

Impact of the COVID-19 pandemic lockdown on public sector ophthalmic work by New Zealand's ophthalmologists

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ABSTRACT

AIM: In response to the COVID-19 pandemic, the New Zealand government enforced a nationwide 'alert level 4' lockdown from 26 March to 27 April 2020. We assessed the impact of this lockdown on New Zealand's public ophthalmology service.

METHOD: An anonymous online survey was sent to all New Zealand-based fellows of the Royal Australian and New Zealand College of Ophthalmologists (RANZCO) after lockdown. Respondents provided retrospective assessment of practice patterns and their personal health during the COVID-19 lockdown. This was supported by national-level administrative data, allowing survey findings to be contextualised.

RESULTS: Fifty-seven respondents (response rate 49%) working in the public health system participated. A large majority of respondents reduced elective clinic and surgical volumes by at least 75% (82% and 98%, respectively). National-level information confirmed clinic reduced to 38.2% of normal and elective operating volumes to 11.5%, with virtual visits increasing 17.9-fold. Elective clinic and elective operating volumes promptly recovered to usual volumes on the second month post lockdown. Most respondents (58%) followed the RANZCO triaging guideline, and 28% triaged emergencies only. At a personal level, respondents reported a significant physical health benefit ($p < 0.001$) associated with the lockdown experience, but no change in mental health or social wellbeing.

CONCLUSIONS: Publicly employed ophthalmologists experienced dramatic reductions to elective clinic and operating volumes during the COVID-19 lockdown. The prompt recovery of service delivery volumes back to pre-lockdown levels supports the value of a COVID-19 elimination strategy in New Zealand. Virtual visits for selected patients allowed ongoing management without risking virus transmission.

The virus SARS-CoV-2 (the cause of COVID-19) began circulating in Wuhan, China, in November 2019. It subsequently spread across the world, becoming a global pandemic. Physical distancing was the main strategy of limiting the spread of COVID-19, leading to a number of nationwide lockdowns. In April, approximately one-third of the world's population was under COVID-19 lockdown orders or similar movement restrictions.^{1,2} New Zealand adopted an evidenced-based strategy of virus elimination. After a small number of cases were identified in New Zealand, a nationwide 'alert level 4' lockdown period began

on 26 March, which eventually relaxed into a less intense alert level 3 lockdown on 28 April.³

Compared to other countries, New Zealand was fortunate to have a number of distinct advantages that favoured an elimination strategy. First, COVID-19 had a relatively late arrival to New Zealand, allowing us time to plan and learn from the experiences of countries like China, Korea, the United Kingdom, Iran and Italy; as a remote island nation with defined and monitored borders, our location enabled an effective border closure and quarantine of all returning New Zealand nationals; and, informed by

evidence-based information and supported by public trust and adherence to health and safety messages from our ‘team of five million’, the central government co-ordinated a ‘go early, go hard’ approach, which included a quick and clear national lockdown instructing the entire population to remain in their ‘bubbles’ (ie, usual family/ household). Testing increased, cases were traced and isolated, and fast and efficient contact tracing was possible.⁴

As a result, New Zealand experienced a limited COVID-19 disease burden compared to other high-income countries, such as Australia, the United Kingdom and Italy. The reduced strain on secondary health services in New Zealand is highlighted by low rates of intensive care admissions (0.7%) and mortality (1.5%) attributable to COVID-19.⁵ However, the reprioritisation of healthcare services and deferral of routine care (including procedures/surgery)⁵ to reduce virus transmission has undoubtedly led to secondary negative health impacts.³

Delays with routine ophthalmic care during COVID-19 lockdown will increase the attributable burden of preventable blindness, and has been highlighted for conditions like age-related macular degeneration (AMD).⁶ Ophthalmology practice patterns in Europe and India have highlighted a significant reduction in the elective work as a result of the COVID-19 pandemic, with a large proportion of ophthalmologists seeing only emergencies.^{7,8} International ophthalmology societies,⁹ including the Royal Australian and New Zealand College of Ophthalmologists (RANZCO),¹⁰ created triaging guidelines to help local ophthalmologists decide who needed care during lockdown.

