

# Implementation of Pharmacist-Led Quality Initiative for Direct Oral Anticoagulant (DOAC) Monitoring

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## Conflict of Interest Disclosure

Presenter does not have any relevant financial relationships or conflicts with the content of the presentation.

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## Objectives

1. Explain the development and workflow process of a pharmacist-based DOAC monitoring program within a health system
2. Identify the gaps in care and barriers for DOAC management
3. Describe the intervention types found with the pharmacist-based DOAC monitoring program

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## Poll

Are any of the audience members currently working or have worked at an institution that had pharmacist-led anticoagulation programs?

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## Development and Workflow of Pharmacist-Based Direct Oral Anticoagulant Monitoring Program

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## Pharmacist-Led Anticoagulation Management

- Improved time in therapeutic range for warfarin patients
- Improved patient satisfaction and education
- Increased adherence
- Decreased thromboembolic and bleeding complications

Haché J, Bonus KD, Chitsike R, Nguyen H, Young S. Assessment of a pharmacist-led direct oral anticoagulant monitoring clinic. *Can J Hosp Pharm.* 2021; 74(1):7-14.  
Hou X, Yang H, Ye Z, Wang Y, Liu L, Cui X. Effectiveness of pharmacist-led anticoagulation management on clinical outcomes: a systematic review and meta-analysis. *J Pharm Pharm Sci.* 2017;20(1):378-396.  
Perleman A, Horowitz E, Hersh-Racah B, et al. Clinical pharmacist led hospital-wide direct oral anticoagulant stewardship program. *Int J Health Policy Res.* 2019; 8: 19.  
Young S, Babop L, Twells L, Dillon C, Hawboldt J, O'Shea P. Comparison of pharmacist managed anticoagulation with usual medical care in a family medicine clinic. *BMC Fam Pract.* 2011;12:88.  
Witt DM, Sadler MA, Shanahan RL, Mazzoli G, Tillman DL. Effect of a centralized clinical pharmacy anticoagulation service on the outcomes of anticoagulation therapy. *Chest.* 2005;127(5):1515-22.

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## Roles of Pharmacists in Anticoagulation

Improving adherence

Optimizing treatment

Improving safety

Supporting transition of care

Smythe MA. Advances in anticoagulation management: the role of pharmacy. *Ann Pharmacother*. 2007;41(3):493-495.



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## Test Your Knowledge #1

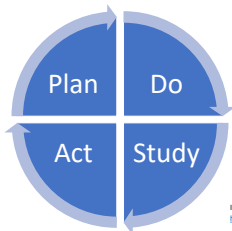
Having a pharmacist-led anticoagulation management program has shown to:

- A. Decrease thromboembolic and bleeding complications
- B. Increase costs to the healthcare system
- C. Reduce provider workload
- D. Eliminate hospitalizations



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## Model for Improvement: PDSA



Plan: Test/observation and collecting data

- Do: Perform the test/observation
- Document issues and unexpected observations
  - Initiate data analysis

- Study: Analyze data
- Compare results to predictions

- Act: Based on information learned from test/observation, fine-tune the process by determining what adjustments need to be made
- Create a plan for the next test

Institute for Healthcare Improvement. How to improve: science of improvement: testing changes. Available at: <https://www.ihp.org/resources/Pages/Howtoimprove/ScienceofImprovementTestingChanges.aspx>. Accessed June 16, 2023.



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## Anticoagulation Stewardship Team

- Consists of:
  - Pharmacists
  - Anticoagulation Management Services manager
  - Anticoagulation Nurse Educator
  - Project Managers
  - Cardiology and primary care physicians
  - Clinical and Business Intelligence (CBI) Developers
  - EPIC Information Technology Developers



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## Test Your Knowledge #2

Which of the following statements is correct?

