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Knowledge, Attitudes and Practices of Surgical Trainees and Trainers on Recommended Surgical Site Infection Prevention Protocols

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Rationale/Objective: This study aimed to determine the knowledge, attitudes and practices of surgeons and surgical trainees regarding published SSI prevention guidelines. Specifically, the study described knowledge and attitudes towards SSI prevention guidelines among members of surgical training programs, described preoperative, intraoperative, and postoperative practices in SSI prevention and identified the presence of surgical site infection surveillance programs among various institutions

Methods: This was a retrospective cross-sectional study that evaluated the knowledge, attitudes, and practices of surgeons and surgical trainees to published SSI prevention guidelines in the Philippines. It utilized existing data from an October 2022 online survey done by the Philippine College of Surgeons distributed to various surgical training institutions in the country.

Results: There were a total of 213 respondents. The different attitudes and knowledge gaps towards present SSI prevention guidelines are described.

Conclusion: Despite the existence of local and international guidelines there still appears to be a significant lack of awareness and variability in practice among the different institutions as well as with surgeons of different levels of expertise or training. Varying preoperative, intraoperative and postoperative practices have also been described, including evident deviations from SSI guidelines. Lastly, there is a lack of standardized SSI surveillance programs among institutions and these are not aligned towards improved patient safety and quality improvement.

Key words: surgical site infection, infection protocols

It has been more than five years since the Philippine College of Surgeons published the consensus guidelines for the prevention of Surgical Site Infection (SSI) in the Philippine Journal of Surgical Specialties[1]. The Department of Health also came up with the National AntibioticGuidelines[2] with a section on Surgical Prophylaxis in 2018. Similar guidelines have emanated from the World Health Organization[3] and the United States Centers for Disease Control and Prevention[4]. First world countries, where compliance and outcomes are reported, often implement a national SSI surveillance program.[5-8] The Philippines has yet to implement similar programs, hence implementation and adherence to the published guidelines on a national level remains unknown. Multiple factors come into play in the development of an SSI. Adherence only to a single intervention may not be very effective in prevention. Likewise, improving awareness of a particular guideline does not necessarily translate to increased adoption and improved outcomes. For example, in a study on compliance to antibiotic prophylaxis guidelines, only modest reduction in SSI rates was observed even after dissemination and increased awareness.[9] Consistent and better outcomes are reported against SSIs and other healthcare-associated infections if a set of interventions, known as a care bundle, are adopted. This is especially true with high-risk patients[10] such as those with high BMIs, diabetes, and compromised immune systems. In order to achieve significant reductions in SSIs, multidisciplinary care bundles should be implemented at a large scale. A standardized SSI Surveillance Program for mastectomy at the Philippine General Hospital showed a higher SSI rate than that in published literature. It was then recommended that a SSI surveillance program must have standardized protocols, dedicated personnel, patient education components, and information analysis to improve an institution's quality of surgical care.[11] Lapitan, et al., cite the effect of a surgical antibiotic guideline in improving

compliance to antibiotic use.[12] Apart from this, there are no other local publications specifically citing knowledge, attitudes and practices of practicing surgeons and trainees regarding SSIs.

In the Asia Pacific region, many challenges still affect implementation of SSI guidelines.[13] These include constraints on human resources, lack of adequate policies and procedures, lack of a strong safety culture, limitation in funding, environmental and geographic challenges, cultural diversity, poor patient awareness, and limitation in self-responsibility. Proposed corrective strategies for this includes: institutional ownership of infection prevention strategies, performance of baseline assessments, review of evidence-based practices within the local context, development of a plan for guideline implementation, outcome assessment and stakeholder feedback, and a commitment to sustainability. SSI surveillance programs which are a staple in more advanced countries, remain a challenge in the APAC region, including the Philippines. Barriers to successful implementation of such a program were: lack of standardized definitions, reporting methodology and accountability, lack of fiscal resources, reporting variability and under-reporting, and lack of safety culture. Implementing an effective surveillance program requires countries to develop a well-designed and robust surveillance plan and ensure adequate training for involved staff.[14] Information exchange, including data and methodologies, will enable continuous learning and improvement of outcomes. In high income countries (HIC), participation in national SSI surveillance programs have resulted in decreased SSI rates. For LMICs, it has been shown that only 13 percent report having a national program;[15] hence implementation and standardization of SSI protocols are still wanting, and accurate SSI rate reporting remains elusive.

As the Philippines is an LMIC 16 with suboptimal government sponsored health insurance, surgical site infection prevention is crucial in maximizing health outcomes by preventing additional hospital days and decreasing out of pocket expenses for the patient. Pastena, et al., noted that surgical site infection doubled the cost of distal pancreatectomies and greatly increased the clinical burden of the patient by up to 25 percent.[17] The Philippine College of Surgeons, as the duly recognized Society to oversee and lead the practice of surgery in the country, is able to spearhead the initiation of a national SSI surveillance program with the goal of ensuring the best quality surgical outcomes. Herein lies the significance of this study - to examine awareness of SSI guidelines by Filipino surgeons and subsequently identify the best strategies for the implementation of these guidelines.

This study aims to determine the knowledge, attitudes and practices of surgeons and surgical trainees regarding published SSI prevention guidelines from the Philippine College of Surgeons, Department of Health National Antibiotic Guidelines 2018 and the World Health Organization. Specifically, the study will describe knowledge and attitudes towards SSI prevention guidelines among members of surgical training programs; describe preoperative, intraoperative, and postoperative practices in SSI prevention; and identify the presence of surgical site infection surveillance programs among various institutions.

Methods

This is a retrospective cross-sectional study that evaluated the knowledge, attitudes, and practices of surgeons and surgical trainees to published SSI prevention guidelines in the Philippines. It utilized existing data from an October 2022 online survey done by the Philippine College of Surgeons distributed to various surgical training institutions in the country (See Appendix A, available online).

This survey was created by the Philippine College of Surgeons Committee on Research and Committee on Surgical Infections Technical Working Group. The survey contained four main sections, specifically:

1) Knowledge on Consensus Recommendations on the Prevention and Management of Surgical Site Infections (SSI) in the Philippine setting,
2) Knowledge on the latest National Antibiotics Guidelines,
3) Attitudes and Practices Concerning a) Antibiotic Prophylaxis, b) Preoperative Measures, c) Post-operative Measures, and
4) Existence of an SSI Surveillance Unit.

It was then hosted and distributed via Google Forms. Forms were accepted only if they were completely filled out. All fields were mandatory.

