Many refugees are at a high risk of cardiovascular disease

PERSPECTIVES

HAAKON E. MEYER

h.e.meyer@medisin.uio.no
Haakon E. Meyer, senior medical officer at the Department of Physical Health and Ageing, Norwegian Institute of Public Health, and professor of epidemiology and preventive medicine at the University of Oslo. He has been involved in studies of the risk of cardiovascular disease in the immigrant population and in low- and medium-income countries.
The author has completed the ICMJE form and declares no conflicts of interest.

RANDI SELMER

Randi Selmer, dr.philos., statistician and senior researcher at the Department of Chronic Diseases, Norwegian Institute of Public Health. She has been engaged in the development of risk models for cardiovascular disease, including NORRISK2.
The author has completed the ICMJE form and declares no conflicts of interest.

KJERSTI STORMARK RABANAL

Kjersti Stormark Rabanal, post-doctoral fellow at Stavanger University Hospital, where she studies cardiovascular disease among immigrants. She is an associate professor at the Department of Public Health, University of Stavanger.
The author has completed the ICMJE form and declares no conflicts of interest.

TOR OLE KLEMSDAL

Tor Ole Klemsdal, specialist in internal medicine and cardiology, senior consultant and head of the Section for Preventive Cardiology, Oslo University Hospital. He has had short-term engagements in the Norwegian Directorate of Health for work related to prevention of cardiovascular diseases and diabetes.
The author has completed the ICMJE form and declares the following conflicts of interest: He has received lecture fees from Astra Zeneca, Bristol-Myers Squibb Norway, Novartis Norway and Sanofi-Aventis Norway, all of which market products for drug-based prevention of cardiovascular disease.

The risk of cardiovascular disease varies considerably in different parts of the world, including within Europe. Norwegian doctors need to be aware of this when they see patients from other countries, such as refugees from Ukraine.

Mortality from cardiovascular diseases in Ukraine exceeds that of Norway by a factor of five (Figure 1) (1). This should be taken into account in the preventive treatment of patients with a Ukrainian background. A practical approach could be to adjust the risk estimates from NORRISK2 (2) upwards to a level that corresponds to the European risk estimates recommended for use in areas with a very high risk (3).
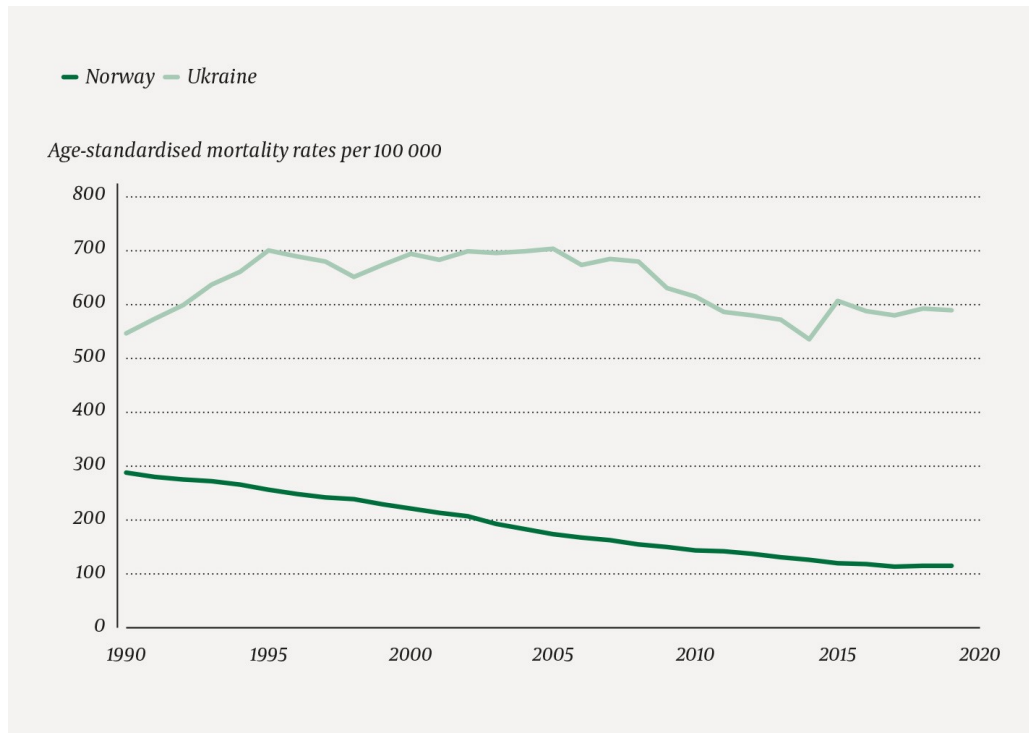

Figure 1 Age-standardised mortality rates per 100 000 for cardiovascular disease in Ukraine and Norway in the period 1990–2019. Men and women in total (1).

