

# Surgeon case-volume and readmission, and reintervention risk after myomectomy in England: a retrospective cohort study

Alison Amoah| Stephen Derek Quinn

## Introduction

- Systematic reviews in gynaecology and outside of gynaecology have demonstrated that higher surgical volume may be associated with better post operative outcomes. As surgical experience increases in relation to number of operations undertaken, technical proficiency also increases. High-volume surgeons may also be exposed to processes of care that positively impact surgical outcomes The relationship between surgical case volume and myomectomy longer term outcomes has hitherto not been investigated.

## Aims

- To investigate the impact of surgical case-volume on rates of readmission, laparoscopic approach and reintervention after myomectomy.

## Methods

- Retrospective, national population-based, cohort study utilising Hospital Episode Statistics(HES) data
- Cohort determined based on HES dataset extract
- Inclusion criteria:** Patients were identified in the HES Admitted Patient Care dataset between 2010 and 2015 that underwent myomectomy in England under the NHS
- Exclusion criteria:** Women who were aged less than 18 years; underwent a non-elective procedure; were coded as having a hysterectomy during the encounter of their index procedure or cases without a valid consultant code
- All encounters linked relating to an individual cohort member using HESID until end of study. After the index treatment, all subsequent encounters scrutinised for the presence of reintervention OPCS4 procedural codes until the end of study. Patients undergoing hysterectomy or Uterine-preserving procedure (UPP) reinterventions contributed person-time to the study until first occurrence of either hysterectomy or UPP reintervention, death, or end of study (31st March 2020).

- Primary outcome(s):** UPP and hysterectomy reinterventions rates after index myomectomy
- UPP reintervention included only myomectomy, uterine artery embolization, endometrial ablation, or MR guided focused ultrasound procedures
- High-volume determined as >12 myomectomies performed annually per surgeon
  - Around the 95th centile
  - Similar threshold used in other studies
- Chi-squared test was used to compare categorical variables. Binary logistic regression was used to provide an estimate of the crude risk for readmission and for laparoscopic approach after myomectomy. Cox's proportional-hazards regression model was used to provide an estimate of the crude risk for hysterectomy or UPP reintervention after index treatment for myomectomy.

