

Celebrating a decade of the minor operations clinic: an approach at a regional New Zealand hospital

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ABSTRACT

BACKGROUND: A minor operations clinic has been providing a “one-stop shop” at our regional New Zealand hospital for the past decade to service management of skin lesions. This study aims to assess demographics, service characteristics, clinical standards and cost-savings from this setup, and to identify areas for improvement and potentially provide a model for other health units.

METHODS: All patients seen between May 2009 and June 2019 were prospectively included. Data includes demographics, waitlist period, referral sources, follow-up destinations, histology including involvement of margins and cost.

RESULTS: A total of 4,926 patients were included, with 6,442 procedures overall. Median age was 72 years old. The main source of referrals was primary care. The majority of patients were returned directly to primary care. Median wait-time was 66 days, and this remained static over the decade. 56.6% of excised lesions yielded malignant histology and 90.1% achieved clear margins. There was a calculated saving of NZ\$607.00 per patient with our one-stop shop compared to our previous traditional model. A further calculated saving of NZ\$452,028.50 was achieved by diverting complex procedures from requiring operating theatre environments.

CONCLUSIONS: Our model provides successful, streamlined and cost-effective treatment of skin lesions for our community. This model (or aspects of) may be similarly effective in other regional centres.

Minor surgical procedures place a significant cost burden on the New Zealand healthcare system because we are a country with one of the highest rates of skin cancer in the world.¹ Nationwide, the general practitioner (GP) is usually the first point of contact. Referrals are then made to secondary care when advice/action is required, or when the GP is unable to excise the lesion due to complexity.

In our region, the general surgical department receives a high workload from skin lesion referrals. Part of this can be attributed to shortage of GPs in the region: for example, our region has 60 full time GPs per 100,000 compared to the national average of 75 GPs per 100,000.² Our GPs consequently have minimal time available for undertaking skin excisions. As a result, our hospital established a minor opera-

tions clinic (MOC) 10 years ago in order to enhance patient experience and minimise the burden of increasing health costs from inefficacy. It was initially established as a “one-stop shop” to deal with skin lesions; however, the range of cases it deals with has since expanded.

In this study, we assess the demographics, service characteristics, clinical standards and costs achieved by this clinic setup, with the aim of identifying areas for further improvements, such as increasing margin clearance rates, shortening waitlists, cost efficacy and comparing our results with other centres and international guidelines. We believe it could also potentially provide a working model for other New Zealand district health boards to replicate at a regional level if it is proven to be successful.

Methods

All patients seen in MOC between May 2009 and June 2019 were prospectively included. No patients who presented to the clinic were excluded. Patients who did not attend the clinic appointment were not recorded.

Data was collated prospectively. Patient demographics (age and gender), waitlist period, referral source, follow-up destination and type of procedure were recorded. Patient identifiable number was used to gather data on ethnicity and histology results. Waitlist period was broken down into two-year periods for sub-analysis to assess whether it had changed over time. Histology results were classified as benign, malignant (including which type of malignancy, and including in-situ carcinomas) or not applicable. Presence of positive margins was also recorded, including whether an invasive or in-situ component was involved.

The current cost of the clinics was provided by the procurement and purchasing departments and is inclusive of staff time. The cost of consumables was obtained by recording all consumables used within a clinic session; this process was repeated for fourteen clinics conducted within a four-week period between June 2019 and July 2019 and then averaged into an amount per single session.

Results

We included 4,926 patients with a total of 6,442 procedures. The median age was 72 years old, with a range of 10 months to 99 years old; there was no gender bias, with 49.5% female patients and 50.5% male; 89.9% of patients identified as NZ European, 5.4% other European, 3.8% Māori and 0.9% other ethnicities (9 African, 9 Chinese, 10 Indian, 9 Pacific Islander, 2 Southeast Asian, 1 Latin American and 7 other).

The majority of referrals were from GPs (50.7%) and the surgical department (32.9%). Other referral sources included dermatology (from both public and private sectors), the medical department and the plastics department. Table 1 summarises the source of referrals to MOC.

The majority of follow-up post-intervention was delegated to patients' regular

GPs (78%) or the referring surgical consultants (12.5%), and 4.8% of patients were recalled back to MOC for further follow-up and/or interventions (usually for staged procedures or due to numerous lesions which exceeded the timeframe available in the initial appointment). A small proportion were referred to elective theatre for more extensive intervention (1.3%) or to plastics/dermatology (1%). Table 2 summarises where patients were discharged to for follow-up care.

