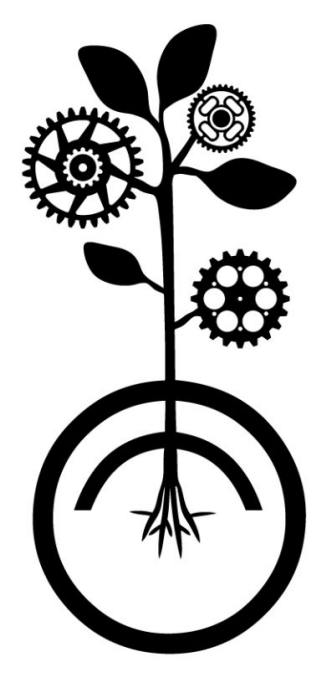




**SUMMER
EXPERIENCE** in
**ENGINEERING
DESIGN**

ResponsiPill: Providing Insight for Enhancing Care

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ResponsiPill



The U.S. Opioid Crisis

- **>1,000,000 overdose deaths** since 1999
- **21-29%** of patients prescribed opioids **report misuse**
- **80%** of heroin users **began with prescription opioids**
- First time exposure is the **critical risk window**
- Creates economic burden of **~\$1-\$1.5T per year**

Limitations of Modern Smart Pill Bottles

- **Stigma** stifles patient adoption
- **Don't integrate well** with hospitals and clinics
- **Limit patient autonomy** and a **natural user experience**

Mission Statement

Design a **secure, user-friendly smart medication insert** that accurately detects and records pill dispensing in real-time to **improve medication adherence tracking** and **support better patient-doctor relations**.