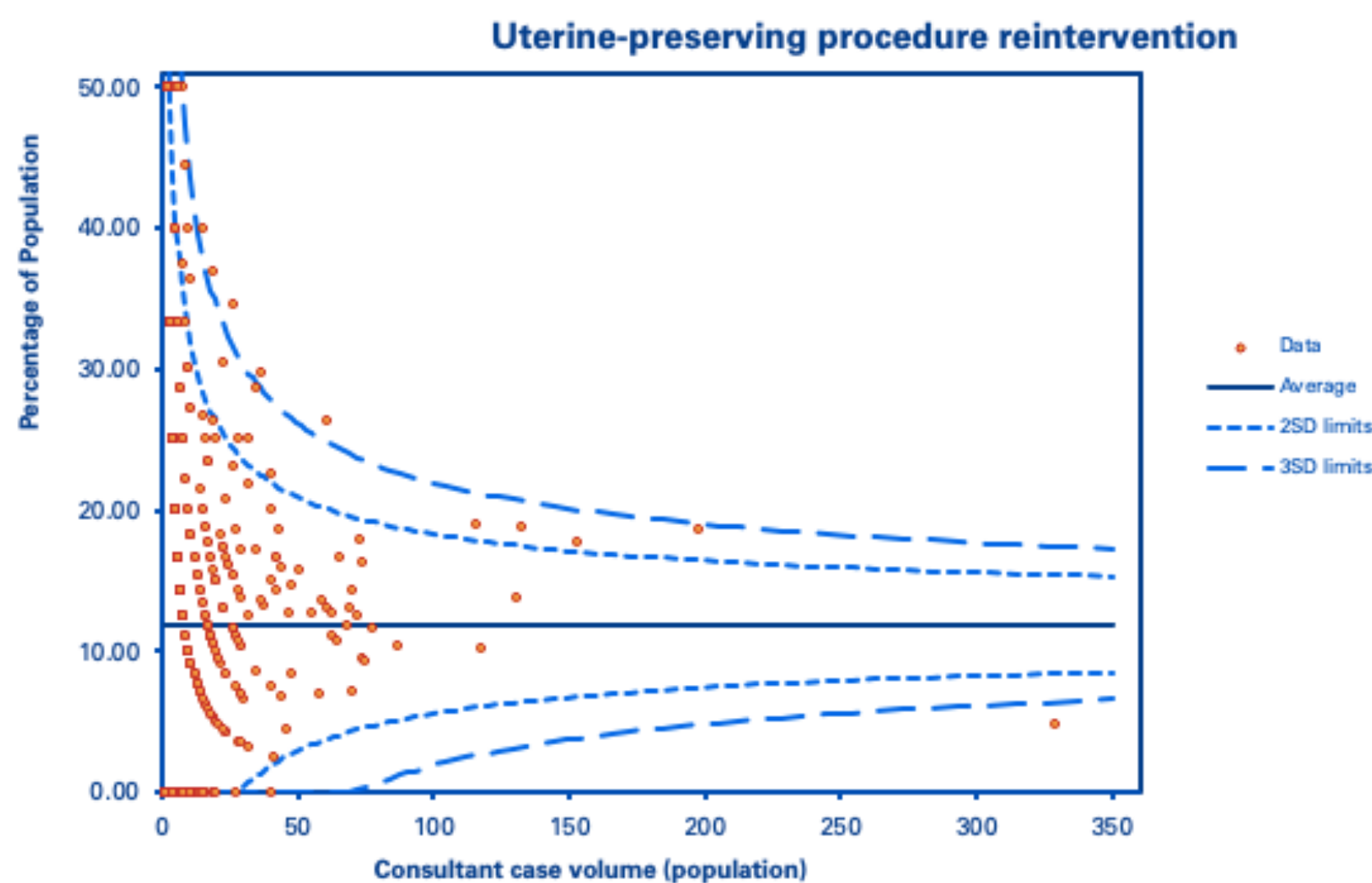
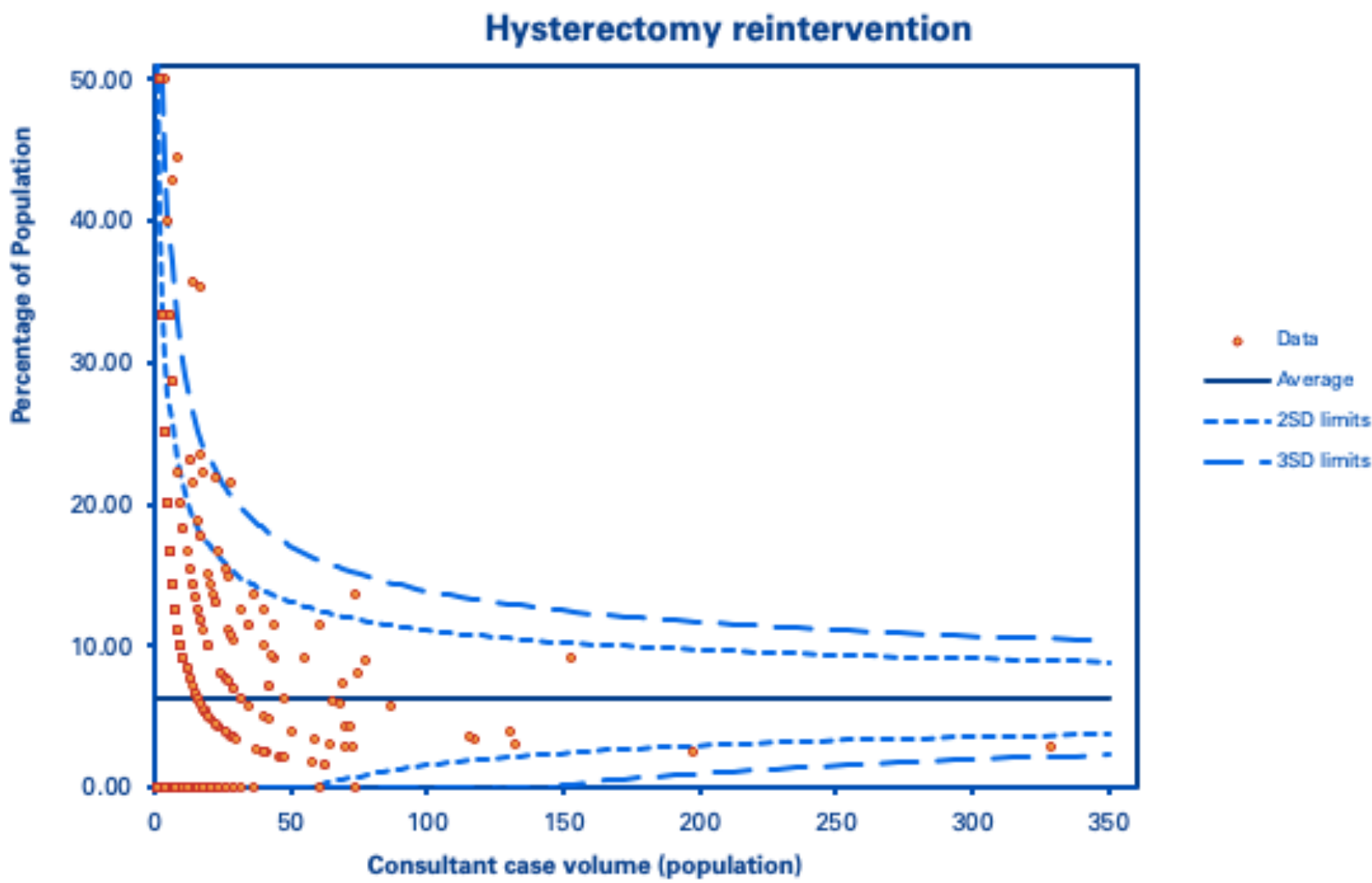
## Results

