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Mortality and the weekend effect

Rohan Cattell

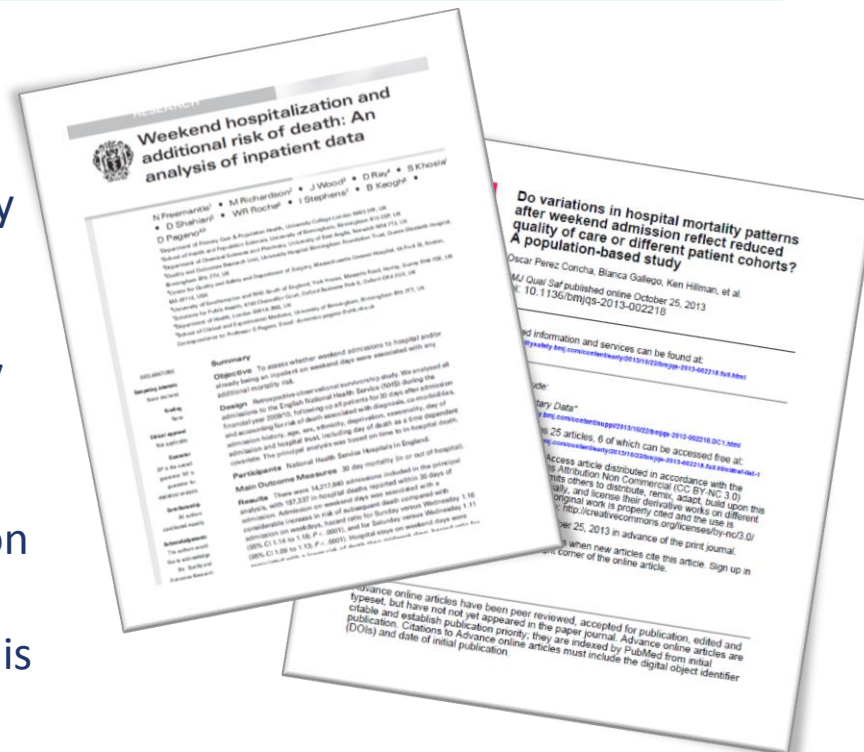


Mortality and the weekend effect

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The weekend effect

- A number of studies in several countries have found that **emergency patients admitted on the weekend** are more likely to die than those admitted during the week
- Most studies look at **risk adjusted 30 day mortality**
- Some studies also look at elective admissions with procedures performed on the weekend
- Most studies conclude that **risk of death** is about **10-15% higher** for emergency patients admitted on the weekend.



Standardised mortality ratios (SMRs)

- We don't have post-discharge mortality information so **can't do 30 day mortality**
- But we **can do in-hospital mortality**
- HRT calculates SMRs at the whole of hospital level (HSMRs) as well as for patient subgroups.
- We can restrict the SMR to just emergency patients and compare patients admitted on the weekend to those admitted during the week.

Risk adjustment

- **SMR = [observed deaths] / [expected deaths]**
- Calculation of expected deaths considers the patient population in question with respect to:
 - Principal diagnosis,
 - age,
 - sex,
 - admission source,
 - admission type,
 - Charlson comorbidity index (CCI) score

SMR example

- In the period from April 2014 – March 2015, **Eagle** had **35,329** emergency episodes. **731** episodes were excluded from the analysis, of the remaining episodes there were:
 - **609** expected deaths
 - **427** observed deaths

