



**HERNIA
OUTCOMES
CAMPAIGN**



**INGUINAL
HERNIA
SURGERY:
VOLUME OF
PROCEDURES
AND PATIENT
OUTCOMES**

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EXECUTIVE SUMMARY

Inguinal hernia surgery is the most common for surgical procedure for men above 18, with more than 80,000 performed each year. Despite very strong academic evidence that having inguinal hernia procedures performed by surgeons with a great deal of experience **means better outcomes for patients**, the vast majority of surgeons perform fewer than one procedure a week, and are of varying grades. Most do fewer than one per month - and almost nine out of ten do fewer than one per week.

A Freedom of Information request to 158 Acute Trusts revealed that of the 2,620 surgeons performing inguinal hernia surgery on the NHS:

- **456 (18%)** performed just **1** inguinal hernia operation in 2012/13
- Over **1,000 (42%)** performed **6** or fewer
- **1,362 (53%)** performed fewer than **12** – or fewer than one a month on average
- Only **70** surgeons across England (**2.7%**) performed more than **100**

Surgeons performed an average of **21** inguinal hernia procedures a year. The median was just **10**.

Almost one in four (**24%**) inguinal hernia patients – **94** in the average Trust – are treated by surgeons performing fewer than **25** procedures a year.

As evidence of a lack of any national strategy to drive up patient outcomes, there is enormous regional variation:

- 1% of surgeons in the Eastern region performed 100 or more procedures in 2012/13, compared to 3% in Yorkshire and the Humber

- In the South West, 91% of surgeons performed fewer than 25 procedures - compared to 66% in the North East.
- In London 43% of surgeons performed fewer than 5 procedures – compared to 20% in the North East

For a condition that for most people is painless, an unacceptably high percentage are left with chronic pain. PROMS data and surgical experience suggest we have gone from an unacceptably high recurrence rate for inguinal hernias to an unacceptably high chronic pain rate.

We recommend:

1. All NHS Trusts should have two or more dedicated inguinal hernia specialists performing at least 25 procedures per annum. Each trust must ensure the vast majority of operations are performed by specialists. This will lead to the number complications and recurrences being dramatically reduced, more day procedures, better outcomes and lower costs for the NHS.
2. There should be a register of all the inguinal hernia operations that are carried out in England. The registry would track recurrence of hernias, how long since the previous repair and the level of pain and discomfort after an operation. The registry would be modelled on the National Joint Registry and the Swedish National Inguinal Hernia Register.
3. The way Patient Reported Outcomes Measures data is recorded, and the information it records must be made fit for purpose. The current form of PROMs data fails to capture recurrence, chronic pain or discomfort. These should be coded and measured properly.

WHY THE VOLUME OF PROCEDURES MATTERS

Several medical and academic studies have explored the relationship between patient outcomes and the number of times a procedure is performed in a hospital, or by a surgeon. There is strong evidence to suggest that patients undergoing surgery at high-volume hospitals have statistically better outcomes.

This pattern can be seen in almost every major surgical procedure. A systematic review by Halm et al found that 71% of all studies of hospital volume and 69% of studies of physician volume confirmed statistically significant associations between higher volume and better outcomes.¹

Birkmeyer et al found that for cancer procedures, patients undergoing surgery at high-volume hospitals have lower rates of perioperative morbidity and mortality than those at lower-volume centres.² Hospital volume also reduced the risk of nonfatal complications, including perioperative pneumonia, septicæmia, and renal failure.