Population

The authors surveyed surgical consultants and trainees (residents and fellows) from Philippine hospitals whose surgical training programs were accredited by their respective societies (i.e., Philippine Society of General Surgeons, Philippine Association of Thoracic and Cardiovascular Surgeons, Philippine Society of Pediatric Surgeons, etc.).

Ethical Considerations

The study protocol was reviewed and approved by the University of the Philippines Manila Research Ethics Board. It was also conducted in accordance with the guidelines of the Helsinki Declaration, the Data Privacy Act of 2012 (RA 10173) and the 2022 National Ethical Guidelines for Research Involving Human Participants. The investigators declare there are no interests, financial or otherwise, with any entity that might benefit from the results of this research. The study was made possible through a research grant from the Philippine College of Surgeons.

Data Gathering and Statistical Analysis

After obtaining ethics board approval, survey responses were tabulated and reviewed. Microsoft Excel was used for data encoding. Statistical analysis was performed using IBM Statistical Package for Social Sciences (SPSS) Statistics version 28.0.1.1. Measures of central tendency were used for quantitative data. Demographic categories were expressed using frequency and proportions. These included 1) Surgical Subspecialty, 2) type of respondent (Consultant or Trainee), type of hospital (Government or Private), geographic location (Metro Manila vs Province). Additionally, the presence of Surgical Site Infection Surveillance (SSIS) was documented. Chi-square test was used to compare responses between these demographic categories.

Results

Respondent Profile

There were a total of 213 respondents. Participants' ages ranged from 26-73 with a median age of 33, where the majority are males (66.7%). Around half (53.1%) were trainees, either as a resident or fellow. More than half of the respondents (57.8%) were working in Metro Manila, with an almost equal number of doctors practicing in government and private hospitals. The largest proportion of participants specialized in general surgery (64.8%) (Table 1).

Table 1. Profile of the respondents (n=213).

Respondent profile	Result
Age, median (IQR)	36 (22)
Sex, n (%)	
Male	142 (66.67%)
Female	71 (33.33%)
M:F ratio	2:1
Designation, n (%)	
Trainer	100 (46.95%)
Fellow	11 (5.16%)
Resident	102 (47.89%)
Location of Training Hospital, n (%)	
Metro Manila	123 (57.75%)
Outside Metro Manila	90 (42.25%)
Type of Primary Institution, n (%)	
Government	106 (49.77%)
Private	107 (50.23%)
Specialty, n (%)	
General Surgery	138 (64.79%)
Subspecialty Surgery	75 (35.23%)

Knowledge and Attitudes

Results of the survey showed that less than half (45.1%) of the participants had read the PCS Consensus Recommendations published in the Philippine Journal of Surgical Subspecialties (45.1%) or the Surgical Antibiotic Prophylaxis Section of the 2018 Department of Health National Antibiotic Guidelines (47.9%). There was no statistical significance between all groups for knowledge

and attitudes on the PCS Consensus Recommendation (Table 2). For the comparisons regarding DOH National Antibiotic Guidelines, there was a significant difference in being able to read the Surgical Antibiotic Prophylaxis section among institutions with surveillance programs versus those without. With regard to compliance to these, there is a significant difference between types of hospitals, with government institutions following all recommendations more diligently than private institutions ($p = 0.048$). In addition to this, there is a generally positive attitude towards these guidelines with 100 percent agreement to all (61.8%) or some (38.2%) of the guidelines. Those who had read the guidelines follow to varying degrees, with 16.7 percent following sometimes, 11.7 percent following most of the time, and majority (71.6%) following all guidelines diligently (Table 3).

Preoperative Practices

Most of the respondents used local guidelines, either from their institution (44.1%) or local society (28.6%) as basis for choice of prophylaxis. There were statistically significant differences on the basis of antibiotic prophylaxis between trainers and trainees ($p = 0.01$), private and government institutions ($p = 0.020$), institutions within and outside Metro Manila ($p = 0.036$), and with SSIS and without SSIS ($p = 0.029$). Majority used their hospital antibiogram (67.6%) to guide surgical prophylaxis, and there was a significant increase of antibiogram use in institutions with SSIS (76.8%, $p = 0.001$), (Table 4)

The majority of the surgeons (62.4%) always asked the patients to take a bath/shower pre-operatively, using either soap (76.7%) or chlorhexidine/povidone iodine (23.3%) as cleanser. Surgeons from government institutions frequently advised preoperative baths more frequently than those from private institutions ($p = 0.04$). There was a significant difference in use of chlorhexidine or povidone iodine (as instructed) in institutions with SSIS ($p < 0.016$) (Table 5). Body hair removal on surgical sites prior to surgery was always practiced by 52.6 percent of participants, with the majority using a shaving razor (61.9%) or hair clipper (33%). Most respondents (67.5%) perform body hair removal inside the OR suite after anesthesia induction. This was a greater number of trainees who timed hair removal at the ward (25.2%) while trainers timed hair removal at the OR holding area or inside the OR suite. There was also a greater number of surgeons from government institutions who had a similar practice of timing hair removal at the ward. Both these differences were statistically significant (trainers and trainees, $p = 0.044$; government and private institutions, $p < 0.001$), (Table 6).

Antibiotic skin testing was still performed by 84.1 percent of the participants (Table 7). There were no statistically significant differences across all group comparisons. Most doctors performed the skin test before the patient is transported from the ward (57.3%) or once the patient arrived at the OR suite (27.3%). There were statistically significant differences in this practice between general and subspecialty surgeons ($p = 0.047$), trainers and trainees ($p < 0.001$), and institutions within and outside Metro Manila ($p < 0.001$). It was also shown that participants sometimes (58.2%) or always (25.8%) use antibiotic prophylaxis in uncomplicated elective cases. There was a statistically significant difference in this practice within Metro Manila compared to outside Metro Manila ($p = 0.047$).

Intraoperative Practices

There were varied choices on surgical hand preparation. Most of the doctors preferred using an alcohol-based handrub (24.9%). This was followed by scrubbing with povidone iodine with brush (20.2%), and scrubbing with chlorhexidine with brush (19.3%). Choices for antiseptic for surgical site preparation were not standardized. Surgeons' preferences included: aqueous povidone iodine (35.2%), povidone iodine with alcohol (33.8%), or benzalkonium with alcohol (19.7%). Differences in preferred surgical hand preparation and antiseptic solutions for surgical site preparations were statistically significant among the demographic groups of trainers and trainees, government and private institutions, and institutions within and outside Metro Manila (Table 8).

