

CASE STUDY

PRECISION ONCOLOGY AT AURORA HEALTH CARE

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INTRODUCTION

Precision oncology involves the utilization of a patient's unique genetic makeup, as well as the genetic information of the patient's tumor, to identify the most accurate and effective course of treatment for an individual (1). As Leading Health Systems look for ways to improve quality while making care more personalized and efficient, many are recognizing the opportunities around implementing precision medicine within oncology.

KEY FINDINGS

- A key feature of precision oncology at Aurora Health Care is the Oncology Precision Medicine (OPM) Clinic, a central location to which providers across the entire health system can refer patients to coordinate the precision medicine process, including education, testing, and recommendations by the Molecular Tumor Board (MTB).
 - Through the OPM Clinic, Aurora created standardized and centralized processes for precision medicine approvals, ordering, and testing, helping to streamline operations and reduce financial waste and unnecessary utilization.
- Oncology leaders at Aurora recognized the benefits of implementing a precision medicine software solution to facilitate the utilization of molecular panel data, ultimately implementing the Syapse Precision Oncology solution.
 - A core factor of the decision to implement the Syapse solution was access to the Oncology Precision Network (OPeN), a network of multiple health systems across the country sharing de-identified data to create a massive database of clinical oncology data and outcomes.
- Since launching the precision medicine program and OPM Clinic in early 2017, the program has seen approximately 150 patients in the first year, far exceeding the initial expectation of 50 patients.

PRECISION ONCOLOGY AT AURORA HEALTH CARE

AURORA HEALTH CARE

Aurora Health Care, based in Milwaukee, Wisconsin and spanning across eastern Wisconsin and northern Illinois, is a not-for-profit integrated provider and, with an annual revenue of over \$5.2 billion, one of the largest health systems in the United States (2). Comprised of 15 hospitals and over 150 clinics, Aurora touches more than 1.2 million unique patients through 8.8 million patient encounters annually (2). Employing 33,000 caregivers – including 1,800 physicians – Aurora Health Care is the largest private employer in Wisconsin (2, 3).

Highly focused on community benefit, Aurora is dedicated to improving access to quality, patient-focused health care for the populations it serves. Additionally, with over 700 clinical research projects and over 400 clinical trials, Aurora's emphasis on teaching and research helps to improve quality of care and community health (3).

ORIGINS OF A PRECISION MEDICINE PROGRAM

A high priority of the Oncology service line at Aurora has been to develop a vertically integrated program in which patients receive consistent, evidence-based care regardless of where they enter the program. As leaders within Oncology recognized the field was rapidly progressing toward the increased utilization of molecularly-based treatments, and with the program's emphasis on evidence-based care, it was a natural transition to move into precision oncology. Additionally,

leaders at Aurora recognized implementing a precision medicine program could have significant clinical impact, potential for improved outcomes, and more effective and targeted treatments for patients, and by moving early, Aurora could establish itself as a leader in this space. The development of a precision medicine program was not only aligned with Aurora's clinical mission to provide the best care possible, but also with the system's emphasis on patient-focused care and personalized medicine.

“This is a broad palate of services that any mature cancer program should be offering. It's the right treatment, for the right patient, at the right time.” – Dr. Jeff Bahr, Chief Clinical Officer and President, Aurora Health Care Medical Group

The vision for the precision oncology program originated with leadership within Oncology, who built a case to present to senior leadership for approval. In building their case, Aurora's Medical Oncology Executive Committee, the advisory committee for senior Oncology leadership, advocated that precision medicine could open doors for advanced patients with reasonable performance status and improve care. Additionally, recognizing that precision medicine testing and treatment is expensive, the development of a standardized program would define which candidates would be selected for treatments, thereby controlling costs associated with the program. Aurora had already implemented standardized clinical care pathways, utilizing Via Oncology; however, leaders noticed oncologists would order molecular panel testing and would then receive large sets of data and information that they may not have the expertise to utilize effectively. The creation of a standardized and centralized precision oncology program and clinic would help to alleviate this issue.

