

THIS MONTH: DIAGNOSTIC TESTING

PCR tests provide a fast track to detection

By Roberta Baker
Union Leader Staff

PCR testing soared during the pandemic as the go-to, drive-through, quick-turnaround way to discover if you had COVID.

The genie is out of the bottle. The worldwide market for PCR tests is predicted to grow from \$8.5 billion in 2023 to around \$12.7 billion in 2032, according to health care market research reported by Data Intello. The reasons cited include a growing prevalence of genetic mutations and infectious diseases and climbing demand for early, high-speed, high-sensitivity and high-accuracy testing.

Game changing PCR diagnostics include digital and rapid-result tests that can be administered just about anywhere.

Today, PCRs are used to diagnose or detect viruses, bacteria, fungi, parasites, genetic diseases such as cystic fibrosis, types of cancer including lymphoma, and gene changes in cancer that warrant medication modifications, according to the Cleveland Clinic.

Diagnostic testing labs, urgent-care centers, and research and community hospitals in New Hampshire use them to screen for common conditions such as influenza and vaginitis. COVID, RSV and MRSA can be detected in a single kit.

PCRs are replacing lengthy, time-consuming and potentially more error- or contamination-prone methods, according to medical technologists.

A PCR, or polymerase chain reaction test, is basically testing in a box — self-contained and unexposed to outside interference, including air- and fluid-borne germs. It's often the size of an ink-jet printer cartridge.

An enzyme that reacts only with the genetic material of a specific pathogen (a disease-causing agent) is added to the PCR container. It causes the pathogen's

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Revealing hidden danger in your DNA

By Roberta Baker
Union Leader Staff

Kelley Goodwin and Amanda Nieters are detectives on the trail of cancer risk.

At Foundation Hematology and Oncology at Southern New Hampshire Health, Goodwin and Nieters, licensed genetic counselors, screen adult patients and sometimes their family members for their risk of developing potentially lethal breast, ovarian, prostate, pancreatic and colon cancers.

It's about rooting out red-flag mutations.

They do this by analyzing the results of blood tests that cover up to 80 different genes whose mutations, or permanent changes in DNA sequencing, portend a higher potential for developing cancer.

Their goal is to establish grounds for ongoing monitoring, early detection and timely treatment as needed — including, when patients seek it, preventive surgery before a cancer takes hold.

Nationwide, it means casting a wide net.

About 75,000 genetic tests for cancer risk are currently on the market in the U.S., according to National Institutes of Health. About 5% to 10% of all cancers are known to have a genetic risk factor

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LUNG SCREENING SAVES LIVES



ROBERTA BAKER/UNION LEADER

Dr. Bianca Monteiro, a pulmonologist at Portsmouth Regional Hospital, uses the Ion navigational bronchoscopy system to find and test tumors in the lungs.

Cutting-edge tech catches cancer early

By Roberta Baker
Union Leader Staff

THE EQUIPMENT looks futuristic. The demand is widespread. Inside the Thoracic Oncology Mobile Experience Truck parked outside Portsmouth Regional Hospital on Sept. 25, clinicians, research associates and members of the public gathered for a demonstration of the latest technology in lung cancer screening and robotic surgery used to diagnose and remove cancer inside the chest and lungs.

A multi-armed robot, DaVinci 5, operated by a surgeon seated in front of a console and screen, resembled a robotic spider or a mechanical octopus. When at work on a patient, it executes tiny, precise movements inside the human chest wall, with minimal incisions and disruption to the surrounding tissue.

Portsmouth Regional Hospital is the first hospital in northern New England

“Lung cancer screening, hands down, out of all cancer prevention in the county, is the best cancer prevention tool we have.”

DR. BIANCA MONTEIRO
pulmonologist at Portsmouth Hospital

to offer a strategic triad of technology to diagnose and treat lung cancer: a 3D CT scanner, the Ion navigational bronchoscopy system, and the DaVinci 5 surgical robot — equipment that patients in New Hampshire and southern Maine previously traveled to Boston to find in one spot.

“This is going to help us get a diagnosis very early on for lung cancer” in stage 1

or 2, “when we have a very small nodules. One of our tools creates a GPS map for your lungs” and shows the best and quickest route to a suspicious mass, said Dr. Bianca Monteiro, a pulmonologist at Portsmouth Hospital.

At stage 3 or 4, cancer is much harder to treat, she said, and often can't be cured completely. Timely detection and yearly monitoring is essential for patients at high risk. Studies have shown that screening can lower their risk of death from lung cancer by 20%, according to research cited by Portsmouth Regional Hospital.

