What previous studies have been performed about anesthesia staffing and case scheduling for obstetrics (labor and delivery)?

Click here for a simple analysis method [PDF]. Statistically, the method assumes non-stationary Poisson distributions. (For a queueing model of the entire labor and delivery ward, click here). References 2, 15, and 16 describe threshold rules for managing admissions of patients for induction of labor or scheduled cesarean section (click here, click here, and click here). Specifically, when the numbers of patients present on the labor and delivery (acute) board exceeds the threshold, elective procedures are postponed for a few hours. Hospitals adjust the threshold by one patient, wait several months to see the effect, and then increase or decrease it again by one patient. Most hospitals in the USA with obstetrical practices have sufficiently small numbers of deliveries per day that these methods likely are sufficient. Click here and see the last section of the paper. Click here for validation using every hospital with a labor and delivery unit in the State of Iowa. Importantly, *do not* expect homogeneity among hospitals for durations of labor or for durations of labor analgesia (i.e., validity to applying national data to your hospital); click here and click here for explanations and national surveys.

At large hospitals with many scheduled cesarean sections, this elective surgical practice can be treated as separable mathematically (e.g., like surgical suite weekend scheduling). Click here, click here, and click here for mini review. For examples of these analyses (for ORs), click here and scroll to the last several pages of the sample report. If data are limited, instead Poisson model can be assumed (click here). When small labor and delivery suites close, patients do disproportionately receive care at large hospitals with obstetric anesthesiologists, such increases are not predicted accurately based on geography alone (click here). Instead, for long-term capacity planning of large obstetrical surgical suites, simple linear regression or quantile regression can be applied to batches of one-year periods (click here).

At small hospitals, the following principles can be useful:

- Consider "supervision" of nurse anesthetists or anesthesia assistants as a process of clinical care, not as a billing term (click here, click here, click here, click here, and click here). If nurse anesthetists are supervised by anesthesiologists, costs will be least by scheduling an anesthesiologist alone or an anesthesiologist and a nurse anesthetist. Make the

decision in part based on the risk of a labor epidural requested soon after a cesarean section has started. Do the mathematics. Monitor upper (e.g., 90th) percentiles of waiting times for placement of a labor epidural. Timing is a frequently mentioned negative theme of women's experiences with neuraxial labor analgesia (click here).

- An anesthesiologist may be scheduled for obstetrics and another for ORs, each contacted independently, and serving as each other's backup. Alternatively, one anesthesiologist is primary for both obstetrics and ORs, and a second serves as backup. Do not do the latter unless monitoring daily how long patients wait (click here, click here, and click here).

- The anesthesiologist or nurse anesthetist at obstetrics needs ongoing skills in general anesthesia and resuscitation. Working only at obstetrics can be impractical.

- Monitoring reliably the incidence of wet taps of each anesthesiologist or nurse anesthetist requires each provider doing at least a couple of hundred annually.

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