AN INSTITUTIONAL MULTI-DISCIPLINARY PROCESS IMPROVEMENT COLLABORATIVE CAN EFFECTIVELY IMPROVE THE PROCESS OF SWEAT TESTING AND REDUCE RATES OF INADEQUATE SAMPLES

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Objective

At our CFF site visit in 2015 Maine Medical Center (MMC) CFF site visit, our Center had quantity insufficient (QNS) rates for iontophoresis above the acceptable range. High rates of QNS samples can result in delayed diagnosis and patient dissatisfaction. To address this issue we formed a process improvement (PI) collaborative at our institution that included senior administration Children's Service line, the Clinical laboratory Director, the laboratory managers, phlebotomists, medical technicians, CF Center staff and a project manager. The goal of the group was to improve the process of sweat testing and lower the rates of QNS.

Background

The Maine Medical Center (MMC) Pediatric Cystic Fibrosis Center is a division of the Barbara Bush Children's Hospital, a 116 bed non-profit organization providing comprehensive, family centered healthcare for all of northern New England. It is Maine's premier hospital, offering services not available elsewhere in the state. Our pediatric CF center is a free standing clinic adjacent to the main hospital following 85 patients. Our patients travel up to 2.5 hours to be seen at our center. About 50% of our patients live in rural areas of Maine. Our laboratory is NorDx, a private laboratory affiliated with MMC and one of two accredited laboratories performing iontophoresis in the state.

Methods

In 11/2015 we engaged our process improvement (PI) team to identify root cause of our high QNS rates with the goal of a lower error rate within the acceptable range of less than 10% under 3 months of age and less than 5% over 3 months of age. The team met weekly for 6 months, monthly for one year then quarterly. A fishbone diagram was developed to identify areas of change. Data collection was performed by the laboratory. Multiple process changes were made during 2016 with no change in QNS results. A laboratory expert was consulted who suggested changes including: limiting the number of physicians ordering the test, reducing the number of inpatients tests ordered, calling patients in advance to improved patient preparation, reducing the number of phlebotomists on the collection team, moving the site of analysis to the main laboratory to avoid transfer of specimens 20 minutes to a laboratory off site, changing to a ChloroCheck Chloridometer®, discontinuing the reporting of sweat volume to avoid error in interpretation and closing the sweat chloride laboratory at our Affiliate Center in Central Maine to maximize the volume of testing at the Core center and focus quality control efforts.

Results

By 4/2019 the QNS rate dropped from 25% to 8% for all ages, from 19% to 12% over 3 months of age and from 28% to 0% under 3 months of age. Limiting the number of physicians was not possible but an order set was developed in our electronic medical record (EMR) to guide appropriate testing parameters including discouraging inpatient testing.

Results

The number of phlebotomists was reduced to less than 5 with a chief phlebotomist assigned to oversee the procedure. A ChloroChek® Chloridometer® was purchased. The sweat chloride analysis was moved to the laboratory at the main campus so that the specimens were no longer transported and a new, highly engaged laboratory group joined the PI team. Volume of sweat collected was omitted from the report. The sweat testing laboratory at the Affiliate site was closed in July 2017 and all referrals from Central Maine were referred to the MMC laboratory. The PI group continue to meet quarterly to monitor data and process and to further improve testing. They are working on streamlining the process for ordering and reporting, developing quality control protocols for false positives and false negatives, improving scheduling, developing a NICU protocol and a protocol for discrepant results between arms. The laboratory director has developed a relationship with the CFF Sweat Testing Action Committee to raise questions when issues arise

Conclusions

Developing an ongoing PI collaborative team that includes laboratory, administrative and clinical personal can be highly effective in improving the process and results of sweat testing which is critical in the diagnosis of CF.