- A. PDSA stands for plan-demonstrate-study-act
- B. PDSA stands for plan-do-study-act
- C. PDSA stands for perform-do-study-act
- D. PDSA stands for perform-do-strategize-act



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## Plan

- Objective: To create a pharmacist-led anticoagulation program that will assist with standardizing care, improving adherence, and optimizing treatment
- Predictions: Development of this program will standardize care, improve adherence, and optimize anticoagulation treatment



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### Plan

Plan:

- Workflow between pharmacists and providers

Pharmacists will:

Chart reviews	Review	Provide	Collaborate
<ul style="list-style-type: none"> <li>• Initial and annual</li> <li>• Appropriateness of DOAC therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Labs</li> <li>• Hospitalization records</li> </ul>	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Perioperative DOAC recommendations</li> <li>• Anticoagulation transitions</li> </ul>	<ul style="list-style-type: none"> <li>• Provider</li> <li>• Social work</li> <li>• Prescription assistance</li> </ul>

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### Plan: Program Builds

- DOAC Pharmacists work pool
  - In-basket messages alerting :
    - New, refill, or renewal prescriptions of any DOAC has been placed
    - Patients with DOAC flags who have been hospitalized within our hospital system
    - Patients with DOAC flags who have renal, liver, or complete blood count (CBC) labs done
- DOAC flag
  - Placed on charts that have been reviewed
  - Used in tracking patients reviewed, used to fire off in-basket messages listed above

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### Plan: Tracking Data

- CBI developed a DOAC Dashboard
  - Tracks total number of prescriptions of DOACs within our health system
  - Number of patients with DOAC flags (intake review occurred)
  - Larger-scale trends:
    - Number of patients on antiplatelets, non-steroidal anti-inflammatory medications, cytochrome P (CYP) or P-glycoprotein (P-gp) inhibitors/inducers
    - Number of patients with abnormal creatinine, total bilirubin, hemoglobin, hematocrit
  - Individual patients with any issues such as abnormal labs or interacting medications highlighted
- Pharmacists also track interventions via excel

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### Do: Initial and Annual Chart Intake Assessment

- Review for appropriateness of:
  - Indication
  - Dose
  - Drug-drug interactions
  - Renal and liver function
  - Weight and BMI
  - Contraindications (example: mechanical valve replacements)
  - Lab safety monitoring frequencies
  - Existing provider perioperative recommendations
  - Cost affordability issues

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### Monitoring of Direct Oral Anticoagulants

	Healthy patients	Renal Impairment (eGFR <60ml/min)	Elderly (age > 75 years)	Liver impairment (Child-Pugh B or C)	Concomitant drugs (CYP or CYP3A4 inhibitors/inducers <sup>1,2</sup> , NSAIDs, antiplatelets <sup>3</sup> )
Complete Blood Count (CBC)	Baseline and annually	Baseline and at least annually	Baseline and at least annually	Baseline and at least every 6 months	Baseline and every 3 to 6 months
Renal Function	Baseline and every 6-12 months	Baseline and every 3 to 6 months	Baseline and every 3 to 6 months	Baseline and at least every 6 months	Baseline and every 3 to 6 months
Hepatic Function	Baseline and annually	Baseline and annually	Baseline and annually	Baseline and at least every 6 months*	Baseline and annually

Conway SE, Hwang AY, Poze CD, Gums KJ. Laboratory and clinical monitoring of direct acting oral anticoagulants: what clinicians need to know. *Pharmacotherapy*. 2017;37: 236-248.

Glaberson DJ, Geerts WH, Douclet J, et al. How to monitor patients receiving direct oral anticoagulants for stroke prevention in atrial fibrillation: a practice tool endorsed by thrombosis Canada, the Canadian Stroke Consortium, the Canadian Cardiovascular Pharmacists Network, and the Canadian Cardiovascular Society. *Ann Intern Med*. 2015;163(5):382-5.

Kearin C, Akl EA, Comerota AJ, et al. Antithrombotic therapy and prevention of thrombosis. 9<sup>th</sup> ed: American college of chest physicians evidence-based clinical practice guidelines. *Chest*. 2016; 141:D1481B-D1606.

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### Gaps in Care and Barriers

#### Financial

- Cost affordability assessment not done *prior* to drug initiation
- Coverage gaps (ex: donut hole)

#### Care at multiple facilities

- Initiation of interacting drugs
- Duplicate or conflicting instructions provided to patient

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## Gaps in Care and Barriers

### Education

- Limited time in provider-patient office visits
- Some important topics not discussed:
  - Importance of avoiding missed doses
  - How to take the drug
  - How to handle upcoming procedure or surgeries

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## Gaps in Care and Barriers

### Drug-drug interactions

### Lab monitoring and dosing

- Lack of exact lab frequencies outlined by guidelines
- Large variation amongst how providers were managing lab monitoring
- Patients are unaware of the importance of labs while on the DOAC

Laboratory and Clinical Monitoring of Direct Acting Oral Anticoagulants: What Clinicians Need to Know. *Pharmacotherapy* 2017;37:236-48.

