

Implementation of an acute care bundle for intracerebral haemorrhage: Experience at a UK Comprehensive Stroke Centre and associated reduction in 30-day case fatality

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X	No, nothing to disclose
	Yes, please specify:

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Acute Bundle of Care for ICH (ABC-ICH) project

Design: Single centre quality improvement project and evaluation

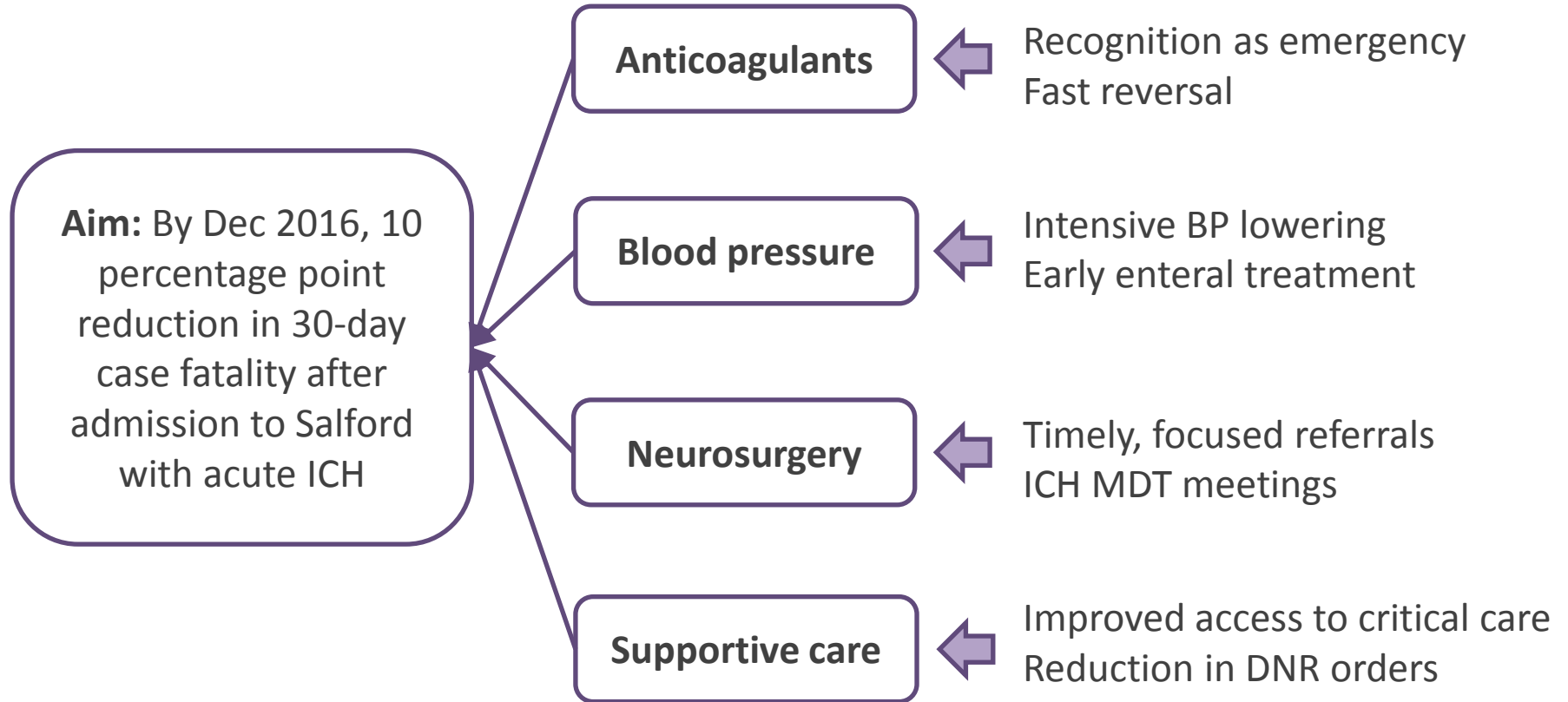
Site: Salford Royal Hospital, Greater Manchester, UK

Aim: 10 percentage point reduction in 30-day case fatality after admission with acute ICH by the end of 2016.

