Notable Grand Rounds
of the
Michael & Marian Ilitch
Department of Surgery

Wayne State University
School of Medicine

Detroit, Michigan, USA

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MYTHBUSTERS, SURGICAL EDITION

June 15, 2022

About Notable Grand Rounds

These assembled papers are edited transcripts of didactic lectures given by mainly senior residents, but also some distinguished attending and guests, at the Grand Rounds of the Michael and Marian Ilitch Department of Surgery at the Wayne State University School of Medicine.

Every week, approximately 50 faculty attending surgeons and surgical residents meet to conduct postmortems on cases that did not go well. That “Mortality and Morbidity” conference is followed immediately by Grand Rounds.

This collection is not intended as a scholarly journal, but in a significant way it is a peer reviewed publication by virtue of the fact that every presentation is examined in great detail by those 50 or so surgeons.

It serves to honor the presenters for their effort, to potentially serve as first draft for an article for submission to a medical journal, to let residents and potential residents see the high standard achieved by their peers and expected of them, and by no means least, to contribute to better patient care.

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Mythbusters, Surgical Edition

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This paper is based on Dr. Lee's Surgical Grand Rounds presentation on June 15, 2022 at the Wayne State University School of Medicine.

Introduction
Not long ago, I was involved in a case where it was decided to run a test for C. diff in a patient with a high output ileostomy. I thought that was unnecessary because I remembered a senior resident telling me in my second year that it was dumb to run a C. diff on someone who had had a colectomy. From then on, it was axiomatic that if there is no colon, there could be no C. diff. This was, of course, until one of my attendings, Dr. Diebel, showed me it was not true and could cite the literature to prove it.

This got me thinking about all the different things young residents hear and unquestioningly accept as truths. Things like:

1. You can't get a *Clostridium Difficile* (C. difff) infection without a colon.
2. There is no difference in surgical infections when the operating surgeon wears a bouffant vs. a scrub cap.
3. Mesenteric defects need to be closed after lap colectomy.
4. There is no difference in outcomes in patients treated by a female vs. male surgeon.
5. Surgical smoke causes cancer.

By debunking these myths I hope to show that surgeons shouldn't accept everything as a truth but be prepared to question. This paper presents the current literature on the common surgical misconceptions listed above and hopefully encourage everyone to do their own research.

1. Can You Get C. diff Without a Colon?
The answer is yes.

The risk of C. diff infection (CDI) increases with antibiotic use, length of hospital stay, age, a defective immune system, and contact with infected patients. While the pathogenesis of C. diff infection is not fully understood, we do know that it involves mucosal damage and inflammation mediated by toxins made by C. diff bacteria. There have been multiple reports of C. diff enteritis (CDE), C. diff infection of the small bowel, in the literature.

Small bowel colonization is thought to occur in the small bowel bacterial flora after a colectomy. Essentially, the neoterminal ileum becomes more like colon and gets colonized by colonic-type bacterial flora.

The fecal stream is thought to change the mucosa of the small bowel to undergo metaplastic changes. It occurs in patients with ileal pouch–anal anastomoses (IPAA), where the epithelium of the pelvic pouch undergoes morphologic changes such as atrophy, hyperplasia, and partial transition to colonic phenotype, and this facilitates the establishment of a fecal flora.

According to a literature review of 77 cases of CDE published in the last 20 years, 54 patients survived and 23 patients expired—a very high (nearly 30%) mortality rate. The diagnosis was made by positive C. diff toxin assay, as well as either CT findings of small bowel thickening or direct visualization with an endoscope.

The majority of cases—92%—arose during hospitalization. Almost 80% of these cases were preceded by surgeries that altered GI anatomy. Only five patients developed CDE spontaneously, without any prior documented antibiotic exposure or recent hospitalization. CDE was more frequently reported in patients with inflammatory bowel disease (over 50%), status post total colectomy, or IPAA. Second generation cephalosporins such as Cefoxitin were found to carry the highest risk of triggering CDE.

The increase in the number of patients with CDE may reflect an increase in the incidence of CDI or virulence of the organism. There may be a lot more than 77 cases in the past 20 years that were just not reported.

The diagnosis of CDE is typically delayed and the mortality rate is high, so we need high clinical suspicion when taking care of these patients so that they get the appropriate treatment.

2. Bouffants vs. Scrub Cap

Is there a difference in surgical infections when the operating surgeon wears a bouffant versus a scrub cap? I know I'm not the only surgeon hassled by a nurse to wear a bouffant, but the answer is no.

Hair carries bacteria such as staph and strep and is therefore a potential source of contamination. The American College of Surgeons (ACS) guidelines indicate that skull caps with minimal hair exposure is acceptable. But the Association of periOperative Registered Nurses (AORN) very strongly recommends bouffant caps with coverage of all hair including sideburns and the nape of the neck.

Many policies concerning the OR appear to have been established without rigorous scientific study. For example, AORN recommends that in restricted areas, those who are not scrubbed should have their arms completely covered with a long-sleeved scrub top or a jacket. The AORN's UK counterpart, the National Institute for Health and Care Excellence (NICE), has issued the completely contradictory recommendation that the arm below the elbows should be bare.

