

## Wrong-Site Surgery, Retained Surgical Items, and Surgical Fires : A Systematic Review of Surgical Never Events

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### PURPOSE OF THE STUDY

A systematic review to estimate the incidence and root cause of wrong-site surgery, retained surgical items, and surgical fires and the effect of interventions aimed at preventing them.

### METHODS

Searches were undertaken in June 2014 to identify studies published since 2004, the year the Universal Protocol was introduced. The review provides incidence estimates after implementation of the Universal Protocol, root-cause analyses of incidents that occur despite the widely implemented Universal Protocol, and the effect of interventions building on the Universal Protocol.<sup>1</sup>

For incidence studies, the authors computed events per 10,000 performed surgical procedures.

For root-cause analyses, the authors abstracted events, assessment details, causes, and risk factors. For intervention evaluations the authors documented the setting, procedure, study design, number of patients, practitioners, and/or procedures, adverse event (including cost associated with the intervention), and event, near-miss, and/or composite outcome.

### RESULTS (INCIDENCE ONLY)

5399 publications were identified. Some studies reported on more than 1 event (*eg, wrong-site surgery and retained surgical items*) or more than 1 review question (*eg, incidence and root causes*).

27 US estimates of wrong-site surgery incidence were identified. The median incidence estimate for wrong-site surgery across 7 US studies reporting a general per-procedure estimate was 0.09 events per 10,000 surgical procedures; however estimates varied widely.

Surgical sponges were the most commonly reported retained items in 21 identified incidence studies. The median incidence estimate for retained surgical items was 1.32 events per 10,000 surgical procedures based on studies reporting per-procedure data. About half of the studies reported that a counting protocol was in place at the time of the incident, and 4 studies<sup>2,3,4,5</sup> stated that events were discovered even when surgical counts were recorded as correct and/or routine radiographic imaging was performed.

3 studies of surgical fires were identified, but none reported a per-procedure estimate of the incidence of surgical fires.

### DISCUSSION

- Whether the event occurrence can be reduced to zero to achieve a true never-event rate is unclear, but **with approximately 50 million US surgical procedures performed annually,<sup>6</sup> the authors median estimate of 1 wrong-site surgery per 10,000 procedures translates to an estimated 500 wrong-site surgeries and 5,000 retained surgical items annually, which constitutes too many events.**

### KEY TAKE-AWAYS

- **Root-cause analyses suggest the need for improved communication.**
- Despite promising individual approaches (*ie, education, team training, a data-matrix-coded sponge-counting system*), apart from global Universal Protocol evaluations, empirical evidence to support any particular intervention is limited.



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