

Building Capacity in Long-Term Care: Supporting Homes to Provide Intravenous Therapy



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ABSTRACT

Background

Typically, long-term care home (LTCH) residents are transferred to hospital to access intravenous (IV) therapy. The aim of this study was to pilot-test an in-home IV therapy service, and to describe outcomes and key informants' perceptions of this service.

Method

This service was pilot-tested in four LTCH in the Hamilton-Niagara region, Ontario. Interviews were conducted with six caregivers of residents who received IV therapy and ten key informants representing LTC home staff and service partners to assess their perceptions of the service. A chart review was conducted to describe the resident population served and service implementation.

Results

Twelve residents received IV therapy. This service potentially avoided nine emergency department visits and reduced hospital lengths of stay for three residents whose IV therapy was initiated in hospital. There were no adverse events. The service was well received by caregivers and key informants, as it provided care in a familiar environment and was perceived to be less stressful and better quality care than when provided in hospital.

Conclusion

IV therapy is feasible to implement in LTCHs, particularly when there are supportive resources available and clinical

pathways to support decision-making. This service has the potential to increase capacity in LTCHs to provide medical care.

Key words: long-term care, intravenous therapy, education

Introduction

Respiratory tract infections (RTI) and urinary tract infections (UTI) are the leading diagnoses of long-term care home (LTCH) residents transferred to the Emergency Department (ED),^(1,2) with IV antibiotics being the leading treatment initiated in the ED and frequently resulting in hospital admission.^(1,3) Several studies have found that up to 25 per cent of ED visits for these infections were preventable had there been earlier and improved management within the LTCH.^(2,4,5) Reducing avoidable acute care utilization by LTCH residents is important, as hospitalization in the frail elderly is associated with adverse events including falls, delirium, infections, functional decline, and mortality.⁽⁶⁻⁹⁾ Furthermore, older adults, in general, account for an increasingly high proportion of ED visits, and hospitalizations, both of which contribute to high health-care costs.⁽¹⁰⁾

Several studies have suggested that there is a need for improved and earlier diagnosis and treatment of infections in LTCH.^(2,11-13) Although LTCH have been deemed as an appropriate setting for IV therapy,⁽¹⁴⁾ IV therapy for either antimicrobial therapy or hypodermoclysis (subcutaneous hydration therapy) has not been widely adopted in Canada and the United States, requiring residents to be transferred to hospital and remain hospitalized until their course of treatment is completed. Although the proportion of LTCH in Canada offering IV therapy is uncertain, U.S. studies suggest that fewer than 25 per cent of LTC and nursing homes provide IV therapy

and fewer than 10 per cent use hypodermoclysis for hydration.^(15,16) Challenges to IV therapy use in LTCHs are related to registered nurse staffing and staffing competency to assess and manage medical conditions,^(1,12,17) uncertainties in diagnosing infections and limited access to radiographic and laboratory testing,⁽¹⁸⁾ poor access to physicians for prompt diagnosis,⁽¹⁾ as well as limited funding for advanced therapies such as IV therapy.⁽¹⁹⁾ A randomized controlled trial comparing the provision of IV therapy in hospital or at home, including nursing homes, found no differences in adverse events, and found lower rates of confusion and complications and higher levels of patient and health-care provider satisfaction among those treated in-home.⁽²⁰⁾ There is potential for significant cost savings, better health outcomes, and minimal risk of adverse events with the administration of IV therapy in LTCH.^(15,20,21)

To address the challenges that have previously limited the use of IV therapy in LTCH and to prevent unnecessary transfers to hospital, our pilot study was undertaken to support timely access to IV therapy within LTCHs for residents with RTI and UTI requiring antibiotics or for residents requiring hydration. In cases where residents were started on IV therapy in the ED, this service was an opportunity for residents to return home to complete their course of treatment rather than be admitted to hospital. The aim of this study was to describe the implementation of this service, and to assess the perceptions of this service by residents, family caregivers, and other relevant key informants.

