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Estimating the Cost of Emergency Department Presentations in NSW

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Abstract

This brief methods paper explains how to use the NSW Government Health Costs of Care Standards to estimate the cost of presentations to emergency departments (ED) in NSW. We begin with a discussion of the allocation of presentations according to visit type, triage category and mode of separation to urgency disposition group (UDG) class for the purpose of allocating cost weights and how to apply these weights to estimate the cost per presentation. The discussion is then extended to incorporate a suggested approach for estimating ED costs when mode of separation is known but visit type and triage category are unknown; we do this by using the distribution of current NSW ED presentations by visit type, triage category and mode of separation to calculate the average cost for each mode of separation.

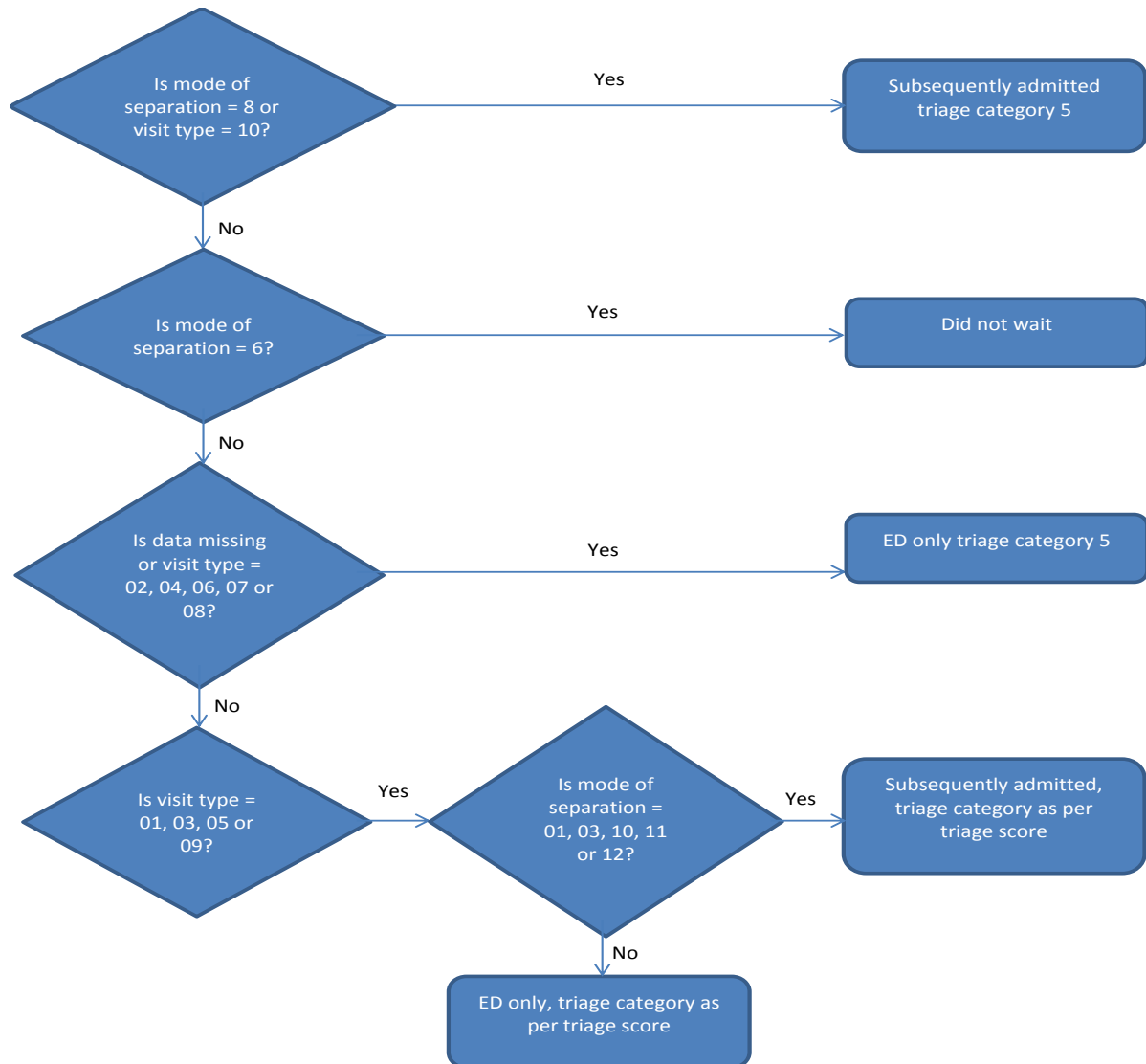
1. Introduction

The estimated cost of emergency department (ED) presentations is required as an input into various types of economic analysis of health and health services. For example, ED costs can be used in comparisons of patients by disease type or when conducting economic evaluations of health services. Costs of ED presentations vary depending on the level of urgency (triage category) of the presentation and disposition group (based on visit type and mode of separation from ED). Therefore, both the number and type of presentations should be considered when estimating between-patient differences in ED costs.

