COVID-19 and the impact on urology service provision at Capital & Coast District Health Board

Simon Lambracos, Lance Yuan, Andrew Kennedy-Smith

ABSTRACT

AIM: To determine the impact on the Capital & Coast District Health Board (CCDHB) urology service of the implementation of nationwide healthcare restrictions in response to the COVID-19 pandemic.

METHODS: This is an observational retrospective study over a 21 working day period during the implementation of National Hospital Response Framework Alert (NHRFA) level 2. We obtained patient data during this period and a corresponding control period prior to the pandemic. The data was focussed on the volume of operating theatre cases, outpatient consultations, procedural clinic appointments and the estimated avoided outpatient travel.

RESULTS: Total urology admissions decreased by 27% during the 21-day NHRFA level 2 period. However, acute surgical procedures increased by 30% whereas elective surgical procedures decreased by 32%. Outpatient consultations overall decreased by 32% during NHRFA level 2 despite virtual phone consultations increasing by 274%. Procedural clinic appointments decreased by 85%. The virtual platform also saved each patient an estimated 22.7km of average travel.

CONCLUSION: The data demonstrate the effects of restrictions in response to a crisis and set a precedent for future management in such scenarios. The data also show how service efficiency can be optimised while providing an environmentally friendly alternative for routine clinical practice.

The coronavirus disease 2019 (COVID-19) pandemic has impacted on societies and health systems across the world. Governmental responses to the crisis and the direct effects of the disease have been expressed differently across countries. Health services in societies that experienced high disease incidence have been challenged or overwhelmed by the clinical problems of patients with COVID-19.

On 25 March 2020, the New Zealand government initiated a national level 4 lockdown, when case numbers were still small, in response to the international COVID-19 pandemic and after confirmation of community transmission within New Zealand. Consequently, the New Zealand Ministry of Health introduced a parallel COVID-19 National Hospital Response Framework, consisting of four alert levels (Figure 1) that are structured according to the severity of impact on healthcare services.

Since the start of the national lockdown, all district health boards (DHBs) have been escalated to National Hospital Response Framework Alert (NHRFA) level 2. As far as the surgical specialties in Capital & Coast DHB (CCDHB) are concerned, this has had four major ramifications:

1. migration of outpatient clinic appointments to a virtual setting or an off-site setting as necessary
2. deferral of non-urgent pre-assessments and non-urgent clinic patients according to urgency
3. activation of any outsourcing arrangements reached and engagement with options for supporting ‘cold trauma’ cases and less-complex urgent cancer surgery
4. prioritisation of planned care surgery and other interventions based on urgency while continuing health service delivery for patients not expected to require ICU/HDU.
This report has been set out to demonstrate the impact NHRFA level 2 and national level 4 has had on the service provided by the urology department at CCDHB and report on innovative service delivery within the constraints of national lockdown and hospital reorganisation in preparation for the anticipated COVID-19 crisis. While the impending epidemic threatened to collapse existing service delivery, potentially with negative outcomes from disease unrelated to COVID-19, the local response partially maintained continuity of urology services. Moreover, the changes in practice triggered some unforeseen improved outcomes.

We have focussed on four aspects of the service that we believe have been significantly affected by the changes made secondary to NHRFA level 2 implementation. These four aspects include:

1. the volume of operating theatre cases (acute and elective), including outsourced public elective cases during NHRFA level 2
2. the volume of outpatient consultations (virtual and face-to-face)
3. the volume of procedural clinic appointments (flexible cystoscopy, TRUS prostate biopsy and urodynamics clinics)
4. the avoided journeys (km) by outpatients travelling to clinic by using a virtual interface.

**Method**

The urology service at CCDHB, Wellington, is a public health service that directly serves a population of 500,000 people and provides secondary care services and a tertiary level urology service for the wider lower North Island of New Zealand. The delivery of care is provided by four to five specialist urologists/senior medical officers (SMOs) and five junior staff/resident medical officers at varying levels of experience and supported by nursing, allied health and administrative staff.

Outpatient and inpatient urology services are delivered through Wellington and Kenepuru hospitals. Community urology care is provided by the network of primary care general practitioners and the community nursing service that are distributed across the region.

