

Improving Healthcare Value: Reducing Overuse in Hospital Pediatrics

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Most hospital pediatricians can recall cases where an abnormal result in one unnecessary test led to a cascade of multiple further unnecessary treatments, procedures, and tests. These cases are well described in the literature and written off as a side effect of delivering high-quality, comprehensive pediatric care.¹ Unfortunately, however, these frequent events are not without consequence and can cause significant harm to patients, as well as stress and fear for parents and families, and indirectly waste valuable resources.

As we look forward to recovering from the COVID-19 pandemic, there are calls to prioritize high-value and more equitable care in the postpandemic world.² Choosing Wisely is a global movement comprised of clinician-led campaigns that partner with national specialty societies to develop lists of evidence-based recommendations of tests, treatments, and procedures that offer no added clinical value and may cause harm.³

In pediatrics, there is a growing recognition and published literature on the harms of overdiagnosis and unnecessary care in children.⁴⁻⁶ Choosing Wisely recommendations are being used as a resource to drive healthcare prioritization and ensure low-value care is avoided so that greater focus can be placed on areas of need exacerbated by the pandemic. Using a Choosing Wisely perspective can drive quality and help inform a shift in practice, creating a roadmap for reducing testing or treatment cascades that harm patients and waste resources as we move toward the goal of high-value pediatric care. However, adoption of Choosing Wisely recommendations in pediatrics has been slow. For example, the pediatric working group of the Society of Hospital Medicine released a *Choosing Wisely*® recommendation in 2013 against the use of continuous pulse oximetry monitoring in children with acute respiratory illness who are not on supplementary oxygen.⁷ Data from a cross-sectional study across 56 hospitals 6 years later found significant variation in this practice for infants hospitalized with bronchiolitis and not receiving supplemental oxygen; 46% were continuously monitored with pulse oximetry (range, 2%-92%).⁸

WHY HAS CHOOSING WISELY LAGGED IN PEDIATRICS?

Traditionally, attention in children's healthcare has focused on underuse (eg, immunizations or mental health) rather than overuse. Further, the weakness of the evidence base, with very few randomized controlled trials in children, limits our ability to provide sufficient confidence in the evidence supporting some of our recommendations.⁹

Second, there is also tremendous anxiety for both parents and frontline clinicians around diagnostic uncertainty of any kind when it comes to children. We endeavour to reassure ourselves and patients' families by leaving no stone unturned. This approach can lead to unnecessary care, including false-positive test results, "incidentalomas," and adverse effects from unnecessary medications. Despite the best intentions of assuaging caregivers' anxiety, overuse of invasive and uncomfortable tests can have the opposite effect of increasing stress and trauma for both children and parents.

Third, there is compelling evidence that practice habits, once established, are difficult to break.¹⁰ Particularly in the high-stakes practice of hospital pediatric medicine, where we are conditioned to expect the worst and anticipate the unexpected. This "do everything to everyone" approach, however, can lead to significant harms for pediatric patients. For example, the exposure to ionizing radiation through unnecessary computed tomography (CT) scans can increase a child's lifetime cancer risk.¹¹

The perpetuation of unnecessary care needs to change in pediatrics, especially for the most vulnerable young patients seeking hospital care. Implementation is a necessary next step to introduce recommendations into practice, and the Choosing Wisely efforts of the Hospital for Sick Children in Toronto, Canada, can offer insights into opportunities to embed this approach across similar quaternary care teaching hospitals, as well as general hospitals and the systems they support.

STEPS TO IMPLEMENTING CHOOSING WISELY HOSPITAL-WIDE

Creating Lists of Recommendations Aligned With Quality Metrics

The Hospital for Sick Children developed a hospital-specific Choosing Wisely list in 2016 to address a gap in existing Choosing Wisely Canada campaign recommendations related to pediatric hospitals.¹² Choosing Wisely Canada was initially focused on adult medicine, and a list of recommendations developed by the Canadian Paediatric Society relates mostly to overuse in pediatric outpatient settings and is not applicable

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TABLE. SickKids Choosing Wisely Recommendations