“Early-stage lung cancer is extremely curable, but it has no symptoms,” said Dr. Antonio Lassaletta, a Portsmouth Regional Hospital thoracic surgeon who operates on lung and esophageal cancers and malignant tumors inside the chest wall — procedures he performs with robotic assistance. “We have to catch it early so we can find it

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Fast detection leads to real-life survivors

By Roberta Baker
Union Leader Staff

Brian Sweeney's wife brought him to the Elliot Hospital's emergency room during COVID because Brian, a long-term smoker with Type 1 diabetes, was having trouble controlling his blood sugar. She said he also was coughing a lot and complaining of having no energy.

The ER team at first suspected pneumonia, but a chest X-ray identified a suspicious spot on a lung or in front of it.

“They weren't even sure if they could perform surgery,” she said, because of restrictions in effect during the pandemic.

On May 1, 2020, physicians surgically removed Sweeney's tumor and lymph nodes without any follow-up radiation or chemotherapy.

“Early detection is very important,” said Sweeney, who is now 61. “I'm still here five years later. Even if you feel it's something stupid, my advice is get it checked out by a professional. That was key for me.”

Sweeney's oldest brother and mother weren't as lucky, he said. They died of cancer. His cousin Tony, a plumber, thought his undetected lung cancer “was a pain he'd just ignore. He thought it was just one of those things. Two months later, he was gone,” said Sweeney.

What would he tell other smokers now? “Get checked out. At stage 1, you don't know



DAVID LANE/UNION LEADER

Lung cancer survivor Brian Sweeney of Manchester speaks with a reporter while at the Thoracic Surgery “Breath of Life” celebration with his wife, Melissa, at the Elliot at River's Edge in Manchester on Oct. 21.

it's there.”

“The whole key to survival is to find lung cancers early, and screening does that,” Dr. Curtis Quinn, a thoracic surgeon, told 10 lung cancer survivors and their guests at a “Breath of Life” celebration at Elliot Hospital last month.

“Courage is being scared to death but saddling up anyway,” Quinn said, quoting John Wayne, who lost one lung to cancer from smoking, but who continued to act after surgery.

Quinn, a lung and chest

surgeon at Elliot Hospital, is an alarm-bell ringer when it comes to lung cancer, and he cites statistics that point to the urgency: An estimated 125,000 people across the U.S. will die this year from lung cancer.

“By the time most people find out because of chest pain or coughing up blood, it's in a later, advanced stage,” said Quinn. By doing CT scans early for patients identified at risk because of their age and smoking history, “we are finding cancers early, when it's stage

1.” The risk of death increases as cancer advances to stages 3 and 4.

The question is how many

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No Flavors this week

The monthly NHMedical section takes the place of this week's Flavors section. Flavors, with Our Gourmet, returns next week.

Survivors

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malignant lung tumors go undiscovered.

After a spot is detected on a low-radiation CT scan, a fiber optic scope is used to probe an airway to biopsy a suspicious lump and find out if it's cancerous.

Pulse electric field energy — or short-duration, targeted electricity — enables lung cancer surgeons to diagnose and destroy early tumors "and you go home," Curtis said. "It stimulates your own immune system to recognize lung cancer." No radiation is used, he said.

In the past 18 months, and as part of a nationwide study, Elliot Hospital has diagnosed and treated some 70 patients with the robot-assisted scoping procedure known as navigational bronchoscopy, and pulse electric field.

Kelly Cronin, 65, of Manchester, who attended "Breath of Life" last month, said she's survived lung cancer twice.

"The first time it was diagnosed accidentally when I went in to the ER" in 2019 "because of a breathing issue." It turned out to be Stage 2 cancer, she said.

Surgery at Elliot Hospital removed two-thirds of her right lung. Chemotherapy followed. That put her on the radar for regular screening and symptom monitoring.

"The second time they caught it so early we had wait for it to solidify to get it done," said Cronin. "The earlier you get it, the better. If you're an old smoker, talk to your doctor and get the scan. I didn't get the scan and I got Stage 2" lung cancer.



DAVID LANE/UNION LEADER

Thoracic surgeon Dr. Curtis Qunn speaks with lung cancer survivor Kelly Cronin of Manchester at the Thoracic Surgery "Breath of Life" celebration at the Elliot at River's Edge in Manchester in October.

Tech

From Page B1

and cure it. Lung cancer screening, hands down, out of all cancer prevention in the county, is the best cancer prevention tool we have."

The first step is to identify patients with heightened risk, then get them in for annual screening as part of a health maintenance program.

Early diagnoses require willingness, but awareness and interest in screening lags, including in habitual smokers, said Monteiro.

