Anticoagulation Management Pearls

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Disclosures

Youssef Bessada, PharmD, BCPS, BCCP has no actual or potential conflict of interest associated with this presentation

Previous iteration developed by:

- Anuja Rizal RPh, Pharm D. CACP
- Information reviewed, updated and built upon for new iteration

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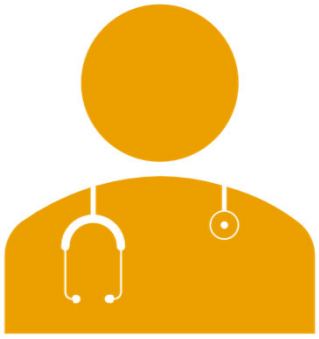
Learning Objectives

At the conclusion of this activity, pharmacists will be able to

1. Describe effective patient-centric anticoagulation management strategies
2. Describe the components of an effective anticoagulation education session
3. Identify barriers to patient learning
4. Apply anticoagulation stewardship in the patient anticoagulation management plan



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Need for Anticoagulation Management

Anticoagulant (AC) Use Increasing

↓

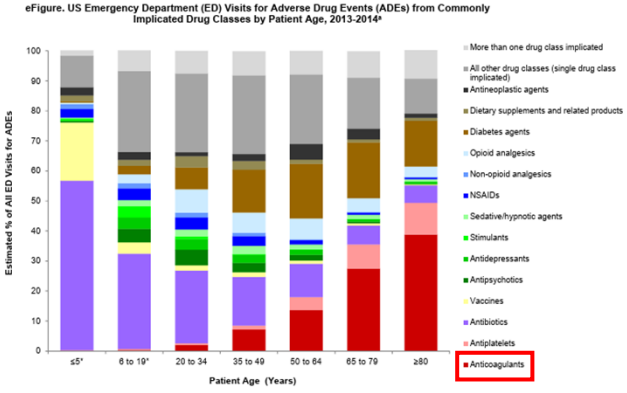
Adverse Events Increasing

↓

Elderly Impacted the Most

↓

Top Drug Class for Patient Harm



Burnett AE & Barnes GD. *Res Pract Thromb Haemost*. 2022 Jul 17;6(5):e12757.
Budnitz DS, et al. *JAMA*, 2021;326(13), 1299–1309.

Image from: Shehab N et al. JAMA. 2016 Nov 22;316(20):2115-2125. ***Author from US Centers of Disease Control & Prevention***

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Joint Commission: National Patient Safety Goals Updated

- Effective January 2021, The Joint Commission (TJC) updated its **National Patient Safety Goal (NPSG) 03.05.01**: *Reduce the likelihood of harm to patients and residents associated with the use of anticoagulant therapy.*

- Goal: Reduce the risk of adverse drug events associated with heparin, low molecular weight heparin, warfarin, and direct oral anticoagulants (DOACs)
- Applies to:
  - Hospitals
  - Ambulatory Health Care
  - Nursing Care Centers
- Focus on **Education**

The Joint Commission: National Patient Safety Goals. Updated 10 22 21. Accessed 03 15 25. Available from: https://www.jointcommission.org/-/media/tjc/documents/standards/national-patient-safety-goals/2021/npsg_chapter_ncc_jan2021.pdf

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Growth in Focus on AC Stewardship at a National Level

2019: Anticoagulation Forum Develops – *Core Elements of Anticoagulation Stewardship Programs*

2021: TJC NPSG Update – *Standard to reduce AC-related harm and a focus on DOAC Education*

2022: National Quality Forum & Anticoagulation Forum Publish – *Advancing Anticoagulation Stewardship: A Playbook*

???: Likely Standard of Care such as Antibiotic & Opioid Stewardship or HF Management

Core Elements of Anticoagulation Stewardship Program. AC Forum. Accessed 03-24-2025
National Quality Forum & Anticoagulation Forum. Advancing Anticoagulation Stewardship: A Playbook. Accessed 03-15-2025
The Joint Commission: National Patient Safety Goals. Updated 10 22 21. Accessed 03 15 25. Available from: https://www.jointcommission.org/-/media/tjc/documents/standards/national-patient-safety-goals/2021/npsg_chapter_ncc_jan2021.pdf

