diagnosed with CRMS may be followed by CF providers or general pulmonologists. European guidelines published in 2021 [1] precipitated an effort to standardize care across providers at our large CF center, as well as in general pulmonology groups. This quality initiative developed a standard CRMS care pathway based on guidelines and provider preference and established a CRMS clinic.

Methods: A survey about CRMS management was distributed to all pediatric CF providers. The survey consisted of seven multiple choice and one open-response question. Questions focused on provider preference for management such as follow-up timeline, throat and sputum cultures, and age of transition.

Results: Survey data revealed discrepant preferences across providers for CRMS management. Most providers reported that they would refer to a CRMS clinic run by an advanced practice provider that also has a genetic counselor present for annual management following established diagnosis of CRMS. Time of referral was split, with 22% choosing to refer immediately after diagnosis, 44% after 6 months old, and 33% after 2 years of age. Preference for throat cultures was split at 50%. Transition from CRMS clinic to as needed rather than annually was divided: 20% at aged 6, 40% at aged 14 to 16, and 40% at age18 with transition to adult CF center. Results of the survey were reviewed at a clinic-wide quality improvement meeting, and a final care pathway flow-chart was created and distributed to all providers as a reference for a new standardized care pathway.

Conclusions: This quality improvement initiative aimed to optimize consistency of care for patients with CRMS. Results of the survey emphasized that provider preference varies. Based on these findings and guideline implementation, our CF center has created a biannual CRMS clinic managed by advanced practice providers and a CF genetic counselor. The distributed flow-chart provides standard management for providers before referral to an annual CRMS clinic. In open-ended responses, providers emphasized inclusion of a genetic counselor in these clinics, which will provide opportunity for regular variant review, updates on variant classification, and counseling for families, as needed.

Reference

[1] Barben J, Castellani C, Munck A, Davies JC, de Winter-de Groot KM, Gartner S, *et al.* (ECFS NSWG). Updated guidance on the management of children with cystic fibrosis transmembrane conductance regulator-related metabolic syndrome/cystic fibrosis screen positive, inconclusive diagnosis (CRMS/CFSPID). *J Cyst Fibros* 2021;20(5):810–9.

151

Variable genetic counseling access and services for parents of infants who screen positive for cystic fibrosis in New York State

E. Langfelder-Schwind[1], D. Kay[2], M. Berdella[1], D. Joan[3], Z. Soultan[4], A. Dozor[5], C. Fortner[6], R. Giusti[7], D. Goetz[8], R. Kaslovsky[9], K. Voter[10], J. Welter[5],
New York State Cystic Fibrosis Newborn Screening Consortium[2,11], M. Caggana[2], H. Sadeghi[12], C. Kier[13]. [1]*Cystic Fibrosis Center at Mount Sinai Beth Israel, Department of Medicine, Icahn School of Medicine at Mount Sinai, New York, NY;* [2]*Newborn Screening Program, Wadsworth Center, New York State Department of Health, Albany, NY;* [3]*Cohen Children's Medical Center, New Hyde Park, NY;* [4]*State University of New York, Upstate Medical University, Syracuse, NY;* [5]*Westchester Medical Center, Westchester, NY;* [6]*Pediatrics, State University of New York, Upstate Medical University, Syracuse, NY;* [7]*Pediatric Pulmonology, Hassenfeld Children's Hospital NYU Langone Health, New York, NY;* [8]*University of Buffalo Medical Center, Buffalo, NY;* [9]*Albany Medical College, Albany, NY;* [10]*Pediatrics, University of Rochester Medical Center, Rochester, NY;* [11]*Cystic Fibrosis Specialty Care Centers, New York, NY;* [12]*Pediatric Pulmonology, Columbia University Irving Medical Center, New York, NY;* [13]*Stony Brook Children's Hospital, Stony Brook Medicine, Stony Brook, NY*

