Association of ICU or Hospital Admission With Unintentional Discontinuation of Medications for Chronic Diseases. Bell CM et al. JAMA Aug 24/31, 2011 – 306(8);840-847

**Background:** The number of transitions in care is increasing. Work hour restrictions and emphasis on shortened hospital stays has increased the focus on effective and safe transitions. The rate of unintentional medication discontinuation has been studied, but not the risk when compared to an ICU admission. Since 2008, JCAHO has required as part of the National Patient Safety Goal some form of medication reconciliation, with future changes looming as methods are studied for utility.

**Methods:** Canadian Institutes of Health Research-funded, population-based cohort study using all hospitalizations from 1997 to 2007 in Ontario, Canada using patients >65 years old who were taking at least 1 year of continuous medications in 1 of the following groups: 1) statins, 2) antiplatelet or anticoagulants, 3) levothyroxine, 4) respiratory inhalers, 5) gastric acid-suppressing medications.

- **Cohorts:**
  - 1) patients discharged after hospitalization including ICU admission
  - 2) patients discharged after hospitalization that did not include ICU admission
  - 3) patients who were not hospitalized (control group)

- **Ensuring Drug Continuity:** used the Ontario Drug Benefits database to check for recent prescription renewal and a minimum of 1 year of continuous use

- **Exclusion:**
  - Hospitalized within 6 months prior to index date (discharge date)
  - Patient died or readmitted to hospital within 90 days
  - Patient hospitalized for greater than 15 days
  - Patients transferred from or discharged to long-term facility, chronic care facility or between hospitals
  - Patient with recorded contraindications to medication continuance (eTables 1 and 2)

**Primary Outcome:** Failure to renew prescription within 90 days after hospital discharge

**Secondary Outcome:** Patients followed from 91 to 365 days – death, ED visit, rehospitalization (downstream effects)

**Sensitivity Analysis:** Patients who died within 90 days of index date (to determine potential underestimation of medical discontinuation)

**Statistical analysis:**
- Controlled for confounding factors - age, low-income status, length of hospital stay, disease burden, number of medications, number of Primary Care and Internal Medicine specialist visits
- Multivariate logistic regression for each of the 5 medication groups
- 99% power to detect relative difference of <2% in the proportion of patients continuing medications with a 2-tailed $\alpha$ level of 0.05.
Results:

- Population: Table 1 – demographics – 187,912 hospitalized patients and 208,468 controls
  - Table 2: Sample size. Non-ICU admission – 144,094. ICU admission: 16,474
- Primary Outcome - Medication Discontinuation: Tables 3 and 4
  - All medication groups had statistically significant adjusted odds ratio (AORs) for hospitalized patients. The lowest AOR was Levothyroxine (1.18; 95%CI 1.14-1.23), and the highest was Antiplatelet/Anticoagulant agent (1.86; 95%CI 1.77-1.97) (Table 3)
  - ICU exposure compared to non-ICU hospitalization: statistically significant AORs for all groups except respiratory inhalers (Table 4)
- Secondary Outcome – Table 5
  - Patients who had complications from 90 days to 1 year post-hospitalization (and excluded in primary outcome calculations) had statistically significant increased rates of discontinued statins (AOR 1.07; 95%CI 1.03-1.11) and antiplatelets/anticoagulants (AOR 1.10; 95%CI 1.03-1.16) but not inhalers, gastric acidsuppressants or levothyroxine.
- Sensitivity Analysis: When including patients who died within 90 days, the rate of medication discontinuation was higher for all medication groups

Discussion/Limitations:

- This retrospective review substantiates previous work describing both increased rate of medication discontinuation after ICU admissions and post-surgery patients
- All medication groups exhibited increased risk of discontinuation with hospitalizations
- ICUs in Ottawa exhibit an additional risk in 4 of 5 medication groups
- Patients with complications from 90 days to 1 year post-hospitalization exhibited an increased rate of discontinuation in 2 of 5 medication groups
- Directly applicable to geriatric population
- Being a cohort study limits the data quality, such as more nuanced reasons for discontinuation of medications, different systems of reconciliation, etc.
- Data not age stratified, though likely was controlled for with regression analysis
- Limited to patients >65 years old
- Did not adjust for hospital characteristics (EMR, size, volume, hospitalists, etc)
- Unclear why patients coming from or being discharged to health care facilities outside the home were excluded
- Remember: association and not causality

Take away:

- Elderly patients in Canada and very likely the United States have at risk of unintentional medicine discontinuation after hospitalization. There is a link to an increase in adverse events within 1 year, including death. Therefore, follow up appointments with an established PCP post-hospitalization is important and more diligent medication reconciliation should be emphasized in hospitals.