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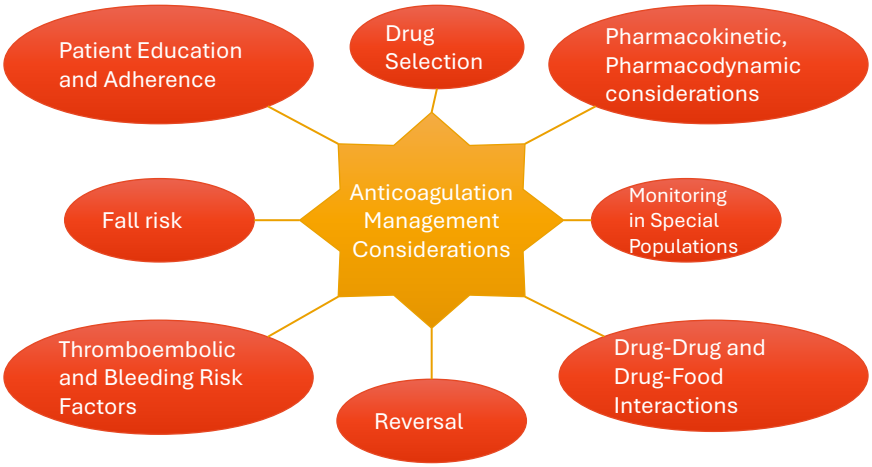
Difficulties of Anticoagulation Management



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Effective Anticoagulation Management Strategies

1

Develop Methods of Maintaining Competencies with Updated Evidence

2

Leverage Technology in Forming Stewardship Models

3

Establish Shared-Responsibility via Staff, Patient & Family Education

- Multidisciplinary support &commitment from leadership
- Adherence issues
- Motivational interviewing

4

Focus on Transitions of Care as High-Risk Management Area

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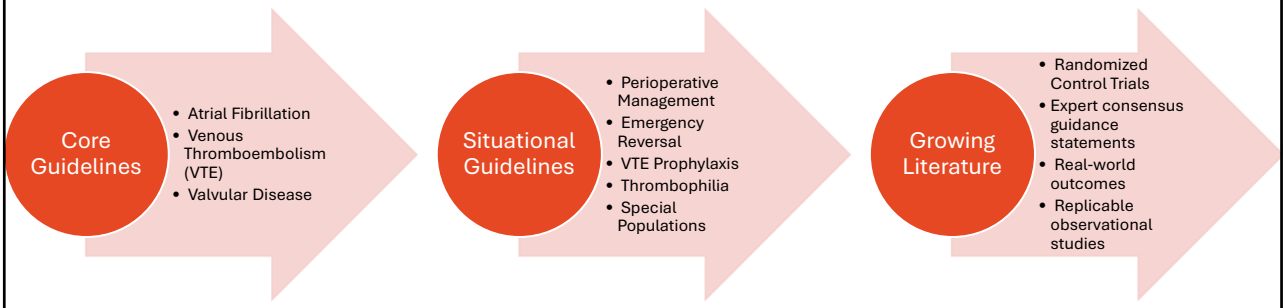
Develop Methods of Maintaining Competencies with Updated Evidence

Establish a *culture of lifelong learning* with most up-to-date evidence:



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Develop Methods of Maintaining Competencies with Updated Evidence

Use Available (& Free!) resources to *keep up* with latest updates:

- CHEST Guidance Reviews
- AC Forum Resource Center, Rapid Recaps, Webinars
- MAQI Compendium of Toolkits
- ACC "Latest in Cardiology" Trial Summaries
- ASH Guideline slide-sets & podcasts

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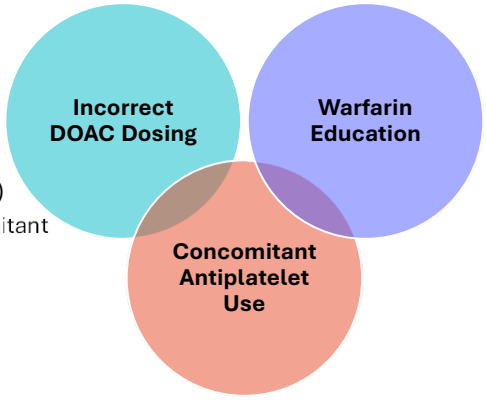
Develop Methods of Maintaining Competencies with Updated Evidence

