1 **Title: Identification of patients with atrial fibrillation in UK community**

2 **pharmacy: an evaluation of a new service.**

3

4 **Introduction**

5 Atrial fibrillation (AF) is an arrhythmia that affects approximately 1-2% of the

6 population and can lead to an increased risk of stroke and circulatory failure (1).

7 Appropriately diagnosing and treating AF can reduce the risk of these complications,

8 which are more costly in individuals with the condition (2). Globally, many patients

9 are asymptomatic and diagnosed as a result of an opportunistic screening (1). With

10 advances in technology and portability of devices, this screening can now take place

11 in locations more convenient for patients. This approach has been trialled in hospital

12 foyers and community pharmacies with different healthcare professionals (3, 4). It

13 has demonstrated that opportunistic screening can prove useful at identifying

14 patients with AF, however, no research has been conducted to date in the context of

15 the UK health system.

16

17 Community pharmacy has been advocated as a potential resource for opportunistic

18 screening and associated lifestyle interventions (5). Research has previously

19 demonstrated the ability of pharmacies to screen patients and identify those at risk of

20 developing other conditions, such as diabetes and cardiovascular disease (6, 7).

21 However, a limitation of previous studies is the lack of appropriate follow-up of

22 referred patients and a description of the collateral benefits of the screening

23 programme in terms of further interventions provided by the pharmacist, particularly

24 to those patients not identified as being at risk of the condition.

25

26

27 **Aim of the study**

The objective of this evaluation is to describe the outcomes from an AF service in UK community pharmacies in terms of referral outcomes and further interventions provided to those patients identified not at risk.

**Ethical approval**

Approval for this service evaluation was obtained from the University East Anglia (UEA) Faculty of Medicine and Health. Anonymised data were provided to the evaluation team (MT) after service completion. No additional data were collected from patients other than that required for service provision.

**Method**

The service was delivered for four months (October 2014 to January 2015) in six independent pharmacies, with a private consultation area, in the Dartford, Gravesham and Swanley area of Kent, UK. Pharmacists received face-to-face training which included knowledge of the condition, service delivery information and how to use the equipment correctly (Microlife Watch BP Office Afib monitor and AliveCor Heart Monitor). In addition, they completed a distance learning package on the management of AF in primary care.

Posters and leaflets were produced to allow in-pharmacy marketing of the service so that patients could self-refer to the service. Additionally, patients were signposted to this service from others offered in the pharmacy such as smoking cessation and weight loss. Pre-booking appointments was not necessary. Recruitment to the service was by a member of the pharmacy team who identified whether patients met the following eligibility criteria:

- aged 65 or over or;
- aged 50-64 and diagnosed with one or more of the following conditions:

56      o   Hypertension

57      o   Heart failure

58      o   Raised cholesterol

59      o   Pulmonary embolism

60      o   Asthma/COPD

61      o   Diabetes or;

62    •   aged 50-64 and have 2 or more lifestyle risk factors:

63      o   High consumption of alcohol

64      o   Smoker

65      o   BMI > $25kg/m^2$

66

67 Eligibility was assessed by asking patients to complete a short questionnaire to

68 ascertain the information above, and from pharmacy medication records, where

69 appropriate. Patients already diagnosed with AF were excluded from the service.

70

71 Pharmacy team members then explained the service to eligible patients and

72 gained their consent to participate. The service provided patients with a

73 consultation which gathered information about their lifestyle (including alcohol

74 intake) and current medical conditions and screened them for the condition.

