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Section 4: Selected Health Co-morbidities and ACC Injury Treatment Utilisation and Compensation Costs: Results of a trial of linked ACC-MOH Data

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Introduction

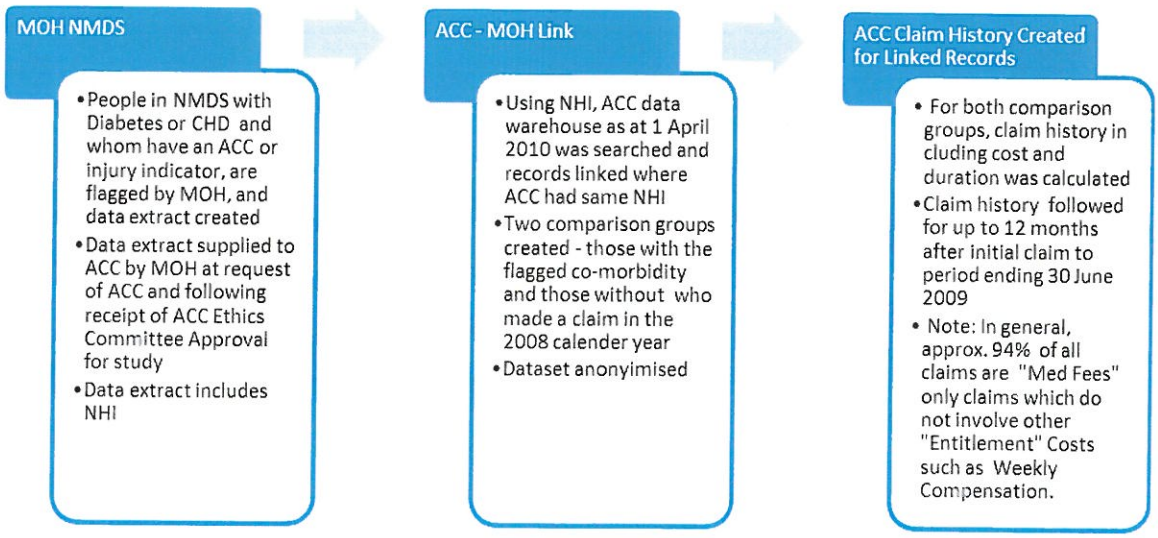
• In the previous section, research findings that explored the effects of a wide range of pre-existing health co-morbidities upon ACC Consultation rates in General Practice settings was presented (CBG Health Research Ltd). The research clearly showed that having a health co-morbidity was significantly associated with increased primary care injury treatment utilisation and associated cost to ACC compared to those with no record of a pre-existing health co-morbidity.

• In this section the results of an ACC research project, in collaboration with ACC Business Intelligence (Injury Prevention), using linked ACC and MOH data is presented.

Methods

• ACC Business Intelligence (Injury Prevention) using National Health Index (NHI) numbers linked Ministry of Health (MOH) data to ACC data to identify all people flagged by MOH as having diabetes and coronary heart disease and an ACC injury claim. By linking the data, the claim histories, including cost and duration, of people with and without these conditions were able to be followed and compared for up to a 12 month period ending 30 June 2009 (Mason, 2010). The process of linkage and claim history preparation is outlined in the following diagram.

Figure 1: MOH - ACC data linkage process and claim history preparation



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• The data linkage process involved identifying all ACC clients born before 1st July 2008 and for whom ACC held a NHI number that could be linked to the MOH

data. This amounted to just over 3,037,435 million people out of 7 million records (or 44% of records) in the ACC data warehouse in April 2010. The details of all claims made by these people in the year from 1st January 2008 to 31st December 2008 were then extracted along with all information about the treatment and entitlements received in the first year of these claims through to 30 June 2009.

- Although less than half the personal records contain an NHI number, there have been recent attempts to improve the proportion of claims on which the NHI number is provided and currently it is known for about 80% of new claims. The NHI number is provided by the initial treatment provider when a new claim is lodged and some treatment providers are able to provide this and others are not. Some primary care treatment providers are not able to provide an NHI because of the nature of the electronic claims filing system. Once an NHI has been provided on one claim, it can be attached to all subsequent claims for that person. Therefore it is likely to be held for most people who have made a claim at any time in recent years and there is no reason for any bias to result from including only these people in this analysis. However to check for population level biases, the prevalence of Diabetes (irrespective of type) and CHD in the ACC data set has been compared to those reported by the MOH for the general population by sex and life cycle age group. The comparisons are presented Tables **Table 1** and **Table 2** on the following pages.

- The results indicate that the prevalence of Diabetes and CHD in the ACC data set is close to that expected – except for females aged over 80 years.

- Other points to note: The ACC data warehouse includes a record for every person who has ever made a claim to ACC, so:

  - it will include people who have since died – ACC is usually only informed of a client's death if that person is currently receiving some sort of payment from ACC. All records where the person is known to have died have been omitted
  - it will include people currently living overseas and visitors who made a claim while they were in New Zealand, for whom co-morbidity information does not exists. It is not known how many these may be, however it is likely to be very small
  - it will include duplicate records for some people. Typically these occur when a claim was lodged with differences in the personal details such as change of name or address and a new record was created instead of the person being recognised as an updated form of the original record. However, any new claims for this person within approximately the last two years will be assigned to only one of these records. This issue applies to both the comparison groups.[1]

- In all these cases, the personal record will have had no new claims related to it but it does not mean that that person was alive and well and living in New Zealand and made no claims. This will be a problem if there are a large number of these records of this type in either group as it will reduce the incidence claim rate for that group.

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[1] ACC Business Intelligence – Data Integrity have commenced a project to improve the integrity of ACC data, including the reconciliation of duplicates records.

Why Diabetes and CHD?

- Diabetes and CHD were selected for analysis because of there relevance to injury treatment and rehabilitation, and specific validated flags were available from the Ministry of Health for this study (Craig Wright, Health and Disability Intelligence).

- Injury patients with diabetes can suffer from neuropathies that reduce heat and pain sensation so burn injuries are more likely. Futhermore, treatment for such injuries is prolonged because poor tissue perfusion associated with diabetes results in a delay in wound healing. The same situation as diabetes applies to those with circulatory disease problems. Obese patients will have reduced opportunities for physical activity based rehabilitation. Age, sex and ethnicity are all complicating factors. The presence of both diseases complicates primary treatment.

- Since this project was commenced, Sarfati et al (2010) have examined the quality of routinely collected MOH data to provide co-morbidity data using standard MOH National Minimum Data Set (NMDS) coding frames. The researchers concluded that routine MOH administrative data "provides a reasonably useful source of accessible information on co-morbidity for risk adjustment particularly in multivariable models" (Sarfati, Hill, Purdie et al., 2010).

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- **Recommendation:**

- Future co-morbidities studies using linked ACC-MOH data should follow the methods published by Sarfati et al (2010). Such an approach would have the advantage of allowing for the effects of a much larger range of health co-morbidities to be quantified, than those reported below. However, such a project may have to address privacy and confidentiality issues as it would require linking data concerning other health issues.

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Findings

Introduction

- In the analysis presented in the following two parts, the key findings for diabetes and CHD are presented respectively. The findings presented focus upon describing the degree to which the presence of the co-morbidity results in quantifiable:

  - extra claims utilisation in terms of "All Claims" and "Entitlement Claims" respectively
  - extra costs in terms of "All Claims" and "Entitlement Claims" respectively at 6 and 12 months for each type of claim
  - extra duration of claims.

- The findings are briefly discussed in the context of additional analyses that have been undertaken, but which are not reported in detail in this paper. The

additional analysis looked at injury situations where the selected co-morbidity could be expected to result in a differential pattern given the medical condition should an effect be true. For example, for diabetes and CHD it could be expected to find increased service utilisation and costs are associated with:

- older age groups
- specific injury types such as falls, burns and extremities and amputation, fractures soft-tissue damage where due to the medical nature of the two conditions an extra risk of injury or complications for treatment and rehabilitation could be expected to be observed.

Prevalence of Diabetes and CHD in the ACC Population Compared to National Estimates

Diabetes

- Of the 3,037,435 people in the ACC claims data set with an NHI number 140,117 people (4.6%) were identified as having diabetes.

- The population distribution of ACC clients with diabetes is very similar to the national estimates from the MOH, apart from those aged over 80 years. In this age group the ACC proportion is 4% lower than would be expected from MOH population data.

- Analysis of the ACC data by age group, ethnicity and social deprivation[2] also shows that the:

  - greatest number of ACC clients with diabetes are those aged 45 – 64 years
  - rate among Pacific Peoples is slightly higher than for other ethnic groups despite the fact that this group tends to have a younger average age than other groups
  - rate of diabetes rises steadily from 3.6% for ACC clients living in the least deprived (or decile 1) areas, to 5.7% for clients living in the most deprived or decile 10 areas.

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Table 1: Percentage of the population with diabetes, comparison MOH estimates with ACC data set

Age group / Sex	MOH national figures			ACC clients in study		
	Female	Male	Total	Female	Male	Total
Aged under 15	0.3	0.3	0.3	0.4	0.4	0.4
Aged 15 -24	0.9	0.5	0.7	1.1	0.6	0.8
Aged 25 - 44	2.5	1.8	2.1	3.0	1.8	2.3
Aged 45 - 64	6.1	7.6	6.8	7.0	7.9	7.4
Aged 65 - 79	14.0	17.1	15.5	14.3	16.9	15.6

[2] Details are available on request from ACC Research.

Aged 80 and over	15.0	17.7	16.0	11.5	13.6	12.3
Total	4.3	4.6	4.4	4.9	4.3	4.6

Coronary Heart Disease

- Of the 3,037,435 people in the ACC claims data set with an NHI 127,000 (4.1%) were identified with having CHD in the dataset.

- The population distribution of CHD among ACC claimants is very similar to the national totals for all ages except those aged over 80 years, which is the situation similar to that for diabetes. The largest numbers of ACC clients with this condition are males aged 65 - 79 years (38,000) followed by females aged 65 -79 years (29,000) and men aged 45-64 (27,000).

- When examined by ethnicity, Māori, Pacific Peoples and Asians ACC clients have observed rates of CHD at approximately half of that compared to Other / European, 2% compared to 5%. This is likely to reflect the different demographic profile of the groups, with Māori and Pacific Peoples has a much higher proportion of young people than the Other/European. However, other ACC research (Kake et al, 2010) indicates that this may also represent some under claiming by these groups.

- In terms of socio-economic status (as measured by deprivation), the distribution of CHD is not as clear for diabetes. The lowest rate at 3.5% is in the least deprived group (i.e. Decile 1). The highest rates of close to 4.5% are found in each of the deciles 5-9, however the most deprived group (i.e. decile 10) have a lower rate at less than 4%. No statistical tests of significance where done on these analyses.

Table 2: Percentage of population with CHD, Comparison National Estimates with ACC Data set

Age group / Sex	MOH national figures			ACC clients in study		
	Female	**Male**	**Total**	**Female**	**Male**	**Total**
Aged under 15	0.1	0.1	0.1	0.2	0.2	0.2
Aged 15 -24	0.1	0.1	0.1	0.2	0.2	0.2
Aged 25 - 44	0.4	0.6	0.5	0.5	0.6	0.6
Aged 45 - 64	2.9	5.3	4.1	3.6	5.8	4.7
Aged 65 - 79	14.1	20.3	17.1	15.7	21.1	18.3
Aged 80 and over	27.2	31.6	28.8	22.1	24.8	23.0
Total	3.4	4.3	3.8	4.2	4.2	4.2

Does the presence of Diabetes or CHD result in Extra Claims Utilisation?

All Claims

Diabetes

- In the July / June 2008/09 financial year, there were in total 1,416,349 claims invoiced to ACC in the data set. Of these, 71,857 (1.97%) were from people who had diabetes.

- Looking at Table 3 and **Figure 2** a higher rate of claiming can be observed for those with diabetes, particularly for those over 80 years of age. Overall, when looking at the ratio of claims (right hand column in table) between the two groups, the existence of diabetes results in approximately 16% extra claims, and this increases to 54% and 67% for females and males in the 80+ year's age group. The ratio represents the approximate extra claim utilisation associated with diabetes as measured by claiming behaviour. Statistically, the claiming differences were not significant at the 95% level; however this changes when examining Entitlement Claims.

Coronary Heart Disease

- In the period under analysis there were 127,000 (4.1%) ACC clients with CHD in the data set.

- The ratios in Table 4 show the levels of extra claiming associated with clients having CHD. There is a marked age gradient, with the risk of extra claiming significantly increasing with age. Women 25 years of age and over with CHD have higher claim rates compared to all other groups except those over 80 years. In contrast, only males with CHD over 65 years have an All Claims rate higher than their counterparts without CHD. Overall, when looking at the ratio of claims between the two groups, the existence of CHD results in approximately 20% extra claims, however this is substantially due to those aged 80 and over where the rate of claiming is 79% and 206% higher for females and males respectively. For all age-groups, the ratios are small, and the differences are not statistically significant. This changes when looking at Entitlement Claims.