METHODS

This was a qualitative study consisting of individual interviews conducted with LTCH residents and their family caregivers and a purposeful sample of key informants (Directors of Care, nursing, and medical staff). A retrospective chart review was conducted to describe those who received IV therapy and health-care outcomes. LTCHs in a largely urban area in Hamilton-Niagara, Southern Ontario, Canada that are serviced by the study partner, Medical Pharmacies Group Limited (provider of pharmacy services and medical supplies) were invited to participate in this study. The time period for this study was nine months from October 2015 to June 2016. Approval for this study was obtained from the Hamilton Integrated Research Ethics Board, McMaster University.

The implementation of new innovations can be daunting in LTC. This sector is challenged to optimally meet the increasing complex health-care needs of residents, primarily due to difficulty recruiting and retaining knowledgeable human resources, limited funding and access to technology, and the highly regulated nature of this sector.⁽²²⁻²⁴⁾ Limited uptake of new knowledge in LTC has been attributed to the lack of attention to the factors facilitating and challenging the implementation of new innovations and limited use of strategies that support and reinforce practice change.^(25,26) Efforts to support the implementation of the IV therapy service in this study were consistent with the knowledge-to-action framework.^(27,28)

This pilot project focused on addressing the factors identified as barriers to the use of IV therapy in LTC^(1,12,17) and supporting the implementation process with clinical support tools and information, education and training, and access to supplies and materials and consultation support, and by engaging organizational leaders and interdisciplinary teams. The supportive resources put in place prior to the start of the IV service, including evidence-based clinical pathways for the assessment and management of UTI (Figure 1) and RTI (Figure 2), are summarized in Table 1. Although there is a paucity of research on knowledge translation in LTC, there is evidence that the supportive strategies used in this study can positively impact the uptake of new health-care practices.⁽²⁹⁻³⁴⁾

Nine LTCHs from the Hamilton/Niagara area of south central Ontario serviced by Medical Pharmacies as the pharmacy provider were invited to participate in this study. Four LTCH did not participate primarily due to competing priorities, and one LTCH was lost after consenting due to staff turnover. Of the four LTCHs that participated in this study, two were located in a large urban centre and two in smaller urban centres. Three of the homes were for-profit homes and one was a municipal government-sourced home. The number of beds per home ranged from 39 to 160; the average number of beds in LTCHs in the region is 119 beds.⁽³⁵⁾ The Case Mix Index, a classification system used to define the

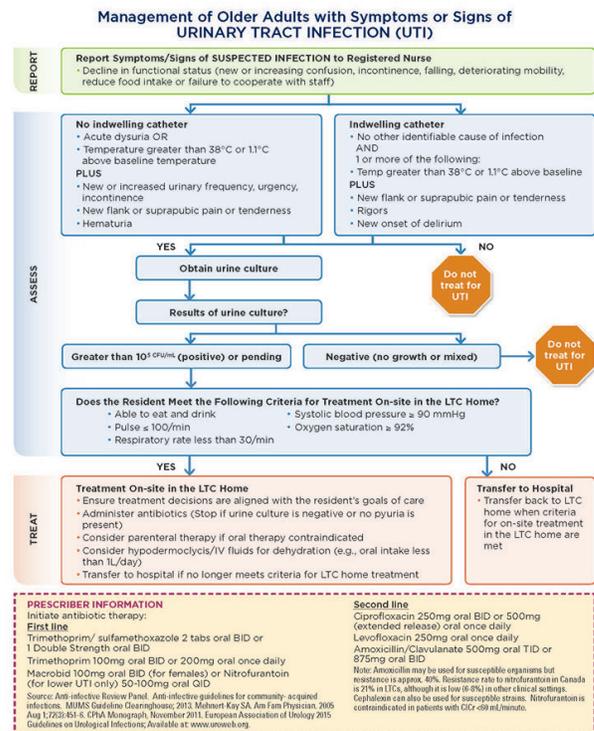


FIGURE 1. Management of older adults with symptoms or signs of urinary tract infection (UTI)

Management of Frail Older Adults with Symptoms or Signs of Mild-Moderate LOWER RESPIRATORY TRACT INFECTION

