

## 1.7 Disease categories used in the DCIS

Disease is classified using the International Classification of Diseases, Ninth Revision, Clinical Modification (or ICD-9-CM). The list of diseases costed for 1993–94 is based on the minimum set needed to cost each chapter of ICD-9 in total and to initially explicitly cost sub-chapter-level disease groups for cardiovascular disease and cancer. Where other classifications of disease are encountered, such as the International Classification of Primary Care (ICPC), these are mapped across to the ICD-9-CM.

### 1.7.1 Chapter-level disease categories

The disease categories used for costing disease at the chapter level of ICD-9-CM are defined in Table 1.4. This table also specifies the ICPC codes and the National Health Survey condition codes mapped to each chapter. Costs are split between two categories for each chapter – treatment and prevention. There are also general categories for treatment (disease unspecified) and prevention (general health examinations and screening) in the eighteenth category, 'Other contact with health services'.

### 1.7.2 Disease categories used for cancer costs

Cancers have been classified by site according to ICD-9 (Table 1.5). For most of the costs reported for 1993–94, cancer sites are defined to include malignant neoplasms, benign neoplasms, in situ neoplasms and neoplasms of uncertain behaviour, since much of the cost associated with screening and treatment of benign and in situ neoplasms is associated with excluding malignancy.

The term 'cancer' is generally used to refer to invasive (malignant) neoplasms and excludes in situ carcinomas, benign neoplasms and neoplasms of uncertain behaviour. The most common cancer in Australia is non-melanocytic skin cancer. Incidence data for this cancer are not collected on a routine basis by cancer registries and are often excluded from statistics relating to 'cancers'.

The categories used for costing neoplasms by site and type are defined in Table 1.5. Where other classifications of disease are encountered (such as the ICPC), these are mapped across to the ICD-9 codes. ICPC code mappings for individual cancer sites are documented in Appendix A of the report on cancer costs (Mathers et al. 1998). Costs are split between two categories for each type of neoplasm – treatment and prevention. For some cancers, screening and diagnostic tests may not be specific to a particular site, or indeed to cancer as opposed to other diseases. This problem arises because the ICPC is based on organ system rather than diagnosis and it is not always possible to know whether diagnostic tests for a body system (for example, respiratory system, digestive system) relate to cancer or other diseases. Additionally, the ICPC codes do not always distinguish between preventive and diagnostic screening. As a result, some cancer prevention activities in primary care will be costed in the general prevention category and the general treatment category (in the 'Other' category of Table 1.4) and will not be included in the cancer costs reported for specific sites or for all cancers).

For final reporting of costs of disease at sub-chapter level, expenditure for the 'Unspecified sites' category is distributed pro rata to the specific site categories.

