



RxVision

Increasing Medication Safety
with Image Recognition using
Deep Learning

Alphonso Woodbury

healthcare



health + care

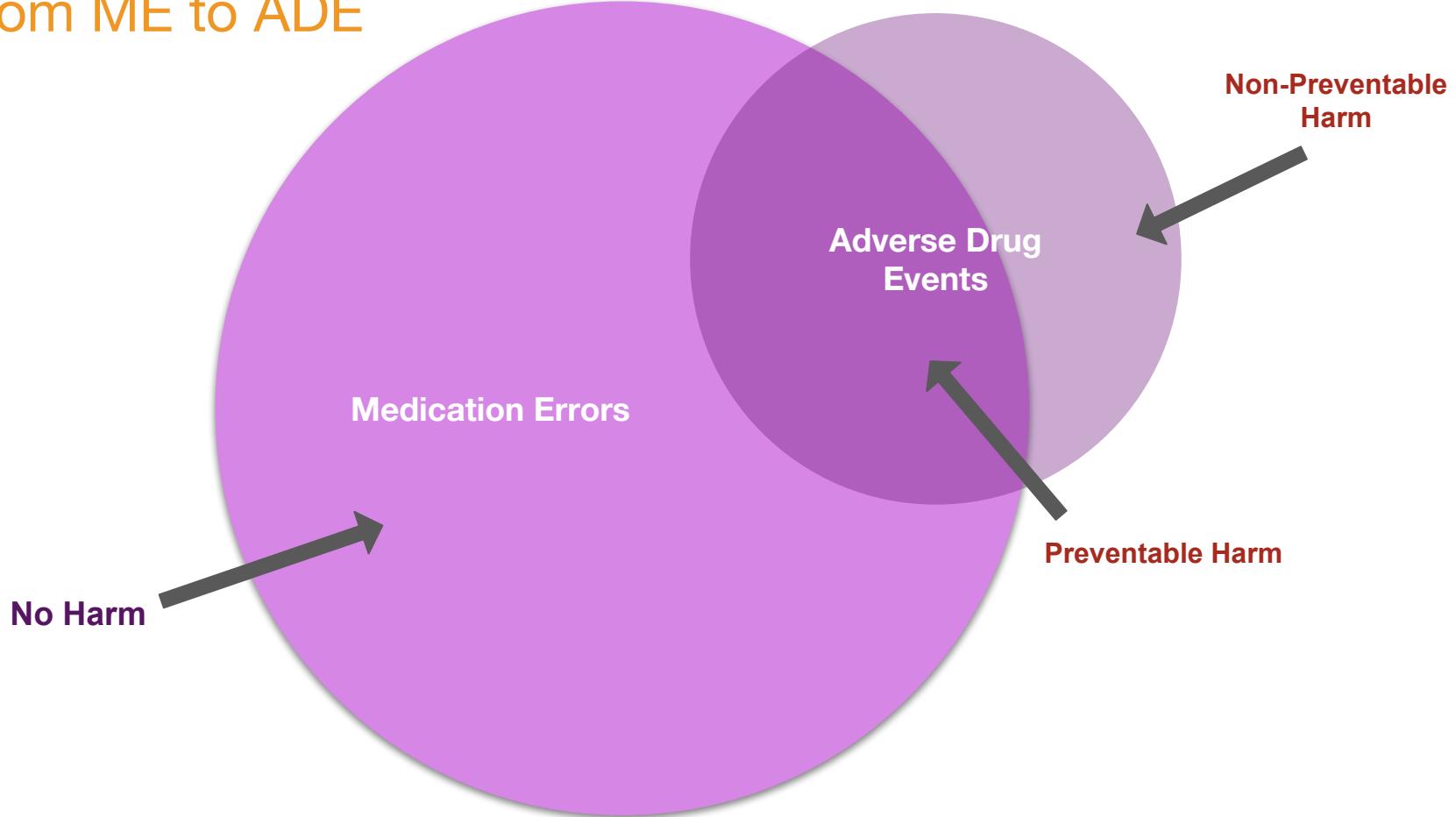
Top 5 Causes of Death USA 2016 (Hopkins)

Heart Disease
Cancer
Medical Errors
Respiratory
Stroke

Adverse Drug Event

Any preventable event that may cause or lead to inappropriate medication use or patient harm (FDA)

From ME to ADE



Multiple Chronic Conditions

103M

High-risk group: patients on
5 or more medications

Aged 65+

52M

will double by 2060 (PRB)

RxVision Solutions: Dispensing Validation



- Camera stack integration to catch errors before reaching pharmacist

RxVision Solutions: Patient/Caregiver Support



A smartphone app to assist with:

- Visual impairment
- Drug change
- Recalls
- Mixed meds

RxVision Solutions: Emergency Intervention



Quick pill identification
during an health crisis

RxVision Technical Details

**Convolutional Neural Network +
Transfer Learning**

15 NDCs, 490 images from NIH





**RxVision
Validation
Accuracy:**



**RxVision
Real-world
Accuracy:**



**RxVision
Validation
Accuracy:**

93%

**RxVision
Real-world
Accuracy:**

...

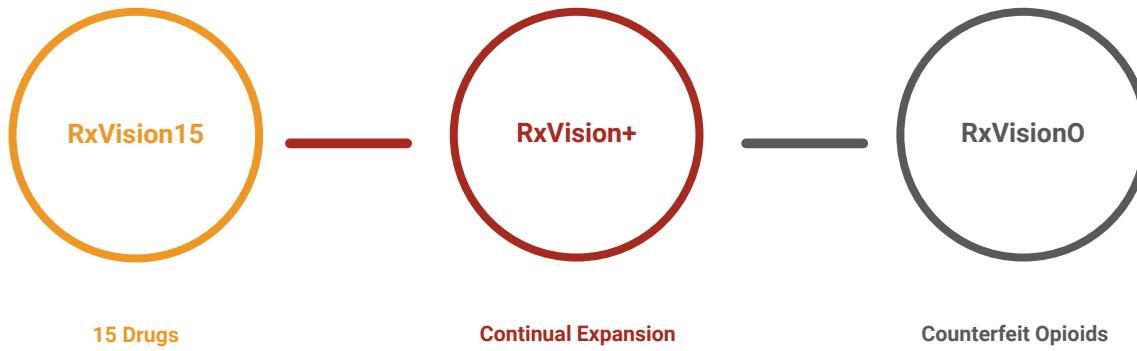
**RxVision
Validation
Accuracy:**

93%

**RxVision
Real-world
Accuracy:**

50%

Real-world Ready





Acknowledgments

An extra-special THANK YOU to the wonderful people at Excella Consulting who sponsored my education at Flatiron School, and to the coaches and instructors who provided the tools to really *Change Things*



Thank You

alphonso@alphonsowoodbury.com



References

Hopkins: Medical error third leading cause of death
3 Types of Medical Errors
FDA: Reducing medical Errors
WHO: Medication Errors
WHO: Growing Threat from counterfeit medications
Aging USA
Adverse Drug Events
CDC: Chronic Diseases
Pill Image Recognition Challenge (2016)
Reducing Medication Errors in Pediatrics
A Similar Pill ID Project from Indiana University
Automatic Drug image identification
NLM RxImage API



We were inspired by [MobileDeepPill](#) (Michigan State University), which achieved 97% Accuracy to win the 2016 NLM Pill Image Recognition Challenge