# Research Brief

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# Improving the Conduct of Systematic Reviews: A Process Mining Perspective


## Summary

To improve the conduct of systematic reviews, we simulated review activities to generate an event log of activities, with start/end dates, reviewer assignment by expertise, and person-hours worked. We analyzed the event log data using process mining techniques. The results showed that the average completion time for the simulated reviews was 463 days with 881 person-hours, with most time spent in study selection (26%) and data collection (24%). Social network analysis of the event log data showed that review coordinators worked closely with reviewers, librarians, statisticians, and methodologists to conduct the reviews; they were more likely than any other member of the review team to hand over completed tasks to other members.


## Implications

Event log data can be useful for managing research teams conducting systematic reviews. Process mining tools, using such data, can provide a practical and informative approach towards improving and modernizing the systematic review process


**Reference:** Pham B, Bagheri E, Rios P et al. Improving the Conduct of Systematic Reviews: A Process Mining Perspective. J Clin Epidemiol. 2018;103:101-111.

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## What is the current situation?

- Systematic reviews are essential to inform clinical and policy decision-making. Methods for the conduct and reporting of systematic reviews have become more rigorous and have further prolonged the completion of systematic reviews
- Information obtained from process mining techniques using event logs is currently not available to researchers, policy-makers and other stakeholders interested in scoping, planning, and prioritizing reviews; making process improvements; or applying innovative computer technologies to improve or automate the systematic review process

## What is the objective?

- To illustrate the use of process mining concepts, techniques, and tools to improve the systematic review process

## How was the research conducted?

- This is a simulation study that employed an event-based decision model to simulate the review process. The simulation generated data pertaining to review activities for multiple reviews, assembled in the form of an event log, and analyzed the data using process mining techniques
- A simulation study was selected because event log data pertaining to the systematic review process does not yet exist. Key study outcomes included person-time by reviewers (hours) and timelines (days).
- The process mining techniques “discovered” process models that allowed for visual display, animation, or replay of the simulated review activities. Summary statistics were calculated for person-time and timelines, and we also analyzed the social networks of team interactions.

## What did the review find?

- The 12 simulated reviews included an average of 3831 titles/abstracts (range: 1565-6368) and 20 studies (6-42).
- The average review completion time was 463 days (range: 289-629) [881 person-hours (range: 243-1752)].
- The average person-hours per activity were: study selection 26%, data collection 24%, report preparation 23%, and meta-analysis 17%.
- Social network analyses showed the organizational interaction of team members, including how they worked together to complete review tasks and to hand over tasks upon completion.
- Event log data are useful to better understand and manage research teams specializing in the production of systematic reviews. Process mining tools can be easily applied to this data, and inform efforts to modernize the systematic review process.


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