



Universiteit
Leiden
The Netherlands

Predicting time-to-event outcomes under different intervention strategies: methods and applications

Prosepe, I.

Citation

Prosepe, I. (2025, December 3). *Predicting time-to-event outcomes under different intervention strategies: methods and applications*. Retrieved from <https://hdl.handle.net/1887/4284487>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/4284487>

Note: To cite this publication please use the final published version (if applicable).

Predicting time-to-event outcomes under different intervention strategies

Methods and applications

Ilaria Prosepe

© Ilaria Prosepe, 2025

PhD thesis, Department of Biomedical Data Sciences, Leiden University Medical Center, the Netherlands

Author: Ilaria Prosepe

Cover design: Laura Scagnellato, Ilaria Prosepe & Ridderprint

Printed by: Ridderprint | www.ridderprint.nl

ISBN: 978-94-6522-806-8

Predicting time-to-event outcomes under different intervention strategies

Methods and applications

Proefschrift

ter verkrijging van
de graad doctor aan de Universiteit Leiden,
op gezag van rector magnificus prof. dr. ir. H. Bijl,
volgens besluit van het college voor promoties
te verdedigen op woensdag 3 december 2025
klokke 10.00 uur

door

Ilaria Prosepe
geboren te Camposampiero, Italië
in 1995

Promotor

prof. dr. H. Putter

Co-promotor

dr. ir. N. van Geloven

Leden promotiecommissie

prof. dr. M. Fiocco

prof. dr. R. H. Keogh

dr. ir. R. A. J. Post

dr. W. van Amsterdam

London School of Hygiene & Tropical Medicine

Erasmus Universiteit Rotterdam

Universiteit Utrecht

Contents

1	Introduction	1
2	The Disconnect Between Development and Intended Use of Clinical Prediction Models for Covid-19: A Systematic Review and Real-World Data Illustration	11
2.1	Introduction	12
2.2	Systematic review	13
2.3	Data Illustration	15
2.4	Discussion	16
3	Survival benefit from liver transplantation for patients with and without hepatocellular carcinoma	23
3.1	Introduction	24
3.2	Patients and methods	24
3.3	Results	27
3.4	Discussion	34
4	Estimating conditional survival benefit for the allocation of scarce resources	41
4.1	Introduction	42
4.2	Methods	43
4.3	Simulation	49
4.4	Application to allocation of liver transplants	54
4.5	Discussion	56
4.6	Appendix	63
5	Decision-support algorithm for platelet transfusion in preterm infants with severe thrombocytopenia	77
5.1	Introduction	78
5.2	Methods	78
5.3	Statistical analyses	80
5.4	Results	81
5.5	Discussion	86
5.6	Appendix	93
6	Causal multistate models to evaluate treatment delay	111
6.1	Introduction	112

6.2	Methods	113
6.3	Simulation	118
6.4	Data application	124
6.5	Discussion	126
7	Interventional updating of time-to-event prediction models	131
7.1	Introduction	132
7.2	Dynamic updating	133
7.3	Interventional dynamic updating	134
7.4	Data application	137
7.5	Discussion	142
7.6	Appendix	146
8	Discussion	149
	Summary	159
	Samenvatting	161
	List of Publications	163
	Acknowledgements	165
	Curriculum vitae	167