As with cancer and hip replacement surgery, patients undergoing gastrointestinal surgery were subject to the same correlation between hospital or surgeon volume and outcome. N Pal et al analysed six years of Hospital Episode Statistics data, which confirmed a volume outcome association for esophagectomy and pancreaticoduodenectomy. With regards to esophagectomy, mortality rates were around twice as high (7.8%) for the lowest volume providers as for the highest volume providers (4.0%). A similar but less clear-cut trend was noted for pancreaticoduodenectomy.³

The same trend has been established for hip replacement surgery. Solomon et al showed that mortality and complication rates after total hip replacement (THR) are inversely associated with the volume of THRs performed at hospitals and by individual surgeons.⁴ 69% fewer adverse events occurred in hospitals where more than 100 THRs in Medicare patients were performed annually, compared with hospitals where 25 or less THRs were performed. Solomon et al concluded that the volume of THRs performed by individual surgeons is the most important determinant of orthopaedic complications and should be considered in efforts to improve THR outcomes.

How the volume of inguinal hernia procedures impacts patient outcomes

There is every reason to expect inguinal hernia procedures – one of the most common surgical procedures – to follow to this well-established rule. The academic evidence supports this.

Feliu-Pala et al found that postoperative complications, operating time and recurrences are all substantially reduced as the surgeon's experience increases. Their study of 1,227 inguinal hernia repairs over a seven-year period found that 42% of complications and 61% of recurrences occurred in the first 100 inguinal hernia repairs a surgeon performed. As the surgeon gains experience with the procedure, complications and recurrences are dramatically reduced.⁵

Edwards and Bailey highlighted that a lack of prior

experience with laparoscopic herniorrhaphy is associated with significant increases in complications and inguinal hernia recurrences.⁶ The lack of prior experience with the transabdominal preperitoneal mesh repair was associated with a marked increase in the number of complications and inguinal hernia recurrences. Choi et al found a learning curve of 60 procedures for laparoscopic totally extraperitoneal repair of inguinal hernias.⁷ Simons suggested that for endoscopic inguinal hernia repair the learning curve ranges from 50 to 100 procedures, with the first 30 to 50 the most critical.⁸ Nordin identified a significantly higher rate of re-operation for those treated by surgeons who carried out 1-5 repairs a year than in surgeons who carried out more.⁹

THE NATIONAL PICTURE

Hundreds of surgeons perform only a few procedures a year

Despite what the academic evidence suggests is desirable, the reality is that hundreds of surgeons perform only a handful of operations each year.

Our Freedom of Information request to every NHS Acute Trust in England had a 98% response rate. It revealed that of the surgeons performing inguinal hernia procedures on the NHS:

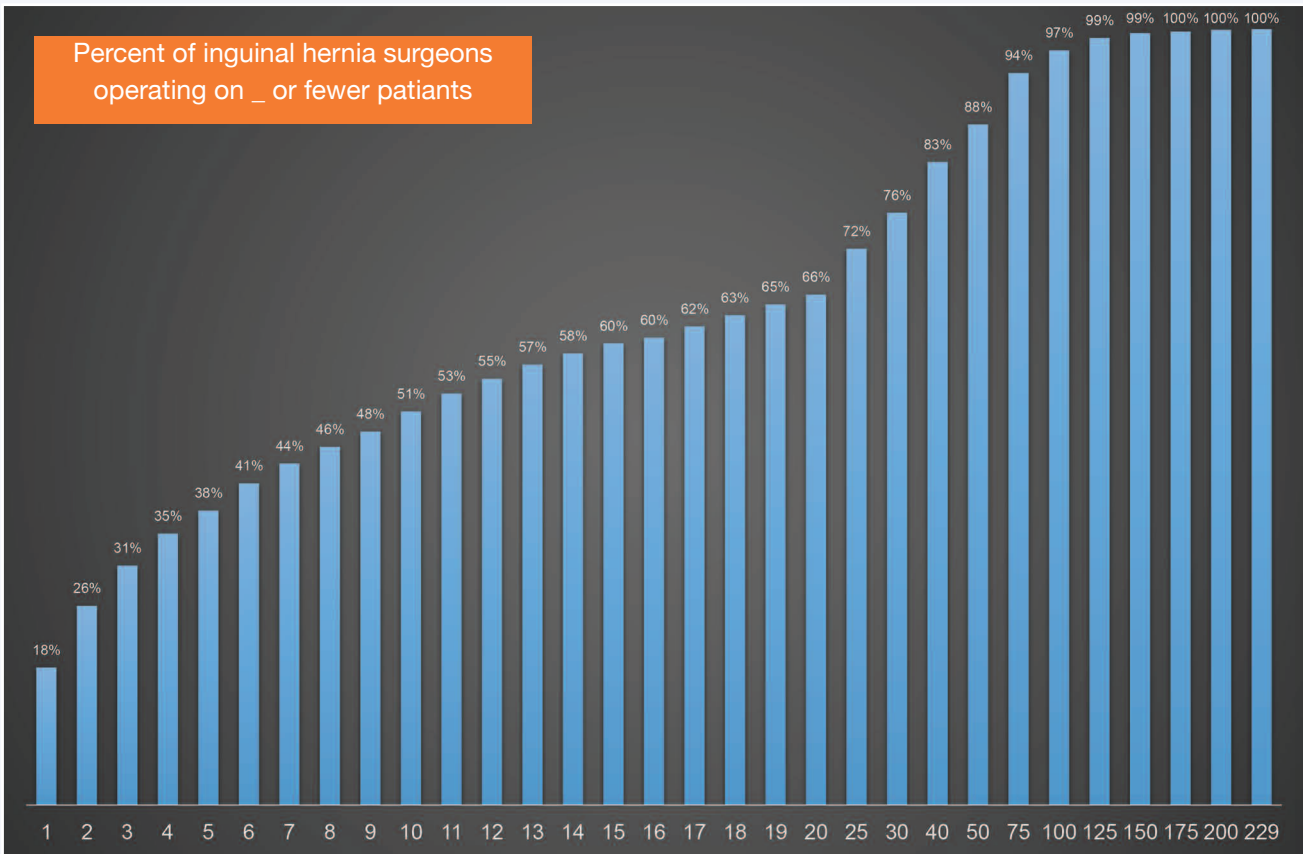
- 456 surgeons (18% of all inguinal hernia surgeons) performed just 1 inguinal hernia operation in 2012/13, with over 1,000 performing 6 or fewer.
- 1,782 (69%) performed fewer than 24 – or fewer than two a month on average.
- 1,362 (53%) performed fewer than 12 – or fewer than one a month on average.

The 158 Trusts who responded to our survey reported a total of 2,567 surgeons repairing 55,521 inguinal hernias. This is an average of only 21.2 a year. But even this figure is inflated by a relatively small number of surgeons repairing many inguinal hernias. **The median figure across England was just 10 inguinal hernias repaired a year.**

Treating inguinal hernias is seen almost as synonymous with general surgery. Only 70 surgeons (2.7%) performed more than 100 procedures. See the table to the right for the full data.

Data from the previous year, 2011/12, show a strikingly similar pattern. Each surgeon repaired an average of 21.2 inguinal hernias in 2011/12. The median figure was 10. Only 70 surgeons performed more than 100 procedures.

Surgeons operating on _ or fewer patients:	Number of surgeons	% of all surgeons who operated on inguinal hernias
1	456	17.7%
2	660	25.7%
3	793	30.9%
4	899	35.0%
5	975	38.0%
6	1065	41.5%
7	1131	44.0%
8	1186	46.2%
9	1236	48.1%
10	1303	50.7%
11	1362	53.0%
12	1411	54.9%
13	1458	56.8%
14	1495	58.2%
15	1528	59.5%
16	1547	60.2%
17	1584	61.7%
18	1621	63.1%
19	1657	64.5%
20	1689	65.8%
25	1841	71.7%
30	1960	76.3%
40	2128	82.9%
50	2252	87.7%
75	2422	94.3%
100	2497	97.3%
125	2538	98.9%
150	2554	99.5%
175	2559	99.7%
200	2565	99.9%
229	2567	100.0%



What this means for patients

For patients, this can mean an unacceptable range of outcomes. By definition, surgeons performing more procedures are responsible for a higher percentage of patients, but the percentage is worryingly low.

