



Surgery without surgeons: a national wake-up call on the state of surgical training in Italy

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Abstract

Introduction Concerns regarding surgical training quality and workforce sustainability are increasing across Europe. In Italy, despite a nationally regulated framework, growing dissatisfaction among trainees and rising numbers of unfilled surgical residency positions suggest systemic shortcomings.

Methods We conducted a nationwide, cross-sectional, anonymous online survey coordinated by the Collegio Italiano dei Chirurghi (CIC) and disseminated through surgical societies and residency programs (January–July 2025). Respondents were surgical residents and early-career surgeons across specialties. Primary endpoint was overall training satisfaction; key secondary endpoints included perceived operative exposure and teaching climate, mentorship/governance, and support for specific reforms. Multivariable analysis evaluated associations with dissatisfaction, including sex, age, and geographic macro-area.

Results Among 645 valid responses, 68.7% reported dissatisfaction with surgical training. The most frequently cited weaknesses were poor teaching attitudes (51.9%) and inadequate operative exposure (34.7%). Only 25.6% reported adequate primary-operator case volume and 29.5% a supportive teaching environment. Support for reform was high (87.8%), including endorsement of standardized accreditation/competency tracking and structured, paid post-residency fellowships (70.4%). Female trainees reported lower satisfaction than men independent of age and geographic macro-area (adjusted OR 0.68, 95% CI 0.47–0.98), while regional differences were modest.

Discussion Despite a formally regulated training system, surgical education in Italy is undermined by fragmented implementation, limited quality assurance, and delayed acquisition of operative autonomy. These deficiencies threaten workforce retention, equity, and long-term healthcare sustainability. Coordinated national reform focusing on governance, accreditation, mentorship, and merit-based progression is urgently needed to align surgical training with contemporary European health-care delivery standards.

Keywords Training · Accreditation · Education · Surgery

Introduction

Across Europe, surgical residency represents a crucial bridge between undergraduate medical education and independent professional practice. In Italy, surgical training incorporates several valuable structural elements rooted in a long-standing academic tradition. As defined by the national training contract, the system is based on a gradual

progression of competencies and includes rotations across university-affiliated hospitals, as well as up to 18 months of extra-network training—either nationally or abroad—to support individualized educational pathways.

Universities and regional authorities also retain a degree of flexibility in shaping training pathways according to local needs, potentially creating opportunities for personalized professional development.

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However, these strengths coexist with growing signals of an emerging crisis within the system. In recent years, unfilled residency positions in surgical specialties have risen, and many trainees have abandoned surgical careers altogether. This paradox—where formal educational opportunities persist alongside rising disengagement of trainees—suggest deeper systemic shortcomings [1–3]. Growing concerns related to inadequate operative exposure, excessive administrative workload, and inconsistent supervision are reshaping perceptions of surgical training across Europe [2, 3]. In Italy, these pressures appear particularly pronounced, reflecting the combined effects of organizational fragmentation, entrenched hierarchical cultures, gender disparities, and systemic inertia [4, 5]. As a result, many trainees leave their assigned specialty or seek training opportunities abroad in more structured and merit-driven environments. The absence of standardized national fellowship programs further contributes to this trend, compelling many young surgeons to pursue post-residency training overseas, contributing a form of “educational migration”. This phenomenon not only represents a loss of national investment, but also signals a broader systemic challenge to the sustainability of surgical workforce and services provision in the near future [6]. Meanwhile, the traditional Italian model of apprenticeship – often summarized by the adage “you learn with your eyes”—continues to influence surgical education today, with an emphasis on observational learning that may limit operative autonomy, competence and surgical proficiency by the end of residency.

In this context, we conducted a national cross-sectional survey to systematically explore the current organization, content, and perceived quality of surgical training across specialties in Italy. The aim of this study was to provide a comprehensive national overview of training pathways, operative exposure, mentorship, and governance, as reported by surgical trainees and early-career surgeons. By mapping both strengths and critical gaps within the existing system, this work seeks to inform evidence-based discussion on the future development of surgical education at a national and international level.

Methods

Study design and setting

We conducted a nationwide, cross-sectional survey of surgical trainees and recently graduated specialists in Italy. The survey was coordinated by the Collegio Italiano dei Chirurghi (CIC) and disseminated through major Italian surgical societies, with additional circulation within residency

programs by individual members. The survey and data collection was conducted between January and July 2025.

Participants

Eligible participants were residents enrolled in an accredited surgical training program in Italy or specialists who had completed residency within the previous three years. Participation was voluntary and anonymous, with no remuneration offered. Respondents provided implied consent at the start of the questionnaire. There were no exclusion criteria other than incomplete questionnaires lacking core demographic data.

