

## REGIONAL MEDICAL LABORATORY, INC., (RML) TULSA, OKLAHOMA



### **THIS HIGHLY RESPECTED COMMERCIAL REFERENCE LABORATORY EMBRACED ACCOUNTABLE CARE AND IS NOW ENJOYING ITS REWARDS.**

Regional Medical Laboratory, Inc., (RML) is a nationally renowned CLIA and CAP-Certified commercial reference laboratory headquartered in Tulsa, Oklahoma. RML provides onsite in-patient laboratory services for St. John Medical Center in Tulsa, Oklahoma as well as out-patient laboratory services for other hospitals, clinics and physician offices in the Tulsa Metropolitan area, Northeastern Oklahoma, South and Western Oklahoma and Southeast Kansas.

RML has two hematology automation lines that went live in April of 2013. One is located at St. John Medical Center and the other is located at a new RML reference laboratory—both are interfaced through single data management software.

### **SHARED SAVINGS REWARD EXCELLENCE**

In 2011, the U.S. Department of Health and Human Services (HHS) released proposed new rules for accountable care organizations (ACOs). The rules were designed to help doctors, hospitals and other healthcare providers better coordinate care for Medicare patients across care settings, including doctors' offices, hospitals and long-term care facilities. The Medicare Shared Savings Program rewards ACOs that lower healthcare costs while meeting performance standards on quality of care and putting patients first.

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# LOOKING AT THE BIG PICTURE



## CONFIGURATION

### XN-9000™ – Lavendar Top Management® with A1c

- x3 XN-10s (CBC analyzer)
- x1 SP-10 (Slidemaker and Stainer)
- TS-500 (tube sorter / archiver)
- x3 Bio-Rad VARIANT™ II TURBO Link HbA1c analyzers

## DAILY VOLUMES

- ~ 1,000 CBCs
- ~ 500 A1cs

## HOURS OF OPERATIONS

### Compressed Testing Hours

- Monday – Friday
- 10 a.m. – 2:30 a.m.

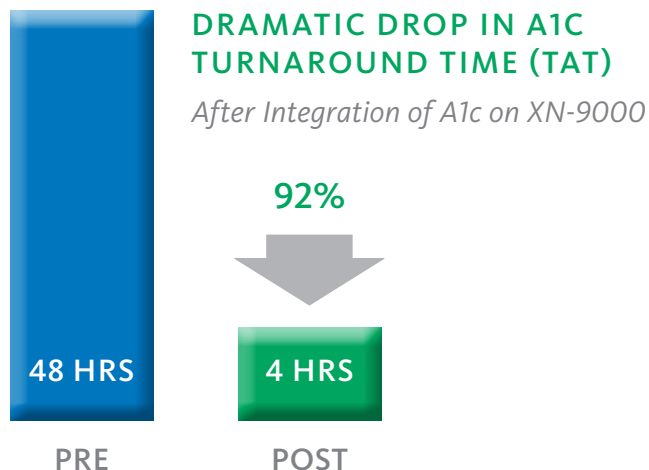
## A GROWING DEMAND FOR A1C TESTING

Just monitoring the increased orders for A1c at RML attests to the increasing prevalence of diabetes. According to Lawrence Johnson, MD, who is the director of hematology, flow cytometry, urinalysis and coagulation, this stems from increased screening for the early detection of Type I diabetes and the growing number of individuals presenting with Type II diabetes due to the tendency toward obesity in the U.S. from lifestyle choices.

Widely accepted as the best long-term marker of diabetes control (I, II), the HPLC assay is considered the “gold standard” for A1c measurements. Integrating A1c testing on a hematology line has dramatically reduced RML’s A1c turnaround times—from 24-48 hours to 4 hours. With this improved service, the laboratory now receives requests for “discharge” A1c values on patients before they are released. Starks considers that these “STAT A1cs” help determine the discharge orders for the patient, personalizing their diabetes control.

Supervising RML’s hematology, coagulation, urinalysis and flow cytometry departments is Jennifer Starks, MT (ASCP). Board-certified hematopathologist, Lawrence Johnson, MD, serves as the laboratory’s director.

At RML’s principal lab, the line fully automates CBC and A1c, processing a workload of 1,000 CBCs and 400-500 A1c measurements in 16 hours of operations — 10:00 am – 2:30 am Monday – Friday using the Sysmex XN-9000™ Automated Hematology System equipped with Bio-Rad VARIANT II TURBO Link HPLC analyzer and Sysmex WAM—also known as the Sysmex Lavendar Top Management™ solution.





### Jennifer Starks, MT(ASCP)

Section Manager  
Regional Medical Laboratory

## LABORATORY-BASED PERSONALIZED MEDICINE

Sysmex WAM Decision Support Software for the Clinical Laboratory enables RML to easily store, retrieve, and analyze large amounts of data in individual patients as well as large patient groups.

Sysmex hematology analyzers are robust in providing accurate reproducible data, which is critical in analyzing long term data in large groups, but, perhaps more importantly, in individual patients in this era of personalized medicine.