In this paper, we present the results of a survey assessing the impact of a COVID-19 lockdown on New Zealand’s public ophthalmology service. We aimed to assess the impact by measuring the reduction in elective clinic and elective operating volumes. We also aimed to assess the personal health impact of the lockdown for New Zealand ophthalmologists.

Methods

The study survey was created in consultation with two consultant ophthalmologists

using the ESCRS survey as a scaffold for its design.⁸ The survey was shortened to eight questions to maximise the response rate, and a final question allowing free-text answers let respondents leave further comments. The survey was reviewed by a clinical psychologist prior to its distribution. The survey was sent to all New Zealand-based RANZCO fellows by their professional body (the RANZCO) on 21 May, with a second reminder six weeks later, on 2 July. At the time of the survey, there were 138 New Zealand RANZCO fellows, with 117 (87%) confirmed as working either part- or full-time in the New Zealand public sector at local district health boards (DHBs). Survey access and collection utilised a self-administered anonymous Google survey form. Survey results were converted into a Microsoft Excel spreadsheet for analysis.

The following national-level administrative data were requested from the Ministry of Health for the month of April 2019 and April 2020: clinic volumes, elective theatre volumes and clinic virtual visits (VVs). This information was received on 19 August 2020 following a request under the Official Information Act. Data for months May and June (2019 and 2020) were received on 12 April 2021.

Results

A total of 59 ophthalmologists responded to the survey, with two excluded due to working only in private (ie, no public/DHB workload). The response rate was therefore 49% (57/117), with respondents representing 12 DHBs from around New Zealand (Figure 1). The median DHB job size of respondents was 0.62 full-time equivalent (Figure 1).

Elective clinic consultations reduced substantially ($p < 0.001$) during the lockdown, with 82% of respondents seeing 75% less than their usual volume of patients (Figure 2). National-level administrative data records for the month of April indicate 2020 clinic consultation volumes were 38.2% of April 2019. Service volumes in May and June 2020 recovered to 68.9% and 107.0% respectively compared to the previous year. Clinic volumes for first specialist appointments (FSAs) experienced a more significant reduction compared to clinic follow-up appointments (Table 1).

Elective surgery essentially stopped ($p < 0.001$) during the lockdown, with 79% of respondents performing zero elective operations, and 98% performing less than 25% of their usual volume (Figure 2). National-level administrative data (which included one week of the less intense lockdown at alert level 3) confirmed elective operating reduced to 11.5% of April 2019 service volumes. The elective operating volumes in May and June 2020 recovered to 80.9% and 115.3% respectively compared to the previous year. Of interest, acute operating volumes reduced to 43.1% of usual service volumes in April. A similar pattern of recovery was demonstrated in May and June 2020, with acute operating recovering to 61.5% and 95% respectively of usual service volumes (Table 1).

VVs performed by telephone, e-mail, application and video were performed by 70% of respondents ($p < 0.001$) (Figure 3). National-level administrative data

confirmed that the volume of VVs increased by 17.9 times compared to April 2019, being 19.8% of all April 2020 clinic visits. A breakdown of VVs for 2020 showed 91.3% were classified as follow-ups, with the remainder being FSAs.

The New Zealand RANZCO triaging guidelines were reported to have been followed by 58% of respondents ($p < 0.001$). Over a quarter (28%) triaged only vision/life-threatening emergencies, and 14% using clinical judgement for triaging (ie, either they were unaware of the clinical guideline or preferred to triage differently to the guideline) (Figure 3).

For ophthalmologists, the impact of the alert level 4 lockdown appeared to have had mixed impacts across the three domains (mental, social wellbeing, physical) of health. There were no reported significant mental health ($p = 0.81$) or social wellbeing ($p = 0.69$) impacts from the COVID-19 lockdown. However, there was

Figure 1: Respondents by district health board (left); box and whisker graph of respondent workload, measured by full-time equivalent (right).

