

Personal reflection on the antimicrobial pharmacist independent prescriber role in the diabetic foot team

Dr Naomi M Fleming, Antimicrobial Pharmacist, Kettering General Hospital, Northamptonshire.

Correspondence to: naomifleming@nhs.net

Abstract

Title

Personal reflection on the antimicrobial pharmacist independent prescriber role in diabetic foot infection.

Author list

Fleming NM.

Summary

The roles of pharmacists in clinical settings has expanded considerably. This paper describes the role of an antimicrobial pharmacist independent prescriber (PIP) within the diabetic foot team. The risk of foot problems in people with diabetes has increased; around one in twenty people with diabetes will develop a foot ulcer in one year and more than one in ten foot ulcers result in the amputation of a foot or a leg. This has a significant associated mortality of 70% within 5 years. Evidence shows that providing an integrated footcare pathway and speedy access to specialist multidisciplinary teams (MDTs), considerably lowers the risk of amputation. The antimicrobial PIP specialist role provides skills in microbiology, as required in the National Institute for Health and Care Excellence (NICE) guidelines for MDT skill mix. Additional benefits such as pharmacy skills, antimicrobial stewardship, prescribing, systems support and navigation, strategic support, research and audit, education and training are reported in this paper.

NHS England funding enabled the development of a diabetic foot infection antibiotic clinic co-led by an antimicrobial PIP and a diabetes specialist podiatrist (DSP). During this clinic, intravenous (IV) and high-risk oral antibiotics were initiated, monitored, reviewed, amended and stopped. This includes the use of 24-hour infusion devices for IV antibiotics, enabling patient care at home. To date (December 2017 to September 2018), we have seen 75 patients in clinic; 33 on traditional IV antibiotics, 26 on 24-hour infusion devices and 16 on oral antibiotics that require close monitoring. Focusing on the infusion device patients, 23 have been 'admission avoidance' and 3 have been 'early discharges' saving the equivalent of either 1,191 bed days or 2,538 home nurse visits.

The role improves patient care, allows faster access to specialist MDT for new patients, avoids unnecessary acute admissions and enables earlier discharge. The role is still evolving; outcome data is being collected and further funding is being sought.

Keywords: stewardship, infection, diabetes specialist podiatrist, admission avoidance, early discharge.

Introduction

Roles of pharmacists within diabetes

The roles of pharmacists in clinical settings has expanded considerably over recent years. Roles for pharmacists as prescribers in diabetes clinics have been described as far back as 2013 by Rushworth.¹ The Diabetes Times reported on the new role of a diabetes consultant pharmacist in Southampton University Hospitals NHS Trust in March 2017, which was seen as a landmark move designed to improve care by harnessing resources following the decline in nurse specialists and registrars.² The clinical pharmacist role within diabetes is now nationally recognised with an Integrated Career and Competency Framework for Pharmacists in Diabetes having

been developed in conjunction with the UKCPA this year.³ What is not described, however, is the role of a pharmacist independent prescriber (PIP) within the diabetic foot team.

Diabetic foot disease

Diabetes is one of the most common chronic diseases in the UK and its prevalence is increasing. By 2025, it is estimated that more than 5 million people in the UK will have diabetes.⁴ The life expectancy of people with diabetes is shortened by up to 15 years, and 75% die of macrovascular complications.⁴

The risk of foot problems in people with diabetes has increased, largely because of either diabetic neuropathy (nerve damage or degeneration) or peripheral arterial disease (poor blood supply

due to diseased large and medium sized blood vessels in the legs), or both.⁴

Diabetes is associated with significant complications:

- Diabetes is the most common cause of lower limb amputations.⁵
- 100 people a week lose a toe, foot or lower limb due to diabetes.⁶
- Diabetic foot ulcers precede more than 80% of amputations in people with diabetes.⁵
- Around one in twenty people with diabetes will develop a foot ulcer in one year.⁷
- More than one in ten foot ulcers result in the amputation of a foot or a leg.⁶
- The rate of leg amputations in people with diabetes is over 15 times higher than in people without.⁸
- Up to 70% of people die within five years of having an amputation as a result of diabetes; 50% die within 5 years of developing a diabetic foot ulcer.⁹

