# Using Digital Health to Enhance Adherence with Prescription Opioids

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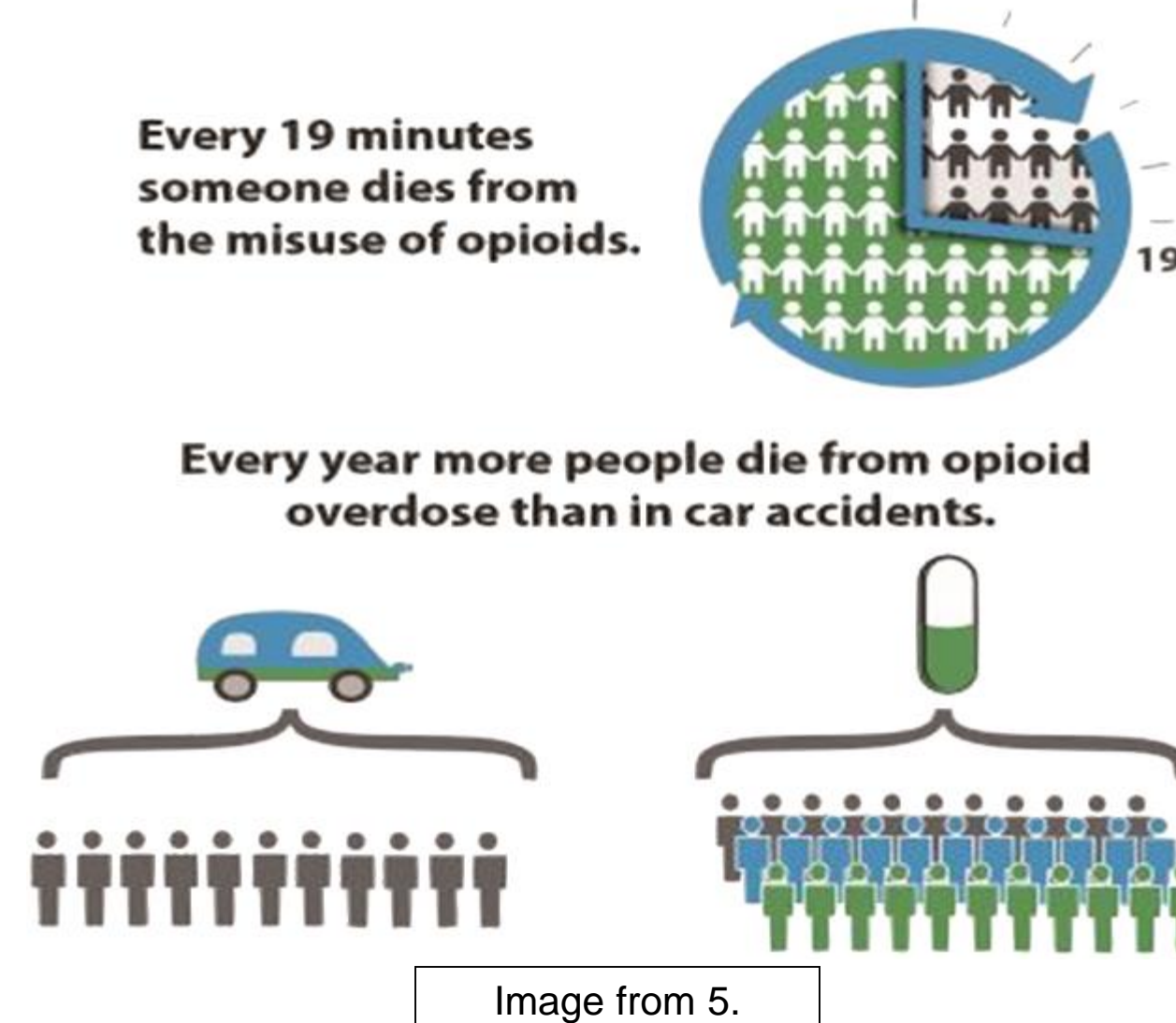**OSWEGO** STATE UNIVERSITY OF NEW YORK

