**Supplement**

The survey will comprise 3 visits to participants’ homes (baseline, 10 ± 4 days, and 30 ± 4 days) followed by 1 phone contact 1 year after the first visit, performed by trained nurses. All nurses participating in the survey will complete special training for project fieldwork. The ECG monitoring system will be installed at the first visit for all individuals who sign informed consent forms and will be returned at the third visit approximately 1 month later. The main questionnaire will be completed at the first visit and includes detailed questions about present health status and any history of comorbidities, hospitalisations, and current medications. The socioeconomic part of the questionnaire includes questions concerning personal and family situations, economic status, household structure, and social life. At the first visit, the Geriatric Depression Scale will be given to participants for self-completion and will be collected at the second visit [1].

BP readings will be obtained 3 times at each visit. Anthropometric measurements will be obtained twice: at the first visit and at the third visit following the end of ECG monitoring. Blood/urine samples will be collected at the second visit after 10 to 12 hours of fasting and analysed at a central laboratory. The follow-up data sheet will be completed at the first visit and at the follow-up visit 12 months after inclusion in the survey.

The survey was designed as a country representative study and will be carried out in a sample of Polish residents aged ≥65 years divided into 6 age groups of equal size and sex proportion (65-69, 70-74, 75-79, 80-84, 85-89, and ≥90 years). The planned size of the research sample is 3000 individuals (250 in each sex and age group). Research participants are randomly recruited in clusters, in a stratified, proportional draw performed in 3 stages. The reason for overrepresentation of the oldest age groups is to allow for separate analysis of data for older individuals.

 Thefirst stageof recruitment identified local administrative units: urban, rural, and urban-rural municipalities. Location classes were defined as follows: villages/rural districts, towns with populations ≤50,000, towns/cities with populations from 50,001 to 200,000, and cities with populations >200,000. Geographical strata were created on the basis of 16 Polish provinces, each including 4 location classes (16 provinces × 4 location classes – exceptions = 59). The number of planned interviews in each geographical stratum was proportional to the population aged ≥65 years in that stratum. The sampling frame for the first stage was the list of municipalities in Poland from the TERYT database (National Official Register of the Territorial Division of the Country) with known population count.

 During the second stage, clusters of streets in urban municipalities and clusters of villages in rural municipalities were drawn. In mixed urban-rural municipalities, clusters of streets and villages were drawn, respectively. Clusters were defined geographically using web geocoding services. The population aged ≥65 years in each cluster within the municipality was approximately the same. Clusters were then randomly drawn for each municipality. This strategy allowed for clustering the final sample and lowered the risk of having an insufficient number of respondents in the final chosen clusters. On the other hand, the probability of being drawn for each inhabitant of the municipality was approximately the same within each age and sex group. The sampling frame for the second stage was the list of streets and villages from previously selected municipalities with a known population aged ≥65 years from the PESEL database (Polish Universal Electronic System for Registration of the Population).

 The third stage was a random selection of individuals from previously defined clusters within previously defined age and sex quotas. The sampling frame was the PESEL database maintained by the Ministry of Digital Affairs. Because of the expected response rate, initially, a sample 10 times as large as the actual number of planned interviews was drawn. Thus, the sample was divided into a base set of 3000 addresses and supplementary sets. Supplementary address sets will be used only when addresses in the base set are used up without reaching the target quantity of interviews (eg, in the event of refusal or if contact with the respondent at the base address was not possible). The third stage of the selection process will be performed in several rounds to keep the data up to date.

 This type of sample selection was prepared and used successfully in other research projects described in separate publications. The method of sample selection was modified for this project, especially in the second stage, to optimise the geographic grouping of respondents.

**BP, Anthropometric, and Laboratory Measurements**

During visits to participants’ homes, the nurse will take a series of BP readings (3 at each visit) and the results will be recorded in the medical questionnaire. Each measurement is performed with the participant in a seated position, on the right upper arm, after at least 5 minutes of rest, and at 2-minute intervals. At the second visit, BP measurements are performed before collecting blood samples. BP readings will be taken using fully automatic oscillometric BP measuring devices (A&D UA 787 Plus) certified by the Association for the Advancement of Medical Instrumentation, British Hypertension Society, and European Society of Hypertension. Before the first measurement, the nurse will measure the circumference of the participant’s right arm to determine the proper cuff size. The nurse uses the narrow cuff if the participant’s arm circumference is <18 cm, the standard cuff if the circumference is between 22.5 and 31.5 cm, and the wide cuff if the circumference is ≥32 cm.

Anthropometric measurements include weight (weighing the participant with his/her shoes off and dressed in light clothes); height; and waist, hip, and neck circumference.

Blood and urine collections are to take place in the morning only when the participant is fasting. The nurse visits the participant with a preassembled sampling kit and obtains 28 mL of venous blood and a sample of morning urine. The nurse then transfers the samples at an ambient temperature to a local laboratory to obtain serum/plasma samples within 2 hours after blood collection. Obtained serum/plasma and urine will be stored at –20°C before transferring them frozen to a central laboratory within 6 weeks.

