

# Use of an interdisciplinary, participatory design approach to develop a usable patient self-assessment tool in atrial fibrillation

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**Abstract:** After identifying that significant care gaps exist within the management of atrial fibrillation (AF), a patient-focused tool was developed to help patients better assess and manage their AF. This tool aims to provide education and awareness regarding the management of symptoms and stroke risk associated with AF, while engaging patients to identify if their condition is optimally managed and to become involved in their own care. An interdisciplinary group of health care providers and designers worked together in a participatory design approach to develop the tool with input from patients. Usability testing was completed with 22 patients of varying demographics to represent the characteristics of the patient population. The findings from usability testing interviews were used to further improve and develop the tool to improve ease of use. A physician-facing tool was also developed to help to explain the tool and provide a brief summary of the 2012 Canadian Cardiovascular Society atrial fibrillation guidelines. By incorporating patient input and human-centered design with the knowledge, experience, and medical expertise of health care providers, we have used an approach in developing the tool that tries to more effectively meet patients' needs.

**Keywords:** patient education, atrial fibrillation, care gaps, patient care tools, patient self-assessment

## Background

Atrial fibrillation (AF), is the most common heart rhythm disorder, and primarily affects the elderly.<sup>1,2</sup> AF causes significant morbidity and mortality and is a significant driver of emergency room visits and hospitalizations.<sup>3,4</sup>

Cardioembolism due to AF accounts for approximately one in six ischemic strokes (one in four in the elderly) and is a cause of stroke-related disability, dementia, and death.<sup>5</sup> At least 60% of patients who have a stroke will end up with some form of permanent disability.<sup>5</sup> In addition, patients with AF experience symptoms, including palpitations, shortness of breath, light-headedness, dizziness, and/or chest pain, which can be extremely bothersome and greatly impact their quality of life.<sup>6</sup> Often these symptoms lead to unplanned visits to the primary care provider and unnecessary emergency room visits.<sup>3</sup>

Fortunately, much of the morbidity and mortality associated with AF is preventable with appropriate therapy, such as treatment with anticoagulation and the use of medications that control heart rate and/or rhythm.<sup>2,7,8</sup> However, in a Canadian registry study of patients with AF admitted with a first ischemic stroke and who were candidates for anticoagulation, most were not taking anticoagulation (60%). In addition, 39% taking anticoagulation were sub-therapeutic at the time of ischemic stroke.<sup>5</sup>

Patient education on management of symptoms and stroke risk is needed. New approaches to chronic disease management have stressed the importance of more informed and ‘activated’ patients who are given sufficient tools to co-manage their health with their health care team.<sup>9</sup> ‘Activated’ patients rank high on self-efficacy scales, a proxy measure for confidence in managing their illness, for example, their perceived ability to navigate the health care system, follow medical advice, manage symptoms, and maintain their physical and emotional well-being.<sup>10</sup> ‘Activated’ patients do better on a range of health outcomes and, by being better self-managers, can improve health system efficiency.<sup>11,12</sup> For example, research suggests that these patients have better relationships with their health care providers, have fewer hospitalizations, and have improved understanding of and compliance with recommended treatment regimes.<sup>13,14</sup>

Establishing interdisciplinary teams composed of health care providers, designers, and patients may be an effective way to develop tools that both engage patients and better meet their needs. Health care providers have expertise on disease states and their management but also have an intimate knowledge of the care gaps that exist for their patients. Designers, especially those with expertise in human-centered design, focus primarily on the needs of the end user and how they will use the tool in their daily life to make it compelling and meaningful. Finally, patient input is critical to test assumptions and ensure ease of use and understanding. This approach enables teams to develop, test, and iterate on the tool quickly, with pain points identified early on.

## Methods/change process

An interdisciplinary, participatory design approach was used to develop a patient-facing tool targeted at patients with AF. As part of a larger project aiming to develop a new care model to improve the care of patients with AF, a group of clinicians, designers, and researchers from the Health Design Lab at Li Ka Shing Knowledge Institute, St Michael’s Hospital and the Centre for Innovation in Complex Care at the University Health Network, Toronto, Canada, set out to develop this AF patient-facing tool. The principle behind this tool is to allow patients to determine if their management is optimal according to the 2012 Canadian Cardiovascular Society (CCS) AF guidelines,<sup>15</sup> and if not, to empower them to speak to their primary care provider.

