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[Aller au sommaire du numéro](#)

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Résumé de l'article

Depuis des décennies, il existe amplement de preuves à l'effet que la formation et la pratique de la médecine peuvent compromettre la santé et le bien-être de la personne. Face aux taux extrêmement élevés de suicide, de toxicomanie, de dépression et d'épuisement professionnel tant chez les étudiants, les résidents que les médecins, il serait faux de prétendre qu'on est ou qu'on devient médecin sans faire de sacrifice. Cet article s'adresse aux acteurs du milieu de l'éducation médicale pour les inciter à considérer la formation qu'ils donnent aux étudiants en tant qu'intervention nécessitant le consentement libre et éclairé de ces derniers. Nous espérons que cet exercice amènera les enseignants à changer de paradigme et les étudiants à entreprendre leur formation médicale de façon libre et informée.

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Abstract

For decades there has been ample evidence that training to become a physician and practicing medicine is hazardous to one's health and wellness. In the face of the extremely high rates of suicide, substance abuse, depression and burnout in the medical student, resident, and physician populations, it would be dishonest to suggest medical education and practice is all gain and no pain. This article is directed to members of the medical education community and challenges stakeholders to view their teaching and training of medical students as an intervention requiring free and informed consent. We hope this exercise shifts the paradigm of educators and enables students to enter medical training from a free and informed position.

Résumé

Depuis des décennies, il existe amplement de preuves à l'effet que la formation et la pratique de la médecine peuvent compromettre la santé et le bien-être de la personne. Face aux taux extrêmement élevés de suicide, de toxicomanie, de dépression et d'épuisement professionnel tant chez les étudiants, les résidents que les médecins, il serait faux de prétendre qu'on est ou qu'on devient médecin sans faire de sacrifice. Cet article s'adresse aux acteurs du milieu de l'éducation médicale pour les inciter à considérer la formation qu'ils donnent aux étudiants en tant qu'intervention nécessitant le consentement libre et éclairé de ces derniers. Nous espérons que cet exercice amènera les enseignants à changer de paradigme et les étudiants à entreprendre leur formation médicale de façon libre et informée.

Preamble

Informed Consent is a central ethical tenet of healthcare professionals. Underlying this axiom is an appreciation of, and respect for, individual autonomy and decision-making.¹ Across disciplines, healthcare professionals agree they have a responsibility to ensure patients are informed of the potential risks and benefits of any given intervention, treatment, or service and to respect the decisions of competent patients to accept or reject a plan of care. Furthermore, healthcare professionals support a patient's right to withdraw their consent at any time and discontinue

services without reproach or prejudice. Unfortunately, these same virtues, commitments and standards are not extended to medical students and trainees during their medical education.

For decades there has been ample evidence that training to become a physician and practicing medicine is hazardous to one's health and wellness. In the face of the extremely high rates of suicide, substance abuse, depression and burnout in the medical student, resident, and physician populations, it would be dishonest to suggest medical education and practice is all gain and no pain.

Therefore, it would be in keeping with our professional values to warn individuals of these risks and consider fully informed consent in advance of and while training for a career in medicine. We make two arguments: a moral imperative based on the ethical standards of the healthcare professions and a statutory argument based on the rights of workers to know the risks of the workplace.

Let's imagine that medical education was a surgical procedure. The physician in question would have an ethical obligation to ensure the would-be student had a thorough understanding of the potential risks and benefits, to engage in shared decision making, and to respect the autonomy and decision-making of the now well-informed student not only in the present, but in the future as well. Of course, this is not far from the lived experience of many medical students who, under the supervision of faculty members (many of whom, as physicians, have committed themselves to the ethical tenets above), undergo a series of pedagogical procedures as interventions to become physicians. As there are risks and benefits to entering the OR as a patient, so too there are when one enters medical school as a learner.

In 2014, D'Eon asked if medical education was hazardous to one's health,² and in 1995, Bligh wrote, "With undergraduate medical education currently carrying a health warning..."³ The next obvious step is to initiate a program of helping our students enter medical school fully informed.