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## Gaps in Care and Barriers

### Resumption post-bleeding or post-procedure

- Lost to follow-up
- Delay in resumption

### Weight and BMI considerations

- Lack of risks versus benefits discussions on DOAC use in morbidly obese BMI or weight

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## Gaps in Care and Barriers

### Switching from warfarin to DOAC

- Unfamiliarity with INR requirements by providers
  - Could lead to inappropriately overlapped anticoagulation

### Dosing

- Under: didn't meet at least 2 characteristics for apixaban 2.5mg twice daily for AFIB
- Over: development of renal impairment that requires a dose reduction

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## Test Your Knowledge #3

Which of the following is a gap in care or barrier identified in the presentation of direct oral anticoagulant therapy?

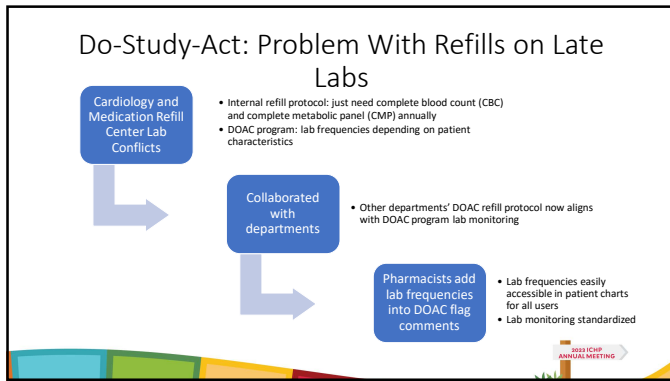
- Patient preference
- Delay in resumption of direct oral anticoagulant after bleeding or post-procedure
- Time
- None of the above

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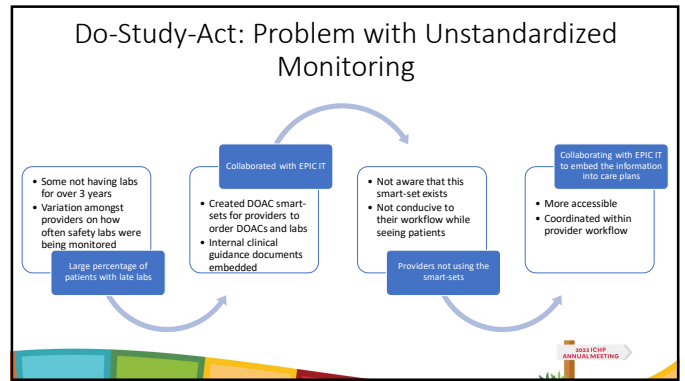
## Discussion

What are some barriers you see in your practice with direct oral anticoagulation management?

