

Appendix C: Healthcare costs

Overview

The healthcare cost of HIV and Hepatitis C were identified through the creation of a model of service delivery reflecting current practice by the authors, who included doctors experienced in HIV and HCV. Utilisation data was derived for different health states from the literature and local data by four CD4 strata in HIV and by seven disease states in HCV.

HIV

Identification

The following items of service were identified for people living with HIV: Medical consultations including general practitioners and specialists; Allied Health including psychologists, social workers and dietician; Pathology including Full Blood Examination, CD4 T-cell Lymphocyte phenotype, HIV viral load, blood chemistry including liver enzymes, creatinine, urea, electrolytes, glucose, genotype resistance testing; inpatient hospitalisations; Medications including prophylaxis and associated non-ARV medications. These items were similar to those identified in a pre-ARV era study of Australian health service use by Hurley [231, 232].

Utilisation

The utilisation of each type of service was determined from published data and clinical experience of the authors. Utilisation was the incremental use of health services over and above the use by people of a similar age and gender without HIV. People living with HIV were divided into four health states according to CD4 T cell count >500, 350-499, 200-349 and >200. Antiretroviral costs were calculated separately.

50% of patients are seen by their general practitioner for HIV care in the HIV Futures 5 study [233]. In a study in the United States people with HIV visited outpatients five times a year [234] and in Italy five to six times [235]; in another study in the USA, patients were seen 9.7 times [236]; all studies showed that utilisation rose with lower CD4 cell counts with 20% more visits when the CD4 was less than 350 [237]. In contrast, males in the overall Australian population aged 25-45years claimed two to three standard GP consultations in a year [238, 239]. 8% of people used a clinical psychologist for counselling, 10% saw a social

worker and 5% saw a dietician. Pathology utilisations followed a standard three monthly monitoring for people with a CD4 cell count greater than 500, with a proportion having a genotype resistance test in a year. Medications for prophylaxis of herpes simplex virus, mycobacterium complex and pneumocystis pneumonia commenced when the CD4 cell count was low.

According to epidemiological data, the risk of AIDS is low with higher CD4 cell counts [234] but people may be admitted with serious non-AIDS events. Hospitalisation was rare (1%) in Italy with high CD4 cell counts [235, 240] but higher (11%) in the USA [234, 235, 240, 241]; hospitalisation risk increased in all settings with lower CD4 cell counts [44]. A national hospital admissions database was searched to determine the types of admission with HIV as a primary or secondary diagnosis in Australia by diagnostic related group(DRG) [42] . The assumptions on use of medical and pathology services were consistent with unpublished data from a study of Medicare Benefits Schedule claims by people with HIV 2003-2007 (n=10951) (Anderson unpublished data).

Valuation

Outpatient items were valued from the Medicare Benefits Schedule [43], Prescription Benefits Schedule[242], the Pharmaceutical Benefits Advisory Committee Manual of Resource Items and the Department of Veteran Affairs in 2008 dollars. The unit costs of inpatient admission were estimated by using the proportions of admissions for each type of DRG and the public hospital cost-weights for DRGs, to create a weighted average cost per admission with HIV.

Antiretrovirals

Use of antiretrovirals was determined by clinical advice from one of the authors (JA), an experienced HIV physician and was consistent with the Australian commentary on the US DHHS guidelines [43] with three lines of antiretroviral therapy. Patients were assumed to start ARVs when their CD4 cell count was less than 350 and continue on them indefinitely. In the population model they moved to the next line of therapy when the previous one failed. Antiretrovirals were valued by the Prescription Benefits Schedule [243].

Patient/carer healthcare costs for HCV

The following Table outlines the patient/carer healthcare costs associated with HCV infection.

