

Research network explores sudden cardiac arrest

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Scientists across Europe are creating a large database of sudden cardiac arrest cases to improve direct patient care.

Sudden cardiac arrest (SCA) continues to be a major public health challenge, accounting for about 20 percent of all natural deaths in industrialised countries. Although there has been a substantial decline in overall coronary heart disease mortality rates in the past 30 years, SCA rates have fallen to a lesser extent. Some 50 percent of all cardiovascular deaths are caused by SCA, a condition in which the heart suddenly and unexpectedly stops beating. With survival rates ranging between 5 percent and 20 percent, there's a need to improve SCA prevention and treatment.

To address this issue, a European public-private consortium is now working on the creation of a joint, harmonised database by analysing SCA victims and DNA samples, along with detailed clinical and medication use information. Funded by the EU, the team of scientists contributing to the ESCAPE-NET project summarised the objectives of their research in the *European Heart Journal*.

They emphasised that the majority of SCA victims in the general population "have a private set of acquired and inherited risk factors (including polymorphisms, i.e. common DNA variants), that, in isolation, increase SCA risk only marginally, but whose interaction may culminate in SCA."

The search for causes of SCA will focus on acquired factors (such as lifestyle, comorbidities, medication use), and genetic and [environmental factors](#). The researchers added that identifying these risk factors and understanding their interactions often have immediate therapeutic implications. They said "designing a risk score that takes multiple interacting [risk factors](#) into account may lead to tailored therapy which saves lives and is more cost-efficient."

Additional research elements

The consortium includes researchers with complementary expertise, such as those who study the causes of SCA and resuscitation scientists. "By joining forces with scientists who study patient characteristics in detail to unravel the causes of SCA, resuscitation scientists may use these characteristics to develop tailored resuscitation strategies," the authors said in the same journal article.

Project partners will conduct studies into the role of socioeconomic and environmental stress in SCA occurrence and survival after SCA, and perform cost-effectiveness analyses of various prevention and resuscitation strategies.

As they explain on the project website, ESCAPE-NET (European Sudden Cardiac Arrest network: towards Prevention, Education and NEw Treatment) brings together Europe's largest SCA study cohorts in one joint database consisting of over 94 000 SCA cases. "A comprehensive integration strategy of these joint exceptionally large and complete datasets constitutes a quantum leap in SCA research, and offers a unique opportunity, out of reach so far, to design strategies for truly personalised medicine."

The website lists several innovations to improve such personalised care. These include discovery of genes/gene profiles, proteins, and pathways as risk determinants for SCA; development of a holistic conceptual framework for SCA in which interactions between various inherited, acquired and environmental factors obtain key relevance; incorporation of environmental factors (socioeconomic/psychosocial stress, air pollution) as integral components of SCA occurrence and outcome; demonstration of gender differences in causes, treatment and outcome of SCA; and generation of a research infrastructure that allows the transfer of scientific knowledge to the scientific community.

ESCAPE-NET will also take advantage of smartphone applications and

ICT solutions.

More information: ESCAPE-NET project: www.escape-net.eu/

Hanno L Tan et al. European Sudden Cardiac Arrest network: towards Prevention, Education and New Effective Treatments (ESCAPE-NET), *European Heart Journal* (2018). [DOI: 10.1093/eurheartj/ehx758](https://doi.org/10.1093/eurheartj/ehx758)

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