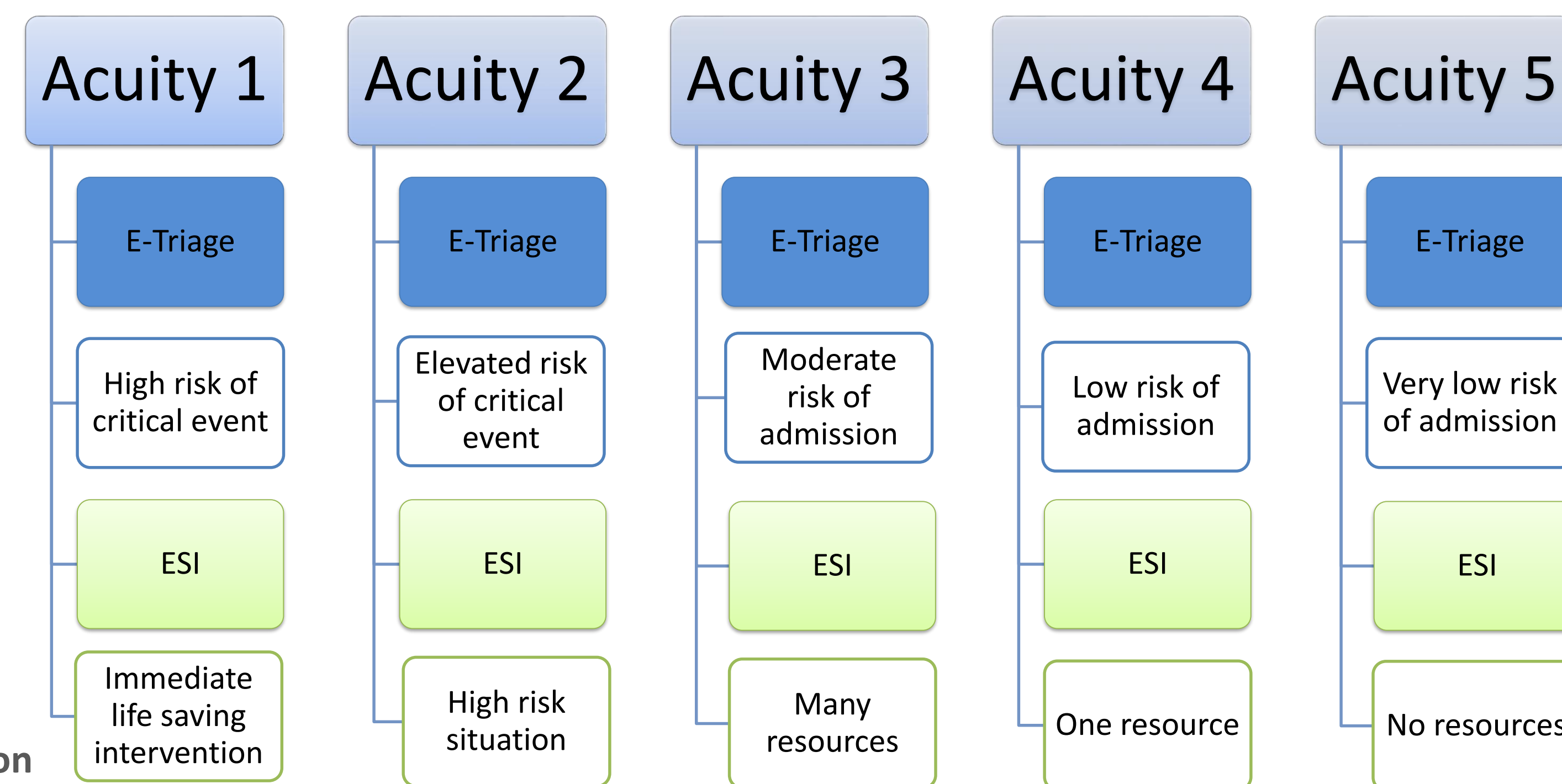


Purpose

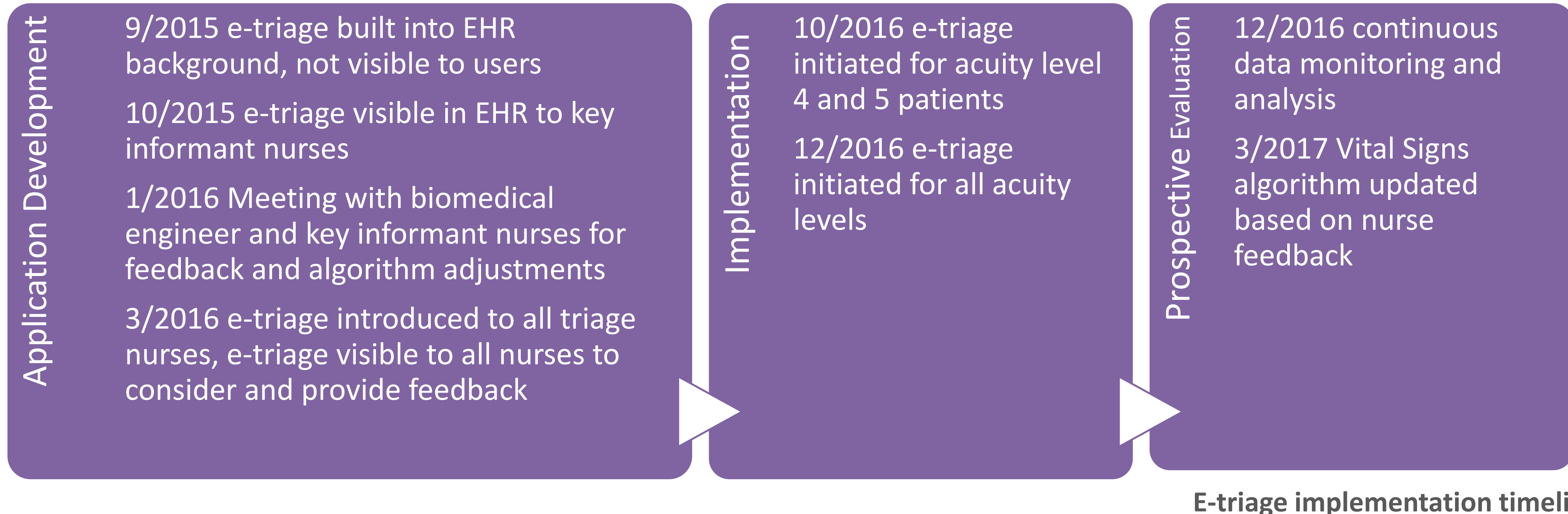
- Leveraging the electronic health record (EHR), as well as translating research to clinical practice, are paramount to improving the provision of healthcare in the US (NIH, 2006; AHRQ, 2017).
- The nurse-driven, often subjective, triage process can greatly benefit from improved use of technology.
- The use of an innovative machine-learning clinical decision support tool (e-triage) has been shown to reliably and accurately triage patients by sorting patients based on likelihood of critical events (Dugas, 2016).
- The objective of the study is quantify and qualify our evolution from the traditional ESI triage system, to e-triage as an exemplar of successful transition from research to practice and nursing integration of data-driven clinical decision support.



