

# Career paths and workforce integration of graduates from a mastology residency program in Brazil

*Trajetória profissional de egressos da residência em mastologia da Unicamp e sua contribuição ao sistema de saúde brasileiro*

Cassio Cardoso Filho<sup>1</sup>  [ccf@unicamp.br](mailto:ccf@unicamp.br)  
Alicia Maria Zane Imbriani<sup>1</sup>  [a185821@dac.unicamp.br](mailto:a185821@dac.unicamp.br)  
Amanda Maria Sacilotto Detoni<sup>1</sup>  [amsdetoni@gmail.com](mailto:amsdetoni@gmail.com)  
Julia Yoriko Shinzato<sup>1</sup>  [julia@unicamp.br](mailto:julia@unicamp.br)  
Cesar Cabello dos Santos<sup>1</sup>  [cabello@unicamp.br](mailto:cabello@unicamp.br)  
Joana Froes Bragança<sup>1</sup>  [joanabb@unicamp.br](mailto:joanabb@unicamp.br)

## ABSTRACT

**Introduction:** Medical residency in mastology plays a key role in the specialized training required for comprehensive breast care, particularly in the context of breast cancer, a leading cause of morbidity and mortality among women. Evaluating the professional trajectory of residency graduates allows the identification of training outcomes, workforce distribution, and contributions to the Brazilian Unified Health System (SUS).

**Objective:** To characterize the professional profile, practice setting, and perceived training adequacy among graduates of the Mastology Residency Program at the University of Campinas (Unicamp).

**Method:** Cross-sectional descriptive study based on an electronic survey of 31 program graduates trained between 2005 and 2022. Sociodemographic characteristics, postgraduate education, professional practice, access to diagnostic and therapeutic resources, and self-assessed preparedness were analyzed using descriptive statistics. The study was approved by the Research Ethics Committee (CAAE 63976822.0.0000.5404).

**Results:** A total of 28 responses were obtained (90%). Most participants were female (68%), had prior training in obstetrics and gynecology (93%), and dedicated 76–100% of their weekly workload to mastology (57%). High satisfaction was reported regarding professional success (93% scoring 4–5/5) and adequacy of training for autonomous practice (96%). However, access to oncoplastic reconstruction techniques and advanced imaging varied across practice settings, with broader availability in the private sector compared to the SUS.

**Conclusion:** The program demonstrates strong capacity to train specialists with high levels of technical autonomy and professional integration. Nevertheless, structural disparities in access to diagnostic and reconstructive technologies across healthcare networks highlight the need for strategies that expand training environments, strengthen benign breast disease management, integrate oncoplastic training, and promote regional workforce distribution in alignment with SUS needs.

**Keywords:** Mastology; Education, Medical; Internship and Residency; Alumni; Labor Market.

## RESUMO

**Introdução:** A residência médica em mastologia desempenha papel central na formação especializada para o cuidado integral às doenças mamárias, particularmente no contexto do câncer de mama, cuja prevalência crescente demanda profissionais altamente qualificados. Avaliar a trajetória dos egressos permite identificar a capacidade dos programas em promover competência técnica, continuidade formativa e contribuição ao Sistema Único de Saúde (SUS).

**Objetivo:** Este estudo teve como objetivo caracterizar o perfil, a inserção profissional e a percepção formativa de egressos do Programa de Residência em Mastologia da Universidade Estadual de Campinas (Unicamp), analisando sua atuação e o acesso a recursos assistenciais.

**Método:** Trata-se de um estudo transversal, descritivo, realizado por questionário eletrônico aplicado a 31 egressos formados entre 2005 e 2022. Analisaram-se variáveis sociodemográficas, trajetória formativa, inserção profissional e acesso a tecnologias diagnósticas e terapêuticas. Analisaram-se os dados por meio de estatística descritiva. O projeto foi aprovado pelo Comitê de Ética e Pesquisa (CAAE nº 63976822.0.0000.5404).