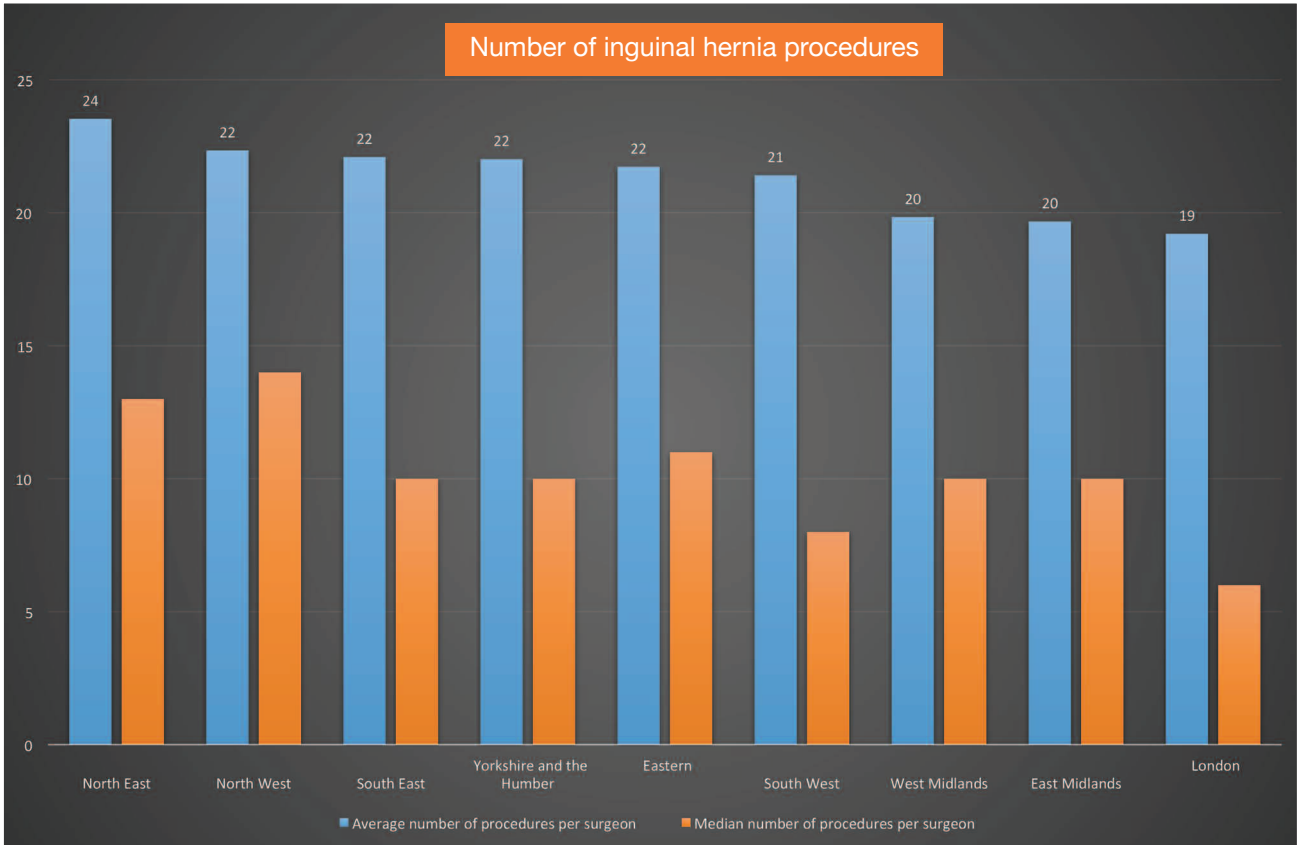
surgeons performing an average of 2 procedures a month or less.

One in fourteen patients (7%) – 28 in the average Trust – are treated by surgeons performing fewer than ten procedures a year.

