

ANTICOAGULATION PROTOCOL

**Federal Bureau of Prisons
Clinical Guidance**

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WHAT'S NEW IN THIS DOCUMENT?

The following changes have been made to the BOP *Anticoagulation Protocol* since it was last issued in April 2013:

- A new table has been added to *Section 4, Heparin Products*. See [Table 2. Dosing of LMWHs for Treatment and Prevention](#).
- In *Section 5, Warfarin*, the discussion has been expanded to include lifestyle factors and health conditions affecting warfarin therapy. See [Interactions with Food, Drugs, Lifestyle, and Health Conditions](#).
- A new *Section 6* on [Novel Oral Anticoagulants \(NOACs\)](#) has been added.
- Information on [Treatment of Deep Venous Thrombosis \(DVT\) and Pulmonary Embolism \(PE\)](#) has been updated in *Section 7*.
- The *Inmate Fact Sheet on Warfarin* is now available in Spanish. See [Appendix 9B](#).
- The CHA₂DS₂-VASc score has replaced the CHADS₂ score for predicting thromboembolic stroke risk in non-valvular atrial fibrillation. See [Appendix 10, Table B](#).

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1. PURPOSE

The purpose of this BOP *Anticoagulation Protocol* is to outline a recommended approach to therapeutic anticoagulation that minimizes the risk of both thromboembolic and bleeding events.

This protocol is designed to guide clinicians in fulfilling the following objectives:

- Optimize anticoagulation benefits.
- Prevent adverse effects of warfarin therapy.
- Provide effective patient education and counseling.
- Improve patient compliance.

2. OVERVIEW

Warfarin, dabigatran, rivaroxaban, apixaban, edoxaban, and various heparin products are used in the treatment and prevention of venous thromboembolism (VTE), as well as prevention of stroke in patients with atrial fibrillation. Warfarin and heparin products are also utilized for the management of patients with cardiac valve replacements to prevent thrombosis and in select patients after myocardial infarction. ***Managing anticoagulation therapy is complex. Each patient's treatment must be individualized and monitored carefully.***

LOW-MOLECULAR-WEIGHT HEPARINS (LMWHs)

The introduction of LMWHs has significantly improved outpatient anticoagulation therapy. The use of LMWHs has decreased the need for hospitalization—during initiation of warfarin for treatment of acute VTE, as well as during “bridge therapy” when warfarin is temporarily held prior to invasive procedures.

→ See more on heparin in [Section 4](#).

WARFARIN

→ ***Warfarin is the primary agent for anticoagulation in the BOP.***

- **Warfarin therapy must be individualized and closely monitored.** Warfarin is among the top 10 drugs with the largest number of serious adverse event reports submitted to the U.S. FDA. As a result, the Joint Commission has issued National Patient Safety Goals for anticoagulation therapy.
- **Warfarin has a narrow therapeutic index.** Excessive or insufficient anticoagulation can have serious and potentially life-threatening consequences, and the therapeutic response to medication is not always predictable. Routine clinical evaluation of the patient, in addition to laboratory monitoring, is essential because the International Normalized Ratio (INR) is an imprecise and indirect measure of clinical effect.
- **The effects of warfarin therapy are significantly influenced by patient-specific factors.** Comorbidities, age, diet, drug-drug interactions, and the patient's adherence with the regimen all influence the effectiveness of the therapy and the risk of complications. The patient's compliance with the therapy is crucial and requires that he or she understand the medication regimen, the monitoring process, and possible side effects. ***Patients should receive intensive counseling and education to promote adherence to the medication regimen; furthermore, they should be monitored to assess compliance.***

→ See more on warfarin in [Section 5](#).

NOVEL ORAL ANTICOAGULANTS (NOACs)

Dabigatran, rivaroxaban, apixaban, and edoxaban are the four NOACs currently approved by the FDA. These newer agents require less monitoring than warfarin since INR does not need to be followed with these medications. Their optimal place in therapy is still under debate and is currently being investigated in clinical trials.

Supplemental Chest Guidelines from 2016 (see Kearon, et al., under [References](#)) recommend the use of NOACs as first line treatment for deep vein thrombosis (DVT), pulmonary embolism (PE), and VTE, instead of warfarin. However, the recommendations are not strong, only Grades 2B and 2C. Many concerns still remain for the NOACs, including bleeding, monitoring parameters, drug interactions, and reversal agents. Within the BOP setting, patients should be monitored closely to prevent major adverse events. The BOP will continue to use warfarin as the primary agent for anticoagulation until stronger evidence is available on NOACs.

➔ See more on NOACs in [Section 6](#).

3. ANTICOAGULATION TEAM MANAGEMENT IN THE BOP

Safe management of inmates on anticoagulation therapy requires rigorous, multidisciplinary coordination and communication. Pharmacists and nurses can assist primary care providers by educating inmates about diet modification and medication use—and by monitoring patients for adherence to treatment and any adverse drug reactions that might occur.

Pharmacists, under Collaborative Practice Agreements approved by the Clinical Director and in accordance with this protocol, can also order and review laboratory work and provide medication management. *Pharmacist-managed anticoagulation clinics provide superior anticoagulation control with fewer anticoagulation-related side effects than standard management programs.*

Information on PROTOCOL PROCEDURES is provided in the following Appendices:

- [Appendix 1](#) contains the BOP anticoagulation protocols, including information that should be obtained prior to providing anticoagulation therapy and the components of a clinic visit.
 - ▶ As indicated in *Appendix 1*, Point of Care INR results should be entered into the electronic medical record (BEMR) flow sheet.
 - ▶ Patient education is critical to successful management of anticoagulation therapy. Key [inmate education](#) messages are outlined in *Appendix 1*.
- Recommended contents for SOAPE notes are provided in [Appendix 2](#).
- A fact sheet for inmates on warfarin therapy is provided in [Appendix 9](#). Inmates who are prescribed dabigatran, rivaroxaban, apixaban, or edoxaban should be provided a separate patient information sheet.

➔ *Fundamental elements of safe anticoagulation management in the BOP are summarized in TABLE 1.*

TABLE 1. SAFE ANTICOAGULATION MANAGEMENT IN THE BOP

✓	#	ELEMENTS OF WARFARIN MANAGEMENT
	1.	Patient Management: Assign clear responsibility for individual patient management for each inmate on warfarin
	2.	Patient Education: Provide thorough and ongoing patient education regarding warfarin, warfarin drug-drug and drug-food interactions, the need for regular monitoring, and signs and symptoms of bleeding or thromboembolism to report.
	3.	Initial INR Testing: After warfarin is initiated, check the INR—ideally daily, but at least every 3 days—until 2 consecutive results are within the therapeutic range. → See Appendix 5 , <i>Warfarin Initial Dosing Algorithm</i> . → See Appendix 3 , <i>Recommended INR Target and Duration of Warfarin Therapy by Indication</i> .
	4.	Dosage Changes: Base warfarin dosage changes upon current INR results (i.e., within the last 48 hours). Use point-of-care INR testing when possible (e.g., CoaguChek® XS Plus).
	5.	Follow-Up INR Testing: Perform follow-up INR testing (preferably every 4 weeks, but can be up to 12 weeks for well-documented, stable and compliant patients). → See Appendix 6 , <i>Warfarin Dosage Adjustment Algorithms</i> .
	6.	Other Medications or supplements: Check the INR after any drug or herbal medicine is added or withdrawn, or the dosage has been changed.
	7.	Transfers: For inmates on warfarin who are being transferred: <ul style="list-style-type: none"> • Inmates must have a <i>current INR*</i> with no changes in warfarin dosing anticipated. • When the INR is outside the therapeutic range, a decision to postpone transfer should be made individually, based on a determination of clinical risk and medical stability. • Receiving institutions should check the INR within 3 working days of transfer.
	8.	New Intakes: Promptly obtain INRs and within 3 working days clinically evaluate all new intakes being prescribed warfarin.
	9.	Invasive Procedures: Perioperative warfarin management should be carefully coordinated with the surgeon to minimize adverse outcomes. → See Appendix 10 , <i>Guidance for Managing Anticoagulation Therapy for Patients Requiring Invasive Procedures</i> .
	10.	Dental Procedures: Dentists should order an INR within the 72 hours preceding a dental procedure, and review the result with the inmate’s physician prior to performing the procedure. → See Dental Procedures for Patients on Warfarin Therapy in Section 5.
<p>* <i>Current INR means an INR obtained at the frequency recommended in Appendix 6 and always within 12 weeks—preferably within 4 weeks.</i></p>		

4. HEPARIN PRODUCTS

UNFRACTIONATED HEPARIN (UFH)

Use of UFH requires careful monitoring of the activated partial thromboplastin time (aPTT) because of UFH's unpredictable anticoagulant effect.

- **PLASMA ACTIVITY:** Peaks 2–3 hours after parenteral administration.
- **PROTOCOLS FOR MONITORING:** Include testing every 6 hours to maintain an aPTT range of 1.5–2.5 times normal. *Thus, UFH is administered only on an inpatient basis.*
- **ADVERSE EFFECTS:** Include heparin-induced thrombocytopenia, defined as low platelet counts and a paradoxical hyper-coagulable state.
 - ➔ *Reversal of the anticoagulation effect of UFH is accomplished rapidly with IV protamine (1 mg per 100 units UFH).*

LOW-MOLECULAR-WEIGHT HEPARINS (LMWHs)

The LMWHs have a distinct advantage over unfractionated heparin in that they have a more predictable anticoagulant effect.

- **PLASMA ACTIVITY:** Peaks 3–5 hours after subcutaneous injection.
- **PROTOCOLS FOR MONITORING:** Inmates treated with an LMWH should be monitored for heparin-induced thrombocytopenia if there has been no exposure to heparin products in the past. Patients with renal failure should be managed in expert consultation. If monitoring for therapeutic levels is required, anti-factor Xa levels should be measured 4 hours after injections.
 - ➔ *As LMWHs are renally cleared, their half-life is lengthened in individuals with renal failure. For this reason, LMWHs are contraindicated in hemodialysis patients.*
- **PREFERRED AGENT:** Enoxaparin (Lovenox®) is the most commonly used LMWH and is the BOP-preferred agent.
- **DOSING:** See **TABLE 2** below for dosing during treatment, bridging, and prophylactic use. Dosing of LMWHs for treatment is based on actual body weight. In morbidly obese patients (BMI ≥ 40 kg/m²), the prophylactic dose may be increased by 30% in some indications.

TABLE 2. DOSING OF LMWHs FOR TREATMENT AND PREVENTION

TREATMENT OF DVT*, PE, AND DURING THERAPEUTIC DOSE BRIDGING	
Normal Renal Function (CrCl ≥30)	Renal Impairment (CrCl <30)
<ul style="list-style-type: none"> • 1 mg/kg subcutaneously (sc) BID or • 1.5mg/kg sc daily 	<ul style="list-style-type: none"> • 1 mg/kg sc once daily
PREVENTION OF DVT*/PE (FOR MEDICAL, SURGICAL, AND ORTHOPEDIC PROCEDURES)	
Normal Renal Function (CrCl >30)	Renal Impairment (CrCl <30)
<ul style="list-style-type: none"> • 40 mg sc once daily • 30 mg sc BID (preferred for knee replacement) 	<ul style="list-style-type: none"> • 30 mg sc once daily
<p>* For treatment of acute VTE, outpatient treatment with LMWHs has been found to be as safe and effective as inpatient care. See Section 7, <i>Treatment of Deep Venous Thrombosis (DVT)</i>.</p>	

- ➔ *If reversal of the anticoagulation effects of LMWHs is needed urgently, administer protamine 1 mg per 100 anti-factor Xa units. **Note:** Enoxaparin (Lovenox) 1 mg = 100 anti-factor Xa units.*

5. WARFARIN

Warfarin is an oral anticoagulant that acts by inhibiting vitamin K-dependent coagulation factors II, VII, IX, and X. It increases clotting time as measured by INR, a standardized measure of a prothrombin time (PT).

