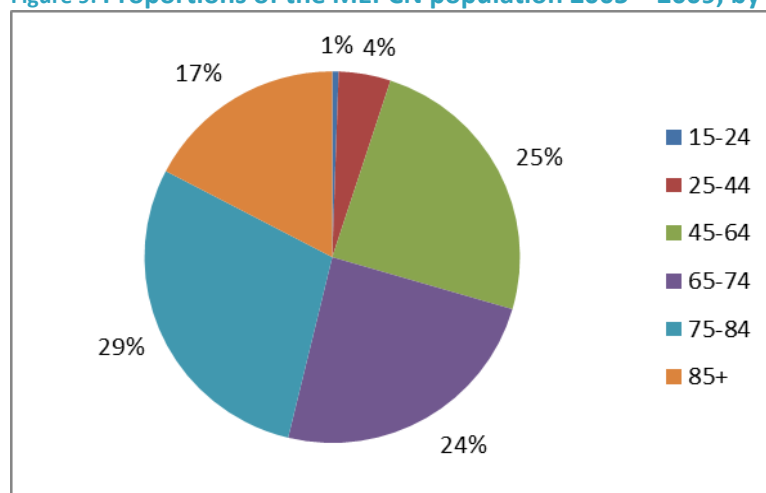
Table 11 shows the age group and gender of the MEPCN population. It can be seen that in keeping with all CMDHB resident adult deaths the numbers of males and females was fairly even overall, with a slight excess of males compared with females. By age group there was a female preponderance in the 25-44 year olds and a slight male preponderance in the 15-24 and 75-84 age groups.

Table 11: MEPCN population 2005 – 2009, by age group and gender

Age Group	Female Number	Male Number	Total Number	(%)
15-24	7	18	25	(0.5)
25-44	121	83	204	(4.5)
45-64	546	570	1,116	(24.5)
65-74	514	591	1,105	(24.3)
75-84	597	719	1,316	(28.9)
85+	419	371	790	(17.3)
Total	2,204	2,352	4,556	100.0

Source: MORT database

Figure 9: Proportions of the MEPCN population 2005 – 2009, by age group

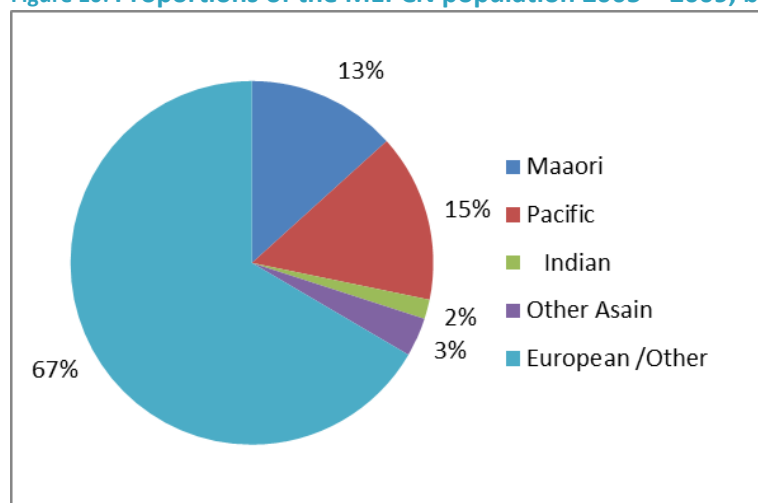


Source: MORT database

Compared with the distribution across age groups of all CMDHB resident adult deaths there were smaller proportions in the 15 – 24 years, 25 – 44 years and 85+ year age groups in the MEPCN population and greater proportions in the 45 – 64 years, 65 – 74 years and 75 – 84 years age groups. This could be due to the types of conditions that the MEPCN population died from compared with the total population.

The breakdown by ethnicity of the MEPCN population is shown in Figure 10. The distribution is similar to that of all CMDHB adult resident deaths.

Figure 10: Proportions of the MEPCN population 2005 – 2009, by ethnicity



Source: MORT database

Table 12 shows the distribution by ethnicity in more detail for the Pacific and Asian populations. In the Pacific group the largest sub group of patients, when prioritised to level 2 of the ethnicity classification, were Samoan, followed by Tongan and Cook Island Maaori. In the Asian population the largest sub groups were Chinese followed by Indian.

Table 12: MEPCN population 2005 – 2009, by ethnicity

Ethnicity	Number	(%)
Maaori	607	(13.3)
Samoan	314	(6.9)
Cook Island Maaori	143	(3.1)
Tongan	146	(3.2)
Niuean	56	(1.2)
Fijian	16	(0.5)
Other Pacific	5	(0.1)
Pacific Total	680	(14.9)
Indian	79	(1.7)
Chinese	104	(2.3)
Southeast Asian	33	(0.7)
Other Asian	20	(0.4)
Asian Total	236	(3.4)
European /Other	3,033	(66.6)
Total	4,556	(100.0)

Source: MORT database

6.3 Residential Locality, CMDHB Service Locality and Decile

The residential locality and Decile of the MEPCN population is given in Table 78 in Appendix Six. The distribution of patients across the seven localities was in keeping with that of CMDHB estimated resident adult population as a whole with the largest proportion of patients residing in Howick and the smallest proportion residing in Otara. A total of 40.3% of the MEPCN population lived in Deciles 9 and 10 which is a similar percentage to that in the total CMDHB estimated resident adult population 2006.

The service locality in which most patients estimated to benefit from palliative care lived was Manukau (40%) (Table13). This compares with 36% of the CMDHB estimated resident adult population 2006 (Table 3). The proportions of patients in Franklin and Mangere / Otara were also very similar to the adult population 2006. A total of 25% of the MEPCN lived in Eastern compared with 30% of the baseline population 2006.

Table 13: MEPCN population 2005 – 2009, by CMDHB service locality

Service Locality	Number 2005 - 2009	Average annual number	(%)
Franklin	690	138	(15)
Eastern	1,142	228	(25)
Mangere/Otara	917	183	(20)
Manukau	1,807	361	(40)
Total	4,556	911	(100)

Source: CMDHB Mortality data

6.4 Place of Death

By definition, information was available on place of death for all of the MEPCN population. In total, 31% of these deaths occurred in the home setting and 33% in hospital similar to the 29% and 36% respectively for the baseline population of CMDHB resident adult deaths. A total of 11% of the MEPCN population died in a hospice. This compares with 5% in the baseline population. In both populations the proportion dying in residential care was the same at 24% (Table 15). The location of death was categorised as 'other' in the MORT database for the remaining 2% (n=100).

Of those deaths occurring in hospital, 85% occurred in CMDHB hospitals and 15% in hospitals in other DHBs, predominantly in ADHB. Looking at the location of the residential care facilities, 74% were located in the CMDHB geographical area and 26% in other DHBs. The majority (94%) of hospice deaths occurred in Totara Hospice South Auckland (Table 14).

Table 14: Place of death of MEPCN population 2005 – 2009, by DHB location of death

DHB	Home	Hospital	Hospice	Residential Care	Other / Unknown
CMDHB		MMH 1,052	THSA 461	797	
		FMH 71			
		PUKH 141			
ADHB		ACH 203	8		
Other / unknown	1,400	16	22	285	100

Source: MORT database

By gender the place of death was distributed fairly evenly with just a slightly higher proportion of females dying in residential care (26% compared with 22%) and slightly more males dying in hospital (34% compared with 31%). This is tabulated in Appendix Five.

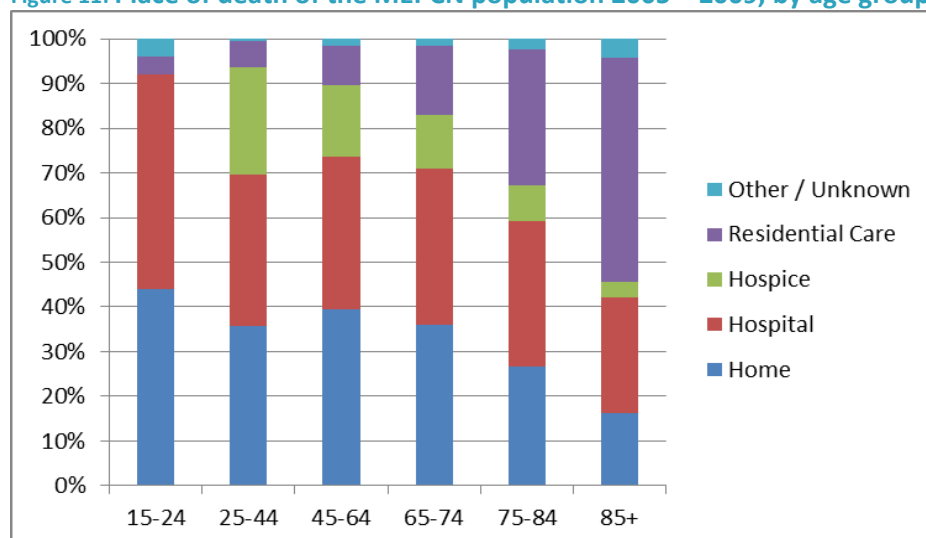
Consistent with total CMDHB resident adult deaths for the same time period, a greater proportion of people in the younger age groups died at home compared to in older age groups who more commonly died in residential care (Table 15 and Figure 11). Those aged 25- 74 years had the highest proportion (24%) of deaths in the hospice setting of all age groups.

Table 15: Place of death of MEPCN population 2005 – 2009, by age group

Age group	Home Number (%)	Hospital Number (%)	Hospice Number (%)	Residential Care Number (%)	Other / Unknown Number (%)	Total Number (%)
15-24	11 (44)	12 (48)	<5 -	<5 -	<5 -	25 (100)
25-44	73 (36)	69 (34)	49 (24)	12 (6)	<5 -	204 (100)
45-64	440 (39)	383 (34)	176 (16)	101 (9)	16 (1)	1,116 (100)
65-74	397 (36)	386 (35)	135 (12)	169 (15)	18 (2)	1,105 (100)
75-84	350 (27)	430 (33)	103 (8)	402 (31)	31 (2)	1,316 (100)
85+	129 (16)	203 (26)	28 (4)	397 (50)	33 (4)	790 (100)
Total	1,400 (31)	1,483 (33)	491 (11)	1,082 (24)	100 (2)	4,556 (100)

Source: MORT database

Figure 11: Place of death of the MEPCN population 2005 – 2009, by age group



Source: MORT database

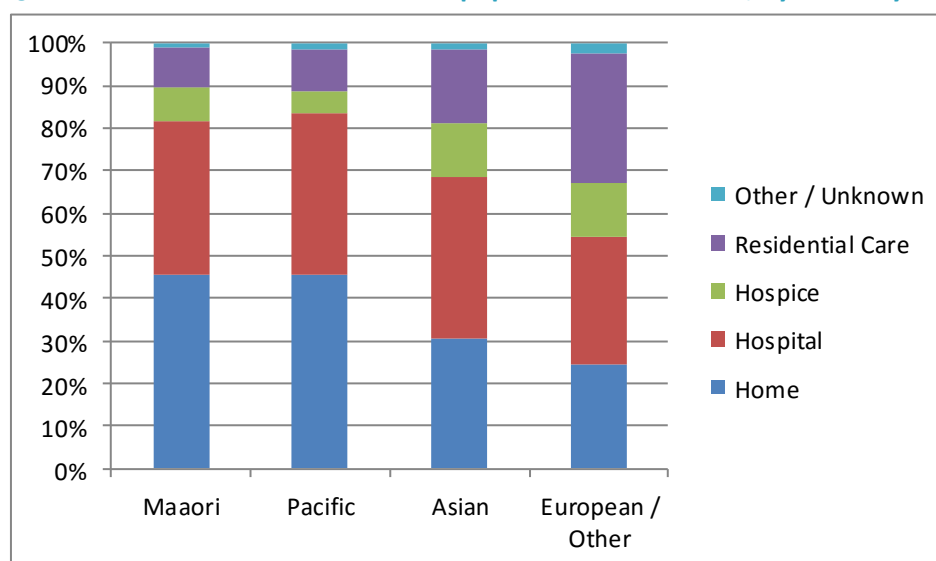
The place of death by ethnicity was also similarly distributed to the baseline population although slightly higher proportions of Maaori and Pacific people died at home and a higher proportion of European / Other people died in residential care (Table 16 and Figure 12).

Table 16: Place of death of the MEPCN population 2005 – 2009, by ethnicity

Ethnicity	Home		Hospital		Hospice		Residential Care		Other / Unknown		Total	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Maaori	278	(46)	217	(36)	50	(8)	56	(9)	6	(1)	607	(100)
Pacific	311	(46)	257	(38)	34	(24)	67	(10)	11	(2)	680	(100)
Asian	72	(31)	90	(38)	30	(13)	40	(17)	4	(2)	236	(100)
European / Other	739	(24)	919	(30)	377	(12)	919	(30)	79	(3)	3,033	(100)
Total	1,400	(31)	1,483	(33)	491	(11)	1,082	(24)	100	(2)	4,556	(100)

Source: MORT database

Figure 12: Place of death of the MEPCN population 2005 – 2009, by ethnicity



Source: MORT database

There was some variation in place of death according to cause of death (Table 17). This is shown in Figure 13. In particular virtually all those dying in a hospice had a neoplasm, although the greatest proportions of people with neoplasms died at home (34%) or in hospital (31%). The majority (66%) of those who passed away from a neurological condition died in residential care. High proportions of those with COPD / Bronchiectasis and Renal Failure / DM with ESRD died in hospital (47% and 39% respectively) compared with the average. The numbers of those who died of liver failure and HIV were too small to reliably analyse.

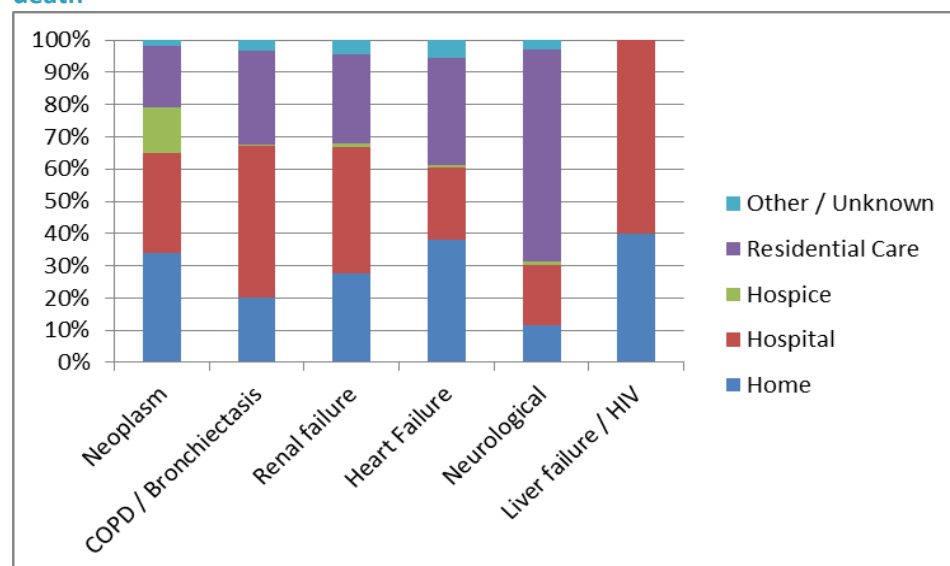
Table 17: Place of death of the MEPCN population 2005 – 2009, by category of cause of death

Cause of Death	Home Number (%)	Hospital Number (%)	Hospice Number (%)	Residential Care Number (%)	Other/Unk Number (%)	Total Number (%)
COPD / Bronchiectasis	118 (20)	279 (47)	<10* -	171 (29)	20 (3)	590 (100)
Heart Failure	49 (38)	29 (22)	<10* -	43 (33)	<10* -	129 (100)
Liver failure/HIV#	- -	- -	- -	- -	- -	5 (100)
Neoplasms	1,153 (34)	1,054 (31)	483 (14)	648 (19)	57 (2)	3,395 (100)
Neurological	30 (11)	49 (19)	<10* -	172 (66)	<10* -	262 (100)
Renal failure / DM with ESRD	48 (27)	69 (39)	<10* -	48 (27)	<10* -	175 (100)
Total	1,400 (31)	1,483 (33)	491 (11)	1,082 (24)	100 (2)	4,556 (100)

Source: MORT database

not shown due to small numbers, * rounded due to small numbers

Figure 13: Place of death of the MEPCN population 2005 – 2009, by category of cause of death



Source: MORT database

6.5 Service Utilisation in the Last Year of Life

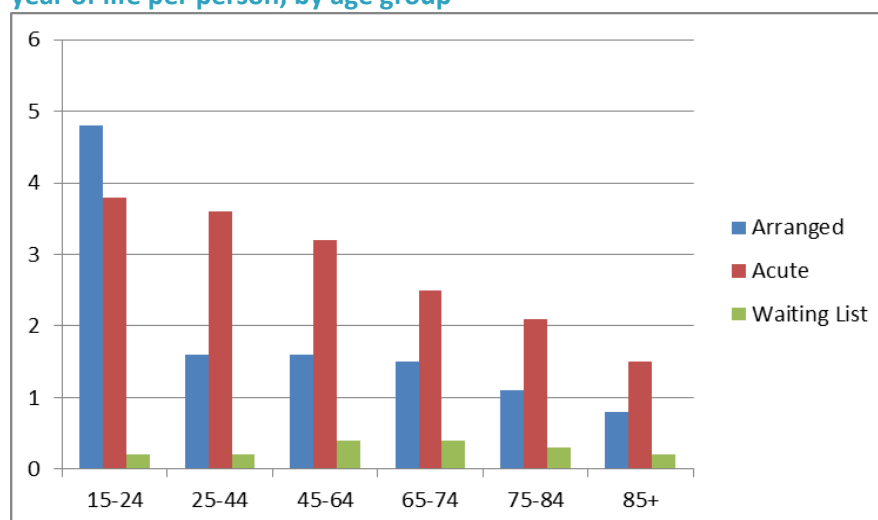
On average the number of total hospital admissions in the last year of life for the minimal estimate of palliative care need population was higher than the cohort of all deaths 2005 – 2009 at an average of four per person. Acute admissions were again more common than arranged admissions with waiting list admissions least numerous. The total numbers of hospital admissions in the last year of life of each admission type, by age group and ethnicity are shown in Table 18 and 19 respectively for the MEPCN population 2005 – 2009. Admissions to CMDHB facilities and other DHB facilities are all included. Figures 14 and 15 show the average number of admissions per patient, by age group and ethnicity respectively, for each type of admission.