**Table 1.4 : Classification system for diseases and injury at chapter level of ICD-9, 1993-1994**

DCIS group ICD chapter	ICD-9	ICPC	NHS
<b>1. Infections and parasitic diseases</b>			
1.1 Treatment	001-139, V71.2, V12.0	A70-A78, A92, B90, D22, D70-D73, F86, N70, N71, <sup>(a)</sup> N72, R70-R72, S03, S70-S76, S95, T70, X70-X73, X90-X91, Y70-Y72, Y75, <sup>(b)</sup> Y76	043, 044, 045
1.2 Prevention and screening	V01-V07, V18.8, V64.0, V73-V75	A44, D44, N44, R44, B25, X23, Y25	083, 074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>2. Cancers</b>			
2.1 Treatment	140-239, V58.0, V58.1, V66.1, V66.2, V67.1, V67.2, V71.1, V10, V15.3	A79, B72-B75, D75-D78, F74, H75, K72, L71, N74-N76, R84-R86, S77-S82, T71-T73, U75-U79, W72, X75-X81, Y77-Y79	073
2.22 Prevention and screening	V16, V76	A26, B26, D26, L26, N26, R26, S26, T26, U26, X25, X26, Y26	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>3. Endocrine, nutritional, metabolic and immunity disorders</b>			
3.1 Treatment	240-279, V12.1, V12.2	T11, T12, T15, T28, T81-T99	001, 002, 078, 106, 003, 108, 004
3.2 Prevention and screening	V18.0, V18.1, V77	T27	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>4. Diseases of blood and blood-forming organs</b>			
4.1 Treatment	280-289, V12.3	B71, B78, B79, <sup>(i)</sup> B80-B84, B99	046
4.2 Prevention and screening	V18.2, V18.3, V78	B27	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>5. Mental disorders</b>			
5.1 Treatment	290-319, V11, V15.4, V40, V65.2, V66.3, V67.3, V71.0	N02, P01-P03, P06-P19, P21-P24, P28, P50-P59, P63-P69, P29, P70, <sup>(c)</sup> P71-P99, T06	005, 006, 205, 206, 306
5.2 Prevention and screening	V17.0, V18.4, V79	P27	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>6. Diseases of the nervous system and sense organs</b>			
6.1 Treatment	320-389, V12.4, V41, V43.0, V43.1, V53.0, V53.1, V53.2	F01-F18, F28, F29, F70-F73, F82-F85, F91-F99, H01-H13, H28, H29, H70-H74, H77, H81-H99, N04, N71, <sup>(d)</sup> N73, N86-N99, P70, <sup>(e)</sup> N28	007, 008, 009, 010, 011, 012, 013, 014, 086, 107, 109, 110
6.2 Prevention and screening	V17.2, V19.0-V19.3, V72.0-V72.1, V80	F27, H27, N27	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>7. Cardiovascular diseases</b>			
7.1 Treatment	390-459, V12.5, V15.1, V42.1, V42.2, V43.2, V43.3, V43.4, V45.0, V45.8, V53.3, V71.7	K28-K29, K70, K71, K74-K80, K82, K83, K84, K86-K96, K99	015, 016, 017, 018, 019, 072, 082, 119, 182, 219
7.2 Prevention and screening	V17.1, V17.3, V17.4, V81.0, V81.1, V81.2	K24-K27	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>8. Respiratory system diseases</b>			
8.1 Treatment	460-519, V12.6	R09, R73-R83, R90-R97, R99	020, 021, 022, 023, 071, 075, 081, 084
8.2 Prevention and screening	V17.5, V17.6, V81.3, V81.4	R27	074, <sup>(w)</sup> 097 <sup>(x)</sup>

(continued)