- *Indications for the use of warfarin, therapeutic goals, and recommended duration of therapy are outlined in [Appendix 3](#).*

INTERACTIONS WITH FOOD, DRUGS, LIFESTYLE, AND HEALTH CONDITIONS

Patients should be counseled to report *any* changes in diet, medications, or health status to their anticoagulation provider. Numerous medications, foods, lifestyle changes, and health conditions can either increase or inhibit warfarin effects. Below is a general description of some interactions with warfarin.

- See [Appendix 4](#), *Warfarin Interactions*, for a detailed list.

DIET

- Foods that interact with warfarin are typically high in vitamin K, especially green leafy vegetables. Individuals on long-term warfarin therapy are sensitive to fluctuating levels of dietary vitamin K. Patients should know that they need to eat such foods in moderation and avoid large fluctuations in intake.
- Per the 2012 ACCP guidelines, routine use of vitamin K supplementation for varying INR is no longer recommended.

MEDICATIONS AND SUPPLEMENTS

Numerous drugs interact with warfarin, either increasing or decreasing the anticoagulant effect.

- *It is recommended that the INR be checked whenever any new drug or herbal medicine is added or withdrawn from a patient's regimen, or when doses of these medications are changed.*

Below is specific guidance on monitoring patients taking antibiotics or amiodarone:

- **ANTIBIOTICS:** Patients started on antibiotics that interact with warfarin (i.e., erythromycin, metronidazole, ciprofloxacin, sulfamethoxazole-trimethoprim, fluconazole, ketoconazole, rifampin, and dicloxacillin) should be instructed to return to clinic in 3 days to assess the effect on their INR—unless a warfarin dose adjustment can be made on the basis of a patient's prior INR response history.
- **AMIODARONE:** Patients started on amiodarone should be instructed to return to clinic in 3 days to assess the effect on their INR. The INR should be followed closely—once or twice weekly—with dosage adjustments provided as needed until the INR is stable. The warfarin dose should be initially reduced by about one-third to one-half (see below), when amiodarone is started.

General guidelines for adjusting the warfarin dose, based on the amiodarone dose:

- ▶ amiodarone 400 mg → reduce warfarin 40%
- ▶ amiodarone 300 mg → reduce warfarin 35%
- ▶ amiodarone 200 mg → reduce warfarin 30%
- ▶ amiodarone 100 mg → reduce warfarin 25%

LIFESTYLE FACTORS

Significant increases in **exercise and mobility** can decrease the INR. Conversely, a significant decrease in exercise or mobility can increase the INR. Patients should be counseled to report changes in their physical activity to their anticoagulation provider.

HEALTH CONDITIONS

Hypothyroidism can increase the INR, while **hyperthyroidism** can decrease the INR. TSH should be routinely monitored for patients receiving thyroid supplementation (every 6–8 weeks during thyroid dose changes, and at least every year once stable).

Persistent diarrhea lasting longer than two days can also significantly increase the INR. Patients should be counseled to report diarrhea lasting longer than two days to their health care or anticoagulation provider

WARFARIN DOSING

The dosing of warfarin can be divided into two phases:

- The **INITIAL PHASE**, where frequent INR monitoring is conducted until a stable dose-response relationship is achieved.
- The **MAINTENANCE PHASE**, in which the frequency of INR testing is reduced.

Warfarin should generally be administered via pill-line during the initial dosing. For patients on long-term therapy, the need for administering warfarin via pill-line should be evaluated individually, based on the inmate's record of compliance with therapy.

→ See [Appendix 5](#), *Warfarin Initial Dosing Algorithm*, and [Appendix 6](#), *Warfarin Dosage Adjustment Algorithms*.

INITIAL PHASE

- A baseline INR should be obtained on all inmates prior to initiating warfarin therapy.
- Generally, warfarin is started at a dose of 5 mg daily.
 - ▶ For patients who may be sensitive to warfarin—such as the elderly, those with liver disease, congestive heart failure, or a high risk of bleeding—the starting dose of warfarin should be less than or equal to 3 mg daily.
 - ▶ An initial effect on the INR usually occurs within the first 2 to 3 days. A therapeutic INR (see [Appendix 3](#)) can often be achieved within 5 to 6 days. However, several dose adjustments may be required to determine the patient's optimal dose, which may extend the time to achieve a therapeutic INR.
 - ▶ Administering a loading dose of warfarin is not recommended under any circumstances.
- The INRs should be obtained as frequently as clinically possible until two consecutive INRs are within a therapeutic range.
- In the setting of a new VTE, an LMWH should be administered concurrently with warfarin due to increased risk of clotting during the first 5 days with warfarin monotherapy. The LMWH cannot be discontinued until at least five doses of warfarin have been administered and two therapeutic INRs >24 hours apart have been achieved (see [Appendix 3](#)).

MAINTENANCE PHASE

- Once the therapeutic range has been achieved and sustained for 2 consecutive days, the INR is checked every 1–2 weeks, and then less often, depending on the stability of the results. See [Appendix 6](#) for a chart showing the recommended frequency of clinic visits for anticoagulation maintenance therapy based on INR values.
- Once the INR stabilizes, the testing frequency can be increased to a maximum of every 12 weeks.
 - ➔ *However, whenever doses are adjusted, more frequent INR monitoring must be resumed.*
- For patients on long-term warfarin therapy, INR fluctuations can result from dietary changes, changes in other medication, poor compliance, change in health status, or alcohol consumption (see [Appendix 4](#) for possible interactions).

INR MONITORING

It is critical to patient care decisions that INR results be available within 48 hours of when the specimen was obtained. After that, the results become a poor basis for decision-making. Point-of-care (POC) INR measurements greatly simplify patient management by providing immediate feedback on anticoagulant effect. As such, POC INR testing performed under a CLIA Waiver, utilizing a system designed for healthcare professionals (e.g., CoaguChek[®] XS Plus), is recommended for use in the BOP.

For patients who are positive for lupus antibodies, a POC machine may be an unreliable source for obtaining an accurate INR. For at least 3 months, concurrent INR testing through venous blood draws and the POC INR machine should be performed. If the two sets of results are comparable, then it would be safe to continue with POC testing only. If the results are widely different, then POC testing would not be advised, and the patient should receive all INR checks through venous blood draws only.

➔ See [Appendix 8](#) for Point-of-Care testing protocol.

MANAGEMENT OF PATIENTS WITH HIGH INR VALUES

There is a close relationship between the INR and the risk of bleeding. The risk of bleeding increases when the INR exceeds 4, and that risk rises sharply with values greater than 5.

Three approaches can be taken to lower an elevated INR:

1. **Stopping the warfarin.** When warfarin is stopped, the INR falls over several days.
2. **Administering oral or parenteral vitamin K.** When vitamin K is administered, the INR declines rapidly.
 - ▶ **Oral vitamin K is the treatment of choice unless a more rapid reversal of anticoagulation is critical.**
 - ▶ If a very rapid reversal of anticoagulation is needed, vitamin K can be administered by slow intravenous infusion—but only in the hospital setting.
3. **Infusing fresh, frozen plasma or prothrombin concentrate.** This is the most rapid and effective of the three approaches and—as with IV vitamin K—should only be administered in the hospital setting.

PROTOCOLS FOR LOWERING HIGH INR VALUES

- Contact a physician if bleeding occurs, if INR >4.5, or if oral Vitamin K is considered.
- **If the INR is from 4.5 to 10, and the patient is not bleeding and has no risk factors that predispose to bleeding:** The next 1–2 doses of warfarin can be omitted, with warfarin reinstated at a lower dose when the INR falls into the therapeutic range.
Alternatively, and only if the patient is at increased risk of bleeding: Omit one dose of warfarin and administer oral vitamin K (1–2.5 mg).
- **If the INR is >10, but clinically significant bleeding has not occurred:** Hold warfarin therapy. Oral vitamin K (2.5–5 mg) should be given, anticipating that the INR will fall within 24–48 hours. The INR, and the patient’s condition more generally, should be monitored closely, with oral vitamin K dose(s) repeated as necessary.
- **When rapid reversal of anticoagulation is required because of serious bleeding or warfarin overdose, the inmate should be transferred to the local emergency room immediately.** Prothrombin complex concentrate replacement therapy is indicated, supplemented with vitamin K by slow intravenous infusion. This can be repeated, depending on the INR. If warfarin is to be resumed after administration of high doses of vitamin K, heparin or LMWH can be given concurrently with the warfarin until the effects of the vitamin K have been reversed, and the patient again becomes responsive to warfarin.
- These protocols are summarized in [Appendix 7](#), *Management of High INR Values*.

MANAGEMENT OF WARFARIN DOSING FOR INVASIVE PROCEDURES

While anticoagulation increases the risk of bleeding associated with surgical procedures, interrupting the anticoagulant therapy increases the risk of thromboembolism. There is no consensus on how to best manage patients on anticoagulant therapy who undergo elective surgery. The risk of thromboembolism must be balanced against the risk of bleeding. **Decisions about perioperative anticoagulation management are complex and should be made in collaboration with the surgeon and an anticoagulation expert.**

- See [Appendix 10](#), *a general reference guide on perioperative anticoagulation management*. The appendix includes information on the bleeding risks associated with different procedures; risk levels for thromboembolism; and bridge therapy, which involves removing the warfarin and temporarily maintaining the anticoagulation effect with LMWH or UF heparin.

At particularly high risk for thromboembolism are patients with:

- Any mitral mechanical cardiac valve
- Any caged-ball valve
- Tilting-disc aortic valve
- Mechanical heart valve with a recent (<6 months) history of stroke or transient ischemic attack (TIA)
- Atrial fibrillation with a recent (<3 months) history of stroke or TIA
- Atrial fibrillation with a CHA₂DS₂-VASc score ≥ 2
- Atrial fibrillation with rheumatic valvular heart disease
- A recent (<3 months) history of VTE
- Severe thrombophilia (including protein C/S deficiency, antithrombin deficiency, antiphospholipid antibodies, or multiple abnormalities)
- History of prior thromboembolism during temporary interruption of therapy

Most patients can undergo low-risk surgical procedures without interrupting warfarin therapy. These procedures include:

- Uncomplicated dental extractions (see [Dental Procedures](#) below)
- Cataract surgery
- Pacemaker insertion
- Joint and soft tissue injections
- Arthrocentesis
- Most dermatologic procedures
- Upper endoscopy and colonoscopy (except polypectomy)
- Catheter ablation of atrial fibrillation

When a more rapid reversal is required to allow urgent surgery: Oral vitamin K (≤ 5 mg) can be given, anticipating reduction of the INR within 24 hours. An additional dose of oral vitamin K (1–2 mg) can be given if the INR remains high after 24 hours. **The INR should be checked immediately prior to the procedure being performed.**

DENTAL PROCEDURES FOR PATIENTS ON WARFARIN THERAPY

It is usually unnecessary to interrupt warfarin therapy for most minor dental procedures. There is a very low risk of significant bleeding associated with minor oral surgery and similarly invasive dental procedures.

- Dentists should order an INR within the 48 hours preceding a dental procedure, and review the result with the inmate's physician prior to performing the procedure.
 - ➔ *Dentists should never independently discontinue or alter a patient's warfarin therapy.*
- Invasive procedures should be postponed until the INR result is received and reviewed. If a patient is on a limited course of warfarin (less than six months), the dentist may elect to delay invasive treatment until after warfarin is discontinued.
- When performing invasive procedures on inmates receiving warfarin, dentists should be prepared to use hemostatic measures. These include the use of atraumatic techniques, vasoconstrictors, gelatin sponges, Surgicel®, and sutures.
- If warfarin is continued during dental procedures, prohemostatic agents such as antifibrinolytics can be used to control procedure-associated bleeding.
- If discontinuation of warfarin is necessary, it should be done 5 days before surgery to normalize the INR (see [Appendix 10](#)).