Here we advocate for the expansion of informed consent and relevant professional values to those entering and currently in the medical profession as a formal process to respect their autonomy and decision-making. Our aim is to ensure those who undertake education and training to practice medicine do so from an informed position. This is our moral argument.

The statutory argument is more direct. According to occupational health and safety regulations in Canada, every worker has the right to be informed and aware of the risks they may face in the workplace. We believe students should be considered workers, and the medical schools, hospital wards, and clinics in which they learn (and work) are their workplaces. Therefore, we have a responsibility to help the students understand the risks they face when they enter and as they journey through medical education.⁴

We have developed a consent form that describes many of the well-known mental health risks people encounter in medical schools in Canada and across the globe. We hope

this paper will stimulate discussion in the medical profession generally and spur action across undergraduate medical programs.

Informed consent to undergo medical education

Please read the following risks and benefits of medical education and then sign the document indicating your free and informed consent to the education and career path you are about to enter—or have already entered.

Potential benefits

1. Medical school is a portal to helping people in incredible ways. You will make an enormous difference in the lives of many people, their families, and caregivers. A career in medicine can be rewarding. It is important to recognize that there are alternative career options that also afford the opportunity to make a positive impact in people's lives.
2. Whatever specialty you enter, you will earn a great deal of money by Canadian standards and will fall easily within the highest 1% of income earners in the country. And this is the case even after paying off your loans and bills from medical school.
3. You will enjoy a privileged position in society and receive the trust and admiration of patients, friends, and family.

Potential risks

4. We have known for decades that medical students experience higher than normal levels of stress and burnout,^{5,6,7,8,9} and are more likely than the general population to die by suicide.^{10,11,12}
5. The curriculum is exceptionally heavy, about double the course load compared to a normal "full" course load at university. You can never learn it all, so, despite your noble aspirations to be a good physician, you may need to use surface and strategic learning approaches just to survive. Around the time of graduation, you will barely remember half of what you thought you knew, and once you start working with actual patients you will realize that much of what you memorized was not that important to patient care anyway. Medicine advances quickly and much of what you learn during medical school and residency will rapidly be out of date. The futility of all that work and anxiety may result in burnout.^{5,13,14,15} See #4 above on stress, burnout, and suicide.

6. If you fall behind, you may be labeled a weak or marginal student. You may be given well-meaning remediation sessions. These may not be effective¹⁶ and may add to the stress of failure¹⁷ since you will be expected to do the remediation successfully while keeping up with the flood of new material. See #4 above on stress, burnout, and suicide.
7. You may need to spend hours dissecting a cadaver in an anatomy lab for limited benefit. There is little evidence that dissecting makes you a better physician (many medical schools have retired full-body dissection long ago and produce successful physicians). Many people find the fumes physically nauseating. The experience can be dehumanizing and in itself does nothing to help you learn how to deal with death and dying.^{18,19} See #4 above on stress, burnout, and suicide.
8. You may accumulate what seems like an enormous debt that will feel like a trap, or a weight tied to your waist, limiting your choices if you realize at some point that medicine is not really the career for you. Where could you find a job that will allow you to pay off an enormous debt like that, or how could you possibly afford to go back to school? See #4 above on stress, burnout, and suicide.
9. When you begin to work with patients and start shadowing or learning on the wards or in clinics, you will encounter death, disease, and disability. Some patients will be despondent and upset, angry, aggressive, and even violent.²⁰ You may not be well prepared to deal with the interpersonal dynamics or your own emotional responses, and there will be little support to help you cope.^{21,22} See #4 above on stress, burnout, and suicide.
10. Major transitions are particularly difficult and stressful with little support or guidance to help you navigate those turbulent waters.²³ These include moving onto clerkship, becoming a resident, and starting independent practice. Failing exams and rotations with the ensuing remediation and additional assessment can be debilitating. See #4 above on stress, burnout, and suicide.
11. You may take the brunt of undeserved abuse, harassment, and intimidation from faculty, physicians, peers and other healthcare professionals, patients, and/or caregivers. You may not get an apology. You may experience or witness racism, sexism, heteronormativity, and other forms of discrimination. As a result, you may experience moral distress, and there are few places to turn to help sort this all out since you will be at the bottom of a steep hierarchy. When you fail to meet someone's expectations, you may be called un-professional, and these comments might be written on your personnel file. See #4 above on stress, burnout, and suicide.
12. Your time in training may coincide with a period when you want to start a family.
 - a. Despite your wishes, you may feel pressured or be given unsolicited advice by faculty, physicians, peers, or colleagues to wait to have a family due to the demanding course load, long work hours and unpredictability of medicine.²⁴⁻²⁹ If you do have a family during training, you may face discrimination, and your decisions and dedication to medicine may be openly questioned by professors, preceptors, and supervisors.^{25,30}
 - b. You may find you are faced with fertility concerns or pregnancy complications, as available data suggests female physicians experience infertility and pregnancy complications at higher rates than the general population (one in four and one in eight respectively).^{26,27,31,32}
 - c. If you become pregnant during training, policies to protect and support your prenatal treatment may not exist. You will continue to work long hours, be required to work overnight call shifts until far along in your pregnancy, and will often go without adequate food, hydration, or sleep. As a pregnant trainee, your supervisors are not likely to give you the same treatment or understanding they would extend to a pregnant patient, including if you have complications or concerns arise during your pregnancy.^{26,27,33,34}
 - d. Should you choose to take parental leave, you may receive negative comments about your time away from medicine from people in leadership positions. Returning from parental leave may have its own set of challenges, as you might experience long and unpredictable work hours, sleep deprivation, difficulty finding time to study and feel guilty for being away from family.³⁴

