National Allergy Asthma Bronchitis Institute

helpline email

Fortis

INFLUENZA AND CHRONIC LUNG DISEASE

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People at high risk of influenza complications

- Children < 2 years
- Adults aged 65 yrs or older
- Pregnant women
- Healthcare professional
- People of any age with certain medical conditions, such as –
  - Chronic heart diseases
  - Chronic lung diseases → Asthma and COPD Patients
  - Chronic kidney diseases
  - Chronic liver diseases
  - Blood or metabolic diseases (such as diabetes)
  - Or weakened immune systems

Source: http://www.who.int/mediacentre/factsheets/fs211/en/ as accessed on 4th August 2015, 12:30 pm

Impact of influenza in pts with Chronic Lung Diseases

- Among those not vaccinated for influenza the rate of hospitalization for pneumonia & influenza doubled from 55/1000 person yrs during the non-influenza season to 110 hospitalizations/1000 person-yrs during the influenza season
- CLD 65 yrs or older, 23.8 (95% CI, 10.1–37.5) deaths due to Influenza per 10,000 persons
- Increase in antibiotic prescriptions from 64 to 108 prescriptions per 1000 persons with CLD

Source: Mallia P, Johnston SL. Influenza infection and COPD. Int J Chron Obstruct Pulmon Dis. 2007;2(1):55-64.

INFLUENZA IN ASTHMA PATIENTS

Global impact of influenza on asthma

- Since the 1960s, asthma has been recognized as a medical condition conferring higher risk for influenza-associated complications during typical influenza seasons

- During the 2009 influenza pandemic, asthma pts accounted for 22% to 29% of all pts hospitalized with 2009 pandemic H1N1

Seasonal influenza-attributable hospitalization rates are substantially higher among children with asthma than among healthy children

Source: Dawood FS, et al. Children with asthma hospitalized with seasonal or pandemic influenza, 2003-2009. Pediatrics. 2011 Jul;128(1):e27-32.

Global impact of influenza on asthma

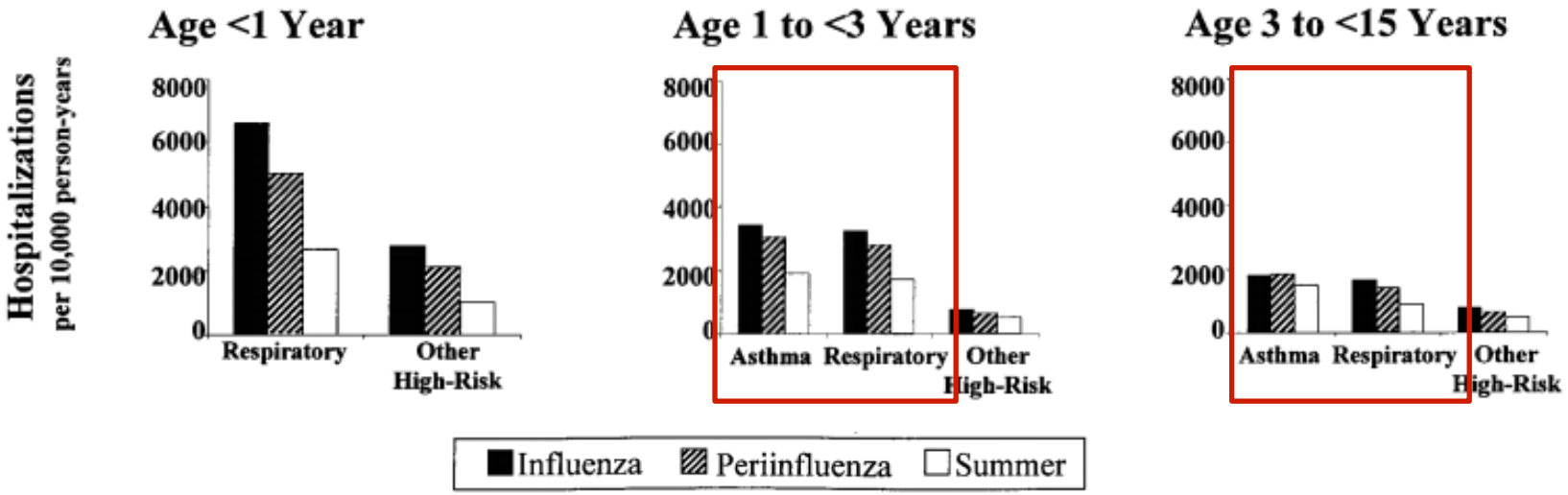
- **2 to 4x** times higher outpatient attendance & hospitalization in children with asthma vs. healthy children

