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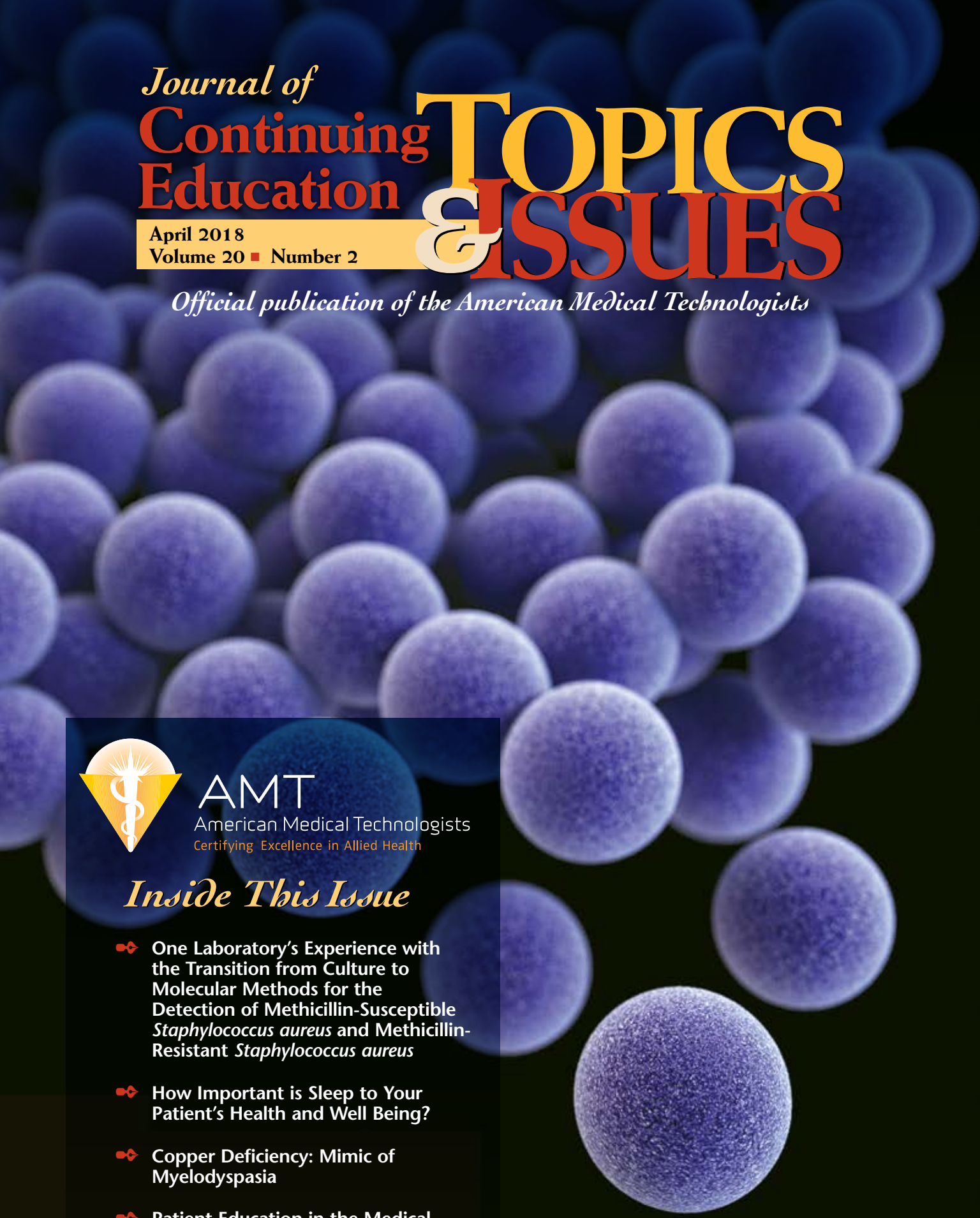

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On the cover: **Methicillin-resistant *Staphylococcus aureus* (MRSA)**

This illustration depicts a three-dimensional (3D) computer-generated image of a group of methicillin-resistant, *Staphylococcus aureus* (MRSA) bacteria, which were arranged in a cluster. The artistic recreation was based upon scanning electron microscopic (SEM) imagery.

Photo courtesy of the CDC

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Article 449
1 Clock Hour

One Laboratory's Experience with the Transition from Culture to Molecular Methods for the Detection of Methicillin-Susceptible *Staphylococcus aureus* and Methicillin-Resistant *Staphylococcus aureus*

By Barbara A. DeBurger and Dr. Joel E. Mortensen

Barbara DeBurger, BS, MT(ASCP), is a Technical Specialist and Joel Mortensen, PhD, is the Director of the Diagnostic Infectious Diseases Testing Laboratory at Cincinnati Children's Hospital, Cincinnati, OH.