Emphasize areas where *Pharmacists should lead stewardship efforts*:

- Typically, areas with complicated medication regimens
- Ensure training is focused on:
  - Adherence to **on-label, recommended DOAC** doses
  - Monitoring DOACs in high-risk situations (e.g. poor renal/liver function, extreme body weights, devices)
  - Opportunities for antiplatelet de-escalation with concomitant CV diseases
  - Warfarin diet, medication interaction management



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Rao SV et al. *Circulation*. 2025 Apr;151(13):e771-e862.
Burnett AE & Barnes GD. *Res Pract Thromb Haemost*. 2022 Jul 17;6(5):e12757.

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Develop Methods of Maintaining Competencies with Updated Evidence

Identify opportunities for *multidisciplinary learning* in niche areas:

- National anticoagulation stewardship standards necessitate **multidisciplinary engagement** of complicated AC situations
- Establish regular multidisciplinary learning (e.g. grand rounds, stewardship committee etc.)
- Ensure these situations are handled with multiple parties

Opportunities for Shared-Decision Making	
• Thrombophilia	→ Hematology
• Heparin-induced thrombocytopenia	→ Hematology / Lab medicine
• Perioperative anticoagulation	→ Surgery / Cardiology / Outpatient AC Clinic
• Cancer-associated VTE	→ Oncology / Surgery
• Acute coronary syndromes	→ Cardiology
• High-risk PE	→ Pulmonology / Hematology

Core Elements of Anticoagulation Stewardship Program. AC Forum. Accessed 03-24-2025
National Quality Forum & Anticoagulation Forum. Advancing Anticoagulation Stewardship: A Playbook. Accessed 03-15-2025

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Develop Methods of Maintaining Competencies with Updated Evidence

Ensure *regular updates of policies & protocols* with changing clinical landscape:

- TJC NPSG Requirement
- Shifts responsibility from *individual* to ***system***

Address:

- ✓ Referral Process
- ✓ Indication and Duration of Anticoagulation
- ✓ Patient Agreement
- ✓ Adherence and Discharge Process
- ✓ Medication Refills
- ✓ Quality Assurance
- ✓ Physician Oversight
- ✓ Staff Education and Training

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Case 1: *DOAC Dosing Dilemma*

Noting JP's age, the anticoagulation nurse practitioner seeing him in clinic has concerns over his DOAC dosing. She states "*he was discharged on apixaban 10 mg BID for 7 days then told to switch to 5 mg BID, per the package insert.*" JP is at the point where he should now switch to 5 mg BID, but the nurse practitioner wants to switch the dose from 5 mg BID to 2.5 mg BID "*to be safe, since he is older.*"

*Which of the following would be the **most appropriate, high-quality resource** to guide your recommendation in this scenario?*

a) Latest guideline on antithrombotic therapy for venous thromboembolism
b) A 2017 real-world case series from your favorite cardiology podcast
c) Your hospital's adult DOAC renal dosing policy

JP: 68-year-old male comes in for a check-up in the anticoagulation clinic you work at after an admission last week for a provoked DVT after a hip surgery he had 30 days prior

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*What strategy could be used to ensure **multidisciplinary utility of updated evidence for future situations**?*

a) Only Pharmacists should dose DOACs in anticoagulation management clinics
b) DOAC dosing Policies and protocols should be updated regularly to reflect best practice
c) The nurse practitioner's error should be highlighted at the next staff meeting to minimize repeat errors

JP: 68-year-old male comes in for a check-up in the anticoagulation clinic you work at after an admission last week for a provoked DVT after a hip surgery he had 30 days prior

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Effective Anticoagulation Management Strategies

1. Develop Methods of Maintaining Competencies with Updated Evidence
2. **Leverage Technology in Forming Stewardship Models**
3. Establish Shared-Responsibility via Staff, Patient & Family Education
   - Multidisciplinary support &commitment from leadership
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4. Focus on Transitions of Care as High-Risk Management Area

