Background: This retrospective study seeks to determine if changing sterile compounded intravenous (IV) levetiracetam to IV push levetiracetam is effective in reducing time to administration for post-ictal patients presenting to the emergency department (ED). Additionally, this study sought to evaluate time and cost savings for pharmacy and nursing staff.

Methods: This was a retrospective chart review in a 590-bed community hospital of patients receiving IV levetiracetam in the ED. The study period encompassed two separate time periods, including December 1, 2018 to May 31, 2019, prior to implementation of IV push levetiracetam (Period 1) and December 1, 2019 to May 31, 2020, post implementation (Period 2). A total of 109 patients from Period 1 and 149 patients from Period 2 were included. The primary endpoint was median time to administration of levetiracetam from time order was placed. Key secondary endpoints included proportion of orders for which additional nursing communication was required to obtain medication (i.e. missing doses), adverse reactions, and cost savings for pharmacists and IV technicians time. Additionally, nursing communications were assessed for time delay to administration. Demographics accounted for included age, race, sex, and weight. Patients were included if they were admitted to the ED at an urban hospital for post-ictal status and levetiracetam was ordered and administered in the ED. Patients were excluded if a medication was ordered by an emergency physician but not administered in the ED.

Results: Primary endpoint results for median time to administration from time when order was placed was 19 minutes for Period 1 and 5 minutes for Period 2 (p less than 0.05). A significantly greater amount of additional nursing communication was required in Period 1, as opposed to Period 2 (46.8 percent versus 4 percent, p less than 0.05). Additionally, estimated cost savings per dose (based on average pharmacist and IV technician hourly wage) was found to be $7.50 for the 15 minutes allotted to complete an urgent IV levetiracetam order. This change led to an estimated $2,235 in pharmacy cost savings annually. Patient demographics appear similar between both periods. No major adverse reactions were documented in the electronic health record for either time period.

Conclusion: Conversion to an IV push strategy for levetiracetam resulted in decreased time to administration, decreased pharmacy and nursing time due to missing doses, and decreased pharmacy costs without an increase in documented adverse events.