Survey development and content

The survey was designed by the study team in collaboration with CIC representatives and refined through pilot testing among a convenience sample of trainees to ensure clarity, relevance, and completeness. Revisions focused on question wording, response options, and organization of thematic sections.

The final questionnaire comprised closed-ended and open-ended items across seven domains:

1. Demographics (age, gender, region, specialty).
2. Overall satisfaction with surgical training.
3. Perceived weaknesses of residency training, including predefined items (inadequate surgical volume; poor teaching attitude among faculty; scarce extra-network opportunities; overcrowding of trainees, lack of incentives for high-performing training programs, and limited opportunities to personalize the training curriculum) and additional free-text comments (free-text responses a)
4. Perceived strengths, including predefined items (adequate case volume as first surgeon, availability and supportive attitude of faculty, extra-network training opportunities, abroad training opportunities) and additional free-text comments (free-text responses b)
5. Attitudes toward reform of post-graduate surgical training and preferences regarding structural changes.
6. Fellowship preferences, including support for fellowships, preferred duration, expected benefits, and selection mechanisms, with free-text comments (free-text responses c) capturing additional viewpoints.
7. Free-text responses (d) allowed respondents to provide elaboration beyond predefined categories.

Geographic classification

Respondents reported the region of their training program, which was categorized into Italy’s three standard

macro-areas: North, Centre, and South. These groupings follow national administrative conventions:

- North=Piemonte, Valle d'Aosta, Liguria, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Emilia-Romagna.
- Centre=Toscana, Umbria, Marche, Lazio
- South=Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna)

Participants with missing geographic data were excluded from macro-area comparisons but retained in overall descriptive analyses.

Variables and outcomes

The primary outcome was self-reported satisfaction with surgical training (dichotomized as satisfied vs not satisfied).

Secondary outcomes included:

- Prevalence of predefined strengths and weaknesses of residency training
- Support for reforms of the surgical training system.
- Attitudes and expectations regarding fellowship programs, including preferred duration, expected benefits, and selection mechanisms.
- Variation in all outcomes by geographic macro-area and gender, assessed through stratified analyses and multi-variable modelling.

Statistical analysis

Statistical procedures followed STROBE recommendations for cross-sectional studies [7] (Supplementary 2). Categorical variables were summarized as counts and percentages and compared across groups using the chi-square test or Fisher's exact test, as appropriate. Continuous variables were summarized as median (interquartile range—IQR) and compared using the Kruskal–Wallis or Mann–Whitney U test, as appropriate.

To examine determinants of training satisfaction, we performed logistic regression. A crude model assessed the unadjusted association between gender and satisfaction, followed by an adjusted model incorporating age and geographic macro-area. Adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were reported. Covariates were selected based on theoretical relevance rather than automated statistical selection.

Missing data were reported descriptively but excluded from stratified and multivariable analyses without imputation.

All analyses were performed using IBM SPSS Statistics, Version 22.0 (IBM Corp, Armonk, NY, USA).

Free-text analysis

Open-ended responses were analyzed using inductive thematic content analysis. Two independent reviewers independently coded all responses, iteratively refining thematic categories and resolving discrepancies through consensus. Coders were not involved in survey design.

Themes were reported with frequencies and integrated into the interpretation of quantitative findings. To enhance transparency and reproducibility, predefined keyword families guided clustering into thematic domains (Supplementary 1), covering: “mentorship and teaching culture” (e.g., supervision, didactics, formative, feedback); “structured rotations and mobility” (e.g., rotations, extra-network or international experiences, high-volume centers); “governance and transparent selection” (e.g., merit-based criteria, national selection procedures, regulatory frameworks); “quality assurance and standardization” (e.g., logbooks, milestone, accreditation, audits); and “resources, workload, and contracts” (e.g., remuneration, workload, contractual conditions). Keyword informed but did not replace reviewer judgement in final theme assignment.

Ethics

Data were obtained through an anonymous, voluntary online survey that did not collect identifiable or sensitive information. No clinical or interventional procedures were involved. All procedures followed applicable national regulations, institutional guidelines, and the principles of the Declaration of Helsinki, and complied with the General Data Protection Regulation (EU 2016/679).