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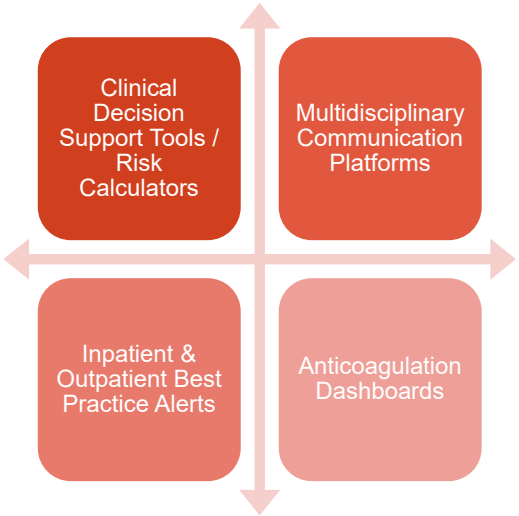
Leverage Technology in Forming Stewardship Models

- The rise of modern technology in electronic medic records can offer key support in developing stewardship models
- Can be pivotal in anticoagulation management to allow the provider to **minimize avoidable errors**
- Many available examples… and more on the way!



National Quality Forum & Anticoagulation Forum. Advancing Anticoagulation Stewardship: A Playbook. Accessed 03-15-2025

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Leverage Technology in Forming Stewardship Models

Clinician Decision Support Tools

Risk Stratification	Treatment Pathways	Best Practice Alerts
• VTE prophylaxis risk (IMPROVE, IMPROVEDD & PADUA score) • VTE severity scores (WELLS & PESI score) • Bleed risk scores (IMPROVE-BLEED & HAS-BLED) • CHA2DS2VASc • GARFIELD-AF	• Pulmonary embolism response pathways • Low-risk DVT response pathway • 4T score for heparin-induced thrombocytopenia	• Incorrect DOAC dosing (according to evidence) • Antiplatelet de-escalation opportunities • VTE phase of care reminders

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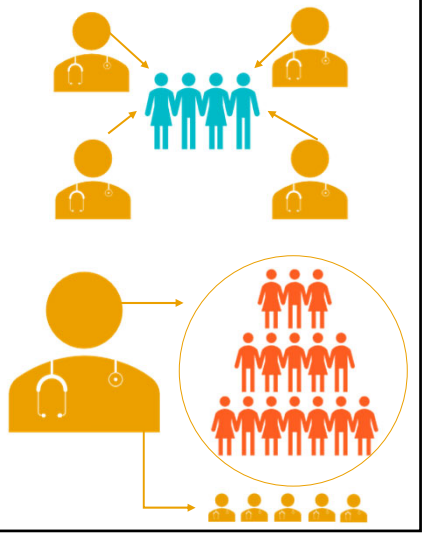
Leverage Technology in Forming Stewardship Models

Population Health & Anticoagulation Monitoring Dashboards

Barnes GD et al (2024)

- Retrospective analysis of nationwide anticoagulant use within the Veteran Health system
- Assessed impact of "moderate" or "high" DOAC dashboard use from 2015-2019
- Observed **128,652** patients receiving DOAC therapy at 123 centers (atrial fibrillation & VTE)
- **All sites** observed a reduction in stroke or VTE (2.7/100 vs. 2.2/100 patient years after implementation
- "Markedly reduced time to intervention (**16** versus **64** minutes) with the DOAC dashboard compared with traditional pharmacist case review…"



Barnes GD et al. *J Am Heart Assoc*. 2024 Sep 17;13(18):e035859
Triller DM et al. *J Thromb Thrombolysis*. 2024 Jan;57(1):107-116
Valencia D et al. *Ann Pharmacother*. 2019 Aug;53(8):806-811.

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Case 2: *Hospital Heparin Hiccup*

PT is re-admitted to the hospital for attempted cardioversion to control her atrial fibrillation. While admitted she is switched from apixaban to an unfractionated heparin infusion. A day prior to cardioversion her platelet count drops from baseline 224 x 10^9/mclL to 156. Later in the evening it drops again to 103. The morning of, the panicked cardiology fellow messages you, the inpatient pharmacist, as the platelets are now 67! He wants to stop the heparin drip for fear of heparin-induced thrombocytopenia (HIT).

