



**AEDEC**



# EUROHEART II PROJECT EVALUATION OF DIABETES GUIDELINES FOR CARDIAC PATIENTS WORK PACKAGE 9





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# 1. Executive Summary

The main objective of Work Package (WP) 9 is to evaluate the 2007 ESC-EASD Guidelines on cardiovascular disease (CVD) prevention in diabetic patients.

In terms of dissemination, almost 9 doctors out of 10 have a copy of the guidelines at their disposal in their practice in Europe, and 8 out of 10 use it. We conducted an e-survey to evaluate both the impact of guidelines in prevention of cardiovascular disease in diabetic patients, and the attitudes and uses of the ESC-EASD Guidelines by physicians in Europe.

We observed unacceptably high rates of important clinical data missing in the health records (26% for BMI, and 17% for LDL).

There is a worryingly high variability in the strategies, criteria and tools used for detecting diabetes among European physicians. There is also a high variability in the assessment of cardiovascular risk among European primary physicians, with many different approaches and risk scores used. There are also large discrepancies in managing patients with impaired glucose tolerance to try and delay the onset of diabetes.

A very high proportion of patients were not reaching the optimal recommended target levels for BP (74%) and LDL (83%). There are also remarkable discrepancies regarding which BP and LDL target values should be used, as well with the use of aspirin in diabetics.

Numerous barriers prevent doctors from using the guidelines: there are too many guidelines; they require too much homework to keep up to date; and their content is not necessarily adapted to daily clinical practice. Scientific societies must therefore, identify more effective strategies to implement professional guidelines and overcome these barriers.

These findings are being widely disseminated. And the key lessons are already being acted upon. Finally, during 2013, Professors Lars Ryden and Jaakko Tuomilehto, both WP9 co-investigators, have participated very actively in updating the 2007's ESC-EASD Guidelines and developing the new version of the ESC-EASD Guidelines 2013. They worked respectively as co-chair and as member of the Guidelines Task Force Expert Panel and took into account the findings of this work package to improve implementation.

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## 2. Background to the project

In Europe the number of adult people (20-79 years old) with diabetes in 2013 is estimated around 56.3 million people (only 50% of them are diagnosed) and this figure is predicted to increase to 68.9 million by 2035 i.e. by 39%. Corresponding figures for impaired glucose tolerance will increase from 60.6 to 73.7 million [1].

Diabetes and coronary artery disease is a common and serious combination. In population based studies from North Carolina almost 50% of the total mortality in people with diabetes is related to cardiovascular disease and only 15% to other specific diabetes related complications [2]. From a health care expenditure perspective, the costs for care of people with diabetes increase rapidly when macrovascular complications are established [3].

The negative impact of dysglycemia is apparent before the onset of what, according to international guidelines, is considered diabetes. In a recent meta-analysis comprising 102 studies and including 700.000 people followed for almost 11 years, the hazard ratio for coronary heart disease started to rise already at a fasting blood glucose of 5.5 mmol/l. The increased risk resulted in coronary death, nonfatal myocardial infarction and stroke and other vascular complications. The risk increase was particularly pronounced in people, who usually are considered at a fairly low cardiovascular risk e.g. women, nonsmokers and people with relatively well controlled blood pressure [4].

Due to improved management there has been a decrease in mortality after myocardial infarction, but the prognosis for people with impaired

glucose tolerance and type-2 diabetes is still worse than for those with normal glucose metabolism. Data from the Swedish Coronary Care Registry comprising all patients with myocardial infarction in Sweden, show an about 30-40% higher one year mortality among patients compared to those without diabetes [5]. To overcome the problems related to the combination of coronary artery disease and diabetes the collaboration between specialists focusing on cardiovascular diseases and those with a particular knowledge of diabetes must increase. As outlined in the European Guidelines for management of people with diabetes and cardiovascular disease cardiologists should look for diabetes in people with coronary artery disease and diabetologists for coronary artery disease in their patients with diabetes [6].

Practice guidelines for handling patients with diabetes and cardiovascular disease are mandatory due to the commonality of this combination and its presently unsatisfactory management in combination with the fact that these patients are distributed on different kinds of care.

It is known that a carefully implemented multifactorial management strategy of such patients can considerably improve their prognosis as shown in the STENO II trial [7] and the Euro Heart Survey on Diabetes and the Heart [8].

Physicians and other health care personnel with responsibility for this increasing category of patients are recommended to study available guidelines and try to reach the recommended treatment targets.

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## 3. Specific Objectives of WP9

1. Estimation of the distribution and dissemination level of the ESC-EASD Guidelines on Diabetes, Pre-diabetes & CVD (version 2007) among health professionals in Europe.

2. Evaluation of the ESC-EASD guideline on prevention of cardiovascular disease in diabetic patients.

## 4. Work Progress and Achievements

### 4.1 Main Activities Carried Out Including Methods and Means.

#### 4.1.1. Identification and Contacts With Potential Stakeholders for WP9

The following organisations have been identified as stakeholders relevant to WP9, as they are all involved in the prevention of diabetes, cardiovascular disease, and/or in the care of diabetic patients possibly also suffering from cardiovascular diseases.

- The European Society of Cardiology (ESC) and the European Association for the Study of Diabetes (EASD) provided information for all joint activities regarding the Internet guidelines dissemination, printing, emailing, mailing, meetings, etc., organized by ESC in collaboration with European national societies members.

- European Society of Family Physicians and Preventive Medicine: information provided by Carlos Brotons.

- European Society of Internal Medicines, Geriatrics, and Endocrinology. Website of these societies were visited to find out dissemination activities of the guidelines.

- Several European consortia on Diabetes and CVD funded by SANCO and FP7 programs were identified:

a) The IMAGE Project. Rafael Gabriel provided written published materials on the Guidelines "A European Evidence-Based Guideline for the Prevention of Type 2 Diabetes"; for "a Toll Kit for Prevention of Type 2 Diabetes in Europe" and for "Quality Indicators for the Prevention of Type 2 Diabetes in Europe. These three documents included recommendations and references to the ESC-EASD Guidelines, and were published in *Hormone and Metabolic Research* 2010; 42: S1-64.

b) The International Network "Who is active in Diabetes Prevention" Newsletter announced the launch of the EHN II survey on Diabetes and promote the participation among its readers.

c) The "Global Diabetes Survey" Jaakko Tuomilehto provided the questionnaire which follows the ESC-EASD guidelines recommendations and was used as a model for developing the new e-questionnaire for the EuroHeart II Survey on Diabetes

## 4.1.2. Evaluation of Dissemination of the ESC/EASD Guidelines on Diabetes, on Pre-diabetes and CVD (version 2007)

The ESC carried a study to have a clear picture of the ESC-EASD guidelines on diabetes, pre-diabetes & CVD (2007) dissemination towards the cardiology community, which represent, for memory, 70,000 physicians in Europe. The following information was compiled:

Support from national cardiac societies:

- 21 National European Societies of Cardiology have endorsed the ESC-EASD Guidelines on Diabetes, Pre-diabetes and CVD 2007.
- The Full Text of the ESC-EASD Guidelines on Diabetes, Pre-diabetes and CVD (2007) was translated into 5 languages since its publication (Spanish, French, German, Turkish, Italian). The Pocket Guidelines were translated into 9 languages since its publication.

Support from "sister organisations":

- Endorsement of the ESC-EASD Guidelines by the European Society of General Practitioners/Family Medicine for the elaboration of European Guidelines on Cardiovascular Disease Prevention in Clinical Practice.
- The recommendations of the ESC-EASD Guidelines are now included within the Fourth Joint Task Force of the European Society of Cardiology and other societies on cardiovascular disease prevention in clinical practice *Eur J Cardiovasc Prev Rehab* 2007;14.

Web dissemination through the ESC Web address, Guidelines section:

<http://www.escardio.org/guidelines-surveys/esc/guidelines/Pages/diabetes.aspx>

- Numbers of page views ESC-EASD Guidelines on Diabetes, pre-diabetes and CVD (2007-2012): 49,786.

- Number of downloads (2009-2012): 14,800.

PDA's downloads 2004-2012:

- 19,987 downloads.
- Top-10 European countries: Italy, Germany, Spain, Romania, Greece, Portugal, UK, Poland, France and the Netherlands.
- Electronic versions of Pocket Guidelines are now available for smart-phones, iPhone/iPad app on-going.

ESC Guidelines are now also available on several professional & social networks: Facebook, Twitter, Myspace, ESC newsletters, etc.

Paper copies:

- Number of copies (full text) distributed to ESC members at the 2007 ESC annual congress: 5,000.
- Number of pocket guidelines produced, distributed to ESC members at ESC congresses or sent out to customers between 2007 and 2010: 7,500.

It is relevant to note that the available figures do not take into account the actual dissemination of the guidelines by physicians themselves between them, whether by copying the electronic versions or the paper versions. These figures do not take into account either the number of electronic or paper copies of the translated versions promoted at national level by national cardiac societies.

Finally, as co-editor, the European Association for the Study of Diabetes was also in charge of the dissemination of the Guidelines to their own members and the diabetology community. Specific numbers are not available to date.



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# 5. Participation in Work Meetings and Work Done

## 5.1 Description of Work Sessions and Meetings Done in WP9

WP9 internal Investigator's working meeting

Date: 07/04/2011

Place: Madrid

Participants: Carlos Brotons, Rafael Gabriel, Javier Muñiz

- To do list & distribute tasks
- Prepare survey protocol/questionnaires
- Merge protocol with EuroHeart eSurvey II and EUROASPIRE IV

WP9 investigator meeting

Date: 18/06/2011

Place: Madrid

Participants: Rafael Gabriel, Carlos Brotons, Javier Muñiz

- Discuss protocol & study questionnaires

WP9 investigator meeting (ESC Congress)

Date: 29/8/2011

Place: Paris

Participants: Rafael Gabriel, Jaakko Tuomilehto

- Presentation of WP9 study protocol to SC members
- Preparation of website's survey

WP9 Investigator's meeting (EUROASPIRE IV)

Date: 29-30/03/2012.

