



General Practice Warfarin Module 2018-19

Every patient, every time



Adapted with permission



Contents

Contents.....	3
1.1 Background	4
1.2 Aim.....	4
1.3 Equity	4
1.4 Measures & rationale	6
2.1 Collect your baseline data.....	8
2.1.1 Identify patients.....	8
2.1.2 Randomise.....	8
2.1.3 Audit.....	8
2.1.4 Complete the spread sheet.....	10
2.1.5 Submit	11
2.2 Plan stage	12
2.2.1 Change ideas	13
2.3 Do	14
2.4 Study	14
2.5 Act.....	15
3.1 Additional Resources	17
3.2 MOPs & Cornerstone	18
3.3 Theory of improvement.....	19
3.4 Glossary.....	20
3.5 References.....	22

Section 1: Introduction

1.1 Background

A key aim of the Safety in Practice programme is to reduce the harm experienced by patients from medication use. Adverse events related to medications are a significant cause of patient morbidity and mortality, and a source of substantial costs for both organisations and patients.

In a 2017 study into medication related patient harm in NZ hospitals, warfarin was noted to be in the top 10 medicines causing harm, predominantly due to bleeding. Warfarin accounted for 1.8% of harm and, when combined with other anticoagulants, was implicated in the most serious harms, along with opioids¹.

General Practice teams need consistent, systematic practice wide approaches to warfarin management to provide safe and effective care for patients taking warfarin. This module helps practices to assess and improve these processes.

1.2 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.

1.3 Equity

Reducing inequalities in outcomes between Maori and other high needs groups compared to the general population is a priority at all levels of the health system, including Auckland and Waitemata DHB's².

Maori and Pacific people have and still do, experience a greater burden of morbidity and mortality relating to valve related heart problems with many resulting from rheumatic fever when younger³. Mechanical heart valve replacement is a common reason for patients to be using warfarin where other oral anticoagulants are not indicated. Inability to use oral anticoagulation for atrial fibrillation due to reduced renal function would also be more likely in these groups.

While Safety in Practice is not a programme specifically focused on equity issues, it is well recognised that for those groups, who are already experiencing poorer health outcomes, the very reasons that contribute to this exposes them to greater risk of errors, oversights, miscommunications and receiving care that is less able to meet their needs. Working on processes to improve patient safety overall would be expected to have particular benefit for reducing risk for these groups, which would contribute to reducing inequity.

Practices can focus their work to look at specific higher risk groups using an equity lens. Some examples might be:

- Selecting discharge summaries only for particular groups and then selecting the sample of 10 patients randomly from these. Dr Info and Mohio both allow either selection by Maori, or by high needs, or ordering them according to ethnicity.
- Specifically seeking input from patients from these groups on their experience of the practice's Warfarin Management systems, and how they might be improved from the patient interaction point of view.

1.4 Measures & rationale

Measure 1 Is there evidence that the last advice on warfarin dosing given to patient followed current local guidelines?

Rationale

- The use of a dosing algorithm can significantly improve anticoagulant control.
- 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.

Sources

Effect of a simple two step warfarin dosing algorithm on anticoagulant control as measured by time in therapeutic range: a pilot study. Kim, Y.K., Nieuwlaat, R., Connolly, S.J., Schulman, S., Meijer, K., Raju, N., Kaatz, S. & Eikelboom, J.W. Journal of Thrombosis and Haemostasis, 2010 8, 101–106.

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. British Journal of General Practice, (1996) 46, 533–535.

Measure 2 Is there evidence that the last advice on the interval for blood testing given to the patient followed current local guidelines?

Rationale – as above

Measure 3 Since the last blood test, has the patient been taking the correct dose as ordered by the treating GP?

Rationale

- Assuming that the patient has been taking the dose that was previously ordered can lead to risk in the common event of non-concordance. Recognising and understanding where there is a discrepancy is important for reducing risk, and is helpful for improving patient understanding.
- To ensure compliance the practice has to ensure that the patient is informed of the correct dose.
- While not required by the audit, it is best practice to explore reasons for non-adherence to advice.

Measure 4 INR is taken within 7 days of planned repeat INR?

Rationale Patients' regular attendance for blood testing is associated with better anticoagulation control.

Source

Prompt repeat testing after out-of-range INR values: a quality indicator for anticoagulation care. Rose AJ, Hylek EM, Berlowitz DR, Ash AS, Reisman JI, Ozonoff A. Circ Cardiovasc Qual Outcomes. 2011 May 1; 4(3):276-82. Epub 2011 Apr 19.