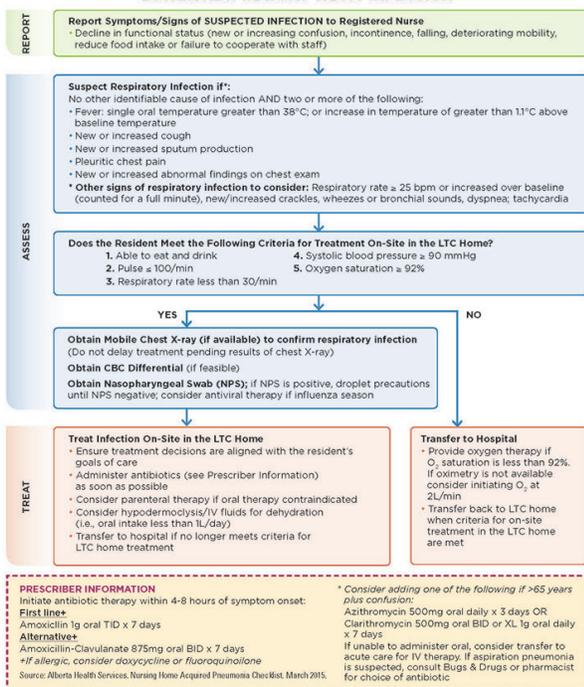


TABLE 1.

In-home IV therapy supports and resources

- Clinical pathways:** Developed to assess residents suspected of having a UTI or RTI and to facilitate decision-making to either treat the resident with oral antibiotics or IV antibiotics within the LTC home or to send the resident to the ED for further investigation and management.
- Resident and family and LTCH staff education video:** Created to introduce the study and provide information on the use of the clinical pathways and procedures for implementing this service. (This video is available at: <https://www.youtube.com/watch?v=1fv4tVo2DSg>).
- IV Therapy Manual:** For use by LTCH nursing staff to implement the service. The manual included a description of their roles and responsibilities, nursing policies and procedures, a nursing checklist for IV therapy administration, monitoring, and discontinuation, troubleshooting issues that arise with IV therapy, prescription referral form and supply requisition form.
- Study poster:** Developed for posting in LTCH in order to explain the service to residents and families.
- Triage support:** Provided by a Nurse Practitioner Led Outreach Team (NLOT) to assist with assessment to identify residents most appropriate for this IV service.
- Nursing services:** Contracted nursing services provided just-in-time training for IV therapy and monitoring (tubing changes, PICC dressing changes) including three visits in the first week, two visits in the second week and once a week thereafter at no charge. Extra visits if requested were paid for by the LTCH. This nursing service was available 24/7 for consultation. In addition, if deemed appropriate by the LTCH Director of Care, group education sessions on IV therapy administration were delivered by the contracted nursing service and were available free of charge.
- Medical supplies:** Timely access to relevant medical supplies (IV pump, IV tubing and related supplies) through the LTCH contracted medical supply company.
- Pharmacist consultation support:** Pharmacists were available through the LTCH contracted medical supply company to provide consultation support related to antibiotic use.

FIGURE 2. Management of frail older adults with symptoms or signs of mild-moderate lower respiratory tract infections

intensity of care and services provided to residents, which is used to determine allocation of resources, ranged from 0.98 to 1.27 (the higher the case mix index, the more intensive are the needs of residents). Three of the homes did not have prior experience with in-house IV therapy, and one home had very minimal experience with initiating IV therapy.

All residents in participating homes who received IV therapy during the study period and their family caregivers were invited to participate in an individual interview upon completion of their treatment. These interviews could be conducted in-person or via telephone. After the end of the study (July 2016), a purposeful sample of 12 key informants who had been involved with IV therapy within their LTCH and who represented different roles/disciplines were invited to participate in an individual telephone interview, including Directors of Care, nurses, medical directors, nurse practitioners, and an ED physician. Questions were asked about their satisfaction with the provision of care, and perceptions of the service as related to strengths, challenges, key lessons learned, and suggestions for improvement. All telephone interviews were conducted by one of the authors (LMH); in-person interviews were conducted by a research assistant. Interviews were audio-recorded and transcribed. Interview transcripts were analyzed using a naturalistic inquiry approach, to enable a better understanding of key informant perspectives within the context of their lived experiences in

LTCH.⁽³⁶⁾ Using inductive analysis, responses to each question were examined and categorized and contrasted to create a summary of recurring themes in the data.^(37,38) Transcripts were reviewed independently by two authors (LMH, AAH) to generate broad categories and identify emerging themes, which underwent several iterations to achieve greater clarity in finalizing key themes generated from the data analysis.

