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Clinical
Laboratory
News

ANTIBIOTIC
STEWARDSHIP

76%

Reduction in active
C. diff after using new
testing algorithm

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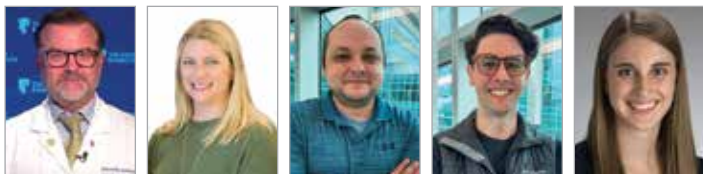
With UNIVANTS Teams of Achievement, Patients Come in First Place

BY CHRISTINA FOLZ

The 2024 winners of the UNIVANTS of Healthcare Excellence Program's "Teams of Achievement" are a testament to both the critical importance of clinical laboratories and the power of partnerships to drive meaningful change. Representing six multidisciplinary teams that span five countries and three continents, they also underscore that modern healthcare is very much a global enterprise.

Abbott brings together the Association for Diagnostics & Laboratory Medicine and other leading professional societies, institutions, and associations across healthcare to create these prestigious awards, which shine a light on how laboratory professionals and their partners are improving care and saving lives around the world.

This supplement explores the outstanding team accomplishments for those recognized as Teams of Achievement in 2024, which include reducing unnecessary CT scans in emergency departments, simplifying the diagnosis of *Clostridioides difficile*, using lab medicine to save lives through organ donation, preventing cardiovascular disease in women, reducing hospital admissions due to pediatric mononucleosis, and enhancing clinicians' ability to prevent erroneous diagnoses of hyperprolactinemia.



REDUCING UNNECESSARY CT SCANS IN EMERGENCY DEPARTMENTS

Traumatic brain injury (TBI) is a common presentation to the emergency department, requiring substantial investigations to enable safe triage and treatment. While the vast majority of TBI patients (80%-90%) are ultimately deemed as mild head injuries, use of imaging such as computed tomography (CT) is often recommended to help avoid potential life-threatening complications caused by intracranial hemorrhage. Thus, patients who are ultimately diagnosed with a mild TBI represent a large group of patients who likely do not need a CT or the associated exposure to radiation.

At Klinikum Lüneburg in Lüneburg, Germany, the decision of whether to conduct a CT scan

was up to each treating physician. As a result, many patients with mild TBI underwent unnecessary CT scans in the ED, contributing to healthcare costs, overuse of administrative resources, and patient exposure to avoidable radiation.

To assist in the determination of need for a CT scan, a multidisciplinary team at Klinikum Lüneburg introduced a clinical pathway that includes use of a blood test to rule out the risk of intracranial lesions seen on CT scans. The test measures two biomarkers associated with TBI: glial fibrillary acidic protein (GFAP) and ubiquitin C-terminal hydrolase L1 (UCH-L1).

“For every doctor involved in care of ED patients, result of the newly implemented test is an objective measure that helps direct treatment decisions,” said Jörg Cramer, the hospital’s head of orthopedics and traumatology. “Avoiding unnecessary radiation exposure is very important, especially for younger patients,” he added.

The blood test is indicated for all adults (aged 18 years or older) mild TBI patients with GCS 14-15 who are seen within 12 hours of trauma. When the team integrated the new pathway into practice, 41% of 117 patients they examined with mild TBI were found to not need subsequent CT scans, resulting in 20 work hours saved for radiology staff and an annual cost saving of 20000€ for patients and their insurance companies.

Their findings further impacted several aspects of care for both patients and providers: It improved patients’ experience and safety, provided physicians with a new objective parameter to rely on when making clinical decisions, and reduced costs, as well as the

demand on radiology, nursing, and administrative resources required for treating patients with mild TBI.

While the use of blood biomarkers to aid TBI care has been available for several years, previously such tests were restricted to patients seen within the first three hours of their injury. The team’s work opens new possibilities for extending these tests over a longer period and significantly expanding the group of patients for whom CT scans would not be needed.