Table 18: MEPCN population 2005 – 2009 hospital admissions in the last year of life, by age group

Age Group	Arranged		Acute		Waiting List	
	Total Number	Average per patient	Total Number	Average per patient	Total Number	Average per patient
15-24	119	4.8	95	3.8	4	0.2
25-44	318	1.6	735	3.6	49	0.2
45-64	1,788	1.6	3,520	3.2	395	0.4
65-74	1,617	1.5	2,734	2.5	394	0.4
75-84	1,512	1.1	2,809	2.1	427	0.3
85+	627	0.8	1,156	1.5	174	0.2
Total	5,981	1.3	11,049	2.4	1,443	0.3

Source: NMDS (Hospital Events) database

Figure 14: MEPCN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by age group

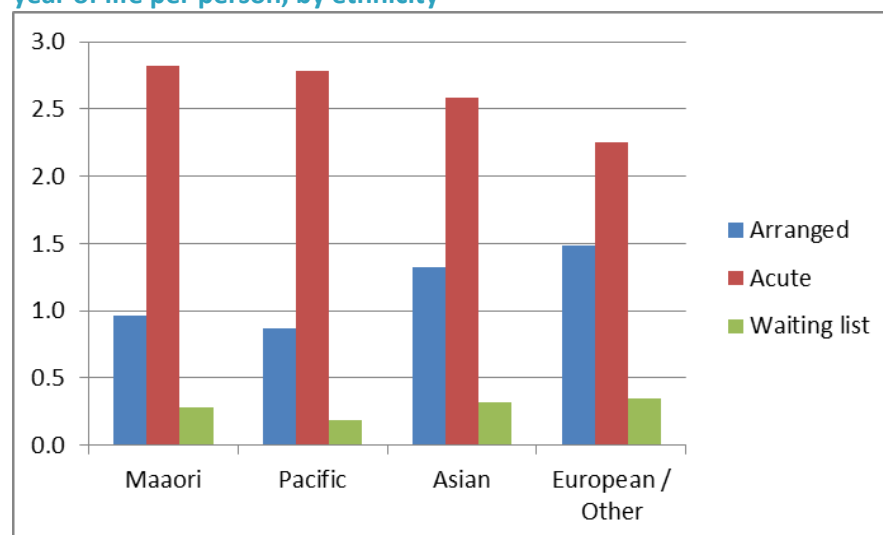


Source: NMDS (Hospital Events) database

The distribution of admissions across age groups appears to be quite different from that of the group of total adult resident deaths 2005 – 2009. In the MEPCN population there is a gradient of reducing average number of admissions from younger to older age groups (Figure 14). This difference is likely to reflect the different spectrum of conditions that those not in the MEPCN die of at the various life stages. In the MEPCN population those in the 15 – 24 year age group have on average nearly nine admissions in their last year of life compared with just 2.5 admissions for the 85+ year age group.

By ethnicity European /Other appeared to have on average more arranged admissions than those of Maaori or Pacific ethnicity and slightly fewer acute admissions than those in all the other ethnic groups.

Figure 15: MEPCN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by ethnicity



Source: NMDS (Hospital Events) database

Table 19: MEPCN population 2005 – 2009 hospital admissions in the last year of life, by ethnicity

Ethnicity	Arranged		Acute		Waiting List	
	Total Number	Average per patient	Total Number	Average per patient	Total Number	Average per patient
Maaori	581	1.0	1,712	2.8	171	0.3
Pacific	594	0.9	1,891	2.8	131	0.2
Asian	312	1.3	610	2.6	76	0.3
European / Other	4,494	1.5	6,836	2.3	1,065	0.4
Total	5,981	1.3	11,049	2.4	1,443	0.3

Source: NMDS (Hospital Events) database

6.5.1 Arranged Admissions

In total there were 5,981 arranged admissions in the last year of life for the CMDHB resident adult MEPCN population. Of these, 4,442 (74%) were to CMDHB facilities. A total of 2,661 (60% of CMDHB facility arranged admissions) were to MMH, 1,337 (30%) to THSA and 444 (10%) were to other CMDHB facilities (Table 24). There were 1,030 (17% of total) arranged admissions to ACH. The majority of the remaining 10% of arranged admissions were to residential care facilities in both CMDHB and Auckland DHB. It is unclear why these admissions to residential care facilities have been included in the database as ‘hospital admissions’.

Table 21 shows the total number of arranged admissions 2005 – 2009 and average annual number of arranged admissions, by speciality, to MMH and ACH. Over half (65%) of all arranged admissions to MMH were under the speciality of Haematology. Respiratory

Medicine was the speciality responsible for the greatest proportion of admissions to ACH (45%).

Table 21 also shows the total bed days 2005 – 2009, percentage of total bed days by speciality and average length of stay by speciality for arranged admissions to MMH and ACH. The greatest numbers of bed days were taken up by the specialities of Geriatric AT&R and Haematology for MMH and ACH respectively. At MMH the Haematology admissions had an average length of stay of < 1day whereas the Geriatric AT&R admissions were on average of over two weeks duration. At ACH Geriatric AT&R arranged admissions were also the longest in duration at a length of stay just under 4 weeks (on average) however Haematology admissions to ACH had an average length of stay of approximately 5 days which explains the higher proportion of total bed days taken up by this speciality at ACH compared with MMH.

Table 22 shows the total number of arranged admissions 2005 – 2009 and average annual number of arranged admissions, by speciality, to select other CMDHB facilities (MSC, PUKH, FMH and Auckland Spinal Unit - ASU). Admissions to these facilities had quite a different profile to that of MMH and ACH with Palliative and Terminal Care being the speciality that had the highest number of admissions and Geriatric Residential Care the highest number of bed days. The latter admissions were responsible for over 14,000 bed days per year and had an average length of stay of 81 days which is a large proportion of the total bed days for arranged admissions.

The recorded arranged admissions to THSA (annual average 267) had an average length of stay of 6.7 days.

6.5.2 Acute Admissions

In total there were 11,049 acute admissions in the last year of life in the CMDHB resident adult MECPN population 2005 – 2009. Of these, 8,100 (73%) were to CMDHB facilities, 2,725 (25%) were to Auckland City Hospital (ACH) and 224 (2%) were to other NZ hospitals. Of the CMDHB acute admissions, 8,031 (>99%) were to Middlemore Hospital (MMH) and 69 (<1%) to other CMDHB facilities: 22 to Pukekohe Hospital, 18 to Franklin Memorial Hospital, 29 to Manukau Super Clinic.

The fact that 25% of acute admissions were to ACH has important implications for service delivery discussions as dialogue will be required with clinicians beyond CMDHB to influence these admissions.

Table 23 shows the total number of acute admissions 2005 – 2009 and average annual number of acute admissions, by speciality, to MMH and ACH. Over half of all acute admissions to MMH were under the speciality of General Medicine. In contrast the majority of acute admissions to ACH were under the speciality of Oncology which reflects the fact that this speciality is provided on a regional basis.

Table 23 shows the total bed days 2005 – 2009, percentage of total bed days by speciality and average length of stay by speciality for acute admissions to MMH and ACH. The greatest numbers of bed days were taken up by the specialities of General Medicine and Oncology for MMH and ACH respectively. This is consistent with the high number of admissions to these specialities. The average length of stay was longest for admissions to Renal Medicine and Orthopaedic Surgery at ACH at a little over three weeks, although these admissions only accounted for a small proportion of the total bed days. The longest average length of stay at

MMH was also for Orthopaedic Surgery, but the actual duration of admission was relatively shorter at MMH at just 10.4 days.

6.5.3 Waiting List Admissions

Waiting list admissions accounted for the smallest proportion of hospital admissions for both MMH and ACH. There was a total of 1,443 waiting list admissions from 2005 to 2009 in the MEPCN population, an annual average of 289 per year. Of these 47% were to MMH, 27% were to MSC and 21% were to ACH with just 5% to other facilities.

Table 24 shows the total number and percentages of waiting list admissions and bed days 2005 – 2009 and average annual number of waiting list admissions and length of stay, by speciality, to MMH and MSC combined and ACH. The greatest number of admission to MMH and MSC combined was under the speciality of Gastroenterology (annual average of 63) although the greatest number of bed days was accrued in General Surgery (58% of total MMH and MSC bed days). At ACH the greatest number of admissions and bed days were to Urology.

6.5.4 Admissions by cause of death category

The numbers and percentages of patients having admissions to hospital in the last year of life are shown in Table 20 by cause of death category. More patients who died of a neoplasm or of renal failure or DM with ESRD were admitted at least once to hospital in their last year of life than those with other causes of death with 87% of these patients having at least one acute admission.

Looking at hospital admissions by type of admission, in Table 25, those with a neoplastic cause of death were responsible for the majority of admissions for all types of admissions, in keeping with the relatively large numbers of patients with this recorded as a cause of death. For arranged admissions the greatest number of bed days was taken up by those with a neurological cause of death as the average length of stay for these admissions was approximately 10 months duration. This length of stay will be influenced by arranged admissions to residential care facilities which were of much longer average duration compared to arranged admissions to MMH. Further analyses excluding these admissions may be useful.

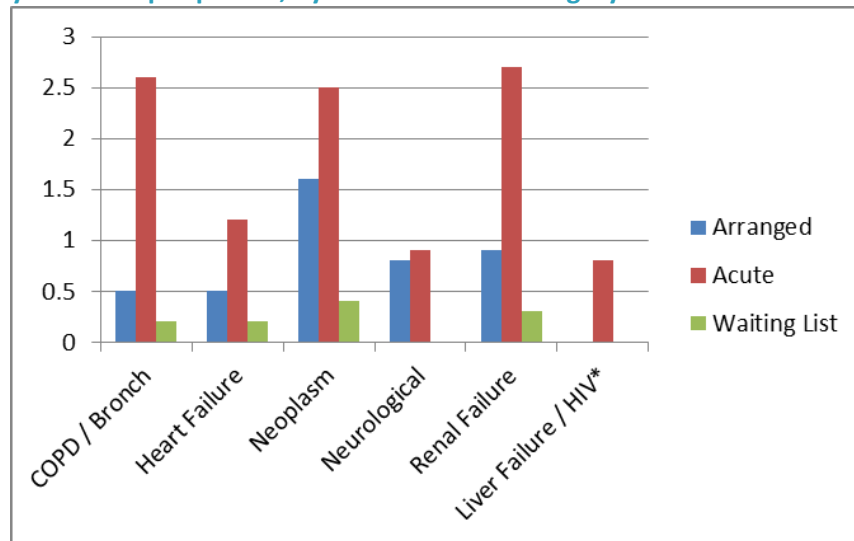
Table 20: MEPCN population 2005 – 2009 with a hospital admission in the last year of life, by cause of death category

Cause of Death Category	Arranged		Acute		Waiting List	
	Patients with one or more admission		Patients with one or more admission		Patients with one or more admission	
	Number	(%)	Number	(%)	Number	(%)
COPD/Bronchiectasis	171	(29)	474	(80)	74	(13)
Heart Failure	35	(27)	76	(59)	15	(12)
Neoplasm	1,897	(56)	2,962	(87)	887	(26)
Neurological	142	(54)	131	(50)	9	(3)
Renal Failure	83	(47)	152	(87)	36	(21)
Liver Failure / HIV*	-	-	-	-	-	-
Total	2,329	(51)	3,797	(83)	1,021	(22)

Source: MORT and NMDS (Hospital Events) database

*Numbers too small to analyse

Figure 16: MEPCN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by cause of death category



Source: MORT and NMDS (Hospital Events) database

Table 21: MEPCN population 2005 – 2009 arranged admissions to MMH and ACH, by speciality

Speciality	MMH					ACH						
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)			Number	(%)	Number	(%)	
Gastroenterology	63	13	(2)	188	(2)	3.0	<5	<1	(<1)	3	(<1)	n/a*
General Medicine	100	20	(4)	539	(6)	5.4	<5	<1	(<1)	5	(<1)	n/a*
General Surgery	53	11	(2)	431	(4)	8.1	16	3	(2)	55	(2)	3.4
Geriatric AT&R	389	78	(15)	5,925	(61)	15.2	7	1	(1)	183	(6)	26.1
Haematology	1,721	344	(65)	823	(9)	<1	171	34	(17)	827	(29)	4.8
Radiology	71	14	(3)	14	(<1)	<1	-	-	-	-	-	-
Renal Medicine	107	21	(4)	517	(5)	4.8	<5	<1	(<1)	1	(<1)	<1
Respiratory Med	73	15	(3)	224	(2)	3.1	465	93	(45)	81	(3)	<1
Orthopaedic Surgery	26	5	(1)	378	(4)	14.5	<5	<1	(<1)	6	(<1)	n/a*
Oncology	-	-	-	-	-	-	142	28	(14)	594	(21)	4.2
Other*	58	12	(2)	600	(6)	10.3	221	44	(21)	1,107	(33)	5.0
Total	2,661	532	(100)	9,639	(100)	3.6	1,030	206	(100)	2,862	(100)	2.8

Source: NMDS (Hospital Events) database

Other MMH= Geriatric AT&R (Intermittent Planned Programme), Psychogeriatrics, Physical Disability AT&R, Emergency Medicine, Specialist Intensive Care, Cardiology, Rheumatology, Endocrinology, Dental Surgery, Gynaecology, Ophthalmology, Plastic Surgery, Adult acute/crisis mental health services.

Other ACH = Physical Disability A,T & R Sub-Series, Cardiology, Specialist Paediatric Haematology, Immunology, Infectious Diseases, Neurology, Specialist Paediatric Oncology, Gastroenterological Surgery, Cardiothoracic Surgery, Otorhinolaryngology, Gynaecology, Neurosurgery, Ophthalmology, Urology.

n/a* not calculated due to small numbers of admissions

Table 22: MEPCN population 2005 – 2009 arranged admissions to CMDHB facilities (excluding MMH), by speciality

Speciality	CMDHB Other**					
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)	
General Medicine	0	-	-	-	-	-
Geriatric AT&R (Active rehab)	54	11	(12)	879	(5)	16.2
Geriatric AT&R (Intermit Planned)	22	4	(5)	223	(1)	10.1
Geriatric Res Care (Hosp Long term)	52	10	(12)	14,546	(81)	279.7
Palliative and Terminal Care	193	39	(43)	2,149	(12)	11.1
Physical Disability A,T & R	8	2	(2)	197	(1)	24.6
Other*	15	3	(3)	34	(<1)	2.3
Total	444	89	(100)	18,028	(100)	40.6

Source: NMDS (Hospital Events) database

*Other = Gastroenterology, Renal medicine, General Surgery, Otorhinolaryngology, Gynaecology, Orthopaedic Surgery

** = Pukekohe Hospital, Franklin Memorial, Manukau Super Clinic, Auckland Spinal Unit

Table 23: MEPCN population 2005 – 2009 acute admissions to MMH and ACH, by speciality

Speciality	MMH					ACH						
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)			Number	(%)	Number	(%)	
Intensive care	361	72	(5)	184	(<1)	<1	-	-	-	-	-	-
Cardiology	50	10	(<1)	321	(<1)	6.4	8	2	(<1)	36	(<1)	4.5
Emerg Medicine	268	54	(3)	127	(<1)	<1	46	9	(2)	18	(<1)	<1
Gastroenterology	292	59	(4)	1,710	(4)	5.9	7	1	(<1)	44	(<1)	6.3
General Medicine	4,260	852	(53)	21,685	(48)	5.1	85	17	(3)	667	(4)	7.8
General Surgery	1,050	210	(13)	8,420	(19)	8.0	61	12	(2)	654	(4)	10.7
Gynaecology	120	24	(2)	663	(2)	5.5	8	2	(<1)	58	(<1)	7.3
Haematology	431	86	(5)	3,035	(7)	7.0	233	47	(9)	1,211	(8)	5.2
Oncology	-	-	-	-	-	-	1,707	341	(63)	8,046	(53)	4.7
Otorhinolaryngology	<5	<1	(0)	11	(<1)	n/a*	61	12	(2)	756	(5)	12.4
Orthopaedic Surgery	236	47	(3)	2,446	(5)	10.4	14	3	(<1)	302	(2)	21.6
Renal Medicine	256	51	(3)	1,811	(4)	7.1	10	2	(<1)	222	(2)	22.2
Respiratory Med	647	130	(8)	3,919	(9)	6.1	74	15	(3)	540	(4)	7.3
Urology	-	-	-	-	-	-	227	45	(8)	1,279	(8)	5.6
Neurosurgery	-	-	-	-	-	-	96	19	(4)	793	(5)	8.3
Other*	58	12	(<1)	728	(2)	12.6	88	18	(3)	552	(4)	6.3
Total	8,031	1,606	(100)	45,060	(100)	5.6	2,725	545	(100)	15,178	(100)	5.6

Source: NMDS (Hospital Events) database

*MMH Other = Geriatric AT&R (Active rehabilitation), Psychogeriatric AT&R (Continuing care), Endocrinology, Diabetology, Rheumatology, Specialist Interventionist Radiology, Postnatal Services [Mother], Dental Surgery, Plastic Surgery, Adult acute/crisis mental health services.

*ACH Other = Specialist Paediatric Oncology, Gastroenterological Surgery, Cardiothoracic Surgery, Ophthalmology, Vascular surgery, Geriatric AT&R (Active rehabilitation), Specialist Paediatric Haematology, Infectious Diseases, Neurology.

n/a* not calculated due to small numbers of admissions

Table 24: MEPCN population 2005 – 2009 waiting list admissions to MMH, MSC and ACH, by speciality

Speciality	MMH and MSC					ACH						
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)			Number	(%)	Number	(%)	
Cardiothoracic Surg	-	-	-	-	-	-	41	8	(14)	268	(18)	6.5
Gastroenterology	313	63	(29)	168	(8)	<1	5	1	(2)	4	(<1)	<1
General Surgery	197	39	(18)	1,269	(58)	6.4	15	3	(5)	161	(11)	10.7
ENT	38	8	(4)	35	(2)	<1	62	12	(21)	315	(21)	5.1
Interven.Radiology	26	5	(2)	3	(<1)	<1	-	-	-	-	-	-
Neurosurgery	-	-	-	-	-	-	31	6	(10)	154	(10)	5.0
Ophthalmology	59	12	(6)	1	(<1)	<1	20	4	(7)	<1	(<1)	<1
Orthopaedic Surgery	42	8	(4)	216	(10)	5.1	<5	<1	(<1)	28	n/a*	28.0
Plastic Surgery	136	27	(13)	214	(10)	1.6	-	-	-	-	-	-
Respiratory Med	187	37	(18)	26	(1)	<1	<5	<1	(<1)	<1	(<1)	<1
Urology	5	1	(<1)	1	(<1)	<1	93	19	(31)	414	(28)	4.5
Other**	64	13	(6)	259	(12)	4.0	40	8	(13)	129	(9)	3.2
Total	1,068	214	(100)	2,192	(100)	2.1	299	60	(100)	1,473	(100)	4.9

Source: NMDS (Hospital Events) database

MMH and MSC Other = Cardiology, General Medicine, Geriatric AT&R, Gynaecology, Haematology, Intensive Care, Renal Medicine.