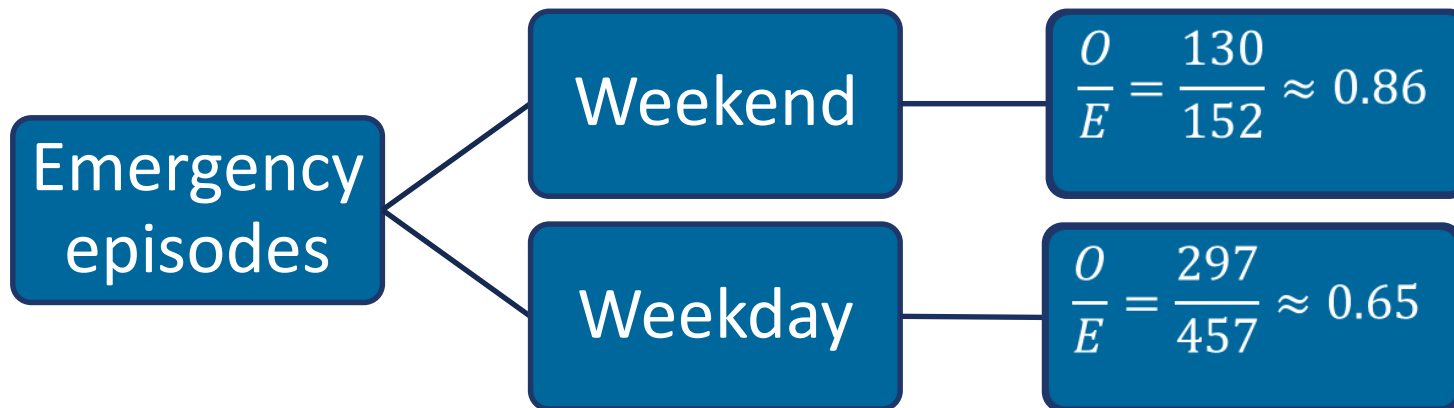
$$\text{SMR} = \frac{427}{609} \approx 0.70$$

Observed deaths

Expected deaths

Weekend vs weekday SMRs

What happens if we split Eagle's SMR by day of admission?

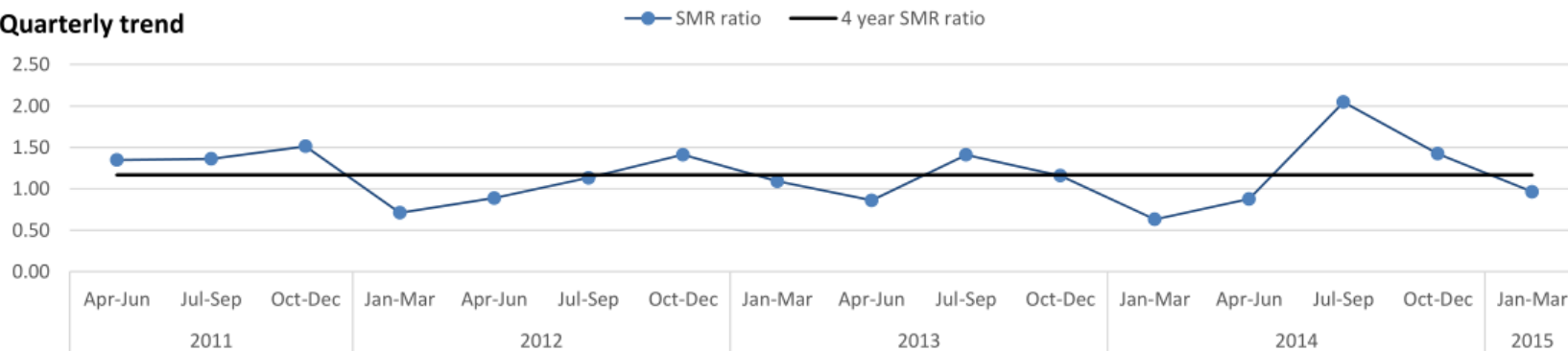


Ratio of weekend to weekday SMRs is $\frac{0.86}{0.65} \approx 1.32$

Accounting for variation

- SMRs will bounce around due to random variation
- How do we know this result wasn't just random variation?