SIMPLIFYING DIAGNOSIS OF C. DIFF AT AN ACADEMIC MEDICAL CENTER

Clostridioides difficile (*C. diff*) is a highly infectious cause of diarrhea that can lead to life-threatening dehydration. Patient groups at increased risk for *C. diff* include elderly people, those in the hospital, and individuals who have recently been discharged from healthcare settings. In many cases, *C. diff* will occur after people have undergone antibiotic treatment. For that reason, interventions focused on infection control and antibiotic stewardship can reduce the occurrence of *C. diff*.

Such interventions also have the potential to streamline costs. In the United States, the CDC’s National Health and Safety Network (NHSN) tracks healthcare-associated infections such as *C. diff*. To incentivize hospitals to reduce these infections, institutions with higher healthcare-associated infection rates, as reported to the NHSN, are subject to lower reimbursements from the Centers for Medicaid & Medicare Services (CMS).

For instance, at the University of Kansas Health System (TUKHS), the Infection Control team reported an inpatient *C. diff* rate of 19% to the NHSN, which

REDUCING UNNECESSARY CT SCANS IN EMERGENCY DEPARTMENTS

41% reduction of CT scans conducted for mild TBI patients in the emergency department as a result of new care pathway and test implementation.

20 total work hours saved for radiology staff.

20,000€ annual cost savings for patients and their insurance companies.

directly contributed to decreased CMS reimbursement.

An interdisciplinary team at TUKHS suspected that the high reportable rate of *C. diff* might not tell the full story. That's because the rate could have been partly due to the lack of a reliable and efficient testing algorithm to differentiate between patients with active, toxin-producing (toxigenic) infections and those with non-toxigenic colonization with the organism. Patients with colonization do not have disease caused by *C. diff* and often exhibit no clinical symptoms.

In addition to causing an erroneously elevated rate of *C. diff*, the inability to differentiate between infection types can affect patient care. For example, it may require people to be held under isolation precautions needlessly, contribute to unwarranted antibiotic use, and lead to overutilization of resources across the infectious disease consult team.

The TUKSH team — which included experts in lab medicine, pharmacy, infection control, infectious disease, and data analytics — created a testing algorithm that used the polymerase chain reaction (PCR) and enzyme immunoassay (EIA) to ensure all *C. diff*-positive stool samples detected by PCR were also subjected to a toxin EIA. All *C. diff* PCR- positive/EIA-negative specimens were algorithmically defined as colonization, whereas *C. diff* PCR-positive/EIA-positive specimens were classified as active *C. diff* infections.

The team's goal for this initiative was to reduce *C. diff* rates reported to the NHSN by 50% and decrease healthcare costs.

They achieved their aim — and then some. In the five months after the team went live with the algorithm and provided

multidisciplinary education, there was an absolute reduction of the NHSN reportable rate by 76% (from 19% to 3.8%). In addition, inappropriate antibiotic use decreased by 25%, for a reduction in pharmaceutical spend totaling \$73,866. The average health system cost savings was \$4.3 million.

The team noted that widespread integration of the informatics infrastructure for the new algorithm posed challenges at TUKHS, a large medical center that spans five facilities and has a bed count over 1,000. Adjustments needed to be made in both the laboratory information system and electronic health records. The team also created a best practice alert to ensure ordering personnel were informed of the new practice.

The team notes that the algorithm allows for accelerated scalability due to its reliance on informatics rule logic to nudge ordering behavior. Likewise, kit testing for *C. diff* toxin is easy to perform and remains relatively inexpensive and widely available in the U.S.

MAXIMIZING LAB EFFICIENCY TO SAVE LIVES WITH ORGAN DONATION

Every year, more than 100,000 men, women and children in the United States need organ transplants to stay alive. Sadly, 17 people die each day, on average, while waiting for a transplant that never comes.

A multifaceted team of experts at the Southwest Transport Alliance (STA) in Dallas, Texas, wanted to reduce that number by creating more opportunities for successful transplantation from available donors. STA is one of 56 U.S. organ procurement organizations (OPOs), which are organizations responsible for recovering

SIMPLIFYING DIAGNOSIS OF *C. DIFF* AT AN ACADEMIC MEDICAL CENTER

76% absolute reduction in patients identified as having an active *C. diff* infection within five months of using new testing algorithm.