Place: London

Participants: Rafael Gabriel, Jaakko Tuomilehto, Lars Ryden

- Final protocol, questionnaires for patient's survey and training procedures

WP9 Investigator's meeting during the EASD Congress

Date: 01-05/10/2012

Place: Berlin

Participants: Rafael Gabriel, Jaakko Tuomilehto, Lars Ryden

WP9 Investigator's meeting with EUROPREVENT/DE\_PLAN Groups investigators

Date: 26/09/2012

Place: Bruselas

Participants: Rafael Gabriel, Carlos Brotons

WP9 investigator's working meeting for the design and organization of e-Surveys

Date: 09/10/2012

Place: Madrid

Participants: Carlos Brotons, Rafael Gabriel, Javier Muñiz

Discussion about EuroHeart eSurvey II on Diabetes with Diabetes Group Castilla Family Physicians

Date: 19/03/2013

Place: Avila

Participants: Rafael Gabriel, Antonio Ledrado

Discussion of EuroHeart sSurvey II with the Diabetes Group Castilla Family Physicians

Date: 02/04/2013

Place: Avila

Participants: Rafael Gabriel, Antonio Ledrado

WP9 internal Investigator's working sessions

Date: 22-23/04/2013

Place: Madrid

Participants: Jaakko Tuomilehto, Rafael Gabriel, Margarita Alonso, Antonio Ledrado, Ana García

Presentation and discussion EuroHeart eSurvey II with Diabetes Group Spanish Society of Internal Medicine

Date: 04/06/2013

Place: Valladolid

Participants: Rafael Gabriel, Margarita Alonso

WP9 Internal Investigator's working meeting

Date: 12-13/06/2013

Place: Madrid

Participants: Rafael Gabriel, Antonio Ledrado, Margarita Alonso, Jaakko Tuomilehto

Presentation and discussion about the EuroHeart eSurvey II on Diabetes with Diabetes Group Spanish Society of Diabetes

Date: 28/06/2013

Place: Sevilla

Participants: Rafael Gabriel, Javier Muñiz

WP9 internal Investigator's working meeting  
Date: 3-4/7/2013  
Place: Madrid  
Participants: Jaakko Tuomilehto, Rafael Gabriel, Margarita Alonso, Antonio Ledrado

WP9 internal Investigator's working meeting  
Date: 19-20/09/2013  
Place: Madrid  
Participants: Carlos Brotons, Rafael Gabriel, Margarita Alonso

WP9 Investigator's working meeting during EASD meeting  
Date: 26/09/2013  
Place: Barcelona  
Participants: Rafael Gabriel, Carlos Brotons, Jaakko Tuomilehto

WP9 Investigator's working meeting during the Diabetes CVD-EASD Group Annual Meeting  
Date: 31-1/10/2013  
Place: Praga  
Participants: Rafael Gabriel, Jaakko Tuomilehto

Presentation/Discussion of results EuroHeart II on Diabetes with DE-PLAN/ePREDICE groups of investigators  
Date: 23-24/01/2014  
Place: Paris  
Participants: Rafael Gabriel

WP9 Investigator's working meeting for preparation of EuroHeart II SC meeting and Final Report draft.  
Date: 30/01/2014  
Place: Madrid  
Participants: Carlos Brotons, Rafael Gabriel

WP9 Investigator's working meeting for preparation of Final Report  
Date: 05/02/2014  
Place: Madrid  
Participants: Rafael Gabriel, Jaakko Tuomilehto

WP9 Investigator's working meeting for preparation of Final Report  
Date: 06/02/2014  
Place: Madrid  
Participants: Javier Muñiz, Rafael Gabriel, Carlos Brotons, Jaakko Tuomilehto

## 6. Development of an e-Questionnaires for the e-Survey on Diabetes and Prevention of CVD in Europe

- Creation of web space (Login user, images, menus, etc ...)
- Test survey's questionnaires is available in <http://www.diabetesguidelineprevention.com>
- Creating the MySQL database and PHP codes to connect the forms with all the fields created in the database

Raising awareness among EUROPREVENT, DE-PLAN and EUROASPIRE IV investigators of the EuroHeart II Project in general and on the EuroHeart eSurvey II on Diabetes in particular. We invited all registered physicians in EUROPREVENT, DE-PLAN and EUROASPIRE IV to join the guidelines evaluation e-survey. The invitation will be also

opened to other European and International networks such as "Who is active in Diabetes Prevention Network", the IMAGE project and the Global Diabetes Survey).

Physician's survey for EUROPREVENT/DE-PLAN and EUROASPIRE consortia (see specific e-questionnaire in annex). Each participating physician was requested to select the first 10 diabetic patients attending his/her practice, on a pre-defined period of time (August 2012-September 2013).

Patient clinical record's survey. (see specific e-questionnaire in annex). Webpage was launched on August 2012 and closed on September 2013.

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# 7. e-Survey for the Evaluation of the 2007 ESC-EASD Guideline on Prevention of Cardiovascular Disease in Diabetic Patients

## 7.1. Introduction

The need to raise awareness about diabetes and its consequences on cardiovascular health led to the design of ad hoc guidelines by the European Society of Cardiology (ESC), in collaboration with the European Association for the Study of Diabetes (EASD). This document, published in 2007, provided for the first time a systematic approach to diagnose and treat the combination of Diabetes Mellitus (DM) and CVD. [6]

The evidence-based strategy promoted by ESC-EASD guidelines led to a consistent improvement in CV outcome in DM subjects, thus strengthening the importance of appropriate diagnostic and therapeutic algorithms to achieve the best care for patients in an individualized setting.

Guideline implementation in daily practice has been evaluated with three cross sectional surveys called EUROASPIRE (European Action on Secondary and Primary Prevention by Intervention to Reduce Events) starting in mid-nineties. They were conducted under the auspices of European Society of Cardiology Euro Heart Survey programme in 1995-1996, 1999-2000 and 2006-2007 in patients with coronary heart disease, and in the most recent survey in asymptomatic individuals at high risk of developing CVD in general practice [9-15]. The objective was to determine whether clinical practice was achieving the standards set in the CVD prevention guidelines. The same methodology was employed in the three EUROASPIRE surveys, including standardized measurements and a central laboratory for lipid

and glucose analyses, so that time trends between the three surveys could be described.

However, despite the long time since the first joint ESC-EASD Guidelines released in 2007, no published study has reported, to our knowledge, a comprehensive assessment of the attainment of cardiometabolic goals in the diabetic population at Primary Care level in Europe. Only few studies have focused on the control of individual cardiovascular risk factors in persons with diabetes, generally, serum glucose, blood pressure (BP), and lipids [16-20]. The 2007 Joint European Societies' Guidelines defined the lifestyle and risk factor goals for patients with established CHD and people at high CVD risk as follows: stop smoking, make healthy food choices and be physically active; a body mass index (BMI) <25 kg/m<sup>2</sup>; blood pressure <130/80 mmHg, total cholesterol <4.0 mmol/L, LDL-cholesterol <2.0 mmol/L, if feasible, and appropriate use of cardioprotective drug therapies, in addition to medication used for treatment of elevated blood pressure, lipids and glucose: aspirin or other platelet-active drugs, beta-blockers, ACE inhibitors/ARBs, and anticoagulants.

Thus, our objective was to examine the achievement of main cardiometabolic goals (targets) defined by the 2007 ESC-EASD Guidelines among diabetic subjects in a sample of the adult diabetic population in primary care European centres.

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## 7.2. Objectives

The general objective is to determine whether the European recommendations on cardiovascular disease prevention are being followed in patients with diabetes seen in Primary Care practices across Europe.

The specific primary objective of this survey was to assess the level of adherence of European physicians and the level of achievement of target goals defined in the 2007's ESC-EASD Guidelines

on Prevention of Cardiovascular Diseases in diabetic patients in real clinical practice across Europe.

A secondary desired objective was trying to compare the level of achievement of ESC-EASD guidelines recommendations (goals) in Primary Care diabetic patients during 2012-3 with the level of achievement in other background surveys conducted previously in Europe (2004-2008).

## 7.3. Study Populations and Methods

### 7.3.1 Background Surveys

The following survey were used as background information for this project.

1. The EuroHeart Survey on Diabetes and the Heart I conducted a study on glucose perturbations in Europe between February 2003 and January 2004. A total of 2.854 CAD-patients (58% of the total sample) were selected from elective consultation of 110 centres in 25 European countries [21]. Thirty percent out of them (n=860) were diabetic.

2. The third EUROASPIRE survey carried out in 2006-2007 was extended beyond coronary patients and first degree blood relatives to include high cardiovascular risk individuals in primary care with medically treated hypertension, dyslipidaemia and diabetes. [13-15] EUROASPIRE III was undertaken in 76 hospital centres and 66 general practices in 22 European countries. The EUROASPIRE III survey included for the first time apparently healthy individuals being treated in general practice as high cardiovascular risk because of raised blood pressure, dyslipidemia or diabetes in 12 European countries. In the general practice arm, 5687 medical notes were reviewed and 4366 high risk individuals were interviewed.

3. DE-PLAN Project (Diabetes in Europe: Detection and Prevention using Lifestyle), was a study carried out between 2006-8 in 17 Primary Care settings

across Europe, in which more than 16,000 high risk adults (FINDRISC score <14) were screened for Type 2 Diabetes by a standard OGTT. In total we identified 976 people (6.1%) with Type-2 Diabetes (478 unknown diabetics and 498 known diabetics). All known diabetics were selected and analyzed [22]. Achievement of 2007 ESC-EASD target's (goals) guidelines were analyzed in each of these three surveys for where specific goal data available.

4. Finally we thought it would be of additional interest for this WP to know about the view and attitudes of primary care patients in Europe toward preventive services and lifestyle. The EUROPREV study consisted of a cross-sectional survey in 22 European countries (Austria, Belgium, Croatia, Cyprus, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Malta, The Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Georgia and Turkey) conducted by EUROPREV-the European Network for Prevention and Health Promotion in Family Medicine/GeneralPractice in 7.947 participants (52.2% females) from September 2008 to September 2009. The main objective of this survey was to explore patients' views and beliefs about the importance of lifestyle and preventive interventions, to assess their readiness to make changes to their lifestyle and their willingness to receive support from GPs ([www.europrev.org](http://www.europrev.org)). [23]

### 7.3.2. The EuroHeart II on Diabetes e-Survey (2012-3)

For this purpose, a customised survey was designed to assess the guideline's target achievement in different outpatient clinics of Europe. Investigators were recruited throughout different European networks of physicians interested in prevention and diabetes as cardiologists and primary physicians from the EUROASPIRE-IV Study, family physicians from the EUROPREV and family physicians from DE-PLAN networks among others. Each participating physician was requested to select and audit the clinical records of 10 diabetic patients visited in his/her own practice. The sample was stratified by clinical setting: outpatient cardiology clinics from the EUROASPIRE-IV project and primary care clinics from EUROPREV/DE-PLAN networks.

Based on the percentage of patients outside the guideline's targets observed in the EuroHeart Survey I, it was calculated that a sample of 400

diabetic patients would be sufficient to estimate the percentage of diabetic patients with HbA1C levels <7%, with a precision of  $\pm 3\%$  and a 95% confidence interval.