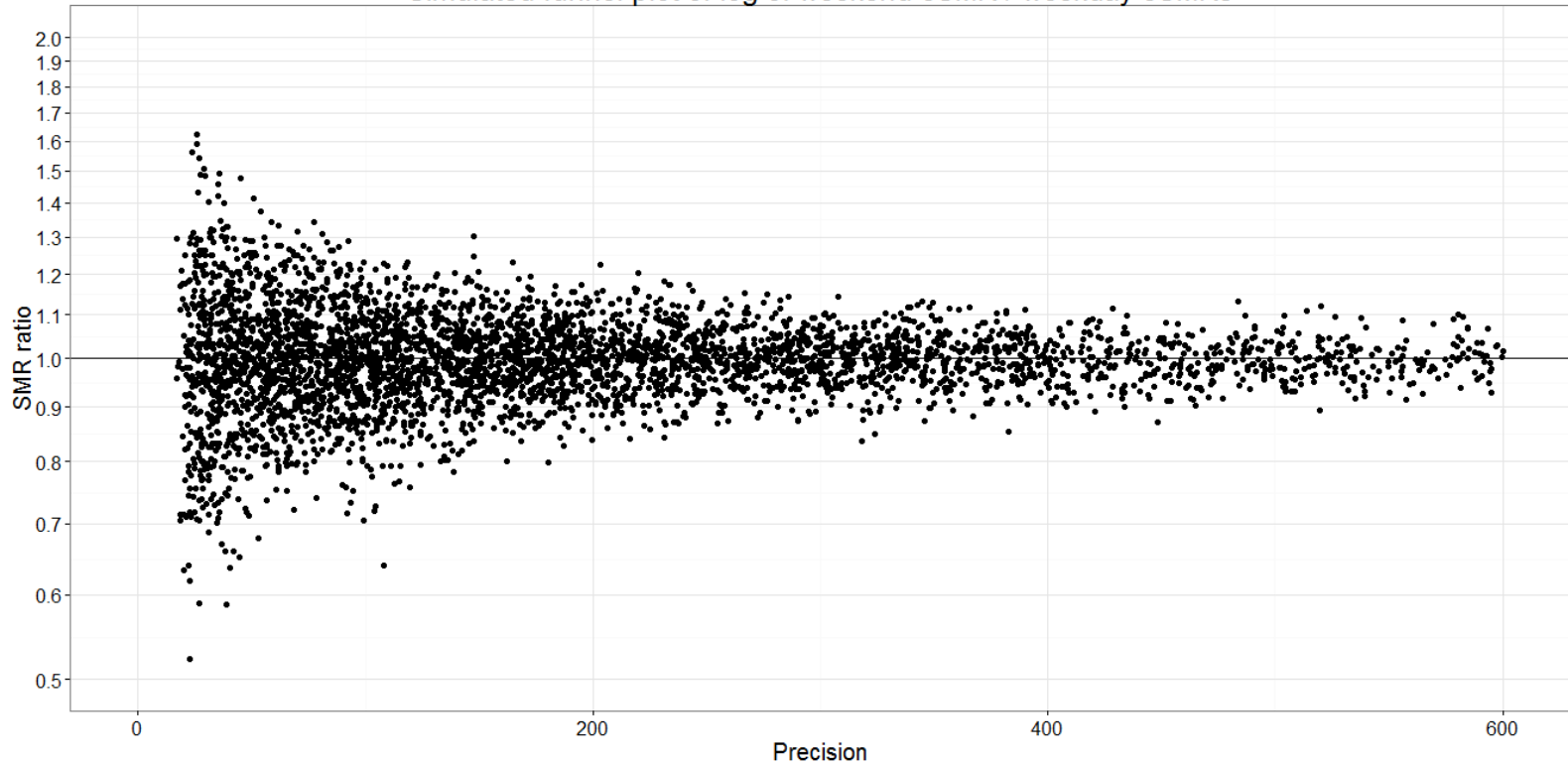
Quarterly trend



What variation should we expect?



