

## Journal Pre-proof

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PII: S0008-4182(22)00214-9  
DOI: <https://doi.org/10.1016/j.jcjo.2022.06.022>  
Reference: JCJO 2386



To appear in: *Canadian Journal of Ophthalmology/Journal canadien d'ophtalmologie*

Received date: 8 September 2021  
Revised date: 20 May 2022  
Accepted date: 28 June 2022

Please cite this article as: Zina Fathalla , Emaan Chaudry , Mino Aminnejad , Forough Farrokhyar , Danah Albreiki , The effects of the COVID-19 lockdown on Canadian ophthalmologists: A survey, *Canadian Journal of Ophthalmology/Journal canadien d'ophtalmologie* (2022), doi: <https://doi.org/10.1016/j.jcjo.2022.06.022>

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**The effects of the COVID-19 lockdown on Canadian ophthalmologists: A survey****Authors:**

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Many healthcare fields, including ophthalmology, were not equipped to manage the logistical, emotional, and mental stresses of the COVID-19 pandemic<sup>1</sup>. Ophthalmologists were required to rapidly adapt to virtual healthcare delivery; a less efficient way of practice for such a procedure-based specialty. Moreover, a decrease in patient encounters caused financial setbacks for many ophthalmologists. The true impact of the pandemic at both a professional and personal level on Canadian ophthalmologists is unknown.<sup>2</sup> Consequently, this study investigates the experiences of Canadian ophthalmologists during the pandemic. Understanding these challenges will provide guidance for physicians when traditional services are limited.

A web-based survey was emailed to all members of the Canadian Ophthalmological Society on November 3rd and 17th, 2020. Survey questions targeted the months of March to July 2020 to capture a specific period when ophthalmologists were first adjusting to new COVID-19 health guidelines and restrictions. Responses were collected until December 31<sup>st</sup>, 2020. This study was approved by The Ottawa Health Science Network Research Ethics Board.

164 responses were collected (14.5% response rate). Demographic and professional characteristics of respondents are displayed in **Table 1**. Of note, we also performed a subgroup analysis and found no significant differences between subspecialists (Appendix A). Our study results revealed many ophthalmologists (83.5%) experienced a reduction in workload which negatively impacts patient health outcomes.<sup>1</sup> This unfortunate reality of delayed care highlights the need for well-established telehealth and infection protocols to allow continued healthcare delivery. Ophthalmologists' decreased workload was also reflected in changes in income across all subspecialties, with 77.4% reporting a 50 to 100

percent decrease, while only 7.3% saw no decrease. These financial cuts were an additional stressor to practitioners during these unprecedented times<sup>2</sup>.

Due to the pandemic, many ophthalmologists (59.7%) shifted to practicing telemedicine at least a quarter of the time, however, only 4.8% reported their experience using telemedicine as “excellent” and 18.5% reported it as “good”. With varied experiences, it is unclear if ophthalmologists will continue to use telemedicine post-pandemic. Participants were split, 33.4% reporting that they would, 42.4% reporting that they would not, and 18.6% of participants were unsure. Regardless of ophthalmologist preference, it is likely that this technology will play a role in some practices and will require well developed infrastructure to do so<sup>4</sup>.

There were a wide range of personal and psychological impacts of COVID-19 on Canadian ophthalmologists. Although 69.5% of ophthalmologists reported having more free time during March-July 2020, 28% and 37.8% reported having “much higher” or “higher” stress levels, respectively. One comment highlighted a few of the pertinent stressors at the time: “Multiple sources of stress...covid protocols, office issues, poor remuneration, no holiday time, telephone care of patients, etc.” (see Appendix B for additional comments that represent the mixed feelings ophthalmologists had towards the pandemic). Given that practitioner wellbeing directly affects patient care, this is a worrisome finding<sup>5</sup>. It is, therefore, important for strong employee wellness programs to prevent and mitigate burn out, including but not limited to promoting a healthy work environment, discussion groups, and mindfulness training<sup>5</sup>.

Our study had a relatively low response rate, likely because participation was voluntary. Moreover, survey studies, especially those distributed digitally, are prone to sampling biases<sup>6</sup>. Nevertheless, it has been argued that the representativeness of the population may be more important than the response rate<sup>7</sup>. Our study participants are representative of Canadian ophthalmologists, ie. mainly from Ontario (39.6%), working in private practice (66%), and in urban-suburban areas (82%).