Examples of personalized medicine include having the ability to look at longitudinal data stored on over two million unique patients. This enables RML to derive statistically significant reference ranges for hemoglobin, as an example, stratified by both gender and decade of age.

Clinicians can avoid over calling or under calling anemia, which prevents the subsequent unnecessary, potentially invasive and expensive testing. This also allows them to look at the relative shifts, in particular, CBC parameters and hemoglobin A1c values in individual patients—and the acuity of those shifts.

Whether a change in a specific parameter is sudden versus slow and long-term implies different potential disease states, helping to point the clinician in the right direction.

With a workload of 1,000 CBCs/day, vast amounts of data of high accuracy and reproducibility are being generated by the XN-9000 line at RML. This has allowed Dr. Johnson to apply the concept of “personalized medicine” to discrete patient subpopulations by taking a new look at “normal.”

Based on the literature, for example, Dr. Johnson knew that the average platelet count in pregnancy dropped but no one had documented the magnitude of the drop. In other words, what was normal for these patients in this state of health? Because RML could use WAM middleware to interface with their database, they were able to extract out all platelet counts by trimester of pregnancy.

Dr. Johnson was able to show that, on average, platelet counts between the first and second trimester of pregnancy differed by 20,000. “That’s meaningful,” he says “and we normalized the data for the second and third trimesters of pregnancy so we were not overcalling thrombocytopenia in pregnancy. But this is only possible if your data is reliable and reproducible,” he cautions.



*“Imagine if you had two million patients. You could find statistical associations that you would never find with 100.”*

**Lawrence Johnson, M.D., FCAP, FASCP**

Hematopathologist  
Regional Medical Laboratory

RML believes they have benefitted from working with Sysmex solutions, extracting the data from the instrument and then analyzing it through the use of Sysmex WAM. Dr. Johnson considers this a valuable laboratory-based application of personalized medicine that helps advance knowledge at the end of the day and which benefits both physician and patient. “Imagine if you had two million patients (RML conducts eight million tests/year). You could find statistical associations that you would never find with 100.”

“In this scenario [using advanced clinical parameters] we have avoided a bone marrow exam,” he says, “and we may have reduced the patient’s length of stay.”

**EFFICIENCIES OUTSIDE AND WITHIN THE LABORATORY**

Dr. Johnson believes that one of the most expensive areas for a hospital is the blood bank. Fewer people are donating, there is the need to increase the amount of screening for newly discovered pathogens, and antibodies are being discovered that are potentially harmful to patients, further restricting the supply.

To do so, Dr. Johnson monitors reproducible “markers” such as a reticulocyte count or an immature platelet fraction (IPF), which are less invasive surrogate markers for bone marrow recovery than a bone marrow aspirate itself.

Operational efficiencies are requisite for laboratory medicine, especially hematology, and rules based decision-making helps drive them. It is no longer possible for every slide to be reviewed, so sensitive and specific white blood cell differential information needs to be generated to support autovalidation. According to Dr. Johnson, “We need to avoid the practice of looking at every smear and rely on instruments that can produce meaningful and reproducible flags, such as immature WBC flags in the case of infections, rouleaux formation in myeloma, or certain types of red blood cells such as schistocytes in Thrombotic Thrombocytopenic Purpura (TTP), which is a medical emergency.

# A COST-EFFECTIVE APPROACH

*“XN training was very helpful. We really liked the online modules because our staff could use them for training as well.”*

## LOOK AT THESE THREE FACTORS THAT DRIVE LAB SUCCESS WHEN DESIGNING YOUR LABORATORY SOLUTIONS FOR THE FUTURE:

1. The ability to attract qualified medical technologists to do more work with less staff—while providing them with ease of use and solid reliability.
2. The technology that allows lab staff to deliver excellent turnaround times to help drive exceptional patient care.
3. The advantages of a streamlined laboratory process that bends the cost curve in the right direction while delivering laboratory-based personalized medicine.

## THE BOTTOM LINE

Personalized medicine need not be dependent on genetic factors and targeted therapies. Today’s laboratory is able to inform clinicians by assessing what is “normal” for a particular “state in life.”

Whether it is a platelet count in pregnancy or a hemoglobin drop in males after 50, these observations are now possible and are leaving the “100-cell normal values” far behind.

As Dr. Johnson puts it, “It’s been exciting work and it’s been a great partnership with Sysmex to do that work because we feel that it is the future.”

RML thinks the top three benefits of a Sysmex partnership include a high level of customer service, instrument reliability and helpful Sysmex associates who don’t stop until they have the right answers.



*Integrated XN-9000 Bio-Rad A1c modules allows RML to offer consistent, rapid testing and result turn around time*



*The Sysmex XN-9000 Lavender Top Management System equipped with Bio-Rad VARIANT™ II TURBO Link analyzer provide RML with fully automated CBC and A1c testing powered by Sysmex WAM.*

## References

1. American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care. 2014;37(Suppl.1):S81-S90. <http://diabetes.niddk.nih.gov/dm/pubs/control>. Accessed August 20, 2014.
2. Stratton IM, Adler A, Matthews D, et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. BMJ. 2000; 321:405-412.