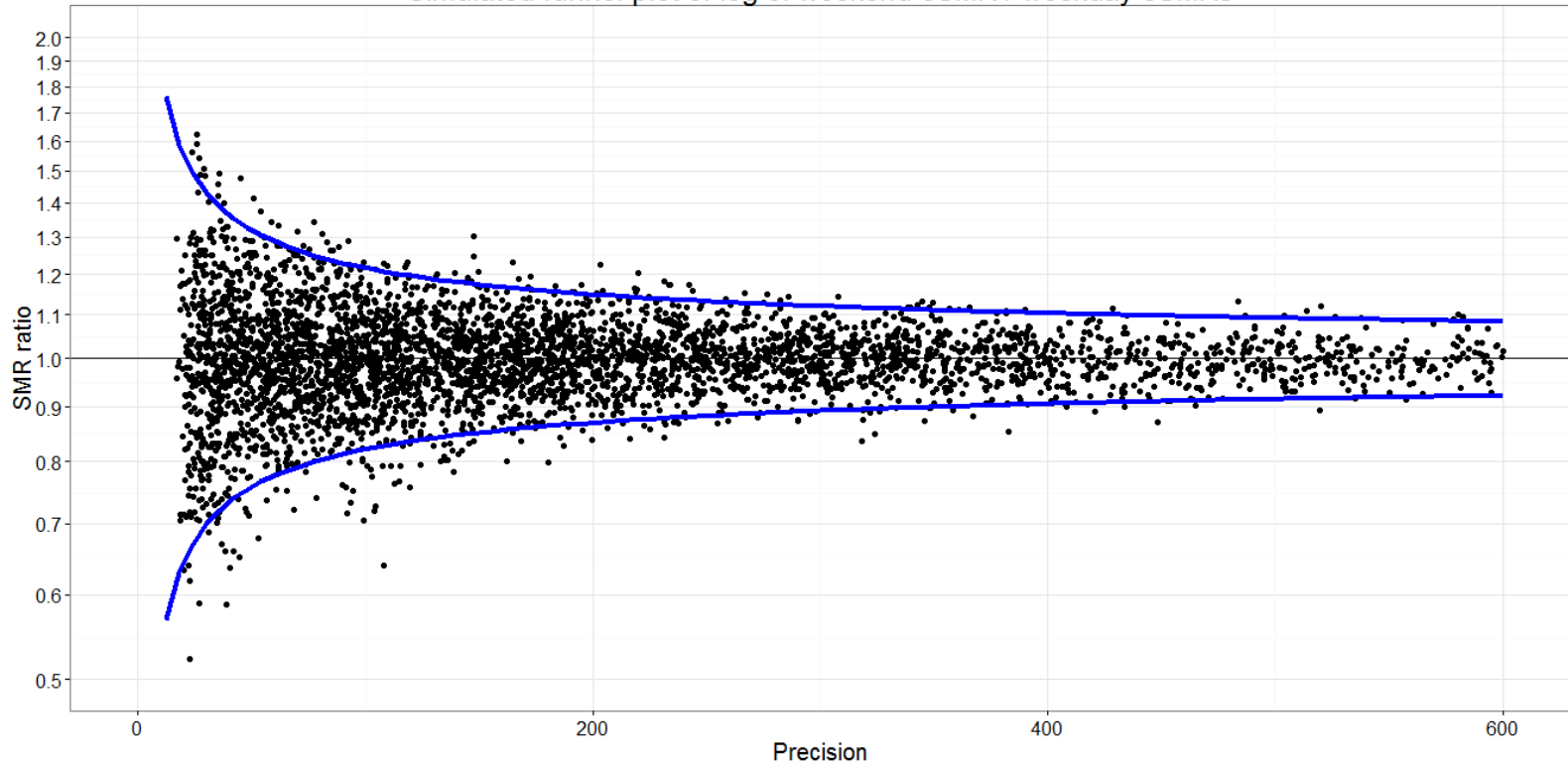
Simulated funnel plot of log of weekend eSMR / weekday eSMRs



What variation should we expect?



