InsuCon: Insulin Injection Confirmation

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EIH ENGINEERING INNOVATION IN HEALTH

Background

Problem

20% incorrect insulin administration (Trief et al.)

100,000+ US ED visits related to insulin related complciation(Geller et al).

Population

Worldwide:

463 Million Diabetics

~ 1 in 11 Adults

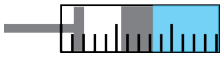
21.4 Million

Diabetics aged > 65

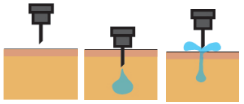
~65% posses inadequate insulin administration competency

Common Errors

Airshots



Early Removal

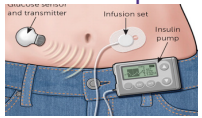


Consequences

Hyper/Hypo-glycemia

- Dehydration
- Blurred Vision
- Organ Failure
- Blindness

Existing Diabetes Technology Landscape

Continuous Glucose Monitor 	Less invasive Information readily available Less human errors	Not friendly for elderly Limiting Technology Body Invasion
Insulin Pen 	Relatively Affordable Portable/User-friendly Mid range dosing precision	More Human error Lack of feedback Invasive Process
Insulin Pump 	Precise dosing (0.01U) No human error Provide correct Injection	Expensive to purchase Body Invasion Time lag during injection

Unmet Need

A way to **accurately confirm insulin self-administration** in **vulnerable diabetic pen users** to **prevent hyper- and hypo-glycemia.**

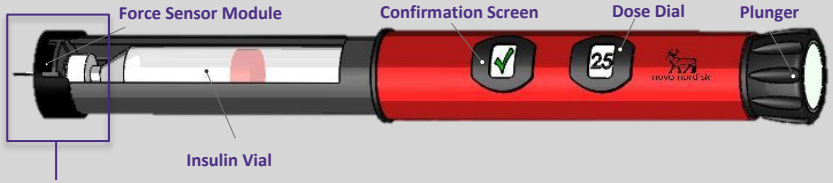
Requirements

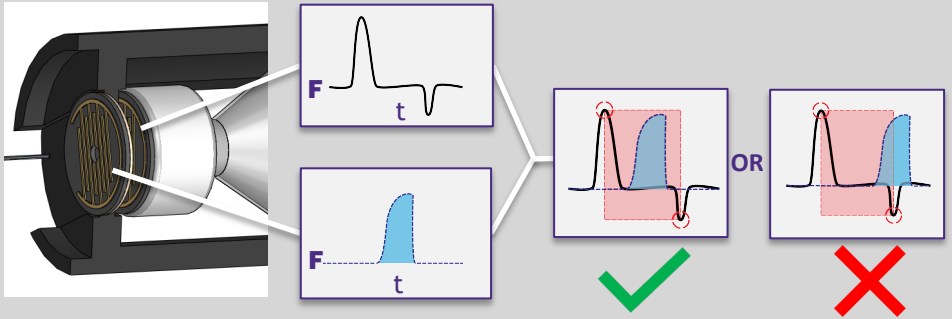
- **Confirm** dose dialed in injection
- Provides patient **feedback** on dose administered
- Dosing history given to **caregivers and clinicians**

Technical Specification

- **Fits and functions** within form factor and constraints of current market available insulin pens

Design Concept

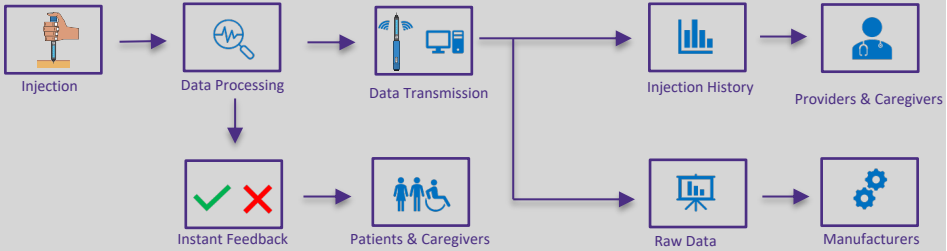




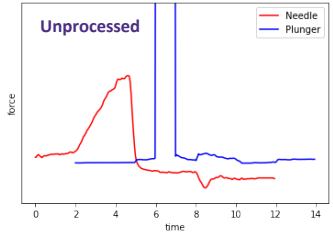
Force Data
Translated to onboard microprocessor