Two studies have examined whether different types of headwear have an impact on surgical outcomes. Markel *et al.* (2017)[1] measured the impact on environmental quality, Kothari *et al.* (2018)[2] other used surgical site infections as their dependent variable.

Table 1 is a demographics chart of patient characteristics surgeons with skull caps versus bouffant caps. Surgeons with skull caps operated on patients who were on average younger, more obese, and less likely to have malignancy, and also were operated on for a longer period of time. Those surgeons also tended to use laparoscopic approach There was no statistically significant difference for the other demographic variables.

Even looking at laparoscopic versus open surgeries, surgeons wearing skullcaps during laparoscopic surgeries had a statistically significant

[1] Markel, Troy A et al. "Hats Off: A Study of Different Operating Room Headgear Assessed by Environmental Quality Indicators." *Journal of the American College of Surgeons* vol. 225,5 (2017): 573-581. doi:10.1016/j.jamcollsurg.2017.08.014

[2] Kothari, Shanu N et al. "Bouffant vs Skull Cap and Impact on Surgical Site Infection: Does Operating Room Headwear Really Matter?." *Journal of the American College of Surgeons* vol. 227,2 (2018): 198-202. doi:10.1016/j.jamcollsurg.2018.04.029

lower rate of surgical site infection versus those who wore bouffant caps. In open surgeries, there was no statistical difference.

The study found that with no head-covering at all, air contamination was about three to five times greater and the bacterial sedimentation

Variable	Bouffant cap	Skull cap	p Value
n (%)	608 (39.4)	935 (60.6)	—
Age, y, mean ± SD	59.1 ± 15.2	56.0 ± 14.7	<0.001
BMI, kg/m^2, mean ± SD	29.6 ± 6.2	32.0 ± 8.1	<0.001
BMI category, n (%)			<0.001
<18.5 kg/m^2	2 (0.3)	2 (0.2)	
18.5–24.9 kg/m^2	124 (20.4)	159 (17.0)	
25.0–29.9 kg/m^2	249 (41.0)	320 (34.2)	
30.0–34.9 kg/m^2	1445 (23.9)	186 (19.9)	
≥35.0 kg/m^2	88 (14.5)	268 (28.7)	
Sex, n (%)			0.16
Female	36 (5.9)	73 (7.8)	
Male	572 (94.1)	862 (92.2)	
Cohort from previous RCT, n (%)			0.58
Hair clipped	308 (50.7)	460 (49.2)	
No hair clipped	300 (49.3)	475 (50.8)	
Comorbidity, n (%)			
Malignancy	63 (10.4)	40 (4.3)	<0.001
Diabetes	62 (10.2)	124 (13.3)	0.07
Tobacco use	107 (18)	145 (16)	0.28
Steroid use	32 (5.3)	48 (5.1)	0.91
Operative time, min, mean ± SD	91.1 ± 68.2	107.5 ± 69.9	<0.001
Laparoscopic approach, n (%)	201 (33.1)	471 (50.4)	<0.001

Table 1. Patient Demographics, Preoperative Comorbidities, and Operative Characteristics.
Source: Table 1 in [Kothari et al. (2018) (see footnote 2)

	Bouffant cap		Skull cap		
Variable	n	%	n	%	p Value
SSI	49	8.1	47	5.0	0.016
Superficial	38	6.3	37	4.0	0.041
Deep	5	0.8	2	0.2	0.12
Organ space	6	1.0	8	0.9	0.79
SSI by operative approach					
Laparoscopic, n = 672	19	9.5	24	5.1	0.035
Open, n = 871	30	7.4	23	5.0	0.14
SSI by procedure type					
Hepatobiliary	4	4.3	8	5.7	0.77
Colorectal/small bowel	28	26.4	12	27.9	0.85
Hernia/other	17	4.2	20	3.6	0.66
Foregut	0	0	7	3.5	—

Table 2. Surgical Site Infection Rates by Surgeon Headwear Type
Source: Table 1 in Kothari et al. (2018) (see footnote 2)