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Table 3: Claims Rate – All Claims Has Diabetes Compared to No Diabetes July / June 2008-09 Financial Year

Diabetes: <u>All Claims</u>		No. of Claims With Diabetes	Claim Rate: Number of claims per 1000 people, in July / June 2008/09 Year & for whom ACC has an NHI number			Claim Rate Ratio Diabetes / No Diabetes
Sex	Age Group		Has diabetes	Does not have diabetes	Total	
Female	Aged under 15	520	451	432	432	1.05
	Aged 15 -24	1,118	514	444	445	1.16
	Aged 25 - 44	5,140	463	425	426	1.09
	Aged 45 - 64	11,786	489	461	463	1.06

	Aged 65 - 79	10,933	518	470	476	1.10
	Aged 80 and over	7,814	673	436	463	1.54
	Sub-Total Number of Claims	37,313	611,280			
Male	Aged under 15	677	499	500	500	1.00
	Aged 15 -24	1,013	688	636	637	1.08
	Aged 25 - 44	3,740	503	520	519	0.97
	Aged 45 - 64	13,410	476	479	478	0.99
	Aged 65 - 79	11,059	486	420	432	1.16
	Aged 80 and over	4,640	606	364	397	1.67
						Total = 1.16
	Sub-Total (N=)	34,544	778,242	(without Diabetes)		
	Grand Total (N=)	71,857	1,389,522	(without Diabetes)		

Table 4: Claims Rate - All Claims Has Coronary Heart Disease Compared to No CHD, July/ June 2008/09 Financial Year

Coronary Heart Disease: <u>All Claims</u>			Claim Rate: Number of claims per 1000 people, in July / June 2008/09 Year & for whom ACC has an NHI number			Claim Rate Ratio CHD / No CHD
Sex	Age Group	No. of Claims With CHD	Has CHD	Does not have CHD	Total	
Female	Aged under 15	172	385	432	432	0.89
	Aged 15 -24	128	394	445	445	0.88
	Aged 25 - 44	967	509	425	426	1.20
	Aged 45 - 64	6,573	529	461	463	1.15
	Aged 65 - 79	13,401	577	458	476	1.26
	Aged 80 and over	15,692	706	395	463	1.79
	Other	1				
	Sub-Total	36,934	611,659			
Male	Aged under 15	294	475	500	500	0.95
	Aged 15 -24	228	564	637	637	0.89
	Aged 25 - 44	1,386	523	519	519	1.01
	Aged 45 - 64	10,393	504	477	478	1.06
	Aged 65 - 79	14,305	506	412	432	1.23
	Aged 80 and over	9,024	647	314	397	2.06
	Other	5				Total = 1.20
	Sub-Total (N=)	35,635	777,151	(without CHD		
	Grand Total (N=)	72,569	1,388,810	(without CHD		

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Figure 2: Comparison All Claim Rates, per 1000 people by Age and Sex with Record of Diabetes to those Without Diabetes, July / June 2008/09 Financial Year

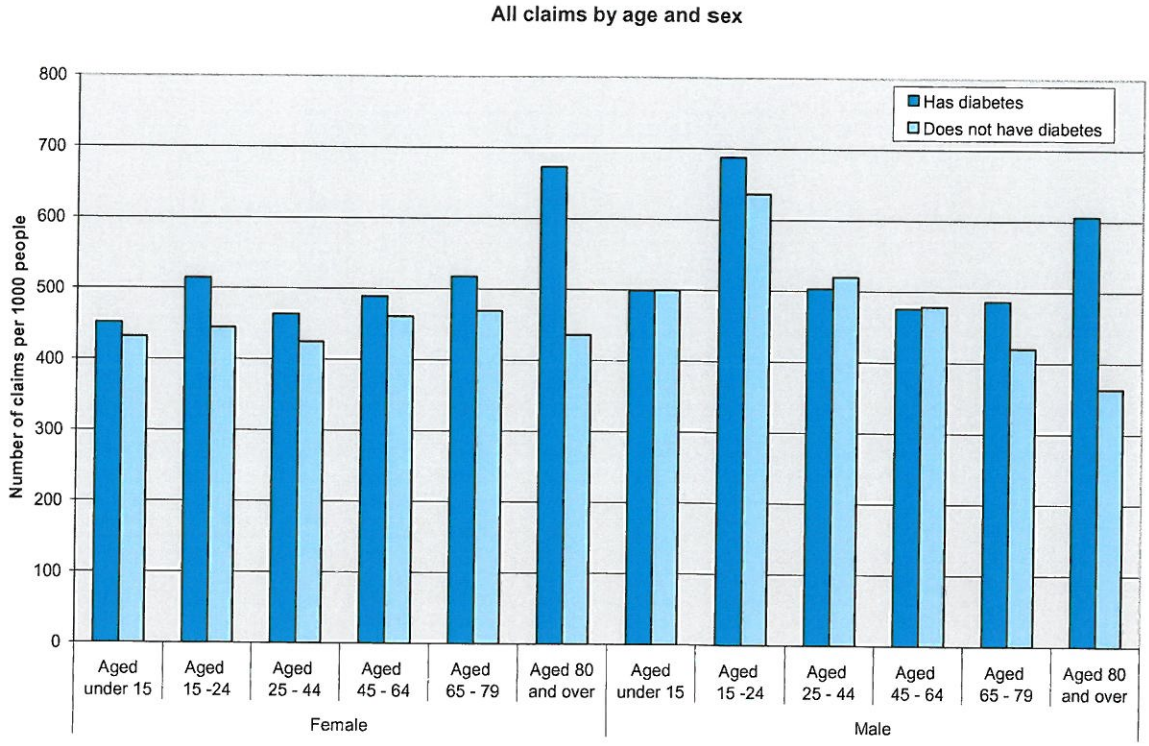
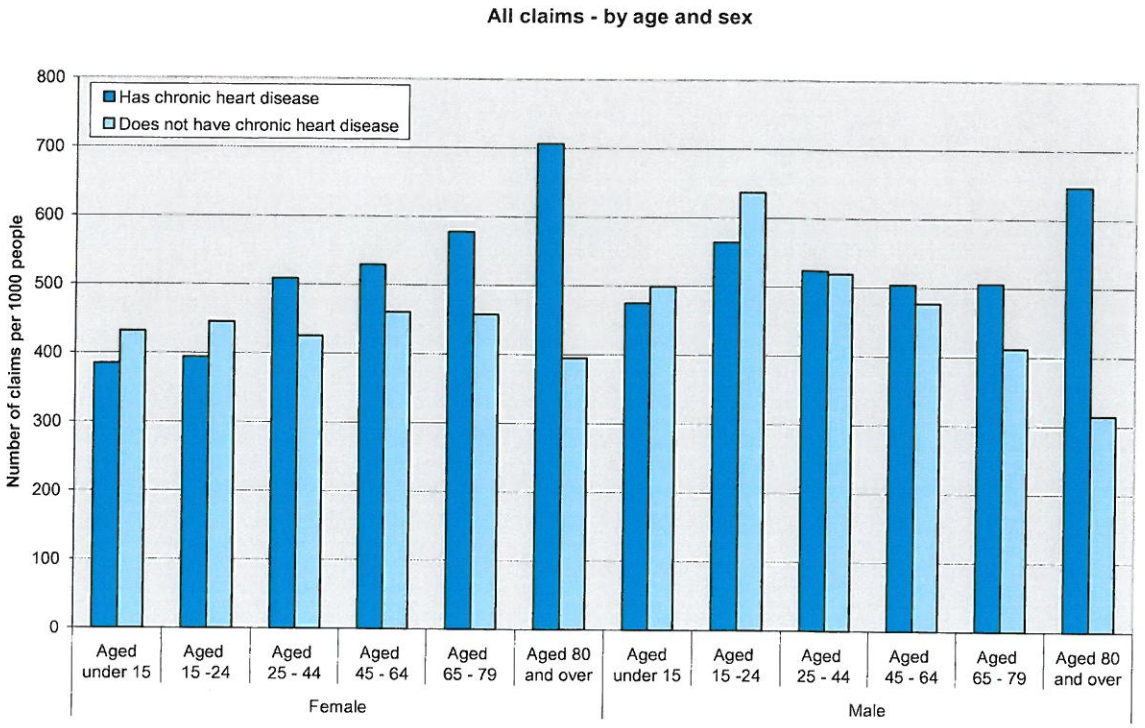


Figure 3: No CHD related All Claims per 1000 People by Age and Sex, July/June 2008/09 Financial Year



Entitlement Claims

- It is often more helpful to limit the analysis to Entitlement Claims. This is sometimes used as a proxy for more serious claims, and they are the claims that often

result in significant long-term liability to the scheme. Entitlement claims include payments for some sort of entitlement, for example compensation for loss of earnings or payment for attendant care, rather than just payments for medical treatment. This is not perfect as sometimes it merely reflects that the client was working at the time of the injury, however it does indicate that at least 5 days were required off work.

Diabetes

- Figure 4 shows the rate of Entitlement claims for those with and without diabetes along with confidence intervals to show whether the rates are significantly different for the two groups.

- It can be seen that the picture for males and females is different with the claim rate for females aged 45 upwards with diabetes significantly higher than for the corresponding groups without the disease. It is particularly marked for those aged 80 years or more, as was also seen for All Claims. For males the only significant difference is in the oldest age group, with the claim rates for the younger age groups being very similar or slightly higher for those without CHD.

- The number of extra Entitlement Claim utilisation is described in Table 5 on the next page. Note the numbers are relatively small, with extra utilisation particularly associated with those over 80 years of age where the rate of claiming is at least 50% higher where CHD is present.

Figure 4: No Diabetes related Entitlement Claims Per 1000 People, By Age and Sex, 95% Confidence Intervals, 2008/09 Financial Year

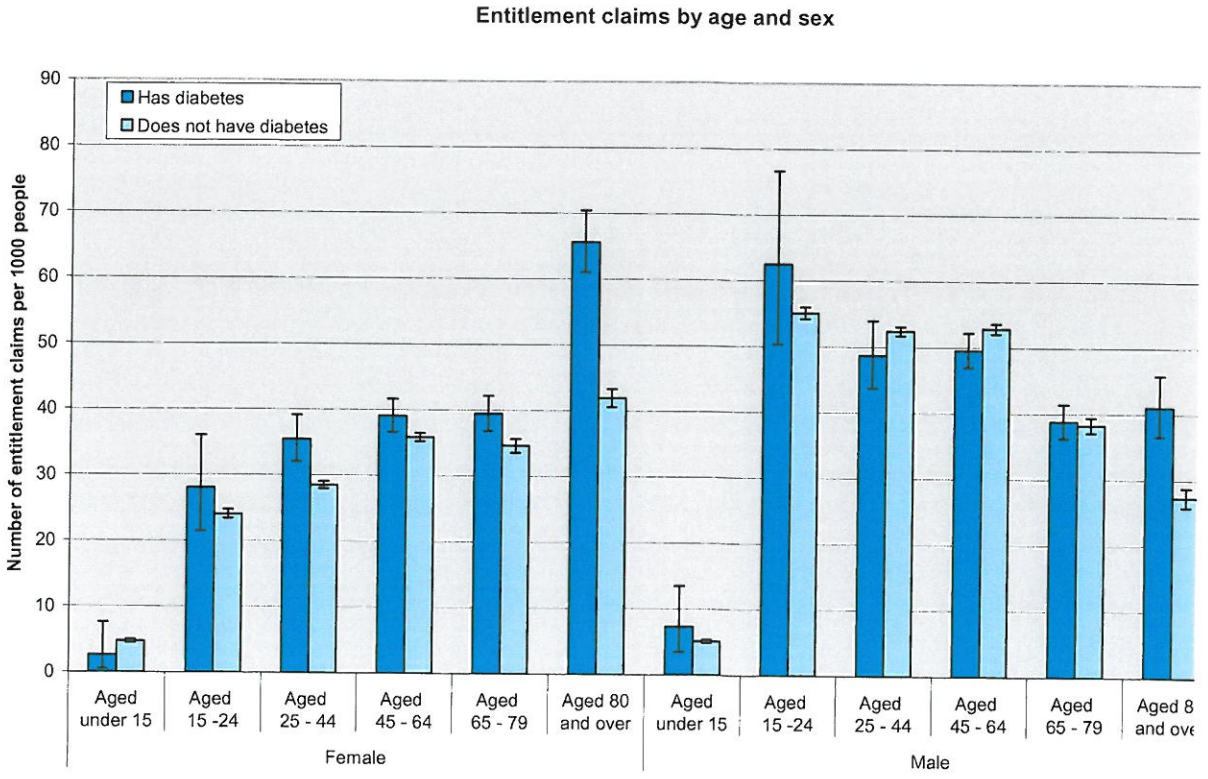


Table 5: Number of Entitlement Claims, Per 1000 People with record (with ACC NHI) With and Without Diabetes, by Sex and Age Group, 2008/09 Financial Year

Diabetes: Entitlement Claims		Number of claims made in July / June 2008/09 Year, for whom ACC has an NHI number		Number of claims per 1000 people, for whom ACC has an NHI number		Claim Rate Ratio Diabetes / No Diabetes
Sex	Age Group	Has diabetes	Does not have diabetes	Has diabetes	Does not have diabetes	
Female	Aged under 15	3	1395	3	5	0.6
	Aged 15 - 24	61	4628	28	24	1.17
	Aged 25 - 44	394	10269	36	29	1.24
	Aged 45 - 64	942	11528	39	36	1.09
	Aged 65 - 79	833	4373	39	35	1.14
	Aged 80 and over	762	3734	66	42	1.56
	Other	0	1			
	Sub-Total	2995	35928		Ratio Sub total	1.03
Male	Aged under 15	10	1803	7	5	1.43
	Aged 15 - 24	92	14274	63	55	1.13
	Aged 25 - 44	362	21813	49	52	0.93
	Aged 45 - 64	1397	17354	50	53	0.94
	Aged 65 - 79	883	4263	39	38	1.02
	Aged 80 and over	314	1332	41	27	1.50
	Other	0	2		Ratio Sub total	1.16
	Sub-Total	3058	60841		Ratio Total	1.14
	Grand Total	6,053	96,769			

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Coronary Heart Disease

• Figure 5 and Table 6 show that woman with CHD 25 years of age and over have significantly higher Entitlement claim rates compared to women without CHD. In contrast only men over 45 years have significantly higher claim rates than their counterparts.