As the table below shows, almost a quarter of patients – 94 in the average Trust – are treated by

Patients treated by surgeons who perform:	Number	%	Average per Trust
<100 a year	45,997	84%	326
<50 a year	28,732	52%	204
<25 a year	13,234	24%	94
<10 a year	4,004	7%	28
<5 a year	1,737	3%	12

REGIONAL VARIATION



There is clearly a lack of a concerted national strategy for ensuring inguinal hernia procedures are handled primarily by dedicated inguinal hernia specialists. As a result, there is huge regional variation in outcomes.

The average inguinal hernia surgeon performed 24 inguinal hernia procedures in the North East in 2012/13 – a figure 26% higher than the London figure of 19. The median figure varied even more dramatically - with the median in the North West (14) more than double that in London (6).

As the tables to the right and overleaf show, 97% of surgeons perform fewer than 100 procedures. The number and percentage of surgeons performing 100 or more was very low in all regions. On this measure,

Number (%) of inguinal hernia surgeons performing fewer than 5 procedures

Region	number	%
London	171	43%
South West	115	42%
East Midlands	79	38%
South East	144	36%
Eastern	100	36%
West Midlands	105	35%
Yorkshire and the Humber	90	33%
North West	104	31%
North East	29	20%
Total	937	36%

London performed best with 3.5% performing 100 or more - compared to 1.5% in the Eastern region.

87% of surgeons performed fewer than 50 procedures in 2012/13 – ranging from 91% in the East Midlands to 85% in the North West.

More than two-thirds of surgeons perform two inguinal hernia procedures a month – or fewer. The South West performs worst on this measure, with 76% performing fewer than 25 compared to 66% in the North East.

More than a third of surgeons performed between 1 and 4 procedures a year. In London, almost half of consultant surgeons fall into this category, compared to one in five in the North East.

Number (%) of inguinal hernia surgeons performing fewer than 25 procedures

Region	number	%
South West	210	76%
London	292	73%
West Midlands	213	72%
East Midlands	148	71%
Yorkshire and the Humber	191	71%
North West	234	69%
South East	278	69%
Eastern	191	68%
North East	95	66%
Total	1,852	71%

Number (%) of inguinal hernia surgeons performing fewer than 50 procedures

Region	number	%
East Midlands	190	91%
West Midlands	263	89%
North East	128	88%
Yorkshire and the Humber	238	88%
London	354	88%
South West	243	88%
South East	349	87%
Eastern	241	86%
North West	285	85%
Total	2,291	87%

Number (%) of inguinal hernia surgeons performing fewer than 100 procedures

Region	number	%
Eastern	277	99%
West Midlands	291	98%
North West	329	98%
East Midlands	204	98%
Yorkshire and the Humber	263	97%
South East	390	97%
South West	267	97%
North East	140	97%
London	388	97%
Total	2,549	97%

CONCLUSION

All the academic evidence suggests that if surgeons are performing a low volume of procedures the outcomes for patients will be worse. Unfortunately, that reality for patients is not reflected in England's Trusts. Surgeons performing fewer than 12 procedures a year treat a quarter of all inguinal hernia patients. For a condition that for most people is painless, an unacceptably high percentage are left with chronic pain. Patient Reported Outcomes Measure data suggest we have gone from an unacceptably high recurrence rate for inguinal hernias to an unacceptably high chronic pain rate. This problem must be recognised, and appropriate solutions found.

All NHS Trusts should have two or more dedicated inguinal hernia specialists performing at least 25 procedures per annum. Each trust must ensure the vast majority of operations are performed by specialists. This will lead to the number complications and recurrences being dramatically reduced, more day procedures, better outcomes and lower costs for the NHS.

We know from the Freedom of Information requests to Trusts that the two surgeons in each Trust who performed the most procedures were responsible for 39% of the total in both years, performing an average of 78 procedures each per year. We propose that these surgeons repair a much greater proportion of the total, with larger Trusts having more than two designated inguinal hernia surgeons.

