

# Enhancing Patient Care via a Pharmacist-Managed Rural Anticoagulation Clinic

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## Abstract

Integrating specialized pharmacist services and follow-up with the laboratory, home care nursing, retail pharmacy and physicians can ensure optimal outcomes for patients receiving anticoagulation, or “blood thinner,” therapy. Improved patient education and discharge care planning can bridge disconnects, enable patients to better manage their care and ensure better patient outcomes and more effective use of health system resources.

Specially trained pharmacists can provide safe and effective management of a high-alert medication to help prevent potentially life-threatening clots or bleeding. With advanced prescribing authorization, the pharmacist can seamlessly provide this service both locally in a commu-

nity and via Telehealth to surrounding areas, potentially for any Albertan. Warfarin therapy may be lifelong or short-term (three to six months), but all patients require regular monitoring with blood tests. Many variables, both lifestyle and medication related, can impact therapy, and through extensive education and access via telephone to an “expert” for questions and follow-up of blood tests, patients are empowered to better regulate their anticoagulants. Anticoagulation pharmacists, as part of an AMS (anticoagulation management service), can provide a continuum of care for patients while in hospital, when discharged home, as an outpatient in the community or as a resident of a long-term care facility or seniors’ home.

## Background

Consider these situations:

- It’s Thursday and you have just been discharged from hospital following heart surgery for a new heart valve. The cardiologist advises you to contact your family doctor to manage your blood thinners, but you are unable to make an appointment until the following week.
- You’ve had a clot in your leg and your doctor requests that you travel to the lab twice a week for blood tests. It’s now been two months, and the “blood test” is still not stable.
- You are a resident of a seniors’ centre but are unable to walk far without assistance. Someone helps you with your medications, but you don’t know what the pills are and aren’t aware that one of them is a blood thinner. The doctor orders blood work for you once a year.

- You have a “clotting disorder” and have had clots in your lungs and your legs. You will be taking blood thinners for the rest of your life. Your work takes you on the road for extended periods, and when you retire you plan to spend several months of the year vacationing in Arizona.

Anticoagulants (“blood thinners”) are used to treat and prevent blood clots for many “clotting” disorders such as deep venous thrombosis, pulmonary embolism, valvular heart disease, hereditary clotting disorders and, more commonly with our aging population, atrial fibrillation which, if not adequately treated, poses a risk for cardioembolic stroke. Effective therapy with warfarin can be measured only with a blood test (INR/PT), and if the range is suboptimal (too low or too high), the patient is at risk for a clot or bleeding. The strongest predictor for improved health outcomes is achieving and maintaining patients within this narrow INR range. However, monitoring, prescribing and follow-up can require complex pharmacological responses and close integration between patient, lab, physician and pharmacist.

Traditionally, anticoagulation therapy in rural Alberta has been managed by family physicians. Patients have their blood drawn in a laboratory, and the technician performs the coagulation test after a batch of blood has been collected. Test results are usually faxed to the doctor’s office later in the day. These results are reviewed and, unless urgent, may be left until the following day. The physician may instruct the receptionist or nurse to contact the patient only if the lab value is out of range. Alberta physicians are compensated with a fee per INR followed, and an enhanced fee if the value is out of range. This traditional model of care may not include systematic education for patients about all the factors affecting their blood test results. If patients are contacted only when out of range, they are limited in their ability to document or track their lab results, or correlate them with lifestyle or medication changes. The patient may not know if everything is okay. As well, many physicians have no systematic approach for tracking and scheduling INRs. Patients who are not getting their lab work done routinely may not be discovered until a doctor’s appointment or a prescription renewal. In order to address this, some physicians have adopted the practice that patients schedule an appointment every month to follow-up their lab results. However, this is time-consuming for both the patient and physician and can be an inefficient use of the healthcare system.