CAUTION REGARDING POST-OPERATIVE MEDICATIONS

- Numerous medications, including antibiotics, interact with warfarin and can affect the INR (see [Appendix 4](#)).
- NSAIDs and aspirin for pain relief should be avoided after invasive dental procedures. Instead, acetaminophen should be considered first-line treatment in these patients. Aspirin or other antiplatelets being used for cardiac issues would be restarted the day after the procedure.
- Due to the multiple drug-drug interactions with warfarin, closely coordinate all post-operative medications, including OTCs, with the provider who is overseeing warfarin therapy.

POST-OPERATIVE INSTRUCTIONS FOR PATIENTS

Patients should be provided with the following post-operative instructions:

- Immediately report any bleeding that does not stop.
 - Protect the surgical site by avoiding “swishing” fluid in the mouth or sucking on straws or candy (because the negative pressure might dislodge the clot).
- ➔ *General recommendations about performance of dental procedures, based on the INR result and the risk of bleeding associated with the procedure, are outlined in TABLE 3 below.*

TABLE 3. DENTAL MANAGEMENT OF PATIENTS ON ANTICOAGULANT THERAPY

RISK OF BLEEDING	PROCEDURE	INR ≤ 3.0	INR = 3.1–3.5	INR > 3.5
Low	<ul style="list-style-type: none"> • Examinations • Radiographs • Impressions • Prosthetic insertion 	Proceed	Proceed	Proceed
Low–Moderate	<ul style="list-style-type: none"> • Restorative dentistry • Supragingival prophylaxis • Scaling and root planing • Endodontics 	Proceed	Proceed ¹	Proceed with provider consultation ²
Moderate	<ul style="list-style-type: none"> • Simple extraction (≤3 teeth) • Gingival curettage • Gingivoplasty • Fixed prosthodontics 	Proceed	Proceed ¹	Proceed with provider consultation ²
Moderate–High	<ul style="list-style-type: none"> • Extraction of single bony impaction • Gingivectomy • Apicoectomy • Placement of single implant • Minor flap/periodontal surgery • Maxillary & mandibular local anesthetic blocks 	Proceed	Consult provider ²	Consult provider ²
High	<ul style="list-style-type: none"> • Full arch/full mouth extractions • Removal of exostoses/ alveoplasty • Multi-quadrant periodontal surgery • Extraction of multiple bony impactions • Placement of multiple implants 	Proceed	Consult provider ²	Delay treatment until INR is decreased.

¹ Proceed if infiltration of anesthetic only. Procedures requiring blocks are “Moderate-High Risk.”

² To determine whether or not to proceed, consult with the provider overseeing warfarin therapy (e.g., primary care provider, anticoagulation pharmacist). A decision will be made by balancing the degree to which the INR is elevated against the urgency for the dental procedure.

Adapted from:

Stanford Anticoagulation Clinic (internet posting). A summary of current perspectives on dental procedures in anticoagulated patients. Stanford, CA: Stanford Anticoagulation Clinic. Accessed July 3, 2008. Available at: <http://www.stanfordhospital.com/PDF/anticoagulation/dentalProcedure.pdf>

Little JW, Falace DA, Miller DS, Rhodus NL. *Dental Management of the Medically Compromised Patient, 8th ed.* St. Louis, MO: Mosby, Inc.;2012:422–434.

6. NOVEL ORAL ANTICOAGULANTS (NOACs)

Patients entering the BOP on a direct thrombin inhibitor or a selective factor Xa inhibitor should be continued on treatment until they can be evaluated and converted to warfarin, when clinically appropriate based upon national formulary criteria. Premature discontinuation of oral anticoagulants without an adequate alternative increases the risk of a thrombotic event.

Patient on NOACs that will not be converted to warfarin should be scheduled in the Pharmacist-managed anticoagulation clinics. Follow-up visits in clinic should occur at least **every 6 months** to review compliance, labs (CBC/UA), and other questions—or **sooner**, for perioperative management of anticoagulants (stopping/starting/bridging).

DIRECT THROMBIN INHIBITORS (DTIs)

Dabigatran (Pradaxa™) exhibits its anticoagulant effect through direct inhibition of free and fibrin-bound thrombin.

→ See **TABLE 4A** for dosing information. See **TABLE 4B** for information on converting from and to dabigatran.

TABLE 4A. DABIGATRAN DOSING

INDICATION	RECOMMENDED DOSE
Reduction of stroke risk and systemic embolism in non-valvular atrial fibrillation	WITHOUT P-GP INHIBITOR: <ul style="list-style-type: none"> • CrCl >30 mL/min: 150 mg twice daily. • CrCl 15–30 mL/min: 75 mg twice daily. • CrCl <15 mL/min or on dialysis: Dosing recommendation cannot be provided.
	WITH P-GP INHIBITOR: <ul style="list-style-type: none"> • CrCl 30–50 mL/min: Consider reducing dose to 75 mg twice daily. • CrCl <30 mL/min: Avoid use.
Treatment of DVT and PE following 5–10 days of parenteral anticoagulation <i>OR</i> Reduction in risk of recurrence of DVT and PE in previously treated patients	WITHOUT P-GP INHIBITOR: <ul style="list-style-type: none"> • CrCl >30mL/min: 150 mg twice daily. • CrCl ≤30 mL/min or on dialysis: Dosing recommendation cannot be provided.
	WITH P-GP INHIBITOR: <ul style="list-style-type: none"> • CrCl <50 mL/min: Avoid use.
NOTES: <ul style="list-style-type: none"> • P-gp Inhibitors include amiodarone, ketoconazole, clarithromycin, and verapamil. • Dabigatran should be stored in and dispensed from the original manufacturer bottle to prevent loss of potency. 	

REVERSAL OF DABIGATRAN

- Idarucizumab (Praxbind™) is FDA-approved as a reversal agent for dabigatran.
- Administer 5 g via IV as two separate 2.5 g doses no more than 15 minutes apart. If coagulation parameters (e.g., aPTT) re-elevate and clinically relevant bleeding occurs, or if a second emergency surgery/urgent procedure is required and patient has elevated coagulation parameters, administration of an additional 5 g may be considered (limited data to support).

TABLE 4B. CONVERSIONS FROM AND TO DABIGATRAN

FROM	TO	RECOMMENDED CONVERSION
Dabigatran	Warfarin	<ul style="list-style-type: none"> • CrCl >50 ml/min: Start warfarin 3 days before discontinuing dabigatran. • CrCl 30-50 ml/min: Start warfarin 2 days before discontinuing dabigatran. • CrCl 15-30 ml/min: Start warfarin 1 day before discontinuing dabigatran. • CrCl <15 ml/min: No recommendations.
Warfarin	Dabigatran	<ul style="list-style-type: none"> • Discontinue warfarin and start dabigatran when the INR is <2.
Dabigatran	Rivaroxaban	<ul style="list-style-type: none"> • CrCl >30 mL/min: Wait 12 hours after last dose of dabigatran to initiate rivaroxaban. • CrCl <30 mL/min: Wait 24 hours after last dose of dabigatran to initiate rivaroxaban.
Rivaroxaban	Dabigatran	<ul style="list-style-type: none"> • Wait 24 hours after rivaroxaban discontinuation to start dabigatran.
Dabigatran	Apixaban	<ul style="list-style-type: none"> • CrCl >30 mL/min: Wait 12 hours after last dose of dabigatran to initiate apixaban. • CrCl <30 mL/min: Wait 24 hours after last dose of dabigatran to initiate apixaban.
Apixaban	Dabigatran	<ul style="list-style-type: none"> • Wait 12 hours from the last dose of apixaban to start dabigatran.
Dabigatran	Edoxaban	<ul style="list-style-type: none"> • Stop dabigatran, and start edoxaban at the time the next dose of dabigatran would have been given.
Edoxaban	Dabigatran	<ul style="list-style-type: none"> • Stop edoxaban. and start dabigatran at the time the next dose of edoxaban would have been given.

SELECTIVE FACTOR Xa INHIBITORS

Selective factor Xa inhibitors include rivaroxaban (Xarelto™), apixaban (Eliquis™), and edoxaban (Savaysa™).

→ See TABLES 5A, 5B, 6A, 6B, 7A, and 7B below for dosing and conversion information.

TABLE 5A. RIVAROXABAN DOSING

INDICATION	RECOMMENDED DOSE
<p>→ For all patients with a CrCl 15–80 mL/min: Do not administer rivaroxaban in patients receiving a combined P-glycoprotein and moderate CYP3A4 inhibitor, unless the potential benefit justifies the potential risk.</p>	
Stroke prevention in non-valvular atrial fibrillation	<ul style="list-style-type: none"> • CrCl >50 mL/min: 20 mg once daily with the evening meal. • CrCl 15-50 mL/min: 15 mg once daily with the evening meal. • CrCl <15 mL/min: Avoid use.
Treatment of DVT/PE	<ul style="list-style-type: none"> • CrCl >30 mL/min: 15 mg twice daily with food for the first 21 days, followed by 20 mg once daily with food. • CrCl <30mL/min: Avoid use.
Reduction in the risk of DVT/PE recurrence	<ul style="list-style-type: none"> • CrCl >30 mL/min: 20 mg once daily with food. • CrCl <30 mL/min: Avoid use.
Prevention of DVT following total hip or knee replacement surgery	<ul style="list-style-type: none"> • CrCl > 50mL/min: 10 mg once daily with or without food. <i>Duration:</i> Knee replacement = 12 days Hip replacement = 35 days • CrCl 30-50 mL/min: 10 mg once daily; monitor closely for blood loss. • CrCl <30mL/min: Avoid use.
<p>NOTE: There is currently no antidote for rivaroxaban. Partial reversal of PT prolongation is seen after administration of prothrombin complex concentrates (PCCs) in healthy volunteers.</p>	

TABLE 5B. CONVERSIONS FROM AND TO RIVAROXABAN

FROM	TO	RECOMMENDED CONVERSION
Rivaroxaban	Warfarin	<ul style="list-style-type: none"> • Consider use of LMWH as a bridge; can discontinue LMWH when INR is therapeutic. • Start warfarin and LMWH 24 hours after the last dose of rivaroxaban.
Warfarin	Rivaroxaban	<ul style="list-style-type: none"> • Wait until INR <3, then initiate rivaroxaban.
Rivaroxaban	Apixaban	<ul style="list-style-type: none"> • Wait 24 hours after the last dose of rivaroxaban to start apixaban.
Apixaban	Rivaroxaban	<ul style="list-style-type: none"> • Wait 12 hours after the last dose of apixaban to start rivaroxaban.
Rivaroxaban	Dabigatran	<ul style="list-style-type: none"> • Wait 24 hours after last dose of rivaroxaban to start dabigatran.
Dabigatran	Rivaroxaban	<ul style="list-style-type: none"> • Wait 12 hours after the last dose of dabigatran to start rivaroxaban.
Rivaroxaban	Edoxaban	<ul style="list-style-type: none"> • Discontinue rivaroxaban and begin edoxaban when the next dose of rivaroxaban would have been given.
Edoxaban	Rivaroxaban	<ul style="list-style-type: none"> • Discontinue edoxaban and begin rivaroxaban when the next dose of edoxaban would have been given.