Background: The Cystic Fibrosis Foundation (CFF) has endorsed guidelines recommending genetic counseling by a provider trained in genetics with expertise in CF for all families of infants with a positive cystic fibrosis (CF) newborn screening (CFNBS) result [1]. The New York State (NYS) CFNBS Consortium has spearheaded an ongoing quality improvement effort to characterize the processes of the NYS CFNBS program and CF specialty care centers (SCCs), with a goal of improving outcomes and increasing access to care for referred infants with abnormal CFNBS results. NYS uses a three-tier immunoreactive trypsinogen (IRT)-deoxyribonucleic acid (DNA)-sequencing (SEQ) algorithm for CFNBS; infants with two or more CFTR variants of potential clinical relevance are referred for follow-up to an SCC. Infants with one CFTR variant are not referred to an SCC. Because the NYS Department of Health reports complex genetic information that requires interpretation and counseling about its implications, we sought to establish baseline rates of genetic counseling provided to parents of infants with CF screen-positive, inconclusive diagnosis/CF transmembrane conductance regulator (CFTR)-related metabolic syndrome (CFSPID/CRMS) or CF carrier status.

Methods: As part of a longer-term follow-up effort by the NYS NBS program and SCCs, a clinical and demographic dataset was compiled for infants referred between December 1, 2017, and November 30, 2021. Genotypes and CFTR phasing data were abstracted from NBS records. Demographic and clinical data, including information about provision of genetic counseling services, were requested from each SCC and tabulated to assess genetic counseling rates. Infants with a positive CFNBS (high IRT and more than one CFTR variant, with one or more variants of uncertain significance or varying clinical consequence), were included in this analysis. Infants classified as having CF were excluded. The NYS Department of Health Institutional Review Board determined this project to be exempt.

Results: Of 290 infants meeting study criteria, 273 (94.1%) were evaluated at least once. Of those, 225 were subsequently classified as having CFSPID/CRMS or as CF unlikely or CF carrier. Parental phasing studies confirmed that all CFTR variants were in cis for 32 infants, or the second variant was reclassified as non-CF-causing (n = 16). SCCs reported that 97 of 273 (35.5%) families saw a trained genetic counselor. CF physicians provided genetic counseling to 51 families (18.7%). Genetic counseling was not provided to 79 families (28.9%); data were not reported for 46 families (16.8%). Reasons provided for lack of genetic counseling included that a genetic counselor was not available (n = 15), the family already had knowledge because of prior child or prenatal testing (n = 3), the infant was adopted or in foster care (n = 2), and the family declined (n = 9). Genetic counseling rates at NYS CF centers for this population ranged from 0% to 100%.

Conclusions: Genetic counseling is provided inconsistently to parents of infants with a positive CFNBS result in NYS; in nearly one-third of cases in which genetic counseling was noted, the CF physician provided it. Inaccessibility of a genetic counselor was the primary reason given when genetic counseling was not performed. Additional efforts are needed to address access barriers to implement CFF recommendations regarding genetic counseling for parents of infants with a positive CFNBS result.

Reference

[1] Langfelder-Schwind E, Raraigh KS, Parad RB, Balcom JR, Birnbaum VK, Darrah R, *et al.* Genetic counseling access for parents of newborns who screen positive for cystic fibrosis: Consensus guidelines. *Pediatr Pulmonol* 2022;57(4):894–902.

152

My patient has an unresolved *CFTR* genotype…what next?

K. Raraigh[1], M. Sheridan[1], M. Aksit[1], K. Pagel[2], K. Hetrick[1], H. Shultz-Lutwyche[1], B. Myers[1], K. Buckingham[3], R. Pace[4], H. Ling[1], E. Pugh[1], M. Knowles[4], M. Bamshad[5,6,7], S. Blackman[1,8], G. Cutting[1]. [1]*McKusick-Nathans Department of Genetic Medicine, School of Medicine, Johns Hopkins University, Baltimore, MD;* [2]*Institute for Computational Medicine, Johns Hopkins University, Baltimore, MD;* [3]*Division of Genetic Medicine, Department of Pediatrics, University of Washington, Seattle, WA;* [4]*Marsico Lung Institute, School of Medicine, University of North Carolina, Chapel Hill, NC;* [5]*Department of Pediatrics, Division of Genetic Medicine, University of Washington, Seattle, WA;* [6]*Department of Genome Sciences, University of Washington, Seattle, WA;* [7]*Center for Clinical and Translational Research, Seattle Children's Research Institute, Seattle, WA;* [8]*Division of Pediatric Endocrinology, Johns Hopkins University School of Medicine, Baltimore, MD*

Background: Most individuals with cystic fibrosis (CF) have two causal variants in separate CF transmembrane conductance regulator (*CFTR*) alleles identified via genetic testing using a variant panel or sequencing of