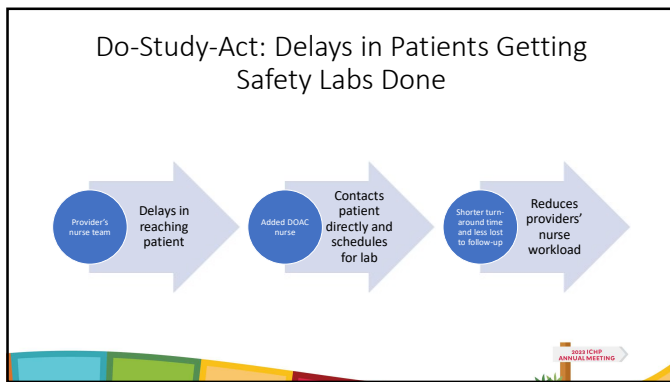
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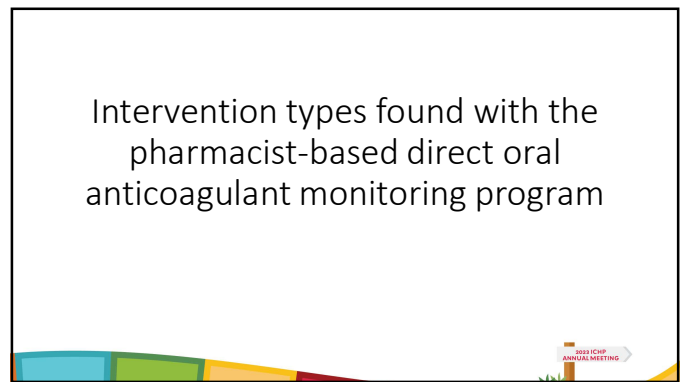
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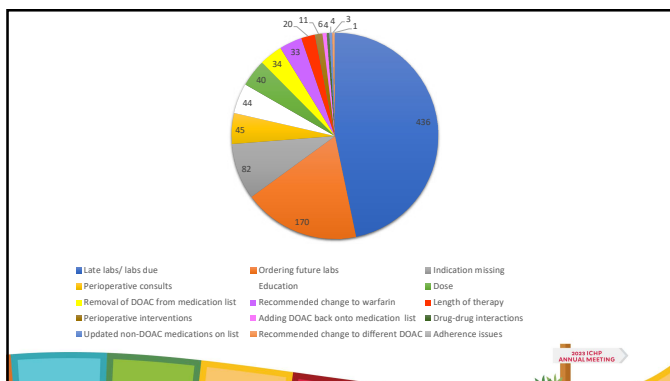
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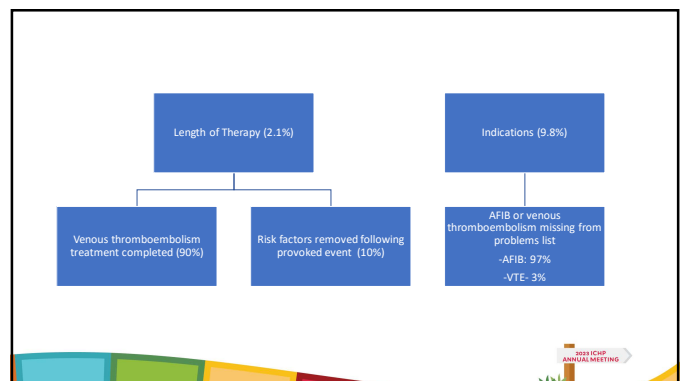
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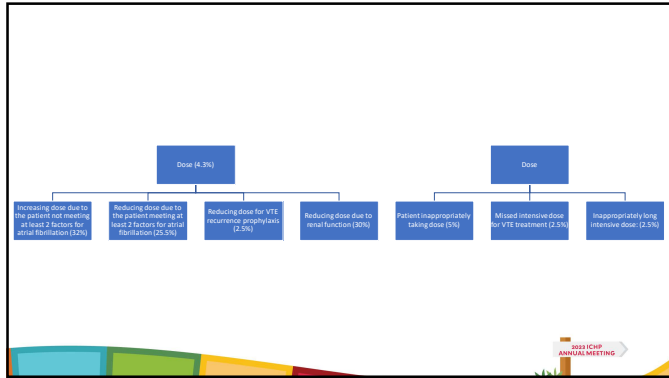
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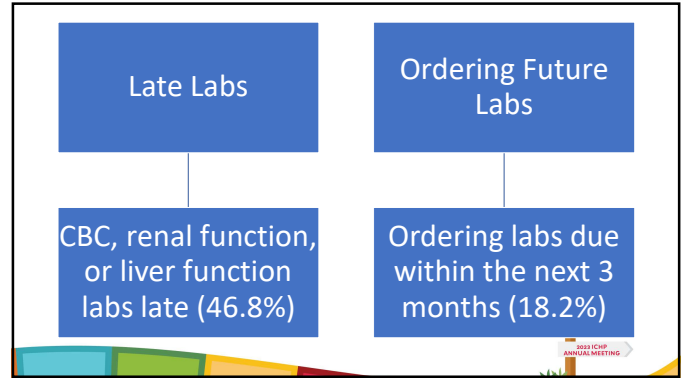
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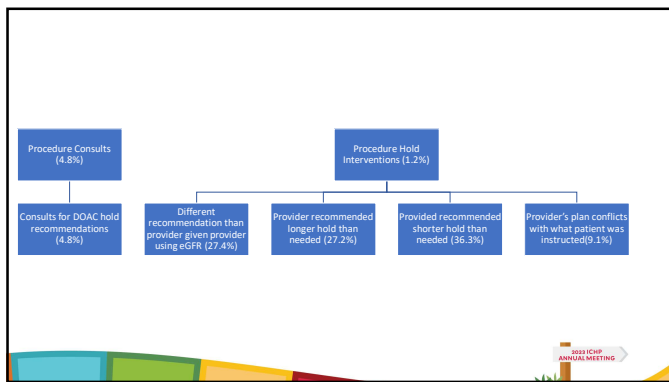
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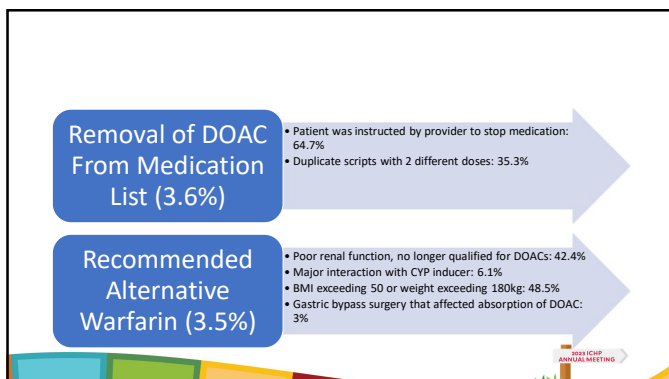
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### Test Your Knowledge #4