The introduction of molecular testing into clinical microbiology laboratories can be a major paradigm shift. Clinical microbiology laboratories have an opportunity to replace traditional methods with molecular methods that can have numerous advantages. However, educating and fulfilling the clinical needs of physicians while complying with administrative, operational, staffing, and financial constraints can be daunting both during and after the introduction of molecular methods. In hospital settings, rapid molecular methods can play major roles in identifying patients with healthcare-associated infections (HAI) such as *Clostridium difficile* infections (CDI), colonization by vancomycin-resistant enterococci and/or detection of methicillin-susceptible *Staphylococcus aureus* (MSSA) and methicillin-resistant *S. aureus* (MRSA). Healthcare-associated infections cause significant morbidity and mortality in both hospital and community settings[1] and have been reported to result in over 6.5 billion dollars in treatment costs and excess hospital stays[2].

Staphylococcus aureus causes a significant number of infections and deaths worldwide and is a major source of HAIs. *S. aureus* is found primarily as normal flora in the nose; 20-30% of the world population is long-term carriers of *S. aureus*[3]. Prolonged hospital stays, proximity to patients with *S. aureus* carriage, endogenous *S. aureus* flora, and long-term exposure to antimicrobial agents can lead to carriage of MSSA and MRSA. Screening of certain populations for MSSA and MRSA has become important for therapeutic management, infection control, and epidemiological purposes. *S. aureus* accounts for the majority of surgical site infections at a rate of 25%. Nasal colonization with either MSSA or MRSA is the most important and significant risk factor for developing surgical site infections[4]. Colonized patients can be decolonized with mupirocin ointment in the nares twice daily and given chlorhexidine baths daily for 5 days prior to surgery[5-7]. The logistics of MRSA screening and prophylaxis can become complicated with patients who need to travel to a (sometimes distant) center days ahead of surgery, especially if culture-based methods are used to detect MRSA.

Traditionally, bacterial culture has been the gold standard for isolating clinically important bacteria, such as *S. aureus*. Commonly used, multipurpose, commercially available media that grows most facultative anaerobic bacteria and selective media designed to enhance the growth of specific bacteria and inhibit others has been used almost universally to detect *S. aureus* at 24 to 48 hours. Prior to 2003,

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.5 Clock Hour

How Important is Sleep to Your Patient's Health and Well Being?

By Alice Macomber

Alice Macomber, RMA(AMT), RPT(AMT), AHI(AMT), Retired Medical Instructor and former University Dept. Chair at Keiser University, Florida.

When we obtain a health history from our patients, we ask a multitude of questions. We ask about medications, family history, social history, drug and alcohol use, sexual function and many other questions but what do we ask about "SLEEP?"

Sleep is a basic human need. Eating, drinking and breathing are the human needs that healthcare primarily focuses on, but without sleep, health can be significantly compromised.

The purpose of sleep is to promote tissue growth and repair tissue, boost your immune system and recharge your heart and cardiovascular system for the next day. Remember that your heart is beating 24/7! With proper sleep, energy is restored and hormones that are essential for growth and development are released.

The National Safety Council (nsc.org) states that there are 50-70 million Americans that chronically suffer from a sleep disorder. This website offers a Sleep Disorder Fact Sheet. Our patients do not always understand the gravity of their sleep disorder. These sleep disorders reduce the quality of life and result in problems such as heart disease, diabetes, kidney disease, stroke, obesity, depression and even reduce lifespan.

There are many different sleep disorders, but the most common ones are:

- Insomnia
- Obstructive Sleep Apnea
- Restless Legs Syndrome
- Shift Work Sleep Disorder

What makes us sleep and what happens when we are sleeping? Your internal body clock controls when you are awake and when your body is ready for sleep.

The quality of sleep is a great factor, regardless of the number of hours. There are two basic types of sleep, REM and non-REM. Dreaming occurs during REM. The non-REM cycle is when the processes of tissue growth and repair, and restoration of energy occur, and hormones are released. REM is essential for processing and consolidating emotions, memories and stress. The REM cycle is vital for learning, stimulating the brain regions used in learning and developing new skills. Children who do not get adequate sleep often struggle to learn and have poor attention span. There are cases where a child is erroneously diagnosed with attention deficit hyperactivity disorder.

In the geriatric population, the lack of sleep often exacerbates the symptoms of other chronic medical conditions. Mentally, the lack of sleep can cause confusion, distortion of memory, depression and decreased mental capacity. Long term sleep deprivation can decrease the ability to deal with stress. In the aging population, this can impact the severity of dementia and paranoia. Caregivers for the elderly family member often suffer from the lack of proper sleep.

It is important to understand circadian rhythm: A cycle or **rhythm** that is roughly 24 hours long; the cyclical daily fluctuations in biological and psychological processes. The term **circadian rhythm refers to** a biological or psychological process that systematically varies over the course of each day.

