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The Croatian Adult Health Cohort Study (CroHort) – Background, Methodology & Perspectives

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ABSTRACT

Health interview surveys are important source of health information. All previous adult population-based health interview surveys in Croatia until CroHort, were one-off projects with very limited possibility of data comparison. CroHort enabled repeated survey of CAHS 2003 respondents with almost identical questionnaire, thus providing comparable data on trends of different risk factors as well as their relation to the specific outcomes. Next follow-up survey of the CroHort cohort is foreseen for 2013. Health interview survey according to Eurostat methodology (EHIS) on the new representative sample of adult Croatian population is planned for 2014. As the data from health interview surveys are valuable in health policy, efforts should be made to increase their use by policymakers in Croatia.

Key words: *Croatian Adult Health Cohort Study, survey methodology, cohort, Croatia*

Background

Health interview surveys are important source of health information for decision makers, public health professionals, researchers and public in general. This information are used in detecting and follow-up of important health problems in population, evaluation of various programmes and measures which influence health, research of health inequalities, analysis of health care availability and use. Health interview surveys are unique source of information about health related lifestyle (nutrition, alcohol consumption, smoking, physical activity) at population level which can not be obtained through routine statistical data.

Many European countries organize national health interview surveys on regular basis, for example UK[1,2], Spain[3], Norway[4], while in the US, National Health Interview Survey has been executed regularly since 1957[5].

In order to ensure constant source of updated information representative at population level, surveys should be repeated in regular intervals, at least each 5 years. Although some countries do practice regular surveys, either in 5-year intervals, 2-year intervals or continuously, in majority the surveys are not executed regularly, possibly depending on priority of risk factors monitoring and available financial resources.

As each country prepared its own questionnaire, the differences in their contents were significant which reduced the comparability of results among countries[6].

Until Croatian Adult Health Cohort Study, all population based health surveys in Croatia were one-off projects with very limited possibility of data comparison.

Review of the Previous Population-based Health Interview Surveys in Croatia

The First Croatian Health Project – 1995

The First Croatian Health Project included as one of its core activities, the first health interview survey on a national adult population sample in Croatia. The final representative sample obtained through stratified multistage design, contained 5,840 respondents aged 18–64 years. The questions encompassed sociodemographic characteristics, personal and family medical history, nutrition, smoking, alcohol consumption and physical activity. Anthropometric (height, weight) and blood pressure mea-

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surements were also included as well as measurement of total cholesterol, HDL, LDL, triglycerides and glucose from a blood sample. The results from this survey provided for the first time representative data on extent and distribution of risk factors for cardiovascular and other chronic non-communicable diseases in Croatia. These results served as the basis for development of intervention programme[7].

Croatian Health Survey – 1997

Croatian Health Survey sample consisted of 5,048 respondents aged 18 years and older, obtained through stratified multistage sampling in four regions using insurance registry. Survey included questions about socioeconomic characteristics, lifestyle and use of health care as well as SF-36 which was implemented for the first time on general population in Croatia[8].

World Health Survey (WHS) – 2003

This survey was developed by World Health Organization in order to collect comparable data on health status of populations (measuring health in multiple domains), risk factors (tobacco, alcohol, pollution), responsiveness of health systems, coverage, access and utilization of health services and health care expenditures. It has been completed in 73 countries worldwide. In Croatia, sample consisted of 994 respondents aged 18 years and older, obtained through stratified multistage sampling of the households[9].

Croatian Adult Health Survey (CAHS) – 2003

Croatian Adult Health Survey was part of a project for prevention of cardiovascular diseases. Its aim was to provide comprehensive data about health of Croatian population, including health status, use of health services and health determinants (nutrition, smoking, alcohol consumption, physical activity, BMI calculated from self-reported height and weight) with emphasis on cardiovascular diseases. The sample consisted of 9,070 respondents aged 18 years and older, obtained through stratified multistage sampling of the households. It was representative both at national level and also at regional level (for six pre-defined regions). Measurements of blood pressure and waist circumference were also included[10].

