

CURE ID Report on COVID-19 Outcome Measures of Importance to Patients July 2023

A collaboration between:

- U.S. Food & Drug Administration (FDA)
- National Center for Advancing Translational Sciences of the National Institutes of Health (NCATS/NIH)
- Critical Path Institute's CURE Drug Repurposing Collaboratory (CDRC)



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Introduction

CURE ID is an application jointly developed by the United States Food and Drug Administration (FDA) and the National Center for Advancing Translational Sciences (NCATS), part of the National Institutes of Health (NIH), that aims to collect real-world data (RWD) on drug repurposing in infectious diseases. In 2020, through a public-private partnership created with the Critical Path Institute (C-Path), the CURE Drug Repurposing Collaboratory (CDRC) was born to further this mission. The CDRC allowed for further engagement of stakeholders from academia to patient advocacy groups.

A challenge CURE ID faced was getting busy physicians to report cases. As a result, our team decided to focus on other methods of collecting data. We concluded that extracting data from electronic health records (EHRs) had potential, as it avoided the need for data entry by busy physicians.

The FDA received funding through the Department of Health and Human Services' (HHS) Office of the Assistant Secretary for Planning and Evaluation's (ASPE) Patient-Centered Outcomes Research Trust Fund (OS-PCORTF) in 2021 to build an automated EHR extraction tool – the “EDGE tool”. It was initially designed for use in acute COVID-19 with applicability to other diseases.

The inclusion of patient perspectives in clinical research and care using EHRs is crucial, yet frequently missing. We sought to identify COVID-19 outcome measures that are important to patients (beyond death and length of stay) and might be collected in EHRs either inpatient or outpatient, enabling their extraction. Through the development of the EDGE tool, we have become familiar with data that is available in EHRs, which informed our assessment. We spoke with patients individually in one-on-one interviews, as well as led a focus group with COVID-19 participants through the Patient Engagement Studio (PES) at the University of South Carolina. We concluded that besides death and length of stay in hospital (if hospitalized), structured data that could be extracted by the EDGE tool did not meaningfully reflect acute COVID-19 outcomes that are important to patients. In this report, we share our findings with recommendations for future research.



Assessment Through Individual Interviews

We conducted interviews with four patients who had recovered from acute COVID-19, six months to one year previously. Despite significant recruitment efforts we were not able to interview as many patients as we had hoped due to barriers shared in our limitations section. We went into the individual interviews with questions designed to engage participants by asking them to describe their acute COVID-19 infection and to share the highest level of care they received.

Patient 1 was in critical condition spending months in the intensive care unit (ICU) while patients 2 through 4 were treated at home either using prescription medications or over the counter (OTC) therapeutics.

We followed by asking three questions that were developed with the support of the CDRC Patient Advisory Committee. The Committee was comprised of 7 patients and care-partners living with or caring for patients with different diseases. The committee meets monthly and two sessions were dedicated to discussing recruitment and questions for this assessment. Below are the questions:

1. What made you realize you were getting better?
2. What (if anything) do you still struggle with today?
3. After explaining what EHR data is and what types of data are available: What outcome measures do you feel could be extracted from EHR data to supplement research?

These questions served as a starting point with follow-up questions asked based upon the individual's answers.

Participants' responses are reflected in the table below.