This note explains how to use information provided in the NSW Government Health Costs of Care Standards to estimate the cost of ED presentations. First, calculation methods and costs per presentation split by urgency and disposition group (UDG) are explained. Second, we present an approach to approximating ED cost when urgency of presentations and visit type are unknown but where data are available on mode of separation from ED.

The NSW Government Health Costs of Care Standards provides an average cost per ED presentation, and a set of cost weights by UDG classⁱ. For the purpose of applying cost weights, UDG class is based on visit type, triage category and mode of separation from ED. The cost weights can be multiplied by the average cost to provide a cost per presentation by UDG class. The allocation of presentations to the appropriate UDG class for costing purposes is summarised in Figure 1.

Figure 1: UDG class allocations



Source: Derived from the algorithm in NSW Government Health (2011) Costs of Care Standards 2009/10, p. 14. The Standards do not include visit type 11 (disaster); we suggest that this be classified as per visit types 1, 3, 5 and 9 (i.e. according to triage score and mode of separation).

2. Average cost and cost weights

In 2009/10 the average cost of an ED presentation was estimated to be \$396.ⁱ Cost weights by UDG class, based on the Round 11 (2006-07) NHCDC National Cost Weights are presented in Table 1.

Table 1: ED cost weights by UDG class

Urgency and Disposition Group (UDG)	Cost weight
Subsequently Admitted, Triage 1	2.96
Subsequently Admitted, Triage 2	1.78
Subsequently Admitted, Triage 3	1.53
Subsequently Admitted, Triage 4	1.33
Subsequently Admitted, Triage 5	0.91
ED Only, Triage 1	1.62
ED Only, Triage 2	1.24
ED Only, Triage 3	1.08
ED Only, Triage 4	0.81
ED Only, Triage 5	0.50
Did not wait	0.18

Source: NSW Government Health (2011) Costs of Care Standards 2009/10, Table 3, p. 15.

3. Applying cost weights

Where there are differences between patient groups in both the frequency and type of presentation, the cost of presentations should be weighted by UDG class. The cost of each type of presentation can be calculated by multiplying the relevant cost weight by the average ED cost (\$396 in 2009/10 prices), as shown in Table 2.

Table 2: Average ED cost per UDG class

	Cost weight	Cost per presentation
	(A)	(A x \$396)
Subsequently Admitted, Triage 1	2.96	1172.16
Subsequently Admitted, Triage 2	1.78	704.88
Subsequently Admitted, Triage 3	1.53	605.88
Subsequently Admitted, Triage 4	1.33	526.68
Subsequently Admitted, Triage 5	0.91	360.36
ED Only, Triage 1	1.62	641.52
ED Only, Triage 2	1.24	491.04
ED Only, Triage 3	1.08	427.68
ED Only, Triage 4	0.81	320.76
ED Only, Triage 5	0.5	198.00
Did not wait	0.18	71.28

Source: Cost weights and base average cost (\$396) from *NSW Government Health (2011) Costs of Care Standards 2009/10*, Table 3, p. 15.

4. Cost of 2012/13 ED presentations in NSW by separation mode

The distribution of current NSW ED presentations by triage category, visit type and mode of separationⁱⁱ can be used to calculate an average weighted cost of presentations by mode of separation from ED. The weighted average costs estimated by this approach can be used where triage information and visit type are not available, but data are available on separation mode.

The current weighted average cost (in 2009/10 prices) of ED only presentations is approximately \$324.91. The weighted average costs of presentations by separation mode are summarised in Table 3 below.