Results

Sample characteristics

Between January and July 2025, a total of 652 questionnaires were returned; seven were excluded due to missing core demographic information, resulting in 645 valid responses included in the analysis. The median age of respondents was 33 years (IQR 30–38), and 44.2% were women (Table 1). Respondents were unevenly distributed across Italian regions, with highest representation from Lombardia (17.5%) and Lazio (17.1%), followed by Sicilia (9.3%) and Veneto (9.0%). Most participants were enrolled in general surgery (34.0%), urology (18.8%), gynecology and obstetrics (12.4%), or cardiac surgery (11.8%) with

Table 1 Baseline characteristics

	Responders (n=645)
<i>All Regions (n, %)</i>	
Abruzzo	7 (1.1%)
Basilicata	2 (0.3%)
Calabria	7 (1.1%)
Campania	43 (6.7%)
Emilia Romagna	49 (7.6%)
Friuli Venezia Giulia	32 (5%)
Lazio	110 (17.1%)
Liguria	21 (3.3%)
Lombardia	113 (17.5%)
Marche	10 (1.6%)
Molise	1 (0.2%)
Piemonte	29 (4.5%)
Puglia	35 (5.4%)
Sardegna	9 (1.4%)
Sicilia	60 (9.3%)
Toscana	38 (5.9%)
Trentino	1 (0.2%)
Umbria	6 (0.9%)
Valle D'Aosta	1 (0.2%)
Veneto	58 (9.0%)
Unknown	13 (2.0%)
<i>Specialties</i>	
General Surgery	219 (34.0%)
Urology	121 (18.8%)
Gynecology and obstetrics	80 (12.4%)
Cardiac surgery	76 (11.8%)
Otorhinolaryngology	45 (7.0%)
Orthopedics and traumatology	28 (4.3%)
Pediatric surgery	24 (3.7%)
Ophthalmology	8 (1.2%)
Plastic surgery	8 (1.2%)
Digestive system surgery	6 (0.9%)
Thoracic surgery	5 (0.8%)
Emergency surgery	4 (0.6%)
Vascular surgery	4 (0.6%)
Unknown / missing	17 (2.6%)
<i>Characteristics</i>	
Age (years, median, IQR)	33 (30–38)
<i>Gender, n (%)</i>	
Male	365 (56.6%)
Female	265 (41.1%)
Non binary	1 (0.2%)
Non responder	14 (2.2%)

limited representation from smaller specialties, reflecting the heterogeneous distribution across training programs.

Analyses were not stratified by training status due to sample size considerations.

Strengths and weaknesses of training

Overall, 68.7% (n=445) of respondents reported dissatisfaction with their surgical training.

The most frequently cited weaknesses were poor teaching attitude among faculty (51.9%; n=335), followed by lack of incentives for high-performing training programs (42.2%; n=272), and inadequate surgical volume (34.7%; n=224) (Table 2). Beyond predefined options, free-text responses (a) were provided by 81 respondents (12.5%) and described a range of structural and cultural shortcomings—including inadequate remuneration, fragmented organization, lack of objective evaluation, limited academic opportunities, insufficiently structured rotations and mobility, and hierarchical, at times hostile, working environment. These findings suggest heterogeneous vulnerabilities across the training system, with varying degrees of fragility among institutions and contexts.

The most reported strengths were abroad (43.0%; n=227) and extra-network training opportunities (34.9%; n=225), followed by availability and supportive attitude of faculty (29.5%; n=190), and adequate case volume as first surgeon (25.6%; n=165). Free-text responses (b) were provided by 42 respondents (6.5%) and highlighted access to advanced technologies, collaborative team environments, the reputation of training centers, and opportunities for academic involvement, suggesting that positive and high-quality experiences were often linked to specific local initiative rather than uniformly embedded within a national training framework.

Need for reform and fellowship preferences

Support for reform of post-graduate surgical training was high (87.8%; Table 3). Among proposed measures, regulation of the residency system through mandatory logbooks, structured assessment, and accreditation (74.1%), and the introduction of paid fellowships after residency (70.4%) ranked highest, while changes to program duration received little support (reduction 5.6%; extension 4.5%).

Most respondents favored 1–2-year fellowships, valuing opportunities to operate as first surgeon (78.3%) and personalized curricula (62.0%). Selection mechanisms were preferred through structured interviews and curriculum review by training directors (62.8%), while fewer respondents suggested public national selections (22.0%). Free-text comments (c) (n=18; Table 3) reinforced these preferences, highlighting the need for (1) merit-based selection through structured interviews and curriculum evaluation; (2) independent or external oversight to ensure fairness; (3) national-level competitive examinations; and (4) —among