Table 1: Common responses from individual interviews

Questions	Common Responses
<p>What made you realize you were getting better?</p>	<ul style="list-style-type: none"> • Increased autonomy - 4/4¹ • Ability to provide care for themselves and others - 4/4 • Having enough physical energy to socialize and/or work - 4/4
<p>What (if anything) do you still struggle with today?</p>	<ul style="list-style-type: none"> • Post-Acute Sequelae of COVID (PASC or Long COVID) - 4/4 • Mental health - anxiety and depression - 4/4 • Need for hybrid work environment for flexibility with bad days - 4/4 • Need to re-strategize work (e.g., setting timers because of brain fog, asking for accommodations with extended deadlines, taking a reduced course load, etc.) - 4/4 • Necessity for naps/rest - 4/4 • Financial stress - 3/4 • Transportation difficulties (e.g., not being safe to drive or the way exertion such as long walks or stairs can exacerbate symptoms) - 4/4
<p>What outcome measures do you feel could be extracted from EHR data to supplement research?</p>	<p>Patients did not identify specific outcome measures that would both be important to them and extractable in current EHRs, however they highlighted some of their priority outcomes and limitations of current data:</p> <ul style="list-style-type: none"> • EHRs do not include data that relates to patient priority outcome measures (e.g., brain fog) - 4/4 • Current inpatient data is more structured towards outcomes measures that are objective and easy to quantify (e.g., laboratory values), whereas patient perspectives may be more subjective - 4/4 • EHR data does not reflect patient experiences accurately (e.g., amount of antiemetics prescribed did not correlate with intensity of nausea experienced/efficacy of the drugs) - 4/4

¹Scoring indicates how many participants responded (e.g., 2/4 or 4/4)



All four participants had been diagnosed with Long COVID, which is estimated to impact 27% of acute COVID-19 patients.¹ They experienced a variety of Long COVID symptoms and reported that brain fog and fatigue had the largest impact on their day-to-day lives. Outcome measures they cared about included the ability to take care of themselves or others and the ability to function normally in work or school. These are not measures that can currently be obtained from EHRs, particularly as structured data variables.

Notably, all the individual interviews took place 8-12 months after the patients' initial acute COVID-19 infection. Only one of the participants was hospitalized for their acute COVID-19 infection. We concluded that at the time of the interviews, patients were more focused on their current concerns than on their experiences during acute COVID-19.

Patients also consistently brought up the impact of their diagnosis on their mental health, which remains a topic that is not adequately captured in structured data in EHRs.

Overall, we found that currently EHRs are not designed to capture many outcomes that are important to patients. Further work should address the value and feasibility of including validated and standardized patient reported outcome (PRO) measures in EHRs.

Assessment Through PES Focus Group

We were only able to get four patients to participate in the interviews described above. In an effort to receive input from larger numbers of patients we designed a short, online survey (refer to Figure 1). The goal of the focus group was to obtain feedback on a proposed survey asking patients about priority COVID-19 treatment outcomes and to determine whether such a survey would have utility.

A one-hour focus group session was convened by the COVID-19 Patient Engagement Studio (PES) at the University of South Carolina, funded by the Patient Centered Outcomes Research Institute (PCORI). The focus group included four patients (distinct from those who participated in the individual interviews) who had experienced acute COVID-19 within the previous 3 years.

The members of the PES were asked to discuss:

1. Whether the outcome measures listed in Figure 1 were in line with patients' interests.
2. Whether the suggested EHR data points were reflective of the patients' experiences.
3. Ways to effectively disseminate the survey.

¹ National Center for Health Statistics: Long COVID. (n.d.). Retrieved from Center for Disease Control and Prevention: <https://www.cdc.gov/nchs/covid19/pulse/long-covid.htm>



Figure 1: Outcome Measures Survey for Acute COVID-19

1. Are you 18 years of age or older?
 - a. Yes
 - b. No (if no, end survey)
2. Were you hospitalized for COVID-19?
 - a. Yes
 - b. No (if no, end survey)
3. Rank the following treatment outcomes in terms of what is most important to you:
 - a. Death
 - b. Length of hospital stay
 - c. Where you were discharged to (ex. home, rehab, long-term care facility, etc.)
 - d. Need for supplemental oxygen
 - e. Need for pain medication/management
 - f. Ability to walk without assistance
 - g. Ability to think clearly (without brain fog or cognitive impairment)
 - h. Your ability to stay awake during the day (lack of fatigue)
 - i. Other: _____
4. Amongst the following information that is generally captured in electronic health records during hospitalization, which of the following would you consider representative of meaningful outcome measures? Check all that apply.
 - a. Vitals
 - b. Level of nursing assistance required for tasks such as going to the bathroom
 - c. Being catheterized
 - d. Blood work
 - e. Imaging
 - f. Number of inpatient physical therapy sessions
 - g. Number of inpatient occupational therapy sessions
 - h. Number of inpatient speech therapy sessions
 - i. How long your hospital stay was
 - j. Where you were discharged to after leaving the hospital
 - k. Amount of pain medication given
 - l. Pain rating scale
 - m. Amount of Zofran or other anti-nausea medication given
 - n. Urine output
 - o. Amount of supplemental nutrition required
5. What treatment outcomes should researchers prioritize studying to be more patient-centered (e.g., activities of daily living)?
 - a. Free text box