Recommendation	Year Released
Don't routinely order NP testing for typical respiratory viruses unless results are likely to impact management.	2016
Don't routinely perform a voiding cystourethrogram in infants after a first febrile UTI.	2016
Don't use continuous pulse oximetry routinely in children hospitalized with acute respiratory illness unless they are on supplemental oxygen.	2016
Don't automatically give IVIG as first-line treatment for children with newly diagnosed typical ITP.	2016
Don't use routine radiography in children who present with acute ankle injuries and meet criteria for a low-risk examination.	2016
Don't routinely continue antibiotics for surgical-site infection prevention after the patient has left the operating room.	2018
Don't routinely order a CT abdomen/pelvis for pediatric trauma patients deemed low risk by established decision rules for clinically significant intra-abdominal injury.	2018
Don't routinely send blood cultures in well-appearing children who are at low risk for bacteremia.	2018
Don't routinely continue broad-spectrum antibiotics, such as vancomycin and meropenem, after 48-hour cultures return unless there is a clear clinical or microbiological indication.	2018
Don't empirically start antibiotics for children older than 3 months with low risk of UTI without evidence of nitrites or significant pyuria on urine dipstick. Do stop antibiotics if the urine culture is negative.	2018
Don't routinely discharge children with acute pain on opioid analgesia for more than 3 days. Do prescribe morphine as a first-line opioid when opioid analgesia is required.	2021
Don't use free thyroxine (T ₄) or triiodothyronine (T ₃) to screen for primary hypothyroidism or to monitor and adjust levothyroxine (T ₄) dose in this condition.	2021
Don't routinely hospitalize or start empiric antibiotics for otherwise healthy and well-appearing children presenting with a febrile illness and first episode of neutropenia.	2021
Don't routinely order urine amino acids as part of a screen for inborn errors of metabolism or in a workup for critical hypoglycemia. To help rule out inborn errors of metabolism, consider ordering urine organic acids and plasma amino acids instead.	2021
Don't routinely order catheterization for UTI testing in febrile children 6-24 months of age without first considering a noninvasive technique for urine screening.	2021

Abbreviations: CT, computed tomography; ITP, immune thrombocytopenic purpura; IVIG, intravenous immunoglobulin; UTI, urinary tract infection.

to hospital-based practice.¹³ The Society of Hospital Medicine-Pediatric Hospital Medicine *Choosing Wisely*[®] list predominantly pertained to unnecessary care of infants with bronchiolitis (eg, not to order chest radiographs in uncomplicated asthma and bronchiolitis). We had measured our compliance with this recommendation and found it was already well below the achievable benchmark of care in the United States,¹⁴ so we preferred to create a list that would resonate with our clinicians. Since the original list was created at the Hospital for Sick Children,¹² we have developed two subsequent lists of recommendations, which were released in 2018 and 2021 (Table).

The approach to list development used by staff pediatricians and trainees, with input from hospital staff and family advisors, has been described elsewhere.¹² The goal was to self-identify five local practices that we felt would help us reduce unnecessary care. This list served as the foundation of an organization-wide quality initiative driven by a steering committee that consisted of the clinician champions as well as representation from various groups at the hospital, including decision support, information services, the family advisory committee, and public affairs.

Each recommendation needed to be evidence-based and measurable, have a clinician champion to implement the recommendation, and have the potential to improve the quality and safety of the care we provided. "Balancing" measures needed to be carefully monitored to ensure that no diagnoses

were being missed or negative effects resulted from decreasing these interventions. In order for a recommendation to be considered, a subgroup of the pediatric department's clinical advisory committee reviewed the references provided to ensure that what was being suggested was based on published evidence and part of current national guidelines. The clinician champion needed to agree to lead the implementation project, and specific outcomes, including appropriate balancing measures, needed to be identified a priori, in addition to an appropriate mechanism to collect the data. Hospital executive leaders were supportive of the initiative and facilitated access to "in-kind" hospital resources as required, although no financial budget was provided. After some early success, the Department of Paediatrics provided part-time project management support to help coordinate the growth and administration of the initiative.

Measuring and Supporting Practice Change

The main implementation principles included targeted education/awareness, transparent measurement with audit/feedback, and, most importantly, embedding changes in the ordering process, essentially making it easy for frontline clinicians to do the right thing (and trickier to do the "wrong" thing). Audit and feedback have been used at both the individual provider level (eg, respiratory viral testing-ordering practices) and

the divisional level (eg, ordering of postoperative antibiotics). These quality improvement initiatives have had a compelling impact. Scorecards have been developed and results shared internally using local divisional as well as hospital-wide tools, varying from staff meetings to screensavers across hospital computers and television screens and the hospital intranet. Evaluation is ongoing, but many of the initial results have been encouraging.¹⁵⁻¹⁷