Upon completion of the study, a review of the medical charts of those who received IV therapy was completed to gather information on resident characteristics (demographics, clinical diagnosis). Information was also extracted on illness, the reason for IV therapy (antibiotic treatment or hydration), diagnosis, and outcomes (completion of treatment, occurrence of adverse events, ED transfer, hospital admission, death).

Information was also gathered on the number of RTI and UTI diagnosed during the study period, type of oral antibiotic prescribed, and number of ED transfers within 14 days of starting oral antibiotics. Quantitative data were analyzed using SAS 9.3 (SAS Institute, Cary, NC) to generate descriptive statistics (frequencies, means, standard deviation).

RESULTS

Provision of IV Therapy

Twelve residents received IV therapy during the study time period. These residents were from three of the LTCHs; one of the LTCHs did not access this service. The characteristics of these residents are presented in Table 2. Of the 12 residents who received IV therapy, the majority ($n = 9$, 75%) had IV therapy initiated in the LTCH; three residents (25%) who were admitted to hospital, two for urosepsis and one for an abscess, were returned from hospital with IV therapy in place (Table 3). No adverse events were reported. Table 4 presents the incidence of infections in the four participating LTCH during the study time period and use of oral antibiotics for these infections, both as listed and not listed in the study clinical pathway.

Caregiver Perceptions of In-Home IV Therapy

Although efforts were made to interview all residents receiving the service, it was not possible to interview any of them because they declined, were too ill, or had died (due to health conditions not IV therapy). Six caregivers of six

unique residents were interviewed. Three of these residents had their IV therapy initiated in hospital and the other three had their IV therapy initiated in their LTCH. These caregivers were the spouses ($n = 2$), daughters ($n = 3$), and a daughter-in-law ($n = 1$) of residents who received IV therapy. When asked if, overall, they were satisfied or dissatisfied with the service, all of the caregivers (100%) indicated that they were satisfied; no one expressed dissatisfaction with the service. All reported that, if the resident were to require IV therapy in the future, it would be their wish to have it administered in the LTCH. Qualitative analysis of interview transcripts identified four key themes (Table 5, with illustrating quotes).

1. Care in a familiar environment and familiar care providers is valued and preferred over care in hospital.

Caregivers valued their family member receiving medical care within the LTCH as the environment is familiar and care providers are accustomed with their needs. Care in hospital was considered as less optimal because care providers are not familiar with the resident and, as a consequence, may not understand what the resident is communicating to them, or they may not know potential safety risks, such as their risk for falls. It was perceived that, when care providers are familiar with the resident, they are better able to provide person-centred care.

2. Receiving care in LTCH is perceived as better quality care compared to care offered in hospital.

Caregivers preferred care in the LTCH so as to prevent, or lower the risk of, poor outcomes associated with care provided in hospital, such as risk of bed ulcers, deconditioning, falls, or injury. Quality of care was discussed in terms of resident outcomes related to response to IV therapy with quicker recovery time associated with care provided in the LTC home.

3. In-home IV therapy is more convenient and less stressful for residents and caregivers than when administered in hospital.

IV therapy administered within LTCH was perceived as more convenient and less stressful for residents and caregivers than when administered in hospital. Transfers and admissions to hospital were perceived as very distressing for the frail elderly and more burdensome for caregivers as related to travel, cost of parking, and long walking distances in large urban hospitals.

4. LTCH nurses have the capacity to provide IV therapy.

LTCH nurses were perceived to be professionally trained and skilled to provide IV therapy and hypodermoclysis; as such, caregivers did not perceive the need for IV therapy as a priority reason for hospital transfer or admission.

TABLE 2.