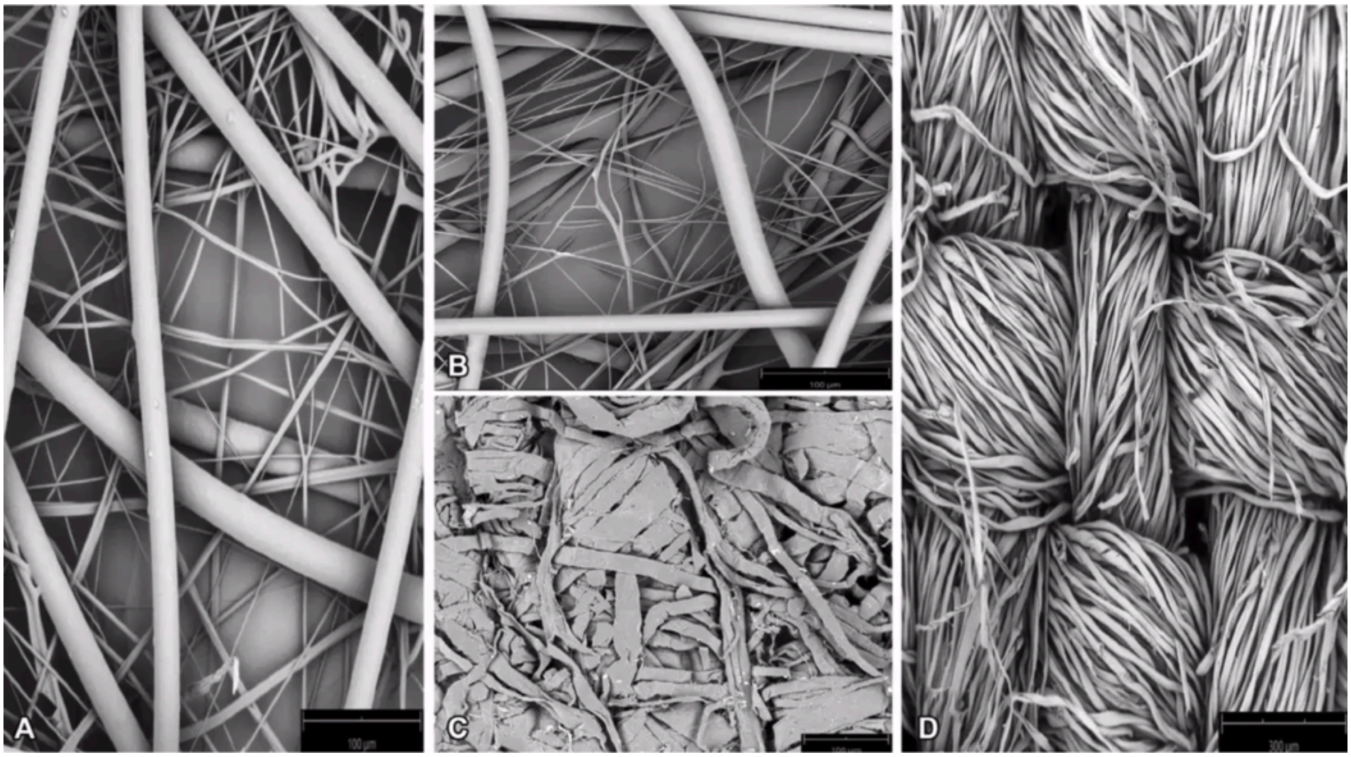

Fig 1. Electron microscopy. (A) Bouffant hats were visually identified with electron microscopy as having fairly porous material. (B) The crown of disposable skull caps also was made of a visually porous material. (C) The sides of the skull caps were visually less porous, as were (D) the cloth skull caps.
Source: Figure 7 in Kothari et al. (2018) (see footnote 2

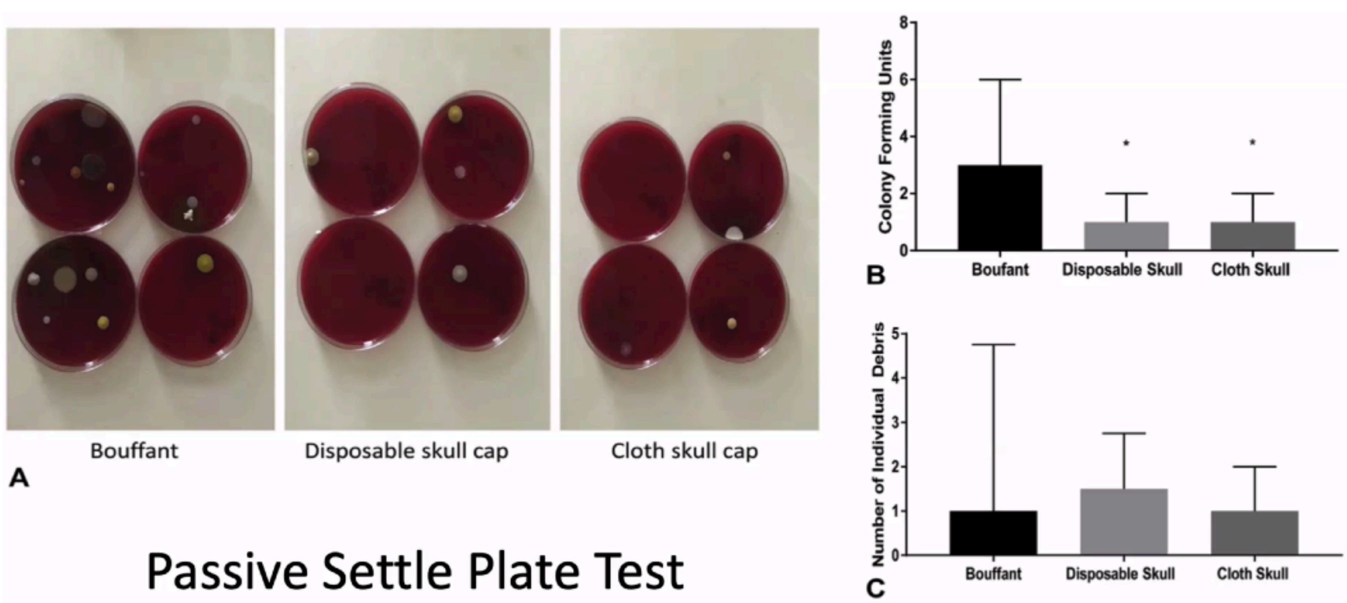

Fig. 2. Passive Settle Plate Test
Source: Kothari et al. (2018) (see footnote 2)