In addition to the patient's record audit, we asked each participant physician to complete a structured personal interview on their perceptions, awareness, behaviour, degree and use of ESC-EASD Guidelines in daily clinical practice. The two surveys (physician's and patient's surveys) were performed simultaneously during the period October 2012-September 2013.

For completing both the physician's and patient's survey questionnaires, a specific webpage was developed in order to facilitate an online register of the data by the investigators.

<http://diabetesguidelineprevention.com/>

### 7.3.3. Study Variables and Data Collection

For the patient's clinical record survey, participating investigators selected patients diagnosed with diabetes from their practices, and retrieved clinical information from the medical records.

In the physician's survey investigators were asked about awareness and availability of the guidelines, and also about barriers to implementation of guidelines.

Variables included in the patient's record form are:

- Geographical location (country, city)
- Patient's socio-demographics (age, sex, civil status, years and highest level of education completed, current employment situation)
- Type of diabetes mellitus
- Date and time from diagnosis of diabetes
- Personal history of high blood pressure, dyslipidaemia and cardiovascular diseases
- Type of hypoglycemic treatment
- Last available weight, waist circumference, fasting plasma glucose and glucose tolerance test, HbA1c, blood pressure, lipoprotein fractions and triglycerides determinations and their corresponding values.
- Lifestyle intervention (diet and physical activity

recommendations)

- Use and type of antihypertensive and lipid lowering treatments
- Use and type of antiagregant, antithrombotic and anticoagulant drugs

Variables in the physician's questionnaire included:

- Physician demographics (year of graduation from medical school, specialty, year of specialization).
- Characteristics of practice/centre (rural/urban, public/private, teaching activities, number of diabetic patients in the practice)
- Awareness and availability of the guideline (usefulness for daily practice, disposal of different guidelines, use in routine practice, guidelines most used, knowledge about the ESC-EASD Guidelines and use of this guideline in daily practice)
- Principal barriers for using the Guidelines.
- Follow-up of guidelines recommendations for screening Diabetes (target populations, tests used for ruling out DM and tools used to detect people at high risk of DM).
- Usual assessment of cardiovascular risk in diabetic patients, usual assessment of diabetes in patients with established cardiovascular disease and tools used.

- Lifestyle counseling and intervention to patients at high risk of DM, impaired glucose tolerance or diabetes mellitus.
- Prescription of drugs in patients with impaired glucose tolerance .
- Test usually used to monitor the glycemic control in type 2 diabetic patients.
- Target of HbA1c usually used in diabetic patients.
- Indications for starting basal insulin treatment in patients with type 2 diabetes.
- First antidiabetic drug usually prescribed to patients with type 2 diabetes who do not reach the glycaemic targets with diet and exercise.
- Target for total cholesterol, LDL-cholesterol,

triglycerides, systolic and diastolic blood pressure levels usually used in diabetic patients.

- Pharmacologic therapy used for patients with diabetes and hypertension.
- Use of comprehensive foot examination in diabetic patients and frequency.
- Frequency and pattern of referral of diabetic patients for ophthalmologic examination and availability of retinal photography, for screening of nephropaty and tests used.

The complete patient´s and physician´s questionnaires are shown in annex.

## 7.4. Results

### 7.4.1. Background Surveys

In the EuroHeart Survey on Diabetes and the Heart I a total of 4,961 Coronary Artery Disease (CAD)-patients from 110 centres in 25 European countries were selected. 47% of the patients came from hospital cardiology wards, 45% from hospital-based outpatient clinics and 8% from outpatient clinics; 71% of participants showed abnormal glucose regulation (31% known diabetes, 12% unknown diabetes and 28% prediabetes, either IFG or/and IGT). (Bartnik et al *Euro Heart J* 2004; 26:1880).

Among the 860 Type 2 diabetic patients selected from elective consultations, 68% of them were outside the ESC-EASD 2007 Guidelines targets for total-cholesterol (<4.5 mmol/L); 93% for LDL (<1.8 mmol); 56% for blood pressure (<130/80 mmHg); 83% for FP-glucose (<6.0 mmol/l) and 32% for HbA1c (<6.5%). In addition, only 17% of diabetic patients with newly detected diabetes were prescribed glucose lowering drugs at 1-year follow up (Anselmino et al *Eur Heart J* 2008; 29: 177).

Overall, in the EUROSPIRE III Survey more than one in six patients smoked and two-fifths were obese. Blood pressure, lipid and glucose control were very poor with most patients not achieving the targets defined in the prevention guidelines. In fact only 21% of patients with history of diabetes had a fasting glucose <7 mmol/L. 61% of patients were above the therapeutic blood pressure target (BP <140/90 mmHg) and 42% of patients

were above the total-cholesterol target (TC<4.5 mmol/l). However an increased use of anti-platelets, beta-blockers, ACE/ARB's, statins and diuretics with a lower use of CCB's was observed compared with Eurospire I ten years before. (Prof. David A Wood, personal communication on behalf of the EUROASPIRE Investigators).

In the DE-PLAN, 70% of known diabetics were treated with antidiabetic drugs, 53% with lipid lowering drugs and 47.5% with antihypertensives. Only 19% of known diabetics achieved the guidelines optimal blood pressure targets (130/80 mmHg) and 18% the LDL-Cholesterol targets (<1.8 mmol/L). However 90% of known diabetics achieved optimal fasting blood glucose targets (<7.0 mmol/L) and 70% 2-h blood glucose goals. [22]

Finally in the EUROPREV Survey, eight hundred and fifty individuals (10,7%) out of seven thousand nine hundred and forty-seven participants (11.9% of men, and 9.6% of women), had a pre-existing condition of high blood glucose.

When we asked "how often do you think it would be appropriate to have blood sugar checked" 16.7% (14.5–19.3) answered they do not know, and 66.0% (63.3–68.7) every year, and the rest (18%) even more often. In summary health professionals should be conversant with the recommended testing intervals for cardiovascular risk factors in order to better educate patients in the judicious use of such tests.

## EuroHeart II on Diabetes e-Survey (2012-13):

Two hundred and forty-eight diabetic patients (56% women, mean age 59.1+6.0 years) were finally selected by 41 investigators across Europe (6 patients per physician on average).

The main results of the clinical evaluation of these patients are shown in figures 1 to 8.

### 7.4.2. Patient's Survey Results

Figure 1. Cardiovascular Risk Factors and Diseases in the study sample.

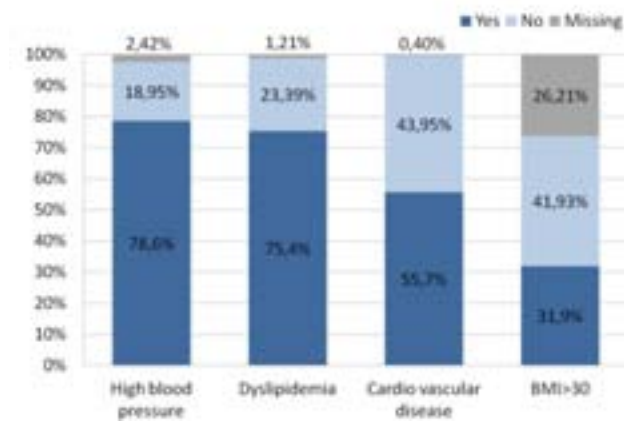


Figure 1 shows the distribution of patients by diagnosis. 78.6% of them have been diagnosed of high blood pressure, 75.4% of dyslipidemia and 55.7% reported a personal history of cardiovascular disease. Thirty two percent of the patients interviewed had a BMI greater than 30Kg/m<sup>2</sup>, 41.9% and 26.2% had not registered this parameter in the clinical record.

Figure 2 shows the percentage of patients with a registered diagnosis of cardiovascular diseases. 75.4% of patients have been diagnosed of ischemic heart disease, 13.8% had a diagnosis of stroke or transient ischemic attack (TIA), 11.6% were diagnosed of peripheral vascular disease and the remaining 23.2% with other cardiovascular diagnosis.

Figure 2. Patients with a clinical diagnosis of cardiovascular diseases (n=138)

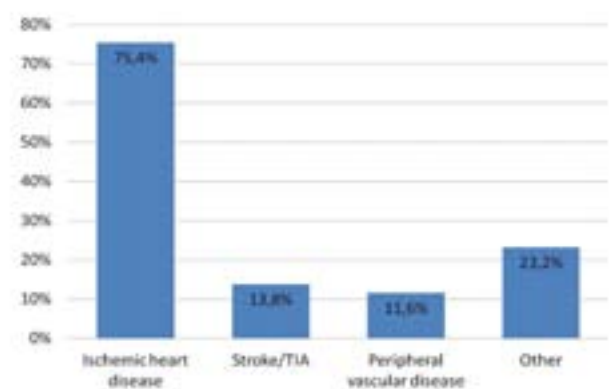


Figure 3. Type of hypoglycemic treatment:

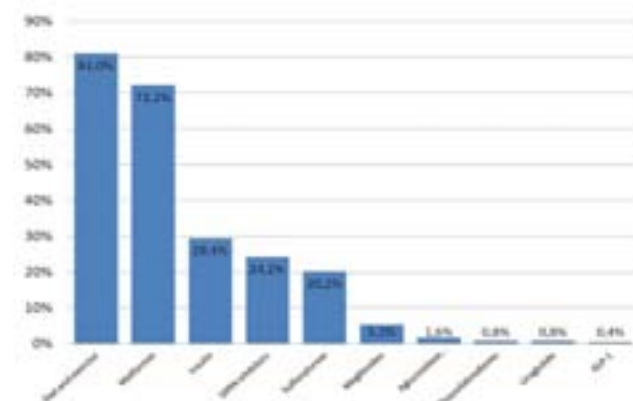


Figure 3 shows the different types of antidiabetic treatment used in primary care diabetics. The most widely non-pharmacological treatment used is diet and exercise, followed by 81% of the patients interviewed. The most frequent antidiabetic drug used is Metformin (72.2%). The other drug therapies are used by a lesser extent.

Insulin is used in the 29.4% of type 2 diabetic patients, 24.2% used Dipeptidyl peptidase-4 (DPP4) inhibitors and 20.2% used sulfonylureas. The other drug therapies were used for an even smaller proportion. Only 5.2% of patients take meglitinides, 1.6% Aglucosidase, 0.8% Thiazolidinediones, 0.8% Liraglutide and 0.4% GLP-1.

Figure 4. Percentage of patients achieving different blood pressure targets in the study population.

