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Summary of research

Smoking-related cancers; risk prediction models

Application Lay Summary:

1a: To prepare a method, based on analysis of lifestyle, environmental information, medical history, physical measurements and genetics, which will estimate an individual's risk for developing smoking-related cancers.

To identify and assess novel markers of cancer predisposition, or early cancerous change, in the general population, in order to identify high-risk individuals.

To study the interaction between smoking-related cancers and other chronic diseases and co-morbidities. It is important to study other diseases at the same time, as they share some risk factors and can affect outcomes.

1b: Improved management and prognosis for common cancers will come from

early detection. However, economics will dictate that screening (e.g. for lung cancer) will not be available for an entire population. There is a major need therefore to identify those people at highest risk, who would benefit from preventive measures and screening. The causes of common cancers may have their basis in lifestyle, environmental exposures and other risk factors occurring in the genetically predisposed host. It is essential therefore that we study the interaction between these factors and medical history and to produce risk assessment models that takes these into account

1c: Prediction models are mathematical functions that relate the presence or occurrence of the disease of interest to sets of risk factors, such as those collected by UK Biobank (or molecular markers measured in UK Biobank samples). This project will develop a risk prediction model that can be used to estimate the probability that an individual with a specific combination of risk factors would develop cancer. The risk model will then be tested to ensure it can be used to: (i) identify individuals at high risk for screening; (ii) educate high risk individuals' about risk factors; (iii) select individuals for chemoprevention.

1d: In order to prevent the occurrence of chance findings, we will prefer to use the full cohort of 500,000 participants of the UKBiobank to allow for optimal documentation of the predictors of smoking-related cancers. This will also be important to model for comorbidities that will have an influence on outcome measures and may be related to the same risk factors (e.g. smoking is related to both cardiac deaths and lung cancer).