ACH Other = Cardiology, Gynaecology, Neurology, Dermatology, Dental Surgery, Vascular surgery

n/a* not calculated due to small numbers of admissions

Table 25: MEPCN population 2005 – 2009 hospital admissions in the last year of life, by cause of death category

Cause of Death Category	Arranged			Acute			Waiting List								
	Total admissions 2005 – 2009		Total bed days 2005 – 2009	Total admissions 2005 – 2009		Total bed days 2005 – 2009	Average length of stay (days)	Total admissions 2005 – 2009		Total bed days 2005 – 2009	Average length of stay (days)				
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)			
COPD /															
Bronchiectasis	274	(5)	21,264	(15)	77.6	1,561	(14)	8,397	(13)	5.4	95	(7)	139	(3)	1.5
Heart Failure	67	(1)	4,370	(3)	65.2	154	(1)	1,109	(2)	7.2	20	(1)	75	(2)	3.8
Neoplasm	5,278	(88)	50,612	(35)	9.6	8,610	(78)	47,959	(77)	5.6	1,273	(88)	3,472	(87)	2.7
Neurological	209	(3)	65,216	(45)	310.6	244	(2)	1,386	(2)	5.7	9	(1)	203	(5)	22.6
Renal Failure	152	(3)	3,199	(2)	21	476	(4)	3,394	(5)	7.1	46	(3)	124	(3)	2.7
Liver Failure / HIV*	-	-	-	-	-	4	(<1)	33	(<1)	8.3	-	-	-	-	-
Total	5,981	(100)	144,661	(100)	24.2	11,049	(100)	62,278	(100)	5.6	1,443	(100)	4,013	(100)	2.8

Source: MORT and NMDS (Hospital Events) database

7 Extended Estimate of Palliative Care Need Population

7.1 Key Findings

Demography

- *During the period 2005 – 2009, a total of 6,409 people may have benefited from palliative care if the methodology for the extended estimate of palliative care need (EEPCN) is applied*
- *This equates to 58.7% of all CMDHB resident adult deaths in this time period*
- *The EEPCN population had a slightly greater proportion of people in the 85+ age group (21.4% v 17.3%), and a slightly smaller proportion in the 45 – 64 age group (21.6% v 24.5%) than the MEPCN population*

Place of death

- *In the EEPCN population 28% of deaths occurred in the home setting, 37% in hospitals and 8% in hospices*
- *A relatively greater proportion of EEPCN deaths occurred at MMH than in the MEPCN population*

Service utilisation in the last year of life

- *On average the number of total hospital admissions in the last year of life for the EEPCN was four per person*
- *Specialities with the most notable increase in number of arranged admissions for the EEPCN population compared with the MEPCN were Geriatric AT&R, Cardiology and Renal Medicine for MMH and Cardiothoracic Surgery and Gastroenterology for ACH*
- *Acute admissions to Cardiology were higher by a factor of six compared with the MEPCN population which is keeping with the fact that approximately 10% of the EEPCN population died of 'ischaemic heart disease'*

During the period 2005 – 2009, a total of 6,409 people may have benefited from palliative care if the methodology for the extended estimate of palliative care need (EEPCN) is applied. This equates to 58.7% of all CMDHB resident adult deaths in this time period. Compared with the MEPCN, an additional 1,150 were included in the EEPCN because they had one or more hospital admissions in their last year of life with a primary diagnosis in the minimal estimate list of conditions (although this was not recorded as their cause of death). There were also 325 people whose primary diagnosis for a non-fatal admission in the last year of life was exactly the same as their underlying cause of death, and 431 for whom the first digit and number of the ICD-10 code for the primary diagnosis of such an admission matched the code given as their cause of death. Due to overlap with some of the population meeting more than one of these criteria this resulted in the addition of 1,853 people to the MEPCN to make up the EEPCN. The breakdown of causes of death for the extra 1,853 of the EEPCN and the total EEPCN is given in Table 81 in Appendix Seven. By definition 100% of CMDHB resident adults whose cause of death was attributable to a neoplasm 2005 – 2009 are included. An additional 156 people dying of diabetes are included which means that 42% of CMDHB resident adults who died of an endocrine disorder 2005 – 2009 are included in this estimate. The proportion of the EEPCN having a cause of death attributable to an external cause of morbidity and mortality was low at only 5% of total CMDHB resident adult deaths of this cause.

The numbers in the EEPCN population by year are shown in Table 26. The average annual number in the EEPCN population in this five year period was 1,282.

Table 26: EEPCN population 2005 – 2009, by year

Year	Number
2005	1,204
2006	1,279
2007	1,293
2008	1,316
2009	1,317
Total	6,409

Source: MORT database

7.2 Age Group, Gender and Ethnicity

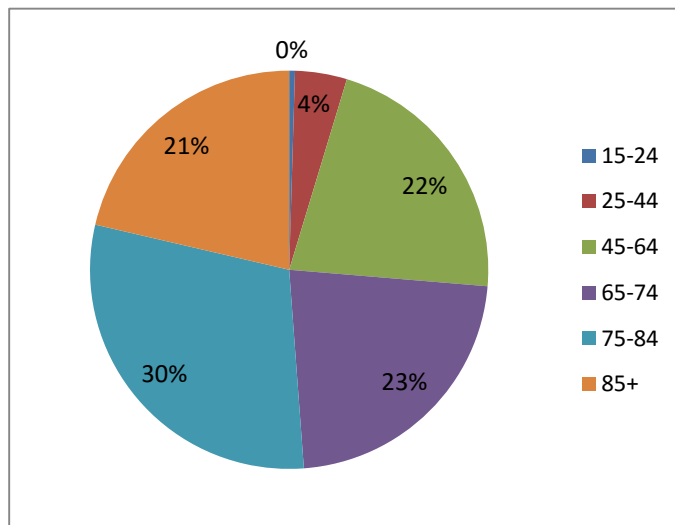
Table 27 shows the age group and gender of the EEPCN population. It can be seen that in keeping with all CMDHB resident adult deaths and the MEPCN the numbers of males and females was fairly even overall, with a slight excess of male deaths compared with female. By age group there was a female preponderance in the 25-44 and 85+ age groups, and a male preponderance in the remaining age groups.

Table 27: EEPCN population 2005 – 2009, by age group and gender

Age Group	Female Number	Male Number	Total Number	(%)
15-24	9	21	30	(0.5)
25-44	149	121	270	(4.2)
45-64	661	726	1,387	(21.6)
65-74	671	771	1,442	(22.5)
75-84	897	1,014	1,911	(29.8)
85+	770	599	1,369	(21.4)
Total	3,157	3,252	6,409	(100.0)

Source: MORT database

Figure 17: Proportions of EPCN population 2005 – 2009, by age group



Source: MORT database

Compared with the distribution across age groups of all deaths there were smaller proportions of deaths in the 15 – 24 years, 25 – 44 years and 85+ year age groups in the EPCN population and greater proportions of deaths in the 45 – 64 years, 65 – 74 years and 75 – 84 years age groups (Figure 17). Compared with the MEPCN population the EPCN population had slightly more people in the 85+ age group (21.4% v 17.3%), and slightly fewer in the 45 – 64 age group (21.6% v 24.5%).

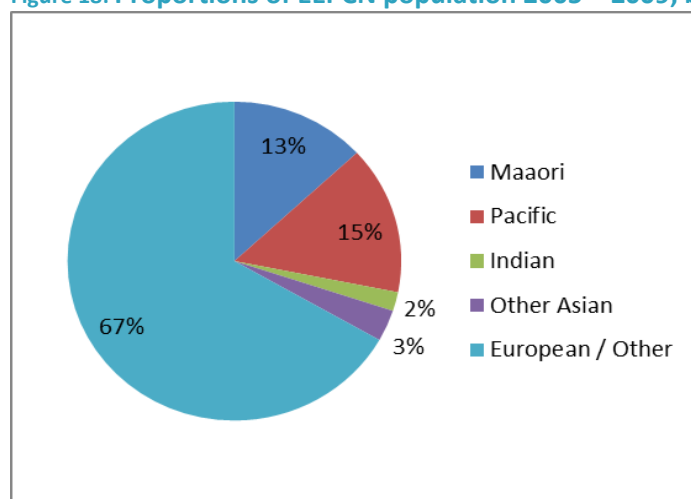
The breakdown by ethnicity of the EPCN population is shown in Table 28 and Figure 18. The distribution of the EPCN across the different ethnic group is consistent with that of the MEPCN and cohort of all CMDHB resident adult deaths 2005 - 2009.

Table 28: EPCN population 2005 – 2009, by ethnicity

Ethnicity	Number	(%)
Maaori	841	(13.1)
Samoan	440	(6.9)
Cook Island Maaori	216	(3.4)
Tongan	188	(2.9)
Niuean	80	(1.2)
Fijian	30	(0.5)
Other Pacific	8	(0.1)
Pacific Total	962	(15.0)
Indian	123	(1.9)
Chinese	135	(2.1)
Southeast Asian	46	(0.7)
Other Asian	23	(0.4)
Asian Total	327	(5.1)
European /Other	4,279	(66.8)
Total	6,409	(100)

Source: MORT database

Figure 18: Proportions of EEPN population 2005 – 2009, by ethnicity



Source: MORT database

7.3 Residential Locality, CMDHB Service Locality and Decile

The residential locality and NZDep06 Decile of the EEPN population is given in Table 79 in Appendix Six. The distribution of the EEPN population across both residential locality and Decile is consistent with that of the total CMDHB estimated resident adult and MEPCN populations. The distribution of the EEPN population across service locality (Table 29) was the same as for the MEPCN.

Table 29: EEPN population 2005 – 2009, by CMDHB service locality

Service Locality	Number 2005 - 2009	Average annual number	(%)
Franklin	952	190	(15)
Eastern	1,586	317	(25)
Mangere & Otara	1,320	264	(21)
Manukau	2,551	510	(40)
Total	6,409	1,282	(100)

Source: CMDHB Mortality data

7.4 Place of Death

In total information was available on place of death for 6,382 of the EEPN population. The location of death was not available for the remaining 27 people as their deaths were not registered in the MORT database. In total, slightly fewer of these deaths occurred in the home setting compared with in the MEPCN population (28% v 31%). Slightly more deaths occurred in hospital (37% compared with 33%) and slightly fewer in a hospice (8% compared with 11%). The percentages who died in residential care were similar at 25% and 24% of the totals. It must be highlighted that confidence intervals on these percentages have not been calculated therefore these differences may be due to chance alone.

The proportions of males and females who died in each location were distributed similarly to the MEPCN population and are given in Table 74 in Appendix Five.

Table 30 shows the location of place of death by DHB of place of death. Most notably, compared with the MEPCN, a relatively high proportion of deaths occurred at MMH with 708 of the extra 1,853 of the EEPN population (38%) dying in this hospital.

Table 30: Place of death of EEPN population 2005 – 2009, by DHB location of death

DHB	Home	Hospital	Hospice	Residential Care	Other / Unknown
CMDHB		MMH 1,760	THSA 472	1,175	
		FMH 78			
		PUKH 185			
ADHB		ACH 292	8		
Other / unknown	1,777	33	23	422	184

Source: MORT database

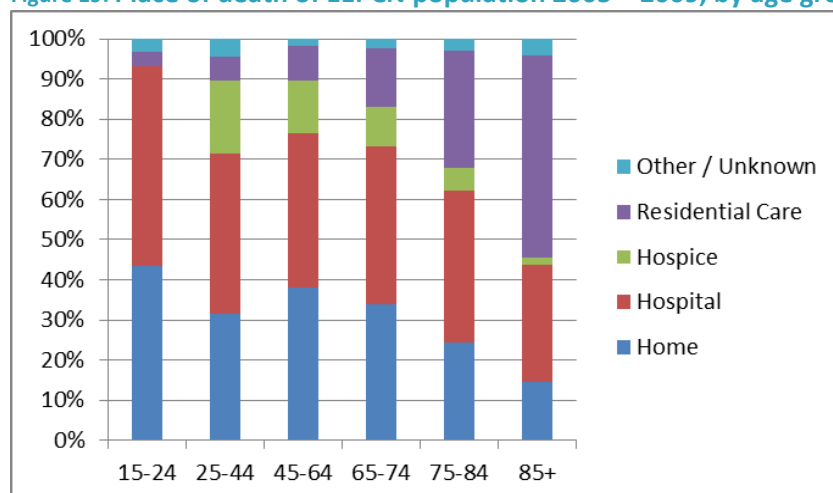
Consistent with total CMDHB resident adult deaths for the same time period, more people in the younger age groups died at home and fewer died in residential care (Table 31 and Figure 19). A relatively greater proportion of those aged 25- 74 years died in a hospice setting compared with those at the extremes of age.

Table 31: Place of death of EEPN population 2005 – 2009, by age group

Age group	Home	Hospital	Hospice	Residential Care	Other / Unknown	Total
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
15-24	13 (43)	15 (50)	<5 -	<5 -	<5 -	30 (100)
25-44	85 (31)	108 (40)	49 (18)	16 (6)	12 (4)	270 (100)
45-64	526 (38)	537 (39)	179 (13)	120 (9)	25 (2)	1,387 (100)
65-74	489 (34)	569 (39)	138 (10)	213 (15)	33 (2)	1,442 (100)
75-84	466 (24)	720 (38)	108 (6)	560 (29)	55 (3)	1,911 (100)
85+	198 (14)	399 (29)	28 (2)	686 (50)	58 (4)	1,369 (100)
Total	1,777 (28)	2,348 (37)	502 (8)	1,598 (25)	184 (3)	6,409 (100)

Source: MORT database

Figure 19: Place of death of EEPN population 2005 – 2009, by age group



Source: MORT database

The place of death by ethnicity was also similarly distributed to the baseline and MEPCN populations with slightly greater proportions of Maaori and Pacific people dying at home

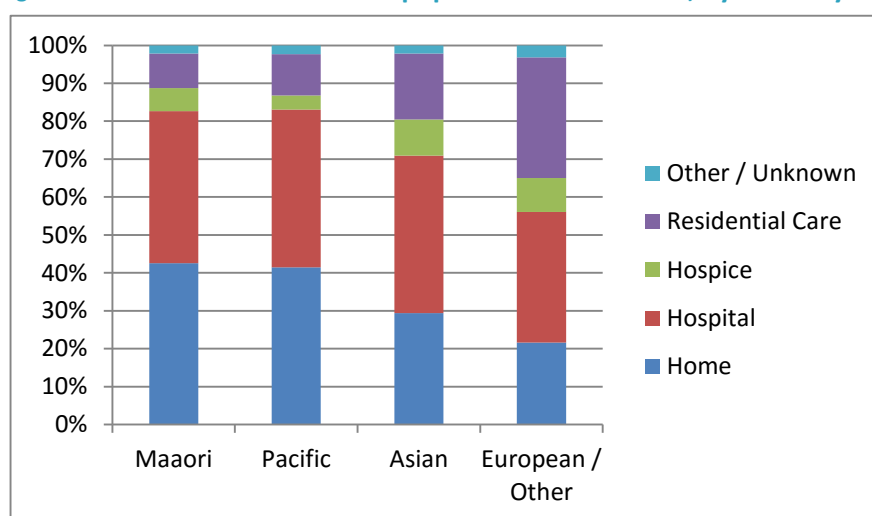
compared to other ethnicities and a greater proportion of European / Other dying in residential care compared with other ethnic groups (Table 32 and Figure 20).

Table 32: Place of death of EPCN population 2005 – 2009, by ethnicity

Ethnicity	Home	Hospital	Hospice	Residential Care	Other / Unknown	Total
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
Maaori	358 (43)	337 (40)	51 (6)	77 (9)	18 (2)	841 (100)
Pacific	399 (41)	400 (42)	36 (4)	105 (11)	22 (2)	962 (100)
Asian	96 (29)	136 (42)	31 (9)	57 (17)	7 (2)	327 (100)
European / Other	924 (22)	1,475 (34)	385 (9)	1,359 (32)	137 (3)	4,279 (100)
Total	1,777 (28)	2,348 (37)	502 (8)	1,598 (25)	184 (3)	6,409 (100)

Source: MORT database

Figure 20: Place of death of EPCN population 2005 – 2009, by ethnicity



Source: MORT database

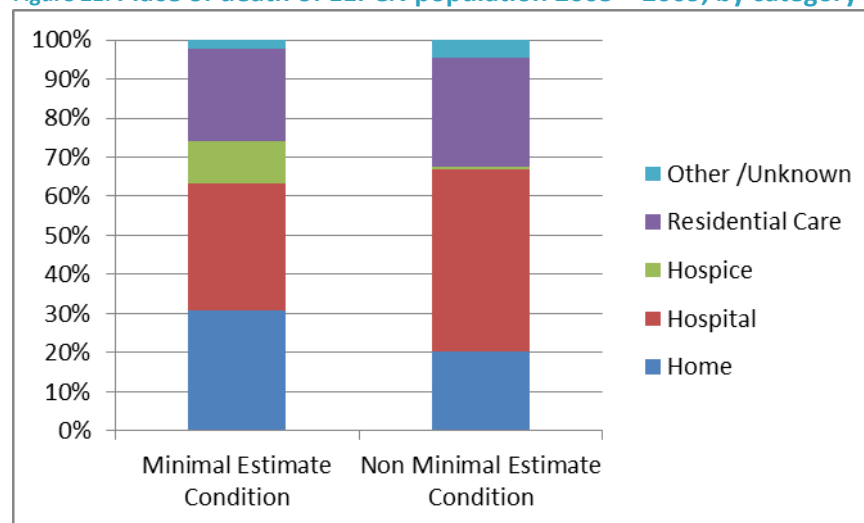
The differences in the original MEPCN population and the additional 1,853 added to make up the EPCN can be seen more clearly in Table 33 and Figure 21. The most common place of death for this latter group was hospital (47%) with only 20% dying at home and 1% dying in a hospice.

Table 33: Place of death of EPCN population 2005 – 2009, by category of cause of death

Cause of Death	Home	Hospital	Hospice	Residential Care	Other / Unknown	Total
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
Minimal Est Condition	1,400 (31)	1,483 (33)	491 (11)	1,082 (24)	100 (2)	4,556 (100)
Non Minimal Est Condition	377 (20)	865 (47)	11 (1)	516 (28)	84 (5)	1,853 (100)
Total	1,777 (28)	2,348 (37)	502 (8)	1,598 (25)	184 (3)	6,409 (100)

Source: MORT database

Figure 21: Place of death of EPCN population 2005 – 2009, by category of cause of death



Source: MORT database

7.5 Service Utilisation in the Last Year of Life

In total there were 26,090 hospital admissions in the last year of life in the EPCN population 2005 – 2009 which equates to an annual average of 5,218. On average the number of hospital admissions in the last year of life for the EPCN was four per person. This is higher than the cohort of all deaths 2005 – 2009 (3 per person) but the same as the MEPCN. Acute admissions were again the most common type of admission (n=16,253) followed by arranged admissions (n=7,753), with waiting list admissions least numerous (n=2,084). The total number of hospital admissions in the last year of life of each admission type, by age group and ethnicity is shown in Tables 34 and 35 respectively for the EPCN population 2005 – 2009. Admissions to CMDHB facilities and other DHB facilities are all included. Figures 22 and 23 show the average number of admissions per patient, by age group and ethnicity respectively, for each type of admission.