**Resultado:** Obtiveram-se 28 respostas (90%). A maioria dos participantes era do sexo feminino (68%), com formação prévia em ginecologia e obstetrícia (93%) e dedicação predominante à mastologia (57% dedicando ≥ 75% da carga horária). Houve elevada satisfação profissional (93% com notas 4-5) e alta percepção de preparo para atuação (96% com notas 4-5). Entretanto, o acesso a oncoplastia avançada e a tecnologias diagnósticas variou conforme o serviço, com maior disponibilidade na saúde suplementar.

**Conclusão:** Os resultados indicam excelência técnica e forte inserção profissional dos egressos, com impacto positivo no cuidado especializado. Contudo, persistem desigualdades estruturais no acesso a tecnologias terapêuticas e reconstrutivas no SUS, apontando oportunidades para fortalecer redes assistenciais, estágios complementares e políticas de fixação.

**Palavras-chave:** Mastologia; Educação Médica; Residência Médica; Egressos; Mercado de trabalho.

<sup>1</sup> Universidade Estadual de Campinas, Campinas, São Paulo, Brasil.

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## INTRODUCTION

Medical Residency is a form of postgraduate specialisation training, whereby doctors receive in-service training at health units, which may or may not be teaching hospitals, under the guidance of highly qualified professionals<sup>1</sup>. It is considered to serve as a model for the training of specialists and supports hands-on learning for the development of skills and knowledge that train the professional in a speciality<sup>2</sup> to meet the needs of the community more efficiently<sup>3</sup>. Accordingly, it is necessary to outline the educational objectives for the specific residency in question<sup>4,5</sup>.

The Medical Residency Programme (PRM) in Mastology at Campinas State University School of Medical Sciences (FCM-UNICAMP) was set up in 2005 and is currently structured over two years, with two residency admissions per year. The programme requires as a prerequisite the completion of a medical residency in Gynaecology and Obstetrics or General Surgery and is in line with the Competency Matrix for Medical Residency Programmes in Mastology, approved by the National Medical Residency Commission (CNRM) in 2021, which establishes national guidelines for the training of specialists in this area<sup>6</sup>.

The selection process for admission to the programme is conducted by the university's own Medical Residency Committee, following its own institutional resident selection criteria. During the period analysed in this study, all the vacancies offered were filled, with the exception of the selection process for entry in 2020, when, due to health contingencies related to the COVID-19 pandemic, only one of the two places offered was filled.

The course takes place primarily at the Professor José Aristodemo Pinotti Women's Hospital – Centre for Comprehensive Women's Health Care (CAISM), which is a leading women's tertiary and quaternary health care unit in the region, as well as being a national benchmark for the treatment of gynaecological and breast cancer<sup>7</sup>. The Mastology Outpatient Clinic, which has been active since CAISM was inaugurated in 1986, provides specialised care for breast diseases, especially cancer, including clinical consultations, diagnostic procedures, post-operative follow-up and indication of complementary treatments<sup>8</sup>. The training is linked to the Unified Health System (SUS) and also includes a surgical component, as well as having a consolidated scientific segment.

It is known that the structuring of the health labour market links the medical curriculum and professional insertion; however, the link between the training institution and the professional success of graduates requires investigation into the indications of this influence. In the United States, the American Medical Association surveyed data on the integration of physicians graduating from residency programmes into

the market and found that 67% worked in the speciality corresponding to their last residency programme, 15.5% opted for an academic career, 5% worked in a speciality other than the one they were trained in during residency, 5.1% said they had other professional plans and 7.1% were unable to enter the job market. Of all the doctors who found a job in their field of training, 22.4% reported having had significant difficulty entering the market<sup>9</sup>.

Paradoxically, in Brazil, the regular and systematic monitoring of graduates is not common practice among institutions that train health professionals<sup>10</sup>. A nationwide survey<sup>11</sup> obtained the following results: in 1989, the Botucatu School of Medicine (UNESP) conducted a survey among its alumni<sup>12</sup>; in 1991, the USP School of Medicine conducted a similar study to profile its graduates<sup>13</sup>; in 1997, the State University of Londrina evaluated its graduates<sup>14</sup>; in 2002, FAMERP (São José do Rio Preto Medical School) presented the profile of its graduates<sup>15</sup>. More recently, graduates from the Unicamp MRP in Haematology were surveyed, indicating that many are responsible for haemotherapy services in their areas of expertise<sup>16,17</sup>. There have therefore been few studies and a dearth of information on graduates from residency programmes in Brazil.