During the COVID-19 lockdown and NHRFA level 2, the urology service was reorganised in anticipation of significant numbers of COVID-19 patients in Wellington regional Hospital, but not without recognising that the outcome of the national level 4 lockdown may effectively abort the epidemic locally too. The service was reconfigured thus:

- The urology department was divided into two teams maintaining strict separation from each other.
- Outpatient clinics were converted wholesale from face-to-face consultations to telemedicine consultations where possible.
- Elective office procedures were suspended during the lockdown period.
- General anaesthetic urology surgery was substantially relocated to a nearby private hospital facility, designated a ‘non-COVID-19 hospital’ and performing cases with urgent clinical priority.
- Some general anaesthetic urology surgery was continued at Wellington Regional Hospital: this included acutely presenting patients and some elective cases with urgent clinical priority.
- Teams alternated weekly between the Wellington Regional Hospital campus and the remote private hospital campus.
- In the event of a member of one team becoming ill, that team would be stood down.

The intention of this reorganisation was to achieve continued delivery of urology service through the COVID-19 pandemic, whether or not there were significant numbers of COVID-19 cases.

This is an observational retrospective study over a period of 21 working days (ie, excluding weekends and public holidays) from the start of the national level 4 lockdown (25 March to 27 April 2020). The service volumes during this time were compared with a similar 21 working day period in March 2019 (15 March to 12 April 2019). The control period was adjusted to exclude the period of junior doctor strike.
Figure 1: Detailing the first two alert levels of the National Hospital Response Framework implemented by all DHBs in response to the COVID-19 pandemic.
activity in late April 2019 and the control period was considered a typical workload for the urology service at CCDHB.

Coding data was retrieved from the CCDHB information system for details regarding urology patients admitted acutely and electively under the urology service within the two time periods.

Data on scheduled outpatient urology consultations and office procedures were collected manually during the two time periods. Telephonic advice and informal consultations were not assessed. Scheduled outpatient consultations included:

- face-to-face consultations
- telemedicine/telephone consultations (virtual clinic)
- office procedures.

The carbon impact of virtual clinic consultations by negating travel to and from the hospital clinic is recognised. To estimate the average travel saved (km) by outpatients consulted using the virtual clinic interface, compared to attending face-to-face outpatient clinic consultations, patients' domiciles were obtained using data from CCDHB coding. We used Google Maps to estimate the distance from each patient's domicile to Wellington Regional Hospital.

**Results**

There were no episodes of staff illness during the study period resulting in both teams being able to continue work commitments as planned. However, through the planned retirement of one SMO, the department workforce was reduced to four SMOs in 2020 from five SMOs in 2019. This left one SMO post vacant during the lockdown period. Data are presented in absolute numbers and, where appropriate, calculated on a per-SMO ratio to better determine the impact of the reduced SMO workforce.

During the study period (25 March to 25 April 2020) there were 77 urology admissions, of which 26 were acute admissions and 51 elective admissions. All elective admissions proceeded with surgery, of which 31 were operated on at the outsource private hospital. This equates to 12.75 elective cases per SMO.

Of 26 acute presentations, 12 patients required acute surgery, which were performed at Wellington Regional Hospital.

During the control period in 2019 there were 106 admissions, of which 75 admissions were for elective surgery, equating to 15 elective cases per SMO. There were 31 acute admissions during the control period, nine of which required acute surgery.

**Figure 2**: The number of admissions and operative cases for the control 2019 and study 2020 cohorts.
The data indicate a 27% overall decrease in elective and acute admissions during the national level 4 lockdown period in comparison to the corresponding 2019 period. However, acute surgical procedures increased in both absolute numbers and in percentage, an increase of 30% from the control period. Elective surgery decreased 32% during the level 4 lockdown period compared to the control period. These outcomes are presented in Figure 2.

Data on the specific surgeries was examined and is presented in Figure 3.

The specific case data indicate a deferment of non-urgent elective stone surgery and some other non-urgent surgery, but a relative increase (25%) in cancer surgery during the NHRFA level 2, compared to the 2019 cohort (Figure 4).

Standard outpatient consultations decreased during the COVID-19 lockdown period. As expected from the reorganisation, there was a marked shift from face-to-face consultations to virtual consultations during the lockdown. There were 391 urology outpatient consultations for the 2020 cohort (97.75 consultations per SMO), of which 373 were virtual and 18 were contact consultations. This compared to a total of 578 urology outpatient consultations for the 2019 cohort (115.6 consultations per SMO; 136 virtual and 442 contact consults). This represented a 32% decrease in the total number of outpatient consultations during level 4 lockdown when compared with the 2019 data, although only an 8% decrease in outpatients per SMO. Face-to-face consultations decreased by 96%, but there was a notable 274% increase in virtual consultations during the national level 4 lockdown period compared to the 2019 time period.