After advocating the clear clinical benefits as well as the potential operational and financial benefits, Oncology leaders received approval for the development of a precision medicine program from C-suite leadership and precision medicine was named the number one priority for the Aurora Health Care Medical Group in 2017. Recognizing the speed at which the field is moving, and with full approval of Oncology and the Medical Group, the program was expedited, approved outside of the normal 18-month budget cycle, and funded as a project from the Office of the CEO. Reflective of the high priority level of the program and the connection to the Office of the CEO, there is significant visibility and interest from Aurora's C-suite leadership and Board of Directors, who commonly receive updates on the program via a dashboard with key metrics.

“We understood [precision medicine] is the future of medical oncology, and felt strongly that we wanted to be a leader rather than a follower.” – Dr. Jim Weese, Vice President, Aurora Cancer Care

IMPLEMENTING PRECISION MEDICINE AND THE DEVELOPMENT OF THE ONCOLOGY PRECISION MEDICINE CLINIC

The precision medicine program at Aurora is centered around the multidisciplinary Oncology Precision Medicine (OPM) Clinic, located in the Vince Lombardi Cancer Clinic at Aurora St. Luke's Medical Center. The OPM Clinic is a central location to which providers across the entire health system can refer patients to coordinate the precision medicine process, including education, testing, and recommendations by the Molecular Tumor Board (MTB), a multidisciplinary body comprised of oncologists, pathologists, pharmacists, genetic counselors, radiologists, research coordinators, and cancer nurse navigators that evaluate a patient's specific genetic results and offer treatment recommendations for each individual case (4).

Operating as a full-service precision medicine resource for oncologists, the OPM Clinic will see the referred patient and handle all aspects of the precision medicine process and communicate all information and recommendations back to the referring oncologist for treatment. Alternatively, oncologists may conduct testing themselves and send the results to the MTB for review

and recommendations. The MTB recommends treatment utilizing a hierarchy of evidence, following the guidelines jointly established by the American Society of Clinical Oncology (ASCO), the Association for Molecular Pathology (AMP), and the College of American Pathologists (CAP). This tiered system categorizes evidence by clinical significance, allowing oncologists to understand the level of evidence that is supporting the treatment recommendations provided.

“Our goals were to ensure that we offered precision medicine care to appropriate patients through streamlined, system-wide workflows, and to increase the knowledge of our provider staff around precision medicine and its potential impact to their patients.” – Jennifer Godden, Co-Director, Oncology Precision Medicine Program

As Oncology leaders at Aurora began developing the precision medicine program and OPM clinic, internal guidelines were established around which patients it is appropriate to use genetic testing and the precision medicine team was given the authority to deny testing where not appropriate to streamline operations and reduce financial waste. An important consideration in developing the program was the cost of testing and treatment for precision medicine, as health systems across the country are experiencing significant financial pressures and are looking to control the total cost of care. Aurora aimed to develop a better organizational understanding of what tests were being utilized and ensuring resources are being used appropriately. With this in mind, Aurora’s OPM Clinic also developed standard processes for approvals, ordering, and testing.

Aurora encounters nearly 8,000 “new analytics case” cancer patients annually and more patients in follow-up; however, the OPM Clinic does not take on every cancer patient that enters the health system, instead targeting those patients who have exhausted all other treatment options, do not have other treatment therapies available for their specific cancer, and/or are candidates for clinical trials. This selective process allows the OPM Clinic to give the appropriate level of personalized care and attention to patients that would benefit from precision medicine and helps to prevent unnecessary utilization. Initially uncertain about uptake, the OPM Clinic has experienced positive feedback and high levels of engagement from oncologists.

In order to optimize precision medicine and facilitate the management and analysis of molecular panel data, Oncology leaders at Aurora recognized the benefits of implementing a precision medicine software solution. A common challenge in precision medicine is oftentimes molecular panel data from genetic testing is returned as a PDF file, making it difficult to interpret, analyze, integrate, or utilize effectively. The implementation of a precision medicine solution would allow raw molecular panel data to be integrated into Aurora’s EHR, thereby allowing easier access to and interpretation of results, extract data, and track long-term trends.

