

CORRECTION

Correction: Using time series analysis approaches for improved prediction of pain outcomes in subgroups of patients with painful diabetic peripheral neuropathy

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Fig 1 is incorrect. The authors have provided a corrected version here.



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STEP 1

STEP 2

STEP 3

STEP 4













- Cluster analyses are implemented to identify patient subgroups.
- RCT data are matched to OS data to create a patient pool that is less biased and more predictive.
- Cluster-specific multivariable time series regression models are derived to predict pain levels in a training dataset.
- Regression models are validated in OS data that did not match with RCT patient data.
- The novel patient's alignment with one of the clusters (from the prior step) is evaluated considering demographic variables along with pain and sleep interference levels at baseline.
- The novel patient is assigned to one of the identified clusters using an ensemble of two instance-based machine learning methods.

The alignment to a cluster then triggers which regression model would be applied to simulate pain levels for the candidate novel patient.

- After the novel patient is assigned to a cluster, 1000 virtual patients are created to reflect the various possible trajectories of outcomes for the novel patient according to what could occur based on the regression model for that cluster.
- The cluster-specific regression models include variables that:
 - Are fixed (e.g., similar to a patient)
 - Vary over time (e.g., to simulate the course of treatment) with values that are randomly generated from the PDFs, which consider patients in that cluster.
- The regression models are applied every week over the 6-week period, with outputs generated by the previous week used as the starting input for the current week.

- The distributions of virtual patient pain levels and responder status are displayed at the end of the 6-week simulation.
- The trajectories over the 6-week period are also shown in order to visualize how each virtual patient arrived at the final pain level.

Fig 1. Simulation steps. OS, observational study; PDF, probability density function; RCT, randomized controlled trial.

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Reference

 Alexander J Jr, Edwards RA, Brodsky M, Manca L, Grugni R, Savoldelli A, et al. (2018) Using time series analysis approaches for improved prediction of pain outcomes in subgroups of patients with painful diabetic peripheral neuropathy. PLoS ONE 13(12): e0207120. https://doi.org/10.1371/journal.pone. 0207120 PMID: 30521533