Appendix

Appendix tables

Table A1: Supply of cardiovascular medicines in selected OECD countries, 2004

	Medicine class							
Country	**ARA**	**CCB**	**BBA**	**DIU**	**AHYP**	**ART**	**GLY**	**CHOL**
				DDD/1,000 population/day				
Australia	146.9	77.0	25.5	39.4	5.2	2.2	5.3	161.8
Belgium	91.3	40.4	66.6	43.7	5.4	8.0	5.0	104.1
Czech Republic	105.1	69.9	71.3	95.5	12.2	5.6	7.1	65.0
Denmark[(a)]	85.1	46.2	29.9	111.5	2.7	1.6	6.3	67.2
Finland[(a)]	125.3	48.3	68.1	61.9	1.7	1.8	6.6	81.7
Germany[(b)]	143.8	48.8	67.6	65.9	11.6	2.3	10.1	57.3
Greece	149.4	68.6	30.7	35.7	6.7	5.5	9.9	84.0
Iceland	80.9	31.5	46.4	67.3	1.4	3.3	3.2	75.2
Norway[(a)]	99.1	46.6	39.4	45.4	n/a	1.3	4.4	110.0
Portugal[(c)]	109.7	37.0	18.3	42.4	0.3	7.3	6.8	71.1
Slovak Republic	88.8	63.3	42.8	31.7	10.7	4.3	6.6	31.5
Sweden[(a)]	85.6	40.7	54.7	87.3	1.9	1.1	6.5	75.2

ARA agents acting on renin–angiotensin system
CCB calcium-channel blockers
BBA beta-blocking agents
DIU diuretics
AHYP antihypertensives
ART antiarrhythmics
GLY cardiac glycosides
CHOL serum-lipid-reducing agents
n/a not available

(a) Data for Denmark, Finland, Norway and Sweden cover supply of medicines in the community and in hospitals.
(b) Data for Germany refer to health insured persons only.
(c) Data for Portugal does not include medicines supplied to civil servants, army and police.

Note: Data shown here refer to prescription medicines supplied in the community. It does not include medicines supplied in hospital unless otherwise specified above.

Source: OECD Health Data 2006.

Table A2: Persistence with medicines by region of patient residence

Medicine class	Proportion of patients persistent at:			
	6 months		24 months	
Region of residence	Males	Females	Males	Females
	% (95% CI)			
HMG CoA reductase inhibitors (statins)				
Metropolitan	82.17 (81.99–82.34)	82.79 (82.61–82.97)	62.51 (62.25–62.77)	63.62 (63.35–63.89)
Rural	85.14 (84.92–85.36)	85.61 (85.38–85.84)	68.35 (68.00–68.69)	68.92 (68.56–69.28)
Remote	82.47 (81.49–83.40)	82.09 (80.99–83.14)	62.76 (61.26–64.22)	61.97 (60.30–63.60)
Angiotensin II antagonists (plain)				
Metropolitan	87.38 (87.10–87.65)	88.49 (88.27–88.70)	71.82 (71.34–72.29)	74.21 (73.84–74.58)
Rural	89.73 (89.40–90.05)	90.41 (90.14–90.67)	76.36 (75.77–76.94)	78.70 (78.23–79.16)
Remote	86.99 (84.98–88.75)	89.71 (88.11–91.11)	72.98 (69.65–76.01)	75.94 (73.19–78.45)
Angiotensin II antagonists (combin.)				
Metropolitan	88.82 (88.41–89.22)	90.87 (90.57–91.16)	75.59 (74.89–76.27)	78.65 (78.13–79.16)
Rural	91.92 (91.41–92.40)	92.76 (92.37–93.13)	81.13 (80.24–81.99)	83.16 (82.49–83.80)
Remote	88.78 (85.50–91.35)	91.49 (89.08–93.39)	80.60 (76.02–84.40)	84.05 (80.41–87.07)
ACE inhibitors (plain)				
Metropolitan	87.56 (87.32–87.79)	88.03 (87.81–88.25)	72.74 (72.34–73.13)	74.23 (73.85–74.61)
Rural	89.27 (89.00–89.53)	89.65 (89.38–89.91)	76.55 (76.09–77.00)	77.84 (77.38–78.30)
Remote	84.47 (83.05–85.78)	84.98 (83.54–86.30)	68.41 (66.14–70.57)	68.64 (66.26–70.89)
ACE inhibitors (combin.)				
Metropolitan	88.68 (88.06–89.27)	90.83 (90.34–91.29)	75.02 (73.92–76.08)	78.48 (77.56–79.36)
Rural	91.24 (90.52–91.91)	92.68 (92.09–93.22)	80.98 (79.70–82.19)	83.03 (81.93–84.07)
Remote	84.91 (80.65–88.30)	87.48 (84.03–90.23)	71.88 (65.14–77.54)	76.65 (71.31–81.13)
Beta-blocking agents				
Metropolitan	73.96 (73.60–74.32)	74.14 (73.80–74.48)	51.09 (50.57–51.61)	51.41 (50.92–51.90)
Rural	76.67 (76.24–77.10)	76.98 (76.56–77.39)	54.54 (53.91–55.17)	56.05 (55.44–56.65)
Remote	74.52 (72.48–76.44)	77.36 (75.33–79.25)	53.70 (50.83–56.48)	55.32 (52.31–58.22)
Warfarin				
Metropolitan	82.55 (82.05–83.03)	83.97 (83.50–84.43)	53.45 (52.52–54.37)	57.33 (56.40–58.25)
Rural	84.17 (83.57–84.75)	85.24 (84.61–85.85)	57.36 (56.21–58.50)	60.69 (59.42–61.93)
Remote	80.44 (77.19–83.28)	83.43 (79.88–86.41)	50.64 (44.99–56.01)	55.36 (48.48–61.69)
Other antithrombotic agents[(a)]				
Metropolitan	89.71 (89.44–89.97)	89.65 (89.33–89.96)	75.05 (74.56–75.54)	75.34 (74.77–75.90)
Rural	90.69 (90.33–91.04)	90.82 (90.39–91.24)	77.66 (77.00–78.31)	78.16 (77.38–78.91)
Remote	89.06 (87.20–90.66)	89.75 (87.42–91.67)	76.88 (73.76–79.68)	74.30 (70.07–78.03)

(a) Includes clopidogrel, dipyridamole and ticlopidine.

Notes

1. The study included newly prescribed patients only.
2. Rates age standardised to the Australian population at 30 June 2001.
3. Region of residence of patients was determined at the time of their first prescription being dispensed.

Source: AIHW analysis of data supplied by DoHA from the Pharmaceutical Benefits Data System.

Table A3: Prescriptions supplied to newly prescribed patients by socioeconomic level

Medicine class	Least disadvantaged group	Most disadvantaged group	Rate ratio
	Rate per 100,000 (95% CI)		
HMG COA reductase inhibitors (statins)			
Males	416.0 (412.8–419.1)	471.7 (468.3–475.2)	1.13
Females	363.8 (360.9–366.8)	461.5 (458.1–464.9)	1.27
Other antithrombotic agents[(a)]			
Males	122.7 (121.0–124.4)	128.4 (126.6–130.2)	1.05
Females	83.0 (81.6–84.3)	89.7 (88.1–91.2)	1.08

(a) Includes clopidogrel, dipyridamole and ticlopidine.