Table 2 Perceived Strengths and Weaknesses of training

Responses (more than one answer allowed)	Count (n=645)	%
<i>Perceived weaknesses</i>		
Poor teaching attitude among faculty	335	51.9
Lack of incentives for high-performing training programmes	272	42.2
Inadequate surgical volume	224	34.7
Limited opportunities to personalise the training curriculum	184	28.5%
Overcrowding of trainees in the same surgical department	156	24.2
Scarce extra-network training opportunities	114	17.7
Free-text responses (a) (on perceived weaknesses)		
<i>Responses (total)</i>	81	12.5
Remuneration and working conditions:	25/81	30.9
– Perception of inadequate salary		
– Excessive workload without proper recognition		
– Absence of contractual protections		
Organization and governance:	20/81	24.7
– Lack of official logbook and objective evaluation tools		
– Marked heterogeneity between training schools		
– Opaque criteria for assigning responsibilities and operative opportunities		
Rotations and mobility	14/81	17.3
– Absence of mandatory rotations in high-volume centres		
– Difficulty in arranging international training experiences		
Research and academic career	12/81	14.8
– Limited value placed on clinical research		
– Few opportunities for publication		
– Academic progression perceived as dependent on personal relationships		
Relational and cultural aspects	10/81	12.3
– Perception of limited respect for junior trainees		
– Hierarchical or hostile working climate		
<i>Perceived Strengths</i>		
Abroad training opportunities	227	43.0
Extra-network training opportunities	225	34.9
Availability and supportive attitude of faculty	190	29.5
Adequate case volume as first surgeon	165	25.6
Free-text responses (b) (on perceived strengths)		
<i>Responses (total)</i>	42	6.5
Exposure to advanced technology	12/42	28.6
– Access to robotic or laparoscopic platforms		
– Opportunities to participate in innovative surgical procedures		
Opportunities for research and academic activity	11/42	26.2
– Possibility to participate in clinical trials		
– Encouragement to publish scientific work		
Team environment	10/42	23.8
– Supportive colleagues		
– Collaborative and inclusive working environment		
Institutional reputation	9/42	21.4
– Training in high-volume, nationally recognised centres		
– Prestige of the surgical school		

some respondents— skepticism toward fellowships if residency training were adequately structured.

Insights from free-text responses

Among 67 free-text comments (d) (Supplementary Table 1), the dominant theme was “*mentorship and teaching culture*”

(56.7%). Trainees called for accountable supervisors, protected training time, and surgical opportunities as a rule rather than an exception; several contrasted current practice with foreign models in which residents routinely act as first surgeons and described a national hierarchical climate that sidelines junior trainees. Additional themes included “*structured rotations and mobility*” (19.4%), encompassing access

Table 3 Need for reform of surgical training

Responses	Count (n=645)	%
Do you consider a reform of post-graduate surgical training necessary?		
Yes	566	87.8
No/missing response	79	12.2
Proposed measures		
Regulation of the current residency training system	478	74.1
Introduction of paid fellowship programs after residency	454	70.4
Reduction in length of residency	36	5.6
Extension of length of residency	29	4.5
Fellowship preferences		
Preferred duration		
1 year	210	32.6
2 years	298	46.2
3 years	52	8.1
≥4 years	12	1.9
Missing	73	11.3
Expected advantages		
Opportunity to operate as first surgeon	507	78.6
Personalized training curriculum	402	62.3
Research opportunities	239	37.1
Higher scores in job recruitment competitions	180	27.9
Higher earnings	147	22.8
Selection criteria		
Interview and CV evaluated by training director	405	62.8
Public national selection	142	22.0
Missing responses	80	12.4
Free-text responses (c)	18	2.8
Merit-based selection through structured interviews and CV evaluation	7/18	38.8
Proposals for independent or external committees	5/18	27.8
Calls for national-level competitive examinations	4/18	22.2
Scepticism about the need for fellowships if residency training were adequate	2/18	11.1

to high-volume centers, periods abroad, and exposure to simulation and cadaver labs. Further themes included “*governance and transparent selection*” (7.4%) emphasizing merit-based selection overseen by external and independent bodies, “*quality assurance and standardization*” (5.9%), such as mandatory logbooks, milestone-based evaluation, accreditation, and periodic audits, and “*resources, workload and contracts*” (4.4%) highlighting concerns about inadequate staffing, heavy on-call burdens, and misaligned compensation.

Regional differences

Of 645 respondents, 47.1% were from the North, and 25.4% each from the Centre and South (Table 4). Age, sex, and overall satisfaction did not differ across regions.

Inadequate surgical volume and poor teaching attitude were more frequently reported in the Centre and South ($p=0.057$ and $p=0.049$, respectively), while other weaknesses and strengths showed no significant variation. Support for reform remained uniformly high (>87%), only endorsement of residency-system regulation differed significantly, highest in the Centre ($p=0.016$).

