Introduction of point of care blood testing for Letterkenny Pathfinder patients. A Quality improvement project report.

By Catherine Kelly and Gary Gardiner

Executive summary

The Letterkenny Pathfinder team followed the journey of patients that they had to convey into the Emergency Department for low grade infections and mild dehydration. The team identified that a number of patients received minimal intravenous-based interventions and were discharged home without hospital admission. The primary aim of the point of care blood testing project was to investigate if this cohort of patients could be safely managed at home by the Pathfinder team through use of intravenous interventions.

The use of point of care blood (POCB) testing enhances diagnostic assessment and captures a more detailed picture of the patient's haemodynamic state. This supports enhanced clinical decision making on scene regarding the decision to treat the patient or convey to the Emergency Department.

A total of 50 patients were included in this study of which 7 were transported to the Emergency Department following POCB test. Suspected low grade infections accounted for 36% of patients and mild dehydration accounted for 50%. Of those patients who were not conveyed, 100% remained safely at home at 24 hours, and 88% remained at home after day 7.Therapy input was required for 63% of the patients involved. The results of the project was overwhelmingly positive in terms of the ability to safely treat and keep patients with low grade infections and mild dehydration at home. Feedback from patients and GPs involved in the study was equally positive.

Critical enablers for this project were: (1) collaboration with the patients' GPs to govern the interventional treatment at home based on POCB test results and provide a direct medical oversight; (2) Letterkenny Laboratory point of care team who oversaw the quality assurance of the ISTAT analyser and monitored the results; (3) having access to the patient's previous blood results which was invaluable to the safe clinical decision making for these patients and; (4) SPARK Funding this project, which provided for the cost of the IT connection from analyser directly to the Laboratory. This study has demonstrated that having all of the four adjuncts above will enable Pathfinder and other National Ambulance Service (NAS) Alternative Care Pathways to provide this safe model of care to their patients in their region.

Glossary

ABx	Antibiotics
CVA HB	Cerebrovascular accident
ED GI	Haemoglobin
LKPF	Emergency department
NAS	Gastro intestinal
NACL	Letterkenny pathfinder
NEWS	National ambulance service
NSTEMI	Sodium Chloride
POC	National Early Warning system
POCB	Non ST elevation myocardial infarction
PF QIP	Point of care
SIADH	Point of care blood
UTI	Pathfinder
	Quality improvement Project
	Syndrome of inappropriate anti diuretic hormone
	Urinary tract infection

Contents

1. Introduction

Letterkenny Pathfinder (LKPF) was established in April 2023 and as part of their service, provided continuous data analysis for each patient outcome. This data revealed that, between April and September 2023, 23 of the 41 patients who were conveyed to ED as a result of Pathfinder referral were discharged within a 24 to 48-hour period. The majority of the 23 patients received 500ml of intravenous (IV) fluids and/or one loading dose of intravenous antibiotics and were sent home on oral antibiotics. Advanced Paramedics (APs) have the skillset to administer both of these treatments but only if the patient conveys to ED. These 23 patients became the catalyst for this pilot.

This Quality improvement project (QIP) had an initial target of 30 patients, based on a retrospective review of patients who the team deemed suitable for POC treatment. This QIP proved so successful that the 30 patient cohort was surpassed within the first four months of the allotted ten month timeframe. As a result of this the project was extended to 50 patients at a relatively early stage to further bolster the reliability of results.

The introduction of point of care blood testing (POCBT) to guide administration of fluids and antibiotics safely at home could change current practice for Pathfinder teams and other NAS Alternative Care Pathways. This QI project involved collaboration between Pathfinder and the patient's General practitioner (GP). The GP can give medical oversight to the selected patients ensuring there is safe clinical decision making.

Point of care blood testing is not new to the healthcare system and has been used in the community for some time. (Soobroyen, Slade and Schiff (2024) demonstrated how Hospital at Home teams in the UK used POCB testing to make safe clinical decisions about their patients' care. It also has been trialled in ambulance services internationally, where Canadian paramedics have been using POCB for several years (Füzéry, A. et al 2021) alongside Scandinavia (Gruebl et al., 2021) and Yorkshire UK (Lightowler et al (2023). Point-of-care blood testing is also used in the NAS-supported EDiTH service (provided by Emergency Medical doctor from SVUH), and this community-based triage tool has reaped benefits for ED.

For the first time, POCB testing within the NAS will be used with the aim of keeping a patient at home with GP collaboration. There is no evidence to date on the use of POCB testing on patients who remain at home for treatment from the NAS rather than the usual conveyance to ED. For this reason, this QI project was established to determine the safety and efficacy of this intervention.

2. AIM

Theprimary aim was to evaluate if POCB testing enhanced the Letterkenny Pathfinder Team's ability to manage 50 patients safely at home and potentially reduce ED attendances in patients aged over 65 years.