*MedConformity*

## INTRODUCTION

- There are 40 deaths every day from prescription opioids[1a].
- 1 in 4 people using long term opioids struggles with addiction[1a].
- 75% of Americans have difficulty complying with daily meds[2].
- Medication adherence problems in America are estimated to cost $100 to $300 billion[3].
- Poor medication adherence leads to poor outcomes and increased usage of healthcare services and increased cost[3].
- To break the non-adherence cycle, patients, in partnership with their doctors and pharmacist, need to commit to a mutually agreed schedule for optimal medication compliance
- Adherence is a team effort involving the patient, healthcare providers, and other supportive individuals (spouse, friends, etc.).



Cycle of Non-Adherence: Medication Non-Adherence → Increased Healthcare Costs → Increased Service Utilization → Poor Outcomes

Medication non-adherence is often hidden from healthcare providers. There is generally a lack of objective data to verify adherence[4]. Using a patient sensitive manner of discovering medication usage information is crucial for discovering non-adherence[4]. Developing a method for objectively measuring the non-adherent behaviors of taking too much of a medication or taking a medication too early will help facilitate more honest conversations between providers and patients.



Every 19 minutes someone dies from the misuse of opioids.[19]

Every year more people die from opioid overdose than in car accidents.

Image from 5.

## BACKGROUND

Three existing medication compliance apps were reviewed:

- **Medisafe**[6]
  Popular and robust app for chronic medication usage
- **Dosecast**[7]
  Not as refined as *Medisafe*; has some "as needed" functionality
- **Memo Health**[8]
  Utilizes sensors, automated interface with a pill box

All three apps worked well, but lacked usefulness for assisting compliance with as needed opioid medications.

- We need to "provide tools and information for healthcare professionals working on overdose prevention and treatment," and "increase awareness and share best practices with providers and patients"[1b]
- Using digital health technology for medication tracking does improve adherence at a relatively low cost for implementation[9].
- Using digital health technology can help patients track their medication usage and disease progression resulting in a better understanding of appropriate medication usage and support their medication self-management[10].

## PROJECT FOCUS

### Mission Statement

Helping involved individuals take control of their opioid usage

- Develop a smartphone app to assist individuals with tracking usage of as needed medications including opioids.
- Help individuals to improve medication compliance.
- Maintain objective data about a person's medication usage.
- Improve communication between patients and providers.
- Research automation methods of tracking medication usage.



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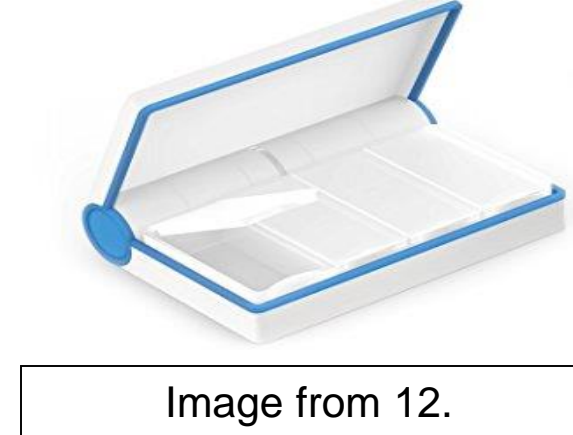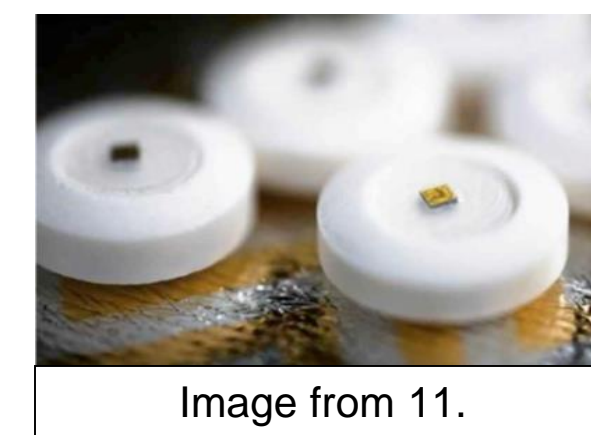
## PROJECT DESIGN

### Selected User Stories

**Persona: All Users**

- **Scenario 0: Taking Medication**
  Given that I am prescribed medication
  And *MedConformity* has accurate medication information.
  When I notify *MedConformity* that medication is taken,
  Then I am informed when my 'Next Dose' is due to be taken.

