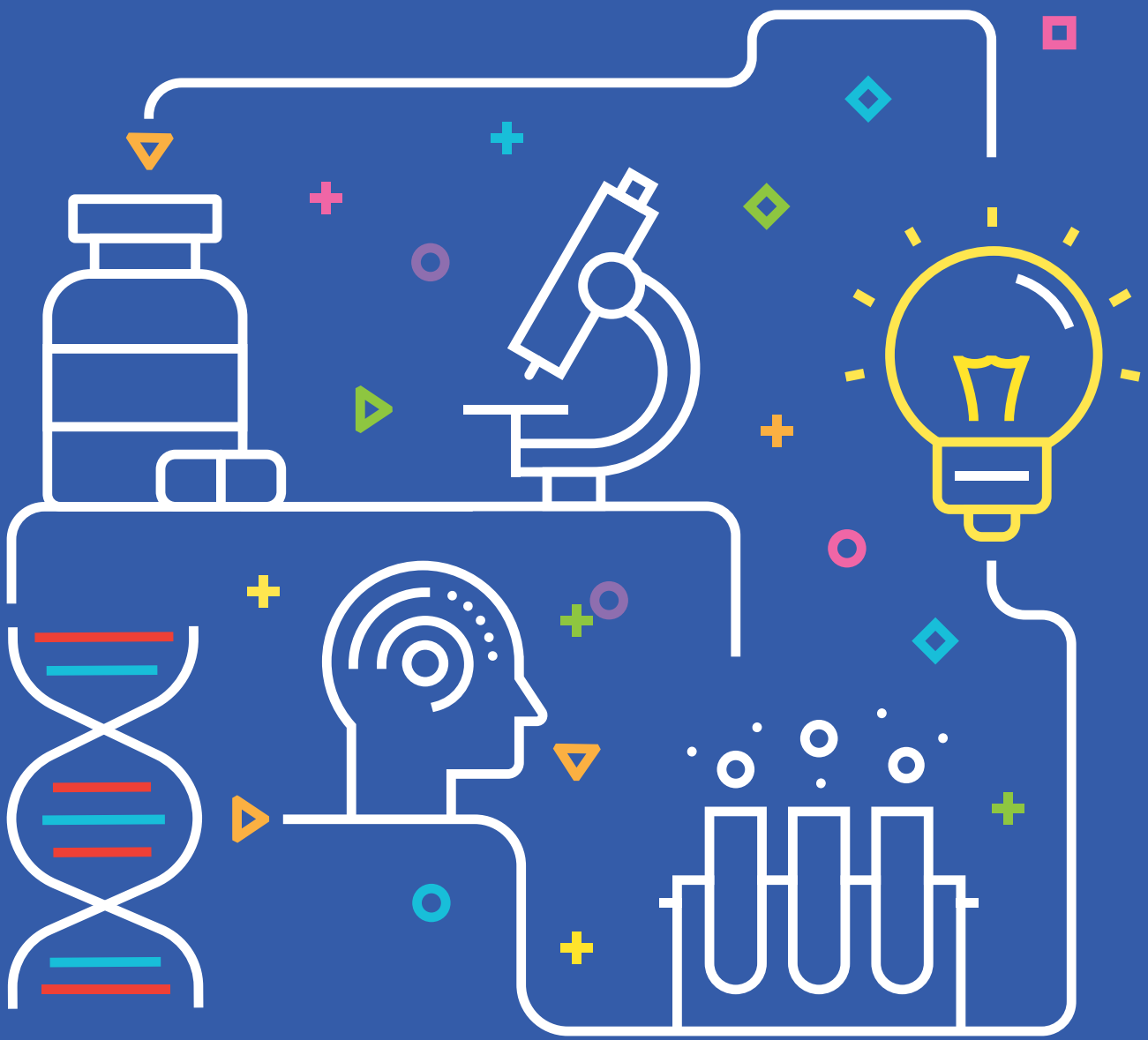
Maine Cancer Genomics Initiative

A Model for Translational Outreach



BY JENS RUETER, MD; JENNIFER BOURNE, MS; AND AMANDA PATTON, MA

The right treatment for the right patient at the right time is the aim of precision medicine. In oncology, identification of actionable biomarkers is increasing the paths to this goal in a growing number of disease subtypes. Advances in molecular biomarkers with U.S. Food and Drug Administration-approved targeted therapies and companion diagnostic tests, growth of treatment paradigm-changing immune checkpoint inhibitor therapies, and the emergence of chimeric antigen receptor T-cell therapy have highlighted the need for clinical, operational, and programmatic changes in cancer care delivery. New knowledge is accruing at warp speed, yet cancer care providers work in real time.