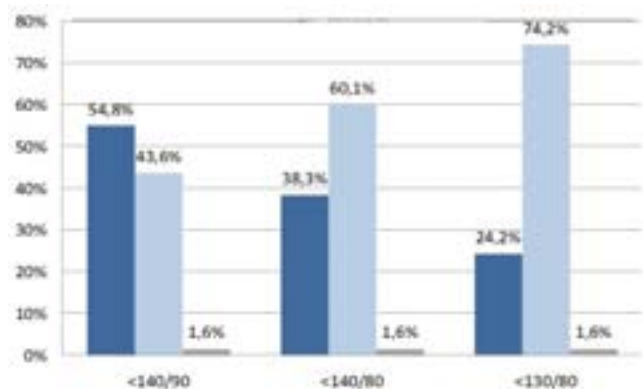
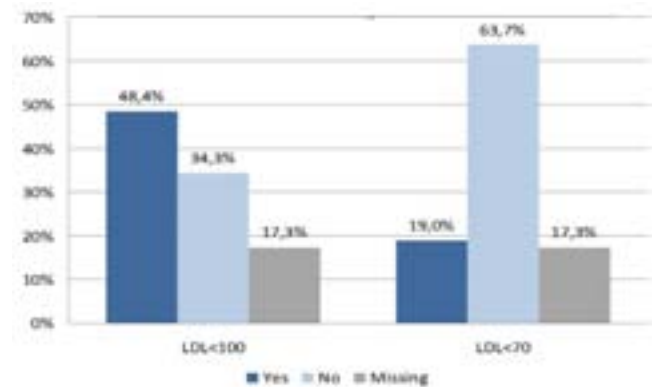


Figure 4 shows the blood pressure targets. The first target shows the results for patients with a systolic blood pressure less than 140 mmHg and/or diastolic blood pressure less than 90mmHg. 43.6% of patients have high levels of blood pressure and 54.8 % one has blood pressure numbers below the mentioned range. The second target for patients is a systolic blood pressure below 140 mmHg and/or diastolic blood pressure below 80 mmHg. 60.1% of patients have elevated levels of blood pressure versus 38.3% of patients who have lower blood pressure, ie, nearly 17% of patients have levels of diastolic blood pressure between 80-90 mmHg. The third target for patients is a lower systolic blood pressure 130 mmHg and / or diastolic blood pressure less than 80 mmHg. With these levels of blood pressure the percentage of patients with elevated blood pressure increases to 74.2%, ie, 14% of patients have a systolic blood pressure between 130-140 mmHg.

Figure 5 depicts the distribution of patients with respect to LDL targets. 34.3% of patients with LDL above 100 mg/dl and 63.7% above 70 mg/dl. Only 19% have LDL levels below 70 mg/dl. In 17.3% of the sample there isn't information.

Figure 5. Percent of patients achieving different LDL targets in the study sample



In Figure 6, the same information is shown than in Figure 5, but only for patients with cardiovascular disease. The 32.6% of these patients have LDL values greater than 100 mg/dl. If the level of cholesterol is lowered to 70 mg/dl the percentage of patients increases to 60.87%.

Figure 6. Percent of patients achieving LDL targets achievement in patients with cardiovascular disease.

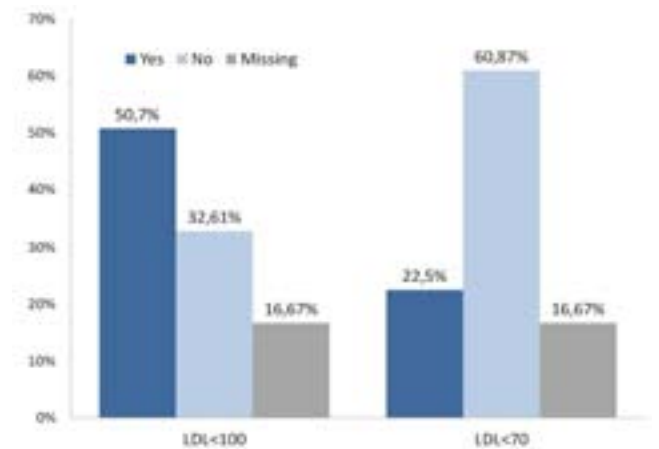


Figure 7. Percentage of patients with different prescribed antihypertensives. (n=213; 85,89%)

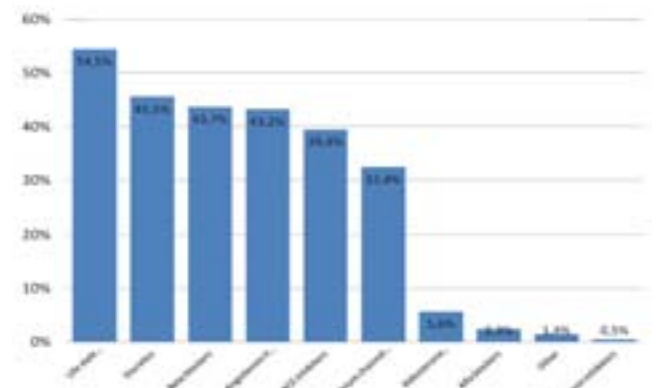
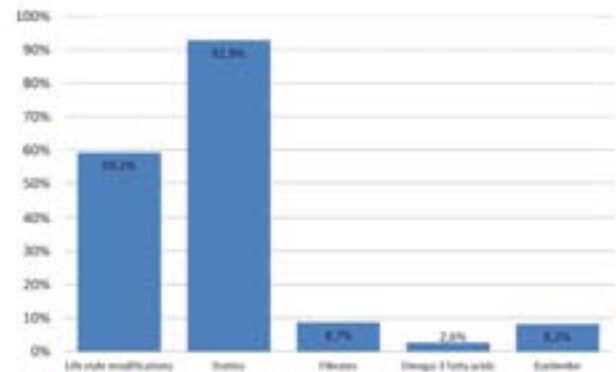




Figure 7 shows the distribution of patients with antihypertensive treatment. 54.5% received information about life style, 45.5% took diuretics, 43.7% took beta blockers, 43.2% took angiotensin II, 39.4% took ACE inhibitors and 32.4% took calcium channel.

Finally, Figure 8 shows the distribution of lipid lowering treatment prescribed to patients. 92.9% of the patients took statins and 59.2% of the patients received information about life style interventions to lower blood lipids.

Figure 8. Percentage of patients with different lipid lowering treatment (n=196; 79.03%).



### Summary of most relevant results in the patient's survey

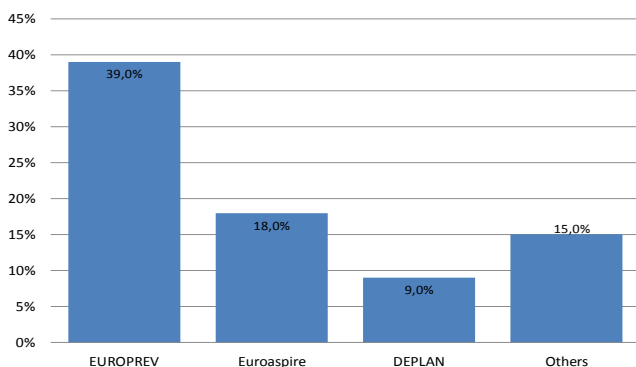
We observed unacceptable high rates of important clinical data missing in the health records (26% for BMI, and 17% for LDL).

Also there is a very high proportion of patients not reaching the optimal recommended target levels for BP and LDL (74% and 83% respectively).

### 7.4.3. Physician's Survey Results

Eighty-one physicians from different networks participated in the survey and answered a specific questionnaire on guidelines. The results of that survey are shown in the following figures.

Figure 9. Distribution of participating physicians by European networks.



The majority (n=43; 43.2%) of responders were family physicians, followed by internists (n=185; 18.5%), endocrinologists (8; 10%) and the rest (23; 28.3%) from several other specialities, including cardiologists. 39% of participating physicians belong

to the EUROPREV network, 18% to EUROASPIRE, 15% not specified and 9% to DE\_PLAN network. (Figure 9).

Figure 10 shows the opinion of physicians on the usefulness of guidelines in their daily practice. 61.7% of physicians declare that they are very useful, 33.3% that they are fairly useful and 1.2% are not useful.

Figure 10. Usefulness of guidelines in primary care daily practice.

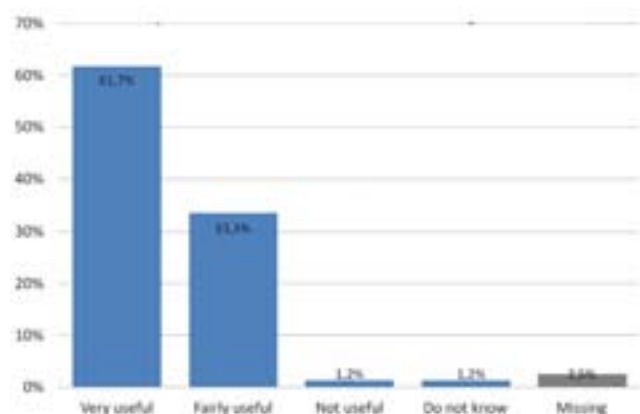
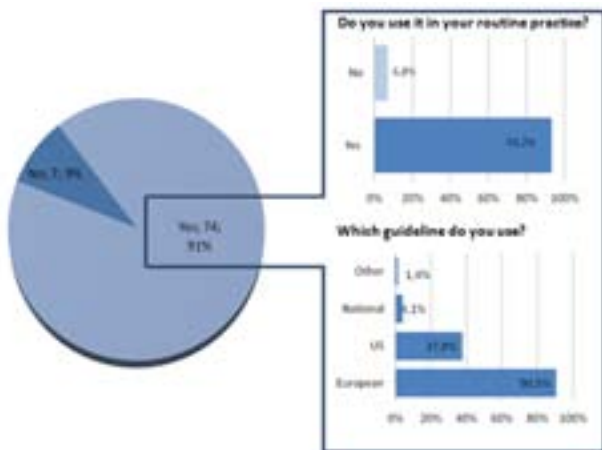


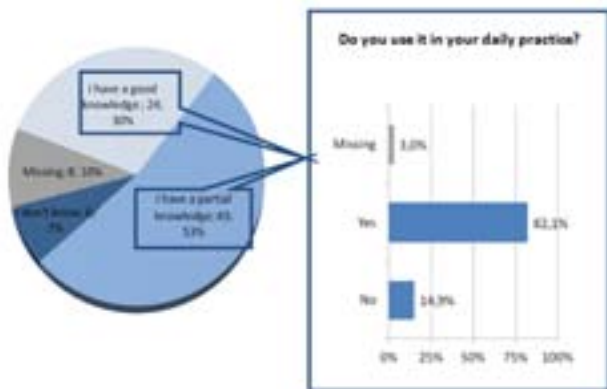
Figure 11. Degree of use of guidelines by European primary care physicians.



