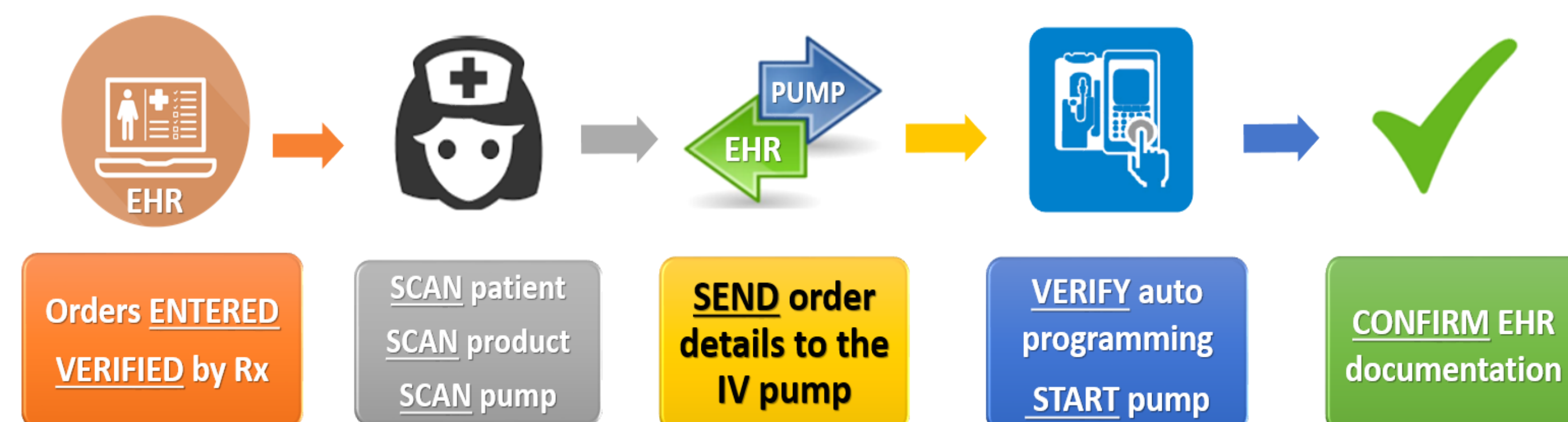




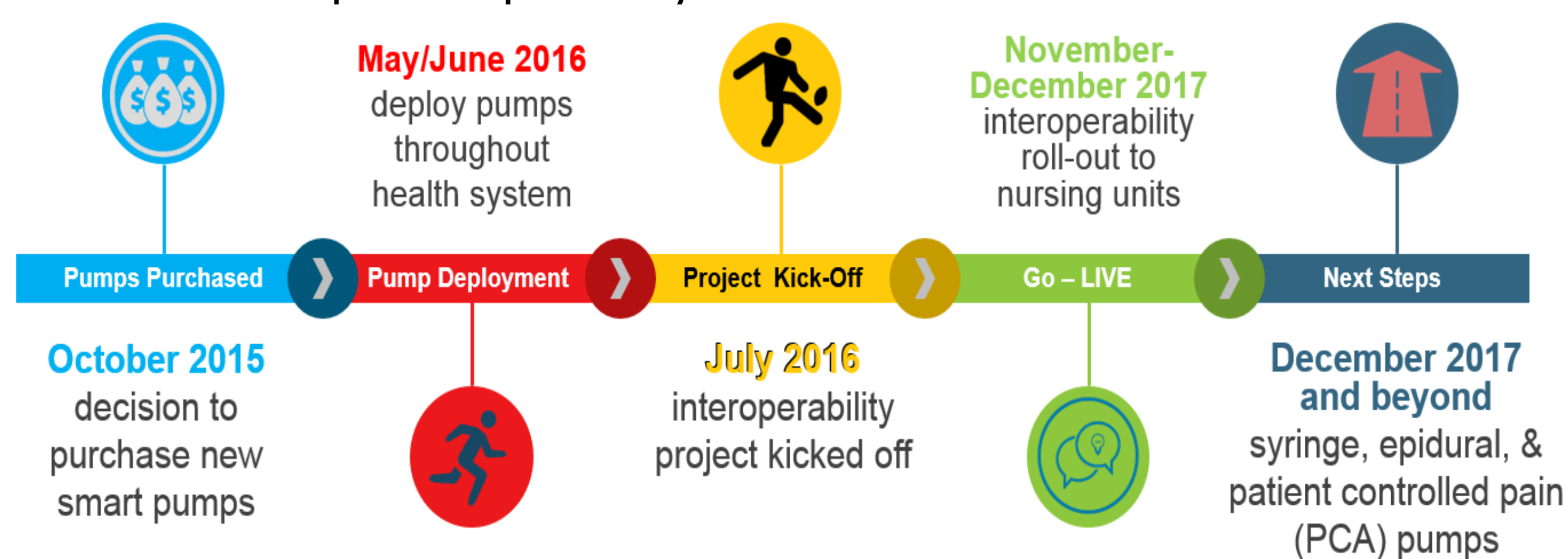
PURPOSE

Describe the process to implement smart pump–electronic health record (EHR) interoperability technology throughout a multi-facility community health system to improve intravenous (IV) medication safety and efficiency with auto-programming, reducing keystroke errors and edits from 17 step manual process to 7 steps.



BACKGROUND

EHR – IV Pump Interoperability Timeline



APPROACH

- Identify stakeholders
 - Leadership
 - Informational Services (IS)
 - Biomedical
 - Nursing
 - Vendors – EHR & IV Pump
 - Facilities
 - Pharmacy
 - Outpatient & Ancillary Services
 - Finance
- Develop a project plan
 - Evaluate the organization’s current state – wireless network, technology usage and barcode compliance, nursing workflows, computerized provider order entry (CPOE), and pump drug library settings
 - Define patient areas and situations that will not use interoperability and label as out of scope
 - Complete an extensive review of every medication and fluid infusion order with all corresponding dosing options
 - Test the interface for every infusion order to evaluate auto-programming of the pump, validate drug library pump limits and, confirm accurate documentation occurs on the MAR and intake flowsheet, and popup alerts or error messages
 - Complete and standardize nursing IV workflows across areas

APPROACH

- Repeat order-interface testing for all medications in a distinct test environment with nursing end-users
- Document and correct errors identified by end-users in real time and/or track issues to include for end-user training
