# HEALTHCARE AT HOME: THE ROWAN TECHNOLOGY REPORT

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## Hospice As The Hub: Acclivity's Vision for a New Care Model with AI

*by Darcey Trescone, RN, BSN*

Population health is a relevant topic in our space, and there are technology providers that are taking it a step further with machine learning and artificial intelligence (AI). I had the opportunity to meet with Jeremy Powell, CEO and Founder from Acclivity Health Solutions to discuss their vision for the post-acute space and how they are utilizing data to support that vision.

## You talk about coming from the acute care space. Can you elaborate?

Our initial work was around acute, integrated delivery networks. We have always been in technology, with an understanding that healthcare is rich in the kind of data that it creates. The ability to express that data where it's most needed is at the point of care. For just shy of 20 years, the core Acclivity team has been incredible at uncovering sources of data and building workflows that help make better outcomes possible. We give a care provider access to relevant input from other sources to support them in making better treatment decisions. So, at scale, we were helping hospital systems perform better. A good example was in the acute systems' emergency departments. We knew that knowing what that provider in the emergency room couldn't know would be invaluable to them if we could broadcast it. Even if a patient was brought in comatose or unconscious, we could provide access to their medications, allergies, medical history, etc. Our goal in that venture was to support the medical community with knowledge about that patient, so the first therapy applied would be one known to be safe with what was already in the patient's history.

# Where does the data in the Acclivity system come from?

The data from Acclivity comes from EMR systems, clinical aggregation solutions like Clinically Integrated Networks (CIN), Health Information Exchanges (HIE), administrative and financial information from claims/benefit systems, and other augmented data sets like case management, population health, and analytics tooling, as well as pharmacy benefit and Durable Medical Equipment (DME) data. Parts of what we were always constructing were these composite workflows built upon data that was resident throughout big swaths of the United States, including commercial hospital systems and large government entities like Indian Health Services and the VA. Outside the United States, we utilized data from the Ministry of Health in Canada or the National Health System (NHS) over in England or Scotland. As an example, knowing someone has a hospital bed and is being treated for bedsores is one mechanism for us to understand the palliative performance scale from an ambulatory status perspective. We scale capabilities from this data to really drive significant improvements in clinical outcomes.

# Why is Acclivity interested in transitioning to the post-acute healthcare space?

Our interest is twofold. It is personal, and it is our mission. Most everyone who finds his way into post-acute health has a personal story as a catalyst.  Our founding team includes a Vanderbilt Fellow Palliative care clinician. We've been close for many years.  During her Palliative Fellowship, she learned her father had a terminal illness. She got to be both the daughter and the doctor managing the last corridor of life for him. What we learned on that journey was that what we had built over the course of 20 years was most aligned with the sickest of patients outside of the hospital. It is the patients who often find themselves unable to get to appointments who make use of inappropriate emergency visits or unwanted services because it's the only way they know to get relief.

In the post-acute space, a home care, hospice, or palliative care clinician could come to the patient's home to treat and identify other needed services. This paradigm is underutilized. What we do well is aggregating data and then providing workflow and insights to the care team - insights that make the patient's needs more obvious, triggering earlier referrals to the post-acute community before an acute hospital episode occurs. The patient then gets what you would expect from healthcare: high quality care with better outcomes at the lowest cost.

# How do you utilize data to drive better outcomes at the lowest cost?

Healthcare delivery is regional, almost down to the zip code, so there is a wide range in the opportunity to achieve savings. We have seen costs from $4,500 per death to $45,000 per death and it really depends upon the attitudes toward health that a region might have about how they access and utilize healthcare. We believe that when you apply the principle that puts medicine before financial the financial savings will follow.

Acclivity is in the triad that is between the patient, the patient's family, and the provider. These three constituents consistently receive the most valuable outcomes from us, and they welcome us back over time and often. What that allows us to do is to really understand where patients are on their healthcare journey.

We think of it as a journey as all of us are typically in a wellness state, and then we might get a chronic condition, like hypertension, that can be managed with medication. The medication puts us back in a wellness state. Later we might get a CHF or COPD diagnosis, and we are now moving up

into the complex state, so we become a different patient type. Certainly, when we move beyond complex into acute and end of life, we are very different than what you would expect – from a healthcare access and utilization perspective – than a wellness patient.

What our solution has been built to do is to know where a patient is on his or her healthcare journey, what familial support they have, what community they have and what parts of the provider community make up access and utilization potential for them. We apply logic that helps the care provider, without bias, understand what the likely best clinical outcome is and what healthcare utilization is recommended to achieve that outcome.

## You've built this system on AI and machine learning?

Though the principles of AI and Machine learning are over 5 decades old, AI and Machine Learning, as applied to healthcare needs, are early sciences, and there are incredible outcomes ahead of us. All of us in this world of machine learning and AI are on the leading edge of that work. What we see that this technology provides us is the removal of bias. As an example, we have found that providers, who are referring entities for hospice, overestimate longevity of prognosis by a multiple of 5. Machines do not have this bias. The model analyzes the data, and it learns based upon previous outcomes. The machine model doesn't have the bias related to having to have a difficult conversation or to describe to a person they are in the last corridor of life. This kind of thinking creates a phenomenon that delays referrals to hospice in many populations. In a machine learning model those things go away, but that is only a small part of what any system should be doing.