• The Claims Rate ratio shows a clear age gradient particularly after 45 years, as one would expect. (It should be noted that the numbers under 15 years are small and should be discarded for analytical purposes.) Overall the presence of CHD results in an extra Entitlement claims utilisation of 23%, however this hides the substantive differences between population groups by age and sex.

- It is interesting to note that male Entitlement claim rates in the working age group (15-64 years) both for those with and without CHD are substantially higher than women in the same age group. However, in the over 80 years age group, female rates are substantially higher than males. The differences are not unique. Women's risk of CHD tends to be increase after menopause. Given the life-cycle age groups used in this analysis, we would expect to see increased claims utilisation in the 65+ age groups.

Figure 5: No CHD related Entitlement Claims per 1000 People by Sex and Age, 95% Confidence Intervals, July/June 2008/09 financial year

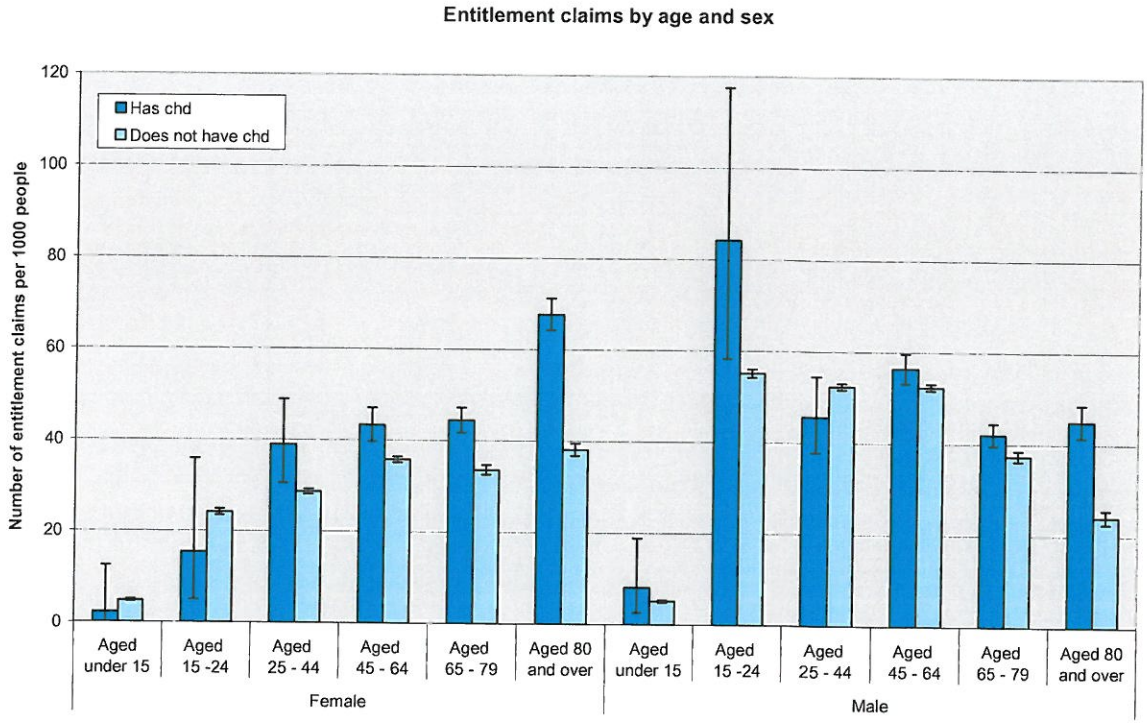


Table 6: Number of Entitlement Claims, Per 1000 People With and Without CHD, by Sex and Age Group, 2008/09 Financial Year

Coronary Heart Disease: **Entitlement Claims**		Number of Entitlement Claims July / June 2008/09 Year, where ACC has an NHI number		Number of claims per 1000 people, for whom ACC has an NHI number			Claim Rate Ratio CHD / No CHD
Sex	Age Group	Has CHD	Does not have CHD	Has CHD	Does not have CHD	Total	
Female	Aged under 15	1	1,397	2	5	5	0.47
	Aged 15 -24	5	4,684	15	24	24	0.64
	Aged 25 - 44	74	10,589	39	29	29	1.36
	Aged 45 - 64	538	11,932	43	36	36	1.21
	Aged 65 - 79	1,030	4,176	44	34	35	1.32
	Aged 80 and over	1,505	2,991	68	38	45	1.78
	Other	-					

			1				
	Sub-Total	3,153	35,770		Ratio Sub total		1.05
Male	Aged under 15	5	1,808	8	5	5	1.57
	Aged 15 -24	34	14,332	84	55	55	1.53
	Aged 25 - 44	121	22,054	46	52	52	0.87
	Aged 45 - 64	1,162	17,589	56	52	53	1.08
	Aged 65 - 79	1,188	3,958	42	37	38	1.12
	Aged 80 and over	627	1,019	45	24	29	1.87
	Other	1	1		Ratio Sub total		1.34
	Sub-Total	3,138	60,761		Ratio Total		1.23
	Grand Total	6,291	96,531				

Claims costs and duration first 6 & 12 months (incl. PHAS)

Diabetes All Claim Costs

- Table 7 and **Figure 6** shows, by sex and age the mean cost of All Claims in the first 6 months where the claimant has diabetes compared to those with no diabetes for the July/June 2008/09 financial Year. The mean cost is the sum of all costs divided by the number of all claims in the period.

- While the mean cost of All claims are generally higher for those with diabetes, the mean difference between those with and without diabetes is not significantly different comparing age groups. However, it can be observed there is a sizable difference between females and males in both comparison groups. Males have higher mean costs (but not duration) compared to females, except for the two oldest age groups (65+), and in the oldest category females costs are significantly higher. This suggests the higher costs are associated with complications of treatment rather than rehabilitation, and whether the claimant is participating in the workforce.

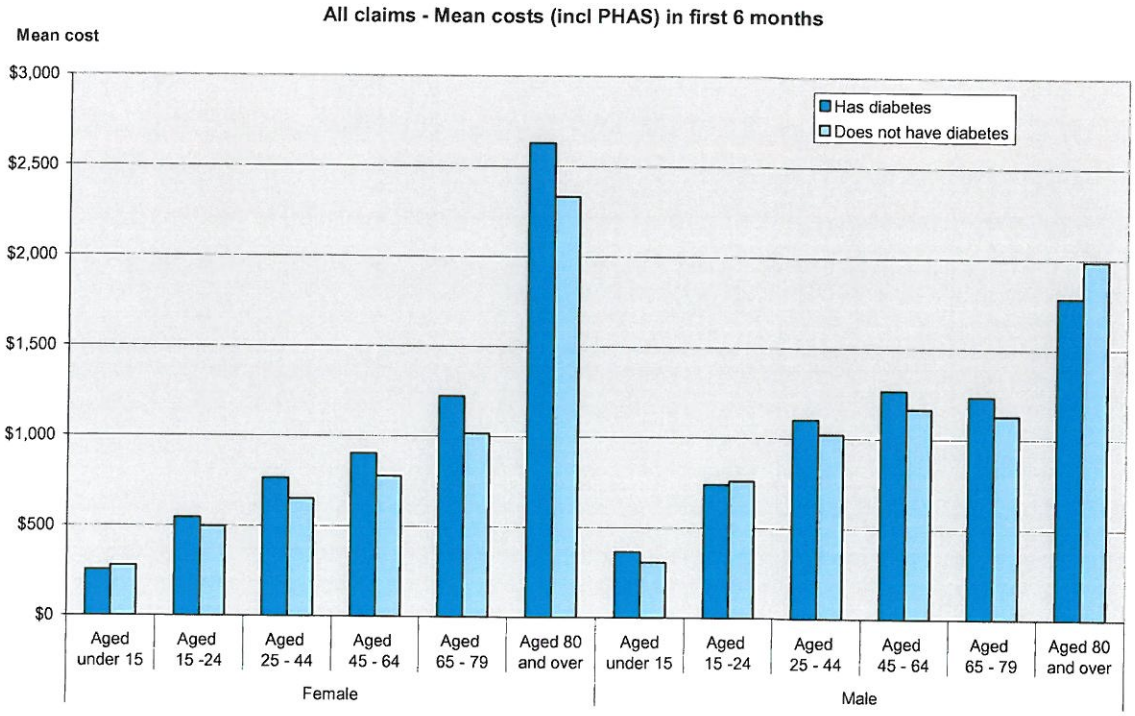
- While statistically there is little difference in terms of mean costs, the combination of higher claims utilisation and extra cost, adds up to a sizable additional cost to the Scheme overall that can be attributed to diabetes. The table shows that the extra cost of All Claims associated with treating and rehabilitating clients with diabetes at the 6 month point is estimated to be approximately $36 million in the 2008/09 financial year. At the 12 month point the costs continue to increase, and are estimated to reach approximately $41 million.

Table 7: Mean Cost (incl PHAS) and mean duration of <u>All Claims</u> Diabetes related, First 6 months, July/June 2008/09 Financial year

Diabetes: <u>All Claims</u>		Mean cost in first 6 months incl PHAS		Extra Mean Cost Diabetes First 6 mth	Average duration of medical payments 6 mth	
Sex	Age Group	Has diabetes	Does not have diabetes		Has diabetes	Does not have diabetes
Female	Aged under 15	$252	$277	-$25	34	29
	Aged 15 -24	$544	$497	$47	56	49
	Aged 25 – 44	$764	$651	$113	72	70

	Aged 45 – 64	$902	$779	$123	80	84
	Aged 65 – 79	$1,224	$1,017	$207	71	76
	Aged 80 and over	$2,628	$2,331	$297	55	53
	Other	$2,215	$394	$1,821	109	105
	Sub-Total	$1,319	$725	$594	70	62
Male	Aged under 15	$364	$308	$56	33	27
	Aged 15 -24	$739	$759	-$20	47	45
	Aged 25 – 44	$1,103	$1,022	$81	63	63
	Aged 45 – 64	$1,265	$1,163	$102	79	78
	Aged 65 – 79	$1,234	$1,129	$105	71	77
	Aged 80 and over	$1,782	$1,986	-$204	49	53
	Other	$809	$1,960	-$1,151	42	181
	Sub-Total	$1,274	$862	$412	69	55
Total Cost		$ 93,224,903	$1,114,022,604			
Excess <u>All Claim</u> Costs Attributable to Diabetes, First 6 months*				$ 36,396,050		
@ 12 months				$ 40,964,302		
* Excess is Sum of: Mean Extra Cost x Sub-total of Claims in each Group						

Figure 6: Mean Cost (Incl. PHAS) of Diabetes related <u>All Claims</u> first 6 Months by Age and Sex, July/June 2008/09 Financial Year



Diabetes Entitlement claims –mean cost and duration at 6 and 12 months (incl. PHAS)

- Table 8 and the two figures that follow show the mean costs and duration of Entitlement claims at 6 and 12 month time points. Costs can continue to increase for

many years but the 6 and 12 month time limits were used. Approximately 94% of all claims are "Med Fees "only claims and conclude within 3 months. Claims longer than 3 months typically involve Weekly Compensation entitlements, and may last for years. Consequently, the numbers presented in the following section most likely represent a conservative estimate, particularly given that not all the claims identified within the sample used in this study have been followed for the same time period.

- As expected, the table shows that costs continue with time, however the differences between the mean costs of the age groups are not particularly large except for females over 65 years of age.

- However, there is a difference between the mean costs of females and males, and in the duration of payments between those with and without diabetes. Males have higher mean costs compared to females, except for the oldest age groups (80+). The mean duration of claims for those with diabetes is longer, and particularly for males in the working age group (45-64 years). This suggests the extra cost of Entitlement Claims for those with diabetes is associated with the extra time for rehabilitation.

- The cumulative extra cost of Entitlement claims associated with diabetes in the 2008/09 financial year is estimated to be $13 million and $14 million at the 6 and 12 month time points respectively.