"We want to change the mentality," said Lassaletta. "Lung cancer is not a death sentence. It's a very curable disease when caught early. Our goal is to find it early and do biopsies early."

New Hampshire's lung cancer rate is slightly lower than the national average, but the statistics ring alarms for improvement. According to data cited by the American Lung Association, 840 lung cancer diagnoses were recorded in New Hampshire in 2022. Roughly 30.5% of lung



ROBERTA BAKER/UNION LEADER

Dr. Antonio Lassaletta, a thoracic surgeon at Portsmouth Regional Hospital, demonstrates the DaVinci 5 surgical robot assistant, which he uses in lung cancer surgery.

cancer patients were alive five years after diagnosis, 29.3% were diagnosed at an early stage, and 18.1% didn't receive treatment, according to findings that year. Along with oncologists and

cancer centers nationwide, HCA Healthcare (which includes Portsmouth Regional, Catholic Medical Center, Parkland Medical Center and Frisbie Memorial Hospital in New Hampshire), recommends lung cancer screening for people age 50 to 80 who are current smokers or who quit within the last 15 years, who have smoked the equivalent of one pack of cigarettes a day for 20 years, or two packs a day for 10 years.

Once risk is identified, these patients should be monitored and tested annually.

At Portsmouth, when a suspicious mass is identified by a 3D CT scan, which supplies X-ray images from different angles, an incisionless biopsy is performed under anesthesia. In the Ion navigational bronchoscopy system, the surgeon can steer to very small nodules. Sample tissue to test is collected through a breathing tube inserted into the lungs.

"We're able to biopsy with a nee-

dle" the same size as the ones used in routine blood draws, Lassaletta said. "It's incisionless, painless and you go home the same day."

Specimens are promptly evaluated for cancer, and sent to laboratories for confirmation.

After a cancer diagnosis, a team including an oncologist, radiologist, radiation oncologist, surgeon and pathologist decides the best way to treat the tumor, which can be the size of a marble when removed.

"The highest chance for a cure" is surgery, Lassaletta said. The DaVinci 5 robot is able to extract very small pieces of lung using a surgical staple to cut and seal.

"We're able to remove these early-stage cancers and have you go home the next day," the thoracic surgeon said.

"Our goal is to disarm the fear of cancer screening. The reason we screen is to find early stage lung cancers so we can cure them," he said.



Jillian Saunders, BSN, RN, OCN



Kim Pauliks, BSN, RN, OCN



Kristen Pilotte, BSN, RN, OCN

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Payson Center for Cancer Care



HOPE
RESOURCE CENTER

PCR Tests

From Page B1

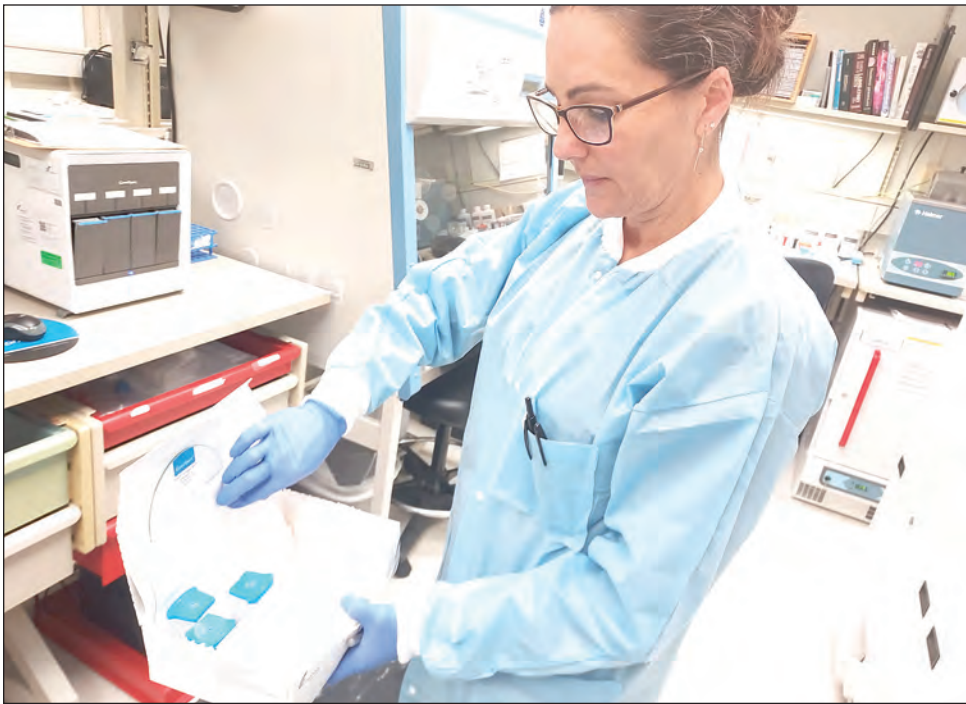
DNA or RNA (genetic material fragments) to rapidly replicate and become much easier to detect than, say, a single, isolated piece.