Norway was previously a high-risk region for cardiovascular disease; in 1970, the mortality rate was more than four times higher than today, i.e. at nearly the same level as currently in Ukraine (4). The updated European guidelines from the European Society of Cardiology have defined four risk regions according to standardised mortality rates for cardiovascular disease reported by the World Health Organization (Table 1) (3). Here, Ukraine is classified as a region with very high risk.

Table 1

Overview of the four risk regions (3)

Low risk (< 100 cardiovascular deaths per 100 000 per year)	UK, Luxembourg, Israel, Switzerland, Spain, Denmark, Belgium, Norway, France, Netherlands
Moderate risk (100–150 cardiovascular deaths per 100 000 per year)	Iceland, Ireland, Sweden, Cyprus, Germany, Portugal, Austria, Finland, Italy, Malta, Greece, Slovenia
High risk (150–300 cardiovascular deaths per 100 000 per year)	Turkey, Kazakhstan, Czech Republic, Slovakia, Hungary, Estonia, Albania, Poland, Bosnia-Hercegovina, Croatia
Very high risk (> 300 cardiovascular deaths per 100 000 per year)	Algeria, Libya, Syria, Uzbekistan, Morocco, Lebanon, Tunisia, Azerbaijan, Egypt, Kyrgyzstan, Macedonia, Moldova, Belarus, Romania, Russia, Ukraine, Latvia, Lithuania, Armenia, Bulgaria, Georgia, Montenegro, Serbia

Total risk assessment

Both the European and the Norwegian guidelines recommend that cardiovascular disease prevention should be based on total risk assessments in order to identify those at highest risk. If someone is a smoker with moderately high blood pressure, high cholesterol and other possible risk factors, the total risk can be considerable even if each individual risk factor appears to give little cause for alarm (5).

> *«The total risk can be considerable even if each individual risk factor appears to give little cause for alarm»*

The European guidelines include risk diagrams for the four regions (3). These show the ten-year risk for a cardiovascular event based on the European Systematic Coronary Risk Estimation 2 (SCORE2) model, and it is noted that the estimated risk is significantly higher for persons from Ukraine than for persons from Norway, given the same level of the risk factors blood pressure, cholesterol, smoking, age and sex.

Varying regional prevalence of cardiovascular diseases can only partly be explained by varying prevalence of risk factors. In other words, for the same level of the risk factors that are included in the risk estimation tools, there are considerable inter-regional differences. This is well documented in epidemiological studies, but the causes are only partly understood. Long-term effects of risk factors and the influence of health-related factors that are not included in the models may contribute – including the way in which these are addressed by healthcare services.

NORRISK2 and SCORE2

The Norwegian guidelines for prevention of cardiovascular diseases recommend using the NORRISK2 risk model (2, 6) to estimate the risk of an acute myocardial infarction or cerebrovascular stroke within the next ten years. This model is based on follow-up of large Norwegian cohorts and is thus adapted to Norwegian conditions. The European guidelines include the SCORE2 (2) risk model for persons under 70 years and the equivalent SCORE2-OP (8) model for those who are older. The NORRISK2 and SCORE2 models have both been developed according to the same principles and use life expectancy models that take competing risks of death into account (5, 7, 8). All the models include age, total serum cholesterol, HDL cholesterol, daily smoking (yes/no) and systolic blood pressure. However, the models differ in some respects. For example, NORRISK2 dichotomises HDL cholesterol (heightened risk at HDL < 1.0 mmol/L in men and < 1.3 mmol/L in women), whereas HDL is included as a continuous variable in SCORE2. In addition, NORRISK2 includes use of antihypertensive drugs (yes/no) and information on early myocardial infarctions in the immediate family.

We have compared the estimated risk from the SCORE2 models for areas with a very high risk with what is obtained from NORRISK2 with the same risk factors. The figures are drawn from Figure 2 in the article that describes NORRISK2 (5) and Figure 3 in the European guidelines (3). Table 2 gives some examples (3, 5). As shown, men in the age group 50–54 years who are non-smokers and have a total cholesterol level of 6 mmol/L, blood pressure of 150 mmHg and an HDL cholesterol level of 1.4 mmol/L have an estimated ten-year risk of 5 % according to NORRISK2 and 11 % according to SCORE2 in areas with a very high risk. Here, we have entered 'no' for antihypertensive treatment and 'no' for family history in NORRISK2, which reflects an optimal profile for these factors. It is not possible to make similar entries in SCORE2.

