

National Surgical and Anesthesia Human Health Resource Study of 2020

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Rationale: The provision of surgical services in the Philippines is an essential component of our healthcare system. Despite an increasing number of accredited training programs, geographic maldistribution remains a key factor in access to surgical care in the country. This study aimed to describe the geographic distribution of surgeons and anesthesiologists in the Philippines and factors that affect their practice to provide insights into the country's surgical capabilities. Additionally, demographic factors such as workforce density, professional mobility, and economic indicators were explored. The ultimate goal was to establish an updated database for continuous monitoring of surgical manpower, facilitated through the collaboration of the Philippine College of Surgeons (PCS) and the Philippine Society of Anesthesiologists (PSA).

Methods: This cross-sectional study, sponsored by the World Surgical Foundation (WSF) and the Philippine College of Surgeons Foundation (PCSF), received exemption from review by the Single Joint Research Ethics Board (SJREB) of the Department of Health. An online survey was distributed to surgeons and anesthesiologists across the Philippines from July 1 to December 31, 2020. Active practitioners in relevant specialties were eligible, excluding retirees. Procedures adhered to ICH-GCP principles, National Ethical Guidelines, and the Data Privacy Act. Additional data, sourced from various outlets, was consolidated, verified and subsequently entered into an electronic data sheet (Google Sheets, Google LLC, Palo Alto CA) to extract descriptive statistics of the surgical and anesthesia workforce at the national and regional levels.

Results: Analysis of the data indicates male dominance with a noticeable trend of increasing female participation in surgical training programs, while anesthesiologist gender distribution showed a female preponderance. Maldistribution in manpower persists, influenced by factors such as training programs, medical education, and the availability of secondary and tertiary hospitals, and other socio-economic conditions in the country. The study reveals regional variations in the distribution of surgeons and anesthesiologists in the Philippines, with a notable concentration in urban centers, the highest being in Luzon, particularly in the National Capital Region (NCR).

Conclusion: The study highlights gender disparities and regional variations in the distribution of surgeons and anesthesiologists in the Philippines, with a significant concentration in Luzon, particularly

in the National Capital Region (NCR). Disparities in subspecialty distribution are exacerbated by healthcare education discrepancies and inadequate healthcare infrastructure especially in rural areas. Addressing these challenges requires focused efforts on expanding training programs, recruiting specialists, and ensuring equitable access to surgical care nationwide. Establishing a comprehensive surgical workforce database is essential for informed policymaking, monitoring workforce distribution, and assess service quality to enhance access to surgical services.

Key words: Workforce, Health Resources, General Surgery, Anesthesiology

“To advocate for the provision of surgical care for the many, rather than the few.” This philosophy was summarized into a catchphrase “Health for all,” a health view associated with Halfdan T. Mahler, former Director-General of the World Health Organization.¹

The successful provision of healthcare services is dependent on the interplay of a number of factors. The most important of these are physical and human resources and a planned health system involving government and non-government institutions. Physical resources pertain to the capital stock and investments, infrastructure, medical equipment, and healthcare information technology; while human resources include the healthcare workers, the workforce density, professional mobility and training.

The Philippine College of Surgeons (PCS) last published a National Surgical Manpower Study in 2005.² In 2020, the PCS, in collaboration with the Philippine Society of Anesthesiologists (PSA) and both local and national government units, had taken on the task to

improve access to surgical and anesthesia services in the country. To ensure that the Colleges are in the best position to do so, an analysis and review of the current surgical and anesthesia manpower is essential.

The Filipino healthcare workers are primary movers of the healthcare system, but their numbers are influenced by the social, economic, and political shifts, both locally and globally. The Philippine surgical and anesthesia workforce, despite an increasing number of accredited training programs, are affected by many factors that impact Philippine society in general. First, the overseas Filipino workers (OFW) phenomenon has seen the emigration of Filipino healthcare workers out of the country, resulting in a “brain drain”. Second, they suffer greatly from geographic maldistribution, with many surgeons and anesthesiologists opting to practice in the more highly urbanized centers of the country.³

This study aimed to describe the geographic distribution of surgeons and anesthesiologists in the country. This entailed quantifying how many surgeons are out there and describing their fields of specialization, board certification status, training background, as well as their specialty or subspecialty affiliations. This will give a clearer view of the present surgical capabilities of the Philippines. For future demographics, the number of training institutions and their distribution would also be a part of this study. Moreover, demographic data such as sex and age, educational indicators, hospital levels, type of practice and economic indicators which may affect the surgical or anesthesia practice were also described. As a consequence of this study, the authors hoped to also develop an updatable database with which to continuously monitor the surgical manpower status in the Philippines using the network of the PCS and PSA.

Methods

This cross-sectional study received exemption from review by the Single Joint Research Ethics Board (SJREB) of the Department of Health. The nationwide data collection was funded by the World Surgical Foundation (WSF) and the Philippine College of Surgeons Foundation (PCSF).

A questionnaire (See Appendix A) was sent to surgeons and anesthesiologists in current practice and

in training through the officers of the various chapters and individually through social messaging groups of their respective professional organizations across the different administrative regions of the Philippines (Figure 1). Participants eligible to participate in the survey were surgeons and anesthesiologists involved in General Surgery and Thoracic Cardiovascular Surgery (TCVS), Pediatric Surgery, Orthopedics, Plastic and Reconstructive Surgery, Cosmetic Surgery, Neurosurgery, Urology, Otolaryngology-Head and Neck Surgery, Ophthalmology, Transplant Surgery, and Vascular Surgery. Participants who were retired or no longer in active practice were excluded.

National Capital Region (NCR)
Cordillera Administrative Region (CAR)
Region I Northern Luzon
Region II Cagayan Valley
Region III Central Luzon
Region IV-A CALABARZON
Region IV-B MIMAROPA
Region V Bicol
Region VI Western Visayas
Region VII Central Visayas
Region VIII Eastern Visayas
Region IX Zamboanga Peninsula
Region X Northern Mindanao
Region XI Davao
Region XII SOCCSKSARGEN
Region XIII Caraga
Bangsamoro Autonomous Region In Muslim Mindanao (BARMM)

Figure 1. The 17 administrative regions of the Philippines, 2020.

Study procedures were done in accordance with ICH-GCP principles, the provisions of the National Ethical Guidelines for Health and Health-related Research of 2017, and the Data Privacy Act of 2012 (RA 10173). Additional data was gathered from July 1, 2020- December 31, 2020 from the following sources: Philippine College of Surgeons, Philippine Society of Anesthesiology, Specialty Societies and Specialty boards, Department of Health, PhilHealth, Philippine Hospital Association, and Official Hospital and Society Websites. Data collected was consolidated and presented to chapter representatives of the PCS and officers of the

PSA to verify its accuracy (See Appendix B). Validated data was entered into an electronic data sheet (Google Sheets, Google LLC, Palo Alto CA) to extract descriptive statistics of the surgical and anesthesia manpower at the national and regional levels.

Results

Table 1 presents the demographic data of surgeons and anesthesiologists in the country. There are more male than female surgeons, with a M-F ratio of 3.8:1. In contrast, there are fewer male than female anesthesiologists, with a M-F ratio of 1:1.2. The surgeons outnumber the anesthesiologists 3.2 to 1. There are more male than female surgical trainees with a M-F ratio of 1.3:1. The mean age of PCS Fellows is 53.8 years; they comprised 37.8% of the study population.

Table 2 shows the breakdown of data on surgeons and anesthesiologists per island group and region. There are more surgeons and anesthesiologists in Luzon (5,831 and 1,733) than in Visayas (915 and 299) and Mindanao (798 and 281). Luzon has the greatest number of surgical trainees (773) followed by Mindanao (140) and Visayas (134). In terms of anesthesia trainees, Luzon has the most (513), followed by Visayas (124), and Mindanao (68). The top 3 regions in Luzon with the highest number of practicing surgeons and anesthesiologists are the National Capital Region (4,822), Central Luzon (770) and Southern Tagalog (746). In terms of trainees in Luzon, the top 3 regions are National Capital Region followed by Central Luzon and Southern Tagalog.

In the Visayas, Central Visayas has the highest number of practicing surgeons and anesthesiologists (612). Western Visayas has the most surgical and anesthesia

trainees (111). The top 3 regions with the greatest number of practicing surgeons and anesthesiologists in Mindanao are Davao (400), Northern Mindanao (253) and SOCCSKSARGEN (145). Overall, the five regions with the highest number of surgical practitioners are National Capital Region, Central Luzon, Southern Tagalog, Central Visayas, and Western Visayas. Meanwhile, the five regions with the fewest surgical practitioners are Caraga, BARMM, Eastern Visayas, Zamboanga Peninsula, and SOCCSKSARGEN.

Surgeons and anesthesiologists are concentrated in the following provinces in the various regions: Benguet (CAR), Pangasinan (Region I Northern Luzon), Isabela (Region II Cagayan Valley); Pampanga, Nueva Ecija and Bataan (Region III Central Luzon); Laguna, Batangas, Cavite, Rizal (Region IV-A CALABARZON); Palawan and Oriental Mindoro (Region IV-B MIMAROPA); Camarines Sur and Albay (Region V Bicol). In the Visayas, surgeons and anesthesiologists are clustered in Negros Occidental and Iloilo (Region VI Western Visayas), Cebu (Region VII Central Visayas), and Leyte (Region VIII Eastern Visayas). In Mindanao, majority of surgeons and anesthesiologists are practicing in Zamboanga del Sur (Region IX Zamboanga Peninsula), Misamis Oriental (Region X Northern Mindanao), Davao del Sur (Region XI Davao), Southern Cotabato (Region XII SOCCSKSARGEN), Agusan del Norte (Region XIII Caraga), and Maguindanao and Lanao del Sur (BARMM). (Details are in the supplement available on the PCS-PJSS Website.)

Figure 2 shows that general surgeons (diplomates and non-diplomates) constitute the highest proportion (38.6%) among the various surgical specialists, followed by ophthalmologists (20.0%), otorhinolaryngologist-

Table 1. Demographic data of study participants.

DEMOGRAPHIC PROFILE (SEX)	SURGEONS	ANESTHESIOLOGISTS	SURGICAL TRAINEES
MALE	5975	1049	697
FEMALE	1569	1264	517
TOTAL	7544	2313	1214

Table 2. Distribution of surgeons and anesthesiologists per island group and region, 2020.