- We aimed to ensure that 100% of patients who remain at home suffer no adverse incidents as a result.

3. OUTCOMES

Our outcomes were designed to assess if POCB testing can provide a safer outcome for selected patients in collaboration with the patient's GP and investigate if the use of POCB testing improves efficiency of care.

The primary outcome measures of the project were as follows;

1. Number of patients who have a POC test.
2. Number of patients who meet the criteria for POC testing.
3. Number of patients with POC results in the normal laboratory reference range and their 7-day outcomes.
4. Number of patients with POC results in the abnormal range and their 7-day outcomes.
5. Number of patients with POC results in the severely abnormal reference range and their 7-day outcomes.
6. Patients with low level infections and/or mild dehydration are successfully managed at home (i.e. still at home 7 days post-POC testing +/- treatment).

In addition to the above this report will investigate:

A. Average on scene times for POC calls versus non-POC calls.
B. Number of follow ups required for POC patients versus non-POC patients.
C. If there was any adverse events from the POC testing process.
D. Patient feedback surveys.
E. GP Surveys.

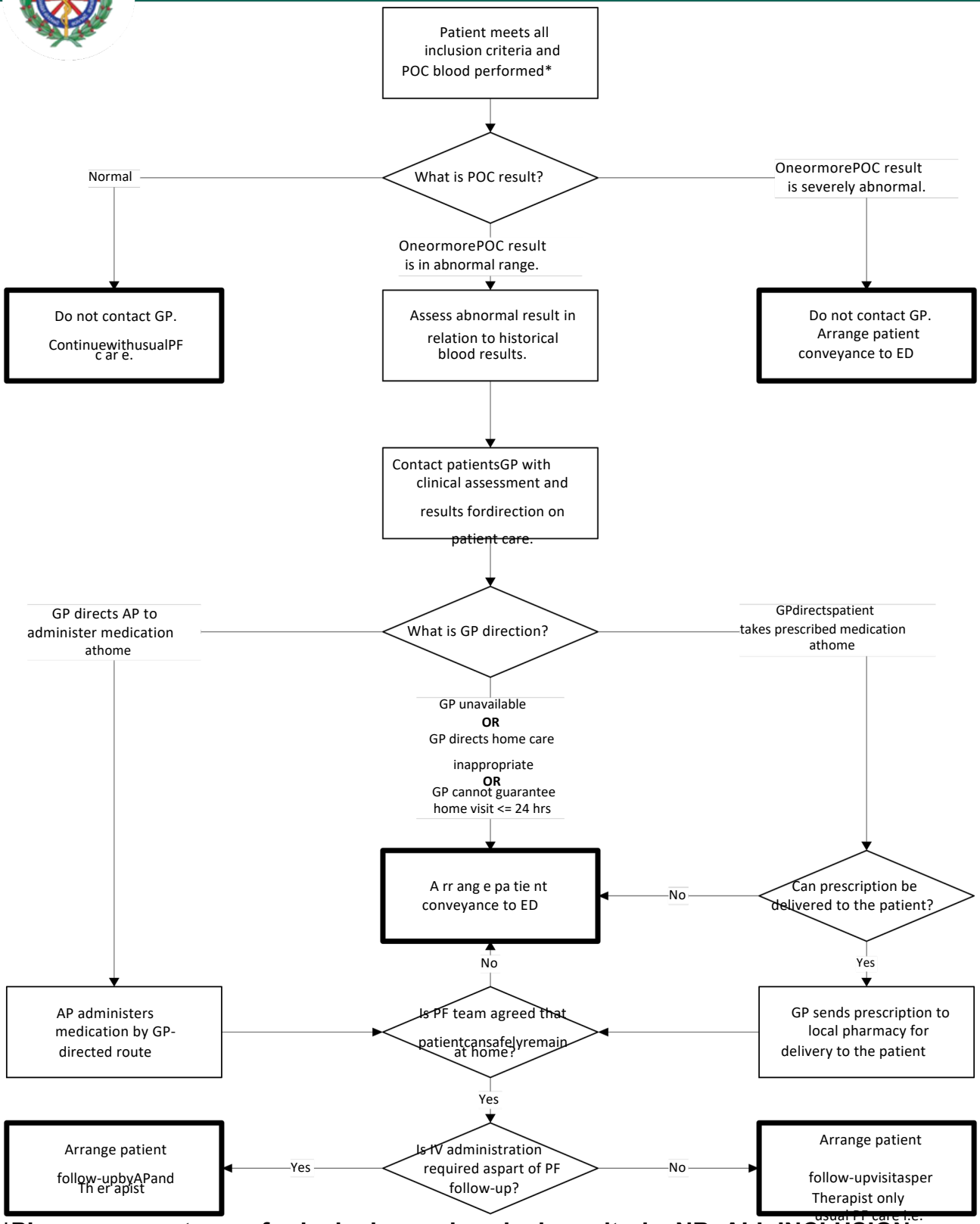
4. Methodology

All GPs in the surrounding catchment area were made aware of this project via email and presentations, which detailed that LKPF would include POCB testing in their assessments with selected patients at home. The email was sent from the Pathfinder team Project Leads, highlighting the date of pilot commencement, opening hours for access to service, contact mobile number for direct referrals alongside inclusion and exclusion criteria. The email also explained that this service was accessible to all GPs who wish to avail of it, but with no obligation to use this service.

