Universität Basel

Research Project

Swiss-PROMPT Swiss Personalized Breast Cancer Risk Prediction study

Project funded by own resources

Project title Swiss-PROMPT Swiss Personalized Breast Cancer Risk Prediction study
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Organisation / Research unit
Departement Public Health / Pflegewissenschaft (Katapodi)
Project start 01.08.2016
Probable end 31.12.2020
Status Completed

Hintergrund: Breast cancer affects about 12% of Swiss women. Predictive models are important in personalized medicine because they contribute to early identification of high-risk individuals, which in turn facilitates stratification of preventive interventions and individualized clinical management. However, existing models have limited discriminatory accuracy (0.6-0.7) and do not include some non-modifiable and modifiable breast cancer risk factors, e.g., mammography density and obesity.

Zielsetzung: The purpose of the study is to provide clinical decision support for accurate, reproducible, and more reliable individualized forecasting of the absolute risk for breast cancer compared to currently used models e.g., Gail model and Breast and Ovarian Analysis of Disease Incidence and Carrier Estimation Algorithm (BOADICEA).

Design / Methode: We employed six different model-free machine-learning methods to predict absolute risk of breast cancer. Using independent training and testing data we quantified and compared the performance of machine-learning methodsă to the performance of the Gail model and BOADICEA using the following datasets (1) simulated, with no signal; (2) simulated, with artificial signal; (3) a random population-based sample of US breast cancer patients and their cancer-free female relatives (N=1232); and (4) a clinic-based sample of Swiss breast cancer patients and cancer-free women seeking genetic evaluation and/or testing at the Geneva University Hospitals (N=1700). Managing the massive, multi-source, incongruent and heterogeneous data includes data harmonization, model-free predictive analytics, and quantitative comparison of forecasting reliability.

Erwarteter Nutzen / Relevanz (z.B. für Public Health): Advanced data-processing protocols are powerful tools to forecast personalized breast cancer risk and can help develop new and updated predictive models specified for Swiss women.

Keywords personalized breast cancer risk; prediction model, machine learning
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Add publication

Published results

4617625, Ming, Chang; Viassolo, Valeria; Probst-Hensch, Nicole; Dinov, Ivo D; Chappuis, Pierre O; Katapodi, Maria C, Machine learning-based lifetime breast cancer risk reclassification compared with

the BOADICEA model: impact on screening recommendations., 1532-1827, British journal of cancer, Publication: JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

4596816, Ming, C.; Viassolo, V.; Probst-Hensch, N.; Chappuis, P. O.; Dinov, I. D.; Katapodi, M. C., Letter to the editor: Response to Giardiello D, Antoniou AC, Mariani L, Easton DF, Steyerberg EW, 1465-5411, Breast cancer research, JournalItem (Kommentare, Editorials, Rezensionen, Urteilsanmerk., etc. in einer wissensch. Zeitschr.

4509423, Ming, Chang; Viassolo, Valeria; Probst-Hensch, Nicole; Chappuis, Pierre O.; Dinov, Ivo D.; Katapodi, Maria C., Machine learning techniques for personalized breast cancer risk prediction: comparison with the BCRAT and BOADICEA models, 1465-5411, Breast cancer research, Publication: JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

Add documents

Specify cooperation partners

ID	Kreditinhaber	Kooperationspartner	Institution	Laufzeit - von	Laufzeit - bis
3977920	Katapodi, Maria	Chappuis, Pierre O, Prof. Dr.	Geneva University Hospitals (HUG)	01.04.2016	31.12.2021
3978028	Katapodi, Maria	Dinov, Ivo D, Prof. Dr.	Department of Computational Medicine and Bioinformatics, & Michigan Institute for Data Science, University of Michigan	01.09.2016	31.12.2020
3978032	Katapodi, Maria	Dellas, Sophie, MD	University Hospital Basel	01.01.2018	31.12.2021