Foot problems in people with diabetes have a significant financial impact on the NHS through primary care, community care, outpatient costs, increased bed occupancy and prolonged stays in hospital. Diabetic foot care costs the NHS in England £1.1bn - £1.3bn a year (£5.7 million per Clinical Commissioning Group (CCG)). It accounts for £1 in every £100 the NHS spends.¹⁰

Evidence shows that providing an integrated footcare pathway with staff trained in foot protection services in the community and providing speedy access to multidisciplinary specialist teams considerably lowers the risk of amputation. Delays in access to specialist care are associated with poorer outcomes and higher costs. Severe ulcers account for the bulk of diabetic foot care costs.¹⁰

National guidance states that commissioners and service providers should ensure that a multidisciplinary foot care service for managing diabetic foot problems in hospital and in the community is in place.⁴

How does an antimicrobial pharmacist role fit with national guidance for diabetic foot problems?

It is recommended that the MDT be led by a named healthcare professional and that it consists of specialists with skills in the following areas:⁴

- Diabetology.
- Podiatry.
- Diabetes specialist nursing.
- Vascular surgery.
- Microbiology.
- Orthopaedic surgery.
- Biomechanics and orthoses.
- Interventional radiology.
- Casting.
- Wound care.

The antimicrobial pharmacist fulfils the specialist role with skills in microbiology but also has additional skills to offer. It is also recommended that all hospital, primary care and community settings should have antibiotic guidelines that take into account local patterns of resistance and are based on the concepts within the national guidelines covering the care pathway for managing diabetic foot infections.⁴ The antimicrobial pharmacist is key to the development of these guidelines.

The components of the role

As the role has developed, so have the components of the role. Originally, the antimicrobial pharmacist provided support for the outpatient MDT clinic (a poster discussing the benefits of this was presented at UKCPA conference 2015 and the Clinical Pharmacy Congress 2016). This part of the role has continued; however, the antimicrobial pharmacist also now runs an additional diabetic foot infection antibiotic clinic with a diabetes specialist podiatrist (DSP). During this clinic antibiotics are initiated, monitored, reviewed, amended and stopped. The components of the whole role can be split into several domains (Table 1) comprising:

- pharmacy related skills
- microbiology related skills
- antimicrobial stewardship
- prescribing
- systems support and navigation
- strategic support
- research and audit
- education and training.

Providing the additional antibiotic clinic has the following benefits:

- Specialist antimicrobial review with clinical wound review and debridement by DSP.
- Regular monitoring of clinical improvement, inflammatory markers, therapeutic drug monitoring, renal and liver function and adverse effects.
- Admission avoidance.
- Access to one stop shop for IV antibiotic initiation reducing pressure on ambulatory care.
- Increased capacity for new patients in traditional consultant led MDT improving access for urgent referrals.
- Improved patient-centred care.

Leadership

There have been several leadership opportunities linked to this role.

Within Outpatient Parenteral Antimicrobial Therapy (OPAT) clinics and a MDT clinic

- Advising on antibiotic choice, dose and formulation of antibiotic including checking for allergy and drug-drug interactions
- Leading on referral to hospital or intermediate care for IV antibiotics.

Pharmacy	Microbiology	Antimicrobial stewardship	Prescribing	Systems	Strategy and innovation	Research and audit	Education/training
Formulation advice e.g. IV 24 hour infusion devices, liquids, IM	Prescribing advice based on culture results	Broad to narrow spectrum antibiotic alternatives	Antimicrobials in MDT clinics	Microbiology e.g. access to restricted sensitivities	Business case for infection clinic and 24 hour infusion devices	Clinic data and patient outcomes	Medical teams
Antimicrobial dosing advice e.g. fungal osteomyelitis, renal dosing, haemodialysis patients	Advice on pathogenic or colonising organisms	IV to oral switch advice	Antimicrobials in antimicrobial pharmacist/podiatrist led clinic	Intermediate Care Team e.g. referral, clinic attendance	Wound management system using plasma to reduce bacterial load	Non-traditional antibiotic outcomes e.g. temocillin, 24 hour infusion devices	Podiatry teams
Antibiotic tissue penetration advice e.g. bone penetration, biofilm penetration	Spectrum of activity for antibiotic advice	Reduction of <i>C difficile</i> risk	Antimicrobials in inpatients	Hospital e.g. ambulatory care referral for lines and to start IV antibiotics	24 hour infusion devices	Outcomes of plasma wound management system	Pharmacy teams
Therapeutic drug monitoring e.g. how to monitor, dose changes on receipt of results	Infection control advice	Alternatives to reduce antibiotic use	Emollients for dry skin in clinics	Cross sector e.g. guideline writing, GP advice,	Horizon scanning for useful antimicrobials e.g. temocillin, dalbavancin	Junior doctor audit programme antibiotic section supervision	Independent prescribers
Allergy advice e.g. cross sensitivities	Antibiotic allergy class advice	Advice to stop antibiotics	Microbiology specimen requests, monitoring and action	Cross professional e.g. GP, microbiology, podiatry, ICT	-	Conference presentations	Patient information leaflet
Interaction checks	Antibiotics for resistant organisms	Outpatient parenteral antimicrobial therapy	Blood test requesting, monitoring and referral	Pharmacy e.g. liaison with community pharmacy	-	-	-
Adverse drug reaction advice e.g. <i>C difficile</i>	Empirical antibiotic advice	-	Prescribing advisory notes for GP on diabetes related medicines on MDT advice	Pathway redesign	-	-	-
Patient concordance	-	-	-	-	-	-	-
Patient counselling e.g. linezolid and food, doxycycline and sunlight	-	-	-	-	-	-	-

