Parental-leave policies and perceptions of pregnancy during surgical residency training in North America: a scoping review

Josephine S. Jakubowski, MSc;
Heather Baltzer, MSc, MD;
Joan E. Lipa, MD, MSc;
Laura Snell, MD, MS

Accepted Jun. 21, 2022

Correspondence to:
L. Snell
Division of Plastic, Reconstructive and Aesthetic Surgery
University of Toronto
Sunnybrook Health Sciences Centre
2075 Bayview Ave, M1-519a
Toronto ON M4N 3M5
laura.snell@sunnybrook.ca

Cite as: *Can J Surg* 2023 March 17; 66(2). doi: 10.1503/cjs.009321

Background: The number of surgical residents experiencing childbearing during residency training is increasing, and there is an absence of clarity with respect to parental-leave, lactation and return-to-work policies in support of residents. The aim of this review was to examine parental-leave policies during residency training in surgery and the perceptions of these policies by residents, program directors and co-residents, as described in the literature.

Methods: We performed a scoping review of the literature based on the following themes: maternity or parental-leave policies; antepartum work-restriction policies and obstetric complications; accommodations for training absences; support for, and perceptions of, maternity or parental leave during residency training; and challenges upon return to work, namely resident performance and breastfeeding.

Results: Parental-leave policies during surgical residency training have historically lacked clarity and enforcement. Although recommendations for parental leave are now in place, this may have historically contributed to a lack of perceived support for surgical residents and may result in variable leave permitted to residents. Unclear policies may also contribute to career dissatisfaction among resident parents, which may deter qualified individuals from selecting surgical subspecialties.

Conclusion: A call for a cultural shift is required to inform policies that would better support residents across all surgical specialties to pursue success in their dual roles as parents and surgeons. With increased awareness, progress in policy and guideline development is under way.

Contexte : De plus en plus de résidentes en chirurgie ont un enfant pendant leur formation; pourtant, les politiques visant à favoriser les congés parentaux, l'allaitement et le retour au travail manquent de clarté. La présente revue vise à analyser les politiques relatives aux congés parentaux pendant la résidence en chirurgie et les perceptions qu'en ont les résidentes, leurs collègues et les différentes administrations de programme selon la documentation.

Méthodes : Nous avons réalisé un examen de la portée de la documentation qui explorait les thèmes suivants : politiques relatives aux congés de maternité ou aux congés parentaux; politiques sur les contraintes professionnelles liées à la période précédant l'accouchement, et complications obstétricales; mesures d'adaptation concernant les absences durant la formation; mesures de soutien et perceptions entourant la maternité ou les congés parentaux pendant la résidence; et défis auxquels les résidentes sont confrontées lors du retour au travail, notamment le rendement exigé et l'allaitement maternel.

Résultats : Les politiques relatives aux congés parentaux pendant la résidence en chirurgie ont toujours manqué de clarté et n'ont jamais été bien appliquées. Bien que des recommandations sur les congés parentaux soient maintenant en place, ces lacunes pourraient avoir été à l'origine de la perception qu'ont les résidentes en chirurgie d'un manque de soutien, ainsi que de la variabilité dans l'approbation des congés. Le manque de clarté des politiques pourrait aussi avoir contribué à l'insatisfaction professionnelle de résidentes qui ont des enfants et les avoir découragés de choisir une surspécialité du domaine de la chirurgie.

Conclusion : Il faut en appeler à un changement de culture pour orienter l'élaboration de politiques permettant de mieux appuyer les résidentes de toutes les spécialités chirurgicales afin qu'elles réussissent leur double rôle parental et professionnel. Grâce à une sensibilisation accrue, nous observons des progrès dans l'élaboration de politiques et de recommandations.

© 2023 CMA Impact Inc. or its licensors

In North America, the cohort of surgical residents has diversified over the last 20 years with respect to gender.[1,2] Yet, institutional parental-leave policies, and historical enforcement of these policies, has been slow to adapt to this landscape.[3,4] As such, childbearing during residency training was historically discouraged owing to perceived or actual demands of training, burdens to colleagues[5,6] and the impact on personal finances.[7–9] Residents who are pregnant may also perceive variable support from program directors,[10,11] and that pregnancy is a negative threat to their career.[3,7,12–14] As a result, a female resident is more likely to feel sad about the prospect of having children[13] and delay childbearing when compared with male colleagues.[8,14,15]

When comparing across all specialties, we found that the female surgical resident is more likely to delay childbearing[16] and, when maternal age is controlled for, is more likely to use assisted reproduction to achieve pregnancy[16] and face greater obstetric complications.[17] This, combined with a lack of similar gender role models,[18–21] may support ongoing gender disparities and slow down the culture shift required for full support of parenthood during a surgical residency.