For example, the 2016 list includes recommendations related to emergency department (ED) test ordering. Implementation efforts to address unnecessary nasopharyngeal swabs for viral testing in bronchiolitis reduced this practice by 80%,¹⁵ and there has been a 50% reduction in ankle X-rays in children with acute ankle injuries who meet criteria for a low-risk examination.¹⁶ The 2016 list also included a recommendation related to inappropriate intravenous immunoglobulin (IVIG) use in children with typical acute immune thrombocytopenic purpura (ITP), and a targeted quality improvement initiative reduced inappropriate IVIG use by 50%, with no detectable increase in bleeding complications or readmission to hospital.¹⁷ These results have been sustained over a period of 3 or more years. Examples from the 2018 list include a 40% decrease in inappropriate urinary tract infection diagnosis and treatment in the ED and a four-fold decrease in the CT abdomen/pelvis imaging rate for low-risk trauma.¹⁸

The steering committee meets every 2 months and includes all of the clinician champions as well as representatives from strategic hospital resources and two family advisors (NGS). These meetings are chaired by the Associate Pediatrician-in-Chief (JNF) and the project manager. The progress of the active projects is discussed, and the experience of the group is used to problem-solve, plan ahead, and encourage academic presentation and publication of the various projects. Patient partnership and participation in committees has ensured that improvements to patient experience, satisfaction, and education are considered in the outcomes of implementation. Moreover, it has safeguarded that this effort is not misperceived as limiting care and remains focused on advancing quality, safety, and the patient experience.

SOME LESSONS LEARNED

While most projects have surpassed expectations, not all have proceeded as anticipated. The biggest challenge is finding a reliable and practical source for data collection. For example, at the time of initiation of the voiding cystourethrography (VCUG) recommendation, practice had presumably changed over the recent years, and compliance already exceeded the goal, illustrating the importance of current accurate data. The oxygen saturation–monitoring recommendation highlighted the challenge presented by data collection that requires manual audits; the inability to find staff to do this regularly significantly hampered this project. The critical role of the clinician champion was highlighted in a few projects when a lead was absent for a prolonged period of time (eg, due to a parental leave or change in job), with no willing replacement. There does seem to be a strong correlation between the commit-

ment and passion of the clinician lead and the success of the project. We have incorporated the lessons learned into the development and rollout of the 2018 and 2021 lists.

SPREAD AND SCALE

The challenge is to scale up these successes to impact and change practice across the hospital pediatrics community. After 5 years, awareness of and engagement with this process are still not uniform across our hospital campus. Nevertheless, anecdotally, at the Hospital for Sick Children, there is a shift in culture where clinicians have processed the imperative to reduce overuse and unnecessary tests and treatments, with phrases such as “this is not very Choosing Wisely” entering the vernacular. It is becoming part of the culture. Second, the new generation of medical school trainees and residents has displayed a tremendous appetite and passion for stewardship and a sense that practice can change from the ground up. The SickKids Choosing Wisely efforts have been a hub for resident-led quality improvement projects and leadership for implementation of recommendations.¹⁹ As we continue to engage all providers at our hospital, we are also reaching out to the other community hospitals in our region, and all children’s hospitals in Canada, to share the principles and lessons learned from our program through a national community of practice.

CONCLUSION

Practicing pediatric medicine in a well-resourced hospital setting should not drive us to overuse in practice “just because we can.” The harms of this approach to our patients and health systems, coupled with the pressures of the pandemic, are compelling reasons to be responsible stewards. There are opportunities to reshape and rethink practice patterns and habits.²⁰ Overuse and overdiagnosis harm our patients and families physically and emotionally and indirectly waste resources urgently needed for investment upstream. Providing safe, quality, high-value care to our young patients requires constant critical thinking. The time is here to advance Choosing Wisely into pediatric hospital practice.