**Table 1.4 (continued): Classification system for diseases and injury at chapter level of ICD-9, 1993-1994**

DCIS group ICD chapter	ICD-9	ICPC	NHS
<b>9. Digestive system diseases</b>			
9.1 Treatment	520-579, V12.7, V53.4, V58.5	D02, D04, D11, D12, D14-D16, D20, D28, D82-D95, D97-D99, L07, D19	024, 025, 026, 027, 029, 030
9.2 Prevention and screening	V18.5, V72.2	D27	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>10. Genitourinary system diseases</b>			
10.1 Treatment	580-629, V13.0, V13.2, <sup>(p)</sup> V42.0, V45.1, V56	U04, <sup>(q)</sup> U06, U28, U70-U72, U88-U95, U99, X01-X09, X10-X15, X16, <sup>(h)</sup> X18-X21, X74, X84, X85, X87, X88, X89, X99, Y01, Y02, Y04-Y07, Y10, Y16, Y29, Y73-Y75, <sup>(i)</sup> Y81, Y85, Y86, Y99, W15	031, 032, 033, 085
10.2 Prevention and screening	V18.6, V18.7, V72.3, V81.5, V81.6	U27, X24, X27, Y24, Y27	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>11. Complications of pregnancy, childbirth and the puerperium</b>			
11.1 Treatment	630-676, V13.1, V13.2 <sup>(p)</sup>	W03, W05, W17-W20, W28, W29, W70, W71, W73, W76, W77, W80-W84, W92-W99, W32-W44, W46, W47, W50-W59, W63-W69	047, 087 <sup>(y)</sup>
<b>12. Skin and subcutaneous tissue diseases</b>			
12.1 Treatment	680-709, V13.3	B70, D05, S02, S9-S11, S20, S22-S24, S29, S84-S94, S96-S99, X16 <sup>(p)</sup>	034, 035, 036, 037
12.2 Prevention and screening	V19.4, V82.0	S27	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>13. Musculoskeletal system and connective tissue diseases</b>			
13.1 Treatment	710-739, V13.4, V13.5, V54	L01-L03, L08-L20, L28, L29, L70, L83-L95, L97-L99	038, 039, 040, 042, 070, 089, 111, 112
13.2 Prevention and screening	V17.7, V17.8, V82.1, V82.2	L27	074, <sup>(w)</sup> 097 <sup>(x)</sup>
<b>14. Congenital anomalies</b>			
14.1 Treatment	740-759, V13.6	A90, B79, <sup>(m)</sup> D81, F80, F81, H80, K73, L82, N85, R89, S83, T78, T80, U85, X83, Y82-Y84	048
14.2 Prevention and screening	V19.5, V19.7, V82.3, V82.4		
<b>15. Perinatal problems</b>			
15.1 Treatment	760-779, V13.7	A93, A94, B79 <sup>(n)</sup>	
<b>16. Symptoms, signs and ill-defined conditions</b>			
16.1 Treatment	780-799	A01-A11, A14, A29, A91, A95, A96, B02-B04, B28, B29, B85-B87, D01, D03, D06-D10, D13, D17, D18, D21, D24, D25, D29, D96, K01, K02-K07, K81, K85, L04-L06, N01, N03, N05-N19, N29, P04, P05, P20, R01-R08, R21, R22, R23, R24, R25, R29, R98, S01, S04-S08, S21, S28, T01-T05, T07-T10, T29, U01-U02, U04, <sup>(k)</sup> U05, U07, U13, U14, U29, U98, X17, X28, X29, X86, Y03, Y08, Y28	051, 052, 053, 054, 055, 056, 057, 058, 059, 060, 061, 062, 064, 080

(continued)

**Table 1.4 (continued): Classification system for diseases and injury at chapter level of ICD-9, 1993-1994**

DCIS group ICD chapter	ICD-9	ICPC	NHS
<b>17. Injury and poisoning</b>			
17.1 Treatment	E800-E999, V14, V15.0, V15.5, V15.6, V66.4, V67.4, V71.3, V71.4, V71.5, V71.6	A12, A13, A80-A88, B76, B77, D79-D80, F75-F79, H76, H78, H79, L72-L81, L96, N79-N81, R87-R88, S12-S19, U80, W75, X82, Y80	049, 050
17.2 Prevention and screening	V82.5		
<b>18. Other contact with health services</b>			
18.1 Fertility control, reproduction, development	V15.7, V20-V28, V30-V39, V45.5, V72.4	W01-W02, W10-W14, W27, W30, W31, W45, W48, W49, W60-W62, W78, W79, W90, W91, Y13, Y14	087, <sup>(y)</sup> 074, <sup>(w)</sup> 097, <sup>(z)</sup> 076
18.2 Elective plastic surgery	V50	H15	
18.3 General prevention, screening, health examination	V19.8, V19.6, V60, V61, V62, V65.3, V65.4, V68, V70, V72.5, V72.6, V72.7, V72.8-V72.9, V82.6, V82.8, V82.9	A97, P25, Z01-Z29; _30: _31, _45, _48: _49, _60: _62 (where _ is all letters except W)	077, <sup>(z)</sup> 091, 074, <sup>(w)</sup> 097 <sup>(x)</sup>
18.4 Treatment and aftercare, unspecified disease	V13.8, V13.9, V15.2, V15.8, V15.9, V42.3-V42.9, V43.5-V43.8, V44, V45.2, V45.3, V45.4, V45.6, V46-V49, V51, V52, V53.5-V53.9, V55, V57, V58.2-V58.4, V58.8, V58.9, V59, V63, V64.1-V64.3, V65.0, V65.1, V65.5, V65.8, V65.9, V66.0, V66.5-V66.9, V67.0, V67.5, V67.6, V67.9, V71.8, V71.9	A89, A32-A43, A46, A47, D32-D43, D46, D47, N32-N43, N46, N47, R28, R32-R43, R46, R47; _32: _44, _46, _47 (where _ is B, F, H, K, L, P, S, T, U, X, Y, Z) _50: _59, _63: _69 (where _ is all letters except P, W)	077, <sup>(z)</sup> 092, 074 <sup>(w)</sup>