Several studies have linked insufficient sleep

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1 Clock Hour

Copper Deficiency: Mimic of Myelodysplasia

By Carlo Ledesma

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Can you tell a fake from the original? A fake Rolex from a true Rolex? Traditionally, within whatever method or profession, it takes a trained and skilled eye to distinguish a real or pseudo-occurrence. The same applies to myelodysplasia in which there are a lot of misleading characteristics that may pinpoint to a dysplastic syndrome, but in fact is not a true myelodysplastic syndrome. These conditions that are sometimes misleading can also cause difficulty in diagnosis; therefore, it is imperative that any competent laboratory scientist in microscopic analysis should be able to distinguish these occurrences to provide a timely diagnosis.

There are a variety of conditions that result in morphologically mimicking myelodysplasia. Myelodysplastic morphology of blood cells can be encountered not only in myelodysplastic syndromes but also can be seen in non-clonal disorders, cause of which can be pointed to viral, bacterial, parasitic infections, autoimmune disorders, juvenile rheumatoid arthritis, immune thrombocytopenic purpura, iron deficiency anemia, megaloblastic anemia, dysgranulopietic neutropenia, congenital neutropenia, malignant lymphoma, after administration of granulocyte colony stimulating factor, chemotherapy, steroids, smoking, alcohol, posttransplantation, copper deficiency also, together with or without cytopenia. (Olcay, 2016)

Copper is an essential element for all living organisms. Its function is related to key activities that are important involving metabolic enzymes such as superoxide dismutase and cytochrome oxidase and also important in the proteins essential for iron homoestasis such as ceruloplasmin. The recommended daily requirements for copper is low; therefore, copper is not commonly encountered. However, we should be aware that copper deficiency can cause hematological abnormalities and sometimes it may masquerade as a myelodysplastic syndrome (MDS).

According to D'Angelo,[2] copper deficiency is mainly associated with conditions such as gastric and bariatric surgery; dietary conditions like parenteral hyperalimentation; loss of proteins with enreropathies; hypoproteinemic status such as celiac disease; complications due to therapy with high doses of zinc and penicillamine; and chronic use of proton pump inhibitors. Copper deficiency can also be linked with hyperzinchemia; in some cases, this condition could be a consequence of possible use of zinc based denture adhesive creams.

The most common hematological abnormalities in copper deficiency are anemia and neutropenia. The pathogenesis of anemia in copper deficiency is complex and multifactorial. Copper and iron interact through the ceruloplasmin, a copper-dependent oxidase, which assists in iron transport in the plasma in association with transferrin by oxidation of Fe2+ into Fe3+ . The hephaestin, a transmembrane copper-containing ferroxidase, having 50% homology to ceruloplasmin, works as a facilitator for iron export from enterocytes into blood circulation.

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1 Clock Hour

Patient Education in the Medical Setting

By Janet R. Sesser

Case Scenario

A patient is newly diagnosed with diabetes and the health care provider asks the medical assistant to provide education about dietary restrictions, how to administer daily injections of Victoza and how increased exercise will help the patient better manage the disease. Where should the medical assistant begin with these requests? What materials or information will be needed for the education? How will the medical office ensure that the patient has the necessary information and training to proceed?

In medical practice, medical assistants have one of the most important roles in patient education. With advanced communication technology and instant internet information available to us, it is easy to think that patients are researching and finding answers to all their health questions.

It is true that patients can access all kinds of health and medical information but will they understand it and be able to apply the new-found information to the management of their disease or condition.

In years past, the physician had the responsibility of instructing and educating patients providing only the amount of information necessary for the patient to understand the basics of their medical problem. Now, patients are expected to become more responsible for their own health status. They need to be involved and take a proactive role in their own health care.

In order to get to this level of action, patients need to understand more than just the basics. They need to comprehend their health status and work at controlling the condition, minimizing symptoms, and stabilizing their disease.

Some areas that the medical assistant will develop patient educational programs might include:

- Instructing and preparing a patient for a procedure or a treatment
- Instructing a patient according to the patient's special dietary needs
- Coaching patients regarding office policies, health maintenance, disease prevention, and treatment plan

Initially, the medical assistant needs to assume that the patient is health care illiterate. That means that the patient does not understand the information and what to do with it to help manage their disease, condition and the healing process. It is up to the medical assistant to fully explain and teach the patient about their condition, the treatment involved, and ways to accept and cope with the health situation. Through understanding their health status, they will hopefully change their attitude or behavior toward better health.

The Patient Education Process

The basic steps necessary for effective patient education are:

1) **Assessment –** pulling together information about the patient's abilities and needs
2) **Planning –** using the information gathered from the assessment phase to decide how to establish the patient instruction program
3) **Implementation –** process used to perform the actual patient teaching

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