“Each PCR cycle takes roughly between 30 seconds and two minutes and will theoretically double the amount of targeted genetic material, if it’s present in the specimen,” said Dr. Michael Hitchcock, a pathologist at Concord Hospital and Concord Hospital-Laconia.

Think of Hitchcock as a diagnostic sleuth for the microscopic things that make people sick, including viruses, bacteria and cancer-causing mutations.

“You’re looking for a needle in a haystack if you’re just looking for one piece of DNA,” said Hitchcock, who spends most of his workdays behind microscopes that give closeup, magnified views of blood, urine and human tissue.

The critical particle replication that occurs within an hour inside an activated PCR test kit makes it expo-



ROBERTA BAKER/UNION LEADER

Jan Kimball, head of laboratory operations at Concord Hospital in Laconia and Franklin, processes PCR tests in Franklin in October.

nentially easier to identify the causes of disease.

“As little as 10 years ago, it took a full room, a clean room. You had to be care-

fully pipetting” under a protective hood. “Now everything is done in a small box. The only thing the human does is inoculate

the sample. The instrument does all the hard work,” said Jan Kimball, a medical technologist who heads laboratory operations at



ROBERTA BAKER/UNION LEADER

Dr. Michael Hitchcock, a pathologist at Concord Hospital in Laconia, examines blood and tissue samples by microscope.

Concord Hospital’s Franklin and Laconia campuses.

“Traditionally, the way to diagnose infection is to do a culture to grow the organism,” Hitchcock said. “It’s difficult” and takes a lot of time as well as specific growing conditions.

“Then when you grow the organism, you still have to do chemical testing to

identify it, then do chemical tests to what drugs will treat it.”

Hitchcock said the biggest revolution in diagnostics today is the speed and accuracy of testing for microorganisms and gene variants that cause disease, which enables patients to get the right treatment sooner.

Genetics

From Page B1

that can predispose, but not directly cause, someone to develop cancer, Goodwin said.

“I like to use the analogy of reading for major targeted hotspots,” said Goodwin. “We’re looking specifically at the hereditary cancer genes to determine someone’s risk.”

“We all have two copies of all these genes,” Goodwin said. “Testing looks for a genetic difference, a mutation — the change brings about that increased risk.”

Well known examples include the BRCA-1 and BRCA-2 genetic mutations, which raise someone’s risk for the hereditary forms of breast cancer. BRCA-1 also spells a higher risk for ovarian cancer.

Genetic counseling starts with

meeting to discuss personal and family history, said Nieters, followed by a full risk assessment, blood testing and counseling after the results are in.

“Depending on what a person wants to know, it could be 10 to 70 or 80 genes” that are tested. “We talk them through which tests are appropriate for them,” said Nieters.

When test results come back in three or four weeks, the counselors meet with patients to discuss the report, explain what the findings mean for health management, make recommendations and discuss whether other close family members should be tested.

“It can shift the timetable to earlier or more frequent cancer

screening,” said Goodwin.

Patients vary greatly in their response to the results. Some are interested in preemptive surgery to remove tissues that could become cancerous.

“There are risks and things to think about,” said Goodwin. “They need to have a conversation with the surgeon.”

“For many people, it’s deciding what scares them more — the risks of surgery or the risk of cancer,” said Nieters. “A big family history can make them lean one way. Everyone has a different perspective based on their personal values, experiences in life and how they feel.”

Age is the No. 1 cancer risk factor, followed by family history, lifestyle factors such as alcohol

use and smoking, diet and exercise, and environmental exposures including sun exposure, secondhand smoke and working with chemicals, according to cancer research.

“No change in any gene can guarantee cancer. Most of the time it’s multiple factors that determine cancer’s expression and risk. Right now we’re collecting data on caffeine use,” said Nieters.

