

Supplemental materials for:

Yawn BP, Wollan P, Rank M, Bertram S, Juhn Y, Pace W. Use of asthma APGAR tools in primary care practices: a cluster-randomized controlled trial. *Ann Fam Med*. 2018;16(2):100-110.

Supplemental:

Supplemental Figure 1—Asthma APGAR Care Algorithm

Supplemental Figure 2—Clinician questions for Asthma APGAR

Supplemental Figure 3 ---Map of sites that completed the study

Supplemental Figure 4---Changes in 6-month rates of asthma-related ED, urgent visits and hospitalizations by age group.

Supplemental Table 1—Baseline patient characteristics by randomization status and age group.

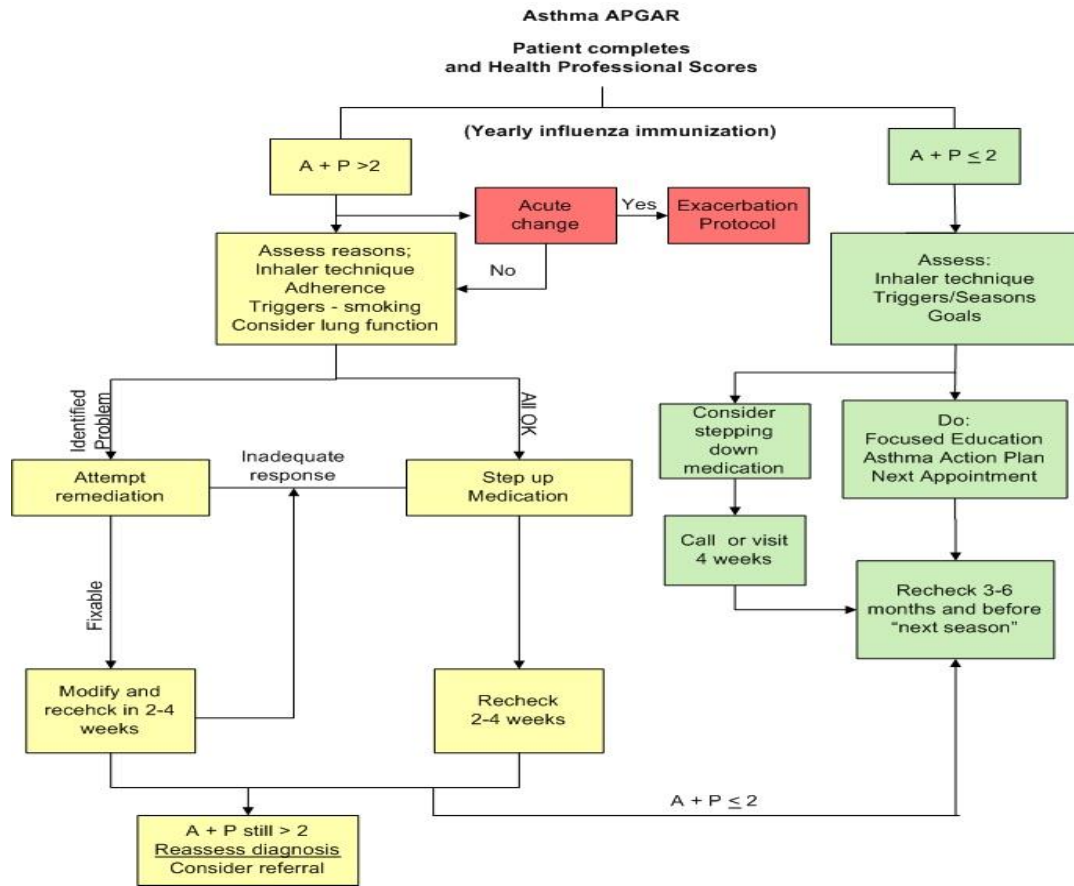
Supplemental Table 2—Logistic regression models for changes in 6-month rates of asthma-related ED, urgent visits and hospitalizations by age group

Supplemental Table 3--Practice adherence to asthma guideline elements

Supplemental Table 4—Asthma medications prescribed

Supplemental Figure 1. Asthma APGAR care algorithm

Algorithm



Supplemental Figure 2: Asthma APGAR follow up

Activity follow up questions:

- What have you given up due to asthma?
- What would you like to do that you can't, because of asthma?

Persistence follow up questions:

- Has the frequency and severity of your daytime symptoms been similar over the last 2 months?
- Has the frequency and severity of your nighttime symptoms been similar over the last 2 months?