Notes

1. The study included newly prescribed patients only.
2. Socioeconomic level coded according to SEIFA. Rates shown for Level 1 (least disadvantaged) and Level 5 (most disadvantaged). For details see Methods section.
3. Rates age standardised to the Australian population at 30 June 2001.
4. The rate ratio is calculated as the rate in the most disadvantaged group divided by the rate in the least disadvantaged group.

Source: AIHW analysis of data supplied by DoHA from the Pharmaceutical Benefits Data System.

Table A4: Persistence with medicines by level of socioeconomic disadvantage

	Proportion of patients persistent at:			
	6 months		24 months	
Medicine class	Least disadvantaged	Most disadvantaged	Least disadvantaged	Most disadvantaged
	% (95% CI)			
HMG COA reductase inhibitors (statins)				
Males	83.15 (82.85–83.45)	81.72 (81.42–82.02)	63.64 (63.18–64.10)	62.80 (62.35–63.25)
Females	83.81 (83.50–84.12)	82.21 (81.91–82.51)	65.16 (64.86–65.63)	63.01 (62.55–63.46)
Other antithrombotic agents[(a)]				
Males	89.43 (88.95–89.89)	90.21 (89.75–90.65)	74.96 (74.08–75.82)	75.75 (74.89–76.58)
Females	89.56 (89.00–90.10)	89.41 (88.83–89.96)	75.66 (74.67–76.62)	75.34 (74.33–76.32)

(a) Includes clopidogrel, dipyridamole and ticlopidine.

Notes

1. The study included newly prescribed patients only.
2. Socioeconomic level coded according to SEIFA. For details see Methods section.

Source: AIHW analysis of data supplied by DoHA from the Pharmaceutical Benefits Data System.

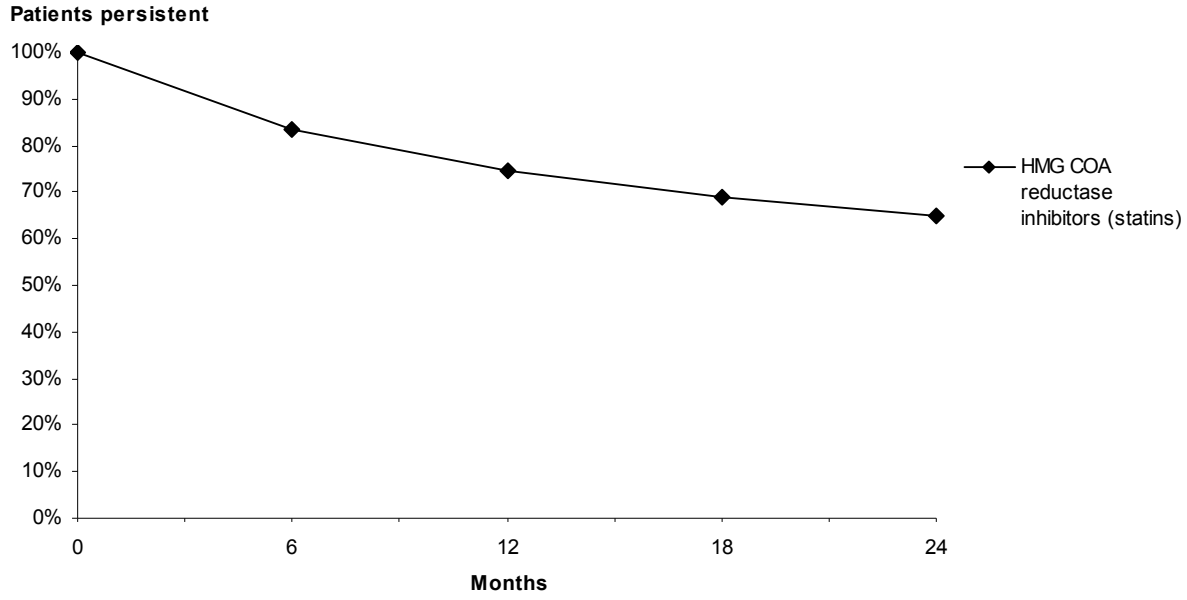
Table A5: Government expenditure on selected medicines (constant prices), 2001–05

Medicine class	2001	2002	2003	2004	2005	% change 2001–05
			($ million)			
Cardiac glycosides	3.4	3.2	3.1	2.9	2.5	–33.2
Antiarrhythmics	14.5	14.2	13.6	13.7	12.7	–14.2
Cardiac-stimulants excluding cardiac glycosides	0.2	0.2	0.6	2.9	4.9	95.1
Vasodilators used in cardiac diseases	49.3	47.6	44.5	44.4	41.6	–18.6
Antihypertensives	11.7	11.5	11.0	14.3	18.6	37.0
Diuretics	26.7	26.1	24.8	25.3	22.9	–16.4
Peripheral vasodilators	0.1	0.1	0.1	0.1	0.1	–8.7
Beta-blocking agents	57.1	67.0	76.6	89.6	94.8	39.7
Calcium-channel blockers	160.9	166.3	168.4	172.8	165.8	2.9
Agents acting on renin–angiotensin system	347.2	384.4	423.0	459.2	450.4	22.9
Serum-lipid-reducing agents	662.9	752.9	848.0	967.2	987.1	32.8
All cardiovascular medicines	*1,334.3*	*1,473.8*	*1,614.0*	*1,792.6*	*1,801.5*	*25.9*
Vitamin K antagonists	8.3	9.1	9.9	10.9	10.4	19.7
Heparin group	6.8	11.4	14.6	14.7	16.5	58.7
Platelet aggregation inhibitors excluding heparin	76.7	108.7	140.6	169.1	184.9	58.5
Enzymes	1.3	1.3	2.5	3.0	2.2	42.3
All blood and blood-forming organs medicines	*93.2*	*130.5*	*167.6*	*197.8*	*214.2*	*56.5*
All medicines	**4,445.2**	**4,883.4**	**5,235.2**	**5,767.1**	**5,803.7**	**23.4**

Note: All figures are expressed in constant price terms to remove the effects of inflation and allow comparison of expenditure in different years on an equal dollar-for-dollar basis.

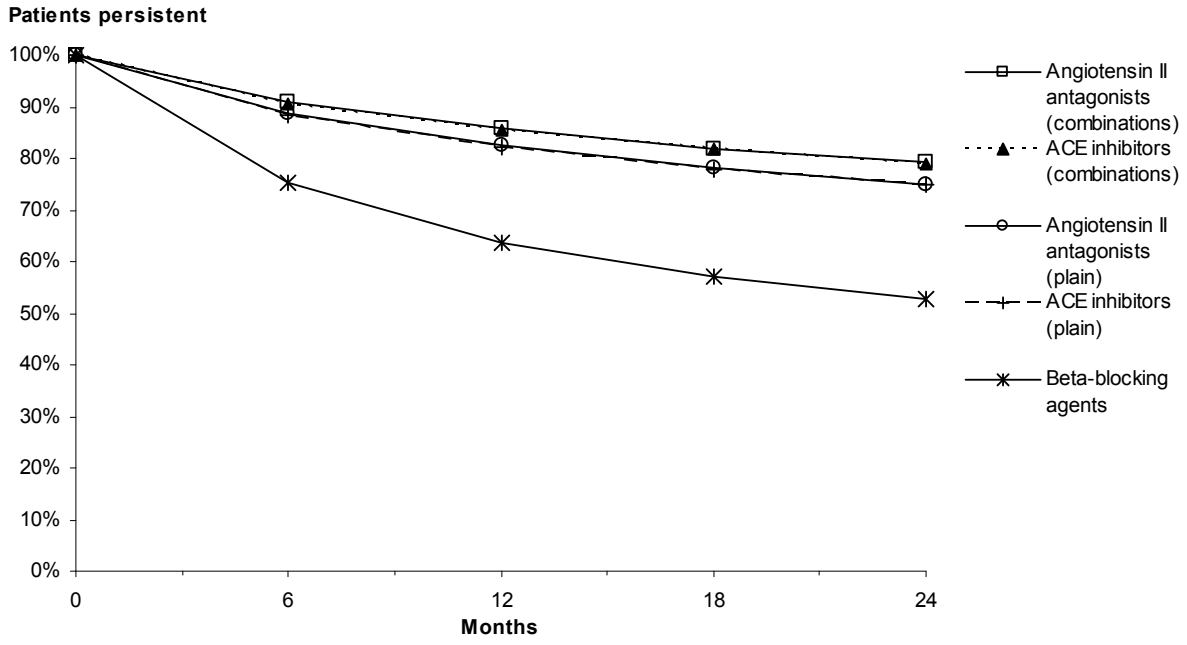
Source: Pharmaceutical Benefits Data System, DoHA (unpublished).