*Which **tool** could be leveraged to help you and the inpatient team proceed with anticoagulation management?*

a) An educational seminar from the American Society of Hematology on HIT
b) A population health dashboard assessing all admitted patients with platelets < 70 x 10^9/µL
c) An EMR-integrated 4T score to objectively assess for HIT

PT: 79-year-old female who had cardiac surgery 3 weeks ago and is now s/p CABG x 2. She has a PMH of hypertension, hyperlipidemia, obesity (BMI of 45 kg/m^2) and persistent atrial fibrillation on apixaban 5mg BID

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How does integrating an assessment score into the EMR, such as the HIT 4T score, help adhere to TJC NPSG AC management standards?

a) Saves the number hematology consults ordered per day for real emergencies
b) Standardizes approach for risk reduction of heparin-associated ADEs
c) Ensures pharmacists alone are responsible for ordering a HIT panel

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Establish Shared-Responsibility via Staff, Patient & Family Education

Clinical Staff Continuous Training:

- Physiology of coagulation
- Hypercoagulable states
- **Pharmacology of Anticoagulant**
  - Mechanism of Action
  - Pharmacokinetics and Pharmacodynamics
  - Adverse Effects
  - Contraindications and Precautions
  - Monitoring (Bleeding, non-hemorrhagic)
  - Initiation
  - Reversal
  - Interactions
    - Drug-Drug
    - Drug-Disease
    - Drug-Food Interactions
- Indication and duration for Anticoagulant Therapy
- Perioperative management
- Policies and procedures of clinic
- Management strategies of non adherent pts
- Motivational interviewing
- Diversity training

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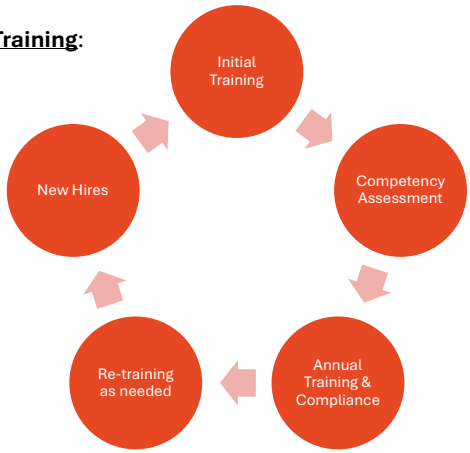
Establish Shared-Responsibility via Staff, Patient & Family Education

Clinical Staff Continuous Training:



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Patient & Family Education

Key Aspects to Patient Education in an Anticoagulation Space

- *Pillar of AC Stewardship*
- *Key Goal of TJC NPSG*

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Patient & Family Education

Organizing Patient & Family Education

- **Face-to-face** (ideally) interaction with trained professional who ensures the patients understands the risks involved, the precautions that should be taken, and the need for regular monitoring.
- **Ongoing**
- Tailored learning to meet pt's **learning style**
- Use of written resources, audio-visual **aids**
- Utilization of **teach-back** methods
- Include **all** family members, caregivers
- **Culturally** sensitive
- Use of ***interpreters*** as needed

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Patient & Family Education

Patient & Family Education Pearls

- Assess **baseline knowledge**
- Ask **open-ended** questions
- Fill in **gaps** in baseline knowledge
- Keep message **short and simple**
- Use **interdisciplinary approach** (e.g., Dietitian, social workers, physician, nursing)
- Include **fall reduction** strategies
- Evaluate and ***document*** the patient's understanding of the education and training

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Patient & Family Education

Logistical

- Familiarize pt. with clinic staff members
- Clinic location, phone & fax #, hours of operation
- Indication
- Dose, Frequency
- Testing (if necessary)
- How to administer
- Storage
- Missed doses
- Refill process
- Emergency treatment/surgical & dental procedures
- Activities of daily life & travelling
- Transitions of care

Topics to Include

Clinical

- Mechanism of Action
- Drug-food interactions, alcohol and tobacco use with warfarin
- Drug-drug interactions (both prescription and OTC)
- Blood tests (Target INR, renal and hepatic function)
- Factors that change INR result
- Possible side effects
- Pregnancy
- Precautions, Who and when pt. should call for questions/issues