- More than 30% of the children experiencing an asthma attack due to pandemic A/H1N1/2009 virus were diagnosed as having pneumonia, required admission to an intensive care unit, needed mechanical ventilation or died

Children with asthma & influenza are also more likely to have pneumonia, require intensive care or develop respiratory failure

Source: Patria MF, et al. Influenza vaccination in children at high risk of respiratory disease. Ther Adv Vaccines. 2013 May;1(1):21-31.

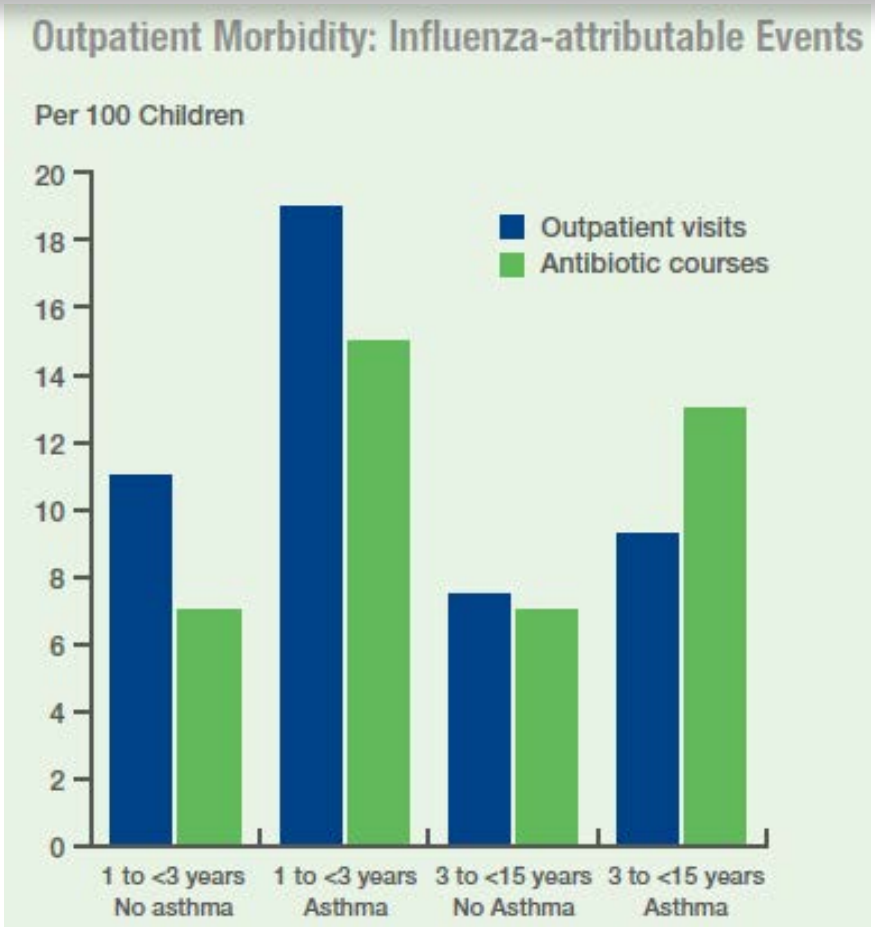
Increase in hospitalizations in asthmatic pts during flu season



Children aged 1 to <15 years with medically treated asthma/ respiratory infections had higher hospitalization rates during influenza seasons

Source: Neuzil KM, et al. The burden of influenza illness in children with asthma and other chronic medical conditions. J Pediatr. 2000 Dec;137(6):856-64.