If the GP decided to access the service, they could refer directly via the mobile number displayed on the email. Information requested from Pathfinder included name, date of birth, eircode and their presenting condition (with any relevant past medical history) for POCB testing in the hope of treating their patient at home with IV fluids, anti-medics, or IV antibiotics. The interventions were administered by the Advanced Paramedic on Pathfinder with medical governance provided by the GP.

Secondly, patients could also be selected by the Pathfinder team. This occurred when the patient's first contact was with the Pathfinder team rather than their GP. The Pathfinder team may assess the patient and deem that they fall within the inclusion criteria for POCB testing. In this scenario, Pathfinder made the GP aware of the full assessment and results of POCB test. The GP then decided, based on the results of POCB testing, that Pathfinder may treat the patient at home or arrange for this patient to be transported to hospital without delay. The patient's GP made the overall clinical decision about the patient's treatment plan and care.

This process is further explained in the attached flowchart below.



***Please see next page for inclusion and exclusion criteria. NB. ALL INCLUSION CRITERIA MUST BE MET BEFORE POC PERFORMED**

5. Inclusion Criteria

- GP has requested Pathfinder to assess a patient at home/or collaboration has
- been made by Pathfinder to the GP on the selected patient.
- Patient and family consent to POCB testing
- One or more vital sign outside normal reference range
- Family member/s remain with patient for the period of at least 24 hours post assessment.
  GP has agreed to see the patient and review within 24 hours.

6. Exclusion criteria

POC testing should NOT be carried out if ONE or MORE of the following criteria are met.

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. Oncology patient with a high temperature
. Clinically unwell septic patient
. Patient who was not previously on oxygen and now requires oxygen from AP.
. FAST positive
  Suspected fracture
  Abdominal pain

Each patient who has availed of the POCB testing at home will be issued with a brief information sheet following the procedure. This is accessible in appendix one.

7. Training

For this QI project, the ISTAT Abbot analyser was used alongside both CHEM8+ and CG4 cartridges (see appendix two for normal levels of blood readings). Additional certified training was provided by the manufacturers to all the team members on the use of the iSTAT machine and the calibration of the results. The four APs in the Pathfinder service had additional training on phlebotomy. This was signed off and verified by a qualified phlebotomist.

8. Validation

The local laboratory calibrated the iSTAT analyser. The Pathfinder team ran three quality assurance tests per week to ensure the iSTAT results were valid. An external bi-monthly calibration was also required at the manufacturer's request.

9. Costings/Funding

The costings of this pilot was calculated and outlined in appendix 3. We were able to secure two iSTAT machines free of charge as they were available and not in use at our local laboratory. We later discovered an addition cost of approx. €10,000 for a connection fee from the iSTAT machine itself directly to the Letterkenny laboratory. Funding was sought through SPARK innovation and the sum of €23,803 was awarded to this project. This covered the cost of cartridges for the 10 month duration and all calibrations.

10. Data collection and analysis

Data on each patient for this pilot was collected and stored in an encrypted HSE laptop accessible to only the project leads. Each patient's outcome was documented, and discussed by core team members of the pilot at fortnightly huddles.

As this is an unprecedented area of research, the evaluation tools at the disposal of the project leads are limited in that there are no comparative measures available, therefore the most objective review of the intervention lies in the results of patient feedback surveys. Each feedback survey (see appendix 4) was completed within two weeks via telephone call following the POCB intervention. To reduce risk of bias, feedback was sought by a team member who did not have face to face contact or any intervention with the patient. On completion of the project, a feedback survey (appendix 5) was also created for the GPs who engaged with the project in order to assess their views and gather data for any possible future applications.

In addition to the objective that no patient experience an adverse event, these patient feedback surveys played a key part alongside appropriate training for the team and validation of the equipment.

11. Project Governance

This project was reviewed by the NAS Research Committee and approved as a quality improvement project. The project was also considered and approved by the NAS Alternative Care Pathways Steering Group before commencement. The project plan was developed in consultation with the NAS Deputy Clinical Director and the NAS General Manager for Clinical Strategy & Evaluation. In order that patient care and outcomes were kept under regular review, fortnightly 'huddles' were held with the project team and the NAS Clinical Directorate.