- (a) N71 also includes 320-323.
- (b) Y75 also includes 607.1, so 50% assigned here.
- (c) P70 also includes Alzheimers disease.
- (d) N71 also includes 036, 047, 062-064, so 50% assigned here.
- (e) P70 also includes 290, was assigned to dementia.
- (g) U04 also includes 788.3, so 50% assigned here.
- (h) X16 also includes 698.1, so 50% assigned here.
- (i) Y75 also includes 112.2, so 50% assigned here.
- (j) X16 also includes 624.9, so 50% assigned here.
- (k) U04 also includes 625.6, so 50% assigned here.
- (l) B79 also includes congenital anomalies and perinatal problems, so assigned 1/3 here.
- (m) B79 also includes blood diseases and perinatal problems, so assigned 1/3 here.
- (n) B79 also includes blood diseases and congenital anomalies, so assigned 1/3 here.
- (p) Part of the ICPC code, attributed to DCIS categories in proportion to hospital inpatient costs.
- (w) 074 is distributed among prevention categories and category 18.4 in proportion to total treatment costs for those categories.
- (x) 097 is distributed equally among all prevention categories in proportion to total treatment costs for those categories.
- (y) 087 is distributed equally between categories 11.1 and 18.1.
- (z) 077 is distributed equally between categories 18.3 and 18.4.

**Notes**

1. ICPC codes for non-specific symptoms/diseases (A0, A00, A15-A25, A27, A28, A99) are excluded from the database prior to analysis. This effectively distributes their encounters (where no other diagnosis specified) pro rata to all other categories.
2. NHS categories 041, 090, 098, 102, 103, 104, 105, 113 and 998 are excluded from the calculations, effectively distributing them pro rata across all categories.

### 1.7.3 Categories used for cardiovascular disease

Disease categories used at the sub-chapter level for cardiovascular disease are defined in Table 1.6. Unlike cancer, prevention and screening costs are treated as a single category and not apportioned to disease groups at the sub-chapter level.

For final reporting of costs of disease at sub-chapter level, expenditure for the 'Unspecified treatment and aftercare' category 7.9 is allocated pro rata to disease-specific categories within the chapter.

**Table 1.5: Classification of cancer sites in terms of ICD-9 codes for neoplasms**

Cancer site	Malignant neoplasms	Benign, in situ and of uncertain behaviour	Prevention activities
Head and neck <sup>(a)</sup>	140–149	210, 212.0, 230.0, 235.0, 235.1	V76.42
Oesophagus	150	211.0, 230.1, 235.5, <sup>(b)</sup> 239.0 <sup>(b)</sup>	
Stomach	151	211.1, 230.2, 235.2, 239.0 <sup>(b)</sup>	
Colorectal <sup>(b)</sup>	153–154	211.3, 211.4, 230.3–230.6, 239.0 <sup>(b)</sup>	V76.41
Liver	155	211.5, 230.8, 235.3	
Pancreas	157	211.6–211.7, 235.5, <sup>(b)</sup> 239.0 <sup>(b)</sup>	
Lung <sup>(c)</sup>	162	212.2, 212.3, 231.1, 231.2, 235.7, 239.1	V16.1, V76.0
Melanoma	172	216, <sup>(d)</sup> 232, <sup>(d)</sup> 238.2 <sup>(d)</sup>	V76.43
Non-melanoma skin <sup>(d)</sup>	173	216, <sup>(d)</sup> 232, <sup>(d)</sup> 238.2 <sup>(d)</sup>	
Breast <sup>(e)</sup>	174	217, <sup>(b)</sup> 233.0, 238.3, 239.3	V16.3, V76.1
Cervix	180	219.0, 219.9, 233.1–233.2, 236.0 (50%)	V76.2
Uterus	179, 182	218, 219.1–219.8, 236.0 (50%)	
Ovary	183	220, 233.3, 236.2	
Prostate	185	222.2, 233.4, 236.5	
Bladder	188	223.2, 223.3, 233.7, 236.7, 236.99, 239.4	V76.3
Kidney	189.0, 189.1	223.0–223.1, 236.91	V16.5
Brain & CNS <sup>(f)</sup>	191–192	225, 237.5, 239.6	
Lymphoma <sup>(g)</sup>	200–203	228, 229, 238.5–238.6	V16.7
Leukaemia	204–208	238.7	V16.6
Other neoplasms	Balance 140–208	Balance 210–239	Balance V16, V76
Unspecified sites <sup>(h)</sup>	V58.0, V58.1, V66.1, V66.2, V67.1, V67.2, V71.1, V10, V15.3		V16.9, V76.9