The following categories showed statistically significant differences between trainers and trainees: surgical hand preparation ($p < 0.001$), antiseptic solution used for surgical site preparation ($p = 0.014$), subcutaneous wound bed irrigation before wound closure in non-contaminated surgeries ($p < 0.001$), use of antibiotic impregnated sutures (<0.001). Subcutaneous

Table 2. Knowledge and attitudes of surgeons on the PCS consensus recommendations.

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIS[b]	Without SSIS	p
Have read the PCS Consensus Recommendations[a]																
Yes	96 (45.1)	60 (43.5)	36 (48.0)	0.526	48 (48.0)	48 (42.5)	0.419	42 (39.6)	54 (50.5)	0.112	58 (47.2)	38 (42.2)	0.475	63 (50.4)	33 (57.5)	0.062
No	117 (54.9)	78 (56.5)	39 (52.0)		52 (52.0)	65 (57.5)		64 (60.4)	53 (49.5)		65 (52.8)	52 (57.8)		62 (49.6)	55 (62.5)	
Attitude towards consensus recommendations																
Agree with all	72 (75.0)	47 (78.3)	25 (69.4)	0.330	35 (72.9)	37 (77.1)	0.637	35 (83.3)	7 (16.7)	0.096	41 (70.7)	31 (81.6)	0.228	49 (77.8)	23 (69.7)	0.385
Agree with some	24 (25.0)	13 (21.7)	11 (30.6)		13 (27.1)	11 (22.9)		37 (68.5)	17 (31.5)		17 (29.3)	7 (18.4)		14 (22.2)	10 (30.3)	
Compliance with recommendations																
Sometimes follow	10 (10.4)	7 (11.7)	3 (8.3)	0.913	3 (6.25)	7 (14.6)	0.382	4 (9.5)	6 (11.1)	0.075	7 (12.1)	3 (7.9)	0.370	4 (6.4)	6 (18.2)	0.258
Follow most of the time	6 (6.3)	4 (6.7)	2 (5.6)		4 (8.3)	2 (4.17)		0	6 (11.1)		5 (8.6)	1 (2.6)		4 (6.4)	2 (6.1)	
Follow all diligently	80 (83.3)	49 (81.7)	31 (86.1)		41 (85.4)	39 (81.2)		38 (90.5)	42 (77.8)		46 (79.3)	34 (89.5)		55 (87.3)	26 (75.8)	

[a]Refers to the respondent being able to review or study the PCS Consensus Recommendations on the Prevention and Management of Surgical Site Infections (SSI) in the Philippine Setting.[1]
[b]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

Table 3. Knowledge and attitudes of surgeons on the 2018 DOH National Antibiotic Guidelines (Surgical Antibiotic Prophylaxis)

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIS[b]	Without SSIS	p
Have read the DOH National Antibiotic Guidelines[a]																
Yes	102 (47.9)	62 (44.9)	40 (53.3)	0.241	48 (48.0)	48 (42.5)	0.258	51 (48.1)	51 (47.7)	0.948	59 (48.0)	43 (47.8)	0.978	67 (53.6)	35 (39.8)	***0.047***
No	111 (52.1)	76 (55.1)	35 (46.7)		52 (52.0)	65 (57.5)		55 (51.9)	56 (54.3)		64 (52.0)	47 (52.2)		58 (46.4)	53 (60.23)	
Attitude towards National Antibiotic Guidelines																
Agree with all	63 (61.8)	43 (69.3)	20 (50)	0.050	35 (72.9)	37 (77.1)	0.649	34 (66.7)	29 (56.9)	0.308	35 (59.3)	28 (65.1)	0.552	41 (61.2)	22 (62.9)	0.870
Agree with some	39 (38.2)	19 (30.7)	20 (50)		13 (27.1)	11 (22.9)		17 (33.3)	22 (43.1)		24 (40.7)	15 (34.8)		26 (38.8)	13 (37.1)	
Compliance with National Antibiotic Guidelines																
Sometimes follow	17 (16.7)	11 (17.7)	6 (15.0)	0.484	3 (6.25)	7 (14.6)	0.665	9 (17.65)	8 (15.6)	***0.048***	8 (13.6)	9 (20.9)	0.323	9 (13.4)	8 (22.9)	0.319
Follow most of the time	12 (11.8)	9 (14.5)	3 (7.5)		4 (8.3)	2 (4.17)		2 (3.9)	10 (19.6)		9 (15.2)	3 (7.0)		7 (10.5)	5 (14.3)	
Follow all diligently	73 (71.6)	42 (67.7)	31 (77.5)		41 (85.4)	39 (81.2)		40 (78.4)	33 (64.7)		42 (71.2)	31 (72.1)		51 (76.1)	22 (62.9)	

[a]Refers to the respondent having read the Surgical Antibiotic Prophylaxis section of the 2018 Department of Health National Antibiotic Guidelines. [2]
[b]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

Table 4. Antibiotic prophylaxis practices of surgeons

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIS[b]	Without SSIS	p
Basis for antibiotic prophylaxis choices[a]																
Personal Preference	24 (11.3)	13 (9.4)	11 (14.7)		13 (13.0)	11 (9.7)		6 (5.7)	18 (16.8)		17 (13.82)	7 (7.8)		7 (5.6)	17 (19.3)	
Institutional Guidelines	94 (44.1)	61 (44.2)	33 (44.0)		37 (37.0)	57 (50.4)		46 (43.4)	48 (44.8)		54 (43.9)	40 (44.4)		59 (47.2)	35 (39.8)	
DOH Guidelines	31 (14.6)	23 (16.7)	8 (10.7)	0.660	9 (9.0)	22 (19.5)	***0.001***	20 (18.9)	11 (10.2)	***0.020***	11 (9.9)	20 (22.2)	***0.036***	20 (16.0)	11 (12.5)	***0.029***
Local Society Guidelines	61 (28.6)	39 (28.3)	22 (29.3)		41 (41.0)	20 (17.7)		31 (29.2)	30 (28.0)		40 (42.5)	21 (23.3)		38 (30.4)	23 (26.1)	
Others (Textbook, International Guidelines)	3 (1.4)	2 (1.4)	1 (1.3)		0 (0.0)	3 (2.6)		3 (2.8)	0 (0.0)		1 (0.8)	2 (2.2)		1 (0.8)	2 (2.3)	
Use of hospital antibiogram for surgical prophylaxis																
Yes	114 (67.6)	91 (68.8)	49 (65.3)	0.601	68 (68.0)	79 (67.3)	0.908	34 (66.7)	29 (56.9)	0.172	83 (67.5)	61 (67.8)	0.963	96 (76.8)	48 (54.5)	***0.001***
No	69 (32.4)	43 (31.2)	26 (34.7)		32 (32.0)	37 (32.7)		17 (33.3)	22 (43.1)		40 (32.5)	29 (32.2)		29 (23.2)	40 (45.4)	

[a]Refers to reference material personally used by respondent as the basis for choice of antibiotic prophylaxis.
[b]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

Table 5. Pre-operative practices of surgeons: Pre-op showers and cleanser instructed for use.

