



@kimkater

Feasibility of “Symptom Discovery,” a Longitudinal and Comprehensive Data Collection Tool during COVID-19

Sayantani Sarkar, PhD, RN

Post-Doctoral Fellow, Yale University School of Nursing

Katherine Kim, PhD, MPH, MBA

Principal, Consumer Health Informatics, MITRE Corporation and Adjunct Associate Professor, University of California Davis





Background

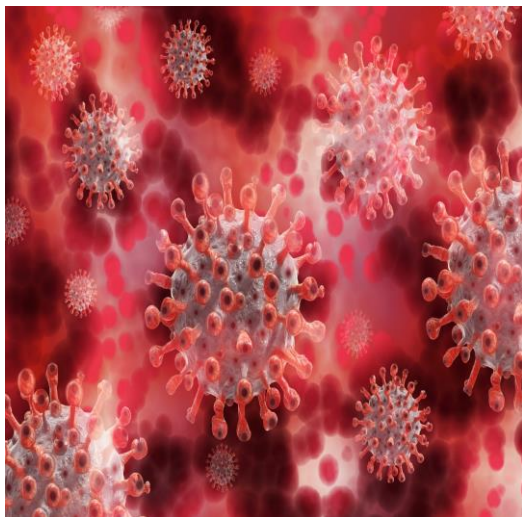


Image Source: Licensed by CC0 Public Domain

- Initial CDC-provided symptom list for COVID-19 was limited (Allen, 2020)
- New signs and symptoms emerged throughout the pandemic, (Russell, 2020; Henry, 2020).
- Few patient or public-facing tools for longitudinal and comprehensive symptom assessment were available for uncharacterized conditions for which symptoms were not fully specified.



Purpose

To explore the feasibility of “Symptom Discovery” mobile app for comprehensive and longitudinal symptom assessment





User Centered Design Method

- Brainstorming with multidisciplinary team members (faculty, graduate and undergraduate students, and patient representatives) with expertise in computer science, medicine, nursing, and informatics
- Wireframes for low-fidelity prototype
- User feedback on high-fidelity app prototype
- Production app developed with the help of an IT firm





Data Collection

Symptom Discovery

Modified Colorado Symptom Index

7/18 33.3% Complete

There are many reasons people delay getting medical care. Have you delayed getting care for any of the following reasons in the PAST 12 MONTHS? (Select all that apply)

- Could not get transportation
- Could not get time off work
- Could not get childcare
- Provide care to an adult and could not leave
- Could not afford to pay for medical care
- None of these apply

SKIP

Symptom Discovery

Report test Result

Enter details of the test below

Test date* Result date*

Select a test type

How was your sample collected?

Select a test result

Upload up to 3 images or documents showing your test results

Photos Camera PDF

Symptom Discovery

Steps 1 of 4

Whole body
Do you have any of these?

Body aches
NONE SEVERE

Chills
NONE SEVERE

General discomfort
NONE SEVERE

Weakness
NONE SEVERE

Pain - pick a spot

Mark the area where you feel pain, have a rash, or see skin discoloration.

Front Rear

R L

Symptom Discovery

Steps 4 of 4

Do you have any symptoms in these specific parts of the body?

Head

Head/Neck Eyes

Upper Torso

Heart/Lungs Breast

Lower Torso

Stomach & Abdomen Reproductive Organs

Symptom Discovery

Any final comments?

Describe anything else unusual with your health, or select review summary to review your symptoms.

Comment

Review Summary

Submit

Health
History

Lab Test &
Results

Comprehensive Symptoms by Body System
(Likert scale, pinpoints, text)



Recruitment

- Eligibility Criteria
 - US Resident
 - English Reader
 - 13 years or older (Participation of 13 to 18-year-old adolescents required parent/guardian consent)
- Outreach
 - Social media paid and organic ads
 - <https://studypages.com/ucdavis/home/>
 - Incentive up to \$60 prorated by number of daily survey completion





Results

Demographics

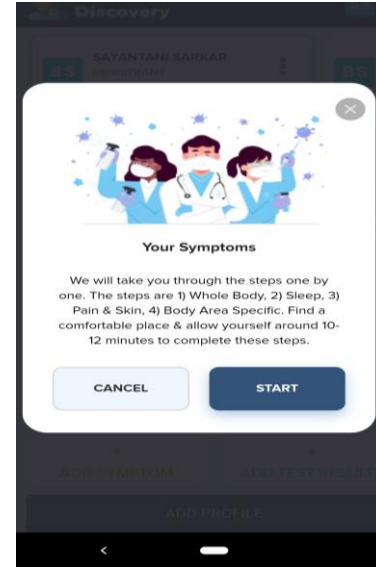
- 79% biological female
- 85% have at least some college education
- 47% non-Hispanic white
- 96% have health insurance
- 3 child profiles

Health History	Number	%
Heart and Blood Conditions (n=112)	37	33.04
Lung conditions (n=111)	33	29.73
Cancer (n=109)	12	11.01
Digestive conditions (n=109)	28	25.69
Hormone/endocrine conditions (n=109)	20	18.35
Kidney conditions (n=109)	3	2.75
Bone, joint, muscle conditions (n=109)	24	22.02
Hearing and eye condition (n=109)	63	57.80
Infectious diseases (n=109)	44	40.37
Brain and nervous system conditions (n=109)	19	17.43
Obesity (n=74)	20	27.03
Skin condition (n=74)	24	32.43



Results

- 2,707 total daily symptom surveys
 - 89 participants (m = 30.42, SD 28.31, range 1-95)
- 45 day median duration of symptom data collection
 - (m = 44.72, SD 28.31, range 1-380)
- 247 lab tests
 - 51 participants (mean 4.84, SD 6.24, range 1-27)
 - 13 uploaded test result images
 - 11 had positive COVID result
 - Test samples 25 by saliva, 25 by nasal swab in two nostrils, 1 by throat/mouth





Discussion

- Demonstrated an innovative approach that allowed for assessment of the whole body via three modes:
 - selection on a body graphic
 - symptoms ratings on a Likert scale
 - multiple-choice questions
- Longitudinal data collection was feasible, with a median duration of 45 days
- Prorated and stepped incentives may be useful for data collection
- May be useful for symptom research in other emerging infections and chronic conditions as well as ongoing monitoring of long COVID.



Acknowledgements

UC Davis Research Team: Jill Joseph, School of Nursing, Joanne Natale, School of Medicine, Xin Liu, Computer Science

Community Partner: Hugo Campos

References

1. Allen WE, Altae-Tran H, Briggs J, Jin X, McGee G, Shi A, et al. Population-scale longitudinal mapping of COVID-19 symptoms, behaviour and testing. *Nat Hum Behav.* 2020;4(9):972-82. doi:10.1038/s41562-020-00944-2.
2. Russell B, Moss C, Rigg A, Hopkins C, Papa S, Van Hemelrijck M. Anosmia and ageusia are emerging as symptoms in patients with COVID-19: What does the current evidence say? *Ecancermedicalscience.* 2020;14:ed98. doi:10.3332/ecancer.2020.ed98.
3. Henry D, Ackerman M, Sancelme E, Finon A, Esteve E. Urticarial eruption in COVID-19 infection. *J Eur Acad Dermatol Venereol.* 2020;34(6):e244-e5. doi:10.1111/jdv.16472.



Thank You