Gender differences

Gender disparities emerged across several domains (Table 5). Women were younger than men ($p<0.001$) and reported lower satisfaction with their training ($p=0.038$). In multivariable analysis adjusting for age and regional macro-area, female trainees remained significantly less likely to report satisfaction (OR 0.68, 95% CI 0.47–0.98; $p=0.036$) indicating that gender independently outweighed regional differences in shaping training satisfaction. Indeed, neither regional macro-area (OR Centre 0.761, $p=0.205$; OR South 0.724, $p=0.139$; North ref.) nor age (OR = 1.02; $p=0.851$) was independently associated with satisfaction. Women more frequently reported poor teaching attitude ($p=0.004$) and overcrowding of trainees ($p=0.037$). Men more often reported adequate case volume as primary operator ($p=0.019$). Support for reform remained high in both groups (>87%), with broadly aligned preferences except for a stronger expectation among women that fellowships would improve recruitment scores ($p=0.005$).

Discussion

This nationwide survey represents, to our knowledge, one of the largest national samples to date providing a contemporary overview of surgical training in Italy from the perspective of trainees and early-career surgeons and highlights a system under strain. Nearly 70% of respondents reported dissatisfaction with their training, driven primarily by limited operative exposure, poor teaching culture, and delayed acquisition of autonomy. While this study was not designed to audit institutional compliance or to establish causal relationships, the consistency of these perceptions suggests structural shortcomings that may affect workforce retention and long-term sustainability.

Structural fragmentation and European context

Although surgical training in Italy is nationally regulated, it remains highly heterogeneous and less structured than other European systems [8–11]. The current minimum-score allocation process may place trainees into specialties that were not their first choice, with potential effects on motivation.

Table 4 Respondent distribution and core outcomes by Italian geographic macro-area (n = 632)

		North n=304	Centre n=164	South n=164	P value
Age (years, median, IQR)		33 (30–37)	33 (30–38)	33 (30–38)	0.862
Sex	Male	170 (55.9%)	91 (55.5%)	97 (59.1%)	0.357
	Female	132 (43.4%)	71 (43.3%)	62 (37.8%)	
	Non binary	0	0	1 (0.6%)	
	Non responder	2 (0.7%)	2 (1.2%)	4 (2.4%)	
Surgical training satisfaction	Yes	103 (33.9%)	45 (27.4%)	47 (28.7%)	0.258
	No	200 (65.8%)	119 (72.6%)	115 (70.1%)	
<i>Perceived weaknesses</i>					
Inadequate surgical volume	Yes	92 (30.3%)	64 (39.0%)	65 (39.6%)	0.057
Poor teaching attitude among faculty	Yes	144 (47.4%)	95 (57.9%)	92 (56.1%)	0.049
Scarce extra-network training opportunities	Yes	50 (16.4%)	36 (22.0%)	27 (16.5%)	0.297
Overcrowding of trainees in the same surgical department	Yes	72 (23.7%)	45 (27.4%)	38 (23.2%)	0.613
Lack of incentives for high-performing training programs	Yes	79 (26.0%)	52 (31.7%)	51 (31.1%)	0.321
Limited opportunities to personalise the training curriculum	Yes	125 (41.1%)	73 (44.5%)	72 (43.9%)	0.731
<i>Perceived strengths</i>					
Adequate case volume as first surgeon	Yes	42 (13.8%)	33 (20.1%)	20 (12.2%)	0.094
Availability and supportive attitude of faculty	Yes	53 (17.4%)	24 (14.6%)	27 (16.5%)	0.731
Extra-network training opportunities	Yes	60 (19.7%)	23 (14.0%)	26 (15.9%)	0.249
Abroad training opportunities	Yes	91(37.6%)	65 (45.8%)	68 (48.6%)	0.079
Do you consider a reform of post-graduate surgical training necessary?	Yes	267 (87.8%)	148 (90.2%)	148 (90.2%)	0.894
<i>Proposed measures</i>					
Regulation of the current residency training system	Yes	224 (73.7%)	137 (83.5%)	116 (70.7%)	0.016
Introduction of paid fellowship programs after residency	Yes	208 (68.4%)	119 (72.6%)	125 (76.2%)	0.192
Reduction in length of residency	Yes	19 (6.3%)	8 (5.5%)	8 (4.9%)	0.822
Extension of length of residency	Yes	13 (4.3%)	7 (4.3%)	9 (5.5%)	0.815
<i>Expected advantages of Fellowship</i>					
Opportunity to operate as first surgeon	Yes	240 (78.9%)	132 (80.5%)	132 (80.5%)	0.891
Personalized training curriculum	Yes	192 (63.2%)	114 (69.5%)	94 (57.3%)	0.072
Research opportunities	Yes	112 (36.8%)	67 (40.9%)	59 (36.0%)	0.607
Higher scores in job recruitment competitions	Yes	76 (25.0%)	54 (32.9%)	49 (29.9%)	0.169
Higher earnings	Yes	73 (24.0%)	30 (23.8%)	35 (21.3%)	0.795