E-triage and ESI comparison

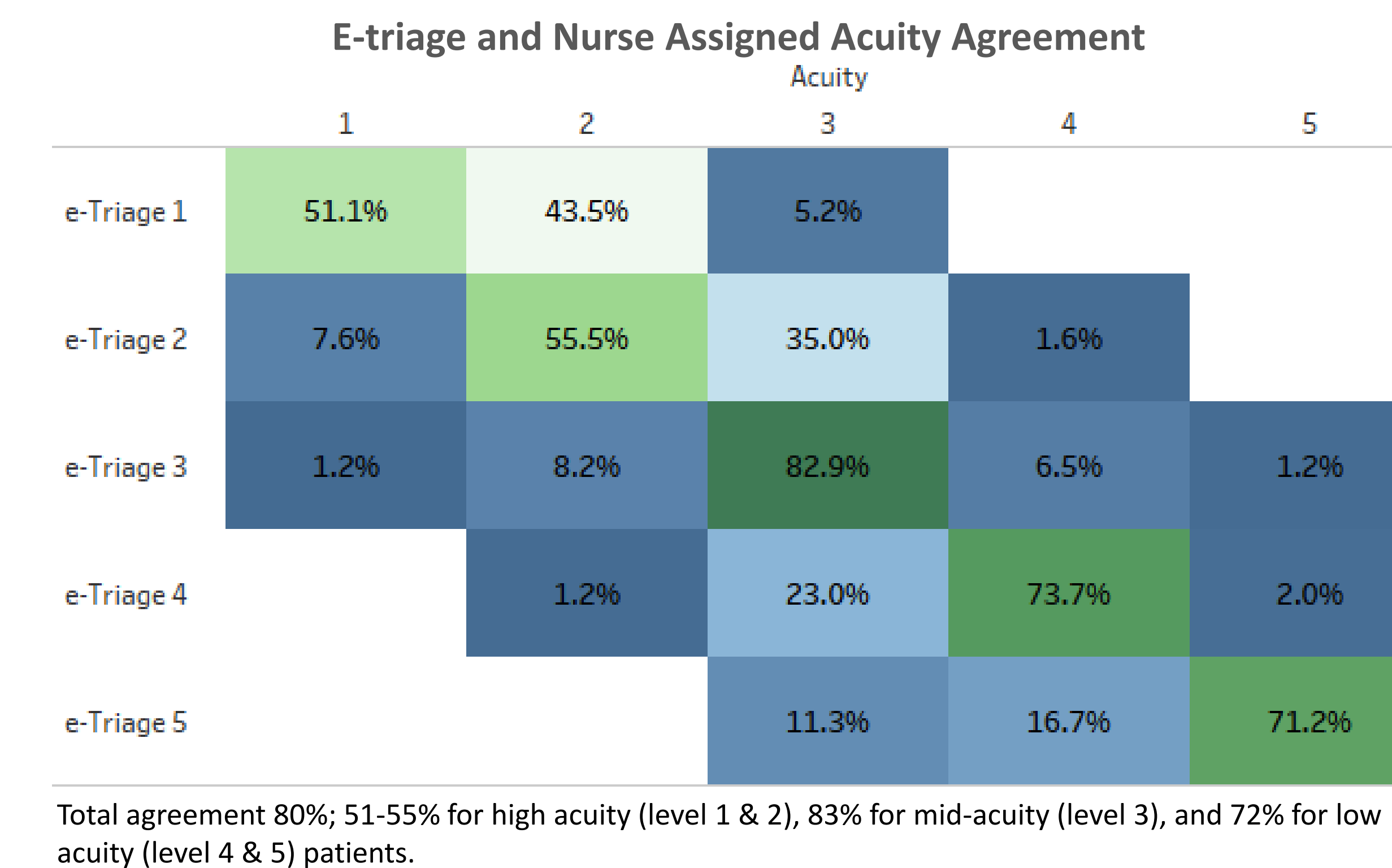
Methods

This is a prospective cross-sectional study in level one, urban, academic trauma center with approximately 70,000 annual patient visits. Participants included all practicing triage nurses. Over one year, we incrementally rolled out a new e-triage system. E-triage is a site-specific, clinical decision support system developed from the ED's patient population that does not replace nursing assessment, but provides a triage level suggestion based on computed risk of several acute critical outcomes: mortality, intensive care unit (ICU) admission, and emergent procedure. Statistical evaluation of e-triage included quantifying: nursing uptake, agreement with e-triage level, and patterns of nurse overrides.

