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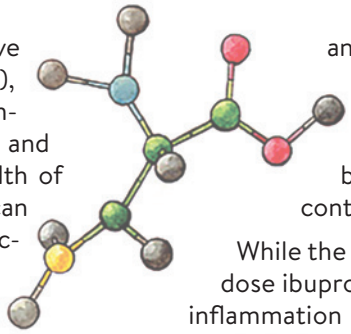
Stanford Children's Health | Lucile Packard Children's Hospital Stanford

Stanford MEDICINE

CYSTIC FIBROSIS CENTER NEWS

Potential Benefits of N-acetylcysteine (NAC) in CF Patients

BY CAROL CONRAD, MD



Oxidative stress is defined as an excessive load of reactive oxygen species (ROS), which cause ongoing or reversible damage in the body. This can occur in individual cells, and in specific body organs, and can affect the health of patients at the whole body level. Antioxidants can chemically react with ROS to quench and thus inactivate these reactive, damaging molecules. Cystic fibrosis is characterized by oxidative stress throughout the body and chronic inflammation in the lungs. Patients with CF are deficient in the body's major anti-oxidant, glutathione (GSH). This is thought to be due to many reasons, including dietary insufficiency, but being the major anti-oxidant of the body, GSH is highly utilized in areas of oxidative stress and inflammation. GSH serves multiple functions and is utilized by cells to regulate physiological functions such as DNA transcription, RNA translation, and subsequent protein synthesis. It is utilized to regulate protein functions and is vital in regulating dietary absorption of nutrients, storage and availability of essential proteins and fatty acids. Oxidation reactions are essential to fight infection and are generated when neutrophils ingest bacteria to rid the body of pathogens.

For reasons still unclear, in CF, the environment in the airways is strongly pro-inflammatory. After neutrophils have been recruited, neutrophil-derived oxidants are released into the airways, and contribute to ongoing tissue destruction. Oxidants, which include hydrogen peroxide, hypochlorous acid, and other damaging particles called free radicals are released and create a vicious perpetual cycle of tissue destruction.

For decades, antioxidant drugs have been utilized to supplement the diets of CF patients, with the rationale that antioxidant drugs may be useful to control both oxidative stress and excessive inflammation in CF airways. Because of this well-defined function for antioxidants, one of the most widely reiterated claims in both medicine and nutrition counseling is that anti-oxidants such as vitamin C and E, inhaled and oral NAC and GSH would prevent, or at least delay, the onset of end-stage lung disease in CF. These claims, however, have not been substantiated with appropriate placebo-controlled clinical intervention trials, until recently.

While the clinical efficacies of corticosteroids and high-dose ibuprofen have been previously proved to decrease inflammation in clinical studies for CF patients, these modalities have been associated with severe side effects, limiting their long-term use. We have recently published the results of a clinical trial testing the efficacy of high doses of NAC taken orally three times a day for 6 months. We performed a placebo-controlled study involving our CF center at Stanford and 10 other CF centers from the US in which we hypothesized that treatment with high doses of NAC would lead to a decrease in the inflammation (neutrophils) in CF airways and potentially lead to clinical improvement, such as improved lung function, decreased occurrence of pulmonary exacerbations, and/or decreased use of antibiotics in that time period.

The study dose used was 900 mg of PharmaNAC™, an oral fizzy pill that was dissolved in water or juice. 70 patients were recruited and took study drug three times a day for 6 months – 3 months longer than the longest previous trials with NAC and a dose significantly higher than previous trials. Thirty-six subjects were randomized to NAC and 34 subjects randomized to placebo. Only six participants in the NAC group and two in the placebo group either withdrew or were lost to follow-up.

Our Center's mission is to excel in cystic fibrosis care, to be partners with those we care for, and to be leaders in the discovery process that will produce the cure for cystic fibrosis.

Clinical Trial Points to Protective Antioxidant Benefits story continued from page 1

The baseline characteristics and randomization strata were similar between treatment groups (Table 1). The FEV1 was less than 60 percent of predicted (compared to normal) in 40 percent of subjects, and 27 percent of subjects were under 18 years of age. We detected a substantial clinical benefit in the outcome of lung function that measures obstruction: the NAC cohort maintained their baseline lung function as measured by the FEV1 (volume) and FEF25–75% (flow) throughout the 24-week period, while 4 to 6 percent declines in these measures occurred in the placebo cohort (Table 2, Fig. 1). We did not expect this result, since 6 months was thought to be too short a period of time to see such an effect in a mall study of this size. And the result that we thought would prove the hypothesis, inflammation, did not support our hypothesis. Neutrophil activity levels in the two groups were similar at baseline between NAC and placebo, respectively, but after 6 months of high dose therapy, there was no significant change in the presence of inflammation as measured by neutrophil elastase measures. There were also no differences detected between treatment groups in other indices of inflammation (absolute neutrophil count, sputum elastase activity) in either sputum or plasma. The measure for change in oxidation status (glutathione in whole blood), was also unaffected. However, our measure for GSH in the blood was probably inadequate, since much more GSH is stored inside cells than flows freely in the serum.

