

*Selezione pubblica, per titoli e prova-colloquio, per l'assunzione, con contratto a tempo determinato, di n. 1 unità di personale con il profilo di **Ricercatore** – III livello professionale dell'Istituto Superiore di Sanità per far fronte alle esigenze previste dal progetto PNRR di Partenariato Esteso dal titolo “HEAL ITALIA – Health Extended Alliance for Innovative Therapies, Advanced Lab-research, and Integrated Approaches of Precision Medicine” per le esigenze del Work Package 4 “Case studies for personalized prevention strategies” – codice identificativo: PE0000019 – CUP: I83C22001830006, nell’ambito della missione 4 “Istruzione e Ricerca”, componente 2 “Dalla Ricerca all’impresa”, linea di investimento 1.3, finanziato dall’Unione Europea - NextGeneratioUE, a valere sull’Avviso pubblico del Ministero dell’Università e della Ricerca (MUR) n. 341 del 15.03.2022, presso il Dipartimento di Malattie Cardiovascolari, Endocrino-metaboliche e Invecchiamento (durata del contratto: 12 mesi) – codice concorso: TD RIC MACA 2024 01– Pubblicazione portale InPA 19.02.2024*

Vengono fissati i seguenti criteri, tenuto conto delle categorie previste dal bando:

**Ctg. 1) SERVIZI E ATTIVITÀ PRESTATI PRESSO ISTITUZIONI DI RICERCA NEL SETTORE DELLA SANITÀ PUBBLICA - fino a punti 14,00 – (saranno attribuiti punti 2,00 per anno o frazione di anno superiore a sei mesi):** Il punteggio sarà attribuito dopo aver sommato tra loro i vari periodi. Se per lo stesso periodo di tempo risultano prestati più servizi e attività, tale periodo verrà considerato una sola volta.

Non saranno valutate nella presente categoria attività svolte a titolo non retribuito quali ad esempio tirocinio, ospitalità e volontariato. Non saranno altresì valutati i periodi svolti durante il dottorato di ricerca e borse di studio, oggetto di specifica valutazione alla categoria 3.

**Ctg.2) PUBBLICAZIONI E/O ATTIVITÀ TECNICO SCIENTIFICHE - fino a punti 14,00 - punteggio massimo attribuibile a ciascuna pubblicazione punti 0,50**

- Punti 0,50: editor di libri con più capitoli;
- Punti 0,20: primo nome, ultimo nome o autore corresponding della pubblicazione su riviste estere attinenti al tipo di esperienza e conoscenza richiesta dal bando;
- Punti 0,10: conferimento di incarichi, attinenti agli argomenti per i quali è richiesta una specifica esperienza da parte dei candidati;
- Punti 0,05: rapporti tecnici, pareri ed elaborati di servizio attinenti agli argomenti per i quali è richiesta una specifica esperienza e conoscenza da parte dei candidati;
- Docenze di durata almeno annuale: 0,10;
- Altri eventuali titoli ritenuti di particolare rilevanza dalla Commissione: 0,10
- Non saranno valutati abstract, ringraziamenti, presentazioni e/o comunicazioni a congressi e poster.

**Ctg. 3) SPECIALIZZAZIONI, BORSE DI STUDIO, DOTTORATI DI RICERCA, PARTECIPAZIONE A CORSI DI FORMAZIONE, VINCITE O IDONEITÀ IN PUBBLICHE SELEZIONI O CONCORSI ED ALTRI TITOLI CULTURALI E PROFESSIONALI - fino a punti 2 - punteggio massimo attribuibile a ciascun titolo punti 0,50**

- Punti 0,50: specializzazioni;
- Punti 0,30: dottorati di ricerca;
- Punti 0,20: borse di studio, seconda laurea e master;
- Punti 0,10: abilitazione
- Punti 0,05: la partecipazione a corsi di formazione e perfezionamento, attinenti alle materie ed all'esperienza richiesta dal bando sarà valutata solo se di durata superiore a 5 giorni. Non saranno valutate partecipazioni a seminari, workshop, convegni, incontri e similari;
- Punti 0,10: vincite o idoneità a concorsi e selezioni di profilo almeno analogo a quello per cui si concorre;
- Brevetti: 0,30;
- Altri eventuali titoli ritenuti di particolare rilevanza dalla Commissione: 0,10