Table 8: Mean Cost (incl PHAS) and Duration of Diabetes related Entitlement Claims, @ 6 and 12months, July/June 2008/09 Financial year

Diabetes: Entitlement Claims		Mean cost in first 6 months incl PHAS		Extra Mean Cost Diabetes @ 6 mth	Mean cost in first 12 months incl PHAS		Extra Mean Cost Diabetes @ 12 mth	Average duration of medical payments 12 mth	
Sex	Age Group	Has diabetes	Does not have diabetes		Has diabetes	Does not have diabetes		Has diabetes	Does not have diabetes
Female	Aged under 15	$4,106	$4,945	-$839	$4,382	$6,118	-$1,736	62	52
	Aged 15 - 24	$4,755	$4,564	$191	$6,340	$6,083	$257	95	73
	Aged 25 - 44	$5,934	$5,874	$60	$8,718	$8,320	$398	126	105
	Aged 45 - 64	$6,355	$6,295	$60	$8,724	$8,882	-$158	113	108
	Aged 65 - 79	$9,456	$7,960	$1,496	$10,561	$9,350	$1,211	91	93
	Aged 80 and over	$17,328	$15,637	$1,691	$17,797	$16,225	$1,572	63	73
	Other	0	$2,146	-$2,146	0	$2,146	-$2,146	0	56
	Sub-Total	$9,919	$7,073	$2,846	$11,490	$9,074	$2,416	95	95
Male	Aged	$6,077	$6,590	-$513	$7,078	$8,241	-$1,163	77	51

under 15								
Aged 15 - 24	$5,173	$5,861	-$688	$5,732	$7,450	-$1,718	72	71
Aged 25 - 44	$7,794	$7,707	$87	$12,518	$10,802	$1,716	109	103
Aged 45 - 64	$8,462	$7,994	$468	$12,540	$11,837	$703	142	126
Aged 65 - 79	$8,348	$7,260	$1,088	$11,932	$10,185	$1,747	167	152
Aged 80 and over	$15,567	$15,143	$424	$17,032	$16,932	$100	92	100
Other	0	$6,105	-$6,105	0	$17,605	-$17,605	0	336
Sub-Total	$8,973	$7,454	$1,519	$12,600	$10,326	$2,274	138	104

Total Cost @ 6 mths	Has Diabetes	No Diabetes
	$ $57,146,839	$707,627,558

Excess* Entitlement Claim Costs Attributable to Diabetes, @ 6 months	$ 13,168,872
12 months	$ 14,189,812

* Excess is Sum of: Mean Extra Cost x Sub-total of Claims in each Group

Figure 7: Mean Cost Diabetes related Entitlement Claims (incl. PHAS) in first 6 months by Age and Sex, July/June 2008/09 Financial Year

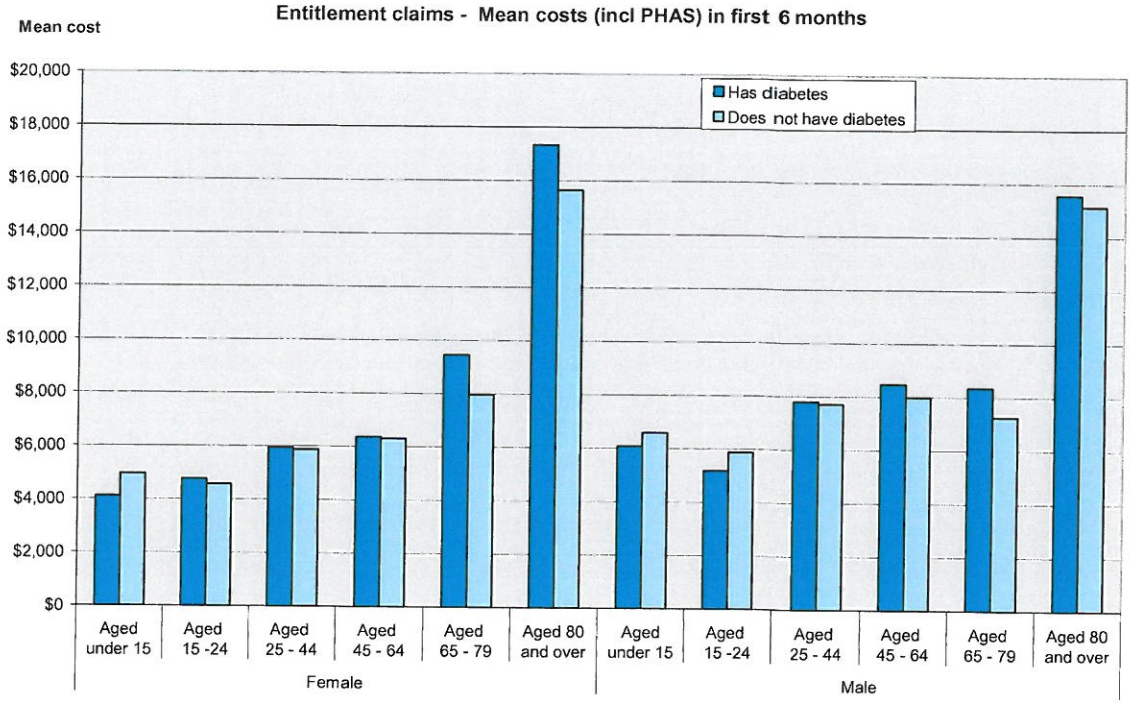
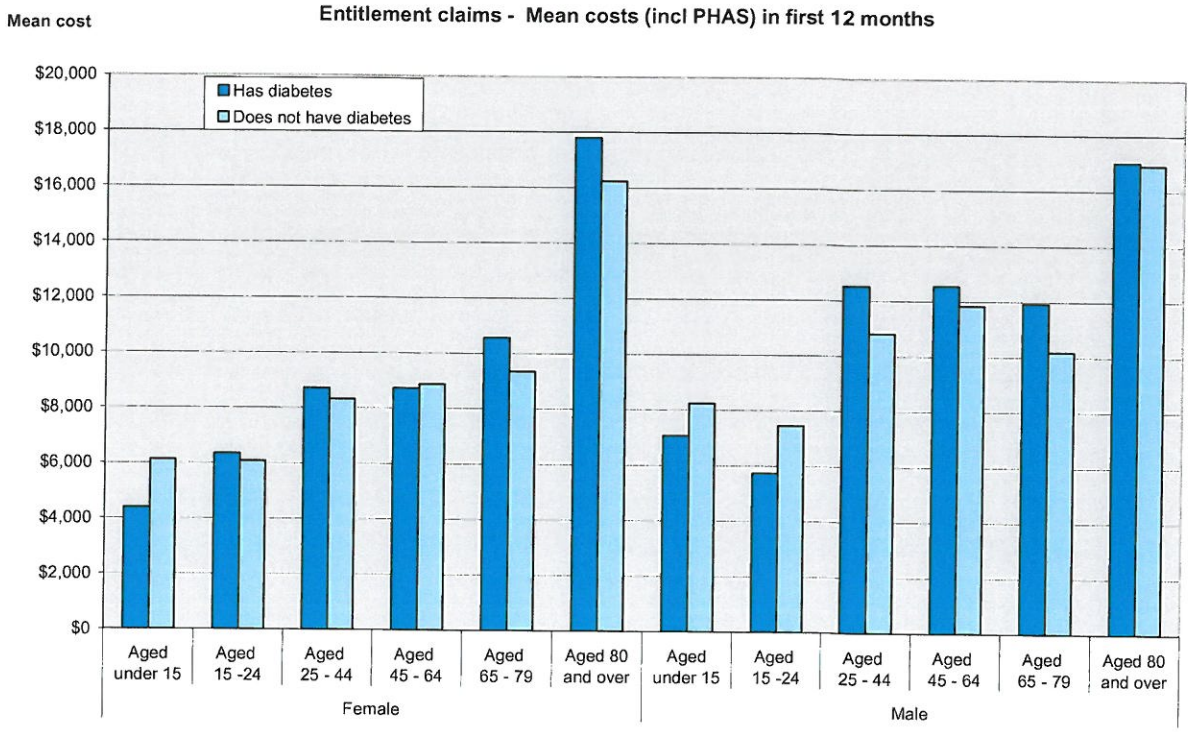


Figure 8: Mean Cost Diabetes related Entitlement Claims (incl. PHAS) in first 12 months by Age and Sex, July/June 2008/09 Financial Year



Additional analysis: Diabetes

- Additional detailed work has been undertaken exploring whether the overall differences reported above hold true in situations where differences would be expected to be seen in injury diagnosis and event given the nature of diabetes. ACC injury diagnosis codes where used in the analysis. The results of this work is summarised below are not statistically significant.

Diabetes and Injury Diagnosis Group

- Slightly higher entitlement claim rates for fractures / dislocations and soft tissue injuries have been found for those with diabetes, and where diabetes is present injury rates to the hip, upper leg and thigh area are at least double those without diabetes.

- For amputations, fractures/dislocations, and lacerations where diabetes is present the mean costs of Entitlement claims are higher compared to those with no diabetes after 6 and 12 months (see - Figure 9 and Figure 10).

- Another interesting feature is that if these costs are compared with the costs after 6 months (Figure 9), it is clear that most of the costs are incurred in the first six months for most diagnoses but the mean cost for amputations and fractures/dislocations claims where diabetes is present continues to increase in the second six months. This suggests that injuries involving people with diabetes are involving longer treatment or rehabilitation times than similar injuries for people without the disease. Figure 11 shows that there is some evidence for this, although the differences are not significant. It may just be that the people with the condition tend to be older on average than those without but this pattern is not observed in those with coronary heart disease in the next Part. Another possibility is that uncontrolled diabetes effects the periphery earlier than uncontrolled CHD.

Figure 9: Mean Cost (incl. PHAS) of Diabetes related Entitlement Claims in first 6 Months of claim by Diagnosis, 2008/09 July/June Financial Year

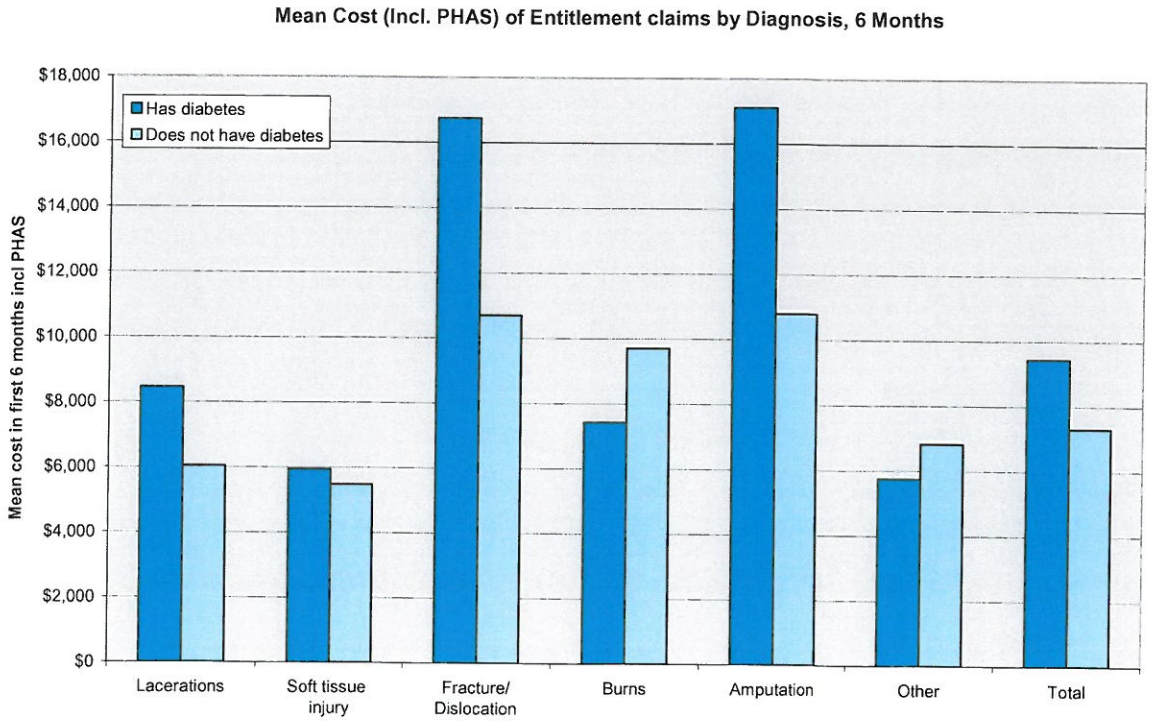


Figure 10: Mean Cost (incl. PHAS) of Diabetes related Entitlement Claims by Diagnosis in first 12 Months of claim, 2008/09 July/June Financial Year