In Canada, residents who meet certain requirements (600 working hours per qualifying period, not including call) are eligible for paid maternity leave (up to 52 weeks),[22] although this may necessitate an extension of training. Recently, in July 2020, the American Board of Medical Subspecialties (ABMS) updated its policy to include maternity and parental leave as an explanation for leave during training.[23,24] Similarly, in March 2020, the American Board of Plastic Surgery instituted a policy that allows for 12 weeks of maternity or paternity leave, medical leave, foster care, adoption or family leave, without exhaustion of vacation time or extension of training.[25]

Despite the presence of these universal parental-leave policies, there is less clarity when it comes to phased return-to-work policies.[23,26] As the number of pregnant residents increases,[1,27–30] there is a timely need to improve consistent implementation of universal parental leave, and to introduce phased return to work and lactation support for residents. The goal of this article is to provide a scoping review of the literature to inform prospective and current surgical residents of the existing policies and current perceptions of parenthood during residency training. We strive to inform policy changes to better support surgical residents in pursuing success in family and their academic careers.

Methods

We performed a scoping review of the literature according to the following topics: maternity or parental-leave policies; antepartum work-restriction policies and obstetric complications; accommodations for training absences; support for, and perceptions of, maternity or parental leave during residency training; and challenges upon return to work, namely resident performance and breastfeeding (Table 1). We consulted library services at Sunnybrook Health Sciences Centre to develop the search terms to best explore the chosen topics. We performed an electronic search of the Ovid database (MEDLINE, Embase, PsycINFO and Cochrane Library), using the following terms: Internship and Residency/ or Resident.mp., exp/ Education, Medical Graduate/., Family leave/or Parental leave., Maternity leave .mp., Paternity leave.mp., Childbearing. tw,kf., ((sug* or female or medical) adj2 residen*). tw.kf. We assessed publications between January 1980 and February 2019 and retrieved 201 articles. Duplicates (n = 24) were removed and titles and abstracts were reviewed by 1 research staff member (J.S.J.). We removed non-English articles, review articles, editorials and letters to the editor (n = 36), as well as nonrelevant articles (n = 83). Data were extracted and amalgamated into topics (J.S.J. and L.S.). This scoping review discusses the findings of the resulting 58 articles.

Of note, we recognize that not all pregnant individuals or individuals who give birth identify as female. Throughout this manuscript, we use only gendered language as per our references.

Results

Parental-leave policies affecting surgical residents in North America

In Canada, all employed birthing parents are eligible for financial support during 17 weeks of maternity leave and

Table 1. Themes discussed

Themes	Purpose
Parental-leave policies	Describe parental-leave policies available to surgical residents in North America and the European Union.
Antepartum work policies and obstetric complications	Describe antepartum work-restriction policies within Canadian programs and American programs, with an emphasis on the rate of obstetric complications among childbearing residents.
Accommodations for training absences	Review the requirements present in some programs, particularly making up missed call. Assess the effect of maternity leave on co-resident workload and perceptions of co-residents toward their pregnant colleagues.
Perceptions of maternity leave	Examine program director perceptions of pregnancy during training.
Challenges upon return to work	Discuss the perceptions of program directors, particularly that pregnancy and childbearing affects resident performance, and review return-to-work and breastfeeding policies.

Table 2. Canadian leave provisions as of 2016 — Canadian's employment insurance program and provincial residency contract top-up

Province	Maternity leave	Parental or adoptive leave
Ontario	Up to 17 wk 15 wk at 84%	10 wk at 84% 35 wk (37 wk if no pregnancy leave was taken)
Quebec	21 wk at 95%	5 d at 100% Up to 38 wk QPIP
Manitoba	17 wk at 60% Wage up to $1200/wk	37 wk Wages up to $1200/wk
Alberta	17 wk at 90%	2 wk at 100% 37 wk
Saskatchewan	17 wk 95%	5 d at 100% 37 wk
British Columbia	17 wk EI only	37 wk at EI only
Maritimes	15 wk at 93%	10 wk at 93% 37 wk
Newfoundland and Labrador	17 wk EI only	Max is 52 wk, EI only

EI = Canada's Employment Insurance Program; QPIP = Quebec Parental Insurance Plan.