Table 3: Summary of weighted average cost per presentation by separation mode:

Separation mode	Cost
1	\$ 444.78
2	\$ 404.82
3	\$ 985.08
4	\$ 336.42
5	\$ 405.76
6	\$ 71.37
7	\$ 345.49
8	\$ 360.36
9	\$ 301.23
10	\$ 684.33
11	\$ 587.06
12	\$ 626.08
13	\$ 400.21
missing	\$ 198.25

The calculations for each mode of separation are provided in the Appendix (Tables A.1 to A.14)

5. Appendix

The calculations of average weighted cost per ED presentation per mode of separation are presented in Tables A.1 to A.14 below, based on 2012/13 NSW ED presentations data by visit type, triage category and mode of separation. Presentations within each mode of separation are allocated to the appropriate UDG class according to the algorithm summarised in Figure 1. These are then multiplied by the relevant cost from Table 2 and a weighted sum calculated based on the frequency of presentations in each UDG class.

Table A.1: Average weighted cost calculation, separation mode 1:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16	5706	1.15%	13.54
Subsequently Admitted, Triage 2	1.78	704.88	99407	20.12%	141.83
Subsequently Admitted, Triage 3	1.53	605.88	233442	47.25%	286.29
Subsequently Admitted, Triage 4	1.33	526.68	136775	27.68%	0.28
Subsequently Admitted, Triage 5	0.91	360.36	11655	2.36%	0.02
ED Only, Triage 1	1.62	641.52		0.00%	0.00
ED Only, Triage 2	1.24	491.04		0.00%	0.00
ED Only, Triage 3	1.08	427.68		0.00%	0.00
ED Only, Triage 4	0.81	320.76		0.00%	0.00
ED Only, Triage 5	0.5	198	7060	1.43%	2.83
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 1			494,045	100.00%	444.78

Table A.2: Average weighted cost calculation, separation mode 2:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16		0.00%	0.00
Subsequently Admitted, Triage 2	1.78	704.88		0.00%	0.00
Subsequently Admitted, Triage 3	1.53	605.88		0.00%	0.00
Subsequently Admitted, Triage 4	1.33	526.68		0.00%	0.00
Subsequently Admitted, Triage 5	0.91	360.36	6	0.01%	0.03
ED Only, Triage 1	1.62	641.52	644	0.83%	5.34
ED Only, Triage 2	1.24	491.04	17358	22.45%	110.22
ED Only, Triage 3	1.08	427.68	34253	44.30%	189.44
ED Only, Triage 4	0.81	320.76	22422	29.00%	93.01
ED Only, Triage 5	0.5	198	2645	3.42%	6.77
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 2			77,328	100.00%	404.82

Table A.3: Average weighted cost calculation, separation mode 3:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16	1252	64.21%	752.59
Subsequently Admitted, Triage 2	1.78	704.88	431	22.10%	155.80
Subsequently Admitted, Triage 3	1.53	605.88	192	9.85%	59.66
Subsequently Admitted, Triage 4	1.33	526.68	48	2.46%	12.96
Subsequently Admitted, Triage 5	0.91	360.36	16	0.82%	2.96
ED Only, Triage 1	1.62	641.52		0.00%	0.00
ED Only, Triage 2	1.24	491.04		0.00%	0.00
ED Only, Triage 3	1.08	427.68		0.00%	0.00
ED Only, Triage 4	0.81	320.76		0.00%	0.00
ED Only, Triage 5	0.5	198	11	0.56%	1.12
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 3			1,950	100.00%	985.08

Table A.4: Average weighted cost calculation, separation mode 4:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16		0.00%	0.00
Subsequently Admitted, Triage 2	1.78	704.88		0.00%	0.00
Subsequently Admitted, Triage 3	1.53	605.88		0.00%	0.00
Subsequently Admitted, Triage 4	1.33	526.68		0.00%	0.00
Subsequently Admitted, Triage 5	0.91	360.36	117	0.01%	0.03
ED Only, Triage 1	1.62	641.52	1135	0.08%	0.52
ED Only, Triage 2	1.24	491.04	77815	5.51%	27.06
ED Only, Triage 3	1.08	427.68	371869	26.34%	112.64
ED Only, Triage 4	0.81	320.76	706187	50.02%	160.43
ED Only, Triage 5	0.5	198	254770	18.04%	35.73
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 4			1,411,893	100.00%	336.42

Table A.5: Average weighted cost calculation, separation mode 5:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16		0.00%	0.00
Subsequently Admitted, Triage 2	1.78	704.88		0.00%	0.00
Subsequently Admitted, Triage 3	1.53	605.88		0.00%	0.00
Subsequently Admitted, Triage 4	1.33	526.68		0.00%	0.00
Subsequently Admitted, Triage 5	0.91	360.36	0	0.00%	0.00
ED Only, Triage 1	1.62	641.52	325	2.31%	14.85

