

Background

- The NPS aims to improve prescribing and use of medicines consistent with evidence-based best practice
- The NPS antibiotics program consisted of a mix of passive (mail outs) and active (direct contact) interventions aimed primarily at GPs

Objectives

- This report compares two multiple regression methods used to determine whether the multiple educational interventions influenced the volume and profile of antibiotic prescribing by GPs for upper respiratory tract infection in Australia

Data

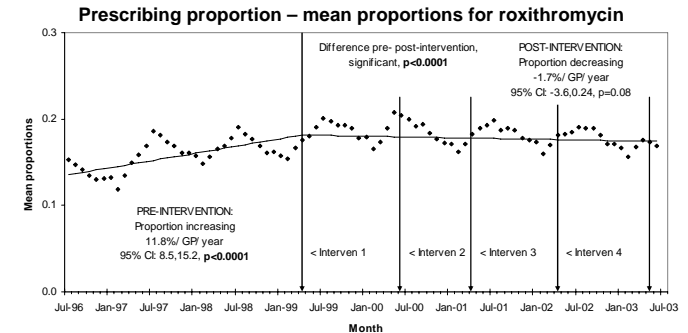
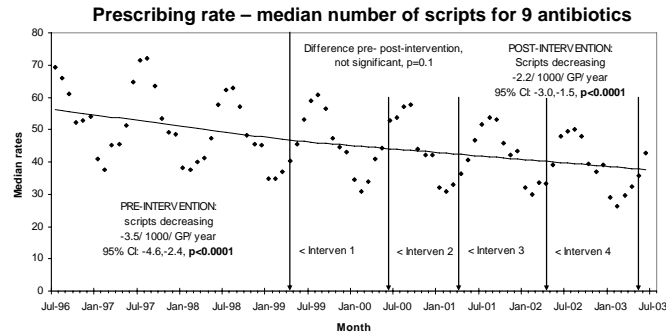
- Administrative claims (from Health Insurance Commission)
- Monthly data over 84 months – July 1996 to June 2003
- General practitioner data (GPs being focus of NPS programs)
- Nine antibiotics primarily used for upper respiratory tract infections amoxicillin, amoxicillin with clavulanic acid, cefaclor, cefuroxime, clarithromycin, doxycycline, erythromycin, phenoxymethylpenicillin, roxithromycin
- Original scripts (not repeats) – to reflect prescribing decision
- By date of prescribing
- Data represent 55% of primary care antibiotic scripts

Outcome measures

- Prescribing rate = median number of prescriptions / 1000 consultations / GP / month
- Prescribing proportion = $\frac{\text{mean proportion (across GPs) of volume of specific antibiotic}}{\text{volume of all nine antibiotics}}$

Statistical analysis

- Augmented regression – included seasonality (as harmonic terms), autocorrelated error and one intervention point (Model 1; Intervent 1)¹
- Seasonally adjusted piecewise linear dynamic regression – had seasonality removed prior to modelling, autocorrelated error and one or several intervention points (including active GP participation) (Model 2a, b, c; Intervent 1, 2, 3, 4, GPs)²
- Both approaches assume trends would remain the same if there was no intervention effect and if there was an effect a simple change in trend would occur



Regression Parameter	Model 1	Model 2a	Model 2b	Model 2c
Intercept	56.50	55.56	55.59	55.68
p-value	0.000	0.000	0.000	0.000
Initial trend	-0.29	-0.25	-0.25	-0.26
p-value	0.000	0.000	0.000	0.000
Interven 1	0.11	0.07	0.08	0.22
p-value	0.100	0.295	0.680	0.400
Interven 2	-	-	-	-0.07
p-value	-	-	-	0.812
Interven 3	-	-	-	0.10
p-value	-	-	-	0.767
Interven 4	-	-	-	-0.24
p-value	-	-	-	0.429
GPs	-	-	-0.038	-0.58
p-value	-	-	0.974	0.657

Regression Parameter	Model 1	Model 2a	Model 2b	Model 2c
Intercept	13.53	13.41	13.41	13.63
p-value	0.000	0.000	0.000	0.000
Initial trend	0.93	0.15	0.15	0.13
p-value	0.000	0.000	0.000	0.000
Interven 1	-1.09	-0.18	-0.18	-0.04
p-value	0.000	0.000	0.001	0.634
Interven 2	-	-	-	-0.19
p-value	-	-	-	0.060
Interven 3	-	-	-	0.14
p-value	-	-	-	0.224
Interven 4	-	-	-	-0.16
p-value	-	-	-	0.111
GPs	-	-	-0.001	-0.09
p-value	-	-	0.997	0.766

Results

- Both methods described a similar decrease in median prescription rates over the 84 months, with a non-significant increase after the first intervention in April 1999 (p=0.100 or 0.295)
- The inclusion of more interventions and the active (GP) term made no difference to this conclusion (p=0.400)
- Using the proportion of roxithromycin as an example of the analyses of proportions, both methods implied that after April 1999 the proportion significantly decreased (p<0.001)
- The significance of this intervention “disappears” in the model which includes all interventions and the active (GP) term (p=0.634)

Conclusions

- Two regression analyses of monthly times series data provide very similar conclusions
- Multiple intervention terms may not need to be considered separately when they are part of an extended roll-out of related interventions

References

- Badcock CA. The impact of the NPS educational program on antibiotic prescribing. Report for NPS, 2004. Unpublished.
- Hyndman RJ, Akram M. Analysis of NPS antibiotic interventions. Report for NPS, 2004. Unpublished.

Disclosure statement

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