There should be a register of all the inguinal hernia operations that are carried out in England. The registry would track recurrence of inguinal hernias, how long since the previous repair and the level of pain and discomfort after an operation. The registry would be modelled on the National Joint Registry and the Swedish National Inguinal Hernia Register.

The way Patient Reported Outcomes Measures data is recorded, and the information it records must be made fit for purpose. The current form of PROMs data fails to capture recurrence, chronic pain or discomfort. These should be coded and measured properly.

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APPENDIX 1 - RESPONSE RATE BY REGION

The Hernia Outcomes Campaign sent a Freedom of Information Request to 161 Acute Trusts in England. We received a response from 98% of Trusts. 20 of the Trusts reported that they had no surgeons performing inguinal hernia procedures in 2011/12 and 2012/13.

Region	Responses	Total number of Trusts	Percentage
North East	8	8	100%
Eastern	18	18	100%
Yorkshire and the Humber	14	14	100%
South East	21	21	100%
East Midlands	8	8	100%
West Midlands	19	19	100%
North West	27	28	96%
London	25	26	96%
South West	18	19	95%
England	158	161	98%

APPENDIX 2 - NUMBER OF SURGEONS WHO OPERATED ON X OR FEWER INGUINAL HERNIAS

Surgeons operating on _ or fewer inguinal hernias	Number	Percentage of all surgeons who operated on inguinal hernias
1	456	17.8%
2	660	25.7%
3	793	30.9%
4	899	35.0%
5	975	38.0%
6	1065	41.5%
7	1131	44.1%
8	1186	46.2%
9	1236	48.1%
10	1303	50.8%
11	1362	53.1%
12	1411	55.0%
13	1458	56.8%
14	1495	58.2%
15	1528	59.5%
16	1547	60.3%
17	1584	61.7%
18	1621	63.1%
19	1657	64.6%
20	1689	65.8%
21	1721	67.0%
22	1750	68.2%
23	1782	69.4%
24	1811	70.5%
25	1841	71.7%
26	1863	72.6%
27	1897	73.9%
28	1917	74.7%
29	1934	75.3%
30	1960	76.4%

Surgeons operating on _ or fewer inguinal hernias	Number	Percentage of all surgeons who operated on inguinal hernias
31	1978	77.1%
32	1991	77.6%
33	2005	78.1%
34	2024	78.8%
35	2037	79.4%
36	2059	80.2%
37	2072	80.7%
38	2091	81.5%
39	2113	82.3%
40	2128	82.9%
41	2140	83.4%
42	2156	84.0%
43	2167	84.4%
44	2174	84.7%
45	2187	85.2%
46	2199	85.7%
47	2219	86.4%
48	2227	86.8%
49	2242	87.3%
50	2252	87.7%
51	2262	88.1%
52	2273	88.5%
53	2285	89.0%
54	2292	89.3%
55	2298	89.5%
56	2305	89.8%
57	2317	90.3%
58	2325	90.6%
59	2333	90.9%
60	2344	91.3%

Surgeons operating on _ or fewer inguinal hernias	Number	Percentage of all surgeons who operated on inguinal hernias
61	2348	91.5%
62	2357	91.8%
63	2363	92.1%
64	2366	92.2%
65	2368	92.2%
66	2374	92.5%
67	2386	92.9%
68	2392	93.2%
69	2399	93.5%
70	2404	93.7%
71	2408	93.8%
72	2410	93.9%
73	2414	94.0%
74	2416	94.1%
75	2422	94.4%
76	2426	94.5%
77	2429	94.6%
78	2439	95.0%
79	2442	95.1%
80	2446	95.3%
81	2450	95.4%
82	2451	95.5%
83	2457	95.7%
84	2459	95.8%
85	2466	96.1%
86	2472	96.3%
87	2473	96.3%
88	2475	96.4%
89	2477	96.5%
90	2477	96.5%
91	2481	96.6%
92	2483	96.7%
93	2488	96.9%
94	2491	97.0%
95	2494	97.2%
96	2495	97.2%
97	2495	97.2%