Key criteria evaluated when selecting a solution was the ability to integrate molecular data into the EHR, interoperability with Aurora’s IT systems and data warehouse, ability to be test agnostic or intake molecular data from disparate labs or tests, ability to do clinical trials matching, and ability to share data across a network. Based on the key criteria, with the approval of Aurora’s senior leadership including the Medical Group President, CFO, COO, IT leadership, and Office of the CEO, Syapse Oncology was selected as an IT component of Aurora’s precision medicine solution.

A crucial benefit of the Syapse solution was access to the Oncology Precision Network (OPeN), a network of multiple health systems across the country sharing de-identified data to create a massive database of clinical oncology data and outcomes. Other members of the OPeN Network include Intermountain Healthcare (Salt Lake City, UT), Stanford Healthcare (Stanford, CA), and Providence St. Joseph Health (Renton, WA). A Primary benefit of the OPeN Network is access to clinical data

“Ideally all precision medicine testing across the US would be included. Despite coming from very different sites – with different doctors, tests, and systems – the data is similar in what people are seeing. There are striking similarities. As we build this out, that’s where the power is.” – Dr. Mike Thompson, Medical Co-Director, Oncology Precision Medicine Program

around treatment outcomes at a larger scale, which informs treating oncologists about treatments that have or have not worked with the same cancer type. Currently, there is a fairly significant lag time between seeing a clinical result and publication. Additionally, publication is especially difficult if sample size is small (n=1) or the result is negative (i.e., a treatment did not work for that specific cancer). However, these results are still useful for practicing oncologists who are looking for alternative treatment options for patients who may not have responded to traditional treatment or have a rare cancer type. The OPeN Network compounds the databases of multiple health systems, informing evidence-based medicine. The implementation of Syapse and access to the OPeN Network will help support clinical decision making and is a differentiator for Aurora in their market.

Initial challenges in the implementation of the Syapse solution included the inability to handle the volume of historical data Aurora was sending. Working together to streamline data integration efforts, and by optimizing the initial cohort, Aurora and Syapse were able to integrate data from oncology patients for the last two years as well as current patients. Integrated into Aurora's Epic EHR through one-click sign on, molecular data will be available directly from the patient record. Going live at the OPM Clinic in late 2017, currently the solution is being used only by the OPM Clinic staff. Oncology leaders plan to give access to Syapse to all oncologists once the solution's capabilities are fully implemented.

“The technology plays an important role in the operations of the clinic. We are looking to use the data, in conjunction with our broader cancer data warehouse, to measure outcomes, costs, and benefits.” – Levi Citrin, IT Business Consultant

Once the solution is fully deployed, Oncology leaders hope to be able to use the software to automate MTB case preparation, which involves abstracting a patient's case history and molecular data history for presentation to the MTB. Automating this process will help streamline operations, improve efficiency, and save time for OPM Clinic staff. Additionally, Oncology leaders anticipate utilizing the similar patients functionality – in which one can compare data between similar patients – to compare molecular data as well as treatment and outcomes data. Furthermore, Aurora hopes to integrate data into its data warehouse, to align with broader cost and quality information as well.

RESULTS AND THE FUTURE OF PRECISION MEDICINE AT AURORA

When launching the precision medicine program and OPM Clinic in early 2017, Oncology leaders aimed to see 50 patients within the first 12 months. Thus far, the program has been highly successful and will have seen approximately 150 patients in the first year, far exceeding expectations. In 2018, Oncology leadership and the OPM Clinic team hope to continue to grow the program and treat patients, fully deploy the Syapse solution, utilize data sharing, and begin tracking metrics to measure effectiveness and outcomes.

Metrics that will be useful in measuring success include patient volumes and outcomes, including the number of patients treated, number of biopsies performed and orders for molecular profile based treatment, number of patients in clinical trials, clinical outcomes, and the proportion of patients that were benefited from molecular profiling. Additionally, Aurora hopes to utilize this data to do large scale research.