Ultimata tale fase la Commissione procede, ai sensi del citato articolo 2, comma 2, del bando, alla formulazione dei seguenti criteri e modalità di valutazione della prova-colloquio da formalizzare nei relativi verbali, al fine di assegnare i punteggi attribuiti alla suddetta prova:

- Padronanza dei fondamenti concettuali e delle specificità tecniche oggetto dell'esperienza richiesta.
- Capacità di elaborazione autonoma e di discussione avanzate delle metodologie oggetto dell'esperienza richiesta e della loro applicazione in ambiti diversi pertinenti all'esperienza medesima.
- Padronanza della lingua inglese
- Padronanza dell'uso delle apparecchiature informatiche

Il colloquio verterà sugli argomenti sopra indicati che saranno oggetto di sorteggio da parte dei candidati ammessi a sostenere la prova.

***QUESITI:***

**COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. .....1.....**

**Il candidato descriva gli studi trasversali ed esempi di applicazione in epidemiologia**

**Quali indicatori epidemiologici si possono ottenere**

**Scelta un indicatore e descriva, utilizzando il pacchetto statistico che preferisce, la procedura per ottenerlo**

Leggere e tradurre la parte in grassetto:

**Trends of blood pressure, raised blood pressure, hypertension and its control among Italian adults: CUORE Project cross-sectional health examination surveys 1998/2008/2018**

**Objectives:** To assess in the Italian general adult population the trends of blood pressure (BP) and prevalence of raised BP (RBP), hypertension and its control in order to evaluate population health and care, and the achievement of an RBP 25% relative reduction as recommended by the WHO at population level.

**Design:** Results comparison of health examination surveys, cross-sectional observational studies based on health examination of randomly selected age and sex stratified samples including residents aged 35-74 years. Data of the 2018/2019 survey were compared with the previous ones collected in 1998/2002 and 2008/2012.

**Setting:** Health examination surveys conducted in Italy within the CUORE Project following standardised methodologies.

**Participants:** 2985 men and 2955 women examined in 1998/2002, 2218 men and 2204 women examined in 2008/2012 and 1031 men and 1066 women examined in 2018/2019.

**Primary and secondary outcome measures:** Age-standardised mean of BP, prevalence of RBP (systolic BP and/or diastolic BP  $\geq 140/90$  mm Hg), hypertension (presenting or being treated for RBP) and its awareness and control, according to sex, age class and educational level.

**Results:** In 2018/2019, a significant reduction was observed in systolic BP and diastolic BP in men (1998/2002: 136/86 mm Hg; 2008/2012: 132/84 mm Hg; and 2018/2019: 132/78 mm Hg) and women (132/82 mm Hg, 126/78 mm Hg and 122/73 mm Hg), and in the prevalence of RBP (50%, 40% and 30% in men and 39%, 25% and 16% in women) and of hypertension (54%, 49% and 44% in men and 45%, 35% and 32% in women). Trends were consistent by age and education attainment. In 2018/2019, hypertensive men and women with controlled BP were only 27% and 41%, but a significant favourable trend was observed.

**Conclusions:** Data from 2018/2019 underlined that RBP is still commonly observed in the Italian population aged 35-74 years, however, the WHO RBP target at that time may be considered met.

**COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. ....2.....**

**Il candidato descriva le principali misure di associazione utilizzate nell'epidemiologia delle malattie non trasmissibili**

**Scelga un indicatore e indichi con quali tipi di studi si può ottenere**

**Descrivendo, utilizzando il pacchetto statistico che preferisce, la procedura per ottenerlo**

Leggere e tradurre la parte in grassetto:

**Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants**

## Abstract

**Background:** Hypertension can be detected at the primary health-care level and low-cost treatments can effectively control hypertension. We aimed to measure the prevalence of hypertension and progress in its detection, treatment, and control from 1990 to 2019 for 200 countries and territories.