Warfarin therapy can be complex, and many factors can affect therapy. In the past, physicians took responsibility for blood tests, and patients were not encouraged to get involved with their therapy, continuing to take their warfarin the same way until notified to change. Unfortunately, if the patient is not informed of the complexities, it may contribute to a “critical” result (blood too thin) due to lack of understanding. When this happens the patient needs to be contacted immediately to assess

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the risk of bleeding, and then, after the event, the patient and physician review the possible contributing factors. If the patient has signs of bleeding, an “antidote” (vitamin K) can be administered to reverse the effect of the blood thinners. Some physicians may not be aware of the correct dosing and administration of vitamin K, and this can lead to the inappropriate administration of an intramuscular or subcutaneous injection (causing severe bruising/poor absorption), or utilizing the intravenous route when the drug could have easily been given orally without a hospital admission. On the other hand, if the INR is too low and the physician is busy, it may be overlooked because the risk of bleeding is less. But many patients can have high risk factors for clotting (Oake 2008) For example, if the diagnosis is atrial fibrillation and the patient has recovered from a previous stroke and has other medical conditions, the risk of a subsequent stroke is doubled with an INR just 0.3 below the therapeutic range of 2.0 to 3.0 (Van et al. 2008; Connolly et al. 2008).

Specialized anticoagulation management services (AMSs) have been successful for optimizing therapy in clinics operating in the United States and have consistently demonstrated superior control of warfarin therapy that has translated into improved patient outcomes and cost-savings to healthcare systems. The American College of Chest Physicians (ACCP) recommends optimal management of warfarin “as occurs in an anticoagulation management service” (Hirsh et al. 2008; Garcia et al. 2008). In Canada, AMSs are uncommon and usually limited to larger urban centres. They may be limited in scope by either offering the service to only a few referring physicians or to a limited segment of patients (Hirsh et al. 2008). More locally, in Alberta, Bungard et al. have demonstrated improved adequacy of anticoagulation and reduced rates of complications at the University of Alberta Anticoagulation Management Service, compared with standard care (Bungard et al. 2009).

### Intervention

In 2002, the former Capital Health Region’s Anticoagulation Management Service in partnership with the University of Alberta Faculty of Pharmacy conducted a research study through EPICORE, the University of Alberta’s Epidemiology

Coordinating and Research Centre. The goal was to extend AMS services into communities by establishing satellite clinics. The education of pharmacists, establishment of standard operating procedures, clinical practical experience and ongoing support was provided by the University of Alberta Hospital [UAH] AMS. All Alberta pharmacists were encouraged to apply, and the Athabasca AMS was successfully implemented in January 2003.

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## Results

The original goal was to enrol 50 patients, although the Athabasca site initially enrolled 77 patients. The satellite clinic was so successful that at the conclusion of the study, all the enrolled patients preferred to be managed by the AMS. At that time, there were five family physicians in Athabasca; two immediately signed over all their warfarin patients, two referred all their “complicated” patients and the vast majority of their regular patients, and one preferred to manage his own patients. This rural AMS service is provided by one pharmacist in addition to regular pharmacy services at the Athabasca Healthcare Centre. As well, anticoagulation therapy is monitored at the centre for residents in the community, having been initiated with referrals from about a 90 km radius.

In February 2004, a physician in Whitecourt, a town 230 km from Athabasca, discovered the service. Soon after, the physician and others at Associate Medical Clinic in Whitecourt began to refer “complicated” patients to the Athabasca AMS. The first referral drove a six-hour round trip for the initial assessment. Since extended travel is not practical, the AMS is now able to effectively use Telehealth technology to provide initial “visits” for enrolment into the program remotely. Over a six-year period, the program has expanded to over 275 patients, 156 of whom are currently being managed remotely, from the community, seniors’ homes, nursing homes and as in-patients in the hospital. The AMS can access lab values via local systems or Alberta Netcare, Alberta’s portal for patient electronic health records, so the location of the blood draw is no longer a barrier to routine patient follow-up.

