Surgical site infections (SSIs) are a source of significant morbidity and mortality for pediatric patients. Prophylactic antibiotics given prior to surgical incision are known to reduce the incidence of SSIs [Bratzler 2006]. However, the efficacy of prophylactic antibiotics is limited by adherence to evidence-based guidelines and requires appropriate drug selection, dosing, and timing [Anderson 2014]. Inappropriate antibiotic prophylaxis may lead to adverse reactions and contribute to antibiotic resistance.

At Lucile Packard Children’s Hospital Stanford we observed substantial variability in the dosing and selection of preoperative prophylactic antibiotics. Using lean quality improvement methodology, we designed a multidisciplinary intervention to improve the administration of preoperative antibiotics as part of a larger effort to reduce SSIs.

### Methods
- Standardized preoperative antibiotic regimens were updated by our Antimicrobial Stewardship Program using recommendations published by the Infectious Diseases Society of America and supplemented by expert consensus.
- Ordering of prophylactic antibiotics was shifted from verbal orders to routine electronic preoperative order sets completed by the surgical team. These order sets prompted the surgical provider with enhanced guidelines and doses, leading to consistent adherence to best practices.
- Advance ordering of antibiotics enabled dose verification, electronic allergy checking, preparation of the antibiotics by pharmacists, and delivery to the anesthesiologist.
- Guidelines were disseminated in multiple formats to ensure high compliance:
  1. Posted in the operating room near the anesthesia workspace
  2. Incorporated into staff identification badges
  3. Included in the House Staff Manual
  4. Embedded into preoperative order sets
  5. Coded into alerts in the intraoperative anesthesia record

### Results
- 1950 cases were audited post-intervention.
- Several Plan-Do-Check-Act cycles were initiated after each month of audits in order to identify barriers and implement countermeasures.
- Compliance with appropriate antibiotic ordering and administration increased from 0% to 85% (p=0) after the first five months of implementation.

### Conclusions
- Adherence to standard preoperative antibiotic guidelines was improved by incorporating preoperative antibiotic selection into the existing pre-surgical order sets.
- Participation of surgeons, pharmacists, and infectious disease physicians in all steps of the improvement project increased buy-in.