Appendix figures



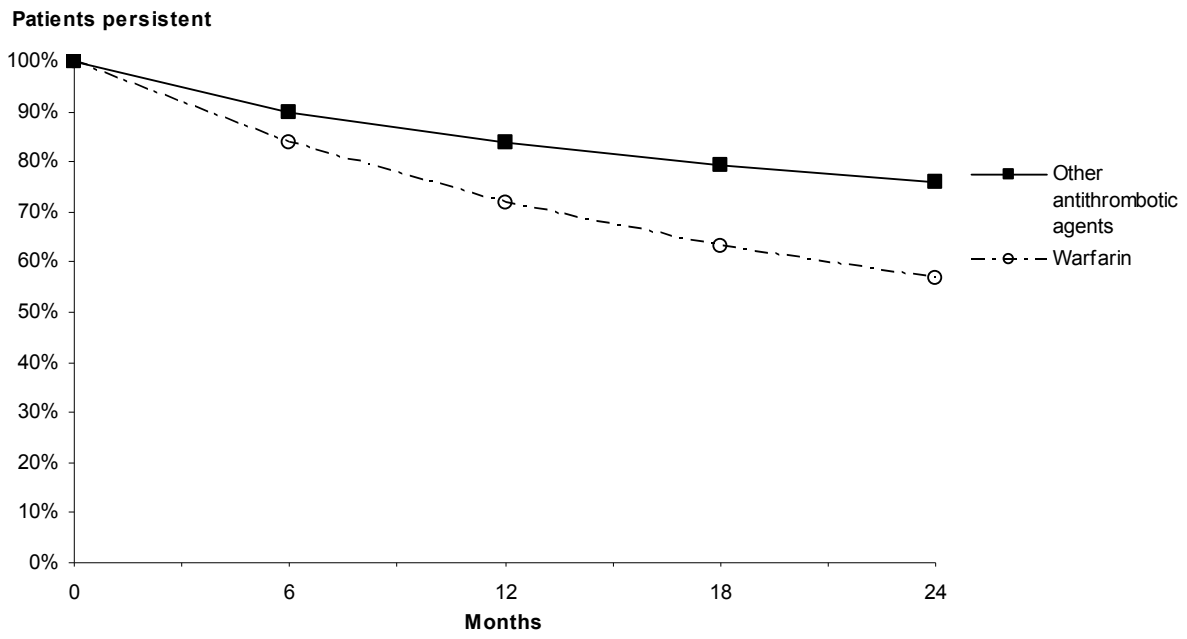
Source: AIHW analysis of data supplied by DoHA from the Pharmaceutical Benefits Data System.

Figure A1: Persistence with HMG COA reductase inhibitors (statins)



Source: AIHW analysis of data supplied by DoHA from the Pharmaceutical Benefits Data System.

Figure A2: Persistence with selected medicines with blood-pressure-lowering effect



Source: AIHW analysis of data supplied by DoHA from the Pharmaceutical Benefits Data System.

Figure A3: Persistence with antithrombotic agents

The Anatomical Therapeutic Chemical (ATC) classification system

Developed by the World Health Organisation, the ATC classification is the Australian standard for classifying medicines. In this system the medicines are grouped according to the system on which they act and their chemical, pharmacological and therapeutic properties. Medicines are classified into five levels. That part of the ATC classification relevant to cardiovascular disease is shown here.

ATC code	ATC Level 1	ATC Level 2	ATC Level 3	ATC Level 4	ATC Level 5[(a)]
B	**Blood and blood-forming organs**				
B01		Antithrombotic agents			
B01A			Antithrombotic agents		
B01AA				Vitamin K antagonists	
B01AA03					warfarin
B01AB				Heparin group	
B01AB05					enoxaparin
B01AC				Platelet aggregation inhibitors excl. heparin	
B01AC06					aspirin
B01AD				Enzymes	
B01AD01					streptokinase
C	**Cardiovascular system**				
C01		Cardiac therapy			
C01A			Cardiac glycosides		
C01AA				Digitalis glycosides	
C01AA05					digoxin
C01B			Antiarrhythmics, class I and III		
C01BA				Antiarrhythmics, class IA	
C01BA01					quinidine
C01BB				Antiarrhythmics, class IB	
C01BB01					lignocaine
C01BC				Antiarrhythmics, class IC	
C01BC04					flecainide
C01BD				Antiarrhythmics, class III	
C01BD01					amiodarone

ATC code	ATC Level 1	ATC Level 2	ATC Level 3	ATC Level 4	ATC Level 5[(a)]
C01C			Cardiac-stimulants excluding cardiac glycosides		
C01CA				Adrenergic and dopaminergic agents	
C01CA24					adrenaline
C01D			Vasodilators used in cardiac diseases		
C01DA				Organic nitrates	
C01DA14					isosorbide mononitrate
C01DX				Other vasodilators used in cardiac diseases	
C01DX16					nicorandil
C02		Antihypertensives			
C02A			Antiadrenergic agents, centrally acting		
C02AB				Methyldopa	
C02AB01					methyldopa
C02AC				Imidazoline receptor agonists	
C02AC01					clonidine
C02C			Antiadrenergic agents, peripherally acting		
C02CA				Alpha adrenoceptor blocking agents	
C02CA01					prazosin
C02D			Arteriolar smooth muscle, agents acting on		
C02DB				Hydrazinophthalazine derivatives	
CO2DB02					hydralazine
C02DC				Pyrimidine derivatives	
C02DC01					minoxidil
C02DD				Nitroferricyanide derivatives	
C02DD01					sodium nitroprusside

ATC code	ATC Level 1	ATC Level 2	ATC Level 3	ATC Level 4	ATC Level 5[(a)]
C03		Diuretics			
C03A			Low-ceiling diuretics, thiazides		
C03AA				Thiazides, plain	
C03AA01					bendrofluazide
C03B			Low-ceiling diuretics, excluding thiazides		
C03BA				Sulfonamides, plain	
C03BA11					indapamide
C03C			High-ceiling diuretics		
C03CA				Sulfonamides, plain	
C03CA01					frusemide
C03CC				Aryloxyacetic acid derivatives	
C03CC01					ethacrynic acid
C03D			Potassium-sparing agents		
C03DA				Aldosterone antagonists	
C03DA01					spironolactone
C03DB				Other potassium-sparing agents	
C03DB01					amiloride
C03E			Diuretics and potassium-sparing agents combinations		
C03EA				Low-ceiling diuretics and potassium-sparing agents	
C03EA01					hydrochlorothiazide with amiloride
CO4		Peripheral vasodilators			
C04A			Peripheral vasodilators		
C04AD				Purine derivatives	
C04AD03					oxpentifylline
C04AX				Other peripheral vasodilators	
C04AX02					phenoxybenzamine hydrochloride

