Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Collection of expectorated sputum or oral pharyngeal cultures during initial period of the COVID-19 pandemic in a pediatric cystic fibrosis clinic

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Background: The COVID-19 pandemic has necessitated novel practices to ensure that children with cystic fibrosis (CF) receive the care that approximates guidelines and evidence-based care as much as possible. The guideline targeted in this project was the routine collection of expectorated sputum or oral pharyngeal cultures quarterly. The catchment area for our patients covers 4 states: Utah, Idaho, Nevada, and Wyoming. In 4 years, 403 patients were seen; 34% (137) of them live in rural zip codes. The aim of this project was to rapidly adapt during the initial period of the COVID-19 pandemic to ensure that as many children as possible received routine surveillance of pulmonary pathogens, every 3 months, via an oropharyngeal swabbed culture or an expectorated sputum culture, regardless of the distance to the CF center.
Methods: Multiple PDSA cycles were utilized to implement practice change in a rapid manner over a 4-month period (Figure 1). A multidisciplinary team, including 2 parents of children with CF, were involved in the process. Cultures were obtained via curbside appointment with CF registered nurses, self/parent-collected at home with mailed directions and supplies, or at traditional in-person clinic visits.

Obtain CF sputum/oral pharyngeal cultures	Test Cycle 1	Test Cycle 2	Test Cycle 3	Test Cycle 4	Test Cycle 5	Test Cycle 6
Test Description:	Pilot curbside cultures with RN	Mail swabs and sterile cups to patients close to a sister facility	Implement curbside cultures with RNs for patients within reasonable driving distance	Mail swabs and sterile cup to remaining patients after labs with appropriate processing identified	Change shipping providers due to cost.	Call/message families to remind them to obtain specimen and take to identified lab
Test Population:	Patients who need cultures as part of treatment decision making	Patients who live close to a sister facility	Patients who live within driving distance of the facility	Patients who live rural communities	Patient who are unable to come in person	Patients who have not returned cultures
Location of test:	Parking lot	Patients' home	Parking lot	Patients' home	Clinic	Clinic/Staff workplace
Start Date	3/20	4/15	5/4	5/7	6/3	7/9

Figure 1.

Results: In 4 months, 133 cultures were obtained outside of traditional in-person visits. Sixty-seven of these were curbside cultures. A total of 120 cultures were mailed, and 66 (55%) were returned. Ninety-eight patients (81.7%) lived within a reasonable distance of an affiliated facility where the specimen could be dropped off and couriered to our laboratory. The remaining 22 patients required coordination to determine a laboratory within a reasonable distance that was covered by insurance and that could process the specimen and provide accurate results. Of the 2 groups, the return rate was similar—12 out of 22 (54.5%) of the nonaffiliated facilities and 54 out of 98 (55.1%) of the affiliated facilities group. The average time from telehealth clinic to completion of culture was 22.65 days; range 2–117 days, median 13 days. Costs of shipping culture collection supplies and the options for more cost-effective shipping were reviewed. Twenty-nine swabs/specimen cups were mailed via a private shipping company, resulting in a total cost of $543.56. Culture collection kits were subsequently mailed via the United States Postal Service (USPS); this decreased cost to $3.80 per item shipped. The total cost of shipping the culture kits via USPS was $216.60 for 57 cultures.
Conclusion: PDSA cycles can be used to make rapid practice changes. Despite challenges caused by the COVID-19 pandemic, rapid testing and adapting made it possible for all patients regardless of location of residence to receive high-quality care. Ongoing quality improvement efforts, including telehealth visits, are aimed at decreasing barriers to care for patients that live a significant distance from clinic and in areas with limited health care resources.
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Development of a decision aid for adult-diagnosed cystic fibrosis in a community hospital CF program

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Background: CF remains underdiagnosed in adults. Contributing factors are perceived rarity of occurrence of late-onset CF, frequent mild symptom presentation, and commonality with symptoms seen in disorders unrelated to CFTR dysfunction. Numerous benefits to adult-diagnosed CF exist [1]. Clinicians are challenged in determining whether there is sufficient clinical suspicion of CF to refer a patient for sweat chloride (SC) testing and/or CFTR mutation analysis (CFTRMA). The study objective is to implement a clinical decision aid/prediction model that can be used to determine who to refer for CF testing (SC/GM) with comparable or better accuracy than based on clinical judgement.
Methods: The study is a retrospective analysis of all patients (119 adults from 2005 to June 2020) referred for SC testing at Santa Barbara Cottage Hospital due to clinical suspicion of CF or referred to our CF center for newly diagnosed CF or possible CF. The study patients were classified as CF diagnosis (A), CF not resolved (B), or CF unlikely (C) based on CF diagnosis guidelines [2]. The decision aid uses logistic regression (LR) analysis to estimate the patient CF diagnosis class probabilities based on the observed presence or absence of each of a predictor set of patient symptoms. A primary metric used in selecting symptoms for inclusion in the predictor set is the area (AUC) under the receiver operating characteristic (ROC) curve resulting from the application of LR analysis to the study data. The calculated class probabilities for a patient determine whether or not CF testing (SC/CFTRMA) is recommended.
Results: The study database covered 119 patients with CF class membership counts as follows: A (22), B (52) and C (45). Stage 1 of the decision aid processing focuses on differentiating A patients from B/C patients using the presence of LR predictor variables: exocrine pancreatic insufficiency, MRSA, *Aspergillus* species, infertility, MSSA, pancreatitis, and asthma. Stage 2 focuses on separating those patients determined in Stage 1 not to belong to class A into B and C class using the presence of LR predictor variables: Nontuberculous mycobacteria, bronchiectasis, *Haemophilus influenza*, *Alcaligenes xylosoxidans*, and *Pseudomonas aeruginosa*. For each processing stage, the LR model coefficients were calibrated to the study patient data. The calculated AUC values and associated Mann-Whitney U test *P* values for the 2 stages were AUC1 = .852 ($p < .001$) and AUC2 = .622 ($P = .012$). The decision aid recommended for SC/CFTRMA testing all 22 of the class A patients and 47 of the 52 class B patients. Of the 45 class C patients 7 were not recommended for SC/CFTRMA testing. The positive predictive value obtained by applying the decision aid to the study database was 64%. Monte Carlo methods using randomized resampling will be used to determine the error statistics of the estimated values of the LR model parameters.
Conclusion: Applied to this patient cohort in whom there was a CF-like phenotype, the decision aid achieved a level of accuracy in predicting CF diagnosis outcomes (A, B or C) on a par with that achieved using clinical suspicion of CF as the lone referral criterion. The planned next step is the application of the decision aid to a large independent cohort for validation.
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References

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