TABLE 6A. APIXABAN DOSING

INDICATION	RECOMMENDED DOSE
Reduction of stroke risk and systemic embolism in non-valvular atrial fibrillation	<ul style="list-style-type: none"> 5 mg twice daily is recommended for most patients. Reduce dose to 2.5 mg twice daily if patient meets two of the following criteria: <ul style="list-style-type: none"> Age >80 years Body weight <60 kg SrCr >1.5 mg/dL If patient is taking a drug that is a strong inhibitor of both CYP3A4 and P-glycoprotein, decrease dose to 2.5 mg PO twice daily. Hemodialysis dosing is 5 mg PO twice daily. Reduce the dose to 2.5 mg PO twice daily if patient is >80 years or body weight <60 kg.
Initial treatment of DVT and PE	<ul style="list-style-type: none"> 10 mg twice daily for 7 days, followed by 5 mg twice daily. Hemodialysis dosing is 5 mg PO twice daily. Reduce the dose to 2.5 mg PO twice daily if patient is >80 years or body weight <60 kg.
Reduction in the risk of recurrent DVT and PE following initial treatment	<ul style="list-style-type: none"> 2.5 mg twice daily after 6 months of initial treatment.
Prophylaxis of DVT following hip or knee replacement surgery	<ul style="list-style-type: none"> 2.5 mg twice daily <p>Duration: Knee replacement = 12 days Hip replacement = 35 days</p>
<p>NOTES:</p> <ul style="list-style-type: none"> There is no specific antidote to apixaban. Hemodialysis does not appear to have a substantial impact on apixaban exposure. Use of procoagulant reversal agent such as prothrombin complex concentrate, activated prothrombin complex concentrate, or recombinant factor VIIa may be considered, but it has not been evaluated in clinical studies. Activated oral charcoal reduces absorption of apixaban, thereby lowering apixaban plasma concentration. 	

TABLE 6B. CONVERSIONS FROM AND TO APIXABAN

FROM	TO	RECOMMENDED CONVERSION
Apixaban	Warfarin	<ul style="list-style-type: none"> Consider use of LMWH as a bridge; can discontinue LMWH when INR is therapeutic. Start warfarin and LMWH 12 hours after the last dose of apixaban.
Warfarin	Apixaban	<ul style="list-style-type: none"> Wait until INR <2, then initiate apixaban.
Apixaban	Rivaroxaban	<ul style="list-style-type: none"> Wait 12 hours after the last dose of apixaban to start rivaroxaban.
Rivaroxaban	Apixaban	<ul style="list-style-type: none"> Wait 24 hours after the last dose of rivaroxaban to start apixaban.
Apixaban	Dabigatran	<ul style="list-style-type: none"> Wait 12 hours after the last dose of apixaban to start dabigatran.
Dabigatran	Apixaban	<ul style="list-style-type: none"> CrCl >30 mL/min: Wait 12 hours after the last dose of dabigatran to start apixaban. CrCl <30 mL/min: Wait 24 hours after the last dose of dabigatran to start apixaban.
Apixaban	Edoxaban	<ul style="list-style-type: none"> Discontinue apixaban and begin edoxaban when the next dose of apixaban would have been given.
Edoxaban	Apixaban	<ul style="list-style-type: none"> Discontinue edoxaban and begin apixaban when the next dose of edoxaban would have been given.

TABLE 7A. EDOXABAN DOSING

INDICATION	RECOMMENDED DOSE
Reduction in the risk of stroke and systemic embolism in patients with non-valvular atrial fibrillation	<ul style="list-style-type: none"> • CrCl >95 mL/min: Not indicated due to increased risk of ischemic stroke. • CrCl 50-95 mL/min: 60 mg once daily. • CrCl 15-50 mL/min: 30 mg once daily. • CrCl <15 mL/min: Avoid use.
Treatment of DVT and PE following 5-10 days of initial therapy with a parenteral anticoagulant	<ul style="list-style-type: none"> • CrCl 50-95 mL/min: 60 mg once daily. • Reduce dose to 30mg daily if patient meets any one of the following criteria: <ul style="list-style-type: none"> • CrCl 15-50 mL/min • Weight ≤60 kg • Concomitant use of certain P-gp inhibitors (verapamil and quinidine or the short-term concomitant administration of azithromycin, clarithromycin, erythromycin, oral itraconazole, or oral ketoconazole)
<p>NOTE: There is no specific antidote or a reversing agent for edoxaban. Hemodialysis does not significantly contribute to edoxaban clearance.</p>	

TABLE 7B. CONVERSIONS FROM AND TO EDOXABAN

FROM	TO	RECOMMENDED CONVERSION
Edoxaban	Warfarin	<ul style="list-style-type: none"> • Oral option: <ul style="list-style-type: none"> • For patients taking edoxaban 60 mg, reduce the dose to 30 mg and begin warfarin concomitantly. • For patients taking edoxaban 30 mg, reduce the dose to 15 mg and begin warfarin concomitantly. • Once an INR ≥ 2 is achieved, discontinue edoxaban and continue warfarin. • Parenteral option: <ul style="list-style-type: none"> • Discontinue edoxaban and administer a parenteral anticoagulant and warfarin at the time of the next scheduled edoxaban dose. • Once a stable INR ≥ 2 is achieved, discontinue the parenteral anticoagulant and continue warfarin.
Warfarin	Edoxaban	<ul style="list-style-type: none"> • Stop warfarin; start edoxaban when INR ≤ 2.5.
Edoxaban	All non-warfarin oral anticoagulants	<ul style="list-style-type: none"> • Stop edoxaban and start the other oral agent at the time of the next dose of edoxaban.
All non-warfarin oral anticoagulants	Edoxaban	<ul style="list-style-type: none"> • Discontinue current non-warfarin oral anticoagulant and start edoxaban at the time of the next scheduled dose of the other oral anticoagulant.

MANAGING NOACs WHEN INVASIVE PROCEDURES ARE REQUIRED

DISCONTINUATION PRIOR TO INVASIVE PROCEDURES

Renal function and the risk of bleeding should be assessed to determine the optimal time for discontinuation of these anticoagulants. See **TABLE 8** below.

TABLE 8. DISCONTINUATION OF NOACs PRIOR TO INVASIVE PROCEDURES

CrCl mL/min	Risk of Bleed	Rivaroxaban*	Apixaban*	Dabigatran	Edoxaban
≥80	Low	≥24 h	≥24 h	≥24 h	>24 h
	High	≥48 h	≥48 h	≥48 h	>24 h
50–79	Low	≥24 h	≥24 h	≥36 h	>24 h
	High	≥48 h	≥48 h	≥72 h	>24 h
30–49	Low	≥24 h	≥24 h	≥48 h	>24 h
	High	≥48 h	≥48 h	≥96 h	>24 h
15–29	Low	≥36 h	≥36 h	Not indicated	>24 h
	High	≥48 h	≥48 h	Not indicated	>24 h
<15	No indication for any agent.				

* Rivaroxaban and apixaban can be stopped 18–24 hours before minimal risk surgery.

BRIDGING OF NOACs

- **ATRIAL FIBRILLATION:** No bridging necessary with any of the NOACs when prescribed for atrial fibrillation, due to rapid onset of action.
- **RIVAROXABAN AND APIXABAN:** For the treatment of new VTEs, bridging therapy with LMWH or UFH is not required for most patients.
- **EDOXABAN AND DABIGATRAN:** For the treatment of new VTEs, a parenteral anticoagulant is recommended for 5–10 days before starting edoxaban or dabigatran.
- **IMMOBILIZATION:** For procedures associated with immobilization, initiate a reduced or intermediate dose of LMWH (40mg BID) 6–8 hours after surgery if hemostasis is achieved.

REINITIATING NOACs

- NOACs can be restarted as soon as hemostasis is achieved (see package inserts), or resumed 4 to 8 hours after intervention.
- Reinitiate with the reduced dose listed below; then follow with the usual maintenance dose.
 - ▶ Dabigatran 75 mg
 - ▶ Rivaroxaban 10 mg
 - ▶ Apixaban 2.5 mg
 - ▶ Edoxaban can be restarted at the usual maintenance dosing (see package insert).
 - ▶ **Delay reinitiation of NOACs for major abdominal surgery or urologic surgery with incomplete hemostasis.** Resuming full dose of NOACs within the first 48–72 hours after the procedure may have bleeding risk that outweighs benefits.

7. TREATMENT OF DEEP VENOUS THROMBOSIS (DVT) AND PULMONARY EMBOLISM (PE)

- Detailed discussion regarding diagnosis and management of DVT is beyond the scope of this protocol; please refer to the guidelines issued by the American Academy of Family Physicians and the American College of Physicians (see Quaseem, et al. in the [References](#) section).

BASIC STEPS FOR MANAGEMENT OF DVT AND PE:

1. **Check baseline:** platelet, CBC, INR, aPTT, and creatinine.
2. **Identify contraindications to anticoagulation therapy.** If contraindications exist, then consider inferior vena cava filter.
3. **Check for history of heparin-induced thrombocytopenia.** If history exists, consider other agents, e.g., argatroban or fondaparinux.
4. **Consider hospitalization if you find:**
 - a. Circulation compromised by DVT or PE.
 - b. Increased risk of bleeding.
 - c. Limited cardiovascular reserve.
 - d. Risk of poor compliance.
5. **If eligible for outpatient treatment, then begin treatment with LMWH and warfarin:**
 - a. Target INR is 2.0–3.0.
 - b. Continue LMWH for at least 5 days (and until 2 consecutive INR values are in therapeutic range at least 24 hours apart).
 - c. Follow closely over the next 7–10 days.
 - d. Follow recommended duration of LMWH and warfarin therapy, as outlined in [Appendix 3](#).
6. **For oncology patients with new DVT or PE, LMWH is recommended as monotherapy for 3–6 months after VTE,** due to decreased morbidity and mortality compared with warfarin. After 3–6 months on LMWH, patients can either remain on LMWH or begin the transition to warfarin.

8. ANTICOAGULATION PROGRAM MANAGEMENT

The Clinical Director and the Health Services Administrator should work collaboratively to ensure that this *BOP Anticoagulation Protocol* is fully implemented, including:

- Clear assignment of responsibility for clinical care for inmates on anticoagulation therapy.
- Timely INR laboratory results (point-of-care testing preferred).
- Assurance of provider education regarding anticoagulation therapy.
- INR testing occurring at recommended intervals.
- Intake and transfer of inmates on anticoagulation in accordance with this protocol.
- Regularly conducted reviews by the Pharmacy and Therapeutics (P&T) Committee of anticoagulant care outcomes—especially the percentage of patients whose INR is within therapeutic range, bleeding episodes, thrombotic episodes, timeliness of evaluation of new intakes and transfers on warfarin, and other locally determined measures.

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APPENDIX 1: ANTICOAGULATION CLINIC PROTOCOL

A. OVERSIGHT OF THE ANTICOAGULATION CLINIC

Oversight of the anticoagulation clinic is the responsibility of the Clinical Director or designee.

B. CLINIC FUNCTIONS

1. Obtain baseline clinical data for inmates on anticoagulation therapy.
2. Identify patients who are at risk for adverse outcomes from anticoagulation therapy.
3. Educate patients regarding indication, risks, complications, and compliance with anticoagulation therapy.
4. Monitor for possible interactions with medications, foods, and disease states.
5. Provide appropriate warfarin dosing based upon INR results (see [Appendix 5](#), [Appendix 6](#), and [Appendix 7](#)).
6. Assess drug-related problems and refer to the primary care provider to ensure appropriate medical attention. *Refer to a physician immediately for:* signs and symptoms of bleeding, signs of symptoms of VTE or stroke, INR >4.5, or if oral vitamin K is considered.
7. After initial clinic visit, and after two consecutive INR values within therapeutic range without adverse events, schedule the patient for follow-up appointments as clinically indicated ([Appendix 6](#)). For those inmates with a history of stable INRs, they may be considered for scheduling up to every twelve weeks.
8. Document appropriate subjective and objective data, laboratory tests, dosing, assessments, therapeutic plans, and follow-up care in the patient's chart in a **SOAPE** format ([Appendix 2](#)). The **BEMR** Flowsheet should be used to monitor therapy changes with Point-of-Care testing.
9. Refer to a physician for orders for discontinuation of warfarin therapy.
10. For new intakes already receiving warfarin therapy, promptly obtain INRs and clinically evaluate.
11. Follow this protocol for appropriately managing inmates on warfarin who are transferring.