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References

1. Elliott DK, Rose SR, Ronan JC. Changing the culture around cultures. *Hosp Pediatr*. 2014;4(6):405-407. <https://doi.org/10.1542/hpeds.2014-0064>
2. Gupta R, Simpson LA, Morgan DJ. Prioritizing high-value, equitable care after the COVID-19 shutdown: an opportunity for a healthcare renaissance. *J Hosp Med*. 2021;16(2):114-116. <https://doi.org/10.12788/jhm.3526>
3. Born K, Kool T, Levinson W. Reducing overuse in healthcare: advancing Choosing Wisely. *BMJ*. 2019;367:l6317. <https://doi.org/10.1136/bmj.l6317>
4. Coon ER, Young PC, Quinonez RA, Morgan DJ, Dhruva SS, Schroeder AR. Update on pediatric overuse. *Pediatrics*. 2017;139(2):e20162797. <https://doi.org/10.1542/peds.2016-2797>
5. Coon ER, Quinonez RA, Moyer VA, Schroeder AR. Overdiagnosis: how our compulsion for diagnosis may be harming children. *Pediatrics*. 2014;134(5):1013-1023. <https://doi.org/10.1542/peds.2014-1778>
6. Wolf ER, Krist AH, Schroeder AR. Deimplementation in pediatrics: past, present, and future. *JAMA Pediatr*. 2021;175(3):230-232. <https://doi.org/10.1001/jamapediatrics.2020.4681>
7. Quinonez RA, Garber MD, Schroeder AR, et al. Choosing Wisely in pediatric

- hospital medicine: five opportunities for improved healthcare value. *J Hosp Med*. 2013;8(9):479-485. <https://doi.org/10.1002/jhm.2064>
8. Bonafide CP, Xiao R, Brady PW, et al. Prevalence of continuous pulse oximetry monitoring in hospitalized children with bronchiolitis not requiring supplemental oxygen. *JAMA*. 2020;323(15):1467-1477. <https://doi.org/10.1001/jama.2020.2998>
 9. Ralston SL, Schroeder AR. Why is it so hard to talk about overuse in pediatrics and why it matters. *JAMA Pediatr*. 2017;17(10):931-932. <https://doi.org/10.1001/jamapediatrics.2017.2239>
 10. Stammen LA, Stalmeijer RE, Paternotte E, et al. Training physicians to provide high-value, cost-conscious care: a systematic review. *JAMA*. 2015;314(22):2384-2400. <https://doi.org/10.1001/jama.2015.16353>
 11. Mathews JD, Forsythe AV, Brady Z, et al. Cancer risk in 680,000 people exposed to computed tomography scans in childhood or adolescence: data linkage study of 11 million Australians. *BMJ*. 2013;346:f2360. <https://doi.org/10.1136/bmj.f2360>
 12. Friedman JN. Saying yes to the less: making it easier to choose wisely [editorial]. *J Pediatr*. 2017;145:4-5. <https://doi.org/10.1016/j.jpeds.2017.01.062>
 13. Canadian Paediatric Society. Five things physicians and patients should question. Choosing Wisely Canada. Updated July 2019. Accessed June 17, 2021. https://choosingwiselycanada.org/wp-content/uploads/2020/07/Paediatrics_EN.pdf
 14. Parikh K, Hall M, Montalbano A, et al. Establishing benchmarks for the hospitalized care of children with asthma, bronchiolitis, and pneumonia. *Pediatrics*. 2014;134(3):555-562. <https://doi.org/10.1542/peds.2014-1052>
 15. Ostrow O, Richardson S, Savlov D, Friedman JN. Reducing unnecessary respiratory viral testing to promote high value care. *Pediatrics*. In press.
 16. Al-Sani F, Ben-Yakov M, Harvey G, et al. P016: Low risk ankle rule, high reward—a quality improvement initiative to reduce ankle x-rays in the pediatric emergency department [poster]. *CJEM*. 2017;19(S1):S83. <https://doi.org/10.1017/cem.2017.218>
 17. Beck CE, Carcao M, Cada M, Porter S, Blanchette VS, Parkin PC. A quality improvement bundle to improve informed choice for children with typical, newly diagnosed immune thrombocytopenia. *J Pediatr Hematol Oncol*. 2018;40(8):e537-e543. <https://doi.org/10.1097/MPH.0000000000001247>
 18. Beno S, Lenton-Brym T, Rosenfield D, McDowall D, Wales P, Principi T. Safe reduction of abdominal CT imaging in pediatric trauma patients: a quality-improvement initiative [abstract]. *Can J Surg*. 2019;62(3 Suppl 2):S29-S30.
 19. Bal C, Tesch M, Blair G, Ostrow O, Premji L. Engaging medical trainees in resource stewardship through resident-led teaching sessions: a choosing wisely educational initiative. *Can Med Educ J*. 2021;12(1):e98-e100. <https://doi.org/10.36834/cmiej.70563>
 20. Berwick DM. Choices for the “new normal.” *JAMA*. 2020;323(21):2125-2126. <https://doi.org/10.1001/jama.2020.6949>