- e. If you choose to breastfeed, you may not reach breastfeeding goals due to unaccommodating workplaces, insufficient time to express milk, lack of appropriate space to pump and store breast milk, lack of workplace breastfeeding policy and inadequate support from supervisors.³⁵
 - f. When you have a family, you may have difficulty finding childcare that is able to meet the needs of your medical schedule (including long hours, overnight call, weekends, etc.) and you will likely miss out on key events in your children's lives. You may be discouraged from pursuing a specialty you love, be passed over for leadership positions or face discrimination simply because you are a parent.^{25,36,37}
 - g. It may be helpful for you to share this document and information with your friends and family as a means of informing them of the impacts of medical training.
13. Medical schools will ask you to engage in self-care²³ even though it will be challenging to find the time or energy due to your all-consuming efforts to absorb the curricular content, the long workdays, and many call shifts.
- a. You will likely be told what types of self-care you should engage in even if you do not find them helpful. Your self-care choices may be criticized based on what others think you need rather than what you know you need, thus reducing your autonomy and agency and putting further pressure on your overall well-being.³⁸
 - b. Unfortunately, sleep deprivation seems to be enabled and encouraged in medical education through the not so hidden curriculum.³⁹⁻⁴²
 - c. You may exercise less. This will reduce your physical and mental health, make it harder to learn, and affect your activities of daily life.^{43,44}
 - d. You will also have less time to prepare (and eat) nutritious foods. You may eat more prepared foods (on the run) and eat out more often.
 - e. You will have less time to spend in parks and open, natural spaces.
 - f. Many of your previous relationships will wither, and some eventually die.⁴⁵
 - g. Medical schools may mandate self-care strategies with assignments, grades, and formal and informal expectations, making them a source of stress rather than the balm they are supposed to be.
14. Some people may tell you that you will get used to all this and that it will make you stronger. They have succumbed to a cognitive bias where they do not remember what it felt like for them and their classmates when they were in medical school. Some of your professors, preceptors, and supervisors may also tell you that they made it and turned out fine, and so you will too. This "assurance" normalizes the experience and even excuses it. People do not get used to poor nutrition or lack of sleep, lack of control, or a broken system. These make us weaker. You and your peers will put on a brave face and complain less so it might seem everyone is getting used to it. If it seems that you are getting used to it (you are not—it just appears that way), then no action is needed. Problem solved. See #4 above on stress, burnout, and suicide.
15. You may reach a point at which you cannot keep yourself well and you may need to seek services or treatment. Any attitudes or beliefs equating your health status with your self-worth, value, or ability to help others will serve to decrease the likelihood of you seeking help as you avoid the patient role and prioritize the needs of others over your own. We sincerely hope you will reach out for help if you need it, but you may experience stigma for doing so, especially for mental health concerns.⁴⁶ See #4 above on stress, burnout, and suicide.
- Please sign below to indicate that you understand the many benefits that may accrue to you and the risks you will be taking in stepping into medical school and beginning your career in medicine.
- Student Signature:** _____
- Date:** _____
- Medical Faculty Member Signature:** _____
- Date:** _____