25% decrease in antibiotic prescribing as a result of using algorithm.

\$73,866 savings in total pharmaceutical spending.

transplantable organs from deceased donors.

The team focused on 'expedited' cases, which are instances where the donor must go to the operating room immediately to maintain the viability of the organs for transplantation. These cases involve donors who have been determined to be brain dead or have irreversible cessation of circulatory and respiratory function.

Before an organ can be transplanted, it must undergo infectious-disease screening to ensure communicable conditions aren't introduced to organ recipients. For organ donation, the United Network for Organ Sharing (UNOS) requires that pre-mortem blood samples be tested using any FDA licensed, approved, or cleared method. However, for tissue and eye donation, the FDA mandates the use of specific tests from specific vendors—a process that can take up to 12 hours.

For the sake of operational efficiency, many OPOs will combine organ testing with the

mandated eye and tissue testing. Unfortunately, this standard methodology can cause potentially life-saving organs to go to waste because it requires recipients to wait until the longest portion of the testing is complete. In expedited cases, the heart, liver, and lungs must be transplanted within mere hours after recovery, a window that will close if the timing of eye and tissue testing extends beyond that.

With approval from UNOS, the STA team established a new clinical care pathway that separates organ donor testing from tissue and eye testing, expediting organ placement, and ultimately saving lives.

“Every second counts in the work of organ donation and transplantation,” said STA CEO & President Bradley L. Adams. “Because of that, we are constantly looking for ways to expedite the

donation process to ensure each gift made possible by our selfless donors is realized. This clinical initiative is the best example in years of how we have gone about that,” he said, adding, “It is not an overstatement to say that it’s a game changer in our space.”

STA’s team spanned numerous disciplines, including lab medicine, IT, clinicians, hospital leadership, and others, enabling a reduction in technologist hands-on time from 7.67 hours, to less than 1 minute, representing a 99.7% improvement in efficiency and enabling resource time elsewhere.

The total cost savings with the implementation is \$297,000 per year. “From a financial perspective, the new platform has impacted many aspects of organ donation,” said STA Chief Financial Officer Stephanie Bowman. “It has driven substantial savings of resources, including time, testing costs, staffing costs, medical costs to the patients on the waiting list, and most importantly, taxpayer dollars,” she said.

The team characterized implementation as simple for such a considerable impact. They validated all the required tests, trained the staff, and used their marketing and education departments to inform people about the impact of the new pathway on surgeons, clinicians, patients, and families.

IDENTIFYING AND PREVENTING CARDIOVASCULAR DISEASE IN WOMEN

In Croatia, cardiovascular disease (CVD) is the leading cause of death. In 2020, nearly 23,000 people in the country died of CVD, accounting for 40% of all deaths, 58% of which were women, thus representing a significant opportunity to identify, screen and treat previously unknown cardiovascular risk.

Considering these alarming statistics, a group of lab medicine professionals, cardiologists, administrators and care coordinators at the Institute for Cardiovascular Prevention and Rehabilitation, Zagreb, Croatia, recognized this opportunity and implemented a clinical screening program through their “Woman and Heart” prevention initiative. The program targeted women aged 45 years or older, since post-menopausal women are at higher risk for CVD. The team’s goal was to identify cardiovascular risk and start prevention early. A key for success was implementation of a panel of biomarkers, including high-sensitivity troponin I (hs-TnI), to identify cardiovascular risk and enable follow-up for early initiation of care where appropriate.

Within the first year of the program, more than 1,000 healthy women were screened, enabling identification and subsequent connection to care for 10.9% of women at moderate- to high-risk of CVD. Impressively, about 1.1% of apparently healthy women with previously unknown coronary artery disease (CAD) were diagnosed with CAD in the first two years.