**Persona: "As Needed Medication" Users**
  As a user of as needed medications
  I want a tool like *MedConformity*
  So that I can keep track of the medications I have taken and when my next dose is due.

- **Scenario 1: Next Dose Lookup.**
  Given that I am prescribed medication
  And *MedConformity* has accurate medication information.
  And I am concerned about taking too much medication.
  When I check *MedConformity* for next dose information,
  Then I take my prescribed medication if enough time has elapsed
  Or, I can set a timer to have *MedConformity* remind me when my next dose would be due.



Design for MedConformity App
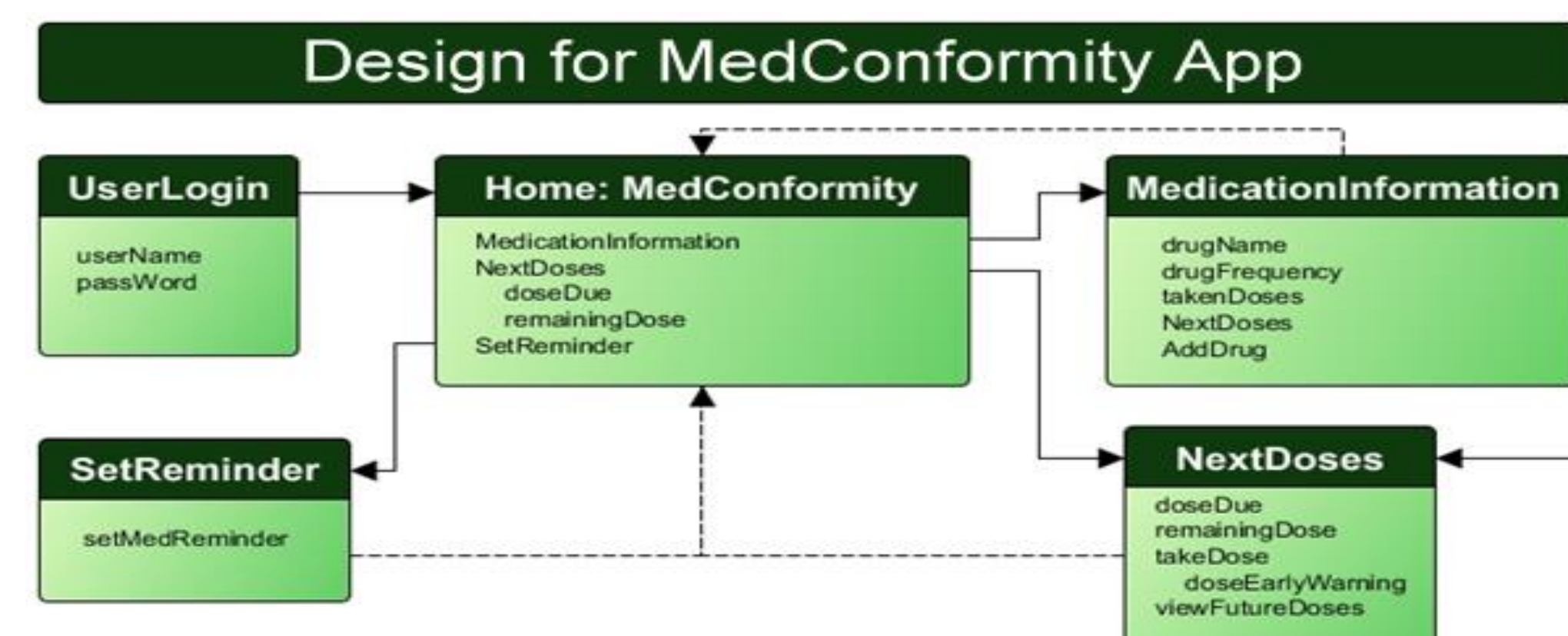
### Resources

