## Pediatric Asthma Management in EAC

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## Definition

Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role The chronic inflammation is associated with the airway hyperresponsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or early morning....

or with treatment



## Mechanisms: Asthma Inflammation

Factors of asthma developments

Host: Genetic, Obesity..... Environment: viruses, air pollutants,..

INFLAMMATION

#### Airway hyperresponsiveness

#### Airway remodelling

Triggers: allergen, exercise, cold air, etc.

#### Exacerbation



#### Comparison asthma prevalence between phase 1&3 in 3 centers (2 age groups)





## ER visit at Srinagarind Hospital



ICS in asthmatic children: 61.6% (2551)



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# Asthma management in children < 5 years old

How to diagnose asthma?
Update GINA guideline 2009 and Thai guideline for children 2008



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# Asthma management in children < 5 years old

How to diagnose asthma?
Update GINA guideline 2009 and Thai guideline for children 2008



Clinical Diagnosis: children & adults Episodic wheezing after allergen exposure Responding to appropriate asthma therapy: bronchodilators Entirely asymptomatic between episodes Positive family history of atopy



- Problems in diagnosis especially in young children
- 1. Atypical case
  - Cough-variant asthma
  - Chronic nocturnal cough
  - etc
- 2. Many wheezing phenotypes



Atypical case in older children Diagnostic test - Reversibility test: FEV1 > 12% - PEF variable: 20% Additional test - Allergic status: Skin test, specific IgE



Many wheezing phenotypes in children < 5 years esp less than 3 years old Variable response to bronchodilators Limitation to routine airflow assessment such as PEF, spirometry Mostly trigger allergens are respiratory viral infections



#### Wheezing prevalence



Stein et al. 1997: Martinez and Helms 1998.

- Children < 5 years esp less than 3 Simple clinical index
  - Frequent episodes of wheeze (more than once a month) > 3 (Practall guideline)
    - Presence of risk factors
      - 1 major: parental history of asthma or eczema or
    - 2/3 minor: eosinophilia, wheeze without cold, allergic rhinitis



Children < 5 years esp less than 3 **Diagnostic test** Trial of treatment with ICS and short acting bronchodilator Marked clinical improvement during treatment and deterioration when it is stopped



# Asthma management in children < 5 years old

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Update GINA guideline 2009 and Thai guideline for children 2008



## Asthma management









## GINA guideline recommendations: updated December 2009





- Achieve and maintain control of symptoms
- Maintain normal activity levels, including exercise
- Maintain pulmonary function as close to normal levels as possible
- Prevent asthma exacerbations
- Avoid adverse effects from asthma medications
- Prevent asthma mortality





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Achieve and maintain control of symptoms for prolonged periods

Assessing asthma control Treating to achieve control Monitoring to maintain control





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## **GINA 2009**

# Assessing asthma control Physicians: levels of control



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## Levels of asthma control

Characteristic	Controlled (All of following)	Partly controlled (Any in any wk)	Uncontrolled	
Daytime	None( <twice td="" wk)<=""><td>&gt; twice/week</td><td>Three or more</td></twice>	> twice/week	Three or more	
Limitations of activity	None	Any	asthma	
Nocturnal	None	Any		
Reliever Rx	None( <twice td="" wk)<=""><td>&gt;twice/wk</td><td colspan="2">present In any week</td></twice>	>twice/wk	present In any week	
Lung function	Normal	<80% predicted		
Exacerbation	None	One or more/yr	One in any wk	



## **GINA 2009**

- Assessing asthma control

  Physicians: levels of control
  Detionts:
- Patients:
  - Asthma Control Test (ACT)™
  - Pediatric Asthma Control Test (PACT)™





### Assessment of symptom control: The Childhood Asthma Control Test<sup>TM</sup>







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## Treating to achieve asthma control: an update





GINA Report 2007 (www.ginasthma.org)