BY REGION	SURGEONS	ANESTHESIOLOGISTS	SURGICAL TRAINEES ^a	ANESTHESIA TRAINEES
<u>LUZON</u>				
CAR	157	69	48	25
REGION I	254	82	33	18
REGION II	121	60	36	16
REGION III	589	181	77	44
REGION IV-A	535	211	40	16
REGION IV-B	226	90	26	13
REGION V	130	37	30	15
NCR	3819	1003	483	366
Total Luzon	5831	1733	773	513
<u>VISAYAS</u>				
REGION VI	379	132	69	42
REGION VII	474	138	37	62
REGION VIII	62	29	28	20
Total Visayas	915	299	134	124
<u>MINDANAO</u>				
REGION IX	108	31	22	11
REGION X	193	60	16	0
REGION XI	286	114	82	48
REGION XII	110	35	3	0
REGION XIII	47	22	0	0
BARMM	54	19	17	9
Total Mindanao	798	281	140	68
GRAND TOTAL	7544	2313	1047	705

^aSurgical trainees are all under General Surgery.

head and neck surgeons (12.7%), and orthopedic surgeons (12.6%). The fewest specialists are in transplant surgery, vascular surgery, pediatric surgery, and plastic and reconstructive surgery. General surgeons, including both diplomates and non-diplomates comprise the biggest group of surgical specialists in all regions (> 30%) and are more than 50% in Western Visayas, Central Visayas, and SOCCSKSARGEN.

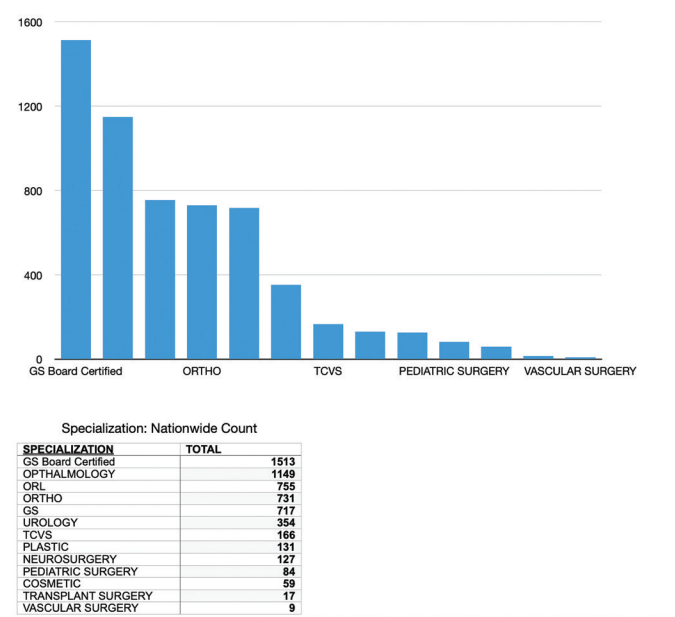


Figure 2. Number of surgeons per surgical specialization, 2020.

Practitioners of the top four surgical specialties (General Surgeons, Ophthalmologists, Orthopedic Surgeons, and ORL HNS) are mainly located in NCR, Southern Luzon, and Central Visayas (Table 3). Close to half of all general surgeons are located in NCR. Around two-thirds of general surgeons are diplomates. There are generally more diplomates than non-diplomates in each region. The exceptions are in Central Visayas, Zamboanga Peninsula, SOCCSKSARGEN and BARMM where the non-diplomates outnumber the diplomates. There are ophthalmologists, orthopedic surgeons, otorhinolaryngologists, urologists and neurosurgeons in all regions. The top four specialty groups (general surgeons, ophthalmologists, ORL-HNS, orthopedic

surgeons) are mainly located in NCR, CALABARZON, and Central Visayas. More than half of ophthalmologists (56.3%), 51.8% of otorhinolaryngologists and 46.0% of orthopedic surgeons are in NCR. Ophthalmologists account for 10-23% of specialists in the different regions except Western Visayas (5.9%). Orthopedic surgeons comprise 10-30% of surgical specialists and urologists, less than 10%. Otorhinolaryngologists make up 10-30% of surgical specialists except in Central Visayas, Eastern Visayas, Caraga and BARMM where they number less than 10%. Plastic and reconstructive/cosmetic surgeons, pediatric surgeons and thoracic and cardiovascular surgeons, transplant surgeons and vascular surgeons are the fewest in most regions or are not reported at all.

The survey asked general surgeons to fill in the subspecialty that they identified with in terms of their society affiliation or their clinical practice. Most surgeons identified themselves as general surgeons and did not indicate any specialty. The top four subspecialties in general surgery are colorectal surgery (21.0%), surgical oncology (19.2%), minimally invasive surgery (17.7%) and hepatobiliary surgery (16.6%), as shown in Table 4. Trauma surgeons comprise 5.6% of general surgical specialists and are concentrated in NCR and CALABARZON. No trauma surgeons were reported in 11 regions. The percentage of general surgeons without a declared subspecialty ranged from 62.4 to 93.3% in the various regions. At least 90% of general surgeons had no declared specialty in Cagayan Valley (91.5%), MIMAROPA (93.3%), NCR (91.6%), Zamboanga Peninsula (90.5%), SOCCSKSARGEN (91.5%), and Caraga (93.3%). There were fewer than five GS specialists in Cagayan Valley, MIMAROPA, Eastern Visayas, Zamboanga Peninsula, SOCCSKSARGEN, Caraga and BARMM. Central Visayas had the lowest proportion of general surgeons without a subspecialty (42.4%). In Central Visayas, 18.2% of general surgeons were surgical oncologists, colorectal surgeons (15.2%) and hepatobiliary surgeons (12.1%).

With respect to training programs (Table 5), there are 1187 surgical residents distributed across 122 residency programs. NCR is host to 42.7% of PSGS-accredited general surgery training programs and another 31.2% are in Central Visayas, Central Luzon and Davao. There are no PSGS-accredited training programs in Caraga. Seven

Table 3. Number of surgical specialties per region, 2020.

SPECIALTY^a	REGION																	
	CAR	I	II	III	IV A	IV B	V	NCR	VI	VII	VIII	IX	X	XI	XII	XIII	BARMM	TOTAL
GENERAL SURGERY (DIPLOMATE)	55	65	26	116	208	20	33	871	112	47	18	12	45	73	17	10	3	1731
GENERAL SURGERY (NON-DIPLOMATE)	21	49	19	53	61	4	19	362	78	113	5	30	20	29	39	5	14	921
THORACIC CARDIOVASCULAR SURGERY	3	6	0	7	17	0	3	143	7	12	0	2	3	5	3	0	0	211
PEDIATRIC SURGERY	3	1	3	0	6	0	0	37	6	11	1	1	4	5	1	0	2	75
ORTHOPAEDICS	19	36	19	75	86	7	13	399	34	55	10	11	24	45	12	14	8	867
PLASTIC AND RECONSTRUCTIVE SURGERY	1	3	1	4	8	0	1	99	4	14	0	0	0	8	0	0	0	143
COSMETIC SURGERY	1	1	1	5	14	0	0	51	1	1	1	0	2	0	0	0	0	78
NEUROSURGERY	3	20	1	7	5	2	2	72	11	11	3	6	8	7	1	1	0	160
UROLOGY	14	16	12	37	42	4	8	204	18	14	1	4	12	12	7	2	1	408
OTOLARYNGOLOGY-HEAD AND NECK SURGEONS	14	27	17	65	105	7	14	451	46	33	6	13	22	32	11	4	4	871
OPHTHALMOLOGY	24	45	17	112	120	5	25	777	53	80	13	11	25	44	13	10	5	1379
TRANSPLANT SURGERY	0	1	0	0	0	0	1	5	4	0	0	0	0	3	0	0	0	14
VASCULAR SURGERY	0	0	0	0	2	0	0	3	1	0	0	1	0	4	0	0	0	11
BLANK/NO DATA AVAILABLE	8	34	4	90	26	13	10	346	4	84	4	17	24	19	6	2	11	702

^aObstetrics and Gynecology are not part of the data this specialty is not under the umbrella of the Philippine College of Surgeons.

Table 4. General surgery specialties per region based on subspecialty societies recognized by PCS, 2020.

GENERAL SURGERY SUBSPECIALTIES^a	CAR	I	II	III	IV-A	IV-B	V	NCR	VI	VII	VIII	IX	X	XI	XII	XIII	BARMM	TOTAL
HEAD AND NECK	1	4	2	2	3	0	2	12	1	2	0	0	1	2	1	0	0	33
BREAST	1	0	0	1	5	0	0	17	5	2	0	0	0	3	0	0	0	34
COLORECTAL	1	3	1	1	9	0	3	26	5	5	0	2	1	12	1	0	1	71
HEPATOBIILIARY	2	0	1	6	7	0	1	21	4	3	1	1	1	7	0	0	1	56
TRAUMA	3	0	0	1	5	0	1	7	0	0	0	0	0	2	0	0	0	19
SURGICAL ONCOLOGY	2	5	0	2	5	1	2	19	6	7	0	1	4	9	2	0	0	65
MINIMALLY INVASIVE	2	1	0	24	6	1	1	20	1	0	2	0	0	2	0	0	0	60

^aThere might be surgeons with multiple subspecialty organizations.

hundred forty-one anesthesiology residents are spread across 65 PSA-accredited training programs, of which 43% are in NCR. There are no PSA-accredited training programs in SOCCSKARGEN, Caraga and BARMM.

Table 5. Number and distribution of training programs in general surgery and anesthesia, 2020.

REGION	PSGS-Accredited Training Programs	Interim GS Programs	No of Surgical Trainees	Anesthesia-Accredited Training Programs	No of Anesthesia Trainees
<u>LUZON</u>					
CAR	3	0	30	3	49
REGION I	3	1	40	3	21
REGION II	3	1	30	3	49
REGION III	8	3	84	4	36
REGION IV-A	5	4	40	3	16
REGION IV-B	1	1	24	1	0
REGION V	3	0	30	3	15
NCR	41	5	530	28	359
Total Luzon	67	15	808	48	545
<u>VISAYAS</u>					
REGION VI	3	2	69	3	42
REGION VII	11	4	113	7	59
REGION VIII	2	1	32	1	14
Total Visayas	16	7	214	11	115
<u>MINDANAO</u>					
REGION IX	1	0	13	1	10
REGION X	3	1	35	2	28
REGION XI	6	1	88	3	43
REGION XII	2	2	8	0	0
REGION XIII	0	0	0	0	0
BARMM	1	0	21	0	0
Total Mindanao	13	4	165	6	81
GRAND TOTAL	96	26	1187	65	741

Source: Philippine Board of Surgery, Philippine Board of Anesthesiology

In terms of training programs and surgical specialties, only NCR has a complete number of training programs as well as the greatest number of training programs in the country. Table 6 shows that there are 166 society-accredited training programs in the different specialties and more than half (51.2%) are in otorhinolaryngology-

head and neck surgery, ophthalmology, and orthopedics. Two-thirds of these accredited programs are based in NCR. More than three-fourths of 18 accredited programs in the Visayas as in Central Visayas, while in Mindanao, two-thirds are in Davao. There are no accredited training programs in SOCCSKARGEN, Caraga and BARMM.