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIS[a]	Without SSIS	p
Advice for pre-op showers																
Always	133 (62.4)	92 (66.7)	41 (54.7)		55 (55.0)	78 (69.0)		78 (73.6)	55 (51.4)		77 (62.6)	56 (62.2)		86 (68.8)	47 (53.4)	
Sometimes	69 (32.4)	39 (28.3)	30 (40.0)	0.202	39 (39.0)	30 (26.5)	0.107	24 (22.6)	45 (42.1)	***0.004***	41 (33.3)	28 (31.1)	0.683	34 (27.2)	35 (39.8)	***0.072***
Never	11 (5.2)	7 (5.1)	4 (5.3)		6 (6.0)	5 (4.4)		4 (3.8)	7 (6.5)		5 (4.1)	6 (6.7)		5 (4.0)	6 (6.8)	
Cleanser instructed for use in preoperative showers																
Soap	155 (76.7)	102 (77.9)	53 (74.6)		72 (76.6)	83 (76.8)		82 (80.4)	73 (73.0)		91 (77.1)	64 (76.2)		85 (70.8)	70 (85.4)	
Chlorhexidine or povidone iodine	47 (23.3)	29 (22.1)	18 (25.3)	0.606	22 (23.4)	25 (23.1)	0.966	20 (19.6)	27 (27.0)	0.214	27 (22.9)	20 (23.8)	0.878	35 (29.2)	12 (14.6)	***0.016***

[a]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

Table 6. Pre-operative practices of surgeons: Removal of body hair

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIS[a]	Without SSIS	p
Removal of body hair on surgical site																
Always	112 (52.6)	82 (59.4)	30 (40.0)		35 (35.0)	77 (68.1)		64 (60.4)	48 (44.9)		58 (47.1)	54 (60.0)		66 (52.8)	46 (52.3)	
Sometimes	82 (38.5)	52 (37.7)	30 (40.0)	***<0.001***	48 (48.0)	34 (30.1)	***<0.001***	33 (31.1)	49 (45.8)	0.065	52 (42.3)	30 (33.3)	0.165	48 (38.4)	34 (38.6)	0.996
Never	19 (8.9)	4 (2.9)	15 (20.0)		17 (17.0)	2 (1.8)		9 (8.5)	10 (9.3)		13 (10.6)	6 (6.7)		11 (8.8)	8 (9.1)	
Instrument for body hair removal																
Shaving razor	120 (61.9)	89 (66.4)	31 (51.7)		44 (53.0)	76 (68.5)		66 (68.0)	54 (55.7)		65 (59.1)	55 (65.5)		65 (57.0)	55 (68.7)	
Hair clipper	64 (33.0)	40 (29.8)	24 (40.0)		33 (39.8)	31 (27.9)		24 (24.7)	40 (41.2)		42 (38.2)	22 (26.2)		42 (36.8)	22 (27.5)	
Scissors	4 (2.06)	0 (0.0)	4 (6.7)	***0.012***	4 (4.8)	0 (0.0)	***0.022***	2 (2.1)	2 (2.1)	0.051	2 (1.8)	2 (2.4)	0.164	4 (3.5)	0 (0.0)	0.163
Scalpel blade	5 (2.6)	4 (3.0)	1 (1.7)		2 (2.4)	3 (2.7)		4 (4.1)	1 (1.0)		1 (0.9)	4 (4.8)		2 (1.7)	3 (3.7)	
Other (all of the above)	1 (0.5)	1 (0.7)	0 (0.0)		0 (0.0)	1 (0.9)		1 (1.0)	0 (0.0)		0 (0.0)	1 (1.2)		1 (0.9)	0 (0.0)	
Timing and location of patient's hair removal																
While at ward	38 (19.56)	30 (22.4)	8 (13.3)		10 (12.0)	28 (25.2)		28 (28.9)	10 (10.3)		20 (18.2)	18 (21.4)		21 (18.4)	17 (21.2)	
At OR reception or holding area	25 (12.9)	16 (11.9)	9 (15.0)		14 (16.9)	11 (9.9)		15 (15.5)	10 (10.3)		14 (12.7)	11 (13.1)		18 (15.8)	7 (8.7)	
Inside or suite/after anesthesia induction	131 (67.5)	88 (65.7)	43 (71.7)	0.324	59 (71.1)	72 (64.9)	0.044	54 (55.7)	77 (79.4)	***0.001***	76 (69.1)	55 (65.5)	0.838	75 (65.8)	56 (70.0)	0.346

[a]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

Table 7. Pre-operative practices of surgeons: Antibiotic prophylaxis

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIS[a]	Without SSIS	p
Antibiotic skin testing																
Yes	179 (84.0)	116 (84.1)	63 (84.0)	0.991	84 (84.0)	95 (84.1)	0.989	90 (84.9)	89 (83.2)	0.731	101 (82.1)	78 (86.7)	0.370	105 (84.0)	74 (84.1)	0.986
No	34 (16.0)	22 (15.9)	12 (16.0)		16 (16.0)	18 (15.9)		16 (15.1)	18 (16.9)		22 (17.9)	12 (13.3)		20 (16.0)	14 (15.9)	
Timing of administration of antibiotic prophylaxis																
Before transport from ward	122 (57.3)	84 (60.9)	38 (50.7)		47 (47.0)	75 (66.4)		69 (65.1)	53 (49.5)		51 (41.5)	71 (78.9)		65 (52.0)	57 (64.8)	
Upon arrival at OR complex	33 (15.5)	24 (17.4)	9 (12.0)	***0.047***	13 (13.0)	20 (17.7)	***<0.001***	15 (14.1)	18 (16.6)	0.057	27 (21.9)	6 (6.7)	***<0.001***	20 (16.0)	13 (14.8)	0.132
In OR suite	58 (27.2)	30 (21.7)	28 (37.3)		40 (40.0)	18 (15.9)		22 (20.7)	36 (33.6)		45 (36.6)	13 (14.4)		40 (32.0)	18 (20.4)	
Antibiotic use in uncomplicated elective cases																
Always	55 (25.8)	31 (22.5)	24 (32.0)		23 (23.0)	32 (28.3)		34 (32.1)	21 (19.6)		24 (19.5)	31 (34.4)		29 (23.2)	26 (29.5)	
Sometimes	124 (58.2)	84 (60.9)	40 (53.3)		56 (56.0)	68 (60.2)		57 (53.8)	67 (62.6)		77 (62.6)	47 (52.2)		75 (60.0)	49 (55.7)	
Never	3 (16.0)	23 (16.7)	11 (14.7)	0.316	21 (21.0)	13 (11.5)	0.154	15 (14.1)	19 (17.8)	0.114	22 (17.9)	12 (13.3)	***0.047***	21 (16.8)	13 (14.8)	0.576