Characteristics of residents receiving IV therapy (N = 12)

<i>Resident Characteristics</i>	<i>Mean (SD)</i>
Age, years	80.7 (4.7)
Weight, kg	60.6 (19.0)
Height, cm	161.1 (10.8)
Number of medications	12.3 (4.6)
Female	$n = 7$ (58.3%)
Indwelling urinary catheter	2 (16.7%)
Swallowing difficulty	2 (16.7%)
Prior hospital admissions (last 90 days)	2 (16.7%)
History of arthritis	1 (8.3%)
History of dementia	3 (25.0%)
History of diabetes	4 (33.3%)
History of hypertension	10 (83.3%)
History of osteoporosis	5 (41.7%)
History of cancer	4 (33.3%)
History of depression	6 (50.0%)

TABLE 3.
Reasons for IV therapy and outcomes based on location of treatment initiation

<i>Reasons and Outcomes, n (%)</i>	<i>Initiation of IV Therapy</i>		<i>Total (N = 12)</i>
	<i>IV Therapy in LTC (n = 9)</i>	<i>IV Therapy in Hospital (n = 3)</i>	
Reason for IV therapy: Hydration	9 (100)	0	9 (75.0)
Antibiotic treatment	0	3 (100%)	3 (25.0%)
Reasons:			
Urosepsis	0	2 (66.7%)	2 (16.7%)
Abscess	0	1 (33.3%)	1 (8.3%)
Outcomes:			
Completion of IV therapy	5 (55.5)	1 (33.3)	6 (50.0)
Deceased	2 (22.2%)	1 (33.3%)	3 (25.0%)
Adverse events	0	0	0
Emergency Department visits	0	1 (33.3%)	1 (8.3%) ^a
Transfer back to emergency department within 30 days of discharge	NA	1 (33.3%)	1 (8.3%)

^a This is excluding the Emergency Department visits that resulted in the admissions during which IV therapy was initiated. IV = intravenous; LTC = long-term care.

TABLE 4.
Incidence of infections and treatment in participating long-term care homes over nine months

<i>Infections and Treatment, n (%)</i>	<i>Respiratory Tract Infections</i>	<i>Urinary Tract Infections</i>	<i>Total</i>
Number of infections	109	164	273
Treatment with oral antibiotics listed in study pathway	90 (82.6%)	146 (89.0%)	236 (86.5%)
Treatment with oral antibiotics not listed in study pathway	19 (17.4%)	18 (11.0%)	37 (13.5%)
Number of hospital transfers within 14 days of starting antibiotics	5 (4.6%) ^a	5 (3.1%) ^b	10 (3.7%)

^a Reasons: pneumonia (1), emesis (1), cellulitis (1), distress (2); two residents transferred to hospital were prescribed antibiotics not listed in the study pathway, % of total respiratory tract infections.

^b Reasons: vaginal bleeding (1), Urosepsis (4); all of the residents transferred to hospital were prescribed antibiotics listed in the study clinical pathway; % of total urinary tract infections.

Key Informant Perceptions of In-Home IV Therapy

In total, 10 key informant interviews were completed with a nurse practitioner, two LTCH Directors of Care, five nursing staff, one medical director, and one ED physician. All of the interview participants (100%) were in favour of widespread implementation of this service across the region. Qualitative analysis of interview transcripts identified five key themes (Table 5, with illustrating quotes).

1. Care provision within LTCH is perceived as better quality care and as avoiding poor outcomes and stress associated with acute care.

IV therapy within LTCH was valued as an opportunity to avoid hospital visits and admission. Key informants reported that residents who visit hospitals/acute care centres for IV

services are likely to return with other medical issues and have poor health outcomes (e.g., bed sores, confusion). They also perceive this as being more stressful for the family caregiver.

2. Provision of IV therapy contributes to building capacity for medical treatment in LTCH.

This service was credited with providing LTCHs with more resources for medical care, and has expanded the nursing scope of practice, all of which has resulted in being better equipped for medical care.

3. Successful implementation of IV therapy is dependent on access to external support.

Administration of in-home IV therapy was facilitated by access to training, and timely access to external nursing sup-

port both through the contracted nursing service, as well as outreach nurse practitioners, pharmacy consultation, and supply acquisition through the contracted medical supply company. It

was noted that, while nurses may be skilled to administer IV therapy, infrequent use in LTCH contributes to the decay of IV skills so that external supports are needed to sustain the service.