We leverage our own built-in-house machine learning model for prognosis, but we also leverage analytics that have been hardened for 30 years that utilize regression algorithms. We know we must give more than just one data type and more than one response from an insight perspective. We give providers the ability to be guided through what they recognize as good clinical decision support, based on data, without them applying machine learning as a first step.

For example, I'm in a patient record of a Caucasian, 75-year-old male with seven different hospital dominant conditions. I can click a consultation button to see what the typical outcomes are for patients of the same age, gender, ethnicity, and with the same conditions in my instance of the data around my market.  I can open the lens and look at patients across the region or nation.  And I can look at the total benchmarking population against the Acclivity book of business, which today is over 1.5 million patient lives. What is presented is a pie chart that shows some portion of the population lived beyond 3 years, some less than 12 months, some less than 6 months, and some less than 3 months and some less than 1 month.  That information is helpful.  To make it complete, we need to apply our machine learning outputs.

The machine learning model we have developed predicts prognosis to 3-month intervals at greater than 90% accuracy. Once the provider sees the accuracy of the model, she will choose to apply machine learning within the system to get a prognosis for her patient as part of her normal workflow.  This will highlight the pie piece that the model predicts for the patient of record. As a second step, with a simple click of a button, the tooling identifies community providers that might engage the patient and family for services related to in-home care.  Our customers refer directly to hospice, palliative, transition/bridge programs, and emerging programs like "Living with Cancer" or "Live Well."  These emerging programs further patient outcomes by supplying them with a comprehensive evaluation, treatment recommendations to manage complex pain and other symptoms such as respiratory distress and anxiety, assistance to achieve patient-identified goals of care, and care coordination across all providers on the patients' care teams.

# So, you are teaching the providers to trust and work with machine learning gradually?

We think you must. We are of the opinion, having grown up on the acute side dealing with very complex patient scenarios, that the closer you can get to the tip of the sphere where providers make clinical decisions the better the outcomes are. It's about evolving with them as they evolve their own thinking and their practice.

We will strive to achieve 100% accuracy in predicting prognosis through data or machine learning. We know that there will always be outliers that beat prognosis models and miraculous journeys that occur. What we want to be a part of is this: as providers learn that the system is smarter than they thought it was, they will eventually rely on it for cases that they don't have a good set of therapies in mind for. Instead of running patients through horrific clinical oncology trials in the last 6 months of life - trials that often don't change the trajectory of the disease - providers will decide to monitor symptoms as a measure of outcomes and prognosis. That is what we think we can do for medicine over time. The vast majority of value-based programs are incentivizing this idea through reimbursement paradigms that align to care outcomes versus volume of procedures. Our tooling is ready-made to support our patients, families, and clinicians through this evolution.

# What is your vision for hospice?

We made an early decision in our business to tie ourselves to hospice because that healthcare sector specifically has built incredible infrastructure around telephonic support, an interdisciplinary approach using nursing, chaplaincy, social work, and allied health staff that can align to whatever (and whenever) a patient has as a need. Benefits focused on the spiritual, physical, emotional, and psychosocial needs of a patient will become medicine at large, and it is a mechanism to drive out high facility costs associated with many parts of today's healthcare system.

We believe hospice will become a hub for the way that care gets delivered and their services will continue to expand. Palliative medicine is already a focus, and we think that hospice will continue to provide more services in the home and evolve to offer a larger variety of patients access to service. Other care entities will become the spokes of the wheel as hospice works with keeping complex patients independent as long as possible, allowing them to age in place.

To date, there are services that an organization with the infrastructure of a hospice and palliative business could bill for that would pay for much of this innovation. With existing staff in hospice there are services that could be provided, including chronic care management, transitions of care, behavioral interventions, and advance care planning, to name a few, which net about $500-$600 per month per patient.

Our world view is that hospice is the hub. The spokes around that hub include primary care, ACOs, and health plans that receive tremendous value from aligning into these "Connected Communities." All the organizations participating provide data to truly collaborate, and that collaboration leads to significant, incremental revenue. In our work to date, a single provider on the platform can net about a million dollars of incremental revenue per quarter as a result. When that starts to occur, the providers start figuring out new ways to collaborate to deliver the best medicine for their markets in our connected communities.

About Acclivity Health Solutions

Acclivity Health Solutions provides the platform for connected care communities focused on patients with advanced illness.  Using the Acclivity platform, healthcare providers are able to securely connect and collaborate with various disciplines in the care team to provide appropriate and timely

services to their shared patient population while meeting the requirements of value-based care.  For more information, please visit www.acclivityhealth.com.