Outpatient visits and antibiotic courses increase in Asthmatic children



- Antibiotic prescriptions are doubled in children 1 to 15 years of age with asthma compared with age-matched controls
- Outpatient visits are elevated for all children with asthma, but particularly for those 1 to 3 years of age

Source: Neuzil KM, et al. The burden of influenza illness in children with asthma and other chronic medical conditions. J Pediatr. 2000 Dec;137(6):856-64.

Indian Data on impact of influenza asthma

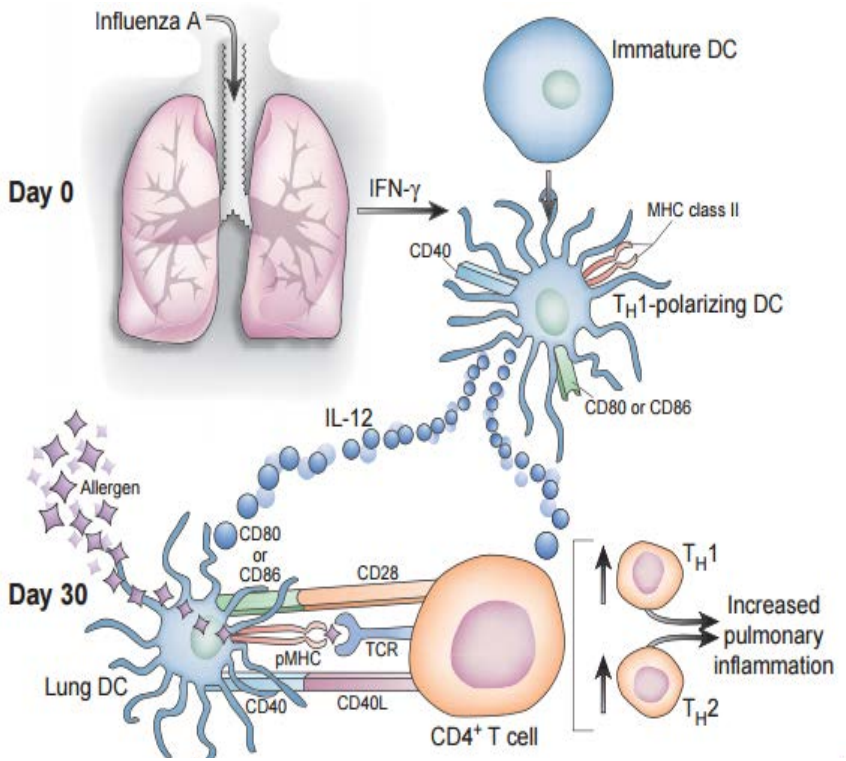
- During the H1N1 Pandemic, a study in Chennai found that bronchial asthma was found to be a risk factor in all hospitalized patients with influenza

Risk Factor	Percentage of Cases	Population Prevalence	P value
Asthma	16%	2.38%.(3)	<0.01
Tuberculosis	8.8%	0.4%	<0.01
Hypertension	7.2%	8.4%	
Diabetes	6.4%	4%	
Alchoholism	10.4%		
Smoking	8.0%		

- Out of all risk factors, asthma was the dominant condition for both the occurrence of H1N1 and associated complications

Source: Puvanalingam A, et al. Case series study of the clinical profile of H1N1 swine flu influenza. J Assoc Physicians India. 2011 Jan;59:14-6, 18.

How influenza exacerbate asthma symptoms



- Influenza A initially enhances Th1 enhancement of allergic inflammation
- After 30 days of infection, dendritic cells activated from the previous Th1 immune response enhance a Th2 immune response in the lungs
- DCs are therefore able to induce both a Th1 & Th2 response leading to increased pulmonary inflammation
- Increases airway obstruction
- Trigger asthma attacks & a worsening of asthma due to the inflammation of the airways & lungs

Source: Riese RJ, et al. Influenza and asthma: adding to the respiratory burden. Nat Immunol. 2004 Mar;5(3):243-4.