Measure 5 Is patient education recorded every 12 months?

Rationale Improved patient knowledge and understanding of the use of warfarin improves anticoagulation control.

Sources

Relationship between patients' warfarin knowledge and anticoagulation control. Tang EO, Lai CS, Lee KK, Wong RS, Cheng G, Chan TY. Ann Pharmacother. 2003 Jan; 37(1):34-9.

Effect of a warfarin adherence aid on anticoagulation control in an inner-city anticoagulation clinic population. Nochowitz B, Shapiro NL, Nutescu EA, Cavallari LH. Ann Pharmacother. 2009 Jul; 43(7):1165-72. Epub 2009 Jun 23.

A structured teaching and self-management program for patients receiving oral anticoagulation: a randomized controlled trial. Working Group for the Study of Patient Self-Management of Oral Anticoagulation. Sawicki PT. JAMA. 1999 Jan 13;281(2):145-50.

Section 2: Instructions

2.1 Collect your baseline data



2.1.1 Identify patients

On the day of the data collection each month, run the query related to your module, available to download from <http://www.safetyinpractice.co.nz> in the Resources section.

2.1.2 Randomise

From the list generated in step 2.1.1 it is important to select a **random sample of 10 patients to audit**.

For sample sizes up to 10

1. Audit all 10 patients.

For sample sizes of 11 - 28

1. Select a random number between 1 and 10 by picking pieces of paper out of a hat.
2. If you select an odd number audit every other patient starting at 1 e.g. 1st, 3rd, 5th, 7th etc.
If you select an even number audit every other patient starting with the second patient e.g. 2nd, 4th, 6th, 8th etc.

For sample sizes 29+

1. Select a random number between 1 and 10 by picking pieces of paper out of a hat.
2. Audit every other patient starting at this number e.g. if 6 is drawn audit the 6th, 8th, 10th patient etc.

2.1.3 Audit

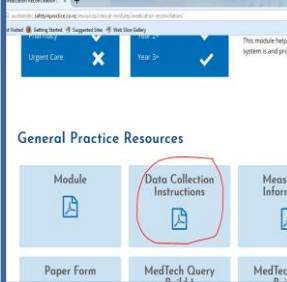
Review each of your 10 selected records against the following criteria. You can use the Paper Form provided in the resources section of our website to keep track or simply enter records directly onto the audit spread sheet.

2.1.3.1 Measures & guidance

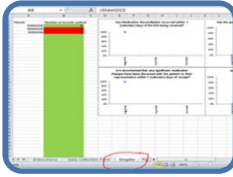
Measure 1 Is there evidence that the last advice on warfarin dosing given to patient followed current local guidelines?
<p>Guidance</p> <p>Practices should refer to the guidance on the Auckland Regional Health Pathways site around warfarin monitoring and check whether the last dosage advice fitted with this.</p> <p>Warfarin - Starting and Monitoring</p> <p>Warfarin Over-anticoagulation</p>
Measure 2 Is there evidence that the last advice on the interval for blood testing given to the patient followed current local guidelines?
<p>Guidance</p> <p>As for measure 1. Ensure the advice for the dose interval is correct.</p>
Measure 3 Since the last blood test, has the patient been taking the correct dose as ordered by the treating GP?
<p>Guidance</p> <p>Practices do need to actually check with the patient or their representative what the actual dosage is they have been taking and compare it to the previous instructions.</p> <p>Record YES if there is recorded evidence that this has been checked.</p> <p>Record NO if there is no recorded evidence of this having been done.</p>
Measure 4 INR is taken within 7 days of planned repeat INR?
<p>Guidance</p> <p>Record YES if date of test is within 7 days.</p> <p>Record no if the result is greater than 7 days from when the test was planned.</p>
Measure 5 Patient education recorded every 12 months?
<p>Guidance</p> <p>Record YES if there is documentation of patient education having been given.</p> <p>Record NO if there is not.</p>

2.1.4 Complete the spread sheet

Tip: Your first set of data is relating to the month of August so this is due on September 10th. For this data set record “August” in the first column.