Table adapted from Resident Doctors of Canada Maternity Leave Policies.[31] EI provides eligible residents with $547/wk before taxes. The first 17 weeks are considered maternity leave; the next 35–37 weeks are considered parental leave and offered to those caring for a newborn or adopted children. The programs result in a combined total of 52 weeks of leave.

Table 3. Canadian antepartum leave provisions as of 2016

Province	Week	Period of call duty
Ontario	27	No call duty
Quebec	20	No call duty Exempt from night shifts 2 consecutive days off/wk
Manitoba	31	No overnight call
Alberta	27	No shifts > 12 h No shifts between 12 midnight and 6 am
Saskatchewan	28	No night call
British Columbia	24	No > 12 continuous hours
Maritimes	28	No overnight call
Newfoundland and Labrador	32	No on-call or in-hospital duty period after 5 pm No duty 8 am Saturday to 8 am Monday

35 weeks of parental leave after the birth of a child.[31] Financial support during maternity leave is offered by Canada's Employment Insurance Program (EI), which provides 55% of total salary, up to $547/week.[22] In addition to EI, a resident may be topped up by their provincial residency contract (Table 2).[22] To qualify for the financial benefits of EI, roughly 15 weeks of work (excluding call) is required to incur the 600 hours during the qualifying period.[31] Consequently, a resident in their first postgraduate year or a resident who begins their training while pregnant will not qualify for this type of financial support.[31] A graduated resident enrolled in a fellowship program will likely also not qualify for this support.[31] Financial support programs in place do not necessarily reflect program-level parental-leave policies in surgical residency programs.[32] Therefore, despite the available financial support, not all residents participate in the full period of parental leave for which they are eligible.[33] Of those surveyed by Augustine and colleagues,[33] 92% of residents and 86% of staff surgeons who gave birth to a child took maternity leave.[33] However, among male respondents, 24% of residents and 33% of staff surgeons fathered a child during residency and only 50% of residents and no staff surgeons took parental leave.[33]

In the United States, the maximum duration of leave from residency for any reason (vacation, sick leave, parental leave) that will not require extension of training is defined by the ABMS.[24] As late as 2018, there remained variability between surgical specialties (Appendix 1, Table 1, available at www.canjsurg.ca/lookup/doi/10.1503/cjs.009321/tab-related-content), yet most pregnant residents reported 5–8 weeks of maternity leave during training,[8,34,35] with proceduralists being more likely to report maternity leaves of shorter durations (< 8 wk).[7] Encouragingly, in July 2020, the ABMS announced progressive leave for residents and fellows, which provides more flexibility to create a parental, family or medical leave protocol that best suits the training required for a specialty or subspecialty, with a minimum duration of leave for this purpose to be 6 weeks.[24]

For practising surgeons, there are no regulatory guidelines for maternity-leave benefits. The mean paid childbearing leave in 2016–2017 for faculty physicians at 12 high-ranked US medical schools was 8.6 weeks.[36] In

2021, the American College of Surgeons published a bulletin in support of healthy pregnancy outcomes.[37] The bulletin suggested that the terms of parental leave should be outlined in all employment contracts, payment should be negotiated, accommodations to duty hours and call schedule should be considered, and parental leave should not affect career progression.[37] Therefore, financial support during leave may vary by institution, full- or part-time status and duration of employment before leave.[38]

Antepartum work policies and obstetric complications

Antepartum work restrictions are better outlined at the provincial level for Canadian surgical residents (Table 3). Of the 8 Canadian provinces with surgical residency training programs, each endorses a reduced workload policy for pregnant residents[31] (Table 2). These recommendations define the gestational week at which a pregnant resident is relieved of call duty and is not required to work extended shifts.[31] Augustine and colleagues[33] observed that Canadian plastic surgery residents and staff surgeons were concerned regarding how far into pregnancy a resident should be expected to take call, despite the existence of guidelines. The higher risk of obstetric complications among surgical residents compared with the general population — including miscarriage, hypertension in pregnancy, placental abruption and intrauterine growth restriction[17] — highlights the importance of follow-through with respect to the antepartum work-restriction guidelines. Behbehani and colleagues[17] observed a higher rate of obstetric complications in residents working 6 or more nights per month on call compared with those working 6 or fewer nights per month on call. The authors also observed that the complications rate was higher among surgical residents operating 8 or more hours compared with those operating 8 or fewer hours (42% v. 9%).[17] Similarly, Hamilton and colleagues[39] observed that the risk of preterm delivery was higher among orthopedic surgeons than in the general population, and residents working more than 60 hours per week had an even greater risk.[39] A recent survey of Canadian plastic surgery residents found that of those who became pregnant, 42% experienced complications.[33] Accordingly, in a 2011 study, 70% of pregnant Canadian general surgery residents stopped overnight call at 35 weeks, and 65% stopped clinical duties at 36 weeks.[40]

