7.3.2 Predictive Medicine

Predictive medicine involves predicting the probability of disease and implementing measures to either prevent the disease altogether or significantly decrease its impact upon the patient. The outcomes of predictive medicine are often applied to the care of individual patients, but may also inform the deployment of resources to entire populations at high risk.

The goal of predictive medicine is to predict the probability of future disease so that healthcare professionals and the patient themselves can be proactive in implementing lifestyle modifications and increased physician surveillance, such as regular skin exams, mammograms, or colonoscopies. Predictive medicine changes the paradigm of medicine from being reactive to being proactive, and has the potential to significantly extend the duration of health and to decrease the incidence, prevalence and cost of diseases.

Much attention has been focused on the availability of genetic makers of vulnerability to specific illnesses. However the accurate capture of phenotypic (e.g. height and weight, blood pressure), environmental factors (e.g. smoking, alcohol consumption) and other lifestyle factors (e.g. exercise, nutrition, quality of life) is not to be overlooked. For example:

1. Patient is a smoker and has ischemic heart disease ? predict excess risk of myocardial infarction
2. Patient has BRCA1 gene and is a 40 year old woman ? predict (excess) risk of breast cancer

SNOMED CT can help to support predictive medicine by:

- Helping to identify clinical trial candidates (as described in section 7.3.1 Identification of Clinical Trial Candidates)
- Helping to analyze clinical data, such as family history, lifestyle and environmental findings, to improve predictive capabilities (using analytics techniques, as described in section 6 SNOMED CT Analytic Techniques)
- Providing a link between patient data and risk assessment rules, so that rules can be triggered based on subsumption of codes recorded in clinical data (see section 6.2 Subsumption). For example, matching against patient records could be improved by defined the above rules as:

    1. Criteria: 77176002 |smoker| AND 414545008 |ischemic heart disease|
       Risk: 22298006 |myocardial infarction|
    2. Criteria: 412734009 |BRCA1 gene mutation positive|
       Risk: 254837009 |breast cancer|