## Preparatory work

The team conducted stakeholder interviews across the spectrum of AF care and reviewed both the medical literature and

the existing tools on the Internet. Five key gap areas were identified: patient understanding of AF; symptom management; rate versus rhythm control versus electrocardioversion; anticoagulation; and stroke prevention. These care gaps were then used as a starting point when the team met for a brainstorming session to discuss how significant care gaps that exist in the management of AF could be addressed.

Given the potential benefits of preventing disability and death related to stroke, as well as avoiding the need for acute emergency care, the team decided to focus the tool on stroke prevention and symptom management. Following the brainstorming session, the generated ideas were mapped out according to themes, and presented back to the participants to confirm the direction that would be taken in terms of target audience, key messages, and type of tool to be developed.

## Tool design and development

The tool was developed using an iterative process, with 33 versions created, each of which was cycled back through the clinical and design teams with input from stakeholders and end users. Clinical content was developed by an interdisciplinary group of clinicians, including pharmacists, nurses, nurse practitioners, cardiologists, general internists, emergency room physicians, and primary care providers. The tool design was created by designers with expertise in human-centered design. Both groups met separately as well as jointly on a weekly basis to ensure the clinical content and design were optimized and complementary.

## Usability testing

Usability testing was completed with an early version of the quiz (see Figures 1 and 2) with 22 patients of various ages from different primary care and cardiology clinics to represent our end-user demographic. Testing was completed using a standardized script and questions developed by both clinicians and designers (see the Supplementary material). A user experience designer then trained a clinician to complete the usability testing interviews with patients. Data from interviews were compiled and analyzed by a user experience designer according to consequence, recoverability, frequency of occurrence, and rational cause.<sup>16</sup> Findings were then used to improve upon the tool.

## Results

### Findings from usability testing and changes made

#### Finding 1: information was too general

Most users believed that ‘Know Your Colours’ was providing them with basic information about AF and the heart. Very few

**4.**

I scored 0.  
I am:  
 a. Taking aspirin (ASA)  
 b. Taking blood thinner (warfarin, dabigatran)  
 c. Not taking aspirin (ASA) or blood thinner (warfarin, dabigatran)  
 Scoring:  
 a = Green b = Red c = Red

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I scored 1.  
I am:  
 a. Taking aspirin (ASA)  
 b. Taking blood thinner (warfarin, dabigatran)  
 c. Not taking aspirin (ASA) or blood thinner (warfarin, dabigatran)  
 Scoring:  
 a = Green b = Green c = Red

---


I scored between 2 – 6.  
I am:  
 a. Taking aspirin (ASA)  
 b. Taking blood thinner (warfarin, dabigatran)  
 c. Not taking aspirin (ASA) or blood thinner (warfarin, dabigatran)  
 Scoring:  
 a = Red b = Green c = Red

**5.**


**Results**

 **Your brain health is red.**  
Here is the question to ask your family doctor:  
How can you and I work together to improve how I'm doing with my heart rhythm and make me at least a yellow for next time?


---

 **Your brain health is yellow.**  
Here is the question to ask your family doctor:  
How can you and I work together to improve how I'm doing with my heart rhythm and make me a green for next time?

---

 **Your brain health is green.**  
Here is the question to ask your family doctor:  
What steps can I take with you to ensure that I stay a green?

## Do You Know Your Atrial Fibrillation Colours?



**What is atrial fibrillation?**  
Atrial fibrillation is an electrical disturbance of the heart where the heart is beating irregularly and fast. This can affect your heart and brain.

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**Why should I care?**  
Atrial Fibrillation increases your risk of stroke (a clot in the brain). It can also affect your quality of life because many of the symptoms are uncomfortable. However, it's possible you may not feel any symptoms.