**Methods:** We used data from 1990 to 2019 on people aged 30-79 years from population-representative studies with measurement of blood pressure and data on blood pressure treatment. We defined hypertension as having systolic blood pressure 140 mm Hg or greater, diastolic blood pressure 90 mm Hg or greater, or taking medication for hypertension. We applied a Bayesian hierarchical model to estimate the prevalence of hypertension and the proportion of people with hypertension who had a previous diagnosis (detection), who were taking medication for hypertension (treatment), and whose hypertension was controlled to below 140/90 mm Hg (control). The model allowed for trends over time to be non-linear and to vary by age.

**Findings:** The number of people aged 30-79 years with hypertension doubled from 1990 to 2019, from 331 (95% credible interval 306-359) million women and 317 (292-344) million men in 1990 to 626 (584-668) million women and 652 (604-698) million men in 2019, despite stable global age-standardised prevalence. In 2019, age-standardised hypertension prevalence was lowest in Canada and Peru for both men and women; in Taiwan, South Korea, Japan, and some countries in western Europe including Switzerland, Spain, and the UK for women; and in several low-income and middle-income countries such as Eritrea, Bangladesh, Ethiopia, and Solomon Islands for men. Hypertension prevalence surpassed 50% for women in two countries and men in nine countries, in central and eastern Europe, central Asia, Oceania, and Latin America. Globally, 59% (55-62) of women and 49% (46-52) of men with hypertension reported a previous diagnosis of hypertension in 2019, and 47% (43-51) of women and 38% (35-41) of men were treated. Control rates among people with hypertension in 2019 were 23% (20-27) for women and 18% (16-21) for men. In 2019, treatment and control rates were highest in South Korea, Canada, and Iceland (treatment >70%; control >50%), followed by the USA, Costa Rica, Germany, Portugal, and Taiwan. Treatment rates were less than 25% for women and less than 20% for men in Nepal, Indonesia, and some countries in sub-Saharan Africa and Oceania. Control rates were below 10% for women and men in these countries and for men in some countries in north Africa, central and south Asia, and eastern Europe. Treatment and control rates have improved in most countries since 1990, but we found little change in most countries in sub-Saharan Africa and Oceania. Improvements were largest in high-income countries, central Europe, and some upper-middle-income and recently high-income countries including Costa Rica, Taiwan, Kazakhstan, South Africa, Brazil, Chile, Turkey, and Iran.

**Interpretation:** Improvements in the detection, treatment, and control of hypertension have varied substantially across countries, with some middle-income countries now outperforming most high-income nations. The dual approach of reducing hypertension prevalence through primary prevention and enhancing its treatment and control is achievable not only in high-income countries but also in low-income and middle-income settings.

COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. ....3.....

**Il candidato descriva con quali studi può essere stimata la prevalenza delle condizioni a rischio delle malattie cardiovascolari nella popolazione generale**

**Descriva, utilizzando il pacchetto statistico che preferisce, la procedura per ottenerli**

Leggere e tradurre la parte in grassetto:

***Diabetes mellitus, fasting blood glucose concentration, and risk of vascular disease: a collaborative meta-analysis of 102 prospective studies***

#### **Abstract**

**Background:** Uncertainties persist about the magnitude of associations of diabetes mellitus and fasting glucose concentration with risk of coronary heart disease and major stroke subtypes. We aimed to quantify these associations for a wide range of circumstances.

**Methods:** We undertook a meta-analysis of individual records of diabetes, fasting blood glucose concentration, and other risk factors in people without initial vascular disease from studies in the Emerging Risk Factors Collaboration. We combined within-study regressions that were adjusted for age, sex, smoking, systolic blood pressure, and body-mass index to calculate hazard ratios (HRs) for vascular disease.

**Findings:** Analyses included data for 698 782 people (52 765 non-fatal or fatal vascular outcomes; 8.49 million person-years at risk) from 102 prospective studies. Adjusted HRs with diabetes were: 2.00 (95% CI 1.83-2.19) for coronary heart disease; 2.27 (1.95-2.65) for ischaemic stroke; 1.56 (1.19-2.05) for haemorrhagic stroke; 1.84 (1.59-2.13) for unclassified stroke; and 1.73 (1.51-1.98) for the aggregate of other vascular deaths. HRs did not change appreciably after further adjustment for lipid, inflammatory, or renal markers. HRs for coronary heart disease were higher in women than in men, at 40-59 years than at 70 years and older, and with fatal than with non-fatal disease. At an adult population-wide prevalence of 10%, diabetes was estimated to account for 11% (10-12%) of vascular deaths. Fasting blood glucose concentration was non-linearly related to vascular risk, with no significant associations between 3.90 mmol/L and 5.59 mmol/L. Compared with fasting blood glucose concentrations of 3.90-5.59 mmol/L, HRs for coronary heart disease were: 1.07 (0.97-1.18) for lower than 3.90 mmol/L; 1.11 (1.04-1.18) for 5.60-6.09 mmol/L; and 1.17 (1.08-1.26) for 6.10-6.99 mmol/L. In people without a history of diabetes, information about fasting blood glucose concentration or impaired fasting glucose status did not significantly improve metrics of vascular disease prediction when added to information about several conventional risk factors.

