

Letters ♦ Correspondance

Do not go gentle

What a great end-of-the-millennium cover on the December issue of *Canadian Family Physician*. Congratulations! You have "captured" the International Year of Older Persons and the end of the century in one great picture.

The Dylan Thomas quote was perfect for the picture and the occasion. It could, in its entirety, also serve as a rallying cry (what Donald I. Rice would term "fire in the belly") for the next generation of family physicians to reverse some of the recent negative trends in health care reform in Canada and restore a better balance to the delivery of primary health care, especially to our older citizens. Along with these comments from "the old man" go my best wishes for good health and success in the new year.

—Reg Perkin, MD, CCFP
Mississauga, Ont
by e-mail

Are you a "risk-minimizer" or a "test minimizer"?

I read with interest the Critical Appraisal article¹ by Dr Gutman regarding Bachur et al's "Occult pneumonias: empiric chest radiographs in febrile children with leukocytosis."² In the same issue is an excellent editorial by Green and Rothrock³ regarding physician evaluation styles for febrile children who appear well.

Before readers decide to start ordering chest radiographs on highly febrile children as Dr Gutman advocates, I suggest they read this thought-provoking editorial. It suggests that, when it comes to ordering tests, physicians can be described as either

"risk-minimizers" (who rely heavily on test-based algorithms and empiric therapy in order to minimize adverse sequelae from occult infections and potentially save lives) or "test-minimizers" (who rely heavily on clinical judgment and follow up and less on tests). Dr Gutman referred to this article in his critical appraisal, but I felt that further attention could have been paid to some of the conclusions that are relevant to everyone who treats febrile children and indeed to all of us who are faced daily with the question of whether to order specific tests for our patients.

Bachur et al² found that 26% of children with temperatures greater than

39°C, white blood cell (WBC) counts of 20 000/mm³, no readily identifiable source of infection, and no clinical evidence of pneumonia had occult pneumonia as identified by a pediatric radiologist. Their rationale for doing this study was to identify possible occult sources of infection that could lead to bacteremia, and that, if missed, could lead to serious adverse outcomes, such as meningitis. As Green and Rothrock³ point out, if occult bacteremia were truly a dangerous entity, why have we not seen large numbers of children returning to emergency departments with progression of disease? A reasonable explanation for this would be the high proportion (about 80%)³ of pediatric pneumonias that are viral and that in children who look otherwise well have benign outcomes. Incidentally, WBC evaluation of febrile children is very insensitive, and using a threshold of 15 000/mm³ fails to identify 14% to 21% of bacteremic children.³ Insuring proper follow up for these febrile children should identify the smaller proportion of children with diseases that would benefit from antibiotics. I suggest that this is what many rural physicians, who might not have easy access to tests, have been doing for years.

Green and Rothrock go on to point out that, in the study by Bachur et al, 38 occult pneumonias were identified, which accounted for one case per 360 febrile children evaluated. This drops to 10/38 when the ill-appearing children and those given antibiotics anyway for minor infections, such as otitis media and pharyngitis, were excluded. If 20% of the remaining cases are presumed bacterial, then the incidence of occult pneumonia drops to one case per 3500 febrile children overall. The criterion standard that they used to diagnose

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pneumonia was the interpretation of a pediatric radiologist. Knowing that there is low interobserver agreement among radiologists and that knowing the diagnosis before reading a film can introduce bias into a final opinion, we should be even more careful about adopting these guidelines as Dr Gutman suggests. It would mean ordering a great many tests with no evidence of any benefit in the long term.

The premise for risk stratifying and empirically treating occult pneumonia is to prevent progression to bacteremia and meningitis. Since *Haemophilus influenzae* type b vaccine, virtually all meningitis is caused by streptococci, and there is no convincing evidence that early antibiotic use can prevent pneumococcal meningitis. Rothrock et al⁴ compiled a meta-analysis comparing all studies with and without empiric

antibiotic therapy. They found that 2190 consecutive febrile children would have to be treated to theoretically prevent one case of meningitis. Because only a third of these will have adverse outcomes, then 6750 children would need to be treated to prevent a single adverse outcome. Adverse effects from antibiotics (rash, allergy, vomiting, diarrhea) would occur in 137 to 567 treated children for each case of meningitis prevented and 393 to 1701 children for each adverse outcome prevented. Their analysis concludes that there is insufficient evidence to conclude that empiric oral antibiotics prevent meningitis. This analysis does not take into account the effect that treating all these well-appearing children is having on antibiotic resistance. We should think closely about whether using stratified diagnostic testing and an algorithmic approach to medicine is worth the high cost, marginal benefit, and inefficient use of resources before routinely adopting an approach that includes empiric chest radiography for otherwise well-looking febrile children.