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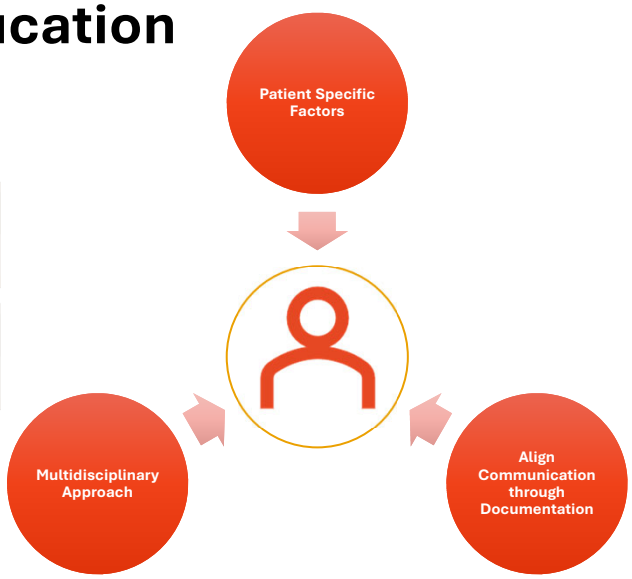
Patient & Family Education

Identify & Address Barriers to Learning

Cultural and Religious Considerations	Psychological Barriers	Desire and Motivation to Learn
Physical Limitation	Language Barrier	Health Care Literacy
Cognitive Ability	Learning Style	



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Patient & Family Education

Utilize various approaches for various learning styles!

Auditory	Kinesthetic	Visual
• Teach back • Questions!	• Practice/exercises • Demonstrations • Situations	• Videos • Pamphlets • Graphics / diagrams • Pamphlets • After Visit Summary

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Patient & Family Education

Patient Reported Outcome Measures (PROMs)

- *Patient-completed instruments that capture "**patient-perceived**" health status and well-being*

- **Benefits**:
  - Qualitative assessment of **changes in health status**/time
  - **Quantify patients' experiences** with the treatment itself
  - Rapid identification of **complications** of VTE
  - Shared **responsibility** for VTE outcomes with patient

- **Obstacles:**
  - Upfront investment of clinician time to educate patient
  - Need for patient "buy-in" for shared decision making & responsibility of care
  - May be time-intensive for patient
  - Require technical build for health-system

Snyder DJ et al. *J Am Heart Assoc.* 2023 Dec 5;12(23):e032146.
de Jong CMM et al. *J Thromb Haemost.* 2023 Oct;21(10):2953-2962.

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Case 3: *Warfarin Woes*

KS presents to clinic for INR monitoring. His INR today is 1.3, and his daughter, who speaks fluent English, accompanies him. During the visit, the pharmacist learns the patient has been taking warfarin every other day because he misunderstood the instruction to take "one tablet daily" and thought it meant only on days he felt symptoms. He also has been eating a lot of Vietnamese greens and herbs that his family prepared for him, not knowing these can affect his INR. The patient seems frustrated the entire visit

*What is the most appropriate **initial** intervention by the pharmacist to improve this patient's warfarin therapy?*

a) Increase the warfarin dose to adjust to his lifestyle and reach therapeutic INR, recheck in 3 days.
b) Emphasize the importance of daily dosing, provide warfarin education using a certified Vietnamese interpreter, and assess understanding using teach-back.
c) Recommend switching to a DOAC immediately to avoid the challenges with dietary interactions, it is unclear why he did not receive one initially.

KS: 68-year-old male originally from rural Vietnam, recently immigrated to the U.S. to live with his daughter. He speaks limited English and primarily communicates in Vietnamese. He has a PMH of heart failure with reduced ejection fraction (HFrEF), hypertension, and a recent diagnosis of lower extremity DVT. He was started on warfarin 2 weeks ago during a hospital admission and was discharged with instructions to follow up at the anticoagulation clinic.

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*What is the **best strategy** to help support ongoing adherence and safe warfarin use for this patient?*

a) Provide the patient with English-language warfarin materials and ask his daughter to translate them & reassess regularly at home.
b) Ask the interpreter to tell the patient to track his warfarin doses and diet in a notebook and bring it to each visit for review.
c) Set up regular phone calls with a Vietnamese-interpreter-assisted call to reinforce education and verify adherence.

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Focus on Transitions of Care

What is a Transition of Care?