## Why Do Patients Prefer to Be Managed with an AMS?

### Providing People-Centred Care

**Education:** Every new patient accepted into the AMS spends an

initial one-hour visit talking with an anticoagulation pharmacist. A folder of written information is provided to take home, as well as a calendar to track INRs and warfarin dosage. Some patients are well informed about their anticoagulation therapy; others require intensive teaching. All patients benefit by reviewing factors that can affect their anticoagulation therapy. The AMS also takes this opportunity to assist with patient compliance by providing dosettes, pill boxes and pill splitters.

**Regular communication and follow-up of INR tests:** The AMS contacts every patient, whether their INR is in range or not. Patients are encouraged to document their results and assess factors that may have affected their blood thinners. When patients take a more active role in their therapy, they are more likely to remain in their target range, which improves health outcomes and reduces the chance of bleeding or critical INRs. Patients who are frustrated by frequent blood tests may be stabilized sooner. Since patients are contacted by a pharmacist regularly (at least monthly), they are also able to communicate other health or medication-related concerns. The pharmacist assesses whether a medical intervention is required and encourages the patient to make an appointment with his or her family physician if required.

**Ongoing access to information and support:** The AMS is available by telephone Monday through Friday during regular business hours to answer any questions and to assist with dosage adjustment if new medications are prescribed. The pharmacist can also assist if the patient is required to stop taking warfarin for surgical or dental procedures. If a patient is at high risk of a clot, “cross-coverage” with heparin can be safely arranged by a professional trained to assess risk of clots and bleeding.

**Lifestyle and travel:** The AMS can adapt to the patient’s lifestyle, which is important in our society. Home-monitoring devices (CoaguChek XS®, Roche Diagnostics, Basel, Switzerland) are available for patients who travel out of the country, work in remote areas or are unable to travel to a lab. The INR still needs to be communicated back to the AMS, but with online encrypted software, the patient can log in to view the warfarin dosing history and enter the results. The pharmacist can then update the patient’s file to provide warfarin dosing instructions. The cost of point-of-care monitoring, such as with the CoaguChek XS meter, has been reduced quite dramatically in recent years, though it remains somewhat expensive when combined with the cost of consumables such as testing strips. This combination of care does, however, allow patients to carry on with their normal duties and activities, while still optimizing their medical care. Patients can choose how to access the anticoagulation service and can safely monitor their warfarin therapy. The AMS provides clinical expertise and improves patient outcomes with the flexibility to adapt to technology and lifestyles.

**Adaptation to changing patient needs:** The AMS has managed patients as their healthcare requirements change over time and can optimize access to healthcare during changes in health due to aging or disease progression. We have provided care for patients who were living unassisted at home, supplying a dosette or pill reminder to help their compliance in taking their medication. We have transferred their care to a nursing home with a MAP (medication assisted program), and when they were not able to ambulate for blood work, we have coordinated home care blood draws.

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## What Are the Other Advantages of a Rural AMS?

### Reducing Clinical Variance

**Delivery of optimized anticoagulant therapy:** With specialized training, an anticoagulation pharmacist can provide a consistent and efficient service to patients taking blood thinners. Since the Athabasca AMS was originally a satellite of the UAH, operating procedures and provision of care are similar to those of a specialized service operating in a teaching hospital. This rural AMS pharmacist received clinical and hands-on experience at the UAH AMS prior to initiating the service. The University of Alberta Faculty of Pharmacy continues to partner with other AMS providers in Alberta to offer courses to pharmacists with an interest in anticoagulation therapy. The Athabasca AMS has developed liaisons with other AMSs in Alberta and operates within standardized guidelines (e.g., ACCP, American College of CHEST Physicians; TIGC, the Thrombosis Interest Group of Canada). The experience and expertise gained by the AMS pharmacist monitoring large numbers of patients over a prolonged period of time can solidify the foundation for providing a superior service in this area of patient care. Patients are stabilized sooner with few blood draws, benefitting not only the patient, but the healthcare system as a whole.