Table1: Examples of components of antimicrobial PIP role

- Blood tests and therapeutic drug monitoring.
- Patient counselling for antibiotics including side effects.
- Liaison with microbiology teams within the hospital and at different Trusts.
- Prescribing and record keeping for FP10s.

Outside of the MDT clinics

- Advising on antibiotic choice, dose and formulation of antibiotic including checking for allergy and drug-drug interactions for hospital and podiatry staff.
- Leading on the non-medical prescribing agenda for pharmacy in the Trust.
- Advising and training on Patient Group Directions (PGDs) for podiatry staff.
- Diabetic foot infection management guidelines.

Outpatient clinic data

In 2017, the whole health economy bid for money as part of the diabetes treatment and care transformation funding from NHS England.

Part of the bid written with the antimicrobial pharmacist was to provide an additional antibiotic clinic. This clinic would be led by the antimicrobial pharmacist and DSP for patients with diabetic foot infections requiring IV or oral antibiotics which require monitoring and review. Included in this bid was costing for staff to run this service and money for the use of 24 hour infusion devices for antibiotics that would usually require three or four times a day (tds or qds) dosing regimens.

The author had identified these devices as a useful innovation for patients and they had previously been successfully piloted with successful results in the diabetic foot infection patient cohort. Unfortunately, due to the way funding streams for the different organisations and services involved had been set up, which meant that the costs were from a different budget than the savings, it was not possible to continue using the devices.

NHS England funding enabled us to use these devices for admission avoidance as the cost of the drug is covered (approximately £100 per day) and monitoring arrangements are in place. This contributes to admission avoidance and frees capacity for more patients to receive antibiotics at home due to a reduced number of visits by the intermediate care nursing team.

The bid was successful and following recruitment, the first clinic started in December 2017.

To date (December 2017 to September 2018), we have seen 75 patients in clinic on antibiotics; 33 have been on traditional IV antibiotics, 26 on 24 hour infusion devices and 16 on oral antibiotics that require close monitoring (for example, linezolid, co-trimoxazole, ciprofloxacin). In total the equivalent of two days per week is committed to the diabetic foot service. This includes OPAT patient-facing clinic time of four hours per week alongside time for monitoring and virtual review of blood results for OPAT patients not being seen in clinic that week, approximately three hours per week. Advice over the phone to the podiatry and medical teams is approximately another two hours per week and attendance at the MDT outpatient clinic is approximately six hours per week.

Focusing on the infusion device patients, 23 have been 'admission avoidance' and 3 have been 'early discharges'. If these patients were admitted for their entire IV therapy, 1,191 extra bed days would have been required. If these patients had been administered these antibiotics at home as traditional bolus regimes, a further 2,538 nurse visits would have been required. The capacity freed by using the devices, instead of traditional three times a day (tds) or four times a day (qds) regimes, allows other patients to be discharged from hospital, thus improving patient flow. The costs of the service, alongside other patient outcomes including inflammatory markers, wound progression, adverse effects and patient satisfaction, is being collected. The data will be collated and published at the end of the NHS England funding period. The evidence we have built up will be sent to the CCG to address the previous funding concerns.