Simulated funnel plot of log of weekend eSMR / weekday eSMRs

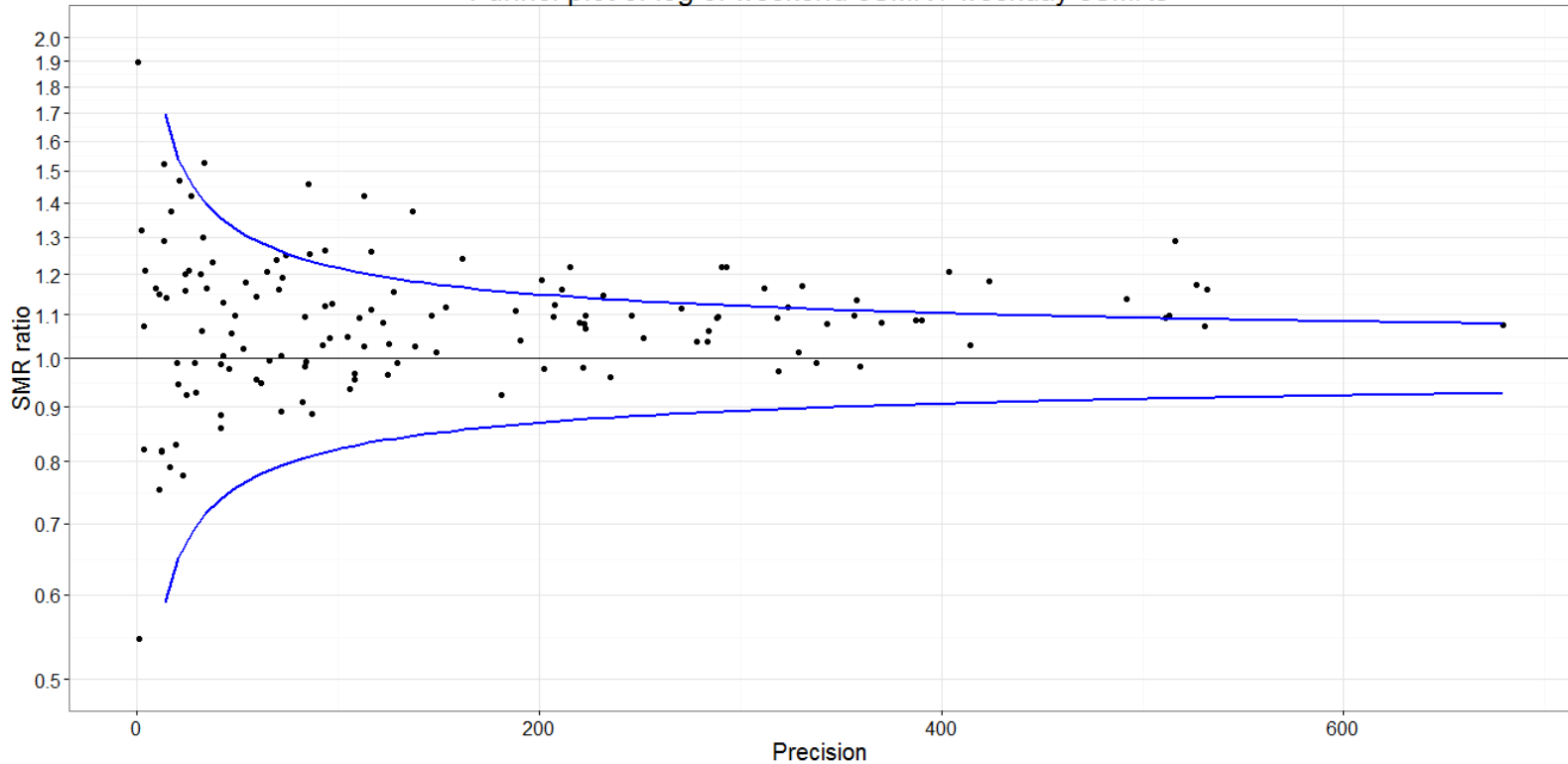


Funnel plot of actual hospitals

4 years data: Apr 2011 – Mar 2015



Funnel plot of log of weekend eSMR / weekday eSMRs

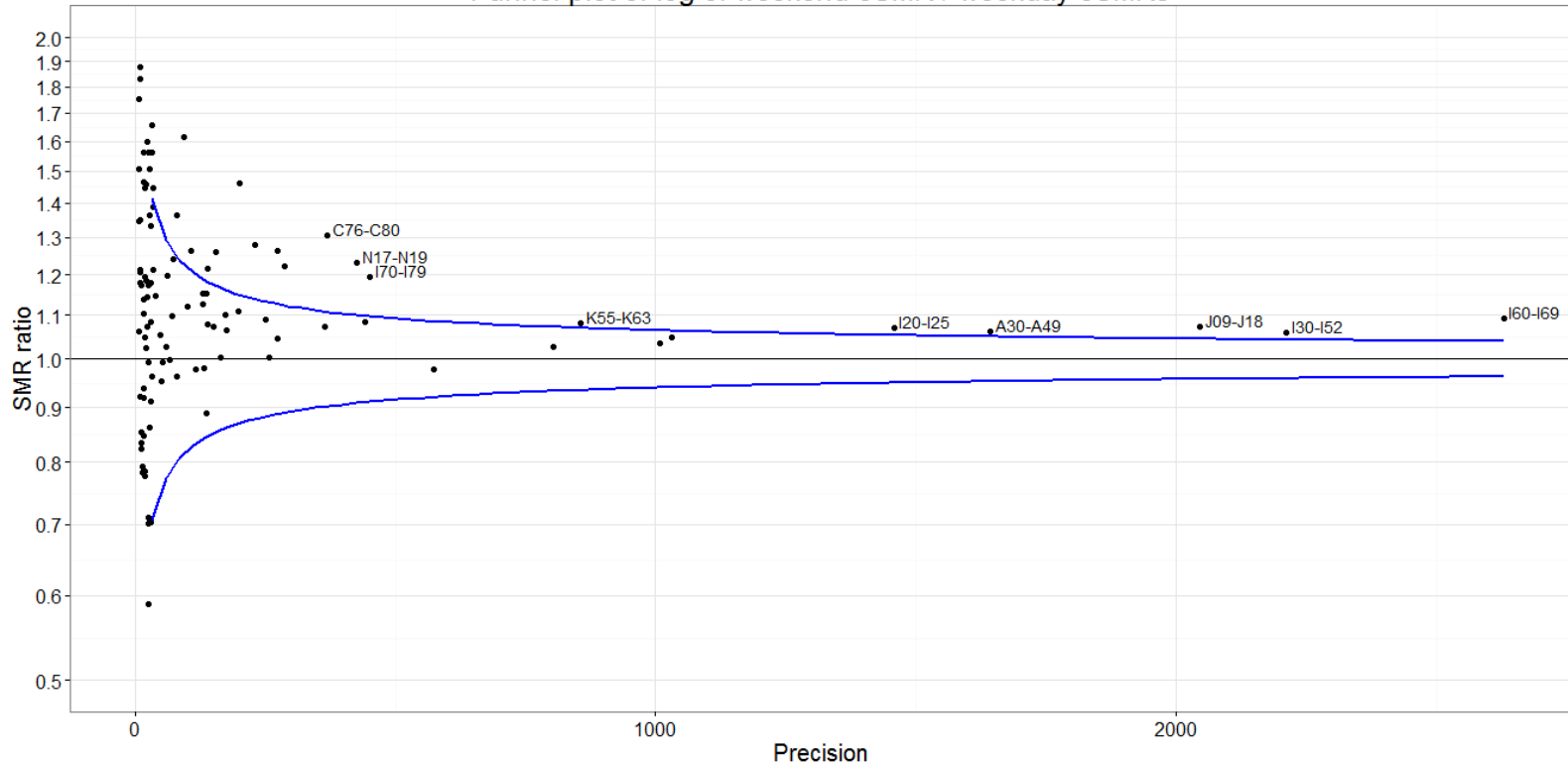


Funnel plot of principal diagnosis blocks

4 years data: Apr 2011 – Mar 2015, all HRT hospitals

