

# Prioritization for Elective Dental Treatment Under General Anesthesia

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## ABSTRACT

This paper describes the process and outcomes of an initiative to develop a system to prioritize operating room bookings for children who require elective dental treatment. This initiative had 3 objectives: to improve the timeliness of treatment in the operating room based on medical and dental need, to provide a means to identify and expedite the highest-priority cases when operating room time became available, and to document the prioritization of cases as a quality assurance measure. Each patient booked for treatment in the operating room was assigned a priority ranking based on a combination of their medical risk and dental status. Measures of interrater reliability between clinician raters were moderate to good. Use of the prioritization system demonstrated improved timeliness of treatment for urgent cases and the effects of additional measures taken to reduce the waiting list.

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**S**urgical waiting lists, a concern for clinicians, have increasingly caught the attention of health care economists and the world press. Canadians have already instituted the use of prioritization to optimize the use of operating room time for orthopedic procedures.<sup>1</sup> This paper describes the process and outcomes of an initiative to develop a method to prioritize elective operating room bookings for dental treatment under general anesthesia at The Hospital for Sick Children in Toronto (SickKids). This initiative had 3 objectives: to improve the timeliness of treatment in the operating room based on medical and dental need, to provide a means to identify and expedite the highest-priority cases when operating room time became available,

and to document the prioritization of cases as a quality assurance measure.

Before this initiative, children who required dental treatment under general anesthesia were categorized as emergent, urgent or low priority, and were assigned the next available booking date accordingly. This practice was thought to be an effective means of prioritizing emergent cases. However, children with a range of less urgent treatment needs, the largest subset of the waiting list, did not seem to be effectively prioritized. In addition, no process existed to locate and expedite the most urgent cases when cancellations occurred or supplemental operating room time became available.

**Table 1** Priority rankings with representative examples of associated medical and dental conditions

Priority (MAWT)	Examples of medical status and dental status
1 (< 24 hours)	Compromised airway and facial cellulitis
2 (24 hours–3 weeks)	Unstable cardiac status and dental abscess Immunocompromised and dental abscess
3 (3–6 weeks)	Unstable cardiac disease and dental caries approximating dental pulp Stable cardiac condition (requires infective endocarditis prophylaxis) and dental abscess
4 (6 weeks–3 months)	Stable cardiac condition (requires infective endocarditis prophylaxis) and dentin caries Low-risk medical status (ASA 1) and dental caries approximating dental pulp
5 (3–6 months)	Seizure disorder and dentin caries and retained primary teeth
6 (> 6 months)	Seizure disorder and gingival hyperplasia requiring gingivectomy

MAWT = Maximum acceptable waiting time

**Table 2** Comparison of waiting list statistics for July and November 2005

Priority	Mean waiting time (days)		Mean time greater than MAWT (days)		No. of patients beyond MAWT		No. of patients on waiting list	
	July 2005	Nov. 2005	July 2005	Nov. 2005	July 2005 (n = 566)	Nov. 2005 (n = 501)	July 2005 (n = 624)	Nov. 2005 (n = 530)
2 (24 hours–3 weeks)	27	0	6	0	2	0	2	0
3 (3–6 weeks)	144	97	102	55	47	33	55	46
4 (6 weeks–3 months)	325	350	234	260	346	336	369	345
5 (3–6 months)	340	365	160	185	144	108	145	115
6 (> 6 months)	301	371	120	190	27	24	29	24