TABLE 1

Baseline Characteristics of Participants by Treatment Group

Characteristic	NAC	Placebo	Total	p-Value
	(N=36)	(N=34)	(N=70)	
	N(%)	N(%)	N(%)	
Female	16 (44)	19 (56)	35 (50)	0.3388
Genotype				
Δ F508/ Δ F508	18 (50)	16 (47)	34 (49)	0.4629
Δ F508/other	12 (33)	13 (38)	25 (36)	
Other/other	2 (6)	4 (120	6 (9)	
Not done	4 (11)	1 (3)	5 (7)	
Age				
7-17 years	9 (25)	10 (29)	19 (27)	0.6783
≥ 18 years	27 (75)	24 (71)	51 (73)	
Azithromycin	23 (64)	24 (71)	47 (67)	0.5509
AZLI or TOBI	23 (64)	17 (50)	40 (57)	0.2406
FEV_1 (% pred)				
40% - <60%	15 (42)	13 (38)	28 (40)	0.7696
60% - 85%	21 (58)	21 (62)	42 (60)	
All subjects FEV_1 [mean (SD)]	62.9 (13.4)	63.8 (13.2)	63.3 (13.2)	

TABLE 2

Summary data for changes in primary and selelcted secondary endpoints from week 0 to week 24

Variable	Treatment effect (9.5% CI)	p-Value
FEV_1 (% pred)	4.4 (0.83, 7.9)	0.02
FEV_1 (L)	0.15 (0.03, 0.28)	0.02
Sputum neutr. elastase activity (log_{10})	0.21 (-0.07, 0.48)	0.14
Sputum neutrophil count (log_{10})	2.6 (-12.1, 17.3)	0.73
Sputum IL-8 (log_{10})	0.19 (-0.03, 0.42)	0.09
Plasma IL-8 (log_{10})	-0.1 (0.33, 0.14)	0.42
GSH in whole blood	64.2 (-177.6, 305.9)	0.60
Incidence of pulmonary exaccerbation	-0.08 (-0.30, 0.14)	0.48
New use of antibiotics	0.08 (-0.14, 0.29)	0.50
CFQ-R respiratory domain	-0.34 (-6.3, 5.67)	0.91
CFRSD number of resp sx	-0.15 (-1.1, 0.8)	0.75

95% point wise confidence intervals (using t-distribution approximation) are included at each time point. Similar changes were measured in FEF 25-75% (see online supplement)

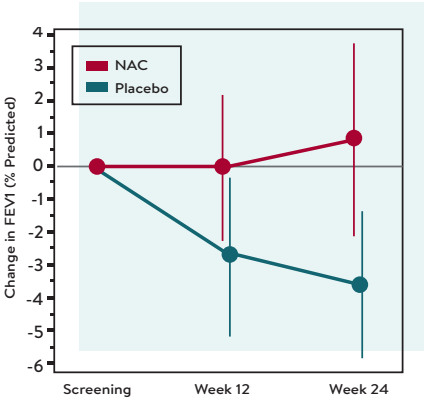


Figure 1. Mean change from baseline in FEV1 (L) over time by treatment group.

We designed the study to detect any change in inflammatory markers, but instead, our data demonstrate a clinically relevant outcome in pulmonary function even though the study was not powered for the parameter. Our pulmonary function results are clinically meaningful. The CF Foundation Registry reports that, on average, CF patients who have mild to moderate lung dysfunction lose between 2 and 4 percent of lung function per year. In this study the NAC recipients maintained their lung function steady over 6 months. Since, in its initial design, our study was underpowered to detect lung function changes, yet we obtained highly significant results, our study demonstrates findings that are clinically relevant and provide impetus for further investigation. The mechanism(s) of action of NAC in CF patients remains to be elucidated, though we speculate, based on various studies using NAC on cell cultures, that NAC likely supplies the amino acid cysteine to cells that make GSH synthesis, and that the GSH is then transported to other cells and organs to modulate CF airway disease via downstream biological mechanisms mentioned above that involve cellular regulation, oxidation balance, and cellular regulation.

We would like to thank everyone who participated in this and all other clinical trials in which our center participates. With such dedication and enthusiasm from our patients, one day we will find a cure for CF!