**Interpretation:** Diabetes confers about a two-fold excess risk for a wide range of vascular diseases, independently from other conventional risk factors. In people without diabetes, fasting blood glucose concentration is modestly and non-linearly associated with risk of vascular disease.

COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. ....4.....

**Il candidato descriva gli studi di coorte in epidemiologia**

**Quali indicatori epidemiologici si possono ottenere**

**Scelta un indicatore e descriva, utilizzando il pacchetto statistico che preferisce, la procedura per ottenerli**

Leggere e tradurre la parte in grassetto:

***SCORE2 risk prediction algorithms: new models to estimate 10-year risk of cardiovascular disease in Europe***

#### **Abstract**

**Aims:** The aim of this study was to develop, validate, and illustrate an updated prediction model (SCORE2) to estimate 10-year fatal and non-fatal cardiovascular disease (CVD) risk in individuals without previous CVD or diabetes aged 40-69 years in Europe.

**Methods and results:** We derived risk prediction models using individual-participant data from 45 cohorts in 13 countries (677 684 individuals, 30 121 CVD events). We used sex-specific and competing risk-adjusted models, including age, smoking status, systolic blood pressure, and total- and HDL-cholesterol. We defined four risk regions in Europe according to country-specific CVD mortality, recalibrating models to each region using expected incidences and risk factor distributions. Region-specific incidence was estimated using CVD mortality and incidence data on 10 776 466 individuals.

For external validation, we analysed data from 25 additional cohorts in 15 European countries (1 133 181 individuals, 43 492 CVD events). After applying the derived risk prediction models to external validation cohorts, C-indices ranged from 0.67 (0.65-0.68) to 0.81 (0.76-0.86). Predicted CVD risk varied several-fold across European regions. For example, the estimated 10-year CVD risk for a 50-year-old smoker, with a systolic blood pressure of 140 mmHg, total cholesterol of 5.5 mmol/L, and HDL-cholesterol of 1.3 mmol/L, ranged from 5.9% for men in low-risk countries to 14.0% for men in very high-risk countries, and from 4.2% for women in low-risk countries to 13.7% for women in very high-risk countries.

**Conclusion:** SCORE2-a new algorithm derived, calibrated, and validated to predict 10-year risk of first-onset CVD in European populations-enhances the identification of individuals at higher risk of developing CVD across Europe.

**COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. .....5.....**

**Il candidato definisca cosa si intende per incidenza di una malattia cronico-degenerativa**

**Da quali studi epidemiologici si può ottenere**

**Descrivere, utilizzando il pacchetto statistico che preferisce, la procedura per ottenerla**

Leggere e tradurre la parte in grassetto:

***SCORE2 risk prediction algorithms: new models to estimate 10-year risk of cardiovascular disease in Europe***

#### **Abstract**

**Aims:** The aim of this study was to develop, validate, and illustrate an updated prediction model (SCORE2) to estimate 10-year fatal and non-fatal cardiovascular disease (CVD) risk in individuals without previous CVD or diabetes aged 40-69 years in Europe.

**Methods and results:** We derived risk prediction models using individual-participant data from 45 cohorts in 13 countries (677 684 individuals, 30 121 CVD events). We used sex-specific and competing risk-adjusted models, including age, smoking status, systolic blood pressure, and total- and HDL-cholesterol. We defined four risk regions in Europe according to country-specific CVD mortality, recalibrating models to each region using expected incidences and risk factor distributions. Region-specific incidence was estimated using CVD mortality and incidence data on 10 776 466 individuals.