Table 6. Distribution of training programs in surgical specialties and subspecialties of surgery, 2020.

BY REGION	Orthopaedics	Ophthalmology	ORL	TCVS	Plastic	Urology	SOSP	Colon	Neurosurgery	Transplant	Pediatric Surgery
<u>LUZON</u>											
CAR	1	1	1	0	0	0	0	0	0	0	0
REGION I	1	3	2	0	0	0	0	0	0	0	0
REGION II	1	0	1	0	0	0	0	0	0	0	0
REGION III	1	1	2	0	1	0	0	0	0	0	0
REGION IV-A	1	0	1	0	1	1	0	1	0	0	0
REGION V	0	0	1	0	0	0	0	0	0	0	0
NCR	11	20	19	9	13	12	5	8	9	1	4
Total Luzon	16	25	27	9	15	13	5	9	9	1	4
<u>VISAYAS</u>											
REGION VI	1	1	1	0	0	1	0	0	0	0	0
REGION VII	2	3	1	1	1	1	1	1	1	0	1
REGION VIII	0	0	1	0	0	0	0	0	0	0	0
Total Visayas	3	4	3	1	1	2	1	1	1	0	1
<u>MINDANAO</u>											
REGION IX	0	0	1	0	0	0	0	0	0	0	0
REGION X	1	1	1	0	0	0	1	0	0	0	0
REGION XI	1	1	1	1	1	1	1	1	1	0	1
REGION XII	0	0	0	0	0	0	0	0	0	0	0
REGION XIII	0	0	0	0	0	0	0	0	0	0	0
BARMM	0	0	0	0	0	0	0	0	0	0	0
Total Mindanao	2	2	3	1	1	1	2	1	1	0	1
GRAND TOTAL	21	31	33	11	17	16	8	11	11	1	6

Sources: Philippine Academy of Ophthalmology, Philippine Society of Otorhinolaryngology-Head and Neck Surgery

Table 7 shows that 64.7% of 68 medical schools are in Luzon, 28% are in NCR and another 28% are in the Visayas. CAR, Cagayan Valley, CALABARZON, Eastern and Central Visayas host at least four medical schools. There is no medical school in Caraga. Four to five out of 10 graduates are from medical schools in NCR. The regions with the most medical graduates in 2020 are NCR, Central Visayas, Central Luzon, Davao, Eastern Visayas and CAR. SOCCSKARGEN and Zamboanga produce the fewest medical graduates.

With respect to surgical procedures, medium and major operations can only be performed in secondary and tertiary hospitals (Table 8). Luzon has the most secondary and tertiary hospitals combined and these are concentrated in NCR and adjacent regions (Ilocos and Central Luzon). There are more tertiary hospitals in Luzon than in the Visayas and Mindanao combined and 52% of these are in NCR. In terms of tertiary hospitals, other regions with the highest number per island group are Western Visayas and Davao region; none in MIMAROPA and Caraga, and at least one in the other regions. All except one of 13 tertiary hospitals in the Visayas are in Regions VI and VII. Almost half of tertiary hospitals in Mindanao are in Davao. Provinces with significant concentrations of tertiary hospitals in the various regions are: Benguet 2 of 2 (CAR), Ilocos Norte 4/7 (Region I), Pampanga 3/11 and Nueva Ecija 3/11 (Region III), Batangas 3/4 (Region IV-A), Camarines Sur 2/3 and Albay 1/3 (Region V), Iloilo 5/9 and Negros Occidental 4/9 (Region VI), Leyte 1/1 (Region VIII), Zamboanga del Sur 1/1 (Region IX), Misamis Oriental 2/2 (Region X), Davao del Sur 4/5 (Region XI), and South Cotabato 1/1 (Region XII). Table 9 shows that 69.6% of all hospitals are privately owned, 7.2% are DOH hospitals and 23% are provincial or district hospitals. More than half (53.2%) of DOH hospitals are in Luzon and 21% are in NCR. There is at least one DOH hospital in each region.

Table 10 shows the data on socio-economic factors per region. In terms of population in 2020, NCR is the region with the densest number of surgeons. After NCR, only CAR, Ilocos Region, Southern Tagalog, Cebu and Davao have higher number of surgeons per hundred thousand population. The NCR has the second biggest population after CALABARZON and the highest gross regional domestic product (GRDP) while

Table 7. Medical schools per region and number of graduates, 2020.

BY REGION	Medical Schools	No of graduates in 2020
<u>LUZON</u>		
CAR	4	52
REGION I	3	40
REGION II	4	37
REGION III	3	84
REGION IV-A	7	29
REGION IV-B	2	24
REGION V	2	36
NCR	19	530
Total Luzon	44	832
<u>VISAYAS</u>		
REGION VI	4	72
REGION VII	8	113
REGION VIII	2	32
Total Visayas	14	382
<u>MINDANAO</u>		
REGION IX	2	13
REGION X	2	35
REGION XI	3	88
REGION XII	2	8
REGION XIII	0	0
BARMM	1	21
Total Mindanao	10	165
GRAND TOTAL	68	1214

CALABARZON has the second highest GRDP. NCR has the highest ratio of surgeons and anesthesiologists to population, at 28/100,00 and 7/100,000, respectively. CAR, Ilocos, Central Luzon, MIMAROPA, Western and

Table 8. Distribution of hospitals in the Philippines, 2020.

BY REGION	Primary	Secondary	Tertiary	Combined Secondary and Tertiary
<u>LUZON</u>				
CAR	20	5	2	7
REGION I	97	44	7	51
REGION II	51	12	3	15
REGION III	118	45	11	56
REGION IV-A	133	21	4	25
REGION IV-B	24	6	0	6
REGION V	31	17	3	20
NCR	87	41	59	100
Total Luzon	561	191	89	280
<u>VISAYAS</u>				
REGION VI	34	0	9	9
REGION VII	49	12	3	15
REGION VIII	42	8	1	9
Total Visayas	125	20	13	33
<u>MINDANAO</u>				
REGION IX	27	8	1	9
REGION X	45	24	2	26
REGION XI	32	20	5	25
REGION XII	52	13	1	14
REGION XIII	13	10	0	10
BARMM	29	2	2	4
Total Mindanao	198	77	11	88

Table 9. Government and private hospitals in the country, 2020.

BY REGION	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
<u>LUZON</u>			
CAR	12	4	13
REGION I	21	4	54
REGION II	15	4	48
REGION III	26	5	133
REGION IV-A	27	3	47
REGION IV-B	11	2	18
REGION V	13	3	35
NCR	22	16	62
Total Luzon	147	41	410
<u>VISAYAS</u>			
REGION VI	25	4	36
REGION VII	7	6	46
REGION VIII	17	2	32
Total Visayas	49	12	114
<u>MINDANAO</u>			
REGION IX	1	6	29
REGION X	12	5	57
REGION XI	10	3	44
REGION XII	11	3	60
REGION XIII	8	3	12
BARMM	10	4	19
Total Mindanao	52	24	221
GRAND TOTAL	248	77	745

Central Visayas and Davao have at least 5 surgeons per 100,000 population. Most regions are served by 1-2 anesthesiologists per 100,000 population. The ratio of anesthesiologists to surgeons ranges from 1:1 to 1:4 across all regions.

Discussion

The results of this study provide comprehensive insights into the demographic distribution, specialty composition, and training landscape of surgeons and anesthesiologists

Table 10. Socio-economic factors per region, 2020.

BY REGION	Population as of 2020	GRDP ^{a, b} 2020	Number of General Surgeons per 100,000	Number of Anesthesiologists per 100,000
<u>LUZON</u>				
CAR	1,797,660	296,523,327	9	4
REGION I	5,301,139	597,981,618	5	2
REGION II	3,685,744	367,095,722	3	2
REGION III	12,422,172	1,862,908,072	5	1
REGION IV-A	16,195,042	2,565,124,332	3	1
REGION IV-B	3,228,558	341,983,262	7	3
REGION V	6,082,165	515,793,741	2	1
NCR	13,484,462	5,797,058,343	28	7
Total Luzon				
<u>VISAYAS</u>				
REGION VI	7,954,723	850,746,746	5	2
REGION VII	8,081,988	1,164,719,190	6	2
REGION VIII	4,547,150	413,291,591	1	1
Total Visayas				
<u>MINDANAO</u>				
REGION IX	3,875,576	394,567,642	3	1
REGION X	5,022,768	861,506,489	4	1
REGION XI	5,243,536	889,457,659	5	2
REGION XII	4,901,486	467,905,541	2	1
REGION XIII	2,804,788	291,665,099	2	1
BARMM	4,404,288	260,254,050	1	0.4
Total Mindanao				
GRAND TOTAL	109,033,245	17,938,582,424		

^aGross regional domestic product^bPhilippine Statistics Authority. Philippine Statistical Yearbook 2021[Internet] available from <https://psa.gov.ph/philippine-statistical-yearbook/year/2021>.

across the Philippines. The data reveal significant gender disparities, with male surgeons outnumbering their female counterparts by a ratio of 3.8:1, whereas female anesthesiologists outnumber males with a ratio of 1:1.2. Such imbalances underscore the need for targeted initiatives to encourage greater gender diversity in surgical and anesthesia fields.

By island group, Luzon has 77% of practicing surgeons and 74% of surgical trainees. The region with the highest distribution of surgeons is NCR, with 51% of the surgeons. This is an increase compared to the previous study where only 35% of surgeons were reported there.³ The distribution of surgeons across provinces per region is likewise unequal. Most of the country's surgeons and anesthesiologists are located in the National Capital Region.