You can read the full study published by Carol Conrad et al. in the 2015 issue of the Journal of Cystic Fibrosis, volume 14, pages 219-227.

High Calorie Eating in a Fast-Paced World

BY JULIE MATEL, RD

Achieving a high calorie diet is important for individuals with cystic fibrosis. In fact, numerous studies have demonstrated that people with CF have better lung function when they are able to achieve a body mass index (BMI) - a weight for height comparison- above the 50th percentile for children and a BMI equal to 22 kg/m2 for adult females and 23 kg/m2 for adult males[1]. However, achieving this goal is often easier said than done. People with CF need to consume 20 to 50 percent more calories than individuals without CF. For example, if a child without CF can grow and gain weight by eating 1800 calories per day, a child with CF may need between 2400 to 2700 calories per day. Keeping up with the demands that CF treatments impose, along with day to day challenges of juggling school and work schedules, cause many people to feel overwhelmed and frustrated when it comes to meal planning. Here are some tips for increasing calories:

DON'T MISS MEALS

Because people with CF need more calories, missing a meal can really affect a person's ability to meet their calorie goal. For example, people may miss breakfast due to a busy morning getting ready for school or work. People with CF have the added challenge of having to take extra time out of their morning routine to perform respiratory treatments, which may take up to one hour. Consider these options for fast high calorie breakfast ideas:

- Whole grain toaster waffles with butter, syrup and a glass of whole milk **(375 calories)**
- Carnation Instant Breakfast© mixed in a blender with whole milk and banana **(340 calories)**
- Whole grain blueberry muffin with butter **(350 calories)**
- Breakfast burrito (made with tortilla, eggs, cheese, and sausage or bacon) **(500 calories)**
- Bagel with cream cheese **(450 calories)**

Remember to include 2 to 3 snacks per day

People with CF need to remember to eat more than just three meals per day. High calorie snacks can provide added calories and nutrition. Consider setting an alarm on a watch or smart phone as a reminder. Plan ahead for the day and stash snacks in back packs, purses, briefcases, desk drawers, lockers, or coolers in your car. And don't forget to carry enzymes with you as well. Here are some ideas for grab and go snacks:

- Trail mix
- Granola, protein, and snack bars
- Fig bars
- Cheese or peanut butter and cracker packs
- Shakes, canned or bottled
- Croissants or muffins
- Nuts (peanuts cashews, almonds, walnuts, macadamia nuts)
- Sunflower seeds
- Raisin bread
- Dried fruit
- Pudding snacks

BOOST A POOR APPETITE

Sometimes folks with CF have a poor appetite. This can occur due to an acute illness or decreased lung function. During this time it may help to have smaller more frequent meals and to make every bite you take high-calorie. Try these calorie boosters to help you reach your energy target:

100 calories per serving.

- Add **avocado** to sandwiches, salads, or make guacamole **(4 T)**
- Add **bacon** to sandwiches or crumble into salads **(2 slices)**
- Add **cheese** to sandwiches, salads, or melt into foods like scrambled eggs, potatoes, or chilli **(1 ounce or 2 T shredded)**
- Add **chocolate chips** or ice cream **sprinkles** to ice cream, fruit, or pudding **(1 ½ T)**
- Add **chopped nuts** to cereal, ice-cream, fruit, salads, or pudding **(2T)**
- Add **cream cheese** to breads, crackers, and fruit. Mix in mashed potatoes or macaroni and cheese **(2 T)**
- Add **heavy cream** to whole milk, hot or cold cereal, fruit smoothies, creamed soups, or any recipe that uses milk **(2 T)**
- Add **margarine** or **butter** to sandwiches, crackers, pancakes, and bread. Melt in hot foods such as rice, spaghetti, potatoes, vegetables, creamed soups or cooked cereals **(1 T)**
- Use **mayonnaise** on sandwiches and salads or make as a dip for raw vegetables **(1 T)**
- Spread **Nutella** on toast, crackers or on fruit slices **(1 T)**
- Add **olives** to salads, sandwiches, pizza, and salsa **(20 small chopped)**
- Add **syrup** to hot cereal, milk, or pour over ice cream **(2 T)**
- Spread **peanut butter** on toast, crackers, celery, or apple slices, pears, or bananas **(1 T)**
- Mix **ranch dressing** with catsup and use in place of catsup with favorite foods **(1 ½ T)**