C. CLINIC PROTOCOL

1. Documentation for New Referrals for Anticoagulation Care

The following clinical information should be sought when an inmate who is already receiving warfarin therapy enters a BOP facility, as well as for all inmates who are initiating warfarin in a BOP facility.

- a. Anticoagulation indication
- b. Date that anticoagulation was initiated and the current warfarin dose
- c. Concurrent use of low-molecular-weight heparin (LMWH) or other anticoagulants.
- d. Most recent INR result and date
- e. Target INR and range
- f. Anticipated duration of therapy
- g. Available information on baseline blood pressure, platelets, CBC, LFTs, fecal occult blood test results, urinalysis, and renal function

2. Inmate Interview

For each referred inmate, conduct an interview that will:

- a. Gather pertinent medical, social, and dietary history.
- b. Explain warfarin therapy to the inmate.
- c. Explain the clinic procedure and provide call-out information.

3. Clinic Procedure

- a. **INR testing:** Schedule INR testing so that the results are available at the inmate's next anticoagulation clinic appointment. If point of care (POC) INR testing is used, the inmate should be evaluated on the same day, using that INR measurement. If non-waived testing is utilized, ensure there is enough time to allow for the testing to be completed and results reported prior to the clinic appointment.
- b. **Preparation for the first clinic visit:** Review the chart to become familiar with the inmate's history. Record all pertinent retrospective information in the medical record as an Administrative note.
- c. **Assessment at each clinic visit:** Review the following issues and document your findings on the BEMR Anticoagulation Flowsheet. *The flow sheet should only be utilized for results obtained from POC testing.*
 - (1) Assess for signs and symptoms of bleeding at each visit, with special attention paid in the setting of an elevated INR:
 - Bleeding that does not stop after 10–15 minutes
 - Red, dark, or cloudy urine
 - Bloody or black/tarry stools
 - Bleeding from gums or nose
 - Bruising (unexpected/excessive)
 - Excessive menstrual bleeding
 - Vomiting blood or "coffee grounds"
 - Coughing up blood
 - Headache, dizziness, weakness
 - (2) If signs and symptoms of embolism (including calf, thigh, groin pain or swelling; chest pain; shortness of breath; cough) or stroke are observed during clinic visit, refer patient to a primary care provider.
 - (3) Review alterations in diet and medications (including commissary items).
 - (4) Review changes in lifestyle or health status.
 - (5) Assess medication compliance.
 - (6) Monitor for changes in blood pressure.
 - (7) Review patient record for any upcoming surgeries.
- d. **Adjust warfarin dose, as indicated:** Question inmates whose INR values are outside the therapeutic range. Attempt to identify precipitating factors that, if controlled, would prevent dosage adjustment. Consider possible drug interactions.

For patients initiating warfarin therapy: See [Appendix 5](#), *Warfarin Initial Dosing Algorithm*. Then, follow the recommendations in [Appendix 6](#), *Warfarin Dosage Adjustment Algorithm*.

- (1) **If the INR is lower than the therapeutic range:** Suspect noncompliance first. Other causes may include drug-drug interactions, dietary alterations, warfarin resistance, etc. If no factor is identified, adjust the warfarin dose in accordance with the dosing recommendations in [Appendix 6](#) and the inmate's past dose-response data. Schedule the inmate for a return visit and repeat INR within the timeframe outlined in [Appendix 6](#).
- (2) **If the INR is higher than the therapeutic range:** If the inmate is bleeding or is suspected to be bleeding, immediately refer the individual to the physician for evaluation. Otherwise, follow the recommendations in [Appendix 7](#), *Management of High INR Values*. **The physician should always be contacted whenever the INR >4.5, there is acute bleeding, or oral vitamin K is being considered.**

- e. Planned surgeries or procedures (including dental procedures):**
- (1) Instruct patients to inform all health providers about their warfarin therapy.
 - (2) After learning about any planned procedures, contact the appropriate surgeon/dentist to discuss treatment plans for the perioperative anticoagulation management of the patient. (see [Appendix 10](#), *Guidance for Managing Anticoagulation Therapy in Patients Requiring Invasive Procedures*).
- f. Inmate education:** Patient education is crucial to the success of anticoagulation management. Information should be presented in both written and verbal form, and tailored to the inmate's ability to comprehend the subject matter. [Appendices 9A and 9B](#), *Inmate Fact Sheets on Warfarin (English and Spanish)*, should be given and explained, if necessary, to inmates on warfarin. Inmates who are prescribed dabigatran, rivaroxaban, apixaban, or edoxaban should also be provided with appropriate patient information sheets. Re-assess the inmate's level of understanding at each visit, reviewing important topics as necessary. During the course of the therapy, the inmate should be knowledgeable about the following:
- (1) The reason for anticoagulant therapy.
 - (2) How to take their anticoagulant medication.
 - (3) What to do if a dose is missed.
 - (4) The importance of regular INR tests and the INR goal for that inmate.
 - (5) The importance of compliance with the regimen, laboratory monitoring, and clinic procedures.
 - (6) Signs and symptoms of bleeding and what to do if they occur.
 - (7) Signs and symptoms of a DVT, PE, or stroke, and what to do if they occur.
 - (8) Drug-diet interactions (foods containing vitamin K).
 - (9) Drug-drug interactions (including prescriptions, commissary medication, herbal products, etc.).
 - (10) Drug-lifestyle interactions (such as changes in exercise), as well as the effect of certain health conditions on INR levels.
 - (11) The importance of informing any health care provider (including dentists) about being on anticoagulant therapy.
- g. Appointment scheduling:**
- ➔ ***The patient's INR should be checked whenever any new drug or herbal medicine is added or withdrawn in a patient's regimen.***
- (1) **For inmates who are initiating warfarin therapy:** INRs ideally should be obtained daily, with the warfarin dose adjusted accordingly until two consecutive INR values are within the therapeutic range. If daily INRs are not feasible, obtain INRs and clinically evaluate the patients at least every 3 days, progressing warfarin dosing more slowly. See [Appendix 5](#), *Warfarin Initial Dosing Algorithm*.
 - (2) **During INR adjustments:** Visits should occur at least weekly until the patient has two consecutive INR values within therapeutic range. See [Appendix 6](#), *Warfarin Dosage Adjustment Algorithms*.
 - (3) **When INRs are stable:** Clinic visits (including INR monitoring) should occur every 1–4 weeks (and up to every 12 weeks for patients demonstrating stability on the current warfarin dose). The frequency of return clinic appointments will depend on the INR stability and other variables—in particular, the inmate's level of understanding about the requirements of warfarin therapy and treatment compliance. The frequency of return visits should be individualized, based on the clinical condition of the patient.

- h. Other follow-up to maintain:**
 - (1) Appointments in the Chronic Care Clinic, as clinically indicated.
 - (2) Urinalysis and CBC with platelets every 6 months.
 - i. Documentation:** Following each clinic visit, be sure to document observations, lab data, and the care plan in BEMR and as a SOAPE note, if indicated (see [Appendix 2](#) for recommended template).
 - j. Discontinuation of therapy:** When the projected duration of anticoagulation therapy is complete, notify the primary care provider and discuss whether or not to discontinue therapy.
- 4. Transfer of Inmates Who Are on Warfarin Therapy**
- a. Transfers to another facility:** Inmates who are taking warfarin should have a current INR result in the medical record prior to transfer, with no changes in warfarin dosing anticipated. A “current INR” means an INR that is obtained at the recommended frequency (as outlined in [Appendix 6](#)) and always within the previous 4 weeks.
Inmates can be cleared for transfer if the INR value is within therapeutic range and the inmate is stable. When the INR is outside the therapeutic range, a decision to postpone transfer should be made individually, based upon a determination of clinical risk and medical stability.
 - b. Transfers into this facility:** New intakes on warfarin are at particularly high risk for adverse outcomes and warrant prompt INRs and clinical evaluation. (See sections 1 and 2 of [Clinic Protocol](#) above.) Inmates who come into an institution on warfarin should be scheduled for an INR via lab at intake. Appropriate follow-up care should then be scheduled to see patient.

(APPENDIX 1: ANTICOAGULATION CLINIC PROTOCOL — PAGE 4 OF 4)

APPENDIX 2: CONTENTS OF SOAPE NOTES FOR ANTICOAGULATION THERAPY

Clinical notes for all visits will be documented in the “SOAPE” format and placed in the patient’s medical record. The following content is recommended:

SUBJECTIVE:

- Patient’s age, diagnosis, and indication(s) for warfarin therapy
- Date that warfarin therapy was initiated
- Current warfarin dose, PT/INR goal range, and planned duration of therapy
- Signs or symptoms of bleeding, thromboembolism, or stroke.
- Concurrent medications and any recent changes in drug therapy
- Changes in diet and intake of food with high vitamin K content
- The physician or clinic responsible for periodic evaluation of patient

OBJECTIVE:

- PT/INR and any other pertinent labs
- Blood pressure, pulse, and respiratory rate
- Any observed bruising or other signs of bleeding

ASSESSMENT:

- Whether the patient is adequately, over-, or under-anticoagulated
- Indicated further assessment

PLAN:

- Current or new warfarin dose
- Other anticoagulant medications maintained or changed
- Date and time of next appointment
- Date of follow-up labs

EDUCATION:

- See “[Inmate Education](#)” section in *Appendix 1, Anticoagulation Clinic Protocol* for assessing patient’s level of understanding.

APPENDIX 3: RECOMMENDED INR TARGET AND DURATION OF WARFARIN THERAPY BY INDICATION

INDICATION	TARGET INR (Therapeutic Range)	DURATION OF THERAPY
Deep Venous Thrombosis (DVT) and Pulmonary Embolism (PE) ¹		
First episode secondary to reversible risk factor(s)	2.5 (2.0–3.0)	3 months
First episode (idiopathic)		3 months
In patients with active malignancy		LMWH for 3–6 months; then, may change to warfarin or continue on LMWH indefinitely or until patient is 1 year post-remission.
In patients with antiphospholipid antibodies or who have 2 or more thrombophilic conditions		12 months (consider indefinitely)
In patients with a deficiency of antithrombin or proteins C or S, gene mutation for factor V Leiden or prothrombin 2010, homocystinemia, or high factor VIII levels		6-12 months (consider indefinitely)
Two episodes of objectively documented events		Indefinitely
Atrial Fibrillation (AF) or Flutter		
Persistent or paroxysmal atrial fibrillation (CHA ₂ DS ₂ -VASc score, ≥2)	2.5 (2.0–3.0)	Indefinitely
Mitral stenosis		Indefinitely
Elective cardioversion		3 wks before & 4 wks after conversion
Valvular Disease		
Rheumatic mitral valve disease with atrial fibrillation or a history of systemic embolism	2.5 (2.0–3.0)	Indefinitely
St. Jude Medical bileaflet in aortic position; Carbomedics bileaflet or Medtronic Hall tilting disk mechanical valves in the aortic position	2.5 (2.0–3.0)	Indefinitely
Mechanical valve in mitral position	3.0 (2.5–3.5)	Indefinitely
Ball/cage valve	3.0 (2.5–3.5)	Indefinitely with aspirin
Mitral bioprosthetic valves (Note: Aortic bioprosthetic valves do not require warfarin for any period of time; only aspirin is indicated.)	2.5 (2.0–3.0)	3 months
Coronary Heart Disease		
High risk patients ² with myocardial infarction	2.5 (2.0–3.0)	3 months with aspirin (indefinite)
<p>INR = International Normalized Ratio LMWH = low-molecular-weight heparin</p> <p>¹ Recommendation is to start warfarin therapy on the first treatment day with LMWH or unfractionated heparin.</p> <p>² Includes patients with large anterior wall myocardial infarction, significant heart failure, intracardiac thrombus visible on echocardiography, history of thromboembolic event</p> <p>Adapted from: Ageno W, Gallus AS, Wittkowsky A, et. al. Oral anticoagulant therapy: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians evidence-based clinical practice guidelines. <i>Chest</i>. 2012;141(2)(Suppl):e44S–e88S. Available at: http://journal.publications.chestnet.org/pdfaccess.ashx?ResourceID=3137628&PDFSource=13</p>		

APPENDIX 4: WARFARIN INTERACTIONS

Certain health conditions, numerous drugs, herbs, and foods can interact with warfarin, especially when the interacting substance is started, stopped, or changed in dose.