**For external validation, we analysed data from 25 additional cohorts in 15 European countries (1 133 181 individuals, 43 492 CVD events). After applying the derived risk prediction models to external validation cohorts, C-indices ranged from 0.67 (0.65-0.68) to 0.81 (0.76-0.86). Predicted CVD risk varied several-fold across European regions.** For example, the estimated 10-year CVD risk for a 50-year-old smoker, with a systolic blood pressure of 140 mmHg, total cholesterol of 5.5 mmol/L, and HDL-cholesterol of 1.3 mmol/L, ranged from 5.9% for men in low-risk countries to 14.0% for men in very high-risk countries, and from 4.2% for women in low-risk countries to 13.7% for women in very high-risk countries. Conclusion: SCORE2-a new algorithm derived, calibrated, and validated to predict 10-year risk of first-onset CVD in European populations-enhances the identification of individuals at higher risk of developing CVD across Europe.

#### COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. ....6.....

**Cosa misura in epidemiologia l'indicatore 'Odds Ratio'?**

**Con quali tipi di studi può essere stimato l'odds ratio di un fattore di rischio rispetto ad un out-come**

**Descrivere, utilizzando il pacchetto statistico che preferisce, la procedura per ottenerlo**

Leggere e tradurre la parte in grassetto:

***Diabetes mellitus, fasting blood glucose concentration, and risk of vascular disease: a collaborative meta-analysis of 102 prospective studies***

#### **Abstract**

**Background:** Uncertainties persist about the magnitude of associations of diabetes mellitus and fasting glucose concentration with risk of coronary heart disease and major stroke subtypes. We aimed to quantify these associations for a wide range of circumstances.

**Methods:** We undertook a meta-analysis of individual records of diabetes, fasting blood glucose concentration, and other risk factors in people without initial vascular disease from studies in the Emerging Risk Factors Collaboration. We combined within-study regressions that were adjusted for age, sex, smoking, systolic blood pressure, and body-mass index to calculate hazard ratios (HRs) for vascular disease.

**Findings:** Analyses included data for 698 782 people (52 765 non-fatal or fatal vascular outcomes; 8.49 million person-years at risk) from 102 prospective studies. Adjusted HRs with diabetes were: 2.00 (95% CI 1.83-2.19) for coronary heart disease; 2.27 (1.95-2.65) for ischaemic stroke; 1.56 (1.19-2.05) for haemorrhagic stroke; 1.84 (1.59-2.13) for unclassified

stroke; and 1.73 (1.51-1.98) for the aggregate of other vascular deaths. HRs did not change appreciably after further adjustment for lipid, inflammatory, or renal markers. HRs for coronary heart disease were higher in women than in men, at 40-59 years than at 70 years and older, and with fatal than with non-fatal disease. At an adult population-wide prevalence of 10%, diabetes was estimated to account for 11% (10-12%) of vascular deaths. Fasting blood glucose concentration was non-linearly related to vascular risk, with no significant associations between 3.90 mmol/L and 5.59 mmol/L. Compared with fasting blood glucose concentrations of 3.90-5.59 mmol/L, HRs for coronary heart disease were: 1.07 (0.97-1.18) for lower than 3.90 mmol/L; 1.11 (1.04-1.18) for 5.60-6.09 mmol/L; and 1.17 (1.08-1.26) for 6.10-6.99 mmol/L. In people without a history of diabetes, information about fasting blood glucose concentration or impaired fasting glucose status did not significantly improve metrics of vascular disease prediction when added to information about several conventional risk factors.

**Interpretation:** Diabetes confers about a two-fold excess risk for a wide range of vascular diseases, independently from other conventional risk factors. In people without diabetes, fasting blood glucose concentration is modestly and non-linearly associated with risk of vascular disease.

#### COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. ....7.....

**Cosa misura in epidemiologia l'indicatore 'Hazard Ratio'?**

**Con quali tipi di studi può essere stimato l'hazard ratio di un fattore di rischio rispetto ad un out-come**

**Descriva, utilizzando il pacchetto statistico che preferisce, la procedura per ottenerlo**

Leggere e tradurre la parte in grassetto:

***Health Literacy, lifestyles, and socio-economic factors in the Italian population: a national survey***

**Introduction:** Health literacy (HL) entails people's knowledge and abilities to find, understand and use health information to make health-related decisions. This study aims to evaluate HL association with lifestyles in the Italian adult population.