rate was about 60 times greater. However, there was no advantage for disposable bouffant caps over disposable skullcaps, and compared to cloth skullcaps, disposable bouffants were found (by electron microscopy—see **Figure 1**) to have increased permeability penetration and microbial shed compared to both disposable and cloth skull caps.

A passive settle plate test was also conducted during procedures performed by all-bouffanted and all-skull capped operating teams, respectively. Agar plates were placed generally at random but with some at strategic locations such as near anesthesia and at the back table, and by the patient's head, for example. **Figure 2** shows there were far more bacterial colony forming units in the bouffant room versus the cloth skullcap room.

The data shows that cloth skullcaps had lower particulate shed and lower settle plate shed than disposable bouffants and therefore appear to be superior. It is important that guidelines, and especially mandatory rules, need to be evidence based.

3. Closing vs. Not Closing Mesenteric Defects

Should mesenteric defects be closed after a laparoscopic colectomy? The short answer is no.

Cabot et al. (2010)[3] conducted a 7-year prospective study of 530 patients who underwent laparoscopic right colectomy for neoplasia with no mesenteric defects closed. Average BMI was 26. About 4.9% had a small bowel obstruction. Twelve patients were successfully managed conservatively and 14 patients required surgery. Of those 14, only four had an internal hernia through the mesenteric defect as the cause of their small bowel obstruction.

The study concluded that mesenteric defects are not associated with a significant rate of clinically relevant internal hernia and that the data supports the practice of leaving the mesenteric defect open after a laparoscopic right colectomy for neoplasia, as is already standard practice.

Portale et al. (2019)[4] conducted a systematic review and meta-analysis of 10 observational studies (2 prospective and 8 retrospective) of internal hernia following laparoscopic colorectal surgery Over 8,400 patients met the inclusion criteria, and both left and right colectomies were included, along with rectal resection or a combination of colonic and rectal procedures. Both benign and malignant cases were included. Mesenteric defects were not routinely closed and the follow up ranged from 0.1 to 10 years.

The study found that 88.7% of patients did not have closure of the mesenteric defect and only 0.39% developed an internal hernia during the follow-up period. The majority—91% of patients with internal hernia required a reoperation.

Figure 3 (p. 6) shows how the mesentery lies in relation to the small bowel and it explains why most of the internal hernias occurred in patients with left colectomies in the study, which rationalized that because the small bowel lies that way it has a natural tendency to slide below the left mesocolon.

The study concluded that the incidence of internal hernia after laparoscopic colectomy was very low, less than 0.5%, and that there was not enough evidence to support closing the mesenteric defect.

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[3] Cabot, Jennifer C et al. “Long-term consequences of not closing the mesenteric defect after laparoscopic right colectomy.” *Diseases of the colon and rectum* vol. 53,3 (2010): 289-92. doi:10.1007/DCR.0b013e3181c75f48

[4] Portale, Giuseppe et al. “Internal hernia after laparoscopic colorectal surgery: an under-reported potentially severe complication. A systematic review and meta-analysis.” *Surgical endoscopy* vol. 33,4 (2019): 1066-1074. doi:10.1007/s00464-019-06671-8