DRUGS that may increase INR (increase bleeding risk)					
acetaminophen	chloral hydrate*	fenoprofen	levothyroxine	pantoprazole	streptokinase
alcohol*	chlorpropamide	fluconazole	liothyronine	paroxetine	sulfamethizole
allopurinol	cholestyramine*	fluorouracil	lovastatin	penicillin G, intravenous	sulfamethoxazole
aminosalicylic acid	cimetidine	flouxetine	mefenamic acid	pentoxifylline	sulfinpyrazone
amiodarone HCl	ciprofloxacin	flutamide	methimazole*	phenylbutazone	sulfisoxazole
argatroban	cisapride	fluvastatin	methylidopa	phenytoin*	sulindac
aspirin	clarithromycin	ifosfamide	methylphenidate	piperacillin	tamoxifen
atenolol	clofibrate	gefitinib	methylsalicylate	piroxicam	tetracycline
atorvastatin*	cyclophosphamide*	gemfibrozil	ointment	pravastatin*	thyroid
azithromycin	danazol	glucagon	metronidazole	prednisone*	ticarcillin
bivalirudin	dextran	halothane	miconazole (vaginal/ oral/systemic)	propafenone	ticlopidine
capecitabine	dextrothyroxine	heparin	moricyzine	propoxyphene	tissue plasminogen activator (t-PA)
cefamandole	diazoxide	ibuprofen	hydrochloride*	propranolol	tolbutamide
cefazolin	diclofenac	ifosfamide	nalidixic acid	propylthiouracil*	tramadol
cefoperazone	dicumarol	indomethacin	naproxen	quinidine	trimethoprim/ sulfamethoxazole
cefotetan	diflunisal	influenza vac.	neomycin	quinine	urokinase
cefoxitin	disulfiram	itraconazole	ofloxacin	rabeprazole	valdecoxib
ceftriaxone	doxycycline	ketoprofen	oxalazine	ranitidine*	valproate
celecoxib	erythromycin	ketorolac	omeprazole	sertraline	vitamin E
cerivastatin	esomeprazole	lansoprazole	omeprazole/oxandrolone	simvastatin	zafirlukast
chenodiol	ethacrynic acid	lepirudin	oxaprozin	stanazolol	zileuton
chloramphenicol	ezetimibe	levamisole	oxymetholone		
	fenofibrate	levofloxacin			
DRUGS that may decrease INR (increase clotting risk)					
alcohol*	chloral hydrate*	dicloxacillin	moricyzine	primidone	trazodone
aminoglutethimide	chlordiazepoxide	ethchlorvynol	hydrochloride*	propylthiouracil*	vitamin C (high dose)
amobarbital	chlorthalidone	glutethimide	nafcillin	raloxifene	vitamin K
atorvastatin*	cholestyramine*	griseofulvin	paraldehyde	ranitidine*	
azathioprine	clozapine	haloperidol	pentobarbital	rifampin	
butabarbital	corticotropin	meprobamate	phenytoin*	secobarbital	
butalbital	cortisone	6-mercaptopurine	pravastatin*	spironolactone	
carbamazepine	cyclophosphamide*	methimazole*	prednisone*	sucralfate	
FOODS that may decrease INR (increase clotting risk)					
The following foods are high in Vitamin K and will decrease the INR. These foods do not necessarily have to be avoided, but one's diet should be similar each day to provide a consistent Vitamin K level in the body.					
basil	coleslaw	liver	spinach		
broccoli	collard greens	mayonnaise	Swiss chard		
Brussels sprouts	coriander	mustard greens	teas (black or green)		
butterhead lettuce	cucumbers (w/ peel)	nutritional supplements	turnip greens		
canola oil	endive	parsley	watercress		
chickpeas	green onions	red leaf lettuce			
chives	kale	soybean oil			
HEALTH CONDITIONS that may increase INR			HEALTH CONDITIONS that may decrease INR		
blood dyscrasias	hepatic disorders: infectious	edema			
cancer	hepatitis, jaundice	hereditary coumarin resistance			
collagen vascular disease	hyperthyroidism	hyperlipidemia			
congestive heart failure (CHF)	poor nutritional state	hypothyroidism			
diarrhea	prolonged hot weather	nephrotic syndrome			
dietary deficiencies	steatorrhea				
elevated temperature/fever	vitamin K deficiency				

* Increased AND decreased INR responses have been reported. Adapted from: Coumadin® Package Insert. See [References](#).

APPENDIX 5: WARFARIN INITIAL DOSING ALGORITHM

This algorithm applies to patients who are either treated with LMWH and warfarin in combination, or treated with warfarin alone.

- The results of a baseline INR should be obtained prior to initiating therapy.
- Patients who are prescribed both LMWH and warfarin should continue LMWH for at least 5 days and until a therapeutic INR has been achieved.
- Once warfarin is initiated, an INR ideally should be obtained daily from Day 3 on, until two consecutive INRs are in therapeutic range. At facilities without on-site INR capability, INRs should be obtained every 1–3 days.

→ If daily INRs are not available, adjust warfarin dose more gradually than in the schedule outlined below.

DAY	INR	WARFARIN DOSE
Day 1 (Administer LMWH)	Baseline INR	5 mg (3 mg if age >65 or if indicated, as in Note #2)
▼		
Day 2 (Continue LMWH)	No INR required	Same dose as Day 1
▼		
Day 3 (Continue LMWH)	<1.5	5–7.5 mg
	1.5–1.9	2.5–5 mg
	2–2.5	0–2.5 mg
	>2.5	HOLD WARFARIN DOSE
▼		
Day 4 (Continue LMWH)	<1.5	10 mg
	1.5–1.9	5–7.5 mg
	2–3	0–5 mg
	>3	HOLD WARFARIN DOSE
▼		
Day 5 (Final dose of LMWH if therapeutic INR x2)	<1.5	10 mg
	1.5–1.9	5–10 mg
	2–3	0–5 mg
	>3	HOLD WARFARIN DOSE
▼		
Day 6 (Final dose of LMWH if therapeutic INR x2)	<1.5	7.5–12.5 mg
	1.5–1.9	5–10 mg
	2–3	0–7.5 mg
	>3	HOLD WARFARIN DOSE

NOTES:

- ¹ This algorithm applies for therapeutic INR targets of 2.5 and 3.0. Therapeutic INR goals vary based on indication (see [Appendix 3](#)).
- ² The initial warfarin dose should be decreased to 3 mg or less, if the patient:
 - Is age >65, or
 - Has significant liver disease, congestive heart failure, or a high risk of bleeding.
- ³ LMWH can be discontinued when two consecutive therapeutic INR values taken at least 24 hours apart are achieved and at least 5 days of warfarin have been administered to the patient.
- ⁴ All dosing changes are made after lab error, drug-drug interactions, changes in diet, and non-compliance issues are ruled out. Provider may recheck PT/INR before changing dose if one of these issues is suspected and resolved.
- ⁵ Warfarin should generally be administered via pill-line during the initial dosing. For patients on long-term therapy, administering warfarin via pill-line should be evaluated individually, based on the patient's record of compliance with therapy.
- ⁶ See [Appendix 6](#) for continued warfarin dosing.

Adapted from: Claremore Indian Hospital. Anticoagulation Services protocol. Oklahoma City, OK: Claremore Indian Hospital; 2001.

APPENDIX 6: WARFARIN DOSAGE ADJUSTMENT ALGORITHMS

FOR TARGET INR OF 2.0 TO 3.0, NO BLEEDING						
INR	<1.5	1.5 to 1.9	2.0 to 3.0	3.1 to 3.9	4.0 to 4.5	> 4.5
ADJUSTMENT	Increase dose by 10–20%; consider extra dose	Increase dose by 5–10% ¹	No change	Decrease dose by 5–10% ¹	Hold for 0–1 day; then, decrease dose by 10%	See Appendix 7 ³
NEXT INR	4–8 days	7–10 days	1 week x the number of consecutive in-range INRs (max: 12 wks) ²	7–10 days	4–8 days	See Appendix 7 ³

FOR TARGET INR OF 2.5 TO 3.5, NO BLEEDING					
INR	<1.5	1.5 to 2.4	2.5 to 3.5	3.6 to 4.5	> 4.5
ADJUSTMENT	Increase dose by 10–20%; consider extra dose	Increase dose by 5–10% ¹	No change	Decrease dose by 5–10%; consider holding one dose ¹	See Appendix 7 ³
NEXT INR	4–8 days	7–10 days	1 week x number of consecutive in-range INRs (max: 12 wks) ²	7–10 days	See Appendix 7 ³

NOTES:

¹ **For therapeutic INR target of 2.0–3.0:** If INR is 1.8–1.9 or 3.1–3.2, consider no change with a repeat INR in 7–10 days.

For therapeutic INR target of 2.5–3.5: If INR is 2.3–2.4 or 3.6–3.7, consider no change with a repeat INR in 7–10 days.

² **Scheduling next INR when target INR is being met:**

- *Example:* If a patient has had 3 consecutive INRs within therapeutic range, schedule a return visit for 3 weeks.
- Preferable to schedule appointments at least every 4 weeks to maximize patient benefit from Anticoagulation Clinic in BOP setting. May extend visits to a maximum of every 12 weeks for patients demonstrating stability and compliance per CHEST guidelines.

³ See [Appendix 7](#), *Management of High INR Values* for further guidance.

APPENDIX 7: MANAGEMENT OF HIGH INR VALUES

PATIENT SITUATION		ACTION
<p>→ CONTACT PHYSICIAN: If bleeding occurs, OR if INR >4.5, OR if oral Vitamin K is considered.</p>		
INR = 4.5 to 10	<p>AND no active bleeding, AND patient has no risk factors for bleeding ...</p>	<ul style="list-style-type: none"> • Omit the next 1–2 doses of warfarin. • Monitor more frequently. • Resume therapy with an appropriately adjusted, reduced dose when INR is in therapeutic range. (see Appendix 3).
	<p>AND no bleeding, BUT patient is at risk for bleeding ...</p>	<ul style="list-style-type: none"> • Omit a dose of warfarin. • Administer vitamin K (1–2.5 mg) orally. Contact a physician before initiating vitamin K. • Monitor more frequently. • Resume therapy with an appropriately adjusted, reduced dose when INR is in therapeutic range. (see Appendix 3)
INR >10	<p>AND no clinically significant bleeding ...</p>	<ul style="list-style-type: none"> • Hold warfarin therapy. • Give oral vitamin K (2.5–5 mg). Contact a physician before initiating vitamin K. INR should be reduced substantially in 24–48 hours. • Monitor INR more frequently. • Repeat vitamin K, as needed. • Resume therapy with an appropriately adjusted, reduced dose when INR is in therapeutic range. (see Appendix 3).
INR ≥4.5	<p>AND a more rapid reversal is necessary, e.g., because urgent surgery is required ...</p>	<ul style="list-style-type: none"> • Administer oral vitamin K (≤ 5 mg). The INR should drop within 24 hours. • If the INR is still high, administer an additional dose of oral vitamin K (1–2 mg). • Check INR immediately prior to the procedure.
<p>Serious bleeding or warfarin overdose!!</p>		<ul style="list-style-type: none"> • Refer IMMEDIATELY to the emergency department!! • IV Vitamin K 5–10mg. • IV route should be restricted for emergency use only. • IM route should be avoided due to the risk of hematoma.