Methods:

- Model for Improvement used to conduct QI project
- Improvement phase: June 2015 – June 2016
- Data entered in QI registry from Jun 2013 – Jan 2017
- All spontaneous ICH included (excluded traumatic ICH, haemorrhagic transformation)

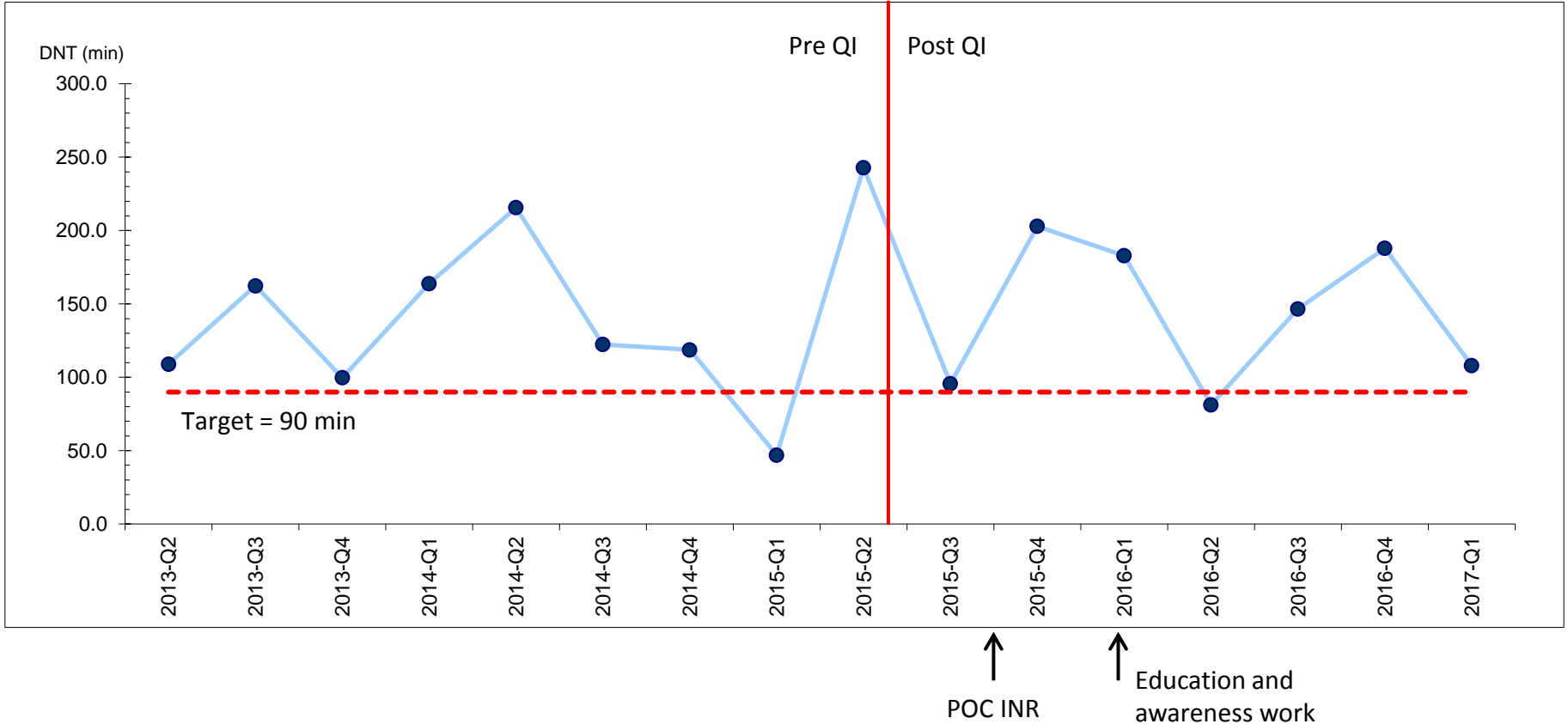
Driver diagram



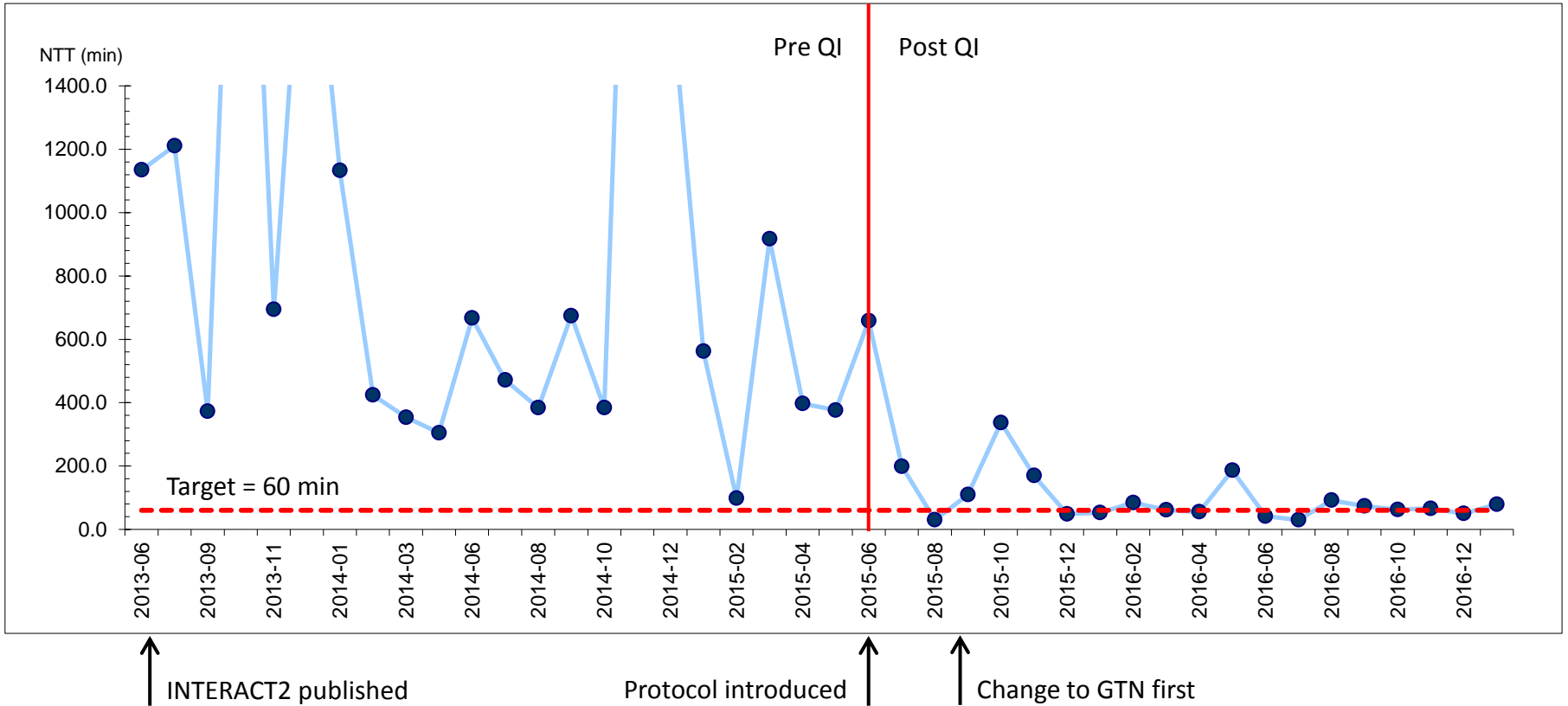
The ABC hyperacute care bundle

- A. Anticoagulant reversal:** Deliver reversal agent < 90 min from arrival
- B. Blood pressure lowering:** Deliver intensive blood pressure lowering with needle-to-target time < 60 min
- C. Care pathway:** Refer patients with good pre-morbid function (mRS \leq 2) and any of the following to Neurosurgery:
 - GCS < 9
 - Posterior fossa ICH
 - Obstructed 3rd/4th ventricle
 - Haematoma volume > 30 ml