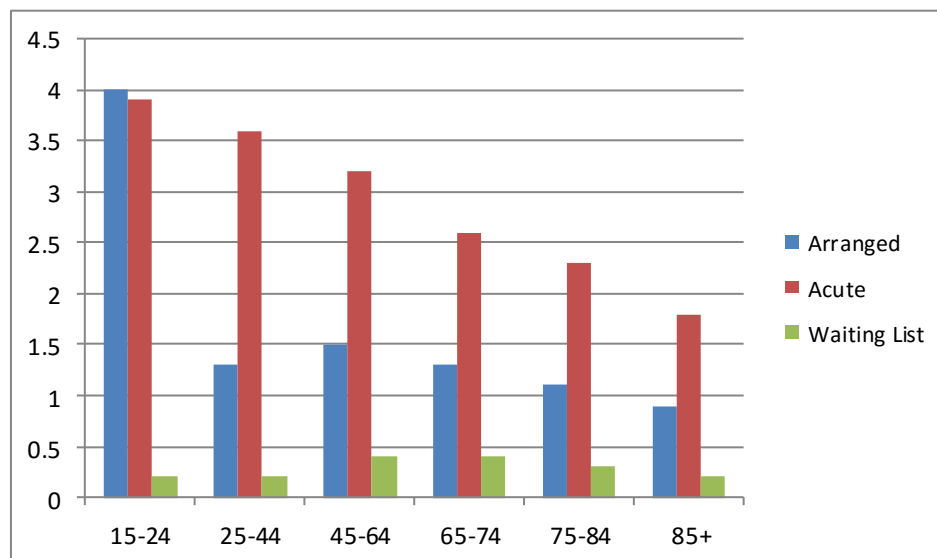
The average number of admissions per person by age group was in keeping with that of the MEPCN population, with the 15 – 24 year olds having an average of just over eight admissions in their last year of life compared with an average of just under three admissions for the 85+ age group. Once again the average number of arranged admissions per person was greater in the 15 – 24 year age group than any other age group.

Table 34: EPCN population 2005 – 2009 hospital admissions in the last year of life per person, by age group

Age Group	Arranged		Acute		Waiting List	
	Total Number	Average per patient	Total Number	Average per patient	Total Number	Average per patient
15-24	119	4.0	116	3.9	5	0.2
25-44	363	1.3	975	3.6	63	0.2
45-64	2,020	1.5	4,463	3.2	509	0.4
65-74	1,931	1.3	3,812	2.6	547	0.4
75-84	2,148	1.1	4,451	2.3	633	0.3
85+	1,172	0.9	2,436	1.8	327	0.2
Total	7,753	1.2	16,253	2.5	2,084	0.3

Source: NMDS (Hospital Events) database

Figure 22: EEPN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by age group



Source: NMDS (Hospital Events) database

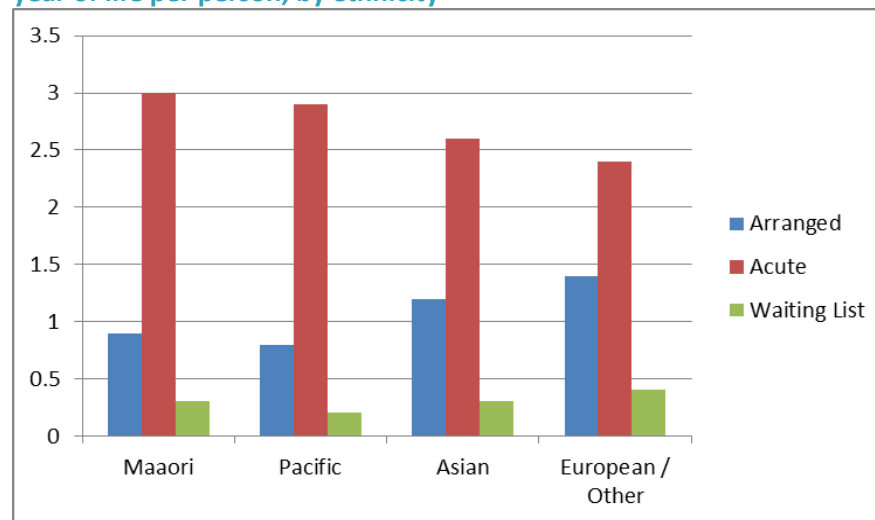
By ethnicity, European /Other again had slightly more arranged admissions than those of Maaori or Pacific ethnicity and slightly fewer acute admissions than those in all the other ethnic groups.

Table 35: EEPN population 2005 – 2009 hospital admissions in the last year of life per person, by ethnicity

Ethnicity	Arranged		Acute		Waiting List	
	Total Number	Average per patient	Total Number	Average per patient	Total Number	Average per patient
Maaori	748	0.9	2,520	3.0	248	0.3
Pacific	745	0.8	2,826	2.9	209	0.2
Asian	389	1.2	834	2.6	86	0.3
European / Other	5,871	1.4	10,073	2.4	1,541	0.4
Total	7,753	1.2	16,253	2.5	2,084	0.3

Source: NMDS (Hospital Events) database

Figure 23: EEPN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by ethnicity



Source: NMDS (Hospital Events) database

7.5.1 Arranged Admissions

In total there were 7,753 arranged admissions in the last year of life for the CMDHB resident adult EEPN population 2005 - 2009. A total of 3,705 (48%) were to MMH, 1,402 (18%) to THSA and 1,611 (15%) were to ACH.

Table 37 shows the total number of arranged admissions 2005 – 2009 and average annual number of arranged admissions, by speciality, to MMH and ACH 2005 – 2009. Just over half (55%) of all arranged admissions to MMH were under the speciality of Haematology. Respiratory Medicine was the speciality responsible for the greatest proportion of admissions to ACH (41%).

Specialities with the most notable increase in number of arranged admissions for the EEPN population compared with the MEPCN for the time period studied were Geriatric AT&R, Cardiology and Renal Medicine for MMH and Cardiothoracic Surgery and Gastroenterology for ACH.

The greatest numbers of bed days were taken up by the specialities of Geriatric AT&R and Haematology for MMH and ACH respectively.

Table 38 shows the total number of arranged admissions 2005 – 2009 and average annual number of arranged admissions, by speciality, to MSC, PUKH, FMH and ASU. As for the MEPCN, Palliative Care and Terminal care had the highest number of admissions and Geriatric Residential Care the highest number of bed days.

7.5.2 Acute Admissions

In total there were 16,253 acute admissions in the last year of life in the CMDHB resident adult EEPN population 2005 – 2009. Of these, 12,796 (79%) were to CMDHB facilities, 3,055 (19%) were to ACH and 402 (2%) were to other NZ hospitals. Of the CMDHB acute

admissions, 12,711 (>99%) were to MMH, and 85 (<1%) to other CMDHB facilities: 24 to PUKH, 24 to FMH, 38 to MSC.

Table 39 shows the total number of acute admissions 2005 – 2009 and average annual number of acute admissions, by speciality, to MMH and ACH. As per the MEPCN population over half of all EEPN acute admissions to MMH (57%) were under the speciality of General Medicine and the majority of acute admissions to ACH were under the speciality of Oncology (57%). Admissions to the speciality of Cardiology increased by a factor of six compared with the MEPCN population which is keeping with the fact that approximately 10% of the EEPN population died of 'ischaemic heart disease'.

Regarding total bed days, the greatest numbers of bed days were taken up by the specialities of General Medicine and Oncology for MMH and ACH respectively. The average length of stay was longest for admissions to Psychogeriatric AT&R at MMH and Orthopaedic Surgery at ACH.

7.5.3 Waiting List Admissions

Waiting list admissions accounted for the smallest proportion of hospital admissions to both MMH and ACH for the EEPN population. There was a total of 2,084 waiting list admissions from 2005 - 2009, an annual average of 417 per year. Of these 45% were to MMH, 31% were to MSC and 18% were to ACH with 6% to other facilities.

Table 40 shows the total number and percentages of waiting list admissions and bed days 2005 – 2009 and average annual number of waiting list admissions and length of stay, by speciality, to MMH and MSC combined and ACH. The greatest number of admission to MMH and MSC combined was under the speciality of Gastroenterology (annual average of 82). The greatest number of bed days was accrued in General Surgery at 48%, (down from 58% in the MEPCN population). At ACH the greatest number of admissions and bed days were to Urology.

7.5.4 Admissions by cause of death category

The numbers and percentages of patients who had admissions to hospital in the last year of life in the EEPN population are shown in Table 36 by cause of death category (MEPCN v non MEPCN). The proportions of patients in the MEPCN and in the additional component of the EEPN who had arranged and waiting list admissions to hospital in their last year of life were very similar but a slightly higher proportion of the latter group had acute admissions (93% v 83%). However as at least one admission (of any type) to hospital was required by definition for this group it is not surprising that the admission figures are higher.

Table 36: EEPN population 2005 – 2009 patients with a hospital admission in the last year of life, by cause of death category

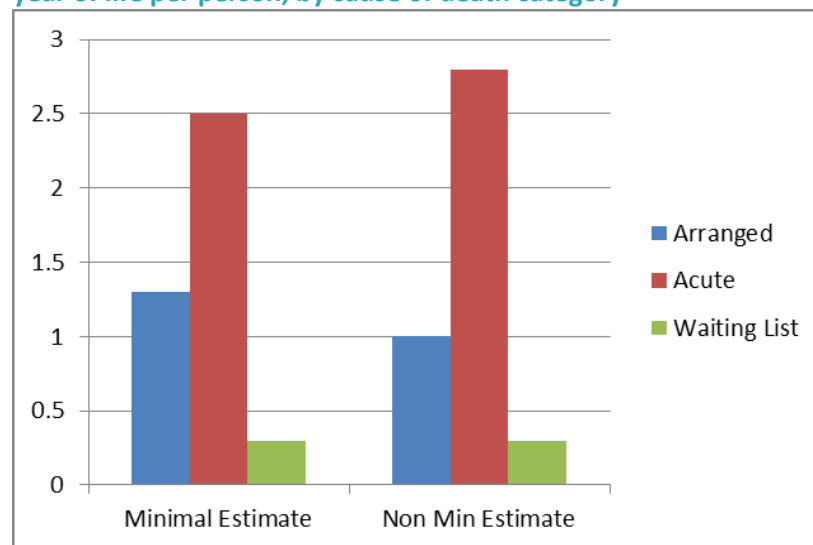
Cause of Death Category	Arranged		Acute		Waiting List	
	Patients with one or more admission		Patients with one or more admission		Patients with one or more admission	
	Number	(%)	Number	(%)	Number	(%)
Minimal Estimate	2,329	(51)	3,797	(83)	1,021	(22)
Non Min Estimate	921	(50)	1,716	(93)	443	(24)
Total	3,250	(51)	5,513	(86)	1,464	(23)

Source: MORT and NMDS (Hospital Events) database

The differences in the original MEPCN population and the additional 1,853 added to make up the EEPN can also be seen in Table 41 and Figure 24. The MEPCN population makes up 71% of the total EEPN population yet accounts for 77% of arranged admissions, but only 58% of arranged admission bed days. This is because the average length of admission of the admissions in the extra 1,853 people was more than double that of the MEPCN.

For acute and waiting list admissions the differences are less marked. The MEPCN part of the EEPN population contributed just slightly less to the total numbers of admissions and total bed days.

Figure 24: EEPN population 2005 – 2009 average number of hospital admissions in the last year of life per person, by cause of death category



Source: MORT and NMDS (Hospital Events) database

Table 37: EEPNCN population 2005 – 2009 arranged admissions to MMH and ACH, by speciality

Speciality	MMH					ACH						
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)			Number	(%)	Number	(%)	
Cardiology	80	16	(2)	552	(3)	6.9	41	8	(4)	38	(1)	<1
Cardiothoracic Surgery	0	0	-	-	-	-	54	11	(5)	415	(11)	7.7
Gastroenterology	85	17	(2)	297	(2)	3.5	<5	<1	(<1)	3	(<1)	n/a*
General Medicine	179	36	(5)	1,065	(6)	5.9	<5	<1	(<1)	8	(<1)	n/a*
General Surgery	75	15	(2)	693	(4)	9.2	17	3	(1)	63	(2)	3.7
Geriatric AT&R	776	155	(21)	11,672	(64)	15.0	13	3	(1)	319	(8)	24.5
Haematology	2,023	405	(55)	865	(5)	<1	175	35	(15)	845	(22)	4.8
Paediatric												
Haematology	0	0	-	-	-	-	48	10	(4)	83	(2)	1.7
Physical Disability												
AT&R	12	2	(<1)	426	(2)	35.5	18	4	(1)	649	(17)	36.1
Radiology	81	16	(2)	84	(<1)	1.0	0	0	-	0	-	-
Renal Medicine	205	41	(6)	906	(5)	4.4	<5	<1	(<1)	1	(<1)	<1
Respiratory Medicine	88	18	(2)	259	(1)	2.9	480	96	(41)	214	(6)	<1
Orthopaedic Surgery	41	8	(1)	565	(3)	13.8	<5	<1	(<1)	6	(<1)	n/a*
Oncology	0	0	-	0	-	-	143	29	(12)	614	(16)	4.3
Other*	60	12	(2)	729	(4)	12.2	163	33	(14)	565	(15)	3.5
Total	3,705	741	(100)	18,113	(100)	4.9	1,161	232	(100)	3,823	(100)	6.7

Source: NMDS (Hospital Events) database

Other MMH= Psychogeriatrics, Emergency Medicine, Specialist Intensive Care, Rheumatology, Endocrinology, Dental Surgery, Gynaecology, Ophthalmology, Plastic Surgery, Adult acute/crisis mental health services.

Other ACH = Immunology, Infectious Diseases, Neurology, Specialist Paediatric Oncology, Gastroenterological Surgery, Otorhinolaryngology, Gynaecology, Neurosurgery, Ophthalmology, Urology.

n/a* not calculated due to small numbers of admissions

Table 38: EPCN population 2005 – 2009 arranged admissions to CMDHB facilities (excluding MMH and THSA), by speciality

Speciality	CMDHB Other**					
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)	
General Medicine	0	0	-	0	-	-
Geriatric AT&R (Active rehab)	83	17	(19)	1297	(5)	15.6
Geriatric AT&R (Intermit Planned)	27	5	(6)	298	(1)	11.0
Geriatric Res Care (Hosp Long term)	91	18	(21)	22,129	(84)	243.2
Palliative and Terminal Care	204	41	(47)	2,219	(8)	10.8
Other*	33	7	(8)	261	(1)	7.9
Total	438	88	(100)	26,204	(100)	59.8

Source: NMDS (Hospital Events) database

*Other = Gastroenterology, Renal medicine, General Surgery, Otorhinolaryngology, Gynaecology, Orthopaedic Surgery

** = Pukekohe Hospital, Franklin Memorial, Manukau Super Clinic, Auckland Spinal Unit.

Table 39: EPCN population 2005 – 2009 acute admissions to MMH and ACH, by speciality

Speciality	MMH					ACH						
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)			Number	(%)	Number	(%)	
Intensive care	529	106	(4)	410	(<1)	<1	0	0	-	0	-	-
Cardiology	304	61	(2)	2,196	(3)	7.2	43	9	(1)	200	(1)	4.7
Emergency Medicine	396	79	(3)	175	(<1)	<1	67	13	(2)	23	(<1)	<1
Gastroenterology	397	79	(3)	2,573	(3)	6.5	7	1	(<1)	44	(<1)	6.3
General Medicine	7,298	1,460	(57)	39,942	(53)	5.5	149	30	(5)	1,094	(6)	7.3
General Surgery	1,439	288	(11)	12,500	(16)	8.7	67	13	(2)	778	(4)	11.6
Gynaecology	125	25	(1)	689	(1)	5.5	8	2	(<1)	58	(<1)	7.3
Haematology	477	95	(4)	3,291	(4)	6.9	235	47	(8)	1,227	(7)	5.2
Oncology	0	0	-	0	-	-	1,735	347	(57)	8,298	(48)	4.8
Otorhinolaryngology	<5	<1	(<1)	11	(<1)	n/a*	70	14	(2)	784	(5)	11.2
Orthopaedic Surgery	345	69	(3)	3,508	(5)	10.2	17	3	(<1)	348	(2)	20.5
Psychogeriatric AT&R	39	8	(<1)	1,354	(2)	34.7	0	0	-	0	-	-
Renal Medicine	481	96	(4)	3,337	(4)	6.9	22	4	(<1)	262	(2)	11.9
Respiratory Med	778	156	(6)	4,994	(7)	6.4	98	20	(3)	828	(5)	8.4
Urology	0	0	-	0	-	-	273	55	(9)	1,447	(8)	5.3
Neurosurgery	0	0	-	0	-	-	124	25	(4)	1,025	(6)	8.3
Other*	101	20	(<1)	975	(1)	9.7	140	28	(5)	997	(6)	7.1
Total	12,711	2,542	(100)	75,955	(100)	6.0	3,055	611	(100)	17,413	(100)	5.7

Source: NMDS (Hospital Events) database

*MMH Other = Geriatric AT&R (Active rehabilitation), Endocrinology, Diabetology, Rheumatology, Specialist Interventionist Radiology, Postnatal Services [Mother], Dental Surgery, Plastic Surgery, Adult acute/crisis mental health services.

*ACH Other = Specialist Paediatric Oncology, Gastroenterological Surgery, Cardiothoracic Surgery, Ophthalmology, Vascular surgery, Geriatric AT&R (Active rehabilitation), Specialist Paediatric Haematology, Infectious Diseases, Neurology.

n/a* not calculated due to small numbers of admissions

Table 40: EPCN population 2005 – 2009 waiting list admissions to MMH, MSC and ACH, by speciality

Speciality	MMH and MSC					ACH						
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)			Number	(%)	Number	(%)	
Cardiothoracic Surgery	-	-	-	-	-	-	52	10	(14)	361	(20)	6.9
Gastroenterology	411	82	(26)	183	(5)	<1	5	1	(1)	4	(<1)	<1
General Surgery	266	53	(17)	1,742	(48)	6.5	16	3	(4)	165	(9)	10.3
Geriatric AT&R	23	5	(1)	417	(12)	18.1	-	-	-	-	-	-
ENT	41	8	(3)	37	(1)	<1	69	14	(18)	347	(19)	5.0
Interven.Radiology	31	6	(2)	5	(<1)	<1	-	-	-	-	-	-
Neurosurgery	-	-	-	-	-	-	33	7	(9)	159	(9)	4.8
Ophthalmology	135	27	(9)	1	(<1)	<1	31	6	(8)	2	(<1)	<1
Orthopaedic Surgery	63	13	(4)	384	(11)	6.1	<5	<1	(<1)	28	(2)	n/a*
Plastic Surgery	259	52	(16)	386	(11)	1.5	-	-	-	-	-	-
Respiratory Medicine	203	41	(13)	44	(1)	<1	<5	<1	(<1)	0	(<1)	<1
Urology	-	-	-	-	-	-	125	25	(33)	539	(30)	4.3
Other**	141	28	(9)	394	(11)	2.8	50	10	(13)	204	(11)	4.1
Total	1573	315	(100)	3,593	(100)	2.3	383	77	(100)	1,809	(100)	4.7

Source: NMDS (Hospital Events) database

MMH and MSC Other = Cardiology, General Medicine, Gynaecology, Haematology, Intensive Care, Renal Medicine.

