COVID-Related Challenges and Solutions: Experiences from Cedars-Sinai Conducting a Remote Clinical Phase II Trial

Brennan Spiegel, MD, MSHS
Cedars-Sinai
Clinical Trials Are Moving Out of the Lab and Into People’s Homes

After the pandemic forced thousands of trials to shut down, researchers found clever ways to conduct human studies remotely — while reaching more people, quickly and cheaply.

There is also the unpredictable nature of human behavior: Dr. Brennan Spiegel, a gastroenterologist and the director of health services research at the Cedars-Sinai Health System, frequently uses Fitbits to monitor trial subjects remotely. But a participant once put the device on a dog. Several others sent their Fitbits through the wash. “You get a lot of steps all of a sudden — thousands and thousands of steps,” he said.
cLBP

Non-Immersive Sham VR

Immersive Distraction VR

Immersive Skills-Based VR

- Psychoeducation
- Pain education
- Breath training
- Relaxation training
- Executive functioning
Skills-Based VR
Distraction VR
Sham VR

Treatment Period

Follow-Up Period

Use PRN at patient discretion
Use PRN at patient discretion
Use PRN at patient discretion

Patient Reported Outcome (PRO) Assessments
Continuous Wearable Activity Monitoring

Study Week

0 4 8 12
Study Sites

- Cedars-Sinai Medical Network
- Rheumatology Clinic
- Chronic Pain Program
- Mark Goodson Spine Center
Enrollment Update – February 24th, 2021

Clinics
N= 165
- Rheum n=23
- Pain n=72
- Spine n=70

Email sent = 197

Eligible not called yet = 118

Consent Sent = 96

Screened 429

CT.gov/other = 15

Interested

Eligible pending phone call = 29

Consent Sent = 96

Enrolled = 1
Needs to sign = 1

Randomized = 63

Ineligible = 30
w/o email = 21

Email Declined = 4

Ineligible = 11
Declined = 18
No ans. x3 = 18

Screen failure = 1
No consent>2wk = 4

107 Excluded

87 Excluded
Recruitment Progress
(Through Feb 27th)
Study Flow Does Not Require In-Person Contact

I. Recruitment Period

II. Randomization & Preparation

III. Active Study Period
Remote e-Consenting

Hello

This is the consent form for the digital pain reduction study. After you have signed this consent form we will be able to mail a TENS unit (pain reduction massage pad) to your home that is free for you to use throughout the study and after. There is a chance you may also get a virtual reality system that is made to reduce pain which would be mailed to you as well. Feel free to call 310-423-5434 if you have any questions.

Best,
Brandon Birkhead MD

(8) You have been provided with a copy of the “Experimental Subject’s Bill of Rights”, if applicable to this research study, and have been provided with an opportunity to ask questions regarding the Bill of Rights.

We will give you a copy of this signed and dated consent form and a copy of the Experimental Subject’s Bill of Rights.

SIGNATURE BY THE PARTICIPANT:

Name of Participant (Print)  Signature of Participant  Date of Signature

SIGNATURE BY THE INVESTIGATOR:

Signature of the Investigator Who Obtained Consent  Date of Signature
Packaging and Sending Devices
Decontaminating Devices

First
- Germicidal Wipes

Second
- Alcohol-based Lens Wipes

Third
- UV Light Box

Fourth
- 3-day Quarantine
Packaging and Sending Devices
Tracking Receipt of Devices

Python

```
import requests

def get_package_details(track_no):
    try:
        headers = {
            'Origin': 'https://www.fedex.com',
            'User-Agent': 'Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/50.0.2602.110 Safari/537.36',
            'Content-Type': 'application/x-www-form-urlencoded; charset=UTF-8',
            'Accept': '*/**',
            'Accept-Language': 'en-US,en;q=0.8',
            'Referer': 'https://www.fedex.com/apps/fedextrack/trackingnumbers?%locale=en_CA&entry_code=ca_english&trackingnumbers=' + str(track_no),
            'Accept-Encoding': 'gzip, deflate, br',
            'X-Requested-With': 'XMLHttpRequest',
        }

        data = {
            'trackingNumber': str(track_no),
        }

        url = 'https://www.fedex.com/trackingcalc/track'

        response = requests.post(url, headers=headers, data=data)
        print('Sending request...')
    
```

Scraping FedEx delivery server...