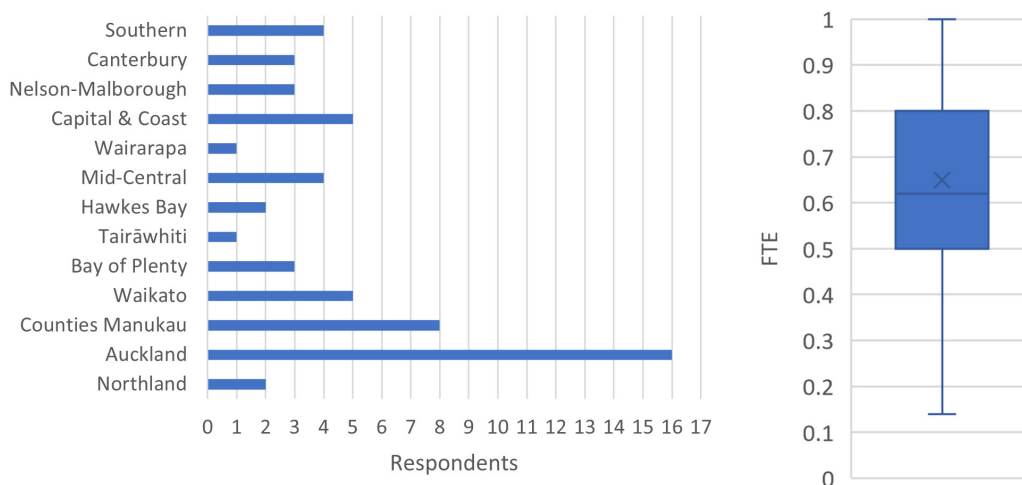


Figure 2: Percentage of elective clinic patient consultations (right) and elective surgeries performed (left) during alert level 4 lockdown compared to usual workload.

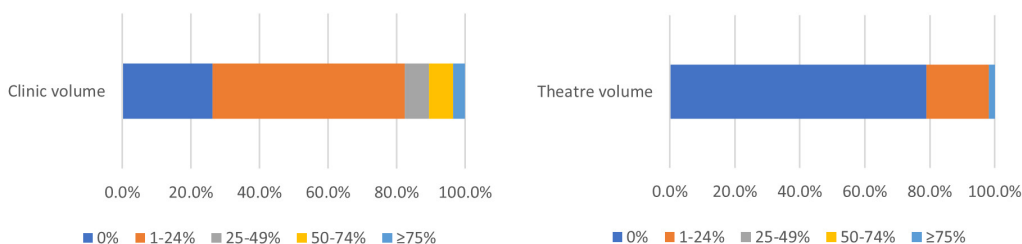
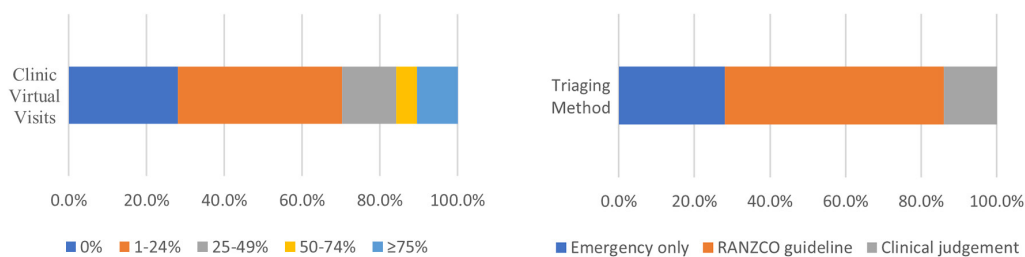


Table 1: Public sector ophthalmic service workload reduction by district health board (DHB) represented as a percentage (%) compared to normal (national-level administrative data for April 2020 compared to April 2019).