This pattern of distribution is mirrored in the dispersion of surgical subspecialties. Only NCR, Cebu and Davao have an almost complete roster of practicing subspecialties and subspecialty training. The most numerous of the specialties are general surgery, ophthalmology, ORL-HNS, and orthopedics. They are likewise concentrated in Luzon compared with the rest of the island groups. Specialties are complete only in NCR. In regions like Central Luzon, CALABARZON, Cebu and Davao, all major specialties are present except transplant surgery. Nevertheless, access to transplant surgery services remains available in the region, even in the absence of resident transplant surgeons or specialized training programs. This accessibility is facilitated by the itinerant practice of specialists, who travel to the region, and by the presence of hospitals equipped to perform transplant surgeries. In Mindanao, Zamboanga, SOCCSKSARGEN, Caraga, and BARMM have basically only general surgeons, ophthalmologists, orthopedic surgeons and ORL-HNS available.

A potential source of surgeons and anesthesiologists practicing locally are local medical school graduates. While medical education, represented by the number of medical schools, is accessible in all the island groups, there is a preponderance for these schools to aggregate in certain regions. Most graduates in 2020 were from NCR, Central Visayas and Davao. Mindanao was at a disadvantage; Caraga was the only region in the country with no medical school. The presence of locally

accessible subspecialty training may also influence where the specialist might decide to practice. Most surgical training is still centered in Metro Manila and Luzon, though Mindanao is emerging a destination for surgical trainees. It has surpassed Visayas in terms of the number of trainees. Unfortunately, here are still some regions with no surgical training programs: Caraga and BARMM. It should be noted that these are the same regions with the fewest practicing surgeons. Improving availability of local professional development opportunities such as training programs in surgery, anesthesia and their subspecialties will not only improve competency in the long term, but also serve to anchor young surgeons and anesthesiologists to an area.

The Philippines faces significant challenges in terms of infrastructure for surgery, particularly in rural areas. Of all hospitals, only 31% are in the secondary or tertiary level, where medium and major surgical procedures can be performed, and are mostly concentrated in urban areas. When examining the combined regional distribution of these hospitals, the regions with the highest proportions are NCR (24.9%), Central Luzon (14%), and Ilocos (12.7%), all in Luzon. In Visayas and Mindanao, Central Visayas (3.7%), Northern Mindanao (6.5%) and Davao (6.2%) outnumber all the other despite their low percentages. District hospitals, which are supported by local government units, are most numerous in Ilocos, Central Luzon, CALABARZON, NCR and Western Visayas. DOH hospitals are still most numerous in NCR. Otherwise, there is an even distribution of DOH hospitals in the remaining regions of the country. While in Mindanao, Zamboanga Peninsula has a high number of DOH hospitals but this does not translate into a high number of practicing surgeons. Private hospitals are most numerous in Central Luzon and even outnumber the number of private hospitals in Metro Manila. While private hospitals are located all over the country, the least number is found in Caraga. A study by Viray, et al., noted that there is a lack of essential surgical equipment, facilities, and infrastructure in rural areas, resulting in limited access to surgical care.⁴ This is particularly true in remote and underserved areas. This highlights the urgent need to strengthen the surgical infrastructure and workforce in the Philippines to ensure that all Filipinos have access to essential surgical care.

Regions with larger populations and a higher Gross Regional Domestic Product attracted a larger number of specialists. Specialists would tend to establish practice in areas with a larger patient base that can support them economically.

The Lancet Commission on Global Surgery (LCoGS) includes, as core indicators of universal access to safe, affordable surgical and anaesthesia care, a minimum of 5,000 surgical procedures per 100,000 persons, and a specialist surgical workforce density of 20 per 100,000 persons.⁵ This has currently not been achieved in the Philippine healthcare system where only the National Capital Region has more than 20 surgeons per hundred thousand population (Table 10).

The study is limited in that it does not give an accurate picture of scope of practice by both general and specialist surgeons and the burden of surgical diseases in the country. While verified data show areas of main practice, it might not adequately represent the itinerant nature of surgical practice and regional network of referrals for patients in need of specialty care. Additionally, other allied medical specialties like Operating Room nurses, laboratory and diagnostic facilities and personnel also need to be surveyed as they play essential roles in the successful conduct of surgical procedures. The type of surgical diseases must also be measured as this would give us a more accurate assessment of adequacy of surgical care access. The predominance of general surgeons in comparison with the other subspecialties might not represent actual lack of access if practicing general surgeons are able to manage the type of diseases in the region. The number of referrals to subspecialty centers might be a better gauge of the need for specialty services. The development of a comprehensive human healthcare resource database that can reflect the scope and geographical reach of practice would be essential in the evaluation of surgical workforce adequacy, formulation of quality improvement measures and aid in policy-making to improve surgical access in the country.

Conclusions

Based on the discussion of the study's findings, it's evident that several conclusions and recommendations can be drawn to tackle the challenges and disparities identified

in the distribution of surgeons and anesthesiologists across the Philippines.

Firstly, the significant gender disparities within the surgical and anesthesia workforce underscore the pressing need for targeted initiatives aimed at fostering greater gender diversity. Efforts should be directed towards creating equal opportunities for female practitioners in surgical training, career progression, and leadership roles within the healthcare system.

The trend towards urban centers likely stems from various factors, including the presence of training programs, accessibility to medical education, the availability of secondary and tertiary hospitals, and economic incentives.

Moreover, the concentration of surgical training programs predominantly in Metro Manila and Luzon emphasizes the importance of expanding training opportunities in underserved regions, particularly in Mindanao, Visayas, and areas without existing surgical training programs like Caraga and BARMM. Enhancing local professional development opportunities is crucial to anchor young surgeons and anesthesiologists to these regions. The improved surgical training in the Philippines is the long-term key to resolving the lack of manpower in the Philippine healthcare system. This is attributed to various factors such as the lack of surgical infrastructure, inadequate development of surgical personnel and insufficient accreditation standards for surgical training programs.⁶

Investing in surgical training, not only provides the needed manpower but, in the long run, may help reduce the need for costly surgical interventions and improve patient outcomes. This can be attained through the formation of a reliable network of training hospitals that provide both care and training for the local populace.⁶

Improving surgical training is crucial in achieving universal healthcare coverage in the Philippines, which aims to ensure that all Filipinos have access to quality and affordable healthcare services, including surgical care.

The inadequate healthcare infrastructure in rural and remote areas poses a significant barrier to surgical access. To address this issue effectively, there's an urgent need for government investment in strengthening surgical infrastructure, especially in secondary and

tertiary hospitals outside urban centers. This includes the provision of essential surgical equipment, facilities, and infrastructure to improve access to surgical care in underserved areas. Population density and economic factors play a significant role in specialist distribution, highlighting the need to align healthcare resources with population needs. It has been noted that aside from the uneven distribution of manpower is the uneven distribution of infrastructure. Despite the number of tertiary hospitals in the regions, not all are training facilities which makes them underutilized. Tertiary hospitals, as the highest level of healthcare facility, have a responsibility to not only provide outstanding medical care but also to train and educate medical professionals. Additional training facilities may address the workforce shortage as well as the lack of infrastructure in the areas.⁷

Adding training facilities improves access to surgical care for the local populace, especially those who are living in underserved areas. By providing training and support to surgeons in rural or remote areas, tertiary hospitals can help to improve the quality and availability of surgical care, reducing disparities in health outcomes between urban and rural areas.⁸

A center for training paves the way for growth within the field as it enhances skills and knowledge. This limits the danger of practicing physicians in being unchanging in their ways due to the need to train in an up-to-date manner. This can lead to better patient outcomes and improved quality of care, as well as helping to promote ongoing professional development.⁴

Moreover, providing training to surgeons in surrounding areas creates a network of knowledge and aid between the different regions. This can help to foster collaboration between healthcare professionals. This can eventually lead to improved communication, information sharing, and knowledge transfer, which can ultimately benefit patient care.⁷

Additionally, the study highlights the limitations of current data collection methods in accurately assessing the scope of surgical practice and the burden of surgical diseases in the country. Addressing these challenges requires the establishment of a comprehensive surgical database to inform policy decisions, monitor workforce distribution, and assess service quality. This study lays the groundwork for such an initiative, marking a critical step towards enhancing surgical care delivery and promoting equitable access to healthcare across the Philippines.

Lastly, policymakers should utilize the findings of this study to inform evidence-based policy interventions aimed at enhancing surgical access nationwide. These

interventions should prioritize the expansion of training programs, promotion of gender diversity, strengthening of rural healthcare infrastructure, and the development of comprehensive healthcare resource databases to support informed decision-making and enhance surgical care delivery in the Philippines.

In conclusion, addressing the identified challenges and disparities in the distribution of surgeons and anesthesiologists requires a multifaceted approach that encompasses targeted initiatives, infrastructure investment, data collection, and policy interventions. By implementing these recommendations, the Philippines can work towards achieving equitable access to essential surgical care for all Filipinos.

Conflicts of Interest Statement

In accordance with transparency standards, the authors of the National Surgical and Anesthesia Human Health Resource Study, hereby declare that they have no affiliations, financial interests, or other relationships that may potentially influence the interpretation of the study's results.

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Appendices

Appendix A. Online questionnaire

NATIONAL SURGICAL AND ANESTHESIA HEALTH MANPOWER STUDY OF 2020

As an essential member of the surgical and anesthesia workforce in the country, the Philippine College of Surgeons invite you to participate in the PCS National Surgical and Anesthesia Manpower Study 2020.

By filling up this form, you agree to the following:

I understand that the study aims to assess the adequacy and accessibility of surgical services in the Philippines based on its surgical workforce density and volume of surgical operations throughout the country.

And that as a participant, I would be willing to share personal information which may be collected directly from me or through my involvement in relevant organizations including my being a Philhealth member.

I understand that PCS would observe protection of confidential data in accordance with existing rules and regulations.

I understand that there is no direct benefit to be obtained by participating in the study but the benefits therefrom would be for the people needing surgical care especially in the underserved areas.

This form takes approximately 15 minutes to complete. We hope you get to answer as honestly as possible.

Thank you!

Section I

Email address

Full name

Age

Sex

Main address of practice

Region

City or Municipality

Secondary address of practice

Region

City or Municipality

Are you a surgeon or an anesthesiologist?

Surgeon

Anesthesiologist

Are you practicing in a private or public hospital?

Public

Private

Both

Others

Are you practicing in a training or non-training hospital?

