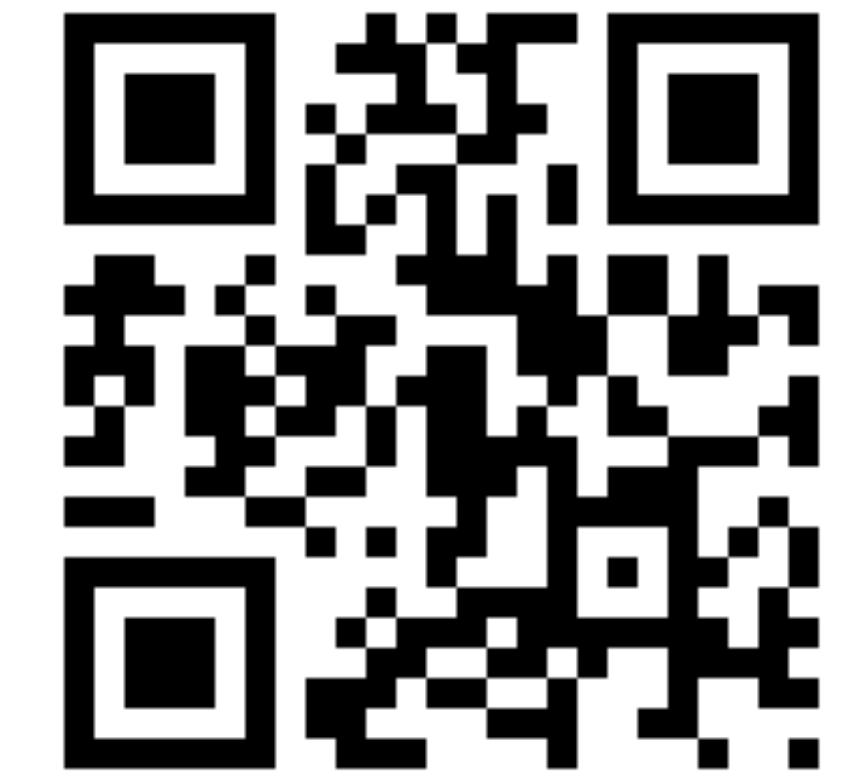




Decision Support for Inpatient Physicians Managing Hyperglycemia

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Problem

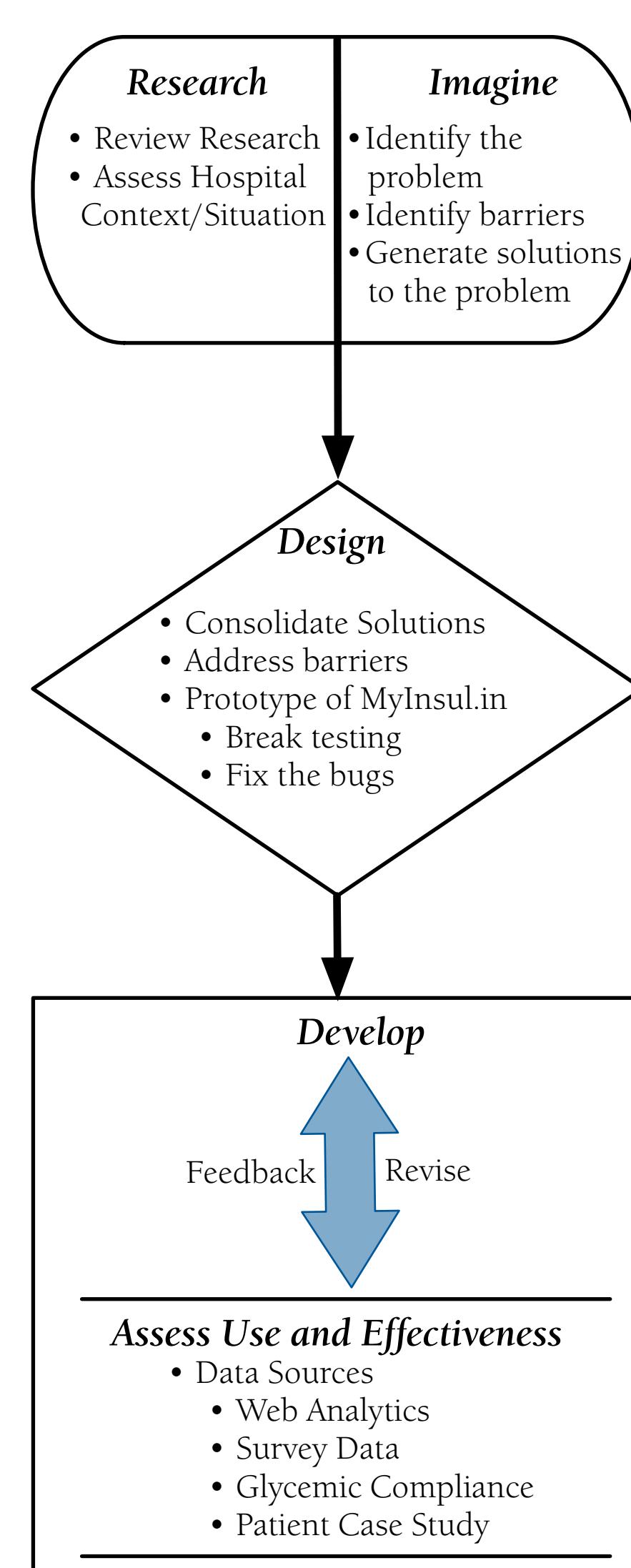
Inpatient physicians need a quick, reliable, consistent, and accurate tool to navigate complex guidelines for managing hyperglycemia.

