Warfarin Management Change Package – 2017/2018

What's your INR?

Warfarin Prescribing and Management Overall
Aim: 100% of patients on Warfarin will be managed within safe margins around the therapeutic target and 100% of practices will have developed consistent processes around INR testing

Warfarin Management Audit Questions
1. Is there evidence that the last advice on warfarin dosing given to the patient followed current local guidelines or used computer-assisted decision making?
2. Is the target INR and duration of treatment clearly documented in the notes?
3. Since the last blood test, has the patient been taking the correct dose as ordered by the treating GP?
4. Has the INR been taken within seven days of the planned date?
5. Is it recorded that the patient has received education about warfarin in the past 12 months?
6. Have all measures been met?

<table>
<thead>
<tr>
<th>Measure</th>
<th>Rationale</th>
</tr>
</thead>
</table>
| Is there evidence that the last advice on warfarin dosing given to the patient followed current Local Guidelines? | The use of a dosing algorithm can significantly improve anticoagulant control  
Effect of a simple two-step warfarin dosing algorithm on anticoagulant control as measured by time in therapeutic range: a pilot study.  
Computerized dosing has been shown to increase the overall percentage time for which patients are in their target INR range and in some studies to reduce the frequency of testing of patients.  
Furthermore, it has been shown to significantly reduce the risk of bleeding and thromboembolic events and overall is a more cost-effective option to manual dosing  
Evaluation of computerized decision support for oral anticoagulation management based in primary care.  
Fitzmaurice, D.A., Hobbs, F.D., Murray, E.T., Bradley, C.P. & Holder, R.  
Manotti, C., Moia, M., Palareti, G., Pengo, V., Ria, L. & Dettori, A.G.  
A multicentre randomised clinical endpoint study of PARMA S computer assisted oral anticoagulant dosage.  
An international multicentre randomized study of computer-assisted oral anticoagulant dosage vs. medical staff dosage.  
Screening computer-assisted dosage programs for anticoagulation with warfarin and other |


<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there evidence that the last advice regarding the interval for blood testing given to patient followed current Local Guidelines?</td>
<td>As above</td>
</tr>
<tr>
<td>Since the last blood test, has the patient been taking the correct dose as ordered by the treating GP?</td>
<td>Clearly the practice has to ensure that the patient is informed of the correct advice regarding warfarin dosage for the patient to be able to comply with the advice. Furthermore, non-adherence to advice given should be further explored.</td>
</tr>
<tr>
<td>INR is taken within 7 days of planned repeat INR?</td>
<td>Patient’s regular attendance for blood testing is associated with better anticoagulation control. Prompt repeat testing after out-of-range INR values: a quality indicator for anticoagulation care.</td>
</tr>
<tr>
<td>Patient education recorded every 12 months?</td>
<td>There is good evidence that improved patient knowledge and understanding of the use of warfarin improves anticoagulation control: Relationship between patients’ warfarin knowledge and anticoagulation control.</td>
</tr>
</tbody>
</table>

**References:**

Theory of Improvement

Driver Diagram: Warfarin Management - Safety in practice (Draft v2)

AIM Measures
Primary Drivers
Secondary Drivers
Change Idea

Consistency
- Audit Results
- Standard procedure
- Warfarin Guidelines
- Appropriateness of Warfarin use
- Comorbidities
- Communication with practice
- Education
- Compliance
- Receipt of results
- Frequency of test

Electronic template
- Streamlined process
- Practice champions
- Refined screening for patients in system
- Staff education
- Front desk update details
- Education updates
- Education checklist
- Multiple language education packs
- Test at local pharmacy
- Use of 1mg tabs only
- Nurse led prescribing
- After hours response plan
- Manual for timely checking by patients
- Electronic recall system

To enhance patient safety around the Warfarin process and to maintain the optimal therapeutic range by 1st July 2016

Version 2 – 4Dec15
Warfarin Audit Instructions

1. Identify patients who have received a prescription for Warfarin in the previous three months. A query has been developed for MedTech and My Practice PMSs to assist with this, which is available online at [http://www.safetyinpractice.co.nz](http://www.safetyinpractice.co.nz)