Patients and clinicians alike felt the program was critical to improving health outcomes through education, lifestyle changes and prevention. Here’s what one patient had to say: “I decided to sign up for the ‘Women and Heart’ initiative and check my health condition,” said Stanislava Kubat, a physiotherapist from Zagreb. “The elevated result of troponin, even not due to a coronary artery disease, put me in the category of high risk, motivated me to change my diet, walk more, rest more, minimize and control stress, and start the treatment immediately,” she said.

MAXIMIZING LAB EFFICIENCY TO SAVE LIVES WITH ORGAN DONATION

7.67 to 0.62 hours reduction in turnaround time for infectious disease testing required prior to organ donation.

92 more organs available for transplant in 2022 due to new protocol.

\$297,000 total annual cost savings with the implementation.

Screening using biomarker panels have subsequently been adopted into routine care, regardless of sex. Enabled by the Croatian National Insurance House—the main source of funding for Croatia’s health system—reimbursement of hs-TnI has been extended for screening to all asymptomatic, apparently healthy people aged over 45 since the beginning of 2023, due in large part to the success of this program.

“As a family doctor, monitoring the health status of patients is my major focus,” said Jasna Stilinovic, MD, a family medicine specialist and GP. “The ability to use hs-TnI in my clinical routine practice has allowed me to identify cardiovascular risk earlier, enabling confident mitigation and potential treatment.”

The team said implementation of similar screening at other institutions would be simple due to the availability of the hs-TnI test, and that international scalability is also feasible. However, work must be done to educate providers and implement new approaches to cardiac risk prevention, they noted.

The “Women and Heart” program laid the foundation for a second important national program called “Telecordis,” which was implemented in December 2023. The goal of the program is to empower primary healthcare centers across Croatia—especially those from remote locations—to use telemedicine to lower cardiovascular mortality by improving health and risk-stratification.

EBV IgM TESTING IN THE ED TO REDUCE PEDIATRIC MONONUCLEOSIS

Emergency department and hospital overcrowding is a concern globally. Efforts to effectively triage and manage patients appropriately

are increasingly important. When pediatric patients present to the emergency department (ED) with symptoms of a viral infection (e.g., fever, fatigue, sore throat, and swollen lymph nodes), there can be anxiety for the family and patient, which further reinforces the need for early disease identification and treatment.

At the Emergency Clinical County Hospital Targu Mures, children who exhibited viral symptoms in the ED were automatically admitted to the hospital to undergo supplementary testing for viral infections like RSV and influenza. If their clinical condition was determined to be stable, they would be discharged regardless of viral testing outcomes.

If, on the other hand, their status was unstable, they were referred to the Infectious Disease (ID) clinic, especially in cases exhibiting clinical suspicion of mononucleosis based on initial examination and laboratory indices (white blood cells, C-reactive protein). Because the ID Clinic is in a separate hospital, patients who were referred there had to be transported there via ambulance.

In a collaborative effort, an integrated care team at this hospital sought to refine their triage and patient pathway to enhance care in the pediatric ED. Thus, the team proposed incorporating EBV-specific immunoglobulin M (EBV IgM) into the panel of testing done on these patients in the pediatric ED. Eliminating EBV infection early can reduce wait times, admissions, the need for hospital transfers, and unnecessary antibiotic use.

Under the previous protocol, spanning 10 months, 177 of 1,506 children (approximately 12%) were referred to the ID Clinic, with 20 presenting mononucleosis suspicion. Delays in testing and diagnosis resulted from time constraints and administrative paperwork. A subset of 115 children (approximately 8%)

IDENTIFYING AND PREVENTING CARDIOVASCULAR DISEASE IN WOMEN

> 1,000 healthy women screened with testing panel of biomarkers within first year (2021) of Croatia’s “Women and Heart” program.

1.1% percentage of apparently healthy women with previously unknown coronary artery disease (CAD) diagnosed with CAD within the two years of clinical screening program.

0 to 33 physicians increase between 2022 and 2023 in number of Croatian doctors who routinely evaluate asymptomatic patients for cardiovascular risk with hs-TnI.

were admitted to the pediatric ward, where they underwent further testing, including EBV IgM.

