# History repeating

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As the world moves toward mass vaccination against SARS-CoV-2 in 2021, many unanswered questions remain. Will vaccine administration be mandatory? Will proof of vaccination be required to attend gatherings such as sporting or entertainment events? Will the unvaccinated be allowed to travel? Will life insurance be more costly if an individual refuses the COVID-19 vaccine? And so many more.

In my previous editorial I talked about my postvaccination DNA being altered and making friends with my injected microchip. This tongue-in-cheek discussion of some of the conspiracy theories regarding vaccination against the coronavirus downplays the real fear some individuals have about being immunized. Many think the vaccine was rushed into production and is not safe. Significant numbers of vaccine refusals are likely as people worry about potential adverse health outcomes. Conspiracy theorists have had a field day, and some are staunchly against vaccination as they falsely claim the vaccine was made from aborted fetal tissue. I have even heard of some groups fearing the vaccine will mark you with the sign of the beast (devil), which is based on a biblical chapter in Revelation. These fears, which seem ridiculous to most, are very real to some.

One night, while thinking about all of this, I was unconsciously rubbing my left deltoid when my fingers rubbed against my smallpox scar. Until 1970, babies were routinely immunized against smallpox, leaving us oldies with a mark either on the outside or inside of our upper arms. I wonder if some lessons about mass vaccination might be found in the history of this other terrible virus.

It is estimated that roughly 300 million people died from smallpox in the 20th century. Its case fatality rate was estimated at around 30%. Contrast that to the COVID-19 mortality rate of around 2% with a current death toll of 2.5 million.

In 1796, British physician Edward Jenner noted that milkmaids who had contracted the milder bovine variant (cowpox) did not become ill with smallpox. He grabbed his gardener's 8-year-old son and scratched his upper arm with the contents of a cowpox blister from a milkmaid. A few months later he repeatedly scratched the boy's arm with contents from smallpox blisters and the boy never contracted the disease. As an aside, I do not think this study would receive ethics approval in 2021. Regardless, this groundbreaking work (which was initially rejected by the Royal Society of Physicians) led to the development of a vaccine.

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Opposition to smallpox vaccination existed almost as soon as the vaccine was developed. Rationale for this criticism varied and included sanitary, religious, scientific, and political reasons. Some objectors and clergy thought the vaccine was un-Christian because it came from an animal. Some distrusted medicine in general and thought that smallpox was not an infection but that it came from decaying matter in the atmosphere. Some individuals were against vaccination because they thought it violated their personal liberty. Many governments started mandatory smallpox vaccination programs, which just added to the tension.

In Leicester, England, three individuals were jailed for refusing to be vaccinated and this same town had a demonstration march in 1885 with up to 100 000 individuals protesting mandatory vaccination.

Regardless, as the 20th century progressed, a general acceptance of vaccination against smallpox took hold. In North America, the smallpox immunization program was stopped around 1970 as the final recorded case on the continent occurred in 1949. The last known naturally acquired case of smallpox on the planet occurred in 1977 in Somalia. The last death from smallpox occurred in 1978, when a medical photographer working above a research lab in England contracted the disease. Currently, smallpox can be found only in the CDC lab in Atlanta and the State Research Lab in Russia.

I would like to believe that we have learned our historical lesson and that COVID-19 vaccination will go smoothly with general acceptance and wide public uptake, but sadly, history does tend to repeat itself. On that point, let us remember what happened to smallpox—it was eradicated largely due to widespread distribution and uptake of the vaccine. Is it too early to dream of the same outcome for SARS-CoV-2? ■

**—David R. Richardson, MD**

# The gender pay gap in medicine

Gender pay gaps continue to exist in a multitude of professions, and medicine is not immune, as highlighted by a recent *CMAJ* article by Drs Cohen and Kiran.[1] As a female physician and a new mother, I am particularly interested and intrigued in this topic. How can I explain to women who enter medicine in the future that they may be paid less despite doing the same work as men, solely because of their gender? The complexity of this issue and the solutions to it cannot be thoroughly discussed in a few short paragraphs, but I hope to encourage increased awareness and conversations on this topic.

More women are entering medicine than ever before. The entering class of UBC Medicine in 2016 was 53.8% women.[2] Despite this, implicit gender-based biases still existed throughout my medical school and residency training. I can't count the number of times I have been mistaken for a nurse while the male colleague is assumed to be the doctor. Or how many times I have heard offhand comments about a female colleague who had to miss a day of work to take care of a sick child. Achieving a work-life balance is difficult, so it is not difficult to understand why female physicians may be drawn to certain specialties. Ultimately, we are all free to choose which specialty we pursue, but the gender pay gap is not explained only by the fact that female physicians may be more drawn to lower-paying specialties. The pay gap exists in higher-paying specialties as well.[1]

Neither can the gender pay gap be explained by the fact that women work fewer hours than men. This has been backed by studies where, despite adjusting for confounders such as the number of hours worked, age, or years in practice, male physicians still consistently earned more than female physicians.[3,4] A 2017 study in BC showed that female GPs made 36% less than male GPs, even though they worked only 3.2 fewer hours per week compared to male GPs.[5] Others have attributed the pay gap issue to female physicians spending more time with patients in general; therefore, in a fee-for-service model, they may be paid less than their male colleagues overall. But the pay gap exists in other payment models as well, such as in the UK where physicians are salaried.[6]

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Current parental leave policies also make it difficult for women taking maternity leave to keep up with office expenses or career advancements, again contributing to the gender pay gap. Women may also spend more time caring for their children or doing household chores, leading to less time for clinical duties. Programs should be put in place to encourage male physicians to take paternity leave as well; the Doctors of BC Parental Leave Program is open to both male and female physicians, but more can still be done.

Solutions to close the gender pay gap are complex. It will require change at many levels. There are several suggestions by Drs Cohen and Kiran, at both the individual and system level, such as advocating for pay transparency, improving parental leave programs, and encouraging women to take on leadership roles in medicine. I have had many mentors who have shown me that there is nothing too great to achieve, but it starts with listening and perseverance. As more doors open for women in medicine, we should all strive for true equality.

Ultimately, the question we should each be asking ourselves is not whether a gender pay gap exists in medicine, but what can I do to help close it? ■

**—Yvonne Sin, MD**


**References**

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