

CASE STUDY

Sentara Healthcare Uses Glytec's eGMS to Achieve the Standard of Care in Glycemic Management



Sentara has always been a quality-focused organization...

...so when they experienced two patient deaths due to prolonged hypoglycemia, hospital leaders knew the status quo was no longer acceptable. Those events kicked off over a decade of glycemic management initiatives that have helped Sentara's 12 hospitals achieve amazing results in glucose control.

About Sentara Healthcare

[Sentara Healthcare](#) is a not-for-profit health system serving communities throughout Virginia and northeastern North Carolina. Anchored by 12 acute care hospitals including Sentara Norfolk General Hospital and Sentara Virginia Beach General Hospital, the 2,700-bed network has been consistently ranked as one of the nation's top integrated healthcare systems.

Sentara is committed to ongoing innovation and technology-driven healthcare. They pioneered the eICU, a remote monitoring system for intensive care. They were also among the first health systems to adopt [Glytec's eGlycemic Management System](#)® (eGMS), and remain a valuable partner in our mission to optimize glycemic management.

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Dr. Paul Chidester, MD

FORMER VICE PRESIDENT OF MEDICAL AFFAIRS, SENTARA HEALTHCARE

Waking up to the cost of poor insulin management

In 2008, glycemic management was not a leading organizational priority at Sentara. The majority of providers relied on outdated sliding-scale insulin therapy (SSI), and hypoglycemia was a relatively common occurrence.

“Hypoglycemia was viewed as a rite of passage, just something that happens in the ICU,” says Dr. Paul Chidester, MD, who served as Vice President of Medical Affairs at Sentara from 2008 to 2019.

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But all that changed when Sentara [experienced several patient deaths](#) due to prolonged hypoglycemia.

“We recognized that then as a preventable adverse event,” says Dr. Chidester. “We realized our approach to diabetes management needed to change, and that hypoglycemia was in fact a safety event to be tracked and avoided.”

Education alone proves insufficient

In the wake of these events, Dr. Chidester was made chair of a newly formed multidisciplinary glycemic control steering committee. The committee decided that the first step toward improving glycemic management must be [reducing the use of sliding scale insulin therapy](#) at their hospitals.

Sliding-Scale Vs. Basal-Bolus

Sliding-scale insulin, while requiring less effort from providers, has been shown to be ineffective at safely controlling blood glucose. The alternative is basal-bolus insulin therapy (BBI), which is [recommended as the standard of care](#) by the American Association of Clinical Endocrinologists, the American Diabetes Association and the Endocrine Society. ¹

Promoting the adoption of basal-bolus insulin therapy in their hospitals was a major challenge for Dr. Chidester and his colleagues. They invested heavily in an education and training campaign for providers, and the initial results were positive.

However, education alone wasn't sufficient to make a lasting change.

“We had a massive educational effort in 2008 and 2009, but over time, with turnover, some of that education fell to the wayside and we saw a decrease in our results,” says Dr. Chidester. “By 2012, our hyperglycemia and hypoglycemia rates had climbed back to their pre-2008 levels.”

The limits of in-house insulin dosing technology

Parallel to their educational efforts, Sentara's glycemic steering committee oversaw the development of an in-house technology solution to help clinicians calculate BBI dosing. While a step in the right direction, the capabilities of this in-house tool were limited.

"We developed a weight-based basal-bolus insulin order set within our EMR to guide clinical staff in the administration of insulin," says Dr. Chidester. "But these static protocols didn't seem to address circumstances where blood glucose would unexpectedly drop significantly, nor did they account for the fact that insulin affects each patient differently. Moreover, these protocols left us vulnerable to medical errors, which simply wasn't acceptable with the stakes being so high."

Glycemic Management Technology: Build Vs. Buy?

Sentara decided to use internal IT resources to build a glycemic management solution within their EMR. Many hospitals take this step on their path before adopting Glytec's complete eGlycemic Management System.

When you've already invested a large amount of money on your EMR, it seems reasonable to take advantage of its capabilities for a glucose control project, rather than adding an additional cost for a third-party solution like Glucommander™.