According to Bevilacqua<sup>18</sup>, medical residency is not a simple extension of the medical course, requiring those responsible for medical education to understand the relationship between curricular learning and residency. In this context, evaluating the reality experienced by Medical Residency Programmes graduates reveals the institution's commitment to training better professionals, as well as providing data to anticipate future needs and incorporate goals to improve medical education. Thus, characteristics such as flexibility, coherence, realism and comprehensiveness constitute an effective evaluation proposal aimed at developing medical residency activities in any institution<sup>19</sup>.

In the field of medical education, knowledge about the profile and professional insertion of graduates is essential for adapting pedagogical aspects to the different contexts that represent society's needs. Therefore, by evaluating an institution's residency project in conjunction with the profile of its graduates, it is possible to identify principles and ways of making them active in the process of change, as well as determining educational needs.

Accordingly, the justification and relevance of this project lie in the possibility of evaluating professional performance after medical residency in Mastology in the training of specialised doctors, by collecting data on the trajectory and professional profile of graduates, considering that this feedback could also help to guide future graduates.

## OBJECTIVES

### General objective

To profile the graduates of the MRP in Mastology at Campinas State University School of Medical Sciences in terms of their practical and professional training between 2005 and 2022.

### Specific Objectives

- To identify the sociodemographic and academic variables of the graduates;
- To analyse their professional insertion;
- To assess the level of personal satisfaction and membership of speciality societies;
- To identify their performance and development in relation to outpatient and inpatient procedures;
- To gather information that can guide adjustments in medical education.

## METHODOLOGY

This was a descriptive, observational and cross-sectional study, with a convenience sample of 31 graduates from the Mastology MRP since its creation in March 2005, with the last group formed in February 2022, with no interruptions in the programme due to the COVID-19 pandemic. The participants were invited by e-mail or WhatsApp® to take part in the online questionnaire, which could only be accessed after accepting the informed consent form, a unique link [http://tiny.cc/egressos\\_PRM](http://tiny.cc/egressos_PRM), also accessible by QR Code. The list of graduates and their contacts (email and last registered mobile phone) were obtained from the secretariat of the Medical Residency Committee (COREME/FCM/UNICAMP), after approval by the Data Protection and Privacy Management Committee (CGPPD/LGPD/UNICAMP), Opinion 26/2022, in accordance with Article 6 of the General Data Protection Law No. 13,709/2018.

Project approved by the Research Ethics Committee (CEP/UNICAMP) under CAAE number: 63976822.0.0000.5404. Participants were assured that they would not suffer any harm or risk by taking part in the project, as they would only answer the proposed questionnaire, which was expected to take 10 to 15 minutes. The principles set out in Resolution 466/2012 of the National Health Council (CNS) were observed.

The participants who answered the questionnaire online were granted anonymous access to start completing it after reading and agreeing to the online Informed Consent Form, ticking the "Yes" box corresponding to the question "Do you agree to take part in the research?", and this procedure replaced the signing of the ICF. Participants received their copy of the ICF via the link provided before filling in the questionnaire as a pdf file. Participants were assured that they would not be invited

to take part in the research again, including any invitations by email to take part.

Thus, the invitation to participate in the research was sent directly to the research subject by email and direct WhatsApp® message, so as not to allow the identification of the other invitees, nor display their contact details (email, telephone, etc.) to third parties. Therefore, the individual invitation sent only showed a sender (the researcher) and a recipient (the research subject themselves), and already contained the PDF file of the ICF for prior reading.

The answers were automatically fed into the database, which was structured using the Excel for Windows® programme (Microsoft), determining the frequencies and means and standard deviations of the variables, with their relationships assessed using univariate analysis (GraphPad®, available at <https://www.graphpad.com/quickcalcs/contingency2/>). A p-value of <0.05 was considered significant, with confidence intervals (CI) set at 95%.