APPENDIX 8: POINT-OF-CARE TESTING PROTOCOL

1. **Obtaining INRs in the BOP:** All INRs in the BOP will be obtained by using either an accredited laboratory or a point of care testing (POC) system approved for *waived* testing. It is recommended that INRs in the outpatient anticoagulation clinic be obtained with a POC testing system designed for healthcare professional use (i.e., CoaguChek® XS Plus), and *not* those designed for individual patient use (i.e., CoaguChek® XS). It is recommended that repeat POC testing on patients be performed by the same individual, to reduce pre-analytical variability.
2. **Maintaining the POC INR systems:** POC INR testing systems will be maintained in accordance with the manufacturer's recommendations, the Joint Commission, CLIA'88, and ACA guidelines. POC testing within the BOP is performed under a CLIA waived certificate. Each institution utilizing waived testing must have its own CLIA waived certificate. The individual named on the certificate (e.g., HSA, Chief Pharmacist) will oversee the use of the POC. For further information, see the user manual for the particular POC test the institution uses.
3. **Operator training:** Employees who are assigned responsibility for using the POC INR system will receive initial training and demonstrate competence in using the system. Initial training, when the meter is placed in an institution, will usually be conducted by the manufacturer. Assurance of ongoing competency will be the institution's responsibility and must conform to applicable accreditation standards and requirements.
4. **Quality assurance:** Quality control (QC) for POC INR systems may be internally integrated into the meter and strips, or may utilize external liquid controls. Internal QC is performed automatically with each test. The QC results are evaluated internally by the meter, prior to completion of a patient's blood test. Even if QC is internal, if external controls are available, it is recommended that the external controls be utilized as directed by the manufacturer.
5. **Storing and using test strips:** Test strips will be stored as directed by the manufacturer. All test strips will be stored in the original container, with the cap closed. Properly stored strips can be used until the expiration date printed on the test strip container. Test strips that are past their "Use By" date will be thrown away. When using the strips, open the test strip container, remove one strip from the container, and immediately close the container, making sure it seals tightly. If utilizing a new container of strips, ensure that the test strip code is entered into the meter. Do not open a container of test strips, or touch a test strip, with wet hands or wet gloves. Strips must be used within 10 minutes of removal from the container. See the system user manual for further information.
6. **Test performance:** In order to produce reliable and relevant test results, strict adherence to the meter manufacturer's current step-by-step protocol is absolutely necessary. See the system user manual for further information.
7. **INR result exceeding 4.5 or failing to correlate clinically:** If the INR result obtained from the POC INR system is greater than 4.5, a second INR test will be performed on a new finger stick on the other hand of the patient.
 - If the two results agree (± 0.4 INR units) *and* the INR result is <7.0 , treatment adjustments can be made by using an algorithm (see [Appendix 5](#), [Appendix 6](#), and [Appendix 7](#)).
 - If the two results do not agree, *or* the INR result is ≥ 7 , the patient will be sent to the lab to recheck the INR and confirm the abnormally high result. The lab should use a non-waived test to confirm the INR.
 - At any time, if it is thought that the INR obtained with the POC INR does not correlate with the patient's clinical status, the patient will be sent to the lab to recheck the INR using a non-waived method.

APPENDIX 9A: INMATE FACT SHEET ON WARFARIN

Why do I need to take Warfarin?

You are being given warfarin because you are at risk for blood clots, which can cause a stroke or heart attack. Warfarin is an “anticoagulant” that helps keep clots from forming in the blood. (*Anti* means *against*, and *coagulant* refers to blood clotting.)

Will warfarin cause me to bleed?

Warfarin decreases your blood’s ability to clot. So, if you get a cut on your hand, or a have stomach ulcer that sometimes bleeds, taking warfarin will make you bleed longer.

Why do I need regular blood tests? What does the INR number mean?

The INR number is a way of measuring how fast your blood clots. The higher your INR, the longer it takes for your blood to clot. You need regular “INR” blood tests to make sure that your warfarin dose is correct:

- **If your INR number is too high**, you have more risk of bleeding and your warfarin dose may need to be lowered.
- **If your INR number drops too low**, blood clots could form, so your warfarin dose would need to be increased.

Why do I have such frequent INR tests?

It is very important that your INR number stay within a safe range. We monitor your blood frequently because many ordinary things can quickly affect your INR while you’re taking warfarin—for example: what you eat or drink, changes in your health (even minor ones), and taking other prescription or over-the-counter medications.

What specific things can affect my INR?

Diet: Foods high in vitamin K (for example, liver and dark-green leafy vegetables like spinach and kale) “work against” anticoagulation therapy because vitamin K helps the blood clot. These foods will lower your INR (shorten the time your blood takes to clot) and increase your risk of dangerous blood clots. If these foods are a part of your diet, you should eat them only in small amounts—and have about the same amount every day so that your INR number stays level. Ask your health care provider for a more complete list of foods high in vitamin K.

Health: Fever, nausea, vomiting, or diarrhea for more than two days in a row can increase your risk of blood clots and should promptly be reported to your healthcare provider.

Medications (including herbal): Many medicines can affect your INR number. Always talk to your healthcare provider before taking any new medication, including commissary items.

These medicines can raise your INR and increase your risk for bleeding:

- **Aspirin** – Also called acetylsalicylic acid, salicylate, or ASA. Be aware that Alka-Seltzer and Pepto-Bismol contain aspirin. Avoid using ointments or gels that contain aspirin.
- **Anti-inflammatories** – Includes ibuprofen (Motrin, Midol, Nuprin, Advil), naproxen (Aleve), and ketoprofen (Orudis, Oruvail). Also known as NSAIDs.
- **Cold medicines and other over-the-counter (OTC) medications** – Always talk with your healthcare provider before taking any OTC medications. Check the label on all OTC medications; many cold medicines contain either aspirin or anti-inflammatories.

What should I be doing?

1. **Take your warfarin exactly when and how your healthcare provider tells you.**
 - If you miss a dose, take the missed dose as soon as possible on the same day—but only if it's within 4 hours of when the dose was scheduled. If it's been more than 4 hours since you were supposed to take it, wait until the next scheduled dose.
 - DO NOT take a double dose the next day to make up for a missed dose.
 - If you forget to take a tablet, tell your health care provider as soon as possible.
2. **Keep your eating habits and activities similar every day.**
3. **Get your blood tested, and come to your other clinic visits, when you are scheduled.**
4. **Be sure to tell other health care providers and your dentist that you take warfarin.**
5. **Contact the clinic immediately if any of the following occurs:**
 - **Any signs of bleeding:**
 - ▶ *bleeding that won't stop after 10–15 minutes*
 - ▶ *red, dark, or cloudy urine*
 - ▶ *bloody stools or black, tarry stools*
 - ▶ *bleeding from your gums or nose*
 - ▶ *unexpected bruising*
 - ▶ *excessive menstrual bleeding*
 - ▶ *vomiting blood or “coffee grounds”*
 - ▶ *coughing up blood*
 - ▶ *headache, dizziness, weakness*
 - **Any signs of clotting:**
 - ▶ *pain or swelling in one leg*
 - ▶ *chest pain or shortness of breath*
6. **Contact the clinic as soon as possible if you:**
 - Have any illness with a fever higher than 101°F, or vomiting or diarrhea lasting more than 48 hours.
 - Are admitted to the hospital (ask them to contact the clinic about your anticoagulation).
 - Are advised by another healthcare provider to take an antibiotic or other medication, to change your warfarin dose, or to stop warfarin for any reason.
 - **Contact the clinic before starting any new medicine, whether prescribed or over-the-counter (commisary), including herbal supplements.**

What should I avoid?

- Avoid big changes in your eating habits.
- Avoid drinking alcohol.
- Avoid any activity or sport that may result in hurting yourself.

APPENDIX 9B: INMATE FACT SHEET ON WARFARIN (IN SPANISH)

Por qué necesito tomar warfarina?

Le están dando warfarin porque usted está en riesgo de coágulos de sangre, que pueden causar un movimiento o un ataque del corazón. La warfarina es un "anticoagulante" que ayuda a prevenir la formación de coágulos en la sangre. (Anti-medios contra, y coagulante se refiere a la coagulación de la sangre.)

Me hará sangrar la warfarina?

La warfarina disminuye la capacidad de su sangre de coagularse. Por lo tanto, si recibe un corte en su mano, o una úlcera de estómago que a veces sangra, tomar warfarina le hará sangrar más tiempo.

Por qué necesito análisis de sangre regulares? ¿Qué significa el número INR?

El número INR es una forma de medir la rapidez con que coagula su sangre. Cuanto más alto es su INR, más tiempo tarda su sangre en coagularse. Usted necesita análisis regulares de sangre "INR" para asegurarse de que su dosis de warfarina es correcta:

- Si su número de INR es demasiado alto, tiene más riesgo de sangrado y puede ser necesario reducir su dosis de warfarina.
- Si su número de INR cae demasiado bajo, podrían formarse coágulos de sangre, por lo que su dosis de warfarina tendría que ser aumentada.

Por qué tengo tan frecuentes pruebas INR?

Es muy importante que su número de INR se mantenga dentro de un rango seguro. Nosotros monitorizamos su sangre frecuentemente porque muchas cosas comunes pueden afectar rápidamente su INR mientras usted está tomando warfarina-por ejemplo: lo que usted come o bebe, cambios en su salud (incluso los menores), y tomando otra receta o de venta libre Medicamentos.

Qué cosas específicas pueden afectar mi INR?

Dieta: Alimentos ricos en vitamina K (por ejemplo, hígado y verduras de hoja verde oscuro como espinaca y col rizada) "trabajan contra" la terapia de anticoagulación porque la vitamina K ayuda al coágulo de sangre. Estos alimentos reducirán su INR (acortar el tiempo que toma su sangre para coagularse) y aumentar el riesgo de coágulos sanguíneos peligrosos. Si estos alimentos son una parte de su dieta, usted debe comer sólo en pequeñas cantidades y tienen aproximadamente la misma cantidad todos los días para que su número INR se mantiene nivel. Pregúntele a su médico para obtener una lista más completa de alimentos ricos en vitamina K.

Salud:

Fiebre, náuseas, vómitos o diarrea durante más de dos días seguidos pueden aumentar el riesgo de coágulos sanguíneos y deben informarse inmediatamente a su proveedor de atención médica.

Medicamentos (incluyendo hierbas):

Muchas medicinas pueden afectar su número INR. Siempre hable con su proveedor de atención médica antes de tomar cualquier medicamento nuevo, incluyendo artículos de comisaria.

Estos medicamentos pueden aumentar su INR y aumentar su riesgo de sangrado:

- Aspirina - También se llama ácido acetilsalicílico, salicilato o ASA. Tenga en cuenta que Alka-Seltzer y Pepto-Bismol contienen aspirina. Evite el uso de ungüentos o geles que contengan aspirina.
- Antiinflamatorios - Incluye ibuprofeno (Motrin, Midol, Nuprin, Advil), naproxeno (Aleve) y ketoprofeno (Orudis, Oruvail). También conocido como AINEs.
- Medicamentos para el resfriado y otros medicamentos de venta libre (OCT) - Siempre hable con su proveedor de atención médica antes de tomar cualquier medicamento de venta libre. Revise la etiqueta en todos los medicamentos OTC; Muchos medicamentos para el resfrío contienen aspirina o antiinflamatorios.