ED Only, Triage 2	1.24	491.04	3068	21.85%	107.27
ED Only, Triage 3	1.08	427.68	6084	43.32%	185.28
ED Only, Triage 4	0.81	320.76	3887	27.68%	88.78
ED Only, Triage 5	0.5	198	680	4.84%	9.59
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 5			14,044	100.00%	405.76

Table A.6: Average weighted cost calculation, separation mode 6:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16		0.00%	0.00
Subsequently Admitted, Triage 2	1.78	704.88		0.00%	0.00
Subsequently Admitted, Triage 3	1.53	605.88		0.00%	0.00
Subsequently Admitted, Triage 4	1.33	526.68		0.00%	0.00
Subsequently Admitted, Triage 5	0.91	360.36	31	0.03%	0.11
ED Only, Triage 1	1.62	641.52		0.00%	0.00
ED Only, Triage 2	1.24	491.04		0.00%	0.00
ED Only, Triage 3	1.08	427.68		0.00%	0.00
ED Only, Triage 4	0.81	320.76		0.00%	0.00
ED Only, Triage 5	0.5	198		0.00%	0.00
Did not wait	0.18	71.28	101,045	99.97%	71.26
Total, separation mode 6			101,076	100.00%	71.37

Table A.7: Average weighted cost calculation, separation mode 7:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16		0.00%	0.00
Subsequently Admitted, Triage 2	1.78	704.88		0.00%	0.00
Subsequently Admitted, Triage 3	1.53	605.88		0.00%	0.00
Subsequently Admitted, Triage 4	1.33	526.68		0.00%	0.00
Subsequently Admitted, Triage 5	0.91	360.36	1	0.00%	0.01
ED Only, Triage 1	1.62	641.52	80	0.16%	1.05
ED Only, Triage 2	1.24	491.04	3015	6.18%	30.36
ED Only, Triage 3	1.08	427.68	14219	29.15%	124.69
ED Only, Triage 4	0.81	320.76	24507	50.25%	161.18
ED Only, Triage 5	0.5	198	6950	14.25%	28.21
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 7			48,772	100.00%	345.49

Table A.8: Average weighted cost calculation, separation mode 8:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16		0.00%	0.00
Subsequently Admitted, Triage 2	1.78	704.88		0.00%	0.00
Subsequently Admitted, Triage 3	1.53	605.88		0.00%	0.00
Subsequently Admitted, Triage 4	1.33	526.68		0.00%	0.00
Subsequently Admitted, Triage 5	0.91	360.36	2865	100.00%	360.36
ED Only, Triage 1	1.62	641.52		0.00%	0.00
ED Only, Triage 2	1.24	491.04		0.00%	0.00
ED Only, Triage 3	1.08	427.68		0.00%	0.00
ED Only, Triage 4	0.81	320.76		0.00%	0.00
ED Only, Triage 5	0.5	198		0.00%	0.00
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 8			2,865	100.00%	360.36

Table A.9: Average weighted cost calculation, separation mode 9:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16		0.00%	0.00
Subsequently Admitted, Triage 2	1.78	704.88		0.00%	0.00
Subsequently Admitted, Triage 3	1.53	605.88		0.00%	0.00
Subsequently Admitted, Triage 4	1.33	526.68		0.00%	0.00
Subsequently Admitted, Triage 5	0.91	360.36	2	0.01%	0.02
ED Only, Triage 1	1.62	641.52	51	0.14%	0.89
ED Only, Triage 2	1.24	491.04	1756	4.78%	23.48
ED Only, Triage 3	1.08	427.68	5243	14.28%	61.07
ED Only, Triage 4	0.81	320.76	16689	45.45%	145.79
ED Only, Triage 5	0.5	198	12977	35.34%	69.98
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 9			36,718	100.00%	301.23

Table A.10: Average weighted cost calculation, separation mode 10:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16	3782	7.95%	93.16
Subsequently Admitted, Triage 2	1.78	704.88	22526	47.34%	333.68
Subsequently Admitted, Triage 3	1.53	605.88	16577	34.84%	211.07
Subsequently Admitted, Triage 4	1.33	526.68	3781	7.95%	41.85
Subsequently Admitted, Triage 5	0.91	360.36	218	0.46%	1.65
ED Only, Triage 1	1.62	641.52		0.00%	0.00