Solution

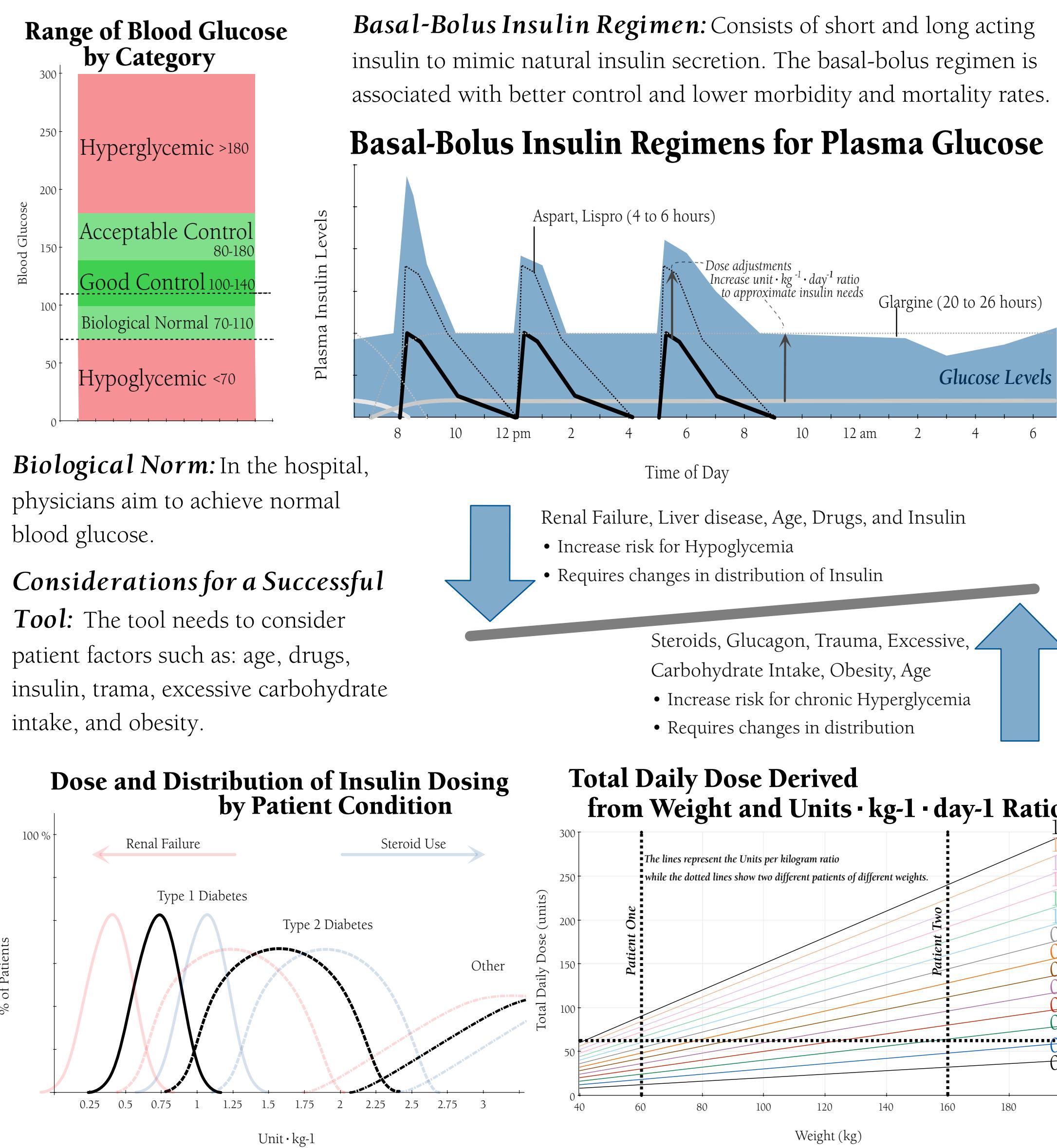
We designed and engineered MyInsul.in, a HIPPA-exempt web application. Our tool provides physicians immediate access to insulin dose and distribution algorithms.