Over the entire study time-period, median time from referral to clinic appointment was 66 days, with a range from 0 to 346 days. Subgroup analysis of two-year periods showed reasonably similar waiting times, as demonstrated in Figure 1. Median waiting time for patients who returned histology results positive for melanoma was 37 days.

Seventy-two patients (0.015%) had a waiting time exceeding 180 days. Of these, 26 of these were offered earlier appointments but were either rescheduled, chose to defer or did not attend their initial appointment. Unfortunately, retrospective analysis of the data did not provide explanations on why the remaining 46 patients (<0.01%) had a prolonged waiting time.

Procedures were predominantly done by either a registrar or a Medical Officer of Specialist Scale (MOSS) (64.8%). A consultant performed 26.8% of procedures. A small proportion were done by house officers (5.8%) or medical students (2.6%) under direct supervision of a more senior staff for learning purposes.

Table 1: Source of referrals to MOC.

Referral source	n	%
GP	2,992	60.7
Surgical	1,621	32.9
Medical	83	1.7
Dermatology	94	1.9
Plastics	13	0.3
Other	13	0.3
Not available	110	2.2
Total	4,926	100.00

The most common procedures performed were excision with direct closure (60.6%), liquid nitrogen treatment (13.5%) or punch biopsy (8.6%). Of note, 2.6% of cases underwent a flap or skin graft closure. Wedge excision of the lips and ears were also performed. Over time, MOC expanded its range of procedures to include temporal artery biopsy (n=47), complex wound care (n=27), nail extraction or wedge excision of nails (n=26), foreign body removal (n=24), aspiration of seroma and insertion of seroma catheters (n=11), lymph node biopsy (n=8) and a small number of steroid injections and fine-needle aspirates.

Assessing the site of lesions, we found 43.8% were located in the head and neck region, 31.7% in the limbs and 24.5% in the truncal region (Figure 2).

Some lesions with very clear benign pathogenesis were not submitted to histology: for example, multiple lipomas (where only one specimen would be sent), ingrown toenails, removal of foreign bodies and complex wound care. Similarly, lesions treated with liquid nitrogen would also not have histology sent. Of the 4,984 procedures that had histology available, 56.6% contained tissue with malignant changes (34 of these contained two types of malignant changes concurrently). A further 2.9% of procedures contained benign histology but were done for wider excisions of a malignancy, and 40.4% of procedures yielded benign histology unrelated to wider excision.

As shown in Table 3, 58.3% of malignant histology pertained to basal cell carcinoma (BCC), 33.5% to squamous cell carcinoma (SCC) (including both invasive and in-situ) and 7.8% to melanoma (both invasive and in-situ). Some of the other malignancies detected included dermatofibrosarcoma, Merkel cell cancer, lymphoma and multiple myeloma.

Of the malignant skin cancer excisions, 90.1% had clear margins and 9.9% did not achieve clear margins. 69.4% of malignant skin cancer excisions involved invasive malignancy and 30.6% pertained to an in-situ component only.

Table 4 shows the proportion of each malignancy type that had involved margins. Squamous cell carcinomas (mainly the in-situ type) had the highest positive margin

rate. Cases performed by a consultant had a slightly higher incidence of involved margins compared to cases performed by junior staff (11.6% vs 7.9%, chi-square $p=0.0029$).

The cost of a surgical outpatient clinic appointment per patient was calculated to be NZ\$343.00. The consumable cost was calculated to be NZ\$48.87 per procedure.

Table 2: Follow-up destination for patients after MOC

Follow-up destination	n	%
GP	3,843	78.0
Surgical	614	12.5
Minor operations clinic	236	4.8
Medical	52	1.1
Theatre	62	1.3
Wound clinic	32	0.6
Plastics	32	0.6
Dermatology	19	0.4
District nursing	7	0.1
Other	10	0.2
Not available	19	0.4
Total	4,926	100.0

Table 3: Types of malignancies detected on histology.

Histology	n	% of total excisions
Basal cell carcinoma	1,644	58.3
Squamous cell carcinoma	944	33.5
Melanoma	220	7.8
Basosquamous cell carcinoma	20	0.7
Other	27	1.0

As each patient undergoes an average of 1.3 procedures, the consumable cost per patient was NZ\$63.53. Thus, the total cost of the clinic appointment per patient was calculated to be NZ\$406.53.

Discussion

In the past, patients with a skin lesion referred by their GP would be typically seen in the surgical outpatient clinic, where the surgeon would decide whether a lesion needs to be excised and whether this should be done in theatre or under local anaesthetic at another clinic appointment. The patient would then be put on yet another waitlist for the procedure.

