Compare surgeons in 4 cohort definition

Xilin Chen

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The 4 types of cohort definitions were described in details on the "explore_cohort_definition.pdf" in the repo.

4 cohort definitions

1. using ABS and fellowship council data to exclude fellowship trained surgeons.

dataset name: *abs_fc*

2. using ABS, fellowship council and medicare specialty code to exclude fellowship trained surgeons.

dataset name: *abs_fc_medicare_splty*

3. Exclude non-GS surgeons by practice patterns by meeting minimal number of types of procedures.

dataset name: *pp*

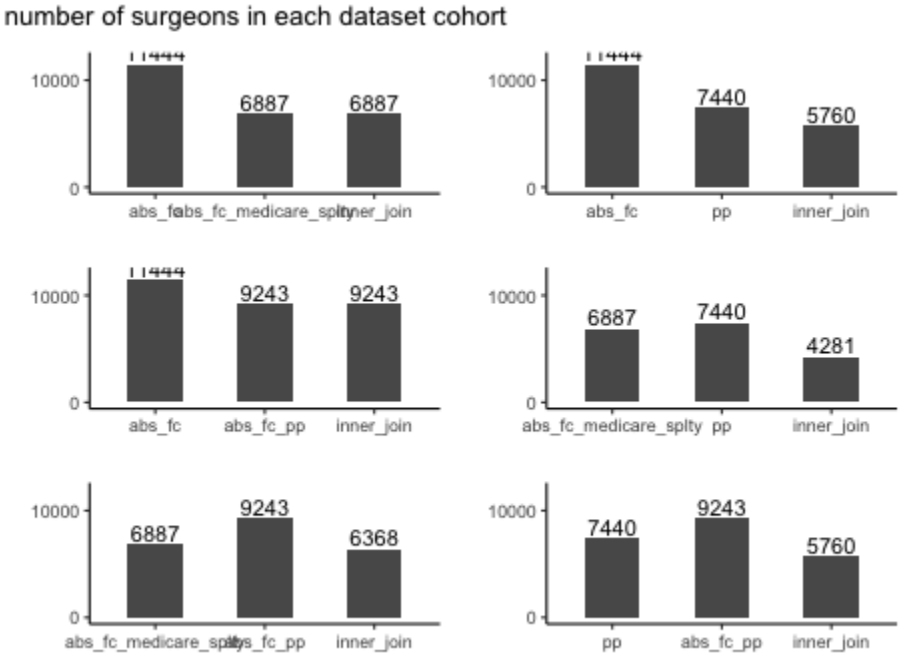
4. Exclude non-GS surgeons by abs, fellowship council and practice patterns.

dataset name: *abs_fc_pp*

Compare surgeon cohort definitions

The plot below shows the comparisons of the 4 cohort definition above. *Inner join* indicates the common surgeons that the compared datasets share.

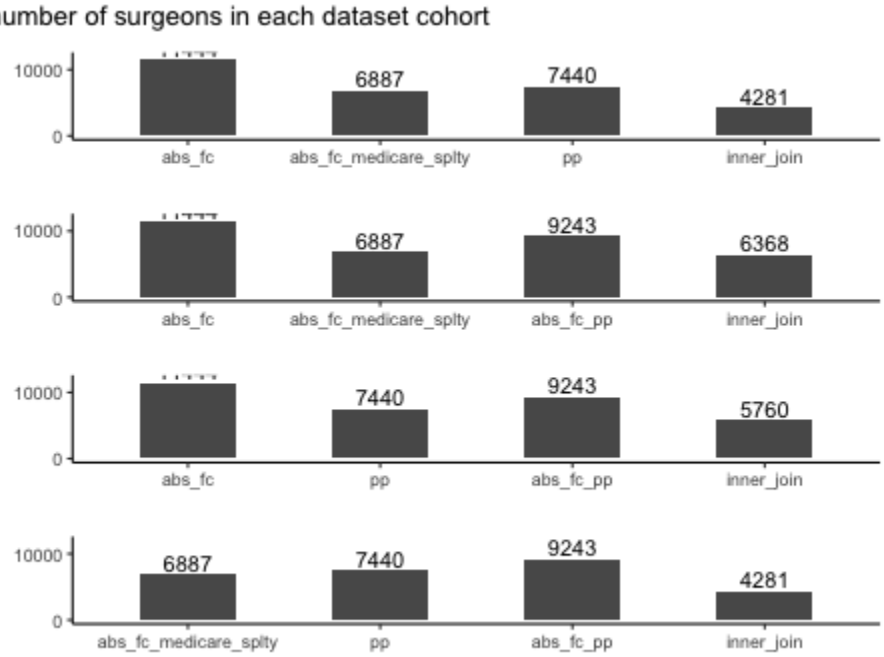
2 datasets inner join



Combine all the *inner join groups* and get a cohort that at least met 2 out of the 4 criteria. The combined group are surgeons who are not fellowship trained based on current ABS or fellowship council database, and identified as general surgery specialty in Medicare or met practice pattern criteria.

The number of surgeons in the combined 4 criteria group is 9762.

3 groups inner join



Combine all the *inner join groups* and get a cohort that at least met 3 out of the 4 criteria. The combined group are surgeons who are not fellowship trained based on current ABS or fellowship council database, and identified as general surgery specialty in medicare or met practice pattern criteria.

The number of surgeons in the combined 4 criteria group is 7847.