TABLE 5.
Interview participant quotes illustrating key themes

<i>Theme</i>	<i>Illustrative Quotes</i>
<i>Caregiver Interviews</i>	
Care in a familiar environment and familiar care providers is valued and preferred over care in hospital.	<p>“My choice would be to give it [IV] in the nursing home. He (resident) is more comfortable, he knows the staff in the nursing home, and there are no strange people asking him questions.” [CGID4]</p> <p>“No disrespect to those at the hospital, but they don’t know my father. They don’t know even just a simple small hint of an expression that he’s not comfortable or he doesn’t like that or whatever.” [CGID1]</p>
Receiving care in LTC is perceived as better quality care, in comparison to care offered in hospital.	<p>“I think it also helped him maybe recover that much sooner or better or faster, [because] he’s not in the hospital because he likes the environment that he’s in and you know, the nurses there are, were catering to him because he had this IV and also you know, asking him if he wanted meals there and they came there and brought him meals and fed him and the food is much better there than in the hospital, so all of that obviously helps his recovery. ... I thought for something like that [hydration] definitely he would have to go to the hospital and I just knew how much he disliked going there, so when they said no, no he could do it here, well I know he was relieved and so was I.” [CGID5]</p> <p>“It’s just that when you have them somewhere where they are in the home and they’re well-being looked after, they are, they’re very well fed there or he is, the food is good and the attention is good.” [CGID3]</p>
In-house IV therapy is more convenient and less stressful for residents and caregivers than when administered in hospital.	<p>“He’s 96 years old, he is skin and bones, he’s dehydrated, he’s you know it’s so cold, winter out there, to drag him in a vehicle all the way up there [hospital] for that [IV] and then bring him back, and it’s such an inconvenience for him and it was much, much easier to do it there [LTC].” [CGID5]</p> <p>“I think treating him [resident] in the nursing home is better than the ER. To get him on the stretcher is a lot of work so it’s much better to treat him in the nursing home. It’s a godsend.” [CGID4]</p>
LTCH nurses have the capacity to provide IV therapy/ hypodermoclysis.	<p>“I think it’s [In-house IV therapy] fantastic. I don’t see why anyone would object to it being in the nursing home, the long term care, I mean they have nurses and you know they’re professionally trained and that’s what they do so I have no questions or concerns about you know, their professionalism on making sure and they have you know the regular doctors that come around and do their rounds, I think it’s a benefit all the way around.” [CGID1]</p> <p>“So I’d rather be here [LTCH], then to move him out of a home and put him in a hospital for that sort of thing [hypodermoclysis] you know, for something like that.” [CGID3]</p>
<i>Key Informant Interviews</i>	
Care provision within LTC is perceived as better quality care and as avoiding poor outcomes and stress associated with acute care.	<p>“I think it helps the residents stay out of hospital, where the nurses there, even though they are skilled, we know the resident personally and know exactly what they require, what their day to day activities are so we know what to expect from them as they go through having the IV in.” [KSID7]</p> <p>“Well when they go to the hospital it’s usually for the initial setup and starting the IV. Waiting long hours in the emergency, waiting long hours you know, just avoiding the transfer stress from going to the hospital, it takes a toll on some residents. So being within their home it’s much more beneficial for them.” [KSID3]</p>
Provision of IV therapy has increased the quality of care in LTCHs by increasing capacity for medical treatment and expanding the nursing scope of practice.	<p>“I think long term care has had to move towards a more medical model for quite some time and this is the first step in that direction... I think people who come in to long term care are sick and they have a lot more needs... I think the ability to do more medical intervention in long term care is something that we’ve needed for quite some time and we’re going to need it even more and more... they’ve needed to expand their skills for some time. Myself I came in to long term care about 4 years ago from acute care, and I was very surprised at how limited their abilities and skills were compared to the acuity of the residents, so I do think it’s a long time coming and this may be the first step to kick things into gear.” [KSID1]</p> <p>“In long term care you should be able to provide care to those that we’re caring for... [in-house IV therapy results in] better customer service and better quality of health, quality of care for our residents.” [KSID6]</p>