Results of routine biochemical laboratory tests are to be sent back to the participants. In the case of out-of-reference values, a special commentary and letter advising the participant to consult a primary care physician will be attached.

**Monitoring System**

Before use in this study, the ECG monitoring system was validated by the staff of the Telemonitoring Center, with participation of 30 volunteers with previously implanted pacing devices capable of detecting atrial signals supervised by remote monitoring. Half (15 participants) of the validation group was known to have frequent episodes of AF lasting >30 seconds in the recent 1 month. All individuals participating in validation signed informed consent forms and were monitored for 2 weeks.

 Episode classification used in the validation study was based on the approach proposed by Hindricks et al [2]. All episodes of AF identified by the external system were classified based on comparison to ECG as true-positive episodes. Episodes of AF/AFl detected by the implanted device but not the external system were classified as false-negative episodes. All episodes detected by the external system were assessed by 2 experienced cardiologists and only verified episodes were considered in further analyses.

The obtained sensitivity of detection, calculated according to the formula, was 90.9%. During the validation exercise, participants were instructed to wear the system as long as possible during the scheduled monitoring time of 14 days. The average ratio between scheduled and true monitoring time in the whole group was 96.15% ± 6.71%; for 3 participants (10%), this ratio was <90%. Thus, the applied noninvasive, long-term ECG monitoring system was characterised by good sensitivity and reliability.

 It is assumed that individuals included in the study will use such continuous ECG monitoring for at least 30 days, which will be provided by the Telemonitoring Center. Earlier discontinuations will be noted. All episodes of AF revealed by the system will be assessed and finally confirmed by trained medical staff including cardiologists. ‘Silent AF’ for the purpose of this study was defined as ‘AF detected and confirmed by the operator in an asymptomatic patient’. Based on data from ECG monitoring, AF burden and total number of AF episodes will be calculated. Any additional serious arrhythmias discovered during monitoring will also be noted. The last phase of the project is to design and implement a unique analytical software module by Comarch integrated with the PMP, which will enable automatic classification of recorded AF episodes.

References

1. Sheikh JI, Yesavage JA.: Geriatric Depression Scale (GDS): recent evidence and development of a shorter version. Clin Gerontol. 1986; 5:165–73
2. Hindricks G, XPECT Trial Investigators. Performance of a new leadless implantable cardiac monitor in detecting and quantifying atrial fibrillation: Results of the XPECT trial. Circ Arrhythm Electrophysiol. 2010; 3(2):141-147. doi: 10.1161/CIRCEP.109.877852
3. Morgan S, Mant D. Randomised trial of two approaches to screening for atrial fibrillation in UK general practice. Br J Gen Pract 2002;52(478):373–80.
4. Hobbs FD, Fitzmaurice DA, Mant J, et al. A randomized controlled trial and cost-effectiveness study of systematic screening (targeted and total population screening) versus routine practice for the detection of atrial fibrillation in people aged 65 and over. The SAFE study. Health Technol Assess 2005;9(40):iii–x, ix-x, 1–74.
5. Benito L, Coll-Vinent B, Gomez E, et al. EARLY: a pilot study on early diagnosis of atrial fibrillation in a primary healthcare center. Europace 2015;17(11):1688–93. doi: 10.1093/europace/euv146
6. Le Page P, MacLachlan H, Anderson L, et al. The efficacy of a smartphone ECG application for cardiac screening in an unselected island population. Br J Cardiol 2015;22:31–3.
7. Smyth B, Marsden P, Corcoran R, et al. Opportunistic screening for atrial fibrillation in primary care in a rural area. QJM. 2016;109(8):539-543. doi: 10.1093/qjmed/hcw011
8. Desteghe L, Raymaekers Z, Lutin M, et al. Performance of handheld electrocardiogram devices to detect atrial fibrillation in a cardiology and geriatric ward setting. Europace 2017; 19(1):29-39. doi: 10.1093/europace/euw025
9. Kaasenbrood F, Hollander M, Rutten FH, et al. Yield of screening for atrial fibrillation in primary care with a hand-held, single lead electrocardiogram device during influenza vaccination. Europace 2016;18(10):1514-1520. doi:10.1093/europace/euv426

**Supplemental Table I** Studies reporting incidence of silent atrial fibrillation

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| **Authors****(year)** | **AF screening method** | **New AF episodes detection** |
| Morgan S. *et al.*(2002) 3 | lead II rhythm strip ECG in subjects over 65 years  | 0.8% |
| Hobbs F.D. *et al*.(2005) 4 | pulse palpation followed by ECG record in people ≥ 65 years during standard GP visit | 1.6% |
| Benito L. *et al*.(2015) 5 | ECG record and physical examination in subjects with at least 1 AF risk factor | 2.4% |
| LaPage P. *et al*.(2015) 6 | blood pressure monitoring with one-lead ECG monitoring | 0.2% |
| Smyth B. *et al*.(2016) 7 | pulse palpation followed by ECG record in people ≥ 65 years | 0.8% |
| Desteghe L. *et al*.(2016) 8 | handheld ECG device in geriatric patients | 2.1% |
| Kaasenbrood F. *et al*.(2016) 9 | single-lead handheld ECG device  | 1.1% |