Descriptive and model results for the combined inner joined datasets

At least in 2 datasets

Table 1

case level

Characteristic	Failed, N = 44,882	Passed, N = 836,512	p-value
flg_male	23,420 (52%)	355,360 (42%)	<0.001
age_at_admit	75 (70, 80)	75 (70, 82)	<0.001
AHRQ_score	8 (2, 17)	9 (1, 19)	0.3
race_white	39,376 (88%)	730,020 (87%)	0.004
ses			<0.001
high_ses	18,263 (41%)	379,127 (45%)	
low_ses	26,619 (59%)	457,385 (55%)	
emergent_admit	14,897 (33%)	404,635 (48%)	<0.001
had_assist_surg	766 (1.7%)	7,434 (0.9%)	<0.001

[1] n (%); Median (IQR)

[2] Pearson's Chi-squared test; Wilcoxon rank sum test

Surgeon level

re_cert_bin	n_surgeon	yearly_case_mean	yearly_case_median
Failed	592	15.90288	11
Passed	9,046	19.11260	14

Model

Death

```
death_30d ~ 1 + re_cert_bin + flg_male + age_at_admit + AHRQ_score +
    race_white + ses + emergent_admit + year + surgeon_yearly_load +
    had_assist_surg + (1 | procedure)
```

Regression table

term	estimate	OR	p_value
(Intercept)	-7.110	0.001	0.000
re_cert_binPassed	0.014	1.014	0.497
flg_male	0.132	1.141	0.000
age_at_admit	0.044	1.045	0.000
AHRQ_score	0.054	1.055	0.000
race_white	0.066	1.068	0.000
seslow_ses	0.182	1.200	0.000
emergent_admit	0.866	2.377	0.000
year	-0.038	0.963	0.000
surgeon_yearly_load	-0.001	0.999	0.000
had_assist_surg	0.086	1.090	0.048

Severe complication Since POA flags only become available after 2010, so the patient outcomes from medicare only include 2010-2018.

```
severe_complication_no_poa ~ 1 + re_cert_bin + flg_male + age_at_admit +
    AHRQ_score + race_white + ses + emergent_admit + year + surgeon_yearly_load +
    had_assist_surg + (1 | procedure)
```

Regression table

term	estimate	OR	p_value
(Intercept)	-2.393	0.091	0
re_cert_binPassed	0.062	1.064	0
flg_male	0.163	1.177	0
age_at_admit	0.006	1.006	0

term	estimate	OR	p_value
AHRQ_score	0.054	1.055	0
race_white	-0.122	0.885	0
seslow_ses	0.023	1.023	0
emergent_admit	0.466	1.594	0
year	-0.030	0.970	0
surgeon_yearly_load	-0.001	0.999	0
had_assist_surg	0.222	1.249	0

At least in 3 datasets

Table 1

case level

Characteristic	Failed, N = 27,436	Passed, N = 793,549	p-value
flg_male	13,821 (50%)	335,554 (42%)	<0.001
age_at_admit	75 (70, 81)	76 (70, 82)	<0.001
AHRQ_score	8 (2, 17)	9 (1, 19)	<0.001
race_white	24,035 (88%)	693,010 (87%)	0.2
ses			<0.001
high_ses	10,012 (36%)	358,026 (45%)	
low_ses	17,424 (64%)	435,523 (55%)	
emergent_admit	10,609 (39%)	393,488 (50%)	<0.001
had_assist_surg	296 (1.1%)	5,971 (0.8%)	<0.001

[1] n (%); Median (IQR)

[2] Pearson's Chi-squared test; Wilcoxon rank sum test

Surgeon level

re_cert_bin	n_surgeon	yearly_case_mean	yearly_case_median
Failed	217	23.20137	18
Passed	7,575	20.32621	15

Model

Death

```
death_30d ~ 1 + re_cert_bin + flg_male + age_at_admit + AHRQ_score +
    race_white + ses + emergent_admit + year + surgeon_yearly_load +
    had_assist_surg + (1 | procedure)
```

Regression table

term	estimate	OR	p_value
(Intercept)	-7.092	0.001	0.000
re_cert_binPassed	0.023	1.023	0.355
flg_male	0.133	1.142	0.000
age_at_admit	0.044	1.045	0.000
AHRQ_score	0.053	1.054	0.000
race_white	0.063	1.065	0.000
seslow_ses	0.182	1.200	0.000
emergent_admit	0.868	2.382	0.000
year	-0.038	0.963	0.000
surgeon_yearly_load	-0.001	0.999	0.000
had_assist_surg	0.122	1.130	0.012

Severe complication Since POA flags only become available after 2010, so the patient outcomes from medicare only include 2010-2018.

```
severe_complication_no_poa ~ 1 + re_cert_bin + flg_male + age_at_admit +
    AHRQ_score + race_white + ses + emergent_admit + year + surgeon_yearly_load +
    had_assist_surg + (1 | procedure)
```

Regression table

term	estimate	OR	p_value
(Intercept)	-2.394	0.091	0.000
re_cert_binPassed	0.086	1.090	0.000
flg_male	0.166	1.181	0.000
age_at_admit	0.006	1.006	0.000
AHRQ_score	0.054	1.055	0.000
race_white	-0.126	0.882	0.000
seslow_ses	0.018	1.018	0.005
emergent_admit	0.464	1.590	0.000
year	-0.030	0.970	0.000
surgeon_yearly_load	-0.001	0.999	0.000
had_assist_surg	0.245	1.278	0.000