This is the first study that looks at the impacts of COVID-19 on Canadian ophthalmologists both professionally and personally. It identifies challenges and areas of improvement and serves as a meaningful learning opportunity for all physicians.

Table 1. Descriptive statistics for all survey questions

Demographic questions	N (%)	Missing (%)
<b>What is your age?</b>  Less than 30 years 30 to 39 years 40 to 49 years 50 to 59 years 60 years or older	6 (3.7) 29 (17.7) 24 (14.6) 43 (26.2) 58 (35.4)	
<b>What is your gender?</b>  Female Male	62 (37.8) 95 (57.9)	
<b>In what province(s) or territory do you work?</b>  Ontario British Columbia Quebec Alberta Nova Scotia Manitoba New Brunswick Prince Edward Island Saskatchewan Yukon Newfoundland and Labrador Northwest Territory	65 (39.6) 30 (18.3) 20 (12.2) 17 (10.4) 12 (7.3) 6 (3.7) 5 (3) 3 (1.8) 2 (1.2) 2 (1.2) 1 (0.6) 1 (0.6)	
<b>Where do you practice?</b>  Urban- Suburban Rural- Town Prefer not to say	135 (82.3) 23 (14) 6 (3.7)	
<b>Which level of practice are you currently in?</b>  Attending Physician Residency Fellowship	150 (91.5) 10 (6.1) 4 (2.4)	

<p><b>What type of clinical setting do you practice/work in?</b></p> <p>Private Practice Academic Hospital Hospital Clinic Community Health Centre Other</p>	<p>108 (65.9) 45 (27.4) 6 (3.7) 2 (1.2) 3 (1.8)</p>	
<p><b>Which subspecialty are you practicing or currently training in?</b></p> <p>General Anterior Segment Cornea Glaucoma Medical Retina Vitreoretinal Surgery Neuro- Ophthalmology Ocular Oncology Oculoplastic Pediatric Ophthalmology Refractive Surgery Strabismus Uveitis</p>	<p>93 (56.7) 28 (17.1) 18 (11) 37 (22.6) 21 (12.8) 11 (6.7) 15 (9.1) 1 (0.6) 21 (12.8) 10 (6.1) 9 (5.5) 7 (4.3) 15 (9.1)</p>	
<p><b>Professional Impacts of COVID-19 questions</b></p>		
<p><b>Which of the following options best reflects your current situation with COVID-19?</b></p> <p>Asymptomatic and no COVID-19 testing done. Asymptomatic and tested negative for COVID-19. Asymptomatic but was in contact with patient with COVID-19. Did not get tested. Asymptomatic but was in contact with patient with COVID-19. Tested negative for COVID-19. Asymptomatic but was in contact with patient with COVID-19. Tested positive for COVID-19. Nonspecific cold or GI symptoms but did not get tested. Symptomatic and tested positive for COVID-19, almost or completely recovered Symptomatic and tested positive for COVID-19, and still experiencing moderate to severe health problems from the virus.</p>	<p>102 (62.2) 37 (22.6) 5 (3) 7 (4.3) 0 (0) 1 (0.6) 2 (1.2) 2 (1.2)</p>	<p>8 (4.9)</p>

<p><b>How did you practice ophthalmology during the March-July 2020 period of the COVID-19 pandemic?</b></p> <p>Not currently practicing/unemployed  Practicing from home (ex. Telemedicine, Video conferencing patients)  Working in clinic setting part-time (ex. Emergency cases only)  Working in clinic setting full-time</p>	<p>6 (3.7)  38 (23.2)  115 (70.1)  48 (29.3)</p>	
<p><b>How did your workload change during the March-July period of the COVID-19 restrictions?</b></p> <p>Decreased  Increased  Stayed the same</p>	<p>137 (83.5)  11 (6.7)  8 (4.9)</p>	8 (4.9)
<p><b>What percentage of your monthly income dropped during March-July 2020 due to COVID-19 restrictions?</b></p> <p>0  20  50  75  100</p>	<p>12  (7.3)  17 (10.4)  51 (31.1)  68 (38.4)  13 (7.9)</p>	8 (4.9)
<p><b>What percentage of your work was telemedicine versus face-to-face clinical practice during March-July 2020?</b></p> <p>Telemedicine 0 of the time  Telemedicine 25 of the time  Telemedicine 50 of the time  Telemedicine 70 of the time  Telemedicine 100 of the time</p>	<p>58 (35.4)  53 (32.3)  17 (10.4)  25 (15.2)  3 (1.8)</p>	8 (4.9)
<p><b>If you practiced ophthalmology using telemedicine during the COVID-19 pandemic, how has your experience been while using telemedicine?</b></p> <p>Excellent  Good  Natural  Poor  Very Poor  N/A</p>	<p>6 (4.8)  23 (18.5)  47 (37.9)  30 (24.2)  10 (8.2)  40</p>	8 (6.4)