Conclusion

We firmly believe that medical students need to be well informed of the risks and benefits of a medical education and career. All workers have the right to know the hazards of the job they are being asked to do. However, we do not expect and do not want the leaders of the medical schools to ask students or applicants to sign a consent form of this nature. We wrote this piece of satire for those who can and should render such a consent form obsolete. To do less is an abdication and repudiation of our professional responsibility.

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References

- Canadian Medical Association. *CMA code of ethics and professionalism*. Available at https://policybase.cma.ca/en/permalink/policy13937#_ga=2.83777748.391414900.1626202876-29424022.1626202876 [Accessed Jul 10, 2021].
- D'Eon M. Is medical education hazardous to your health? *Can Med Ed J*. 2014;5(1), e1-e4. <https://doi.org/10.36834/cmej.36738>
- Bligh J. Problem-based, small group learning. *BMJ*. 1995;311:342-343. <https://doi.org/10.1136/bmj.311.7001.342>
- Government of Saskatchewan. Safety in the workplace: approved standards and practices | Available at <https://www.saskatchewan.ca/business/safety-in-the-workplace/approved-standards-and-practices>. [Accessed on Jul 15, 2021].
- Sletta C, Tyssen R, Løvseth LT. Change in subjective well-being over 20 years at two Norwegian medical schools and factors linked to well-being today: a survey. *BMC med ed*. 2019 Dec;19(1):1-2. <https://doi.org/10.1186/s12909-019-1476-3>
- Rotenstein LS, Ramos MA, Torre M, et al. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: a systematic review and meta-analysis. *Jama*. 2016 Dec 6;316(21):2214-36. <https://doi.org/10.1001/jama.2016.17324>
- Dyrbye L, Shanafelt T. A narrative review on burnout experienced by medical students and residents. *Med ed*. 2016 Jan;50(1):132-49. <https://doi.org/10.1111/medu.12927>
- Erschens R, Keifenheim KE, Herrmann-Werner A, et al. Professional burnout among medical students: systematic literature review and meta-analysis. *Med Teach*. 2019 Feb 1;41(2):172-83. <https://doi.org/10.1080/0142159X.2018.1457213>
- Blacker CJ, Lewis CP, Swintak CC, Bostwick JM, Rackley SJ. Medical student suicide rates: a systematic review of the historical and international literature. *Acad Med*. 2019 Feb 1;94(2):274-80. <https://doi.org/10.1097/ACM.0000000000002430>
- Arnetz BB. Psychosocial challenges facing physicians of today. *Soc Sci Med*. 2001; 52(2), 203-213. [https://doi.org/10.1016/S0277-9536\(00\)00220-3](https://doi.org/10.1016/S0277-9536(00)00220-3)
- Wallace JE, Lemaire JB, Ghali WA. Physician wellness: a missing quality indicator. *The Lancet*. 2009; 374(9702), 1714-1721. [https://doi.org/10.1016/S0140-6736\(09\)61424-0](https://doi.org/10.1016/S0140-6736(09)61424-0)