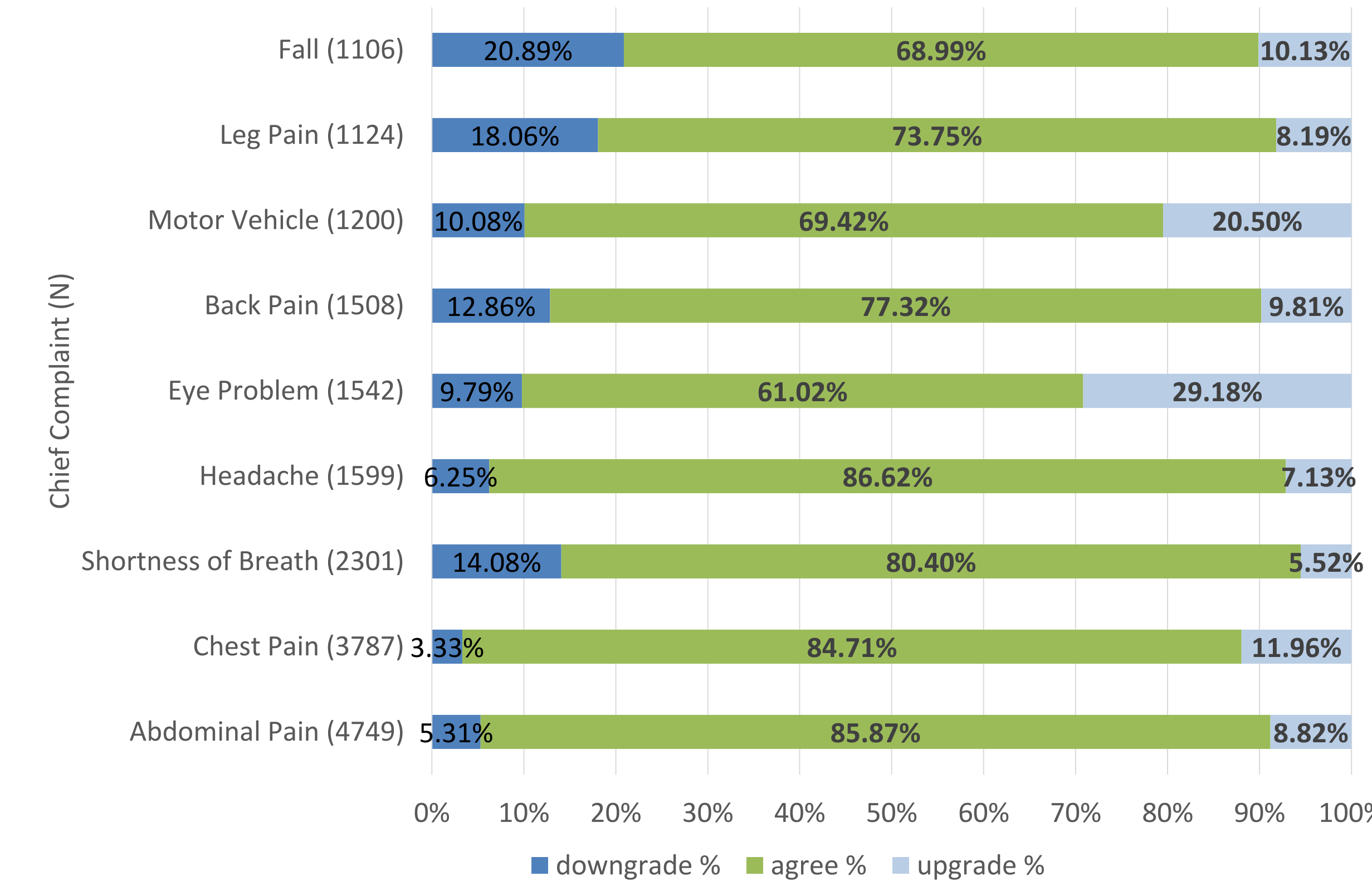


E-triage implementation timeline

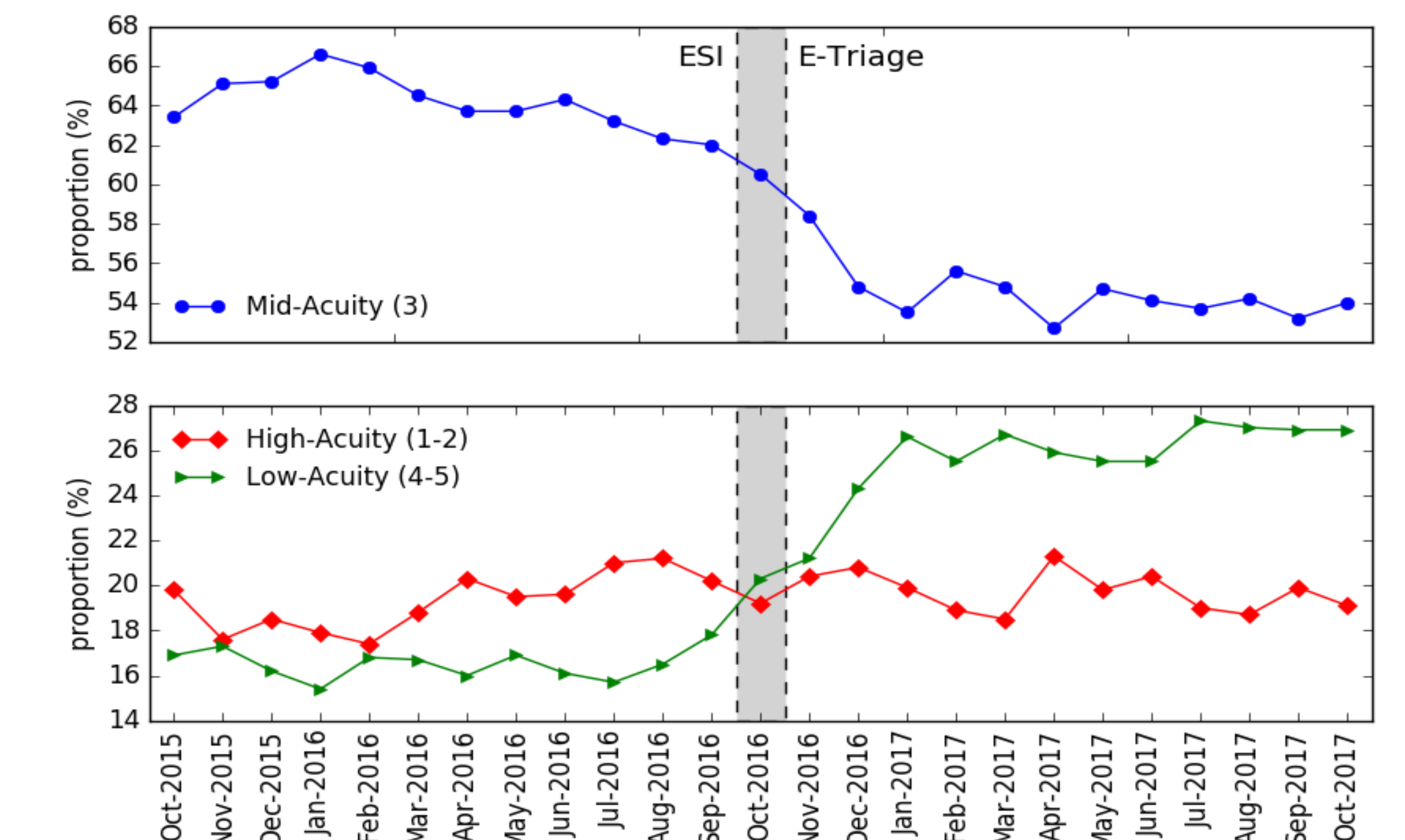
Results



Percent Nursing Agreement with e-triage Among 10 Most Frequent Chief Complaints



Pre/Post Patient Differentiation Across Low, Mid and High Acuties



Percentage of Highest Agreement, Upgrades and Downgrades by Chief Complaint

Chief Complaints with Most Agreement	Frequency / N	Percentage Agreement
Headache	1385 / 1599	86.6%
Sickle cell	825 / 955	86.4%
Emesis	746 / 865	86.2%
Abdominal pain	4078 / 4749	85.9%
Chest pain	3208 / 3787	84.7%
Chief Complaints with Most Upgrades	Frequency / N	Percentage Upgraded
Ingestion	242 / 572	42.3%
Seizure	194 / 551	35.2%
Suicidal ideation	349 / 1036	33.6%
Eye problem	450 / 1542	29.2%
Alcohol intoxication	133 / 514	25.9%
Chief Complaints with Most Downgrades	Frequency / N	Percentage Downgraded
Post-op problem	88 / 385	22.9%
Referral	134 / 609	22%
Fall	231 / 1106	20.9%
Foot pain	141 / 680	20.7%
Leg pain	203 / 1124	18.1%

Nurses tended to downgrade (N=33) patients complaining of abdominal pain for reasons such as vital signs (n=13), nursing visual assessment (n=5) and lack of associated symptoms (n=6). Most upgrades (N=126) were attributed to "protocol," (n=49) past medical history (n=14), and presence of associated symptoms (n=14).

Implications

Large scale practice change is possible, yet requires high levels of end-user engagement, including a mutually-educational relationship between the users and support technology. Trends in overrides related to chief complaint and subsequent outcomes can continue to inform the implementation and development of the triage tool. This transition exemplifies the translation of informatics research to practice as well as the potential of nurses to use the EHR and machine learning to improve healthcare.