In contrast, in the available literature,[15,41–43] it appears that many residents in the US continued to work an unmodified schedule until labour.[30,44] Several pregnant residents reported an unmodified work schedule until birth,[41] and many believed this adversely affected their health or the health of their child.[17,39,42,45]

To address this, in August 2021, the American College of Surgeons published recommended accommodations to call schedule, duty hours and operative schedule late in the third trimester.[37] The recommendation also included flexibility for new mothers who intended to continue breastfeeding to express breast milk during work hours.[37]

Accommodations for training absences

In Canada, a surgical resident may be granted an extended parental leave, and benefits can be paid up for to 61 weeks.[46] The benefit rate is 33% of the resident's average weekly insurable earnings, and when the second parent (non–birth parent) takes a minimum of 5 weeks of parental leave, the parental benefit increases by up to 8 weeks for a total of 69 weeks.[46] Of note, in Canada, parental leave benefits are shared per family.[46] In doing so, the resident is not obliged to "make up" missed call accrued from their training absence but may have to extend their training to satisfy the requirements of the Royal College of Physicians and Surgeons of Canada.

In the US, it has been reported that surgical residents may have had to make up missed call[47,48] in addition to extending their training[49,50] if they exceed maximum leave set by the ABMS-member Board.[51] As of 2018, the median leave among all specialties was 6 weeks,[31] but differences exist among programs (Appendix 1, Table 1). The maximum allowable time away from training per year without having to add additional training time varies among specialties.[23] In addition, the capacity to accumulate leave over the duration of training varies by program.[23] These inconsistencies have resulted in discrepancies in formalized maternity or parental-leave policies and in the permitted duration of leave. In these environments, most female surgical residents report that returning to work is the most difficult aspect of their pregnancy,[52,53] when they may have to overcome obstetric complications or the challenges of parenthood or both, and continue to fulfill time-based training requirements.

Perceptions of parental leave

Often, the work of pregnant colleagues is covered by co-residents, without compensation or schedule rearrangements.[5,44] The necessity of co-residents to cover parental leave may be the result of scheduling inflexibility or inadequate service coverage.[54] Nonetheless, the increased load on co-residents may contribute to negative perceptions of the resident parent.[40] Notably, pregnant residents themselves perceive the negative impact of their pregnancy on co-residents.[53] Significantly more female than male resident parents (63% v. 43%) felt that childbearing placed a burden on their colleagues.[13] This perceived stigma from co-residents is associated with female surgical residents' desire to revisit their career choice.[9] Notably, parenthood during residency training is not an issue exclusive to childbearing residents, but rather one that affects co-residents

as well as the residency program and, for this reason, supporting institutional policies that alleviate scheduling burdens are necessary.

As few as 30% of plastic surgery residents said they felt supported during their pregnancy by their program directors,[15] and 65% felt supported by their attending surgeons.[6] Among all specialties, surgical residents report the lowest support for pregnancy from male residents and faculty.[55] In a nationwide survey of general surgery residency program directors, 15% said they would advise against having a child during residency.[10] In a recent assessment of gender diversity and equity policies among Canadian plastic and reconstructive surgery programs,[32] our group observed that these programs had an approach for paid maternity, paternity or caregiver leave, but only 2 had approaches to support trainees as parents.[32]

As many as 39% of pregnant surgical residents surveyed by Rangel and colleagues[41] considered leaving surgery, and 29% would discourage students from a surgical career, specifically because of the difficulties of balancing pregnancy and motherhood.[41] Interestingly, the duration of maternity leave may mediate career satisfaction and perceived support,[41] and so longer maternity leave may alleviate some of these stressors, resulting in residents who are more satisfied with parenthood and breastfeeding.[8]

Challenges upon return to work: resident performance, well-being and breastfeeding

In 2 surveys of program directors — obstetrics and gynecology[5] and general surgery[10] — it was observed that 83% and 61%, respectively, asserted that pregnancy during training decreases performance.[5,10] In studies evaluating the average American Board of Surgery In-Training Exam scores as a metric to compare performance before childbirth with performance after pregnancy, Shifflette and colleagues[52] report that 31% scored lower after pregnancy compared with their prepregnancy scores, whereas others did not report fewer pass rates.[52,56] It is possible that lower scores may be explained by the added workload and disproportional parenting duties of female resident parents.[57] Physician-parent survey respondents revealed that males were more likely to miss family activities owing to work demands, whereas females reported missing more work activities owing to family responsibilities.[57] To the best of our knowledge, no group has examined the effect of parenthood during training on either ABMS or Royal College of Physicians and Surgeons of Canada certifying examination pass rates.