<p><b>Do you envision yourself continuing to practice telemedicine beyond the COVID-19 pandemic?</b></p> <p>Yes No I do not know N/A</p>	<p>48 (33.4) 61 (42.4) 27 (18.6) 20</p>	<p>8 (5.6)</p>
<p><b>In your experience, how did the COVID 19 pandemic impact the Canadian ophthalmology community?</b></p> <p>Brough it closer than before Distanced the community apart Stayed the same</p>	<p>54 (32.9) 43 (26.2) 59 (36)</p>	<p>8 (4.9)</p>
<p><b>Personal Impacts of COVID-19 questions</b></p>		
<p><b>Including yourself, how many individuals lived in your residence from March-July 2020?</b></p> <p>0 1 2 3 4 4-5 5 6 7</p>	<p>2 (1.2) 18 (11) 43 (26.2) 26 (15.9) 38 (23.2) 1 (0.6) 12 (7.3) 8 (4.9) 3 (1.8)</p>	<p>13 (7.9)</p>
<p><b>From March-July 2020, who was living in your residence?</b></p> <p>Children Spouse Parent Sibling In- law Roommate Live alone Prefer not to disclose</p>	<p>89 (54.3) 129 (78.7) 5 (3) 4 (2.4) 3 (1.8) 4 (2.4) 13 (7.9) 5 (3)</p>	

<p><b>During the COVID-19 restrictions from March-July, how much free time did you feel you had compared to before the pandemic?</b></p> <p>More Less Same</p>	<p>114 (69.5) 24 (14.6) 16 (9.8)</p>	<p>10 (6.1)</p>
<p><b>How would you rate your stress levels during March-July 2020 as compared to before the pandemic?</b></p> <p>Much higher Higher No change Lower Much lower</p>	<p>46 (28) 62 (37.8) 23 (14) 18 (11) 5 (3)</p>	<p>10 (6.1)</p>
<p><b>How would you rate your overall mental health from March-July?</b></p> <p>Excellent Very good Fair Poor Very poor</p>	<p>18 (11) 62 (37.8) 58 (35.4) 15 (9.1) 1 (0.6)</p>	<p>10 (6.1)</p>
<p><b>How has COVID-19 affected your personal relationships?</b></p> <p>Mostly positively affected my relationships Mostly negatively affected my relationships no change</p>	<p>50 (30.5) 25 (15.2) 79 (48.2)</p>	<p>10 (6.1)</p>
<p><b>Did you engage in physical activity from March-July?</b></p> <p>Always Very often Sometimes Rarely Never</p>	<p>41 (25) 55 (33.5) 34 (20.7) 20 (12.2) 4 (2.4)</p>	<p>10 (6.1)</p>



The Pandemic changed me in the following sense?		
Made me more patient	34 (20.7)	
Made me more creative	41 (25)	
Made me more depressed/stressed	66 (40.2)	
Made me see life in a whole new way	66 (40.2)	
Made me appreciative and grateful	93 (56.7)	

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## Appendix A:

Table 1. Subgroup analysis to see how different subspecialists within ophthalmology have answered the questions #9-14.