(a) Includes neoplasms of the lip, oral cavity and pharynx.

(b) Includes neoplasms of the colon and rectum (bowel).

(c) Includes neoplasms of the trachea, bronchus and lung.

(d) Includes all neoplasms of the skin apart from melanoma.

(e) Includes female breast cancer only. Male breast cancer is included in the category 'Other neoplasms'.

(f) Includes all neoplasms of the brain and nervous system.

(g) Includes Hodgkin's disease, non-Hodgkin's lymphoma and multiple myeloma.

(h) Costs in this category are distributed pro rata across the site-specific categories for this report.

(p) Codes that fall across several categories are distributed in proportion to costs for malignant neoplasms for those sites.

(q) Costs apportioned to melanocytic and non-melanocytic neoplasms in proportion to the costs for malignant neoplasms.

**Table 1.6: Classification system for cardiovascular disease, 1993–1994**

DCIS sub-group	ICD-9	ICPC
7.1 Rheumatic heart disease	390–398	K71
7.2 Hypertensive disease	401–405	K86, K87
7.3 Ischaemic heart disease	410–414	K74–K76
7.4 Diseases of pulmonary circulation	415–417	K82, K93
7.5 Other forms of heart disease	420–429	
– cardiac dysrhythmias	426–427	K78–K80, K84 <sup>(n)</sup>
– heart failure	428–429	K77
– other	420–425	K70, K84, <sup>(n)</sup> K83
7.6 Cerebrovascular disease	430–438	K89, K90
7.7 Diseases of arteries, arterioles and capillaries	440–448	K91, K92, K99 <sup>(n)</sup>
– atherosclerosis	440	K91
– peripheral vascular	441–444	K92
– other	446–448	K99 <sup>(n)</sup>
7.8 Diseases of veins, lymphatics and other diseases of the circulatory system	451–459	K88, K94–K96, K99 <sup>(n)</sup>
7.9 Unspecified treatment and aftercare	V12.5, V15.1, V42.1, V42.2, V43.2, V43.3, V43.4, V45.0, V45.8, V53.3, V71.7	K28–K29
7.10 Prevention and screening	V17.1, V17.3, V17.4, V81.0, V81.1, V81.2	K24–K27

## 1.8 Results

The health system costs of disease and injury in Australia in 1993–94 are summarised at the broad disease group level according to ICD-9 chapters (Table 1.7). They are ranked in descending order of total costs. Digestive system diseases are the second most expensive group, following cardiovascular diseases, in part because of the large expenditure on dental services, included in the ‘Allied health services’ sector. It is interesting to note that mental disorders and musculoskeletal disorders, which include many long-term chronic disorders with relatively low fatality rates, rank highly in the direct cost estimates.

More detailed results for disease costs in 1993–94 will be published by the Institute during 1998 in the following reports:

- *Health System Costs of Disease and Injury in Australia 1993–94*
- *Health System Costs of Cancer in Australia 1993–94*
- *Health System Costs of Cardiovascular Disease and Diabetes in Australia 1993–94.*

**Table 1.7: Health system costs for cancers and other diseases, by ICD-9 chapter and health sector, 1993-94 (\$ million)**