However, Glytec's FDA-cleared technology can account for many more variables than a homegrown calculator, leading to better performance.² When you factor in the cost savings from reduced length of stay, readmissions and cost of care, the ROI of a solution like Glucommander is very likely to surpass that of a homegrown solution.³

Searching for a better solution

Looking at the disappointing results of their education campaign and their homegrown BBI tool, Sentara's glucose control committee decided to seek help from outside providers.

While reviewing their options, the committee agreed on a list of must-have criteria. They decided that any potential insulin management solution must:

- Adapt to individual patients and changing conditions
- Integrate with the EMR and fit easily into clinicians' workflows
- Be supported by training and change management services

The team at Sentara didn't have to look far to find the right fit. One of their hospitals had already implemented Glytec's eGlycemic Management System in their ICU, and they were able to directly compare their results to those of the hospitals using the homegrown BBI tool.

The answer was clear: Glytec was the path forward for the Sentara's glycemic management initiative.

The Solution: Glytec's eGlycemic Management System®

The Glucommander IV module of Glytec's eGlycemic Management System met all of the steering committee's criteria.

Adapt to individual patients and changing conditions ✓

Powered by FDA-cleared algorithms, Glucommander accounts for a range of variables to provide insulin dosing recommendations that are truly personalized for the patient, and is smart enough to adapt to changing conditions.

"It's easy to have a protocol and say 'if the blood sugar does this, do this,' but what happens if blood sugar drops dramatically? You have to be able to adjust the protocol to fit that patient," says Dr. H. Courtenay Harrison, Jr., Medical Director Diabetes Center at Sentara Virginia Beach General Hospital. "Glytec learns on each patient as the insulin drip is progressing how sensitive or how resistant that patient is."

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MEDICAL DIRECTOR DIABETES CENTER, SENTARA VIRGINIA BEACH GENERAL HOSPITAL

Integrate with the EMR and fit easily into clinicians' workflows ✓

Glytec's eGMS integrated directly with Epic, enabling the Sentara team to create minimally-disruptive workflows for doctors and nurses.

"If the patient has orders for an IV insulin drip, the nurse opens that patient's chart in the EMR, there's a Glucommander icon in the MAR, they click on it, and it auto-populates with all the demographic information," says Margaret Bachand, RD CDE, Manager Diabetes Center at Sentara Virginia Beach. "They enter the piece that's individualized based on the physician order, and they're ready to go...It's been a huge time-saver."

"Our nurses found it easier to click on the Glucommander icon within the MAR and have lab and other values auto-populate en route to recommending a specific dosage of insulin," adds Dr. Chidester. "This was far more streamlined than the piecemeal process we'd previously implemented."

Be supported by training and change management services ✓

Finally, Sentara chose Glytec because they were able to provide valuable change management services, evaluating why the first attempt had failed to stick and assisting with a new round of training and education.

Results with Glucommander IV

Sentara saw immediate results following the implementation of Glucommander IV. The health system was able to reclaim — and surpass — the progress they had made with their original initiative.

"Our time-to-target blood glucose dropped to six hours, and because the algorithm operated in the background while our staff continued with their typical duties, patients remained in target longer than before," says Dr. Chidester.

Within 90 days of implementing Glucomander, Sentara [documented significant improvements](#) in rates of both hypoglycemia and hyperglycemia.

Rates of Hypoglycemia (blood glucose <70 mg/dl) dropped from 2.1% pre-implementation to 0.9% post-implementation across the entire system. Meanwhile, rates of hyperglycemia (blood glucose >180 mg/dl) dropped from 23.1% to 19.5%.⁴

Results Summary

57%

Reduction in hypoglycemia events

15%

Reduction in hyperglycemia events

6 hours

New time-to-target blood glucose

Sentara also saw big results in their cardiac surgery units.

“Within a few months of implementing Glucomander, we had zero instances of post-op blood glucose levels >200 mg/dL. This meant we were able to transition patients across (and ultimately out of) the hospital quicker,” says Dr. Chidester. “Patients were safer during their hospital stay, and in many cases, we avoided overnight admissions altogether. These efforts have no doubt saved the health system millions of dollars a year because we weren’t always using ICU beds.”

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Sentara also found that Glucomander IV enabled their nurses to manage several patients on IV insulin at once. This allowed them to move patients from the ICU to step-down units while they were still on their insulin drip, freeing up beds for other patients.

