

Applications and Proliferation Results of the Characterised Cancer Prevention

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Abstract

Evaluating cancer prevention programs requires collecting and linking data on a case specific level from multiple sources of the healthcare system. Therefore, one has to comply with data protection regulations which are restrictive in Germany and will likely become stricter in Europe in general.

Keywords: Evaluation; Cancer domain; Reliability; Lack of Insurance; Self-care; Screening

Introduction

To facilitate the mortality evaluation of the German mammography screening program, with more than 10 Million eligible women, we developed a method that does not require written individual consent and is compliant to existing privacy regulations. Our setup is composed of different data owners, a data collection centre and an evaluation centre [1]. Each data owner uses dedicated software that pre-processes plain-text personal identifiers and plaintext evaluation data in such a way that only irreversibly encrypted record assignment numbers and pre-aggregated, reversibly encrypted EDAT are transmitted to the DCC. The DCC uses the RANs to perform a probabilistic record linkage which is based on an established and evaluated algorithm. For potentially identifying attributes within the EDAT, we developed a novel process generalization from the pre-processed and encrypted attribute aggregations, to create a new data set with assured k-anonymity, without using any plain-text information. The anonymized data is transferred to the EC where the EDAT is decrypted and used for evaluation. Our concept was approved by German data protection authorities. We implemented a prototype and tested it with more than 1.5 Million simulated records, containing realistically distributed IDAT [2]. The core processes worked well with regard to performance parameters. We created different generalizations and calculated the respective suppression rates. We discuss modalities, implications and limitations for large data sets in the cancer registry domain, as well as approaches for further improvements like l-diversity and automatic computation of 'optimal' generalizations. African-American women's decisions about cervical cancer prevention and control in South Carolina. Cervical cancer disparities persist despite cervical cancer prevention advances and declining mortality rates, particularly among African-American women in the South. The purpose of this qualitative study was to explore behaviour, knowledge, and attitudes as influences on health decisions and preferences for cervical cancer prevention and control among African-American women in South Carolina [3]. Data were collected from three focus groups conducted with 28 adult women aged 18 to 70 years in South Carolina. Purposive snowball sampling was employed. Data were coded using a content analysis approach in NVivo. Fleiss' kappa coefficient, a measure of inter-rater reliability, was 0.83. Twenty seven participants self-identified as African American. The mean age of focus group participants was 45. Knowledge of human papillomavirus and cervical cancer risk was relatively low. Participants positively viewed cervical cancer screening and HPV vaccination. Lack of health insurance and costs were screening barriers. Providers were viewed as trusted health information sources, yet stigma and fear negatively influenced screening. Cultural identity served as a facilitator

and barrier for screening. Motivated by strength, identified as a central to African-American womanhood, participants viewed cervical cancer prevention as an important responsibility. However, the Strong Black Woman script, which has been associated with self-care and coping strategies, was also a screening barrier owing to competing priorities. Study findings provide insight into cervical cancer prevention decision making and support tailored interventions. Culturally relevant interventions may better convey evidence-based messages about advances in cervical cancer prevention and control. Expected long-term impact of the German screening colonoscopy programme on colorectal cancer prevention: Analyses based on 4,407,971 screening colonoscopies. Endoscopy based screening programmes for colorectal cancer is being implemented in an increasing number of countries. In Germany, screening colonoscopy at age 55 or older has been offered since the end of 2002 [4]. We aimed to estimate the long-term impact of this offer on CRC prevention. We estimated numbers of prevented CRC cases by expected age and year of their occurrence over four decades by four state Markov models. Estimates are based on screening colonoscopies reported to the German screening colonoscopy registry in 2003-2012, transition rates between the four states and general population mortality rates. Effective prevention against cancers depends heavily on sustained individual efforts practicing protective behaviours and avoiding risk factors in a complex sociocultural context, which requires continuous and personalized supports. Contemporary prevention relies primarily on strategies targeting general population with limited attention being paid to individualized approaches. This study tests a novel package called, in acronym of core intervention components, ecrops-CA that leverages protective behaviours against over 80% leading cancers among high risk individuals via continuous and tailored counselling by village doctors [5]. The study utilizes a quasi-RCT design involving 4320 high risk individuals selected, via rapid and detailed risk assessments, from about 72,000 farmers aged 35+ in 36 administrative villages randomized into equal intervention and delayed intervention arms. The intervention arm receives baseline and semi-annual follow up evaluations plus ecrops-CA for 5 years;

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while the control arm, only the baseline and follow-up evaluations for the first 5 years and ecrops-CA starting from the sixth year if the intervention is proved effective. ecrops-CA comprises electronic supports and supervision, counselling cancer prevention (C), recipe for objective behaviors, operational toolkit, performance based incentives, and screening and assessment. Evaluation measures include: incidence and stage of the leading cancers, cancer-related knowledge, attitudes and practices; easy biophysical indicators intervention compliance, acceptance of the package.

