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Establishing a community infusion service in Canterbury, New Zealand: strategies and lessons

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ABSTRACT

Background and context. An increasing number of drugs and blood products need to be delivered by intravenous infusion. In the Canterbury region of New Zealand, these have historically been delivered at a hospital site; however, some infusions could be delivered in a community setting without compromising patient safety. **Assessment of problem.** The Canterbury health system has a key strategic objective of delivering care close to patients' homes. In 2018, Canterbury district health board (DHB) put out a tender for a community infusion service that would deliver blood products and other intravenous drugs with appropriate medical oversight. **Strategies for improvement.** Following an interview and selection process, a fee-for-service contract was developed with a group of general practices with partial common ownership. It was nurse-led with medical oversight available. In July 2018, a Community Infusion Service (CIS) was started in two urban sites in Canterbury. It later expanded to two more sites, one urban and one rural. **Results.** From July 2018 to May 2021, over 3000 infusions and blood transfusions were delivered by the CIS across seven infusion types (blood; immunoglobulin; infliximab; natalizumab; pamidronate; toculizumab; zoledronic acid). Both general practice and hospital services referred patients to the CIS. No major incidents were reported. Patients reported satisfaction with the service. **Lessons.** Infusions and blood products can be delivered safely nearer to patients' homes in primary care in a New Zealand setting. Medical input was rarely required; however, the transition was resource-intensive; it required both overall process and criteria negotiations, as well as individual patient discussions. In its initial stages, the CIS did not have adequate clinical governance and operational support, which affected the speed and scale of its development.

Keywords: blood transfusions, community, contracting, governance, health system change, immunoglobulin, infusions, primary care, transfusion medicine.

Introduction

There are many conditions that are managed with long-term, regular intravenous (IV) infusions, and also a considerable volume of evidence that shows selected infusions can be moved from hospitals to community settings in a way that is safe and preferred by patients.[1–3] For health authorities, community-based services have the beneficial effect of reducing demand on hospital capacity.[4]

New Zealand is currently divided into 20 district health board (DHB) regions. DHBs have the responsibility for funding and providing health services in their area. Canterbury DHB covers the mid-South Island, including the urban centre of Christchurch. It is the second largest DHB by both population and geographical area. The Canterbury health system has a key strategic objective to deliver care close to patients' homes. Over the last two decades, integration of primary and secondary health-care services has led to more health services being provided in the community.[5–9]

In 2018, the Planning and Funding section of the Canterbury DHB asked for requests for proposals to deliver selected infusions to patients in the community, instead of patients being required to attend the Medical Day Unit (MDU) at Christchurch Hospital for these.

What gap this fills

What is already known Patients regularly require blood products and drugs to be delivered intravenously. In some areas, this is done in the community. There is a move in Canterbury, New Zealand, to deliver care closer to patients' homes.

What this study adds

Infusions and blood products can safely be delivered nearer to patients' homes in primary care settings in New Zealand when funded and governed appropriately and supported by clinicians.

The aims were to both free up capacity in the MDU and to enable patients to receive care in the community, closer to their homes. At this point, some DHB-funded blood transfusions were being delivered in a district nursing setting, but there was no on-site medical oversight for this service. A key factor in evolving the model was to ensure medical oversight was available daily for transfusion reactions or any other medical complications. Following an interview and selection process, a fee-for-service contract was developed with a group of general practices with partial common ownership and the ability to deliver a nursing-led service with medical oversight across different sites. This was termed the Community Infusion Service (CIS).

This paper describes the experience (background and lessons; description of the service; challenges involved in its establishment) of setting up this CIS.

Assessment of problems

Once the DHB contract with the CIS was in place, it was decided to start the CIS with blood transfusions. The rationale was that as blood transfusions take a long time (6 h for two units of blood), moving blood transfusions out of the MDU would free up 'chair hours' and thus hospital capacity.

The Canterbury Initiative is a group of clinicians and project managers funded by the Canterbury DHB that works across the primary and secondary care interface to effect changes in health-care delivery.[10] They work closely with Community HealthPathways, which provides online guidance for general practitioners, and Hospital HealthPathways, which provides online guidance for hospital clinicians.[11] The Canterbury Initiative and HealthPathways became involved in the set-up of the CIS. This included establishing clinical and process details for blood transfusions (eg who would prescribe the blood products, who would guide patients through the consenting process, and which patients were suitable for receiving infusions in a community setting as stratified by clinical risk). To meet the CIS criteria, patients needed to be mobile, independent, not in heart failure, and with adequate venous access. More complex patients continued to receive infusions in the hospital setting of the MDU. To ensure consistency in clinical standards, the CIS used the same nursing and medical protocols as hospital-based services, including the MDU. This was particularly important given the potential for serious adverse reactions with blood transfusions.

