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## Dietary Effects of Vitamin K on INRs

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# Dietary Effects of Vitamin K on INRs

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Family Medicine Clerkship Community Project

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# Problem Identification and Need Finding

- ▶ Warfarin (Coumadin) is well studied and the most used anticoagulation medication <sup>1</sup>
  - ▶ Highly effective and low-cost anticoagulant <sup>2</sup>
  - ▶ Narrow therapeutic range increases risk of bleeding or thromboembolic event
    - ▶ Requires frequent INR monitoring
    - ▶ Many interactions with modifiable risk factors
      - ▶ Patient comorbidities, acute illness, medications, and vitamin K <sup>3</sup>
- ▶ Errors in medication management can lead to supratherapeutic or subtherapeutic INRs and subsequent coagulopathic adverse events
  - ▶ More than 1/3 of patients have been shown to have supratherapeutic or subtherapeutic INR control <sup>4</sup>

# Cost

- ▶ High cost of alternative anticoagulation medications that do not require INR monitoring or have fewer interactions<sup>5</sup>
- ▶ Warfarin is a leading cause of adverse drug reaction related medical admissions<sup>5</sup>
  - ▶ On average, Warfarin can lead to a 6-day hospital stay
- ▶ Poor INR control requires more frequent monitoring and increased healthcare utilization

# Community Perspective

- ▶ Poor communication and counseling from providers to patients who were recently started on anticoagulation
  - ▶ “There was no discussion or counseling on blood thinners and what to avoid for interactions before leaving the hospital” - Anonymous Patient
- ▶ Difficulty finding reliable resources online without medical jargon
  - ▶ “It can be hard finding accurate information online that does not have too much medical jargon, it is hard to tell what is reliable:” - Anonymous Patient
- ▶ It is difficult for patients to recall all counseling in the acute setting due to information overload upon hospital discharge
  - ▶ “Upon discharge (after a stroke), my mother thought she was told to take vitamin K supplements, but she cannot keep her INRs in the therapeutic range, they tend to be low” - Anonymous Patient
  - ▶ “Many patients have variable INRs” - Medical Provider
  - ▶ “After being in the hospital, many patients do not remember all of the counseling, it is helpful to have handouts for them to review and to reference at home” - Medical Provider

# Intervention and Methodology

- ▶ Develop a handout or pamphlet outlining the dietary effects of vitamin K on warfarin and INR monitoring
- ▶ Give the handout to patients on or considering starting anticoagulation in the outpatient setting

# Results

- ▶ Strong support for needing a patient focused handout addressing modifiable factors that can help stabilize anticoagulation control (INRs)
- ▶ Strong support for digestible information that is available to patients of all literacy and medical knowledge levels
- ▶ Support for a pamphlet that:
  - ▶ Outlines what to look for in multivitamins
  - ▶ Suggests foods to avoid while on warfarin
  - ▶ Is easy to read and understand
  - ▶ Contains links to other reliable resources for further research and understanding

# Evaluation of Effectiveness and Limitations

- ▶ Limited sample size: limited contact in clinic with patients on warfarin for anticoagulation
- ▶ Inpatient and outpatient perspectives would offer further insight into anticoagulation initiation and long-term management
- ▶ Quantifiable metrics for comparing the efficacy and variability of warfarin to other long term anticoagulation medications (DOACs)

# Future Interventions

- ▶ Surveying patients upon initiation of warfarin (inpatient discharge or outpatient) to quantify their understanding of how diet can affect the efficacy of treatment
- ▶ Surveying changes in INR control before and after patient education, with and without the pamphlet as a tool.
- ▶ Assessing patient comfort and confidence before and after the pamphlet in monitoring their INR

# References

1. Gatt, A., Riddell, A., Van Veen, J. J., Kitchen, S., Tuddenham, E. G., & Makris, M. (2009). Optimizing warfarin reversal-an ex vivo study. *Journal of thrombosis and haemostasis*, 7(7), 1123-1127.
2. Hull, R. D., Garcia, D. A., & Vazquez, S. R. (n.d.). *Warfarin and other VKAs: Dosing and adverse effects*. UpToDate. Retrieved March 14, 2022, from [https://www.uptodate-com.ezp.med.uvm.edu/contents/warfarin-and-other-vkas-dosing-and-adverse-effects?search=inr+monitoring&source=search\\_result&selectedTitle=2~150&usage\\_type=default&display\\_rank=2](https://www.uptodate-com.ezp.med.uvm.edu/contents/warfarin-and-other-vkas-dosing-and-adverse-effects?search=inr+monitoring&source=search_result&selectedTitle=2~150&usage_type=default&display_rank=2)
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5. Ebrahim, I., Bryer, A., Cohen, K., Mouton, J. P., Msemburi, W., & Blockman, M. (2018). Poor anticoagulation control in patients taking warfarin at a tertiary and district-level prothrombin clinic in Cape Town, South Africa. *South African Medical Journal*, 108(6), 490-494.

# Final Pamphlet



## Vitamin K

- If you are on a blood thinner called warfarin (Coumadin), it is important to eat a healthy and balanced diet that is **consistent**. Daily changes in vitamin K can alter the way your blood clots (commonly monitored by INR), making consistency in your diet important for good medication management and control.
  - Eating the same amount of vitamin K every day helps maintain good INR and medication control
- Vitamin K helps make 4 of your blood clotting proteins, which is why it can affect blood thinning medications.
- Vitamin K is found in many everyday foods and is also naturally produced by bacterial in your gut.

### Daily Recommended Intake

Age	Male	Female	Pregnant or Lactating
<6 months	2.0 mcg	2.0 mcg	
7-12 months	2.5 mcg	2.5 mcg	
1-3 years	30 mcg	30 mcg	
4-8 years	55 mcg	55 mcg	
9-13 years	60 mcg	60 mcg	
14-18 years	75 mcg	75 mcg	75 mcg
>19 years	120 mcg	90 mcg	90 mcg

### Common Foods with High Vitamin K Concentrations:

- Green leafy vegetables: kale, collard greens, Swiss chard, mustard greens, parsley, spinach, cabbage, lettuce
- Vegetables: Brussels sprouts, broccoli, cauliflower
- Fish, liver, meat, and eggs
- Soybeans and canola oil
- Dietary supplements (Boost, Ensure, multivitamins, tobacco products, etc.)
  - Vitamin K is commonly found in supplements containing calcium, magnesium, or vitamin D.

A list of foods with their vitamin K content can be found at the following links (or scan the QR code on your smart phone).



<https://ods.od.nih.gov/pubs/usdandb/ViTK/Phylloquinone-Content.pdf>



<https://ods.od.nih.gov/pubs/usdandb/ViTK/Phylloquinone-Food.pdf>

Ask your doctor before starting new antibiotics or if you have any malabsorption disorders such as: cystic fibrosis, celiac disease, ulcerative colitis, short bowel syndrome, or bariatric surgery.



Additional information can be found at:

<https://ods.od.nih.gov/factsheets/VitaminK-Consumer/>

Resources  
<https://medlineplus.gov/ency/article/002407.htm>  
<https://ods.od.nih.gov/factsheets/VitaminK-HealthProfessional/>  
<https://uihc.org/health-topics/warfarin-your-diet-and-vitamin-k-foods>  
<https://www.hsph.harvard.edu/nutritionsource/vitamin-k/>