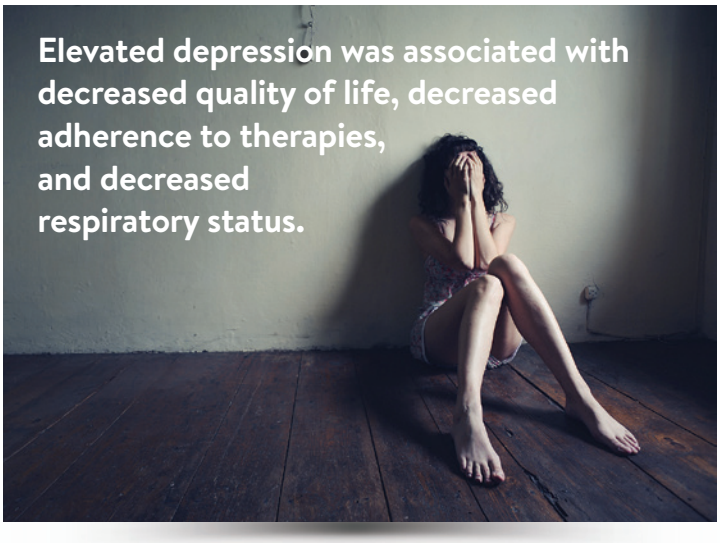
1. *Cystic Fibrosis Foundation patient data registry. Bethesda, MD: Cystic Fibrosis Foundation; 2009.*

The Importance of Mental Health Screening for CF Patients and Families

BY MEG DVORAK, LCSW

In 2013, the Cystic Fibrosis Foundation and the European Cystic Fibrosis Society (ECFS) convened an expert committee, the Guidelines Committee on Mental Health (GCMH), to develop clinical care recommendations for anxiety and depression in individuals with CF and parent caregivers. The recommendations are based on the significant findings of The International Depression Epidemiological Study (TIDES), just released in 2014.

The TIDES study was conducted in Europe and the USA over a 3-year period. Two brief screening measures, the HADS (Depression and Anxiety) and the CES-D (Center for Epidemiological Studies--Depression), were administered to individuals ages 12 and older with CF, and caregivers of children with CF, birth to 18. Measures were completed during a stable, routine clinic visit; demographic and health information were collected and verified via chart review.



Psychological screening measures were completed by 6,088 individuals with CF and 4,102 parents. Elevated symptoms of depression were found in 10 percent of adolescents, 19 percent of adults, 37 percent of mothers, and 31 percent of fathers. Elevations in anxiety were found in 22 percent of adolescents, 32 percent of adults, 48 percent of mothers and 36 percent of fathers. Overall, elevations were 2 to 3 times the rates reported in community samples (Quittner et al., under review).

Analyses of comorbid symptoms indicated that adolescents reporting depression were 14.97 times more likely to report anxiety; adults elevated on depression were 13.64 times more likely to report anxiety; mothers with elevated depression were 15.52 times more likely to report anxiety; fathers with elevated depression were 9.20 times more likely to report elevated anxiety. Significant differences were found by patient age (depression: adolescents 19 percent vs. adults 29 percent; anxiety: adolescents 22 percent vs adults 32 percent). Mothers reported more symptoms of depression and anxiety than fathers, respectively (depression 37 percent vs. 31 percent; anxiety 48 percent vs. 36 percent). Concordance between 1,122 parent-teen dyads indicated that adolescents were 2.32 and 2.22 times more likely to be elevated on depression and anxiety, respectively, if a parent was elevated.

Perhaps the most significant finding was that elevated depression was associated with decreased quality of life, decreased adherence to therapies, and decreased respiratory status. Depression was also associated with increased number of hospitalizations, increased health utilization, and increased healthcare costs. Clearly, mental health is an area that needs more attention in CF programs.

To better understand the context of mental health care delivery, the GCMH distributed an online survey to approximately 4,000 CF Health Professionals of which there were 1,454 respondents. In the US, responsibility for mental health issues was predominantly undertaken by social workers, whereas in Europe, psychologists handled this responsibility. However, the majority did not have a colleague trained to manage mental health issues and over 20 percent of respondents had no one on their team whose primary role was mental health.

Additionally, 73 percent of respondents did not have any experience in screening for anxiety and depression. The survey highlights the importance of standardizing the screening of mental health in CF programs around the world as well as training staff, if necessary, to conduct the screenings.

Starting this year, the CFF recommends that CF centers screen every CF patient ages 12 and up as well as parent caregivers for anxiety and depression on an annual basis and additionally as needed. The screening tools to be used are the PHQ--9 (patient health questionnaire) and the GAD-7 (Generalized anxiety disorder), both of which are well validated tools used frequently in primary care settings. These tools are easy to understand and take very little time to complete. They can be used as a platform to discuss concerns and increase awareness of the strong impact of mental health on medical treatment. Patients with concerning screening scores can be referred to treatment and monitored more closely in follow up visits.