Despite an increase in parenthood among residents, it appears that residents of all genders are equally pursuing academic endeavours and careers.[58] General surgery residents who were pregnant during their training were more likely to pursue fellowships than nonparents.[56] The academic achievements of childbearing residents may be comparable with those of nonparents because many residents pursue graduate degrees, mentor students and prepare manuscripts while on maternity leave.[30] Recently, Merchant and colleagues[6] observed that 39% of female general surgery residents who took 6–12 months of leave engaged in graduate work or research so as to not lose time from training, remain intellectually challenged and receive pay. Thus, financial incentives or burdens, as well as support or lack thereof from program directors, are 2 factors that may influence the duration of maternity leave taken by residents.[59]

Regardless of the resident's productivity during their leave, upon return to work they are more likely to feel that childbearing during training negatively influenced professional perceptions[60] and adversely affected their career.[13] A resident may also face sleep deprivation, difficulties arranging child care and the agony of leaving a newborn child.[61]

On top of these challenges, a resident may face barriers to breastfeeding, which is of concern given that breastfeeding for less than 8 weeks is associated with postpartum depression.[62] The resident may not be guaranteed time or adequate facilities to breastfeed,[6] be too busy, not have a place to pump close to the operating room, or feel unsupported by an attending surgeon and co-residents.[6] This may result from a lack of formal lactation policies and unavailability of on-site lactation facilities, which have been reported by only 58% of program directors.[10] In Canada, provision of longer maternity leave may alleviate some of the obstacles associated with breastfeeding, yet there are not enough lactation services to support breastfeeding during training.[6,10]

Implementing policies to support lactation during training is critical. Fortunately, progressive lactation policies exist, such as described in Gordon and colleagues,[54] which protect 30 minutes of breastfeeding every 4 hours.[54] The provision of dedicated lactation rooms with hospital-grade pumps may improve the efficiency of postpartum residents through reduced pumping time and increased mean milk volume.[63] Storage capabilities are also essential.[63] The ability to breastfeed during training may, however, be influenced by medical subspecialty.[64] For example, a surgical resident may find it difficult to leave the operating room to pump, and the lactation facilities, if present, may be far removed from the operating room.[40] Combined with the time needed to pump and store the milk, this requires the resident to be away from a patient for a substantial amount of time.[40] This prolonged absence, along with a lack of understanding regarding the necessity to consistently pump, may contribute to surgical residents terminating breastfeeding earlier than they wished.[64]

Conclusions and future directions

A recent survey from the American Society of Plastic Surgeons found that 73% of women and 39% of men delayed

starting a family because of the demands of training.[15] Trends in Canada are similar, as 72% of residents did not want to become pregnant during residency.[33]

In the face of obstetric complications among pregnant residents[17,39] and a lack of contingency plans for service coverage by co-residents,[27] clearer antenatal, parental and return-to-work policies are needed. Encouragingly, progress is being made, as illustrated by recent ABMS and American Board of Plastic Surgery policies, as well as by American College of Surgeons guidelines.[37] Specific examples of progressive policies in other specialties — such as that put forth by Gordon and colleagues[54] for emergency medicine residents at a renowned teaching hospital — suggest that parental leave, return-to-work and breastfeeding policies to support resident parents are feasible. These policies should include accessible infrastructure for pumping and program-wide education on the importance of breastfeeding.[27,65] The absence of universal policies for parental leave, antenatal work modification and postpartum modifications at the program level is not unique to North American surgical-residency programs. In countries in the European Union, policies exist that provide surgical residents with varying levels of support for parental leave[26] (Appendix 1, Table 2). Of note is the fact that several countries endorse a mandatory maternity or parental leave.[26] This concept does not currently exist in North America. A mandatory leave period may help with enforcement of policy and encourage the requisite cultural shift necessary to support parenthood in the surgical training environment. In short, as the number of childbearing residents increases, there is a call for a cultural shift of residency training programs to better support their trainees as parents.