Once agreed upon, details were documented on the Community and Hospital HealthPathways. Referrers used standard referral and communication methods such as the electronic request management system (ERMS) that is in use across the South Island for general practice, or fax where this was not available (ie for hospital referrers who did not have access to the ERMS).

As well as the development of overall protocols, each patient transitioning from the MDU to the CIS was required to have a discussion about safety, prescription arrangements, and the process for the new service. These discussions were supported with patient information, which was available via HealthInfo, an open-access health information website for the general public, funded by the various South Island DHBs.[12]

CIS structure

A general practitioner (GP) was the medical director of the CIS. They worked alongside a CIS nurse manager, who was an experienced specialised nurse and who was responsible for nursing and administration standards. The CIS had centralised administrative support. A GP was available at each CIS site to provide urgent and emergency care for patients as required. Practice nurses at each site were involved in administering infusions. The CIS started at two urban Christchurch sites in July 2018 and expanded to include a third urban site as well as a rural site.

Results of assessment/measurement

Infusion types and volumes

The CIS started off administering a small volume of blood transfusions in July 2018. Other intravenous drugs were added as the service grew. Each time a new infusion was added to the CIS's capability, the referring service(s) were involved with identifying criteria, operational details and reviewing the draft HealthPathway. By July 2021, the CIS had expanded to seven infusion types, with multiple referring services as follows: blood (haematology and general practice); immunoglobulin (haematology, immunology, neurology); infliximab (dermatology, gastroenterology, immunology, rheumatology); natalizumab (neurology); pamidronate (haematology); toculizumab (rheumatology); and zoledronic acid (haematology, oncology).

From July 2018 to 31 May 2021, a total of 3273 infusions were delivered by the CIS.

Patient demographics

The ethnicity of patients ($n = 2976$) receiving an infusion at the CIS was as follows: NZ European 89%, Māori 6%, Asian 3%, Pacific 1%, Middle Eastern, Latin American and African (MEELA) 1%.

This compares to an enrolled general practice population ($n = 553\,400$) in Canterbury that consisted of: NZ European 76%, Māori 9%, Asian 11%, Pacific 3%, MEELA 1% (data from March 2021). The mean patient age was 58 years.

Adverse events

There have been no serious adverse drug reactions (eg anaphylaxis) or other medical events at the CIS, nor have there been any patient complaints. One patient returned to the MDU due to difficult venous access.

Patient survey results

Understanding and improving patient experiences is an important consideration when setting up new services or changing existing ones. The Canterbury Initiative has out-of-scope ethical approval to carry out surveys as part of routine service review and improvement. A survey was undertaken on the experiences of patients who had transitioned from receiving their infusion in the MDU to the CIS. Eighty patients who had received infusions in both the MDU and CIS were identified from medical records and contacted in November 2019. They received an invitation to participate in the study, a consent form, survey questionnaire and a pre-paid postage-return envelope. Thirty-three responses were received (response rate, 41.3%). Almost all patients (31) answered that they did not have any concerns receiving their infusions in a community setting, with only two patients indicating they had concerns receiving their infusions in this setting. And 13 of the patients noticed a difference in the way they received their infusions at the CIS compared to at the MDU, 19 noticed no difference, whereas one had no comment. Of the 13 patients who noticed a difference between the two services, the majority had noticed a positive difference, several noticed a negative difference, whereas several others expressed both positive and negative experiences. The majority of respondents wanted to continue to receive their infusions at the CIS compared to the MDU or their general practitioner.

Lessons and messages

The following lessons and messages were identified by retrospective, informal discussion with stakeholders, as well as by the authors' own experiences in both the set-up and ongoing operations of CIS.

