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Development and validation of a risk prediction model for incident liver cancer

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Objective: We aimed to develop and validate a risk prediction model for liver cancer based on routinely available risk factors using the data from UK Biobank prospective cohort study.

Methods: This analysis included 359,489 participants (2,894,807 person-years) without a previous diagnosis of cancer. We used the Fine-Gray regression model to predict the incident risk of liver cancer, accounting for the competing risk of all-cause death. Model discrimination and calibration were validated internally. Decision curve analysis was conducted to quantify the clinical utility of the model. Nomogram was built based on regression coefficients.

Results: Good discrimination performance of the model was observed in both development and validation datasets, with an area under the curve (95% confidence interval) for 5-year risk of 0.782 (0.748–0.816) and 0.771 (0.702–0.840) respectively. The calibration showed fine agreement between observed and predicted risks. The model yielded higher positive net benefits in the decision curve analysis than considering either all participants as being at high or low risk, which indicated good clinical utility.

Conclusion: A new risk prediction model for liver cancer composed of routinely available risk factors was developed. The model had good discrimination, calibration and clinical utility, which may help with the screening and management of liver cancer for general population in the public health field.

KEYWORDS

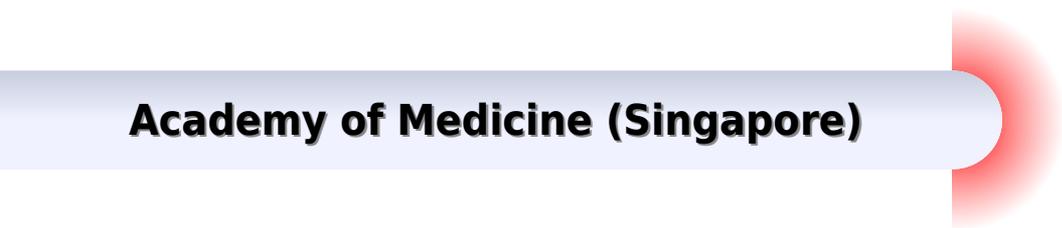
risk prediction, risk management, screening, nomogram, liver cancer

Introduction

Liver cancer is one of the most common cancers worldwide, ranking the fifth in men and the ninth in women (1). According to World Cancer Research Fund (WCRF), there were over 840,000 new cases in 2018 in 185 countries (1). In the United States, based on the data from Centers for Disease Control and Prevention (CDC) and National Cancer Institute (NCI), 34,638 new cases of liver cancer were reported and 27,685 people died of liver cancer in 2018 (2). Despite the significant advances in therapies, mortality and morbidity of liver cancer remain substantially high, posing a significant public health

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Annals of Internal Medicine ,2008 *Journal of the National Cancer Institute* ,2007

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Breast MRI Interpretation Gillian M. Newstead,2021-01-06 State of the art resource details effective breast MRI techniques for improved screening and diagnosis Magnetic resonance imaging MRI of the breast has evolved into an important breast cancer screening tool and major advance in women s health Breast MRI is currently the most sensitive detection technique for both non invasive and invasive cancers and follow up in women with a new breast cancer diagnosis It is increasingly becoming the go to imaging method for screening women at high and intermediate risk of breast cancer and those with dense breast tissue on mammography Yet despite its reliability and growing use many radiologists lack the expertise to accurately perform breast MR image interpretation Breast MRI Interpretation Text and Case Analysis for Screening and Diagnosis by Gillian M Newstead reflects insights and expertise from one of the leading authorities on breast imaging The book is a highly practical reference on evaluation and interpretation of breast MR imaging with discussion of the modality as a screening and diagnostic tool Topics include image acquisition and interpretation clinical implementation managing findings and overcoming problems Key Highlights About 3 000 illustrations from the University of Chicago including single selected images side by side images at different time points and acquisition parameters and 3 D images enhance understanding of breast imaging Discussion of advanced acquisition techniques and future potential applications including non contrast imaging quantitative dynamic imaging and artificial intelligence using advanced computer analytic methods This remarkable resource streamlines the breast MRI process enabling radiologists to incorporate this imaging modality into practice conduct screening and diagnostic exams more efficaciously and interpret findings accurately

Clinical Prediction Models Ewout W. Steyerberg,2019-07-22 The second edition of this volume provides insight and practical illustrations on how modern

statistical concepts and regression methods can be applied in medical prediction problems including diagnostic and prognostic outcomes Many advances have been made in statistical approaches towards outcome prediction but a sensible strategy is needed for model development validation and updating such that prediction models can better support medical practice There is an increasing need for personalized evidence based medicine that uses an individualized approach to medical decision making In this Big Data era there is expanded access to large volumes of routinely collected data and an increased number of applications for prediction models such as targeted early detection of disease and individualized approaches to diagnostic testing and treatment Clinical Prediction Models presents a practical checklist that needs to be considered for development of a valid prediction model Steps include preliminary considerations such as dealing with missing values coding of predictors selection of main effects and interactions for a multivariable model estimation of model parameters with shrinkage methods and incorporation of external data evaluation of performance and usefulness internal validation and presentation formatting The text also addresses common issues that make prediction models suboptimal such as small sample sizes exaggerated claims and poor generalizability The text is primarily intended for clinical epidemiologists and biostatisticians Including many case studies and publicly available R code and data sets the book is also appropriate as a textbook for a graduate course on predictive modeling in diagnosis and prognosis While practical in nature the book also provides a philosophical perspective on data analysis in medicine that goes beyond predictive modeling Updates to this new and expanded edition include A discussion of Big Data and its implications for the design of prediction models Machine learning issues More simulations with missing y values Extended discussion on between cohort heterogeneity Description of ShinyApp Updated LASSO illustration New case studies [Risk Adjustment for Measuring Health Care Outcomes](#) Lisa I. Iezzoni,1994 **Anaesthesia and Intensive Care** ,2008 [Annals of the Academy of Medicine, Singapore](#) Academy of Medicine (Singapore),1998 [Journal of the American Medical Association](#) ,2010-03 [Fishman's Pulmonary Diseases and Disorders, 2-Volume Set, Sixth Edition](#) Michael A. Grippi,Danielle E. Antin-Ozerkis,Charles S. Dela Cruz,Robert Kotloff,Camille N. Kotton,Allan I. Pack,2022-10-22 The definitive guide to the clinical and scientific aspects of pulmonary medicine fully updated with the latest advances in the field A Doody's Core Title for 2024 2023 Fishman's Pulmonary Diseases and Disorders delivers unparalleled coverage of pulmonary medicine With nearly 2500 illustrations 60 videos and 22 000 references this peerless two volume resource provides a comprehensive overview of the scientific basis of lung function in health and disease You'll find detailed coverage of the broad array of disorders affecting the respiratory system including obstructive and restrictive diseases pulmonary vascular disorders sleep disordered breathing lung neoplasms respiratory infections and respiratory failure In addition you'll learn about all the latest advances including molecular development of the lung stem cells and respiratory disease the genetics of pulmonary disease the growth of personalized medicine technical advances in lung transplantation and much more Notable new content in the 6th edition includes

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