75 The Audit-C questionnaire (8) was used to assess alcohol consumption. This

76 is a three-statement questionnaire that assesses the potential risk of a

77 person's drinking habits. A score of greater than five indicates harmful

78 drinking. Patients were then screened for AF and had their blood pressure

79 measured using a Microlife WatchBP Office Afib monitor (recommended by

80 National Institute of Health and Care Excellence (NICE) for the detection of

81 AF whilst monitoring blood pressure (BP)). The monitor takes three

82 simultaneous double-arm BP measurements whilst screening for AF. It has a

83  sensitivity of 97-100% and a specificity of 89%. If the screen picks up

84  evidence of AF, then a one-lead electrocardiogram (ECG) is conducted on the

85  patient using an AliveCor Heart Monitor. This method of testing has been

86  reported in more detail elsewhere in the literature (3, 4). Both of these

87  measurements were conducted by pharmacy team members including the

88  pharmacist and other pharmacy staff. The consultation was predicted to last

89  20-25 minutes if an ECG was conducted or 15-20 minutes if not. This length

90  of time was also dependent on the number of other interventions provided as

91  part of the service. Data was not collected on the actual length of the

92  consultations.

93

94  If the patient's measurements showed evidence of AF, the pharmacist sent the ECG

95  reading electronically to an AliveCor cardiologist, based in the UK at a private

96  medical centre, for analysis. The cardiologist returned an electronic analysis report to

97  the pharmacist within 24 hours. The pharmacist subsequently telephoned the patient

98  to explain the results. If a patient was required to see their GP, the pharmacist

99  emailed the GP surgery with a copy of the ECG reading, analysis report from the

100  cardiologist and supplementary information from the consultation. Patients referred to

101  the GP were followed up by their pharmacist to determine the actions as a result of

102  the referral.

103

104  Training ensured that feedback was provided in an appropriate manner, so that the

105  patient was given a realistic assessment, but was not unnecessarily alarmed. During

106  the consultation, all patients received advice on alcohol consumption, smoking,

107  weight loss and hypertension, if risks were identified from the eligibility questionnaire

108  or blood pressure results. This was conducted by either the pharmacy or a third party

109  provider e.g. smoking cessation clinic.

110

111 All information captured during the delivery of the service was recorded on a central

112 database used routinely to track community pharmacy service delivery in the UK.

113

114 **Results**

115 594 eligible patients consented for the service, 87.7% white British. Table 1 shows

116 the patient characteristics for the service.

117

118 Table 1: Patient characteristics

| Patient characteristic | N | Mean (SD) |
|---|---|---|
| Age | 594 | 68.3 (8.9) |
| Number of regular medicines | 184 | 2.8 (2.1) |
| BMI | 594 | 27.8 (5.3) |
| Systolic blood pressure | 594 | 137.8 (17.9) |
| Diastolic blood pressure | 594 | 78.2 (10.9) |
| Audit-C score | 594 | 2.7 (2.7) |

119

120 Of the 594 patients screened, nine were identified as at risk of having AF and were

121 referred to their GP. Seven patients provided information to the pharmacist on the

122 outcome of the GP referral. Five (0.8% of total) had a diagnosis of AF (and were then

123 prescribed medication), one with Torades de Pointes and one had not been

124 diagnosed with any condition.

125

126 The service also identified 109 (18.4%) patients who had a high blood pressure

127 measurement and were not diagnosed with hypertension (who were subsequently

128 referred to their GP), 176 (29.6%) patients with a BMI greater than 30, 131 (22.1%)

129 with an Audit-C score greater than five (increased risk of drinking problems) and 59

130 (9.9%) smokers. As a result, across the whole service, pharmacists provided 413

131 interventions in 326 (54.9%) patients aimed at weight reduction (239 57.9%)), alcohol

132 consumption (123 (29.8%)) and smoking cessation (51 (12.3%)). Seventy-seven

133 (23.6%) patients received multiple interventions to address these problems.

134

135 **Discussion**

136 This service aimed to identify patients with AF in an accessible and opportunistic

137 manner. The identification of nine cases out of approximately 600 screens (1.5%)

138 indicates that this is potentially an alternate method of capturing these patients and

139 aligns with previous identification rates explored in other settings and countries (3, 4).