ACH Other = Cardiology, Gynaecology, Neurology, Dermatology, Dental Surgery, Vascular surgery

n/a* not calculated due to small numbers of admissions

Table 41: EPCN population 2005 – 2009 hospital admissions in the last year of life, by cause of death category

Cause of Death Category	Arranged			Acute			Waiting List		
	Total admissions 2005 – 2009		Average length of stay (days)	Total admissions 2005 – 2009		Average length of stay (days)	Total admissions 2005 – 2009		Average length of stay (days)
	Number	(%)		Number	(%)		Number	(%)	
Minimal Estimate	5,981	(77)	24.2	11,049	(68)	5.6	1,443	(69)	2.8
Non Min Estimate	1,772	(23)	58.8	5,204	(32)	6.7	641	(31)	3.0
Total	7,753	(100)	32.1	16,253	(100)	6.0	2,084	(100)	2.8

Source: MORT and NMDS (Hospital Events) database

8 Totara Hospice South Auckland and Franklin Hospice Populations

8.1 Key Findings

Demography

- *From Jan 2005 to Dec 2009 inclusive 409 patients were under the care of Franklin Hospice (FH) and 2,631 patients under Totara Hospice South Auckland (THSA)*
- *At FH 40.3% of patients were female and 244 patients 59.7% were male. At THSA 48% were female and 52% male*
- *The proportion of patients in each age group is very similar for the two hospice populations however the hospice patients were younger on average than the cohort of all CMDHB resident adult deaths 2005 - 2009*
- *For 2005 to 2009 the proportion of deaths in the 85+ age group was 8.8% and 9.7% for FH and THSA populations respectively compared with 25.1% for the total CMDHB population, 17% for the MEPCN population and 21% for the EEPCN population*
- *The distribution of patients across different ethnic groups is quite different for the two hospices, but reflects that of the geographical populations they serve*
- *The most common diagnosis was 'neoplasm', (90% at FH and 82% at THSA)*
- *THSA patients with COPD / bronchiectasis commonly had multiple other diagnoses*

Place of death

- *Slightly more FH patients died at home than THSA patients (52% compared with 44%). In both hospice populations greater proportions of patients died at home than in the total CMDHB adult population (29%)*
- *19% of THSA patient deaths occurred in a hospice compared with 4.6% of total CMDHB resident adult deaths*

Service Utilisation in the last year of life

- *81% of hospice patients were admitted to CMDHB facilities in their last year of life*
- *The greatest numbers of arranged admissions were to the speciality of Haematology for both hospice populations*

As virtually all patients who are under hospice services die rather than being discharged from these services, the number of patient deaths under hospice services was taken as a proxy for the number of patients under the care of hospice services for this report.

From January 2005 to December 2009 inclusive a total of 2,631 patients were under the care of Totara Hospice South Auckland (THSA). In comparison, for the same time period, a total of 409 patients were under the care of Franklin Hospice (FH).

The number of patients seen by year 2005 – 2009 by each hospice is listed in Table 42. On average THSA cared for approximately six times more patients than the smaller FH each year. This is in keeping with the difference in size of population served by each hospice. Notably in 2005 THSA appeared responsible for fewer patients than in the other four years. The reason for this is not apparent.

Table 42: THSA and FH populations 2005 – 2009, by year of death

Year	Franklin Hospice	Totara Hospice South Auckland
2005	69	359
2006	58	525
2007	87	592
2008	107	567
2009	88	588
Total	409	2,631

Source: FH and THSA data

8.2 Age Group, Gender and Ethnicity

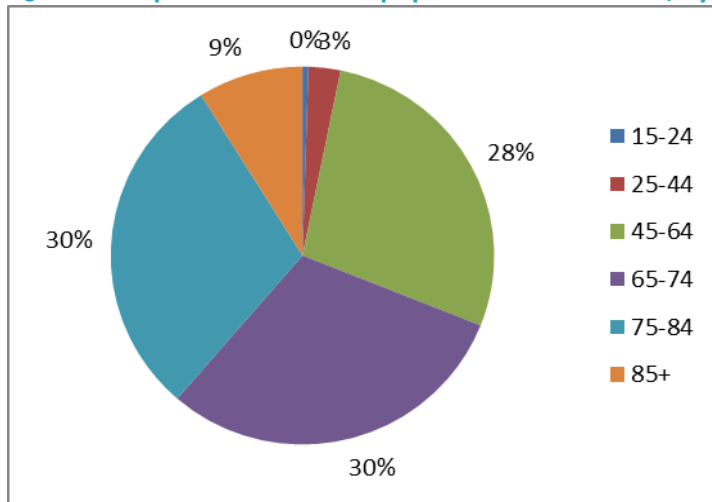
The gender and age distributions of hospice patients are shown in Table 43. At FH 165 patients (40.3%) were female and 244 patients (59.7%) were male. Most notably in the 65-74 age group there were twice as many male patients as female patients. The genders of the THSA patients were more equally distributed with just a slight male predominance at a total of 1,263 patients (48.0%) female and 1,368 patients (52.0%) male. The proportion of patients in each age group was very similar for the two hospice populations (Figures 25 and 26) however the hospice patients were generally younger than the cohort of all CMDHB resident adult patients who died in this five year period with the proportion of deaths in the 85+ age group being substantially lower at 8.8% and 9.7% for FH and THSA respectively compared with the total CMDHB population of 25.1% (Figure 3). The proportions of deaths in the hospice 85+ age groups were also lower than that of the MEPCN and EPCN which were 17% and 21% respectively.

Table 43: THSA and FH populations 2005 – 2009, by age group and gender

Age Group	Franklin Hospice				Totara Hospice South Auckland			
	Number of Female Patients	Number of Male Patients	Total number	(%)	Number of Female Patients	Number of Male Patients	Total number	(%)
15-24	<10	<10	<10	-	6	10	16	(0.6)
25-44	<10	<10	14	(3.4)	103	64	167	(6.3)
45-64	55	58	113	(27.6)	374	424	798	(30.3)
65-74	41	82	123	(30.1)	332	372	704	(26.8)
75-84	46	75	121	(29.6)	314	376	690	(26.2)
85+	14	22	36	(8.8)	134	122	256	(9.7)
Total	165	244	409	(100)	1,263	1,368	2,631	(100)

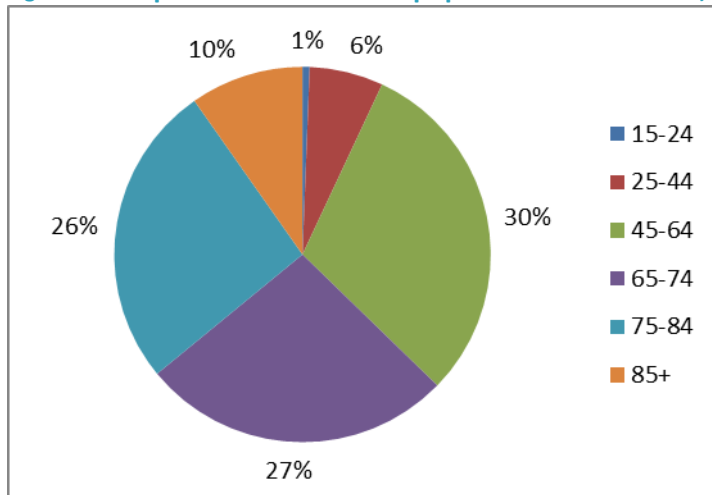
Source: FH and THSA data

Figure 25: Proportions of the FH population 2005 – 2009, by age group



Source: FH data

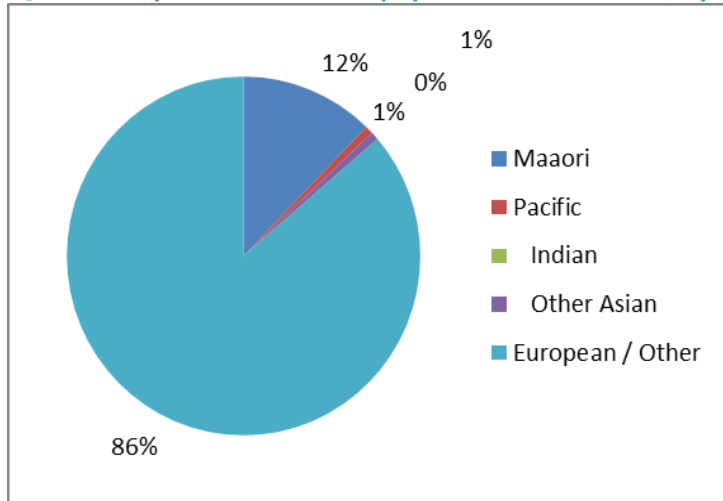
Figure 26: Proportions of the THSA population 2005 – 2009, by age group



Source: THSA data

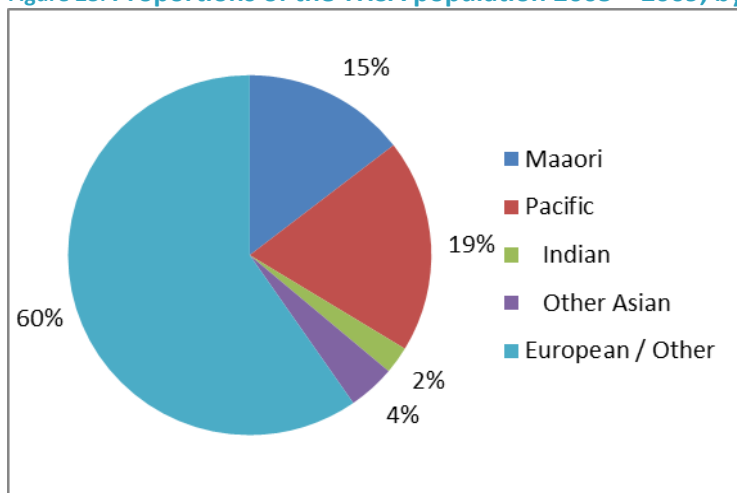
In contrast the distribution of patients across different ethnic groups shown in Figures 27 and 28 and listed in Table 44, was quite different for the two hospices. Franklin Hospice had a much larger proportion of its patients recorded as European / Other (86.3% total) and relatively few Pacific and Asian patients compared with THSA for which 19.1% of patients were Pacific, 6.6% Asian and only 59.4% European / Other. The proportions of patients that were Maaori were fairly similar at 12.2% and 14.5% for FH and THSA respectively. The distribution by ethnicity of the FH population was consistent with those of the Franklin residential and service localities.

Figure 27: Proportions of the FH population 2005 – 2009, by ethnicity



Source: FH data

Figure 28: Proportions of the THSA population 2005 – 2009, by ethnicity



Source: THSA data

The ethnicities listed in Table 44 are as recorded in the hospice databases. When these records were cross checked with ethnicities documented the live CMDHB hospital events database a reasonable correlation was found especially for the FH patients.

Table 44: THSA and FH populations 2005 – 2009, by ethnicity

Ethnic Group	Franklin Hospice		Totara Hospice South Auckland	
	Number of Patients	(%)	Number of Patients	(%)
Maaori	50	(12.2)	381	(14.5)
Pacific				
Samoaan			233	(8.9)
Cook Island Maori			94	(3.6)
Tongan			117	(4.4)
Niuean			31	(1.2)
Other Pacific			27	(1.0)
Pacific Total	3	(0.7)	502	(19.1)
Asian				
Indian			64	(2.4)
Other Asian			110	(4.2)
Asian Total	3	(0.7)	174	(6.6)
European / Other				
NZ European	253	(61.9)	1,179	(44.8)
MEELA			68	(2.6)
Other	100*	(24.4)	316	(12.0)
European / Other Total	353	(86.3)	1,563	(59.4)
Unknown			11	(0.4)
Total	409	(100)	2,631	(100)

Source: FH and THSA data

*MEELA and Other combined as small numbers

Of the 2,118 THSA patients who had an admission in the last year of life, ethnicity codes were recorded in the CMDHB hospital events database for 1,982 patients. Of these 1,982 patients just 63 patients had a prioritised ethnicity code that differed from that recorded in the THSA database (2.4% of total THSA patients). The differences are listed in Table 45.

Table 45: Differences in ethnicity recording between the hospice and CMDHB hospital events databases

Ethnicity as recorded in the hospice database	Franklin Hospice		Totara Hospice South Auckland	
	Number in the hospice database for which inpatient ethnicity coding does not match	Corresponding ethnicity recorded in the inpatient database	Number in the hospice database for which inpatient ethnicity coding does not match	Corresponding ethnicity recorded in the inpatient database
Maaori	2	1 Pacific 1 European / Other	23	4 Pacific 19 European / Other
Pacific	0	n/a	9	1 Maaori 2 European / Other 6 Asian
Asian	0	n/a	6	6 Pacific
European / Other	2	1 Maaori 1 Asian	25	11 Maaori 9 Pacific 5 Asian
Total	4	As above	63	As above

Source: THSA data and CMDHB Hospital Events database

There were also more minor differences at level 2 of ethnicity coding, but these were not quantified as the general grouping at level 1 for these patients remained the same. The most frequent inconsistency was found between patients classified as European / Other in one source and Maaori in the other (n=30). Notable also are the eleven patients recorded as Indian in one source and Fijian in the other. It is recognised that Fijian Indians are particularly prone to inconsistent classification between different databases (Mehta S 2012). Three of the four patients classified as NZ Maaori in the THSA database and Pacific in the inpatient database were classified as Cook Island Maaori in the latter. This is another group for which inconsistencies frequently arise.

In the FH database inpatient ethnicity coding was available for 331/409 hospice patients. Inconsistencies in ethnicity coding between the hospice and CMDHB hospital events databases were found for only four patients (<1% of total FH patients). These are also listed in Table 45.

All further analyses by ethnicity use the ethnicities recorded in the hospice databases.

8.3 Diagnoses

For each hospice patient there was no indication of which diagnosis was the primary or main diagnoses therefore patients have been grouped according to how many minimal estimate of palliative care need (MEPCN) diagnoses they had, which category of MEPCN diagnoses they were recorded as having and the presence or otherwise of other non-MEPCN diagnoses. In some later analyses the grouping is limited to whether the list of diagnoses for the patient included a neoplasm diagnosis or purely comprised of non-cancer related conditions.

8.3.1 Franklin Hospice

Of the 409 patients at Franklin Hospice, 407 had one or more specific diagnoses recorded on the database. The remaining 2 patients had no diagnosis recorded. For 342 patients only one diagnosis was recorded, for the remaining 65 patients multiple diagnoses were recorded.

Of the 407 with a given diagnosis 392 patients had at least one MEPCN diagnosis and the remaining 15 patients only had diagnoses recorded that were not in the MEPCN list. The most common diagnosis for this group was pneumonia (n=4). Of the 392 patients with MEPCN diagnoses, 372 had just one MEPCN diagnosis and 20 had two MEPCN diagnoses. A total of 33/392 patients with one or more MEPCN diagnosis also had other non-MEPCN diagnoses recorded. The most common diagnoses not in the MEPCN diagnosis list for these 33 patients were diabetes (n=7), ischaemic heart disease (n=6) cerebrovascular accident (n=3) and deep vein thrombosis (n=3).

The total number of patients with conditions in each MEPCN diagnosis category is given in Table 46. Patients are counted more than once if they have diagnoses in multiple categories. A total of 90% of FH patients 2005 – 2009 had a neoplasm.

Table 46: FH population 2005 – 2009 with a MEPCN condition

MEPCN Category	Patients Number	(%)
Neoplasm	366	(90)
COPD / Bronchiectasis	14	(3)
Renal Failure	8	(2)
Heart Failure	11	(3)
Neurological*	13	(3)
Liver Failure / HIV	0	-

Source: FH data

*= Alzheimer’s disease, Parkinson’s disease, Motor Neurone Disease, Huntington’s disease

Table 47 and Figure 29 show the numbers and percentages of patients with single and multiple diagnoses by MEPCN category. Patients diagnosed with a neoplasm more commonly had just a single diagnosis recorded.

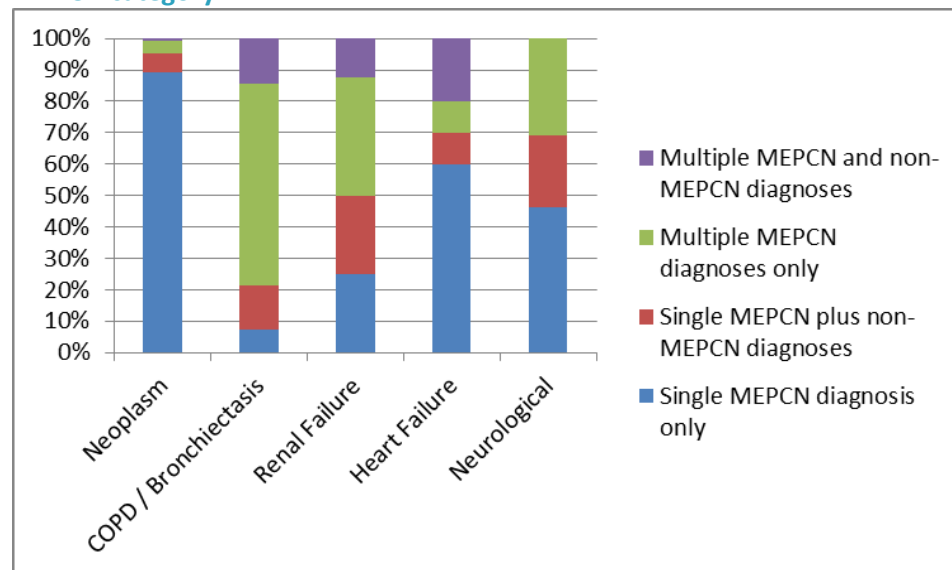
Table 47: FH population 2005 – 2009 with single / multiple diagnoses

MEPCN Category	Patients with single MEPCN diagnosis only		Number of patients with single MEPCN plus non-MEPCN diagnoses	Number with additional MEPCN diagnoses only	Number with additional MEPCN and non-MEPCN diagnoses
	Number	(%)			
Neoplasm	327	(89)	22	14	3
COPD / Bronchiectasis	1	(7)	2	9	2
Renal Failure	2	(25)	2	3	1
Heart Failure	6	(55)	1	1	2
Neurological*	6	(46)	3	4	0
Liver Failure / HIV	0	-	0	0	0
Total	342	n/a	30	31	8

Source: FH data

*= Alzheimer’s disease, Parkinson’s disease, Motor Neurone Disease, Huntington’s disease

Figure 29: Proportions of FH population 2005 – 2009 with single and multiple diagnoses, by MEPCN category



Source: FH data

8.3.2 Totara Hospice South Auckland

Of the 2,631 patients at Totara Hospice, 2,585 had one or more specific diagnoses recorded on the database. The remaining 46 patients had a diagnosis of ‘unclassified condition’ recorded. For 1,538 patients only one diagnosis was recorded, for the remaining 1,047 patients multiple diagnoses were recorded (average 3.3, range 2-10).