The lack of standardized logbooks, uniform evaluation metrics, and structured mentorship also limits consistent monitoring of operative exposure and competency acquisition. National legislation (e.g., Legislative Decree No. 402/2017) defines minimum operative requirements; for example, general surgery trainees are expected over five years to participate in at least 30 major, 80 intermediate, and 325 minor procedures, acting as first operator in 3, 20, and 130 cases, respectively. However, these targets are frequently unmet

and may be insufficient even when achieved. In theory, residency positions should match training capacity based on network size, surgical volume/mix, and an assumption that ~10% of activity is reserved for education; in practice, this alignment often fails, highlighting a gap between regulatory design and real-world implementation.

Governance of training programs is formally assigned to regulatory bodies, notably the National Observatory on Specialist Medical Training (Osservatorio Nazionale sulla

Table 5 Respondent distribution and core outcomes by gender (n=630)

		Male n=356	Female n=265	P value
Age (years, median, IQR)		34 (31- 40)	31 (29–35)	<0.001
Surgical training satisfaction	Yes	128 (35.1%)	71 (26.8%)	0.038
	No	235 (64.4%)	194 (73.2%)	
<i>Perceived weaknesses</i>				
Inadequate surgical volume	Yes	133 (36.4%)	86 (32.5%)	0.310
Poor teaching attitude among faculty	Yes	170 (46.6%)	154 (58.1%)	0.004
Scarce extra-network training opportunities	Yes	68 (18.6%)	43 (16.2%)	0.460
Overcrowding of trainees in the same surgical department	Yes	75 (20.5%)	74 (27.9%)	0.037
Lack of incentives for high-performing training programs	Yes	164 (44.9%)	103 (38.9%)	0.142
Limited opportunities to personalise the training curriculum	Yes	93 (25.5%)	86 (32.5%)	0.060
<i>Perceived strengths</i>				
Adequate case volume as first surgeon	Yes	67 (18.4%)	30 (11.3%)	0.019
Availability and supportive attitude of faculty	Yes	60 (16.4%)	45 (17%)	0.914
Extra-network training opportunities	Yes	70 (19.2%)	42 (15.8%)	0.293
Abroad training opportunities	Yes	120 (40.8%)	102 (45.3%)	0.325
Do you consider a reform of post-graduate surgical training necessary?	Yes	318 (87.1%)	238 (89.8%)	0.459
<i>Proposed measures</i>				
Regulation of the current residency training system	Yes	268 (73.4%)	203 (76.6%)	0.403
Introduction of paid fellowship programs after residency	Yes	254 (69.6%)	194 (73.2%)	0.329
Reduction in length of residency	Yes	23 (6.3%)	12 (4.5%)	0.382
Extension of length of residency	Yes	15 (4.1%)	13 (4.9%)	0.697
<i>Expected advantages of Fellowship</i>				
Opportunity to operate as first surgeon	Yes	287 (78.6%)	212 (80.0%)	0.692
Personalized training curriculum	Yes	220 (60.3%)	176 (66.4%)	0.133
Research opportunities	Yes	136 (37.3%)	97 (36.6%)	0.933
Higher scores in job recruitment competitions	Yes	86 (23.6%)	90 (34.0%)	0.005
Higher earnings	Yes	81 (22.2%)	62 (23.4%)	0.722

Highlights statistically significant differences

Formazione Medica Specialistica), which accredits programs largely through quantitative structural parameters. While this provides regulation, it still underuses qualitative indicators such as anonymous trainee feedback and independent assessment of educational climate, revealing not a lack of oversight but limits in its scope [12]. Objective evaluation of individual operative exposure is also constrained: unlike fully qualified surgeons, trainees lack centralized or regional systems for case tracking, and medico-legal barriers (including limits on case attribution/signature, particularly in private institutions) further weaken documentation. Annual progression assessments remain poorly aligned with operative competence and progressive autonomy. These observations reflect frameworks and reports, but this study was not designed to formally audit compliance or causality. While these observations derive from regulatory frameworks and institutional reports, the present study was not designed to formally audit compliance or causality.

In our survey, nearly 69% of respondents reported dissatisfaction, consistent with structural and cultural shortcomings. Limited operative exposure is often linked to poor teaching commitment, reluctance to delegate responsibility, and unsupportive environments [13]. While isolated centers of excellence exist, they rely on individual mentors rather than systemic regulation [14]. Only about one in four respondents reported adequate operative exposure or a supportive teaching environment, suggesting that training quality still depends more on local context than on nationally guaranteed standards. Regional differences were modest, with slightly poorer teaching attitudes in Central and Southern Italy ($p=0.049$) and stronger calls for formal oversight from Central regions, indicating a broadly national crisis with local variations [15]. Comparison with other European systems offers actionable models. These systems combine national oversight, standardized assessment tools, and milestones tied to progressive autonomy.