The NAS Deputy Clinical Director privileged the Pathfinder APs to perform interventions and administer medications as directed by the patient's GP. The competency to draw blood and administer medications was within the APs scope of training but not within their current scope of practice as they only administer medications to patients that are being transported to hospital. For the purposes of the project, APs could only administer medications that were within their current scope of practice. The unique aspect of this project was that, usually when such medications are administered, the patient is conveyed to ED.

While the AP was privileged to take the GP's direction with regard to the conveyance decision, the GP had clinical responsibility for the decision that the patient remained at home. Operational governance for APs remained within the usual NAS operational framework for the duration of the project.

12. Findings/Results

The results of the initial outcomes are as follows;

1.50 patients had a POC test.
2.47 patients met the POC criteria. The remaining 3 had normal vital signs but GP still requested POC testing. 1 requested HB check, 1 requested K check, and 1 'off form'.
3.As per table 1, of the 50 POC patients tested, 12% had POC results in the normal laboratory range. At 7 days, all these patients remained at home.
4.36% of patients tested had abnormal range results. Of these, only one was transported to hospital. Of note, this was the first patient tested, and neither the GP nor family were sufficiently confident about keeping the patient at home. The patient had a prolonged wait in ED, received one 500ml bag of NACL, one dose of IV antibiotic and was discharged home at 05:00 hrs. On feedback, both family and GP regretted the decision not to treat at home. All other patients remained at home by day 7.
5.52% (n=26) of patients recorded severely abnormal results, 30% (n=15) of whom remained home at day 7.
6. 5 patients required no input.
7.Low grade infection accounted for 36% of POC calls (18 patients). Of these, 94% remained at home by day 7. 1 did not make day 7 due to resistance to penicillin antibiotic
8.Dehydration accounted for 40% of the POC calls (20 patients), and 95% of these all safely remained at home by day 7. 1 did not make day 7 due to continuously low Na – patient was admitted with SIADH
9.5 patients (10%) received both IV abx and IV fluids.

A. Average call duration for POC calls compared to non-POC calls

Call duration (from time call received in NEOC to time all assigned resources clear) was calculated for all calls attended by Pathfinder during the QI project. The average call duration for a POC call was 171 minutes (standard deviation (SD): 95 minutes) compared to 158 minutes (SD: 115 minutes) for a non-POC call. While the average call duration for POC may appear longer, this difference was not statistically significant i.e. use of POC was not associated with longer call duration.

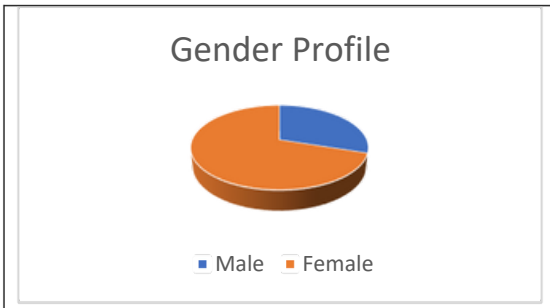
B. Number of follow ups required for POC patients versus non-POC patients showed no variation. 50 non POC patients were randomly selected by a member from the Pathfinder team who was not involved in the project. The follow-up encounters for the POC patients averaged 2.56 and non- POC patients were averaging 2.44. 27 out of the 43 patients required OT/PT input. 7 patients required AP follow-up.

C. There were no adverse reactions to any patient's during the QI process.

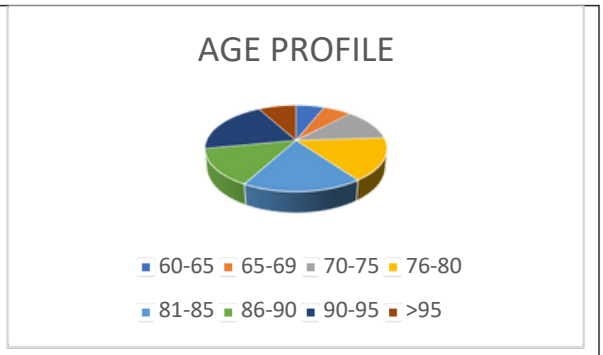
Related findings

Of the 50 patients involved in the cohort, the following are some findings:

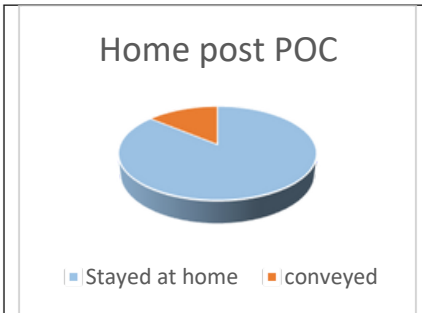
Gender and age profile;



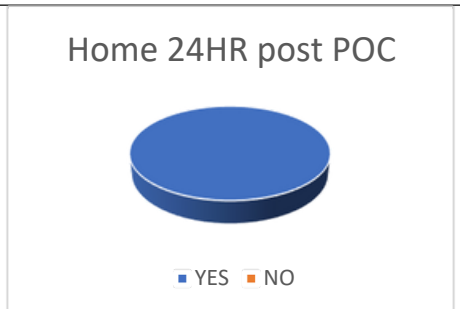
35 female/15 male, or 70% female/30% male.