[a]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

Table 8. Intraoperative practices of surgeons: Hand preparation and surgical site preparation
Table 8. Intraoperative Practices of Surgeons: Hand Preparation and Surgical Site Preparation

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIs	Without SSIS	p
Surgical Hand Preparation																
Scrub with povidone iodine and brush	43 (20.2)	31 (22.5)	12 (16.0)		13 (13.0)	30 (26.5)		31 (29.2)	12 (11.2)		16 (13.0)	27 (30.0)		28 (22.4)	15 (17.0)	
Scrub with chlorhexidine and brush	4 (19.2)	29 (21.0)	12 (16.0)		16 (16.0)	25 (22.1)		17 (16.0)	24 (22.4)		15 (12.2)	26 (28.9)		19 (15.2)	22 (25.0)	
Wash with povidone iodine	24 (11.3)	18 (13.0)	6 (8.0)	0.275	7 (7.0)	17 (15.0)	***<0.001***	18 (17.0)	6 (5.6)	***<0.001***	15 (12.2)	9 (10.0)	***<0.001***	12 (9.6)	12 (13.6)	0.381
Wash with chlorhexidine	19 (8.9)	12 (8.7)	7 (9.3)		9 (9.0)	10 (8.8)		13 (12.3)	6 (5.6)		10 (8.1)	9 (10.0)		11 (8.8)	8 (9.1)	
Alcohol based hand rub	53 (24.9)	28 (20.3)	25 (33.3)		38 (38.0)	15 (13.3)		15 (14.1)	38 (35.5)		41 (33.3)	12 (13.3)		35 (28.0)	18 (20.4)	
Wash with soap/cleanser and alcohol based hand rub	33 (15.5)	20 (14.5)	33 (15.5)		17 (17.0)	16 (14.2)		12 (11.3)	21 (19.6)		26 (21.1)	7 (7.8)		20 (16.0	13 (14.8)	
Antiseptic solution used for surgical site preparation																
Chlorhexidine with alcohol	18 (8.4)	12 8.7)	6 (8.0)		5 (5.0)	13 (11.5)		9 (8.5)	9 (8.4)		6 (4.9)	12 (13.3)		11 (8.8)	7 (8.0)	
Aqueous chlorhexidine	4 (1.9)	2 (1.4)	2 (267)		2 (2.0)	2 (1.8)		1 (0.9)	3 (2.8)		3 (2.4)	1 (1.1)		2 (1.6)	2 (2.2)	
Povidone iodine with alcohol	72 (33.8)	52 (37.7)	20 (26.7)		25 (25.0)	47 (41.6)		50 (47.2)	22 (20.6)		34 (27.6)	38 (42.2)		41 (32.8)	31 (35.2)	
Aqueous povidone iodine	75 (35.2)	48 (34.8)	27 (36.0)	0.518	39 (39.0)	36 (31.9)	***0.014***	40 (37.7)	35 (32.7)	***<0.001***	45 (36.6)	30 (33.3)	***0.003***	42 (33.6)	33 (37.5)	0.877
Benzakalium with alcohol	42 (19.7)	23 (16.7)	19 (25.3)		28 (28.0)	14 (12.4)		5 (4.7)	37 (34.6)		34 (27.6)	8 (8.9)		28 (22.4)	14 (15.9)	
Other (Povidone iodine soap, NA)	2 (0.9)	1 (0.7)	1 (1.3)		1 (1.0)	1 (0.9)		1 (0.9)	1 (0.9%)		1 (0.8)	1 (1.1)		1 (0.80)	1 (1.1)	

[a]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

wound bed irrigation before wound closure in non-contaminated wounds was always (45.1%) or sometimes (34.7%) done by most of the respondents, with statistically significant difference only between the trainers and trainees ($p < 0.001$). Respondents used either plain sterile saline (64.7%) or povidone iodine based solution (22.9%), with no statistically significant differences between any subset on the choice of irrigation. Majority respondents sometimes (58.7%) used antibiotic impregnated sutures for wound closure (Table 9). This practice was only statistically significant between trainers and trainees ($p < 0.001$).

Post-operative Practices

A majority of respondents (71.4%) never used topical antibiotic agents postoperatively. The differences in the practice of use of topical antibiotic agents were only statistically significant between trainers and trainees ($p = 0.037$). A majority (45.1%) of respondents changed dressings in uncomplicated cases after 48 hours but the time to first change of dressing was statistically different between general and subspecialty surgeons ($p = 0.010$), trainers and trainees ($p <0.001$), and private and government institutions ($p = 0.040$). There was a preference for changing dressings after 48 hours among subspecialty, trainers, and private practice surgeons (Table 10).

Surgical Site Infection Surveillance

Table 11 shows that most respondents (85.9%) indicated the presence of institutional reporting of surgical site infections. This was more significant in institutions with SSIS ($p < 0.001$) compared to those without. With regard to the reporting scheme for surgical site infections among all respondents, the predominant mode was self-report at 86.4%. Third-party reports constitute 26.3% of surveillance reports while patient reports only came in at 13.1%. There were significantly more reports coming from institutions with SSIS encompassing self-reports ($p = 0.005$), third party reports ($p < 0.001$), and patient reports ($p = 0.022$). Additionally, there were more third party- and patient reports in proportion to the total number of self-reports.

Among all respondents, 58.8% reported the presence of an SSI surveillance unit. Of this, 23% had dedicated staff while 35.7% had staff with multi-tasking personnel. This is shown in Table 12.