—Tim Graham, MD, CCFP(EM) RESIDENT
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Response

I applaud Dr Graham's comments, which serve to highlight the controversies in the literature regarding the appropriate investigation and management of pediatric fever without source. He comments that more attention could have been paid to the editorial by Green and Rothrock¹ in my critical appraisal of Bachur et al. One study represents a clinical trial and the other an opinion-based commentary, which I believed was not amenable to critical appraisal in the context of the Critical Appraisal section of *Canadian Family Physician*. I do, however, thank Dr Graham for eloquently reviewing the article and bringing forth for discussion an issue for which no clear consensus exists.

At the heart of this controversy is recognition of the drop in *Haemophilus influenzae* prevalence and the acknowledgment that, in 2.5% to 3.0% of highly febrile children without physical signs of invasive bacterial disease, fever is due to occult bacteremia (OB) mostly with *Streptococcus pneumoniae*. This organism is much less invasive than *H influenzae*, and thus pediatric fever without source is likely a new disease that demands new approaches and reevaluation of use of empiric antibiotics.

There is a spectrum of widely accepted approaches to pediatric fever without source and huge variation in terms of what is actually done. Green and Rothrock have distilled the two ends of the spectrum into the concept of "risk minimizers" and "test minimizers."

Dr Graham alludes to one end of the spectrum in his reference to rural physicians who have practised "watchful waiting" and close follow up with these children. They are what Green and Rothrock call test minimizers. These physicians believe that the actual incidence of OB is low and question whether empiric antibiotic therapy prevents serious bacterial illness (SBI). Green and Rothrock argue

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against empiric antibiotics, noting that there is little or no evidence showing the value of antibiotics in preventing meningitis. Little information exists, however, on preventing other serious complications occurring in 10% to 25% of OB cases, such as cellulitis, pneumonia, and sepsis.²

The test minimizer approach is predicated on follow up. Certainly rural doctors in relatively closed populations have the ability to follow up with their patients, but this might not be the case in urban or suburban emergency rooms. A recent study³ of febrile children at an urban emergency department in the United States, with prescheduled free follow-up appointments, reported 92% compliance with follow up. However, 93 of 423 patients originally enrolled in the study were not included in the final analysis because they could not be contacted to see whether they complied with follow up. This suggests that the number who followed up is actually much lower than the quoted 92%. This situation is probably generalizable to our Canadian system where there is no charge for follow up, which might be a deterrent in the United States and threaten the comparison value of this study. Without reliable careful follow up, this approach could be regarded as dangerous and perhaps negligent.

The other end of the spectrum is to minimize risk to patients by generating tests in an attempt to lower risk of adverse outcome by identifying those at higher or lower risk. The question is which tests can aid us in doing this?

The American Academy of Pediatrics⁴ has suggested catheter or suprapubic urine culture as the diagnostic approach for detecting urinary tract infection in febrile children. Many of us would regard an invasive urine collection procedure as unacceptable in most cases of well-appearing children with high fevers. The incidence of occult urinary tract infections is not insignificant. There is no clear consensus on the appropriate approach to this

cause of pediatric fever and the tests used to identify it.

Dr Graham references the Green and Rothrock article stating the relative insensitivity of a white blood cell (WBC) count of 15 000. Kuppermann et al² identified WBC and specifically absolute neutrophil count as independent predictors of occult pneumococcal bacteremia. Lee and Harper⁵ note the rate of occult bacteremia in the post-HiB vaccine era to be 1.6% with a WBC count above 15 000 showing a sensitivity of 86% and specificity of 77%. They suggest that, if this standard were used, approximately 19 non-bacteremic children would need to be treated empirically for each bacteremic child. Haddon et al⁶ found a 3.4% incidence of bacteremia in febrile children without any recognizable viral syndrome and found a WBC count above 20 000 and clinical features to have a predictive accuracy of more than 10%. Careful follow up and no empiric antibiotics appear to be appropriate regardless of WBC count.