ATC code	ATC Level 1	ATC Level 2	ATC Level 3	ATC Level 4	ATC Level 5[(a)]
C07		Beta-blocking agents			
C07A			Beta-blocking agents, plain		
C07AA				Beta-blocking agents, plain, non-selective	
C07AA07					sotalol
C07AB				Beta-blocking agents, plain, selective	
C07AB03					atenolol
C07AG				Alpha- and beta-adrenoceptor blocking agents	
C07AG01					carvedilol
C08		Calcium-channel blockers			
C08C			Selective calcium-channel blockers with mainly vascular effects		
C08CA				Dihydropyridine derivatives	
C08CA01					amlodipine
C08D			Selective calcium-channel blockers with direct cardiac effects		
C08DA				Phenylalkylamine derivatives	
C08DA01					verapamil
C08E			Non-selective calcium-channel blockers		
C08EX				Other non-selective calcium-channel blockers	
C08EX02					perhexiline
C09		Agents acting on the renin–angiotensin system			
C09A			ACE inhibitors, plain		
C09AA				ACE blockers	
C09AA05					ramipril

ATC code	ATC Level 1	ATC Level 2	ATC Level 3	ATC Level 4	ATC Level 5[(a)]
C09B			ACE inhibitors, combinations		
C09BA				ACE blockers and diuretics	
C09BA04					perindopril and indapamide
C09C			Angiotensin II antagonists		
C09CA				Angiotensin II antagonists, plain	
C09CA04					irbesartan
C09D			Angiotensin II antagonists, combinations		
C09DA				Angiotensin II antagonists and diuretics	
C09DA04					irbesartan and hydrochlorothiazide
C10		Serum-lipid-reducing agents			
C10A			Cholesterol and triglyceride reducers		
C10AA				HMG COA reductase inhibitors	
C10AA05					atorvastatin
C10AB				Fibrates	
C10AB04					gemfibrozil
C10AC				Bile acid sequestrants	
C10AC01					cholestyramine
C10AD				Nicotinic acid and derivatives	
C10AD02					nicotinic acid
C10AX				Other cholesterol and triglyceride reducers	
C10AX09					ezetimibe

(a) One generic medicine is shown as an example at this level.

Data sources

AIHW National Hospital Morbidity Database: contains demographic, diagnosis, procedure and duration of stay information on episodes of care for patients admitted to hospital. The collection is maintained by the AIHW using data supplied by state and territory health authorities.

AIHW National Mortality Database: contains information on the cause of death supplied by the medical practitioner certifying the death or by a coroner. Registration of deaths is the responsibility of the state and territory registrars of births, deaths and marriages. Registrars provide the information to the ABS for coding of cause of death and then it is given to the AIHW.

BEACH (Bettering the evaluation and care of health) survey of general practice: an ongoing national cross-sectional survey looking at aspects of general practice in Australia, conducted by the Australian General Practice Statistics and Classification Centre (an AIHW collaborating unit within the Family Medicine Research Centre, University of Sydney). BEACH began in April 1998 and involves a random sample of about 1,000 general practitioners per year, each of whom records details on 100 consecutive patient encounters.

Pharmaceutical Benefits Data System: held at the Australian Government Department of Health and Ageing (DoHA), it is used to monitor expenditure and use of prescription medicines subsidised by the Pharmaceutical Benefits Scheme (PBS) and the Repatriation PBS (RPBS). The database contains information pertinent to the payment of claims for pharmaceuticals from Medicare Australia for medicines subsidised by the PBS and the RPBS. Inpatient hospital prescribing is not included. It is the source for data on subsidised scripts in the Drug Utilisation Sub-Committee database. The data are based on the date of supply or dispensing of prescriptions.

Drug Utilisation Sub-Committee database: held at the Australian Government Department of Health and Ageing (DoHA), it monitors the community (that is, non-public hospital) use of prescription medicines in Australia. The database combines information supplied by Medicare Australia on medicines subsidised by the Pharmaceutical Benefits Scheme (PBS) and the Repatriation PBS, and an estimate of unsubsidised prescriptions (under co-payment and private prescriptions) calculated from a validated sample of community based pharmacies from the continuous Pharmacy Guild Survey. Inpatient hospital prescribing is not included.

National Health Survey 2004–05: conducted by the ABS, to obtain national information on the health status of Australians, their use of health services and other actions people had taken for their health, and health-related aspects of their lifestyle. The 2004–05 survey collected information from a sample of 25,900 people across all ages from all states and territories from August 2004 to June 2005. One adult and one child (where applicable) from each sampled dwelling were included in the survey. Information about use of medicines was collected as reported by participants for the following conditions only: asthma, circulatory conditions, diabetes, arthritis, osteoporosis and mental wellbeing. Medicines include pharmaceuticals, vitamin and mineral supplements, and natural and herbal medicines.

Methods

Codes used in this report

Data	Disease / problem / medicine class	Classification	Code
Deaths / Hospital separations (Drugs, medicaments and biological substances causing adverse effects in therapeutic use)	Anticoagulants	ICD-10 / ICD-10-AM	Y44.2
	Anticoagulant antagonists, vitamin K and other coagulants		Y44.3
	Antithrombotic drugs		Y44.4
	Thrombolytic drugs		Y44.5
	Salicylates		Y45.1
	Predominantly β-adrenoreceptor antagonists, not elsewhere classified		Y51.5
	α-Adrenoreceptor antagonists, not elsewhere classified		Y51.6
	β-Adrenoreceptor antagonists, not elsewhere classified		Y51.7
	Cardiac-stimulant glycosides and drugs of similar action		Y52.0
	Calcium-channel blockers		Y52.1
	Other antidysrhythmic drugs, not elsewhere classified		Y52.2
	Coronary vasodilators, not elsewhere classified		Y52.3
	Angiotensin-converting-enzyme inhibitors		Y52.4
	Other antihypertensive drugs, not elsewhere classified		Y52.5
	Antihyperlipidaemic and antiarteriosclerotic drugs		Y52.6
	Peripheral vasodilators		Y52.7
	Antivaricose drugs, including sclerosing agents		Y52.8
	Other and unspecified agents primarily affecting the cardiovascular system		Y52.9
	Benzothiadiazine derivatives		Y54.3
	Loop (high-ceiling) diuretics		Y54.4
	Other diuretics		Y54.5
Number of medicines taken for health condition (NHS)	Hypertensive disease		06
	Angina and other ischaemic heart diseases		07,08
	Cerebrovascular diseases		11
	Oedema and heart failure		12
	Diseases of arteries, arterioles and capillaries		13
	Other diseases of the circulatory system		09,10,14,15,16,17,18,19,20

