Using an Online Clinical Process Support System for Asthma Care: Fewer Exacerbations and Visits

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BACKGROUND

- Asthma affects 8% of US children and is a leading cause of child morbidity and health care cost. However, National Heart, Lung, and Blood Institute (NHLBI) Guideline compliance among pediatricians has been low even with use of Electronic Health Record (EHR) template reminders.
- NHLBI guidelines are based on asthma severity but Primary Care Providers (PCPs) are inaccurate at estimating severity without screens.
- Other evidence-based care components for which there may not be time include: Use of problem solving counseling for adherence, addressing allergens, and patient education.
- We created an online template for asthma care decision support (Asthma Intervention Module or AIM) based on patient entered pre-visit data including: Asthma severity (PACCI), allergen triggers, barriers to adherence, individualized medication suggestions, a "teleprompter" for problem solving counseling, patient-specific education, pre-filled online asthma action plans, and between-visit online monitoring. The AIM reduces the burden of documenting guideline completion. PCP use of AIM also creates data for a QI activity yielding MOC-4 credits.

OBJECTIVE

To explore impact of an online Asthma Intervention Module (AIM) on asthma control and healthcare utilization via a cluster randomized control study.

DESIGN/METHODS

- 24 community pediatric practices across the US over 27 months (2015-7) used the CHADIS web system for collecting data. Parents of 4860 children 0-18 years with asthma completed the Pediatric Asthma Control and Communication Instrument (PACCI)[1] online before visits.
- Practices were randomized to control or use of AIM in CHADIS.
- AIM group patients were asked to complete PACCI monthly from home.
- PACCI assesses asthma severity/control, controller use and adherence, ER visits, hospitalizations, exacerbations, trajectory and burden.
- AIM clinicians had access to decision support : NHLBI guideline tips, a teleprompter for problem solving counseling specific to individual adherence barriers to adherence, guideline based medication suggestions, alert reports between visits regarding patients with uncontrolled asthma, and MOC-4 credit.
- AIM families had access to individualized patient education and Asthma Treatment Plans in an online portal.
- Data was analyzed for children who had >=1 PACCI showing **persistent asthma** plus a PACCI 30+ days after the intervention began.
- For the AIM group, "Post" was defined as the last PACCI 30+ days after starting use of AIM and "Pre" as the first PACCI showing persistent asthma 14+ days prior to Post (n=444).
- For controls, Post was the last completed PACCI and Pre was first PACCI with persistent asthma 14+ days prior to Post (n=313).

DEMOGRAPHICS & CHARACTERISTICS

		Control		AIM		
DEMOGRAPHICS		**N**	**%**	**N**	**%**	**P**
Gender - Male		175	55.9	250	56.3	.914
Ethnicity – Hispanic		74	44.0	43	12.3	<.001
Race	White	109	34.8	179	40.3	.125
	Black	28	9.0	139	31.3	<.001
	Asian	1	0.3	24	5.4	<.001
	American Indian	11	3.5	4	0.9	.011
	Other	28	9.0	16	3.6	.002
		Mean	**SD**	**Mean**	**SD**	**P**
Patient Age (Years)		8.9	0.2	8.6	0.2	.362

		Control		AIM		
PRACTICE CHARACTERISTICS		**N**	**%**	**N**	**%**	**P**
Location	Suburban	278	88.8	216	48.6	<.001
	Urban	10	3.2	160	36.0	<.001
	Rural	25	8.0	68	15.3	.002
Region	South	140	44.7	265	59.7	<.001
	West	157	50.2	81	18.2	<.001
	Northeast	16	5.1	68	15.3	<.001
	Midwest	0	0.0	30	6.8	<.001
Co-Located Asthma Specialist		47	15.0	60	6.8	<.001
No Case Manager Available		165	52.7	100	22.5	<.001

RESULTS

Post Measures for Children with Ever Persistent Asthma					
	Control		AIM		
Measure	**N**	**%**	**N**	**%**	**P**
Controlled Asthma	152	48.6	230	51.8	.380
Persistent Asthma on Daily Meds	130	80.8	176	82.2	.711
Ever on Daily Meds	274	87.5	388	87.4	.950
Zero Days - Quick Relief	162	51.8	267	60.1	.022
Zero Nights - Sleep Problems	224	71.6	324	73.0	.670
No Burden From Asthma	189	60.4	282	63.5	.382
Zero Missed Doses	121	48.4	176	50.3	.271
No Symptoms Past Week	128	40.9	195	43.9	.407
"Better" Asthma Trajectory	199	63.6	233	52.5	.002
"Better" among those not controlled at Post	81	50.3	76	35.5	.004
"Same" Asthma Trajectory	102	32.6	184	41.4	.013
"Same" among those controlled at Post	32	21.1	70	30.4	.042
Worse Asthma Trajectory	12	3.8	27	6.1	.168
Poorly Controlled at Pre, on Controller Med at Post	130	80.8	29	100.0	.010
Steroid Bursts	77	24.6	83	18.7	.050

		Control		AIM		
Hospitalized for Asthma	Pre	10	3.2	17	3.8	.643
	Post	8	2.6	8	1.8	.477
ED or Urgent Care Visits	Pre	40	12.8	55	12.4	.873
	Post	23	7.4	25	5.6	.340

	Mean	SD	Mean	SD	P
Acute Asthma Visits (Non-ED or Urgent - Past 3 Months)	**0.37**	**0.06**	**0.21**	**0.03**	**.009**
PACCI Sum Score (Worse >3)	3.09	0.19	2.95	0.17	.582
PACCI Problem Index	1.18	0.08	1.10	0.07	.476

RESULTS & DISCUSSION

- There was no difference between groups in PACCI problem index at Pre.
- The AIM group had more days of no quick relief medication use (p = .022) and fewer steroid bursts (p = .05) implying fewer asthma exacerbations.
- Those "poorly controlled" at Pre were more likely to be appropriately on controller at Post in the AIM group (100% vs. 81%, p = .01).
- Mean number of acute asthma visits in the past 3 months was lower in the AIM group (p = .009).
- At the end of the study the AIM group was more likely to be rated as on a steady trajectory and already controlled (p = .042). The control group was more likely to be rated as getting better at the end, but those getting better were more likely to be not controlled than those in the AIM group (p = .004).
- Patients in the AIM condition tended to have fewer hospitalizations, fewer ED or urgent care visits, and tended to have larger Pre-Post drops in utilization.

CONCLUSIONS

- Use of this asthma online clinical process support system by pediatricians showed some benefits with less rescue medicine and steroid burst use suggesting less need for care for exacerbations and also fewer acute asthma visits.
- Children in the AIM group with initially "poorly controlled" asthma were more often appropriately treated with controller medication.
- Patients with controlled asthma at Post were more often from the AIM group whether they were rated as (getting) Better or the Same at Post.
- PACCI completed online before and between visits was useful in informing pediatric care of asthma.
- Patient specific decision supports based on patient generated data may represent an advance in clinical process support over generic EMR templates.

LIMITATIONS

- More Control practices had co-located asthma experts but more AIM practices had case management available. Use of these is unknown.

KEY REFERENCE

1. Okelo SO, Eakin MN, Patino CM, Teodoro AP, Bilderback AL, Thompson DA, Loiaza-Martinez A, R and CS, Thyne S, Diette GB, Riekert KA (2013) The Pediatric Asthma Control and Communication Instrument asthma questionnaire: For use in diverse children of all ages. J Allerg Clin Immunol. 132(1):55-72.