<table>
<thead>
<tr>
<th>Materials sent:</th>
<th>Patient Name</th>
<th>status</th>
<th>mails</th>
<th>mails_delivered_date</th>
</tr>
</thead>
<tbody>
<tr>
<td>STD</td>
<td>John Doe</td>
<td>Delivered</td>
<td></td>
<td>Wed 2/26/2020 16:18</td>
</tr>
<tr>
<td>138</td>
<td>Jane Doe</td>
<td>Delivered</td>
<td></td>
<td>Thu 2/27/2020 15:00</td>
</tr>
<tr>
<td>193</td>
<td>John Doe</td>
<td>Delivered</td>
<td></td>
<td>Thu 2/27/2020 14:43</td>
</tr>
<tr>
<td>192</td>
<td>John Doe</td>
<td>Delivered</td>
<td></td>
<td>Thu 2/27/2020 14:43</td>
</tr>
<tr>
<td>191</td>
<td>Jane Doe</td>
<td>Delivered</td>
<td></td>
<td>Thu 2/27/2020 14:43</td>
</tr>
<tr>
<td>211</td>
<td>John Doe</td>
<td>Label created</td>
<td></td>
<td>Thu 3/05/2020 14:31</td>
</tr>
</tbody>
</table>
Bugs Will Bite
# Survey Response Monitoring with REDCap

<table>
<thead>
<tr>
<th>Record ID</th>
<th>Survey</th>
<th>Month 2: Usage 14 (c)</th>
<th>Month 2: Usage 15 (c)</th>
<th>Month 2: Usage 16 (c)</th>
<th>Month 2: Usage 17 (c)</th>
<th>Month 2: Usage 18 (c)</th>
<th>Month 2: Usage 19 (c)</th>
<th>Month 2: Usage 20 (c)</th>
<th>Month 2: Usage 21 (c)</th>
<th>Month 2: Usage 22 (c)</th>
<th>Month 2: Usage 23 (c)</th>
<th>Month 2: Usage 24 (c)</th>
<th>Month 2: Usage 25 (c)</th>
<th>Month 2: Usage 26 (c)</th>
<th>Month 2: Usage 27 (c)</th>
<th>Month 2: Usage 28 (c)</th>
<th>End of Study Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>87</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>88</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>89</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>91</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Logo: REDCap

Logo: Twilio

**NIH HEAL INIATIVE**

**BACPAC**

---

16
With Remote Trials, It’s Vital to Keep Engaging

1. Survey Scheduled
   - No → Survey Administered
   - Yes → Day 90?
     - Yes → Verify Patient Address Unchanged
     - No → Yes
     - No → Complete Headset Return
     - Yes → Send Honorarium
     - No → Skills-Based?
       - Yes → Follow-Up Survey
       - No → Complete

2. Survey Administered
   - No → Yes
   - Yes → Survey Completed?
     - Yes → Twilio/REDCap Reminder (x3)
     - No → No
     - No → Reminder Call
     - No → No
     - No → Responsive
     - Yes → Lost to Follow-Up
     - Yes → Yes

3. No → Yes

4. Complete
# Identifying Nonadherent Participants At-a-Glance

## REDCap Dashboard

<table>
<thead>
<tr>
<th>Record Id</th>
<th>SSQ</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
<th>Week 9</th>
<th>Week 10</th>
<th>Week 11</th>
<th>Week 12</th>
<th>Journal 2</th>
<th>Journal 3</th>
<th>Journal 4</th>
<th>Journal 5</th>
<th>Journal 6</th>
<th>Journal 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>+</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>17</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>19</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>20</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>21</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>22</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>23</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>24</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>25</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>26</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>27</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>28</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>29</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>30</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>31</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>32</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>33</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>34</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>35</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>36</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>37</td>
<td>+</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Making REDCap More Readable and Motivating

My Survey Timeline

Usage Survey Completion Rate

Weekly Survey Completion Rate

Survey Type
- Startup
- Usage
- Weekly
- End of Study

Legend
- Green: Surveys Completed
- Red: Surveys Missed
- Gray: Surveys Remaining

39.3%
50.0%
Key Points

• Remote patient trials have proven successful during COVID-19
• Cohort builders (eg. Deep 6 AI) can expedite recruitment at a time when fewer patients have been visiting their clinicians
• Use of wearables allows remote biometric monitoring
• Use of web-based platforms allows remote PRO monitoring
• Critical to run a tight ship (we’re literally a shipping station)
• Develop streamlined digital monitoring dashboards
• Find ways to engage patients outside of the clinical environment
Thank you