	Total clinic %	Clinic FSA %	Clinic FU %	Elective operating %	Acute operating %
National average	38.2	43.2	36.7	11.5	43.1
DHB median	26.8	37.2	26.1	7.6	37.5
DHB 1	45.5	48.2	44.6	15.1	35.1
DHB 2	87.1	80.9	89.0	33.3	100.0
DHB 3	80.4	56.2	90.1	19.5	40.0
DHB 4	25.2	25.6	25.0	3.2	86.4
DHB 5	19.9	40.0	16.4	8.1	n/a
DHB 6	26.9	31.7	24.3	6.6	14.3
DHB 7	96.7	60.7	84.6	0.0	n/a
DHB 8	26.8	45.8	29.1	0.0	150.0
DHB 9	26.5	35.9	24.8	8.8	0.0
DHB 10	43.6	51.1	41.5	0.0	50.0
DHB 11	26.2	54.2	22.7	8.2	60.0
DHB 12	22.5	26.1	21.6	8.7	0.0
DHB 13	22.4	37.2	19.7	20.9	137.5
DHB 14	33.3	33.3	33.3	45.5	n/a
DHB 15	15.9	11.0	17.9	0.0	100.0
DHB 16	31.0	37.3	28.8	7.6	45.8
DHB 17	42.2	19.2	48.9	0.0	n/a
DHB 18	22.7	9.1	26.1	3.2	n/a
DHB 19	11.4	29.0	7.4	0.0	0.0

n/a Not applicable, FSA first specialist assessment, FU follow-up.

Figure 3: Percentage of virtual visits during alert level 4 lockdown (left), and triaging method for the alert level 4 lockdown restrictions (right).



a clear physical health ($p < 0.001$) benefit reported from the lockdown (Figure 4).

A number of key themes emerged on review of the thirteen free-text comments left by respondents. Two respondents highlighted the benefits of consultant (ie, senior medical officer) triage for managing acute referrals increasing efficiency and remote management. A few respondents appreciated the “less frenetic pace of work”; however, almost half of respondents appreciated the delays generated from lockdown have increased the “backlog of elective work”, putting a “strain on services long term”.

Discussion

The COVID-19 alert level 4 lockdown dramatically reduced the clinic and surgical workload for New Zealand’s publicly employed ophthalmologists. Our retrospective survey of practice patterns found that during the lockdown almost 80% of these ophthalmologists did not perform elective surgery, with a similar proportion reducing clinic volumes by 75%. National-level administrative data indicate clinic consultation visits and elective operating volumes reduced to 38.2% and 11.5% of normal, respectively.

The timely access to ophthalmic care has major impacts on the progression of eye conditions and their treatment outcomes.¹¹ It is therefore not surprising that COVID-19 has led indirectly to increased rates of blindness from delayed diagnosis/referral of acute and chronic ocular conditions internationally.^{6,12} The timing of COVID-19 during VISION 2020 is ironic, given this was the year to celebrate vision.¹³ Instead a scaled back and repri-

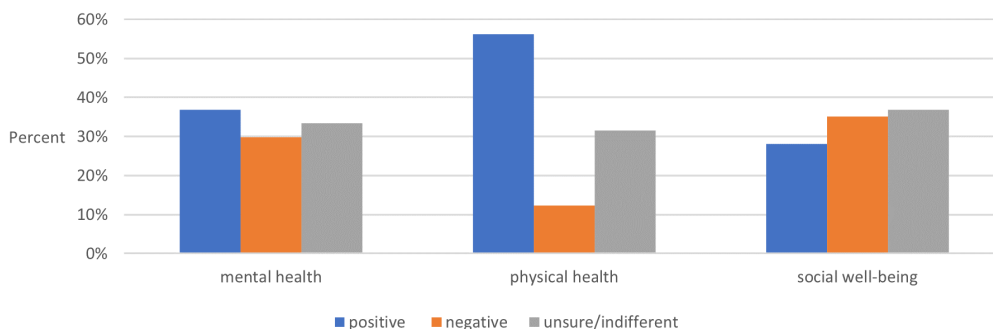
oritised ophthalmic service has probably increased the risk of avoidable blindness from reduced access in the international setting.

Research to date documenting reduced clinic and elective surgical volumes during COVID-19 lockdowns have been published in both India and Europe (ESCRS survey).^{7,8} Nair et al found 70% of ophthalmologists in India stopped all clinical work (clinic and operating) for their nationwide lockdown. For ophthalmologists in India who continued to see patients, over 80% classified their patient encounters as emergencies (eg, endophthalmitis, retinal detachment, trauma).⁷ In Europe, the ESCRS survey reported that one-third of European ophthalmologists provided emergency care only, with 11% and 58% of European ophthalmologists stopping all clinic consultations and operating, respectively.⁸

In the New Zealand public ophthalmic sector, elective surgical volume reduced by almost 90%, which is less than European and Indian survey data by comparison.^{7,8} The reduction of elective clinic consultations was more modest compared to the elective surgical volumes in New Zealand. There was substantial variation between different DHBs (Table 1), which highlights a different case-mix of patients and/or different triaging strategy.