91% of physicians use guidelines, 93.2% of them use it in their routine practice. And the most used are European guideline (90.5%). (Figure 11)

53% of physicians had a partial knowledge of guidelines and 30% had a good knowledge, 82.1% of them used it in their daily practice. (Figure 12)

Figure 12. Level of knowledge about guidelines by European primary care physicians.



45.7% of physicians felt that there are too many guidelines, 40.7% felt that their too heavy work load and lack of time are barriers to Implementing Clinical Practice Guidelines. 34.6% of physicians felt that there are other barriers and 32.1% felt that guidelines are too theoretical and non practice oriented and 28.4% felt that there is a lack of consensus. (Figure 13)

Figure 13. Barriers to implementing Clinical Practice Guidelines in daily practice.

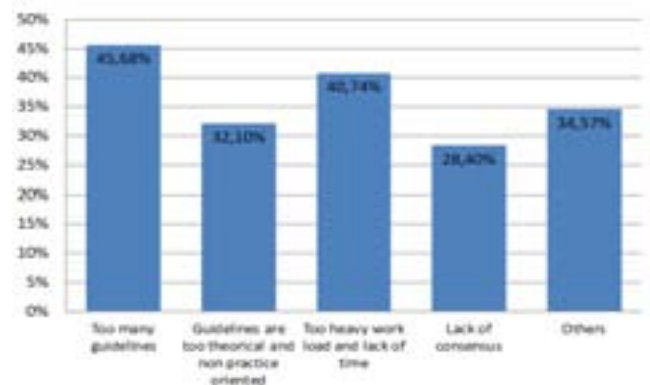
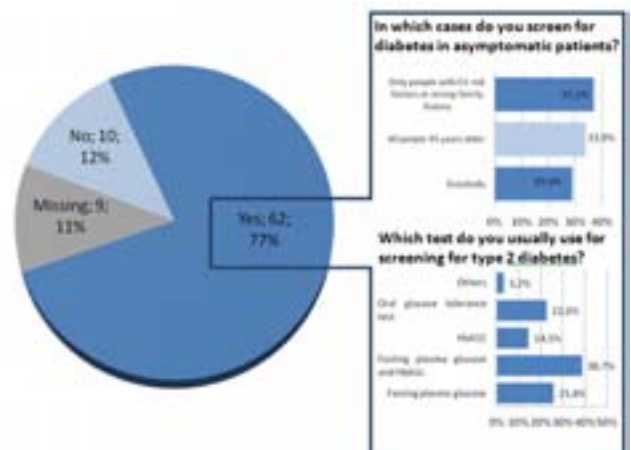


Figure 14. Percentage of primary care physician screening for diabetes in Europe.



77% of physicians usually screen their patients for diabetes. 37.1% of them screen in asymptomatic patients only with people with cardiovascular risk factors or strong family history, 33.9% with all people 45 years older and 29% with everybody. 38.7% of physicians who screen for type 2 diabetes usually used fasting plasma glucose and HbA1c, 25.8% used fasting plasma glucose and 22.6% used oral glucose tolerance test. (Figure 14)

48% of physicians usually used assessment tools. 25.6% of them used Findrisk and 69.2% used other assessment tools. (Figure 15)

Figure 15. Use of diabetes assessment tools by primary care physicians in Europe.

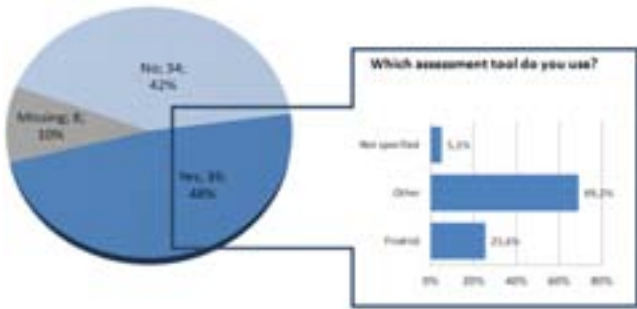
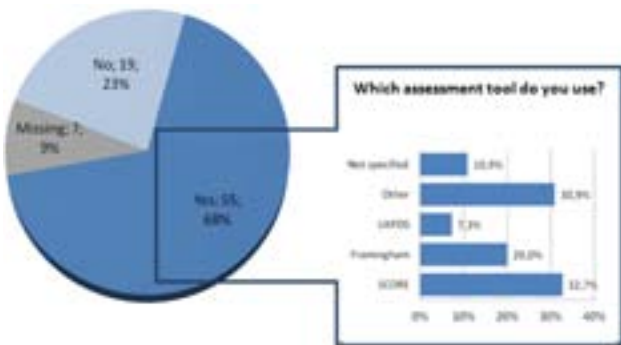


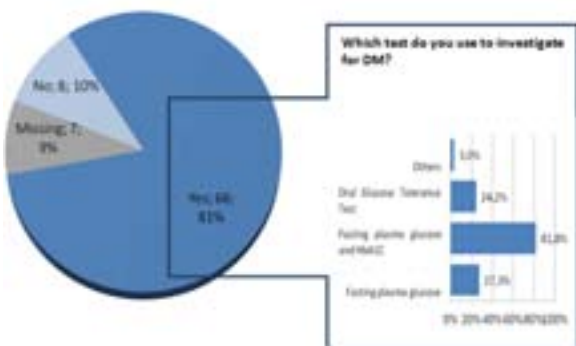
Figure 16. Type of assessment tool used for diabetes by primary care physicians.



68% of physicians usually used other assessment tools. 32.7% of them used SCORE, 30.9% used other assessment tools, 20% used Framingham. (Figure 16)

81% of physicians usually used a test to investigate for DM. 81.8% of them used Fasting plasma glucose and HbA1c, 27.3% used fasting plasma glucose and 24.2% used Oral Glucose Tolerance Test. (Figure 17)

Figure 17. Tests used to investigate for DM in primary care in Europe.



86% of physicians usually used a test to investigate for DM. 65.7% of them did it themselves in the practice, 20% referred to the nurse, 12.9% referred to a specific centre. (Figure 18)

Figure 18. Systematic use of test to investigate for DM in Europe.

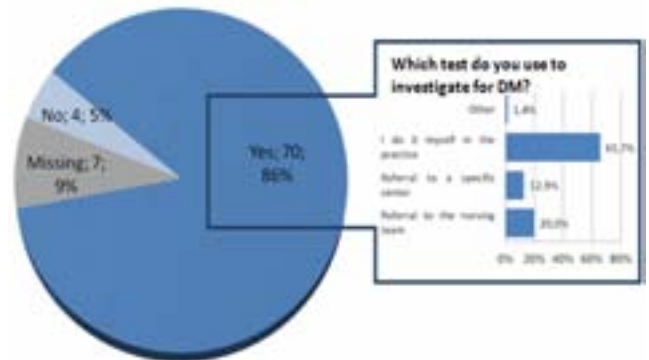
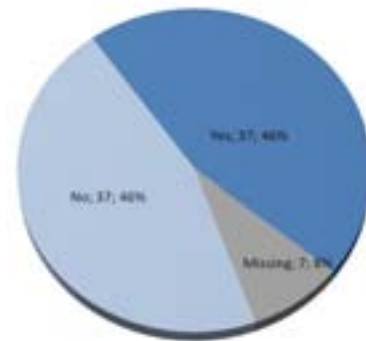


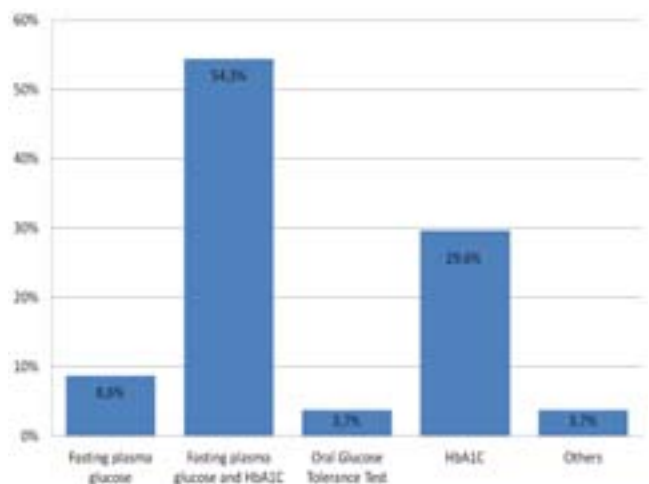
Figure 19. Pharmacological treatment prescribed in patients with impaired glucose tolerance.



46% of physicians usually prescribed metformin, acarbose or glitazones to delay the onset of diabetes. (Figure 19)

54.3% of physicians who monitor the glycemic control in the type 2 diabetic patients, usually used fasting plasma glucose and HbA1c, 29.6% used only HbA1c and 8.6% used fasting plasma glucose. (Figure 20)

Figure 20. Tests used to monitor glycemic control in the type 2 diabetic patients



57% of physicians usually used <7% target of HbA1c, 28% used 6.5% target and 1% used <8% target in diabetic patients. (Figure 21)

Figure 21. Target of HbA1C usually used in diabetic patients.

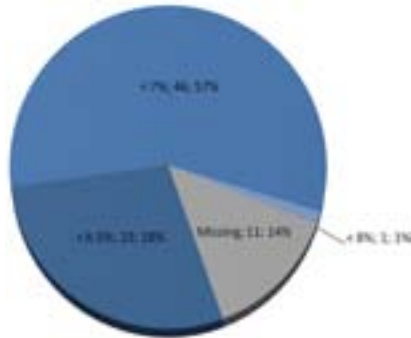
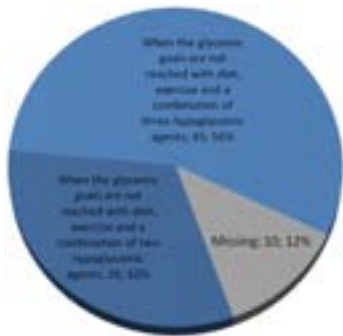
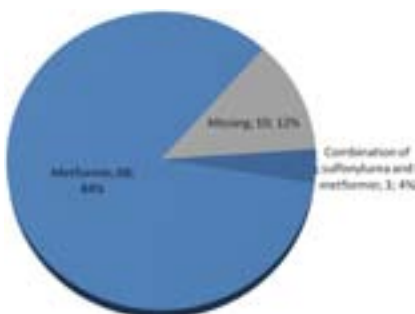


Figure 22. Time of treatment start with basal insulin in patients with type 2 diabetes.