140 This aligns closely with figures comparing no screening with opportunistic and

141 systematic screening, which indicates that an opportunistic approach may be more

142 cost effective for identifying cases of AF (9).  However, the collateral benefits of the

143 service should also be highlighted. These were the identification of a large number of

144 patients with undiagnosed hypertension and those with lifestyle risk factors for other

145 long-term conditions e.g., diabetes and COPD. At the point of identification, the

146 pharmacist was then able to provide appropriate and established pharmacy public

147 health interventions to address these issues. Evidence from other studies suggests

148 that patients view the pharmacist's involvement in public health services as good and

149 they are satisfied with the service experience (10).

150

151 This service screened a large number of patients in an opportunistic manner, whilst

152 making full use of the pharmacy team. The limitations of the evaluation centre on the

153 lack of follow-up of patients who received advice regarding weight reduction, alcohol

154 consumption or smoking cessation. Similarly, patients who were identified as having

155 high blood pressure were not followed up to determine their actions as a result of the

156 test. Patient and pharmacist feedback on the service was also not obtained which

157 may have been useful to understand their reactions to discovering cases of AF.

158

## Conclusion

This evaluation supports previous work by Lowres and Le Page regarding opportunistic screening for AF in settings other than the clinic or GP surgery. Our work goes further than other screening service evaluations for other conditions by characterising the interventions provided to, not only those identified with the target condition - in this case AF - but those without it. This demonstrates that pharmacies can provide this type of screening service and public health interventions as part of routine practice. However, the true effect of these additional interventions, along with appropriate follow-up, should be the focus of future studies.

Conflicts of interest

None

## References

1.      Lip GYH, Tse HF, Lane DA. Atrial fibrillation. The Lancet. 2012;379(9816):648-61.

2.      Brüggenjürgen B, Rossnagel K, Roll S, Andersson FL, Selim D, Müller-Nordhorn J, et al. The Impact of Atrial Fibrillation on the Cost of Stroke: The Berlin Acute Stroke Study. Value in Health. 2007;10(2):137-43.

184    3.    Le Page P, MacLachlan H, Anderson L, Penn L-A, Moss A, Mitchell AR. The efficacy of

185    a smartphone ECG application for cardiac screening in an unselected island population. Br J

186    Cardiol 2015;22:31-3.

187    4.    Lowres N, Neubeck L, Salkeld G, Krass I, McLachlan AJ, Redfern J, et al. Feasibility

188    and cost-effectiveness of stroke prevention through community screening for atrial

189    fibrillation using iPhone ECG in pharmacies. The SEARCH-AF study. Thromb Haemost.

190    2014;111(6):1167-76.

191    5.    Department of Health. Pharmacy in England: building on strengths - delivering the

192    future (ISBN 978-0-10-173412-7). London: The Stationery Office; 2008.

193    6.    Twigg MJ, Wright DJ, Thornley T, Haynes L. Community pharmacy type 2 diabetes

194    risk assessment: demographics and risk results. Int J Pharm Practice. 2015;23(1):80-2.

195    7.    Willis A, Rivers P, Gray LJ, Davies M, Khunti K. The Effectiveness of Screening for

196    Diabetes and Cardiovascular Disease Risk Factors in a Community Pharmacy Setting. PLoS

197    ONE. 2014;9(4):e91157.

198    8.    Bush K, Kivlahan DR, McDonell MB, Fihn SD, Bradley KA, for the Ambulatory Care

199    Quality Improvement P. The audit alcohol consumption questions (audit-c): An effective

200    brief screening test for problem drinking. Arch Intern Medicine. 1998;158(16):1789-95.

201    9.    Hobbs R, Fitzmaurice D, Jowett S, Mant J, Murray E. A randomised controlled trial

202    and cost-effectiveness study of systematic screening (targeted and total population

203    screening) versus routine practice for the detection of atrial fibrillation in people aged 65

204    and over: The SAFE study. Health Tech Assess. 2005;9(40):90.

205    10.    Eades CE, Ferguson JS, O'Carroll RE. Public health in community pharmacy: a

206    systematic review of pharmacist and consumer views. BMC Public Health. 2011;11:582.

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