Here at Stanford we plan to build the mental health screening scores into the electronic health record to measure trends over time, just as with FEV1 or BMI scores. This promotes a more comprehensive standard of care for all CF patients and ensures that those patients most at risk for depression and anxiety get the treatment they need. If you have any questions about these new guidelines or would like to request a screening at any time, please ask your clinic social worker.

The Cystic Fibrosis Parent Advisory Council BY KIRSTEN MCGOWEN

The CF Parent Advisory Council always strives to address the needs of all families seen at the Pediatric CF Clinic at Lucile Packard Children's Hospital Stanford. We have had some recent changes in council membership as we said goodbye to Siri Vaeth, who joined in 2005 and was Lead Parent since 2009. Siri has been instrumental in countless projects with the care team that directly impacted CF families. She will be dearly missed but we wish her well in her new endeavors at Cystic Fibrosis Research, Inc. (CFRI). I was welcomed as a new member of the CF Parent Advisory Council and am a Co-Leader Parent along with Amy Baugh. I am the mother of two sons, one of whom has CF and recently celebrated his 5th birthday. As a parent who has been active in both the Newborn and Pediatric Clinics, I will be looking to support programs that aid newly diagnosed families or those transitioning into the Pediatric Clinic for the first time. In addition, Mary Helmers has successfully mailed the CF Passports to all families. This wonderful new resource is used to inform other health care providers of the new Infection Control Guidelines for CF Patients in both inpatient and outpatient settings at Lucile Packard Children's Hospital. Presenting your CF Passport when you arrive at another department (for example: the lab, radiology, ENT, endocrinology or outpatient surgery) will identify you as a CF patient and alert the staff to the CF Infection Control Policy (healthcare members wear a gown, mask and gloves when caring for a CF patient that are closer than six feet).

As discussed in the last newsletter, information regarding support for a gastronomy tube (G-tube) was a highlight project for the Advisory Council in 2014. As many parents know, it can be challenging for people with CF to maintain a healthy body mass index (BMI) and in some cases a G-tube may be recommended. The parent and care team members found an excellent resource regarding gastronomy tubes through the Feeding Tube Awareness Foundation. Their handout, "A Parent's Introduction to Tube Feeding" provides useful information for either families whose children are considering or have recently had a G-tube placed. This handout is available from our CF Care Team or online at www.feedingtubeawareness.com

New Staff Members:

Pediatric: **SEAN RYAN, RCP**, Clinical Research Coordinator: Sean earned his Associates Degree in Respiratory Care from Carrington College, Las Vegas, NV in the summer of 2010. Originally from the Bay Area, Sean moved back to Oakland in 2012 to take advantage of the health care opportunities the Bay Area had to offer. Later that year, he had the opportunity to join the Pulmonary Function Lab at Lucile Packard Children's Hospital. His time there was invaluable, obtaining skills he can utilize in his new position as a Clinical Research Coordinator. Sean is thrilled to be part of the research group and feels privileged to be able to take part in the medical advances that this organization is so highly regarded for. In his spare time, Sean enjoys spending time with family, playing guitar, exercising, and rooting for his East Bay sports teams. He was also recently married this April.

Adult: **VERONICA (RONNI) WETMORE, RN, MS:** Ronni was born and raised in rural Upstate New York State in the Adirondack Mountains. She earned her AAS and RN degree, and went on to earn a BS in Public Health, and then a MS in Healthcare Administration and Policy. While earning her degrees, and prior to becoming a CF Coordinator, she worked as an Ambulatory Surgery nurse, and an Emergency Department and Post Anesthesia Care Unit nurse. Her particular interest in cystic fibrosis stems from the fact that she has lost two brothers and one cousin to the disease. She became the Coordinator of the Adult CF program at Albany Medical Center while her youngest brother was still alive and was working there as a Physician Assistant. It was with his urging that she accepted that position. Eight years ago she was asked by a private practice group of Pulmonologists in Jacksonville, Florida to work with them to establish and coordinate an accredited Adult CF Center there. She has been active with the CF Foundation for many years. She has served on the Education Committee, was an original member of the Mentor/Apprentice Program supported by the CFF, and was co-author of "CF 101: Job Description of the CF Program Coordinator." She also has been a speaker and lecturer at the annual NACFC conference nearly every year for the past 10 years. Ronni is the new adult CF coordinator at Stanford.