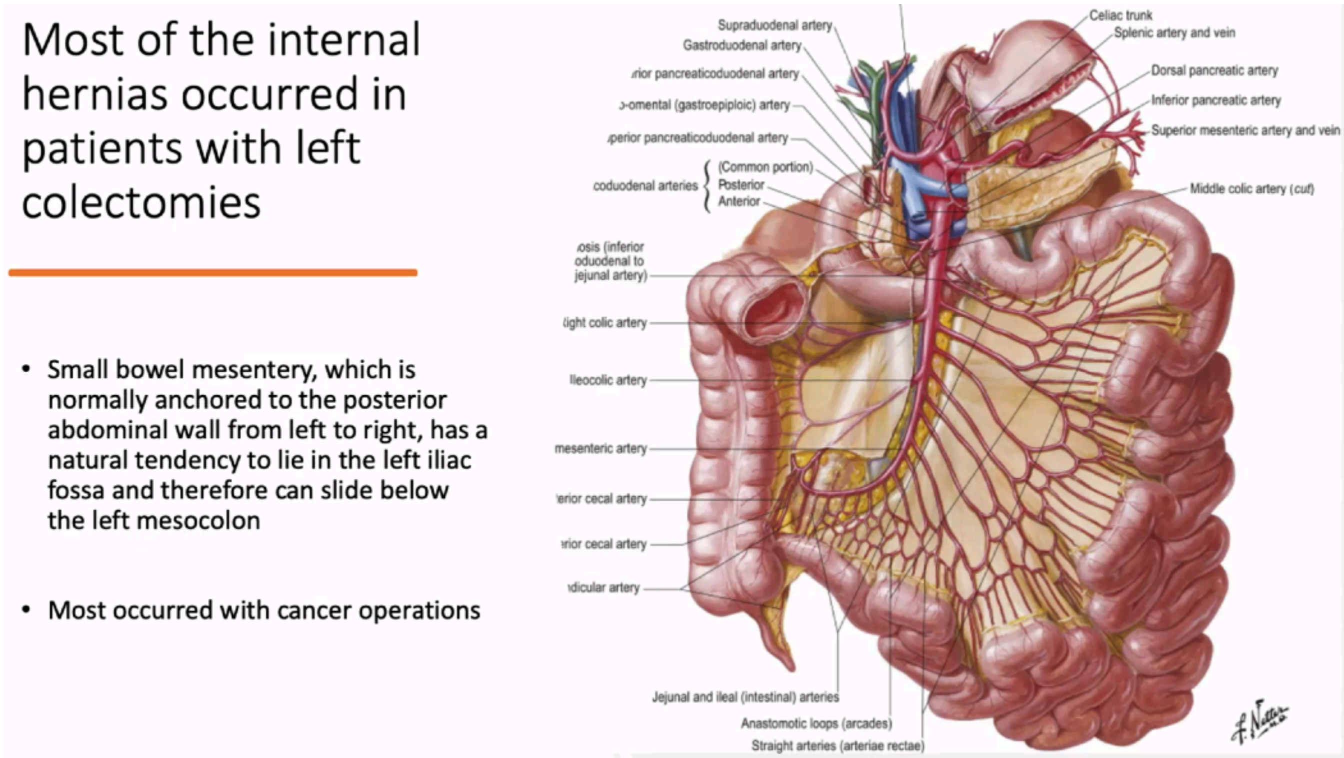

Fig. 3. Internal Hernia and Left Colectomy

4. Female versus male surgeons

Is there a difference in outcomes between patients treated by female versus male surgeons? The answer is yes.

Wallis et al.'s study published in early 2022 examined the association of surgeon–patient sex concordance with postoperative outcomes.[5] Primary care studies found gender discordance (male-physician-to-female-patient or female-physician-to-male-patient) to be associated with worse rapport, lower certainty of diagnosis, and increased disagreements with the advice provided. The authors hypothesized therefore that sex discordance between surgeons and patients may contribute to differences in postoperative outcomes.

They conducted a retrospective cohort study of cases involving both laparoscopic and open procedures in 1,320,108 patients treated by 2,937 surgeons in Ontario, Canada from 2007 to 2019. The cases involved 21 common elective and emergent procedures: CABG, fem-pop bypass, AAA repair, appendectomy, cholecystectomy, gastric bypass, colon resection, liver resection, spinal surgery, craniotomy, knee replacement, hip replacement, open repair of the femoral neck, total thyroidectomy, neck dissection, lung resection, radical cystectomy, and carpal tunnel release. The primary outcomes were death, readmission, or complication within 30 days after surgery.

They found that 602,560 patients were sex concordant with their surgeon (509,634 male sur-

[5] Wallis, Christopher J D et al. "Association of Surgeon-Patient Sex Concordance With Postoperative Outcomes." *JAMA surgery* vol. 157,2 (2022): 146-156. doi:10.1001/jamasurg.2021.6339

geon with male patient, 92,926 female surgeon with female patient) and 717,548 were sex discordant (667,279 male surgeon with female patient, 50,269 female surgeon with male patient). Sex discordance was associated with worse outcomes for female patients (aOR, 1.11; 95% CI, 1.06-1.16) and better outcomes for male patients (aOR, 0.96; 95% CI, 0.93- 0.99)

In other words, female patients treated by a male surgeon had worse outcomes, and male patients treated by a female surgeon had better outcomes.

Figures 4 and 5 serve as flowcharts of the independent variables—surgical specialties, age of the surgeon, surgeon volume of cases, and surgeon years in practice, as well as hospital status

Variable	Discordance (95% CI)
Specialty	
Cardiothoracic surgery	1.10 (1.06-1.13)
General surgery	1.03 (1.01-1.05)
Neurosurgery	1.12 (0.99-1.27)
Orthopedic surgery	1.04 (0.96-1.12)
Otolaryngology	1.03 (0.86-1.24)
Plastic surgery	1.04 (0.93-1.17)
Thoracic surgery	1.02 (0.96-1.09)
Urology	1.14 (0.62-2.10)
Vascular surgery	1.26 (0.79-2.03)
Surgeon age, y	
<40	1.06 (1.02-1.11)
41-50	1.08 (1.02-1.13)
51-60	1.06 (1.00-1.13)
≥61	0.91 (0.80-1.02)
Surgeon volume (quartiles)	
First (lowest)	1.07 (1.01-1.14)
Second	1.06 (1.03-1.09)
Third	1.08 (1.05-1.11)
Fourth (highest)	0
Surgeon years in practice	
<5	1.06 (1.02-1.10)
5.1-10	1.08 (1.03-1.13)
10.1-15	1.10 (1.02-1.18)
≥15.1	1.05 (1.00-1.10)
Hospital status	
Academic	1.07 (1.03-1.11)
Community	1.06 (1.04-1.08)
Elective vs emergent	
Elective	1.06 (1.03-1.09)
Emergent	1.00 (0.97-1.03)