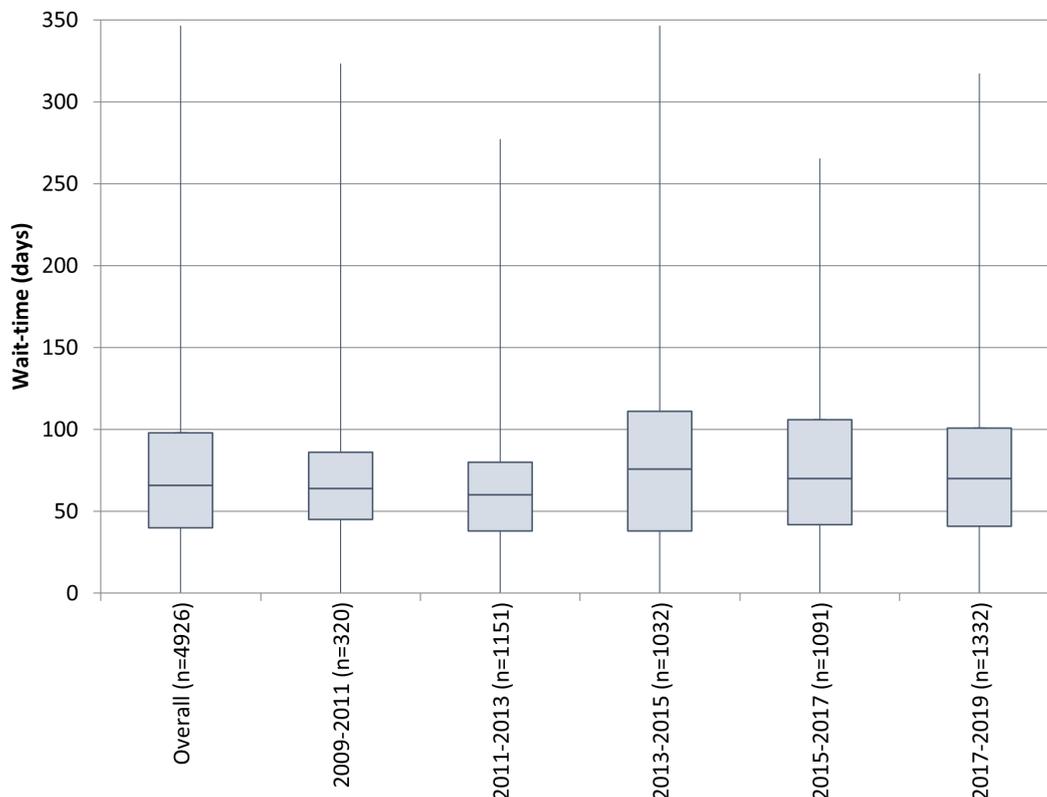
To streamline this process and minimise wait-times, a direct-access MOC was set up ten years ago, whereby patients proceed directly to a single appointment. These single sessions are led by the general surgeon who assesses the lesion, decides on a treatment plan and intervenes on the lesion immediately if appropriate. If minor surgical treatment in this setting is not

appropriate, the patient is referred to the appropriate service or, if general anaesthesia is required, to the main theatre list to receive treatment. This setup was designed initially to reduce waiting times (discussed in more depth below). It also frees up significantly more space in the surgical outpatient clinics for other referrals. Ten years ago, we ran only one clinic per week; this has gradually increased to at least four clinics per week and approximately 17 clinics per month.

In the past, some referrals would have been directed to the visiting plastics services to be assessed, and patients were subsequently required to travel to a tertiary hospital four hours away for their surgical procedure. This also required an overnight stay. Our clinic has been able to divert some patients from this route back to our local service, saving patients significant time and expense.

Although there are other registrar-led clinics in other hospitals that undertake skin lesion excisions after referral from surgical

Figure 1: Time from referral to clinic appointment.



outpatient clinics, we are not aware of similar one-stop shops in New Zealand.

Patients receive an appointment letter by mail with instructions regarding the management of anticoagulation medication if applicable. Standard written post-procedural instructions are given to each patient—this covers wound care, dressings, pain relief, suture removal, follow-up arrangements and when to resume anticoagulation. A report is sent to the GP and linked to the patient medical record for every patient seen in MOC.