	<table border="1"> <tr> <th>Review Date: please type date beside each individual record for current month</th> <th>Has Medication Reconciliation occurred within 7 (calendar) days of the EDS being received?</th> <th>Has the patient's regular medication list been updated?</th> </tr> <tr> <td>01/08/2018</td> <td></td> <td></td> </tr> </table>	Review Date: please type date beside each individual record for current month	Has Medication Reconciliation occurred within 7 (calendar) days of the EDS being received?	Has the patient's regular medication list been updated?	01/08/2018			<table border="1"> <tr> <th>Review Date: please type date beside each individual record for current month</th> <th>Has Medication Reconciliation occurred within 7 (calendar) days of the EDS being received?</th> <th>Has the patient's regular medication list been updated?</th> </tr> <tr> <td>01/08/2018</td> <td>y</td> <td>n</td> </tr> </table>	Review Date: please type date beside each individual record for current month	Has Medication Reconciliation occurred within 7 (calendar) days of the EDS being received?	Has the patient's regular medication list been updated?	01/08/2018	y	n	<table border="1"> <tr> <th>Has it been documented that any significant medication changes have been discussed with the patient within 7 (calendar) days of receipt?</th> <th>Overall Compliance</th> </tr> <tr> <td></td> <td></td> </tr> </table>	Has it been documented that any significant medication changes have been discussed with the patient within 7 (calendar) days of receipt?	Overall Compliance		
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01/08/2018	y	n																	
Has it been documented that any significant medication changes have been discussed with the patient within 7 (calendar) days of receipt?	Overall Compliance																		
<p>Download the spread sheet for your module in the Resources section of www.safetyinpractice.co.nz</p>	<p>Record the month the data relates to in a DD/MM/YY format left column. For your first data set collected in September this is 1/8/18,</p>	<p>Mark y, n or n/a against for each measure and each patient according to your findings in the previous section.</p>	<p>The final measure "Overall compliance" will auto-populate.</p>																

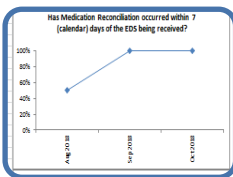
Tip: Please don't audit more than 10 patient for a given month or add or remove rows from the spread sheet as this will disrupt the formulas and cause the graphs to break.



Graphs will be automatically generated in the next tab in the spreadsheet.

Referral type (date received) each individual provided for current month	Has Medication Reconciliation occurred within 7 (calendar) days of the EDs being received?	Has the patient medication be reconciled?
01/08/2018	n	n
01/08/2018	n	n
01/08/2018	n	n
01/08/2018	n	n
01/08/2018	n	n
01/08/2018	n	n
01/08/2018	y	y
01/08/2018	y	y
01/08/2018	y	y
01/08/2018	y	y

Next month add your data to the same spread sheet.



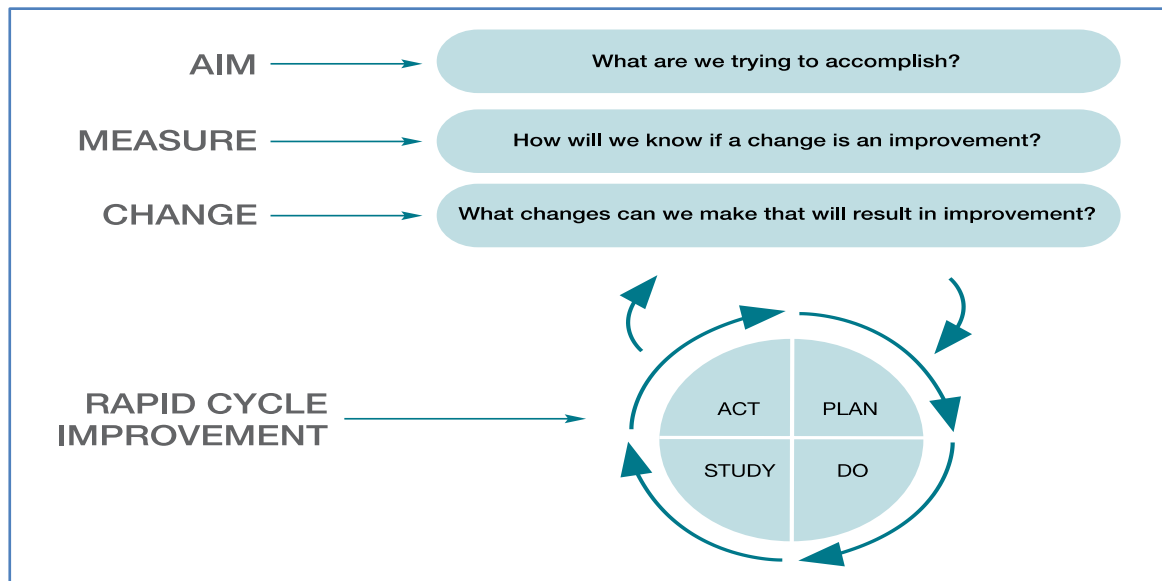
This means you can track your progress over time.