Subspecialists within Ophthalmology							
	General (N=93)	Anterior Segment (N=28)	Cornea (N=18)	Glaucoma (N=37)	Medical Retina (N=21)	Vitreoretin al surgery (N=11)	Neuro ophthalmolog y (N=15)
<b>How did you practice ophthalmology during the March-July 2020 period of the COVID-19 pandemic?</b>							
<ul style="list-style-type: none"> <li>Not currently practicing/unemployed</li> <li>Practicing from home</li> <li>Working in clinic setting part-time</li> <li>Working in clinic setting full-time</li> </ul>	4 (4.3) 23 (24.7) 73 (78.5) 22 (23.7)	3 (10.7) 8 (28.6) 20 (71.4) 8 (28.6)	1 (5.6) 4 (22.2) 14 (77.8) 4 (22.2)	3 (8.1) 11 (29.7) 26 (70.3) 9 (24.3)	0 (0.0) 3 (14.3) 14 (66.7) 8 (38.1)	0 (0.0) 0 (0.0) 1 (9.1) 8 (72.7)	1 (16.7) 6 (40.0) 11 (73.3) 2 (13.3)
<b>How did your workload change during the March-July period of the COVID-19 restrictions?</b>							
<ul style="list-style-type: none"> <li>Decreased</li> <li>Increased</li> <li>Stayed at home</li> </ul>	83 (93.3) 3 (3.4) 3 (3.4)	23 (82.1) 2 (7.1) 3 (10.7)	17 (94.4) 0 (0.0) 1 (5.6)	32 (88.9) 2 (5.6) 2 (5.6)	18 (90.0) 1 (5.0) 1 (5.0)	9 (100) 0 (0.0) 0(0.0)	12 (85.7) 2 (14.3) 0 (0.0)
<b>What percentage of your monthly income dropped during March-July 2020 due to COVID-19 restrictions:</b>							
<ul style="list-style-type: none"> <li>0</li> <li>20</li> <li>50</li> <li>75</li> <li>100</li> </ul>	10 (11.2) 10 (11.2) 24 (27.0) 37 (41.6) 8 (9.0)	1 (3.6) 5 (17.9) 8 (28.6) 10 (35.7) 4 (14.3)	2 (11.1) 3 (16.7) 6 (33.3) 6 (33.3) 1 (5.6)	3 (8.3) 3 (8.3) 11 (30.6) 17 (47.2) 2 (5.6)	1 (5.0) 2 (10.0) 10 (50.0) 6 (30.0) 1 (5.0)	1 (11.1) 1 (11.1) 4 (44.4) 3 (33.3) 0 (0.0)	1 (7.1) 3 (21.4) 4 (28.6) 5 (35.7) 1 (7.1)
<b>What percentage of your work was telemedicine versus face to face clinical practice during March-July 2020?</b>							

<ul style="list-style-type: none"> <li>• Telemedicine 0 of the time</li> <li>• Telemedicine 25 of the time</li> <li>• Telemedicine 50 of the time</li> <li>• Telemedicine 70 of the time</li> <li>• Telemedicine 100 of the time</li> </ul>	32 (36.0)	11 (39.3)	10 (55.6)	10 (27.8)	9 (45.0)	9 (100)	6 (42.9)
	33 (37.1)	5 (17.9)	3 (16.7)	11 (30.6)	6 (30.0)	0 (0.0)	2 (14.3)
	8 (9.0)	3 (10.7)	2 (11.1)	8 (22.2)	1 (5.0)	0 (0.0)	3 (21.4)
	14 (15.7)	9 (32.1)	3 (16.7)	5 (13.9)	4 (20.0)	0 (0.0)	3 (21.4)
	2 (2.2)	0 (0.0)	0 (0.0)	2 (5.6)	0 (0.0)	0 (0.0)	0 (0.0)
<b>If you practiced ophthalmology using telemedicine during the COVID-19 pandemic, how has your experience been while using telemedicine?</b>							
<ul style="list-style-type: none"> <li>• Excellent</li> <li>• Good</li> <li>• Natural</li> <li>• Poor</li> <li>• Very Poor</li> <li>• N/A</li> </ul>	3 (4.4)	2 (9.1)	1 (9.1)	1 (3.6)	0 (0.0)	0 (0.0)	0 (0.0)
	11 (15.9)	4 (18.2)	1 (9.1)	8 (28.6)	4 (30.8)	0 (0.0)	2 (16.7)
	30 (43.5)	6 (27.3)	3 (27.3)	8 (28.6)	4 (30.8)	0 (0.0)	4 (33.4)
	18 (26.0)	5 (22.7)	3 (27.3)	7 (25.0)	2 (15.4)	1 (100.0)	3 (25.0)
	7 (10.2)	5 (22.7)	3 (27.3)	4 (14.2)	3 (23.1)	0 (0.0)	3 (25.0)
	20	6	7	8	7	8	2
<b>Do you envision yourself continuing to practice telemedicine beyond the COVID-19 pandemic?</b>							
<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don't know</li> <li>• N/A</li> </ul>	25 (32.5)	12 (46.2)	4 (23.6)	13 (40.6)	9 (47.4)	1 (16.7)	6 (42.9)
	38 (49.4)	12 (46.2)	9 (52.9)	13 (40.6)	9 (47.4)	4 (66.7)	7 (50.0)
	14 (18.2)	2 (7.7)	4 (23.6)	6 (18.8)	1 (5.2)	1 (16.7)	1 (7.1)
	12	2	1	4	1	3	0