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**What can be done?**  
There are a variety of treatments and options available that can improve your health and reduce your symptoms and risk of stroke.  
By going through the following quiz and identifying your colour, you will know what to ask your health care team to ensure that you are receiving the best treatment for you.

Figure 1 Initial version, patient-facing tool for stroke risk assessment.

**1.**

 **What colour is your heart health?**  
*By answering the questions, we can figure out how to help you feel the best you can.*

**1. This past year, I have visited the emergency department and/or had unplanned visits with my family doctor with concerns about my atrial fibrillation:**  
 a. More than once  
 b. Once  
 c. Never


**2. In the past 4 weeks, I have been bothered by any of the following symptoms: fast heart rate (palpitations), shortness of breath, light-headedness, dizziness or chest pain/pressure:**  
 a. A great deal  
 b. A little  
 c. I have not had any of these symptom

---


Figuring out your score  
**1 or more a's = Red**  
**1 or more b's and no a's = Yellow**  
**all c's = Green**

**2.**


**Results**

 **Your heart health is red.**  
Here is the question to ask your family doctor:  
How can you and I work together to improve how I'm doing with my heart rhythm and make me at least a yellow for next time?


---

 **Your heart health is yellow.**  
Here is the question to ask your family doctor:  
How can you and I work together to improve how I'm doing with my heart rhythm and make me a green for next time?

---

 **Your heart health is green.**  
Here is the question to ask your family doctor:  
What steps can I take with you to ensure that I stay a green?

---

 **What colour is your brain health?**  
*By answering the questions, we can figure out how to help prevent you from having a stroke.*

**3.**

**1. I have congestive heart failure.**  
 a. Yes (1 point)  
 b. No  
 c. I don't know

**2. I have high blood pressure or am taking blood pressure medication(s).**  
 a. Yes (1 point)  
 b. No  
 c. I don't know

**3. I am 75 years of age or older.**  
 a. Yes (1 point)  
 b. No

**4. I have diabetes.**  
 a. Yes (1 point)  
 b. No  
 c. I don't know

**5. I have previously had a stroke or mini-stroke (Transient Ischemic Attack or TIA).**  
 a. Yes (2 points)  
 b. No  
 c. I don't know

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Figuring out your score  
**If you answered 'I don't know' to any of the previous questions please take this sheet to your family doctor and ask them to help you complete the quiz.**  
 Please write your score here and continue: \_\_\_\_\_

Figure 2 Initial version, patient-facing tool for symptom management.

participants expressed that they thought this was primarily an assessment tool.

**Action:** We focused on the purpose of tool, removed “What is atrial fibrillation?”, “Why should I care?”, and “What can be done?” and refocused the introductory content on explaining the concept and tool.

**Finding 2: participants were not confident that their physician would know what the material was or what to do with it**

**Action:** We addressed this by developing a physician-facing tool that would accompany the patient-facing tool.

**Finding 3: there was confusion about what the colors meant**

**Action:** The legend for the heart and brain colors was made consistently visible throughout the quiz sections.

**Finding 4: participants had trouble figuring out their score**

They were missing the scoring at the bottom and moving forward prematurely.

**Action:** The format of the tool was changed so that parts 1 and 2 were confined to their own respective pages. Therefore, participants could complete the quiz and score without having to move to a different page or section of the page.

**Finding 5: lack of direction in what to do with the results**

“You showed me a red so it doesn’t look good for me, but how bad is it?”

**Action:** Information in the results section was changed to give more direction to the patient, including how soon they should follow up with their family doctor.

**Finding 6: participants were not clear on what was brain health and what was heart health content**

There was too much flipping back and forth between pages, and participants had trouble following the arrows. Positioning of brain health results on the back was problematic because participants were not turning to the back and referred instead to the heart health results, which caused confusion.

**Action:** The format of the tool was redesigned from a brochure format to a booklet format to create a more linear path through the self-assessment.

**Finding 7: scoring was difficult**

Participants had trouble adding up points and sometimes did not see them.

**Action:** Scoring was completely redesigned so that determining the score required minimal work on the patients’ part.

**Finding 8: many participants did not know what the term ‘congestive heart failure’ meant**

**Action:** The language in the question was changed from “I have congestive heart failure.” to “I have heart failure or I have been told I have water in the lungs.”