## RESULTS

Thirty-one mastologists trained between 2005 and 2022 at the Campinas State University School of Medical Sciences were invited to take part in the survey, and 28 responses (90% participation) were obtained to the online questionnaire. In terms of socio-demographic data, the majority were female (68% vs 32%), with ages ranging from 30 to 46. Almost all the participants currently live in the state of São Paulo and 82% are married. With regard to average personal income, 43% declared a monthly income of over thirty thousand reais.

With regard to academic training, of the 28 respondents, only two had a general surgery (GS) residency as a prerequisite and the others were trained in gynaecology and obstetrics (GO). During the MRP, 64% carried out an internship abroad, with the European Institute of Oncology in Milan standing out as the main destination. The majority (50%) had not completed a postgraduate course, but 32% had a master's degree and 14% a doctorate, with 3 participants stating that they had also completed a Master of Business Administration (MBA) course. As for complementary courses after the end of residency, 46% did not take any, but some courses stand out, such as breast imaging (39%), oncoplasty (21%) and genetics/high risk (14%).

When asked about scientific projects and published articles, 32% of the participants are currently conducting research projects and 32% are not, but have published articles. With regard to participation in congresses and symposia, the majority responded that they attend regional/state congresses (89%) and 71% national congresses; 57% of participants also attend regular scientific meetings and 28% international congresses.

With regard to pursuing an academic career, 43% responded negatively, 28% intend to or are pursuing one and 29% are yet to decide. As regards medical education, 46% of the participants do not work in this area, 25% work in public education and 24% in the private system.

Most of the research participants currently work professionally in cities in the state of São Paulo. Of those who had previously trained in GO, 37% only work in mastology, 26% in mastology and outpatient and/or surgical gynaecology, and 21% also work GO shifts. Of the GS graduates, 100% work only in mastology. They were also asked about their weekly working hours and those dedicated exclusively to mastology: 57% of participants devote 76-100% of their weekly workload exclusively to mastology, while only 21% devote less than 50%. Mastology care is surgical in 100% of the responses, clinical in 92% and imaging in 11%, with stereotactic biopsies featuring prominently among the latter.

The use of social media was also noted, with Instagram and WhatsApp being the main vehicles used (75% and 82% respectively). The main purpose highlighted was for non-professional interactions (78%), but there was also prominent use of social media to interact with other professionals (53%), interact with patients (53%) and disseminate medical content to patients and the general public (39%).

With regard to care networks and contractual relationships, 24 professionals are contracted by a supplementary health team, but only 35% of the participants work exclusively in the private system, with the other 65% working in both this sector and the Unified Health System (SUS).

With specific regard to oncoplastic surgery, 29% of the participants do not perform this type of surgery, and the majority (61%) perform both delayed and immediate reconstructions. The most commonly used techniques are the use of implants and tissue expanders (95%), followed by breast remodelling/liposuction (85%) and complex myocutaneous flaps (61%). Access was primarily to breast implants (78%), acellular dermal matrix (7%) and both (18%). There was a statistically significant difference in the use of oncoplastic surgery between the 11-15 years since graduation compared to the 1-10 years group ( $p=0.0018$ ) – Table 1

All the participants said they had access to mammograms, ultrasound, computerised tomography and scintigraphy, with less than 100% access to magnetic resonance imaging (96% access) and PET-CT (78% access). With regard to interventions, the main method highlighted was ultrasound-guided dry needling, followed by mammography-guided needle localisation and stereotactic biopsy. Mammotomy is accessible for 82% of participants and radioguided occult lesion localization (ROLL) for 78%.