Theme	Illustrative Quotes
Successful implementation of IV therapy in LTC is dependent on access and timeliness of access to external supports (nursing support, pharmacy for consultation, medical supplies).	<p>“Having pharmacy as a key person to go to just even to talk things through, like here’s the situation, what do you think? And they were really very, I found they just would bring another perspective.” [KSID1]</p> <p>“Peace of mind that we have the expert support, so for example our staff is trained in doing IVs, but because we don’t do it often enough sometimes when they go interstitial there is a problem sometimes you know who is working, when and can we, can we put the IV back on. So I think that’s extra, through the pharmacy we were able to get that extra support that was peace of mind, we have not used it, but it’s still a peace of mind.” [KSID4]</p>
Education/training are key to enhancing LTCH staff (physician, nursing) skills, as well as confidence and comfort with IV therapy.	<p>“I think it’s probably more I would say with us kind of, and myself remembering what are the IV antibiotics, what are the doses in certain situations and then how kind of a refresh for myself, and trying to communicate that with the nurses to be a bit more maybe I mean educational kind of sessions might have been helpful. We can’t cover everything but just go through typical scenarios, it might have been helpful for myself to kind of work through that person to person, having some maybe web based information that I kind of go through before we started would have been helpful.” [KSID8]</p> <p>“Raising the level of quality of training in care that is provided there [LTC], rather than being somewhat more sedate and kind of accepting that they’re not as skilled as other nurses, I think that would be very important to keep, to get their skills right up and put them up there with the rest.” [KSID9]</p>
Decision-making regarding the use of IV therapy in LTC is usually collaborative with care providers consulting together to determine the course of treatment.	<p>“I think when we did order it [antibiotics] we definitely had to go to them [nursing staff] and kind of look at the care pathway and look at the process because it’s definitely something new that I think was easily accessible for the nursing staff when we did look at it and had a look at it together.” [KSID8]</p> <p>“Having pharmacy as a key person to go to just even to talk things through, like here’s the situation, what do you think? And they were really very, I found they just would bring another perspective.” [KSID1]</p> <p>“We have a nurse practitioner so we can call her any time, she can come in and assess and advise us if we have any question or anything.” [KSID5]</p>

IV = intravenous; LTC/LTCH = long-term care/long-term care home

4. Education/training are key to enhancing LTCH staff skills.

Ongoing access to training for nursing staff was deemed critical to maintaining IV therapy skills and to promoting the service so as to increase opportunities for nursing staff to develop confidence and comfort with IV therapy. As many physicians working in LTCH are family physicians who maintain a primary care practice, they have minimal opportunities for prescribing IV antibiotics and thus require access to education on types of IV antibiotics, doses, and indications.

5. Decision-making regarding the use of IV therapy in LTCH is usually collaborative, with care providers consulting together to determine the course of treatment.

Decision-making regarding the use of IV therapy was described as a collaborative process among care providers (physicians, nurses, nurse practitioners, pharmacists). The clinical pathways used in this pilot project were described as useful tools for physicians, nurses, and pharmacists to facilitate discussion regarding the most appropriate treatment interventions.

Suggestions for Improvements

LTCH key informants identified a number of suggestions for improving and sustaining this service, such as providing

ongoing training and education for nurses on IV therapy best practices, for physicians on IV antibiotics (types, doses, indications), and for family members on IV therapy and the benefits of remaining in the LTCH for treatment over care in hospital. Other suggestions were aimed at resolving identified challenges, such as enhancing supports and services in LTCH including: increasing access to peripherally inserted central catheters (PICC) (perceived as easier to use with residents who resist IVs), increasing access to physicians for consultation in off hours to avoid ED transfers, and improving timeliness of response from laboratory services. While there was increased communication within LTCH and with external services (ED, outreach teams) related to IV therapy to manage infections, further work is needed to improve communication processes.

DISCUSSION

This study demonstrated that the availability of in-home IV therapy, for both hydration and antibiotic treatment, can potentially reduce the need for residents to be transferred to hospital for this treatment and reduce hospital length of stay for residents able to return to the LTCH to complete IV therapy started in hospital. One limitation to this study was that there were very few residents identified as requiring IV antibiotics during the study time period. There are likely a number of reasons for this. The rate of influenza in LTCH in this region

