



**Article:**

Hsuan-Chieh (Joyce) Liao, Alec Saitman, Jane Dickerson.  
*Developing Benchmarking Metrics for Appropriate Ordering of Vitamin D, Thyroid Testing, and Iron Workups.*

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**Guest:** Dr. Joyce Liao is a clinical chemist, assistant professor, and associate laboratory director at the University of Washington in Seattle, Washington.

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.

Clinical laboratories, hospitals, and health systems are increasingly implementing laboratory stewardship programs to optimize the utilization and value of laboratory testing. These programs often seek to improve the ordering, retrieval, and interpretation of laboratory tests. However, it can be difficult for laboratory stewardship programs to determine what tests to focus on, how to define where there are test utilization issues, and how to set tangible goals to improve utilization.

One strategy that could aid in addressing these barriers is the application of benchmarking of laboratory utilization data across different institutions. The January 2025 Special Issue of *JALM*, titled “Diagnostic Stewardship in Action: Advancing Healthcare Value,” features a special report describing a laboratory stewardship benchmarking initiative created by the informatics working group of the Patient-Centered Laboratory Utilization Guidance Services, known as PLUGS. The group established three initial benchmarks: the ratio of 25-hydroxyvitamin D to 1,25-dihydroxyvitamin D test orders, the ratio of thyroid stimulating hormone to free thyroxine test orders, and the percentage of iron workup orders after an initial low mean corpuscular volume. The members of the working group analyzed data from their own institutions and then established optimal benchmarks through inter-laboratory comparisons.

Today, we’re joined by the article’s first author, Dr. Joyce Liao. Dr. Liao is a clinical chemist, assistant professor and associate laboratory director at the University of Washington. She has been actively involved with PLUGS since 2018, participating in several laboratory stewardship projects. Welcome Dr. Liao. Let’s start with this, what is benchmarking and how does it support clinical laboratory goals?

Joyce Liao:

Before we jump into benchmark, I would like to talk a little bit about test utilization. Approximately 70% of all clinical

diagnoses are based on laboratory tests and lab test utilization is about ensuring the right tests are ordered for the right patient at the right time. We based our decision on clinical evidence and guidance, aiming to improve patient outcome, avoid unnecessary tests, and cut healthcare costs. Let us break down the test utilization process into different layers.

So first, choosing appropriate tests is about selecting the most relevant test for the specific clinical condition by streamline and standardize how tests are ordered to avoid any unnecessary repeats and to ensure the test is clinically relevant. After the tests are ordered and run, the clinical team should be able to retrieve the result and have the knowledge and tool to interpret the result accurately, as these directly impact their decisions and patient care.

So, we try to keep the cycle going by talking and providing feedback and education to each other. From the lab side, we update clinician on the new test option and guidelines, evaluate the ordering practice, helping them stay sharp and make informed decision. Now moving to benchmark. This is where it gets really strategic. Benchmarking in lab stewardship means comparing our own performance metrics to best practice or standards from peer group. Why do we do that? It helped us to identify where we can improve our test utilization. By setting a standardized framework for comparisons, we ensure that we are using our resources efficiently and effectively, adapt to various scenario.

By measuring our performance continually against these benchmark, we make sure that we are keeping up with latest standard, driving quality improvement, and optimizing outcome. It's about setting a high standard, reaching it, and then keeping it.

Randye Kaye: All right. Thank you. I can see why benchmarking is so important and laboratory science is so important. So, can you tell us a little bit more about PLUGS? What is PLUGS and what are its missions?

Joyce Liao: So, PLUGS is abbreviation for Patient-Centered Laboratory Utilization Guidance Services. It's a long name, which is an initiative dedicated to improving laboratory tests orderings, interpretations, retrieval, and reimbursement. Our permanent goals are to enhance the efficiency and effectiveness of laboratory services, improve patient care, and reduce our necessary healthcare costs through optimized test utilization.