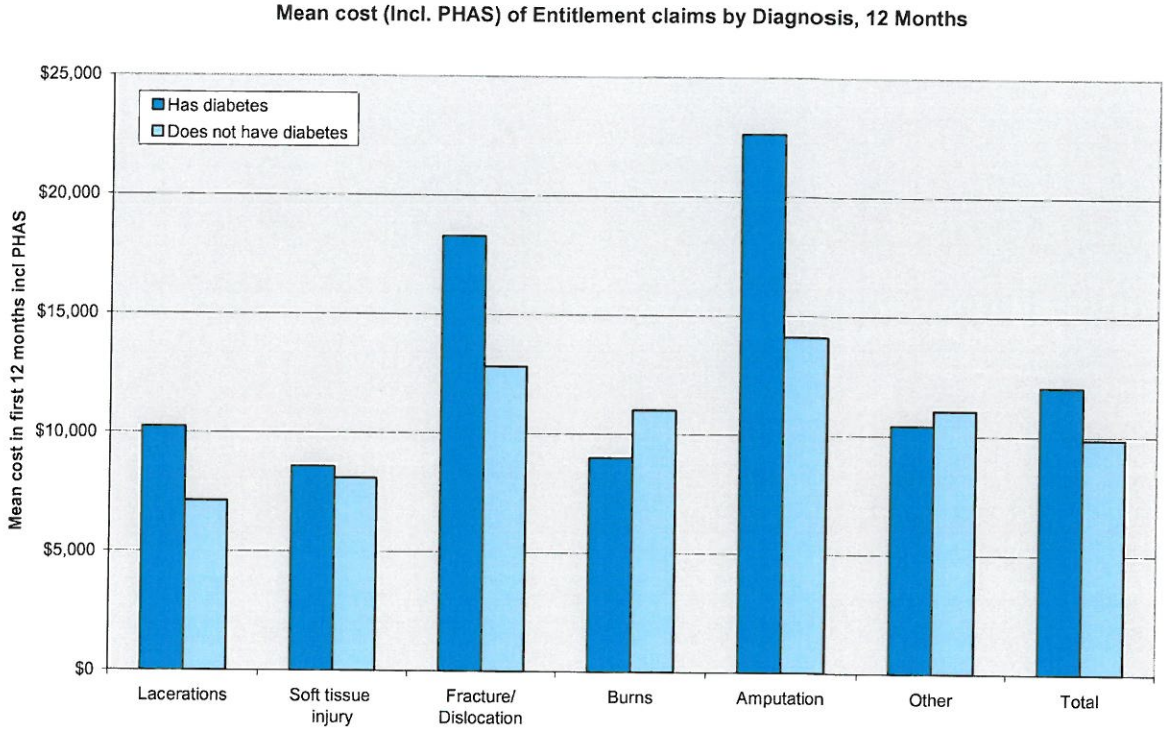
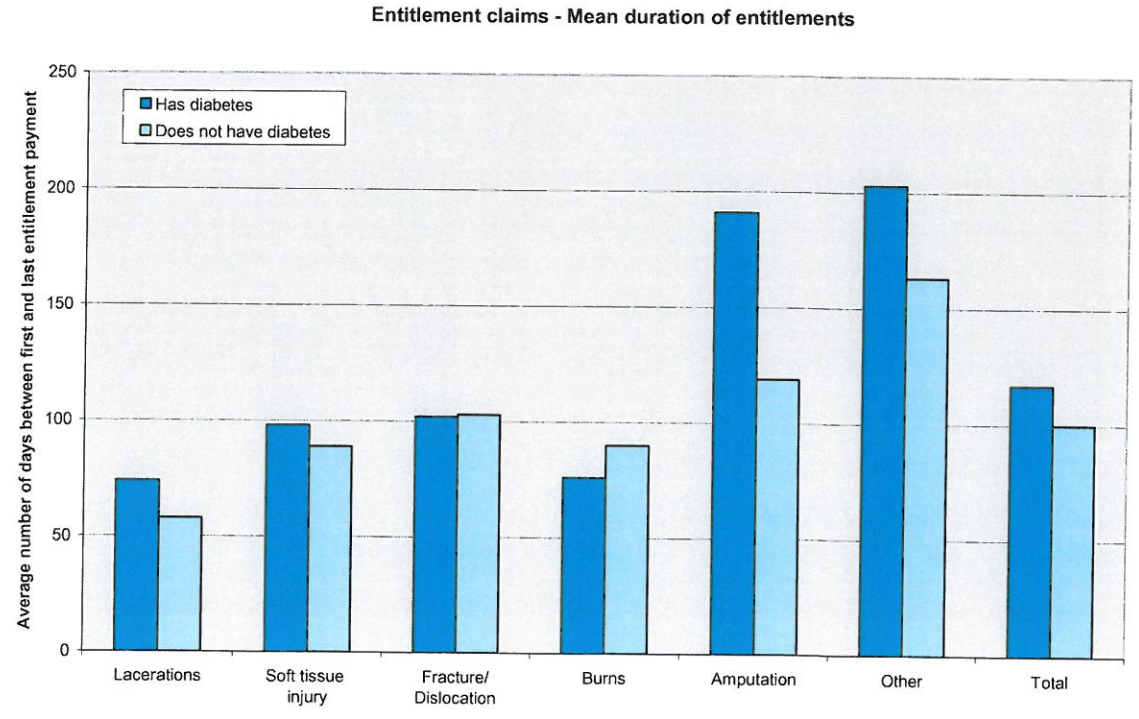


Figure 11: Mean duration of Entitlement Payments, first 12 months 2008/09 Financial Year, Diabetes / No Diabetes, Diagnosis



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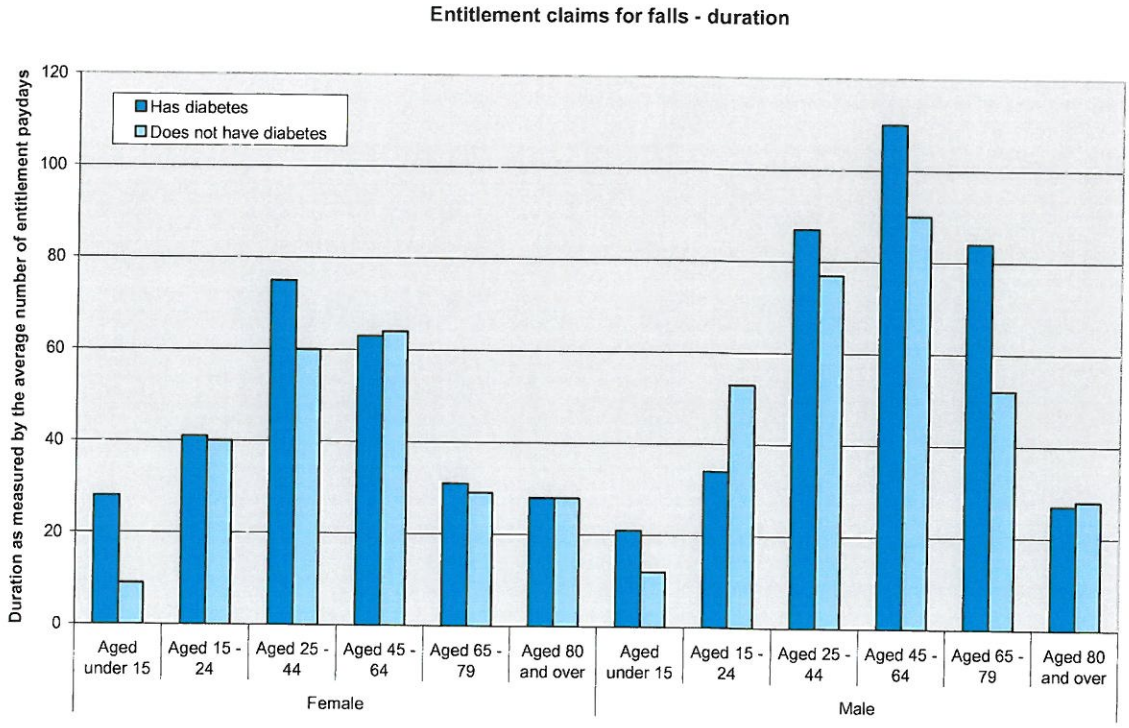
Diabetes and Type Injury Event: Falls, Burns, Extremities

Falls

- It could be expected that diabetics may be more likely to have more falls, which would result in a higher rate of claiming. This appears to be slightly evident, particularly amongst older women. The rate of falls for females over the age of 80 years is particularly high for those with diabetes, at over 50 claims per 1000 people, compared with about 30 claims for women of the same age without the condition.

- In terms of cost of falls, a similar pattern as reported above for claims costs by diagnosis can be seen. The mean costs of falls claims where diabetes is present are higher for females over 80 years of age, and males in the older age groups. Costs also continue to increase with time. However the differences are not statistically significant, and are likely to be related to duration (see Figure 12) which shows that those with diabetes tend to have longer duration times particularly for those in the working age groups. This suggests that falls injuries involving people with diabetes results in rehabilitation times than similar injuries for people without the disease.

Figure 12: Mean duration of Diabetes Falls related Entitlement Payments, first 12 months 2008/09 Financial Year



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Burns

- The number of burns related injuries associated with diabetes are small when disaggregating by sex and age group. Analysis showed that:

  - those with diabetes have much higher rates of burns related claims compared to those without diabetes

- most burns claims are of relatively short duration, although there is a suggestion that where diabetes is present, claims duration is longer particularly for males

- the mean cost of treatment for both female and male diabetics in the 25 to 44 age group is significantly higher compared to their counterparts, however this is likely to be a function of the relatively higher number of claims and the increased duration of claims in this age group.

Extremities

- Given the nature of diabetes, it might be expected that analysis of extremity related injuries might show a difference between those with and without diabetes respectively. There is some evidence of higher Entitlement claim rates (Figure 13), although not significantly so.

- However the mean cost of Entitlement claims is higher, typically in the range of $1,000 to $1,500 at both the 6 and 12 month time points (Figures 13 and 14). The increased cost is likely to be related the longer claim duration time (Figure 16).

Figure 13: No Diabetes related Extremity Entitlement Claims Per 1000 people, July/June 2008/09 Financial Year

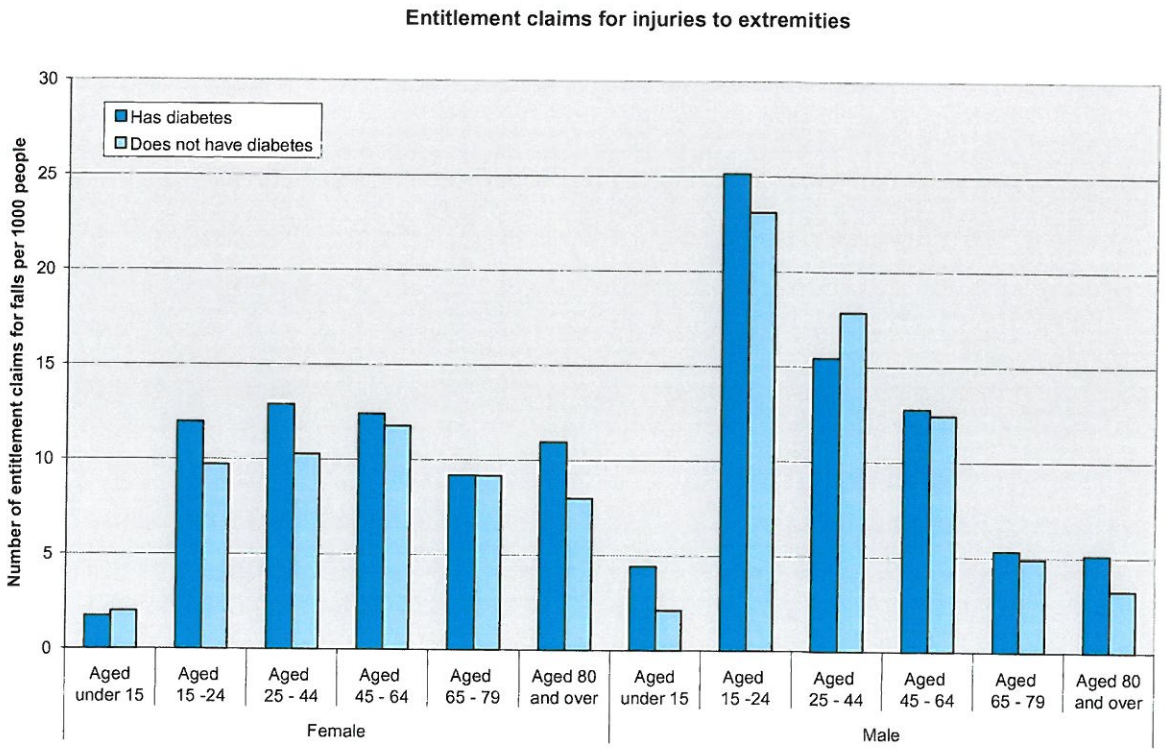


Figure 14: Mean Cost (Incl. PHAS) Diabetes Extremity Entitlement Claim first 6 Months, 2008/09 Financial Year