The final ‘Know Your Colours’ tool has evolved into an educational program for patients and providers. It includes a self-assessment and educational tool for patients with AF designed to capture information on stroke risk, impact of symptoms on daily living, unplanned visits to their primary care provider and emergency room visits (see Figure 3). Appropriateness of management is based on the 2012 CCS AF guidelines.<sup>15</sup> Symptom management, referred to as ‘Heart Health’, and stroke management, referred to as ‘Brain Health’, are scored separately. Based on the responses, patients are classified as ‘green’, ‘yellow’, or ‘red’, with specific instructions on how soon to follow up with their primary care provider based on their result.

The accompanying letter to the primary care provider comprises a description of the ‘Know Your Colours’ program and its importance on the front page, with a tool to aid clinicians in the management of AF on the back page. It includes information on diagnosis, medication management, and monitoring and is adapted from the Canadian Cardiovascular Pharmacists Network Stroke Prevention in AF Pocket Reference ([www.ccpn.ca](http://www.ccpn.ca)) and the 2012 CCS AF guidelines<sup>15</sup> (see Figure 4).

## Discussion

‘Know Your Colours’ was designed to allow patients to use it easily and enable them to better understand AF and, help them assess whether they are being optimally managed based on their risk of stroke and general symptoms. Through increasing patient understanding of AF symptoms and management, the end goal will be to empower patients to self-assess their condition and consult with their primary health care provider if they are being sub-optimally managed or have additional questions.

Through our team’s interdisciplinary and patient-inclusive approach, we were able to design a tool that incorporated many different perspectives and areas of expertise, including those of the patients themselves. Traditionally, clinicians working in a given therapeutic area develop patient education tools based on what they think is important for the patient to know. It may then be reviewed by a Patient Education



# Atrial Fibrillation

😊 😐 😞

## Do you know your colours?

More information available at:  
www.knowyourcolours.com



St. Michael's  
Health Design Lab

Know Your Colours is a quiz (two short ones actually) for people with atrial fibrillation.

Two important goals in the management of your atrial fibrillation are:

1. reducing your risk of having a stroke (Brain Health)

2. control of your symptoms (Heart Health)

Complete this quiz to find out how well these are being managed. Your doctor wants to improve your care and this quiz can be used as a conversation starter to help you to get and stay on track.

St. Michael's  
Health Design Lab



### Find your brain health colour

**Step 1** Check off all of the statements that apply to you.

- I have heart failure or I have been told I have water in the lungs.
- I have high blood pressure or take blood pressure medications.
- I am 75 years of age or older.
- I have diabetes.
- I have previously had a stroke or mini-stroke.

**Step 2** Determine your results

In step 1, I have no checkmarks and I am:

- Taking blood thinner (dabigatran, warfarin) = **Yellow**
- Taking Aspirin (ASA) = **Green**
- Not taking Aspirin or Blood thinner = **Yellow**

or

In step 1, I have one or more checkmarks and I am:

- Taking blood thinner (dabigatran, warfarin) = **Green**
- Taking Aspirin (ASA) = **Yellow**
- Not taking Aspirin or Blood thinner = **Red**

**Green Brain Health** You seem to be on appropriate treatment for preventing a stroke. Keep doing what you're doing.

**Yellow Brain Health** Changes may need to be made to your medications to ensure you're on the most appropriate treatment to decrease your risk of having a stroke. You should follow up on your next visit or within 2 months with your family doctor.

**Red Brain Health** Changes may need to be made to your medications to decrease your risk of having a stroke. You should ideally follow up with your family doctor within 2 weeks.

### Find your heart health colour

**Step 1** 1. In the past 4 weeks **one or more** of the following heart symptoms have bothered me: fast heart rate, heart skipping a beat, shortness of breath, light-headedness, dizziness, chest pain/pressure.