- Yung E, Lagacé F, Zhong YJ, Tabry V, Sarkis B, Sun-Drapeau L, Jin S. *CFMS position paper on responding to medical student suicide*. In Proceedings of the 2018 CFMS Annual General Meeting. Ottawa: Canadian Federation of Medical Students (CFMS). 2018; pp21-23.
- Slavin S. Reflections on a decade leading a medical student well-being initiative. *Acad Med*. 2019 Jun 1;94(6):771-4 <https://doi.org/10.1097/ACM.0000000000002540>
- Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: causes, consequences, and proposed solutions. In Mayo Clinic Proceedings 2005 Dec 1;80.12: pp1613-1622. <https://doi.org/10.4065/80.12.1613>
- Slavin SJ, Schindler DL, Chibnall JT. Medical student mental health 3.0: improving student wellness through curricular changes. *Acad Med*. 2014 Apr;89(4):573. <https://doi.org/10.1097/ACM.000000000000166>
- Pell G, Fuller R, Homer M, Roberts T. Is short-term remediation after OSCE failure sustained? A retrospective analysis of the longitudinal attainment of underperforming students in OSCE assessments. *Med Teach*. 2012 Feb 1;34(2):146-50. <https://doi.org/10.3109/0142159X.2012.643262>
- Ellaway RH, Chou CL, Kalet AL. Situating remediation: accommodating success and failure in medical education systems. *Acad Med*. 2018 Mar 1;93(3):391-8. <https://doi.org/10.1097/ACM.0000000000001855>
- Chia TI, Oyeniran OI, Ajagbe AO, Onigbinde OA, Oraebosi MI. The symptoms and stress experienced by medical students in anatomy dissection halls. *J Taibah Uni Medical Sci*. 2020 Feb;15(1):8. <https://doi.org/10.1016/j.jtumed.2020.01.001>
- Klender SM. Fear of death, dissection avoidance behaviors, and performance in gross anatomy courses with cadaveric dissection. In Doctoral dissertation, The University of Mississippi Medical Center. 2020.
- Kwok S, Ostermeyer B, Coverdale J. A systematic review of the prevalence of patient assaults against residents. *JGME*. 2012 Sep;4(3):296. <https://doi.org/10.4300/JGME-D-11-00184.1>
- Benbassat J. Changes in wellbeing and professional values among medical undergraduate students: a narrative review of the literature. *Adv Health Sci Ed*. Oct 1 2014;19(4):597-610. <https://doi.org/10.1007/s10459-014-9500-1>
- Kemp S, Hu W, Bishop J et al. Medical student wellbeing-a consensus statement from Australia and New Zealand. *BMC med ed*. 2019 Dec;19(1):69. <https://doi.org/10.1186/s12909-019-1505-2>
- Radcliffe C, Lester H. Perceived stress during undergraduate medical training: a qualitative study. *Med Ed*. 2003;37(1), 32-38. <https://doi.org/10.1046/j.1365-2923.2003.01405.x>
- Cusimano MC, Baxter NN, Sutradhar R, et al. Delay of pregnancy among physicians vs nonphysicians. *JAMA Intern Med* 2021;181:905-12. <https://doi.org/10.1001/jamainternmed.2021.1635>