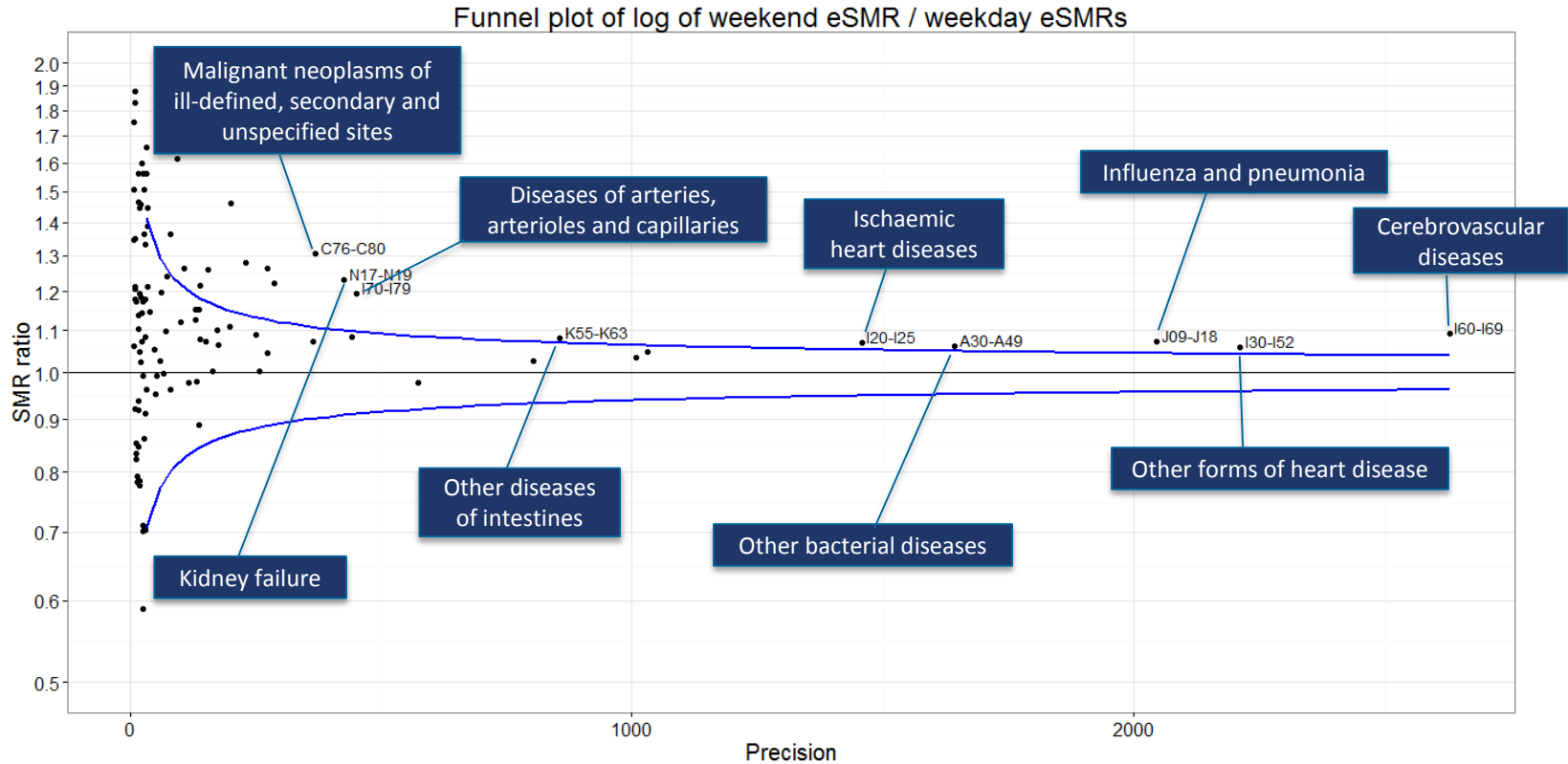


Funnel plot of log of weekend eSMR / weekday eSMRs



Funnel plot of principal diagnosis blocks

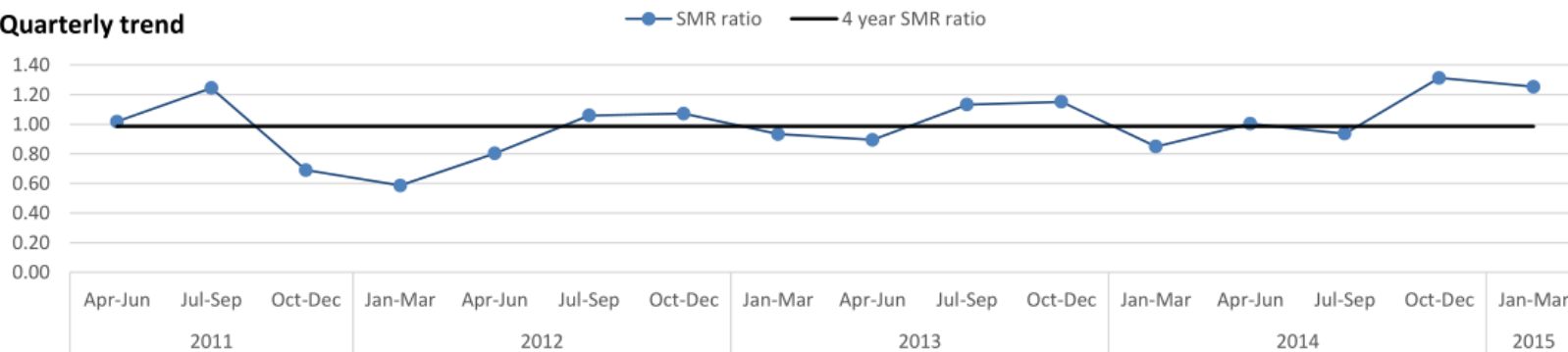
4 years data: Apr 2011 – Mar 2015, all HRT hospitals



Are there hospitals that don't show a weekend effect?

- Over 4 years, Cougar's ratio is 0.99.

Quarterly trend



What drives the weekend effect?

- Different patients?
 - Risk adjustment should help to eliminate this issue but it could be a factor in some diagnosis groups. Would not expect to be spread across all groups though.
- Different documentation?
 - Evidence suggests otherwise
- Different patient flow?
 - Examination of palliative care rates does not indicate significant differences
- Different care due to different staffing...