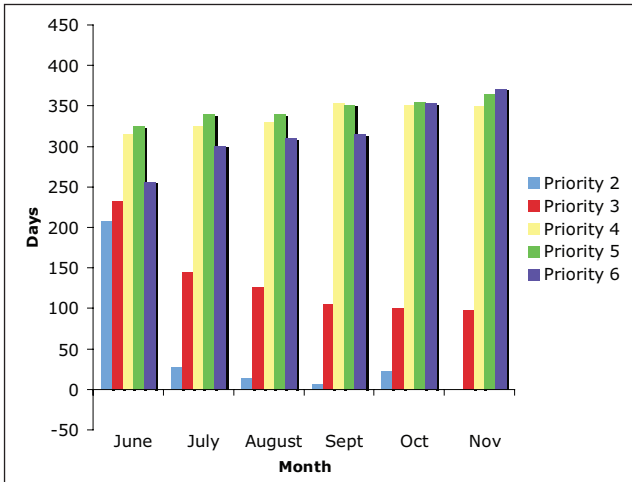
MAWT = Maximum acceptable waiting time

### Development of the Prioritization System

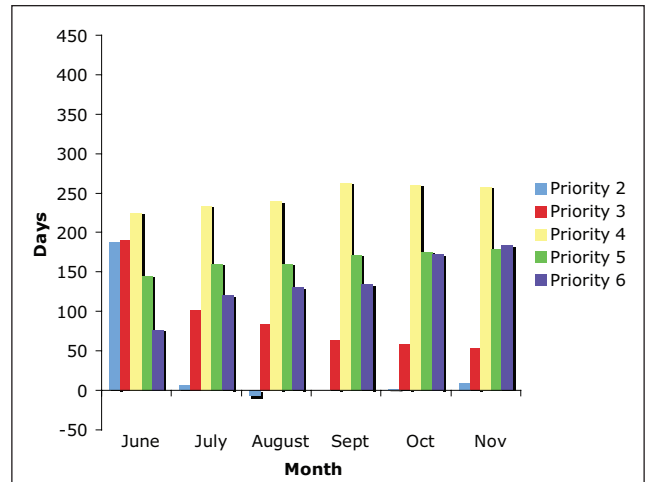
A ranking system for prioritization of care was developed, based on the expert opinion of 3 pediatric dentists with extensive experience booking appointments for treatment in the operating room. Reliance on expertise was necessary because no evidence supporting maximum acceptable waiting times for children who require dental treatment has been published.<sup>2</sup> A ranking system that assessed a child’s medical risk and dental status was devised. A comprehensive list of medical conditions encountered in the patient population treated at SickKids was produced. Medical conditions were classified as high risk (e.g., untreated tetralogy of Fallot, compromised immune system), moderate risk (e.g., repaired ventricular septal defect for which infective endocarditis prophylaxis is indicated) or low risk (e.g., child with mild cerebral palsy or autism). Risk categories were based on the potential effect of the child’s dental disease on his or her medical status. For example, a dental abscess is commonly a

low health risk for a healthy child, but a potentially life-threatening condition for a child with a compromised immune system. Medical risk rankings were paired with dental conditions that are commonly treated at SickKids (e.g., facial cellulitis, dental abscess, dental caries). Three clinician raters used consensus to define the maximum acceptable waiting time (MAWT) for treatment of each medical risk and dental condition pairing. From this list of paired medical and dental descriptors, an ordered ranking of maximum acceptable waiting times was developed. This ranking system was adapted to a 6-level hospital-wide scale for prioritization of operating room cases (Table 1).

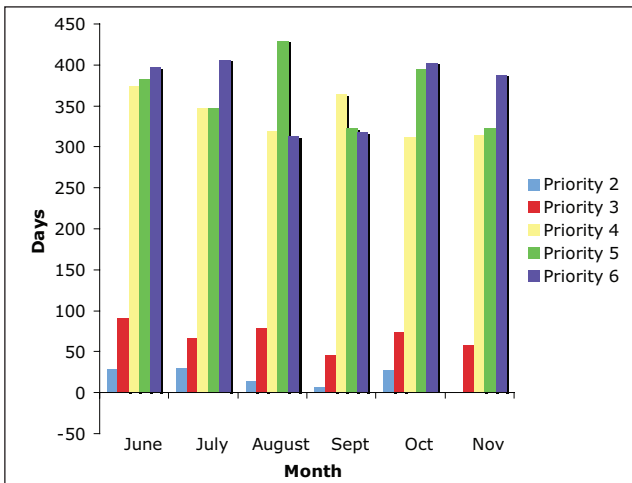
Before implementation of the prioritization system, the reliability of the raters’ prioritization was assessed. Three pediatric dentists independently ranked 2 randomly selected consecutive weeks of charts for patients who were booked for treatment in the operating room (28 charts). Interrater reliabilities were calculated.



**Figure 1:** Mean waiting times for elective treatment under general anesthesia by month and priority ranking. Priority 1 = < 24 hours; priority 2 = 24 hours–3 weeks; priority 3 = 3–6 weeks; priority 4 = 6 weeks–3 months; priority 5 = 3–6 months; priority 6 = > 6 months.



**Figure 2:** Mean time greater than maximum acceptable waiting time for elective treatment under general anesthesia by month and priority ranking. Priority 1 = < 24 hours; priority 2 = 24 hours–3 weeks; priority 3 = 3–6 weeks; priority 4 = 6 weeks–3 months; priority 5 = 3–6 months; priority 6 = > 6 months.



**Figure 3:** Mean waiting times for elective treatment under general anesthesia by month and priority ranking for new patients. Priority 1 = < 24 hours; priority 2 = 24 hours–3 weeks; priority 3 = 3–6 weeks; priority 4 = 6 weeks–3 months; priority 5 = 3–6 months; priority 6 = > 6 months.

A booking sheet that included the prioritization system was designed for elective booking of time in the operating room, staff was instructed in its use and the system was implemented for all new bookings in May 2005. Concurrently, the charts of all 625 patients on the existing waiting list were reviewed and ranked over a 3-day period by 5 staff pediatric dentists. A password-protected searchable database was developed (with FileMaker Pro; FileMaker, Inc., Santa Clara, Calif.) to organize information for the waiting list and priority data. All cases from the existing waiting list and all new cases were entered into the database. This database was designed so that the patient information coordinator could locate patients with the most urgent treatment needs

when cancellations occurred or when supplemental operating time was made available. The database was also used to calculate statistics for the monthly waiting list as a quality assurance measure.