Discussion

Knowledge and Attitudes Towards Guidelines

The results of this study showed that despite existence of SSI guidelines, knowledge gaps and poor awareness are present. While surgeons from government institutions reported increased compliance, most other comparison groups did not have significant differences. This emphasizes the general lack of awareness on current recommendations which may affect institutional practices. This conclusion is supported by Cameron, et al.,[5] where surgeons showed low adherence to antibiotic prophylaxis guidelines due to poor awareness. This implies adopting a strategy focusing on information dissemination. Lapitan, et al. demonstrated an increase in compliance with antibiotic prophylaxis after dissemination of the surgical antibiotic use guidelines at the Philippine General Hospital Department of Surgery, increasing compliance from 11.4 percent to 21.6 percent post-intervention.[12]

Khan, et al., shared a different strategy for increasing awareness wherein participants engaged in a 3-part interprofessional, task-based learning, involving video demonstrations, role-play exercise, and facilitated peer-group reflecting session. They concluded that this training bridged the gap between knowledge and practice[18] and could theoretically be applicable to SSI guideline compliance. Horgan, et al. also emphasized that educating surgeons and healthcare professionals are fundamental in SSI prevention.[19] However, active (rather than passive) information dissemination methods yield better results.[20]

There is still an overall positive attitude to these recommendations despite less than half of participants being knowledgeable on the full recommendations. This finding is similar to those of Khan, et al.[18] and Horgan, et al.[19] where they found that healthcare professionals' attitudes towards guidelines on SSI prevention were predominantly positive. There were still a minority of respondents who only agree with some recommendations and who intermittently follow them as well. This can be attributed to cognitive dissonance in which antibiotic prescribing practices are habituated. Surgeons have already established certain behaviors, making change challenging in light of new guidelines.[21,22]

Variable Practices

Different levels of awareness and knowledge cause variable practices among surgeons in surgical training programs. The choice for antibiotic prophylaxis is based usually on institutional guidelines (44.1%) followed by local society guidelines (28.6%). This lack of agreement on what guide to use by health care professionals can result in limited use[20] hindered further by those whose personal preference (11.3%) predominate in practice. According to Giusti, et al.,[23] personal preference is related to the number of years in practice (>18 years). Present data also reflect this difference in antibiotic prophylaxis choice among trainers and trainees. Although it is perceived that younger surgeons were more likely to access guidelines, the final decision on antibiotic use was ultimately decided by the trainer. Junior staff are also more inclined to accept seniors recommendations in an effort to comply with hierarchy.[20] This study suggests the need for effective communication and a more patient-centered practice, particularly when practicing in a multidisciplinary environment. This allows for

Table 9. Intraoperative practices of surgeons: Hand preparation and surgical site preparation

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIS[a]	Without SSIS	p
Subcutaneous wound bed irrigation before wound closure in non-contaminated surgeries																
Always	96 (45.1)	70 (50.7)	26 (34.7)	0.073	31 (31.0)	65 (57.5)	***< 0.001***	48 (45.3)	48 (44.9)	0.588	54 (43.9)	42 (46.7)	0.914	53 (42.4)	43 (48.9)	0.541
Sometimes	74 (34.7)	42 (30.4)	32 (42.7)		39 (39.0)	35 (31.0)		34 (32.1)	40 (37.4)		44 (35.8)	30 (33.3)		44 (35.2)	30 (34.1)	
Never	43 (20.2)	26 (18.8)	17 (22.7)		30 (30.0)	13 (11.5)		24 (22.6)	19 (17.8)		25 (20.3)	18 (20.0)		28 (22.4)	15 (17.0)	
Solutions for wound irrigation																
Sterile plain saline	110 (64.7)	69 (61.6)	41 (70.7)	0.081	52 (74.3)	58 (58.0)	0.072	52 (63.4)	58 (65.9)	0.387	55 (56.1)	55 (76.4)	0.050	66 (68.0)	44 (60.3)	0.363
Sterile water	16 (9.4)	13 (11.6)	3 (5.2)		4 (5.7)	12 (12.0)		5 (6.1)	11 (12.5)		10 (10.2)	6 (8.3)		10 (10.3)	6 (8.2)	
Medicated solutions	4 (2.3)	1 (0.9)	3 (5.2)		2 (2.9)	2 (2.0)		2 (2.4)	2 (2.7)		3 (3.1)	1 (1.4)		3 (3.1)	1 (1.4)	
Povidone iodine based	39 (22.9)	29 (25.9)	10 (17.2)		11 (15.7)	28 (28.0)		22 (26.8)	17 (19.3)		29 (29.6)	10 (13.9)		18 (18.6)	21 (28.8)	
Other (sterile PNSS for HPB, medicated solution for KT)	1 (0.6)	0 (0.0)	1 (1.7)		1 (1.4)	0 (0.0)		1 (1.2)	0 (0.0)		1 (1.0)	0 (0.0)		0 (0.0)	1 (1.4)	
Use of antibiotic impregnated sutures																
Always	23 (10.8)	13 (9.4)	10 (13.3)	0.059	1 (1.0)	16 (14.2)	***< 0.001***	7 (6.6)	10 (9.3)	0.761	8 (6.5)	9 (10.0)	0.471	9 (7.2)	8 (9.1)	0.732
Sometimes (when available)	38 (17.8)	23 (16.7)	15 (20.0)		56 (56.0)	69 (61.1)		63 (59.4)	62 (57.9)		76 (61.8)	49 (54.4)		76 (60.8)	49 (55.7)	
Never	152 (71.4)	102 (73.9)	50 (66.7)		43 (43.0)	28 (24.8)		36 (34.0)	35 (32.7)		39 (31.7)	32 (35.6)		40 (32.0)	31 (35.2)	

[a]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

Table 10. Postoperative practices of surgeons

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIS[a]	Without SSIS	p
Use of topical antibiotic agents																
Always	23 (10.8)	13 (9.4)	10 (13.3)	0.509	10 (10.0)	13 (11.5)	***0.037***	11 (10.4)	12 (11.2)	0.754	7 (5.7)	16 (17.8)	***0.011***	16 (12.8)	7 (8.0)	0.085
Sometimes	38 (17.8)	23 (16.7)	15 (20.0)		11 (11.0)	27 (23.9)		17 (16.0)	21 (19.6)		26 (21.1)	12 (13.3)		27 (21.6)	11 (12.5)	
Never	152 (71.8)	102 (73.9)	50 (66.7)		79 (79.0)	73 (64.6)		78 (73.6)	74 (69.2)		90 (73.2)	62 (68.9)		82 (65.6)	70 (79.5)	
First change of dressing in uncomplicated cases																
Within 24 hrs	23 (10.8)	16 (11.6%)	7 (9.3)	***0.010***	7 (7.0)	16 (14.2)	***<0.001***	16 (15.1)	7 (6.5)	***0.040***	13 (10.6)	10 (11.1)	0.570	13 (10.4)	10 (11.4)	0.611
After 24 hrs	86 (40.4)	66 (47.8)	20 (26.7)		25 (25.0)	61 (54.0)		47 (44.3)	39 (36.4)		45 (36.6)	41 (45.6)		50 (40.0)	36 (40.9)	
After 48 hrs	96 (45.1)	51 (37.0)	45 (60.0)		61 (61.0)	35 (31)		41 (38.7)	55 (51.4		60 (48.7)	36 (40.0)		59 (47.2)	37 (42.0)	
Other	8 (3.8)	5 (3.6)	3 (4.0)		7 (7.0)	1 (0.9)		2 (1.9)	6 (5.6)		5 (4.1)	3 (3.3)		3 (2.4)	5 (5.7)	