**Consistent patient monitoring:** Warfarin has been identified in hospitals as a high-alert medication, as errors in dosage or administration can have severe consequences (Institute for Safe Medical Practices; ISMP). With the shortage of medical staff, locums providing services and the physician on-call schedule, warfarin dosing may not be as consistent as if one specialized

AMS provider were monitoring this aspect of patient care.

### Organizing the Care Continuum

**Communication with retail pharmacists:** Compliance with warfarin therapy is essential for stable control of INRs. One missed dose in the seven to 10 days prior to a blood test can result in suboptimal results, and complicated or unstable conditions are often due solely to compliance problems. The AMS communicates with retail pharmacies for prescriptions and to provide compliance packaging for special needs clients, and contacts home care nursing for patients with additional needs. The location of the pharmacy is not a hindrance, as regular communication with the pharmacies in Boyle at a distance of 50 km, and Whitecourt at 230 km has not been any more difficult than locally in Athabasca. In addition, the local pharmacies recognize that AMS is part of their patients' care and consult with the AMS pharmacist when a customer taking warfarin is starting a potentially interacting prescription drug or over-the-counter medication.

**Communication with home care nurses:** If a patient is not able to physically ambulate to the laboratory, the AMS contacts home care and arranges blood draws. If several patients residing in a long-term care home are taking warfarin, blood draw days are scheduled to minimize visits. Before the advent of the AMS, several residents in a nearby seniors' home were discovered to have been taking warfarin for over a year without lab work to monitor therapy; medical services had changed, and the patients' anticoagulation therapy had been overlooked. The AMS can partner with home care to better provide services for seniors living independently, in seniors' homes or in long-term-care facilities.

**Communication with laboratory technicians:** The on-site lab recognizes that there have been fewer blood draws and there is less potential scarring since the AMS has been managing warfarin patients. Prior to the AMS, daily INRs were routinely ordered for in-patients. With one provider monitoring and adjusting warfarin dosages, therapy is stabilized quicker. As well, nursing staff are not required to contact the physician at their office for follow-up of INRs and warfarin orders, saving time for all staff involved in the medication process. Lab results and critical INRs are communicated in a more efficient manner, as the lab contacts the AMS directly, and the AMS does not have to wait for a faxed report.

**Communication with other healthcare professionals:** Once an AMS has been established and is recognized as a service in the hospital and community, referrals can occur from unexpected sources. Recently, the hospital physiotherapist contacted the AMS to assist with a patient who had a hereditary clotting

disorder and was undergoing rehabilitation for a knee replacement. As this patient had previously been enrolled in a program in Edmonton, she preferred that the local AMS, rather than her family physician, manage her therapy.

**Collaboration with family practitioners:** Family practitioners can access the AMS for expertise in managing supra-therapeutic or critical INRs, and, if the patient is not already enrolled, the AMS will be consulted to recommend an oral vitamin K dosage. The AMS is also available for information pertaining to drug interactions and clinical expertise in deep venous thrombosis (DVT) prophylaxis or management. The clinic is located within a 10-second walk of both the emergency department and the acute care nursing station. The clinic/pharmacy department is available during regular morning rounds and by telephone during regular business hours. Although initially not all the local physicians referred patients to the AMS, there is now 100% recognition of the benefits. The AMS has reduced the daily workload for physicians following INR lab results. The AMS provides specialist support to physicians, pharmacists and other healthcare providers.

### Improving Process Management

**Local hospital transition:** Since the AMS service operates in a community hospital and provides AMS services in-house, newly diagnosed in-patients can seamlessly transition back home at discharge. Patients can be educated and set up in the program while still in hospital, and then their therapy can be managed at home. As well, lifelong warfarin therapy can be consistently managed over time when patients are admitted to hospital for other medical conditions. The potential for error is reduced with optimized communication.

**Tertiary care transition:** Patients can also be referred directly from tertiary care centres when discharged back to their community. Two patients with new heart valves were referred to the AMS this past December 2008, and there was no interruption in their warfarin therapy management during the busy holiday season. In February, a patient was discharged home from an Edmonton hospital following a knee replacement. The AMS communicated with home care for blood draws, and the hospital records were faxed directly to the AMS, thus enabling continuity of care.