Participants' responses are reflected in the table below.



Table 2: Common responses from PES focus group

Questions	Common Responses
<p>Whether the outcome measures listed were in line with patient interests</p>	<p>With the exceptions of brain fog and fatigue, the outcome measures listed in the survey were not in line with patient interests. Instead, the patients were interested in the following:</p> <ul style="list-style-type: none"> • Ability to eat, drink, shower, and dress safely 4/4¹ • Ability to continue down the same career trajectory as prior to their Long COVID diagnosis 3/4 • Ability to hold down any type of job 3/4 • Ability to care for themselves or others 4/4 • Ability to financially support themselves and their families (if relevant) 4/4
<p>Whether the suggested EHR data points were reflective of the patients' experiences</p>	<p>Suggested EHR data points from the survey were not reflective of the patients' experiences, instead patients stated:</p> <ul style="list-style-type: none"> • Outcome measures that are priorities to patients are not currently present in inpatient EHRs 4/4 • Patient priority measures tend to be more subjective whereas data available in EHRs are objective and easy to quantify (e.g., radiology results) 4/4 • The data available in EHRs does not accurately reflect their experiences (e.g., patients review of their medical records indicated the amount of pain medications prescribed did not correlate with amount of pain experienced) 4/4
<p>How to effectively disseminate the survey</p>	<p>Patients recommended the following to effectively engage in patient-centered outcomes research:</p> <ul style="list-style-type: none"> • Be mindful of energy limitations 4/4 • Be mindful that symptoms can fluctuate, and researchers must be flexible in scheduling any interviews/focus groups/etc. 4/4 • Be mindful of incentives offered to participate and ensure they are reflective of the cost of participation for patients 4/4 • Financial incentives along with data access incentives were of interest 4/4

¹Scoring indicates how many participants responded (e.g., 2/4 or 4/4)