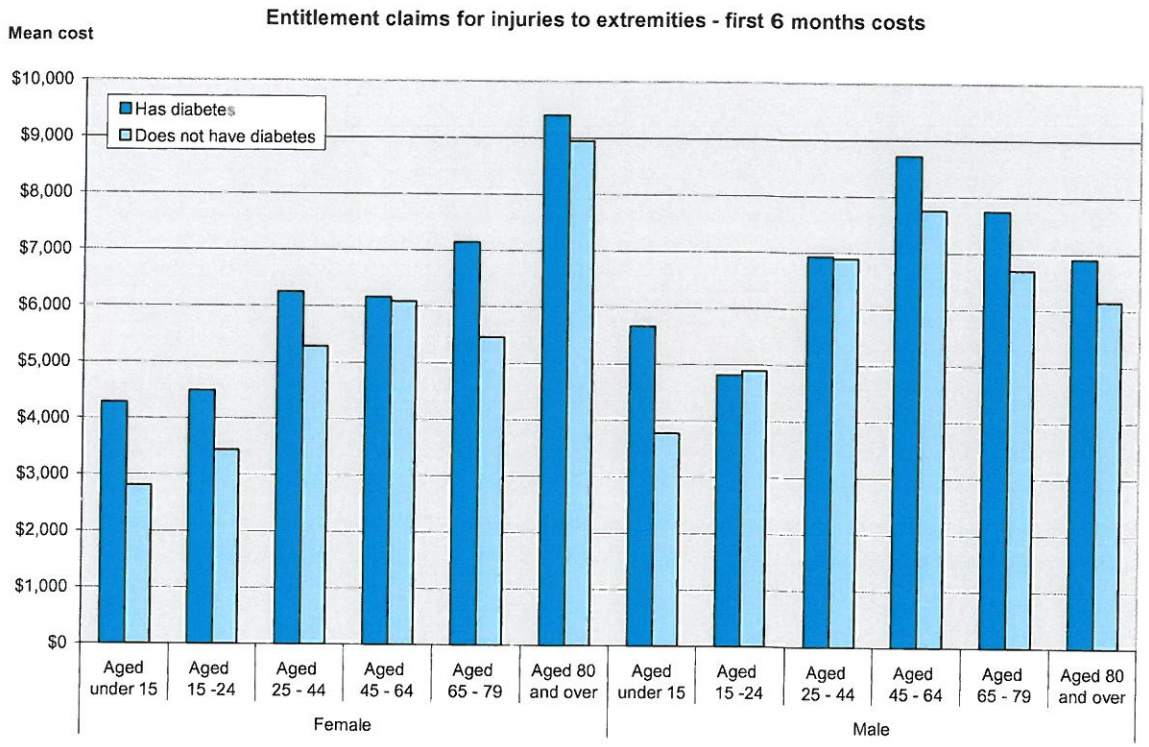


Figure 15: Mean Cost (Incl. PHAS) Diabetes Extremity Entitlement Claims first 12 Months

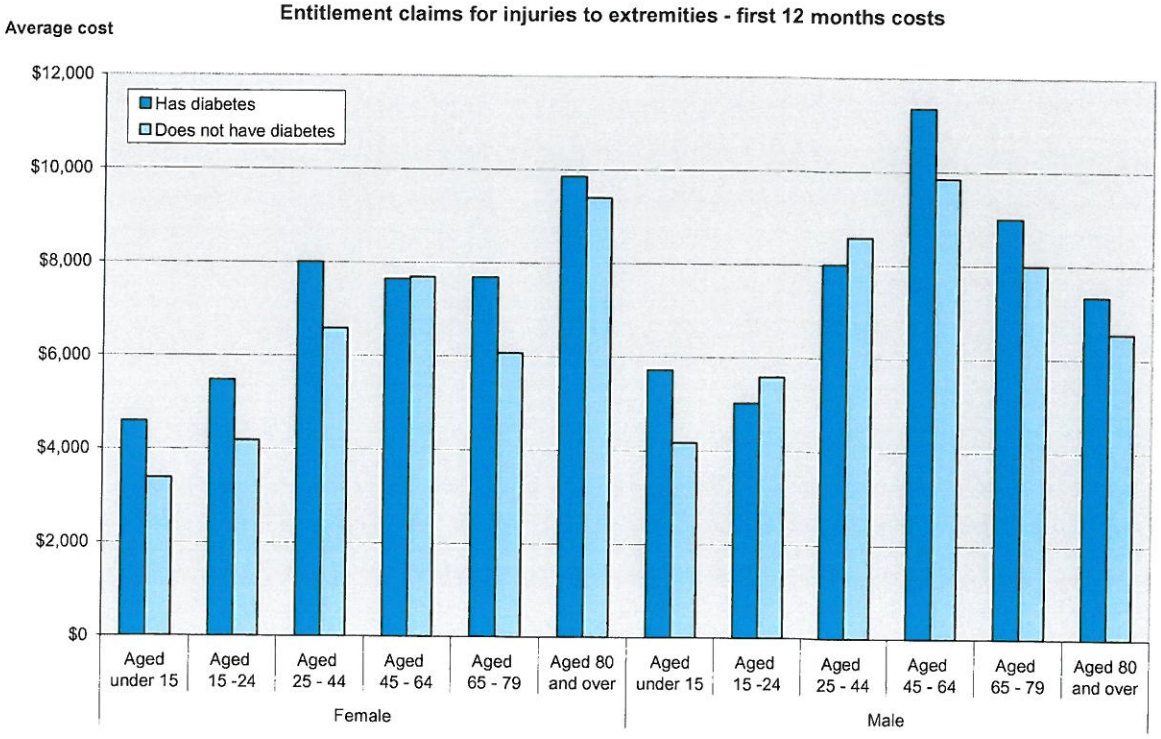
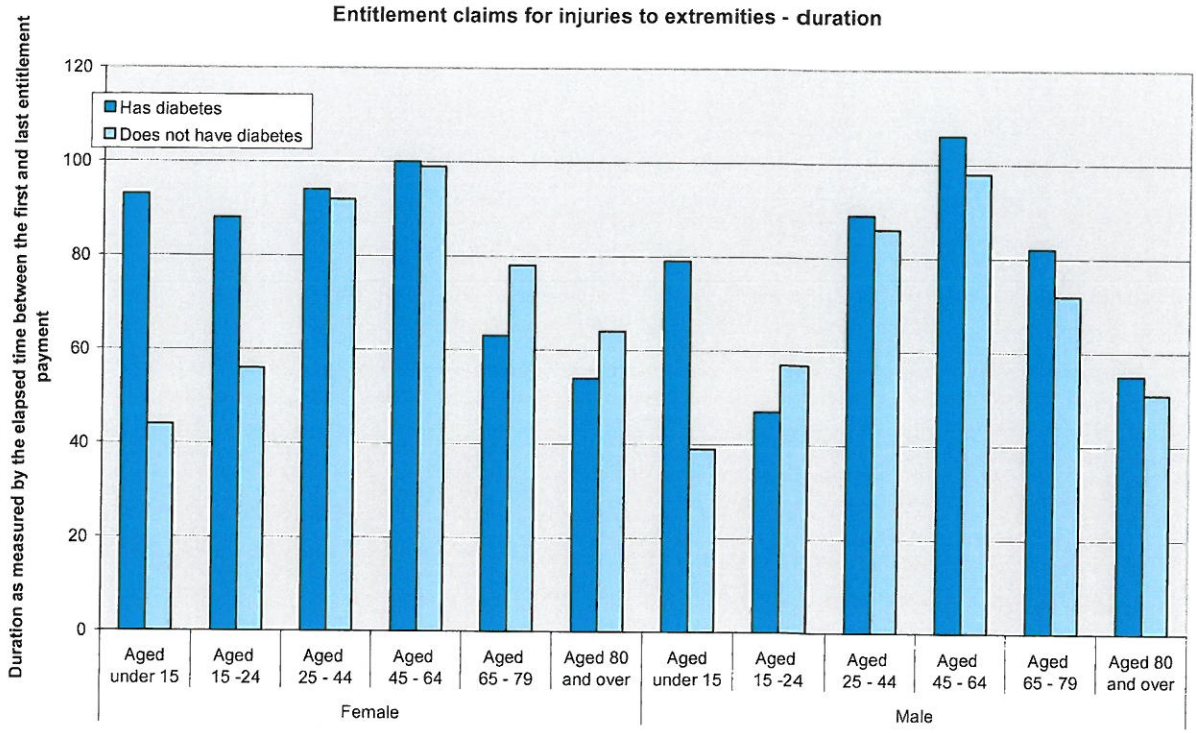


Figure 16: Mean Duration Diabetes Extremity Entitlement Claims



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CHD All Claim Costs

- **Table 9** shows the mean extra cost associated with all CHD related claims at 6 and 12 month time points, and the mean duration of payments.

- The table indicates a consistent pattern of extra cost associated with CHD of typically between $300-$400 per claim, irrespective of age and sex. There is no difference in duration, suggesting the extra cost is associated with complications of treatment rather time rehabilitating.

- Overall, the extra costs attributable to CHD are at least $62 million in the 2008/09 financial period.

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Table 9: Mean Cost (incl PHAS) and Mean Duration of All Claims CHD related, @ 6 and 12 months, July/June 2008/09 Financial year

Coronary Heart Disease: All Claims		Mean cost in first 6 months incl PHAS		Extra Mean Cost CHD @ 6 mth	Mean cost in first 12 months incl PHAS		Extra Mean Cost CHD @ 12 mth	Mean duration of medical payments	
Sex	Age Group	Has CHD	Does not have CHD		Has CHD	Does not have CHD		Has CHD	Does not have CHD
Female	Aged under 15	$254	$277	-$23	$258	$297	-$39	30	29
	Aged 15 -24	$872	$497	$375	$946	$597	$349	50	50
	Aged 25 - 44	$1,147	$651	$496	$1,508	$843	$665	78	70
	Aged 45 - 64	$1,056	$776	$280	$1,330	$1,008	$322	83	84
	Aged 65 - 79	$1,316	$986	$330	$1,455	$1,119	$336	72	76
	Aged 80 and over	$2,618	$2,260	$358	$2,713	$2,341	$372	52	55
	Other	$4,197	$380	$3,817	$4,197	$445	$3,752	0	114
	Sub-Total	$1,812	$696	$1,116	$1,961	$838	$1,123	65	62
Male	Aged under 15	$449	$308	$141	$503	$331	$172	30	27
	Aged 15 -24	$1,991	$758	$1,233	$2,441	$906	$1,535	78	45
	Aged 25 - 44	$1,177	$1,023	$154	$2,036	$1,353	$683	69	63
	Aged 45 - 64	$1,381	$1,157	$224	$1,945	$1,599	$346	82	78
	Aged 65 - 79	$1,251	$1,116	$135	$1,534	$1,433	$101	71	77
	Aged 80 and over	$1,926	$1,955	-$29	$2,046	$2,150	-$104	50	54
	Other	$2,536	$1,240	$1,296	$7,148	$1,264	$5,884	188	101
	Sub-Total	$1,455	$853	$602	$1,801	$1,095	$706	69	55
Total Cost		Has CHD: $118,773,333		No CHD: $1,088,624,467					
Excess All Claim Costs Attributable to CHD first 6 months*		$ 62,670,614.00			**Excess @ 12 mths**		$ 66,635,192.00		
* Excess is Sum of: Mean Extra Cost x Sub-total of Claims in each Group									

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CHD Entitlement claims –Mean Cost and Duration at 6 and 12 months (incl. PHAS)

• **Table 10** and the three figures on the following pages clearly show that the presence of CHD is associated with sizable extra Entitlement costs, particularly in the working age population aged between 15 and 64 years (Figure 17 and Figure 18). Excess mean Entitlement costs are typically in the region of $2,000, depending upon sex and age group.

• The mean CHD Entitlement claim duration, as measured by number of paydays, is shown in Figure 19. It can be seen that there is very little difference between the pairs of groups for those over 65 years, which contain most people with coronary heart disease. The durations for people younger than 45 years were longer on average for those with the disease than for those without, however the number of clients with coronary heart disease in each of these age groups is very small. Where

the mean duration is longer, the Entitlement costs are correspondingly significantly higher.

- Overall, the extra Entitlement claims costs associated with CHD in the 2008/09 financial year are estimated to be approximately $27 million.