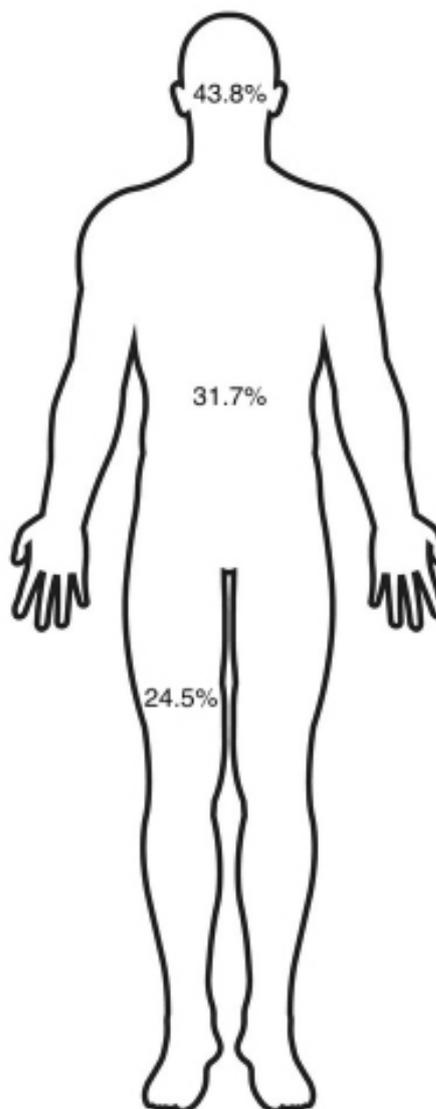
Our results demonstrate that the patient demographic is predominantly European individuals of more advanced age. This is expected, given ultraviolet (UV) exposure and susceptibility to UV radiation in this cohort, and as the development of skin cancer correlates with age (cumulative UV exposure) and ethnicity (skin type).³⁻⁵ In particular, our region has one of the highest melanoma rates in the country (age-standardised rate of 54.9/100,000 compared to a national average of 35.1/100,000).⁵ This may be due to ethnic distribution, atmospheric factors, sun-exposure behaviours, the farming population and relatively cool temperatures relative to the UV index. Taking into account a Northland study on cutaneous SCC, wherein Māori made up 1% of patients despite 30% of the population identifying as Māori⁶ (versus 15% locally), and a 2018 study wherein Māori made up 0.3% of doctor presentations across New Zealand with non-melanocytic skin lesion,⁷ our rate of 3.8% Māori suggests that we are achieving an equitable service for our population.

Most procedures were excision and direct closure of lesions and liquid nitrogen treatment. However, advanced reconstructive techniques, such as flaps, skin grafts and wedge excision of the ears and lips, were also performed. These reconstructions are often beyond the scope of a GP or junior doctor—our clinic setup enables these to be done by a consultant surgeon. The clinic has also been utilised to provide expertise in specialised procedures, such as obtaining fine-needle aspirates, temporal artery biopsies and tissue biopsies, all of which are important for diagnostic value. MOC has also managed the removal of foreign bodies, including cardiac REVEAL

Table 4: Proportion of involved margins by skin malignancy type.

Histology	% of total excisions
Basal cell carcinoma	9.1
Squamous cell carcinoma	11.2
Melanoma	2.0
Basosquamous cell carcinoma	10.0

Figure 2: Distribution of lesions.



devices and Jadelle contraceptive implants. Punch biopsies were used when necessary for diagnostic and therapeutic purposes. This shows that the utility of our clinic setup is versatile.

Patients requiring more complex procedures for which local anaesthesia is unsuitable (n=62, 1.3%) were reviewed by the consultant and then arrangements were made for them to have their procedure done in the operating theatre. Admission paperwork and consent forms were completed in MOC, thus abolishing the requirement of another appointment. One hundred and eight-four patients (3.7%) did not undergo intervention as they had a benign asymptomatic pathology or a resolved lesion. Rarely were high-risk patients rebooked due to anticoagulation that had not been stopped.

MOC also provides valuable learning opportunities for junior doctors. Registrars of different experience levels are allocated to join the consultant surgeon. The clinic is also often attended by house officers and medical students. The more experienced registrars perform the procedures independently under supervision and receive advice as required, whereas less experienced registrars are guided with closer supervision by the consultant. The consultant performs more complex procedures with the assistance of juniors. These sessions are utilised to teach the juniors about skin cancer, different types of skin closure, wound management and sutures. Additionally, it teaches interaction with the conscious patient during a procedure, including discussions about management options and taking informed consent. GPs with an interest in skin surgery are also invited to attend these clinics and get involved in the procedures; this approach has resulted in training of several GPs who now practice in the community independently.

The analysis of the histology provides some feedback regarding our clinical practice. Our percentage of biopsies that hold malignant tissue (56.6%) is similar to that reported by a Queensland GP network (54%) and higher than the pooled Australian national data (39%).⁴ This indicates that we are identifying appropriate lesions and not excising unnecessarily.