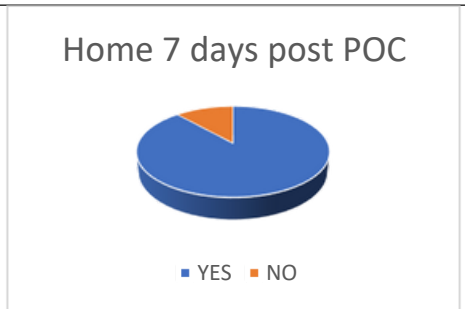
Non conveyance profile;



43/50 or 86% stayed home post POC

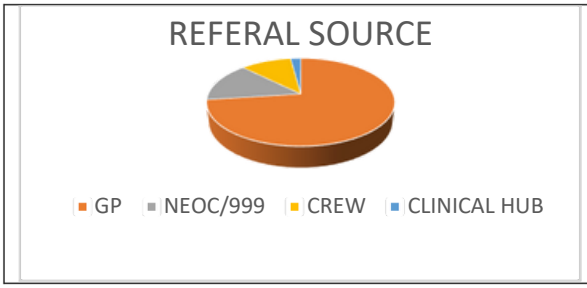


100% remained home 24hrs post POC



38/43 or 88% remained home 7 days post POC

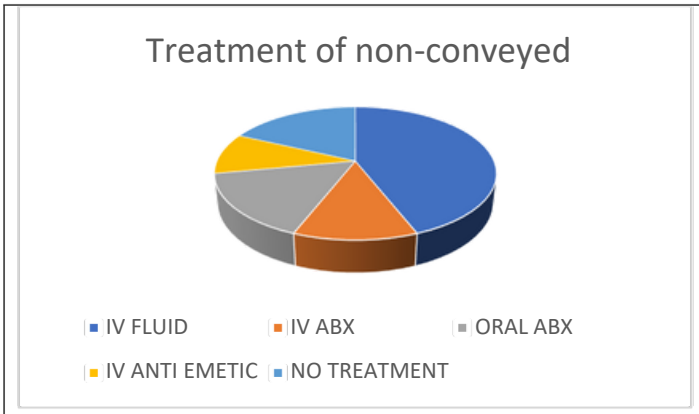
Referral Sources;



Referral source;

GP	70%
NEOC	14%
CREW	10%
Clinical hub	2%
PHN	2%
Cardiac hub	2%

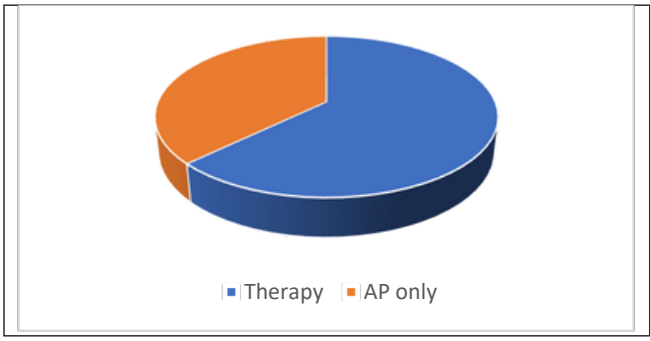
Treatment of non-conveyed patients;



IV FLUID	22
IV ABX	6 8
ORAL ABX	5 9
IV ANTI EMETIC	1 1
NO TREATMENT	
IV DIURECTIC	
IV PARACETAMOL	

Must note that some patients would have received multiple treatment interventions.

Therapy input;



Therapy input required: 27/43 (63%)

Geographical spread of calls;

Apart from expected clusters around more populated areas, this graph shows that the project was widely used in each area of the county.

13. Feedback surveys

Patient As per appendix 1, all patients or next-of-kin of patients included in this project were contacted by a team member within the week after the POC testing was carried out. This survey was overwhelmingly positive and received no negative comments. All participants ticked the 'strongly agree' for each box apart from the 'The blood testing procedure was painful and/or uncomfortable' category. Some had agree, some had disagree, which was an expected outcome as it was pertaining to insertion of a needle into a vein.