Data	Disease / problem / medicine class	Classification	Code
General practice (BEACH)	Arrhythmia (atrial fibrillation/flutter, paroxysmal tachycardia, cardiac arrhythmia NOS)	ICPC/ICPC-2 PLUS	K78, K79, K80
	Diabetes (diabetes; insulin-dependent, diabetes; non-insulin-dependent, gestational diabetes)		T89, T90, W85
	Heart failure		K77
	Hypertension (uncomplicated hypertension, hypertension with involvement of target organs, hypertension pre-eclamptic, hypertension in pregnancy)		K86, K87 W81002 W81003
	Ischaemic heart disease (ischaemic heart disease without angina, Ischaemic heart disease with angina)		K74, K76
	Lipid disorder (lipid disorder, lipodystrophy)		T93 T99075
	Peripheral vascular disease (Claudication; intermittent, Buergers disease, peripheral vascular disease, gangrene, ischaemia; limb (gangrene))		K9201 K92001 K92003 K92004 K92006
	Stroke (stroke/cerebrovascular accident)		K90
PBS medicines in data set analysed for concordance with medicine	Antithrombotic agents	PBS	
	warfarin		2843P 2209G 2844Q 2211J
	aspirin		8202Q
	clopidogrel		8358X
	dipyridamole		8335Q
	dipyridamole with aspirin		8382E
	ticlopidine		2095G
	Beta-blocking agents		
	oxprenolol		2942W 2961W
	pindolol		3062E 3065H`
	propanolol		2565B 2566C 2899N
	sotalol		8398B 2043M
	atenolol		1081X
	bisoprolol		8604W 8605X 8606Y
	metoprolol succinate		8818D 8732N 8733P 8734Q 8735R
	metoprolol tartrate		1324Q 1325R

Data	Disease / problem / medicine class	Classification	Code
PBS medicines in data set analysed for concordance with medicine (continued)	carvedilol		8742D 8255L 8256M 8257N 8258P
	labetalol		1566K 1567L
	ACE inhibitors (plain)		
	captopril		1147J 1148K 1149L 8760C
	enalapril		1370D 1368B 1369C
	fosinopril		1182F 1183G
	lisinopril		2456G 2457H 2458J
	perindopril		3050M 3051N 8704D
	quinapril		1968N 1969P 1970Q
	ramipril		1944H 1945J 1946K 8470T 8668F 8937J
	trandolapril		2791X 2792Y 2793B 8758Y
	ACE inhibitors (combinations)		
	enalapril with hydrochlorothiazide		8477E
	fosinopril with hydrochlorothiazide		8400D 8401E
	perindopril with indapamide		8449Q
	quinapril with hydrochlorothiazide		8589C 8590D
	Angiotensin II antagonists (plain)		
	candesartan		8295N 8296P 8297Q 8889W
	eprosartan		8397Y 8447N
	irbesartan		8246B 8247C 8248D
	telmisartan		8355R 8356T

Data	Disease / problem / medicine class	Classification	Code
PBS medicines in data set analysed for concordance with medicine (continued)	Angiotensin II antagonists (combinations)		
	candesartan with hydrochlorothiazide		8504N
	eprosartan with hydrochlorothiazide		8624X
	irbesartan with hydrochlorothiazide		8404H 8405J
	telmisartan with hydrochlorothiazide		8622T 8623W
	HMG COA reductase inhibitors (statins)		
	atorvastatin		8213G 8214H 8215J 8521L
	fluvastatin		8023G 8024H
	pravastatin		2833D 2834E 8197K 8829Q
	simvastatin		2013Y 2011W 2012X 8173E 8313M

BEACH study data analysis

The methods used to collect and analyse BEACH data are described in detail in AIHW: Britt et al. 2005. Here is a brief account of the method used to analyse data shown in this report.

Rates of prescription or supply of medicines by general practitioners were compared for the period 2000–01 to 2005–06. Statistical significance was assessed based on a linear trend over the years, with non-overlapping confidence intervals between the 2000–01 results and the 2005–06 results. These trends were analysed using SAS V8.2 regression procedures, adjusting the standard error to allow for the design effect of the cluster sample.

Where significant changes over time were detected, we calculated the estimated annual rate of change. This is expressed as the mean annual increase or decrease over the study period in the number of general practice encounters for that problem where a particular medicine was prescribed or supplied, occurring in Australia each year.

Extrapolated estimates were calculated by multiplying the encounter rate for 2000–01 by the number of unreferred attendances (A1 and A2 items) claimed through Medicare in that year to give the estimated number of encounters at which a particular medicine was prescribed or supplied. The same was done for 2005–06. Where the change was linear over time, the difference between the two estimates was averaged over 5 years to give the estimated annual rate of change in encounters.

Analysis of concordance with medicines

The Australian Government Department of Health and Ageing (DoHA) holds the Pharmaceutical Benefits Data System, which contains national prescribing information on medicines subsidised by the Pharmaceutical Benefits Scheme (PBS) and the Repatriation PBS (RPBS) (see Box 1 in chapter 3). For medicines in the PBS and RPBS, the patient pays for the cost of a medicine up to the co-payment amount and the government pays the balance of the cost, if this is more than the co-payment amount. All prescriptions for which this government subsidy is paid are recorded in the database. Those prescriptions that fall below the co-payment level, and therefore attract no subsidy, are not recorded.

In 2002 it became compulsory to record Medicare numbers for patients being dispensed subsidised PBS and RPBS medicines. This allows the capacity to build prescription histories for individual patients as well as providing information on their age, sex and postcode of residence.

Data

We obtained from DoHA anonymous individual patient records of PBS medicines supplied over the period 1 January 2002–1 June 2006 for selected medicines commonly used in the prevention and treatment of CVD. Each data record included:

- unique patient identifier number (PIN)
- patient 5 year age group, sex and postcode of residence
- date of supply of prescription
- patient beneficiary category (general, concessional or repatriation and safety net status)
- PBS item number
- number of prescriptions supplied.

The following medicine classes were selected for analysis:

1. HMG COA reductase inhibitors (statins)
2. plain angiotensin II antagonists
3. combination angiotensin II antagonists
4. plain ACE inhibitors
5. combination ACE inhibitors
6. beta-blocking agents
7. warfarin
8. other antithrombotic agents (including clopidogrel, dipyridamole and ticlopidine).

We defined cohorts of patients by medicine class, as shown above. We followed each cohort over the study period and confined the analyses to medicines class; that is, we did not look at medicine switching within each medicine class or between medicine classes.

Inclusion and exclusion criteria

To ensure uniform populations for the medicines studied, we included only newly prescribed patients, defined as those with no scripts dispensed in the 12 months before the patient's first supply for each of the medicine classes, resulting in an effective study period of 15 January 2003–27 June 2006.

We included only patients who had been dispensed at least two prescriptions without discontinuation between them (see definition of persistence below), suggesting medicine use beyond a single prescription.

For the cohorts using 'HMG CoA reductase inhibitors (statins)' and 'other antithrombotic agents', we included patients in all beneficiary categories as all medicine items in these classes cost more than the co-payment level for general patients. Therefore, all prescriptions for these items are recorded in the Pharmaceutical Benefits Data System.

For all the other cohorts, we excluded general patients and focused the analyses on patients who had concessional or repatriation status for the whole study period. This was done because the Pharmaceutical Benefits Data System covers only subsidised prescriptions and many medicines in classes 2 to 7 above fall below the general co-payment level, so prescriptions are recorded only for concessional/repatriation patients and general patients on safety net. General patients can also move in and out of the safety net during each calendar year. Furthermore, patients may have changed their beneficiary status over the course of the study. These factors result in incomplete coverage in the database of prescriptions for these medicines supplied to general patients and inadequate follow-up of patients who changed their beneficiary status.

Records for patients dispensed more than one prescription for the same medicine on any given date were also excluded.

Records with 'dummy' PINs, used by data entry staff when patient identifying information was lacking, and records with missing information on age, sex or postcode were excluded as well.

Measures of concordance

In assessing concordance with medicines, we looked at compliance and persistence according to the definitions and measures in Halpern et al. 2006.