Continuation of Table 2. Subgroup analysis to see how different subspecialists within ophthalmology have answered the questions #9-14.

Subspecialists within Ophthalmology							
	Ocular oncology (N=1)	Oculoplastics (N=21)	Ophthalmic Pathology	Pediatric Ophthalmology (N=10)	Refractive Surgery (N=9)	Strabismus (N=7)	Uveitis (N=15)
<b>How did you practice ophthalmology during the March-July 2020 period of the COVID-19 pandemic?</b> <ul style="list-style-type: none"> <li>• Not currently practicing/unemployed</li> <li>• Practicing from home</li> <li>• Working in clinic setting part-time</li> <li>• Working in clinic setting full-time</li> </ul>	0 (0.0)	2 (9.5)		1 (10.0)	0 (0.0)	1 (14.3)	1 (6.7)
<b>How did your workload change during the March-July period of the COVID-19 restrictions? (Missing)</b> <ul style="list-style-type: none"> <li>• Decreased</li> <li>• Increased</li> <li>• Stayed at home</li> </ul>	1 (100)	19 (90.5)		7 (77.8)	8 (88.9)	5 (83.3)	12 (80.0)
<b>What percentage of your monthly income dropped during March-July 2020 due to COVID-19 restrictions: (Missing)</b> <ul style="list-style-type: none"> <li>• 0</li> <li>• 20</li> <li>• 50</li> <li>• 75</li> <li>• 100</li> </ul>	0 (0.0)	1 (4.8)		1 (11.1)	0 (0.0)	1 (16.7)	1 (6.7)
<b>What percentage of your work was telemedicine versus face to face clinical practice during March-July 2020?</b> <ul style="list-style-type: none"> <li>• Telemedicine 0 of the time</li> </ul>	0 (0.0)	8 (38.1)		5 (55.6)	1 (11.1)	3 (50.0)	6 (40.0)

<ul style="list-style-type: none"> <li>• Telemedicine 25 of the time</li> <li>• Telemedicine 50 of the time</li> <li>• Telemedicine 70 of the time</li> <li>• Telemedicine 100 of the time</li> </ul>	1 (100.0)	7 (33.3)		3 (33.3)	4 (44.4)	2 (33.3)	4 (26.7)
	0 (0.0)	3 (14.3)		0 (0.0)	0 (0.0)	0 (0.0)	2 (13.3)
	0 (0.0)	3 (14.3)		1 (11.1)	4 (44.4)	1 (16.7)	3 (20.0)
	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
<b>If you practiced ophthalmology using telemedicine during the COVID-19 pandemic, how has your experience been while using telemedicine? (Missing)</b>							
<ul style="list-style-type: none"> <li>• Excellent</li> <li>• Good</li> <li>• Natural</li> <li>• Poor</li> <li>• Very Poor</li> <li>• N/A</li> </ul>	0 (0.0)	2 (11.8)		0 (0.0)	2 (25.0)	0 (0.0)	2 (15.4)
	1 (100.0)	3 (17.6)		1 (14.3)	0 (0.0)	0 (0.0)	3 (23.1)
	0 (0.0)	9 (52.9)		4 (57.1)	4 (50.0)	3 (60.0)	4 (30.7)
	0 (0.0)	3 (17.7)		2 (28.6)	1 (12.5)	1 (20.0)	2 (15.4)
	0 (0.0)	0 (0.0)		0 (0.0)	1 (12.5)	1 (20.0)	2 (15.4)
	0	4		2	1	1	2
<b>Do you envision yourself continuing to practice telemedicine beyond the COVID-19 pandemic? (Missing)</b>							
<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don't know</li> <li>• N/A</li> </ul>	1 (100.0)	10 (52.6)		5 (55.6)	5 (55.6)	4 (66.7)	5 (35.7)
	0 (0.0)	7 (36.8)		4 (44.4)	3 (33.3)	2 (33.3)	5 (35.7)
	0 (0.0)	2 (10.6)		0 (0.0)	1 (11.1)	0 (0.0)	4 (28.6)
	0	2		0	0	0	1