Medication follow up questions:

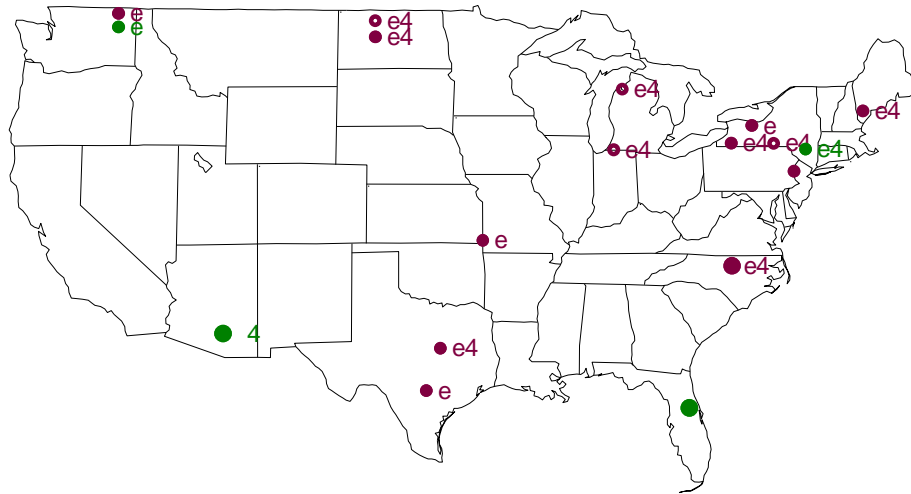
- Would you like to know the difference between rescue and controller medication?
Y/N/Unsure
- Do you have or use a rescue medication? *Y/N/Don't know*
 - Show me medication or describe it.
 - How often do you use your rescue medication?
- What do you do when you feel you need a rescue medication? _____
- Do you have or use a prevention medication? *Y/N/Don't know*
 - Show me medication or describe it.
 - How often do you use your prevention medication?
- Demonstrate inhaler technique.
- Does the cost of your treatment affect your taking/buying asthma medication?
Y/N/Unsure

Response to therapy follow up questions:

- Do you think your asthma therapy helps? *Y/N/Unsure*
- How often do you have to refill your rescue inhaler?
- Which ones help?
 - Avoiding triggers? *Y/N*
 - Rescue inhaler? *Y/N*
 - Preventive medicines? *Y/N*