was unusually low during the winter season; to the best of our knowledge, there were no, or few, institutional outbreaks in this region. Some residents, particularly those with cognitive impairment, may not be appropriate for IV therapy due to their tendency to remove the IV lines or end of life goals of care.⁽³⁹⁾ Moreover, the use of the clinical pathways for this study may have improved detection with attention to the functional changes that can signal an infection and resulted in more timely and effective management of infections with the use of oral antibiotics consistent with pathway criteria, thereby avoiding the need for IV therapy or ED transfers. In some cases where IV antibiotics may be indicated, there may still be a preference to use oral antibiotics as the first line treatment, with intentions to use IV antibiotics if oral antibiotics are not effective. This may reflect resistance to change or lack of physician or nurse practitioner familiarity with parenteral antimicrobials (types, indications, doses). As identified in this study, this may be resolved with educational opportunities for licensed prescribers in LTCH, as well as clinical pathways for assessing and managing infections in LTC. As many residents did not meet the criteria for in-home IV therapy, use of clinical pathways and access to this service cannot completely eliminate the need for transfer to hospital; severe symptoms in the light of multi-morbidity may require further investigations that can only be provided in hospital.

Consistent with factors known to facilitate successful implementation of innovative medical interventions in LTC,⁽¹²⁾ this study highlights the importance of collaborative decision-making facilitated by the clinical pathways. It suggests that an in-home IV therapy service is feasible to implement in LTC when there are educational, nursing, and pharmacy supports available to facilitate and support the service. Access to professional development is critical to ensuring the success of health-care innovations in LTCH,⁽³³⁾ particularly as the assessment and diagnosis of infections in the frail elderly is challenging and often complicated by multi-morbidity.⁽⁴⁰⁾ Moreover, the selection of appropriate antibiotics was not as precise as initially anticipated, particularly the selection of IV administered antibiotics, for which many LTCH medical directors were not previously experienced as they are community-based family physicians who did not have frequent opportunities to prescribe these medications. LTCH medical directors who also work in Emergency Departments may be more familiar with these medications.

The quality of care in LTCH has been questioned, with many calls for improvements related to staffing, use of standardized assessment measures, and access to health services.⁽⁴¹⁻⁴³⁾ Implementation of this type of service in LTCH serves to increase the nursing scope of practice, increase capacity of the LTC sector to provide medical treatment, and generally enhances quality of care. Across both family caregivers and other key stakeholders there was general consensus that provision of this service within LTCH is preferable to in-hospital treatment, particularly as it prevents adverse events associated with hospitalization such as pressure ulcers,

deconditioning, and hospital acquired infections. Although no residents were interviewed in this study, there is evidence that LTCH residents prefer to receive IV therapy in-home rather than in hospital.⁽⁴⁴⁾

There are a number of limitations to this study. A small number of homes participated in this study; the service was not implemented in one of the homes that had committed to the study and while the reason for this is not entirely clear, it is suspected that staff and Director of Care turnover during the study time period challenged implementation. One of the homes had previous experience, albeit limited, with in-home IV therapy. These homes may not be representative of all LTCH in the region; these homes may have had more positive perceptions of this service from the outset, but this is unclear as their perceptions of in-house IV therapy prior to initiating this study were not measured. As the majority of residents received hypodermoclysis for hydration, it may be that LTCHs are more comfortable with providing this type of therapy than IV therapy for antibiotic administration, though this was not evident from these study findings and should be explored further. The sample size for the caregiver interviews was small; further research is needed with a larger sample size to validate the findings of this current study. More research is needed to evaluate the impact of this service on nursing workload, improving resident health outcomes, and health system cost savings.

CONCLUSION

This study demonstrated that it is feasible to implement an IV therapy service within LTC when there are supportive resources, such as clinical pathways to facilitate assessment and management of infections, as well as educational, nursing, and pharmacy supports available to build and sustain capacity for IV therapy in LTC. This type of service in LTC has the potential to reduce transfers to the ED and hospital admissions, avoid the unfavourable outcomes commonly associated with acute care, increase resident and family caregiver satisfaction with LTC, and enhance quality of care provided in LTC with increased capacity to provide medical treatment and potentially better outcomes for residents.

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CONFLICT OF INTEREST DISCLOSURES

The authors declare that no conflicts of interest exist. Dr. O'Donnell, Ms. Broadhurst, and Mr. Navare are employees of Medical Pharmacies Group Limited.

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