56% of physicians, when the glycemic goals were not reached with diet, exercise and a combination of three hypoglycemic agents, usually started treatment with basal insulin for patients with type 2 diabetes and 32% started treatment when the glycemic goals are not reached with diet exercise and combination of two hypoglycemic agents. (Figure 22)

Figure 23. First drug prescribed to patients with type 2 diabetes who do not reach the glycemic targets with diet and exercise



In Figure 23, 84% of physician prescribed Metformin as the first drug to patients with type 2 diabetes who do not reached the glycemic targets with diet and exercise and 3.4% prescribed a combination of sulfonylurea and metformin.

47% of physicians usually used the target <130 mg/dl of LDL-cholesterol levels in diabetic patients , 33% used the target <100 mg/dl and 3% used the target <70 mg/dl. (Figure 24)

Figure 24. Target of LDL-cholesterol levels used in diabetic patients.

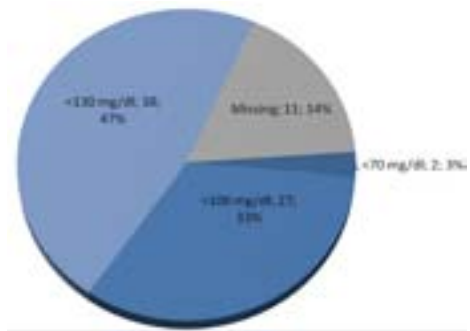
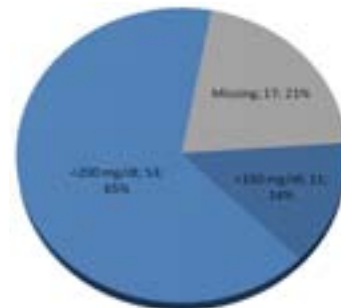
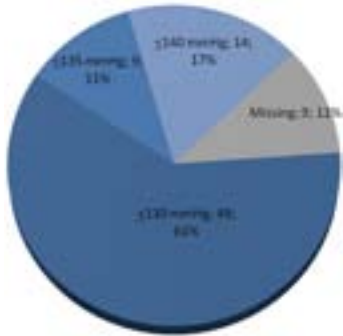


Figure 25. Target of total triglyceride levels used in diabetic patients.



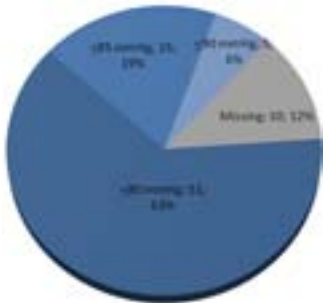
65% of physicians usually used the target <200 mg/dl of tryglicerides levels in diabetic patients and 14% used the target <150 mg/dl. (Figure 25) 61% of physicians usually used the target <135 mmHg of systolic blood pressure in diabetic patients, 17% used the target <170 mmHg and 11% used the target <135 mmHg. (Figure 26)

Figure 26. Target of systolic blood pressure used in diabetic patients.



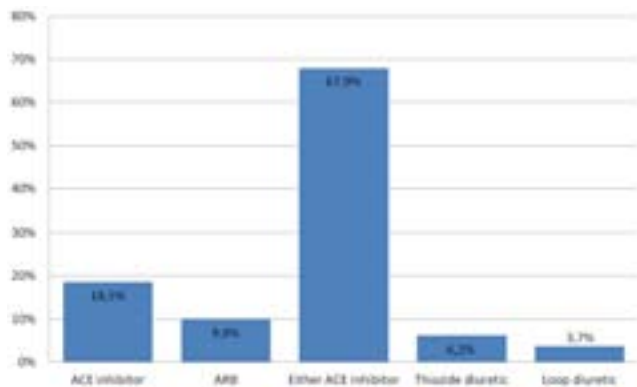
63% of physicians usually used the target <80 mmHg of diastolic blood pressure in diabetic patients, 19% used the target <85 mmHg and 6% used the target <90 mmHg. (Figure 27)

Figure 27. Target of diastolic blood pressure used in diabetic patients.



67.9% of physicians thought that a regimen that includes either ACE inhibitor or ARB as Pharmacologic therapy for patients with diabetes and hypertension should be used, 18.5% thought that ACE inhibitor should be used, 9.9% thought that ARB should be used, 6.2% thought that thiazide diuretic should be used and 3.7% thought that loop diuretic should be used. (Figure 28)

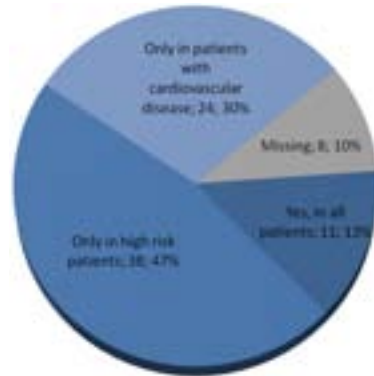
Figure 28. Pharmacologic therapy for patients with diabetes and hypertension



47% of physician usually prescribed aspirin therapy only in high risk diabetic patients, 30% prescribed it only in diabetic patients with cardiovascular

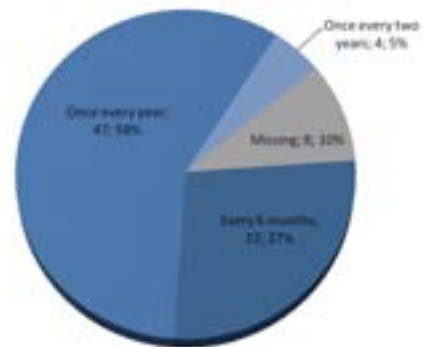
disease and 13% prescribed aspirin therapy in all patients. (Figure 29).

Figure 29. Prescription of aspirin therapy in diabetic patients



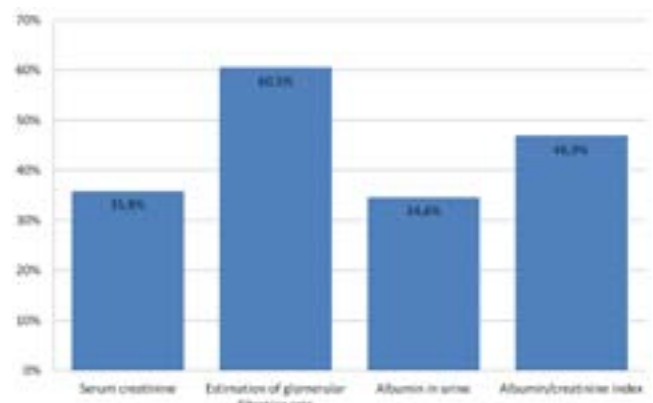
58% of physicians screened for nephropathy in diabetic patients once a year, 27% screened it every 6 months and 5% screened it once every second years. (Figure 30)

Figure 30. Frequency of screening for nephropathy in diabetic patients.



60.5% of physicians used the estimation of glomerular filtration rate for nephropathy screening in diabetic patients, 46.9% used albumin/creatinine index, 35.8% used serum creatinine and 34.56% used albumin in urine. (Figure 31)

Figure 31. Tests used for nephropathy screening in diabetic patients.



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## *Summary of the most relevant results observed in the physician's survey*

There is high variability in the screening methods, criteria and tools used for detecting diabetes among the European primary physicians.

There is also a high variability in the assessment of cardiovascular risk among the European primary physicians, with many different approaches and risk scores used.

There are large discrepancies in managing patients with impaired glucose tolerance to delay the onset of diabetes. There are also remarkable discrepancies regarding which BP and LDL target values should be used, as well with the use of Aspirine in Diabetics.

## 7.5. Commentaries/Discussion

The evaluation of the improvement in clinical practice and health outcomes is the goal of any clinical practice guidelines. This assessment required the design of surveys carried out in collaboration with clinicians working in different clinical settings: cardiology clinics and primary care centres, etc.

The two surveys (patient's clinical audit and physician's behaviour) carried out during 2012-13 in the framework of EuroHeart II will allow to assess the current patterns of practice in relation to the guidelines target areas for further promotion. It also will permit to assess whether or not health outcomes are improving from previous years in Europe. The collected data can be useful to compare against previous data collected in Europe and with different national or local data. These data can be used

as well in clinical audit and other quality assurance activities and will facilitate assessment of how the guidelines are affecting the routine care being delivered by clinicians and the effects of that care on the health of their patients.

It is difficult to do a formal statistical comparison of the EuroHeart II results with previous surveys, conducted in Europe as the EuroHeart Survey I, the EUROASPIRE III or DE-PLAN surveys. The historical retrospective comparison can be biased due to differences in objectives, study design, study populations and targets (goals) defined in each survey. The only possible and reasonable comparison perhaps can be done with the EUROASPIRE III and DE-PLAN surveys, both including diabetic patients from Primary Care settings in Europe.

### *7.5.1. Benefit and Impact of the Report.*

The results of the EuroHeart II eSurvey on Diabetes provides a preliminary picture of the extent to which coronary risk factors are identified among diabetic patients in Primary Care in Europe, how effectively they are managed, in this high risk group of individuals, and whether this is changing for the better. This new information shows how the current European recommendations on cardiovascular prevention in diabetics are being implemented by European physicians and the potential for prevention programmes in clinical practice to further reduce coronary morbidity

and mortality. This will complement the work of the European Societies - European Society of Cardiology, European Atherosclerosis Society, European Society of Hypertension, European Association for the Study of Diabetes, International Diabetes Federation-Europe, International Society of Behavioural Medicine, European Society of General Practice/Family Medicine and European Heart Network – in promoting the development of national guidance on cardiovascular prevention and its communication and implementation by primary care physicians in Europe.

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The results of this EuroHeart II e-survey on Diabetes might be also of interest to the investigators of the new EUROASPIRE-IV Survey, and used as a starting piece of information for learning and discuss in advance about possible expected and unexpected results in the moderate/high-risk population component of the EUROASPIRE –IV survey, now ongoing in several Primary Care practices across Europe. The EUROASPIRE-IV survey will give a unique European picture of preventive action by cardiologists, other specialists and primary care physicians looking

after patients with coronary disease and their families, and individuals at high risk of CVD. A sample of general practices (or all general practices) will be taken in such a way that any patient with hypertension, dyslipidaemia or diabetes are included in the patient sample. The EUROASPIRE IV participating countries will represent very different geographical parts of Europe with a study population larger than the present survey, and marked differences in the organisation of medical care and economic resources.