Affiliations: From the Division of Plastic, Reconstructive and Aesthetic Surgery, University of Toronto, Toronto, Ont. (Baltzer, Lipa, Snell); the Department of Medicine, Queen's University, Kingston, Ont. (Jakubowski).

Competing interests: Joan Lipa reports reimbursement for travel expenses for the American Board of Plastic Surgery and the American Society for Reconstructive Microsurgery. Dr. Lipa is director and chair-elect of the American Board of Plastic Surgery and president, American Society for Reconstructive Microsurgery. Laura Snell is co-lead of equity, diversity and inclusion at the Department of Surgery, University of Toronto. No other competing interests were declared.

Contributors: All of the authors contributed to the conception and design of the work. Laura Snell contributed to the acquisition of data. Laura Snell and Joan Lipa contributed to the analysis and interpretation of data. Josephine Jakubowski, Heather Baltzer and Laura Snell drafted the manuscript. Heather Baltzer, Joan Lipa and Laura Snell revised the manuscript critically for important intellectual content. All of the authors gave final approval of the version to be published and agreed to be accountable for all aspects of the work.

Content licence: This is an Open Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY-NC-ND 4.0) licence, which permits use, distribution and reproduction in any medium, provided that the original publication is properly cited, the use is noncommercial (i.e., research or educational use), and no modifications or adaptations are made. See: https://creativecommons.org/licenses/by-nc-nd/4.0/

References

1. Turner PL, Lumpkins K, Gabre J, et al. Pregnancy among women surgeons: trends over time. *Arch Surg* 2012;147:474-9.
2. Parmeshwar N, Stuart ER, Reid CM, et al. Diversity in plastic surgery: trends in minority representation among applicants and residents. *Plast Reconstr Surg* 2019;143:940-9.
3. Bucknor A, Kamali P, Phillips N, et al. Gender inequality for women in plastic surgery: a systematic scoping review. *Plast Reconstr Surg* 2018;141:1561-77.
4. Troppmann KM, Palis BE, Goodnight JE Jr, et al. Women surgeons in the new millennium. *Arch Surg* 2009;144:635-42.
5. Hariton E, Matthews B, Burns A, et al. Pregnancy and parental leave among obstetrics and gynecology residents: results of a nationwide survey of program directors. *Am J Obstet Gynecol* 2018;219:199e191-199 e198.
6. Merchant SJ, Hameed SM, Melck AL. Pregnancy among residents enrolled in general surgery: a nationwide survey of attitudes and experiences. *Am J Surg* 2013;206:605-10.
7. Scully RE, Davids JS, Melnitchouk N. Impact of procedural specialty on maternity leave and career satisfaction among female physicians. *Ann Surg* 2017;266:210-7.
8. Stack SW, McKinney CM, Spiekerman C, et al. Childbearing and maternity leave in residency: determinants and well-being outcomes. *Postgrad Med J* 2018;94:694-9.
9. Rangel EL, Lyu H, Haider AH, et al. Factors associated with residency and career dissatisfaction in childbearing surgical residents. *JAMA Surg* 2018;153:1004-11.
10. Sandler BJ, Tackett JJ, Longo WE, et al. Pregnancy and parenthood among surgery residents: results of the first nationwide survey of general surgery residency program directors. *J Am Coll Surg* 2016;222:1090-6.
11. Tang AL, Miller A, Hauff S, et al. Maternity and paternity leave in otolaryngology residency training in the United States. *Laryngoscope* 2019;129:1093-9.
12. Willett LL, Wellons MF, Hartig JR, et al. Do women residents delay childbearing due to perceived career threats? *Acad Med* 2010;85:640-6.
13. Kin C, Yang R, Desai P, et al. Female trainees believe that having children will negatively impact their careers: results of a quantitative survey of trainees at an academic medical center. *BMC Med Educ* 2018;18:260.
14. Pham DT, Stephens EH, Antonoff MB, et al. Birth trends and factors affecting childbearing among thoracic surgeons. *Ann Thorac Surg* 2014;98:890-5.
15. Furnas HJ, Li AY, Garza RM, et al. An analysis of differences in the number of children for female and male plastic surgeons. *Plast Reconstr Surg* 2019;143:315-26.
16. Davids JS, Scully RE, Melnitchouk N. Impact of procedural training on pregnancy outcomes and career satisfaction in female postgraduate medical trainees in the United States. *J Am Coll Surg* 2017;225:411-8.e2.
17. Behbehani S, Tulandi T. Obstetrical complications in pregnant medical and surgical residents. *J Obstet Gynaecol Can* 2015;37:25-31.
18. Gargiulo DA, Hyman NH, Hebert JC. Women in surgery: Do we really understand the deterrents? *Arch Surg* 2006;141:405-7, discussion 407-8.
19. Glauser W. Rise of women in medicine not matched by leadership roles. *CMAJ* 2018;190:E479-80.
20. Gabram SG, Hoenig J, Schroeder JW Jr, et al. What are the primary concerns of recently graduated surgeons and how do they differ from those of the residency training years? *Arch Surg* 2001;136:1109-14.
21. Ferris LE, Mackinnon SE, Mizgala CL, et al. Do Canadian female surgeons feel discriminated against as women? *CMAJ* 1996;154:21-7.