Coronary Heart Disease: Entitlement Claims		Mean cost in first 6 months incl PHAS		Extra Mean Cost CHD @ 6 mth	Mean cost in first 12 months incl PHAS		Extra Mean Cost CHD @ 12 mth	Mean duration of medical payments	
Sex	Age Group	Has CHD	Does not have CHD		Has CHD	Does not have CHD		Has CHD	Does not have CHD
Female	Aged under 15	$109	$4,946	-$4,837	$109	$6,118	-$6,009	0	52
	Aged 15 -24	$7,343	$4,564	$2,779	$8,356	$6,084	$2,272	64	73

Table 10: Mean Cost (incl PHAS) and Mean Duration of CHD related Entitlement Claims, @ 6 and 12 months, July/June 2008/09 Financial year

	Aged 25 - 44	$9,450	$5,851	$3,599	$13,802	$8,297	$5,505	126	105
	Aged 45 - 64	$7,708	$6,236	$1,472	$10,574	$8,794	$1,780	123	108
	Aged 65 - 79	$9,970	$7,762	$2,208	$11,198	$9,135	$2,063	92	93
	Aged 80 and over	$17,272	$15,245	$2,027	$17,768	$15,850	$1,918	66	74
	Other	0	$2,146	-$2,146	0	$2,146	-$2,146	0	56
	Sub-Total	$13,050	$6,784	$6,266	$14,280	$8,817	$5,463	85	96
Male	Aged under 15	$4,969	$6,592	-$1,623	$7,404	$8,237	-$833	117	51
	Aged 15 -24	$11,021	$5,844	$5,177	$13,958	$7,423	$6,535	103	71
	Aged 25 - 44	$8,534	$7,704	$830	$18,043	$10,791	$7,252	109	103
	Aged 45 - 64	$8,762	$7,980	$782	$13,558	$11,779	$1,779	149	126
	Aged 65 - 79	$8,086	$7,255	$831	$10,999	$10,330	$669	161	153
	Aged 80 and over	$16,096	$14,688	$1,408	$17,589	$16,559	$1,030	92	103
	Other	$11,812	$399	$11,413	$34,798	$412	$34,386	672	0
	Sub-Total	$9,982	$7,400	$2,582	$13,569	$10,273	$3,296	140	104
Total Cost		Has CHD: $72,470,166			No CHD: $692,295,080				
Excess All Claim Costs Attributable to CHD first 6 months*		$27,859,014				**Excess @ 12 mths**		$ $27,567,687	
* Excess is Sum of: Mean Extra Cost x Sub-total of Claims in each Group									

Figure 17: Mean Cost (Incl. PHAS) CHD related Entitlement Claims, first 6 Months, July/June 2008/09 Financial Year

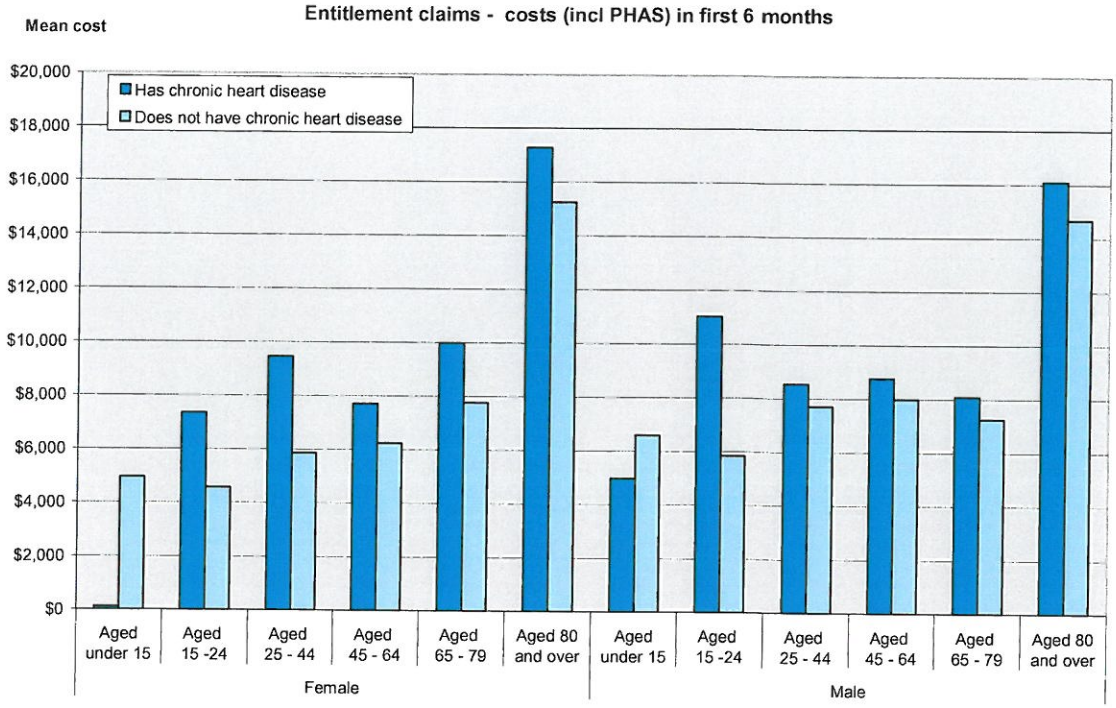


Figure 18: Mean Cost (Incl. PHAS) CHD related Entitlement Claims, first 12 Months, July/June 2008/09 Financial Year

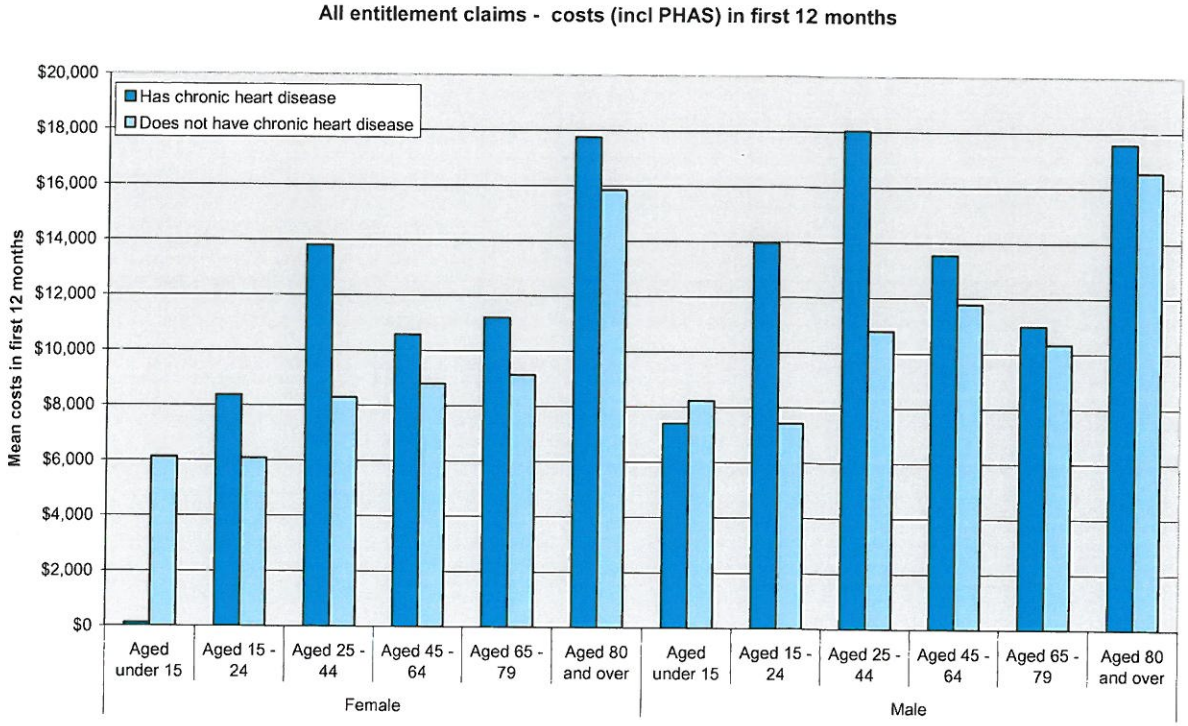
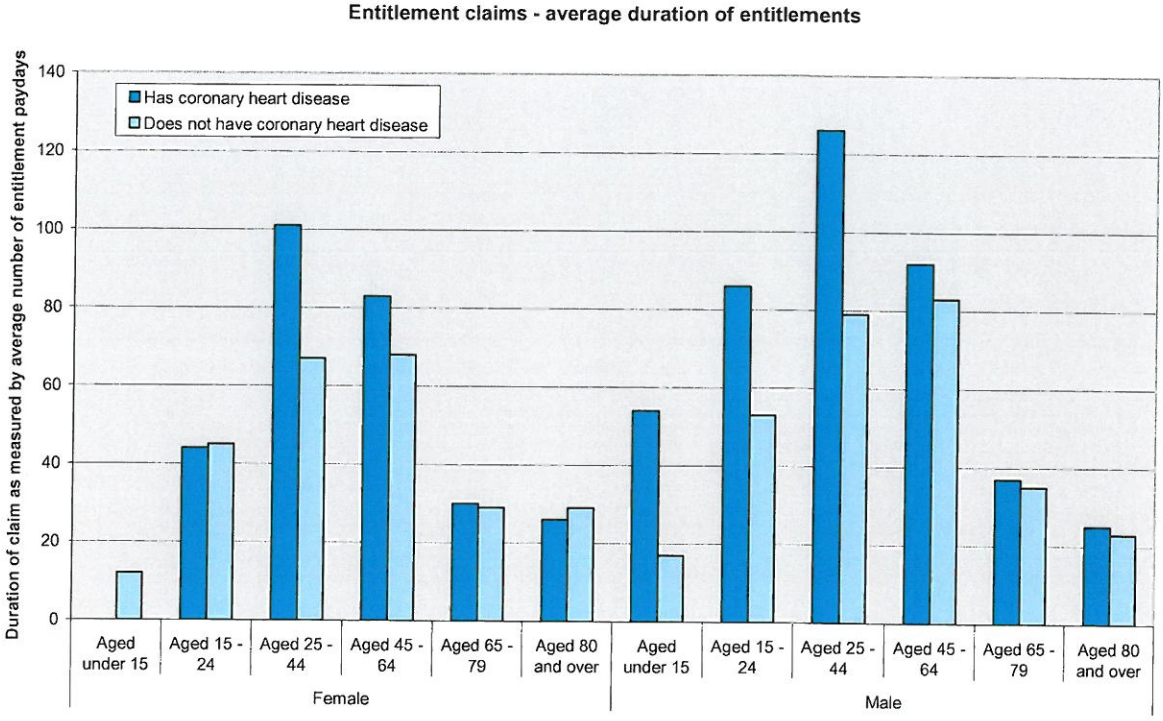


Figure 19: Duration CHD Entitlement Claims, Mean Paydays, July/June 2008/09 Financial year



Additional analysis: CHD

- Additional detailed work has been undertaken exploring whether the overall differences reported above hold true in situations where differences would be expected to be seen in injury diagnosis and event given the nature of CHD. The results of this work is summarised below. The findings support the overall results.

CHD and Injury Diagnosis Group and Injury Site

- The following two figures show the rates of CHD Entitlement claims by major diagnosis group, and mean cost in first 12 months. It can be seen that the highest claim rates for those with CHD are fractures / dislocations closely followed by soft tissue injury, and then lacerations. The rates of claiming are significantly higher for fractures/dislocations are approximately double those without CHD (**Figure 20**).

- When examined by sex and age group, the differences in overall Entitlement claim rate is largely driven by females over 45 years of age. There is very little effect of CHD on males under 80 years.

- When the costs of these claims is considered in Figure 21, it can be seen that the mean cost for fractures and dislocations for those with coronary heart disease is significantly higher compared to those without CHD, with a mean cost of approximately $21,000 compared with under $10,000 for those without CHD.

Figure 20: No CHD Entitlement Claims per 1000 People by Injury Diagnosis, 2008/09 Financial Year