In the United Kingdom, the Intercollegiate Surgical Curriculum Programme (ISCP; <https://www.iscp.ac.uk/>) provides a centralized electronic logbook and objective assessment tools. France includes mandatory regional inter-hospital rotations and continuous evaluation [16]. Germany and the Netherlands implement national board standards, including training in certified high-volume centers and simulation-based learning [17, 18].

Aligning Italy with these best practices could improve competence, patient safety, and retention, while reducing “educational migration” within the EU [9].

Cultural and generational shifts

Beyond structural issues, the findings highlight a pervasive lack of mentorship and a hierarchical culture that limits

junior autonomy. Poor teaching attitudes and inadequate surgical exposure represented the main obstacles to effective training. Operative opportunities are often allocated on subjective rather than merit-based criteria, undermining motivation and engagement. This pattern is particularly evident in Italy, where the traditional model of “learning by watching” frequently replaces structured, supervised operative training.

The COVID-19 pandemic further intensified these dynamics, accelerating a generational shift toward prioritizing work–life balance and professional well-being. Younger surgeons increasingly view personal development and psychological safety as integral to their professional identity [19]. A rigid, non-meritocratic environment—combined with excessive workload and minimal recognition—thus fuels disengagement and early burnout [12, 20].

Gender

Gender disparities emerged as a consistent feature of surgical training in Italy. In this survey, women were younger than men and reported lower satisfaction with their training, a difference that persisted after adjustment for age and regional macro-area, indicating that dissatisfaction among female trainees reflects structural rather than demographic factors. Female trainees more frequently reported poor teaching attitudes and overcrowding of residents, whereas men were more likely to report adequate operative volume as primary surgeon, suggesting a gender gap in access to hands-on surgical experience.

These findings are consistent with international and national evidence showing that women in surgery face persistent barriers related to mentorship, operative exposure, and informal allocation of opportunities, despite no intrinsic differences in surgical skill acquisition [21, 22]. Prior studies have linked such disparities to higher dissatisfaction and attrition, driven more by organizational culture and perceived inequity than by lifestyle preferences or aptitude [23]. Support for comprehensive reform was similarly high across genders, indicating shared awareness of systemic shortcomings. Women, however, placed greater value on structured fellowships as a way to improve recruitment and career progression, likely because formal, merit-based pathways can help offset unequal training experiences during residency. Overall, the findings suggest that gender gaps in surgical training largely stem from modifiable cultural and organizational factors and should be addressed explicitly.

“Educational Migration” and the unmet need for structured fellowships

The phenomenon of “educational migration” emerges as a major consequence of the current disorganization, as many trainees seek structured and merit-based experiences abroad to compensate for limitations in domestic training. Consistently, 70.4% of respondents supported the introduction of paid post-residency fellowships, indicating strong demand for structured pathways to consolidate operative skills and achieve independence.

In a well-functioning system, operative experience should be the norm rather than the exception, with fellowships complementing—not replacing—the training that residency must provide. The preferred duration of one to two years aligns with international standards of European models. Establishing transparent, merit-based national fellowship programs that are accredited, monitored, and integrated with workforce planning could help retain young surgeons, reduce brain drain, and offer structured pathways to sub-specialization.

A call for governance, accountability and reform

Most participants (92.6%) supported comprehensive national reform of surgical training, prioritizing quality assurance and structured accreditation over extending residency duration. Proposed reforms focused on three pillars: (1) certification of training programs and individual curricula through national and external evaluation; (2) institutional accreditation to ensure equitable standards nationwide; and (3) the formal introduction of structured fellowships as a complement to core training.

International benchmarks such as UEMS (Union Européenne des Médecins Spécialistes) guidelines already endorse competency-based assessment, mandatory logbooks, and inter-institutional mobility. Adopting these tools would align Italian training with European standards and help rebuild trust in the system. Current structures also tend to delay operative autonomy until late, creating a self-perpetuating cycle where limited early exposure leads to slower independence and fewer opportunities for future trainees. Earlier, stepwise autonomy could speed competence while generating a virtuous training cycle that strengthens mentorship and long-term sustainability [24].