Croatian Adult Health Cohort Study (CroHort) – methodology

Aim of CroHort was to contact and re-interview 9,070 respondents who participated in CAHS 2003, thus becoming the first follow-up study of CAHS 2003 cohort. Modules in CroHort responded to those in CAHS 2003 with the following exceptions: module Immigration from CAHS 2003 was not included in CroHort, while new module included in CroHort was Stress (10 questions from Perceived Stress Scale – standardized and validated instrument for measuring stress). Module Chronic conditions, medication and preventive examination was supplemented by the question on hormone replacement therapy, while module Dietary habits was supplemented by the set of 20 additional questions (Table 1).

The survey was carried out in 2008 by public health nurses who visited respondents with residence within the area where public health nurses usually work, in order to simplify interviewing of respondents and minimize non-response. However, as the data about addresses of respondents were the same as used during first question-

TABLE 1
CroHort QUESTION MODULES

Module	Description
Household	General information, including household size and age composition, number of rooms, income and urbanisation level
Socio-demographic characteristics	Age, gender, marital status, education, occupation, subjective estimation of socio-economic status
SF-36 questionnaire	Widely accepted survey consisting of several dimensions: general health, activity limitations, mental and physical problems
Stress	Perceived Stress Scale - standardized and validated instrument for measuring stress
Quality of life	Satisfaction with life
Health care access and utilization	Availability and visits to family physicians, specialists, dentists, etc, hospitalizations, difficulties in accessing health care services, additional health insurance
Chronic conditions, medication, preventive examination	Self-reported chronic disease and medication taking; preventive examination, screening, vaccination
Smoking	Everyday smoking including the possibility to calculate pack-years estimates, information on quitting attempts, exposure to second hand smoke
Physical activity	Self-reported physical activity during work, leisure and commuting
Dietary habits	Information on breakfast, fat, sugar and caffeine intake, salt, meat, fish, fruit/vegetables, sweets, fast-food consumption and eating patterns
Alcohol consumption	Types and amount of alcohol consumption, binge drinking
Physical measurements	Waist circumference, blood pressure, pulse rate; height and weight were self-reported

TABLE 2
NUMBER OF RESPONDENTS ACCORDING TO THE COUNTIES IN 2003 AND 2008 AND RESPONSE RATES IN 2008

Country	Number of respondents in 2003	Number of respondents in 2008	Response rate in 2008
Zagreb	639	187	29.3%
Krapina-Zagorje	299	157	52.5%
Sisak-Moslavina	327	166	50.8%
Karlovac	355	158	44.5%
Varaždin	438	193	44.1%
Koprivnica-Križevci	414	169	40.8%
Bjelovar-Bilogora	310	150	48.4%
Primorje-Gorski Kotar	780	308	39.5%
Lika-Senj	148	24	16.2%
Virovitica-Podravina	110	45	40.9%
Požega-Slavonia	99	60	60.6%
Brod-Posavina	427	23	5.4%
Zadar	306	142	46.4%
Osijek-Baranja	652	212	32.5%
Šibenik-Knin	304	100	32.9%
Vukovar-Srijem	418	133	31.8%
Split-Dalmatia	672	214	31.8%
Istria	393	186	47.3%
Dubrovnik-Neretva	214	22	10.3%
Međimurje	316	122	38.6%
City of Zagreb	1,449	458	31.6%
Croatia	9,070	3,229	35.6%

naire in 2003, certain number of addresses was outdated because respondents moved away and there were no possibilities foreseen to obtain their new address and organize interview. That contributed to significantly lower response rate compared to 2003 survey recorded in all counties. The highest response rate was recorded in Požega-Slavonia County (60.6%), while Brod-Posavina County had the lowest response rate (5.4%), with Croatian average being 35.6% (Table 2).

Response rate in 2008 compared to 2003 sample by sex was almost identical: 35.1% of men and 35.8% of women.

TABLE 3
REASONS FOR NON-RESPONSE

Reasons for non-response	Number of respondents	% of total sample in 2003
Refused to participate (total)	3,453	38.1
Contact not established (total)	2,388	26.3
Reasons:		
Died	808	8.9
Other	1,580	17.4
Non-response (total)	5,841	64.4

Relatively large number of respondents was successfully contacted, but refused to participate in the survey (38%), which points out the need to analyse the reasons for refusing to participate and take precautions in the future surveys in order to improve response rate. Possible reasons include oversaturation of population with numerous commercial and non-commercial surveys as well as lack of time and motivation for participation (Table 3).

