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Comparison of Statistical Approaches Dealing with Immortal Time Bias in Drug Effectiveness Studies

Immortal time bias can be minimized by using a time-dependent Cox model analysis, but the underlying assumptions may be difficult to assess. Methods, such as prescription time-distribution matching (PTDM) and the sequential Cox approach, have been proposed to avoid the need for a time-dependent Cox analysis. We compared the performance of these approaches using simulated survival data. Our simulations revealed that the PTDM approach is not effective in addressing immortal time bias, but the sequential Cox approach is more useful. All of these approaches were applied to investigate the impact of beta-interferon treatment in delaying multiple sclerosis disability progression.