[a]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

Table 11. Institutional reporting of SSI

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p	With SSIS[a]	Without SSIS	p
Institutional reporting of SSI																
Yes	183 (85.9)	112 (88.4)	61 (81.3)	0.156	85 (85.0)	98 (86.7)	0.718	93 (87.7)	90 (84.1)	0.447	104 (84.5)	79 (87.8)	0.504	116 (92.8)	67 (76.1)	***0.001***
No	30 (14.1)	16 (11.6)	14 (18.7)		15 (15.0)	15 (13.3)		13 (12.3)	17 (15.9)		19 (15.4)	11 (12.2)		9 (7.2)	21 (23.9)	

[a]Surgical Site Infection Surveillance Unit
Values indicated are n (%). Statistically significant p values in bold italic font.

Table 12. Presence of surgical site infection surveillance unit

	All respondents	General surgery	Subspecialty	p	Trainer	Trainee	p	Government	Private	p	Metro-Manila	Outside Metro-Manila	p
Presence and staffing of surgical site infection surveillance unit													
Yes (with dedicated staff)	49 (23.0)	27 (19.6)	22 (29.3)	0.143	26 (26.0)	23 (20.4)	0.432	22 (20.7)	27 (25.2)	0.599	33 (26.8)	16 (17.8)	0.260
Yes (staffed with multi-tasking personnel)	76 (35.7)	48 (34.8)	28 (37.3)		37 (37.0)	39 (34.5)		41 (38.7)	35 (32.7)		40 (32.5)	36 (40.0)	
No	88 (41.3)	63 (45.6)	25 (33.3)		37 (37.0)	51 (45.1)		43 (40.6)	45 (42.1)		50 (40.6)	38 (42.2)	

Values indicated are n (%). Statistically significant p values in bold italic font.

improvement of patient safety, greater employee morale and greater flow of information.[20]

The consensus recommendations highlight preoperative bathing or showers.[1] Despite this, 5.2 percent of respondents never advise preoperative showers to their patients. This should be a relatively easy guideline to follow in terms of SSI prevention for elective procedures. Majority (76.6%) instruct their patients to use soap for preoperative baths. There is no specific recommendation regarding cleansers to be used during a preoperative bath, citing either plain or antimicrobial soap[1,3] ensures that the skin is clean and bacterial load at the site of incision is decreased.[3] The availability and cost-effectiveness of using plain soap for preoperative baths could be the reason why it is the predominant choice.

In this study, majority of surgeons still routinely remove body hair prior to surgery (52.6%). This was more prominent among general surgeons and trainees. Contrast this to consensus recommendations of the PCS and the WHO global guidelines[3] which advise against routine hair removal. Moreover, 61.86 percent of the participants also responded that they use shaving razors to remove body hair preoperatively.

Comparison of trainers and trainees also shows differences between their practice on removal of body hair, instrument used, and timing of hair removal. This deviation from guidelines may stem from the 1) lack of knowledge or awareness, 2) difficulty in changing habits,

and 3) cost considerations. Traditionally, hair removal was done preoperatively to avoid interference with surgical exposure and skin markings, and to decrease problems with application of sutures and wound dressings. Hair was also previously considered unclean and associated with increasing rates of SSI, but this has already been refuted.[3] The timing of hair removal of the respondents also contradicts the local recommendation of not performing hair removal inside the operating room.[1] In the latest iteration of the Infectious Disease Specialists of America (IDSA) guidelines on SSI prevention, hair removal is only advised if it may interfere with surgery. It specifies the use of two recommendation 1) use of clippers instead of razors, and 2) performing hair removal outside the operating room.[24]

This may also reflect how training could affect the practice of a surgeon as a barrier identified for adherence to antibiotic prophylaxis. Habits and old practices picked up during training and was a reason for not adhering to current guidelines.[20] This further highlights the importance of increased awareness on objective strategies over traditional practices.

Antibiotic skin testing is still a practice done by most (84.04%) of the respondents. Although guidelines on skin testing for antibiotics were not mentioned in the PCS and DOH national antibiotic guideline, skin test was traditionally done to test the safety of penicillin[25], and the same is done using cephalosporins despite not being validated.[26] This practice of indiscriminate skin testing is contrary to the position published by the Philippine Society of Allergy Asthma and Immunology last 2018[27] wherein they state the practice is not evidence-based. The PSAAI instead recommends taking a thorough allergy history and careful monitoring during antibiotic administration.

Surgical hand preparation has been historically established to prevent contamination during operation thus also preventing surgical site infection and is a standard of care for any surgical procedures. The general recommendation of PCS for surgical hand preparation is the use of appropriate antimicrobial and water or alcohol-based hand rubs and scrubbing surgical antimicrobial agents available in the market. With this, present study shows a difference in practice of surgical hand preparation. This pattern was significant among 1) trainers and trainees, 2) government and private, and 3) Metro-Manila and Outside Metro-Manila. It also shows that alcohol-based hand rub (24.9%) tends to be the more popular choice of hand preparation for the present study's respondents. Alcohol based hand rubs have been on the rise since recent studies have found out that it is equally effective with surgical hand scrubbing in preventing surgical site infection. Added benefits to this include less skin irritation, speed, antimicrobial potency and economic use of tap water[28] and might be the reasons for being the most popular choice.