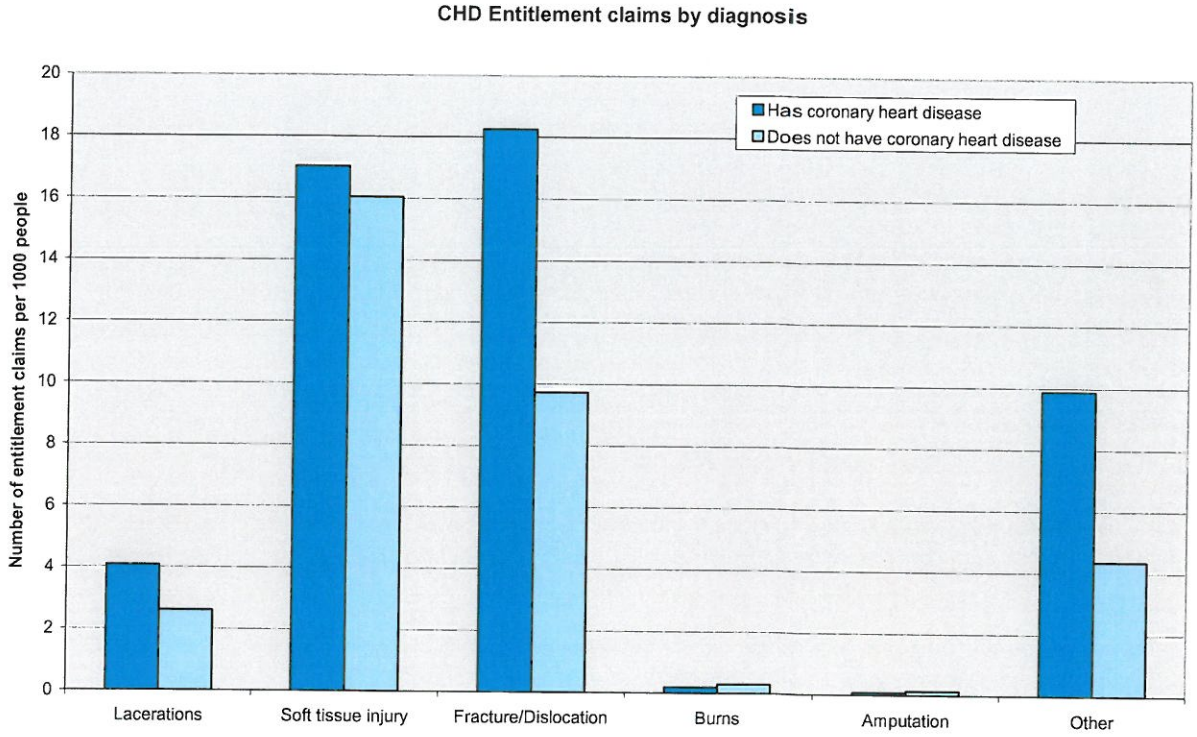
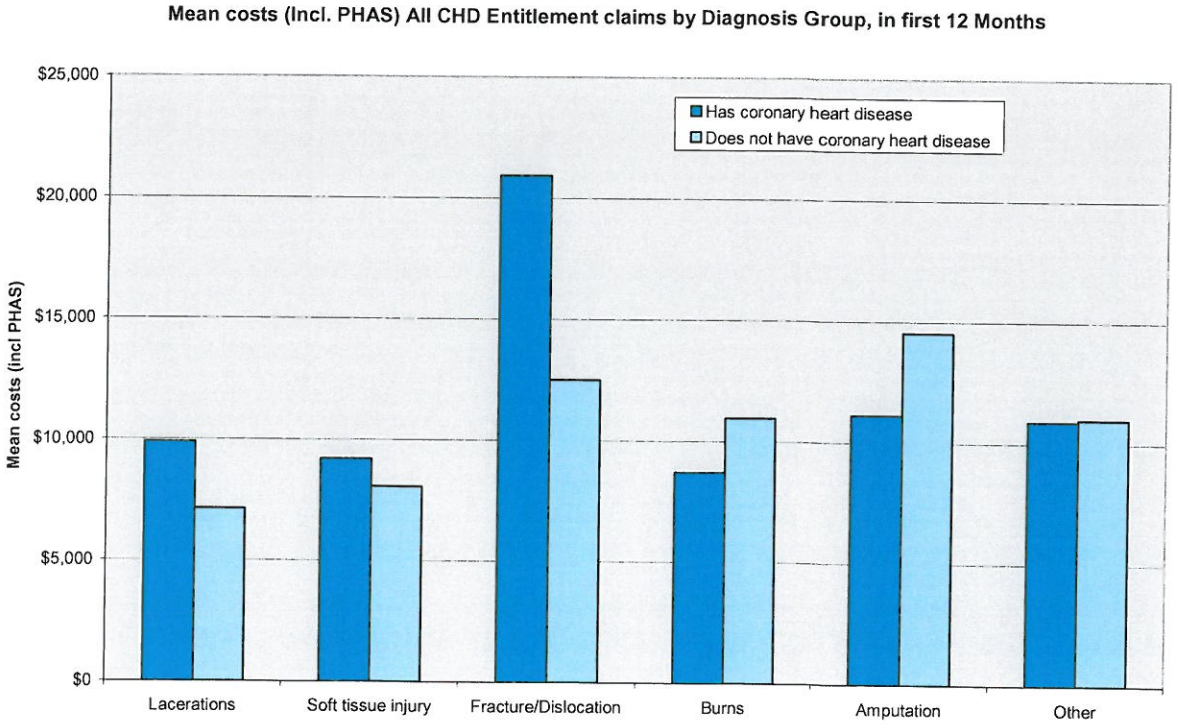


Figure 21: Mean Cost of CHD Entitlement Claims by Injury Diagnosis Group, 2008/09 Financial Year



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CHD and Type Injury Event: Falls

- The Entitlement claim rate for falls is shown in Figure 22 below. The figure shows a marked age gradient and differences between the sexes. Females aged 80 years and over with coronary heart disease have significantly higher claim rates at over 50 entitlement claims per 1000 people compared to all other population groups. The next highest claiming groups are females aged 65-79 and males aged 80 years and over with coronary heart disease, and then women aged 80 years and over without the condition.

- In addition to the extra claims utilisations associated with CHD, there are higher costs at both the 6 and 12 month time points for all age groups and both sexes (Figure 23 and Figure 24). Depending sex and age group, the extra costs are typically in the range of $2,000 to $5,000 per claim, and increase with time.

- It is also interesting to note that the cost of claims, irrespective of the presence of CHD, increases with age-group.

- As observed earlier, CHD is associated with increased duration of Entitlement claims in the working age groups, but this decreases with age (**Figure 25**).

Figure 22: CHD Falls Related Entitlement Claims per 1000 people, 2008/09 Financial Year

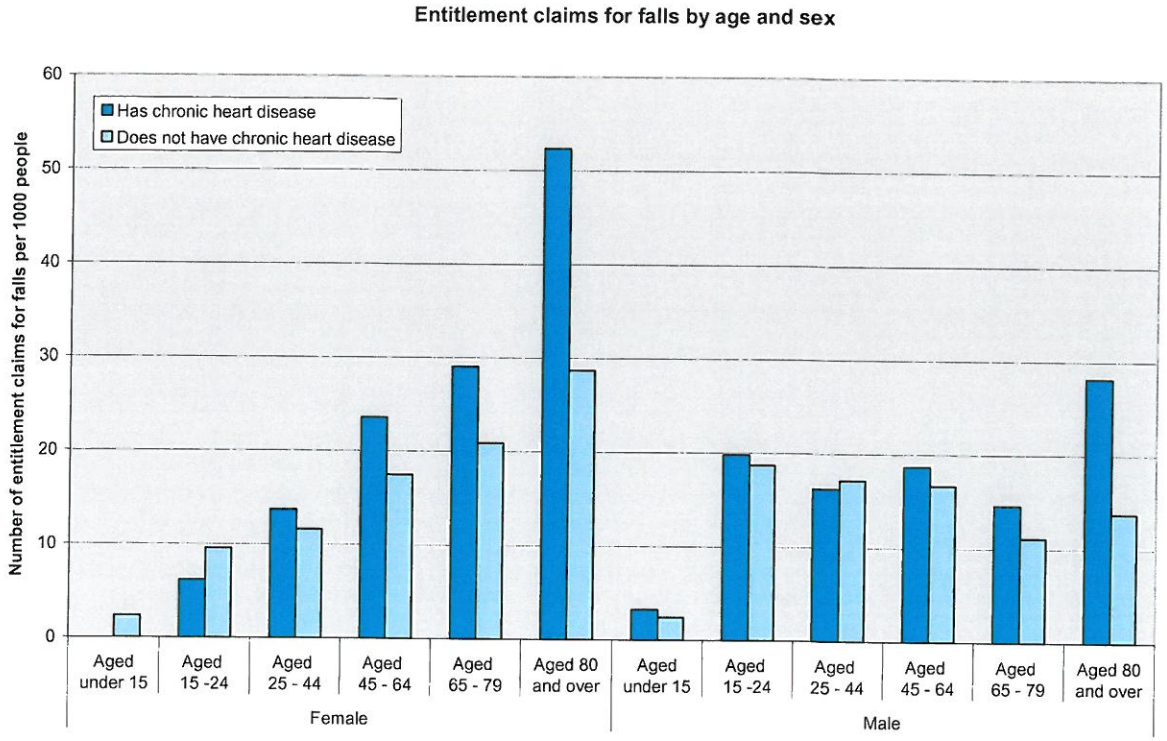

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Figure 23: Mean CHD Falls Related Entitlement Costs (Incl. PHAS), first 6 months, 2008/09 Financial Year

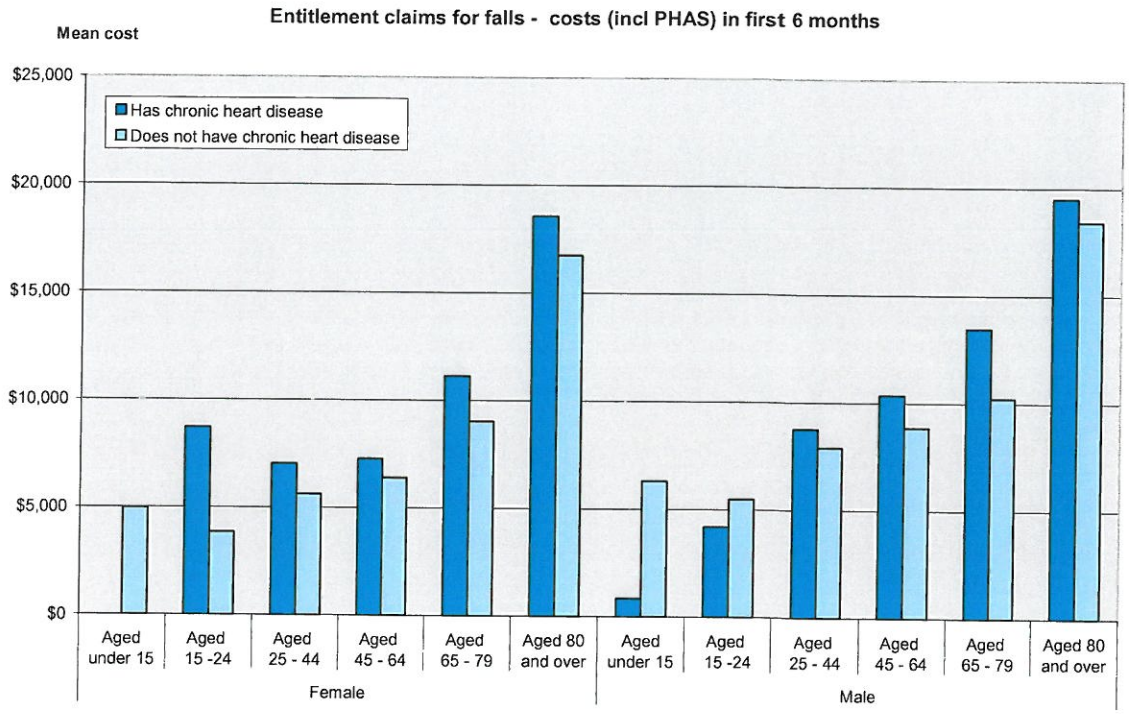

Figure 24: Mean CHD Falls Related Entitlement Costs (Incl. PHAS), first 12 months, 2008/09 Financial Year, Sex and Age

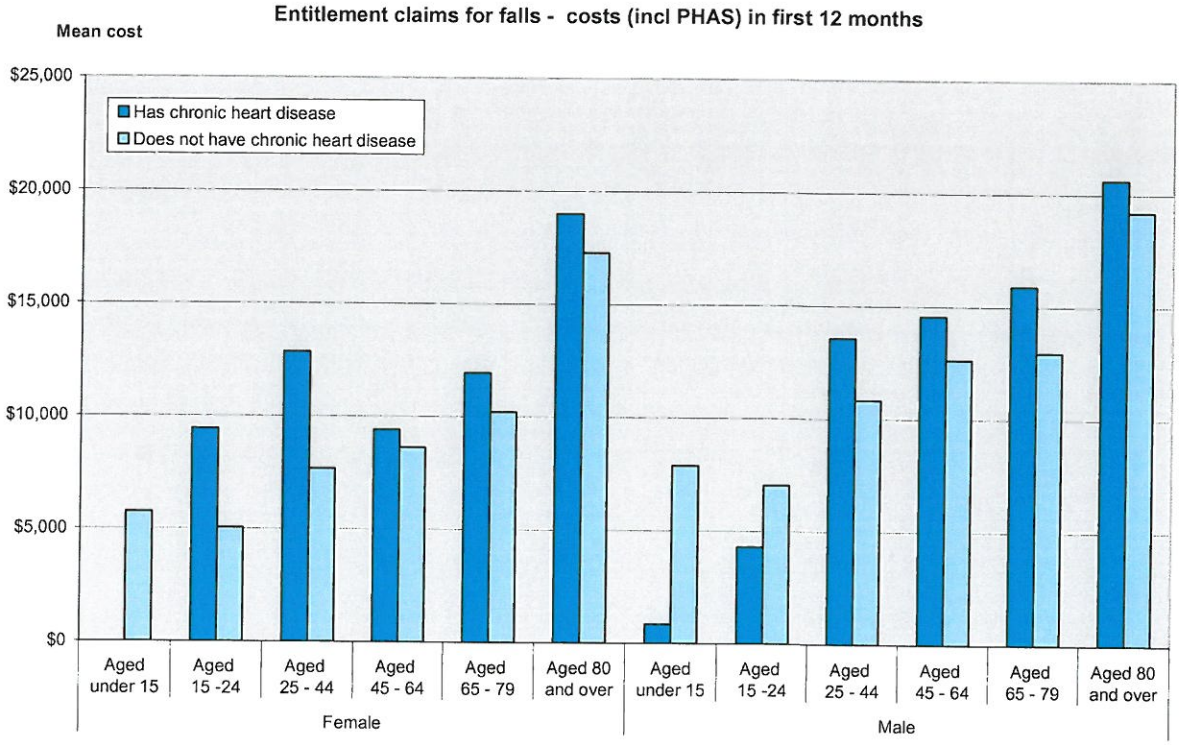

Figure 25: Mean Duration of CHD Falls Related Entitlement Claims, 2008/09 Financial Year, Sex and Age