Qué debo hacer?

1. Tome su warfarina exactamente cuando y como le indique su médico.

Si omite una dosis, tome la dosis olvidada tan pronto como sea posible el mismo día, pero sólo si está dentro de las 4 horas de la fecha en que se programó la dosis. Si ha pasado más de 4 horas desde que se suponía que debía tomarla, espere hasta la siguiente dosis programada.

- NO tome una dosis doble al día siguiente para compensar la dosis olvidada.
- Si olvida tomar un comprimido, informe a su médico lo antes posible.

2. Mantenga sus hábitos alimenticios y actividades similares todos los días.

3. Lleve a cabo la prueba de sangre, y vienen a sus visitas a otras clínicas, cuando está programado.

4. Asegúrese de decirle a otros proveedores de atención médica ya su dentista que usted toma warfarina.

5. Comuníquese con la clínica inmediatamente si ocurre cualquiera de lo siguiente:

- Cualquier signo de sangrado:
 - ▶ sangrado que no se detendrá después de 10-15 minutos
 - ▶ orina roja, oscura o turbia
 - ▶ heces sanguinolentas o heces negras, alquitranadas
 - ▶ sangrado de las encías o la nariz
 - ▶ hematomas inesperados
 - ▶ exceso de sangrado menstrual
 - ▶ vómitos de sangre o "granos de café"
 - ▶ tosiendo sangre
 - ▶ dolor de cabeza, mareos, debilidad
- Cualquier signo de coagulación:
 - ▶ dolor o hinchazón en una pierna
 - ▶ dolor de pecho o dificultad para respirar

6. Comuníquese con la clínica tan pronto como sea posible si:

- Tener cualquier enfermedad con fiebre superior a 101oF, o vómitos o diarrea que dure más de 48 horas.
 - Están ingresados en el hospital (pídales que se pongan en contacto con la clínica acerca de su anticoagulación).
 - Es aconsejado por otro proveedor de atención médica a tomar un antibiótico u otro medicamento, para cambiar su dosis de warfarina o para detener la warfarina por cualquier razón.
- ' Póngase en contacto con la clínica antes de comenzar cualquier medicamento nuevo, ya sea recetado o sin receta (comisario), incluyendo suplementos de hierbas.

Qué debo evitar?

- Evite grandes cambios en sus hábitos alimenticios.
 - Evite beber alcohol.
 - Evite cualquier actividad o deporte que pueda resultar en hacerse daño
- .

APPENDIX 10: GUIDANCE FOR MANAGING ANTICOAGULATION THERAPY FOR PATIENTS REQUIRING INVASIVE PROCEDURES

→ **The guidance in this Appendix is for general reference only.** Coordinate perioperative anticoagulation management with the surgeon who is performing the procedure. Obtain expert consultation as needed.

TABLE A: Bleeding Risk Associated with Invasive Procedures and Recommendations for Perioperative Management	
1. High Bleeding Risk (Surgical)	
PROCEDURE	RECOMMENDATIONS
<ul style="list-style-type: none"> Cardiac surgery Abdominal aortic aneurysm repair Neurosurgery Most cancer surgery Bilateral knee replacement Transurethral resection of the prostate (TURP) Kidney biopsy 	<p>Low-Risk for Thromboembolism*</p> <ul style="list-style-type: none"> Stop warfarin 5 days before surgery and allow INR to return to near baseline. Bridging before surgery is not recommended in these patients. Restart warfarin after surgery (12-24hrs after surgery, evening or next morning). Use prophylactic dosages of LMWH or UFH if procedure predisposes to thrombosis. <p>Intermediate-Risk for Thromboembolism*</p> <ul style="list-style-type: none"> Stop warfarin 5 days before surgery. Start LMWH or UFH the day after warfarin is stopped. Prophylactic or Treatment dose of LMWH or UFH therapy can be used based on patient's risks for bleeding and thromboembolism. After surgery, restart warfarin plus prophylactic or treatment dose of LMWH or UFH based on patient's risk for bleeding, thromboembolism, and adequate hemostasis. Caution should be used when treatment dose is chosen after high bleeding-risk surgeries. <p>High-Risk for Thromboembolism*</p> <ul style="list-style-type: none"> Follow bridge therapy protocol**.
2. Intermediate Bleeding Risk (Surgical)	
PROCEDURE	RECOMMENDATIONS
<ul style="list-style-type: none"> Abdominal surgery Hemorrhoidal surgery Axillary node dissection Dilatation and curettage Hydrocele repair Orthopedic surgery Pacemaker insertion Internal cardiac defibrillator insertion Endarterectomy or carotid bypass surgery Noncataract eye surgery (complex lid, lacrimal, orbital) Extensive dental surgery (multiple tooth extractions) 	<p>Low-Risk Thromboembolism*</p> <ul style="list-style-type: none"> Stop warfarin 5 days before surgery and allow INR to return to near normal. Restart warfarin after surgery (12-24hrs after surgery, evening or next morning). Use prophylactic LMWH or UFH if procedure predisposes to thrombosis. <p>Intermediate-Risk for Thromboembolism*</p> <ul style="list-style-type: none"> Stop warfarin 5 days before surgery. Start LMWH or UFH the day after warfarin is stopped. Prophylactic or Treatment dose of LMWH or UFH therapy can be used based on patient's risks for bleeding and thromboembolism. After surgery, restart warfarin plus prophylactic or treatment dose of LMWH or UFH based on patient's risk for bleeding, thromboembolism, and adequate hemostasis. <p>High-Risk for Thromboembolism*</p> <ul style="list-style-type: none"> Follow bridge therapy protocol**.
<p>* See Table B, Risk Levels for Thromboembolism.</p> <p>** See Table C, Bridge Therapy Protocol.</p>	
(Appendix 10, Table A continues on next page.)	

(Appendix 10, Table A continued from previous page.)	
3. Intermediate-to-Low Bleeding Risk (Nonsurgical)	
PROCEDURE	RECOMMENDATIONS
<ul style="list-style-type: none"> • Coronary angiography with or without percutaneous coronary intervention • Noncoronary angiography • Upper endoscopy with endosphincterotomy • Colonoscopy with polypectomy, • Bronchoscopy with or without biopsy • Biopsy (prostate, bladder, thyroid, breast, lymph node, pancreas) 	<p>Low-Risk for Thromboembolism*</p> <ul style="list-style-type: none"> • Stop warfarin 5 days before surgery and allow INR to return to near normal. • Restart warfarin after surgery (12-24hrs after surgery, evening or next morning). • Use prophylactic dosages of LMWH or UFH if procedure predisposes to thrombosis. <p>Intermediate-Risk for Thromboembolism*</p> <ul style="list-style-type: none"> • Stop warfarin 5 days before surgery. • Start LMWH or UFH the day after warfarin is stopped. Prophylactic or Treatment dose of LMWH or UFH therapy can be used based on patient's risks for bleeding and thromboembolism. • After surgery, restart warfarin plus prophylactic or treatment dose of LMWH or UFH based on patient's risk for bleeding, thromboembolism, and adequate hemostasis. <p>High-Risk for Thromboembolism*</p> <ul style="list-style-type: none"> • Follow <i>bridge therapy protocol</i>**
4. Low-to-Minimal Bleeding Risk	
PROCEDURE	RECOMMENDATIONS
<ul style="list-style-type: none"> • Arthrocentesis • General dental treatment (hygiene, restorations, endodontics, prosthetics, minor periodontal therapy, and uncomplicated extractions) • Ophthalmic procedures (cataract, trabeculectomy, vitreoretinal) • TURP with laser surgery • Upper and lower gastrointestinal endoscopy with or without mucosal biopsy 	<p>All Levels of Risks for Thromboembolism</p> <ul style="list-style-type: none"> • Continue warfarin therapy. • Check INR the day of or the day before surgery to ensure patient's INR is not supratherapeutic.
<p>* See Table B, Risk Levels for Thromboembolism.</p> <p>** See Table C, Bridge Therapy Protocol.</p>	

APPENDIX 10, TABLE B: Risk Levels for Thrombosis
<p>Low-Risk for Thromboembolism</p> <ul style="list-style-type: none"> Atrial fibrillation with a CHA₂DS₂-VASc score of 0 and no prior history of CVA. Venous thromboembolism (VTE) more than 12 months earlier and no high-risk features. <p>Intermediate-Risk for Thromboembolism</p> <ul style="list-style-type: none"> Atrial fibrillation with a CHA₂DS₂-VASc score of 1 with no prior history of CVA. Newer (second-generation) mechanical aortic valve in normal sinus rhythm without heart failure or previous thromboembolism. VTE 3–12 months earlier. <p>High-Risk for Thromboembolism</p> <ul style="list-style-type: none"> Atrial fibrillation with recent stroke (<6 months) or a CHA₂DS₂-VASc score ≥2. Any ball/cage valve. Aortic mechanical valve with previous thromboembolism, atrial fibrillation, or congestive heart failure. Mitral mechanical valves. Venous thromboembolism less than 3 months earlier. Venous thromboembolism more than 3 months earlier with high-risk factors (active malignancy, multiple episodes of VTE, known thrombophilic state).

APPENDIX 10, TABLE C: Bridge Therapy Protocol	
<p>Although the following recommendations are based on expert opinion, this protocol is provided for general reference only. Perioperative anticoagulation management must be closely coordinated with the surgeon performing the procedure, in consultation with a clinical expert.</p>	
DAYS	RECOMMENDATIONS
-7	<ul style="list-style-type: none"> Stop aspirin therapy in patients with low risk for cardiovascular event. Also check INR—in elderly patients or when longer warfarin degradation is suspected.
-5	<ul style="list-style-type: none"> Stop warfarin and check INR.
-4	<ul style="list-style-type: none"> Start therapeutic doses of LMWH or UFH the day after warfarin is held. Consider prophylactic LMWH doses for patients with an intermediate risk of thromboembolism.
-1	<ul style="list-style-type: none"> Give last dose of LMWH 24 hours before procedure. Give last dose of UFH 4-6 hours before procedure. Check INR; if 1.5 or higher, give vitamin K (1.0-2.5 mg orally). Stop Aspirin therapy (in patient with moderate to high risk for cardiovascular event and are undergoing non-cardiac surgery).
0 (day of surgery)	<ul style="list-style-type: none"> No LMWH or UFH on the day of the procedure. Resume previous warfarin dose 12–24 hours after procedure if the patient has achieved hemostasis.
1	<ul style="list-style-type: none"> Continue regular warfarin dosage. Low and intermediate bleeding risk procedures: Restart LMWH or UFH at therapeutic dosage 24 hours after procedure. High bleeding risk procedures: Restart LMWH or UFH at therapeutic dosage 48–72 hours after procedure OR consider LMWH or UFH prophylactic dosage for procedures with a high risk of bleeding.*** Restart Aspirin 24hrs after surgery.
2	<ul style="list-style-type: none"> Check INR.
4 to 10	<ul style="list-style-type: none"> Check INR. Stop LMWH when INR is within therapeutic range.
<p>*** See Table A, <i>Bleeding Risk Associated with Invasive Procedures & Recommendations for Perioperative Management</i>, above for when and how to use bridge therapy protocol.</p>	

Source for Tables A–C: Ageno W, Gallus AS, Wittkowsky A, et. al. Oral anticoagulant therapy: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians evidence-based clinical practice guidelines. *Chest*. 2012;141(2)(Suppl):e44S–e88S. Available at:

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