Design Specifications

Constraints



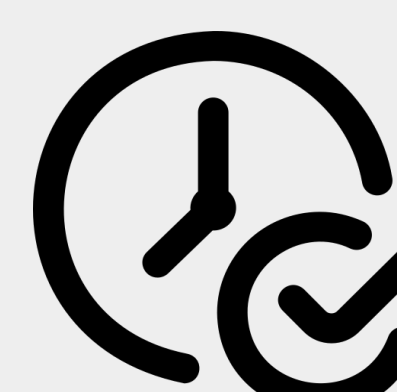
Medication Protection

Meet FDA and USP requirements



Data Protection

Meets HIPAA data regulations



Medication Tracking

Record real-time accurate dispensal timestamps

Objectives



Battery Life

Lasts ≥ 2 weeks



Singulation

$\leq 2\%$ error rate



Intuitive Use

UDS ≥ 4 :
No Instruction Needed



Portability

Height: <Pill Bottle
Weight: <65g



Low Cost

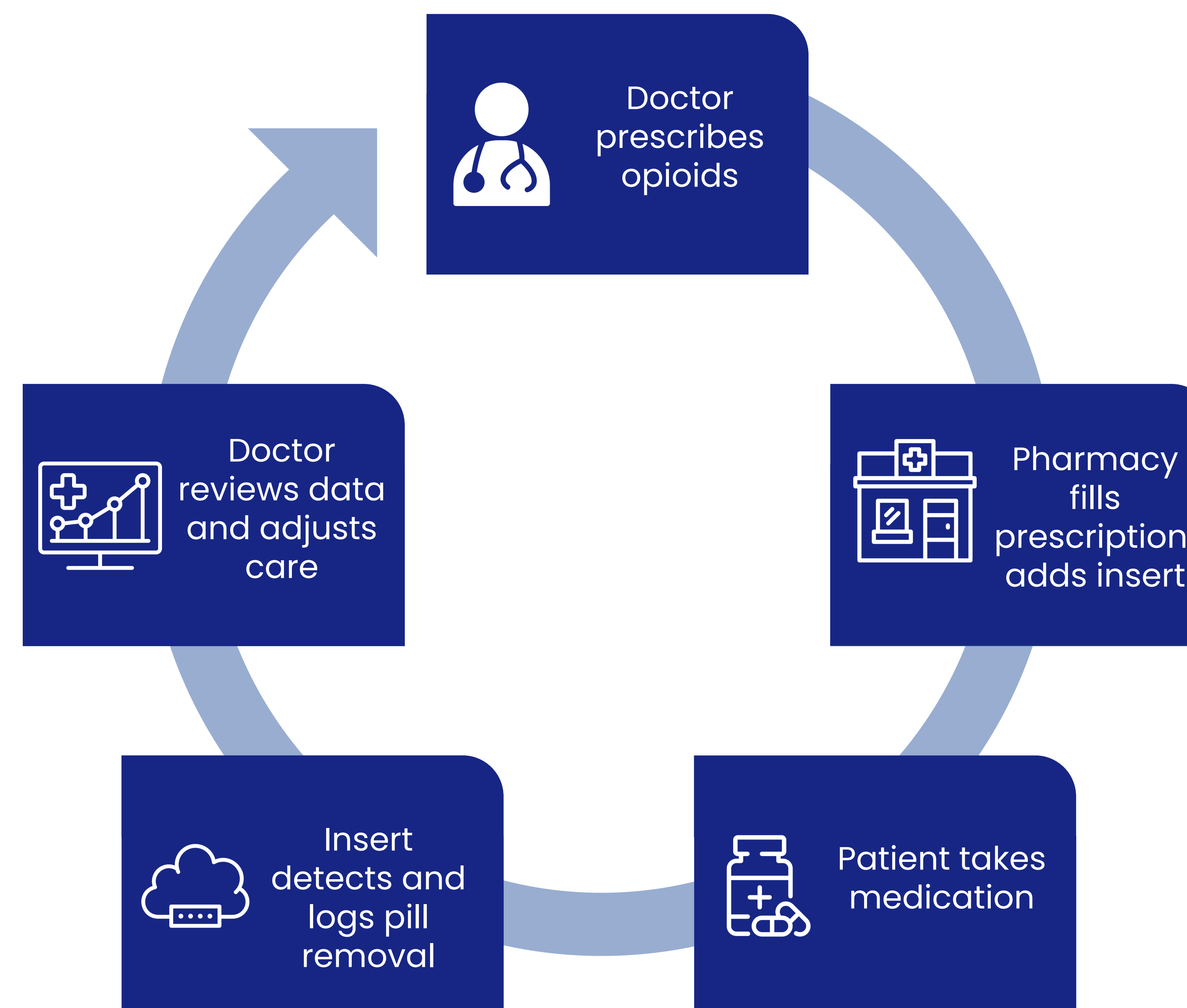
