Visual Representation of Exposure Patterns in Drug Safety Research

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Multi-patient timeline; time to onset
Histogram of focus events after aligning by index event. (Norén, et al.)

Temporal Pattern Discovery for Trends and Transient Effects: Its Application to Patient Records

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Figure 1: Abstract representation of an event history data set. Each line represents an event history, where the index event of interest is marked with squares and the focus event of interest is marked with circles.

Figure 2: The same event histories as in Figure 1 aligned by their index events. Note that the event history with two index events is represented twice here. The histogram in the bottom panel is a simple summary of the number of index events with a focus event in each given time period.
Figure 3: Example of a chronograph. The bottom panel displays the observed and expected numbers of index events with a focus event in different time periods relative to the index event. The top panel displays the corresponding variation in the IC value.
Chronograph examples (Norén, et al. continued)

Adverse drug reactions

Figure 4: Chronograph for the registration of flushing relative to first prescriptions of nifedipine.

Figure 5: Chronograph for the registration of localized swelling, mass and lump, lower limb relative to first prescriptions of nifedipine.

Beneficial effects

Figure 6: Chronograph for the registration of malaise and fatigue relative to first prescriptions of sibutramine.

Underlying disease

Figure 7: Chronograph for the registration of acute pancreatitis relative to first prescriptions of omeprazole.
Intervals

- We expect some AEs to occur early in exposure, others late
- But we want to see what actually happens before building our assumptions into a study model
- Interface allows user specification of early and late periods of exposure and post-exposure, and highlighting of events occurring during defined risk periods
- Pattern notation with rank and filter allows exploration of dechallenge and rechallenge scenarios
- Adherence
  - Allowable gap between prescriptions
  - Carry-over of stockpiled medication
More than one exposure or event type

- Concomitance and medication history
  - Patterns of occurrence of other drugs prescribed around the same time as the drug of interest
- Co-morbidity
  - Patterns of illness, signs and symptoms surrounding index date
- Drug switching
  - Switch as evidence of adverse reaction
  - Switch as index date for study comparing two second-line drugs, index date is the switch from a common first-line drug

Actively working on ways of exploring these patterns.
Your ideas?
UMD HCIL LifeFlow, Anti-Parkinsons Drug Eras
HCIL’s LifeFlow – Opioid Drug Eras