Objectives

- 1) Engineer a tool that will support physicians' decisions with standard clinical insulin guidelines to personalize insulin doses related to a patient's mass, BMI, disease state, and drug use.
- 2) Revise MyInsul.in based on physicians' initial feedback.
- 3) Validate the use and effectiveness of MyInsul.in.
- 4) Further revise MyInsul.in based on follow-up physician feedback.



Biological Research



Methods

Experimental Design: A natural experimental design was used to analyze the use of MyInsul.in at a local teaching hospital. This design enabled analysis of physicians' adoption of MyInsul.in in a manner that allowed for physicians to make their own decisions in the hospital. This design allowed for physician autonomy to adopt and use MyInsul.in.

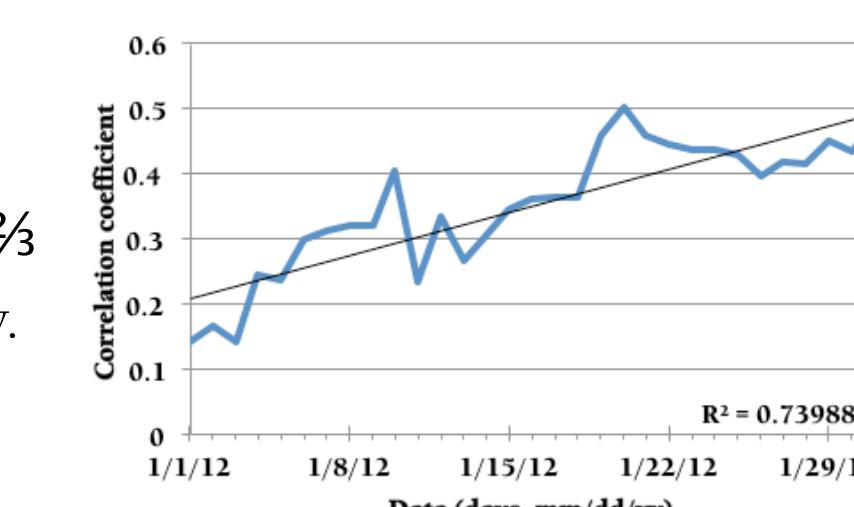
Data Sources:

| | |
|---|---|
| Informatics Engineers: Web Analytics | Physicians: Survey Data |
| <ul style="list-style-type: none"> Unique views on the full-sized website Timeline of Events Number of unique patients receiving Insulin | <ul style="list-style-type: none"> Baseline Survey: Assess Barriers and Knowledge/Education Deficits Follow-up Survey: Assess change in Barriers and Knowledge/Education MyInsul.in Survey: Determine the success of the program through Physicians' responses |
| Hospital Quality Committee: Glycemic Compliance | Patients: Case Studies |
| <ul style="list-style-type: none"> Compliance Rates for December and January Number of Unique Patients receiving Insulin | <ul style="list-style-type: none"> Case study review, de-identified patient data: Assess physicians use of MyInsul.in while prescribing insulin to their patients. Review effectiveness of physicians' interventions using MyInsul.in to prescribe insulin to their patients. |

Results

Informatics Engineering: Web Analytics

- ~338 unique visits (5.45 daily average) from the medical system's network on the **full-sized version** during the months of intervention.
- ~2/3 of unique views came from within the patient electronic record.
- ~1/3 of the views came from the workstations' Internet browsers.
- Analytics data was collected for the **full-sized version only**, though ~2/3 of physicians reported using the mobile version exclusively on the survey.
- The correlation between views and patients increased over the two months from 0.15 to 0.48. The correlation became moderate.



Physicians: Survey Data

Sample Includes: Attending Physicians and Residents

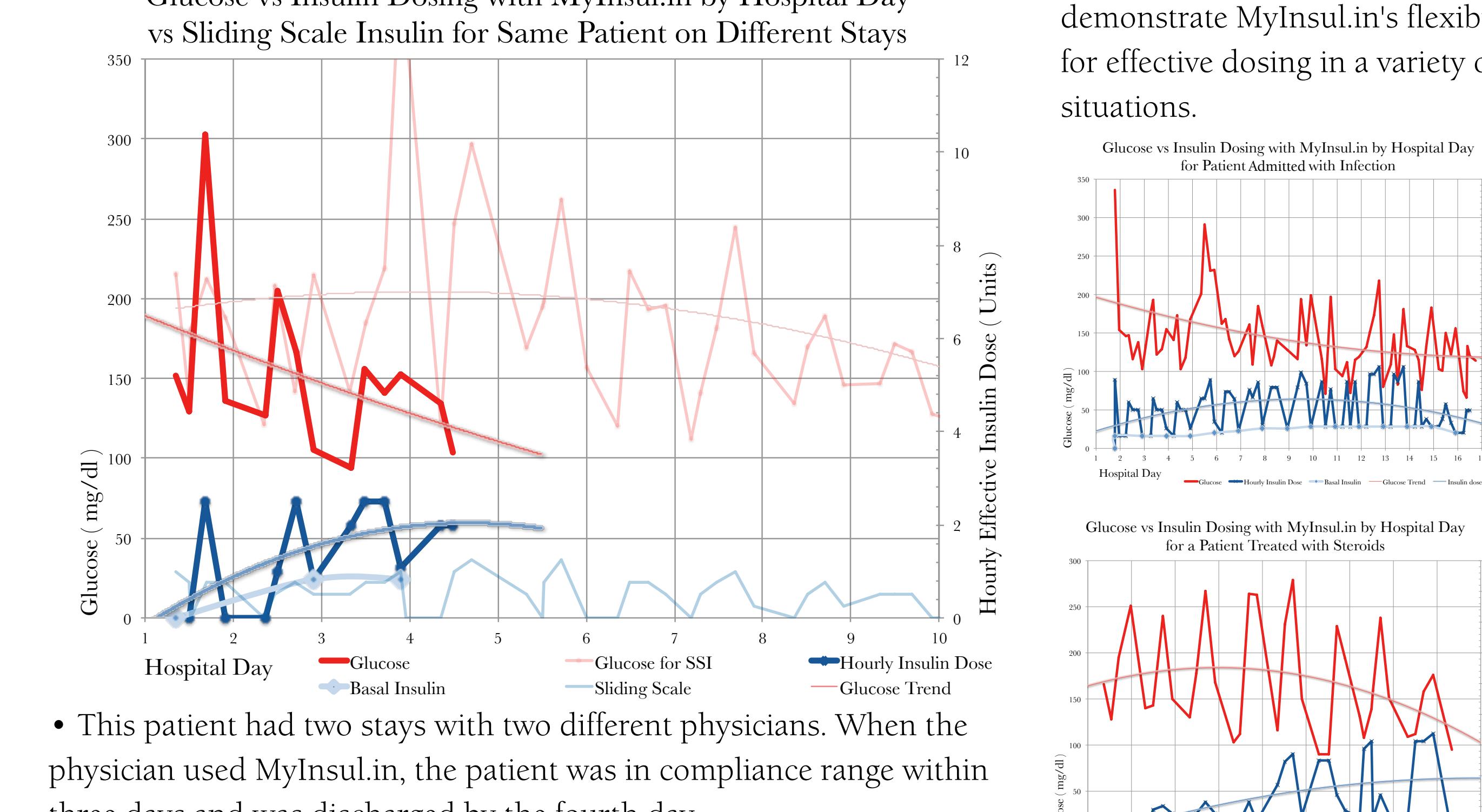
- The baseline survey had 49 results while the follow up survey had 35 results.
- Over 80% (n=22) of physicians reported liking MyInsul.in's features and approximately 20% (n=9) reported that the features could be improved.
- 14% (n=5) of inpatient physicians reported using MyInsul.in on 75-100% of their patients. 22% (n=8) of the inpatient physicians reported never using MyInsul.in when prescribing insulin.