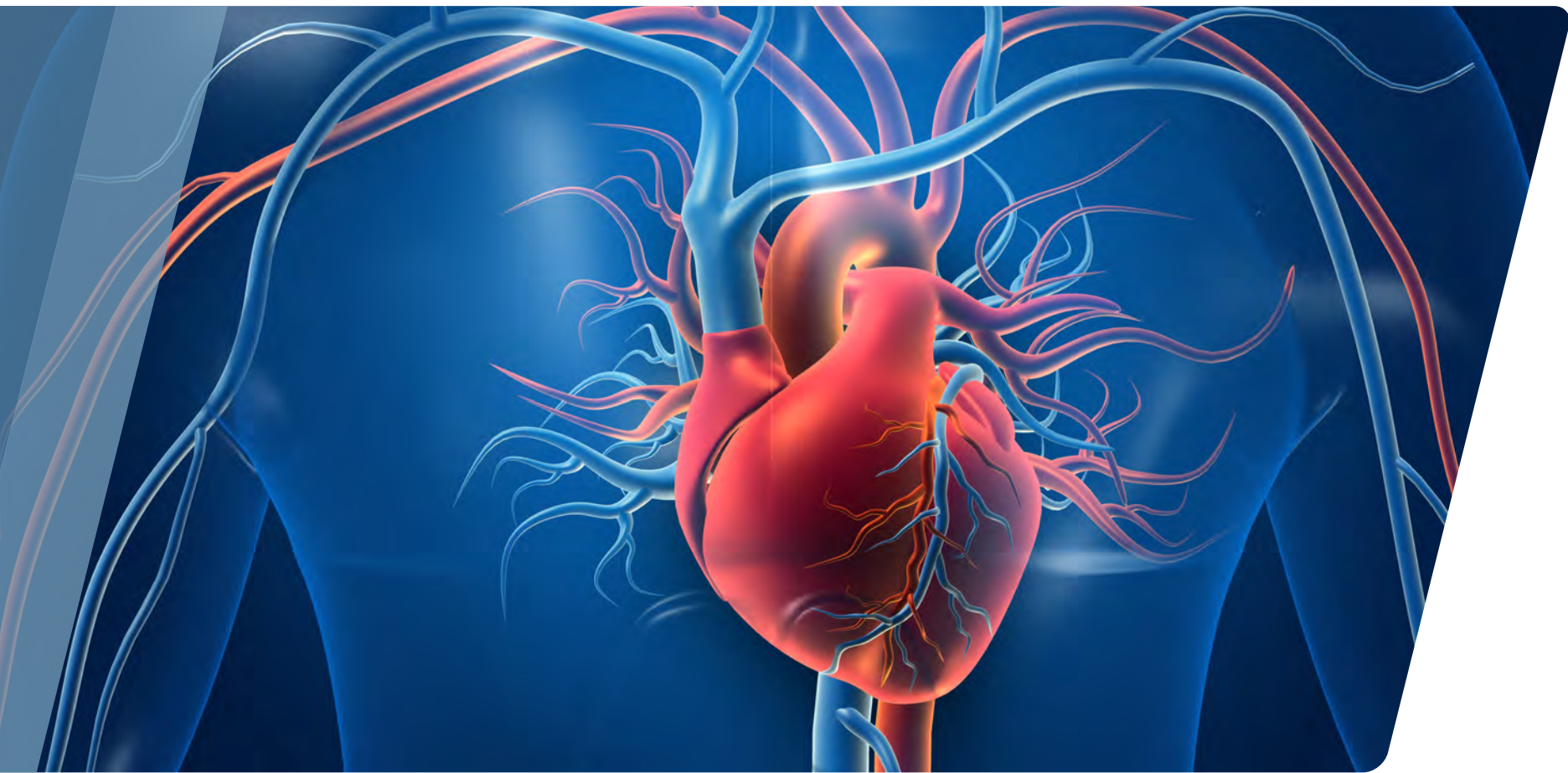
“If they’re interested in changing lifestyle habits, we can help them with that. While we’ve learned a lot about genetics, we still don’t know everything yet,” Goodwin said.

Who should consider genetic testing for inherited cancer risk? The National Cancer Insti-

tute at the National Institutes of Health recommends genetic testing for anyone diagnosed with triple-negative breast cancer, ovarian cancer, pancreatic cancer, colorectal cancer before age 50, metastatic prostate cancer or male breast cancer.

In general, having a family member with a known, inherited and harmful genetic mutation increases a person’s cancer risk and is a signal for testing.

Other red flags are cancers diagnosed before age 50, parents and siblings with the same type of cancer, a family member with multiple forms of cancer, and any immediate family member with breast, ovarian, colon or endometrial cancer, according to the Cancer Institute.



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CONCORD HOSPITAL



Brent Miller, technical operations manager for the laboratory at Concord Hospital, works at a station in the lab on Oct. 24.

Inside the underground lab, robots are running the blood tests

By Roberta Baker
Union Leader Staff

Ever wonder where your blood goes after a nurse or phlebotomist extracts it from your arm?