As researchers dive deeper into the nuanced biology of the diseases comprising cancer, the role of biomarkers in diagnosis and treatment expands and precision oncology continues to gain momentum. However, even in the instance of non-small cell lung cancer, which saw clinical guidelines for biomarker testing first issued in 2013 and then updated in 2018, standardizing implementation of these testing recommendations across all care settings is challenging. In a recent article, Pennell and colleagues describe the state-of-the-science and guidelines around biomarker testing for patients with advanced non-small cell lung cancer and the real-world difficulties clinicians face in bringing these into clinical practice.[1] The authors conclude that for the oncology community to more fully integrate these advances, there is a need for:

- Education on biomarkers and biomarker testing for providers, patients, administrators, payers, and policymakers.
- Provider education on how to understand and appropriately apply next-generation sequencing report information.
- Physician champions to spearhead integration of biomarker testing into practice.
- Communication across disciplines with agreed-upon common vocabulary and terminology.
- Access to tests and timely results so that this information can be incorporated into treatment planning.

In Maine, a program that addresses these issues has been underway for several years.

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A Community-Engaged Approach

The Maine Cancer Genomics Initiative (MCGI), a collaboration between The Jackson Laboratory (JAX) and oncology care providers and patients across the state, may be an ideal incubator for a model that engages all oncology stakeholders as partners in advancing biomarker testing and application into practice, increasing access to state-of-the-art genomic testing and to clinical trials.

According to the U.S. Census Bureau, Maine slightly edges out Vermont as the state with the highest proportion rural population (61.6 percent vs. 61.3 percent, respectively).[2] Although residents in some areas of Maine have convenient access to high-quality cancer care at academic medical centers and robust community practices, participation in clinical research is challenging not only due to the state's rural character but also because Maine, with a total population of 1.3 million, is so sparsely populated.[3] Oncology providers in the state already participate in important cancer collaborative research groups and clinical trials. However, JAX, an independent, nonprofit biomedical

Dr. Jens Rueter (L) with participating clinicians at an MCGI Genomic Tumor Board session.

research institution based in Bar Harbor, Maine, wanted to find a way "to harness the power of working in the community, to bring all oncology providers in the state together in collaboration with The Jackson Laboratory, to get more done for cancer care," said Jennifer Bourne, MS, program manager for the Maine Cancer Genomics Initiative.

The MCGI launched in 2016, with patient enrollment starting in July 2017. The first phase of the initiative focused on making genomic somatic cancer testing more accessible across the state. Leveraging the translational resources of the Jackson Laboratory for Genomic Medicine facility in Connecticut, JAX developed a cancer genomics panel. During the initiative's foundational phase (2016-2020), MCGI conducted a study that offered cancer somatic testing to clinicians for their patients at no cost and enrolled almost 1,650 patients. By surveying cancer clinicians and their patients, MCGI aimed to learn from their experience with integrating results of panel testing into practice. MCGI partnered with staff at the Maine Medical Center Research Institute and Center for Outcomes and Evaluation to design the survey instruments for the study and for data analysis.

Nearly all medical oncology practices in Maine—with the exception of the Veterans Administration—are participating in the MCGI. Early on, MCGI staff conducted extensive outreach to the community, traveling to practices and meeting with clinicians to explain the program's goals. Then, in August 2017, MCGI launched its first genomic tumor board program. Bourne credits these ongoing MCGI-hosted meetings with furthering clinician interest in the initiative. The genomic tumor board program is part of the interpretability education component of the MCGI, designed to expand clinician understanding of how the genetic panel test results are interpreted. Prior to the COVID-19 public health emergency, these conferences were held on-site at clinicians' practices. The JAX MCGI team would travel to the providers' site and "review any of the patient test results that the clinician wanted to review," Bourne said. From the start, the conferences included a virtual component and now—as a consequence of the COVID pandemic—are held exclusively via video conferencing.