2.1.5 Submit

Submit your data on the 10th of each month to audit@safetyinpractice.co.nz

Tip: Please ensure all data sent to Safety in Practice is anonymized

Creating Change – Getting started



Before you start your plan phase:

- Bring together your team – these people will work with you to plan and carry out the test of change
- Select the process you wish to change

As a team answer the 3 questions above:

1. What are we trying to accomplish? (write an objective for this PDSA cycle)
2. How will we know if a change is an improvement?
3. What changes can we make that will result in improvement?

2.2 Plan stage

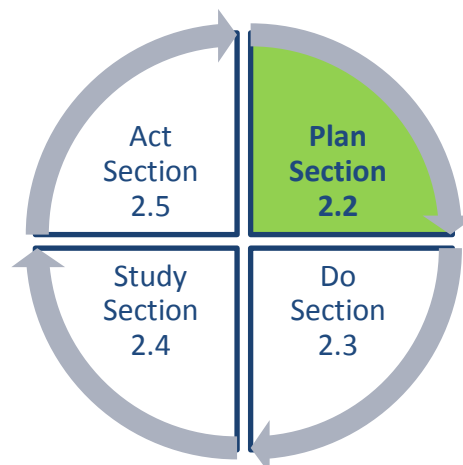
Plan how the changes will happen – ask yourselves and write down the following:

- What will we do?
- Who will carry out the plan?
- When will it take place?
- Where will it happen
- What data and information will we collect – i.e. what will help us determine if the change is an improvement?
- Do we need training or materials?

Make predictions – what do you think will happen when you test the change and why?

Ask yourself:

- What do we hope to learn by



testing the change?

- What will happen when we test the change?
- How will the change be carried out?

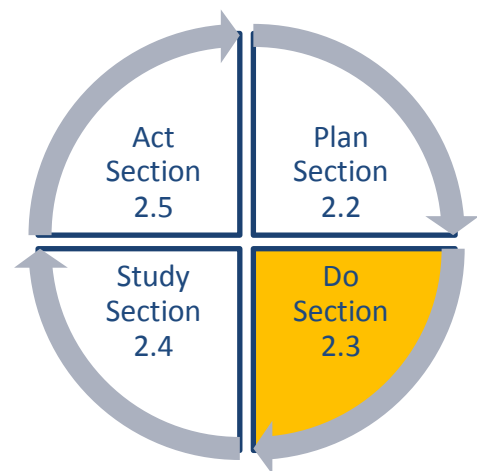
2.2.1 Change ideas

General	<ul style="list-style-type: none"> • Have a doctor and nurse champion in the practice – this has given practices more confidence in dealing with results and testing frequency. • Checking whether patient should still be on warfarin or whether oral novel anti-coagulation medicine would be more appropriate. • Identify patients with stable INRs to appropriate point of care testing through CPAMS. • Practice wide usage of 1mg tablets only.
Practice processes	<ul style="list-style-type: none"> • Front desk maintaining up to date contact details. • All clinical staff to use standardised guidelines. • System for handling faxed INR's & ensuring that acted on that day before clinic closed. • Implementation of a recall system to follow-up on INR time frames. • INR management IT tool & new protocol created using practice wide feedback, experience and knowledge. • 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. • Setting up policies around testing intervals. • Development of a manual process to ensure the practice has the ability to monitor and remind INR patients, especially the ones currently testing spasmodically.
Recording process in patient management system	<ul style="list-style-type: none"> • Moved from duplicate electronic and manual process to single entry using INR screening template. • Dropdown option added within the screening tem to show whether Nurse or Doctor can manage patient. • Refined screening term to identify patients on warfarin. • Process in place for each test recording : INR result, warfarin dose, when next test is due, GP signature, nurse signature when patient advised any patient specific notes relevant to warfarin monitoring
Practice team roles and responsibilities	<ul style="list-style-type: none"> • Open discussion of most appropriate clinician to manage specific groups of patients on warfarin • Transition to nurse dosage adjustments under standing orders. • Up skilling opportunities for nurses
Patient education	<ul style="list-style-type: none"> • Patients having education updates. • Education checklist prepared and embedded into form.