1. The initial CIS contract was put in place using a traditional funder–provider contracting model where the funder (DHB) put out a proposal and potential providers tendered for it. This method of commissioning services is appropriate for simple transactions where the desired outcome and process is clear from the outset.[13,14] However, with the CIS, it was unclear what the expectations or deliverables were under the contract. For example, there was a lack of clarity on the indicative volumes of transfusions to be delivered initially or what the data requirements were. This led to stress, confusion, damaged relationships and rework in the initial stage. The CIS was a complex undertaking that required close collaboration. As such, it may have benefited from a co-design model where the expectations, issues and risks were identified and worked through with all stakeholders before any contract was in place.[14] This may have made the service set-up smoother, more efficient, and less fractious for all participants.
2. Contracting and financials. Although hospital services in New Zealand are fully publicly funded, general practices are private businesses receiving capitation and other funding from government and patients. The contracting parties required patience and *korero* (discussion) to understand each other's business, financial, and employment contexts. The contract was quite flexible about new expenses incurred and increased infusion numbers; however, some tensions arose with delayed payments and contract renewal. This created issues for the CIS, which was part of a small private business. Future contracts are planned to include a fixed component to supply basic infrastructure and infusion capacity with a variable component for patient numbers.
3. Blood transfusions were a challenging infusion to start a new service with. For example, they required fully compliant blood fridges, which CIS needed to source at short notice. There were challenges around blood ordering and delivery logistics. Further issues arose with the specific timing of the crossmatch process, in which the patient must provide a blood sample to ensure they receive the correct blood type for infusion. Blood transfusions also tended to be administered irregularly to quite frail patients, who frequently needed to cancel appointments at short notice due to medical issues. Conversely, pre-infusion blood tests sometimes revealed that a blood transfusion was no longer needed due to an improved haemoglobin level. These complexities were difficult for a small, evolving service that was set up at speed. By contrast, immunoglobulin or infliximab are delivered regularly to usually fit patients and thus more straight-forward. It would have been simpler for the service to have started with a different infusion than blood products.
4. A lack of overarching clinical governance in the initial stage. This meant some key staff and stakeholders (eg transfusion medicine specialists and committee) had not been consulted appropriately in the early stages of the CIS. This created a minor delay (several weeks) in getting

the HealthPathways signed off and therefore starting the service. The lack of clinical 'buy in' was reflected by an initial reluctance of clinicians to refer patients to the CIS instead of the MDU for transfusions as they were accustomed to doing. The lack of clinical governance was compounded by a lack of clear communication across the health system about the CIS. In response to these identified gaps, an Ambulatory Therapies Governance Group was formed, which included participants from nursing (both community and the MDU), hospital medical specialists, general practice, management, and the DHB funder. Its goal was to provide clinical governance to determine the most appropriate settings for drugs and products to be administered across the Canterbury health system, including home, non-specialised general practice, specialised CIS, or secondary care. A second group, an Ambulatory Therapies Operational Group, managed the specific relationship between the MDU and the CIS. It had participants from various hospital services, MDU, and CIS.

5. Background work for moving infusions from the MDU to the CIS. Both the overall processes and individual patient discussions required more resources than anticipated, particularly for the MDU. The volume of work required affected the pace at which additional drugs could be transitioned from the MDU to the CIS, even with the support of the Ambulatory Therapies Operational Group.
6. Equity was overlooked in the setting-up of the CIS. The aim of the project was to free up capacity in the MDU and to increase overall infusion capacity across the Canterbury health system. It required considerable project and clinician resources; however, this may not have been a priority from an equity perspective in terms of the greatest health needs for specific populations. More complex patients continued to receive infusions in a hospital rather than the community setting, so further analysis could examine the equity implications of this. For example, it could be examined if specific populations with a higher burden of disease and more comorbidities still needed to travel further to the hospital for care.
7. The CIS structure itself. Practice nurses showed they were able to administer infusions to best practice standards with appropriate oversight; however, infusions were not the primary business of the general practice sites, so the CIS had to be balanced with providing regular patient care. Some sites needed persuasion to become involved and reassurance the practice was adequately funded for the additional work involved in administering infusions. Medical input at each site for patients proved to be occasional and not onerous. As such, although the availability of medical input at each site had been a driver for moving to the CIS model, it was not necessarily required.
8. Patients liked receiving infusions at the CIS, which is consistent with the Canterbury health system goals of providing care close to home. These findings are in agreement with earlier studies,[15–18] which also showed that patients tended to favour infusions being delivered in community-based facilities.
9. The DHB model of devolved decision-making at a local level enabled this change initiative; local clinicians, funders and other stakeholders were able to gather in a room and work through clinical and process requirements, build relationships, address any concerns, and renegotiate the contract when required. In April 2021, the New Zealand government announced its plan to abolish DHBs and replace them with a centralised entity called Health NZ, and to establish a Māori health authority.[19] An aim of these changes is to avoid the purported 'postcode lottery' in which patients have different levels of access to services based on geographic location. As Canterbury patients can currently receive infusions in community settings but patients in other New Zealand DHB regions cannot, it remains unknown the effect the health system reforms will have on the CIS.

Conclusion

Delivering selected infusions in community settings, especially general practices, is safe and preferred by patients. Good governance, careful discussion, and clear clinical pathways are required. The sequencing of putting in place a contract, designing the service, starting the service, and only then putting in place governance was not optimal and could have been ordered differently. Further expansion of the service is wanted by clinicians, but the impact of the centralising health reforms on local innovations such as the CIS are awaited.