Training

Non-training

Both

Location (City, Region) of training hospital of practice

Section II

1. Are you a/an
 - o Practicing doctor
 - o Surgical/Anesthesiology trainee

Section III. For Practicing Doctors

1. If you are a surgeon, what is your MAIN specialty? Otherwise, please proceed to #2
 - o General Surgery
 - o Ophthalmology
 - o Orthopedics
 - o Otorhinolaryngology – Head and Neck Surgery
 - o Thoracic and Cardiovascular Surgery
 - o Plastic Reconstructive and Aesthetic Surgery
 - o Colon and Rectal Surgery
 - o Urology
 - o Pediatric Surgery
 - o Neurosurgery
 - o Transplant Surgery
 - o Surgical Oncology
 - o Hepatobiliary and Pancreatic Surgery
 - o Others
2. If you are an anesthesiologist, what is your subspecialty?
3. Cardiothoracic Anesthesia
 - o Critical Care Anesthesia
 - o Neurosurgical Anesthesia
 - o Obstetric Anesthesia
 - o Orthopedic Anesthesia
 - o Pain Medicine
 - o Pediatric Anesthesia
 - o Other

4. By approximation, how many operations have you done within the LAST WEEK in your main address of practice?
 - ☐ 0
 - ☐ 1 to 20
 - ☐ 21 to 40
 - ☐ 41 to 60
 - ☐ 61 to 80
 - ☐ 81 to 100
 - ☐ Others
5. By approximation, how many operations have you done within the LAST MONTH in your main address of practice?
 - ☐ 0
 - ☐ 1 to 20
 - ☐ 21 to 40
 - ☐ 41 to 60
 - ☐ 61 to 80
 - ☐ 81 to 100
 - ☐ Iba pa:
6. By approximation, how many operations have you done within the LAST YEAR in your main address of practice?
 - ☐ 0
 - ☐ 1 to 20
 - ☐ 21 to 40
 - ☐ 41 to 60
 - ☐ 61 to 80
 - ☐ 81 to 100
 - ☐ Others
7. By approximation, within the LAST WEEK what is the most common sur-gery/anesthesia procedure?
8. By approximation, within the LAST MONTH what is the most common surgery/anesthesia procedure?
9. By approximation, within the LAST YEAR what is the most common sur-gery/anesthesia procedure?
10. What is the name of the accredited institution where you completed your surgical/anesthesia training?
11. Are you a diplomate of a specialty board?
 - ☐ Yes
 - ☐ No

12. If yes, kindly check all that applies. Otherwise, Please choose N/A.

- ☐ Philippine Board of Surgery
- ☐ Philippine Board of Ophthalmology
- ☐ Philippine Board of Orthopedics
- ☐ Philippine Board of Otorhinolaryngology – Head and Neck Sur-gery
- ☐ Philippine Board of Thoracic and Cardiovascular Surgery
- ☐ Philippine Board of Plastic Reconstructive and Aesthetic Surgery
- ☐ Philippine Board of Colon and Rectal Surgery
- ☐ Philippine Board of Urology
- ☐ Philippine Board of Pediatric Surgery
- ☐ Philippine Board of Neurosurgery
- ☐ Philippine Board of Transplant Surgery
- ☐ N/A
- ☐ Others

13. Are you a fellow of a society?

- ☐ Yes
- ☐ No

14. If yes, kindly check which applies. Otherwise, Please choose N/A.

- ☐ Philippine College of Surgeons
- ☐ Philippine Academy of Ophthalmology
- ☐ Philippine Orthopedic Association
- ☐ Philippine Society of Otorhinolaryngology – Head and Neck Sur-gery
- ☐ Philippine Urological Association
- ☐ Philippine Association of Thoracic and Cardiovascular Surgery
- ☐ Philippine Association of Plastic Reconstructive and Aesthetic Surgeons
- ☐ Philippine Society of Colon and Rectal Surgeons
- ☐ Philippine Society of Pediatric Surgeons
- ☐ Philippine Society of General Surgeons
- ☐ Surgical Oncology Society of the Philippines
- ☐ Philippine Academy for Head and Neck Surgery
- ☐ Philippine Society for Transplant Surgeons
- ☐ Philippine Association of Laparoscopic and Endoscopic Surgeons
- ☐ Philippine Association of Hepato-Pancreatic Biliary Surgeons
- ☐ Philippine Society for Vascular and Endovascular Surgery
- ☐ Philippine Society Of Anesthesiologists
- ☐ Academy of Filipino Neurosurgeons
- ☐ N/A
- ☐ Others:

Appendix B. Key Informant Interview guide for Chapter Validation

1. About your Region
 - a. Provinces
 - b. Population per province
2. Demography
3. Economics and GDP (per province and whole region)
4. Accessibility (Transportation, Land, Air, & Sea)
5. Education
6. Health care Facilities in your Region
7. Surgeons and Anesthesia Training Programs
8. Surgical services available (verification of electronic database)
 - a. General Surgeons
 - b. Surgical Specialties
9. Anesthesia services available (verification of electronic database)
 - a. General Anesthesia
 - b. Specialty Services
10. Conclusion (per Region)

A. SUPPLEMENTAL TABLES S1 TO S17. Details of the distribution of primary, secondary and tertiary hospitals by region.

Table S1. Distribution of hospitals in CAR.

BY PROVINCE	Primary	Secondary	Tertiary	Combined Secondary and Tertiary
ABRA	3	0	0	0
APAYAO	2	0	0	0
BENGUET	5	4	2	6
IFUGAO	2	0	0	0
KALINGA	5	0	0	0
MT. PROVINCE	3	1	0	1

Table S2. Distribution of hospitals in region I.

BY PROVINCE	Primary	Secondary	Tertiary	Combined Secondary and Tertiary
ILOCOS NORTE	51	23	4	27
ILOCOS SUR	15	4	0	4
LA UNION	7	2	2	4
PANGASINAN	24	15	1	16

Table S3. Distribution of hospitals in region II

BY PROVINCE	Primary	Secondary	Tertiary	Combined Secondary and Tertiary
BATANES	1	0	0	0
CAGAYAN	15	5	1	6
ISABELA	28	5	1	6
NUEVA VIZCAYA	5	2	1	3
QUIRINO	2	0	0	0

Table S4. Distribution of hospitals in region III

BY PROVINCE	Primary	Secondary	Tertiary
AURORA	1	1	0
BATAAN	8	3	1
BULACAN	46	11	1
NUEVA ECIJA	16	5	3
PAMPANGA	27	16	3
TARLAC	14	7	2
ZAMBALES	6	2	1

Table S5. Distribution of hospitals in region IV-A.

BY PROVINCE	Primary	Secondary	Tertiary
BATANGAS	33	21	3
CAVITE	23	0	1
LAGUNA	34	0	0
QUEZON	19	0	0
RIZAL	24	0	0

Table S6. Distribution of Hospitals in Region IV-B

BY PROVINCE	Primary	Secondary	Tertiary
MARINDUQUE	1	0	0
OCCIDENTAL MINDORO	2	0	0
ORIENTAL MINDORO	8	2	0
PALAWAN	10	4	0
ROMBLON	3	0	0

Table S7. Distribution of hospitals in region V.

BY PROVINCE	Primary	Secondary	Tertiary
ALBAY	9	5	1
CAMARINES NORTE	5	3	0
CAMARINES SUR	9	3	2
CATANDUANES	3	3	0
MASBATE	3	0	0
SORSOGON	2	3	0

Table S8. Distribution of hospitals in NCR.

REGION	Primary	Secondary	Tertiary	Combined Secondary and Tertiary
NCR	87	41	59	100

Table S9. Distribution of hospitals in region VI.

BY PROVINCE	Primary	Secondary	Tertiary
AKLAN	3	0	0
ANTIQUE	2	0	0
CAPIZ	2	0	0
GUIMARAS	1	0	0
ILOILO	14	0	5
NEGROS OCCIDENTAL	12	0	4

Table S10. Distribution of hospitals in region VII.

BY PROVINCE	Primary	Secondary	Tertiary	Combined Secondary & Tertiary
BOHOL	1	0	0	0
CEBU	15	5	1	6
NEGROS ORIENTAL	28	5	1	6
SIQUIJOR	5	2	1	3

Table S11. Distribution of hospitals in region VIII.

BY PROVINCE	Primary	Secondary	Tertiary
BILIRAN	1	0	0
EASTERN SAMAR	9	1	0
LEYTE	13	6	1
NORTHERN SAMAR	5	0	0
SOUTHERN LEYTE	7	1	0
WESTERN SAMAR	7	0	0

Table S12. Distribution of hospitals in region IX.

BY PROVINCE	Primary	Secondary	Tertiary
ZAMBOANGA DEL NORTE	4	1	0
ZAMBOANGA DEL SUR	15	7	1
ZAMBOANGA SIBUGAY	8	0	0

Table S13. Distribution of hospitals in region X.

BY PROVINCE	Primary	Secondary	Tertiary
BUKIDNON	13	9	0
CAMIGUIN	1	0	0
LANAO DEL NORTE	11	6	0
MISAMIS OCCIDENTAL	7	4	0
MISAMIS ORIENTAL	13	5	2

Table S14. Distribution of hospitals in region XI.

BY PROVINCE	Primary	Secondary	Tertiary
DAVAO DE ORO	5	0	0
DAVAO DEL NORTE	9	5	1
DAVAO DEL SUR	16	14	4
DAVAO OCCIDENTAL	1	0	0
DAVAO ORIENTAL	1	1	0

Table S15. Distribution of hospitals in region XII.

BY PROVINCE	Primary	Secondary	Tertiary
COTABATO	25	0	0
SARANGANI	5	0	0
SOUTH COTABATO	8	10	1
SULTAN KUDARAT	14	3	0

Table S16. Distribution of hospitals in region XIII.

BY PROVINCE	Primary	Secondary	Tertiary
AGUSAN DEL NORTE	2	4	0
AGUSAN DEL SUR	3	2	0
DINAGAT ISLAND	0	0	0
SURIGAO DEL NORTE	4	2	0
SURIGAO DEL SUR	4	2	0

Table S17. Distribution of hospitals in BARMM.

BY PROVINCE	Primary	Secondary	Tertiary
BASILAN	5	0	0
COTABATO CITY	3	1	1
LANAO DEL SUR	9	0	1
MAGUINDANAO	7	1	0
SULU	4	0	0
TAWI-TAWI	1	0	0

B. SUPPLEMENTAL TABLES S18 TO S33. Details of the distribution of government and private hospitals in the country by region.