**Table 1.** Use of oncoplasty techniques in relation to time since graduating from the Mastology MRP.

| Years of practice | NO       | YES       | Total     |
|-------------------|----------|-----------|-----------|
| 11 – 15 years     | 6        | 2         | 8         |
| 1 – 10 years      | 2        | 18        | 20        |
| <b>Total</b>      | <b>8</b> | <b>20</b> | <b>28</b> |

Fisher's exact test

• Two-tailed p value = 0.0018

Source: database from completion of the questionnaire [http://tiny.cc/egressos\\_PRM](http://tiny.cc/egressos_PRM)

As regards IHC, or immunohistochemistry, 100% of professionals have access to the hormone receptor status test, HER2 status (including FISH) and Ki-67. The same percentage was obtained with regard to access to adjuvant and neoadjuvant therapies, which included chemotherapy, radiotherapy, hormone therapy and immunotherapy/targeted therapies, with 75% responding that their main access is exclusively through supplementary healthcare plans. Only 18% of the professionals reported using only therapies available through the SUS. Only 4 participants reported not having access to regular genetic testing; 43% have access to germline testing, and 18% to somatic testing or both.

In their surgical practice, all the participants said they had access to sentinel lymph node biopsy, with 14% using only Patent Blue marking, 7% only nuclear medicine imaging with radiopharmaceuticals and the rest having access to both types of marking, with radiopharmaceuticals being preferentially used in 54% of cases and dual marking in 18%. Intraoperative freezing is accessible to all professionals for sentinel lymph node assessment and for intraoperative margin assessment for 75% of the participants.

Another important point is the access to a multi-professional team reported by the participants, which includes physiotherapists (93%), nursing staff (89%), psychologists (82%), nutritionists (64%), social services (57%), patient groups and NGOs (36%) and physical educators (11%).

Finally, when asked about their quality of life, the majority considered themselves to be professionally successful (rated 4 or 5 for 93% of the group) and satisfied with their personal lives (rated 4 or 5 for 89% of the group). With regard to training in Mastology, once again the majority considered it sufficient for their professional practice (rated 4 or 5 for 96% of the participants).

## DISCUSSION

Through the online questionnaire sent to former residents, it was possible to evaluate various aspects of the Medical Residency Programme in Mastology at the Campinas



State University School of Medical Sciences, such as socio-demographic profile, academic and professional training, current area of work, access to oncology services and quality of life. This study provides important data for evaluating both the quality of teaching and the employability of graduates and post-residency professional experience.

A similar study was carried out by the scientific and medical residency commissions of the Brazilian Society of Mastology, presented at the Sao Paulo Mastology Conference in 2022. In that work, questionnaires were also sent to several former residents (a total of 162 participants) from various regions of the country. In keeping with this study, the majority of professionals were female (70.4%) and had previous training in gynaecology and obstetrics (69.1%). However, some of the data it obtained did not align with that presented here, such as work in medical education, where 74.1% of the participants work in a college or teaching hospital, compared to 49% in this study who reported being involved in this area.

With regard to complementary courses, the majority of participants said they had not taken any, meanwhile when asked if they perform oncoplastic surgeries, the majority replied in the affirmative, with the group who graduated 1-10 years ago using these techniques most, in line with its temporal dissemination in daily practice. This suggests that the MRP is providing quality, up-to-date and complete teaching, guaranteeing professionals the security to practise various strategies within Mastology. This may also be related to access to internships abroad during residency, since the main destination chosen was the European Institute of Oncology, widely known for its experience and pioneering spirit in oncological and reconstructive surgery.

Another fact worth discussing is the use of social media to publicise content and facilitate communication between professionals and patients, since technology is increasingly accessible. This has been of great value, especially during the COVID-19 pandemic, as it has also facilitated conferences and meetings between professionals in various locations, as well as weekly discussions at a distance, which must have been experienced by the participants in this research, since most of them said they took part in regular scientific meetings. Furthermore, frequent participation in regional and state congresses shows the commitment of graduates from the Unicamp MRP to keeping up to date with new discoveries and treatments in mastology, in line with what is observed in other specialities, such as haematology<sup>18</sup>.

Despite this, only a third of the participants are currently working on research projects. However, when looking at previous scientific production, most of the professionals said they had published an article, once again showing that this residency

programme stands out not only in terms of surgical techniques and clinical decisions, but also in terms of scientific stimulation.