Compliance was defined as taking medicines at the prescribed frequency and dose and was measured using the medicine possession ratio (MPR).

MPR = days supplied/days between consecutive scripts dispensed

We measured MPR over the first 12 months from the start of therapy. We defined those patients with MPR of 80% or more as compliant and calculated the proportion of compliant patients in each cohort.

Persistence was defined as the continued use of medicines for the specified treatment period, which in the case of the medicines indicated for cardiovascular disease included in this study was assumed to be lifelong. It was measured from the start of therapy (first date of medicine supply—index date) until the date of treatment discontinuation or the end of the study period. Treatment discontinuation was defined as ≥ 90 days between one medicine supply and the subsequent supply of any medicine in the same class (that is, missed two script periods). Persistence was measured by

- percentage of patients persistent at 6 months, 12 months, 18 months and 24 months from the index date (using Kaplan–Meier analysis)
- average duration of persistence.

The 95% confidence intervals for persistence were calculated using the methods presented in Hosmer & Lemeshow (1999).

Analysis of inequalities

To measure inequalities in the supply of medicines, we looked at differences between populations by socioeconomic indexing and geographical classification.

Socioeconomic indexing for area (SEIFA) is based on the Index of Relative Socioeconomic Disadvantage (IRSD), which was constructed by the ABS to classify geographic areas on the basis of social and economic information (ABS 2003). The IRSD is derived from social and economic characteristics of a Statistical Local Area (SLA), such as income, educational attainment, unemployment, jobs in various occupations and variables that reflect disadvantage.

Individual patients were classified into fifths of socioeconomic disadvantage, based on the IRSD value for the SLA of usual residence. SLA estimates were assigned to patients according to their postcode by using postcode to SLA conversion factors. Level 1 includes the least disadvantaged households, while Level 5 covers the most disadvantaged households. Note that the IRSD relates to the average disadvantage of all people living in an SLA and does not necessarily reflect an individual's socioeconomic status. Rates were calculated for males and females separately, age standardised to the Australian population as at 30 June 2001.

Geographical classification uses the ABS Australian Standard Geographical Classification (ASGC) Remoteness Areas Classification to map regional areas by grouping areas with similar characteristics together (AIHW 2004c).

The ASGC Remoteness Areas assigns each SLA to one of six regional categories: major cities, inner regional, outer regional, remote, very remote and migratory. These categories were then regrouped into three larger zones: metropolitan, rural and remote. SLA estimates were assigned to patients using the postcode to SLA conversion factors. Rates were calculated for males and females separately, age standardised to the Australian population as at 30 June 2001.

Limitations of the study

Information on the diagnosis for which the medicines were prescribed is not recorded in the Pharmaceutical Benefits Data System. We assumed that the medicines studied had been prescribed to prevent or treat a cardiovascular condition, and were therefore intended for long-term use, but this may not have been true for all patients in the study. However, cardiovascular conditions are by far the most common indication for those medicines that can be used to treat other conditions.

Likewise, information on the dosing regime prescribed is not recorded in the Pharmaceutical Benefits Data System. We assumed a daily dose equal to the pack dose dispensed and medicine dosing regimes as set out in the Australian Medicines Handbook 2006, but there are instances where doctors might validly vary these, such as in older patients, in patients with coexisting conditions or those taking multiple medicines.

The database does not record patients' date of death, so we may have included in our analysis time periods beyond which some individuals were alive. This would result in an overestimation of discontinuation rates for medicines for those individuals.

In the case of warfarin and beta-blocking agents, there are some indications where these medicines are prescribed for a limited period only. As the database does not contain information to allow us to identify these patients, we could not exclude them from the analysis, resulting in overestimation of discontinuation rates for these medicines.

National bodies with responsibility for quality use of medicines

Australian Commission on Safety and Quality in Health Care

The Australian Commission on Safety and Quality in Health Care was established by Australian Health Ministers in 2006 to lead and coordinate national efforts to improve health care safety and quality. It succeeded the Australian Council for Safety and Quality in Health Care which operated from 2000 to 2005.

Pharmaceutical Health And Rational Use of Medicines (PHARM) Committee

The PHARM committee is a multidisciplinary committee that provides expert advice to the Australian Government Minister for Health and Ageing and the Department of Health and Ageing on the National Strategy for Quality Use of Medicines. It also promotes and reviews the National Strategy for Quality Use of Medicines and oversees its implementation, and encourages quality use of medicines educational activities and programs.

Members have expertise in general practice, pharmacy, nursing, pharmaceutical industry, consumer issues, health education and behavioural science and are appointed by the Minister for Health and Ageing.

Australian Pharmaceutical Advisory Council (APAC)

APAC is a consultative forum that advises the Australian Government on a wide range of medicines policy issues. The Council includes representatives of peak health professions (pharmacy, medical and nursing), pharmaceutical industry, consumer and medical organisations, as well as government members with an interest in implementing Australia's National Medicines Policy.

National Prescribing Service (NPS)

NPS is a non-profit organisation, independent of government and the pharmaceutical industry, operating since 1999 and funded by the Australian Government Department of Health and Ageing. Its members represent health professionals, government, industry and consumers.

The NPS aims: to achieve better health and economic outcomes as a result of quality use of medicines; to improve the quality of prescribing and use of medicines by using interventions designed to change prescribing behaviour and providing independent, reliable, timely information about medicines to prescribers and consumers; and to build awareness and competence among health professionals and the community that will lead to quality use of medicines, including choices between medicines and other approaches to health problems.

Pharmaceutical Benefits Advisory Committee (PBAC)

PBAC is an independent statutory body established in 1954 to make recommendations and advise the Australian Government Minister of Health and Ageing on which medicines should be made available as part of the PBS. It considers the effectiveness and cost of a proposed benefit compared to alternative therapies. The committee recommends maximum quantities to be dispensed and repeats of the medicine. It may also recommend restrictions to the indications for which PBS subsidy is available.

Therapeutic Goods Administration (TGA)

TGA is part of the Australian Government Department of Health and Ageing and is responsible for ensuring that therapeutic goods available in Australia are of an acceptable standard and that Australians have timely access to therapeutic advances. It controls the supply of therapeutic goods through pre-market assessment, licensing of manufacturers and post-market surveillance.

National Institute of Clinical Studies (NICS)

NICS, now part of the National Health Medical and Research Council, is Australia's national agency for improving health care by helping close gaps between best available evidence and current clinical practice. It was established by the Australian Government in 2000. NICS works with researchers, practitioners and other stakeholders to establish where gaps exist; raises awareness of these gaps; and supports health professionals to understand and overcome the barriers to applying evidence within Australian health care settings.