- Complete a thorough **Failure Modes Effects Analysis** with key stakeholders to address identified concerns and clarify follow-up
- Major decision points
 - Define out-of-scope areas, medications and situations
 - Standardize nursing IV administration workflows
 - Determine the number of clinical care areas (CCA) needed
 - Determine how bolus IV fluids will be ordered and infused

OUTCOMES

- An EHR – IV Pump Steering Committee was formed and met weekly with subgroup meetings, tasks, and assignments occurring in between
- 7** key nursing units were identified to guide standard workflows
- Decrease CCAs **22 → 9**
 - Critical Care
 - Emergency Care
 - Medical Surgical
 - Obstetrics
 - OP Infusion
 - Oncology
 - Pediatrics
 - Perioperative
 - Training
- 3** rounds of testing were completed on **1400+** medication orders ensuring the order auto-programs the pump, closes without alerts, and documents rate, dose, and volumes correctly to the EHR
- 7** out of scope units and **6** out of scope patient care situations were defined, along with infusions which will not integrate

Units	Situations	Infusions
Cath Lab	Code Blue	Blood
Dialysis	Rapid Response	Fluids >999 mL/hr
Endoscopy	Sepsis Resuscitation	Gravity / pressure bag
Emergency Transport	STEMI	One-step meds
Neonatal ICU	Stroke Activate	Research drugs
Perioperative	Trauma	
Radiology		

- 18** nursing workflows were standardized across **8** facilities and more than **50** departments
- Trained **5500+** nurses over **10 weeks** using multimodal training:
 - Terminology e-learning
 - Instructor-led classes

