Stroke123: results from a multicentre, controlled before-and-after study

Professor Dominique Cadilhac

Co-authors: MF. Kilkenny, NE. Andrew, K Hill, B Grabsch, NA. Lannin, CS. Anderson, C Levi, AG. Thrift, S Faux, GA. Donnan, S Middleton, G Cadigan, J Wakefield, R Grimley on behalf of the Stroke123 investigators and AuSCR Consortium
Background

• Improving access to evidence-based care may reduce preventable death and disability from stroke
• Effective strategies exist for changing clinician behavior to improve care, but need evaluating in stroke
• Within Australia, snapshot ‘audit’ and feedback is undertaken with a national audit, and from 2009 AuSCR was established (*voluntary, continuous data collection*)
• In Queensland, proactive clinicians and government established state-wide quality improvement programs
  – worked with the Stroke Foundation to deliver StrokeLink
Aim

To determine if **organizational interventions** for acute stroke care are more effective compared with usual quality improvement.

**Organizational interventions** included:

- **Financial incentives** for increased access to stroke units
- **Tailored quality improvement program** incorporating external facilitation and feedback on clinical indicators and 90-day outcomes (Enhanced StrokeLink)

- Eligibility:
  - Hospitals collecting data in AuSCR

![Diagram of PDCA cycle with external facilitation and implementation of action plan and external support](diagram.png)
Methods

• Controlled before-after study with four time points

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<tbody>
<tr>
<td>Pre-lx</td>
<td>2010-12</td>
<td>2012-14</td>
<td>2014</td>
<td>2014-15</td>
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<td>Enhanced StrokeLink</td>
<td>Post-lx</td>
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• **Primary outcome**: net change in composite score (proportion of processes achieved of 8 pre-defined processes) [T0 vs T3]

• **Secondary**: change in individual processes; composite score change comparing hospitals that did vs did not develop action plans in T2; national comparison providing a temporal control (composite 4 indicators)

• Multivariable analyses adjusted for patient clustering by hospital


Australian Stroke Clinical Registry used in Queensland (2012-2015)
N=13,433

Rest of AuSCR (New South Wales, Victoria, Tasmania, Western Australia) (2009-2015)
N=20,484 (23 hospitals)


Excludes:
- 3 hospitals not participating in the intervention (n = 4,661)
- 1 hospital with no AuSCR data
- From 2004-09 not all indicators were collected (n = 6,298)

Time period (T)

Primary outcome (composite score)

Secondary outcome (action plan)

$T_0$ Pre-intervention (1/1/2010–30/6/2012) N = 5,596

$T_1$ Financial incentives (1/7/2012-10/3/2014) N = 4,443

$T_2$ Enhanced StrokeLink (11/3/2014-7/11/2014) N = 2,682

$T_3$ Post-intervention (8/11/2014 – 31/12/2015) N = 4,781

19 hospitals N = 17,502

$T_0$ N = 5,903

$T_1$ N = 6,675

$T_2$ N = 2,718

$T_3$ N = 5,188

14 hospitals N = 13,861

Secondary outcome (to assess temporal trends)
Summary of results

• **Primary outcome**: improvement in composite outcome: 18% over the whole Stroke123 intervention period (14% following introduction of financial incentives) [8 indicators * and **]
• **Action plan**: 8% difference in the indicators that a hospital self-nominated
• **Comparison with rest of Australia***
  - 17% improvement in Queensland (95%CI 0.13, 0.20)
  - No change in hospitals from other parts of Australia (95% CI -0.03, 0.03)
• Change in practice can be significantly improved with financial incentives and an externally facilitated QI program that provides national registry outcome data
• Merits further study and application in different environments

*stroke unit care, thrombolysis, antihypertensive medication at discharge, discharge plan  **Mobilization same or following day of admission, swallowing screen/assessment, aspirin within 48 hours, discharged with antithrombotics