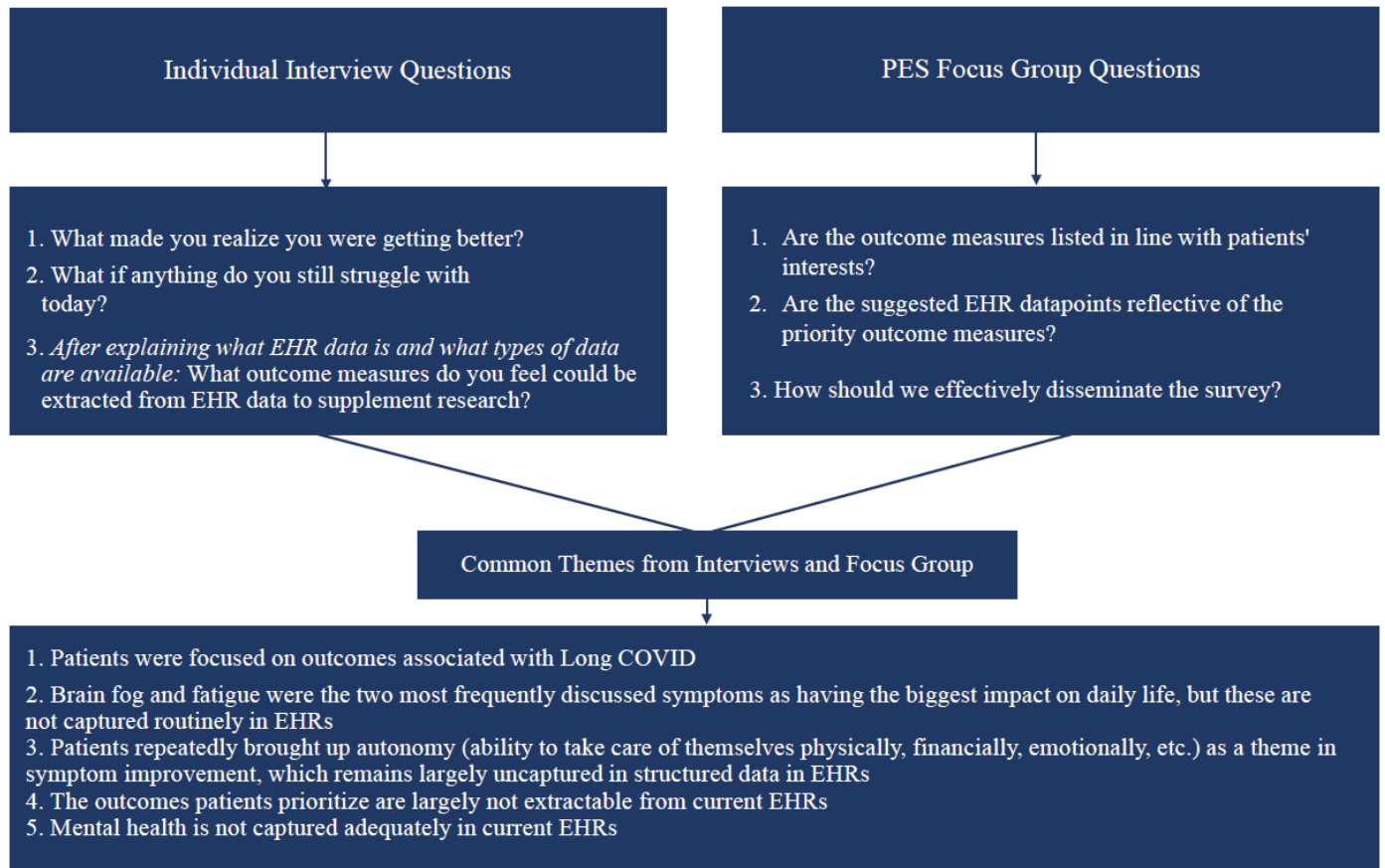
We found that the data designed to be collected through the survey did not align with patient interests. Confirming the findings from the individual interviews, we found that the focus group also prioritized Long COVID over acute COVID-19. This could be partly due to the timing of the focus group discussion as participants were anywhere from 6 months to 3 years post initial acute COVID-19 diagnosis. Members of the focus group also echoed individual interview participants' statements about the reliability of EHRs and their ability to reflect patient priority outcome measures. Participants in the focus group did not feel that there would be benefit in conducting the survey described in Figure 1.

Limitations

- Patients' priorities are related to Long COVID.
- Patients struggled to commit their time and energy for interviews.
- Patients reported financial difficulties because of their inability to work due to their symptoms.
- Patients reported that participation in this type of assessment would require significant financial incentives.
- Scheduling and conducting interviews was difficult because patients were unable to predict when their symptoms would occur.



Figure 2: Assessment Process



Conclusion

We aimed to identify outcome measures that can be extracted from EHRs which are important to patients in research of acute COVID-19. We found that patients are focused on Long COVID rather than acute COVID-19. It is pertinent to note that this finding might be partly attributable to the timing of the assessment. Patients also communicated outcomes of importance that either do not exist in current EHRs or are not captured in ways that make them readily extractable. EHR data are often objective (e.g., laboratory values) whereas the outcomes patients reported to be important were largely subjective and related to quality of life. Patients raised concerns about EHR data not accurately representing their experiences.

Recommendations for Future Research:

- Continuing engagement with patients to identify outcome measures of importance.
- Customizing data capture in EHRs to facilitate research of importance to patients.
- Including validated patient reported outcomes (PRO) measures in EHRs should be considered to accurately reflect the intensity and nature of patients' symptoms.