Asthma pts are at high risk of severe disease & complications from flu

Influenza can be more serious for people with asthma, even if mild symptoms are controlled by medication

Influenza infection in the lungs can trigger asthma attacks & a worsening of asthma symptoms

Can lead to pneumonia & other acute respiratory diseases

Asthma pts are more likely to develop pneumonia after getting sick with the flu than people who do not have asthma

Asthma is the most common medical condition among children hospitalized with the Influenza and one of the more common medical conditions among hospitalized adults

Source: http://www.cdc.gov/flu/asthma/index.htm. Accessed on 3rd November, 2015., 2:00pm

INFLUENZA IN COPD PATIENTS

Global impact of influenza on COPD

- USA it is estimated to affect 24 million people & is the 4th leading cause of morbidity & mortality
- On a worldwide basis, it is estimated that COPD will be the 3rd leading cause of mortality by the year 2020
- It is the 2nd most common cause of mortality in India.
- Morbidity and mortality associated with COPD are due to acute exacerbations
- Respiratory viruses are associated with 40%–60% of COPD exacerbations

Source: Mallia P, Johnston SL. Influenza infection and COPD. Int J Chron Obstruct Pulmon Dis. 2007;2(1):55-64.

Global impact of influenza on COPD

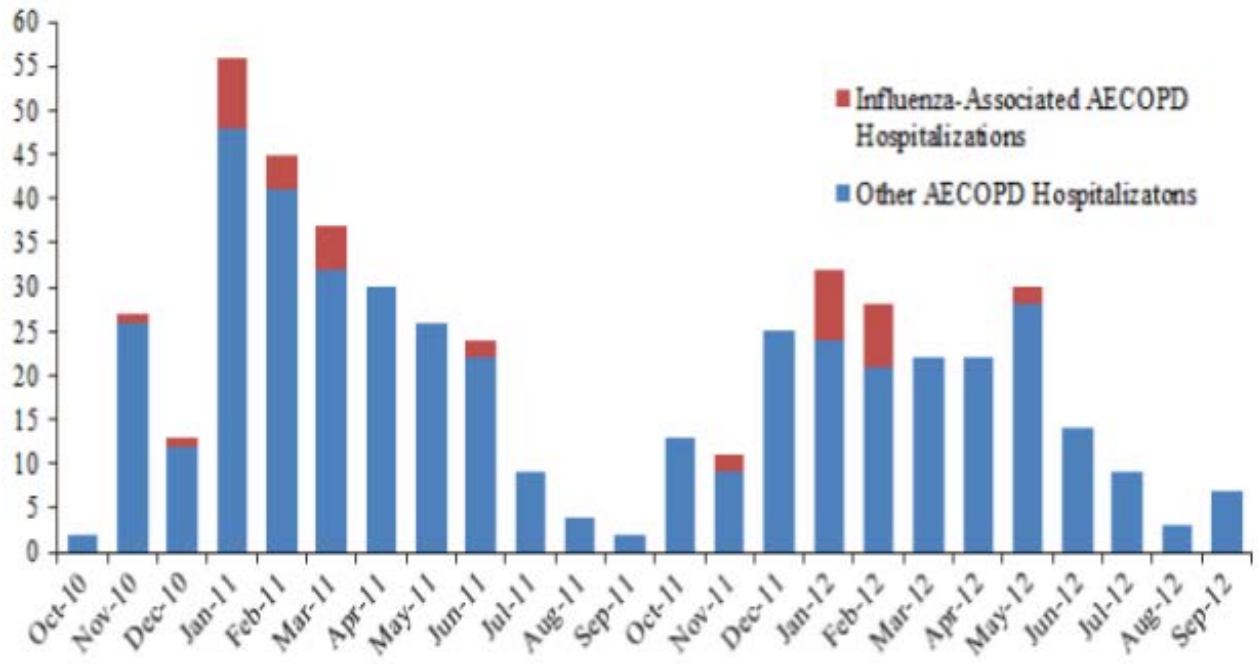
- 16%-36% of COPD pt exacerbations are due to influenza
- Among those with CLD 65 yrs or older, there were 23.8 deaths due to influenza per 10,000 persons
- Estimated increase in antibiotic prescriptions attributed to influenza ranged from 64 to 108 prescriptions per 1000 persons with CLD
- Influenza virus and RSV together accounted for 9% of deaths in those 65 yrs or older

Source: Mallia P, Johnston SL. Influenza infection and COPD. Int J Chron Obstruct Pulmon Dis. 2007;2(1):55-64.