Qualifications and Competencies

There are no published standard qualifications required for this role; however, relevant qualifications held by the author include a pharmacy degree, an infection management for pharmacists postgraduate diploma and an independent prescribing qualification with diabetic foot infection as the field of study.

There are currently no published competencies for an antimicrobial pharmacist prescribing in this field. It would seem prudent for this role to be underpinned by the competencies within the antimicrobial stewardship, independent prescribing and parts of the diabetes pharmacist and DSP competency frameworks.

As an antimicrobial specialist, the Public Health England antimicrobial prescribing and stewardship competencies are vital:¹¹

- Competency 1: Infection prevention and control.
- Competency 2: Antimicrobial resistance and antimicrobials.
- Competency 3: Prescribing antimicrobials.
- Competency 4: Antimicrobial stewardship.
- Competency 5: Monitoring and learning.

As an independent prescriber, the following competency domains need to be fulfilled for all prescribers from any profession:¹²

Consultation

1. Assess the patient.
2. Consider the options.
3. Reach a shared decision.
4. Prescribe.
5. Provide information.
6. Monitor and review.

Governance

7. Prescribe safely.
8. Prescribe professionally.
9. Improve prescribing practice.
10. Prescribe as part of a team.

Reviewing the competency frameworks available on the Diabetes UK website for specialists in diabetes, the role does not fit with the Integrated Career and Competency Framework for Pharmacists in Diabetes at the advanced level.³ Sections of the pharmacy framework at foundation level and sections of the podiatry competency framework at advanced level for integrated diabetic foot care are appropriate. The podiatry framework states many of the competencies are transferable, and the framework can be adapted and used by other healthcare professionals involved in diabetic foot care.¹³

The particular relevant podiatry competency domains (at advanced level) include:

- Generic.
- Pharmacotherapy.
- The infection control element of wound care.
- Health improvement.
- Research and audit.
- Leadership.

The relevant pharmacy competency domains (at foundation level) include:

- General management
 - Screening, prevention and early diagnosis.
 - Promoting self-care.
 - Mental health.
 - Nutrition.
 - Glucose and ketone monitoring.
 - Oral therapies.
 - Injectable therapies.
 - Hypoglycaemia.
 - Hyperglycaemia.
 - Intercurrent illness.
 - End-of-life care.
 - Governance, safety and audit.
- Managing diabetes in hospital
 - General admission.
 - Surgery.
 - Discharge planning.
- Diabetes complications
 - Neuropathy.
 - Nephropathy.

The role may be extended to include other competencies from either the pharmacy or podiatry frameworks depending on the needs of the service, for example:

- Screening.
- Dermatology.
- Radiology.
- Painful diabetic peripheral neuropathy.
- Ulcer prevention.
- Other elements of wound care.
- Post-ulcer care.

- Charcot neuroarthropathy.
- Pregnancy.
- Role dependent special environments e.g. prison, nursing and residential homes.

Alternatively, the role can be developed by increasing levels in competence from foundation to advanced or from advanced to mastery.

Professional Challenges

As this is a new role and there are no current standards, the boundaries of responsibilities can be unclear. Regular clinical supervision with the consultant MDT lead is useful to ensure this is discussed and roles and responsibilities can be understood by all team members. Pharmacists can still be considered as non-clinical, which can lead to different expectations of the role which also needs discussion and agreement. Podiatrists have chosen to work within a limited formulary and there can be the expectation that the antimicrobial pharmacist will provide a prescription for a patient if it is not on the podiatry formulary when the pharmacist has not been involved in assessing the patient. This can be challenging, particularly if the antimicrobial pharmacist has advised it from the microbiology results, for example over the phone. The antimicrobial pharmacist does, however, need to make it clear when they are working in an advisory capacity only.

Network for Support

Locally there is advice and support from the diabetes consultant team, microbiology and the podiatry team. There are several networks for support across the East Midlands including the Antimicrobial Pharmacists Group and the East Midlands Diabetic Foot Meeting. The European diabetic foot study group annual meeting and the annual OPAT conference provide both an educational opportunity as well as an opportunity to present our local work for scrutiny and peer review.

Next steps

Currently, we have time-limited funding from NHS England. A business case is being submitted to the CCG for ongoing funding for the pharmacist and podiatrist led clinic, the continued use 24 hour infusion devices and the admission avoidance pathway.

The model is also being considered at a neighbouring Trust and the antimicrobial pharmacist is supporting the development of another antimicrobial pharmacist in this specialism.