$\leq \$5$ per unit

Padgett Insert

Electronics

Singulator

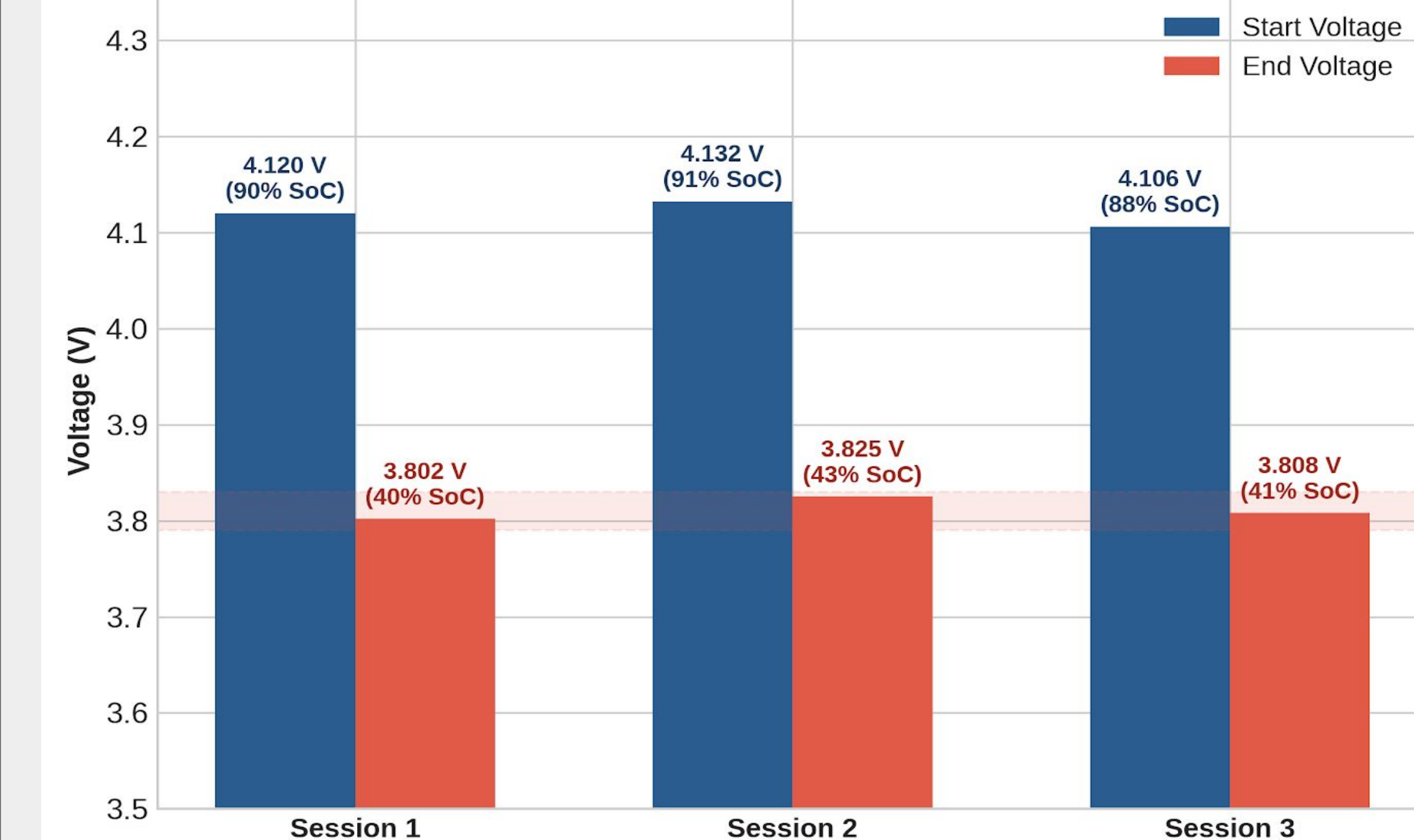
Pill Guide



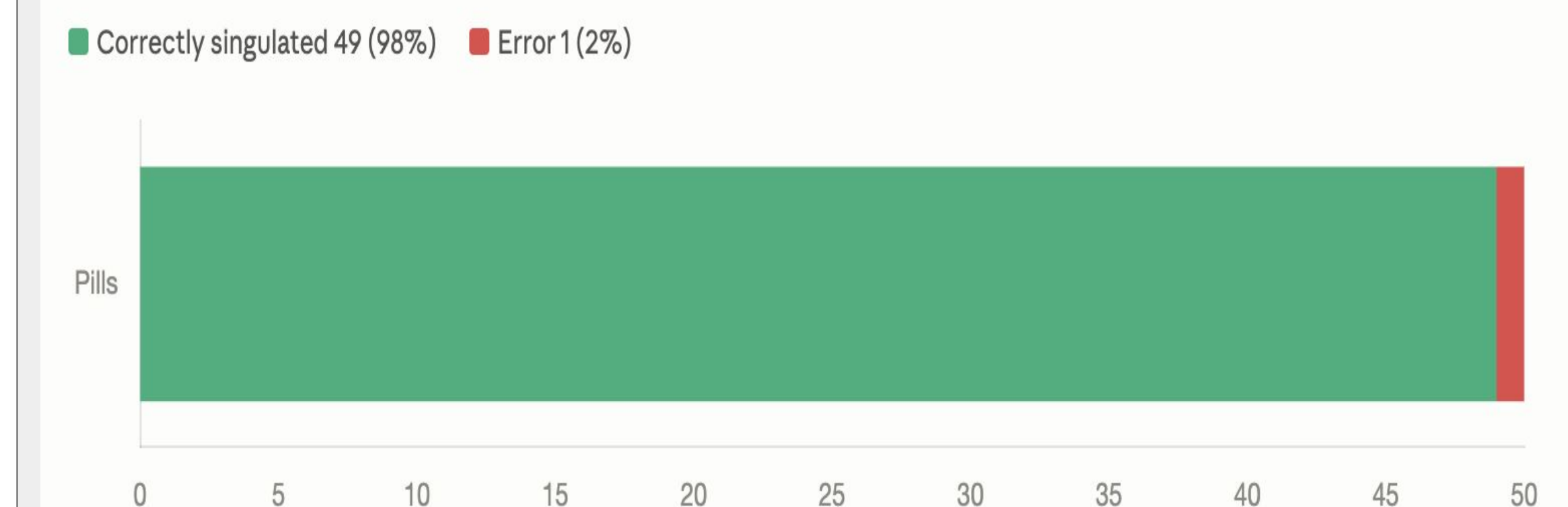
Preliminary Testing

Battery

Battery Voltage & State of Charge (SoC): Before vs. After Session



Singulation



Future Plans

- Integrate with Epic/MyChart systems
- Test using different pills and pills bottles
- Get patient and hospital feedback

Acknowledgements

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