25. Adesoye T, Mangurian C, Choo EK, et al. Physician moms group study group. Perceived discrimination experienced by physician mothers and desired workplace changes: a cross-sectional survey. *JAMA Intern Med* 2017;177:1033–6. <https://doi.org/10.1001/jamainternmed.2017.1394>
26. Rangel EL, Castillo-Angeles M, Easter SR, et al. Incidence of infertility and pregnancy complications in US female surgeons. *JAMA Surg.* 2021;156(10):905–915. <https://doi.org/10.1001/jamasurg.2021.3301>
27. Stentz NC, Griffith KA, Perkins E, et al. Fertility and childbearing among American female physicians. *J Womens Health.* 2016;25:1059–65. <https://doi.org/10.1089/jwh.2015.5638>
28. Bering J, Pflibsen L, Eno C, et al. Deferred personal life decisions of women physicians. *J Womens Health.* 2018;27:584–9. <https://doi.org/10.1089/jwh.2016.6315>
29. Cusimano MCBN, Sutradhar R, Ray J, et al. Reproductive patterns, pregnancy outcomes and parental leave practices of women physicians in Ontario, Canada: the Dr. Mom cohort study protocol. *BMJ Open* 2020;10:e041281. <https://doi.org/10.1136/bmjopen-2020-041281>
30. Mills G, Ruzyski SM, JeSabourin J, Dance E. Experiences of breastfeeding among women residents in Alberta: a cross-sectional survey. *Postgrad Med.* Sept 20,2020; 133:1, 42-47. <https://doi.org/10.1080/00325481.2020.1814581>
31. Györfy Z, Dweik D, Girasek E. Reproductive health and burn-out among female physicians: nationwide, representative study from Hungary. National Library of Medicine. *BMC women's health.* Oct 2, 2014; 14:121. <https://doi.org/10.1186/1472-6874-14-121>
32. Kaye EC. One in four - the importance of comprehensive fertility benefits for the medical workforce. *N Engl J Med.* Apr 16, 2020;382(16):1491-1493. <https://doi.org/10.1056/NEJMp1915331>
33. Mohan H, Ali O, Gokani V, et al. Surgical trainees' experience of pregnancy, maternity and paternity leave: a cross-sectional study. *Postgrad Med J.* 2019;95:552-557. <https://doi.org/10.1136/postgradmedj-2018-135952>
34. Willoughby KA, Yaworski MJ, Zendel BR, Curran V. National survey of the transition back to Canadian residency programs after parental leave. *CMEJ.* 2020; 11(5), e16-e30; <https://doi.org/10.36834/cmej.68486>.
35. Melnitchouk N, Scully RE, Davids JS. Barriers to breastfeeding for US physicians who are mothers. *JAMA Intern Med.* 2018;178(8):1130–1132. <https://doi.org/10.1001/jamainternmed.2018.0320>
36. Giantini Larsen AM, Pories S, Parangi S, et al. Barriers to pursuing a career in surgery: an institutional survey of Harvard Medical School students. *Ann Surg* 2021;273:1120–6. <https://doi.org/10.1097/SLA.0000000000003618>
37. Halley MC, Rustagi AS, Torres JS, et al. Physician mothers' experience of workplace discrimination: a qualitative analysis. *BMJ* 2018;363:k4926. <https://doi.org/10.1136/bmj.k4926>
38. Schiller JH, Stansfield RB, Belmonte DC, et al. Medical students' use of different coping strategies and relationship with academic performance in preclinical and clinical years. *Teach Learn Med.* 2018 Jan 2;30(1):15-21. <https://doi.org/10.1080/10401334.2017.1347046>
39. Jahrami H, Dewald-Kaufmann J, AlAnsari AM, Taha M, Al Ansari N. Prevalence of sleep problems among medical students: a systematic review and meta-analysis. *J Public Health.* 2019 Apr 1:1-8.
40. Abdulghani HM, Alrowais NA, Bin-Saad NS et al. Sleep disorder among medical students: relationship to their academic performance. *Med Teach.* 2012, 34 Suppl 1. S37-41. <https://doi.org/10.3109/0142159X.2012.656749>.
41. Soomi L. Naturally occurring consecutive sleep loss and day-to-day trajectories of affective and physical well-being. *Ann Behav Med.* 2021; <https://doi.org/10.1093/abm/kaab055>
42. D'Eon MF. Enabling and encouraging sleep deprivation among medical students. *Can Med Ed J.* 2020 Mar;11(1):e1. <https://doi.org/10.36834/cmej.69918>
43. Dyrbye LN, Satele D, Shanafelt TD. Healthy exercise habits are associated with lower risk of burnout and higher quality of life among US medical students. *Acad Med.* 2017 Jul 1;92(7):1006-11. <https://doi.org/10.1097/ACM.0000000000001540>
44. Stathopoulou G, Powers MB, Berry AC, Smits JA, Otto MW. Exercise interventions for mental health: a quantitative and qualitative review. *Clin Psychol.* 2006 May;13(2):179-93. <https://doi.org/10.1111/j.1468-2850.2006.00021.x>
45. Landau C, Hall S, Wartman SA, Macko MB. Stress in social and family relationships during the medical residency. *J Med Ed.* 1986;61.8: 654-660. <https://doi.org/10.1097/00001888-198608000-00004>
46. Tillett R. The patient within-psychopathology in the helping professions. *Adv Psychiatr Treat.* 2003; 9(4):272-279. <https://doi.org/10.1192/apt.9.4.272>
47. Wikipedia contributors. Outcome bias. *Wikipedia, The Free Encyclopedia.* Dec 5, 2020. Available at: https://en.wikipedia.org/w/index.php?title=Outcome_bias&oldid=992511968. [Accessed Jul 15, 2021].