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Jussi Niemelä, MD, PhD, works as a pediatrician at the Department of Pediatrics at Turku University Hospital.



Turku University Hospital is Finland's oldest hospital founded in 1759. It has 3 100 employees and beds for just above 1000 patients. At the pediatric department children aged 0 to 16 years are treated. The department has over 20 subspecialties and an emergency department.

The most common pediatric patient is a patient with an infection or stomach pains.

Money saved, time saved and of patients with new testing r

For three years now, Dr Jussi Niemelä and his colleagues at Turku university hospital in Finland have performed rapid point-of-care tests of total white blood cells (WBC) and C-reactive protein (CRP). This saves both time and money. So much money in fact, that the department has employed an additional physician during rush hours.

The most significant cost savings come from decreased nighttime laboratory costs. With the money saved there is now an extra physician at the department between four and ten pm.

"It is very helpful with an extra pair of hands during our busiest hours. Shorter time in the waiting room is of course a good thing for both patients and parents. It is rewarding to, as soon as possible, be able to examine and treat a child that is not feeling well. Shorter time at the hospital among other sick children decreases the risk of catching other diseases."

Unnecessary referral to university hospital

In Finland CRP is a widely used point-of-care test in doctors offices. Patients with elevated CRP values are often referred to the university hospital for further evaluation. Dr Niemelä thinks this is not always necessary. Clinical evaluation of the patients should always be the primary point for referral, and CRP and WBC count should then be interpreted within this frame of reference. In addition, if small hospitals and doctors offices had

access also to a rapid WBC, they would be able to diagnose and make immediate treatment decisions themselves.

"Together with clinical signs, the combination of CRP and WBC can help us distinguish between viral and bacterial infections and help us avoid over use of antibiotics. Some viral infections cause an increase in CRP but not in leukocyte count/level. If CRP is only slightly elevated, a WBC result can confirm the diagnosis. A high WBC and a low CRP is important to find, since this can be an early sign of a pneumococcal infection which can develop into sepsis very rapidly. It is reassuring that the combination of CRP and WBC can help me find something I might otherwise miss. It helps me decide whether to treat an infection or not, and how severe it is. If the values are normal there is time to wait a while and see how things develop, whereas if the values are high it is more acute. When I tell parents that I have examined their child and performed tests and everything points toward a viral infection, they usually know that there is no need for antibiotics."

smoother handling outlines

A good experience for doctors

The idea that the physicians themselves were to perform the point-of-care testing, originally came from the head of department Professor Jussi Mertsola. At first Dr Niemelä and his colleagues were not too positive about it. One of the concerns among the physicians was that it might harm the contact with patients.



“ We were worried to be regarded as “the bad doctor” sticking the child. But this hasn't happened. Finger tests seem to be better tolerated than venous samples. A long needle can be frightening for a child. I also think it is a good experience for us doctors, and if there is no nurse around it is good to be able to take the test yourself.”

No routine testing in children

There is no routine testing of children at the Pediatrics department in Turku. The patient always needs to see a physician before any testing is performed. Rapid point-of-care testing there and then, saves time since results are available immediately. Dr Jussi Niemelä experiences that handling of patients is definitely more efficient now.

“Even if you get used to always having patients waiting, it is neither convenient for me, nor for the families. Everything simply runs smoother when patients don't have to wait”.

Differential white blood counts are ordered when considered needed, such as for neonates, immuno suppressed children, or patients where test values do not correlate with clinical signs.

Dr Niemelä recalls one occasion when he was especially pleased having the rapid tests at hand. A family came in a hurry with a sick child just before going abroad.

They needed help to decide whether to catch the ferry or not.

“After clinical evaluation of child and performing POC tests we did not have to wait for more laboratory testing. I could reassure them that it was OK to travel since the child only had a viral infection. And they did catch the ferry. This might not be clinically the most relevant case, but it was absolutely relevant for real life.”

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For further reading about C-reactive protein and total white blood cell count see:

Peltola V. et al. Comparison of total white blood cell count and serum C-reactive protein levels in confirmed bacterial and viral infections. The Journal of Pediatrics, 2006 Nov; 149(5): 721-724.

Peltola V. et al. Discrepancy between total white blood cell counts and serum C-reactive protein levels in febrile children. Scandinavian Journal of Infectious Diseases, 2007; 39: 560-565.