**Reduced hospital admissions:** The AMS can reduce unnecessary patient admissions for non-urgent DVT. For example, a patient newly diagnosed with a clot in the lower leg can be managed by an anticoagulation pharmacist in the outpatient department with heparin, or be taught to self-inject at home. The AMS provides education, initiates warfarin and follows subsequent blood work for the duration of therapy, whether short- or long-

term. In the traditional setting, this type of patient may have been admitted for one week or longer to receive drug treatment. **Accessibility:** With one centre for patient anticoagulation services, the AMS can communicate with healthcare providers and patients via telephone, fax, email, or online via an encrypted software program. The AMS provides care for long-term care patients, locally hospitalized patients, patients in the community and patients in other locations. Telehealth equipment is based in the hospital and is used to bridge the gap for remote care.

**Collaborative relationships:** In order to organize and improve patient-centred care, the anticoagulation pharmacist is in an ideal position to establish a collaborative relationship with physicians and other members of the healthcare team. Not only do patients benefit from having only one resource to contact about the complex management of their blood thinners, but that link enhances the connection to other caregivers and facilitates a team-centred continuum of care.

### Ongoing Challenges

One of the challenges of establishing collaborative relationships with physicians and providing support for patients is remuneration. Currently, the fee structure in Alberta supports only compensation to physicians as a fee for service, so changes are required to support pharmacist involvement and training, given their direct involvement with this component of patient care. Advanced prescriptive authority for pharmacists supports this model very well in both the rural and urban settings, as the patient can choose to enrol in the AMS, rather than defer to the physician for that decision. The patient and healthcare team rely on the physician for diagnosis of conditions requiring anticoagulation. Education, ongoing management and support are provided by a pharmacist within the scope of an AMS clinic. As physicians become aware of the unique ability of AMS clinics to improve patient care and outcomes by providing advanced education and management, these clinics can become very busy. Demand also increases for provision of this service to complex and hard-to-manage cases because of the clinical expertise involved. Bungard et. al noted that "Although anticoagulation management services improve patient care and outcomes, they are often overwhelmed by the demand for the service – they become victims of their own success" (Bungard et al. 2008: 254). This clinic is no exception and is managed by one pharmacist trying to balance new referrals, manage the current patient load and provide other hospital job duties. The AMS has reached its maximum capacity given the current staffing.

Innovative software is required for clinical data collection and support (monitoring warfarin dosage and appointment scheduling), as well as for generating workload and quality assurance reports. Facilitation of patient involvement and awareness necessitates web-based software in place to allow

seamless communication and sharing of data such as INR and dosing information between patient, pharmacist, laboratory and physician. For example, giving other healthcare providers the capability to view the patient's INR and warfarin history could improve communication and continuity of care. This would be especially important for patients on warfarin who present to a hospital emergency department.

### The Future

As we look to the future with increasing demands and shortages of physician time and availability, the rural setting is ideal for this type of team-centred approach. Based in the local healthcare institution, this type of ambulatory care clinic allows contributions from all members of the healthcare team, thus improving the process of patient care and management. The service is then also available to the in-patient population, who are at higher risk of poor anticoagulation control and adverse effects (Biscup-Horn et al. 2008). Thus, again the continuum of care is improved. Supported with adequate staffing and reimbursement for the clinic, patients can benefit from enhanced monitoring and engagement with their own health, either at the clinic or from a distance.

With specialized training and clinical experience, pharmacists can apply this model of care to managing other chronic diseases such as hypertension, cholesterol and diabetes, and also aspects of women's health. If an urban teaching hospital can establish satellite support for rural clinics, patients can receive improved care in their communities and ease the patient burden for family practitioners. This represents a workable combination of the elements of integration, including patient-centred care, workforce optimization, an organized care continuum, reduced clinical variance and improved process management. **HQ**

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