PLUGS integrate key elements such as governments, data extractions and monitoring, targeted intervention, and continuously review and improvement to establish a

sustainable model for laboratories that support high quality care and fiscal responsibility. Specifically, I would like to mention the critical role of PLUGS informatics working group in achieving our goals. This committee includes more than 15 laboratory medical director, genetic counselors, and laboratory leaders from over 10 institutions. We are tasked with developing guidance to tackle common test utilization issue.

The group focus on creating metrics, or benchmarking, that are easily retrievable and calculable, pulling comprehensive data from various lab system. As we mentioned in our manuscript, we have set specific benchmark for a pilot study and we are now expanding our benchmark to include more metrics. This is all about standardized practice and enhancing test utilization across multiple institutions. And now we are really keen on getting more institution involved and welcome your participation as lab professional in this initiative.

Randye Kaye: All right. Thank you. So can we talk a bit more about the benchmarks? The working group that you just spoke about has now created three benchmarking guides. So what challenges did the committee encounter in creating these benchmark metrics?

Joyce Liao: This is great question. So in our project, detailed in the manuscript, we faced several key challenge when the developing these benchmark metrics. First, we have to make sure that this benchmark are applicable across wide variety of healthcare setting, and for diverse patient population. It's pretty tricky because each healthcare environment and patient group is unique and what works in one setting might not work in another.

For example, we can probably imagine data from children hospital will be very different from that of large reference lab. So we had to consider a wide array of scenarios to ensure that our benchmark would be universally beneficial and relevant to various institutions. Another big challenge was ensuring data comparability across different systems. The participate lab could use various LIS, we called laboratory information systems, and EHR, electronic health records, and each system handle data differently. Trying to compare data across LIS system can be like comparing apple to orange. And this part was particularly demanding because it involves extracting and analyze of huge data sets from different sources, requiring a high level of technical expertise.

So to tackle this challenge, our PLUGS informatics working group, which include expert from more than 10 different institution, works very closely together. We developed the guidance and methodologies that are adaptable and could handle the variability and complexity of the data. This

collaborative approach was critical to ensure that our benchmarks are not only actionable but also reflective of best practice across all participating institution. It was all about enhancing test utilization effectively and to improve our patient care.

Randye Kaye: All right. Thank you. So, final question: are there take home messages that you have for our listening audience and our readers, and how can they benefit from these benchmarking guides at their own institutions?

Joyce Liao: So, the key takeaway from our paper is the proven effectiveness of laboratory stewardship when coupled with strategic benchmarking.

Our research demonstrate how laboratories can align their practice with establish standards and benchmark set by peer group. We specifically focus on metrics from common laboratory testing. In our manuscript we include vitamin D, thyroid function tests, and iron workup, and now we are working on adding more benchmark metrics such as hemoglobin A<sub>1c</sub>.

Through the paper, we delved into the development and implementation process, offering explanations and examination of how these benchmarks are applied, and the results across different institution. We detailed the practical applications and the outcome observed at each participating institution, highlighting potential improvement in test ordering practice by different strategies and significant reductions in unnecessary testing. These underscore the critical role of benchmarking in enhancing patient care and also illustrate the impact of optimizing resource utilization in clinical laboratories.

For those interested in a deeper dive into our method and finding, now I'm really excited to announce the manuscript is available online, and the guideline can be accessed through PLUGS website as member. Our manuscript and guideline detailed policies and templates that support the implementation of this benchmark in different institute and how it's improved patient care and achieve our goal.

Randye Kaye: All right. Very valuable information. Thank you so much for joining us today.

Joyce Liao: Thank you for having me.

Randye Kaye: That was Dr. Joyce Liao from the University of Washington, discussing the *JALM* article, "Developing Benchmarking Metrics for Appropriate Ordering of Vitamin D, Thyroid Testing, and Iron Workups." This article is from the January 2025 Special Issue of *JALM*, titled "Diagnostic Stewardship in

Action: Advancing Healthcare Value.” 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.