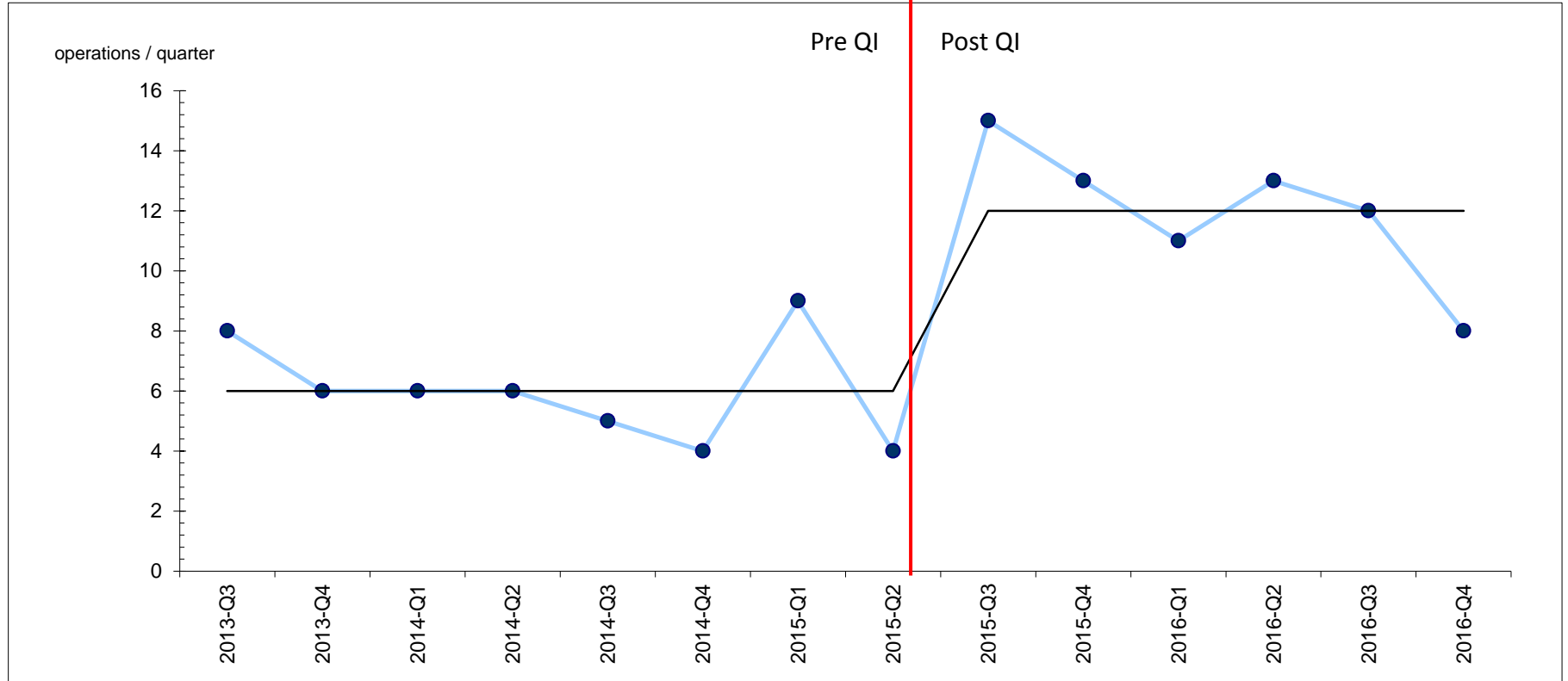
Anticoagulant reversal – DNT by quarter



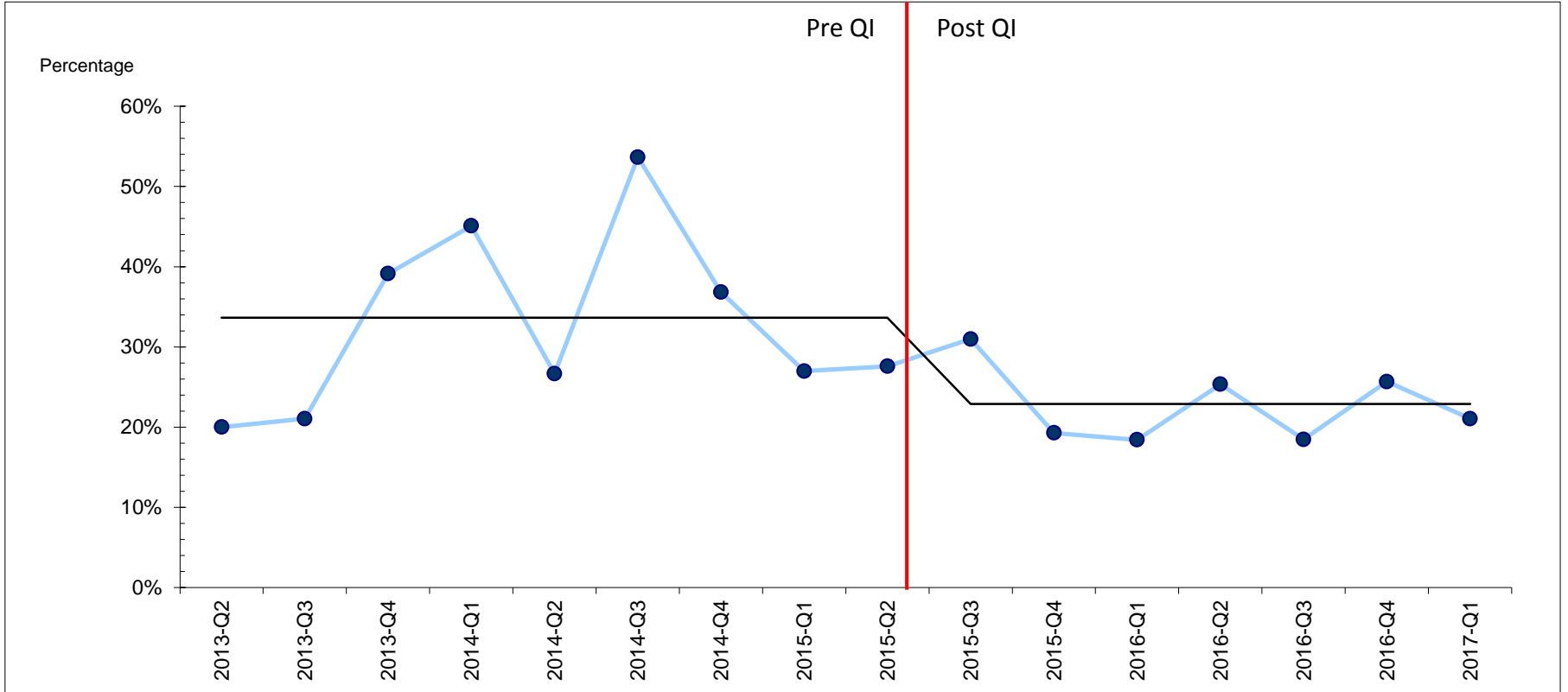
Intensive BP lowering – NTT by month



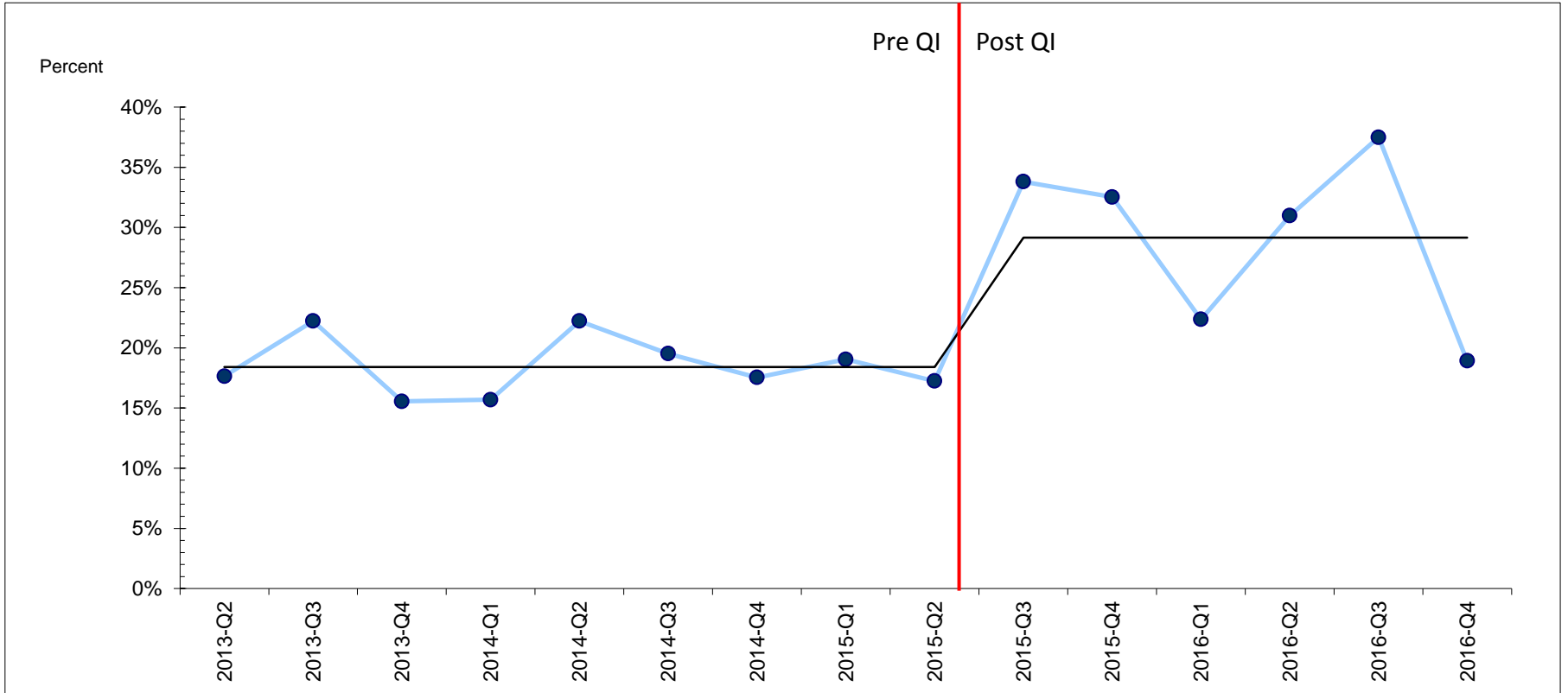
Neurosurgery - operations per quarter



DNR order by < 24 h - % by quarter



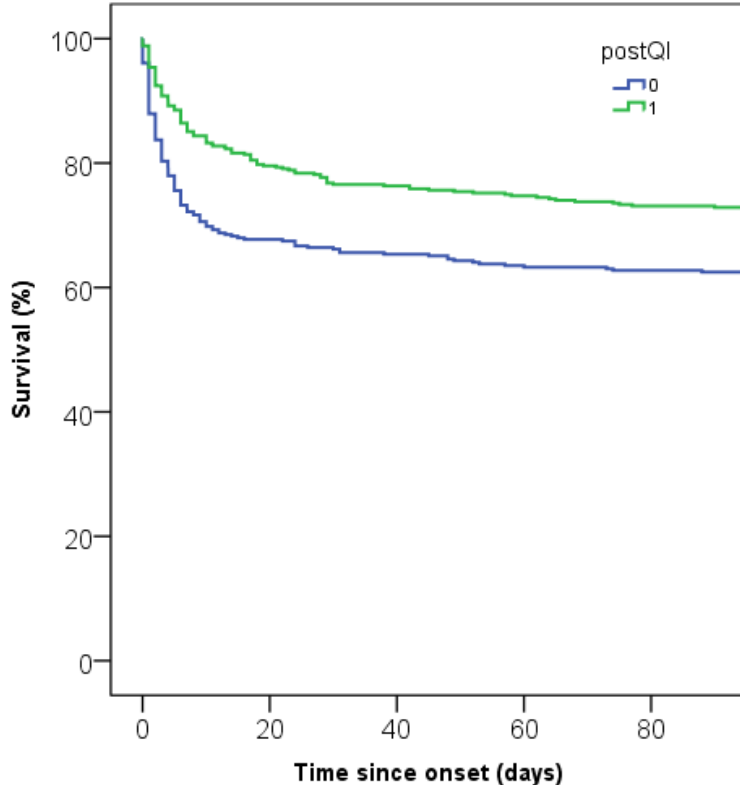
Critical care admissions - % by quarter



Baseline characteristics

Factor	Pre QI (n=381)	Post QI (n=449)	p
Age	71.8 (57.0 – 81.2)	70.6 (56.8 – 80.3)	0.96
Premorbid mRS (0-2)	305 (80.1%)	370 (82.4%)	0.42
Anticoagulant	55 (14.4%)	57 (12.7%)	0.48