Our percentage of positive margins (9.9%) is similar to the 9% identified in a study within Northland district health board⁸ and the 8.8% identified in a meta-analysis of SCC interventions.⁹ A 2009 study in New Zealand identified variable incomplete excision rates depending on vocation: dermatologists had a rate of 0%, GPs 23%, GPs with special interests 21.5% and specialist surgeons 20%.¹⁰ It is difficult to compare our standard given the wide range of incomplete excision rates in the literature, but it would seem we are achieving reasonably adequate excisions. Also, 30.6% of our involved margins had only an in-situ component, and as these lesions often have poorly defined macroscopic margins, it is difficult to achieve clear margins for these without taking significant tissue. It is also reassuring for our clinical practice as they have a lower rate of recurrence and many can be treated later on with topical creams. Subgroup analysis of involved margins by operator showed cases performed by a consultant had slightly higher rates of involved margins. This is most likely due to selection bias, as difficult excisions are performed by a consultant.

A large number of our elderly patients present with multiple coalescent lesions where the treatment focuses on the symptomatic lesions (fungating, bleeding or painful). As they are not fit, or not willing, to undergo a general anaesthesia for a complex procedure, a conservative excision is performed. Thus, it is also expected in these cases to have an involved margin, and this is explained to the GP via correspondence.

The majority of patients (78%) are returned to the GP, which reduces the burden on the surgical clinics. Patients are instructed to see their GP in a specified timeframe for a wound check, for removal of sutures (if required) and to receive the histology results. The results are also reviewed by the responsible hospital consultant—this safety mechanism of dual histology results review ensures that no significant results are left unnoticed. Patients with suspicious lesions that might require further excision are followed-up in the outpatient clinics (12.5%). Patients with multiple lesions who require more than one session of treatment (4.8%) are given a further appointment in MOC at an appropriate time, thus avoiding a second referral.

Once histology results are reviewed, patients with positive or inadequate margins that require re-excision are also recalled to MOC (including those who had been discharged to the GP).

The average age of the population is always increasing, with an even more pronounced difference being observed in the European population.¹¹ The expected incidence of skin cancers is predicted to increase: for instance, the number of non-melanoma skin cancer lesions managed locally in 2013 was 5,587, with a forecasted increase to 5,798 in 2017.¹² The current numbers are likely higher and will continue to increase.

It is reassuring that median wait-times of 66 days have not substantially increased since MOC began 10 years ago. This shows that we have appropriately increased provision of clinic appointments to match the demands of our population. The waiting times are reviewed regularly by the managers and surgeons. Additional clinics, the addition of further surgeons as well as the utilisation of a MOSS have increased the monthly capacity and kept the wait-times constant. In the future, as the population continues to age and expand, we will need to continue to match increasing demand by recruiting a further surgeon to the department.

In order to assess cost-efficacy, we must consider the difference between the previous and current models. In the past, patients would have had a total of three surgical outpatient clinics (assessment, intervention and follow-up), with a total cost of NZ\$1013.53 per patient. The current model drops this to a single outpatient clinic with a total cost of NZ\$406.53. This results in cost-savings of NZ\$607.00 per patient as well as a decrease of approximately four months

of waiting time. That 4,926 patients were treated in this clinic suggests NZ\$2,990,082 has been saved over the past 10 years. Although this figure does include a small proportion of patients who did not have an intervention or who had several visits to MOC, we are also unable to determine cost-savings made from reducing referrals to a tertiary service for plastics input, and thus the total sum saved is still likely underestimated. Similarly, we were able to divert 118 patients away from operating theatre sessions for complex procedures (skin grafts, large flap closures, wedge excision of the lips and ears). That the estimated cost for skin procedures under general anaesthetic is NZ\$3830.75 suggests that NZ\$452,028.50 has been saved in the last 10 years from this aspect.

Conclusion

The current setup has been in place since 2009. It allows direct access to minor surgical procedures with a general surgeon and bypasses the extra clinic appointments. It also has the benefit of assessing and treating patients on the same day, which significantly reduces the wait time for treatment. We are achieving adequate margins in accordance with other studies. MOC provides great teaching opportunities for junior staff to practice both technical and non-technical clinical skills. The cost- and time-savings are significant and have positive implications for healthcare. We need to ensure we continue to increase capacity in accordance with increasing demand, so that waiting times remain at acceptable levels. We believe our model could also be replicated in other district health boards, which would potentially expand the benefits reaped on a national level.

Competing interests:

Nil.

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