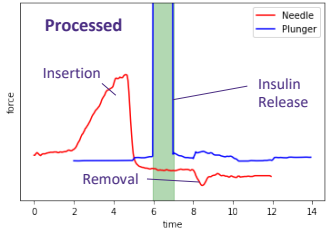
Sensing Algorithm
Interprets and reports injection event

Reporting
To patients, providers and manufacturer



Prototyping and Results



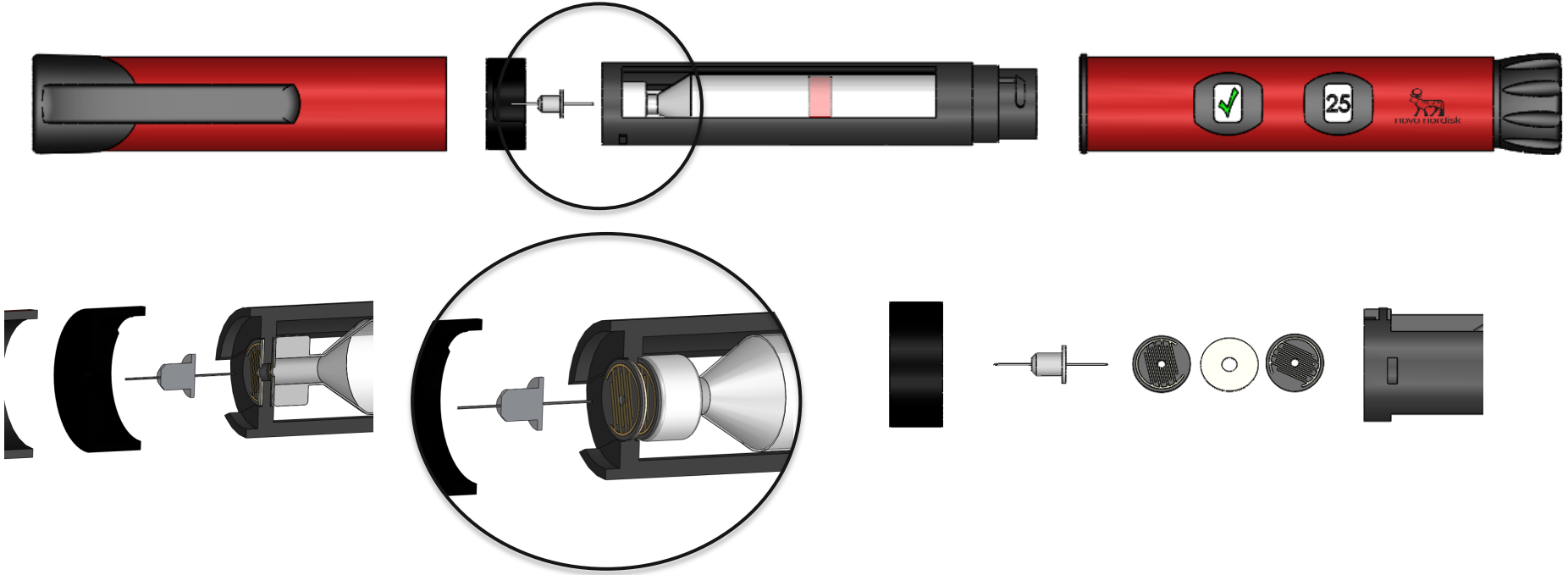


Summary

- **Demonstrated** solution proof of concept via preliminary results
- **Built** stable and portable functional prototype
- **Created** framework for information/communication network

Future

- **Widen testing** to materials and situations beyond most encountered
- **Strengthen and test** current and future algorithms against large and varying dataset
- **Investigate** other value from data, such as, calculation of insulin volume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