Table 2

Example of ten-year risk of a cardiovascular event estimated by NORRISK2 and SCORE2 for populations with a very high risk of cardiovascular disease, given that systolic blood pressure = 150 mmHg, total cholesterol = 6.0 mmol/L and HDL cholesterol = 1.4 mmol/L (non-HDL = 4.6 mmol/L)[1] [3, 5]

Sex/age	Non-smoker		Smoker	
	NORRISK2 (%)	SCORE2 (%)	NORRISK2 (%)	SCORE2 (%)
Women				
50–54	2	9	5	18
60–64	5	17	10	29
70–74	11	34	17	44
Men				
50–54	5	11	10	19
60–64	10	19	16	28
70–74	18	33	22	41

[1]If 'no' to antihypertensive treatment and no first-degree relative with a known myocardial infarction before the age of 60 in the NORRISK2 model

---

«The NORRISK2 model is thus likely to significantly underestimate the ten-year risk of cardiovascular disease among refugees from Ukraine»

The NORRISK2 model is thus likely to significantly underestimate the ten-year risk of cardiovascular disease among refugees from Ukraine. These patients should therefore be treated at a lower level.

The Norwegian guidelines already note that for a given level of blood pressure, cholesterol and smoking habits, people with a background from South Asia will be at a 1.5 times higher risk than the general Norwegian population. Since we are now expecting a considerable number of people from Ukraine to arrive in Norway, it is important to be aware that we will be facing a group that is at a significantly heightened risk. They may also be suffering from high levels of psychosocial stress, which may further aggravate the risk.

Practical approach

When using NORRISK2 to assess potential initiation of drug-based prevention in a Ukrainian refugee, a practical approach could be to double the NORRISK2 estimate when considering whether the intervention threshold has been exceeded. The Norwegian guidelines (6) recommend consideration of drug-based preventive treatment (lowering lipid levels with the aid of statins, possibly antihypertensive treatment) when the total ten-year risk exceeds 5 % in the age group 45–54 years, 10 % in the age group 55–64 years and 15 % in the age group 65–74 years. Individual assessment is recommended for persons younger than 45 and older than 75 years.

The use of drug-based preventive treatment must be considered once lifestyle changes have been attempted for 3–12 months and after a subsequent renewed risk assessment. In cases of significantly heightened risk and blood pressure > 160/100 mmHg, interventions must be initiated without major delay, as described in the guidelines from the Norwegian

Directorate of Health (6). Alternatively, the European SCORE2 tool that applies to nations with a very high risk can be used. SCORE2 also has tables for other countries with a heightened risk, such as people from the Balkan region, Turkey and Poland, who constitute numerically significant minorities in Norway.

For persons with established cardiovascular disease, the treatment principles and measurements for purposes of risk factor control will be the same irrespective of background.

REFERENCES

1. Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 (GBD 2019) Results. https://ghdx.healthdata.org/gbd-results-tool Accessed 6.7.2022.

2. Helsedirektoratet. Risikokalkulator. https://hjerterisiko.helsedirektoratet.no/ Accessed 6.7.2022.

3. Visseren FLJ, Mach F, Smulders YM et al. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J 2021; 42: 3227–337. [PubMed][CrossRef]

4. Folkehelseinstituttet. Hjerte- og karsykdommer i Norge. https://www.fhi.no/nettpub/hin/ikke-smittsomme/Hjerte-kar/ Accessed 6.7.2022.

5. Selmer R, Igland J, Ariansen I et al. NORRISK 2: A Norwegian risk model for acute cerebral stroke and myocardial infarction. Eur J Prev Cardiol 2017; 24: 773–82. [PubMed][CrossRef]

6. Helsedirektoratet. Forebygging av hjerte- og karsykdom. https://www.helsedirektoratet.no/retningslinjer/forebygging-av-hjerte-og-karsykdom Accessed 6.7.2022.

7. SCORE2 working group and ESC Cardiovascular risk collaboration. SCORE2 risk prediction algorithms: new models to estimate 10year risk of cardiovascular disease in Europe. Eur Heart J 2021; 42: 2439–54. [CrossRef]

8. SCORE2-OP working group and ESC Cardiovascular risk collaboration. SCORE2-OP risk prediction algorithms: estimating incident cardiovascular event risk in older persons in four geographical risk regions. Eur Heart J 2021; 42: 2455–67. [PubMed][CrossRef]