**Methods:** In 2021, in the framework of the Italian participation in the WHO network Measuring Population and Organizational Health Literacy M-POHL, a survey was conducted on a representative sample of the Italian population aged 18+ years (n=3,500). A validated 47-item questionnaire was used to collect core HL information, plus 31 items for correlate information, including lifestyles. For each HL-item, a 4-point Likert scale was applied: very easy/easy/difficult/very difficult. The HL index (percentage of very easy/easy), was stratified in Inadequate (0%-50%), Problematic (51%-66%), Sufficient (67%-80%), Excellent (81%-100%). Inadequate/Problematic were merged into "Limiting", Sufficient/Excellent in "Not limiting". **Multinomial logistic regression analysis was implemented to assess the association between dichotomous HL and obesity (BMI>=30 Kg/m<sup>2</sup>), physical activity-PA (intense (5-7 days a week)/not intense (0-4 days a week)), fruit and vegetable diet-FVD (daily/not daily),**

**smoking habit (yes/no), adjusted by sex, age, region, education-ED, financial deprivation-FD.**

Results: Prevalence of Limiting HL is 64.6%. In Limiting HL, obesity is significantly higher than in Not limiting HL (14.6% vs 12.0%), similarly not intense PA (82.3% vs 75.7%), not daily FVD (54.0% vs 47.7%), low ED (22.3% vs 18.0%), severe FD (20.8% vs 9.1%); the opposite for smokers (30.2% vs 34.7%). Significant association with Limiting HL was found for not intense PA (Odds Ratio-OR=1.48), not daily FVD (OR=1.24), low ED (OR=1.39), severe FD (OR=3.33).

Conclusions: Results show that persons with not intense PA and those with not daily FVD need targeted support to improve HL, as well as those with a lower level of education and problematic financial situation.

COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. .....8.....

**Il candidato descriva che cosa si intende per fattore di confondimento in uno studio epidemiologico**

**Come si può tenere in considerazione l'effetto di confondimento in un'analisi epidemiologica**

**Descrivendo, utilizzando il pacchetto statistico che preferisce, come tenere in considerazione l'effetto dei fattori di confondimento**

Leggere e tradurre la parte in grassetto:

***Diabetes mellitus, fasting blood glucose concentration, and risk of vascular disease: a collaborative meta-analysis of 102 prospective studies***

**Abstract**

Background: Uncertainties persist about the magnitude of associations of diabetes mellitus and fasting glucose concentration with risk of coronary heart disease and major stroke subtypes. We aimed to quantify these associations for a wide range of circumstances.

Methods: We undertook a meta-analysis of individual records of diabetes, fasting blood glucose concentration, and other risk factors in people without initial vascular disease from studies in the Emerging Risk Factors Collaboration. We combined within-study regressions that were adjusted for age, sex, smoking, systolic blood pressure, and body-mass index to calculate hazard ratios (HRs) for vascular disease.

Findings: Analyses included data for 698 782 people (52 765 non-fatal or fatal vascular outcomes; 8.49 million person-years at risk) from 102 prospective studies. Adjusted HRs with diabetes were: 2.00 (95% CI 1.83-2.19) for coronary heart disease; 2.27 (1.95-2.65) for ischaemic stroke; 1.56 (1.19-2.05) for haemorrhagic stroke; 1.84 (1.59-2.13) for unclassified stroke; and 1.73 (1.51-1.98) for the aggregate of other vascular deaths. HRs did not change appreciably after further adjustment for lipid, inflammatory, or renal markers. HRs for coronary heart disease were higher in women than in men, at 40-59 years than at 70 years and older, and with fatal than with non-fatal disease. At an adult population-wide prevalence of 10%, diabetes was estimated to account for 11% (10-12%) of vascular deaths. **Fasting blood glucose concentration was non-linearly related to vascular risk, with no significant associations between 3.90 mmol/L and 5.59 mmol/L. Compared with fasting blood glucose**

concentrations of 3.90-5.59 mmol/L, HRs for coronary heart disease were: 1.07 (0.97-1.18) for lower than 3.90 mmol/L; 1.11 (1.04-1.18) for 5.60-6.09 mmol/L; and 1.17 (1.08-1.26) for 6.10-6.99 mmol/L. In people without a history of diabetes, information about fasting blood glucose concentration or impaired fasting glucose status did not significantly improve metrics of vascular disease prediction when added to information about several conventional risk factors.

