Improving Syndromic Data Quality through Implementation of Error Capture Module

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Objective
To streamline emergency department data processing in Oregon ESSENCE (Oregon’s statewide syndromic surveillance) by systematically and efficiently addressing data quality issues among submitting hospital systems.

Introduction
Oregon Public Health Division (OPHD), in collaboration with The Johns Hopkins University Applied Physics Laboratory, implemented Oregon ESSENCE in 2011. ESSENCE is an automated, electronic syndromic surveillance system that captures emergency department data from hospitals across Oregon. While each hospital system sends HL7 2.5.1-formatted messages, each uses a uniquely configured interface to capture, extract, and send data. Consequently, ESSENCE receives messages that vary greatly in content and structure. Emergency department data are ingested using the Rhapsody Integration Engine 6.2.1 (Orion Health, Auckland, NZ), which standardizes messages before entering ESSENCE. Mechanisms in the ingestion route (error-handling filters) identify messages that do not completely match accepted standards for submission. A sub-set of these previously-identified messages with errors are corrected within the route as they emerge.

Results
The module captured 16,273,963 error messages over 81 days. The two error capture filters (before and after existing modifiers) each generated 50% of the error messages. The module identified errors across seven HL7 message segments (DG1, EVN, OBX, PID, PR1, PV1, PV2). One submitter produced 87% of the error messages. Of those, 93% were errors in two fields in the PID segment. Based on the results, ESSENCE team members contacted this submitter and resolved this error, greatly reducing the ingestion and error assessment burden of Rhapsody and the development team. Currently the ESSENCE team is still analyzing the rest of the errors, applying fixes and contacting submitting facilities as needed. Once completed, the ESSENCE team will enable the error capture module bi-annually to continue refinement of its system strategically guide data quality work.

Conclusions
Oregon ESSENCE developed a tool to evaluate errors in emergency department HL7 messages it receives for syndromic surveillance. Its quick development and reusability make it a cost-effective and sustainable data quality solution for focusing effort in regional installations of syndromic surveillance.

Keywords
ESSENCE; Data Quality; Interoperability; Syndromic Surveillance; Oregon

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