Quality Improvement Initiatives in the Adult Cystic Fibrosis Program

BY JENNIFER CANNON, NP

"What do you do to ensure improvement in the CF program?" "How do you communicate patient concerns to the team?" "How do you decide on particular protocols?" These are all valid questions to ask your CF team. I take a lot of pride in working in an environment where Continuous Quality Improvement (CQI) is valued. Below, I have included the initiatives that we support both within the Adult CF Team as well as with our patients to help support the growth and development of our CF Center. The Adult Team fully supports the continuous and collaborative nature of these programs with the ultimate goal to improve patient outcomes at Stanford.

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Quality Improvement within the Adult Program

Our team holds a monthly CQI meeting with Dr. Mohabir, the Nurse Practitioners, Nurse Coordinator, Respiratory Therapists, Dietician and Social Worker. During these meetings, team members prepare a variety of CF topics for discussion, which can range from efficacy of certain medications to protocols that we use both in the hospital and clinic. This monthly meeting is a time where we learn as a team. Examples of items that we discuss include:

- Cystic Fibrosis Foundation Care Guidelines
- Protocols for Patient Care: Examples include Distal Intestinal Obstruction Syndrome (DIOS) Protocol, feeding tube placement, late diagnosis of Cystic Fibrosis in adult patients.
- Efficacy of Cystic Fibrosis Therapies per recent research: Examples include Vitamin K use in patients without evidence of Liver Disease, Advair use in CF patients without Asthma.
- Clinic Flow Concerns
- Ongoing research opportunities for CF team members
- Programmatic Concerns

Quality Improvement between Patients and the Adult Program

The Patient Advisory Council consists of Stanford CF patients as well as staff members who meet on a monthly basis to help provide feedback to the CF team. The goal aligns closely with the monthly CQI meeting's goal to improve the patient experience and care at Stanford. A member of the Adult Team is present for these meetings to act as a liaison between patients and the CF team. Concerns that are brought up during the Patient Advisory meetings are addressed with CF team in an ongoing manner. This is an excellent space for collaboration between patients and providers. If you would like any additional information on the Council, please contact Colleen Dunn, the membership chair, at (650) 736-0388 or cedunn@stanford.edu.

I hope that this article provides some background on the quality improvement initiatives in which our center participates. The ultimate goal is always to provide the best care possible for our patients through open communication and collaboration between patients and team members. Please feel free to ask any questions regarding these programs at your next clinic visit.

Pediatric CF Center Update

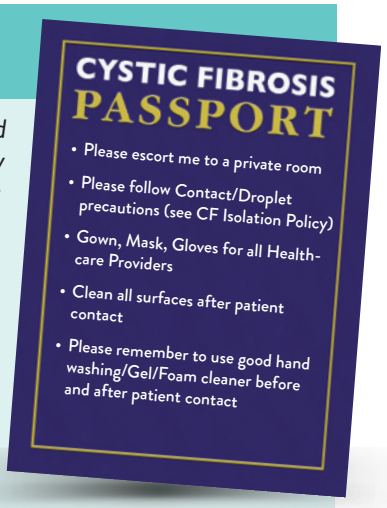
BY MARY HELMERS, RN

CF PASSPORT: Parents/Patients, please REMEMBER to carry your child's CF PASSPORT in your wallet at all times. Back in November we sent out the following letter (see below). If for some reason you do not have a CF Passport, please ask for one when you come to your next clinic appointment. We now have the passports in both English and Spanish.

"November 24, 2014. Happy Fall!

We hope this letter finds everyone well. The Stanford CF Center has always considered infection control to be a critical component of safe patient care. The purpose of this letter to inform our CF patients and families about changes in the Infection Control Guideline's for CF patients in the Outpatient and Inpatient settings here at LPCH.

As you already know, your Healthcare team wears a gown, mask and gloves when caring for patients that are closer than 6 feet. When you come to clinic we wear all of the above items when seeing you at the clinic visit. If you are admitted to the hospital you will also see that all your care provider's wear the same gear. The same materials we use in clinic and on the inpatient units, will be used by the all the other departments/clinics in the hospital. This is our goal!!!



We are currently working with the Infection Control Department here at LPCH to in-service and get all our ancillary and specialty clinics on board with the changes. In an attempt to do this we are asking for your help. We are beginning to educate the various departments/specialty areas, but it is a work in progress and will take time to get all the areas on board. Please do not hesitate to speak up and advocate for yourselves. We appreciate and encourage the Team approach!

Included in this letter is your CYSTIC FIBROSIS PASSPORT to carry with you at all times. The purpose of the PASSPORT is for identification and to alert all the areas that you may visit in

which the CF Isolation Policy needs to be enforced. So, when you arrive at another department (for example: the lab, radiology, ENT clinic, or outpatient surgery), just present your CYSTIC FIBROSIS PASSPORT. Presenting your card will identify you as a Cystic fibrosis patient and alert the staff to our infection control policy. Will help make this a successful program!

