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Abstract

Autism Spectrum Disorder (ASD) is a developmental condition that presents many challenges to families and physicians in today's society. The impact of an ASD diagnosis is life-changing for many families and is estimated to have a lifetime care cost for an individual with ASD of \$2.4 million in the United States and \$2.2 million in the UK¹. With a prevalence of ASD in our population of 1 in 59 children², we've recognized the importance of early intervention as the greatest tool available to treat ASD³. The AAP currently recommends the screening with the Modified Checklist for Autism in Toddlers (M-CHAT-R), a validated tool for children ages 18 and 24 months. However, even with these recommendations, the average age of ASD diagnosis is 4-5 years of age². With the FSU Autism Institute's validated Early Screening for Autism and Communication delays (ESAC), our **AIM** is to optimize the integration of this validated screening tool into a busy primary care pediatrics office over the course of 1 year to improve early detection and referral of ASD.

Introduction

As the CDC reports the prevalence of ASD to be 16.8 per 1,000 children, our current screening tools have failed to detect more children than they are identifying. The Smart ESAC was developed to address the pressing need for new approaches to autism screening in the primary care setting. The ESAC was derived from on the Infant-Toddler Checklist (ITC), a broadband screening tool documented to detect ASD better than the currently available screening tools⁴. Table 1 shows the detection rates of a few large scale studies of the M-CHAT and how the ITC comes closest to detecting currently understood rates of ASD in the population.

Table 1. Screening tool detection rates from larger studies.

Screening Tool	Sample Size	Age in Months	# per 1,000
M-CHAT ⁵	18,122	20.4	5.24
M-CHAT ⁶	52,026	18.0	1.15
Infant-Toddler Checklist (ITC) ⁷	6,026	16.4	14.94

How the ESAC Works

- Parents complete screen on iPad in the office at 12 month WCC
 - "Smart" technology offers brief 10 question, broadband screen for communication delay
 - If positive, initial 10 questions are seamlessly followed by 20 more questions specific to autism
- Results are automatically scored and a generated report is reviewed with the patient by the clinician
- Parents are invited to create an online portal
 - Parents are auto-invited to complete subsequent ESACs in preparation for upcoming WCCs. (15, 18, 24, 30 month visits)

*WCC = Well-child check/visit

The Office Integration Process

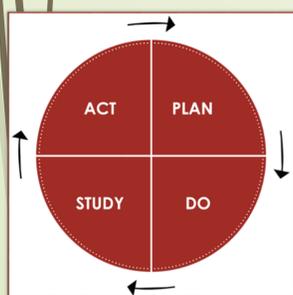
- Autism Navigator training for providers
- iPad authorization and installation for office
- Exchange of staff information for portal generation
- Portal Access set-up and trouble-shooting
- Training of office staff (MA, LPN, RN, MD) on use of portal, patient entry into the system, ESAC administration, viewing results

Project Design

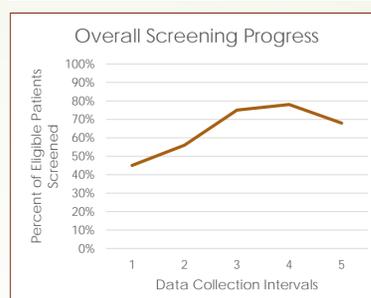
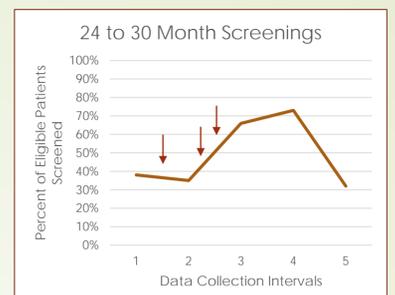
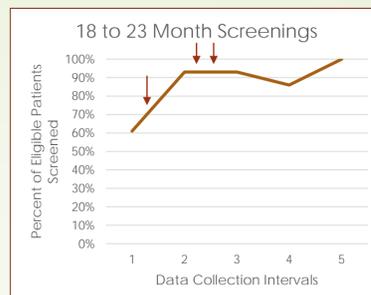
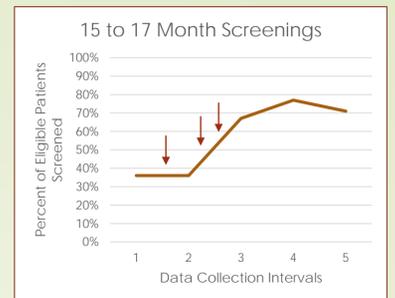
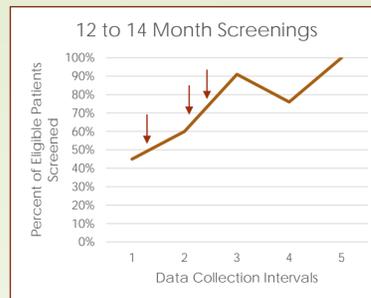
Cycle 1: Acquired secure iPads in the office to facilitate screening efficiency and to maintain office productivity.

Cycle 2: Work with provider to integrate ESAC notes into routine pre-planning.

Cycle 3: Create and distribute brochures to parents about new screening process.



Results



* ↓ denotes implementation of PDSA cycle

Intervals	Dates
1	8.30.17 – 11.24.17
2	11.25 – 2.17.18
3	2.18.18 – 4.15.18
4	4.16.18 – 7.15.18
5	7.16.18 – 9.15.18

Key: dates of data collection

Table 3. Data collected from chart review

Average Age of Referral	
Pre-ESAC	ESAC
37 months	19.7 months
3.1 years	1.6 years

Discussion

The data shows an overall increase in percentage of eligible patients who were screened over the 5 data collection periods. After PDSA cycles, 100% of WCCs included an ESAC screening for children ages 12-14 months and 19-23 months. The data was unintentionally skewed in the 24-30 month screenings in part due to combining the screenings from 24 months and the screenings from 30+ months into the same data set. Reviewing the data, we found that patients at 24 months of age are much more likely to be screened than at 30 months. Due to the efficiency of earlier ESAC screenings, the 30 month screening was often deemed unnecessary by the clinician as the patient likely had already been referred for evaluation. In other cases, patients who had had consecutive negative screenings were unlikely to be screened again at 30 months due to physician confidence and clinical judgement. These factors caused the screening percentages in this age range to appear less substantial compared to other ages, however, the overall improvement trend was still positive.

In addition to examining the optimization of the screening tool for all eligible patients, the average age of referral was determined. Through pre and post-ESAC chart review, the average age of referral for evaluation before using the ESAC was 37 months. With the implementation of the ESAC in the past year, the average age of referral was decreased to 19.7 months. While many factors can delay the referral process after a child's positive screening, like parent denial/noncompliance, this data still shows a striking improvement in the quality of care for the patients in this practice.

Future Directions

After this first year, we are continuing to work with this office to optimize screening for all eligible children at age-appropriate well-child visits. Our next PDSA cycle will include modifying the brochure for parents to encourage and guide parent portal establishment to increase at-home screening. This will ultimately streamline efficiency and improve office flow. Our long-term goal is to incorporate the ESAC into the standard of care for all Physician Associates Pediatrics practices, including 21 offices with 47+ clinicians.

The Smart ESAC has shown the potential to lower screening age for autism to a point of replacing the currently recommended M-CHAT in this office, improving detection and referral ages to ultimately lead to earlier intervention and better outcomes for our patients.

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