- 536 gynaecologists performed >= myomectomy in 1 year. Median annual case volume per surgeon = 6 +/- 6.5. Range: 1-80
- 27 gynaecologists (5%) were defined as high volume surgeons (>12 myomectomies/year)
- There were 9443 myomectomies undertaken over 5 years

|                             | Myomectomy cases | Percent |
|-----------------------------|------------------|---------|
| High-volume (> 12 cases/yr) | 2123             | 22.5    |
| Low-volume (1-12 cases/yr)  | 7320             | 77.5    |
|                             | 9443             | 100     |

|                                             | Low-volume (1-12 cases/yr) | High-volume (>12 cases/yr) |         |
|---------------------------------------------|----------------------------|----------------------------|---------|
| 30-day complications                        | 2.9%                       | 2.1%                       | P=0.036 |
| 30-day readmission                          | 5.6%                       | 4.1%                       | P=0.004 |
| Uterine-preserving procedure reintervention | 11.3%                      | 14.2%                      | P<0.001 |
| Hysterectomy reintervention                 | 6.9%                       | 4.5%                       | P<0.001 |
| Laparoscopic approach                       | 13.8%                      | 32.0%                      | P<0.001 |

**Figures.** Funnel plots demonstrating consultant case volume over 5 years against proportion undergoing hysterectomy reintervention or UPP procedure reintervention. Each orange data point represents a single consultant.



For the regression analyses below, the cohort of women undergoing a myomectomy by a low-volume surgeon was used as the reference cohort, and the high-volume surgeon cohort used as the comparator group.

**Adjusted risk** was conditioned on covariates that included: age, ethnicity, index of social deprivation, geographical region and co-morbidities.

## Laparoscopic approach

|            | B(SE)         | Sig    | Exp(B)                |
|------------|---------------|--------|-----------------------|
| Unadjusted | 0.838(-1.773) | <0.001 | 2.313 (2.056 – 2.601) |
| Adjusted   | 1.262 (0.075) | <0.001 | 3.531 (3.049 – 4.089) |

## 30-day readmission

|            | B(SE)           | Sig   | Exp(B)                |
|------------|-----------------|-------|-----------------------|
| Unadjusted | - 0.320( 0.121) | 0.008 | 0.573 (0.726 – 0.920) |
| Adjusted   | - 0.406( 0.128) | 0.002 | 0.666(0.518 – 0.856)  |

## Hysterectomy reintervention

|            | B(SE)           | Sig    | Exp(B)                |
|------------|-----------------|--------|-----------------------|
| Unadjusted | - 0.405( 0.111) | <0.001 | 0.667(0.536 – 0.829)  |
| Adjusted   | - 0.171( 0.121) | 0.158  | 0.843 (0.665 – 1.069) |

## UPP reintervention

|            | B(SE)        | Sig    | Exp(B)                |
|------------|--------------|--------|-----------------------|
| Unadjusted | 0.226(0.067) | <0.001 | 1.123 (1.098 – 1.430) |
| Adjusted   | 0.167(0.073) | 0.023  | 1.181(1.023- 1.364)   |

## Conclusions

### Summary points

- There are significant differences in readmission, and rate of laparoscopic approach in favour of the high-volume cohort. There was a 3.5-fold increased use of laparoscopic approach for the high volume cohort, compared to the low-volume cohort, and a 34% reduced rate of 30-day readmission in adjusted analyses.
- There was no difference in hysterectomy reintervention between low-volume and high-volume cohorts in adjusted analyses.
- There was a significant difference regarding UPP reintervention in favour of the low-volume cohort.
- These findings have a potentially important public health impact: there is evidence of disparity in outcomes in relation to surgical case volume after myomectomy. Surgical volume is one potentially modifiable variable that may alter outcomes for patients.
- This data raises an interesting question regarding the centralisation of care for severe or complex fibroids i.e. accredited fibroid centres. The HES database does not include data regarding fibroid or uterine anatomy.
- Further prospective study is required, particularly regarding the study of the impact of fibroid anatomy and surgical complexity on these outcomes

### Contact information

- Department of O&G, St Marys Hospital, Paddington, London
- Email: [alison.amoah@nhs.net](mailto:alison.amoah@nhs.net)