	<ul style="list-style-type: none"> • Cycle of education developed leading to better patient involvement and compliance. • Collation of resources available for patient education e.g. flip chart, red book etc. • Plan to send out Patient Education document to all warfarin patients and adding wording of “if you would like further information please contact the clinic”. • Changed the wording on the INR screening term within Medtech from “Patient Info Given” as a tickbox to “Patient Education Given” as a date field.
Patient involvement	<ul style="list-style-type: none"> • Involving patients in the change process – provide good feedback on what they think works best from their perspective.

2.3 Do

- Prepare to test; gather resources
- Try out your change idea – it’s usually best to try it out on a small sample or area of your practice. Starting on a small scale might mean 1 or 2 patients – that way if it doesn’t work its easier to remove the step or process
- While you are testing keep track of what happens in real time – don’t wait to write it up



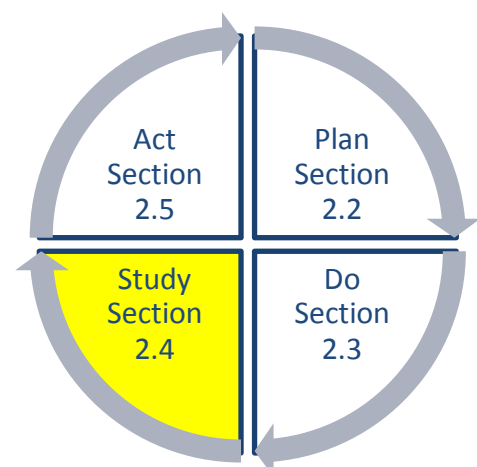
2.4 Study

Complete the analysis of the data.

Ask yourself:

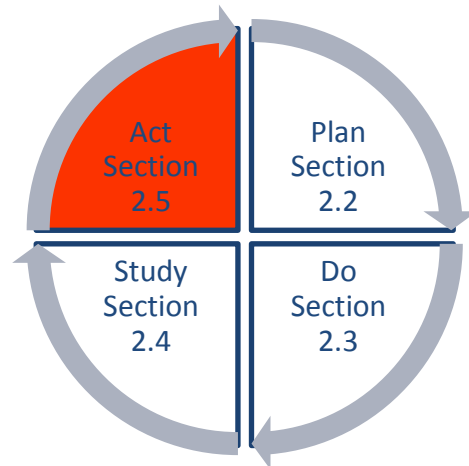
- What has changed
- Who was affected
- Are the effects positive or negative
- Are they worth keeping or removing, adapting or developing

Compare the data to your predictions.



2.5 Act

- Summarise and reflect on what was learned.
- Refine the change based on what was learned.
- Are you going to adopt the change, adapt and retest, or abandon?
- Prepare a plan for your next PDSA cycle – back to step 2.2 Plan for your next cycle!



Previous teams' experiences

Benefits	Challenges
<ul style="list-style-type: none"> • Patient demographic info up to date. • Clear communication between all staff groups. • Simpler, quicker process. • Up-skilling nurses & pharmacists. • Increased confidence in process. • Reduced GP prescribing times. • Patient's happier. • Patient's better educated. • Increased concordance. • All staff groups engaged in improving the system. • More stable INR results. • Less blood tests. 	<ul style="list-style-type: none"> • Time taken to apply changes. • Multiple electronic systems, processes & guidelines available. • Resistance to change, especially changing roles & responsibilities within the team. • Co-ordinating implementation across many staff groups.

Section 3: Resources

3.1 Additional Resources

Resources – general

- Health Pathways information about Atrial Fibrillation (includes patient information)
<https://aucklandregion.healthpathways.org.nz/index.htm?18972.htm>
- BPAC article: An update on antithrombotic medicines
www.bpac.org.nz/BPJ/2015/April/antithrombotic.aspx
- BPAC article: The safe and effective use of dabigatran and warfarin in primary care
www.bpac.org.nz/2017/anticoagulants.aspx

Resources – warfarin

- Health Pathways information regarding warfarin
<https://aucklandregion.healthpathways.org.nz/index.htm?18972.htm>
- Waitemata DHB – Warfarin Counselling Checklist and List of Interactions (included in pack)
<https://aucklandregion.healthpathways.org.nz/Resources/PWarfarin-CounsellingChecklistListofInteractionsMay13.pdf>
- BPAC Guidelines: INR for Monitoring Warfarin Treatment
www.bpac.org.nz/BT/2010/November/inr.aspx
- New Zealand Formulary: Warfarin www.nzf.org.nz/nzf_1493
- SafeRx® leaflets. "Warfarin: What you need to know" leaflets are available at www.saferx.co.nz in English, Chinese, Korean, Niuean, Samoan, and Tongan
- Anticoagulant Treatment Booklet "Red Book" – available free from Medidata on 09 488 4271 or email gmouldey@medidata.co.nz with the name of your pharmacy, your delivery address and the number of 'Red Books' you require.
- Health Navigator <https://www.healthnavigator.org.nz/medicines/w/warfarin/>
- Patient information sheet card <https://www.countiesmanukau.health.nz/assets/Community-health/Pharmacy/Warfarin-patient-information-card.pdf>