Indian data on Impact of influenza on COPD

- Study conducted in India (2010-Sep 2012) found that **influenza was associated with 14–33%** of hospitalizations for acute exacerbation of COPD (AECOPD) during the peak winter mths

- Of the viral infections implicated in AECOPD, influenza is currently the only vaccine-preventable infection



Source:Koul PA, et al. Contribution of influenza to acute exacerbations of chronic obstructive pulmonary disease in Kashmir, India, 2010-2012. Influenza Other Respir Viruses. 2015 Jan;9(1):40-2. doi: 10.1111/irv.12291.

Influenza in COPD

- Influenza causes exacerbation of COPD pts due to inflammation of the airways & lungs[1]
- Responsible for approximately 1/3 COPD exacerbations[1]
- Influenza is the important cause of excess mortality & morbidity in COPD pts & may affect the progression of the disease[2]
- Viral infections, like influenza, may impair host defences, which leads to increased colonization or infection with pathogenic bacteria[1]

Pts with COPD are at an increased risk for respiratory illness-related hospitalisation during influenza outbreaks irrespective of age & degree of morbidity[2]

Source: 1. Wongsurakiat P, et al. Acute respiratory illness in patients with COPD and the effectiveness of influenza vaccination: a randomized controlled study. Chest. 2004 Jun;125(6):2011-20.. 2.Poole PJ, et al. Influenza vaccine for patients with chronic obstructive pulmonary disease. Cochrane Database Syst Rev. 2006 Jan 25;(1):CD002733.

Influenza and influenza-like illness interferes with work & leisure time activities

Effectiveness at work: 4.6
(scale of 1 to 10 (fully effective)

Work loss
2.8 days

Caregiver assistance:
0.4 days

Interference with activities at home reported by 73%

Interference with leisure activities reported by 84%

Confined to bed
2.4 days

N=411 patients with influenza or influenza-like illness completed questionnaires on entry to study & after 28 days

Source: Keech M, Scott AJ, Ryan PJ. The impact of influenza and influenza-like illness on productivity and healthcare resource utilization in a working population. Occup Med (Lond). 1998 Feb;48(2):85-90.

CHALLENGES IN THE MANAGEMENT OF INFLUENZA

Indications: Antiviral drugs

- Pts at risk & their household contacts, who have not (yet) been vaccinated at the time when influenza infections are becoming widespread in an area
- Control of an outbreak in a (semi-)closed community (e.g. nursing home)
- Patients at risk with a known hypersensitivity to chicken proteins (contraindication for vaccination)
- Vaccine mismatch between vaccine component and circulating virus strain
- Pandemic threat with no vaccine (yet) available

Source: Prevention and control of influenza. Recommendations ACIP. *MMWR Recomm Rep* 2004; **53** (RR-6): 1–40

Considerations in the use of antiviral drugs

M2-channel inhibitors
Amantadine & Rimantadine

- Effective against influenza A only
- Most common adverse effects: CNS (anxiety, insomnia, dizziness, headache, nervousness) and gastrointestinal upset.
- Viruses may develop resistance within 2-4 days after start of therapy
- Drugs have to be given within 24 to 48 hrs after the onset of symptoms
- Drugs can diminish the severity of clinical symptoms & shorten duration of uncomplicated influenza disease by average of 1 day