- Android Studio (version 2.3.3)[13] was used as the integrated development environment for creating *MedConformity*.
- GitHub was used for importing a similar open-source project ("*DrugBug*"[14]) that was designed for tracking chronic medication usage.
  • Logic for *DrugBug* was altered to adapt the application for dealing with as needed medication usage.
  • The *DrugBug* user interface was altered to match the requirements discovered through the User Stories above.

## RESULTS
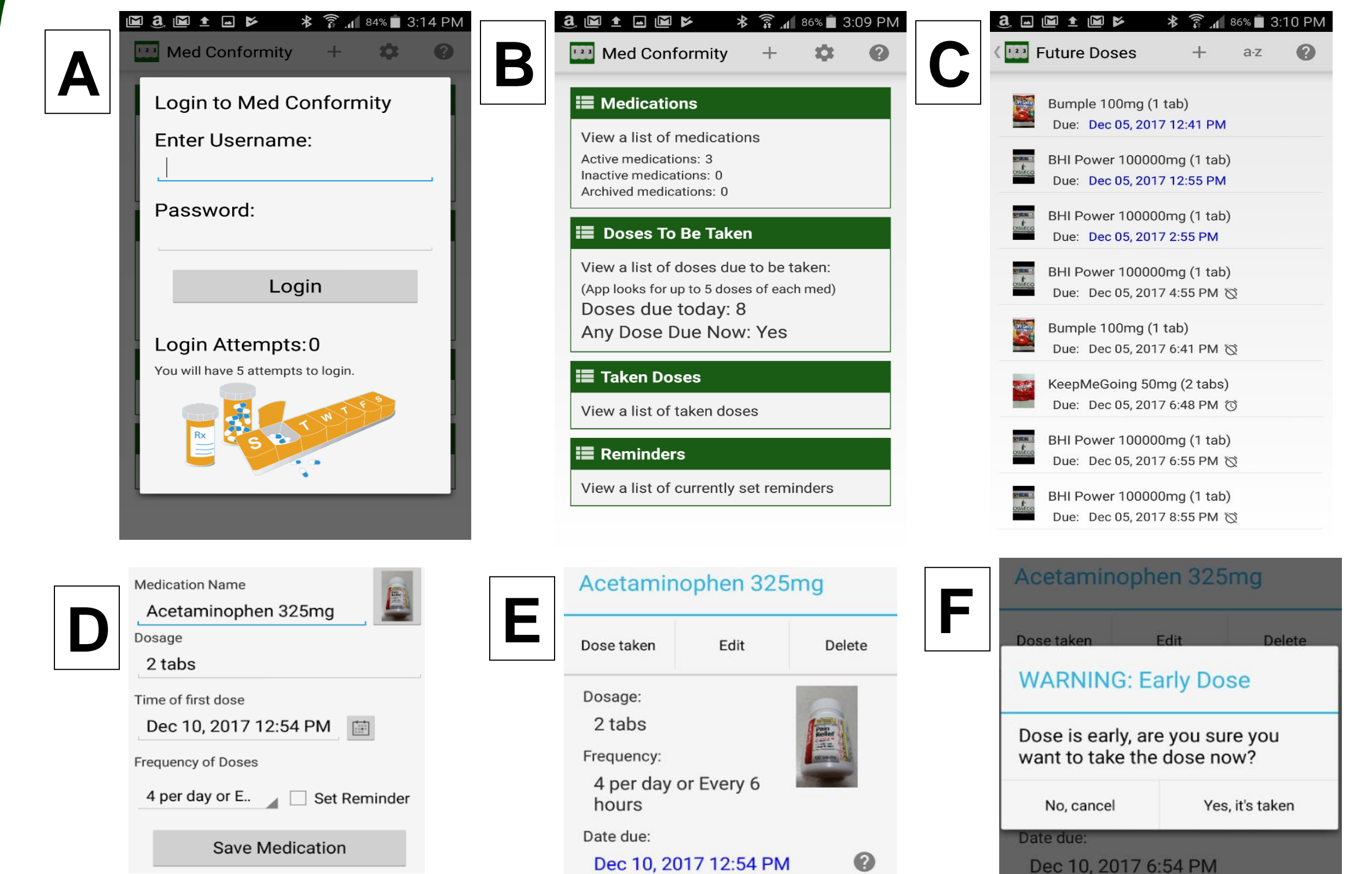


A. Login Screen.
B. Home Screen: emphasis on "Doses due" and "Any Dose Due Now."
C. List of the earliest times medications can be taken.
D. Record of prescription data.
