Pharmacy-based screening for atrial fibrillation in high-risk Māori and Pacific populations

Atrial fibrillation (AF) increases exponentially with age and patients have a five times higher risk of ischaemic stroke. While AF may be associated with symptoms such as palpitations, chest pain, shortness of breath, or oedema, many are asymptomatic. Thus incidence rates likely underestimate the true burden of this condition.

In New Zealand (NZ) AF data are limited for Māori and Pacific populations. The Māori Community Heart Study reported an AF prevalence of 2% among rural Māori and 1% in urban Māori aged 20–64 years. However, a recent cohort study investigating AF in NZ octogenarians using both electrocardiography (ECG) and medical record review found a 30% prevalence of AF in Māori aged 80–90, and a 21% prevalence in non-Māori aged 85. US data report a higher prevalence of AF in Pacific peoples than non-Pacific. AF meets all the WHO criteria for routine screening, namely (1) AF is an important health problem; (2) There are acceptable treatments; (3) Facilities exist for the diagnosis and treatment of AF; (4) AF has a latent and symptomatic stage; (5) There are screening tests that are non-invasive and acceptable; (6) The natural history of AF is well understood; (7) There are agreed upon policies on whom to treat; (8) Screening costs are low and cost effective; (9) Case finding can be continuous; and (10) Suitable diagnostic tests exist (previously pulse-taking followed by a 12-lead ECG).

In the past, systematic community AF screening has not been considered cost-effective given the time, effort and inconvenience required to undertake 12-lead ECGs. However, technological advances in ECGs are set to change this paradigm. Multiple electronic devices are now available which can provide reliable detection of AF, without the need for a standard 12-lead ECG. The FDA-approved AliveCor® heart monitor is one diagnostic tool that has the potential to make community-based mass screening feasible.

The heart monitor is a cheap (US$200), accurate (sensitivity 98%, specificity 97%), highly portable medical device that snaps onto the back of an iPhone and wirelessly communicates with an app on the phone. By placing fingertips on two electrodes on the back of the case a medical quality, single-channel ECG is produced in the app. The ECGs are automatically sent to a website where they are analysed and the presence of AF determined within 30 seconds. In the near future, the diagnostic algorithm will be available on the device.

In NZ, community pharmacists, the health professional seen most often by adults, are increasingly becoming involved in screening for health conditions and delivery of brief interventions. As a result, this group could be utilised to screen for undiagnosed AF in high-risk populations. Australian researchers have recently completed a cross-sectional study using pharmacies to screen for undiagnosed AF in 1004 adults aged ≥65 years (utilising the AliveCor® heart monitor).
The incidence of asymptomatic AF was found to be 1.0% in this population\(^9\), and the screening process was found to be cost effective for stroke prevention and improving quality of life\(^10\). However, results of this study are not directly transferable to the NZ health environment, and thus a study was undertaken in late 2013/early 2014 to determine the feasibility of using the AliveCor\textsuperscript{®} monitor to screen for undiagnosed AF in a high risk primary care population, using a community pharmacist in Auckland as the first point of contact for screening.

The study participants included Māori and Pacific people aged \(\geq 55\) years who visited the All Seasons Pharmacy in Te Atatu, Auckland. Potential participants were approached when they attended the pharmacy and invited to participate, with screening undertaken by a pharmacist once eligibility had been confirmed and consent obtained.

Participants completed a questionnaire and the ECG was undertaken using the AliveCor\textsuperscript{®} device. Patients were informed immediately of the result and if AF positive referred back to their usual GP for a 12-lead confirmatory ECG. The GP managed any further referrals as required. All ECGs produced by the heart monitor were checked by a cardiologist.

A total of 121 people were recruited over 14 weeks, with a 3% refusal rate. Overall 37% of participants were Māori and 63% were Pacific, 48% were women, the average age was 65.4 years (SD=7.6 years), and 61% had between 8–12 years of schooling (26% had less than 8 years or no education and 13% had more than 12 years). Heart health data are summarised in Table 1.

### Table 1: Self-reported ‘heart health’ of participants

<table>
<thead>
<tr>
<th>Heart health</th>
<th>N=121</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current smoker</td>
<td>21%</td>
</tr>
<tr>
<td>Currently taking warfarin</td>
<td>12%</td>
</tr>
<tr>
<td>Had a family member that had problems with their heart or blood vessels at an early age (father/brother &lt;55 years, mother/sister &lt;65 years)</td>
<td>29%</td>
</tr>
<tr>
<td>Had been told they had:</td>
<td></td>
</tr>
<tr>
<td>An abnormal heart beat</td>
<td>20%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>35%</td>
</tr>
<tr>
<td>Angina</td>
<td>11%</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>62%</td>
</tr>
<tr>
<td>Stroke or transient ischaemic attack</td>
<td>16%</td>
</tr>
<tr>
<td>Heart attack</td>
<td>8%</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>59%</td>
</tr>
</tbody>
</table>

Twenty (17%) participants were found to have AF when screened (Table 2). The false positives observed all occurred early in the study and the quality of the tracings was ‘poor’ according to the cardiologist. We therefore believe these false positives were due to incorrect handling of the device, which was corrected through further training of the pharmacists.

Overall, two (1.7%) of the 121 people screened had a new diagnosis of AF, and two known AF cases appeared not to be receiving warfarin, giving a total of four people...
(3%) that could benefit from an intervention. Pharmacists and participants found the heart monitor easy to use, and participating GPs had overwhelmingly positive feedback on the study.

**Table 2. AF results according to age, gender and ethnicity**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Māori</th>
<th>Pacific</th>
<th>Mean age (years)</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown but likely false positive</td>
<td>0</td>
<td>1</td>
<td>55.0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>False positive</td>
<td>3</td>
<td>1</td>
<td>65.8</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Previously undetected AF*</td>
<td>0</td>
<td>2</td>
<td>75.0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Known AF</td>
<td>4</td>
<td>9</td>
<td>69.7</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>13</td>
<td>68.0</td>
<td>9</td>
<td>20</td>
</tr>
</tbody>
</table>

*Includes one person confirmed by cardiologist but not GP confirmed.

This study clearly showed that (1) screening for AF within a pharmacy environment is feasible; (2) the AliveCor® iPhone device is highly acceptable to Māori and Pacific populations, as well as health professionals in this environment; (3) AF screening within the pharmacy environment provides an excellent ‘teachable moment’ about heart health; and (4) the AliveCor® iPhone device is a cheap, effective and accurate screening tool that has the potential to significantly reduce the chances of an adverse health outcome, and contribute to a reduction in known health inequalities. A larger NZ study is now planned to verify these results.

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References:  