You probably don't envision a labyrinth of medical technicians working with a battalion of robots to test and analyze human fluids, tissue samples and microscopic disease-causing agents.

Concord Hospital's diagnostic testing laboratory hums round the clock like a busy factory floor.

Inside a high-tech basement room, a plexiglass covered conveyor belt resembling a miniature train track ferries blood tubes to and from automated stations with strategic testing roles.

Some of the robotic equipment looks similar to what you might see in an office or kitchen. A centrifuge that spins vials of blood, separating it into plasma and serum, could pass for a slow cooker.

Sleek, self-contained robotic testers resemble copiers and printers, quietly going about a narrowly focused mission.

This subterranean universe has no face-to-face interaction with patients, but it means the difference between health and disease, and often, life and death.

Roughly 4,000 samples pass through the Concord Hospital Laboratory each day, about 4.1 million each year. Concord Hospital-Laconia annually processes roughly 1.8 million

reportable lab tests. About 160,000 are performed at Concord Hospital-Franklin.

Increasing accuracy and decreasing turnaround time are the goals, and the need is an ongoing given.

"A very high percentage of anyone's medical record is lab results," said Dr. Michael Hitchcock, a pathologist at Concord Hospital and Concord Hospital-Laconia.

"Medical providers couldn't do what they do without our results," said Jan Kimball, head of Concord Hospital laboratories in Laconia and Franklin.

Interviewed in October, Brent Miller, chief of laboratory operations at Concord Hospital's main campus, stood by one of the hospital's latest innovations in diagnostic testing: the Vitek MS Prime, a mass spectrometer that can identify bacteria in real time, sometimes while patients are on the operating table.

"Before, we waited at least a day. For any bacterial disease, we're getting the right bacteria fast," he said.

A machine next in line identifies drugs that can eradicate it.

"The right drug for the right bug," Miller said, instead of an incorrect or less-precise match that might make a patient resistant to multiple drugs.

The mass spectrometer technology indirectly shrinks a patient's length of stay in the hospital and their exposure to other infectious diseases, said a

medical technician in the lab.

The Vitek MS Prime, a bio-typing system, identifies bacteria by a measurement called time of flight.

A laser beam fires down on the unwanted microbes, passing through to a detection shield.

Time of flight is the millions of a second it takes to hit the shield. This varies according to the bacteria's molecular weight, which in turn, identifies the problem bacteria.

"We're getting IDs we weren't getting before," said another technician in the lab.

A yearly census of the bacteria encountered at Concord Hospital each year gives health and medical officials an idea of the strains that are circulating in the region, which change over time.

Across the lab, "instrumentation allows us to do a higher volume at a higher speed," said Miller. The technology inside the machines "is more complex than it used to be," more discerning of minute variations, he said, and conducting the tests with less interference.

Roughly 130 medical technicians spread across different shifts work to ensure quality control, periodically testing the instruments.

Humans also carry out the high-complexity tests that aren't automated.

Universal precautions and protective barriers insulate them from toxic exposure.

"We treat every sample

as if it's potentially contagious," said Miller.

New Hampshire's larger hospitals, including Concord, Elliot and Dartmouth Hitchcock, have automated laboratories that increase diagnostic speed and volume.

STAT testing now can be done within an hour for emergency room patients who require rapid blood testing and quick transfusions.

"The faster we get the results back, the better it is for that patient," said Miller.

Machines measure the data, but humans find the meaning

By Roberta Baker
Union Leader Staff

The lab at Concord Hospital is a giant lattice-work of testing pathways, selected by sample type. Think of a Monopoly board with lots of curves and side alleys to get to the finish.

First, a technician receives bags of blood tubes and other containers sent from the area where blood and urine samples are collected and labeled in tubes and jars with color-coded tops. The specimens are then logged in at the lab, then sent to an inspection module that takes photos of each to confirm the labeling and ensure that the needed tests are run.

The samples then proceed to the appropriate stations where testing machines wait, humming, pumping or silent.

Robotic instruments conduct tests that make up the CBC (complete blood count) and the CMP (complete metabolic panel).

Other screenings can include liver enzymes; vitamin B12; A1C for diabetes; amylase for pancreatitis; and troponin, a cardiac marker that elevates during a heart attack, said Jan Kimball, head of lab operations at Concord Hospital in Laconia and Franklin. Urine tests can detect drugs such as cocaine, THC, opiates and methamphetamine. At Concord Hospital in Concord, the lab also screens for fentanyl.

"We call this section the

core laboratory because most patients who come in have this testing done," said Brent Miller, head of laboratory operations at the hospital's main campus in Concord.