Of the 2,585 patients with a given diagnosis a total of 210 patients only had diagnoses recorded that were not in the MEPCN diagnosis list. The most common of these are given in Table 81 in Appendix Eight. The top three diagnoses were diabetes mellitus (this was in conjunction with other non-MEPCN diagnoses), ischaemic heart disease (IHD) and cerebrovascular accident (CVA).

The remaining 2,375 patients had at least one MEPCN diagnosis. Of these 2,153 had just one MEPCN diagnosis, 197 had two, 24 patients had three and one patient had four MEPCN diagnoses.

A total of 834/2,375 patients with one or more MEPCN diagnosis also had other non-MEPCN diagnoses recorded. The most common ‘other’ conditions in patients with MEPCN diagnoses are given in Table 82 in Appendix Eight. Yet again diabetes mellitus was the most common condition (documented for 26% of these patients).

Certain conditions featured higher up the ranking in the patients with no MEPCN diagnosis compared with those with an MEPCN diagnosis such as CVA (3rd versus 8th) and myocardial infarct (4th versus 18th). Others such as pneumonia, dementia, gangrene and multiple organ failure did not feature at all in the top 33 diagnoses of patients with an MEPCN. Conversely some conditions were more common amongst patients with an MEPCN most noticeably gout and asthma which were 5th and 6th on this list respectively.

The total number of patients with conditions in each MEPCN category is given in Table 48. Patients are counted more than once if they have diagnoses in multiple categories. In the THSA population 2005 – 2009, 82% of patients had a neoplasm.

Table 48: THSA population 2005 – 2009 with a MEPCN condition

MED Category	Patients Number	(%)
Neoplasm	2,157	(82)
COPD / Bronchiectasis	175	(7)
Renal Failure	135	(5)
Heart Failure	110	(4)
Neurological*	39	(2)
Liver Failure / HIV	7	(<1)

Source: THSA data

*= Alzheimer’s disease, Parkinson’s disease, Motor Neurone Disease, Huntington’s disease

As in the FH population, patients at THSA with neoplasms frequently had this as the single diagnosis recorded. In contrast patients with COPD / bronchiectasis more frequently had multiple diagnoses recorded (Table 49 and Figure 20).

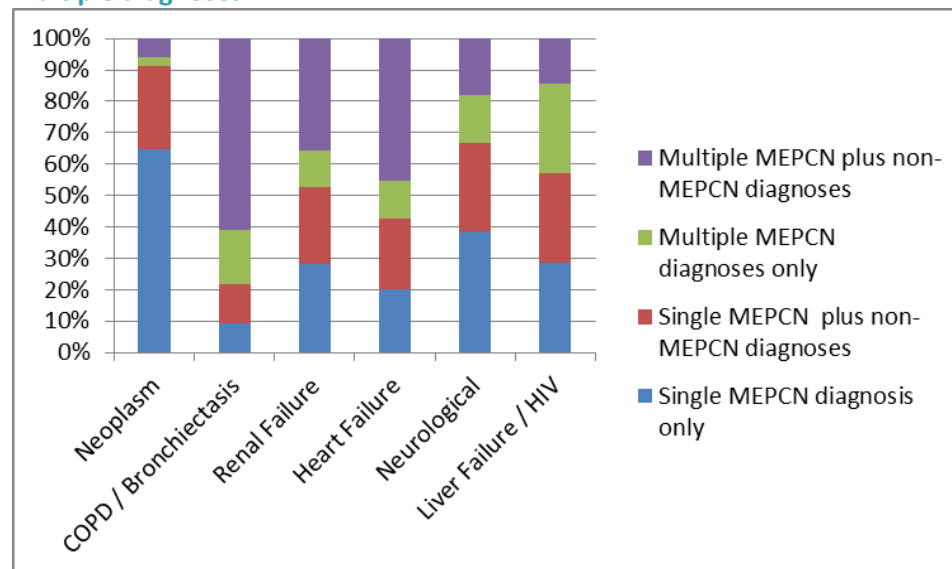
Table 49: THSA population 2005 – 2009 with single / multiple diagnoses

MEPCN Category	Patients with single MEPCN diagnosis only		Number of patients with single MEPCN diagnosis plus non-MEPCN diagnoses	Number with additional MEPCN diagnoses only	Number with additional MEPCN and non-MEPCN diagnoses
	Number	(%)			
Neoplasm	1,394	(65)	573	61	129
COPD / Bronchiectasis	16	(9)	22	30	107
Renal Failure	38	(28)	33	16	48
Heart Failure	22	(20)	25	13	50
Neurological*	15	(39)	11	6	7
Liver Failure / HIV	2	(29)	2	2	1
Total	1,487	n/a	666	128	342

Source: THSA data

*= Alzheimer’s disease, Parkinson’s disease, Motor Neurone Disease, Huntington’s disease

Figure 30: Proportions of THSA population within each MEPCN category with single/multiple diagnoses



Source: THSA data

8.4 Place of Death

Place of death was recorded on the hospice databases for each patient and these are presented in Table 50. It should be noted that as place of death may be recorded on the hospice databases slightly differently to on the MORT database, comparison of place of death between the hospice populations and the total CMDHB population and MEPCN and EPCN populations may not be valid. In the THSA database a reasonable proportion of patients are noted to have died in a ‘private hospital’. The assumption has been made that these private hospitals are affiliated to residential care facilities and therefore they have been included in the residential care category. This is consistent with the categorisation of these facilities in the MORT database. At FH data was not reliably collected on hospital name until 2008 / 2009 and in the FH database 36% were noted to have died in hospital ‘unspecified’. It is highly likely that some of these were also been in hospitals associated with residential care facilities but in the absence of more detailed information they have been

included in the 'hospital category'. This limits the validity of the place of death results for 'hospital and 'residential care for the FH population.

In 2005 – 2009 the proportions of hospice patients who died at home was 52% and 44% for Franklin and THSA patients respectively. The proportion of the total CMDHB adult population who died at home 2005 – 2009 was 29% (Table 6). Not unexpectedly the percentage of hospice patients who died in a hospice for THSA patients (which has an inpatient facility) was also higher than the total population average at 19% compared with 4.6%. Less than 1% of FH patients died in a hospice however Franklin Hospice is a community facility with no inpatient facility.

The percentages of patients who died in hospital were 46% and 20% for FH and THSA respectively compared with 36.3% for the total CMDHB estimated resident adult population; however the validity of this comparison is limited as described above.

The numbers of patients who died in residential care were substantially lower for hospice patients than the total CMDHB estimated resident adult population at less than 1.0% compared with 24.0%. Even including all the patients who died in 'private hospitals' for THSA (14%), residential care deaths for THSA would still be lower than the total population average. One reason for this may be that the average age of death for the hospice population was also significantly lower. Additionally many residential care facilities are able to provide palliative care to their residents and therefore need support for complex patients only.

Table 50: THSA and FH populations 2005 – 2009, by place of death

Place of death	Franklin Hospice		Totara Hospice South Auckland	
	Number	(%)	Number	(%)
Home	211	(52)	1,168	(44)
Hospital				
MMH	9	(2)	333	(13)
ACH	4	(1)	78	(3)
Franklin Memorial	9	(2)	0	-
Pukekohe Hospital	15	(4)	0	-
Other / unspecified	149	(36)	110	(4)
Hospital Total	186	(46)	894	(20)
Hospice				
Totara			475	(18)
Franklin				
Other Hospice			11	(<1)
Hospice Total	4	(<1)	486	(19)
Rest Home	3	(<1)	27	(1)
Private Hospital	1	(<1)	373	(14)
Other	1	(<1)	45	(2)
Unknown	3	(<1)	11	(<1)
Total	409	(100)	2,631	(100)

Source: FH and THSA data

Place of death for each hospice population by gender is tabulated in Tables 75 and 76 in Appendix Five. Place of death by age group and ethnicity is provided for THSA in Tables 51 and 52 respectively. It was not possible to analyse place of death for the FH population by age group or ethnicity due to small numbers and difficulties with the classification. There was a clear increase in the proportion of the THSA population dying in residential care (and

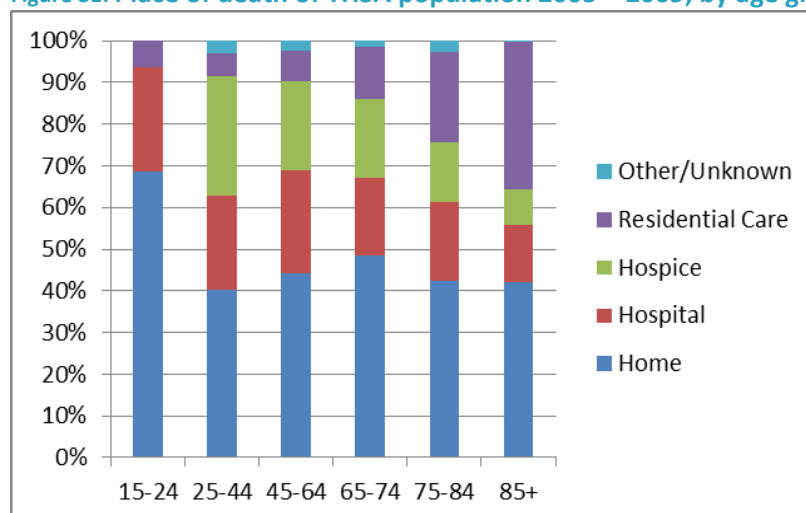
private hospitals) by age. Conversely a greater proportion of younger patients died in hospices, with the exception of the very youngest age group, the 15 – 24 years olds.

Table 51: Place of death of THSA population 2005 – 2009, by age group

Age group	Home	Hospital	Hospice	Residential Care (includes Private Hospital)	Other / Unknown	Total
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
15-24	11 (69)	<5 -	<5 -	<5 -	<5 -	16 (100)
25-44	67 (40)	38 (23)	48 (29)	9 (5)	5 (3)	167 (100)
45-64	353 (44)	196 (25)	172 (22)	57 (7)	20 (3)	798 (100)
65-74	341 (48)	131 (19)	134 (19)	87 (12)	11 (2)	704 (100)
75-84	288 (42)	128 (19)	99 (14)	146 (21)	19 (3)	690 (100)
85+	108 (42)	35 (14)	22 (9)	90 (35)	<5 -	256 (100)
Total	1,168 (44)	532 (20)	475 (18)	400 (15)	43 (2)	2,631 (100)

Source: THSA data

Figure 31: Place of death of THSA population 2005 – 2009, by age group



Source: THSA data

It is recognised that preference of place of death varies by ethnicity (Taylor, Ensor et al. 2012). Data was not available on preference of place of death but Table 52 shows actual place of death by ethnicity for the THSA population. Numbers were too small to analyse FH patients in this way. Figure 33 shows that a relatively high proportion of Pacific and Maaori patients died at home compared with those of Asian or European / Other ethnicity, whereas a higher proportion of those of Asian or European / Other ethnicity died in hospital or the hospice.

Table 52: Place of death of THSA population 2005 – 2009, by ethnicity

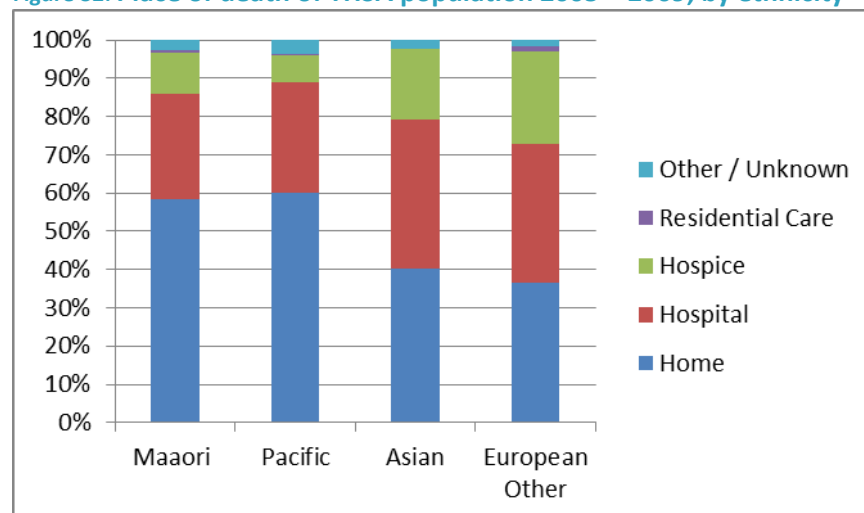
Ethnicity	Home		Hospital		Hospice		Residential Care (includes Private Hospital)		Other / Unknown		Total	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Maaori	223	(59)	83	(22)	42	(11)	23	(6)	10	(3)	381	(100)
Pacific	301	(60)	119	(24)	35	(7)	29	(6)	18	(4)	502	(100)
Asian	70	(40)	54	(31)	32	(18)	14	(8)	4	(2)	174	(100)
European / Other	569	(36)	260	(17)	377	(24)	333	(21)	24	(2)	1,563	(100)
*Total	1,163	(44)	516	(20)	486	(19)	399	(15)	56	(2)	2,620	(100)

Source: THSA data

* Totals are different to previous tables as ethnicity was unknown for 11 patients

Compared to the total CMDHB adult population a higher proportion of Maaori and Pacific patients under THSA services died at home or in the hospice. A much smaller proportion of THSA patients across all ethnicities died in residential care than in the total population but this is most marked for European / Other.

Figure 32: Place of death of THSA population 2005 – 2009, by ethnicity



Source: THSA data

The proportions of patients who died at home and in the hospice setting varied by diagnosis for THSA patients 2005 – 2009. Patients diagnosed with a neoplasm frequently died in the hospice (21%) compared with only 8.0% those with no purely non-neoplasm diagnoses. The proportions of patients who died at home were 42% in patients with a neoplasm and 55% in patients with non-neoplasm diagnoses.

8.5 Service Utilisation in the Last Year of Life

A total of 331 / 409 (81%) FH patients and 2,118 / 2,631 (81%) THSA patients were admitted to a CMDHB facility in their last year of life. Data was not available on hospital admissions to facilities outside CMDHB. The majority of admissions for both hospice populations were

acute admissions (53% and 70%) followed by arranged admissions (37% and 20%) and then admissions from a waiting list (10% for both).

Table 53 shows the total number of admissions and number of individual patients who had one or more admissions in their last year of life for both hospice populations. A significantly higher percentage of FH patients had an arranged admission (47%) than THSA patients (21%) and a slightly higher percentage of THSA patients had an acute admission compared with FH patients at 76% and 68% respectively. The proportions of patients having a 'waiting list' (elective) admission were very similar in the two populations.

Table 54 shows the total number of CMDHB bed days occupied by FH and THSA patients in their last year of life, by type of admission. Acute admissions were responsible for by far the largest proportion of bed days, particularly for THSA (81%), both due to the longer average length of stay per admission, and due to the higher total number of admissions of this type. The average length of stay across all admission types was 5.2 days for the FH population and 4.7 days for the THSA population.

Table 53: THSA and FH populations 2005 – 2009 CMDHB hospital admissions in the last year of life, number of admissions

Type of Admission	Franklin Hospice				Totara Hospice South Auckland			
	Number of admissions (% of total)		Patients with admissions Number (%)		Number of admissions (% of total)		Patients with admissions Number (%)	
Arranged	496	(37)	192	(47)	1,404	(20)	539	(21)
Acute	709	(53)	279	(68)	4,920	(70)	1,988	(76)
Waiting List	130	(10)	87	(21)	699	(10)	518	(20)
Total	1,335	(100)	331	(81)	7,023	(100)	2,118	(81)

Source: CMDHB Hospital Events database

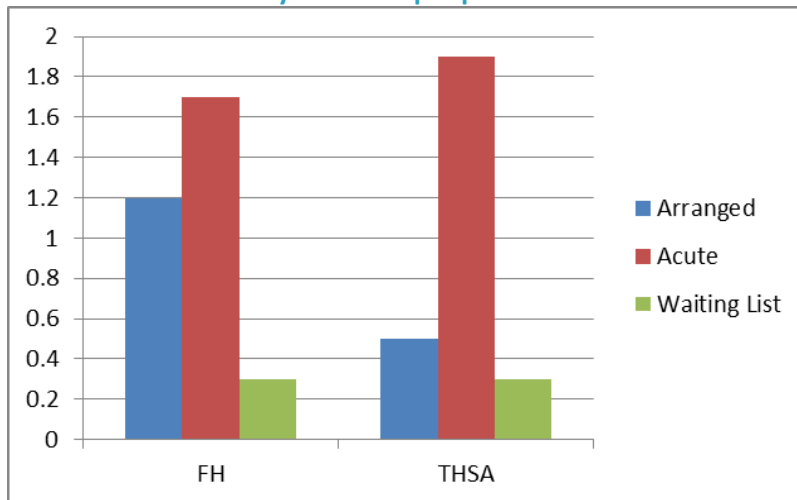
Table 54: THSA and FH populations 2005 – 2009 CMDHB hospital admissions in the last year of life, bed days and average length of stay

Type of Admission	Franklin Hospice				Totara Hospice South Auckland		
	Total number of bed days (%)	Average length of stay per admission	Average total bed days per patient (n=409)	Total number of bed days (%)	Average length of stay per admission (days)	Average total bed days per patient (n=2,631)	
Arranged	2,700 (39)	5.4	6.5	4,731 (14)	3.4	1.8	
Acute	4,029 (58)	5.7	9.9	26,855 (81)	5.5	10.2	
Waiting List	161 (2)	1.2	0.4	1,490 (5)	2.1	0.6	
Total	6,890 (100)	5.2	16.8	33,076 (100)	4.7	12.6	

Source: CMDHB Hospital Events database

Figure 33 shows the average number of each type of admission in the last year of life per person for each hospice population. Franklin Hospice patients had on average 3.2 hospital admissions in their last year of life to CMDHB facilities and THSA patients 2.7 admissions. This is lower than the average number of total hospital admissions per patient in the MEPCN and EEPN populations but the data used for the estimated populations included admissions to other DHB facilities.