Source: www.rapidreferenceinfluenza.com as accessed on 18th nov 2015, at 3:15pm

Considerations in the use of antiviral drugs

Neuraminidase inhibitors
Zanamivir & Oseltamivir

- Drugs have to be administered within 24 to 48 hrs after disease onset
- Drugs can diminish the severity of clinical symptoms & reduce the duration of uncomplicated influenza A and B illness by approximately 1 day
- Viruses may develop resistance within 2-4 dys after start of therapy
- Zanamivir may induce bronchospasm
- Oseltamavir is normally well tolerated, may induce gastrointestinal side effects

Source: www.rapidreferenceinfluenza.com as accessed on 18th nov 2015, at 3:15pm

Vaccination remains the method of choice for influenza prophylaxis

Vaccination is the primary & single most cost-effective method of **preventing influenza**

Source: www.rapidreferenceinfluenza.com as accessed on 18th nov 2015, at 3:15pm

Recommendations: Global Bodies

CDC
Centers for Disease Control and Prevention[1]

ACIP
Advisory committee on Immunization Practices[1]

IAP
Indian Academy of Pediatrics[2]

GOLD
Global initiative for chronic obstructive lung disease[6]

NIH
National Heart, lung and Blood institute[4]

ICS
Indian Chest Society[5]

Source: 1. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a3.htm as accessed on 5th August 2015, at 11:47am. 2. http://www.indianpediatrics.net/sep2013/867.pdf as accessed on 5th August 2015, at 11:57am. 3. Bellamy D et al. International Primary Care Respiratory Group (IPCRG) Guidelines: management of chronic obstructive pulmonary disease (COPD). Prim Care Respir J. 2006 Feb;15(1):48-57. 4. http://www.nhlbi.nih.gov/files/docs/guidelines/06_sec3_comp3.pdf as accessed on 5th August 2015, at 12:05pm. 5.Dheeraj Gupta et al. Guidelines for diagnosis and management of community- and hospital-acquired pneumonia in adults: Joint ICS/NCCP(I) recommendations. Lung India. 2012 Jul-Sep; 29(Suppl 2): S27–S62.. http://www.goldcopd.org/uploads/users/files/GOLD_Pocket_2015_Feb18.pdf

EFFECTIVENESS OF INFLUENZA VACCINES IN COPD & ASTHMA PATIENTS

Effectiveness in asthmatic children

- Influenza vaccine decreases the rate of influenza-associated exacerbations and in acute respiratory diseases
- Influenza vaccine in children with asthma seems to lead to high and persistent seroprotection rates (87–90% after 1 month, and 74–77% after 6 months)
- Flu vaccine is safe and well tolerated in children

Source: Patria MF, et al. Influenza vaccination in children at high risk of respiratory disease. Ther Adv Vaccines. 2013 May;1(1):21-31.

Effectiveness in asthmatic children

Randomized, double-blind & placebo-controlled study was conducted in children with asthma 6-18 yrs of age, who had used medication for asthma in the previous year. They were recruited in general practices during the seasons 1999-2000 & 2000-2001. A total of 696 children were enrolled, of whom 347 were vaccinated with Influvac & 349 were in the placebo group

- No serious adverse events were observed
- Apart from daytime cough, no differences were found for the frequency or severity of asthma symptoms as an adverse reaction to vaccination
- Found to have a moderately beneficial effect on quality of life in influenza-positive weeks of illness in children with asthma
- No evidence that vaccination increased the risk of exacerbations of asthma