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## 8. WP9's Collaboration in the Development of the 2013 Joint ESC/EASD Guidelines on Diabetes, Pre-diabetes Glucose Abnormalities and Prevention of Cardiovascular Disease

During 2013, two WP9's co-investigators (Lars Ryden and Jaakko Tuomilehto, as co-chair and co-author of the Guidelines Panel Experts respectively), have participated very actively in updating the 2007's ESC-EASD Guidelines to develop the 2013 new version of the ESC-EASD Guidelines [24]. The preliminary results of WP9 survey were presented and discussed informally within the Joint Guidelines Panel Experts who recognized the importance of multidisciplinary care teams, included primary care physicians and nurses, for the effective delivery and implementation of the Guidelines recommendations.

In 2007, the European Society of Cardiology (ESC) and the European Association for the Study of Diabetes (EASD) developed the first Joint ESC-EASD Guidelines for Prevention of Cardiovascular Diseases in Diabetes (7). The aim of the Joint European Societies Guidelines on CVD prevention was to improve the practice of preventive cardiology by encouraging the development of national guidance on coronary prevention and its communication, implementation and evaluation through national societies in each country. Patients with coronary or other atherosclerotic cardiovascular disease, and those at high risk of developing CVD, have been defined as the highest clinical priority for prevention.

The time elapsed since the publication of the first guidelines (5 years), the publication of new clinical trials, and the major advances made not only in glucose-lowering drugs but also in basic science, makes it timely and necessary to update the previous guidelines.

The emphasis of these guidelines is to provide

information on the current state of the art in how to prevent and manage the diverse problems associated with the effects of diabetes on the heart and the vasculature in a holistic manner.

The authors of the current guidelines have included 546 references (vs 711 in the previous document), of which 331 are new publications (since 2007). The document contains 83 recommendations: 51 class I, 20 IIa, 6 IIb and 6 III; 36 are made with level of evidence A, 27 B and 20 C. Although most of these recommendations seem to be based on studies and registries, with few being based on expert opinion (level C), many sections contain no recommendations.

In summary, the recent ESC-EASD guidelines on the management of diabetes, pre-diabetes and CVD deliver a number of evidence-based recommendations designed to assist clinicians and other health-care providers in preventing, diagnosing and treating CVD in patients with DM. While several aspects have been clarified and are considered established knowledge, consistent evidence gaps remain due to a small number of randomized studies or heterogeneity of the populations studied. The authors of the guidelines have identified up to 29 gaps in knowledge. During the next decade, efforts in clinical and translational research should address important clinical issues such as the identification of reliable biomarkers for CV risk stratification, the definition and management of high-risk patients and very high-risk patients, the effectiveness of intensive glycaemic control in diabetics with stable and acute CAD as well as the benefit of new glucose-lowering drugs in the prevention of cardiovascular outcome.



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## 9. Coordination with Other Projects or Activities at European, National at International Level

- EURASPIRE IV Project. European action on secondary and primary prevention of coronary heart disease in order to reduce events. European Association for Cardiovascular Prevention and Rehabilitation. European Society of Cardiology.
- DE-PLAN (Diabetes in Europe; Prevention using Lifestyle Intervention and Nutrition) Project, Steering Committee and Consortium.
- The European Network for Prevention and Health Promotion in Family Medicine and General Practice (EUROPREV).

- The International Network "Who is active in Diabetes Prevention".
- The IMAGE Project: Development and Implementation of a European Guideline and Training Standards for Diabetes Prevention.

These are major ongoing European projects on Diabetes and Cardiovascular Prevention in Primary Care and hospital settings across Europe including family physicians, internists, cardiologists and endocrinologists.

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# 10. Presentations and Plan of Exploitation of Results

- Presentation of the EuroHeart II e-Survey on Diabetes in the Annual Meeting of the European Group of Insulin Resistance. 17 May 2013. Athens. Rafael Gabriel.
- Presentation of EuroHeart II e-Survey preliminary results to EUROPREV Investigator Annual Meeting. 21-24 August 2013. Tampere (Finland). Carlos Brotons.

The principal results of the the report of EuroHeart II on Diabetes will be exploited during 2014 in the following ways:

- Presentations at major international, European and national scientific meetings: EUROPREVENT, EUROPREV, European Society of Cardiology (ESC), European Association for the Study of Diabetes (EASD), European Atherosclerosis Society (EAS), European Society of Hypertension (ESH), European Association for Cardiovascular Prevention and Rehabilitation (EACPR), European Congress of Family Medicine, WONCA-Europe and others.
- Printing of 1000 copies and distribution of final report to main European national professional societies of Cardiology, Diabetes, Internal Medicine, General/FamilyMedicine, to different specific working groups on Diabetes and CVD and among key leader persons from mentioned professional organisations.

- The principal results of this report will be submitted by the end of February 2014 to the two major peer review journals on Primary Care and Prevention of Diabetes and Cardiovascular Diseases: the Primary Care Diabetes Journal and the European Journal of Cardiovascular Prevention.
- Once the article is accepted by the journal, we have negotiated with the publisher of Primary Care Diabetes Journal to distribute 5.000 copies of the published article in the two major European Congresses of Cardiovascular Diseases and Diabetes to be held respectively at the end of August 2014 in Barcelona and in September in Vienna.
- Article in ESC newsletter, to the 50,000+ subscribers of the newsletter.
- Targeted emailing to the members of the ESC Council of Clinical Practice.
- Uploading the WP9 Final report into the websites of the ESC, EASD, ESH, ESA, EACPR, WONCA-Europe, EFP, and other professional organizations as CARDIOATRIO ([www.cardioatrio.org](http://www.cardioatrio.org)), IMAGE, Global Alliance on Diabetes (GACD).
- Message to the European National Cardiology societies to ask them to disseminate the survey results to their members.

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# Annexes

## 1-Patient´s and Physicians e-questionnaires

### 2-Invitation letter

## PATIENTS SURVEY

Country: \_\_\_\_\_ City/twon: \_\_\_\_\_

Date when answering this questionnaire day   month   year

Is this patient included in any of the following projects (please mark as many as applicable):

DE-PLAN/ePREDICE Projects

Euro-PREVENT Network

Euro ASPIRE IV Survey

Other European Diabetes Project/Network  Please, specify \_\_\_\_\_

### I. PATIENT'S SOCIO-DEMOGRAPHIC QUESTIONS

1. Date of birth:   (day) /   (month) / 19 (year)

2. Sex:  male  female

3. Civil status:

a. Married or living with a partner

b. Not married, nor living with a partner

c. Separated or divorced

d. Widowed

4. Years of full-time education (compulsory and further education) completed:   years

5. Which is the highest level of education reached?

a. Primary

b. Secondary

c. Tertiary

6. Current employment situation:

a. Employed / self-employed

b. Student

c. Housewife/husband or equivalent

d. Pensioner

e. Unemployed

### II. CLINICAL QUESTIONS

7. Type of diabetes mellitus:

a. Type 1

b. Type 2

c. MODY (Maturity onset diabetes of the Young)

d. LADA ( Latent Autoimmune Diabetes in Adults)

e. Secondary DM (drugs, exocrine pancreas disease, endocrinopathy, infections...)

8. Date of diagnosis of type 2 diabetes mellitus:    day   month   year
9. Years of type 2 diabetes mellitus progression:
- a. <1 year
- b. 1 to <5 years
- c. 5 to <10 years
- d. 10 or more years
10. Does the patient have any of the following conditions?
- High blood pressure
 

a.Yes

b.No
  - Dyslipidemia
 

a.Yes

b.No
11. Does the patient have any cardio vascular disease? (Mark more than one option if it is necessary).
- a. No
- b. Ischemic heart disease
- c. Stroke/ TIA (transient ischemic accident)
- d. Peripheral vascular disease
- e. Other
- Please, specify \_\_\_\_\_
12. Type of hypoglycemic treatment (more than one option can be marked):
- a. Diet and exercise
- b. Metformin
- c. Sulfonylureas (glipizide, glyburide or glybenclamide, glimepiride)
- d. Meglitinides (repaglinide, nateglinide)
- e. Thiazolidinediones (rosiglitazone, pioglitazone...)
- f. Glucosidase inhibitors (acarbose, meglitol...)
- g. DPP4 inhibitors (sitagliptin, saxagliptin...)
- h. Insulin
- i. Other
- Please, specify \_\_\_\_\_
13. Last weight determination:
- ,   Kg
- Date of determination: day   month   year
- Unavailable measure
14. Height
- cm
- Date of determination: day   month   year
- Unavailable measure
15. Last waist circumference:
- ,   cm
- Date of determination: day   month   year
- Unavailable measure
16. Last HbA1c determination:
- Level:  ,  %
- Date of determination: day   month   year
- Unavailable measure

17. Last fasting plasma glucose (either in mg/dL or mmol/L):

□□□, □□ mg/dL

□□□, □□ mmol/L

Date of determination: day □□ month □□ year □□□□

Unavailable measure

18. Has an oral glucose tolerance test performed?

a. Yes

b. No

19. In case of affirmative answer, which were the levels of the two hour post-load glucose values? ( either in mg/dL or mmol/L):

□□□, □□ mg/dL

□□□, □□ mmol/L

Date of determination: day □□ month □□ year □□□□

20. Last blood pressure determination:

• Systolic: □□□, □□ mm Hg

Date of determination: day □□ month □□ year □□□□

Unavailable measure

• Diastolic: □□□, □□ mm Hg

Date of determination: day □□ month □□ year □□□□

Unavailable measure

21. Last lipid levels determination (either in mg/dL or mmol/L):

• Total cholesterol: □□□, □□ mg/dL

□□□, □□ mmol/L

Date of determination: day □□ month □□ year □□□□

Unavailable measure

• Total LDL-cholesterol: □□□, □□ mg/dL

□□□, □□ mmol/L

Date of determination: day □□ month □□ year □□□□

Unavailable measure

• Total HDL-cholesterol: □□□, □□ mg/dL

□□□, □□ mmol/L

Date of determination: day □□ month □□ year □□□□

Unavailable measure

• Triglycerides: □□□, □□ mg/dL

□□□, □□ mmol/L

Date of determination: day □□ month □□ year □□□□

Unavailable measure

22. Is the patient receiving antihypertensive treatment ?

a. Yes

b. No

If YES, go to question 24. If NOT go to question 23.