Bachur et al used an elevated WBC count and empiric chest x-ray to identify those at risk for occult pneumonia. Dr Graham is correct in noting that most pneumonias in this age group are viral. As such, they are unlikely to benefit from antibiotic therapy. Green and Rothrock¹ state that empiric chest x-ray is even less important in febrile children with minor sources of bacterial infection because these patients will receive antibiotics anyway. Diagnosing an occult pneumonia is important regardless of the cause. Issues such as duration of expected disability and time loss for parents, counseling parents regarding surveillance for signs of worsening condition, and adjunctive therapies are all important in addition to patient care concerns, such as the need for admission for monitoring or respiratory therapy. I remind Dr Graham that even Green and Rothrock¹ state, "All emergency physicians will agree that it is conceptually important to know that

pneumonia frequently may be occult in the subset of highly febrile, well appearing children."

As Green and Rothrock note, the gap in clinical practice between risk minimizers and test minimizers remains vast, and no evidence of consensus is emerging.⁷⁻⁹ They suggest each emergency physician ask himself or herself: am I a risk minimizer or a test minimizer? They further state that "for the sake of practicality [test minimizers] are willing to take a greater chance of being wrong." This approach might lead to missed occurrences of SBI, and the true risk of such outcomes is so low as to not justify the time, expense, and invasiveness of the routine risk-stratification approach. And further, those with serious illness will be identified through close follow up and return visits to the emergency department.

With regard to the ability of laboratory and clinical parameters to identify those with meningitis (the complication we are trying to avoid with a risk-minimizer approach), a recent study¹⁰ suggests that children ultimately diagnosed with meningococcal disease have commonly been evaluated as outpatients and discharged home before diagnosis. This study retrospectively identified those with meningococcal disease and positive blood culture results who had been assessed in the emergency department and discharged home. This finding appears to contradict a main point of the test-minimizer argument that asks, if OB is a risk for meningitis, why do we not see many children returning with meningitis? Does this suggest that an initial blood culture is the way to go in pediatric fever without source? Or does it simply mean that it is hard to keep up with current guidelines?

Investigating and treating these patients requires physicians to know their comfort level regarding diagnosis and treatment of pediatric fevers. Zerr et al¹¹ looked at what factors are associated with compliance by

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practitioners with guidelines and protocols for managing febrile children. Factors associated with decreased compliance included more years since graduation from medical school, higher proportion of office visits by children younger than 1 year, and increased comfort diagnosing SBI. Factors associated with increased compliance included a higher perceived likelihood of SBI and better-reported knowledge of recently published guidelines. Does this mean that, as you get farther out in your career, you are better at discriminating as might be the case with the rural doctor referred to by Dr Graham?

To further complicate this issue, it seems to depend on what specialty a physician has been trained in. Wittler et al¹² surveyed family physicians, pediatricians, and emergency physicians regarding management of fever

without source. They found that, for a 4-month-old outpatient, 59% of emergency physicians, 45% of pediatricians, and 28% of family physicians would give empiric antibiotics. Most physicians would manage a 16-month-old outpatient without antibiotics. Is there a difference between 16- and 4-month-olds? Are febrile children different in emergency departments?

Most of the literature in the last few months has favoured a less rigorous protocol-driven approach. Indeed, at the recent Scientific Assembly of the American College of Emergency Physicians, the prevailing opinion suggested that following clinical judgment and admitting children who appear unwell or in whom follow up cannot be assured and treating others expectantly with no empiric antibiotics and careful follow up is likely appropriate. No clear consensus was

apparent regarding use of catheter urine culture or blood cultures in managing these children.

The WBC count appears to be of little value in identifying those with SBI. There is a paucity of data showing effect of empiric antibiotics in preventing meningitis. Use of elevated WBC count to indicate need for other tests, such as chest x-ray to identify occult pneumonia as suggested by Bachur et al, is apparently controversial. Clearly no correct answer is available at this time as to what the criterion standard of investigation and treatment of pediatric fever without source is. One's approach must be based on level of confidence in one's ability to discriminate between well- and unwell-appearing children, one's tolerance of risk, and one's interpretation of the conflicting literature.

—*Samuel J. Gutman, MD, CCFP(EM)*
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A bit of Canadian medical history...

Thank you for Louisa Blair's article¹ in the October 1999 issue. Surely the first surgeon was the hitherto unnamed surgeon who accompanied John Guy to Cupids (then Cupper's Cove), the first official English settlement in Canada, 1610, as recorded in the Willoughby papers of John Guy's correspondence with his sponsors of the colony.

Surgeons in the 17th century frequently learned their trade as apprentices to other surgeons, many