Office procedure consultations were significantly affected, as expected from the reorganisation. The urology service at CCDHB had already integrated urinary biomarker assessment (CxBladder) to manage demand for flexible cystoscopy. CxBladder testing continued during the period of COVID-19 lockdown but did not influence the data on flexible cystoscopy procedures in either time period. There were 192 office procedures performed in the 2019 cohort compared to 28 office procedures in the 2020 cohort (Table 1).

The total travel distance saving for outpatients consulted in the 2020 cohort using a virtual platform was 6,828km. This equates...
Figure 4: The proportion of cancer and non-cancer procedures performed for both 2019 and 2020 cohorts.

Figure 5: The number of patients attending contact, virtual and procedural clinics for the control 2019 and study 2020 cohorts.
to an average 22.7km of travel saved per patient during the national level 4 lockdown as a result of the virtual clinic interface (Table 2).

**Discussion**

The urology service review of clinical activities during the COVID-19 lockdown demonstrates an overall reduction in service delivery and a reorientation to non-contact outpatient consultations. The impact on throughput of the hospital-wide preparations for the epidemic, closures and reorganisation were mitigated by proactive outsourcing of elective surgery to a private hospital and a dramatic shift to virtual consultations. This reorganisation was conceived and implemented simultaneously with the national lockdown. The outcomes from this experience set a precedent for crisis response management within the department for the future.

**Admissions**

The total number of admissions decreased by 27% during the NHRFA level 2 period in comparison to the corresponding 2019 period. It appears that the reduction in elective operating cases was largely responsible for this decrease and that, despite outsourcing elective cases to the private hospital, the service was unable to match the usual workload. Furthermore, there was only a 16% decrease in acute admissions during NHRFA level 2. The volume of acute admissions is likely to vary regardless of the circumstances, but it could also be explained by a reduction in patients presenting to hospital due to the perceived

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**Table 1:** A breakdown of the number of patients attending procedural clinic consultations for the 2019 and 2020 cohorts.

<table>
<thead>
<tr>
<th>Cohort</th>
<th>TRUS biopsy</th>
<th>Flexible cystoscopy</th>
<th>Urodynamics</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>65</td>
<td>107</td>
<td>20</td>
<td>192</td>
</tr>
<tr>
<td>2020</td>
<td>2</td>
<td>26</td>
<td>0</td>
<td>28</td>
</tr>
</tbody>
</table>

**Table 2:** Number of patients from the various regions serviced by urology at CCDHB with clinic appointments during NHRFA level 2 and the distances these patients would have to travel to attend clinic appointments at the Wellington Regional Hospital. Distances averaged for satellite towns and calculated individually for patients within Wellington City.

<table>
<thead>
<tr>
<th>Suburb</th>
<th>Number of patients</th>
<th>Distance to hospital (km)</th>
<th>Total distance (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Featherston</td>
<td>2</td>
<td>65</td>
<td>130</td>
</tr>
<tr>
<td>Lower Hutt</td>
<td>86</td>
<td>19</td>
<td>1,634</td>
</tr>
<tr>
<td>Martinborough</td>
<td>1</td>
<td>83</td>
<td>83</td>
</tr>
<tr>
<td>Masterton</td>
<td>2</td>
<td>101</td>
<td>202</td>
</tr>
<tr>
<td>Otaki</td>
<td>2</td>
<td>76</td>
<td>152</td>
</tr>
<tr>
<td>Paekākāriki</td>
<td>3</td>
<td>43</td>
<td>129</td>
</tr>
<tr>
<td>Paraparaumu</td>
<td>20</td>
<td>53</td>
<td>1,060</td>
</tr>
<tr>
<td>Porirua</td>
<td>29</td>
<td>23</td>
<td>667</td>
</tr>
<tr>
<td>Upper Hutt</td>
<td>32</td>
<td>37</td>
<td>1,184</td>
</tr>
<tr>
<td>Waikanae</td>
<td>12</td>
<td>63</td>
<td>756</td>
</tr>
<tr>
<td>Wainuiomata</td>
<td>3</td>
<td>26</td>
<td>78</td>
</tr>
<tr>
<td>Wellington Central</td>
<td>109</td>
<td>Calculated individually</td>
<td>753</td>
</tr>
<tr>
<td>Total</td>
<td>301</td>
<td></td>
<td>6,828</td>
</tr>
</tbody>
</table>
risk of contracting COVID-19 in hospital, and therefore this may represent an unmet need.

Operating theatre cases
There was a 33% increase in acute operating theatre cases during NHRFA level 2 compared to the control 2019 period. This is most likely explained by the fact that NHRFA level 2 did not impose any restrictions on acute theatre cases, and this would therefore represent the acute surgical requirement at the given time.