- a. Yes, very much
- b. Yes, somewhat
- c. No, has not bothered me

This past year, I have visited the emergency department and/or had unplanned visits with my family doctor with concerns about my atrial fibrillation:

- a. More than once
- b. Once
- c. Never

**Step 2** Determine your results

I have all c's = **Green**  
I have 1 or more b's and no a's = **Yellow**  
I have 1 or more a's = **Red**

**Green Heart Health** The management of your symptoms seems to be good. Keep doing what you're doing.

**Yellow Heart Health** Changes may need to be made to your medications to provide better control of your symptoms. You should follow up on your next visit or within 2 months with your family doctor.

**Red Heart Health** Changes may need to be made to your medications to provide better control of your symptoms. You should ideally follow up with your family doctor within 2 weeks.

Figure 3 Final version, patient-facing tool.

Committee that assesses plain language and literacy level, but input is not received from the patient until after wide-scale dissemination. This approach may result in tools that do not meet patients' needs as effectively.

We found that by engaging end users in the tool-development process we were able to identify potential problems and opportunities in the early stages of development

to make our tool more effective. By working in a team composed of a variety of professional perspectives, including specialists, primary care providers, nurses, pharmacists, researchers, usability experts, and designers, we could design a more holistic tool.

There are several limitations to this work that require further research. Although the initial prototype was tested

**Know Your Colours Atrial Fibrillation Patient Education Program**

Dear Doctor:

Know Your Colours is an educational program developed by a group of clinicians and researchers at the Health Design Lab at St. Michael's Hospital and the Centre for Innovation in Complex Care at University Health Network designed to improve the care of patients with atrial fibrillation.

**1. What is Know Your Colours?**

Know Your Colours is a self-assessment tool for patients with atrial fibrillation (AFib) designed to capture information on stroke risk (**Brain Health**) and symptoms (**Heart Health**) in order to promote optimal management. Patients are encouraged to have a discussion with their health care provider about their results. Results are classified as Green, Yellow or Red. **Green** suggests that management is optimized. **Yellow** and **Red** suggest that assessment and modifications to treatment may be beneficial.

**2. Why is this important?**

Cardioembolism due to AFib accounts for approximately one in 6 ischemic strokes (one in 4 in the elderly) and is a cause of stroke-related disability, dementia and death. At least 40% of patients who have a stroke will end up with some form of permanent disability and for many this is preventable with appropriate therapy.<sup>1</sup> In addition, optimal treatment of AFib can improve patient-assessed quality of life by decreasing their symptoms and preventing the need for emergency room visits.

**3. Why is my patient coming to me with this and what should I do?**

**Stroke Prevention (Brain Health)**

Stroke risk is calculated using the CHADS<sub>2</sub> score to identify the patient's level of risk for stroke and recommendations for therapy are based on the 2012 Canadian Cardiovascular Society Atrial Fibrillation Guidelines.<sup>2</sup>

If they scored:

**Green** – Your patient appears to be on optimal stroke prevention management.

**Yellow** or **Red** – Your patient may benefit from a reassessment of their medications for stroke prevention. This quiz does not consider contraindications or intolerances to therapies so it is possible that your patient may not be able to begin the recommended therapy to make them a "GREEN".

Please see the next page for an overview of how to determine your patient's risk of stroke using CHADS<sub>2</sub> and recommendations for therapy.

**Symptom Management (Heart Health)**

If they scored:

**Green** – Your patient appears to be optimally managed.

**Yellow** or **Red** – Your patient may benefit from a reassessment of their heart rate or rhythm control medications.

Please see the next page for a heart rate control algorithm based on the 2012 Canadian Cardiovascular Society Atrial Fibrillation Guidelines to help select initial or add-on therapy.<sup>2</sup>

<sup>1</sup>Stroke, 2009;40:235-249

<sup>2</sup>Canadian Journal of Cardiology 2012;28:125-136



**AFib In One Page**

**1. Stroke Risk**

**a** Determine your patient's CHADS<sub>2</sub> score. CHADS<sub>2</sub> risk stratification does not apply to AFib patients with mitral stenosis.