The optimized protocol spanned another 10 months, resulting in a 2% reduction in children being referred to the ID clinic (20 fewer children) — and a corresponding 2% decrease in pediatric ward admissions (26 fewer admissions) over that period. Notably, waiting time for a final decision on children with mononucleosis suspicion post-examination decreased from 3.42 to 2.17 hours. The team estimates that a 2% reduction in pediatric ward admissions would equate to a cost savings of 6,136€, since the cost is 118€/hospital bed/day and the median length of stay for mononucleosis is two days.

Clinicians' overall satisfaction with laboratory services also increased by 6.2% after the new protocol was implemented.

"I have increased certainty in avoiding prescribing antibiotics if testing, including EBV IgM, provides confirmation for viral infection," said the hospital's Chief Medical Officer Bogdan Solomon.

According to the team, their clinical care initiative benefited from the fact that their emergency unit had its own dedicated laboratory, allowing them to optimize protocols and directly influence outcomes.

By contrast, EDs without their own labs often must rely on point-of-care solutions that lack the capability to offer EBV IgM. Since the team's lab already had the instrument needed for the protocol in place, acquiring the test was simple and did not have a high financial impact.

PREVENTING ERRONEOUS DIAGNOSES OF HYPERPROLACTINEMIA

Hyperprolactinemia is a pituitary disease characterized by serum prolactin levels that are continuously elevated above the normal range. While not life-threatening, it can lead to significant health complications. In women, these include irregular menstruation, infertility, loss of sexual desire, breast hyperplasia, and other problems. In men, they include infertility, loss of libido, breast enlargement, and more.

To maximize quality of life for patients with hyperprolactinemia, the condition must be promptly identified and treated. A confounder to this process can be macroprolactin, a non-bioactive isoform of prolactin that is not harmful and a common interferent to immunological assays used to detect prolactin. Excessively high concentrations of macroprolactin, i.e., more than 60% of a patient's circulating prolactin is composed of macroprolactin, can cause erroneous diagnoses of hyperprolactinemia.

According to the latest meta-analysis results, the global incidence of macroprolactinemia in hyperprolactinemia is 18.9% (95%, CI, 15.8%, 22.1%). Since macroprolactinemia is considered a normal variant, usually without the typical clinical manifestations of hyperprolactinemia, it generally does not require treatment.

Patients with hyperprolactinemia often need multiple examinations, which can take weeks or even months, and they must see multiple outpatient clinics before a diagnosis is confirmed. That means that erroneous diagnoses due to macroprolactinemia can lead to unnecessary healthcare costs and

resource use, along with anxiety among patients and their families.

To help mitigate this issue, a multidisciplinary team of neuroendocrinology and pituitary experts in the endocrinology department at Huashan Hospital, China, collaborated with the Huashan laboratory department. They engaged in case discussions to identify clinical needs related to macroprolactin and ultimately established and implemented a macroprolactinemia screening initiative.

Using the polyethylene glycol precipitation method and based on a chemiluminescence immunoassay, they developed a new prolactin monomer detection method. The team then established a reference interval for the prolactin monomer in both sexes in the region and verified its detection accuracy through clinical samples.

Between 2021 and 2023, a total of 14,950 patients at Huashan Hospital have undergone the new prolactin monomer testing, of which 3,238 patients have been diagnosed with macroprolactinemia. For patients, the early identification of macroprolactinemia has mitigated use of unnecessary medications and/or imaging tests every six months.

Further, nearly three-quarters (72.22%) of the doctors interviewed said that the detection of monomeric prolactin can quickly diagnose hyperprolactinemia and reduce patient stress.

"Monomeric prolactin testing helps clinicians identify macroprolactinemia early, reduces patients' repeated imaging examinations, and avoids unnecessary drug treatment," said Yao Zhao, a professor of neurosurgery at Huashan Hospital. "This is especially true for patients who have taken bromocriptine but had no obvious

EBV IgM TESTING IN THE ED TO REDUCE PEDIATRIC MONONUCLEOSIS

2% reduction in children being referred to the infectious disease clinic over 10 months after integration of optimized protocol.