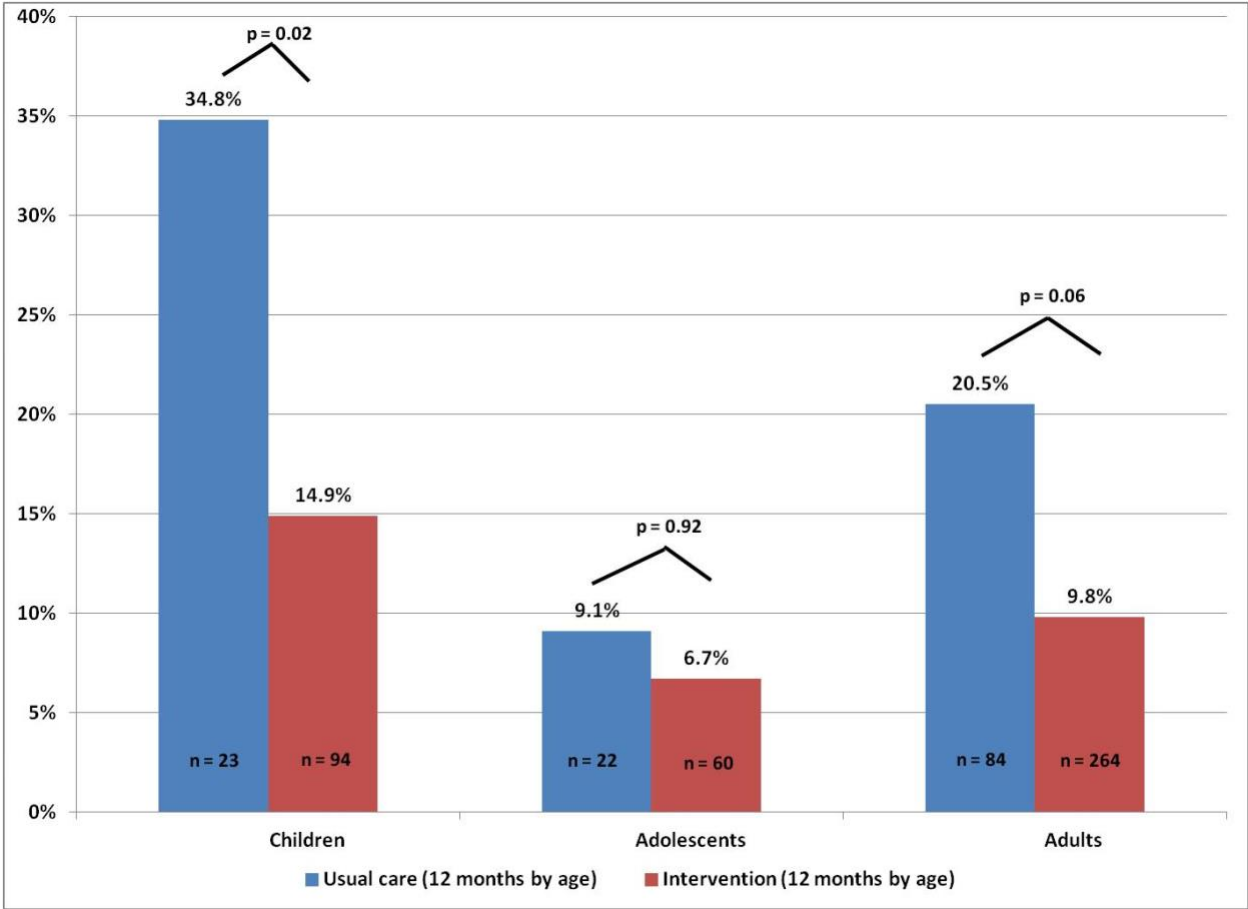
What else helps your asthma? _____

Supplemental Figure 3. Sites completing the Asthma Tools Study



Large dots indicate urban location, pop>250K (N=3)
Hollow dots indicate residency practice (N=4)
Red indicates FM (N=14), green Pediatrics (N=4)
e indicates EMR in use (N=15)
4 indicates 4 or more physicians (N=12)

Supplemental Figure 4. End of enrollment period asthma related ED, urgent care or hospital visits in past 6 months comparing intervention to usual care by age group.



Supplemental Table 1. Baseline demographics and behaviors, by age group: A= adults, B=children and C=adolescents

A. Adults				
Characteristics by enrollment group	Available for baseline analysis N = 518 Those who returned the baseline survey, 80.1% of enrolled patients			
	Intervention N=312	Usual Care N=105	Transition N=101	P value for those with differences
Age in yrs: Mean	29.1	26.6	28.7	
*denotes statistical difference across group	N (%)	N (%)	N (%)	
Race/ethnicity by % of total				
White	93.3	82.9	88.1	P = .03
Black	3.8	14.3	10.9	P < .001
Other/none	2.9	2.8	1.0	
Hispanic*	3.2	1.9	8.9	P = .02
Family income/year by % of total				
<\$10,000	15.7	18.1	15.8	
\$10,000 to \$49,999	35.9	32.4	35.6	
≥ \$50,000	45.2	47.6	48.5	
Not reported	3.2	1.9	0	
BMI				
% obese*	48.9	45.7	51.2	
Secondhand smoke by %				
ever 5-7 days/ week	63.1	63.8	60.4	
now 5-7 days/week	23.1	18.1	19.8	
% smoking-current				
Ever	40.1	33.3	31.7	
Activity levels by %				
strenuous activity				
≥3 x a week, 15 min.	25.6	27.6	20.8	
≥ 5 x a week, 15 min	9.9	12.4	9.9	
Allergy tests ever, %yes	54.2	59.0	60.4	
Asthma control by ACT score				
% not in control—score <20	60.6	63.1	64.4	
% who thought they needed asthma care and could not get it	16.8	18.1	29.3	P = .02
% with asthma-related visit to ED, urgent care or hospital in 6 months before enrollment	17.5	22.1	15.9	

B. Children.				
Characteristics by enrollment group	Available for baseline analysis N = 191 Those who returned the baseline survey, 78.0% of enrolled patients			
	Intervention N=103	Usual Care N=27	Transition N=61	P value for those with differences
Age in yrs: Mean	29.1	26.6	28.7	
*denotes statistical difference across group	N (%)	N (%)	N (%)	
Race/ethnicity by % of total				
White	87.4	33.3	57.4	P < .001
Black	8.7	55.6	37.7	P < .001
Other/none	3.9	11.1	4.9	
Hispanic*	18.4	14.8	49.2	P < .001
Family income/year by % of total				
<\$10,000	9.7	29.6	23.0	P = .01
\$10,000 to \$49,999	27.2	40.7	60.7	P < .001
≥ \$50,000	61.2	22.2	14.8	P < .001
Not reported	1.9	7.4	1.6	
BMI				
% obese*	22.6	12.8	20.3	
Secondhand smoke by %				
ever 5-7 days/ week	16.5	37.0	21.3	
now 5-7 days/week	10.7	25.9	11.5	
% smoking-current				
Ever	-	-	-	
Activity levels by % strenuous activity				
≥3 x a week, 15 min.	68.9	63.0	57.4	
> 5 x a week, 15 min	36.9	33.3	29.5	
Allergy tests ever, %yes	48.5	40.7	29.5	
Asthma control by ACT score				
% not in control—score <20	56.9	40.7	57.4	
% who thought they needed asthma care and could not get it	5.0	3.8	8.3	
% with asthma-related visit to ED, urgent care or hospital in 6 months before enrollment	25.2	18.5	27.9	