If you have any questions or concerns please do not hesitate to contact us. Please call the RN phone line @ 650-736-1359."

CF BINDERS: To help expedite your clinic visit, please remember to bring your CF Binder with you to clinic as well as the most recent CF action plan.

PRESCRIPTIONS: Just a reminder that your prescription request can take up to 72 hours to be processed. This has always been our policy, however, we strive to process them sooner. Please keep in mind that even after we send the scrip to the pharmacy, it can still take another 48 to 72 hours for the pharmacy to process (especially mail order pharmacies). It is important for you to stay on top of your refills and request them at least 1 week before you are due to run out.

Helpful hints for requesting refills:

*Call your pharmacy first to find out if you have refills

*If you have a refill....great! Then the pharmacist will process

*Your pharmacy should call us if you have no refills

We cannot guarantee your request will be filled the same day or within 24 hours.

ANNUALS: Remember our goal is to get all annual testing done on or around your child's birthday.

WEAR YOUR MASK: We have new turquoise-colored masks that we ask all CF patients to wear. They are being handed out at the front desk. These masks have smaller filters that allow for more protection when walking outside during all the construction. We would like all patients to wear them to and from all clinics/hospital and when you walk outside the medical center. They should fit snug around the nose and mouth. If you have not received the new mask, ask the front desk staff or anyone from the CF Team.

LASTLY, we are working on getting copies of all our CF Center patients Genotype/Sweat Chloride test results. If you have a copy or the original result please bring it with you to your next clinic appointment. If your child had these tests done at an outside lab or another CF Center, please contact them and ask them to fax results to (650)497-8791 Attn: Mary Helmers, RN, Pediatric CF Coordinator. We need these results for all our patients! Our plan is to have patients re-genotyped if there is no documentation on file. Thank you for your help.

Baseline FEV-1 Determination - What's In A Number?

BY ELIKA RAD, NP

Most cystic fibrosis patients and caregivers are familiar with pulmonary function tests, otherwise known as PFTs, spirometry/spiros, breathing test, or breathing numbers. You and your CF care team use this number as a marker of your health trajectory. So it is natural for patients to want to know what their "baseline" lung function is. Before I explain how baseline lung function is determined, let's review a few PFT basics.

Pulmonary function tests measure lung function or how well the lungs are working by how fast (rate) and how much air (volume) can get in and out of the lungs. These numbers can give information about airways that are blocked by mucous or airways that can't move enough air. There are two objective measures of lung health that help your CF caregiver measure your lung changes over time and help guide treatment.

- Forced expiratory volume in 1 second (FEV-1)
  - Measured as an absolute volume in liters
- Forced expiratory volume in 1 second as a percentage of predicted (%FEV-1)
  - Your volume compared to the volume of "your clone without CF lung disease"
  - Patients remember this more often because it is a round number.

Studies have looked at rapid rates of decline of the %FEV-1 and have associated risk factors with this decline to include patient's age, microorganism colonization, diabetes and nutritional status[1]. Also the highest degree of decline in lung function has been observed at adolescence and early adulthood2,3 (Figure 1 above).

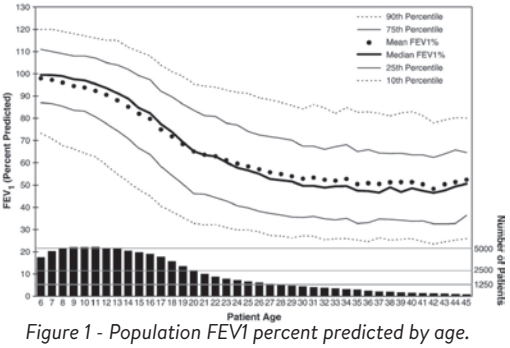


Figure 1 - Population FEV1 percent predicted by age. Liou, et al. Journal of Cystic Fibrosis, 2010.

A sudden significant decline in your lung function from your baseline can happen at any time and can be explained by an acute illness/infection, inflammation, weight loss or lack of adherence to your prescribed airway clearance and inhaled therapies. Sometimes this decline is sustained for weeks or months depending on the degree of injury to your lungs. To determine your baseline lung function, we use your best FEV-1 and %FEV-1 over the past 1 to 2 years. A trend of your entire lung function test is kept in your electronic medical record as well as in our

CF Center at Stanford
770 Welch Road, Suite 350
Palo Alto, CA 94304

national registry database. A new decline in lung function does not equate to a new baseline unless we have exhausted all treatment options, i.e. treating infection/inflammation and optimizing your airway clearance therapies and nutritional status.