Table S18. Distribution of government and private hospitals in CAR.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
ABRA	2	0	1
APAYAO	2	2	0
BENGUET	3	1	7
IFUGAO	2	0	0
KALINGA	1	0	4
MOUNTAIN PROVINCE	2	1	1

Table S19. Distribution of government and private hospitals in region I.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
ILOCOS NORTE	2	1	5
ILOCOS SUR	7	0	13
LA UNION	5	1	5
PANGASINAN	7	2	31

Table S20. Distribution of government and private hospitals in region II.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
BATANES	0	1	0
CAGAYAN	7	1	14
ISABELA	4	1	29
NUEVA VIZCAYA	2	1	5
QUIRINO	2	0	0

Table S21. Distribution of government and private hospitals in region III.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
AURORA	0	0	2
BATAAN	3	2	7
BULACAN	6	0	42
NUEVA ECIJA	6	2	16
PAMPANGA	7	1	38
TARLAC	2	0	21
ZAMBALES	2	0	7

Table S22. Distribution of government and private hospitals in region IV-A.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
BATANGAS	9	1	47
CAVITE	1	1	0
LAGUNA	8	0	0
QUEZON	8	1	0
RIZAL	1	0	0

Table S23. Distribution of government and private hospitals in region IV-B.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
MARINDUQUE	1	0	0
OCCIDENTAL MINDORO	3	0	0
ORIENTAL MINDORO	3	0	7
PALAWAN	2	2	10
ROMBLON	2	0	1

Table S24. Distribution of government and private hospitals in region V.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
ALBAY	3	1	11
CAMARINES NORTE	2	0	6
CAMARINES SUR	1	2	11
CATANDUANES	3	0	3
MASBATE	2	0	1
SORSOGON	2	0	3

Table S25. Distribution of government and private hospitals in region VI.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
AKLAN	1	0	6
ANTIQUE	3	0	1
CAPIZ	3	0	4
GUIMARAS	1	0	0
ILOILO	10	3	12
NEGROS OCCIDENTAL	7	1	13

Table S26. Distribution of government and private hospitals in region VII.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
BOHOL	3	2	10
CEBU	1	4	30
NEGROS ORIENTAL	2	0	6
SIQUIJOR	1	0	0

Table S27. Distribution of government and private hospitals in region VIII.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
BILIRAN	1	0	0
EASTERN SAMAR	1	0	9
LEYTE	7	2	11
NORTHERN SAMAR	2	0	3
WESTERN SAMAR	3	0	4
SOUTHERN LEYTE	3	0	5

Table S28. Distribution of government and private hospitals in region IX.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
ZAMBOANGA DEL NORTE	0	1	4
ZAMBOANGA DEL SUR	0	4	19
ZAMBOANGA SIBUGAY	1	1	6

Table S29. Distribution of government and private hospitals in region X.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
BUKIDNON	4	0	18
CAMIGUIN	0	1	0
LANAO DEL NORTE	1	0	16
LANAO DEL SUR	0	1	0
MISAMIS OCCIDENTAL	2	1	9
MISAMIS ORIENTAL	5	2	14

Table S30. Distribution of government and private hospitals in region XI.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
DAVAO DE ORO	4	0	1
DAVAO DEL NORTE	3	1	10
DAVAO DEL SUR	1	1	32
DAVAO OCCIDENTAL	1	1	0
DAVAO ORIENTAL	1	0	1

Table S31. Distribution of government and private hospitals in region XII.

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
COTABATO	5	1	24
SOUTH COTABATO	2	1	18
SARANGANI	3	0	1
SULTAN KUDARAT	1	1	17

Table S32. Distribution of government and private hospitals in region XIII

BY PROVINCE	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
AGUSAN DEL NORTE	1	0	5
AGUSAN DEL SUR	2	0	3
DINAGAT ISLAND	0	0	0
SURIGAO DEL NORTE	1	2	3
SURIGAO DEL SUR	4	1	1

Table S33. Distribution of government and private hospitals in BARMM.

BY REGION	Provincial and District Hospitals	DOH Hospitals	Private Hospitals
BASILAN	0	1	4
COTABATO CITY	0	1	4
LANAO DEL SUR	2	1	7
MAGUINDANAO	4	0	4
SULU	3	1	0
TAWI-TAWI	1	0	0

C SUPPLEMENTAL TABLES S34 TO S41. Details of distribution of surgeons and anesthesiologists per region by province

Table S31. Distribution of surgeons and anesthesiologists per province in Cordillera Administrative Region (CAR). Highlighted row indicates area with the highest density of specialists.

CAR	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
ABRA	8	5		
APAYAO	5	2		
BENGUET	123	52	48	25
IFUGAO	2	2		
KALINGA	15	5		
MOUNTAIN PROVINCE	4	3		
Total	157	69	48	25

Table S32. Distribution of surgeons and anesthesiologists per province in Region I. Highlighted row indicates area with the highest density of specialists.

REGION I	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
ILOCOS NORTE	57	16	4	
ILOCOS SUR	36	13		
LA UNION	43	13	15	8
PANGASINAN	120	40	14	10
Total	254	82	33	18

Table S33. Distribution of surgeons and anesthesiologists per province in Region II. Highlighted row indicates area with the highest density of specialists.

REGION II	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
BATANES	2	0	0	0
CAGAYAN	36	26	16	7
ISABELA	61	24	10	3
NUEVA VIZCAYA	20	8	10	6
QUIRINO	2	2	0	0
Total	121	60	36	16

Table S34. Distribution of surgeons and anesthesiologists per province in Region III. Highlighted row indicates area with the highest density of specialists.

REGION III	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
AURORA	5	1		
BATAAN	33	17	2	9
BULACAN	122	46	14	
NUEVA ECIJA	132	32	18	8
PAMPANGA	214	47	25	18
TARLAC	52	19	11	9
ZAMBALES	31	19	7	
Total	589	181	77	44

Table S35. Distribution of surgeons and anesthesiologists per province in Region IVA. Highlighted row indicates area with the highest density of specialists.

REGION IV-A	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
BATANGAS	162	66	26	13
CAVITE	166	75	24	16
LAGUNA	162	56	15	
QUEZON	56	20		
RIZAL	151	60		
Total	697	277	65	29

Table S36. Distribution of surgeons and anesthesiologists per province in Region IVB. Highlighted row indicates area with the highest density of specialists.

REGION IV-B	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
MARINDUQUE	1	3		
OCC MINDORO	2	1		
ORIENTAL MINDORO	21	9		
PALAWAN	36	10		
ROMBLON	4	1		
Total	64	24		

Table S37. Distribution of surgeons and anesthesiologists per province in Region V. Highlighted row indicates area with the highest density of specialists.

REGION V	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
ALBAY	41	10	30	3
CAM NORTE	18	8		
CAM SUR	50	13		12
CATANDUANES	8	2		
MASBATE	3	1		
SORSOGON	10	3		
Total	130	37	30	15

Table S38. Distribution of surgeons and anesthesiologists per province in National Capital Region (NCR). Highlighted row indicates area with the highest density of specialists.

NCR	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
VALENZUELA	54	8	14	7
CALOOCAN	48	12	7	16
LAS PINAS	154	38	0	4
MAKATI	230	37	25	19
MANDALUYONG	99	37	2	
MANILA	647	166	185	142
MALABON	99	2	0	
MARIKINA	101	30	14	13
MUNTINLUPA	201	37	9	
PARANAQUE	143	46	0	
PASAY	45	18	18	4
PASIG	273	57	54	38
QC	1489	464	140	104
SAN JUAN	118	28	15	19
TAGUIG	108	21		
NAVOTAS	4	1		
PATEROS	6	1		
Total	3819	1003	483	366

Table S39. Distribution of surgeons and anesthesiologists per province in Region VI. Highlighted row indicates area with the highest density of specialists.

REGION VI	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
AKLAN	17	2		
ANTIQUE	10	5		
CAPIZ	28	13		
GUIMARAS	5	2		
ILOILO	145	56	45	26
NEGROS OCCIDENTAL	174	54	24	16
Total	379	132	69	42

Table S40. Distribution of surgeons and anesthesiologists per province in Region VII. Highlighted row indicates area with the highest density of specialists.

REGION VII	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
BOHOL	29	8	14	8
CEBU	415	122	23	54
*NEGROS ORIENTAL	30	8		
SIQUIJOR				
Total	474	138	37	62

Table S41. Distribution of surgeons and anesthesiologists per province in Region VIII. Highlighted row indicates area with the highest density of specialists.

REGION VIII	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
BILIRAN		1		
EASTERN SAMAR	2	1		
LEYTE	51	18	28	20
NORTHERN SAMAR	2	2		
SAMAR	5	3		
SOUTHERN LEYTE	2	4		
Total	62	29	28	20

Table S42. Distribution of surgeons and anesthesiologists per province in Region IX. Highlighted row indicates area with the highest density of specialists. (SURG-Surgeons; ANESTH-Anesthesiologists)

REGION IX	MALE	FEMALE	SURG	MALE	FEMALE	ANESTH	Resident Surgeons in Training	Anesthesia in Training
ZAMBOANGA DEL NORTE	9	1	10		2	2		
ZAMBOANGA DEL SUR	77	15	92	10	17	27	22	11
ZAMBOANGA SIBUGAY	4	2	6		2	2		
Total	90	18	108	10	21	31	22	11

Table S43. Distribution of surgeons and anesthesiologists per province in Region X. Highlighted row indicates area with the highest density of specialists.

REGION X	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
BUKIDNON	23	7		
CAMIGUIN	2	0		
LANAO DEL NORTE	30	12		
MISAMIS OCCIDENTAL	10	4		
MISAMIS ORIENTAL	128	37	16	
Total	193	60	16	

Table S44. Distribution of surgeons and anesthesiologists per province in Region XI. Highlighted row indicates area with the highest density of specialists.

REGION XI	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
DAVAO DE ORO	1	1		
DAVAO DEL NORTE	34	21		11
DAVAO DEL SUR	250	90	82	37
DAVAO OCCIDENTAL				
DAVAO ORIENTAL	1	2		
Total	286	114	82	48

Table S45. Distribution of surgeons and anesthesiologists per province in Region XII. Highlighted row indicates area with the highest density of specialists.

REGION XII	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
COTABATO	23	8		
SARANGANI	3			
SOUTH COTABATO	66	23	3	
SULTAN KUDARAT	18	4		
Total	110	35	3	

Table S46. Distribution of surgeons and anesthesiologists per province in Region XIII. Highlighted row indicates area with the highest density of specialists.

REGION XIII	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
AGUSAN DEL NORTE	27	11		
AGUSAN DEL SUR	7	5		
DINAGAT ISLANDS				
SURIGAO DEL NORTE	8	4		
SURIGAO DEL SUR	5	2		
Total	47	22		

Table S47. Distribution of surgeons and anesthesiologists per province in BARMM. Highlighted row indicates area with the highest density of specialists.

