

CASE STUDY

# Machine-Learning-Driven Engagement Campaign Drives Cardio Appointments and Revenue

Actium Health's AI approach helped Virtua Health boost revenue 130% and improve more patients' heart health.

KEY OUTCOMES



Machine learning from local data

Providing enhanced visibility into Virtua's patients, and the ability to detect care needs that would have been missed with national training data.



Data-driven outreach

Delivering relevant communications to the right patients increased the likelihood high-risk patients would book a cardio-related appointment.



Increased access and revenue

Driving high-risk patients who received the engagement messages to book more appointments — ultimately generating \$800,000 in revenue.

# Traditional Methods Fail to Identify Cardio Needs

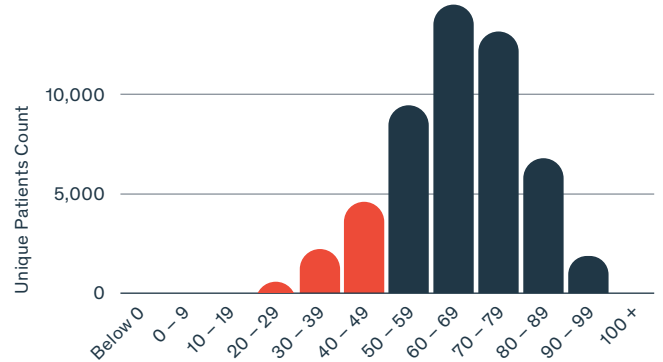
Cardiovascular diseases are the number one cause of death, yet conventional segmentation misses people who need engagement for heart services.

For instance, outreach using “age greater than 50” naturally excludes thousands of people below 50 who are also at high risk. Other filters, such as past encounters, biomarkers, or demographic lifestyle markers, compound the problem.

Healthcare needs are too complex to be represented in simple slices and data filters.

As shown to the right, filter-based approaches in cardiology (and other services) can exclude thousands of people who need services. This can significantly impact patient well-being and service line revenues.

**MODEL RISK BY AGE**



Thousands of patients below age 50 are at risk

## AI/Machine Learning Approach

With these challenges in play, the marketing leaders at Virtua Health — an award-winning comprehensive community healthcare system comprising five hospitals and 270+ locations in South New Jersey and Philadelphia — knew that driving access demanded a far more nuanced approach.

They selected Actium for this approach because of the ability to use data science to identify patients in need and

report on the results. Also, Virtua Health had previously seen impressive results when partnering with Actium to identify and engage patients at high risk for breast cancer. Virtua Health’s breast cancer screening campaign impacted the lives of more than 1,300 patients, and the health system was optimistic that Actium could help drive similar results for cardiology patients.

## How Does This Work?

Rather than manually filtering and segmenting, machine learning models observe characteristics across hundreds of thousands, or even millions of patients.

Using volumes of local health system data to train allowed the model to pick up on nuances specific to Virtua Health and the area. These nuances help identify people in need of services, and they won’t surface in with generic, national datasets or manual filters.

THE DATA IN THIS EXAMPLE WAS SPECIFIC TO VIRTUA HEALTH:

**3M+**  
patients

**13M+**  
admissions & discharges

**≈100M**  
vital signs

**10M**  
medications

**150M+**  
lab results

## How Well Did the Method Perform?

The hype that surrounds AI is mainly when people present methods and models, but refuse to talk about performance and results. The other part of the hype is that results are often presented in a way that isn't understandable to a layperson.

To discuss model performance in a way that's relatable, we use "Highest Decile Lift." This asks, "For the people the model identified as the top 10% risk, how much more likely were they to need cardio services than the general population?" For those who wish to dig deeper into model performance, our Health AI University provides non-

technical leaders with rigorous understanding & questions to evaluate AI vendors.

The general population is the baseline "1x" lift score. Any model performing at 1x is doing no better than randomly picking people from the population.

In this case, the machine learning approach delivered a 10x lift. This means that people in the top 10% identified by the model were 1,000% more likely than the general population to need cardiovascular services within the next year.

## How Did This Perform in a Campaign?

Virtua Health used the model in an email campaign with approx. 133,000 recipients.

To measure the campaign's effectiveness, we used a Randomized Control Trial (RCT) approach. This means that of the 130,000+ people in the campaign, a random 7,000 were in a holdout group. The holdout group would not receive the campaign communication during the study. Using this method will allow us to understand, given the same audience, the percent of patients that would come

in for an appointment without outreach vs those with outreach. The remaining people in the holdout group would receive the communication after it was proven effective.

We developed the communications in tandem with Virtua Health and one of their design partners. This is often the case with AI driven campaigns, where a data-oriented partner can help inform the creative process based on demographics and other factors in the target audience.

**35%**      **3.3%**

open rate vs industry  
average 21.7%

click rate vs industry  
average 2.49%

**30.3%**

higher revenues from email openers  
vs control group

### IMPACT ON APPOINTMENTS

**25%**

Greater likelihood that high-risk patients receiving the email campaign would book a cardio-related appointment.

High cardio risk patients who received the email: **16.3%** booked cardio-related appointments

High cardio risk patients who did not receive the email: **13%** booked appointments

## Impact on Revenue

We observed the cardiovascular-related revenue per patient for patients who received the email versus those who did not receive the email.

- Test Group (Cardiovascular Model High Risk who Received Email): **Approx. \$30**
- Control Group (Cardiovascular Model High Risk who Did Not Receive Email): **Approx. \$25**

The difference in performance between this group means the email was responsible for approx. \$6.50 overall lift per patient.

By multiplying this difference across the test population, this means the model-based campaign helped grow approximately \$800,000 in revenue. This represents 20%+ of overall revenue for the cardiology department within the study's time period.

The impact here goes deeper than revenue. Early detection and intervention for cardiology-related scenarios improves heart health, well-being, and even saves lives.



**“The science behind Actium’s approach enabled us to increase the number of cardiology appointments booked and drive revenue. More importantly, we were able to positively impact the lives of patients with elevated health risks by working with Actium to deliver engaging communications to the right individuals.”**

**RYAN YOUNGER** – VP of Marketing, Virtua Health



## What Do These Results Mean for Patients and Virtua Health?

Machine-learning-based campaign approaches account for hundreds of patient characteristics and thousands of nuances that humans can't feasibly tune.

The study above outlined how this approach is developed, how it's put into practice, and how it performs based on best practices in marketing trials.

In the study, we were careful to respect the partnership and content that helped drive the campaign success. The AI's role was to simplify the approach of reaching cardiovascular audiences with complex, nuanced needs.

As demonstrated by the lift above, AI-guided outreach has the potential to help many millions of people better their care.

# \$800,000

in revenue was generated by the model-based campaign

# 25%

of high-risk patients who receive the email campaign were more likely to book a cardio-related appointment



## Where Others See Patient Data, Actium Health Sees Human Potential

Learn how fast Actium Health can transform your healthcare system at: [actiumhealth.com](https://actiumhealth.com)  
or email [sales@actiumhealth.com](mailto:sales@actiumhealth.com) to request a demo.