HCV-related outcome	Annual Cost
Chronic HCV	\$2,827
Cirrhosis	\$4,212
Treatment	\$4,426
Hepatocellular carcinoma	\$7,400
Transplant	\$13,665

CD4 >500

Description	Number per year	Unit cost	% of pts having	cost per patient	Rationale / Comment
MEDICAL					
General-practitioner consultations	5	\$33.55	50%	\$82.00	item 23
Specialist consultations	5	\$69.75	50%	\$145.00	item 116
Clinical Psychologist	12	\$119.75	8%	\$114.96	CL01 One hour; http://www.dva.gov.au/health/provider/docs/Clinical_Counsellors_Fee_Schedule_1Nov08.pdf
Social Worker	2	\$57.55	10%	\$11.51	SW01 One hour; http://www.dva.gov.au/health/provider/docs/Social_Workers_Fee_Schedule_1Nov08.pdf
Dietician	2	\$80.30	5%	\$8.03	DT01 One hour; http://www.dva.gov.au/health/provider/docs/dietitiansnov08.pdf
DIAGNOSTICS					
FBE	4	\$17.20	100%	\$51.60	Item 66515
CD4 T cell lymphocyte count	4	\$105.85	100%	\$317.60	Included in item 66515
HIV viral load	4	\$181.45	100%	\$544.40	
Liver enzymes/renal	4	\$17.80	100%	\$59.40	
Glucose/lipids	1	\$0.00	100%	\$14.85	included in item 66500
Resistance test	1	\$600.00	10%	\$60.00	10-20% viral failure/year
HOSPITALIZATIONS					
CD4 >500 TOTAL COST per YEAR				\$1,523.35	

Cost-effectiveness of Australian NSPs

HIV CD4 CD4 350-499 Description	Number per year	Unit cost	% of pts having	cost per patient	
				baseline	item
MEDICAL					
General-practitioner consultations (MBS item 23) 50%	5	\$33.55	50%	\$82.00	item 23
Specialist consultations (MBS item 116) 50%	5	\$69.75	50%	\$145.00	item 116 CL01 One hour; http://www.dva.gov.au/health/provider/docs/Clinical_Counsellors_Fee_Schedule_1Nov08.pdf
Clinical Psychologist	12	\$119.75	8%	\$114.96	SW01 One hour; http://www.dva.gov.au/health/provider/docs/Social_Workers_Fee_Schedule_1Nov08.pdf
Social Worker	2	\$57.55	10%	\$11.51	DT01 One hour; http://www.dva.gov.au/health/provider/docs/dietitiansnov08.pdf
Dietician	2	\$80.30	5%	\$8.03	
DIAGNOSTICS					
FBE	5	\$17.20	100%	\$64.50	
CD4 T cell lymphocyte count	5	\$105.85	100%	\$397.00	
HIV viral load	5	\$181.45	100%	\$680.50	Item 66515
Liver enzymes/renal	5	\$17.80	100%	\$74.25	Included in item 66515
Glucose/lipids	1	\$14.85	100%	\$14.85	
Resistance test	1	\$600.00	20%	\$120.00	
HOSPITALIZATIONS	1	\$7,245.40	3%	\$342.00	
CD4 350-499 TOTAL COST per YEAR				\$2,054.60	

CD4 200-349 TOTAL COST per YEAR Description	Number per year	Unit cost	% of pts having	cost per patient baseline	Rationale / Comment
MEDICAL					
General-practitioner consultations (MBS item 23) 50%	7	\$33.55	50%	\$114.80	
Specialist consultations (MBS item 116) 50%	7	\$69.75	50%	\$203.00	CL01 One hour; http://www.dva.gov.au/health/provider/docs/Clinical_Counsellors_Fee_Schedule_1Nov08.pdf
Clinical Psychologist	12	\$119.75	8%	\$114.96	SW01 One hour; http://www.dva.gov.au/health/provider/docs/Social_Workers_Fee_Schedule_1Nov08.pdf
Social Worker	2	\$57.55	10%	\$11.51	DT01 One hour; http://www.dva.gov.au/health/provider/docs/dietitian_snov08.pdf
Dietician	2	\$80.30	5%	\$8.03	
DIAGNOSTICS					
FBE	6	\$17.20	100%	\$77.40	
CD4 T cell lymphocyte count	6	\$105.85	100%	\$476.40	
HIV viral load	6	\$181.45	100%	\$816.60	Item 66515
Liver enzymes/renal	6	\$17.80	100%	\$89.10	Included in item 66515
Glucose/lipids	1	\$14.85	100%	\$14.85	
Resistance test	1	\$600.00	20%	\$120.00	
HOSPITALIZATIONS	1	\$7,245.40	6%	\$684.00	
CD4 200-349 TOTAL COST per YEAR				\$2,730.65	