Leaders at Aurora are also looking to track financial metrics to calculate an ROI on the precision medicine program. Oncology leadership is working with Financial leadership at Aurora to help calculate this, taking into account the number of patients that have actionable genetic markers, as well as spin off revenue generated from precision oncology (e.g., biopsies, additional testing, etc.). A more difficult metric is the value of doing the right thing for the right patient at the right time.

Lastly, and most importantly, Aurora is evaluating the benefit to patients and to the provider oncologists. Patient outcomes, survivorship, and quality years following treatments are all metrics Aurora is hoping to track. Additionally, as the pace of healthcare changes so quickly, providers can experience symptoms of burnout due to the pressure to keep up. Oncology leadership at Aurora views the precision medicine program as a means to help reduce oncologist burnout by providing a more collaborative

process by which to systematically evaluate data around a patient and offer a consultative summary and recommendation of treatments. Additionally, both the oncologist and patient can feel assured that all potential treatment options have been explored and the patient is receiving the best, evidence-based treatment available for their cancer.

“ We had no idea what the uptake was going to be. After the first [OPM Clinic] meeting, we saw many oncologists that had patients they didn’t know what to do with – they were happy to have somewhere to send them. It burns people out to see people you don’t know what to do with. Oncologists have found this rewarding and it provides patients comfort knowing we have done all we can. That’s hard to get an ROI on.” – Dr. Mike Thompson, Medical Co-Director, Oncology Precision Medicine Program

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METHODOLOGY

In January and February, 2018, The Academy conducted in-depth telephone interviews with five executives at Aurora Health Care around the decision-making process, implementation, and impact of a precision medicine program in oncology. The Academy thanks the following individuals for their participation in this project:

- **Jeffrey Bahr, M.D.**, Chief Clinical Officer and President, Aurora Health Care Medical Group
- **Levi Citrin, J.D.**, IT Business Consultant
- **Jennifer Godden, Pharm.D, BCOP**, Co-Director, Oncology Precision Medicine Program & Pharmacy Clinical Coordinator, Oncology Pharmacogenomics
- **Michael Thompson, M.D., Ph.D.**, Medical Co-Director, Oncology Precision Medicine Program
- **James Weese, M.D., FACS**, Vice President, Aurora Cancer Care

The purpose of this report is to provide an example of successful development and integration of a precision oncology program, identify the process and impact of adopting a precision medicine solution in oncology, and highlight the challenges and successes experienced by Aurora Health Care in their program development and implementation thus far.

None of the participants listed above shall derive any personal profit or gain through participation in this case study. No participants reported a conflict of interest in participating in this case study.

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The Health Management Academy (The Academy) is a membership organization exclusively for executives from the country's Top-100 Health Systems and most innovative healthcare companies. The Academy's learning model identifies top priorities of health system leaders; develops rich content based on those priorities; and addresses them by convening members to exchange ideas, best practices, and information. The Academy is the definitive trusted source for peer-to-peer learning in healthcare delivery with a material record of research and policy analysis. Offerings include C-suite executive peer forums, issues-based collaboratives, leadership development programs, research, advisory, and media services. The Academy is an accredited CE provider. More information is available at www.academy.net.

SYAPSE

Syapse is on a mission to deliver the best care for every cancer patient through precision medicine. Our software platform, data sharing network, and industry partnerships enable healthcare providers to bring precision cancer care to every patient who needs it. By bringing together leading healthcare innovators into a unified ecosystem, we are working toward a future in which all cancer patients have access to the best personalized care, regardless of location or income. Our customers—including Intermountain Healthcare, Providence St. Joseph Health, Henry Ford Health System, Aurora Health Care, Catholic Health Initiatives and Dignity Health—manage one million active cancer cases at nearly 300 hospitals in 25 states. Headquartered in San Francisco, Syapse is backed by investors including Social Capital, Safeguard Scientifics, Ascension Ventures, GE Ventures, Intermountain Healthcare Innovation Fund, Merck Global Health Innovation Fund, Medidata Solutions, Roche Venture Fund, and Amgen Ventures. For more information, visit syapse.com.

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