ICD-9 chapter	Total costs	Hospitals <sup>(a)</sup>	Medical <sup>(b)</sup>	Pharmaceuticals	Allied health services	Nursing home	Other <sup>(c)</sup>
Circulatory	3,719	1,657	503	715	40	587	218
Digestive <sup>(d)</sup>	3,715	1,070	284	275	1,849	35	202
Musculoskeletal	3,002	1,207	518	276	416	430	154
Injury	2,601	1,663	393	127	160	112	146
Mental	2,586	1,007	432	198	83	718	147
Respiratory	2,521	833	624	784	37	107	135
Nervous system	2,334	766	431	248	227	503	159
Cancer	1,904	1,327	261	53	12	32	219
Genitourinary	1,662	997	383	143	17	32	90
Symptoms	1,334	478	426	302	57	5	66
Complications of pregnancy	1,051	941	32	11	6	0	60
Endocrine	966	235	222	309	54	47	98
Skin	956	336	247	259	56	6	53
Infectious	849	246	316	193	15	13	65
Perinatal	239	221	1	0	0	3	14
Blood	192	101	42	24	1	5	18
Congenital	159	116	18	2	0	13	8
Other <sup>(e)</sup>	1,607	859	505	122	44	0	77
<b>Total</b>	<b>31,397</b>	<b>14,062</b>	<b>5,640</b>	<b>4,042</b>	<b>3,075</b>	<b>2,647</b>	<b>1,932</b>

(a) Public and private acute hospitals, repatriation hospitals and psychiatric hospitals. Includes hospital non-inpatient costs.

(b) Medical services for private patients in hospitals are included under 'Hospitals'.

(c) Includes breast, cervix, lung and skin cancer public health programs, research and other institutional, non-institutional and administration expenditure. Does not include other public health services, community health services, ambulances, or medical aids and appliances.

(d) Dental costs are classified to Diseases of the Digestive System and included under the Allied Health Services sector.

(e) Other contact with health services: fertility control, reproduction and development, cosmetic surgery, general health examination, and treatment for unspecified disease.

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# 2 Hospital inpatients

## 2.1 Summary

This methodology estimates acute hospital inpatient costs by disease category, age and sex by apportioning the total inpatient expenditure to individual episodes of hospitalisation, with an adjustment for resource intensity of treatment for the specific episode (using diagnosis related groups (DRGs)). Medical costs for private, compensable and other non-public patients in public and private hospitals are estimated for age-sex-disease groups using a set of private medical weights for DRGs and age-sex-specific information from the Health Insurance Commission on in-hospital private medical charges for various categories of service.

Public psychiatric hospital data for New South Wales and Victoria are used to allocate public psychiatric hospital inpatient costs to disease, age and sex.

### Box 2.1: Key assumptions and limitations

- *The proportion of total public acute hospital expenditure that relates to inpatients is given by the inpatient fractions estimated for each State and Territory by the National Health Ministers' Benchmarking Working Group.*
- *The cost of inlier days for a hospital episode is proportional to the DRG weight for that episode, using AN-DRG-1 or AN-DRG-2 national cost weights for public hospitals, repatriation hospitals and private hospitals.*
- *The average medical cost component included in AN-DRG cost weights relates entirely to public patients.*
- *Half of the average pathology and imaging costs per DRG relate entirely to public patients, the other half relate to all patients.*
- *Outlier days of hospital inpatient stays are low cost 'nursing care' days.*
- *The average cost per outlier bed day is \$110, based on the figure used in the Victorian casemix funding formula.*
- *In-hospital private medical expenditures are assumed to vary with DRG in accordance with the DRG cost weight components shown in Table 2.5 for the various categories of medical service.*
- *Medical charges for compensable and ineligible hospital inpatients are assumed to be the same as those for a private patient in the same DRG and type of hospital.*
- *The components of the DRG hospital cost weight that are assumed to be independent of length of stay are theatre, critical care, pathology, imaging and those components of medical cost relating to obstetrics, surgery, anaesthetics and assisting at operations. The components assumed proportional to length of stay are nursing, drugs, catering, depreciation (private hospitals), other medical costs and other costs.*
- *Inpatient casemix for public psychiatric hospitals in New South Wales and Victoria is representative of the national casemix.*
- *All inpatient bed days in public psychiatric hospitals have the same average cost.*