6,136€ estimated cost savings due to 2% reduction in pediatric ward admissions.

3.42 to 2.17 hours reduction in waiting time for a final decision on children with mononucleosis suspicion post-examination.

PREVENTING ERRONEOUS DIAGNOSES OF HYPERPROLACTINEMIA

18.9% estimated global incidence of macroprolactinemia in hyperprolactinemia.

14,950 number of patients at Huashan Hospital who have undergone new prolactin monomer testing between 2021 and 2023.

3,238 number of patients who underwent prolactin monomer testing who were diagnosed with macroprolactinemia, mitigating their need for subsequent testing and treatment.

effect, which greatly alleviates the anxiety of patients and their families," he said.

The team's innovative monomeric prolactin detection method has won several honors in China, including third prize in the 2020 Shanghai Medical Staff Science and Technology Innovation "Starlight Program," second prize in the first National Endocrine Disease Testing and Clinical Thinking Case Competition in 2021, and a Silver Award in the 34th Shanghai Excellent Invention Selection Competition in 2022.


The technique also reduces the healthcare cost burden on the medical system and patients. The team estimates savings of about 600 yuan per patient, totaling 1.94 million yuan.

In addition, the team says the new method is not difficult for healthcare institutions to integrate, and several other hospitals in China have already adopted it into their system.

INTEGRATED TEAMS FOR THE WIN

While the UNIVANTS 2024 Teams of Achievement incorporate a wide range of healthcare professionals across various disciplines, all the awardees had one thing in common: strong partnerships working toward a common purpose of improving patient care.

Whether using lab medicine to prevent unnecessary CT scans in the ED, simplify diagnosis of *C. diff*, save more lives through organ donation, enable prompt cardiovascular risk assessment, or reduce superfluous tests for mononucleosis or hyperprolactinemia, healthcare teams around the world are finding their collaborative efforts are improving patient care and saving money—the ultimate win-win.

To learn more about UNIVANTS and other current and past award recipients, visit <https://www.univantshce.com/>. 

UNIVANTS 2024 TEAMS RECOGNIZED IN THIS ISSUE

The UNIVANTS of Healthcare Excellence program honors interdisciplinary teams that revolutionize patient care through innovative, data-driven solutions. These trailblazers set new standards in healthcare by achieving measurable improvements in clinical outcomes, operational efficiency, and patient satisfaction. By fostering collaboration and embracing new strategies, they are inspiring the global healthcare community to change healthcare for the better.

Reducing unnecessary CT scans in the emergency department with a new mild head injury assessment pathway

Klinikum Lüneburg, Lüneburg, Germany

Felix Brüning-Wolter, Meike Schrader, Nicola Wolff, Thomas Rodt, and Jörg Cramer

The Kansas Two-Step: Simplifying the diagnosis of *clostridioides difficile* at an academic medical center

The University of Kansas Health System, Kansas City, Kansas, United States

Matthew Loeb, Matt Humphrey, Sarah Mester, Matt Shoemaker, and Maggie Reavis

No time to lose with lives on the line – Maximizing efficiency in the lab to save more lives through organ donation

Southwest Transplant Alliance, Dallas, Texas, United States

Selena Warden, Doug Butler, Sean Forquer, Reid Freeman, and Cristina Solomon

The Women and Heart Program – Empowering women's health through early identification and prevention of coronary risk

Institute for Cardiovascular Prevention and Rehabilitation, Zagreb, Croatia

Andrea Snagić, Goran Krstačić, Ante Miljak, and Sonja Frančula-Zaninović

Reducing unnecessary admissions associated with pediatric mononucleosis via implementation of EBV IgM testing in the emergency department

Emergency Clinical County Hospital Targu Mures, Mures, Romania

Oana Roxana Oprea, Karoly Vecsei, Florina Floristeanu, Lucia Mezei, and Dobreanu Minodora

Establishment of a monomer prolactin detection method and specific reference interval to enhance the ability to identify macroprolactinemia

Huashan Hospital Fudan University, Shanghai, China

Ming Guan, Yao Hu, Hongying Ye, Zhaoyun Zhang, Yao Zhao