Discussion

The prevention package incorporates key success factors in a synergetic way toward cost effectiveness and long-term sustainability. It targets a set rather than any single cancer; chooses village doctors as key solution to the widespread lack of professional manpower in implementing personalized and thus relatively sophisticated prevention; adopts real-time monitoring in reaching continuous improvement; utilizes smart web aids to enable prioritizing complex determinants of objective behaviours, linking counselling sessions happened at different time points and hence delivering highly coordinated prevention; uses 2-stage risk assessment models in identifying high risk individuals so as to focus on the most needed; applies standardized operation procedures in simplifying and smoothing behaviour intervention yet ensuring delivery of essential steps and key elements [6]. In the Prostate Cancer Prevention Trial, finasteride reduced the risk of prostate cancer by 25%, even though high-grade prostate cancer was more common in the finasteride group. However, it remains to be determined whether finasteride concentrations may affect prostate cancer risk. In this study, we examined the association between serum finasteride concentrations and the risk of prostate cancer in the treatment arm of the PCPT and determined factors involved in modifying drug concentrations. Data for this nested case-control study are from the PCPT. Cases were drawn from men with biopsy-proven prostate cancer and matched controls. Finasteride concentrations were measured using a liquid chromatography-mass spectrometry validated assay. The association of serum finasteride concentrations with prostate cancer risk was determined by logistic regression. We also examine whether polymorphisms in the enzyme target and metabolism genes of finasteride are related to drug concentrations using linear regression [7]. Among men with detectable finasteride concentrations, there was no association between finasteride concentrations and prostate cancer risk, low-grade or high-grade, when finasteride concentration was analyzed as a continuous variable.

Recommendations

Since there was no concentration-dependent effect on prostate cancer, any exposure to finasteride intake may reduce prostate cancer risk. Of the twenty-seven SNPs assessed in the enzyme target and metabolism pathway, five SNPs in two genes, CYP3A4 (rs2242480; rs4646437; rs4986910), and CYP3A5 (rs15524; rs776746) were significantly associated with modifying finasteride concentrations. These results suggest that finasteride exposure may reduce prostate cancer risk and finasteride concentrations are affected by genetic variations in genes responsible for altering its metabolism pathway. The burden of cancer is likely to increase among the human immunodeficiency virus (HIV)-positive population as it ages due to successful antiretroviral therapy [8]. The purpose of this study was to determine the risk of cancer in HIV-infected patients. This study was a matched nested case-control study. It was performed using the National Health Insurance Research Database of Taiwan. The control

group included non-HIV-infected patients matched by sex, age, and year of enrolment. Logistic regression analyses were performed and simultaneously adjusted for potential confounder's income, urbanization, and Charlson index of comorbidity to evaluate HIV infection as an independent risk of cancer. We calculated the overall and sex-specific standardized incidence ratios (SIR) to investigate the pattern of cancer risk and overall cancer risk in the patients with HIV infection. Of the 1,115 HIV-infected patients, 104 (9.33%) developed cancer during the 11-year follow-up period. The risk of cancer for patients with HIV infection was significant after adjustment for potential confounders [9]. There was a significantly increased risk of developing non-Hodgkin lymphoma, lymphoma compared with the control group. In addition, HIV-infected patients were at significant risk for renal, oral, breast, liver, skin, and colorectal cancer. CONCLUSIONS: Patients with HIV infection are at increased risk for several specific cancers. Our results support the implementation of an active and accelerated cancer screening schedule for patients with HIV infection to increase their life span. A recent hypothesis has stated that many ovarian cancers could arise from the distal part of the fallopian tube. On one hand we know that risk reducing salpingo-oophorectomy is the most effective prevention for ovarian cancer among BRCA mutation carriers. On the other, oophorectomy increases the relative risk for cardiovascular, osteoporotic psychosocial and cognitive dysfunctions in premenopausal women. This raises the question whether bilateral salpingectomy could be an effective strategy in the prevention of ovarian cancer in case of hereditary predisposition and in the general population. Here we discuss origin of ovarian cancer in the light of the latest molecular studies and the relative risks and benefits of a strategy of exclusive salpingectomy in comparison with the classical adnexectomy [10]. The action of vitamin D₃, in its biological form 1 α , 25(OH)₂vitD₃ or calcitriol, may be summarized as a steroid-like hormone able to modulate basic functions of cell encompassing energy balance, stress response, mitochondria biogenesis, intracellular calcium oscillations, and replication/apoptosis mechanisms leading to cell survival. Moreover, calcitriol exerts a potent role as an innate and adaptive immune cytokine as immunity is closely related to self-maintenance through its energetic/metabolic balance and homeostasis of cell turnover.

Conclusion

Therefore, vitamin D might be the ancestral form of survival hormones developed with calcified vertebrate bearing skeleton in order to survive far from water. This characteristic may suggest that the role of dietary vitamin D in preventing cancer is simply ancillary to the many factors playing a major role in contrasting impairment in energy balance and cell survival. Most probably, the immune role of calcitriol might be included in the maintenance, mostly by adipose tissue, of an anti-inflammatory, tolerant immune status, depending on the immune tolerance and modulation from the gut.

Acknowledgement

None

Conflict of Interest

None

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