Effectiveness in asthmatic children

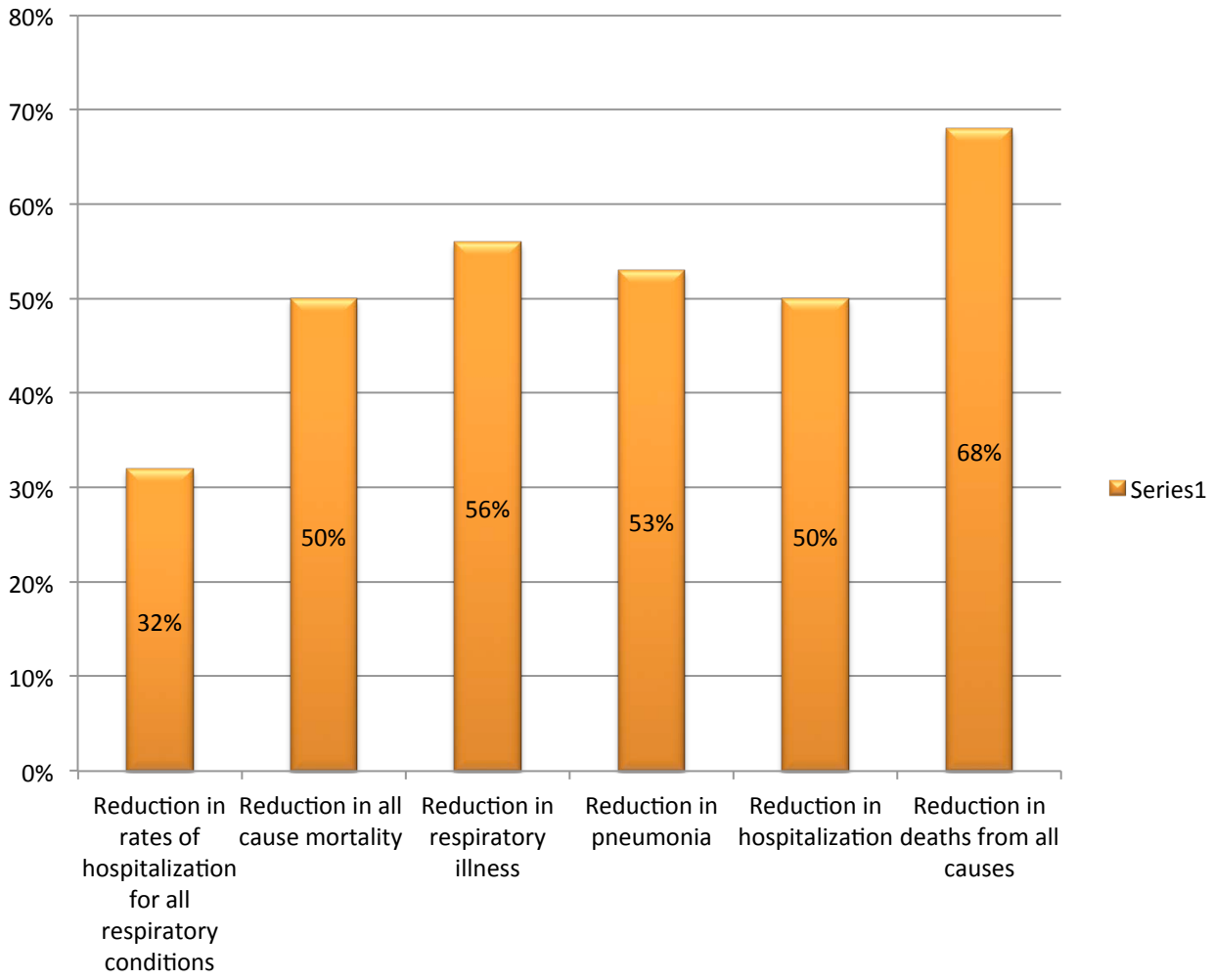
Reduce the risk of asthma exacerbation by 22% to 41%[1]

Study in children 0 to 12 years old with asthma, a beneficial clinical effect (↓n no of lower RTI & acute otitis media) in vaccinated preschool children[2]

Ong et al reported a reduction in the use of oral steroids in vaccinated children with asthma[3]

Source: 1. *Destefano F et al.* Does influenza vaccination prevent asthma exacerbations in children?*Kramarz P, J Pediatr. 2001 Mar; 138(3):306-10. 2.* Smits AJ et al. Clinical effectiveness of conventional influenza vaccination in asthmatic children. Epidemiol Infect. 2002;128(2):205–11. 3. Ong BA, Forester J, Fallot A. Does influenza vaccination improve pediatric asthma outcomes? J Asthma.2009;46(5):477–80