Glossary

Angiotensin-converting-enzyme (ACE) inhibitors	Medicines used to treat people with high blood pressure or heart failure. They limit the progressive enlargement of the heart that can occur after a heart attack and relieve heart failure symptoms. If given early during a heart attack, they can reduce the risk of death.
Acute coronary syndrome	Describes acute myocardial infarction (heart attack) or unstable angina when they first present as a clinical emergency with chest pain or other features.
Adverse event	An event or circumstance in which a person receiving health care was harmed.
Agents acting on renin–angiotensin system	Includes ACE inhibitors and angiotensin II antagonists.
Angina	A short episode of chest pain that occurs when the heart has a temporary deficiency in its blood supply due to a severe, but incomplete, blockage in one of its arteries.
Angiotensin II antagonists	Medicines used to treat people with high blood pressure or heart failure. They also reduce the progression of kidney disease in people with diabetes, high blood pressure and protein leaking from the kidneys into the urine.
Antiarrhythmics	Medicines given to restore the normal heart rhythm or prevent life-threatening abnormal heart rhythms (arrhythmias).
Antithrombotic agents	Medicines that prevent the formation of clots, which could block blood vessels, by interfering with the clotting process. They are given to certain patients with heart disease, such as those with atrial fibrillation, after some heart attacks, or to those with severe heart failure, with ischaemic stroke or peripheral vascular disease (except previous embolism) to lower their risk of subsequent disease. They are also commonly used during percutaneous coronary intervention.
Arrhythmia	A disturbed rhythm of the heart beat—either too fast, too slow or irregular.
Atrial fibrillation	A condition marked by an irregular rapid heart beat. It arises because the heart's collecting chambers (atria) stop beating rhythmically and quiver uselessly (fibrillate).
Beta-blocking agents	Medicines used to treat patients with high blood pressure, but they also have other important uses. Through their lowering of blood pressure, these medicines prevent strokes and heart attacks. Also, in people with angina or history of heart attack, beta-blockers can reduce pain and deaths, and prevent further heart attacks. Certain beta-blockers are often used in the treatment of heart failure.
Calcium-channel blockers	Medicines effective in reducing blood pressure and angina.

Cardiovascular disease	Any disease of the heart (cardio) and blood vessels (vascular). Includes myocardial infarction, angina, heart failure, stroke and peripheral vascular disease. Also known as circulatory disease.
Cerebrovascular disease	Cerebrovascular disease refers to any disorder of the blood vessels supplying the brain or its covering membranes.
Circulatory disease	See *cardiovascular disease*.
Complementary medicines	Also known as traditional or alternative medicines. They include vitamins, minerals, nutritional supplements, and herbal, aromatherapy and homeopathic products.
Coronary heart disease	Also known as ischaemic heart disease, it is the most common form of heart disease. There are two major clinical forms: acute myocardial infarction and angina.
Chronic disease	Condition with a long development period, some of which may have no symptoms; prolonged course of illness, perhaps leading to other health complications; and associated functional impairment or disability.
Diabetes	Condition in which the body cannot properly use its main energy source: the sugar glucose.
Diuretics	Medicines effective in reducing blood pressure, which reduces the occurrence of strokes and heart disease. Diuretics are also helpful for treating symptoms in people with heart failure.
Drug-adverse event	Medicine problem that results in harm to the patient.
Harm	Includes disease, injury, suffering, disability and death.
Heart attack	See *myocardial infarction*.
Heart failure	Heart failure occurs when the heart functions less effectively in pumping blood around the body. It can result from a variety of diseases and conditions that impair or overload the heart, notably heart attack, high blood pressure or a damaged heart valve. People with mild heart failure may have few symptoms, but in more severe cases it can result in chronic tiredness, reduced capacity to undertake physical activity and shortness of breath.
Hypertension	High blood pressure.
Myocardial infarction	Often referred as heart attack, it is a life threatening event that occurs when a blood vessel supplying the heart itself is suddenly blocked completely, threatening to disrupt the heart and its functions. Strictly, myocardial infarction refers only to those heart attacks that have caused death of some heart muscle.
Over-the-counter medicines	Private, non-prescription medicinal preparations that can be purchased from pharmacies, supermarkets and other retail outlets.
Peripheral vascular disease	Pain in the legs due to inadequate blood supply.

Plain ACE inhibitors	ACE inhibitors without a diuretic component.
Prescription medicines	Pharmaceutical medicines available only on prescription of a registered medical practitioner and available only from pharmacies.
Serum-lipid-reducing agents	Also known as lipid-lowering medicines, they are effective in preventing heart attacks and reducing coronary heart disease deaths. HMG CoA reductase inhibitors (statins), resin binders, nicotinic acid, fibrates and probucol all reduce blood LDL cholesterol and possibly increase HDL cholesterol to varying degrees, with statins being the most effective. They also have varying effects in lowering blood triglycerides.
Statin	See *serum-lipid-reducing agents*.
Stroke	Stroke occurs when a blood vessel to the brain is suddenly blocked or bleeds. This may result in part of the brain dying due to the lack of blood, leading to a loss of brain function or impairment in a range of activities including movement, thinking and communication, and may lead to death.
Tachycardia	An abnormally fast heart beat.
Thrombosis	Clotting of blood within a blood vessel.

References

ABS (Australian Bureau of Statistics) 1999. National health survey: Use of medications, Australia 1995. Cat. no. 4377.0. Canberra: ABS.

ABS 2003. Information Paper: Census of population and housing – socio-economic indexes for areas, Australia, 2001. Cat. no. 2039.0. Canberra: ABS.

ABS 2006. National health survey: summary of results, Australia 2004–05. Cat. no. 4364.0. Canberra: ABS.

Australian Council for Safety and Quality in Health Care 2002. Second national report on patient safety: Improving medication safety. Canberra: Commonwealth of Australia.

Australian Council for Safety and Quality in Health Care 2005. Medication safety breakthrough collaborative, Team showcase. Canberra: Commonwealth of Australia.

Australian Council for Safety and Quality in Health Care and National Institute of Clinical Studies 2004. Charting the safety and quality of health care in Australia. Canberra: Commonwealth of Australia.

AIHW (Australian Institute of Health and Welfare) 2004a. Heart, stroke and vascular diseases—Australian facts 2004. Cat. no. CVD 27. Canberra: AIHW and National Heart Foundation of Australia.

AIHW 2004b. Medical labour force 2002. Cat. no. HWL 30. Canberra: AIHW.

AIHW 2004c. Rural, regional and remote health: a guide to remoteness classifications. Cat. no. PHE 53. Canberra: AIHW.

AIHW 2005. Expenditures on health for Aboriginal and Torres Strait Islander People 2001–02. Cat. no. HWE 30. Canberra: AIHW.

AIHW 2006a. Chronic diseases and associated risk factors in Australia, 2006. Cat. no. PHE 81. Canberra: AIHW.

AIHW 2006b. Health expenditure Australia 2004–05. Cat. no. HWE 35. Canberra: AIHW.

AIHW: Britt H et al. 2005. General practice activity in Australia 2004–05. Cat. no. GEP 18. Canberra: AIHW.

AIHW: Knox S et al. 2005. Locality matters: the influence of geography on general practice activity in Australia 1998–2004. Cat. no. GEP 17. Canberra: AIHW.

Australian Medicines Handbook 2006. Australian Medicines Handbook. Adelaide: Australian Medicines Handbook Pty Ltd.

Benner J, Glynn R, Mogun H, Neumann P, Weinstein M & Avorn J 2002. Long-term persistence in use of statin therapy in elderly patients. Journal of the American Medical Association 288:455–461.

Bourgault C, Senecal M, Brisson M, Marentette M & Gregoire J 2005. Persistence and discontinuation patterns of antihypertensive therapy among newly treated patients: a population-based study. Journal of Human Hypertension 19:607–613.

Brook E, Rosman D, Holman C & Trutwein B 2005. Summary report: research outputs project, WA Data Linkage Unit (1995–2003). Perth: WA Data Linkage Unit. Viewed January 2007,
<http://www.publichealth.uwa.edu.au/_data/page/63033/ROP_SUMMARY3.pdf>

Burgess C, Holman C & Satti A 2005. Adverse drug reactions in older Australians, 1981–2002. Medical Journal of Australia 182(6):267–270.