BARMM	SURGEONS	ANESTHESIOLOGISTS	Resident Surgeons in Training	Anesthesia in Training
BASILAN				
LANAO DEL SUR	20	11	3	
MAGUINDANAO	31	8	14	9
SULU	2			
TAWI TAWI	1			
Total	54	19	17	9

D. SUPPLEMENTAL TABLES S48 TO S54. Details of distribution of surgeons per surgical specialization by province.

Figure S48. Distribution of surgeons per surgical specialization in CAR

CAR	ABRA	APAYAO	BENGUET	IFUGAO	KALINGA	MOUNTAIN PROVINCE	TOTAL
SPECIALIZATION							
GS (DIPLOMATE)	3	2	42	1	2	4	54
GS	2	2	10	1	6		21
TCVS			3				3
PEDIATRIC SURGERY							
ORTHO	1		15		3		19
PLASTIC			1				1
COSMETIC					1		1
NEUROSURGERY			3				3
UROLOGY			7	1	2	4	14
ORL			13		1		14
OPHTHALMOLOGY	2	1	19		2		24
TRANSPLANT SURGERY							
VASCULAR SURGERY							
BLANK/NO DATA AVAILABLE			8				8
GS SUBSPEC							
HEAD AND NECK			1				1
BREAST			1				1
COLORECTAL			1				1
HEPATOBIILIARY			2				2
TRAUMA			3				3
SURGICAL ONCOLOGY			2				2
MINIMALLY INVASIVE		1				1	2
NO SPECIALTY	8	4	109	2	15	3	141

Figure S49. Distribution of surgeons per surgical specialization in Region I.

REGION I	ILOCOS NORTE	ILOCOS SUR	LA UNION	PANGASINAN	TOTAL
SPECIALIZATION					
GS (DIPLOMATE)	12	9	14	30	65
GS	11	10	8	20	49
TCVS	1	1	2	3	4
PEDIATRIC SURGERY				2	2
ORTHO	8	4	4	20	36
PLASTIC		1	1	1	3
COSMETIC	1				1
NEUROSURGERY	2	2	2	5	11
UROLOGY	3	2	4	7	16
ORL	5	7	5	10	37
OPHTHALMOLOGY	10	7	7	21	45
TRANSPLANT SURGERY	1				1
VASCULAR SURGERY					
BLANK/NO DATA AVAILABLE	3		29	1	33
GS SUBSPEC					
HEAD AND NECK	1		1	2	4
BREAST					
COLORECTAL		2	1	1	3
HEPATOBIILIARY				1	
TRAUMA					
SURGICAL ONCOLOGY	1	1	1	2	5
MINIMALLY INVASIVE		1		0	1
NO SPECIALTY	55	40	47	116	258

Figure S50. Distribution of surgeons per surgical specialization in Region II.

REGION II	BATANES	CAGAYAN	ISABELA	NUEVA VIZCAYA	QUIRINO	TOTAL
SPECIALIZATION						
GS (DIPLOMATE)	0	8	14	4		26
GS	2	2	11	4		19
TCVS						
PEDIATRIC SURGERY		1	1	1		3
ORTHO		8	8	3		19
PLASTIC			1			1
COSMETIC			1			1
NEUROSURGERY			1			1
UROLOGY		5	6	1		12
ORL		6	8	3		17
OPHTHALMOLOGY		4	9	4		17
TRANSPLANT SURGERY						
VASCULAR SURGERY						
BLANK/NO DATA AVAILABLE	0	1	1	0	2	4
GS SUBSPEC						
HEAD AND NECK				2		2
BREAST						
COLORECTAL		1				1
HEPATOBIILIARY		1				1
TRAUMA						
SURGICAL ONCOLOGY						
MINIMALLY INVASIVE						
NO SPECIALTY	2	34	61	18		115

Figure S51. Distribution of surgeons per surgical specialization in Region III.

REGION III	AURORA	BATAAN	BULACAN	NUEVA ECIJA	PAMPANGA	TARLAC	ZAMBALES	TOTAL
SPECIALIZATION								
GS (DIPLOMATE)		11	22	16	44	15	8	116
GS		1	8	10	23	7	4	53
TCVS			1	1	4	1		7
PEDIATRIC SURGERY								
ORTHO		4	15	9	37	5	5	75
PLASTIC			0	2	1	1		4
COSMETIC		1	0	1	1	2		5
NEUROSURGERY			0	3	2	1	1	7
UROLOGY		4	12	5	12	2	2	37
ORL		3	23	6	25	5	3	66
OPHTHALMOLOGY		8	25	20	48	6	5	112
TRANSPLANT SURGERY								
VASCULAR SURGERY								
BLANK/NO DATA AVAILABLE	5	1	1	59	15	6	3	90
GS SUBSPEC								
HEAD AND NECK		3	9	3	6			21
BREAST					1			1
COLORECTAL					1			1
HEPATOBIILIARY		1	1		3		1	5
TRAUMA		1						1
SURGICAL ONCOLOGY		1			1			2
MINIMALLY INVASIVE		2	4		18			20
NO SPECIALTY	5	25	93	129	184	52	30	538

Figure S52. Distribution of surgeons per surgical specialization in Region IV-A.

REGION IV-A	BATANGAS	CAVITE	LAGUNA	QUEZON PROVINCE	RIZAL	TOTAL
SPECIALIZATION						
GS (DIPLOMATE)	57	53	48	9	41	208
GS	10	8	17	17	9	61
TCVS	7	2	2	1	5	17
PEDIATRIC SURGERY	2	2	1	1		6
ORTHO	23	29	13	4	17	86
PLASTIC	3	3			2	8
COSMETIC	1	3	2		8	14
NEUROSURGERY	3	1			1	5
UROLOGY	14	9	8	3	8	42
ORL	19	26	31	7	22	105
OPHTHALMOLOGY	22	22	32	12	32	120
TRANSPLANT SURGERY						
VASCULAR SURGERY	2					2
BLANK/NO DATA AVAILABLE		9	9	2	6	26
GS SUBSPEC						
HEAD AND NECK	5	4	0			9
BREAST		4	1			5
COLORECTAL	4				5	9
HEPATOBIILIARY	2	1	3	1		7
TRAUMA	2	3				5
SURGICAL ONCOLOGY	2	2			1	5
MINIMALLY INVASIVE	3	1	1		1	6
NO SPECIALTY	145	151	156	55	144	651

Figure S53. Distribution of surgeons per surgical specialization in Region IV-B.

REGION IV-B	MARINDUQUE	OCCIDENTAL MINDORO	ORIENTAL MINDORO	PALAWAN	ROMBLON	TOTAL
SPECIALIZATION						
GS (DIPLOMATE)		1	7	12		20
GS				3	1	4
TCVS						
PEDIATRIC SURGERY						
ORTHO			3	4		7
PLASTIC						
COSMETIC						
NEUROSURGERY				2		2
UROLOGY			1	3		4
ORL				6	1	7
OPHTHALMOLOGY			1	4		5
TRANSPLANT SURGERY						
VASCULAR SURGERY						
BLANK/NO DATA AVAILABLE	1	1	9		2	13
GS SUBSPEC						
HEAD AND NECK						
BREAST						
COLORECTAL						
HEPATOBIILIARY						
TRAUMA						
SURGICAL ONCOLOGY				1		1
MINIMALLY INVASIVE			1			1
NO SPECIALTY	1	2	20	35	4	62

Figure S54. Distribution of surgeons per surgical specialization in Region V.

REGION V	ALBAY	CAM NORTE	CAM SUR	CATANDUANES	MASBATE	SORSOGON	TOTAL
SPECIALIZATION							
GS (DIPLOMATE)	9	5	14	1		4	33
GS	1	7	3	4	2	2	19
TCVS	1		2				3
PEDIATRIC SURGERY							
ORTHO	6		7				13
PLASTIC	1						1
COSMETIC							
NEUROSURGERY	1		1				2
UROLOGY	2	1	4			1	8
ORL	5		7	2			14
OPHTHALMOLOGY	8	5	8	1		3	25
TRANSPLANT SURGERY			1				1
VASCULAR SURGERY							
BLANK/NO DATA AVAILABLE	6	2	1		1		10
GS SUBSPEC							
HEAD AND NECK		1	1				2
BREAST							
COLORECTAL	1		2				3
HEPATOBIILIARY	1						1
TRAUMA			1				1
SURGICAL ONCOLOGY	1		1				2
MINIMALLY INVASIVE			1				1
NO SPECIALTY	38	17	43	8	3	10	119

Figure S55. Distribution of surgeons per surgical specialization in NCR.

NCR	VALENZUELA	CALOOCAN	LAS PIÑAS	MAKATI	MANDALUYONG	MANILA	MALABON	MARIKINA	MUNTING LUPA	PARAÑAQUE	PASAY	PASIG	QC	SAN JUAN	TAGUIG	NAVOTAS	PATEROS	TOTAL
SPECIALIZATION																		
GS (DIPLOMATE)	15	20	36	45	23	225	23	25	46	32	9	54	274	24	16	2	2	871
GS	11	4	19	9	5	137	5	4	16	7	7	17	94	8	19	0	0	362
TCVS	0	1	3	13	3	18	3	3	1	4	0	7	82	1	4	0	0	143
PEDIATRIC SURGERY	0	0	0	2	0	12	0	1	4	0	0	3	8	1	1	0	0	32
ORTHO	3	2	23	22	11	40	12	15	28	31	4	21	164	8	15	0	0	399
PLASTIC	0	1	2	9	5	17	5	1	9	2	0	10	34	3	1	0	0	99
COSMETIC	1	1	5	4	0	9	0	6	6	0	0	3	14	1	0	1	0	51
NEUROSURGERY	0	0	2	6	0	15	0	3	2	3	0	5	33	1	1	0	1	72
UROLOGY	1	0	10	8	5	21	5	5	9	8	2	9	107	7	6	0	1	204
ORL	6	7	20	36	11	55	11	13	28	24	6	34	159	13	26	1	1	451
OPHTHALMOLOGY	15	12	14	70	35	78	35	20	50	30	4	56	314	31	12	0	1	777
TRANSPLANT SURGERY	0	0	0	0	0	1	0	0	0	0	0	0	3	0	1	0	0	5
VASCULAR SURGERY	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	3
BLANK/NO DATA AVAILABLE	2	0	20	4	1	18	0	4	1	1	13	54	202	20	6	0	0	346
GS SUBSPEC																		
HEAD AND NECK	0	0	0	1	1	2	1	0	1	0	0	2	3	0	1	0	0	12
BREAST	0	0	0	0	0	2	0	0	1	0	0	3	1	0	0	0	0	7
COLORECTAL	0	0	0	3	0	7	0	0	0	3	0	4	8	0	1	0	0	26
HEPATOBIILIARY	0	0	3	0	0	7	0	0	1	1	0	2	4	2	1	0	0	21
TRAUMA	0	0	0	0	0	1	0	1	1	0	0	0	3	0	1	0	0	7
SURGICAL ONCOLOGY	0	0	2	0	0	6	0	0	1	2	0	1	6	0	1	0	0	19
MINIMALLY INVASIVE	0	0	1	1	2	1	2	0	8	0	0	3	2	0	0	0	0	20
NO SPECIALTY	54	48	148	225	96	620	96	100	187	136	45	258	1461	116	103	4	6	3703

Figure S56. Distribution of surgeons per surgical specialization in Region VI.