References

1 Condino AA, Fidanza S, Hoffenberg EJ. A home infliximab infusion program. *J Pediatr Gastroenterol Nutr* 2005; 40(1): 67–9. doi:10.1097/00005176-200501000-00012
2 Payne D. Administering intravenous therapy in patients' homes. *Br J Community Nurs* 2019; 24(2): 67–71. doi:10.12968/bjcn.2019.24.2.67
3 O'Hanlon S, Glenn R, Hazler B. Delivering intravenous therapy in the community setting. *Nurs Stand* 2008; 22(31): 44–8. doi:10.7748/ns2008.04.22.31.44.c6444
4 Briggs AM, Bragge P, Slater H, *et al.* Applying a Health Network approach to translate evidence-informed policy into practice: a review and case study on musculoskeletal health. *BMC Health Serv Res* 2012; 12(1): 394. doi:10.1186/1472-6963-12-394
5 McGeoch G, Shand B, Gullery C, *et al.* Hospital avoidance: an integrated community system to reduce acute hospital demand. *Prim Health Care Res Dev* 2019; 20: e144. doi:10.1017/S1463423619000756
6 McGonigle L, McGeoch G. An initiative to improve equity, timeliness and access to District Health Board-funded physiotherapy in Canterbury, Christchurch, New Zealand. *J Prim Health Care* 2020; 12(4): 377–83. doi:10.1071/HC20074
7 McGeoch G, Sycamore M, Shand B, *et al.* A regional programme to improve skin cancer management. *J Prim Health Care* 2015; 7(4): 339–44. doi:10.1071/HC15339
8 Epton MJ, Stanton JD, McGeoch GRB, *et al.* The development of a community-based spirometry service in the Canterbury region of New Zealand: observations on new service delivery. *npj Primary Care Resp Med* 2015; 25(1): 15003. doi:10.1038/npjpcrm.2015.3

9 Epton MJ, Kelly PT, Shand BI, *et al.* Development and outcomes of a primary care-based sleep assessment service in Canterbury, New Zealand. *npj Primary Care Resp Med* 2017; 27(1): 26. doi:10.1038/s41533-017-0030-1

10 Canterbury Initiative. Canterbury District Health Board. 2019. Available from: https://www.cdhb.health.nz/about-us/key-projects-and-initiatives/canterbury-initiative/ [accessed 9 January 2020].

11 HealthPathways Community, Canterbury DHB, and Streamliners NZ. What is HealthPathways? HealthPathways Community. 2022. Available from: https://www.healthpathwayscommunity.org/About [accessed 3 September 2021].

12 HealthInfo. HealthInfo. 2021. Available from: https://www.healthinfo.org.nz/ [accessed 27 July 2021].

13 Thiagarajan P, McKimm J. Mapping transactional analysis to clinical leadership models. *Br J Hosp Med* 2019; 80(10): 600–4. doi:10.12968/hmed.2019.80.10.600

14 Jansen C, Higgins J. Showing up differently: a collective approach to complex issues. Leadership Lab. 2018. Available from: https://leadershiplab.co.nz/wp-content/uploads/2019/12/Showing-up-differently-Collective-approaches-to-complex-issues-final.pdf [accessed 29 July 2021].

15 van Eijk Y, Boonen A, Schulpen G, *et al.* Safety and patient satisfaction of infliximab administration in an extramural setting supervised by a rheumatology specialist nurse. *Ann Rheum Dis* 2006; 65(2): 276. doi:10.1136/ard.2005.036566

16 Doran J-P, Alraqi S, Callanan I, *et al.* An audit of hospital based outpatient infusions and a pilot program of community-based monoclonal antibody infusions. *Ir J Med Sci* 2009; 178(4): 497–501. doi:10.1007/s11845-008-0274-4

17 Ostrov BE, Reynolds K, Scalzi LV. Patient preferences and satisfaction in a multispecialty infusion center. *Patient Prefer Adherence* 2014; 8: 755–61. doi:10.2147/PPA.S63214

18 McNamara RJ, McKeough ZJ, Mo LR, *et al.* Community-based exercise training for people with chronic respiratory and chronic cardiac disease: a mixed-methods evaluation. *Int J Chron Obstruct Pulmon Dis* 2016; 11: 2839–50. doi:10.2147/COPD.S118724

19 New Zealand Government. Major reforms will make healthcare accessible for all NZers. Beehive.govt.nz.; 2021. Available from: https://www.beehive.govt.nz/release/major-reforms-will-make-healthcare-accessible-all-nzers08/05/2021;03/22/2022;03/23/2022 [accessed 27 July 2021].

Data availability. The data that support this study cannot be publicly shared due to ethical or privacy reasons and may be shared upon reasonable request to the corresponding author if appropriate.

Conflicts of interest. Lisa McGonigle is employed as a project manager by Canterbury DHB, which contracts the CIS. Graham McGeoch was formerly a primary care adviser to Planning and Funding, Canterbury DHB, and is currently the medical director of Better Health Ltd., the general practice company that delivers the CIS.

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