23. What type of antihypertensive treatment receives? (mark more than one option when appropriate)

a. Lifestyle modifications

b. ACE inhibitors

c. Angiotensin II receptor antagonists

d. β blockers

e. α blockers

f. Calcium channel blockers

g. Diuretics

h. Renin inhibitors

i. Aldosterone antagonists

j. Others

Please, specify \_\_\_\_\_

24. Is the patient receiving lipid lowering treatment?

a. Yes

b. No

If the answer is YES, go to question 25. If the answer is NO the questionnaire is finished.

25. What kind of lipid lowering treatment receives? (mark more than one option when appropriate) :

a. Lifestyle modifications

b. Statins

c. Fibrates

d. Others

Please, specify \_\_\_\_\_

## PHYSICIANS SURVEY

### I. BACKGROUND

1. Year of graduation from medical school: \_\_\_\_\_

2. Specialty: \_\_\_\_\_

3. Year of specialization: \_\_\_\_\_

4. Is the practice/ centre:

a. In an urban area?

b. In a rural area?

c. In a semi-rural area?

5. Would the practice/centre best be described as a:

a. Primary health centre?

b. Solo practice?

c. Hospital?

d. Other? (please specify): \_\_\_\_\_

6. Is the practice/centre:

a. A public centre?

b. A private centre?

c. Other? (please specify): \_\_\_\_\_

7. Do postgraduate teaching activities take place at the practice/centre?

a. Yes

b. No

8. Practice size: \_\_\_\_\_

9. Number of diabetic patients in your practices: \_\_\_\_\_

### II. AWARENESS AND AVAILABILITY OF THE GUIDELINE

10. What do you think about the usefulness of guidelines in your daily practice? They are...

a. Very useful

b. Fairly useful

c. Not useful

d. Do not know



11. Do you have any guideline on diabetes mellitus and cardiovascular disease prevention at your disposal?
- a. Yes
- b. No
12. If you answered "yes", do you use it in your routine practice?
- a. Yes
- b. No
13. Which guideline do you use? (please, mark only one)
- a. European guidelines
- b. US guidelines
- c. My own institution's guideline
- d. Other \_\_\_\_\_
14. What is your knowledge about the Guidelines on diabetes, pre-diabetes, and cardiovascular diseases of the European Society of Cardiology (ESC) and of the European Association for the Study of Diabetes (EASD)?
- a. I have good knowledge of the guideline
- b. I have partial knowledge of the guideline
- c. I know that this guideline exists, but I do not know its content
- d. I do not know this guideline
15. In case that you have good knowledge, do you use this guideline in daily practice?
- a. Yes
- b. No

### III. BARRIERS

Please, answer how do you agree with the following statements about barriers for implementing Clinical Practice Guidelines:

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
16-Guidelines restrict physician's autonomy					
17-There are too many guidelines					
18-Guidelines are too theoretical and non practice oriented					
19-Guidelines are not applicable at the individual level					
21-There is too heavy work load and lack of time to implement guidelines					
22-There is lack of consensus among guidelines					
23-Lack of financial incentives					
24-Bad patient compliance					

25. Please, specify other barriers for implementing clinical practice guidelines \_\_\_\_\_

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#### IV. FOLLOWING THE GUIDELINE

26. Do you screen your patients for Diabetes Mellitus?

- a. Yes
- b. No

27. In case that you answered "yes", in which cases do you screen for diabetes in asymptomatic patients?

- a. Everybody
- b. All people 45 years old or older.
- c. Only people with other cardio vascular risk factors or strong family history of diabetes mellitus.

28. Which test do you usually use for screening for the potential type 2 diabetes?

- a. Fasting plasma glucose (FPG)
- b. Fasting plasma glucose and HbA1c
- c. Measuring HbA1c.
- d. Oral Glucose Test Tolerance Test
- e. Others \_\_\_\_\_

29. Do you usually use any tool to detect people at high risk of type 2 DM?

- a. Yes
- b. No

If your answer was "yes", please indicate which assessment tool do you use. \_\_\_\_\_

30. Do you usually assess the cardiovascular risk in diabetic patients?

- a. Yes
- b. No

If your answer was "yes", please indicate which assessment tool do you use. \_\_\_\_\_

31. Do you usually investigate for diabetes in patients with established cardiovascular disease?

- a. Yes
- b. No

Evaluation of the ESC guideline on prevention of cardiovascular disease in diabetic patients

32. If you answered "yes", which test do you use to investigate for DM?

- a. Fasting plasma glucose (FPG)
- b. Fasting plasma glucose and HbA1c
- c. Measuring HbA1c.
- d. Oral Glucose Test Tolerance Test
- e. Others

33. Do you usually offer lifestyle counseling to patients at high risk of DM, with impaired glucose tolerance or diabetes mellitus?

- a. Yes
- b. No

34. If you answered "yes", how do you do it??

- a. Referral to the nursing team
- b. Referral to a specific center
- c. I do it myself in the practice
- d. Others \_\_\_\_\_

35. In patients with impaired glucose tolerance (FGP < 7.0 (<126mg/dL) + 2h PG  $\geq$  7.8 and <11.1 (<200), do you usually prescribe certain drugs such metformin, acarbose or glitazones to delay the onset of diabetes?

- a. Yes
- b. No

36. Which test do you usually use to monitor the glycemic control in type 2 diabetic patients?

- a. Fasting plasma glucose (FPG)
- b. Fasting plasma glucose and HbA1c
- c. Measuring HbA1c.
- d. Oral Glucose Test Tolerance Test
- e. Others \_\_\_\_\_

37. Which target of HbA1c do you usually use in diabetic patients?

- a.  $\leq$ 8%
- b.  $\leq$ 7%
- c.  $\leq$ 6,5%

38. At which moment do you usually start treatment with basal insulin in patients with type 2 diabetes?

- a. When the glycemic goals are not reached with diet, exercise and one hypoglycemic agent
- b. When the glycemic goals are not reached with diet, exercise and a combination of two hypoglycemic agents.
- c. When the glycemic goals are not reached with diet, exercise and a combination of three hypoglycemic agents.

39. Which is the first drug that you prescribe to a patient with type 2 diabetes who do not reach the glycemic targets with diet and exercise?

- a. Sulfonylurea
- b. Metformin
- c. Basal insulin
- d. Combination of sulfonylurea and metformin
- e. Other hypoglycemic agents

40. Which target of total cholesterol levels do you usually use in diabetic patients? (Write the answer either in mg/dL or in mmol/L).

\_\_\_\_\_ mg /dL                      \_\_\_\_\_ mmol/L

41. Which target of LDL- cholesterol levels do you usually use in diabetic patients? (Write the answer either in mg/dL or in mmol/L).

\_\_\_\_\_ mg /dL                      \_\_\_\_\_ mmol/L

42. Which target of triglyceride levels do you usually use in diabetic patients? (Write the answer either in mg/dL or in mmol/L).

\_\_\_\_\_ mg /dL                      \_\_\_\_\_ mmol/L

43. Which target of blood pressure do you usually use in diabetic patients?

Systolic blood pressure: \_\_\_\_\_

Diastolic blood pressure: \_\_\_\_\_

44. Pharmacologic therapy for patients with diabetes and hypertension should be with a regimen that includes:

- a An ACE inhibitor
- b An ARB
- c Either an ACE inhibitor or an ARB
- d A thiazide diuretic
- e A loop diuretic

45. Do you usually prescribe aspirin therapy in diabetic patients?

- a Yes, in all patients
- b Only in high risk patients
- c Only in patients with cardiovascular disease
- d Never

46. Do you usually do (or refer) a comprehensive foot examination in diabetic patients?

- a yes
- b no

47. If you have answered "yes", how often do you do (or refer) a comprehensive foot examination?

- a Every 6 months
  - b Once every year
  - c Once every two years
  - d Other
- Please specify \_\_\_\_\_

48. How often do you refer diabetic patients without known retinopathy for an ophthalmologic examination?

- a Once a year
  - b Once every two years
  - c Once every three years
  - d Other
- Please specify \_\_\_\_\_

49. Does your center dispose a specific tool to do a retinal photography?

- a yes
- b no

50. How often do you screen for nephropathy in diabetic patients?

- a Every 6 months
  - b Once a year
  - c Once every two years
  - d Other
- Please specify \_\_\_\_\_

51. Which tests do you use for nephropathy screening in diabetic patients (you can mark more than one option).

- a Serum creatinine
  - b Estimation of glomerular filtration rate (GFR)
  - c Albumin in urine
  - d Albumin/creatinine index
  - e Other
- Please specify \_\_\_\_\_

# Invitation Letter



Dear colleagues,

It is our pleasure to present you the 'Euro Heart II Survey' approved by The Executive Agency for Health and Consumers of the UE (SANCO Program). The project is coordinated and conducted by the European Heart Network (EHN) and the European Society of Cardiology. As leaders of Work Package 9, we have been committed to run a survey entitle "Evaluation of the ESC-EASD guidelines on prevention of cardiovascular disease in diabetic patients".

The specific aims of this survey are:

- Assess the effectiveness of dissemination and implementation of the ESC-EASD Guidelines.
- Obtain information about the extent to which the guidelines has produced the health outcomes identified in the development stage.

The investigators involved in this specific workpackage and survey of the project are: J. Tuomilehto (Finland), R. Gabriel (Spain), L. Ryden (Sweden), C. Brotons (Spain) and J. Muñiz (Spain).

For further info about the European Heart Network (EHN) and the Euro Heart Survey II project please visit [www.ehnheart.org](http://www.ehnheart.org)

We are asking for your collaboration and whether you are so kind to answer the "questionnaire addressed to physicians". Answering this questionnaire is very easy and will take only few minutes. Also, we ask you to complete the "patient´s questionnaire" collecting and enter into the system the information requested for the last 10 diabetic patients seen in your consultation list, based on the information on your medical records. You do not need to interview the patients.

As a result of this project it is our intention to produce several scientific publications and your name will appear jointly will all the investigators. Also, if you and your organization would like to present this data in scientific conferences, please contact investigators and they will facilitate your request.

For completing, both the physician´s and patient´s questionnaire, please go to the following web address, get registered and follow the instructions:

1: click this webpage  
<http://diabetesguidelineprevention.com/>

2. If this is the first time you enter in this website and you need a password, please click here.

When you 'click here'

And the page of Registration Form appears. Introduce name, surname and contact email and SEND.

You will receive a temporary password at your inbox. If not, CHECK YOUR SPAM FOLDER.

You should introduce this password at the loginpage. Then, you will have the opportunity to change your password by your own password. Then, you will automatically enter at the questionnaires.

Before start over again, please CHECK YOUR SPAM FOLDER.

We appreciate very much your collaboration.

Kind regards,

J. Tuomilehto, R. Gabriel, L. Ryden, C. Brotons and J. Muñiz.







**AEDEC**