Findings	Points
C Congestive Heart Failure	1
H Hypertension	1
A Age ≥ 75 years	1
D Diabetes	1
S Prior Stroke or TIA	2

**ii. Determine your patient's recommended treatment:**

CHADS<sub>2</sub> = 0  
Stroke risk is 1.5 (1.2 – 3.0)

≤ 65 yrs or combination of female sex and vascular disease  
Either female sex or vascular disease  
No additional risk factors for stroke

OAC<sup>1</sup> ASA No antithrombotic

CHADS <sub>2</sub> Score	Stroke Rate per 100 patient years (95% CI)	Recommended therapy
0	2.8 (2.0 – 3.8)	OAC <sup>1</sup>
1	4.0 (3.1 – 5.1)	OAC
2	5.9 (4.6 – 7.3)	OAC
3	8.8	OAC
4	12.5	OAC

<sup>1</sup>OAC = Oral Anticoagulant Therapy

**b** Determine your patient's risk of bleeding. One way to do this is the HAS-BLED score:

Hypertension SBP ≥ 160 mmHg	Abnormal renal or liver function	Stroke	Bleeding history	Labile INR	Elderly age ≥ 65 years	Drugs of concern	Max. score
1	1	1	1	1	1	1 or 2	9

Score 3 indicates high risk. Score 4 or more some cautioning patient evaluation of antithrombotic therapy. The incidence of major bleeding with HAS-BLED score of 0 to 1 is 1.0%/year, 2 is 1.0%/year, 3 is 3.7%/year, 4 is 8.7%/year, 5 is 12.9%/year.

**c Summary of Available Treatments:**

Stroke Prevention	Major Bleeding	Comments
Compared to warfarin, dabigatran 150 mg BID is superior in preventing stroke while dabigatran 110 mg BID has similar efficacy	Compared to warfarin, dabigatran 150 mg BID and rivaroxaban 20 mg once daily are associated with similar rates of major bleeding but more GI bleeds	No clinical trials directly comparing dabigatran to rivaroxaban therapy are available
Compared to warfarin, rivaroxaban 20 mg once daily is at least as good at preventing strokes	Compared to warfarin, dabigatran 110 mg BID is associated with less major bleeding and is the preferred dose for patients over 80 years or over 75 years with risk factors for bleeding	2012 Canadian Atrial Fibrillation Guidelines suggest dabigatran patients should routinely receive OAC or ASA
Warfarin is superior to ASA (Efficiency based on achieving time in therapeutic range (INR 2-3) at least 60% of the time)	Both dabigatran and rivaroxaban are associated with less intracranial hemorrhage (ICH) than warfarin	Dabigatran and rivaroxaban should be avoided in significant renal dysfunction (i.e., CrCl < 30 mL/min)
2012 Canadian Atrial Fibrillation Guidelines recommend dabigatran and rivaroxaban over warfarin		Dabigatran is contraindicated in combination with strong P-gp inhibitors. Rivaroxaban is contraindicated in combination with strong inhibitors of both P-gp and CYP 3A4. Refer to prescribing information for details
		Discuss cost and coverage of new OACs with patient

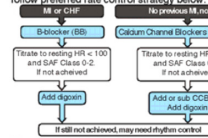
Adapted from the Canadian Cardiovascular Pharmacists Network Stroke Prevention in Atrial Fibrillation (SPAF) Pocket Reference

**2. Symptoms/Quality of Life (QOL)**

**a** Assess symptoms using Severity of Atrial Fibrillation (SAF) class:

SAF Class	Impact on QOL	Example
0	Asymptomatic	
1	Minimal effect on QOL	Single episode of AFib without syncope or heart failure (HF)
2	Minor effect on QOL	Mild awareness of symptoms or rare (less than a few per year) episodes
3	Moderate effect on QOL	Moderate awareness of symptoms on most days or more severe symptoms
4	Severe effect on QOL	Highly symptomatic, or frequent episodes, or AFib related syncope or CHF