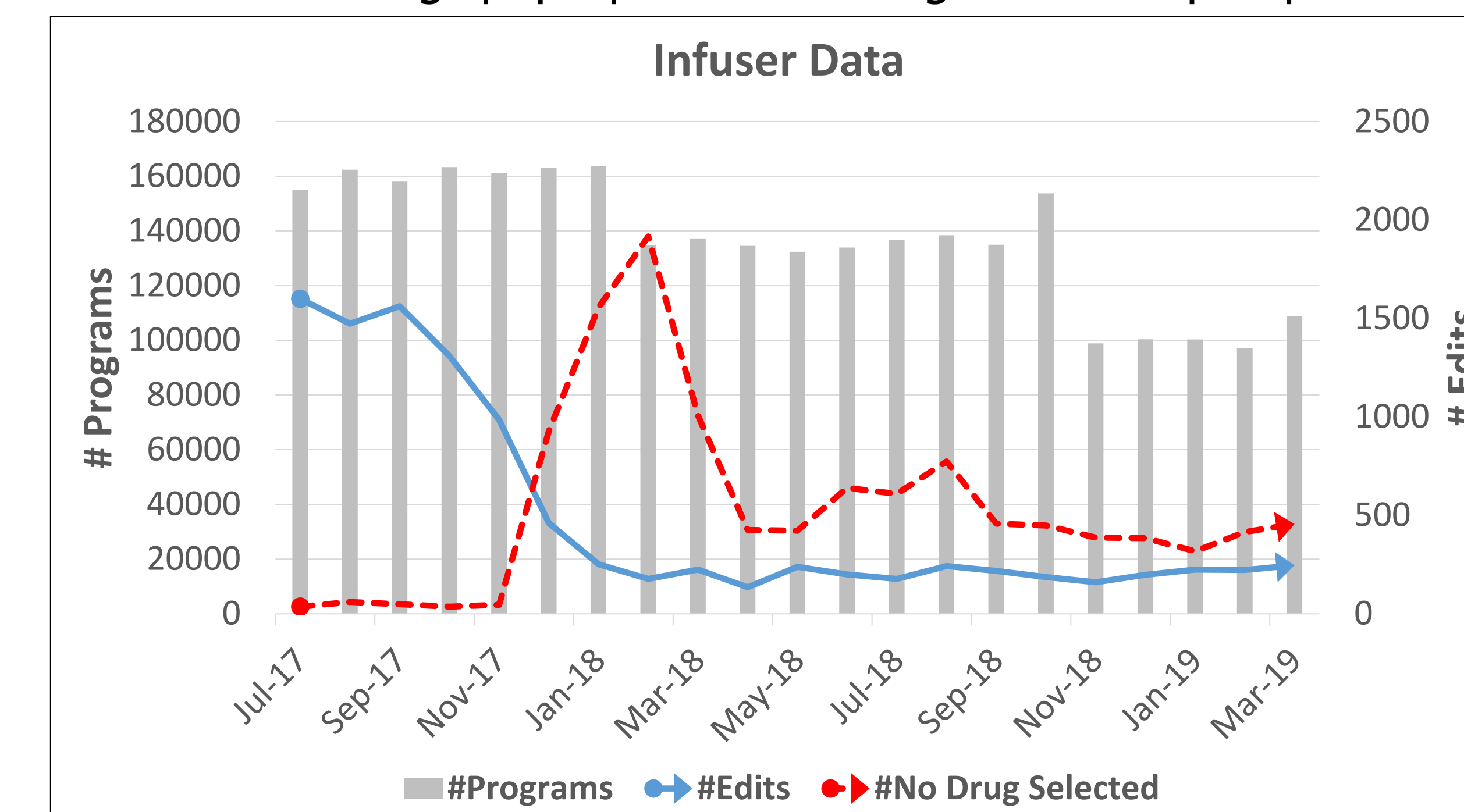
OUTCOMES

- The 2 hour in class sessions included
 - Interoperability overview presentation
 - EHR-IV workflow video clips
 - Hands-on exercises within a simulation environment
- Additional education was created for out-of-scope areas, pharmacy, providers and new hires.
- The project took **18 months** to complete from kick-off to go-live.
- Post Go-Live discovery:

Unrealized Outcome:

↑ No Drug Selected = ⚡ Safe Infusion Limits

Why? Infusion NOT in the selected CCA will result in an EHR “Unmatched Drug” pop-up and “No Drug Selected” pump alert.



- Successes:
 - ↓ Keystrokes errors and edits
 - ↑ Infusion administration safety
 - Standardized infusion practices
 - Real time infusion administration data
- Challenges:
 - Validating pump data
 - Wi-Fi connectivity
 - National drug shortages
 - Timely formulary addition

CONCLUSIONS

- Assessment of current state technology and nursing IV workflows should start early
- A multidisciplinary approach is critical to ensure all aspects of the project are aligned
- A dedicated resource to serve as a liaison among the stakeholders with existing knowledge of pharmacy and nursing is invaluable
- Collaborating with IS, biomedical, and facilities will minimize delays
- Implementation will not be without challenges or delays, yet achievable within a reasonable timeframe
- Ongoing communication post go-live thru end user feedback, event review analysis, and proactive assessment of data allows the system and end user experience to continuously improve