WARFARIN PATIENT INFORMATION

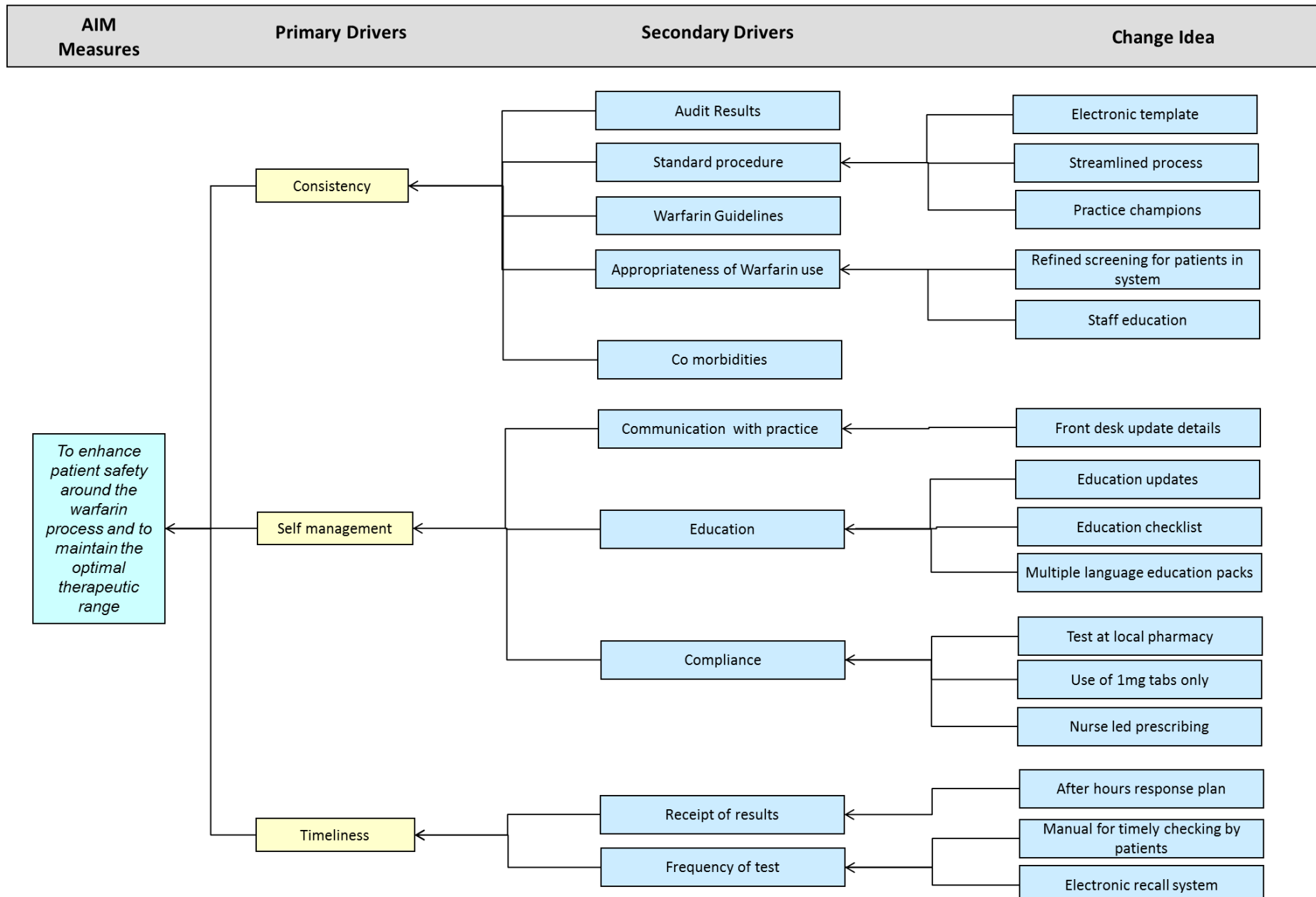
<p>Warfarin stops clots from being made or getting bigger</p>	<p>The right dose = the right INR</p>	<p>Take your tablets at the same time every evening</p> <p>Your doctor or nurse will tell you how many tablets to take and when to go for your next blood test</p>	
<p>Call doctor or nurse if any of the following occurs:</p> <ul style="list-style-type: none"> Any unusual bleeding or bruising Severe unexplained pain Fever, vomiting, diarrhoea, infection 	<p>Other medicines can affect warfarin: Ask your pharmacist or doctor about all your medicines</p>	<p>Mix your green vegetables with other coloured vegetables*</p> <p><small>*This does not apply if you are on a diet. You must consult with a dietitian</small></p>	
<p>Take your warfarin at _____ Have regular blood tests starting _____</p> <p>Phone your doctor for your INR results on the day of your blood test</p> <p>Take the recommended dose until your next blood test</p>			<p>Other information/recommendations:</p>