22. *EI maternity and parental benefits: what these benefits offer*. Ottawa: Government of Canada; 2019. Available: https://www.canada.ca/en/services/benefits/ei/ei-maternity-parental.html (accessed 2019 May 31).
23. Varda BK, Glover Mt. Specialty board leave policies for resident physicians requesting parental leave. *JAMA* 2018;320:2374-7.
24. *American Board of Medical Specialities announces progressive leave policy for residents and fellows*. Chicago: ABMS; 2020. Available: https://www.abms.org/newsroom/abms-announces-progressive-leave-policy-for-residents-and-fellows/ (accessed 2020 Mar. 24).
25. The American Board of Plastic Surgery I. Personal Leave Policy. ABPS Personal Leave Policy. 2020.
26. Dingemann C. The female pediatric surgeon. *Eur J Pediatr Surg* 2017;27:228-33.
27. Garza RM, Weston JS, Furnas HJ. Pregnancy and the plastic surgery resident. *Plast Reconstr Surg* 2017;139:245-52.
28. Krause ML, Elrashidi MY, Halvorsen AJ, et al. Impact of pregnancy and gender on internal medicine resident evaluations: a retrospective cohort study. *J Gen Intern Med* 2017;32:648-53.
29. Lashbrook DL, Frazier LM, Horbelt DV, et al. Pregnancy during obstetrics and gynecology residency: effect on surgical experience. *Am J Obstet Gynecol* 2003;189:662-5.
30. Blair JE, Mayer AP, Caubet SL, et al. Pregnancy and parental leave during graduate medical education. *Acad Med* 2016;91:972-8.
31. Resident Doctors of Canada. Having a Family During Residency 2019. Available: https://residentdoctors.ca/resources/family-residency-canada/ (accessed 2019 May 31).
32. Retrouvey H, Lipa JE, Forrest C, et al. State of gender diversity and equity policies within plastic and reconstructive surgery in Canada. *Plast Reconstr Surg Glob Open* 2020;8:e3047.
33. Augustine H, Risvi SA, Dunn E, et al. Pregnancy and parental leave among plastic surgery residents in Canada: a nationwide survey of attitudes and experiences. *Can J Surg* 2020;63:E454.
34. Dixit A, Feldman-Winter L, Szucs KA. Parental leave policies and pediatric trainees in the United States. *J Hum Lact* 2015;31:434-9.
35. Rangel EL, Castillo-Angeles M, Changala M, et al. Perspectives of pregnancy and motherhood among general surgery residents: a qualitative analysis. *Am J Surg* 2018;216:754-9.
36. Riano NS, Linos E, Accurso EC, et al. Paid family and childbearing leave policies at top US medical schools. *JAMA* 2018;319:611.
37. *Revised Statement on the Importance of Workplace Accommodations for Pregnancy, Parental Leave, and Lactation Support for Practicing Surgeons. Bulletin of the American College of Surgeons 2021*. Chicago: American College of Surgeons; 2021. Available: https://bulletin.facs.org/2021/08/revised-statement-on-the-importance-of-workplace-accommodations-for-pregnancy-parental-leave-and-lactation-support-for-practicing-surgeons/ (accessed 2021 Aug. 6).
38. Magudia K, Bick A, Cohen J, et al. Childbearing and family leave policies for resident physicians at top training institutions. *JAMA* 2018;320:2372.
39. Hamilton AR, Tyson MD, Braga JA, et al. Childbearing and pregnancy characteristics of female orthopaedic surgeons. *J Bone Joint Surg Am* 2012;94:e77.
40. Merchant S, Hameed M, Melck A. Pregnancy among residents enrolled in general surgery (PREGS): a survey of residents in a single Canadian training program. *Can J Surg* 2011;54:375-80.
41. Rangel EL, Smink DS, Castillo-Angeles M, et al. Pregnancy and motherhood during surgical training. *JAMA Surg* 2018;153:644-52.
42. Carty SE, Colson YL, Garvey LS, et al. Maternity policy and practice during surgery residency: how we do it. *Surgery* 2002;132:682-7, discussion 687-8.
