

Data Mining Methods

Monsen, K., Westra, B.L., Yu, F., Ramadoss, V.K. & Kerr, M.J. (2009). Data Management for Intervention Effectiveness Research: Comparing Deductive and Inductive Approaches, *Research in Nursing and Health*, 32(6) 647-656

Four intervention management approaches were developed using the Omaha System intervention data from 15 home care agencies (621,385 interventions provided to 2,862 patients). The first approach used the Omaha System "action category" resulting in four groups of interventions. The second approach was mapping Omaha System interventions to a theory, resulting in five groups of interventions. The third approach used clinical expert consensus similar to development of the ICD-9 hierarchy in the Clinical Care Classification System with 23 mutually exclusive groups of interventions. The fourth approach used a data mining used cluster analysis with K-Means and Expectation Maximization approach which generated 150 groups of interventions, of which 24 were meaningful and unique. Interventions in deductive groups were mutually exclusive, and approaches mapped readily according to intervention action terms. The four management approaches created meaningful intervention groups to be employed in future outcomes evaluation studies.

Dey, S., Cooner, J., Delaney, C.W., Fakhoury, J., Kumar, V., Simon, G., Steinbach, M., & Westra, B.L. (accepted). Data Mining to Predict Mobility Outcomes in Home Health Care, *Nursing Research*

The purpose of this study was to 1) identify patient and support system characteristics associated with improvement or no improvement in mobility, 2) evaluate the consistency of these variables across subgroups, and 3) group individual variables into patterns that provide a higher level understanding of patient and support system characteristics related to improvement of mobility. Discriminative pattern mining for knowledge discovery was conducted with electronic health record (EHR) data documented by home care clinicians between October 1, 2008 and December 31, 2009. Outcome and Assessment Information Set (OASIS) data were extracted from a national convenience sample of 581 Medicare-certified HHC agencies' EHRs for 270,634 patients. Patients were divided into mobility subgroups based on their mobility score during admission at HHC and discriminative pattern mining was then used to discover patterns associated with improvement of mobility. Overall, 49.4% of patients improved in mobility; while 50.6% did not improve by discharge from HHC. Many of the variables associated with improvement in mobility outcome were similar across all mobility subgroups, except for the subgroup in which patients were chairfast, but able to wheel themselves independently; however, the number, strength, and direction of associations varied. The most improvement was shown by patients with a mobility score of 2 at admission, who had 80% improvement by discharge. Within that subgroup, four patterns of variables were associated with an increased likelihood of improvement while five patterns were associated with a reduced likelihood of improvement.