**Interpretation:** Diabetes confers about a two-fold excess risk for a wide range of vascular diseases, independently from other conventional risk factors. In people without diabetes, fasting blood glucose concentration is modestly and non-linearly associated with risk of vascular disease.

#### COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. ....9.....

**Il candidato descriva quali sono i metodi principali di standardizzazione di un indicatore epidemiologico e quali vantaggi comportano**

**Descriva, utilizzando il pacchetto statistico che preferisce, la procedura per ottenere un indicatore standardizzato**

Leggere e tradurre la parte in grassetto:

***Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants***

#### **Abstract**

**Background:** Hypertension can be detected at the primary health-care level and low-cost treatments can effectively control hypertension. We aimed to measure the prevalence of hypertension and progress in its detection, treatment, and control from 1990 to 2019 for 200 countries and territories.

**Methods:** We used data from 1990 to 2019 on people aged 30-79 years from population-representative studies with measurement of blood pressure and data on blood pressure treatment. We defined hypertension as having systolic blood pressure 140 mm Hg or greater, diastolic blood pressure 90 mm Hg or greater, or taking medication for hypertension. **We applied a Bayesian hierarchical model to estimate the prevalence of hypertension and the proportion of people with hypertension who had a previous diagnosis (detection), who were taking medication for hypertension (treatment), and whose hypertension was controlled to below 140/90 mm Hg (control). The model allowed for trends over time to be non-linear and to vary by age.**

**Findings:** The number of people aged 30-79 years with hypertension doubled from 1990 to 2019, from 331 (95% credible interval 306-359) million women and 317 (292-344) million men in 1990 to 626 (584-668) million women and 652 (604-698) million men in 2019, despite stable global age-standardised prevalence. In 2019, age-standardised hypertension prevalence was lowest in Canada and Peru for both men and women; in Taiwan, South Korea, Japan, and some countries in western Europe including Switzerland, Spain, and the UK for women; and in several low-income and middle-income countries such as Eritrea, Bangladesh, Ethiopia, and

Solomon Islands for men. Hypertension prevalence surpassed 50% for women in two countries and men in nine countries, in central and eastern Europe, central Asia, Oceania, and Latin America. Globally, 59% (55-62) of women and 49% (46-52) of men with hypertension reported a previous diagnosis of hypertension in 2019, and 47% (43-51) of women and 38% (35-41) of men were treated. Control rates among people with hypertension in 2019 were 23% (20-27) for women and 18% (16-21) for men. In 2019, treatment and control rates were highest in South Korea, Canada, and Iceland (treatment >70%; control >50%), followed by the USA, Costa Rica, Germany, Portugal, and Taiwan. Treatment rates were less than 25% for women and less than 20% for men in Nepal, Indonesia, and some countries in sub-Saharan Africa and Oceania. Control rates were below 10% for women and men in these countries and for men in some countries in north Africa, central and south Asia, and eastern Europe. Treatment and control rates have improved in most countries since 1990, but we found little change in most countries in sub-Saharan Africa and Oceania. Improvements were largest in high-income countries, central Europe, and some upper-middle-income and recently high-income countries including Costa Rica, Taiwan, Kazakhstan, South Africa, Brazil, Chile, Turkey, and Iran.

**Interpretation:** Improvements in the detection, treatment, and control of hypertension have varied substantially across countries, with some middle-income countries now outperforming most high-income nations. The dual approach of reducing hypertension prevalence through primary prevention and enhancing its treatment and control is achievable not only in high-income countries but also in low-income and middle-income settings.

#### COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. ....10.....

**Il candidato descriva che cosa si intende per modificatore di effetto in uno studio epidemiologico**

**Come si può valutare l'influenza di un modificatore di effetto in un'analisi epidemiologica**

**Descrivendo, utilizzando il pacchetto statistico che preferisce, come valutare l'influenza di un modificatore di effetto**

Leggere e tradurre la parte in grassetto:

***Trends of blood pressure, raised blood pressure, hypertension and its control among Italian adults: CUORE Project cross-sectional health examination surveys 1998/2008/2018***

**Objectives:** To assess in the Italian general adult population the trends of blood pressure (BP) and prevalence of raised BP (RBP), hypertension and its control in order to evaluate population health and care, and the achievement of an RBP 25% relative reduction as recommended by the WHO at population level.

**Design:** **Results comparison of health examination surveys, cross-sectional observational studies based on health examination of randomly selected age and sex stratified samples including residents aged 35-74 years. Data of the 2018/2019 survey were compared with the previous ones collected in 1998/2002 and 2008/2012.**

Setting: Health examination surveys conducted in Italy within the CUORE Project following standardised methodologies.

Participants: 2985 men and 2955 women examined in 1998/2002, 2218 men and 2204 women examined in 2008/2012 and 1031 men and 1066 women examined in 2018/2019.

Primary and secondary outcome measures: Age-standardised mean of BP, prevalence of RBP (systolic BP and/or diastolic BP  $\geq 140/90$  mm Hg), hypertension (presenting or being treated for RBP) and its awareness and control, according to sex, age class and educational level.

Results: In 2018/2019, a significant reduction was observed in systolic BP and diastolic BP in men (1998/2002: 136/86 mm Hg; 2008/2012: 132/84 mm Hg; and 2018/2019: 132/78 mm Hg) and women (132/82 mm Hg, 126/78 mm Hg and 122/73 mm Hg), and in the prevalence of RBP (50%, 40% and 30% in men and 39%, 25% and 16% in women) and of hypertension (54%, 49% and 44% in men and 45%, 35% and 32% in women). Trends were consistent by age and education attainment. In 2018/2019, hypertensive men and women with controlled BP were only 27% and 41%, but a significant favourable trend was observed.

Conclusions: Data from 2018/2019 underlined that RBP is still commonly observed in the Italian population aged 35-74 years, however, the WHO RBP target at that time may be considered met.

#### COLLOQUIO DEL 16.05.2024 – GRUPPO DI QUESITI N. ....11.....

**Il candidato descriva le curve di Kaplan-Meyer e fornisca in quali tipi di studi epidemiologici possono essere utilizzate**

**Descriva, utilizzando il pacchetto statistico che preferisce, come impostare il loro utilizzo in un'analisi di dati epidemiologici**

Leggere e tradurre la parte in grassetto:

**SCORE2 risk prediction algorithms: new models to estimate 10-year risk of cardiovascular disease in Europe**

#### **Abstract**

**Aims:** The aim of this study was to develop, validate, and illustrate an updated prediction model (SCORE2) to estimate 10-year fatal and non-fatal cardiovascular disease (CVD) risk in individuals without previous CVD or diabetes aged 40-69 years in Europe.

**Methods and results:** We derived risk prediction models using individual-participant data from 45 cohorts in 13 countries (677 684 individuals, 30 121 CVD events). We used sex-specific and competing risk-adjusted models, including age, smoking status, systolic blood pressure, and total- and HDL-cholesterol. **We defined four risk regions in Europe according to country-specific CVD mortality, recalibrating models to each region using expected incidences and risk factor distributions. Region-specific incidence was estimated using CVD mortality and incidence data on 10 776 466 individuals.**

**For external validation, we analysed data from 25 additional cohorts in 15 European countries (1 133 181 individuals, 43 492 CVD events).** After applying the derived risk prediction models to external validation cohorts, C-indices ranged from 0.67 (0.65-0.68) to 0.81 (0.76-0.86). Predicted CVD risk varied several-fold across European regions. For example, the estimated 10-year CVD risk for a 50-year-old smoker, with a systolic blood pressure of 140

mmHg, total cholesterol of 5.5 mmol/L, and HDL-cholesterol of 1.3 mmol/L, ranged from 5.9% for men in low-risk countries to 14.0% for men in very high-risk countries, and from 4.2% for women in low-risk countries to 13.7% for women in very high-risk countries.

Conclusion: SCORE2-a new algorithm derived, calibrated, and validated to predict 10-year risk of first-onset CVD in European populations-enhances the identification of individuals at higher risk of developing CVD across Europe.