Education around the evolving science and complexities of integrating genomic testing results into clinical practice is just one component of the MCGI. Operational support is another key piece of the initiative. Integration of rapidly changing clinical advances that necessitate cross-discipline specialists and application of new technologies can be impeded by multi-factorial operational and process-related challenges that impact all oncology stakeholders—patients, providers, payers, and policymakers.

"One of the interesting things about the MCGI study," said Bourne, "is that we have enabled practices in the state of Maine that have no research infrastructure to participate in a human subject protection program-compliant way in this study. What that means is we have a clinical research manager and clinical research associate in our offices who talk to the patients at rural practices who might want to participate in the MCGI study and enroll them on the study. In this way we provide support to enable the practice to be part of the research and ensure that interested participants are able to join the study."

In another example, an MCGI team member coordinates all genomic tumor board meetings. During a 60-minute session, four cases are usually discussed. MCGI staff coordinating the conference manage all of the logistics: scheduling the virtual tumor board, contacting participating practices for potential case submission, coordinating the cases to be discussed, and sending these to the prep team and expert advisers in advance of the conference. The conference coordinator also ensures that all of the technical components needed to run the session are in place and tracks provider attendance because continuing medical education is offered for participation. Typically, the discussion focuses on the results of the panel tests, so imaging is not required. "The exception to that is the neuro-oncology practice. They often send brain scans to incorporate into the discussion as well," Bourne said.

Each genomic tumor board conference includes a clinical trials expert who is prepared with information on any locally available studies for which the patient's genomic test results are a match. "In these sessions, we also have had national, and one international, medical experts in the translational medical oncology area, so treating clinicians are able to have peer consults with key opinion leaders in the field," which brings added value, notes Bourne. MCGI genomic tumor board case presentations are de-identified and any MCGI participating practice can call in to the conferences.

Though gaining buy-in "always takes a little bit of time," said Jens Rueter, MD, Jackson Laboratory Medical Director and Principal Investigator of MCGI, "… we made it very clear that we're doing this to help the clinicians and the patients overall in navigating through very complex genomic information. … I think people saw over time that what we are doing will provide them with value, and they were excited to participate as they recognized that the MCGI is what they want for their patients."

The MCGI was designed based on the needs of the Maine community. "The personalization that we were able to take to the practices by building this group, this alliance, and then getting their feedback about what's it like to integrate these things; I think that's made it exciting in a lot of ways," said Bourne.

MCGI offices are located in the community, in space leased from ACCC member MaineGeneral Harold Alfond Center for Cancer Care. When the COVID-19 virus spread escalated, an unanticipated opportunity for additional collaboration emerged. The Jackson Laboratory, which offers next-generation sequencing, expanded its capability to include COVID-19 testing. A number of the Maine institutions, including some hospitals participating in the MCGI, turned to the JAX for these tests, notes Dr. Rueter, including MaineGeneral. By providing access to COVID-19 testing, the Jackson Laboratory was able to support these programs as they moved to restore elective surgery procedures delayed by the pandemic.

A Model for Translational Outreach

JAX is one of only seven National Cancer Institute-designated cancer centers dedicated to basic and translational cancer research. Scientists at the JAX Cancer Center engage in laboratory research that combines advances in knowledge of human cancer genomics with mouse biology and genetics to ask clinically meaningful questions about cancers with a goal of finding precise genomic solutions for the disease. The JAX Cancer Center extends to two campuses that comprise approximately 50 members with multidisciplinary expertise focused on a single research goal: understanding and targeting the genomic complexity of cancer. MCGI connects to this goal as "a model of what we call translational outreach," said Dr. Rueter. "If you think about it this way—we need to more quickly apply the basic science findings to clinical problems and then take the clinical outcomes back to the bench. The JAX Cancer Center has its programs right at that interface—translational research."