3.2 MOPs & Cornerstone

The Medication Reconciliation Audit is endorsed by the RNZCGP for Maintenance of Professional Standards (see website).

The audits and PDSA cycles can be used for Cornerstone / Foundation standards as a Quality Improvement activity

3.3 Theory of improvement



3.4 Glossary

ACE-inhibitor	Angiotensin converting enzyme inhibitor such as lisinopril. An anti-hypertensive medication.
ADE	Adverse Drug Event
ADHB	Auckland District Health Board
ALT	Alanine aminotransferase, a marker of liver function.
AST	Aspartate aminotransferase, a marker of liver function.
ARB	Angiotensin receptor blocker such as candesartan. An anti-hypertensive.
Bundle	Each of the areas identified as presenting the highest risk to patients within the community have been developed into modules. Each module is structured to include a change package and a bundle.
CARM	Centre for Adverse Reaction Monitoring New Zealand
CoX-2 inhibitors	A form of NSAID that, unlike e.g. ibuprofen, only works on the CoX-2 enzyme.
CPAMS	Community Pharmacy Anticoagulation Monitoring Service
CKD	Chronic kidney disease
Change package	A collection of change ideas known to produce a desired outcome in a process or system.
Cytotoxic	A drug that is toxic to living cells.
Dr Info	A clinical information platform used by general practices. Data is extracted and analysed from practices PMS'.
DMARDs	Disease modifying anti-rheumatic drugs. These medications are used in autoimmune diseases such as rheumatoid arthritis.
EDS	Electronic Discharge Summary
eGFR	Estimated glomerular filtration rate, renal function test
FBC	Full blood count
GI	Gastro-intestinal
IHI	Institute of Health Improvement
INR	International Normalised Ratio. This is a marker of coagulability in the blood used to guide warfarin dosage.
H2 antagonists	Gastro-intestinal protective medication
HQSC	Health Quality & Safety Commission of New Zealand
LFTs	Liver function tests
Medication Reconciliation	The process of collecting, comparing, and communicating the 'most accurate' list of medicines that a patient is taking, together with details of any allergies and/or adverse drug reactions (ADRs), with the outcome of providing correct medicines for a given time period
Module	A structured way of improving the processes around patient care: a small, straightforward set of evidence-based practices, generally three to five, that, when performed collectively and reliably, have been proven to improve outcomes.

Mohio	A clinical information platform used by general practices. Data is extracted and analysed from practices PMS'.
NSAIDs	Non-steroidal anti-inflammatory drugs used for pain and inflammation. Examples include ibuprofen, naproxen and diclofenac.
Opioids	Strong pain medications such as codeine, morphine and fentanyl.
OTC	Over the counter
PPI	Proton pump inhibitor such as omeprazole. These medicines reduce stomach acid.
PMS	Patient management system e.g. MedTech, MyPractice, ToniQ
PHO	Primary health Organisation e.g Auckland, Alliance Health Plus, Comprehensive Care, East Health Trust, Total Healthcare, National Hauora Coalition, Procure
TFTs	Thyroid function tests
RNZCGP	Royal New Zealand College of General Practitioners
WBC	White blood cells. Used as a marker of infection and immune system functioning.
WDHB	Waitemata District Health Board
SIP	Safety in Practice