REGION VI	AKLAN	ANTIQUE	CAPIZ	GUIMARAS	ILOILO	NEGROS OCCIDENTAL	TOTAL
SPECIALIZATION							
GS (DIPLOMATE)	7	4	6	2	53	40	112
GS	2	5	2	2	14	53	78
TCVS			1		3	3	7
PEDIATRIC SURGERY					3	3	6
ORTHO	3		4		11	16	34
PLASTIC					2	2	4
COSMETIC					1		1
NEUROSURGERY					7	4	11
UROLOGY	1		1		11	5	18
ORL	3		6		18	19	46
OPHTHALMOLOGY	1	1	4	1	20	26	53
TRANSPLANT SURGERY					2	2	4
VASCULAR SURGERY						1	1
BLANK/NO DATA AVAILABLE			4				4
GS SUBSPEC							
HEAD AND NECK					1		1
BREAST	1	2				2	5
COLORECTAL					3	2	5
HEPATOBIILIARY					2	2	4
TRAUMA							0
SURGICAL ONCOLOGY					3	3	6
MINIMALLY INVASIVE						1	1
NO SPECIALTY	16	8	28	5	136	164	357

Figure S57. Distribution of surgeons per surgical specialization in Region VII.

REGION VII	BOHOL	CEBU	NEGROS ORIENTAL	SIQUIJOR	TOTAL
SPECIALIZATION					
GS (DIPLOMATE)	2	42	3		47
GS	11	90	12		113
TCVS		12			12
PEDIATRIC SURGERY		10	1		11
ORTHO	3	49	3		55
PLASTIC		14			14
COSMETIC		0			0
NEUROSURGERY	1	9	1		11
UROLOGY	1	11	2		14
ORL	1	30	2		33
OPHTHALMOLOGY	4	71	5		80
TRANSPLANT SURGERY					
VASCULAR SURGERY					
BLANK/NO DATA AVAILABLE	6	77	1		84
GS SUBSPEC					
HEAD AND NECK		2			2
BREAST		2			2
COLORECTAL		5			5
HEPATOBIILIARY		3			3
TRAUMA					0
SURGICAL ONCOLOGY		7			7
MINIMALLY INVASIVE					
NO SPECIALTY	29	396	30		455

Figure S58. Distribution of surgeons per surgical specialization in Region VIII.

REGION VIII	BILIRAN	EASTERN SAMAR	LEYTE	NORTHERN SAMAR	SAMAR	SOUTHERN LEYTE	TOTAL
SPECIALIZATION							
GS (DIPLOMATE)			14	1	2	1	18
GS			3	1	1		5
TCVS							0
PEDIATRIC SURGERY			1				1
ORTHO		1	8			1	10
PLASTIC							
COSMETIC			1				1
NEUROSURGERY			3				3
UROLOGY			1				1
ORL			6				6
OPHTHALMOLOGY		1	10		2		13
TRANSPLANT SURGERY							
VASCULAR SURGERY							
BLANK/NO DATA AVAILABLE			4				4
GS SUBSPEC							
HEAD AND NECK							
BREAST							
COLORECTAL							
HEPATOBIILIARY			1				1
TRAUMA							
SURGICAL ONCOLOGY							
MINIMALLY INVASIVE			2				2
NO SPECIALTY		2	48	2	5	2	59

Figure S59. Distribution of surgeons per surgical specialization in Region IX.

REGION IX	ZAMBOANGA DEL NORTE	ZAMBOANGA DEL SUR	ZAMBOANGA SIBUGAY	TOTAL
SPECIALIZATION				
GS (DIPLOMATE)	1	11		12
GS	2	23	5	30
TCVS		2		2
PEDIATRIC SURGERY		1		1
ORTHO	3	8		11
PLASTIC COSMETIC				
NEUROSURGERY	2	4		6
UROLOGY	1	3		4
ORL	1	11	1	13
OPHTHALMOLOGY		11		11
TRANSPLANT SURGERY				
VASCULAR SURGERY		1		1
BLANK/NO DATA AVAILABLE		17		17
GS SUBSPEC				
HEAD AND NECK				
BREAST				
COLORECTAL		2		2
HEPATOBIILIARY		1		1
TRAUMA				
SURGICAL ONCOLOGY		1		1
MINIMALLY INVASIVE				
NO SPECIALTY	10	88	6	104

Figure S60. Distribution of surgeons per surgical specialization in Region X.

REGION X SPECIALIZATION	BUKIDNON	CAMIGUIN	LANAO DEL NORTE	MISAMIS OCCIDENTAL	MISAMIS ORIENTAL	TOTAL
GS (DIPLOMATE)	8	1	9	2	25	45
GS	2	1	3		14	20
TCVS					3	3
PEDIATRIC SURGERY			1		3	4
ORTHO	4		4	1	15	24
PLASTIC						
COSMETIC			1		1	2
NEUROSURGERY	1				7	8
UROLOGY	4		1	1	6	12
ORL	3		3	2	14	22
OPHTHALMOLOGY	1		6	3	15	25
TRANSPLANT SURGERY						
VASCULAR SURGERY						
BLANK/NO DATA AVAILABLE			2	1	21	24
GS SUBSPEC						
HEAD AND NECK					1	1
BREAST						
COLORECTAL					1	1
HEPATOBIILIARY			1			1
TRAUMA						
SURGICAL ONCOLOGY					4	4
MINIMALLY INVASIVE						
NO SPECIALTY	23	2	29	10	122	186

Figure S61. Distribution of surgeons per surgical specialization in Region XI.

REGION XI	DAVAO DE ORO	DAVAO DEL NORTE	DAVAO DEL SUR	DAVAO OCCIDENTAL	DAVAO ORIENTAL	TOTAL
SPECIALIZATION						
GS (DIPLOMATE)		7	65		1	73
GS	1	1	27			29
TCVS			5			5
PEDIATRIC SURGERY			5			5
ORTHO		4	41			45
PLASTIC		2	6			8
COSMETIC						0
NEUROSURGERY		4	3			7
UROLOGY			12			12
ORL		3	29			32
OPHTHALMOLOGY		10	34			44
TRANSPLANT SURGERY		1	2			3
VASCULAR SURGERY			4			4
BLANK/NO DATA AVAILABLE		2	17			19
GS SUBSPEC						
HEAD AND NECK		1	1			2
BREAST			3			3
COLORECTAL		1	11			12
HEPATOBIILIARY			7			7
TRAUMA			2			2
SURGICAL ONCOLOGY			9			9
MINIMALLY INVASIVE			2			2
NO SPECIALTY	1	32	215		1	249

Figure S62. Distribution of surgeons per surgical specialization in Region XII.

REGION XII	COTABATO	SARANGANI	SOUTH COTABATO	SULTAN KUDARAT	TOTAL
SPECIALIZATION					
GS (DIPLOMATE)	3		14		17
GS	12		16	11	39
TCVS	1		2		3
PEDIATRIC SURGERY			1		1
ORTHO	1		8	3	12
PLASTIC					
COSMETIC					
NEUROSURGERY			1		1
UROLOGY	2		5		7
ORL	2		8	1	11
OPHTHALMOLOGY	2		9	2	13
TRANSPLANT SURGERY					
VASCULAR SURGERY					
BLANK/NO DATA AVAILABLE		3	2	1	6
GS SUBSPEC					
HEAD AND NECK			1		1
BREAST					
COLORECTAL			1		1
HEPATOBIILIARY					
TRAUMA					
SURGICAL ONCOLOGY			2		2
MINIMALLY INVASIVE					
NO SPECIALTY	23	3	62	18	106

Figure S63. Distribution of surgeons per surgical specialization in Region XIII.

REGION XIII	AGUSAN DEL NORTE	AGUSAN DEL SUR	DINAGAT ISLANDS	SURIGAO DEL NORTE	SURIGAO DEL SUR	TOTAL
SPECIALIZATION						
GS (DIPLOMATE)	7	1		1	1	10
GS		2		2	1	5
TCVS						
PEDIATRIC SURGERY						
ORTHO	8	2		2	2	14
PLASTIC						
COSMETIC						
NEUROSURGERY	1					1
UROLOGY	2					2
ORL	2			1	1	4
OPHTHALMOLOGY	6	2		2		10
TRANSPLANT SURGERY						
VASCULAR SURGERY						
BLANK/NO DATA AVAILABLE	1		1			2
GS SUBSPEC						
HEAD AND NECK						
BREAST						
COLORECTAL						
HEPATOBIILIARY						
TRAUMA						
SURGICAL ONCOLOGY						
MINIMALLY INVASIVE						
NO SPECIALTY	27	6	1	8	5	47

Figure S64. Distribution of surgeons per surgical specialization in BARMM.

REGION BARMM	BASILAN	LANAO DEL SUR	MAGUINDANAO	SULU	TAWI TAWI	TOTAL
SPECIALIZATION						
GS (DIPLOMATE)		3				3
GS		6	7	1		14
TCVS						
PEDIA SURGERY		1	1			2
ORTHO		5	3			8
PLASTIC						
COSMETIC						
NEUROSURGERY						
UROLOGY			1			1
ORL		1	2		1	4
OPHTHALMOLOGY		3	2			5
TRANSPLANT SURGERY						
VASCULAR SURGERY						
BLANK/NO DATA AVAILABLE		1	9	1		11
GS SUBSPEC						
HEAD AND NECK						
BREAST						
COLORECTAL			1			1
HEPATOBIILIARY			1			1
TRAUMA						
SURGICAL ONCOLOGY						
MINIMALLY INVASIVE						
NO SPECIALTY		19	29	2	1	51