2. From the identified list, randomly select a sample of 10 patients

3. Print and complete the Warfarin Audit Data Collection Form (included in the Warfarin Bundle audit spreadsheet and online at [http://www.safetyinpractice.co.nz](http://www.safetyinpractice.co.nz)

4. Transfer the data collected to the Warfarin audit spreadsheet. Please make sure the date is entered beside each individual record. The data will automatically be collated and displayed on the run charts that can be printed as needed

5. Save the spreadsheet

6. Email the completed spreadsheet by or on the 10th of each month (i.e. June data is due on 10 July, July data is due on 10 August). The spreadsheet is to be emailed to roxanne.leech@middlemore.co.nz
<table>
<thead>
<tr>
<th>Practice Name</th>
<th>Note: This sheet is not for entering data on your computer, it is only for printing and completing by hand. Once you have done this, enter your data on the appropriate data collection form.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Please circle response as appropriate</td>
</tr>
<tr>
<td>Review Month</td>
<td></td>
</tr>
<tr>
<td>Patient</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is there evidence that the last advice on Warfarin was given to the patient followed current local guidelines or used computer assisted decision making?</td>
</tr>
<tr>
<td></td>
<td>Is the target INR and duration of treatment documented in the notes?</td>
</tr>
<tr>
<td></td>
<td>Since the last INR blood test, has the patient been taking the correct dose as ordered by the treating GP?</td>
</tr>
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<td></td>
<td>Has the INR been taken within 7 days of the planned date?</td>
</tr>
<tr>
<td></td>
<td>Is it recorded that the patient has received education about warfarin in the last 12 months?</td>
</tr>
<tr>
<td></td>
<td>Comments</td>
</tr>
<tr>
<td>1</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
<tr>
<td>2</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
<tr>
<td>3</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
<tr>
<td>4</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
<tr>
<td>5</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
<tr>
<td>6</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
<tr>
<td>7</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
<tr>
<td>8</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
<tr>
<td>9</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
<tr>
<td>10</td>
<td>Y  N  Y  N  Y  N  Y  N  Y  N</td>
</tr>
</tbody>
</table>
Change Ideas Tested

- To streamline the process, simplify instructions, implement recalls working with project team first
- Allow time for changes to be checked, adjusting further if required, before rolling out to all staff to embed as usual practice
- Developing nurse and doctor champions in the practice gave all staff confidence in dealing with INR results and testing frequency
- Development of a manual process to ensure the practice has the ability to monitor and remind INR patients, especially the ones currently testing spasmodically
- Identify patients with stable INR results to have point of care testing done at the pharmacy
- Patients having education updates
- For each test: INR result, warfarin dose, when next test is due, GP signature, nurse signature when patient advised, any patient specific notes relevant to warfarin monitoring
- Front desk maintaining current contact details
- System for handling faxed INRs & ensuring acted on before clinic closed each day
- Moved from duplicate electronic process to single entry using the INR screening term
- Refined screening term to identify patients on warfarin
- Implementation of recall system to follow up INR timeframes
- Education check list prepared and embedded in form
- INR management IT tool and new protocol created using practice wide feedback, experience and knowledge
- All clinical staff used standardised guidelines
- Setting up policies around what time patients do tests
- Designating nursing time to follow up INR results daily
- Cycle of education leading to patients involvement and better compliance
- Practice wide usage of only 1mg tablets
- Transition to nurse prescribing
- Reflection on current practice by the clinical team
- Up skilling opportunities for nurses
- Open discussion of best clinical person to manage specific groups of patients on warfarin
- Involving patients in the changes – provide good feedback on what they think works best from their perceptive
- Collation of resources available for patient education i.e. flip chart, red book etc.
- Plan to send out Patient Education document to all Warfarin patients and add wording of “If you would like further information please contact the clinic
- Drop down arrow added within screening term to show whether nurse or Dr can manage patient
- Changed the wording on the INR screening term within MedTech from “Patient Info Given” tick box to “Patient Education Given” as a date field
- Trial of Point of Care testing with local pharmacy.
**Benefits/Positives**