The antimicrobial pharmacist is planning to carry out further training and development including the diabetes foot module hosted by the Society of Chiropodists and Podiatrists.

The process of presenting at conferences and publishing data will be continued.

If this kind of role interests you, speak to your diabetes team who will be able to put you in touch with the consultant who leads on the diabetic foot in your area. You could also arrange to shadow the antimicrobial pharmacist at a clinic in Kettering General Hospital (KGH) to see how it works in practice.

Acknowledgements

Thank you to Dr Michael Pierides for service supervision and proofreading; Duane Maclean and Paula Grannon for editing and proofreading.

Declaration of interests

Dr. Fleming reports funding from NHS England during the conduct of the study; grants from Eumedica, Pfizer, Astellas and Quintiles Commercial UK Ltd outside the submitted work; personal fees from Synergy Field and Research, Menarini Apothecom and Momentum Bioscience outside the submitted work.

References

1. Rushworth G. Evolution of pharmacist prescriber involvement in a diabetes clinic. *Clinical Pharmacist*. 2013;5:26. Available at: <https://www.pharmaceutical-journal.com/careers/career-profile/evolution-of-pharmacist-prescriber-involvement-in-a-diabetes-clinic/11116056.fullarticle?firstPass=false>
2. Southampton creates first diabetes consultant pharmacist post. *Diabetes Times*. March 2017. Available from: <https://diabetestimes.co.uk/southampton-creates-first-diabetes-consultant-pharmacist-post/> [Accessed 19/12/18]
3. An Integrated Career and Competency Framework for Pharmacists in Diabetes. 2018. Available from Diabetes UK: <https://diabetes-resources-production.s3.eu-west-1.amazonaws.com/resources-s3/2018-05/Diabetes%20CCF%20May%2018.pdf> [Accessed 19/12/18]
4. NICE Diabetic foot problems: prevention and management. NICE Guideline [NG19] January 2016. Available from: <https://www.nice.org.uk/guidance/ng19> [Accessed 19/12/18]
5. Pecoraro RE, Reiber GE, Burgess EM. Pathways to diabetic limb amputation: basis for prevention. *Diabetes Care*. 1990;13:513-521. Available from: <https://reference.medscape.com/medline/abstract/2351029>
6. National Diabetes Support Team. Diabetic foot guide. 2006. Available from <https://www.bipsolutions.com/docstore/pdf/13429.pdf>
7. Abbott CA, Vileikyte L, Williamson S et al. Multicenter study of the incidence of and predictive risk factors for diabetic neuropathic foot ulceration. *Diabetes Care*. 1998;21(7):1071–1075. Available from: <http://care.diabetesjournals.org/content/21/7/1071>
8. Williams G and Pickup JC. 2004. *Handbook of diabetes*. Oxford: Blackwell.
9. Moulik PK, Mtonga WR, Gill GV. Amputations and mortality in new-onset diabetic foot ulcers stratified by aetiology. *Diabetes Care*. 2003;26:491-494. Available at: <http://care.diabetesjournals.org/content/26/2/491.long>
10. The College of Podiatry. Improving Diabetic Foot Care: A Guide for Commissioners. 2017. Available from: <https://www.improvingdiabeticfootcare.com/nhs-cost-of-ulcers-and-amputations> [Accessed 19/12/18]
11. Department of Health, Expert Committee on Antimicrobial Resistance and Healthcare Associated Infections (ARHAI) and Public Health England. Antimicrobial prescribing and stewardship competencies. 2013. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/253094/ARHA|prescrcompetencies_2_.pdf [Accessed 19/12/18]
12. Royal Pharmaceutical Society. A Competency Framework for all Prescribers. July 2016. Available from: <https://www.rpharms.com/Portals/0/RPS%20document%20library/Open%20access/Professional%20standards/Prescribing%20competency%20framework/prescribing-competency-framework.pdf> [Accessed 19/12/18]

13. TRIEPodD-UK. Podiatry competency framework for integrated diabetic foot care. June 2012. Available from: https://diabetes-resources-production.s3-eu-west-1.amazonaws.com/diabetes-storage/migration/pdf/The%20Podiatry%20Integrated%20Career%20and%20Competency%20Framework%20for%20Diabetes%20Foot%20Care%20-%20TRIEPodD-UK_May%202012.pdf [Accessed 19/12/18]