New Zealand adopted the elimination strategy towards COVID-19, as opposed to the mitigation and suppression strategies adopted by European countries.¹⁴ The benefit of the New Zealand approach afforded the country a relatively quick return to normal domestic activity and

Figure 4: Impact of alert level 4 lockdown on mental health (left), physical health (middle) and social wellbeing (right).



routine ophthalmic clinical care.¹⁵ In principle, elimination focuses on preventing pandemic virus introduction and ending local transmission, as opposed to ongoing suppression/mitigation strategies that involve ongoing physical distancing, testing and contact tracing (and potentially repeated lockdowns).¹⁴ Public ophthalmology service volumes recovered back to normal on the second month after lockdown. Although the impact of lockdown to ophthalmic service delivery was significant, it was relatively short-lived, and this is a credit to the success of our public health elimination policy. Furthermore, although New Zealand and most European countries were in lockdown, the health systems of many European countries were overwhelmed, and they experienced potentially avoidable deaths and increased all-cause mortality.¹⁶

Most international ophthalmology societies around the world produced triaging guidelines during the COVID-19 pandemic. There was a focus on delaying non-urgent care and following recommended safety practices to reduce infection transmission.¹⁷ The New Zealand RANZCO branch produced a triaging guideline with recommendations for various ocular presentations and ophthalmic diseases.¹⁰ These were followed by the majority of respondents in our survey, with those in a tertiary referral region being 1.9 times more likely to follow these guidelines. The variance in the triaging of care, reflected by the workload reductions across DHBs (Table 1), may have led to inequities in healthcare access and differences in ocular health outcomes between regions. Triaging care during this period was time consuming, challenging and involved many competing interests. New novel scoring algorithms¹⁸ and modelling tools¹⁹ may have a role in providing a more objective assessment in the future.

Most ophthalmologists in our survey reported physical health benefits during the lockdown, which is not surprising given the known health benefits of exercise and its promotion as an essential activity during the New Zealand lockdown.²⁰ Previous research has shown that lockdowns generally produce negative benefits to mental health and an improved sense of community and

social connectedness, but our survey results did not support these findings.²¹

The use of teleophthalmology (or VVs), which provides physical distancing protections while continuing to offer care, increased 17.9-fold during the lockdown month of April. Over 90% of patient VVs were classified as follow-up consultations, and the literature has shown these patients (as opposed to first specialist assessments) are more likely to engage with this type of service delivery.²² Furthermore, the integration of acute teleophthalmology services in France and the United Kingdom was able to reduce in-person ophthalmology assessments by 73%²³ and 78%²⁴ respectively.

If New Zealand re-entered another lockdown as a result of a large outbreak from a border control failure, the application and translation of our research could help inform future ophthalmology service responses. The survey highlights the success of upscaling VVs and consultant-led triage to reduce the risk of virus transmission. This form of service delivery may have a greater role in our overburdened public health system for the future. Anecdotal unpublished reports from across New Zealand indicate a number of patients have gone blind in their only eye due to missed or delayed elective clinic appointments. Future research could calculate the visual burden attributed to delayed clinic appointments/surgery from the alert level 4 lockdown. It would be interesting to then assess whether the different ophthalmic workload reductions by DHB had any impact on the visual burden.

The combination of survey findings and national-level administrative data is a strength of our study, and we compared findings to the published literature in Europe and India. The survey response rate of 49% is in line with the online web-based survey response rate of surgical doctors.²⁵ The survey could have been held closer to the end of lockdown to increase the accuracy of the respondents' answers. The national-level administrative data for April also captures one week of alert level 3 restrictions, and so triaging of care may have been loosened, given the country had already stepped down from alert level 4 lockdown restrictions.

Competing interests:

Dr Hadden reports that he is the current chair of the New Zealand branch of the Royal Australian and New Zealand College of Ophthalmologists, which formulated prioritisation guidelines for ophthalmology during the pandemic.

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