When compared, respondents and non-respondents had the same percentage of male and female respondents in the sample (in both more than 2/3 of the sample was female – Table 4), but respondents were significantly older than non-respondents what should also be taken into account in interpretation of results (Table 5). In comparison with CAHS 2003 sample (which comprised of both respondents and non-respondents in 2008), the percentages of male and female respondents in CroHort were the same, but respondents in 2008 were in average almost six and a half years older, while non-respondents in 2008 were in average four years older (Table 4 and 5).

In CAHS 2003, complex weighting scheme was applied to increase representativeness of the sample and to balance for non-response, excess of female and older respondents and differences in regional contributions to the sample. Sample of CroHort was not weighted, therefore data from CroHort should be considered informative and analysed only at national level. However, they can provide various estimates regarding dynamics of different risk factors in the cohort and their relation to the specific outcomes.

CroHort was more than just a follow-up survey – it also included intervention by public health nurses who

TABLE 4
SEX STRUCTURE OF CroHort RESPONDENTS AND NON-RESPONDENTS AS WELL AS CAHS 2003 SAMPLE

	Men Number	%	95% Cl	Women Number	%	95% Cl
CroHort respondents	1,015	31.4	29.8–33.0	2,214	68.6	67.0–70.2
CroHort non-respondents – total	1,875	32.1	30.9–33.3	3,966	67.9	66.7–69.1
Died	298	36.9	33.6–40.2	510	63.1	59.8–66.4
Refused	1,102	31.9	30.4–33.5	2,351	68.1	66.5–69.6
No contact established	475	30.1	27.8–32.2	1,105	69.9	67.7–72.2
CAHS 2003 respondents (non-weighted)	2,890	31.9	30.9–32.8	6,180	68.1	67.2–69.1

TABLE 5
MEAN AGE OF CroHort RESPONDENTS AND NON-RESPONDENTS (AGE IN 2008) AND CAHS 2003 SAMPLE (AGE IN 2003)

	Mean age (years)	95% Cl
CroHort respondents	60.45	59.91–60.99
CroHort non-respondents – total	58.14	57.69–58.60
Died	71.84	70.80–72.97
Refused	55.58	55.01–56.16
No contact established	56.74	55.90–57.57
CAHS 2003 respondents (non-weighted)	53.97	53.62–54.32

offered counselling and one-year follow-up to high risk respondents, including evaluation of the risk level before and after intervention, thus providing additional value to this survey.

Future perspectives of health interview surveys in Croatia

The follow-up of CroHort cohort is planned to be continued by repeated survey of the 3,229 respondents after another five-year period – in 2013. It would enable further analysis of changes in respondents' risk profile and associated outcomes.

At the same time, new health survey on the new representative sample of adult population is planned as Croatia would join EU.

European Health Interview Survey (EHIS) – 2014

EUROSTAT (EU Statistical Office) recognized lack of reliable, comparable and regularly available health data in member states and therefore developed European Health Interview Survey (EHIS) – a standardized and validated health survey which is planned to be executed every five years in all EU countries. The first wave of EHIS was completed in EU countries in 2007/10 period, while the second wave is planned for 2014. In 2009, Croatian National Institute of Public Health started preparations for participation of Croatia in the second EHIS wave through project »Implementation of the EHIS« as a part of »Multi-beneficiary statistical cooperation programme PHARE 2006«. The project included translation and testing of the questionnaire, pilot survey on a random sample of 280 inhabitants of Zagreb older than 18 years and preparation of schedule for implementation of EHIS. All activities of pilot EHIS were executed entirely in accordance with methodology required by EUROSTAT. The survey was comprised of 4 modules (Table 6).

Majority of the interviewers were students. Data were collected between June and September 2009 through face-to face interviews, after obtaining written informed consent for participation from each respondent. Sensitive questions like out-of pocket payments, smoking, alcohol consumption and drug abuse were filled in the questionnaire by respondents themselves and sealed in an envelope in order to keep them confidential.