Most importantly, using Glucomander, Sentara was able to sustain these results long-term. Glucomander IV was rolled out across all of Sentara’s hospitals, and remains in constant use.

“The feedback from our staff and our patients remained extremely positive in the months and years following the initial implementation of Glucomander,” says Dr. Chidester. “With Glytec, we were finally able to achieve and sustain the standard of care and the results we were seeking.”

Further progress: SubQ and Hospital-to-Home

Sentara has build upon their success using the Glucommander IV module by adding other capabilities of the eGlycemic Management System.

At Sentara Virginia Beach General Hospital, the addition of Glytec's subcutaneous insulin solution, Glucommander SubQ, helped boost provider adoption of basal-bolus insulin therapy among patients requiring subcutaneous insulin by 277% in the nine months following rollout.

Several Sentara hospitals have also adopted the Hospital-to-Home module (H2H®) of Glytec's eGMS, which facilitates changes to insulin management regimens for patients during discharge. By adjusting home insulin therapy regimens, Sentara aims to improve the safety of patients with diabetes after they leave the hospital and reduce preventable readmissions.

The initial results of this initiative have been very positive. In a [study](#) of 28 patients with diabetes admitted and discharged from three Sentara hospitals using H2H, none had a readmission, urgent care visit, or emergency department visit caused by diabetes or any glucose-related incidents in the following month.⁵

Results Summary

0

Readmissions for glucose-related incidents
with H2H

Conclusion

With Glytec's eGlycemic Management System, Sentara Healthcare has finally been able to achieve their goal of reducing adverse events caused by insulin in their hospitals. And while the path to using Glytec's eGMS was not always straightforward, today it is a part of the fabric of the health system.

"We were in the ICU talking with the nurses, and a particular nurse gave a completely unsolicited response and said 'I wouldn't consider working anywhere where they didn't have Glucommander in use,'" reports Margaret Bachand.

"There are patients entering inpatient care who inquire about the service by name, stating they wouldn't want to be admitted to a facility that doesn't use this resource," adds Dr. Chidester.

Glytec's eGMS helps Sentara get patients to target blood glucose faster, move them out of the ICU faster, send them home faster and reduce readmissions. And while Sentara's mission to improve glucose control has always been driven by quality goals, their efforts have resulted in tens of millions of dollars in cost savings as well.

Of course, as Sentara learned following their first initiative, none of this progress can be taken for granted. Glytec remains a committed partner to Sentara Healthcare, and we continue to work together to ensure these results are sustained.

References

1. “American Association of Clinical Endocrinologists.” AACE.com, www.aace.com/disease-state-resources/diabetes/depth-information/clinical-evidence-glucose-control-inpatient.
2. Glytec. Data on file.
3. Gaines M, Pratley R, Tanton D. Financial Implications of Poor Glycemic Management & Improvement Strategies for Optimal Outcomes. IHI National Forum on Quality Improvement in Health Care. 2018.
4. Aloji JA, Mulla C, Ullal J, Lieb DC. Improvement in inpatient glycemic care: pathways to quality. *Curr Diab Rep.* 2015;15(4):18. doi:10.1007/s11892-015-0587-4
5. 2017 Diabetes Technology Meeting Abstracts. *J Diabetes Sci Technol.* 2018;12(2):426-532. doi:10.1177/1932296818761742

Contact us to learn more about Glytec’s eGMS

Contact Glytec

The eGlycemic Management System® is a modularized solution for glycemic management across the care continuum that includes Glucommander™. Glucommander™ is a prescription-only software medical device for glycemic management intended to evaluate current as well as cumulative patient blood glucose values coupled with patient information including age, weight and height, and, based on the aggregate of these measurement parameters, whether one or many, recommend an IV dosage of insulin, glucose or saline or a subcutaneous basal and bolus insulin dosing recommendation to adjust and maintain the blood glucose level towards a configurable physician- determined target range. Glucommander™ is indicated for use in adult and pediatric (ages 2-17 years) patients. The measurements and calculations generated are intended to be used by qualified and trained medical personnel in evaluating patient conditions in conjunction with clinical history, symptoms, and other diagnostic measurements, as well as the medical professional’s clinical judgement. No medical decision should be based solely on the recommended guidance provided by this software program.

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