## Appendix B:

### Participant Comments - "Professional Impacts" Section

Communication with colleagues was enhanced but the virtual meetings were very impersonal and at times disheartening.
I do not feel that Neuro-ophthalmology lends itself very well to practicing with telemedicine.
There is no substitute to face to face interaction among professionals which is paramount for professional development.
Our rounds have better attendance, but it's difficult not working with my colleagues.
With no PPE support from government, it is clear that the governments across Canada were utterly unprepared for a pandemic.

We are at serious X Roads: - develop tools for good virtual care - fees for sustainable medical ophthalmology practice - address surgical backlog issues.
I am planning to continue doing day 1 post-op checks remotely.
While I was affected greatly in March and April, May had significantly more in person visits and return to normal income.
Initially I saw only urgent cases and did phone calls. Then I began seeing elective patients and worked extra hours and days in the office until I caught up in September. Virtual conferences are not as good for meeting up with colleagues.
No conferences, no workshops etc - very difficult to meet and interact with other ophthalmology residents.
Regarding telemedicine, I used it minimally, mostly to answer questions, but an adequate assessment of my patients could not be done by telemedicine due to the inability to perform an exam.
Community closer locally; more distant between centers.
I miss the opportunity to discuss cases with colleagues in a casual way.
I feel the ophthalmology community was closer because I participated in rounds from other universities, webinars that would normally not be accessible to me and meetings where Canadian ophthalmologists met to discuss issues and problem-solve together. This feeling of togetherness is subjective and dependent on my participation in online events.
My income did not decrease because I am a resident. My salary is constant.
I am 50% private practice and 50% hospital-based practice. Having a private practice location to see patients was immensely helpful during the pandemic and remains so! Not sure what I would have done without it.
Great online virtual learning sessions and working together to brainstorm how to improve our office settings.
I believe that in most cases, telemedicine is a pro replacement for real medicine. In Toronto, multiple ophthalmologists have decided to retire, and many patients have been left without management for their glaucoma and or other chronic disorders requiring management. I have also been seeing patients with temporal arteritis and other severe problems that have been basically abandoned by their non-ophthalmological physicians. Every week I see one or two patients that would have lost their vision or their life, if I was not open, seeing them.
Found some colleagues took advantage of virtual care but did not service patients well, increasing on call burden of others, other offices closed and left their patients high and dry.

### Participant Comments - "Personal Impacts" Section

The collateral damage to the rest of medicine caused by "fear of Covid" was felt personally and professionally very profoundly.
There have been some positives, but I can't wait for it to be over!
I cycle between gratitude and stressed!
With Zoom, I've been more connected with friends, but feel that I've grown more and more distant from colleagues.
My inability to go for my daily swim (80-100 lengths of the pool) was a major negative effect for me.
We have entered a new world for new opportunities and better care - we must explore this with courage and confidence!
My stress level lowered because I was an associate and not involved with maintaining expenses of a practice. Had

I been in charge of clinic operations my stress would have been high, my mental status depressed and my marital status separated!!!
Multiple sources of stress...covid protocols, office issues, poor remuneration, no holiday time, telephone care of patients, etc.
May tip me into full retirement earlier than otherwise.
Allowed me a more balanced life myself with emphasis on physical and creative outlets to maintain a positive mental outlook, but was constantly acutely aware of the increased stressors on so many others disproportionately skewed against lower socioeconomic sectors of society and the possibility of future similar and worse global problems.
There were many positive and negative emotions felt during the pandemic. All of the above apply to me in different ways.
With respect to relationships - some were positively affected, others negatively affected. Work relations definitely negatively affected. Home relations remained excellent with partner and mother-in law who we took out of a retirement home to stay with us but relations negatively affected with son who came to stay for 4 months and may not have been following the same guidelines as the rest of us - increasing the stress level.
It was like being on sabbatical and less patients requesting/demanding our time.
I did 45 Webinars globally in March - July due to accelerated interest in learning and cancelled meetings. It was, and continues to be a new academic load that I happily carry trying to make things better globally. But it did and continues to keep me busy.
Nice time off, not overworked.