Out of chosen sample of 280 inhabitants of Zagreb, 135 accepted to participate in the survey, therefore the response rate was 48.2%. Data input and analysis was done by Croatian National Institute of Public Health. Micro-data file and methodology description were delivered to EUROSTAT. Detailed schedule for implementation of full-scale EHIS in Croatia in 2014 was prepared in accordance with EUROSTAT plan for second wave of EHIS in EU[11,12].

European Health Examination Survey (EHES)

European Health Examination Survey (EHES) was started as an activity of Health Programme of the EU which recognised the need for comparable and high quality data on the health and health risks obtainable only through physical measurements. A set of core questions and measurements includes questionnaire items on basic background characteristics (age, sex, socio-economic status), health behaviours and health status, physical measurements (weight, height, waist circumference and blood pressure) and measurements from blood samples (total and HDL cholesterol, fasting glucose). In addition, each country will have opportunity to include other measurements – physical function tests, dental examinations, bone density measurement, mental health tests, various markers from the blood sample, etc. Measurement proto-

TABLE 6
EHIS QUESTION MODULES

Module	Description
Demographic and socio-economic characteristics	General information, including household size and age composition, urbanisation level, age, gender, marital status, education, occupation
Health status	Self-assessment of health, self-reported chronic diseases, accidents and injuries, diseases connected to workplace, physical and sensory limitations in everyday activites, use of aid
Health care use	Hospitalizations, visits to family physicians, specialists, dentists; use of laboratory services; visits to speech therapists, psychologists; medication taking; preventive health care: vaccinations, blood tests (cholesterol, glucose), cancer screening; satisfaction with health care system; out-of-pocket payments for health care
Health determinants	Self-reported height and weight, physical activity, dietary habits (consumption of fruit and vegetables), exposure to harmful environmental influences (at home and workplace) - noise, air pollution, etc; exposure to violence; smoking, alcohol consumption and drug abuse

cols, training and quality control will be standardised in order to assure comparability and high quality of the data. Currently, EHES is in a pilot phase in 14 countries, which means that in each piloting country a sample of 200 adults would be examined. Croatia does not participate in the current pilot phase of EHES; however pilot would probably be the first phase of EHES introduction to Croatia in the future[13].

Conclusion

Although significant number of health interview surveys was conducted in Croatia during previous 15 years, none of them until CroHort, succeeded to be more than one-off project. CroHort for the first time enabled repeated analysis of the health survey respondents, thus providing valuable information about trends in numerous lifestyle habits, respondents' health status and use of health care. As Croatia becomes member of EU, health interview survey according to standardised EUROSTAT methodology will be organised in regular intervals on a representative sample of adult population in Croatia. Therefore, health interview surveys organisation will not anymore depend exclusively on enthusiasm of limited number of public health practitioners and researchers. However, further challenge will be to increase visibility of health interview surveys data beyond scientific publications and to promote use of these data as valuable source of information for policymakers at all levels (national, county, local).

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CroHort: HRVATSKA KOHORTNA STUDIJA KARDIOVASKULARNOG ZDRAVLJA – POZADINA, METODOLOGIJA I PERSPEKTIVA

SAŽETAK

Zdravstvene ankete značajan su izvor informacija o zdravlju stanovništva. Sve prethodne zdravstvene ankete provedene na odraslom stanovništvu Hrvatske bile su jednokratni projekti s vrlo ograničenom mogućnošću usporedbe podataka. Hrvatska kohortna studija kardiovaskularnog zdravlja (CroHort) omogućila je ponovno anketiranje ispitanika Hrvatske zdravstvene ankete 2003. tijekom 2008. godine putem gotovo identičnog upitnika, čime su dobiveni usporedivi podaci o trendovima različitih rizičnih čimbenika, kao i o njihovoj povezanosti sa specifičnim ishodima. Iduće ponovno anketiranje CroHort kohorte predviđeno je za 2013. godinu. Zdravstvena anketa prema Eurostatovoj metodologiji (EHIS) na novom reprezentativnom uzorku odraslog stanovništva Hrvatske planirana je za 2014. godinu. S obzirom da su podaci iz zdravstvenih anketa od velike vrijednosti za zdravstveno planiranje, potrebna su nastojanja da se njihovo korištenje u tom postupku u Hrvatskoj poveća.