3.5 References

1. Robb, G, Loe E, Maharaj A et al. Medication-related patient harm in New Zealand hospitals. New Zealand Medical Journal 2017;130(1460):21-32 Available at: www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2017/vol-130-no-1460-11-august-2017/7328
2. Waitemata and Auckland DHBs, 2017. 2017/18 Annual Plan. Available at: <http://www.waitematadhb.govt.nz/dhb-planning/organisation-wide-planning/annual-plan/>
3. Maori Health Profile 2015 University of Otago. Available at: <https://www.otago.ac.nz/wellington/otago152507.pdf>
4. Kim, Y.K., Nieuwlaat, R., Connolly, S.J., Schulman, S., Meijer, K., Raju, N., Kaatz, S. & Eikelboom, J.W. Effect of a simple two step warfarin dosing algorithm on anticoagulant control as measured by time in therapeutic range: a pilot study. Journal of Thrombosis and Haemostasis, 2010 8, 101–106.
5. Fitzmaurice, D.A., Hobbs, F.D., Murray, E.T., Bradley, C.P. & Holder, R. Evaluation of computerized decision support for oral anticoagulation management based in primary care. British Journal of General Practice, 1996. 46, 533–535.
6. Manotti, C., Moia, M., Palareti, G., Pengo, V., Ria, L. & Dettori, A.G. Effect of computer aided management on the quality of treatment in anticoagulated patients: a prospective, randomized, multicentre trial of APROAT (Automated Program for Oral Anticoagulant Treatment). Haematologica, 2001. 86, 1060–1070.
7. Poller, L, Keown, M, Ibrahim, S, Lowe, G, Moia, M, Turpie, AG, Roberts, C, van den Besselaar, AM, van der Meer, FJ, Tripodi, A, Palareti, G. & Jespersen, J. A multicentre randomised clinical endpoint study of PARMA 5 computer assisted oral anticoagulant dosage. British Journal of Haematology, 2008a 143, 274–283.
8. Poller, L., Keown, M., Ibrahim, S., Lowe, G., Moia, M., Turpie, A.G., Roberts, C., van den Besselaar, A.M., van der Meer, F.J., Tripodi, A., Palareti, G., Shiach, C., Bryan, S., Samama, M., Burgess-Wilson, M., Heagerty, A., Maccallum, P., Wright, D. & Jespersen, J. An international multicentre randomized study of computer-assisted oral anticoagulant dosage vs. medical staff dosage. Journal of Thrombosis and Haemostasis, 2008b, 6, 935–943.
9. Poller, L, Roberts, C, Ibrahim, S, Keown, M, Ageno, W, van Den Besselaar, AMHP, Fitzmaurice, D, Harenbeg, J, Kitchen, S, Lowe, G, Moia, M, Palareti, G, Tripodi, A, Turpie, AGG & Jespersen, J. Screening computer-assisted dosage programs for anticoagulation with warfarin and other vitamin K antagonists: minimum safety requirements for individual programs. Journal of Thrombosis and Haemostasis, 2009, 7, 1736.
10. Jowett, S., Bryan, S., Poller, L., Van Den Besselaar, A.M., Van Der Meer, F.J., Palareti, G., Shiach, C., Tripodi, A., Keown, M., Ibrahim, S., Lowe, G., Moia, M., Turpie, A.G. & Jespersen, J., The cost-effectiveness of computer-assisted anticoagulant dosage: results from the European Action on Anticoagulation (EAA) multicentre study. Journal of Thrombosis and Haemostasis, (2009) 7, 1482–1490.
11. Prompt repeat testing after out-of-range INR values: a quality indicator for anticoagulation care. Rose AJ, Hylek EM, Berlowitz DR, Ash AS, Reisman JI, Ozonoff A. Circ Cardiovasc Qual Outcomes. 2011 May 1; 4(3):276-82. Epub 2011 Apr 19.

12. Relationship between patients' warfarin knowledge and anticoagulation control. Tang EO, Lai CS, Lee KK, Wong RS, Cheng G, Chan TY. *Ann Pharmacother*. 2003 Jan; 37(1):34-9.
13. Wong RS, Cheng G, Chan TY. *Ann Pharmacother*. 2003 Jan; 37(1):34-9.
14. Nochowitz B, Shapiro NL, Nutescu EA, Cavallari LH. Effect of a warfarin adherence aid on anticoagulation control in an inner-city anticoagulation clinic population. *Ann Pharmacother*. 2009 Jul; 43(7):1165-72. Epub 2009 Jun 23.
15. Sawicki PT. A structured teaching and self-management program for patients receiving oral anticoagulation: a randomized controlled trial. Working Group for the Study of Patient Self-Management of Oral Anticoagulation. *JAMA*. 1999 Jan 13;281(2):145-50.