ED Only, Triage 2	1.24	491.04		0.00%	0.00
ED Only, Triage 3	1.08	427.68		0.00%	0.00
ED Only, Triage 4	0.81	320.76		0.00%	0.00
ED Only, Triage 5	0.5	198	701	1.47%	2.92
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 10			47,585	100.00%	684.33

Table A.11: Average weighted cost calculation, separation mode 11:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16	375	4.30%	50.39
Subsequently Admitted, Triage 2	1.78	704.88	1380	15.82%	111.50
Subsequently Admitted, Triage 3	1.53	605.88	3448	39.52%	239.46
Subsequently Admitted, Triage 4	1.33	526.68	2615	29.97%	157.87
Subsequently Admitted, Triage 5	0.91	360.36	391	4.48%	16.15
ED Only, Triage 1	1.62	641.52		0.00%	0.00
ED Only, Triage 2	1.24	491.04		0.00%	0.00
ED Only, Triage 3	1.08	427.68		0.00%	0.00
ED Only, Triage 4	0.81	320.76		0.00%	0.00
ED Only, Triage 5	0.5	198	515	5.90%	11.69
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 11			8,724	100.00%	587.06

Table A.12: Average weighted cost calculation, separation mode 12:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16	996	3.37%	39.53
Subsequently Admitted, Triage 2	1.78	704.88	7670	25.97%	183.05
Subsequently Admitted, Triage 3	1.53	605.88	13761	46.59%	282.29
Subsequently Admitted, Triage 4	1.33	526.68	6403	21.68%	114.18
Subsequently Admitted, Triage 5	0.91	360.36	418	1.42%	5.10
ED Only, Triage 1	1.62	641.52		0.00%	0.00
ED Only, Triage 2	1.24	491.04		0.00%	0.00
ED Only, Triage 3	1.08	427.68		0.00%	0.00
ED Only, Triage 4	0.81	320.76		0.00%	0.00
ED Only, Triage 5	0.5	198	287	0.97%	1.92
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 12			29,535	100.00%	626.08

Table A.13: Average weighted cost calculation, separation mode 13:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16		0.00%	0.00
Subsequently Admitted, Triage 2	1.78	704.88		0.00%	0.00
Subsequently Admitted, Triage 3	1.53	605.88		0.00%	0.00
Subsequently Admitted, Triage 4	1.33	526.68		0.00%	0.00
Subsequently Admitted, Triage 5	0.91	360.36	0	0.00%	0.00
ED Only, Triage 1	1.62	641.52	47	1.39%	8.89
ED Only, Triage 2	1.24	491.04	777	22.92%	112.55
ED Only, Triage 3	1.08	427.68	1383	40.80%	174.48
ED Only, Triage 4	0.81	320.76	972	28.67%	91.97
ED Only, Triage 5	0.5	198	211	6.22%	12.32
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode 13			3,390	100.00%	400.21

Table A.14: Average weighted cost calculation, separation mode missing:

UDG class for costing purposes	Cost weight (a)	Cost \$ (a x 396) (b)	Number (c)	% (c / total) (d)	Weighted cost \$ (b x d)
Subsequently Admitted, Triage 1	2.96	1172.16		0.00%	0.00
Subsequently Admitted, Triage 2	1.78	704.88		0.00%	0.00
Subsequently Admitted, Triage 3	1.53	605.88		0.00%	0.00
Subsequently Admitted, Triage 4	1.33	526.68		0.00%	0.00
Subsequently Admitted, Triage 5	0.91	360.36	1	0.15%	0.55
ED Only, Triage 1	1.62	641.52		0.00%	0.00
ED Only, Triage 2	1.24	491.04		0.00%	0.00
ED Only, Triage 3	1.08	427.68		0.00%	0.00
ED Only, Triage 4	0.81	320.76		0.00%	0.00
ED Only, Triage 5	0.5	198	653	99.85%	197.70
Did not wait	0.18	71.28		0.00%	0.00
Total, separation mode missing			654	100.00%	198.25

6. References

ⁱ NSW Government Health (2011) Costs of Care Standards 2009/10

http://www0.health.nsw.gov.au/policies/gl/2011/GL2011_007.html

ⁱⁱ 2012/13 NSW ED presentations data by visit type, triage category and mode of separation, provided by NSW Health