Overarching themes from the feedback included:

- Very thankful that transport to ED/ hospital could be avoided.
- Patients and families were delighted to have effective definitive treatment at home.
- Praise for the Letterkenny pathfinder team in their interpersonal care they delivered.

Some quotes are as follows;

"This service allowed mum to be treated at home where she wanted to be, she quickly recovered from her UTI and I believe it was due to the assessment and skills of this team, we will be eternally grateful."

"The manner of the team was amazing"

"Each team member went above and beyond our expectations"

"The team gave us great understanding of the procedure"

"So thankful we have this in Donegal, otherwise dad would have went to ED and our last 2 experiences with him in there were dreadful"

GP Appendix 5 describes the GP survey used in this pilot. The GPs that responded again showed positive experiences, with 100% that used the POCB testing agreed or strongly agreed that the results were beneficial to their decision making. It also showed that 100% agreed or strongly agreed they were happy with the interventions administered and 100% agreed or strongly agreed they were happy with the outcome of their patient. One GP highlighted that when they made a referral, the PF team may have been in another location that would have been some distance away from their patient. The GP did state this wasn't a complaint but merely an observation and understands the logistics in the role of the ambulance service.

Some additional quotes from our GPs include;

"Incredible service, very helpful, always keep my patients out of hospital, provide services which would otherwise require ED. Very collaborative and professional approach. Highly recommend to GP colleagues"

"Have found this service most useful, allowing the patient to get enough care and aid diagnosis/ fluids to allow them to avoid hospital in many instances. My patients were very appreciative of the service also."

"Excellent service. The staff are always so professional to deal with. The follow up care is excellent"

"Addition of CRP would be really beneficial"

14. Discussion and future applications

This POCBT pilot took the team on a journey of discovery which lead to significant learning in predictable and unpredictable areas. Patient no.1, for example, was conveyed to the ED, but if we (GP and the team) had the confidence and competence we had by the time we gained more experience, this patient would certainly have stayed at home.

With any firsts, mistakes were made, possible 'false activations' where the POC possibly should not have been used (Patient no. 5) and there was occasions where the patient could have been treated safely at home if there was sufficient communication between the crew and the GP.

Findings for usages of POC can be segregated into what more can be done to keep a wider cohort of patient at home, and how POC can be used to fast-track patients who have to convey to ED for matters which cannot be safely managed at home. Patient no. 6 had epistaxis and was on anticoagulants. The clinical hub could not safely make the decision to keep this patient at home until they had knowledge of the patient's haemoglobin levels. POC in this case was the critical clinical adjunct to help the clinical hub doctor make that decision.

Patient no. 29, as previously mentioned, had to convey to ED because they had coffee ground hematemesis as the team were assessing him. This made it a clear cut decision that the patient had to be transported to ED. However, through the use of POCB testing and the Glasgow-Blatchford score of 4 on scene, ED staff were furnished with a more robust assessment which aided the triage process for the patient. This particular patient was escalated for endoscopy investigations in ED on arrival and reduced prolonged waiting times in ED for bloods. This aided the receiving facility to categorise the patient as a low, medium or high risk candidate. (Schembre et al., 2020)

There were two patients that impacted us most during the project, patient no. 27 and patient no. 44. Patient 27 was a collaboration between GP, Pathfinder and the palliative care team. The GP involved with this patient's care wanted to respect their wishes of having their last moments at home with family. This patient was given IV fluids and anti-emetic by PF, the palliative care team optimised pain relief, and some equipment was provided from the Occupational Therapist to aid comfort. After a few days this patient took their last breaths surrounded by their loved ones.

Patient no. 44 had acquired a brain injury later in life and was wheelchair bound. He subsequently developed a UTI and became quite unwell at home, with NEWS score of 12. The GP involved requested us to treat at home with his medical oversight as this man's wish was not to go to hospital. GP prescribed 1 litre of fluids, IV Ceftriaxone, and IV paracetamol. This man had numerous face to face visits daily by GP, PHN, and PF. He received 3 days of IV treatment and made a full recovery. This showed us the value and strength of community collaboration and communicating closely together. It is important to note that the access to previous blood results from hospital records were a huge clinical adjunct in our decision making. This was evident with all 50 patients involved, as it helped to identify acute and chronic presentations, in turn making us ask the question does this patient need urgent ED attendance right away.

We feel it important to note that out of the 43 patients that remained at home, 27 (63%) of these required therapy input. This was higher than we anticipated which highlights the importance and need of holistic multi-disciplinary assessment for patients. The GP collaboration also yielded unprecedented success. Their unique knowledge on each of their patients' medical, social, and environmental backgrounds, showed a powerful gain in the safe clinical decision making. Patient 50 was our final patient of the pilot but also our first patient that commenced a collaboration with the cardiac integrated team in the community. Their vision was to give patients access to IV diuretic (furosemide) at home as they previously have to attend ED for this. The consultant and ANP takes governance and follow-up care of these patients, and PF furnishes them with the POCB results prior to administration. A few GPs highlighted the value of a CRP reading which could help them indicate the need to either treat with an oral antibiotic or an IV. Discussions have also taken place with other community teams such as the local OPAT team, to open more avenues for these elderly patients at home.