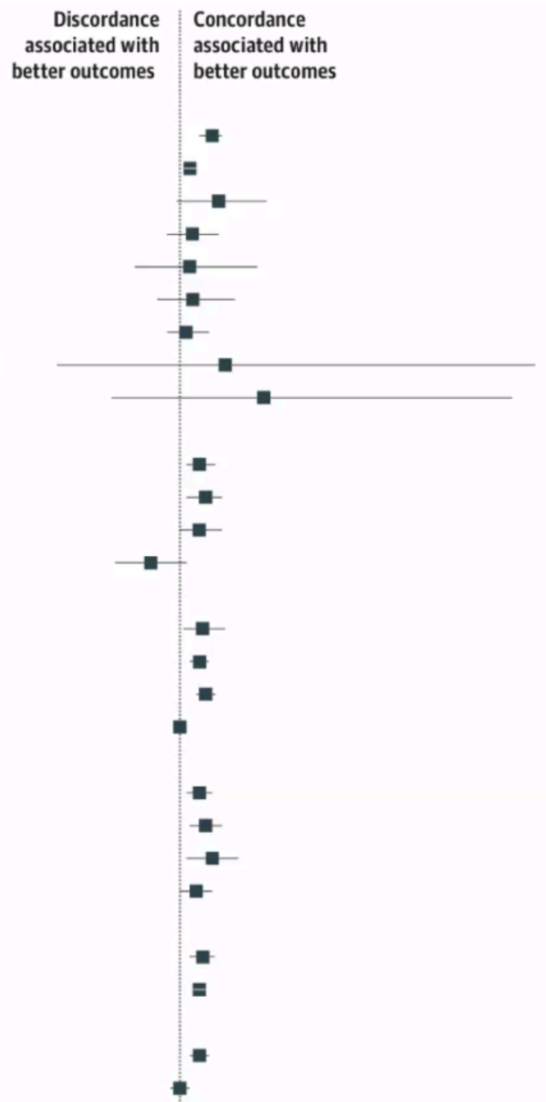

Fig. 4. Likelihood of Adverse Postoperative Outcomes (Death, Readmission, and Complications) According to Surgeon and Patient Sex Concordance, Stratified by Physician, Patient, Hospital, and Procedural Factors
Source: Figure 1 in Wallis et al. (2018) (see footnote 5)

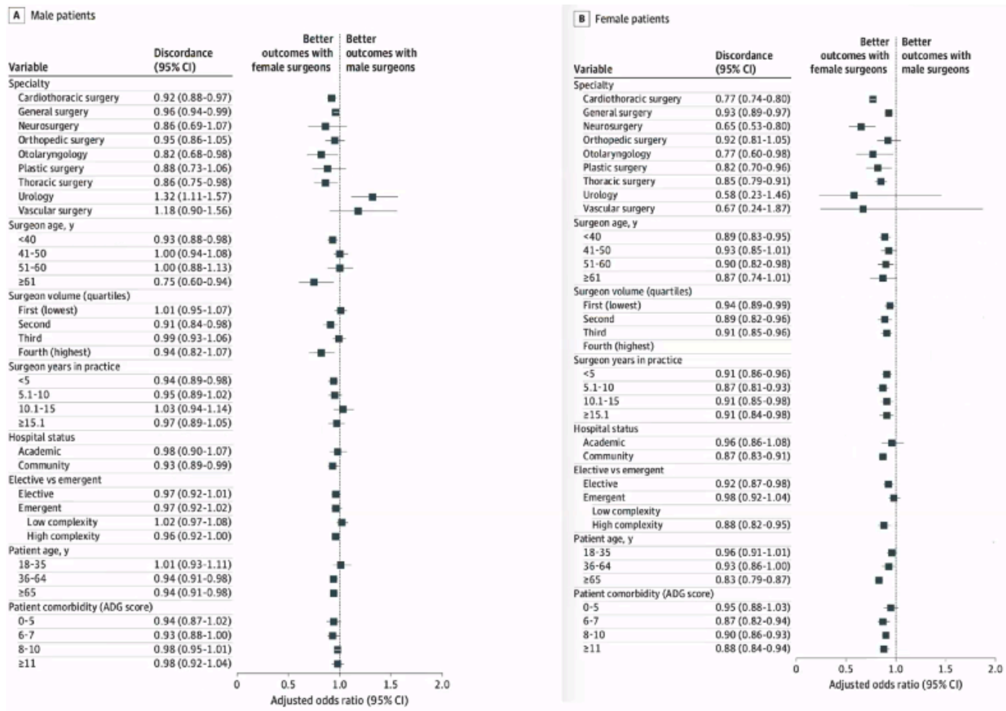

Fig. 5. Patient Outcomes Based on Surgeon Gender
Source: Wallis et al. (2018) (see footnote 5)