- MyInsul.in reduced most knowledge barriers that it set out to address. However, physicians did not report the barriers being fully removed.
- Barriers not addressed by MyInsul.in become more prevalent in physicians reports.
- Disagreement with other team members increased 35.8% following introduction of MyInsul.in.

Patients: Case Studies

Glucose vs Insulin Dosing with MyInsul.in by Hospital Day vs Sliding Scale Insulin for Same Patient on Different Stays



Discussion

Our Data Suggests:

MyInsul.in supports physician's in managing hyperglycemia.

- MyInsul.in was designed to eliminate barriers and increase glycemic compliance rates in the hospital.
- MyInsul.in decreased barriers, increased physicians' knowledge and familiarity with hospital protocols, and, when used, provided physicians with effective insulin recommendations.
- Individual cases show that MyInsul.in was effective for managing blood glucose levels when used and worked for a variety of different situations.

MyInsul.in is used in the hospital, although not frequently.

- Most residents reported using MyInsul.in less than twenty-five percent of the time.
- Only twenty percent of the physicians used MyInsul.in more than half of the time, suggesting that our project is in an early phase of adoption.

MyInsul.in reduced the barriers it addressed.

- MyInsul.in addressed knowledge, awareness and plan based barriers. Physicians reported these barriers decreasing following introduction of MyInsul.in.
- Barriers MyInsul.in did not address were system barriers. Physicians reported these barriers increased following introduction of MyInsul.in.
- MyInsul.in increased disagreement with other team members on how to control glucose suggesting discussion within the hospital.

Future Studies:

- Further show the effectiveness of MyInsul.in with a two year observational period.
- Introduction and adoption of MyInsul.in into different hospital systems to increase outreach of the tool.
- Revise MyInsul.in with more complex and effective insulin protocols to ensure patients are provided with the best possible care.

Conclusion

This study developed and assessed the use and effectiveness of an electronic insulin dosing guide to manage hyperglycemia in a teaching hospital.

The data suggests that MyInsul.in was effective in reducing barriers to manage hyperglycemia when used. However, MyInsul.in is in the early stages of adoption suggesting that further intervention and education is necessary to improve hospital glycemic control.