The PCS consensus guidelines mainly recommended the use of chlorhexidine with alcohol for surgical skin preparation and povidone-iodine only as an alternative if the patient has allergy with chlorhexidine.[1] Despite this, only 8.5 percent of respondents use chlorhexidine with alcohol with the majority favoring the use of aqueous povidone iodine (35.2%) and povidone iodine with alcohol (33.8%). Povidone iodine has been used for preoperative skin preparation since 1955.[29] While the CDC released its first guideline on surgical skin preparation on 1983, it only mentioned the use of any antimicrobial for surgical skin preparation. It was not until 2016 when WHO recommended chlorhexidine with alcohol as an antiseptic solution for surgical site preparation. The low adherence to current guidelines with regard to this might stem from this old practice. There also is a significant price difference in low-income countries where the patient shoulders health care costs. Cupino, et al.,[29] also mentioned that while there are numerous studies attesting to chlorhexidine as superior, there was no significant difference in the microbiologic growth after surgical skin preparation when povidone iodine was used. An institution might not feel the need to follow the guideline when same results can be achieved for less cost.

The value of antiseptic wound lavage has been subject to debate for years. PCS does not recommend antiseptic wound lavage and intraperitoneal lavage even if the wound is classified as contaminated or dirty. Despite this, the majority of the present study's respondents still perform subcutaneous wound bed irrigation and only 20.2 percent never perform this. This study shows that majority of those who perform this procedure are still in training and the majority of those who never perform this are trainers. This shows the gap

between knowledge and practice between these two groups when it comes to this particular practice. While it may not have a negative effect on patients, it emphasizes the need for formalized training on the topic. One study pointed out that conducting a training program increased participant's knowledge significantly and that they positively applied what they learned about preventing surgical site infection in practice.[30] Since wound irrigation is not recommended by the PCS, there was no recommendation on the type of solution to be used. Majority of respondents use sterile plain saline (64.7%) for wound irrigation, however this might not have significant effects according to Ambe, et al..[31] IDSA guidelines of 2023 however now recommend wound bed irrigation with an antimicrobial solution.[24] This reversal of position highlights the need for surgeons to keep abreast with the latest updates.

Finally, the PCS recommends the use of antibiotic impregnated sutures in all types of surgery. However, only a few (8%) always practice this recommendation. More trainers never use antibiotic impregnated sutures as compared to trainees (43 vs 28, $p<0.001$). However, the majority (58.7%) of respondents sometimes use this depending on the availability of the product hence, this could be one factor for low adherence.

The use of topical antimicrobial agents in wounds undergoing primary intention were not recommended in the current guidelines. The National Institute of Health and Care Excellence (NICE) did not find convincing evidence on the postoperative use of antimicrobials in preventing infections and this was also adopted in the Philippines. Findings of this study note that there is a general adherence to this recommendation, with 71.4 percent of respondents affirming non-use of topical antibiotics postoperatively. However, trainers adhere to this recommendation significantly more frequently than their trainees (79% vs 72%, $p=0.037$). Frequent use of topical antibiotic agents is also more prevalent Outside Metro-Manila (17.8%). Second, unless the wound is grossly contaminated, the current recommendation prescribes keeping dressings intact for at least 48 hours postoperatively. Only around half of the respondents (45.1%) adhere to this recommendation, with significantly more trainers than trainees following these guidelines (61% vs 35%, $p<0.001$). A similar pattern was seen in other groups as well where change of dressing after 48 hours was chosen more among subspecialty and private surgeons.

Surgical Site Infection Surveillance

There is a substantial portion of the current guidelines dedicated to endorsing a surveillance system for surgical site infections on an institutional level. Based on the results of this study, some institutions appear to a reporting system for SSI with a vast majority being self-reported. The study only asks about the presence of reporting without any other details on the components of the report. Lacking also is information on frequency of reports, analysis being done and feedback to the rest of institution. The CDC recommends certain methodological tools to conduct this surveillance such as stratifying SSI rates according to the associated risk factors. Further examination of surveillance practice and how it affects actual practices is also warranted.

Self-reports characterize the majority of the responses in these surveillance units. This is appropriate since the surgeon has the primary responsibility to ensure the safety of the patient and will be able to monitor signs of infection because of their frequent contact with the postoperative patient. One has to understand why numbers are low for third-party reports. This may include nurses who assisted in the surgery or who are manning the wards or interns assisting during surgery. The authors also expect them to know the recommendations and alert the institution if there are any violations. With lower reporting rates, there is a need to investigate if any such gaps in communication between surgeons and allied healthcare workers exist. There might be cases wherein nurses may find it hard to report violations in SSI protocols. The same applies to patients. They reported the lowest frequency in terms of reporting. Analyzing whether this is because surgeons already detected the infection before they could be reported or if there are any other communication or power gaps between surgeons and patients, is needed. Finally, results show that only 23 percent of institutions have a dedicated staff for SSI surveillance, with the rest having no staff at all or having staff doing multiple tasks concurrently. This represents a significant gap in the implementation of the current guidelines. Staffing problems dedicated to monitoring, analyzing and

managing surgical site infections in institutions can compromise patient health. Dedicated staff, who may not necessarily be surgeons themselves, but equipped with epidemiological skills may increase adherence of institutions to the current guidelines and promote patient safety. This is suggested by current results which show an increase in third party report and patient report in institutions with SSIs, with the added benefit of bypassing the biased nature of self-reporting systems.

This survey only represents a small fraction of all PCS Fellows and accredited training programs. Despite initiatives to secure more respondents in the initial survey, time constraints, a general lack of interest, and the ongoing pandemic also limited the response rate. A more detailed and in-depth analysis, and inability to conduct follow-up questions and triangulation of data, were also limitations of the present study.

Conclusions

This study demonstrates the different attitudes and knowledge gaps towards present SSI prevention guidelines. Despite the existence of several local and international guidelines, there still appears to be a lack of general awareness on such. There also is a significant variability among surgeons from different institutions and expertise. Varying preoperative, intraoperative and postoperative practices have also been described, including evident deviations from known SSI guidelines. These may reflect lack of information dissemination and communication.

Lastly, although there is documented presence of surgical site infection surveillance programs among various institutions, these are still few and not standardized from the perspective of patient safety and quality improvement contexts. The results here provide baseline data for policies and program development which the PCS can implement with regards SSI awareness and prevention initiatives.

Recommendations

The Philippine College of Surgeons can take the lead in implementing initiatives to improve compliance to SSI guidelines. Examples include: 1) implementation of standardized surveillance programs in all member institutions, 2) promotion of inter-professional collaboration and 3) creation of management bundles with other SSI stakeholders. With implementation of a particular bundle, frequent outcome assessment and regular audits will be needed in order to cement practices into routine medical staff behaviors.

Future research can be undertaken on administrative and training-related factors affecting surgeon awareness and compliance to existing SSI guidelines. Increased awareness can be promoted through integration of teaching modules into residency and medical school curricula with appropriate evaluation measures.

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