Despite a 25% increase in urgent cancer cases during NHRFA level 2, there was, as expected, a decrease in general elective operating. This was calculated as 32% but there are confounding factors that potentially exaggerate this difference:

Firstly, 7% of the elective cases for the 2019 cohort occurred in Kenepuru Community Hospital (KCH), a regional hospital in Porirua catering for low-risk elective cases only. The availability at KCH normally allows for simultaneous elective lists both there and at Wellington Regional Hospital. However, during NHRFA level 2, KCH was closed.

Secondly, in 2019 there were five consultants working in the urology department as opposed to four consultants in 2020. This provided the opportunity for an increased elective surgical capacity in 2019. It therefore seemed more representative to demonstrate the difference in elective case workload by calculating the number of cases per consultant. For the 2019 cohort this was 15 cases per consultant compared to 12.75 for the 2020 cohort. Each consultant was therefore averaging 2.25 elective cases less during NHRFA level 2, which, considering the severe restrictions placed on elective case workload, suggests a less significant difference between the cohorts than was initially indicated.

Finally, it is also worth noting that, despite the decrease in elective case workload, over 60% of elective cases during NHRFA level 2 were outsourced to the private hospital. Of these, 45% were urgent cases treating potential or confirmed cancer diagnoses. This represented a 25% increase in urgent cases during NHRFA level 2 compared to the 2019 period. This demonstrates that, even with severe restrictions on performing elective cases in the public sector, over 30 patients could still receive essential elective care in a safe environment. Not only does this mean that patients can receive elective surgical care in a timely manner, but also that a backlog of elective cases does not develop once NHRFA level 2 is de-escalated.

Outpatient clinics
As per the NHRFA level 2 restrictions, all outpatient clinics should be deferred to a virtual or offsite setting and all non-urgent appointments should be deferred. As a result, in the urology department at CCDHB, the vast majority of outpatient consultations were rescheduled as virtual phone consultations and, where possible, non-urgent face-to-face consultations were deferred until normal service resumes. A select few urgent face-to-face appointments were retained where physical examination or in-clinic investigations were required.

These alterations to the outpatient service were demonstrated by a 274% increase in virtual consultations under NHRFA level 2 compared with the corresponding period in 2019. Consequently, this correlated with a 96% decrease in contact consultations for the 2020 cohort.

Procedural clinics
The major difficulty in implementing NHRFA level 2 within the department was attempting to accommodate the patients that were due for procedural clinic appointments. As our data suggest, procedural clinic consultations were down by 85% for the 2020 cohort compared to the 2019 cohort. Only two TRUS prostate biopsy procedures and 26 flexible cystoscopies were performed during NHRFA level 2, all of which were subacute cases. Standard procedural clinics had to be deferred due to their non-urgent nature. This in turn resulted in a significant backlog of procedural clinic appointments for after NHRFA level 2 and a significant number of patients with delayed investigations.

Avoided travel
We have previously assessed the acceptability to patients of virtual clinic consultations (unpublished) and the actual travel savings. Although virtual consultations limit the possibility of physical examination and in-clinic procedures, it does provide a significant economic and environmental benefit to the community.
As stated previously, by consulting with patients in a virtual setting and avoiding face-to-face consultations at the hospital, travel reduced by an estimated 6,828km. This equates to an average 22.7km of travel per patient saved, which would have had significant repercussions on the environment as well as on travel expense and journey time for outpatients.

**Conclusion**

Our data provide a snapshot interpretation of the altered workload relating to admissions, operating theatre cases and outpatient clinics in the CCDHB urology department during the implementation of NHRFA level 2. They provide us with an insight into which aspects of the service are most heavily affected by the imposed restrictions and how best to manage these to moderate the overall impact of healthcare provision for the community. The data also set a precedent for major crisis response management going forward and highlights which areas might require particular attention in these scenarios. Furthermore, with regard to the virtual consultation platform, the data also suggest ways in which our practice can be adapted on a routine basis in the future, in order to increase efficiency and to provide a service that is both economic to the patient and environmentally prudent.

**Competing interests:**
Nil.

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**Author information:**
Simon Lambracos: General Surgery Department, Poole Hospital NHS Trust, Longfleet Road, Poole BH15 2JB, UK.
Lance Yuan: Urology Department, Capital & Coast DHB, Riddiford Street, Newtown, Wellington 6011.
Andrew Kennedy-Smith: Urology Department, Capital & Coast DHB, Riddiford Street, Newtown, Wellington 6011.

**Corresponding author:**
Mr Simon Lambracos, Surgical Trainee, NHS
simon.lambracos@gmail.com

**URL**

**REFERENCES**