Technology for Healthy Aging Living

Improving Opioid Safety in Seniors

Dr. Randy Wei, Radiation Oncology
Dr. Solomon Liao, Palliative Medicine & Geriatrics

UC Irvine Health
Disclosure

I am not a geriatrician.

I am a radiation oncologist.

Many of my patients are greater than 65 y/o and have pain.

I like to listen to my patients and colleagues.
Greying of America

- By 2030, 1 in every 5 Americans > 65 y/o
- By 2050, 89 million Americans > 65 y/o
- 15-20% seniors > 65 have mild cognitive impairment
- Medicare spending to increase from $555 billion (2011) to $903 billion (2020)

Source: State of Aging & Health 2013 CDC
Alzheimer’s Association 2016
Model for Healthy Aging and Disease

Level of Function

Heart disease
Cancer
Polypharmacy
Accidents
Infections

New Drugs
Improved nutrition
Public Health
Technology?

21 65 76

Age (yrs)

Functional Dependence
Loss of Autonomy
Death
How can we improve access to healthcare for seniors?

- Geographical proximity to doctors
- House calls
- Telemedicine
- Synchronous vs Asynchronous
Seniors and Technology Use (2013)

Percent of adults who go online

- 86% All adults
- 59% Seniors 65+

Bar graph showing:
- Cell phone: All adults 91, 65+ 77
- Internet: All adults 86, 65+ 59
- Broadband: All adults 70, 65+ 47

Pew Research Center's Internet Project July 18-September 30, 2013 tracking survey.
PEW RESEARCH CENTER
• Global Social Enterprise Initiative at Georgetown and Philips
  - 1,200 Americans 34-67

• 73% prefer aging at home

• 90% agree independence and access to quality healthcare is important

• 62% of “leading edge” baby boomers born before 1955 comfortable with technology

• 67% would pay $25-499 per month if technology kept them at home
Obama Administration Takes More Actions to Address the Prescription Opioid and Heroin Epidemic

How Bad is the Opioid Epidemic?

Drug Overdose Deaths in 2014

<table>
<thead>
<tr>
<th>Substance</th>
<th>Death Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opioids</td>
<td>18,893</td>
</tr>
<tr>
<td>Heroin</td>
<td>10,574</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>7,945</td>
</tr>
<tr>
<td>Cocaine</td>
<td>5,415</td>
</tr>
</tbody>
</table>
Doctor: Seniors have 'highest rate of drug overdose death'

Andrew Kolodny of Physicians for Responsible Opioid Prescribing discusses 'hidden epidemic' of elderly painkiller abuse

August 29, 2015 3:00PM ET
by The Fault Lines Digital Team

Seniors not immune from opioid epidemic

McKnight’s Senior Living

‘Astounding’ number of opioids prescribed to elderly, report finds

Opioid use among seniors: A growing concern

Seniors Are Suffering from an Opioid Epidemic

- 12 million Medicare opioid prescriptions were written last year - is this a crisis? Or just pain management?

Robert McCarvey  Follow  Jul 5, 2016 9:11 AM EDT
Prescription Opioids and Seniors
Meet Rose

- 65 y/o widow, 1 daughter
- Diabetic, hypertension, rheumatoid arthritis
- Lives alone in Tustin
- Occasional visits from friends.
- Forgets she has taken an 80 mg oxycodone and takes a second within 2 hours. She becomes dizzy and falls and breaks her hip. Decrease QOL and increase risk of death.
- **How do we improve medication safety?**
Meet Chris

• 71 y/o male with no children

• Metastatic Prostate Cancer

• Lives alone in Huntington Beach

• Recently discharged from hospital after diagnosis of metastatic prostate cancer. Has difficulty going to med/onc due to pain.

• How do can we adjust patient’s pain medication at home?
Prescription Opioids and Seniors

- Prevalence of pain in elderly in home (25-50%) and nursing home (75%) (Ferrell 2003)

- More than 40% of Seniors over 65 take 5 or more medications (CDC)

- 44% seniors have low health literacy and have difficulty understanding how medicine is prescribed and take too little or too much.

- 12 million Medicare beneficiaries received at least one prescription opioid painkiller in 2015 (US Office of Inspector General)

- Cost of $4.1 billion to Medicare

- From 2006-2012, 78% increase in ED visits from misuse of drugs with 11% from opioids (Gerontological Society of America)
Why the high rate of opioid related side effects in elderly?

<table>
<thead>
<tr>
<th>Reduced Kidney Function</th>
<th>Reduced Liver Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced GI absorption</td>
<td>Poly-Pharmacy</td>
</tr>
<tr>
<td>Depression / Anxiety</td>
<td>Disorientation</td>
</tr>
<tr>
<td>Memory Loss</td>
<td>Chronic Boredom / Isolation</td>
</tr>
</tbody>
</table>
Challenges for Healthcare Providers in Managing Pain in Seniors

“How frequently are they taking their pain medication?”

“Are they taking their opioids correctly?”

“How effective is it helping their pain / QOL?”

“How can I adjust their pain medication up or down if I don’t know how they are taking it?”
Right Person, Right Time, Right Dose

**HOW PICARD WORKS**

- **Thumb print sensor** - recognizes patient and dispenses medication
- **Controlled dosage** - is dispensed when patient is due, otherwise device locks-out attempts.
- **Location is registered** - for security. If PICARD is lost or stolen, it locks and sends an alert to the patient along with current location.

**WHAT DATA IS COLLECTED**

- Number of **attempts**
- Any **unauthorized attempts**
- **Time/date** each pill is dispensed
- **Self-reported pain-level score** - Occasional inquiries are sent to 45-60 minutes after medication is dispensed.
- **Activity and vital statistics** from smartwatch

*[UC Irvine Health]*
PICARD Open Developer Platform with Machine Learning

PICARD AI + API Developer Kit
Use case scenarios

• Keeping seniors at home for longer time and safer.

• Use PICARD and machine learning to predict future trajectories in health and prevent it.

• Use PICARD and wearables to study how opioids improve not not improve functional activity.

• Use PICARD to study habits of elderly taking medication as they get older, and thus design interventions?

• Use PICARD as a “Safe Alert” for medication instead of falls.
How do we improve technology adoption in seniors?

• “Product is not for me”
  • Improve design thinking by talking to the core users... Seniors!

• Reframing Financial and Opportunity Cost
  • Reduce need for institutional care and # caregiver hours
  • Maintain autonomy and living at home longer

• Appeal to Adult Age Children

• Double Edge Sword
  • “What if I fall? Will my kids want to put me in a nursing home?”

• “Aging into” technology
THANK YOU

Contact: rwei@uci.edu

UCI Medical Center
Dr. Solomon Liao (Geriatrics/PM)
Dr. Randy Wei (Oncology)
Rossenne Pirello (pharmacy)
Nance Hove (Risk Management)
Kathryn Osann (Statistics)

Duke Medical Center
Dr. Padma Gulur (Anesthesia)

CallIT2
Dr. GP Li
Dr. Sergio Gago
Dr. Linyi Xia
Jason Kwon (graphics)
All undergrads and grads