**ii. Assess HR:** If resting HR > 100 and/or SAF class is > 2 follow preferred rate control strategy below:



**iii. Rate control drug dosing information:**

Class	Medication	Starting Dose	Usual Range
β-blocker (BB)	Bisoprolol	2.5-5 mg daily	2.5-10 mg daily
	Metoprolol	12.5-25 mg BID	25-150 mg BID
	Atenolol	25-50 mg daily	50-150 mg daily
CCB (CCB)	Diltiazem CDB	120 mg daily	120-360 mg daily
	Verapamil SRB	120 mg BID	120-240 mg BID
Digitalis	Digoxin <sup>‡</sup>	0.0625-0.125 mg daily	0.125-0.25 mg daily

<sup>‡</sup> Caution when combining CCB and digoxin

**b** Assess AFib pattern (paroxysmal, persistent, permanent):

Pattern	Definition	Action
Paroxysmal	AFib is self-terminating within 7 days	Educate and REASSURE patient that this rarely requires cardioversion <sup>§</sup> or urgent intervention. REFER if rhythm control needed.
Persistent	AFib is not self-terminating within 7 days	If symptoms (SAF > 2) persist despite HR control, REFER for cardioversion <sup>§</sup>
Permanent	Longstanding AFib where a decision re: rhythm sinus rhythm has been made	Focus on RATE CONTROL to achieve resting HR < 100. Rhythm control not indicated.

<sup>§</sup> Pharmacologic or electrical

<sup>†</sup> Use only non-dihydropyridine CCB for heart rate control (diltiazem, verapamil). All management recommendations are in accordance with Canadian Cardiovascular Society Atrial Fibrillation Guidelines Canadian Journal of Cardiology 2012;28:125-136. If your patient requires assistance with rhythm control or you need assistance in managing any of your patients with atrial fibrillation, please refer them to the Atrial Fibrillation Quality Care Program (AF-QCP) at 1-855-AFib-411 or fax your referral to 416-333-3333. Please visit our website for further information: www.knowyourcolours.com

**Figure 4** Prescriber-facing tool.

with end users and these findings were used to improve upon the tool, the final version was not tested again. In addition, although we routinely obtained feedback on the provider letter and tool from physicians in our working group, as well as several external family physicians, the feedback was informal and did not follow a standardized script. These limitations will be addressed as part of another study that is currently underway.

For our next phase of research, the tool will be mailed to patients identified with a diagnosis of AF (n = 160) in a family practice clinic. The provider letter and tool will also be provided to all the family physicians (n = 13) at the clinic. The primary objective is to determine if the 'Know Your Colours' tool improves the proportion of patients receiving guideline-concordant care according to the 2012 CCS AF guidelines.<sup>15</sup> Secondary objectives include usability testing from both the patients' and the physicians' perspectives and to assess if there is improved documentation in the electronic medical record. Other methods of dissemination are being discussed including having the tool available on a website coupled with a public awareness campaign. However, this will be a future phase of the work.

This work was promising but can still be built upon in many ways. The 'Know Your Colours' project serves as an example of how patient-centered tools can be developed using

an interdisciplinary collaborative approach and tested using patient input during the development phase.

**Conclusion**

The 'Know Your Colours' project resulted in a useful patient tool, largely due to the inter-disciplinary approach taken in its development. By incorporating patient input and human-centered design with the knowledge, experience, and medical expertise of health care providers, we were able to more efficiently create a tool that addressed patients' needs.

**Disclosure**

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## Supplementary material

### Usability testing guide

1. Before we start, can you tell me what you do for a living? (If they are retired capture what they did prior to retiring).
2. Is English your first language?
3. Have you ever heard of atrial fibrillation before?
4. What are your first impressions of this tool?
5. Can you tell me based on what you see what it is for?
6. "Do You Know Your Atrial Fibrillation Colours" is a self-assessment tool that you would receive from a healthcare provider. It would help you and your healthcare provider identify your risk of stroke and if your symptoms are being managed in the best possible way. Do you think you would ever use this? Why/why not?
7. Show me how you would complete this sheet.
8. Heart: Is figuring out your score straightforward?
9. Brain: Is figuring out your score straightforward?
10. Do you think you would complete this and bring it to your family physician, why/why not?
11. Are there any terms used that you found difficult to understand?
12. What are your overall impressions of what you've seen today? Does anything stand out as confusing? Is there anything missing?
13. Do you have any other questions or comments?

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