Taking care of you and managing your CF is a team effort between you and your care team. We encourage a dialogue about your lung health and its trajectory; so if you ever have a doubt or questions about where your baseline is and where it is headed please initiate a conversation with us at your next visit.

1. Rosenbluth, DB, Wilson K, Ferkol, T, Schuster DP. Lung function decline in cystic fibrosis patients and timing for lung transplantation referral. Chest. 2004 Aug;126(2):412-9.

2. Liou TG, et al. Year-to-year changes in lung function in individuals with cystic fibrosis. Journal of Cystic Fibrosis. Volume 9, Issue 4, July 2010, Pages 250–256

3. Szczesniak RD, et al. A semiparametric approach to estimate rapid lung function decline in cystic fibrosis. A semiparametric approach to estimate rapid lung function decline in cystic fibrosis. 2013 Dec;23(12):771-7. doi: 10.1016/j.annepidem.2013.08.009. Epub 2013 Oct 5.

Stanford Adult Cystic Fibrosis Advisory Council BY BRIAN EDDY

The adult advisory council is busy working on several projects: The return patient questionnaire is a form that patients can fill out prior to a clinic visit in order to streamline clinic visits. This is presently being utilized in clinic now. Another project, The CF Encounters Project, is targeted at capturing patient experiences to show medical personnel how common encounters may be interpreted by the patient. The third project is related to how patients should escalate concerning issues. For example, what to do if an after-hours intern tries to change your medical protocol without discussing it. For more information about this council, go to http://cfcenter.stanford.edu/acfac/

CYSTIC FIBROSIS CENTER AT STANFORD

Pediatric Providers at Lucile Packard Children's Hospital Stanford: Carlos Milla, MD, Pediatric CF Center Director; Sumit Bhargava, MD; My My Buu, MD; Carol Conrad, MD; David Cornfield, MD; Susan Gage, MD; Richard Moss, MD; Terry Robinson, MD; Nanci Yuan, MD; and Jacquelyn Zirbes, DNP, RN, CPNP

Clinic Scheduling ..... (650) 724-4788
Clinic and Prescription Refill ..... FAX (650) 497-8791
Erica Oliva, Patient Services Coordinator ..... (650) 498-2655
Mary Helmers, Nurse Coordinator ..... (650) 736-1359
Liz Beken, CF Clinic Nurse ..... (650) 736-1359
Kristin Shelton, Respiratory Therapist ..... (650) 724-0206
Julie Matel, Nutritionist, Dietitian ..... (650) 736-2128
Sruthi Veeravalli, Social Work ..... (650) 736-1905
Jacquelyn Zirbes, Newborn Screening Coordinator ..... (650) 721-1132

FOR URGENT ISSUES:
Monday-Friday, 8 am to 4 pm, contact RN Coordinator (650) 736-1359
All other times, for children's needs, call (650) 497-8000 (Lucile Packard Children's Hospital main number)

ADULT PROVIDERS AT STANFORD:
Paul Mohabir, MD, Adult CF Center Director; David Weill, MD; Gundeep Dhillon, MD; Jennifer Cannon, NP, Kelly Johnson, NP, Megan Kneemiller, NP, Elika Rad, NP, Laura Starr, NP, Meredith Wiltse, NP

Clinic Scheduling ..... (650) 736-5400
Adult CF Center ..... FAX (650) 723-3106
Ronni Wetmore, RN, MS Nurse Coordinator ..... (650) 498-6840
Carol Power, Respiratory Therapist ..... (650) 736-8892
Michelle Stroebe, Registered Dietitian ..... (650) 721-6666
Meg Dvorak, Social Work ..... (650) 518-9976

URGENT ISSUES:
Monday-Friday, 8 am to 5 pm: call nurse coordinator
Monday-Sunday 5pm to 7am: (650) 723-4000 and ask for the Pulmonary Fellow on-call
Saturday – Sunday 7am – 5pm: (650) 723-4000 and ask for the Adult CF Ghost Pager

REFILL REQUESTS:
Please submit your request to your pharmacy and allow 2 weeks advance notice. For urgent requests, call the coordinator line or send a message via MyHealth.

RESEARCH:
Colleen Dunn, Zoe Davies, Sean Ryan (650) 736-0388

Visit our Website at http://cfcenter.stanford.edu for more information about our center and CF.

To subscribe to this newsletter, please contact Cathy Hernandez by phone at (650) 724-3474 or by email at cathyh1@stanford.edu
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