Design and preliminary test of a personalized genetic risk tool to promote smoking cessation

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Genetic variation in nicotinic receptor subunits explains differences in smoking behaviors and risk of smoking-related diseases. Returning genetic susceptibility results may motivate smoking cessation, personalize treatment, and reduce disease risk. However, research is needed to optimize the design and communication of genetics-informed interventions. This study engaged stakeholders in participatory co-design of a personalized genetics-informed risk tool for smoking and tested its feasibility and potential to change smoking behaviors.

We developed an algorithm that integrates genetic (CHRNA5 variants) and phenotypic (cigarettes per day) factors to estimate one’s risk of lung cancer, COPD, and difficulty quitting smoking. To communicate this risk, we designed a personalized intervention, the "genetics and smoking risk profile". In two prototype studies, we conducted brief participatory design interviews (n=110) followed by quantitative surveys (n=100) with potential end-users to confirm acceptability of iterative design changes. In current smokers from the community (n=108), we conducted genetic testing, returned the personalized genetics-informed risk profiles, and assessed feasibility and efficacy of the risk profile to change smoking behavior.

Current smokers agreed it was important to learn their smoking-related genetic risk (91%) and planned to share their risk results with others (80%). Although data collection is ongoing following return of results, current smokers demonstrated comprehension of the risk profile (>90%) and expected that the risk profile will help them quit or reduce smoking (>80%) and use an FDA-approved medication to quit smoking (>70%).

Iterative co-design with current smokers yielded a highly acceptable personalized genetics-informed risk profile that demonstrated promise for supporting smoking cessation.