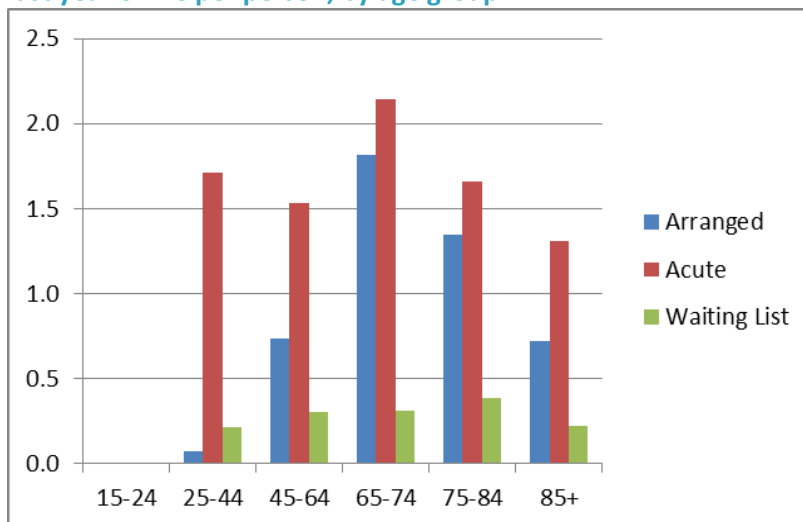
Figure 33: FH and THSA populations 2005 – 2009 average number of CMDHB hospital admissions in the last year of life per person



Source: CMDHB Hospital Events database

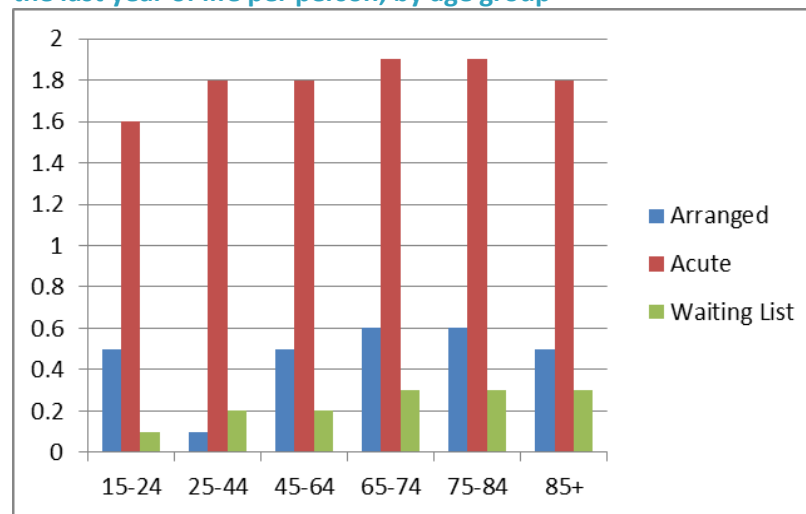
The distributions of admissions in the last year of life, by age group, were quite different for the hospice populations compared with the MEPCN and EPCN populations (Figures 34 and 35 and Tables 55 and 56). Most notably the younger patients in the hospice populations had far fewer admissions to CMDHB hospital facilities. Comparisons are limited by the fact that admissions to ACH are not included in the hospice data but are included in the MEPCN and EPCN data. Oncology admissions to ACH are therefore not included in the hospice data and are likely to be common amongst the younger age groups. Further analyses would be needed to fully understand the trends seen in this preliminary piece of work.

Figure 34: FH population 2005 – 2009 average number of CMDHB hospital admissions in the last year of life per person, by age group



Source: FH data and CMDHB Hospital Events database

Figure 35: THSA population 2005 – 2009 average number of CMDHB hospital admissions in the last year of life per person, by age group



Source: THSA data and CMDHB Hospital Events database

Table 55: FH population 2005 – 2009 CMDHB hospital admissions in the last year of life, by age group

Age Group	Arranged		Acute		Waiting List	
	Total Number	Average per patient	Total Number	Average per patient	Total Number	Average per patient
15-24	0	-	0	-	0	-
25-44	1	0.1	24	1.7	3	0.2
45-64	83	0.7	173	1.5	34	0.3
65-74	223	1.8	264	2.1	38	0.3
75-84	163	1.3	201	1.7	47	0.4
85+	26	0.7	47	1.3	8	0.2
Total	496	1.2	709	1.7	130	0.3

Source: FH data and CMDHB Hospital Events database

Table 56: THSA population 2005 – 2009 CMDHB hospital admissions in the last year of life, by age group

Age Group	Arranged		Acute		Waiting List	
	Total Number	Average per patient	Total Number	Average per patient	Total Number	Average per patient
15-24	8	0.5	26	1.6	1	0.1
25-44	25	0.1	295	1.8	32	0.2
45-64	390	0.5	1,445	1.8	173	0.2
65-74	407	0.6	1,361	1.9	192	0.3
75-84	436	0.6	1,329	1.9	213	0.3
85+	138	0.5	464	1.8	88	0.3
Total	1,404	0.5	4,920	1.9	699	0.3

Source: THSA data and CMDHB Hospital Events database

A breakdown of admissions by ethnicity was possible for THSA. As for the MEPCN and EPCN populations, those in the European / Other group had slightly fewer acute admissions on average but had, more arranged admissions per person than people in other ethnic groups. People of Pacific ethnicity had the highest average number of acute admissions per person.

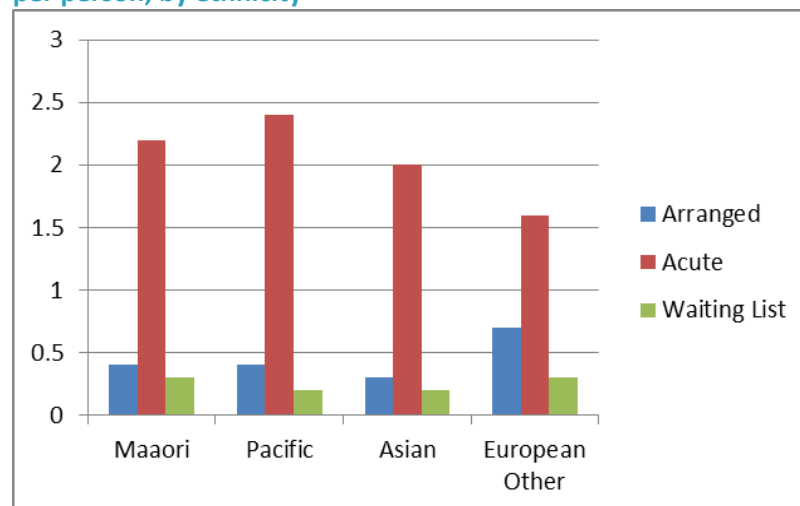
Table 57: THSA population 2005 – 2009 CMDHB hospital admissions in the last year of life, by ethnicity

Ethnicity	Arranged		Acute		Waiting List	
	Total No	Average per patient	Total No	Average per patient	Total No	Average per patient
Maaori	149	0.4	838	2.2	113	0.3
Pacific	178	0.4	1,204	2.4	86	0.2
Asian	56	0.3	341	2.0	36	0.2
European / Other	1,019	0.7	2,521	1.6	462	0.3
Total*	1,402	0.5	4,904	1.9	697	0.3

Source: THSA data and CMDHB Hospital Events database

* Totals are different to previous tables as 20 admissions were in the 11 patients whose ethnicity was unknown

Figure 36: THSA population 2005 – 2009 CMDHB hospital admissions in the last year of life per person, by ethnicity



Source: THSA data and CMDHB Hospital Events database

8.5.1 Arranged Admissions

Tables 58, 59 and 60 show the number of arranged, acute and waiting list admissions respectively for patients of each hospice service, by speciality on discharge. For arranged admissions the greatest number of CMDHB admissions was to the speciality of Haematology for both hospice populations. These admissions comprised of 46% of the total for FH and 60% for THSA. As the length of stay for haematology admissions was very brief the total number of bed days under this speciality is not particularly high. For the FH population half of the total bed days for arranged admissions were under Palliative Care. In contrast the largest proportion of total bed days for the THSA population (50%) was to Geriatric AT&R. In both populations, of the specialities singled out in Table 58, the Geriatric admissions were the longest in duration. The FH population however had some individuals with lengthy admissions to the spinal unit in their last year of life which explains why the length of stay for ‘other’ is so long.

8.5.2 Acute Admissions

The greatest proportion of acute admissions and greatest proportion of total bed days were both under the speciality of General Medicine for both hospice populations. The length of

stay under General Medicine was just under 5 days on average. General Surgery was responsible for the second highest proportion of acute admissions, at 19% for FH and 14% for THSA.

8.5.3 Waiting List Admissions

There were relatively few elective admissions. The speciality that had most admissions of this type was Gastroenterology at 34% for FH and 30% for THSA. General Surgery and Respiratory Medicine also had admissions of this type, with General Surgery being responsible for highest proportions of bed days.

Table 58: THSA and FH populations 2005 – 2009 CMDHB arranged admissions, by speciality

Speciality	Franklin Hospice					Totara Hospice South Auckland						
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)			Number	(%)	Number	(%)	
Gastroenterology	<10	<2	(2)	35	(1)	n/a*	49	10	(3)	123	(3)	2.5
General Medicine	16	3	(3)	36	(1)	2.3	62	12	(4)	323	(7)	5.2
General Surgery	<10	<2	(1)	37	(1)	n/a*	40	8	(3)	255	(5)	6.4
Geriatric AT&R	54	11	(12)	789	(29)	14.6	167	34	(12)	2,385	(50)	14.3
Geriatric Long Stay / Respite	14	2	(2)	251	(9)	17.9	<10	<2	(<1)	22	(<1)	n/a
Haematology	229	46	(46)	78	(3)	<1	842	169	(60)	290	(6)	<1
Hospice (Palliative)	138	28	(28)	1,343	(50)	9.7	12	2	(<1)	149	(3)	12.4
Radiology	12	2	(2)	0	-	-	41	9	(3)	81	(2)	2.0
Renal Medicine	<10	<2	(<1)	6	(<1)	n/a	61	12	(4)	228	(5)	3.7
Respiratory Med	<10	<2	(1)	12	(<1)	n/a	67	13	(5)	189	(4)	2.8
Other*	9	2	(2)	113	(4)	12.6	61	12	(4)	686	(15)	11.2
Total	496	99	(100)	2,700	(100)	5.4	1,404	281	(100)	4,731	(100)	3.4

Source: CMDHB Hospital Events database

*Other = Acute Care Medicine, Cardiology, Emergency medicine, Endocrinology, Gynaecology, Hand Service, Neurological Rehabilitation, Oral / Maxillofacial Surgery, Otorhinolaryngology, Orthopaedic Surgery, Plastic Surgery, Psycho geriatrics, Spinal Rehabilitation, Stroke Medicine

Where the number of admissions is less than 10 numbers have been rounded.

n/a* not calculated due to small numbers of admissions

Table 59: THSA and FH populations 2005 – 2009 CMDHB acute admissions, by speciality

Speciality	Franklin Hospice					Totara Hospice South Auckland						
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)			Number	(%)	Number	(%)	
Acute Care Med	<10	<2	(<2)	3	(<1)	n/a*	32	6	(<1)	38	(<1)	1.2
Cardiology	<10	<2	(<2)	38	(<1)	n/a*	50	10	(1)	356	(1)	7.1
Emergency Medicine	42	8	(6)	15	(<1)	<1	362	72	(7)	121	(<1)	<1
Gastroenterology	26	5	(4)	101	(3)	3.9	243	49	(5)	1,376	(5)	5.7
General Medicine	328	66	(48)	1,534	(39)	4.7	2,467	493	(50)	12,014	(45)	4.9
General Surgery	137	27	(19)	1,012	(26)	7.4	700	140	(14)	5,171	(19)	7.4
Geriatric Respite	<10	<2	(<2)	1	(<1)	n/a*	<10	<2	(<1)	0	(-)	0
Gynaecology	<10	<2	(<2)	17	(<1)	n/a*	97	19	(2)	478	(2)	4.9
Haematology	45	9	(6)	314	(8)	7	233	47	(5)	1,671	(6)	7.2
Hospice (Palliative)	18	4	(2)	297	(8)	16.5	<10	<2	(<1)	3	(<1)	<1
Orthopaedic Surgery	26	5	(4)	265	(7)	10.2	112	22	(2)	1,145	(4)	10.2
Renal Medicine	0	-	-	0	-	-	142	28	(3)	1,008	(4)	7.1
Respiratory Med	58	12	(8)	333	(8)	5.7	418	84	(8)	2,694	(10)	6.4
Other*	16	3	(2)	99	(3)	6.2	59	12	(1)	780	(3)	13.2
Total	709	142	(100)	4,029	(100)	5.7	4,920	984	(100)	26,855	(100)	5.5

Source: CMDHB Hospital Events database

*Other = Acute Psychiatry, Diabetes, Endocrinology, Hand Service, Oral/Maxillofacial Surgery, Otorhinolaryngology, Plastic Surgery, Plastics Hands, Psychogeriatrics, Rheumatology, Stroke Medicine.

n/a* not calculated due to small numbers of admissions

Table 60: THSA and FH populations 2005 – 2009 CMDHB waiting list admissions, by speciality

Speciality	Franklin Hospice					Totara Hospice South Auckland						
	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)	Total number of admissions 2005 – 2009	Average annual number of admissions		Total bed days 2005 – 2009		Average length of stay (days)
		Number	(%)	Number	(%)			Number	(%)	Number	(%)	
Gastroenterology	44	9	(34)	10	(6)	<1	212	42	(30)	92	(6)	<1
General Surgery	26	5	(20)	104	(65)	4.0	120	24	(17)	794	(53)	6.6
Geriatric – AT&R	<10	<2	(<5)	26	(16)	n/a*	<10	<2	(<1)	69	(5)	n/a*
Ophthalmology	<10	<2	(<5)	-	-	-	43	9	(6)	1	(<1)	<1
Orthopaedics*	<10	<2	(<5)	11	(7)	n/a*	25	5	(4)	282	(19)	11.3
Plastic Surgery	12	2	(9)	-	-	-	69	14	(10)	81	(6)	1.2
Respiratory Med	19	4	(15)	4	(3)	<1	134	27	(19)	10	(<1)	<1
Other**	18	4	(14)	6	(4)	<1	92	18	(13)	161	(11)	1.8
Total	130	26	(100)	161	(100)	1.2	699	140	(100)	1,490	(100)	2.1

Source: CMDHB Hospital Events database

* = Orthopaedic Surgery and Orthopaedic Interim Care

**Other = Cardiology, General Medicine, Gynaecology, Hand Service, Neurological Rehabilitation, Oral/Maxillofacial Surgery, Otorhinolaryngology, Plastics Hands, Radiology, Renal Medicine, Urology

n/a* not calculated due to small numbers of admissions

8.5.4 Hospital of Admission

Table 61 shows the hospital of admission for all CMDHB facility inpatient admissions in the last year of life for FH and THSA patients 2005 - 2009. For both hospice populations the majority of admissions were to Middlemore Hospital (MMH) but a larger proportion of FH patients compared with THSA patients were, as would be expected, admitted to the local Franklin Memorial (FMH) and Pukekohe (PUKH) hospitals (6% and 10% respectively for FH).

Table 61: THSA and FH populations 2005 – 2009 hospital of admission for CMDHB admissions in the last year of life

Type of Admission	Franklin				Totara				
	AA	AC	WN	Total (%)	AA	AC	WN	Total (%)	
MMH	305	681	83	1,069 (80)	1,377	4,901	429	6,707 (96)	
MSC	<5	<5	46	51 (4)	12	17	239	268 (4)	
FMH	67	10	0	77 (6)	<5	<5	<5	5 (<1)	
PUKH	121	15	0	136 (10)	10	<5	<5	11 (<1)	
Other	<5	<5	<5	<5 (<1)	<5	<5	31	32 (<1)	
Total	496	709	130	1,335(100)	1,404	4,920	699	7,023 (100)	

Source: CMDHB Hospital Events database

References

- Escobar Pinzon, L. C., M. Claus, et al. (2011). "Preference for place of death in Germany." Journal of Palliative Medicine **14**(10): 1097-1103.
- Mehta S (2012). Health needs assessment of Asian people living in the Auckland region. Auckland, Northern DHB Support Agency.
- Ministry of Health (2011) "National Minimum Dataset (Hospital Events) data dictionary." <http://www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary>.
- Ministry of Health (2012) "Data and Statistics: mortality collection (MORT) " <http://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/collections/mortality-collection>.
- Neergaard, M. A., A. B. Jensen, et al. (2011). "Preference for place-of-death among terminally ill cancer patients in Denmark." Scandinavian Journal of Caring Sciences **25**(4): 627-636.
- Palliative Care Council of New Zealand (2011). National Health Needs Assessment for Palliative Care. Wellington, Cancer Control New Zealand.
- Palliative Care Subcommittee (2007). New Zealand palliative care: a working definition. Wellington, Ministry of Health.
- Rosenwax, L. K., B. McNamara, et al. (2005). "Estimating the size of a potential palliative care population." Palliative Medicine **19**(7): 556-562.
- Taylor, E. J., B. Ensor, et al. (2012). "Place of death related to demographic factors for hospice patients in Wellington, Aotearoa New Zealand." Palliative Medicine **26**(4): 342-349.
- Tebbit P (2004). Population-based needs assessment for palliative care. a manual for cancer networks. London, National Council for Hospice and Specialist Palliative Care Services.
- CMDHB. (2012) CMDHB Residential Localities Report. CMDHB.
- Winnard D, et al. (2012) Memorandum: Deprivation analyses for population and localities planning. Jun 2012 CMDHB.
- Wang, K. (2012). NZ DHB and CAU Estimated Population 1991-2031. Auckland, Counties Manukau District Health Board.
- World Health Organization (2002). National cancer control programmes, policies and managerial guidelines. Geneva, World Health Organization.