Different instruments at different locations tabulate electrolytes and other markers of health or distress.

An amino acid analyzer harnesses magnetic particles connected to antibodies "that attach to anything you want tested. It measures how much is in your blood based on how much is recovered," said Miller.

Another module screens for Lyme disease and tick-borne pathogens such as babesia, ehrlichia, bartonella and anaplasmosis, which are rare but becoming more common in New England.

In the space of 30 seconds, a robotic cell counter determines how many red and white blood cells were circulating in your body at testing time.

The blood passes through a laser, which shows nuclear membranes and the cells inside, spotlighting abnormalities.

When an abnormal range comes back on an automated test, the blood is tested by a human technician who examines it under a microscope, looking closely at different types of red and white blood cells for imbalances and disease signposts.

In this realm of automated machines with a mission, "The technologist's eyes are still the gold standard," said Miller.

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ELLIOT HOSPITAL

The future of heart medicine is all about imaging

By Roberta Baker
Union Leader Staff

Dr. Vikas Veeranna, an Elliot Hospital cardiologist with an additional specialty in advanced cardiac imaging, is one of a kind in southern New Hampshire and a sleuth when it comes to serious and emerging heart problems.

Heart disease remains the No. 1 killer in New Hampshire and across the country. It has outnumbered deaths from all types of cancer combined since the American Heart Association started tracking.

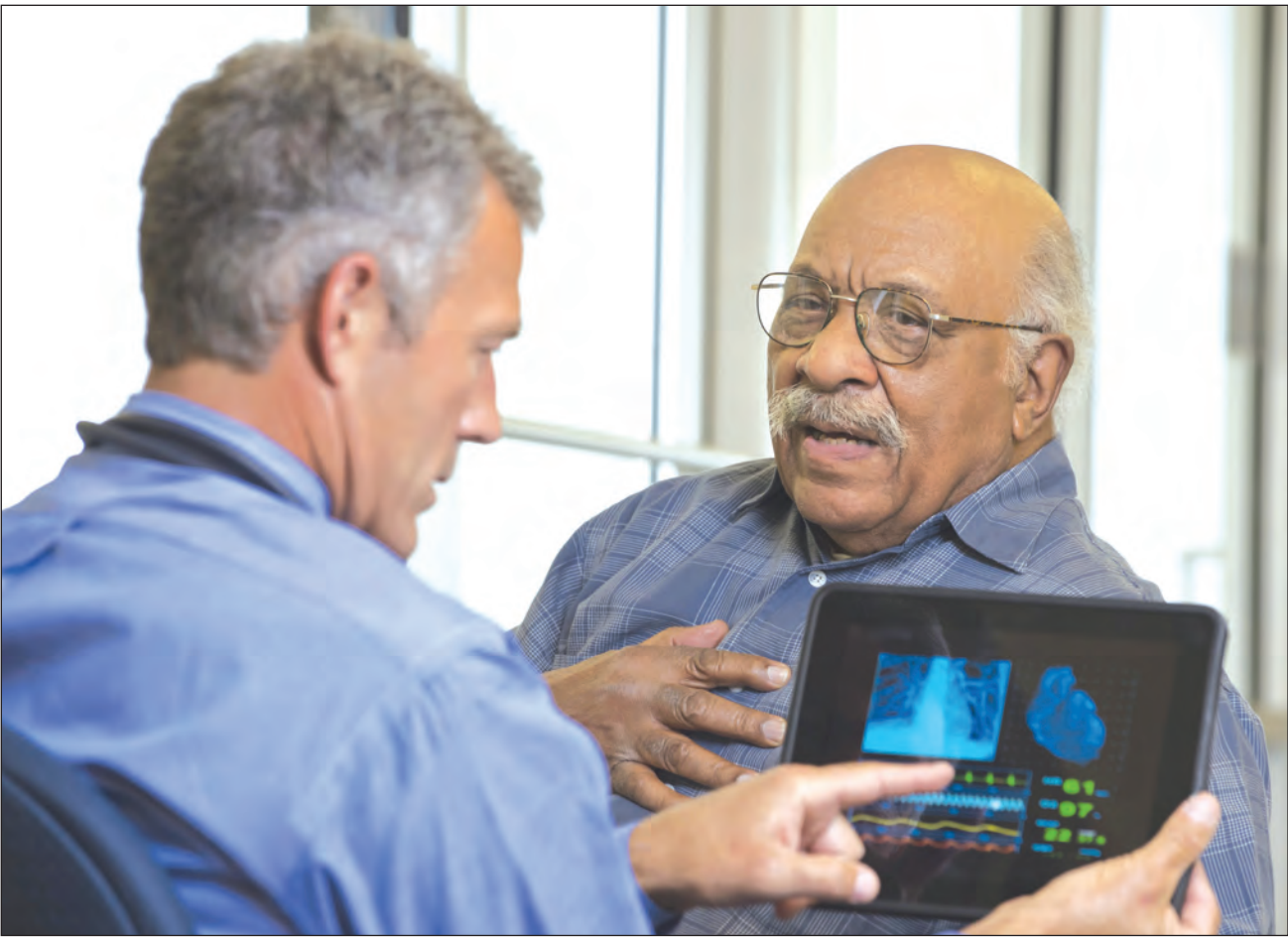
In the Granite State, as people grow older, their chance of heart ailments rises as they accumulate risk factors such as diabetes, high blood pressure, high cholesterol, decades of smoking, obesity, poor diet and sleep patterns, and lack of physical exercise.