CD4 <200 Description	units per year	Unit cost	% of pts having	cost per patient baseline	Rationale / Comment
MEDICAL					
General-practitioner consultations (MBS item 23) 50%	8	\$33.55	50%	\$131.20	
Specialist consultations (MBS item 116) 50%	5	\$69.75	50%	\$145.00	
Clinical Psychologist	12	\$119.75	8%	\$114.96	CL01 One hour; http://www.dva.gov.au/health/provider/docs/Clinical_Counsellors_Fee_Schedule_1Nov08.pdf
Social Worker	2	\$57.55	10%	\$11.51	SW01 One hour; http://www.dva.gov.au/health/provider/docs/Social_Workers_Fee_Schedule_1Nov08.pdf
Dietician	2	\$80.30	5%	\$8.03	DT01 One hour; http://www.dva.gov.au/health/provider/docs/dietitiansnov08.pdf
DIAGNOSTICS					
FBE	6	\$17.20	100%	\$0.00	65070
CD4 T cell lymphocyte count	6	\$105.85	100%	\$476.40	
HIV viral load	5	\$181.45	100%	\$680.50	
Liver enzymes/renal	6	\$17.80	100%	\$89.10	covered in 66512
Glucose/lipids	1	\$0.00	100%	\$14.85	covered in 66512
Resistance test	1	\$600.00	50%	\$300.00	
NON-ARV medications					
Cotrimoxazole	52	\$8.93	100%	\$331.92	Prophylaxis for PCP
Valtrex /Famvir	12	\$213.63	100%	\$1,853.40	
Azithromycin	6	\$67.82	50%	\$203.46	50% will need it as CD4<100
HOSPITALIZATIONS	1	\$7,245.40	10%	\$1,140.00	
	1	\$7,245.40	3%		
	1	\$7,245.40	50%		
CD4<200 TOTAL COST per YEAR				\$5,500.33	

Table: Diagnostic Related Groups for HIV admissions

DRG Code v5	DRG Description	No.	% of total	Average cost per Admission
S65C	HIV-Related Diseases -Csc	152	4.45%	\$5,998
S65B	HIV-Related Diseases +Sc	151	4.42%	\$8,862
S65A	HIV-Related Diseases +Ccc	128	3.75%	\$20,793
S60Z	HIV, Sameday	58	1.70%	\$721
T63B	Viral Illness A<60 -Cc	4	0.12%	\$1,098
T63A	Viral Illness A>59/+Cc	1	0.03%	\$2,044
TO1C	Or Proc Infect & Paras Dis-Cc	1	0.03%	\$5,028
S60Z	HIV, Sameday	896	26.23%	\$721
S65C	HIV-Related Diseases -Csc	564	16.51%	\$5,998
S65A	HIV-Related Diseases +Ccc	497	14.55%	\$20,793
S65B	HIV-Related Diseases +Sc	450	13.17%	\$8,862
Q62Z	Coagulation Disorders	174	5.09%	2,555
G11A	Anal & Stomal Procedures +Csc	81	2.37%	6,423
G44C	Other Colonoscopy, Sameday	70	2.05%	1,177
F74Z	Chest Pain	66	1.93%	1,474
X62A	Poisng/Toxc Eff Drugs A>59/+Cc	62	1.81%	3,651
G45B	Other Gastrpy+N-Mjr Digest Dis	61	1.79%	1,047
TOTAL		3416	100.00%	\$7,245.40

		Number per year	Unit cost	cost per year
ARV medications				
cost of first line SOC	Truvada	12	\$765.10	\$9,181.20
	Efavirenz	12	\$452.64	\$5,431.68
total first line				\$14,612.88
Cost of second line SOC	NRTI Abacavir	12	\$423.00	\$5,076.00
	NRTI	12	\$282.00	\$3,384.00
	Atazanavir	12	\$521.91	\$6,262.92
	boosting ritonavir	12	\$37.92	\$455.01
total second line SOC				\$15,177.93
Cost of subsequent line				
	Kaletra	12	\$685.00	\$8,220.00
	Raltegravir	12	\$1,146.60	\$13,759.20
	Etravirine	12	\$483.10	\$5,797.20
total third line				\$27,776.40