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Global Heatwaves Threaten Integrity of Patient Test Results: A Dire Warning for the Lab Medicine Community.

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Guest: Dr. Joesph Wiencek from Vanderbilt University Medical Center and Vanderbilt School of Medicine.

Randye Kaye:

Hello, and welcome to this edition of *JALM* Talk from *The Journal of Applied Laboratory Medicine*, a publication of the Association for Diagnostics & Laboratory Medicine. I'm your host, Randye Kaye.

With increasing trends in clinical laboratory consolidations, clinical specimens are increasingly collected at outpatient clinics further from clinical laboratories. These specimens must be stored and transported prior to testing. The transportation steps, and particularly the storage of specimens in outdoor courier lock boxes, can subject specimens to extreme temperatures. Of particular concern are the high temperatures that are becoming more frequent with global heatwaves. Extreme temperatures have been shown to impact commonly measured analytes by affecting sample quality that could lead to risks such as inaccurate results, misdiagnosis, unnecessary interventions, and needs for sample recollection.

The September 2023 issue of *JALM* features a letter to the editor describing a study undertaken by researchers at the Vanderbilt University School of Medicine to track the internal temperature of an outdoor specimen lock box over a 24-hour period on a hot summer day in Nashville, Tennessee using a thermal camera.

Today, we are joined by the letter's corresponding author, Dr. Joesph Wiencek. Dr. Wiencek is a board-certified clinical chemist at Vanderbilt University Medical Center where he holds the position of Service Line Medical Director of the Core Laboratory. He is also an Associate Professor of Pathology, Microbiology, and Immunology at Vanderbilt School of Medicine. Welcome, Dr. Wiencek. To set the stage, could you give us a historical overview of the utilization of lock box containers in specimen transport and how they have evolved over time?

Joesph Wiencek:

Well, thanks for having me and thanks for the question. I find it fascinating to delve into the origins of everyday norms, especially lab medicine norms. Interestingly, after giving a presentation for one of the local ADLM sections, an audience

member reached out to me directly after the presentation to share with me the history of these common everyday boxes.

So, the history that was given was that independent clinical laboratories really came about in the mid-late 1960s into the early 1970s. And apparently, the idea of lock boxes for this purpose was inspired by everyday milk boxes. And for the folks that don't know, these boxes were commonly used for milk and dairy deliveries, and were replaced approximately three times a week.

Initially, similar boxes now known as courier lock boxes were placed in doors, but eventually they migrated outdoors and then they started to brave the elements. The earlier versions of these also had no insulation and it wasn't until about mid-1990s that locks were even introduced to these boxes for protection of the patient health identification.

Randye Kaye: All right. Thank you. I do remember milk boxes very vaguely. So, now, your letter mentions that there are no existing standards for courier lockbox containers. Why do you think this gap exists and what potential consequences could it have on the reliability and the security of specimen transportation?

Joesph Wiencek: Well, I'm happy you asked this question. This is something I've been speaking about for several years. So, back when I first spoke about this during my clinical chemistry fellowship, interestingly, I had the privilege of conversing with individuals nationwide who share basically similar struggles with their lock boxes, and all of this was kind of anecdotal at this point. Yet, when I started to dive into the general instructions that were online for various private reference in academic labs, it became quite evident that the only consistent aspect of these instructions was their inconsistency, and this was certainly, like, basically further supported when trying to identify universal standards as they related to guidance documents or accreditation resources. And as a direct result, I believe there have been many years and countless amounts of specimens affected by external transport conditions.

Randye Kaye: All right. Thank you. Yeah. I assume that you are right about this. So, let's delve into global heatwave, the current phenomenon that's impacting communities across the globe. How are these heatwaves affecting various regions? What role could they play in exacerbating these challenges in specimen transport?

Joesph Wiencek: Well, I think if anyone has a TV, a smart phone, or newspaper access, they're seeing on a continual basis that really global temperatures are making quite an impactful headline, and the extreme temperature patterns are just becoming more and more frequent. And I think that these past two to three

summers are great case examples, and temperatures have been sweltering in various regions of the world, not just United States. And areas within the United States, like Seattle, have experienced record temperatures close to 50 degrees Celsius.

And as a result, many folks in this region ended up going to the hospital, and I could only imagine that similar conditions for specimen transport is not necessarily going to be helpful for the integrity of the specimen. And so, I really believe that these extreme temperatures are going to have a profound impact on centrifuged as well as uncentrifuged specimens, as well as various other specimen types in the laboratory.

Randye Kaye: So, your study used thermal imagery to monitor the temperature fluctuations throughout the day. That's fascinating. Could you share the inspiration behind incorporating this innovative approach into your research on specimen transport?

Joesph Wiencek: I'm glad that you state that it's fascinating because I found it to be fascinating, too. The inspiration really came behind integrating this thermal imagery into our research stemmed from a study involving the gradual warming of red blood cell products that were removed from the refrigerator and placed onto a countertop. And I think it's important to highlight because the blood bank sector within laboratory medicine actually maintains well-defined temperature standards, which I find to be a model that other facets of laboratory medicine could align or adopt.

Randye Kaye: All right. Thank you. So, finally, what can be done about this? Can you talk about advancement, strategies, collaborations? Which ones are being explored to mitigate these issues and ensure the integrity of specimen transport?

Joesph Wiencek: Well, again, I appreciate your thought-provoking questions and definitely the time today. So, over the years, through posters, scientific presentations, as well as like unconventional like sidebar conversations and dialogues, I think the significance of utilizing these boxes for specimen transport has become like more increasingly clear. And now, there's a positive turn of events. And so, the Clinical and Laboratory Standards Institute, also known as CLSI, has commissioned an innovative document focused on evaluating external transport procedures.

To me, this is a groundbreaking advancement and I'm honored that I was asked to lead the document development. And so, working alongside my vice chair, we have assembled a globally-diverse panel of experts, and they're spanning all various fields, such as chemistry, hematology, coagulation, and even anatomical pathology. And all of our efforts are

centered around external specimen transport guidance, which did not exist until this document was suggested. And so, the group has been meeting for approximately two years. And lastly, it's fun to share that I'll be delivering an update on this document's development at this year's ADLM Pre-Analytical Conference in Philadelphia. And I believe the listeners for this podcast will not want to miss it.

Randy Kaye:

That was Dr. Joseph Wiencek from Vanderbilt University School of Medicine describing the *JALM* letter to the editor "*Global Heatwaves Threaten Integrity of Patient Test Results: A Dire Warning for the Lab Medicine Community*". Thanks for tuning in to this episode of *JALM* Talk. See you next time. And don't forget to submit something for us to talk about.