The president learning for us during this project was that normal vital signs in the elderly population may give false reassurance. These patients appear to either compensate very well vitally or there is a delay in their aging somatosensory cortex. The addition of POCB testing may help to identify these patients. Patient no. 8 is the perfect example of this. He had normal vital signs yet his sodium levels were at an un-correctable level, was conveyed and sadly passed away a number of weeks later.

This begs the question of pre-hospital practitioners – what are we missing in our clinical investigations without POCB?

15. Conclusion

The main aim of this project was to introduce POCB testing to investigate if it is a safe clinical adjunct to treat and keep patients with mild dehydration and/or low grade infections at home with minimal IV interventions. Our results suggest that POCB is highly effective at achieving this aim and has actually surpassed all expectations.

Although new to LKPF, this pilot has positively impacted on many services, including ED and NEOC, as the option to refer a wider cohort of low acuity, older persons to Pathfinder is now available. These options free staff and ambulances for more acute calls and sicker patients, giving better use of resources and have a positive economic impact on the hospital attached.

The GP practices that avail of this service will now be able to provide more for their elderly patients at home. It will give them the opportunity to provide a safe higher level of care in the community. The AP in Pathfinder will also be able to use their skillset and treat more elderly at home and the Pathfinder team will have the opportunity to enhance their knowledge and skills as practitioners and deliver a more robust service for the low acuity frail older person.

As described above, this pilot had an extremely significant impact on all stakeholders involved, though none more so than the 50 patients who have had the opportunity to avail of POCB testing at home. It helped make safe clinical decisions about the patients' care and provide a unique opportunity to receive treatment within their own home, in collaboration with their own GP who is conversant on their health. This in turn reduced (1) an unnecessary conveyance for 43 patients to ED and (2) the potential complications that may arise from an ED attendance in our elderly patients.

The success of this pilot was from the collaboration of all of stakeholders and team-members involved. The goal of hospital and community agencies joining forces to provide care for our elderly patients in their own home was something everyone involved felt strongly about. The vision 'if everyone is moving forward together, and putting the patient first, then success takes care of itself' was achieved. Without the strong structure, support, medical oversight and governance from our local laboratory team and GPs, this would not have been a success. Their expertise gave a unique oversight of the patient, alongside the access to previous hospital records. These records provided the team with an overall history and baseline of the patient, helping to identify chronic and acute flare-ups. Furthermore, the funding that SPARK provided for this project made a simple idea come into an existence. It is now hoped that this project has the potential to expand to all PF teams and alternative care pathways as it has the potential to re-shape pre-hospital care and decompress ED.

16. Acknowledgements

This project was dependant on so many key stakeholders, without any of whom it would not have been possible for it to come into existence. Catherine and Gary would like to acknowledge and thank the following, who each played a part in this project in big and small ways;

Siobhán Masterson, Dr Sean O'Rourke, JJ Mc Gowan, John Ward, Dr Evelyn Mc Manus, Dr Dineo, Gary Doherty, Spark funding for their support, in particular Eva Stanley and Catherine Marsh. Laboratory ladies from Letterkenny University Hospital Francesca Patton, Aoife O'Donnell; Susan Breen, Caoimhe Haughey, Paulette Alexander, Lorraine Mc Govern and April Boyle. Mary Cashen from Abbotts for training and guidance throughout. The Letterkenny Pathfinder team for their continued support and help with this project and for the care and attention they gave to each of these patients. Last, but by no means least, to all of our GPs in Donegal who engaged enthusiastically with the project. This would not have been possible without you all.

Throughout the duration of the project the core team had fortnightly online meetings to discuss each case, and an overall view of how the project was developing. This gave direction on certain calls and was one of the foundations of its success. A special thanks has to go to Siobhan Masterson for her advice and guidance.

All inputs from all of the above and all stakeholders who helped this initiative from its inception to its ending are very much appreciated.

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Appendices

Appendix one

FAO: PATIENT

Patient Name: _____

Date: _____

Following assessment that included point-of-care blood testing, the Letterkenny Pathfinder Team contacted your GP to discuss the treatment that would be most appropriate for you. Your GP advised that it was appropriate for you to remain at home following treatment.

The Letterkenny Pathfinder Team have now completed your treatment for today. With your agreement, you will not be brought to hospital. A member of the Letterkenny Pathfinder Team will review you again with a home visit within 24-36 hours.