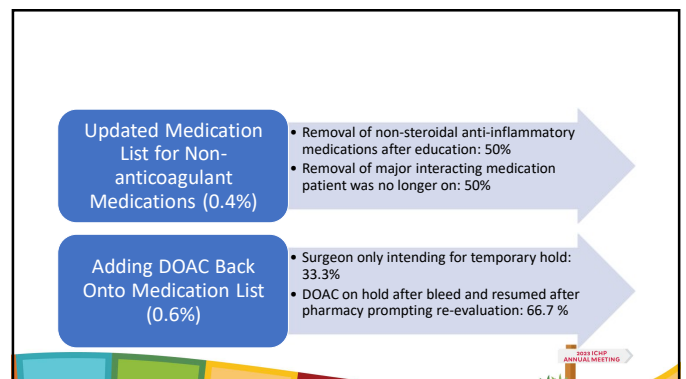
Which was the most common pharmacist intervention in the direct oral anticoagulant program?

- Missing indications
- Procedure consults
- Late labs
- Incorrect dose

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Phone Education (4.7%)	DOAC Booklets	MyChart Patient Message
<ul style="list-style-type: none"> <li>New DOAC initiation</li> </ul>	<ul style="list-style-type: none"> <li>Initiated within the last 12 months</li> </ul>	<ul style="list-style-type: none"> <li>All patients signed up for MyChart communication</li> </ul>




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### Test Your Knowledge #5

Which of the following was an example of PDSA that the program came across?


- Patients were not accessing the provided educational material which led to a collaboration with IT
- Providers were not responsive to pharmacist interventions which led to a hard-stop alert being built
- Safety lab monitoring was unstandardized which led to a collaboration with IT team to create a smart-set with clinical guidelines embedded in it for provider use
- Patients did not trust the pharmacists



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### Discussion


What are the most impactful or common interventions you have seen or done so far with direct oral anticoagulants?



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### Pharmacist-Led Anticoagulation Program


- Objective:** To create a pharmacist-led anticoagulation program that will assist with standardizing care, improving adherence, and optimizing treatment for DOAC use
- Standardize care:**
  - Safety lab monitoring and refills
  - Perioperative management
- Improving adherence:**
  - Education- correct dosing
- Optimize treatment:**
  - Revise dosing errors, inappropriate perioperative plans, choice of anticoagulant, dosing for VTE recurrence prophylaxis, length of therapy, drug-drug interactions



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### References

- Haché J, Bonsu KO, Chitsike R, Nguyen H, Young S. Assessment of a pharmacist-led direct oral anticoagulant monitoring clinic. *Can J Hosp Pharm*. 2021; 74(1):7-14.
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- Institute for Healthcare Improvement - How to improve - science of improvement: testing changes. Available at: <https://www.ihl.org/resources/Pages/Howtoimprove/ScienceofimprovementTestingChanges.aspx>. Accessed June 16, 2023.
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