Effectiveness in COPD pts



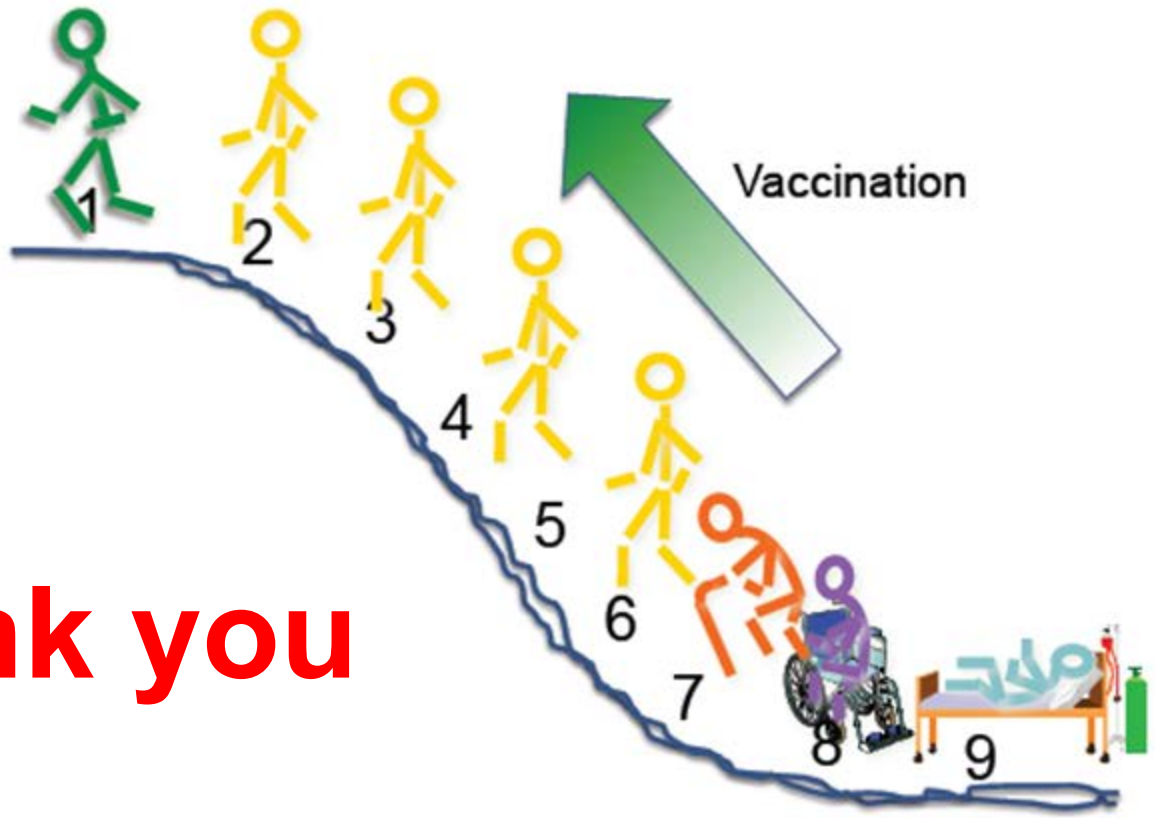
Source: Poole PJ, et al. Influenza vaccine for patients with chronic obstructive pulmonary disease. Cochrane Database Syst Rev. 2006 Jan 25;(1):CD002733.

Conclusions

- Seasonal influenza-attributable hospitalization rates are substantially higher among children with asthma than among healthy children
- Asthma is the most common medical condition among children hospitalized with the Influenza and one of the more common medical conditions among hospitalized adults
- 16%-36% of COPD pt exacerbations are due to influenza

- Of the viral infections implicated in AECOPD, influenza is currently the only vaccine-preventable infection
- **Vaccination** is the primary & single most cost-effective method of **preventing influenza**
- Influenza vaccination reduces the risk of asthma exacerbation by 22% to 41%.
- Influenza vaccination reduces all cause mortality in COPD by 50%

Adding Life to Years



Thank you