

Appendix 2: Cost Benefit Analysis

The analysis below suggests that a hospital that inserts 1,000 large bore catheters per year with an average arterial cannulation rate (0.5%) could save up to \$116,518 by using the Compass, assuming that the device costs \$35 and reduces the incidence of arterial cannulation to 0%. This equals a cost savings of \$116 per catheter. Alternate scenarios with different complication rates are also included. In the lowest complication rate scenario (0.1%), the break even point for the Compass is \$26.35 (the price at which the costs saved by using the Compass equals the device cost).

The following assumptions were used in the cost-benefit analysis:

- All arterial cannulations are managed with direct surgical or interventional techniques(16), thereby avoiding many of the more serious complications and deaths associated with the pull/pressure technique. In a “real world” scenario where the pull-pressure technique may be used, the costs would likely be higher.
- Prices for endovascular management, rather than open repair, are used in the analysis. As open repair costs are higher, this represents a conservative cost estimate.
- Patients require a 2-day ICU stay (based on a review of arterial cannulation management where the range was 1-11 days with a median stay of 2 days(11)).
- 1 in 10 arterial cannulations result in a legal claim against the hospital.
- The analysis does not take into account the cost of avoidable patient death or the cost of canceled elective surgical procedures.
- Based on published series, three rates of arterial cannulation are included: low (0.1%), medium (0.5%), and high (1.0%).

	Cost	High Incidence	Average Incidence	Low Incidence
Arterial Cannulation Rate		1.00%	0.50%	0.10%
# Arterial Cannulation		10	5	1
Angiography	\$431	\$4,310	\$2,155	\$431
Endovascular Repair	\$10,290	\$102,900	\$51,450	\$10,290
ICU - 2 day stay	\$10,000	\$100,000	\$50,000	\$10,000
Claims Cost (1 in 10 cases)	\$95,816	\$95,816	\$47,908	\$9,582
Total Costs		\$303,036	\$151,518	\$30,303
Compass Cost	(\$35)	(\$35,000)	(\$35,000)	(\$35,000)
Total Savings		\$268,036	\$116,518	(\$4,697)
Savings per catheter		\$268	\$116	(\$5)
Break Even Price (Compass)		\$303	\$151	\$30

Costs used in analysis:

Carotid artery stent procedure, MS-DRG 035-Other vascular procedures with CC:

\$10,290 (2008 National Average Payment Rate)

Computed tomographic angiography, neck, with contrast material(s), including noncontrast images, if performed, and image post-processing, CPT Code 70498: \$431

ICU cost \$10,000 for 2 days (42)

The average claim for a mechanical injury deemed “preventable by pressure waveform monitoring” resulted in an average payment of just over \$95,000 (see Table; data from Domino et al.(4))

Injury	Number	Median Payment
Carotid artery puncture	16	\$40,870
Hemothorax	2	\$297,000
Wire/catheter embolus	1	\$39,725
Other vessel injury	6	\$184,625
Average Claim (weighted)		\$95,816