43. Phelan ST. Sources of stress and support for the pregnant resident. *Acad Med* 1992;67:408-10.
44. Gabbe SG, Morgan MA, Power ML, et al. Duty hours and pregnancy outcome among residents in obstetrics and gynecology. *Obstet Gynecol* 2003;102:948-51.
45. Diamond R. Promoting sensible parenting policies: leading by example. *JAMA* 2019;321:645-6.
46. *Pregnancy and Parental Leave*. Toronto: PARO; 2019. Available: https://myparo.ca/pregnancy-parental-leave/ (accessed 2019 May 23).
47. Weiss J, Teuscher D. What provisions do orthopaedic programs make for maternity, paternity, and adoption leave? *Clin Orthop Relat Res* 2016;474:1945-9.
48. Davis JL, Baillie S, Hodgson CS, et al. Maternity leave: existing policies in obstetrics and gynecology residency programs. *Obstet Gynecol* 2001;98:1093-8.
49. Morris LE, Lindbloom E, Kruse RL, et al. Perceptions of Parenting residents among family medicine residency directors. *Fam Med* 2018;50:756-62.
50. Hutchinson AM, Anderson NS III, Gochnour GL, et al. Pregnancy and childbirth during family medicine residency training. *Fam Med* 2011;43:160-5.
51. Rose SH, Burkle CM, Elliott BA, et al. The impact of parental leave on extending training and entering the board certification examination process: a specialty-based comparison. *Mayo Clin Proc* 2006;81:1449-53.
52. Shifflette V, Hambright S, Amos JD, et al. The pregnant female surgical resident. *Adv Med Educ Pract* 2018;9:365-9.
53. Cole S, Arnold M, Sanderson A, et al. Pregnancy during otolaryngology residency: experience and recommendations. *Am Surg* 2009;75:411-5.
54. Gordon AJ, Sebok-Syer SS, Dohn AM, et al. The birth of a return to work policy for new resident parents in emergency medicine. *Acad Emerg Med* 2019;26:317-26.
55. Mundschenk MB, Krauss EM, Poppler LH, et al. Resident perceptions on pregnancy during training: 2008 to 2015. *Am J Surg* 2016;212:649-59.
56. Brown EG, Galante JM, Keller BA, et al. Pregnancy-related attrition in general surgery. *JAMA Surg* 2014;149:893-7.
57. Colletti LM, Mulholland MW, Sonnad SS. Perceived obstacles to career success for women in academic surgery. *Arch Surg* 2000;135:972-7.
58. Holliday EB, Ahmed AA, Jagsi R, et al. Pregnancy and Parenthood in Radiation Oncology, Views and Experiences Survey (PROVES): results of a blinded prospective trainee parenting and career development assessment. *Int J Radiat Oncol Biol Phys* 2015;92:516-24.
59. Stewart DE, Robinson GE. Combining motherhood with psychiatric training and practice. *Can J Psychiatry* 1985;30:28-34.
60. Walsh A, Gold M, Jensen P, et al. Motherhood during residency training: challenges and strategies. *Can Fam Physician* 2005;51:990-1.
61. Gjerdingen DK, Chaloner KM, Vanderscoff JA. Family practice residents' maternity leave experiences and benefits. *Fam Med* 1995;27:512-8.
62. Brown A, Rance J, Bennett P. Understanding the relationship between breastfeeding and postnatal depression: the role of pain and physical difficulties. *J Adv Nurs* 2016;72:273-82.
63. Creo AL, Anderson HN, Homme JH. Productive pumping: a pilot study to help postpartum residents increase clinical time. *J Grad Med Educ* 2018;10:223-5.
64. Dixit A, Feldman-Winter L, Szucs KA. "Frustrated," "depressed," and "devastated" pediatric trainees: US academic medical centers fail to provide adequate workplace breastfeeding support. *J Hum Lact* 2015;31:240-8.
65. Osband YB, Altman RL, Patrick PA, et al. Breastfeeding education and support services offered to pediatric residents in the US. *Acad Pediatr* 2011;11:75-9.