Appendices

Appendix One: CMDHB Localities

Table 62: CMDHB localities framework

DHB	Ward	Board	Residential Locality	Service Locality
Auckland	Manukau	Mangere – Otahuhu	Otahuhu	-
Counties Manukau	Manukau	Mangere – Otahuhu	Mangere	Mangere /Otara
Counties Manukau	Manukau	Otara – Papatoetoe	Otara	Mangere / Otara
Counties Manukau	Manukau	Otara – Papatoetoe	Papatoetoe	Manukau
Counties Manukau	Howick	Howick	Howick	Eastern
Counties Manukau	Manurewa-Papakura	Manurewa	Manurewa	Manukau
Counties Manukau	Manurewa-Papakura	Papakura	Papakura	Manukau
Counties Manukau	Franklin*	Franklin*	Franklin*	Franklin*

Source: CMDHB Residential Localities Report 2012

*Note includes through to the "old" Franklin southern boundary, so has the part of Franklin that is now in Waikato Council area

Appendix Two: Minimal Estimate of Palliative Care Need ICD10-AM codes

Table 63: ICD10 – AM 6th Edition codes mapping to conditions in the minimal estimate of palliative care need

ICD description	ICD 10 code
Neoplasm	C00-D48
Heart Failure	I110, I130, I132, I50
Liver failure	K704, K711, K721, K729
Chronic Obstructive Pulmonary Disease	J40, J410, J411, J418, J42, J430, J431, J432, J438, J439, J440, J441, J448, J449
MND	G122
Parkinson's	G20
Huntington's	G10
Alzheimer's	G300, G301, G308, G309
HIV/AIDS	B20-B24
DM with ESRD	E1023, E1123, E1323
Bronchiectasis	J47
Renal failure	I120, I131, N180, N188, N189, N19

Source: PCC National Health Needs assessment for Palliative Care

Appendix Three: Service Localities, by Ethnicity and Age Group, for Baseline (2006) and Projected CMDHB Estimated Resident Adult Populations 2011 - 2026

Table 64: Maori baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026

CMDHB Service locality	2006		2011		2016		2021		2026		
	Number	(% of total adult popn)	Number	% change from 2006	Number	% change from 2011	Number	% change from 2016	Number	% change from 2021	% change from 2006
Franklin	5,640	(13)	6,270	11%	6,910	10%	7,420	7%	8,015	8%	42%
Eastern	3,440	(3)	4,020	17%	5,060	26%	6,150	22%	7,470	21%	117%
Mangere / Otara	12,300	(17)	13,330	8%	14,505	9%	15,645	8%	17,145	10%	39%
Manukau	26,675	(22)	28,885	8%	30,890	7%	33,200	7%	36,965	11%	39%
Total	48,055	(14)	52,500	9%	57,365	9%	62,415	9%	69,595	12%	45%

Source: Wang K. NZ DHB and CAU Estimated Population 1991-2031

Data may not sum exactly as individual cells are rounded to the nearest 5

Table 65: Pacific baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026

CMDHB Service locality	2006		2011		2016		2021		2026		
	Number	(% of total adult popn)	Number	% change from 2006	Number	% change from 2011	Number	% change from 2016	Number	% change from 2021	% change from 2006
Franklin	630	(1)	870	38%	1,005	15%	1,160	16%	1,345	16%	113%
Eastern	1,820	(2)	2,405	32%	3,695	54%	4,970	35%	6,300	27%	246%
Mangere / Otara	40,405	(56)	47,845	18%	55,110	15%	61,815	12%	69,330	12%	72%
Manukau	20,035	(16)	23,660	18%	27,035	14%	30,910	14%	35,530	15%	77%
Total	62,890	(19)	74,780	19%	86,845	16%	98,850	14%	112,510	14%	79%

Source: Wang K. NZ DHB and CAU Estimated Population 1991-2031

Data may not sum exactly as individual cells are rounded to the nearest 5

Table 66: Asian baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026

CMDHB Service locality	2006		2011		2016		2021		2026		
	Number	(% of Total adult popn)	Number	% change from 2006	Number	% change from 2011	Number	% change from 2016	Number	% change from 2021	% change from 2006
Indian											
Franklin	825	(2)	1,140	38%	1,315	15%	1,585	21%	1,790	13%	117%
Eastern	6,650	(7)	9,265	39%	12,170	31%	14,705	21%	17,210	17%	159%
Mangere / Otara	4,105	(6)	5,235	28%	6,090	16%	6,790	12%	7,560	11%	84%
Manukau	13,320	(11)	17,205	29%	20,185	17%	23,295	15%	26,650	14%	100%
Total	24,900	(7)	32,850	32%	39,755	21%	46,375	17%	53,205	15%	114%
Other Asian											
Franklin	445	(1)	790	78%	980	24%	1,315	35%	1,600	22%	261%
Eastern	27,095	(27)	35,650	32%	43,345	22%	51,300	18%	60,095	17%	122%
Mangere / Otara	2,465	(3)	2,990	21%	3,555	19%	4,025	13%	4,650	15%	88%
Manukau	6,540	(5)	8,345	28%	9,760	17%	11,610	19%	13,765	19%	111%
Total	36,545	(11)	47,770	31%	57,640	21%	68,255	18%	80,110	17%	119%
Total Asian											
Franklin	1,270	(3)	1,930	52%	2,290	19%	2,900	27%	3,395	17%	167%
Eastern	33,740	(33)	44,915	33%	55,510	24%	66,005	19%	77,305	17%	129%
Mangere / Otara	6,570	(9)	8,225	25%	9,645	17%	10,815	12%	12,205	13%	86%
Manukau	19,860	(16)	25,550	29%	29,940	17%	34,910	17%	40,415	16%	103%
Total	61,445	(18)	80,620	31%	97,390	21%	114,625	18%	133,320	16%	117%

Source: Wang K. NZ DHB and CAU Estimated Population 1991-2031

Data may not sum exactly as individual cells are rounded to the nearest 5

Table 67: European / Other baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026

CMDHB Service locality	2006		2011		2016		2021		2026		
	Number	(% of total adult population)	Number	% change from 2006	Number	% change from 2011	Number	% change from 2016	Number	% change from 2021	% change from 2006
Franklin	35,290	(82)	35,610	1%	36,130	1%	36,535	1%	36,225	-1%	3%
Eastern	62,035	(61)	63,730	3%	66,630	5%	68,790	3%	69,805	1%	13%
Mangere / Otara	13,385	(18)	13,280	-1%	13,475	1%	13,485	0%	13,535	0%	1%
Manukau	56,185	(46)	56,370	0%	56,945	1%	57,800	2%	58,315	1%	4%
Total	166,895	(49)	168,985	1%	173,180	2%	176,610	2%	177,880	1%	7%

Source: Wang K. NZ DHB and CAU Estimated Population 1991-2031

Data may not sum exactly as individual cells are rounded to the nearest 5

Table 68: Aged 15 – 44 years baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026

CMDHB Service locality	2006		2011		2016		2021		2026		
	Number	(% of total adult population)	Number	% change from 2006	Number	% change from 2011	Number	% change from 2016	Number	% change from 2021	% change from 2006
Franklin	21,545	(50)	20,470	-5%	19,615	-4%	19,570	0%	20,055	2%	-7%
Eastern	55,875	(55)	60,020	7%	65,340	9%	70,790	8%	75,830	7%	36%
Mangere / Otara	47,320	(65)	51,755	9%	55,530	7%	59,470	7%	65,120	10%	38%
Manukau	76,190	(62)	80,605	6%	84,875	5%	91,400	8%	101,295	11%	33%
Total	200,930	(59)	212,850	6%	225,360	6%	241,225	7%	262,300	9%	31%

Source: Wang K. NZ DHB and CAU Estimated Population 1991-2031

Data may not sum exactly as individual cells are rounded to the nearest 5

Table 69: Aged 45 – 64 years baseline (2006) and projected population changes by CMDHB service locality, 2001 - 2026

CMDHB Service locality	2006		2011		2016		2021		2026		
	Number	(% of total adult population)	Number	% change from 2006	Number	% change from 2011	Number	% change from 2016	Number	% change from 2021	% change from 2006
Franklin	14,585	(34)	15,915	9%	16,510	4%	16,350	-1%	14,720	-10%	1%
Eastern Mangere / Otara	31,865	(32)	37,880	19%	42,470	125	45,310	7%	46,920	4%	47%
Manukau	18,720	(26)	22,690	21%	26,680	18%	29,930	12%	32,140	7%	72%
Total	98,540	(29)	115,140	17%	127,955	11%	136,550	7%	139,900	2%	42%

Source: Wang K. NZ DHB and CAU Estimated Population 1991-2031

Data may not sum exactly as individual cells are rounded to the nearest 5

Table 70: Aged 65 years and over baseline (2006) and projected population changes by CMDHB service locality, 2001 – 2026

CMDHB Service locality	2006		2011		2016		2021		2026		
	Number	(% of total adult population)	Number	% change from 2006	Number	% change from 2011	Number	% change from 2016	Number	% change from 2021	% change from 2006
Franklin	6,705	(16)	8,290	24%	10,205	23%	12,095	19%	14,205	17%	112%
Eastern Mangere / Otara	13,300	(13)	17,170	29%	23,085	34%	29,820	29%	38,130	28%	187%
Manukau	6,620	(9)	8,230	24%	10,530	28%	12,360	17%	14,955	21%	126%
Total	39,815	(12)	48,895	23%	61,465	26%	74,725	22%	91,100	22%	129%

Source: Wang K. NZ DHB and CAU Estimated Population 1991-2031

Data may not sum exactly as individual cells are rounded to the nearest 5

Appendix Four: Groupings of ICD10-AM Codes into Broad Categories of Causes of Death

Table 71: Groupings of ICD10 AM coding into broad categories of cause of death

Cause of Death Category	Sub Diagnosis	ICD10 code
Infectious and Parasitic		A00 – B99
Neoplasms	Malignant Benign / Uncertain / unknown	C00 – C96 D00 – D48
Endocrine, Nutritional and Metabolic	Diabetes Other	E 10 – E14 E00 – E07, E15 – E90
Mental / Behavioural Disorders		F00 – F99
Nervous System		G00 – G99
Circulatory System	Hypertensive Disease	I10 – I15
	Ischaemic Heart Disease	I20 – I25
	Other Forms of Heart Disease	I00 – I09, I26 – I52
	Cerebrovascular Disease	I60 – I69
	Diseases of arteries / capillaries	I70 – I79
Respiratory System	Respiratory infections Chronic lower respiratory Disease Other	J00 - J22 J40 –J47 J30 – J39, J60 - 99
Digestive System		K00 – K93
Skin Infections		L00 – L08
Musculoskeletal and Connective Tissue		M00 – M99
Genitourinary System		N00 – N99
Pregnancy, Childbirth and the Puerperium		O00 – O99
Congenital / Chromosomal Abnormalities		Q00 – Q99
External Causes of Morbidity and Mortality	Transport Accidents Other Accidental Injury Intentional Self-harm Assault / Undetermined intent Other external causes	V01 – V99 W00 – X59 X60 – X84 X85 – Y34 Y35 – Y98
Other*		D50 – D89, H00 – H95, I80 – I99, L10 – L99, R00 – R99

Source: ICD10 – AM Manual

*Other = Diseases of the eye and adnexa, Symptoms, signs and abnormal clinical findings not elsewhere classified, Other diseases of the skin and subcutaneous tissue, Diseases of veins, lymphatic vessels and lymph nodes not elsewhere classified, Diseases of the blood and blood forming organs and certain disorders involving the immune mechanism

Appendix Five: Place of Death, by Gender, for Total CMDHB Resident Adult Deaths and the MEPCN, EPCN, and Hospice Populations 2005 - 2009

Table 72: Place of death of CMDHB resident adults who died 2005 – 2009, by gender

Gender	Home		Hospital		Hospice		Residential Care		Other / Unknown		Total	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Female	1,349	(26)	1,922	(37)	248	(5)	1,546	(29)	228	(4)	5,293	(100)
Male	1,826	(33)	2,040	(36)	259	(5)	1,074	(19)	443	(8)	5,629	(100)
Total	3,174	(29)	3,960	(36)	507	(5)	2,620	(24)	661	(6)	10,922	(100)

Source: MORT database

Table 73: Place of death of the MEPCN population 2005 – 2009, by gender

Gender	Home		Hospital		Hospice		Residential Care		Other / Unknown		Total	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Female	662	(30)	680	(31)	239	(11)	573	(26)	50	(2)	2,204	(100)
Male	738	(31)	803	(34)	252	(11)	509	(22)	50	(2)	2,352	(100)
Total	1,400	(31)	1,483	(33)	491	(11)	1,082	(24)	100	(2)	4,556	(100)

Source: MORT database

Table 74: Place of death of the EPCN population 2005 – 2009, by gender

Gender	Home		Hospital		Hospice		Residential Care		Other / Unknown		Total	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Female	829	(26)	1,113	(35)	244	(8)	883	(28)	88	(3)	3,157	(100)
Male	948	(29)	1,235	(38)	258	(8)	715	(22)	96	(3)	3,252	(100)
Total	1,777	(28)	2,348	(37)	502	(8)	1,598	(25)	184	(3)	6,409	(100)

Source: MORT database

Table 75: Place of death of the FH population 2005 – 2009, by gender

Gender	Home		Hospital		Hospice		Residential Care		Other / Unknown		Total	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Female	86	(52)	75	(45)	1	(1)	0	-	3	(2)	165	(100)
Male	125	(51)	112	(46)	3	(1)	3	(1)	1	(0)	244	(100)
Total	211	(52)	187	(46)	4	(1)	3	(1)	4	(1)	409	(100)

Source: FH data

Table 76: Place of death of the THSA population 2005 – 2009, by gender

Gender	Home		Hospital		Hospice		Residential Care		Other / Unknown		Total	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Female	553	(26)	430	(35)	234	(8)	13	(28)	32	(3)	1,262	(100)
Male	614	(29)	465	(38)	252	(8)	14	(22)	24	(3)	1,369	(100)
Total	1,167	(28)	895	(37)	486	(8)	27	(25)	56	(3)	2,631	(100)

Source: THSA data

Appendix Six: Residential Locality and Decile for Baseline (2006), MEPCN and EPCN Populations

Table 77: CMDHB estimated resident adult baseline (2006) population by residential locality and NZDep decile

Locality	Deciles 1-2		Deciles 3-4		Deciles 5-6		Deciles 7-8		Deciles 9-10		Total		% in each locality
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	
Franklin	22,521	(42)	7,650	(14)	15,668	(29)	-	-	7,950	(15)	53,789	(100)	16%
Howick	46,966	(50)	16,037	(17)	22,003	(24)	8,198	(9)	-	-	93,204	(100)	27%
Mangere	-	-	-	-	2,486	(6)	4,644	(11)	35,237	(83)	42,367	(100)	12%
Manurewa	4,634	(8)	5,721	(10)	9,169	(15)	-	-	39,759	(67)	59,283	(100)	17%
Otara	-	-	-	-	-	-	4107	(17)	20,054	(83)	24,161	(100)	7%
Papakura	3,638	(12)	-	-	5,283	(18)	6,928	(23)	14,096	(47)	29,945	(100)	9%
Papatoetoe	-	-	-	-	377	(1)	9,935	(27)	26,225	(72)	36,537	(100)	11%
Total	77,759	(23)	29,408	(9)	54,986	(16)	33,812	(10)	143,321	(42)	339,286	(100)	100%

Source: Wang K. NZ DHB and CAU Estimated Population 1991-2031

Table 78: MEPCN population 2005 - 2009 by residential locality and NZDep decile

Residential Locality	Deciles 1-2		Deciles 3-4		Deciles 5-6		Deciles 7-8		Deciles 9-10		Total		% in each locality
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	
Franklin	263	(32)	132	(16)	304	(37)	-	-	123	(15)	822	(100)	18%
Howick	515	(50)	189	(18)	255	(25)	78	(8)	-	-	1037	(100)	23%
Mangere	-	-	-	-	37	(7)	85	(15)	441	(78)	563	(100)	12%
Manurewa	104	(12)	27	(3)	131	(16)	65	(8)	511	(61)	841	(100)	18%
Otara	-	-	-	-	-	-	39	(15)	229	(85)	268	(100)	6%
Papakura	51	(9)	-	-	70	(12)	211	(37)	234	(41)	567	(100)	12%
Papatoetoe	-	-	-	-	-	-	161	(35)	297	(65)	458	(100)	10%
Total	933	(20)	348	(8)	797	(17)	639	(14)	1835	(40)	4556	(100)	100%

Source: CMDHB Mortality data

Table 79: EPCN population 2005 – 2009 , by residential locality and NZDep decile

Residential Locality	Deciles 1-2		Deciles 3-4		Deciles 5-6		Deciles 7-8		Deciles 9-10		Total		% in each locality
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	
Franklin	349	(31)	169	(15)	423	(38)	-	-	180	(16)	1,122	(100)	18%
Howick	706	(49)	270	(19)	357	(25)	115	(8)	-	-	1,448	(100)	23%
Mangere	-	-	-	-	54	(7)	115	(14)	629	(79)	798	(100)	12%
Manurewa	134	(12)	43	(4)	182	(16)	76	(7)	703	(62)	1,142	(100)	18%
Otara	-	-	-	-	-	-	47	(12)	338	(88)	386	(100)	6%
Papakura	70	(9)	-	-	95	(12)	323	(39)	334	(41)	823	(100)	13%
Papatoetoe	-	-	-	-	-	-	243	(35)	447	(65)	690	(100)	11%
Total	1,259	(20)	482	(8)	1,112	(17)	918	(14)	2,631	(41)	6,409	(100)	100%

Source: CMDHB Mortality data

Appendix Seven: EEPCN Population 2005 – 2009, by Cause of Death

Table 80: EEPCN population 2005 – 2009, by cause of death

ICD description	ICD 10 code	Number (extra 1,853)	MEPCN	Total	% of total deaths in category
Infectious and Parasitic		20	3	23	32%
Neoplasms		0	3,395	3395	100%
Endocrine/Nutritional and Metabolic	Diabetes	156	77	259	
	Other	26			42%
Mental/Behavioural Disorders		36		36	17%
Nervous System		29	262	291	78%
Circulatory System	Hypertensive Disease	2	95		
	Ischaemic Heart Disease	673			
	Other Heart Disease	201	70		
	Cerebrovascular Disease	270			
	Diseases of arteries / caps	54		1365	35%
Respiratory System	Respiratory infections	39			
	Chronic lower resp disease	13	590		
	Other	43		685	80%
Digestive System		107	2	109	37%
Skin Infections		16		16	59%
Musculoskeletal					
Connective Tissue		37		37	40%
Genitourinary System		37	62	99	53%
Congenital / Chromo Abnormalities		11		11	22%
External Causes of Morbidity/Mortality		32		32	5%
Other*		22		22	42%
Unknown		27		27	-
Total		1,853	4,456	6,409	59%

Source: Mort database

*Other = Diseases of the eye and adnexa, Symptoms, signs and abnormal clinical findings not elsewhere classified, Other diseases of the skin and subcutaneous tissue, Diseases of veins, lymphatic vessels and lymph nodes not elsewhere classified, Diseases of the blood and blood forming organs and certain disorders involving the immune mechanism
Pregnancy, Childbirth and the Puerperium

Appendix Eight: Additional Non MEPCN Diagnoses in the THSA Population

Table 81: THSA population 2005 – 2009 most common diagnoses in patients that had no MEPCN condition

Ranking	Diagnosis	Number of patients
1	Diabetes mellitus	20
2	Ischaemic heart disease	18
3	CVA	19
4=	Hypertensive disease	8
4=	Pneumonia	8
4=	Acute MI / cardiac arrest	8
4=	Acute renal failure / renal impairment	8
7=	Pulmonary embolism	6
7=	Peripheral vascular disease	6
9=	Atrial fibrillation	5
9=	Dementia	5
11=	Aortic Aneurysm	4
11=	Aortic Stenosis	4
11=	Asthma	4
11=	Cardiomyopathy	4
11=	Gangrene	4
11=	Multiple organ failure	4

Source: THSA data

Table 82: THSA population 2005 – 2009 most common additional diagnoses in patients that had one or more MEPCN condition

Ranking	Diagnosis	Number of patients
1	Diabetes mellitus	223
2	Ischaemic heart disease	118
3	Hypertensive disease	73
4	Atrial fibrillation	65
5	Gout	41
6	Asthma	33
7	Acute renal failure / renal impairment	28
8	CVA	25
9	Gastro-oesophageal reflux	23
10=	Pulmonary embolism	21
10=	Deep vein thrombosis	21
12	Peripheral vascular disease	19
13=	Aortic stenosis	12
13=	Hypothyroidism	12
13=	Fracture	12
16=	Gastric / duodenal ulcer	10
16=	Aortic aneurysm	10
18=	MI / cardiac arrest	9
18=	Alcohol consumption	9
20=	Hyperlipidaemia	8
20=	Hypercalcaemia	8
20=	Bowel obstruction	8
20=	Diverticulosis	8
24=	Benign prostatic hypertrophy	7
24=	Epilepsy	7
24=	Glaucoma	7
24=	Cirrhosis of liver	7
24=	Diverticulitis	7

Source: THSA data