Surgeons operating on _ or fewer inguinal hernias	Number	Percentage of all surgeons who operated on inguinal hernias
98	2495	97.2%
99	2497	97.3%
100	2497	97.3%
101	2499	97.4%
102	2503	97.5%
103	2505	97.6%
104	2513	97.9%
105	2516	98.0%
106	2518	98.1%
107	2519	98.1%
108	2521	98.2%
109	2525	98.4%
110	2526	98.4%
111	2527	98.4%
112	2528	98.5%
113	2528	98.5%
114	2529	98.5%
115	2529	98.5%
116	2531	98.6%
117	2532	98.6%
118	2533	98.7%
119	2536	98.8%
120	2537	98.8%
121	2537	98.8%
122	2537	98.8%
123	2537	98.8%
124	2538	98.9%
125	2538	98.9%
126	2538	98.9%
127	2540	98.9%
128	2541	99.0%
129	2541	99.0%
130	2541	99.0%
131	2542	99.0%
132	2542	99.0%
133	2543	99.1%
134	2545	99.1%

Surgeons operating on _ or fewer inguinal hernias	Number	Percentage of all surgeons who operated on inguinal hernias
135	2545	99.1%
136	2545	99.1%
137	2545	99.1%
138	2545	99.1%
139	2545	99.1%
140	2545	99.1%
141	2545	99.1%
142	2546	99.2%
143	2546	99.2%
144	2546	99.2%
145	2547	99.2%
146	2549	99.3%
147	2550	99.3%
148	2552	99.4%
149	2553	99.5%
150	2554	99.5%
151	2554	99.5%
152	2555	99.5%
153	2556	99.6%
154	2556	99.6%
155	2556	99.6%
156	2556	99.6%
157	2556	99.6%
158	2556	99.6%
159	2556	99.6%
160	2557	99.6%
161	2557	99.6%
162	2557	99.6%
163	2557	99.6%
164	2558	99.6%
165	2558	99.6%
166	2558	99.6%
167	2558	99.6%
168	2558	99.6%
169	2558	99.6%
170	2558	99.6%
171	2559	99.7%

Surgeons operating on _ or fewer inguinal hernias	Number	Percentage of all surgeons who operated on inguinal hernias
172	2559	99.7%
173	2559	99.7%
174	2559	99.7%
175	2559	99.7%
176	2559	99.7%
177	2559	99.7%
178	2559	99.7%
179	2559	99.7%
180	2561	99.8%
181	2561	99.8%
182	2561	99.8%
183	2561	99.8%
184	2561	99.8%
185	2561	99.8%
186	2561	99.8%
187	2561	99.8%
188	2561	99.8%
189	2561	99.8%
190	2561	99.8%
191	2563	99.8%
192	2563	99.8%
193	2564	99.9%
194	2564	99.9%
195	2564	99.9%
196	2564	99.9%
197	2565	99.9%
198	2565	99.9%
199	2565	99.9%
200	2565	99.9%
201	2565	99.9%
202	2565	99.9%
203	2565	99.9%
204	2565	99.9%
205	2565	99.9%
206	2565	99.9%
207	2565	99.9%
208	2565	99.9%

Surgeons operating on _ or fewer inguinal hernias	Number	Percentage of all surgeons who operated on inguinal hernias
209	2565	99.9%
210	2565	99.9%
211	2565	99.9%
212	2565	99.9%
213	2565	99.9%
214	2565	99.9%
215	2565	99.9%
216	2565	99.9%
217	2565	99.9%
218	2565	99.9%
219	2565	99.9%
220	2565	99.9%
221	2565	99.9%
222	2565	99.9%
223	2565	99.9%
224	2565	99.9%
225	2565	99.9%
226	2566	100.0%
227	2566	100.0%
228	2566	100.0%
229	2567	100.0%
230	2567	100.0%
231	2567	100.0%
232	2567	100.0%
233	2567	100.0%

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