Chapman R, Benner J, Petrilla A, Tierce J, Collins, Battleman D et al. 2005. Predictors of adherence with antihypertensive and lipid-lowering therapy. Archives of Internal Medicine:1147–1152.

Chobanian A, Bakris G, Black H, Cushman W, Green L, Izzo Jr J et al. 2003. The seventh report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure: the JNC 7 report. Journal of the American Medical Association 289:2560–2572.

Claxton A et al. 2001. Medication compliance: the importance of the dosing regime. Clinical Therapeutics 23:1296–1310.

Cramer J 2002. Effect of partial compliance on cardiovascular medication effectiveness. Heart 88:203–206.

DoHA (Department of Health and Ageing) 2000. National Medicines Policy. Canberra: DoHA.

DoHA 2002. The National Strategy for Quality Use of Medicines. Canberra: DoHA.

DoHA 2003a. Manual of indicators to measure the quality use of medicines component of Australia's National medicines policy. Canberra: DoHA.

DoHA 2003b. Measurement of the quality use of medicines component of Australia's National Medicines Policy. Second report of the national indicators. Canberra: DoHA.

DoHA 2005. Australian Statistics on Medicines 2003. Canberra: Commonwealth of Australia.

DoHA 2006. Schedule of pharmaceutical benefits. Canberra: Commonwealth of Australia.

Department of Veterans' Affairs 2006. Viewed 29 June 2006, <http://www.dva.gov.au/health/veteransmates/index.htm>.

Gilbert A, Roughead E, Beilby J, Mott K & Barratt J 2002. Collaborative medication management services: improving patient care. Medical Journal of Australia 177:189–192.

Goldney R & Fisher L 2005. Use of prescribed medications in a South Australian community sample. Medical Journal of Australia 183(5):251–253.

Gowan J 2006. Home medicine reviews and the aged. Complementary Medicine March/April:20–24.

Gurwitz J 2004. Polypharmacy—a new paradigm for quality drug therapy in the elderly? Archives of Internal Medicine 164:1957–1959.

Halpern M, Khan Z, Schmier J, Burnier M, Caro J, Cramer J et al. 2006. Recommendations for evaluating compliance and persistence with hypertension therapy using retrospective data. Hypertension 47:1039–1048.

Hamman G, Weimar C, Glahn J, Busse O & Diener H 2003. Adherence to secondary stroke prevention strategies: results from the German Stroke Data Bank. Cerebrovascular Diseases 15(4):282–288.

Hosmer DW Jr & Lemeshow S 1999. Applied survival analysis: regression modelling of time to event data. New York: John Wiley & Sons 42–44.

Kelaher M, Taylor-Thomson D, Harrison N, O'Donoghue L, Dunt D, Barnes T et al. 2004. Evaluation of PBS medicine supply arrangements for remote area Aboriginal Health Services under S100 of the National Health Act. Cooperative Research Centre for Aboriginal Health and Program Evaluation Unit University of Melbourne. Viewed 1 February 2007,

<http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pbs-indigenous-report>.

Kelman C, Bass A & Holman C 2002. Research use of linked health data—a best practice protocol. Australia and New Zealand Journal of Public Health 26:251–255.

Kelman C, Pearson S, Day R, Holman C, Kliewer E & Henry D 2007. Evaluating medicines: let's use all the evidence. Medical Journal of Australia 186:249–252.

La Rosa J & La Rosa J 2000. Enhancing drug compliance in lipid-lowering treatment. Archives of Family Medicine 9:1169–1175.

MacLennan A, Myers S & Taylor A 2006. The continuing use of complementary and alternative medicine in South Australia: costs and beliefs in 2004. Medical Journal of Australia 184:27–31.

McLean A & Le Couteur D 2004. Aging biology and geriatric clinical pharmacology. Pharmacological Reviews 56:163–184.

Miller G, Britt H, Valenti L & Knox S 2006. Adverse drug events in general practice patients in Australia. Medical Journal of Australia 184 (7):321–324.

National Health Priority Council 2006. National Chronic Disease Strategy. Canberra: Australian Government Department of Health and Ageing.

National Institute of Clinical Studies 2003. Evidence-practice gaps report, volume 1. Melbourne: National Institute of Clinical Studies.

National Institute of Clinical Studies 2004a. National emergency department collaborative report. Melbourne: National Institute of Clinical Studies.

National Institute of Clinical Studies 2004b. NICS projects: heart failure program. Melbourne: National Institute of Clinical Studies. Viewed 29 March 2006, <http://www.nicsl.com.au/projects_projects_detail.aspx >.

National Institute of Clinical Studies 2005. Evidence-practice gaps report, volume 2. Melbourne: National Institute of Clinical Studies.

National Prescribing Service 2004. Evaluation report no. 7 2003–04. Progress, achievements and future directions. Sydney: National Prescribing Service.

National Prescribing Service 2005. Evaluation report no. 8 2004–05. Progress, achievements and future directions. Sydney: National Prescribing Service.

National Primary Care Collaboratives 2006. <www.npcc.com.au>.

Nelson M, Reid C, Ryan P, Wilson K & Yelland L 2006. Self-reported adherence with medication and cardiovascular disease outcomes in the Second Australian National Blood Pressure Study (ANBP2). Medical Journal of Australia 185(9):487–489.

Osterberg L & Blaschke T 2005. Adherence to medication. New England Journal of Medicine 353:487–497.

Perreault S, Lamarre D, Blais L, Dragomir A, Berbiche D, Lalonde L et al. 2005. Persistence with treatment in newly treated middle-aged patients with essential hypertension. Annals of Pharmacotherapy 39:1401–1408.

Phillips S, Marton R & Tofler G 2004. Barriers to diagnosing and managing heart failure in primary care. Medical Journal of Australia 181(2):78–81.

Psaty B, Koepsell T, Wagner E, LoGerfo J, & Inui T 1990. The relative risk of incident coronary heart disease associated with recently stopping the use of beta-blockers. Journal of the American Medical Association 263(12):1653–1657.

Rudnicka A, Ashby D, Brennan P & Meade T 2003. Thrombosis prevention trial: compliance with warfarin treatment and investigation of retained effect. Archives of Internal Medicine 163(12):1454–1460.

Schoen C, Osborn R, Huynh P, Doty M, Peugh J et al. 2005. The Commonwealth Fund 2005 international health policy survey of sicker adults in six countries. New York: Commonwealth Fund. Viewed 7 November 2005, <www.cmwf.org>.

Simons L, Simons J, McManus P & Dudley J 2000. Discontinuation rates for use of statins are high. British Medical Journal 321:1084.

The Sax Institute 2007. Centre for Health Record Linkage. Viewed February 2007, <http://www.saxinstitute.org.au/researchassetsprograms/BetterHealthServicesThrough Research/CentreforHealthRecordLinkage.cfm?objid=647>.

Therapeutic Guidelines Ltd. 2003. Therapeutic guidelines: cardiovascular version 4, 2003. Melbourne: Therapeutic Guidelines Ltd.

Tinetti M, Bogardus S & Agostini J 2004. Potential pitfalls of disease-specific guidelines for patients with multiple conditions. New England Journal of Medicine 351:2870–2874.

Urbis Keys Young 2005. Evaluation of the home medicines review program—pharmacy component. Accessed 22 November 2006, <http://beta.guild.org.au/uploadedfiles/Medication_Management_Reviews/Overview/UrbisKeysYoungevaluation.pdf>.

World Health Organization (WHO) 2003. Adherence to long-term therapies. Evidence for action. Geneva: World Health Organization.

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