REDUCE				INCREASE		
	TREATMENT STEPS					
STEP	STEP	STEP 3	STEP <b>4</b>	STEP 5		
		asthma education				
environmental control						
as needed rapid- acting B2-agonist as needed rapid-acting B2-agonist						
	SELECT ONE	SELECT ONE	ADD ONE OR MORE	ADD ONE OR BOTH		
PTIONS	low-dose ICS*	low-dose ICS plus long-acting ß2-agonist	medium- or high-dose ICS plus long-acting ß2-agonist	oral glucocorticosteroid (lowest dose)		
LLER O	leukotriene modifier**	medium- or high-dose ICS	leukotriene modifier	anti-lgE treatment		
ONTRO		low-dose ICS plus leukotriene modifier	sustained-release theophylline			
5		low-dose ICS plus sustained-release theophylline				

\*inhaled glucocorticosteroids \*\* receptor antagonist or synthesis inhibitors

### Initial naïve patients with persistent symptoms



\*inhaled glucocorticosteroids

\*\* receptor antagonist or synthesis inhibitors



## Children <5 years

#### Allergy 2008



# Inhaled therapies vs oral therapies in children





### GINA guidelines for inhaled vs oral therapy

GINA guidelines state that:

"Inhaled therapy is the cornerstone of asthma treatment for children of all ages"

"ICS are currently the most effective anti-inflammatory medications for the treatment of persistent asthma"

1. Global Initiative for Asthma (GINA): Global strategy for asthma management and prevention. Revised Edition 2007.



#### Initial naïve patients with persistent symptoms



\*inhaled glucocorticosteroids

\*\* receptor antagonist or synthesis inhibitors

#### Initial severely uncontrolled

	REDUCE		<b>↓</b>		INCREASE		
	TREATMENT STEPS						
	STEP	STEP 2	STEP 3	STEP 4	STEP 5		
			asthma education				
	environmental contiol						
	as needed rapid- acting B2-agonist		as needed rapio	-acting B2-agonist			
		SELECT ONE	SELECT ONE	ADD ONE OR MORE	ADD ONE OR BOTH		
	ONTROLLER OPTIONS	low-dose ICS*	low-dose ICS plus long-acting ß₂-agonist	medium- <i>or</i> high-dose ICS <i>plus</i> long-acting ß2-agonist	oral glucocorticosteroid (lowest dose)		
		leukotriene modifier**	medium- <i>or</i> high-dose ICS	leukotriene modifier	anti-lgE treatment		
			low-dose ICS plus loukotriene modifiel	sustained-release r theophylline			
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TREATMENT STEPS						
STEP 1	STEP 2	STEP 3	STEP 4	STEP 5		
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ER 0	leukotriene modifier**	medium- <i>or</i> high-dose ICS	leukotriene modifier	anti-lgE treatment		
CONTROLL		Iow-dose ICS plus leukotriene modifier Iow-dose ICS plus sustained-release	For ch 5 year	ildren <u>&lt;</u> 's		
		theophylline				

\*inhaled glucocorticosteroids \*\* receptor antagonist or synthesis inhibitors

## Dose of inhaled corticosteroid

Medium Drug Low High 200-400 Beclomethasone 100 >400 Budesonide (MDI) 200 200-400 >400 Budesonide nebulizer 500 200-500 Fluticasone 100 >500





Achieve and maintain control of symptoms for prolonged periods

Assessing asthma control Treating to achieve control Monitoring to maintain control



# Monitoring to maintain control





### Children > 5 years old



\*inhaled glucocorticosteroids

\*\* receptor antagonist or synthesis inhibitors



Children < 5 years Step up with doubling the initial dose

#### Allergy 2008





# Treating to maintain asthma control

### Duration and adjustments to treatment

• The initial treatment should be given for at least 3 months to establish its effectiveness in reaching control

When achieves control, follow up may be
 3-6 months interval



# Treating to maintain asthma control

### When control is not achieved

- Check the inhalation technique and compliance before step up of treatment
- Check the avoidance of allergen especially passive smoking
- Review the diagnosis and look for comorbidity such as AR, sinusitis



### **Inhalation device**





## Inhalation device

- Age group preferred device
- < 4 years Pressurized MDI with spacer via face mask
- 4-6 years
- Pressurized MDI with spacer via mouthpiece
- > 6 years

Dry powder inhaler(DPI) or Breath-actuated pressurized MDI or pressurized MDI with spacer















# THANK YOU

