INTRODUCTION

- Brooke Army Medical Center (BAMC) has a comprehensive and ongoing program for monitoring and reporting Adverse Drug Reactions (ADRs). However, despite continued encouragement and promotion, many ADRs occur go unreported. This is a patient safety concern as it affects the ability of pharmacists to monitor the safety of medication use in patient populations and to provide proper education to healthcare professionals.

OBJECTIVES

- The purpose of this study is to utilize data mining tools to recapture additional ADRs not reported/documented through traditional methods (Patient Safety Reporting (PSR) and local pharmacy ADR forms). This novel process can improve efforts in patient safety by appropriately identifying and screening patients for complications associated with their medication therapy.

METHODS

Data Sources

- International Statistical Classification of Diseases and Related Health Programs (ICD) 9 and 10 codes associated with adverse drug reactions for BAMC patients were extracted monthly by accessing Military Health System Management Analysis and Reporting Tool (M2) data. There are approximately 640 ICD codes associated with adverse drug reactions. Visits from outpatient clinics and the Emergency Department as well as admissions on the inpatient side where reviewed and coded within 60-90 days of encounter close out.

- Sources of data reported include patient identifiers, type of visit (emergency department, clinic visit, or inpatient admissions), encounter date, provider, and diagnosis from the electronic health record.

- Non-formulary drug requests were also reviewed and analyzed for association with a previous adverse drug reaction prohibiting the patient from taking a local formulary agent.

Analysis

- All data gathered from M2, non-formulary requests, and routine reporting was screened for potential ADRs.

- Patients’ medication records were updated with the ADR if the event was coded as probable according to the Naranjo Algorithm. If the reaction was determined to be severe or atypical of the medication, the ADR was reported to the FDA MedWatch. Newest reports include the Alerts Based on ADR Causality and Severity (ABACUS) to determine probability and a three-tiered scoring system for severity (Green, Amber, Red).

- ADR data is reported and tracked bimonthly at the Pharmacy and Therapeutics Committee Meetings and Pharmacy Department Process Improvement Meetings.

- Severity ratings were also documented and tracked at these meetings.

• Overall, a significant increase in ADR recapture resulted utilizing data mining tools in addition to traditional reporting methods.

RESULTS

- ADR Reporting Increased from 2014 to 2015

  - 2014 ADRs captured averaged 17.92 ± 6.46; 2015 ADR averaged 31.58 ± 12.55. Using an two tailed t-test between the 2 years resulted in a statistically significant difference (p=0.0029) with a 95% CI (-22.12 to -5.22) between the two year groups.

  - The majority of ADRs captured were from M2 data (monthly average of 58%) and non-formulary requests (monthly average of 34%). Traditional methods accounted for the remaining ADRs (monthly average of 8%).

  - Results from ADR recapture efforts where consolidated, reviewed, tracked, and reported to the bimonthly Pharmacy and Therapeutics Committee Meetings and Pharmacy Department Process Improvement Meetings. Severity ratings were also documented and tracked at these meetings.

- Overall, a significant increase in ADR recapture resulted utilizing data mining tools in addition to traditional reporting methods.

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean ADRs Captured</th>
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<tr>
<td>2014</td>
<td>17.92 ± 6.46</td>
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<tr>
<td>2015</td>
<td>31.58 ± 12.55</td>
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DISCUSSION

- This study has a number of limitations, including:
  - The majority of ADRs captured through M2 are based on coding accuracy, medical interpretation/definitions of ADRs.
  - ICD 9 coding converted to ICD 10 coding between 2014 to 2015 resulting in an additional several hundred codes associated with ADRs. Provider and coder familiarity and knowledge of new ICD 10 coding may affect accuracy of the data reviewed.
  - Multiple potential confounding variables are not accounted for by this analysis, include provider interventions, patient interventions, patient telephone consults for potential ADRs, nursing advice lines/consults, and lack of consistency with pharmacy personnel reviewing ADRs.
  - Potential future directions may include tracking ADR severity categories as defined by ABACUS with the associated reporting method. Additionally, proactively tracking interventions caught as a result of documented ADRs in patients’ medication profiles as a patient safety measure.

CONCLUSION

- ADR capture can be a challenge with the ever increasing demands on providers and increasing workload for pharmacies. Data mining tools can provide some relief from a patient safety aspect to recapture and appropriately document ADRs in patients’ electronic health record. This will allow pharmacies to accurately screen patients every time they present with new prescriptions, and avoid costs associated with additional provider visits and/or inpatient admissions related to ADRs.

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