- Basic information for each patient now complete: name, NHI, DOB, preferred contact information, script held by patient, when last education given to patient, target, reason for use, duration
- This enables safe prescribing and clear care planning for each patient and increased communication between staff members
- Nurses are finding it simpler and faster
- Patients like the simple instructions
- Confirmation that our processes and management of warfarin is of a high standard overall
- GPs feel more confidence in safety in prescribing
- Dosing based on online BPAC guidelines
- Better compliance by patients with the 1mg only usage
- Significantly reduced GP prescribing of warfarin. Improved warfarin education and a structured screening template
- Improved awareness of the doctors and nurses of following an algorithm
- The vast majority of warfarin dosing is prescribed by the nursing staff
- People on our team know what their responsibilities are and what is expected of them
- Increased nursing confidence
- It has been interesting to see the patient and staff buy-in on providing a safe warfarin prescribing practice
- We have now reviewed each patient on Warfarin
- Starting to see movement in graph
- Our data has improved from the previous audit
- Responsibilities and what is expected of the team has been reinforced
- Staff have been thoughtful and incisive in their contributions and suggestions for our new protocol & IT tool, and have been keen to implement the same
- Staff have demonstrated the need for frequent reinforcement to occur to affect change
- Using best practice guidelines and standing orders approved by doctors nurses gained confidence advising patients of altered dosages
- Nursing staff have greater interaction with patients and patients have become more aware as they have received more education
- Greater compliance, stability and extended time between tests has been achieved
- Doctors have become less involved in the management of warfarin/INR management
- Nursing staff have become more confident and better educated regarding warfarin and management of INR
- Patient feedback has been very positive so far
- The process we use is less time consuming and more accurate
- Some previously non-compliant patients have become more compliant, but there are a couple who will never become compliant – various reasons, mostly social.
- Stable INRs
- Patients understand their medication regime
- Less frequent blood testing
- Point of care testing at pharmacy brings about better INR control.
**Issues/Negatives**

- Initially the changes show a blip in adopting our new protocol, although we are positive this will improve going forward. However it must be recognised that the management is adequate and appropriate; it is the location and mechanism for documentation that is not meeting the new standards.
- Finding the time to do this.
- Some problems with managing pharmacy based INR testing – now sorted after meeting and discussing processes and expectations.
- Difficult at the beginning of the pilot. Resistance from both doctors and nurses.
- Taking a while to see an upswing on the graphs.
- There seems to be no single agreed electronic system.
- The current system we use is not as efficient as our old manual system.
- We're entering the INR, warfarin dose and next test time in the Inbox comment field after check previous doses by opening the patient screening selecting this term only. The result and new instruction is then sent to the nurses' inbox where they contact the patient and create the next screening entry.
- We've a new system but we'll need to refine it.
- We'll find out from other practices what systems they are using.
- We're currently running both manual and electronic together until we've gone through two cycles.
- There was initially some resistance from nurses, who did not see it as their responsibility to chart the warfarin doses.
- Not all staff enthusiastic moving to electronic system.
- Reluctance to change from some staff.
- Difficulties in coordinating practice wide meetings.
- Identification of near misses.
- Confidence across all staff in use of tool.
- Focus on one area has resulted in slip in another.
- Coordination of practice wide meetings (time).
- Gaining agreement from all parties.
- Staff confidence in shift of responsibilities.

**Outcome Measures**

- Are patients spending more time in the therapeutic range?
- Has the frequency of INR testing decreased?
Prompts for Discussion with Patients

Low INR (< 2)
Need to ask patient about possible causes of low INR before increasing the dose of Warfarin. How much have they been taking recently? Document the amount taken in the patient notes.

<table>
<thead>
<tr>
<th>CAUSE</th>
<th>DOSE OF WARFARIN</th>
<th>REPEAT INR TEST IN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missed dose in last 5 days</td>
<td>Same dose</td>
<td>3 days</td>
</tr>
<tr>
<td>Temporary Vitamin C in last 5 days</td>
<td>Same dose</td>
<td>3 days</td>
</tr>
<tr>
<td>Temporary high Vitamin K foods in last 5 days</td>
<td>Same dose</td>
<td>3 days</td>
</tr>
<tr>
<td>- Liver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Broccoli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Brussel sprouts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Spinach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Watercress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Cabbage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Coriander</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate dose to achieve target INR</td>
<td>&lt; 1.5 increase by 20%</td>
<td>3 days</td>
</tr>
<tr>
<td>1-5-1.9</td>
<td>increase by 10%</td>
<td></td>
</tr>
</tbody>
</table>