Engaging with community providers is vital, Dr. Rueter believes, because the learning "goes both ways."

As an example, Dr. Rueter explains the JAX Cancer Center's long-standing participation in SWOG and a number of SWOG subcommittees. "In many of these committees, we are providing expertise in the mouse modeling of diseases. On the other hand, the MCGI is represented in SWOG within the Cancer Care Delivery Committee. We are contributing to discoveries at the last step in the translational process—implementation in the clinic."

"We don't have Phase I, II, and III clinical trials, but we have a strong foothold in the basic translational world, and we also have now a growing footprint in the ultimate translation, which is integration into practice," said Dr. Rueter. As a next step, the JAX Cancer Center is working on a study proposal that would "apply a rigorous clinical trial to an MCGI-type model. Within the SWOG framework, we want to use that approach toward really a rigorous evaluation of what actually works and what doesn't work so that we can bring that whole field of precision medicine forward."

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For translational research institutions "it's important to know what the clinical problems are that we are trying to address, and what we can do to impact those problems and what are the effects of that intervention? Just because we are providing [genomic] testing, for example, doesn't mean that it is ultimately positively impacting patient outcomes. We need the feedback from the community on what works and what doesn't work. At the same time, the clinical community also needs to know what are the newest trends in the discovery process? What are the new data that are coming out and how should I be re-thinking my practicing conventions, and how do I need to adapt to deliver the best possible care to my patients?"

As the field of precision oncology moves forward "to deliver the best care, all the components have to work hand-in-hand.

You need the right biomarker, you need the right drug, you need the right study design to understand the implications of both of them, and then apply it to practice."

With MCGI's genomic tumor boards, Dr. Rueter believes that JAX is on the right track "because we are trying to address a core issue that is not ours alone. Everyone is grappling with the question of how do you best present complex data, in a format [for clinicians]? How do you organize this so that people actually show up and can participate? And then, what are the outcomes and how do we address the remaining questions."

In October 2020 the MCGI team moved into the next phase of work with the Maine oncology community. The focus will be on accessibility of cancer genomic testing, supporting clinicians with interpretability of results and actionability in precision oncology. The MCGI team will expand efforts to make access to more treatments and clinical trials possible while continuing to facilitate regional access to cancer genomic testing. OI

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2. U.S. Census Bureau. Geographic areas and rural data. Available online at: gis-portal.data.census.gov/arcgis/apps/MapSeries/index.html?appid=7a41374f6b03456e9d138cb014711e01. Last accessed October 21, 2020.

3. U.S. Census Bureau. Maine. Available online at: data.census.gov/cedsci/profile?g=0400000US23. Last accessed October 21, 2020.

MCGI Participating Oncology Programs & Practices in Maine [as of 12/2020]

- Harold Alfond Center for Cancer Care, Augusta*
- MDI Hospital Oncology and Infusion Therapy, Bar Harbor
- MaineHealth Waldo County General Hospital Oncology and Infusion Therapy, Belfast
- Northern Light Cancer Institute, Northern Light Eastern Maine Medical Center, Brewer*
- Cancer Care at Midcoast Hospital, Brunswick
- Pines Hematology/Oncology, Cary Medical Center, Caribou*
- Northern Light Cancer Care at Northern Light Maine Coast Hospital, Ellsworth
- New England Cancer Specialists, Kennebunk
- York Hospital Oncology & Infusion Care, Kittery
- Hematology-Oncology Associates at Central Maine Healthcare, Lewiston*
- St. Mary's Center for Cancer & Blood Disorders, Lewiston
- MaineHealth Stephens Memorial Oncology Clinic, Norway
- Northern Light Cancer Care at Northern Light Mercy Hospital, Portland
- Northern Light Cancer Care at Northern Light AR Gould Hospital, Presque'Isle
- MaineHealth Cancer Care Center York County, Sanford
- New England Cancer Specialists, Scarborough*
- Maine Medical Partners Medical Oncology, South Portland
- New England Cancer Specialists, Topsham
- York Hospital Oncology & Infusion Care, Wells
- York Hospital Oncology & Infusion Care, York

*ACCC Cancer Program Members