Veeranna has a time-sensitive mission. After decades of decline, cardiovascular mortality rates are increasing, particularly in people over 45, according to data cited by Elliot Hospital and national research.

Heart disease accounts for roughly one in five New Hampshire deaths. The numbers are up in younger adults, and heart disease rates in women are now approximately equal to the rates in men.

Veeranna is one of four cardiologists statewide who has been trained in advanced cardiac imaging, which enables heart doctors to detect heart disease earlier before any symptoms appear and irreversible damage occurs.

An array of diagnostic technology, with a heart physician directing and



Heart disease causes about one in five deaths in New Hampshire. While a doctor may start with a stethoscope, imaging tests help provide a clearer picture of heart problems. Elliot Hospital in Manchester now has a cardiologist who specializes in advanced imaging.

interpreting results, makes it possible to intervene earlier and tailor care to the patient’s specific needs, potentially preventing more heart attacks and life-threatening conditions.

Cardiac MRI (magnetic resonance imaging) itself isn’t new, but having a cardiologist who subspecializes in advanced imaging on a cardiac care team is a first for Elliot Hospital and Greater Manchester.

Before Veeranna arrived over a year ago, patients in southern New Hampshire frequently traveled to large, academic medical centers in Lebanon and

Boston for high-resolution imaging and treatment in one place.

About 100 to 150 cardiologists nationwide complete the training in imaging hardware and software each year, but most settle in major urban areas, Veeranna said.

Veeranna’s job begins with a stethoscope. But it rapidly progresses to higher-tech fact-finding methods, such as echocardiograms, cardiac MRI, computed tomography (CT) scans and positron emission tomography (PET) scans.

“Ten to 15 years ago,

these were still in developmental stages, and they were only in larger hospitals and research centers. In the past five years, we’ve started to get these more into community hospitals. But it’s still very limited,” the doctor said.

Advanced imaging cardiologists sit beside medical technicians during patient scans.

“You need the physician trained to give that reading. We’ve entered an era of precision medicine. It’s not cookie-cutter care where one size fits all,” Veeranna said.

His patients present a va-

riety of ailments, including blockages, valve problems and pumping deficits. Some conditions are linked to genetics and activated by risk factors. Often members of the same family are monitored.

“Heart disease is just an umbrella which has so many other aspects,” Veeranna said. Advanced imaging technology “allows us to dig deeper. What kind of disease do you have? What stage is it in? What can be done about it? You’re trying to get into the nitty gritty details of what you need to do to manage that person’s health, It’s

personalized, precision medicine.”

In cardiac MRIs, radio waves and magnetic fields combine to produce high-resolution pictures without radiation.

Cardiac MRIs are the gold standard for assessing heart function, Veeranna said.

They give doctors tissue characterization with clarity “as if you’re looking at heart tissue under a microscope.”

The Heart and Vascular Center at Elliot Hospital performs about 800 to 900 cardiac MRIs each year, he said.

The tests answer pressing questions such as “Did you have a heart attack? Do you have a viral infection or a bacteria in the heart muscle? Is your heart being inundated by abnormal proteins? That’s how specialized this test gets,” Veeranna said.

The technologies have different strategic applications. A CT scan checks for blockages in the vessels that carry the blood supply.

An echocardiogram uses ultrasound technology to examine the heart’s structure and function.

A PET scan injects patients with a nuclear tracer that pinpoints areas of the heart with inflammation or insufficient blood flow.

Advanced cardiac imaging can catch emerging disease and track its advance, including in cancer patients whose medications affect heart function.

“We want to prevent people from getting to the point where they have symptoms,” said Veeranna. “We diagnose early, monitor closely and we make decisions to take care of the problems earlier,” which improves survival and longevity.

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