(academic or community) and elective versus emergent procedures. **Figure 4** shows the correlation between the independent variables and the dependent variable of sex concordance (or discordance) between patient and surgeon. In Figure 4, all of the variables are correlated with better outcomes (except if surgeon age was greater than age 61, in which case discordance was greater.) So, increased likelihood of better post-op outcomes for patients who are sex concordant with their surgeons.

Figure 5 breaks it up into males and females. On the left, were male patients with the same variables such as surgery type, surgeon age, years in practice, etc. All of the dots fall in the half with better outcomes with female surgeons and that is also the same thing that can be said for female patients as well.

To explain these findings, one thing we have to know is that the patient–physician relationship is strengthened by a shared identity based on sex, race, ethnicity, religion, or other personal beliefs or values. Sex discordance may lead to incomplete examinations in the postoperative setting and may contribute to failure to intervene when patients have minor deviations from the expected postoperative course.

In the Wallis study, case complexity was not assessed, but another study (Kaleher et al, Annals Surgery 2021) has found that male surgeons perform more complex or high risk cases than female surgeons and that female surgeons are more likely to perform cases with lower RVU values than their male peers, even when accounting for differences in clinical subspecialties and years of practice.

Wallis et al. hypothesized that female surgeons may be referred to less complex cases (or, conversely, more complex cases get referred to male surgeons) because primary care physicians believe males make more superior surgeons than females.

5. Surgical Smoke

It is widely held (my personal observation) that surgical smoke causes cancer. Does it?

The answer is no.

William T. Bovie patented his cautery device, which used a high-frequency electric current to cut through tissue, in 1931. Cautery is now a mainstay in operating rooms, but it causes "surgical smoke" made up of the gaseous byproducts of cauterized tissue. Smoke now can be from lasers to "Bovies" to ultrasonic devices to drills to bone saws. 95% of it is water (steam) and the remainder consists of particulates like chemicals, blood, viruses, and bacteria. Approximately 77% of the particulate matter is less than 1.1 micrometers and the mean diameter is 0.07 micrometers.

The smoke plumes can contain hydrogen cyanide and carcinogens such as acetylene and butadiene, as well as furfural and styrene, carcinogens which are eye and respiratory tract irritants known to affect the central nervous system.

Chemical Substance	Exposure Considerations
Aldehydes—acetaldehyde, formaldehyde, acrylamide	• The vapor is a respiratory tract irritant • Considered by NIOSH to be a potential occupational carcinogen • Use and exposure are increasingly regulated; maximum exposure limit is 0.05 ppm
Ketones	• Exposure can cause local irritation and peripheral neuropathy • Standards exist for safe exposure; the 8-hour exposure limit is 590 mg/m^3
Benzene	• Considered by NIOSH to be a potential occupational carcinogen • Exposure should be reduced to lowest possible limit o Short-term exposure limit is 5 ppm in any 15-minute period
Xylene	• Volatile organic compound • Respiratory irritant, skin irritant; eye damage can occur from exposure to higher concentrations • 8-hour exposure limit is 435 mg/m^3
Toluene	• Exposure can cause headaches, nausea, and dizziness • NIOSH recommends biennial medical examinations for exposed workers • Short-term exposure limit should not exceed 0.14 mg/m^3; for a 10-hour work shift, the limit is 0.135 mg/m^3
Styrene	• Inhalation and skin exposure can result in occupational injury • Adverse effects on CNS have been observed • Considered by NIOSH to be a teratogen and carcinogen
Furfural	• Eye and respiratory tract irritant • Limited data to establish safe exposure limits
Methylpropene, ethylene, propanenitrile	• No identified safe exposure limits
Hydrogen cyanide/hydrocyanic acid	• Exposure affects CNS and cardiovascular system • NIOSH specifies exposure limits for air respirators only
1,3-Butadiene	• Considered by NIOSH to be a teratogen and carcinogen

Table 3. Chemical Substances Identified in Diathermy Plume

Source: Table 2 in Ha, Hyeong In et al. "Chemicals in Surgical Smoke and the Efficiency of Built-in-Filter Ports." *JSLS : Journal of the Society of Laparoendoscopic Surgeons* vol. 23,4 (2019): e2019.00037. doi:10.4293/JSLS.2019.00037

Table 3 (p. 9) is a chart of all chemical substances that have been identified in smoke plumes. Four of them are identified as carcinogens and the same compounds are found in cigarette smoke. Benzene is also found in gasoline.