E. Location to record that a dose was taken.
   The date due is printed in red if the dose is too early.
F. Warning indicating that a dose is taken early. If the dose wasn't taken, the record can be cancelled.

All data is stored in a SQL table and can be retrieved from the "Taken Doses" activity linked from the home screen ('B' above).

## FUTURE DIRECTION

- Add capability for a user to more easily share data.
- Add capability for free text notes that can be associated with medication usage.
- Incorporate an automated method for recording medication usage.
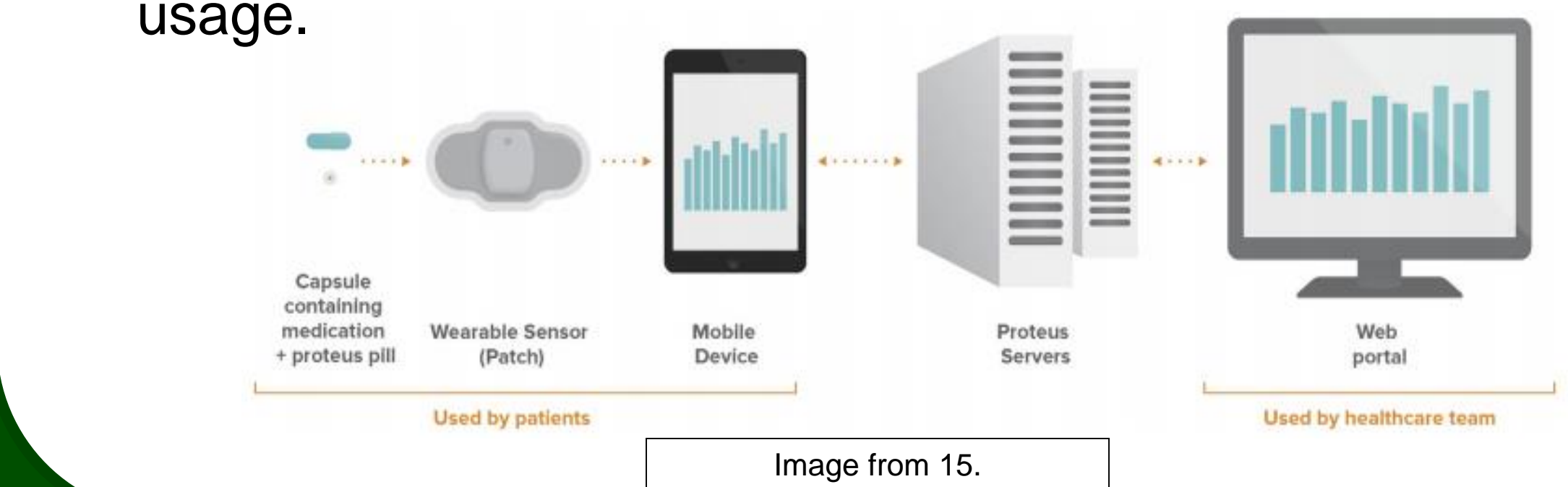


Image from 15.

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