Moving Beyond Administrative Data Sets and Coding Data

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In the study by Harris et al[1] in this issue of *Hospital Pediatrics*, the authors attempted to compare the identification of central line–associated bloodstream infections (CLABSIs) by using administrative coding data versus clinical criteria from the Centers for Disease Control and Prevention that are reported to a voluntary infection control network. The authors demonstrated that more CLABSIs were reported with the voluntary network ($n = 138$) than with the administrative data ($n = 76$). In analyzing the data, using the infection control network as the gold standard, they found that CLABSI identification by using coding data had a sensitivity of 35% with a positive predictive value of 63%.

Their study[1] outlines some of the potential pitfalls and problems with using coding data to study clinical outcomes. In the case of CLABSIs, before 2007, these infections were coded with a nonspecific *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM), code that included infections associated with many devices, such as arterial lines or pacemakers. The use of nonspecific codes makes it difficult to accurately use coding data for the purposes of clinical outcomes research. For example, researchers attempting to study apparent life-threatening events in children before 2009, when the first specific code for these events was introduced, had to search for such disparate codes as apnea, cyanosis, and reflux.[2] The upcoming introduction of *International Classification of Diseases, 10th Revision, Clinical Modification,* in the United States will reportedly help alleviate this concern. The number and specificity of codes have been increased substantially over those currently available in ICD-9-CM, but this assertion will need to be studied and verified.

However, the study by Harris et al[1] also demonstrates that having a specific code available does not guarantee accurate coding data. The patient population of this study was patient discharges in calendar year 2010, several years after the introduction in 2007 of a specific code for infections due to central venous catheters (ICD-9-CM 999.31). Therefore, even though a specific ICD-9-CM code existed, the accuracy of coding was not improved due to the lack of use of this code. This finding highlights a larger problem with coding data: getting providers to choose the correct code. Recently, acute gastroenteritis (AGE) was reported as a top 10 diagnosis for hospitalized children,[3] based on the Pediatric Health Information System (PHIS) administrative data set. With the global use of oral rehydration therapy and the widespread adoption of the rotavirus vaccine, AGE admissions have decreased over the years.[4,5] Why, therefore, would PHIS report that AGE is still a top 10 diagnosis for hospitalized children? A chart audit performed at 1 institution (Seattle Children's Hospital) as part of a quality improvement committee's analysis

revealed that many admissions labeled as "AGE" were based on the use of ICD-9-CM codes for dehydration or vomiting, rather than on the specific ICD-9-CM codes for gastroenteritis. As expected, the codes for dehydration and vomiting are used frequently in concert with many other disease states, such as bronchiolitis, community-acquired pneumonia, and urinary tract infections (UTIs).

Hospitals and physician groups have attempted to alleviate this concern by having professional coders assign discharge codes to the medical records of hospitalized patients, rather than relying on providers to accurately perform this task. Again, Harris et al[1] highlight the limitations of this method by pointing out that coders can only choose codes based on specific language in provider documentation. In the case of CLABSIs, coders could not choose ICD-9-CM 999.31 in patients with a central venous catheter present and a documented bloodstream infection unless providers specifically mentioned or documented that the bloodstream infection was associated with the central venous line. The previously mentioned chart review of AGE admissions found that coders chose the code for noninfectious gastroenteritis (ICD-9-CM 558.9) far more often than the expected codes for acute gastroenteritis (ICD-9-CM 008.8 [viral enteritis] or 009.0 [infectious gastroenteritis]), based on poor provider documentation.

Another recent study based on the PHIS database showed that freestanding children's hospitals varied substantially in their prescription rates of antibiotics.[6] The variation seemed to persist even when taking into account patient or hospital factors that would

predispose to greater antibiotic usage. Is this a true difference among these hospitals, or are some hospitals much better at coding and listing multiple secondary diagnoses and therefore the increasing complexity of their patients? Researchers have tried to study the coding process and offer tips and techniques to improve the accuracy of coding,[7] but it remains, at best, an inexact science. These studies underscore the concern that research using administrative or coding data is only as good as the accuracy of the coding data.

However, we would make the argument that even if the coding data were correct, clinicians should use caution when translating database studies into actual patient care. A study by Tieder et al,[8] again using the PHIS data set, demonstrated that using ICD-9-CM codes for UTIs, especially if listed as the principal diagnosis, could accurately identify patients with a diagnosis of UTI. Is this finding useful? Most pediatric UTI guidelines are focused around the first occurrence of a UTI. For example, a community hospital may wish to improve care for "first-time UTIs" by studying the rate of voiding cystourethrograms performed, with the goal of decreasing ordering of this procedure over time. Currently, there is no way to use coding data to differentiate a patient with a first febrile UTI from patients with their 21st UTI.

Harris et al[1] also demonstrated that coding data, even if correct, could potentially place hospitals that care for complex children at a disadvantage, because coding data are not risk-adjusted. CLABSIs typically occur in children with complex medical conditions, with long lengths of stay. Is it any

surprise then, to learn that community pediatric programs would have better CLABSI rates than their large, urban, tertiary partners? Administrative data sets were not designed for use in clinical outcomes research.

But if administrative data sets are not the answer, then where do we go from here? Again, Harris et al[1] provide a possible answer. More CLABSIs were identified with the use of a secure, voluntary surveillance system, which was based on clinical and laboratory criteria, standard definitions, and risk adjustment of CLABSI rates. Perhaps the pediatric hospital medicine community should work to develop more clinically focused networks or surveillance systems, rather than continuing to use administrative data sets for purposes for which they were not designed. The Value in Pediatrics Network, as part of the American Academy of Pediatrics' Quality Improvement Innovation Network, is an example of such a clinically focused network. This inpatient-focused quality improvement organization has had projects on topics as diverse as bronchiolitis benchmarking, discharge handoffs, and identification band errors.[9–11] The American Academy of Pediatrics' Pediatric Research in Inpatient Settings is another example of a clinician-led improvement network. They have had success with a large multicenter study on improving resident handoffs in the inpatient setting.[12] This network is also focusing its efforts on improving the PHIS database. The PHIS+ database, which would go beyond simple administrative data and include laboratory and imaging results, may solve some of the inherent problems with this much-used resource.

But perhaps it is time to free ourselves and move beyond the limitations

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intrinsic in administrative data sets by literally breaking free of their use. We must continue to support and encourage the development of clinical data sets and networks for the purpose of clinical outcomes research.

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