Sex (female)	199 (52.2%)	232 (51.7%)	0.89
GCS	14 (10-15)	14 (11-15)	0.94
Infratentorial	45 (11.8%)	55 (12.2%)	0.92
IVH	147 (38.7%)	168 (37.4%)	0.72
ICH volume (ml)	19.0 (6.4 – 51.7)	17.1 (5.1 – 44.8)	0.18

Kaplan-Meier analysis



Pre-QI project commencement:

- Jul 2013 – May 2015
- 381 cases admitted
- 30-day case fatality = 33.9%

Post-QI project commencement:

- Jun 2015 – Jul 2016
- 449 cases admitted
- 30-day case fatality = 23.4%

Logrank test: **p=0.001**

Cox regression analysis

Factor	HR	95% CI	Sig.
GCS	0.87	0.84 to 0.89	<0.0001
Anticoagulant	1.38	1.06 to 1.81	0.018
Infratentorial	1.78	1.32 to 2.39	<0.0001
IVH	1.38	1.11 to 1.73	0.05
ICH vol	1.007	1.005 to 1.009	<0.0001
Age	1.053	1.043 to 1.063	<0.0001
Post QI	0.67	0.54 to 0.84	<0.0001
Post QI (unadj)	0.69	0.55 to 0.86	0.001

Conclusion

- Improvements seen in blood pressure lowering, surgery rates and supportive care
- Associated with significant improvement in 30-day case fatality
- **Next steps:**
 - Scale up in Greater Manchester supported by Health Foundation
 - Survival and 6-month mRS to be collected
 - Robust evaluation of clinical and cost effectiveness in RCT

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