Monthly tabulations or calculations for each priority ranking, including the number of children on the waiting list, mean waiting time, standard deviation in waiting time, mean time greater than the MAWT, number of children waiting longer than the MAWT and mean waiting time for new patients were done at the end of each month.

## Results

In July 2005, 624 children who were booked for treatment in the operating room were on the waiting list. By November 30, 2005, this list was reduced to 530 patients (Table 2) because of changes in eligibility criteria. Weighted kappa values for the 3 raters were 0.5 to 0.8 for ranking 28 charts. Interrater reliability results indicated moderate-to-good agreement among raters.<sup>3</sup> Month-end statistics were collected or calculated since June 2005. Mean waiting time, mean time greater than the MAWT and mean waiting time for new patients from June to November 2005 are displayed in Figs. 1, 2 and 3.

## Discussion

The system described provided a reliable method for prioritizing the care of children who require dental treatment under general anesthesia. Like many prioritization systems, it had face validity; it seemed to prioritize patients according to their medical and dental risk.<sup>1</sup> A validation study of this prioritization system, which will begin in the second half of 2007, will provide evidence about the MAWT for conditions commonly

treated in the operating room at SickKids and determine the content validity of the prioritization system.

Initial month-end statistics demonstrated disproportionately long average waiting times and mean times greater than the MAWT for patients whose status was assessed as priority 2 and 3. Over the period that the system was applied, average waiting times and average waiting times for new patients decreased for those with priority 2, 3 and 4 assessments. Reduced waiting times for children with urgent treatment needs partially satisfied the first objective: improving the timeliness of care for children with most urgent treatment needs. However, **Fig. 2** demonstrates that most patients on SickKids dental department's operating room waiting list were waiting much longer than their MAWT in November 2005. Prioritization of bookings allowed children with the most pressing dental problems to be treated within their MAWT. Consequently, by July 2005 all children assessed as priority 1 (emergent) or priority 2 (elective) were treated within their MAWT for the first time.

The ability to locate the most urgent cases by priority was not previously available. Ease of identification of high-priority cases permitted reallocation of space made available by cancellations and additional allocation of operating room time. This facility satisfied the second objective: to provide a method for locating the most urgent cases when openings occurred. However, as a consequence of the identification and improved waiting times for priority 2 and some priority 3 elective cases, children with 4, 5 and 6 priority rankings had increased waiting periods. Many of these children (priority 3 and 4) had a moderate-risk medical status or advanced rampant dental caries and abscesses. These waiting periods remained longer than desirable and may pose a health risk for these patients. The third objective, documenting the prioritization of patients, was satisfied by the collection and analysis of the month-end statistics since the initiation of the prioritization of operating room cases.

The department of dentistry at SickKids is mandated to provide treatment for children with comorbid conditions and the very young who are best treated in a hospital environment. Early review of the monthly database statistics led to decisions to curtail growth of the operating room waiting list because new children assessed as priority 4 to 6 had waiting times well beyond their MAWTs. With that objective in mind, the maximum age of eligibility for normal children with dental caries was reduced from age 3 years to age 2 years, and referrals from community dentists for healthy children 3 years of age and older were no longer accepted, effective June 2005. These actions reduced the total number of children on the waiting list by about 15% by November 2005. Reducing the waiting list for the dental operating room by limiting access to the hospital improved the proportion of children who received treatment within

the MAWT, but did not ensure that all children on the waiting list would receive treatment within their MAWT. Currently, only 2-year-old children who are unable to cooperate for treatment and the medically compromised are eligible to receive treatment within the hospital. Few community-based dental or anesthesia services are available for treatment of this population.

Prioritization of operating room cases was originally seen as a method to improve the efficient management of operating room time, a resource in heavy demand. As the prioritization system was applied, it was decided that an expanded version could be used for booking ambulatory clinic patients and for planning for managed reductions in patient activity as a component of pandemic planning. Modified versions of this system are being prepared for both of these purposes. ❖

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## References

1. Conner-Spady B, Estey A, Arnett G, Ness K, McGurran, Bear R, and other. Steering Committee on the Western Canada Waiting List Project. Prioritization of patients on waiting lists for hip and knee replacement: validation of a priority criteria tool. *Int J Technol Assess Health Care* 2004; 20(4):509-15
2. MacCormick AD, Collicutt WG, Parry BR. Prioritizing patients for elective surgery: a systematic review. *ANZ J Surg* 2003; 73(8):633-42.
3. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977; 33(1):159-74.