Hydrogen cyanide and toluene, which is found in paint thinner, can cause headache, nausea and dizziness. The maximum recommended inhalation exposure for toluene is about 0.3 milligrams per cubic meter of air, which is what the general public is exposed to in the daily environment. Those who smoke a pack of cigarettes a day are exposed to one milligram of toluene.

Hill et al. (2013)[6] found that smoke from one gram of tissue destroyed by electrosurgical methods had the mutagenic potential of smoking six unfiltered cigarettes. In a typical breast reduction case, the smoke was the equivalent to that of 27 to 30 cigarettes.

The smoke causes irritating symptoms in people with respiratory problems such as bronchitis, asthma, sinus infections, and allergies. Perioperative nurses are twice as prone as the general population to experience such symptoms.

The plastic surgeons at Bryn Mawr Hospital in Pennsylvania noticed that several OR personnel were experiencing acute health effects, including upper respiratory and eye irritation, headache and nausea during breast reduction procedures.

OR nurses and lung cancer risk
In 1976, 121,700 female registered nurses aged 30 to 55 years responded to a mailed questionnaire about known and suspected risk factors for cancer and heart disease, leading to the establishment of the Nurses' Health Study. Participants completed follow-up questionnaires every 2 years, providing additional information about health outcomes and risk factors for disease. Duration of operating room employment was collected, and the women were followed for lung cancer.

Between 1976 and 2000, the percentage of follow-up information obtained from the study participants (questionnaire responses plus deaths), was 95.6%. An estimated 98% of all deaths in the Nurses' Health Study cohort were able to be captured through the National Death Index.

After adjusting for age and smoking history including passive smoke exposure, they found that a history of operating room employment was *not* associated with an increased rate of lung cancer in their multivariable analyses.

In fact, nurses in the highest exposure category (more than 15 years in the OR) had a significantly lower rate of lung cancer than nurses with no prior operating room employment.

HPV Transmission
There have been four documented cases of possible HPV transmission from smoke to surgeon. All were gynecologists. One was a healthy 44 year old with no respiratory disease who developed laryngeal papillomatosis and infected with HPV types 6 and 11 after treating patients with anogenital condylomata.

Second was a 28 year old gynecological operating room nurse who assisted repeatedly in excisions of anogenital condylomas and developed laryngeal papillomatosis. Third was a 53 year old male who performed laser ablations on greater than 3000 patients with dysplastic, cervical, and vulvar lesions for over 20 years, and presented with HPV 16-positive tonsillar squamous cell carcinoma. He apparently had no identifiable risk factors other than long-term exposure to laser plumes.

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[6] Hill, D S et al. "Surgical smoke - a health hazard in the operating theatre: a study to quantify exposure and a survey of the use of smoke extractor systems in UK plastic surgery units." *Journal of plastic, reconstructive & aesthetic surgery : JPRAS* vol. 65,7 (2012): 911-6. doi:10.1016/j.bjps.2012.02.012

Fourth was a 62 year old male gynecologist with a 30-year history of laser ablation and very few other risk factors for oral pharyngeal cancer. He developed HPV 16-positive base of tongue cancer.

Dissemination of melanoma cells within the plume

Fletcher et al. (1999)[7] found viable melanoma cells in smoke plumes created during electrosurgery on mice with melanoma. After cutting into pellets of mouse melanoma cells with the cautery, the plume was collected and cultured in the medium. Viable cells were found as long as seven days later. However, there are no studies that have demonstrated the transmission of viruses or cancer cells to OR staff during surgery.

The conclusion was that there is inadequate evidence to directly link electrosurgical smoke to increased morbidity and mortality among OR personnel. But exposure to carcinogens and the development of malignant cancers is a cumulative process, so although there's no study demonstrating that electrosurgical smoke alone causes cancer, chronic exposure to the contents of surgical smoke may contribute to the process.

The current JCAHO (Joint Commission on Accreditation of Healthcare Organizations) recommendation is to implement standard procedures for the removal of surgical smoke and plume through the use of engineering controls, such as smoke evacuators and high filtration masks.

Most surgical masks only filter particles to approximately 0.5 mm in size; however, the majority of particles in plumes are ultrafine and much smaller. N95 masks filter at least 95% of airborne particles and should be the standard.

Methods for minimizing exposure to smoke

Local exhaust ventilation devices or suction should be used whenever electrosurgery is required and placed no further than 2 inches from the smoke source. Filtered central wall room suction units should be installed in all operating rooms. In laparoscopy, smoke should be evacuated with a dedicated smoke evacuator.

Summary

- C. diff infection is possible in patients without a colon.
- Bouffants allow the shedding of more bacteria and debris than cloth scrub caps.
- There's not enough evidence to support routine closure of mesentery defects, especially in colectomies.
- Female surgeons overall have better outcomes.
- No study has shown that surgical smoke has increased morbidity and mortality in OR personnel.

The key message is that surgeons should do their own research and not take for granted statements made without evidence to back them up.

* * *

[7] Fletcher, J N et al. "Dissemination of melanoma cells within electrocautery plume." *American journal of surgery* vol. 178,1 (1999): 57-9. doi:10.1016/s0002-9610(99)00109-9