If you feel unwell or your symptoms worsen before your review visit, please call **112 or 999**.

Ref: Letterkenny Pathfinder POC Quality Improvement Project

Appendix Two

Bloodresults that will be considered as part of clinical assessment Table1presents the array of blood results that are available from both cartridge types. Forthepurposes of this project, only the following results will be taken into consideration:

- Sodium
- Potassium
- Urea nitrogen/Urea
- Creatinine
- Haemoglobin calculated
- Lactate
- Anion gap
- Blood glucose

Table 1 Blood results produced using CHEM8+ and CG4+ cartridges in the ISTAT machine

Istat Abbott	Normal Range	Abnormal Range	Severely Abnormal Range
CHEM8+ cartridge			
Sodium (Na)	135-145mmol/L	<135or>145	124orlesssevere
Potassium (K)	3.5-5.2mmol/L	<3.5or>5.2	< 3or >5.5
Chloride (Cl)	96-106mmol/L	<96or>106	(inlinewithNa)
Blood Urea nitrogen/Urea	2.5-10.7mmol/L	<2.5or>1.0.7	>15mmol/Lor>20% abovebaselinevalue
Glucose	3.9-5.8mmol/L	<3.9or> 5.8	>15
Creatinine	45-85umol/L	<45or> 85	>100umol/Lor>20% abovebaselinevalue
Anion gap	10-20mmol/L	<10or>20	>20
Haemoglobin (Hb)	12-16g/dL	<12or> 16	<9.5
CG4+ cartridge			
Lactate	Less than 1	Morethan 1	Greaterthan2

Appendix Three

PROJECT COSTINGS

Pathfinder Letterkenny, Letterkenny University Hospital, Letterkenny, Co. Donegal
Project Name: *POC Blood testing for LK Pathfinder patients*

Date:
Created by: *Catherine Kelly & Gary Gardiner*

	Item name	Item Description	Cost (€)	Plus Vat	Handling fee	Total Cost
For start-up						
	iSTAT machine, holder and printer	(Gifted from Letterkenny Lab)	3,600			
	Clinisys - Connectivity fee IT Solutions.	From iSTAT machine to Letterkenny Lab	7,591			7,591
	Clinisys - Annual Fee IT solutions		916			916
	Roche - Implementation fee	from Abbots to Letterkenny Lab	1,665			1,665
Calibration of machine/Quality Control (QC) tests						
	CHEM 8 Cartridges	QC Tests for year supply (8 Boxes @ 217.25)	1,738	399.74	120	2,258
	CG4 Cartridges	QC Tests for year supply (8 Boxes @ 186.80)	1,488	342.24	120	1,950
	Tri Control Amps 1/2/3	QC Tests for year supply (18 Boxes @ 25.43)	458	105.28	120	683
	External Quality Control Amps -bi monthly		250			250
For 10 months of patients						
	CHEM 8 Cartridges	For Patient Use (9 Boxes @ 217.25)	2,110	485.3	120	2775.3
	CG4 Cartridges	For Patient Use (9 Boxes @ 186.80)	1,993	442.17	120	2,555
	iSTAT printer paper	For Patient Use (4 Boxes @ 32.30)	130	29.71		160
Research Fee						
	To publish the findings	Open Access	3,000			3,000
	TOTAL					**23,803**

Appendix Four

Letterkenny Pathfinder POC Feedback

Please rate your opinionofthe followingaspectsofLetterkennyPathfinderPoint of Care treatment.

Tick the box most appropriate

	Strongly agree	Agree	Disagree	Strongly disagree
Iwas happy with the overall quality of service provided				
Iwas happy with the information provided for diagnosis and treatment				
Iwas adequately informed of the procedure carried out.				
Iwas satisfied with the assessment carried out at my home.				
Ifelt confident that the outcome was the best for me/the patient.				
Iwas satisfied with the follow up support provided.				
Iwould like to see point of care blood testing integrated into more of the ambulance service.				
Iam in favour of the development of hospital avoidance programs.				
Iwould be in favour of enhancing the skillset of this team				

Ifyou would like to add any suggestions or comments please use the box provided

Appendix Five

Letterkenny Pathfinder POC GP feedback

Please rate yourexperienceofthefollowingaspectsofLetterkennyPathfinderPoint of Care treatment.

Tick the box most appropriate

	Strongly agree	Agree	Disagree	Strongly disagree
Did you find it was easy to access the service				
Did you find the Pathfinder team approachable?				
Did you find the results of POC beneficial to your decision making				
Were you happy with the interventions administered				
Were you happy with the outcome of your patient				
Iwas satisfied with the follow up support provided.				
Iwould be happy to engage with service again.				

Ifyou would like to add any suggestions or comments please use the box provided.

Please suggest any future uses / additional blood markers you think would help in your practice