C. Adolescents				
Characteristics by enrollment group	Available for baseline analysis N = 134 Those who returned the baseline survey, 77.0% of enrolled patients			
	Intervention N=81	Usual Care N=25	Transition N=28	P value for those with differences
Age in yrs: Mean	15.0	15.5	15.5	
*denotes statistical difference across group	N (%)	N (%)	N (%)	
Race/ethnicity by % of total				
White	86.4	76.0	75.0	P = .03
Black	6.2	20.0	21.4	
Other/none	7.4	4.0	3.6	
Hispanic*	13.6	20.0	53.6	P < .001
Family income/year by % of total				
<\$10,000	11.1	16.0	10.7	P = .02 P = .03
\$10,000 to \$49,999	29.6	28.0	46.4	
≥ \$50,000	55.6	52.0	25.0	
Not reported	3.7	4.0	17.9	
BMI				
% obese*	29.0	19.0	31.3	
Secondhand smoke by %				
ever 5-7 days/ week	23.5	40.0	21.4	
now 5-7 days/week	16.0	24.0	17.9	
% smoking-current				
Ever	2.5 4.9	0 0	0 0	
Activity levels by % strenuous activity				
≥3 x a week, 15 min.	59.3	52.0	39.3	
≥ 5 x a week, 15 min	40.7	24.0	21.4	
Allergy tests ever, %yes	43.2	44.0	50.0	
Asthma control by ACT score				
% not in control—score <20	57.0	52.0	42.9	
% who thought they needed asthma care and could not get it	5.2	4.2	11.5	
% with asthma-related visit to ED, urgent care or hospital in 6 months before enrollment	12.3	16.0	21.4	

Supplemental Table 2. Hospital, urgent care or ED asthma-related visit past 6 months, regression model with random effects

	Value	Std.Error	t-value	p-value	OR (CI)
(Intercept)	-1.914	.482	-3.971	<.001	
Baseline	1.733	.291	5.949	<.001	5.7 (3.2,10.0)
Intervention vs. Transition	-.788	.412	-1.913	.048	.5 (0.2, .98)
Intervention vs. Control	.728	.364	2.002	.04	2.1 (1.01,4.2)
Sex Male vs. Female	-.193	.332	-.580	.56	
Children vs. Adults	0.611	.378	1.619	.11	
Teens vs. Adults	-.554	.552	-1.004	.32	
Non-Black vs. Black	-.341	.388	-.878	.38	
Income> 50K vs all others	-.838	.293	-2.860	.004	.4 (0.2,0.8)
Hispanic vs non-Hispanic	.172	.485	.355	.72	

Supplemental Table 3. Adherence to Elements of Asthma Guidelines

	Intervention N = 632	Control N = 208	Transition N = 226	Significance of change in intervention vs control (12 months – baseline)
Change in % of assessment of specific elements from baseline to 12-months				
Adherence to 3 or more elements	20.7%	-1.9%	10.2%	P < .001
Specific elements:				
Control assessed	55.2%	0.5%	19.5%	P < .0001
Allergies assessed	15.8%	-11.1%	-.05%	P < .0001
Inhaler technique observed	1.2%	-5.2%	1.7%	P = .03
Asthma action plan completed	3.6%	1.4%	4.0%	P = .51
Medication adherence assessed	32.3%	25.4%	37.6%	P = .13

Supplemental Table 4. Medications prescribed, comparing baseline and 12-months by group using medical record data

N = 1063, 99.4% of enrolled patients

		Intervention N = 630 (%)	Control N = 208 (%)	Transition N = 225 (%)
No asthma medications recorded				
	Baseline	69 (10.9)	18 (8.7)	14 (6.2)
	12-months	9 (1.4)	8 (3.8)	0
SABA only				
	Baseline	88 (13.9)	31 (14.9)	17 (7.5)
	12-months	55 (8.7)	24 (11.5)	6 (2.7)
Daily anti-inflammatory				
	Baseline	245 (38.8)	62 (29.8)	87 (38.5)
	12-months	258 (40.8)	65 (31.3)	93 (41.2)
Combination ICS + long acting bronchodilator				
	Baseline	230 (36.4)	98 (47.1)	107 (47.3)
	12-months	308 (48.9)	112 (53.8)	129 (57.1)