Expanding surgical training settings to ensure workforce sustainability

The survey also points to where training occurs and how this affects workforce sustainability. In Italy, residency is concentrated in university hospitals, often seen as overcrowded

with limited operative opportunities, while rotations in peripheral affiliated hospitals are usually short. This limits hands-on experience and fails to use the training capacity of non-academic centers. Broadening training networks to include accredited non-university and peripheral hospitals could increase operative exposure, autonomy, and responsibility, while strengthening regional service delivery [25]. Although attrition and future resident shortages make wider trainee dispersion seem risky, this should not delay reform. Undertraining already jeopardizes safe surgical care, especially with an ageing workforce and falling recruitment. The response should combine stronger accreditation and governance to ensure uniform standards across sites with national systems for competency tracking, mentorship, and fair access to operative exposure. Aligning training quality with workforce needs is therefore a strategic investment in the long-term sustainability of Italian surgical services.

Limitations

This study has several limitations. Despite the large number of respondents, the denominator of eligible participants could not be established because Italy lacks a national database of surgical residents. Consequently, the total number of individuals who received the survey is unknown and a response rate cannot be calculated. In addition, participating organizations were unable to share membership lists, further limiting assessment of coverage and representativeness. The survey was disseminated through scientific societies targeting surgeons under 40, which may have led to uneven representation across specialties. For this reason, it was not possible to conduct a sensitivity analysis. Indeed, most responses came from general surgery, urology, and gynecology, while smaller surgical disciplines were less represented; as such, the results may not fully reflect the perspectives of all surgical branches.

As with all survey-based studies, the findings are based on self-reported perceptions and therefore capture subjective experiences rather than objectively measured indicators of training quality. While essential for understanding trainee perspectives, this approach may limit the objectivity of certain conclusions.

Additionally, the survey design did not enforce conditional filtering between questions: while 454 respondents expressed support for the introduction of fellowships, 572 provided answers regarding their duration. This discrepancy reflects the open-response format rather than conceptual inconsistency. Finally, although participation covered all major geographical regions, some variation in representation persists, with smaller or peripheral centers likely underrepresented.

Nevertheless, the sample size and diversity of respondents provide a valuable national snapshot of the state of surgical training in Italy, capturing the prevailing attitudes, needs, and frustrations of a generation of surgeons who are both witnesses and victims of a system in urgent need of reform.

The cross-sectional design also precludes assessment of temporal trends or causal relationships between training characteristics and career outcomes.

Policy implications and recommendations

Addressing the structural crisis of surgical training in Italy requires coordinated action at multiple policy levels. Reform must move beyond institutional goodwill to become a national health priority. The establishment of an independent national body for accreditation and evaluation—operating autonomously from universities and hospital administrations and protected from undue external influence—would be a crucial first step. This body should oversee the certification of training centers, the implementation of standardized logbooks, and the periodic auditing of operative exposure and mentorship quality. Equitable access to training does not necessitate identical outcomes; a merit-based system should transparently recognize differences in aptitude and professional alignment. Rather than duplicating existing structures, this body could build upon and strengthen current regulatory frameworks by incorporating qualitative evaluation and trainee-reported outcomes.

Moreover, surgical education should be recognized as a strategic component of workforce planning within the National Health Service. Incentivizing teaching through protected time, career recognition, and financial compensation would foster a culture where education is valued as a professional duty rather than an ancillary activity. National fellowship programs—paid, merit-based, and structured—should be developed to bridge the transition from residency to independent practice while preventing the loss of talent abroad.

Finally, surgical training must be integrated into a broader vision of healthcare equity. Ensuring that every region can train and retain competent surgeons is not merely an educational issue—it is a public health imperative.

The results of this survey expose a profound misalignment between Italy's surgical training system and the expectations of a new generation of surgeons. The combination of structural inadequacy, lack of meritocracy, and cultural rigidity is driving both disengagement and risk undermining workforce retention and future service provision. Without urgent and coordinated national reform, Italy risks facing the paradox of “surgery without surgeons”: a healthcare system unable to sustain its own surgical workforce. Strengthening

surgical training is therefore not only an educational priority, but a strategic investment in the resilience and sustainability of the healthcare system.

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Data availability Deidentified individual participant data collected for this study will be made available upon reasonable request to the corresponding author for purposes of academic research. Requests will be evaluated based on scientific merit and feasibility, and access will be granted following approval of a study proposal and, where appropriate, the execution of a data-sharing agreement. No additional documents are available.

Declarations

Conflict of interest The authors declare no competing interests.

Ethical approval This study was conducted as an anonymous, voluntary online survey and did not collect identifiable personal data or sensitive information. In accordance with applicable institutional policies and national regulations, the project was deemed exempt from formal review by a Research Ethics Committee/Institutional Review Board, and therefore no IRB/REC approval number applies. All procedures were performed in line with the principles of the Declaration of Helsinki and relevant data protection requirements (GDPR, EU 2016/679).

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