Within settings	E.g. Primary care to behavioral health
Between settings	E.g. Outpatient clinic to Hospital
Across health states	E.g. Personal residence to nursing home
Between providers	E.g. Patient establishes care at a new site

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Focus on Transitions of Care

Pharmacist's Role is to minimize medication discrepancies across care transitions, especially with high-risk medications

- Medication discrepancies affect nearly **all patients** that move across transitions of care
  - *Unintended*
    - Omission – Failure to take the correct action (e.g., prescribe a required medications)
    - Commission – Taking the wrong action (e.g., prescribing the wrong drug or dose)
  - *Intended*
  - *Undocumented*

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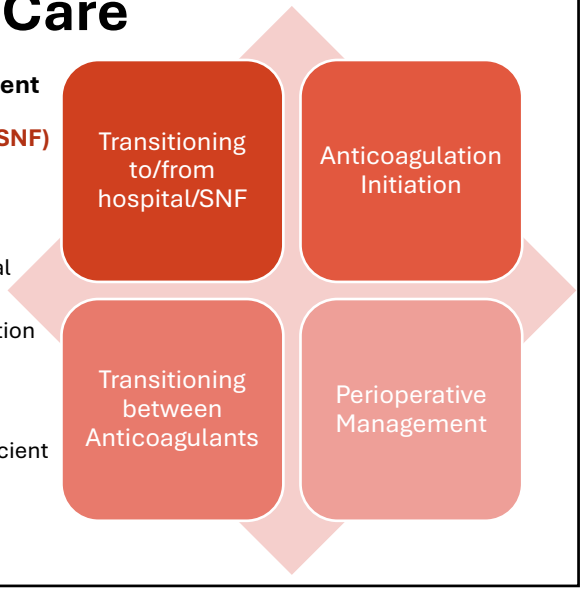
Focus on Transitions of Care

Key Transitions of Care in Anticoagulation Management

Transitioning to/from hospital/ skilled nursing facility (SNF) admissions

- Associated with many errors in **dosing**, particularly
- Require high quality **medication reconciliation**
- Ineffective transition of care results in **preventable** hospital readmissions (TJC area of importance)
- Medicare codes 99495 and 99496 **reimbursable** for transition of care services
  - Non-face-to-face encounter w/in 48hrs after discharge
  - Face-to-face office visit 7-14 days post discharge
- Opportunity for multidisciplinary collaboration for safe, efficient and effective care pathways (e.g. Low-Risk DVT)



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Burnett AE & Barnes GD. *Res Pract Thromb Haemost*. 2022 Jul 17;6(5):e12757.

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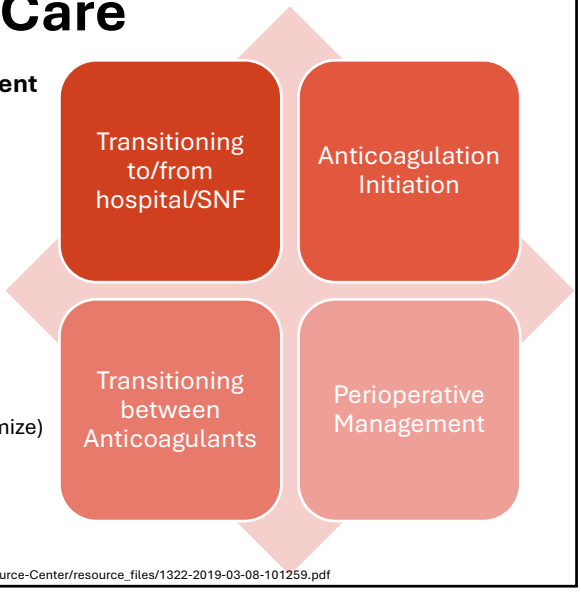
Focus on Transitions of Care

Key Transitions of Care in Anticoagulation Management

Anticoagulation Initiation
- **Highest-risk** period is during initiation (bleed & clot)
- Highest need area for **education**
- Key to **assess pt. for appropriateness** of prescribed regimen
  - Renal/liver function
  - Weight
  - Drug interactions
  - Presence of devices
- Need to **address barriers to non-adherence** (e.g. cost)

Transitioning between anticoagulants
- **Inherently** increases risk of bleed and clotting (goal is to minimize)
- Must be done according to package insert and evidence-based guidance
- Transition of Anticoagulants 2019 ← Excellent resource