As expected, the majority of participants reported having access to various oncological services, ranging from guided biopsies, reconstruction materials, targeted therapies and genetic testing. This ease of access may be related to the network of care in which the professional finds himself, since private sectors are able to provide better treatment technologies than those found in public health, as well as the retention of graduates near major centres, as is witnessed in other specialities of greater care complexity<sup>19</sup>. None of the participants answered that they work exclusively for the SUS. Nonetheless, it is noteworthy that the Unicamp MRP is only linked to the SUS and, even with difficulties in accessing technology, it provides quality teaching that has enhanced the reputation of its graduates.

With regard to quality of life, the majority of participants were pleased to say that they were satisfied with their personal and professional lives. Despite the high workload, with more than 40 hours a week, the majority devote more than 75% of their time to mastology, which must reflect their satisfaction at working in their chosen field. One of the contributing factors to this is remuneration, with 44.4% reporting an average monthly income of over 30 thousand reais.

This study has some limitations that should be taken into account when interpreting the results. Firstly, this is a cross-sectional study based on a self-reported questionnaire, which can introduce memory biases and individual perceptions of the participants. Although the response rate was high (90%), the possibility of selection bias cannot be ruled out, since professionals with greater institutional ties or satisfaction with their training may be more likely to answer the questionnaire. Furthermore, although additional inferential analyses could be explored, the census nature of the sample and the small size of some subgroups reinforced the methodological choice of a predominantly descriptive analysis. In addition, since this was an analysis of graduates from a single medical residency programme at a highly complex university hospital, the results may not be fully generalisable to smaller programmes or those in different healthcare settings. On the other hand, the high participation rate and the time span of the sample, covering practically the entire trajectory of the programme since its creation, reinforce the descriptive consistency of the findings and their usefulness for reflections on specialised training in mastology in the context of the SUS.

## CONCLUSION

The results of this study indicate that the Unicamp Medical Residency Programme in Mastology has ensured

solid training, with high rates of professional insertion in the area, a high degree of exclusive dedication to the speciality and a strong perception of technical preparation and clinical autonomy. These findings demonstrate the institutional capacity to train specialists who are able to act in a qualified manner in the comprehensive care of breast diseases, including breast cancer, a condition of great epidemiological relevance in the country.

However, analysing their professional careers reveals structural challenges that go beyond individual training, especially with regard to equal access to diagnostic and reconstructive technologies in the SUS, strengthening care for benign pathologies and the link between teaching practices and regional care networks. These aspects have a direct impact on the ability to offer comprehensive mastology care in different territories, particularly outside the major centres. In view of this, it is recommended to strengthen the residency's social responsibility strategies, including:

1. Planned expansion of practice settings, including secondary level outpatient clinics and regional services, to support training in benign pathologies and promote internalisation;
2. Structured incorporation of oncoplastic surgery into the curriculum, with inter-institutional partnerships where necessary to ensure the learning of immediate reconstruction techniques;
3. Policies to integrate training, management and career, with content on practice management, negotiating with operators and professional relationship models;
4. Systematic monitoring of graduates, as a permanent instrument for evaluating and adjusting the curriculum.

The consolidation of residency programmes as spaces for technical training and commitment to the SUS requires joint efforts between training institutions, managers and scientific societies. Strengthening residency in mastology, from this perspective, contributes not only to the individual improvement of the specialist, but also to guaranteeing qualified access to breast health care for all women, in all territories of the country.

## CONTRIBUTION OF THE AUTHORS

Cassio Cardoso Filho: Conceptualisation of the study, supervision, interpretation of results and final revision of the manuscript. Amanda Maria Sacilotto Detoni: Data collection and organisation, writing of the initial paper. Julia Yoriko Shinzato: Technical contribution and critical review of the content. César Cabello dos Santos: Critical review and contribution to the interpretation of the results. Alicia Maria Zane Imbriani:

Contributions to the pedagogical discussion and revision of the paper. Joana Froes Bragança: Final revision and collaboration on institutional contextualisation.

## CONFLICT OF INTEREST

We declare no conflict of interest.

## FUNDING

We declare that there is no funding.

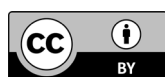
## STATEMENT OF DATA AVAILABILITY

Research data is only available upon request

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