Bleeding Questions
Bleeding can occur when the INR is between 2 and 3, but is more likely with higher INRs. Ask the patient about the following:
- Red or brown urine
- Red or black stools
- Severe headache
- Unusual weakness
- Excessive menstrual bleeding
- Prolonged bleeding from gums or nose
- Dizziness, trouble breathing or chest pain
- Unusual pain, swelling or bruising
- Dark, purplish or mottled fingers or toes
- Vomiting or coughing up blood
Repeat Tests When Last Two Tests Between 2-3

<table>
<thead>
<tr>
<th>PREVIOUS INTERVAL</th>
<th>NEXT TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every 3 days</td>
<td>Every week</td>
</tr>
<tr>
<td>Every week</td>
<td>Every two weeks</td>
</tr>
<tr>
<td>Every two weeks</td>
<td>Every month to six weeks</td>
</tr>
</tbody>
</table>

**High INR (> 3):**
Consider wrong dose taken and interactions with medications and food. Ask the patient if they have recently had any of the following common causes of a high INR:

<table>
<thead>
<tr>
<th>Wrong dose of tablets taken</th>
<th>Ginger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>Grapefruit or grapefruit juice</td>
</tr>
<tr>
<td>Allopurinol</td>
<td>Ibuprofen</td>
</tr>
<tr>
<td>Arnica</td>
<td>Lansoprazole</td>
</tr>
<tr>
<td>Cefaclor</td>
<td>Liquorice</td>
</tr>
<tr>
<td>Co-trimoxazole</td>
<td>Metronidazole</td>
</tr>
<tr>
<td>Cranberry juice</td>
<td>Omeprazole</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>Sulphonamides</td>
</tr>
<tr>
<td>Garlic</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INR</th>
<th>ACTION</th>
<th>REPEAT INR TEST IN</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1-3.9</td>
<td>Same dose</td>
<td>Only if minor bleeding 3 days</td>
</tr>
<tr>
<td>4-5</td>
<td>Stop 1 day; reduce dose by 10-20%</td>
<td>Only if minor bleeding 3 days</td>
</tr>
<tr>
<td>&gt;5</td>
<td>Stop &amp; restart when INR &lt;5; reduce dose by 20%</td>
<td>Give Vit K 1mg if INR not falling or high risk of serious bleeding Daily</td>
</tr>
<tr>
<td>&gt;8</td>
<td>Stop &amp; restart when INR &lt;5; reduce dose by 20%</td>
<td>Vit K 1mg if minor bleeding &amp; consider hospital admission; Vit K 10mg if major bleeding &amp; hospital admission Daily</td>
</tr>
</tbody>
</table>

**Indications and Duration of Warfarin Therapy**

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>TARGET INR</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVT or PE due to reversible risk factors</td>
<td>2-3</td>
<td>3 months</td>
</tr>
<tr>
<td>DVT or PE due to two unprovoked causes or cancer</td>
<td>2-3</td>
<td>Lifetime</td>
</tr>
<tr>
<td>Chronic AF</td>
<td>2-3</td>
<td>Lifetime</td>
</tr>
<tr>
<td>Mechanical aortic valve</td>
<td>2-3</td>
<td>Lifetime</td>
</tr>
<tr>
<td>Antiphospholipid syndrome without recurrent VTE</td>
<td>2-3</td>
<td>Lifetime</td>
</tr>
<tr>
<td>Condition</td>
<td>Duration</td>
<td>Management</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Mechanical mitral valve</td>
<td>2.5-3.5</td>
<td>Lifetime</td>
</tr>
<tr>
<td>Mechanical aortic or mitral valve with additional risk factors for VTE</td>
<td>2.5-3.5</td>
<td>Lifetime</td>
</tr>
<tr>
<td>Antiphospholipid syndrome with recurrent VTE</td>
<td>3.0-4.0</td>
<td>Lifetime</td>
</tr>
</tbody>
</table>

Example of a Warfarin Prescribing template
For Medtech

[Image of Warfarin Prescribing template]