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Transition of Anticoagulants 2019. Accessed 04-14-2025. Available from: https://acforum-excellence.org/Resource-Center/resource_files/1322-2019-03-08-101259.pdf

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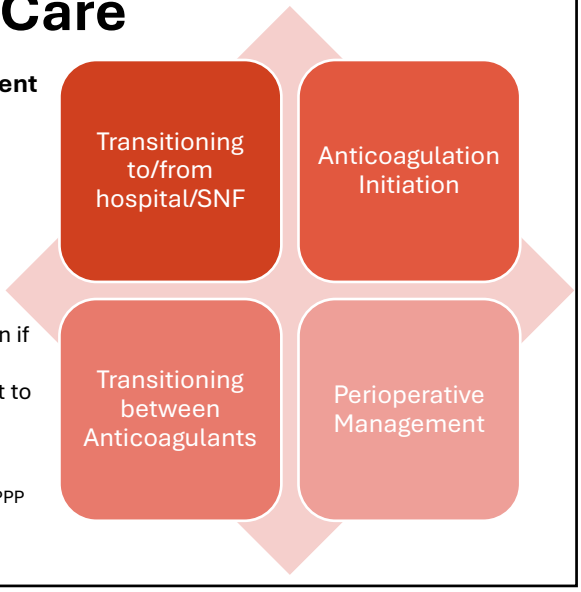
Focus on Transitions of Care

Key Transitions of Care in Anticoagulation Management

Perioperative Anticoagulation
- **Coordinate** with physicians, surgery, pharmacy
- Determine **Thromboembolic Risk**
- Determine **Bleeding Risk**
- Determine **Timing** of Anticoagulant Interruption
- Assess whether "**bridging**" therapy needed
- Provide **education** to patient/family members regarding interruption and administration of injectable anticoagulation if needed
- Ensure prescription for **low molecular weight heparin** sent to patient's pharmacy if needed
- Use available tools:
  - CHEST Guidance tools
  - Management of Anticoagulation in the Periprocedural Period App (MAPPP App) in electronic health record



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Spyropoulos AC et al. *Clin Appl Thromb Hemost*. 2020 Jan-Dec;26:1076029620925910.

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Case 4: *Enoxaparin Errors*

JM was instructed to hold warfarin and start enoxaparin by the clinic once her INR <2.5 prior to admission. She successfully underwent her scheduled surgery and was discharged home two days later. During a routine post-discharge follow-up call, the anticoagulation clinic discovers that JM was discharged without a warfarin prescription and has not resumed anticoagulation. Her last warfarin dose was 5 days ago. A bridging plan was noted in a detailed pre-op surgical plan, but no plan was documented in the discharge summary.

*What was the **most significant system-based error** that contributed to this patient's interruption in anticoagulation therapy?*

a) The patient forgot to ask the surgical team for her warfarin prescription before leaving the hospital
b) Warfarin was likely not restarted because her INR was still elevated post-operatively and the surgical team was worried
c) A transition of care omission occurred due to lack of coordination between surgical and anticoagulation teams

JM: 65-year-old female weight: 80 kg, CrCl: 75 ml/min), a regular patient at your hospital's anticoagulation clinic, who is admitted for elective orthopedic surgery (total knee replacement) and has a history of mechanical mitral valve replacement on warfarin (INR Goal 2.5-3.5)

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*Which of the following interventions would be **most effective** in reducing the risk of warfarin omissions during perioperative transitions of care?*

a) Educate patients pre-operatively to call the clinic if they don't receive a warfarin prescription upon discharge within 1-2 days.
b) Standardize a process for inpatient teams to document the perioperative plan in the discharge summary and contact the clinic if the plan changes.
c) Ensure the orthopedic surgery team to takes full responsibility for warfarin management postoperatively to avoid conflicting communication.

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Summary

- Develop Methods of Maintaining Competencies with Updated Evidence
- Leverage Technology in Forming Stewardship Models
- Establish Shared-Responsibility via Staff, Patient & Family Education
  - Multidisciplinary support &commitment from leadership
  - Adherence issues
  - Motivational interviewing
- Focus on Transitions of Care as High-Risk Management Area

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Thank you!

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