PHARMACY PHACTS

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What are the benefits of influenza vaccination?

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Although activity of the influenza virus peaks between December and February, the influenza season begins in October and November and can persist into May. During the 2018-2019 influenza season, the CDC recommends use of any licensed, age-appropriate influenza vaccine, including inactivated influenza vaccine [IIV], recombinant influenza vaccine [RIV], or live attenuated influenza vaccine (LAIV). Since February 24, 2010, it has been recommended that every person 6 months of age and older be vaccinated each season.

The influenza vaccine prevents millions of illnesses and influenza-related healthcare visits each year. When the vaccine viruses match circulating strains, it has been shown to reduce the risk of influenza-related visits by 40-60 percent. In addition, a 2018 study demonstrated that a vaccinated adult hospitalized with influenza was 59 percent less likely to be admitted to the intensive care unit than an unvaccinated individual. Vaccination can reduce the risk of influenza-associated hospitalization and risk of influenza-related death for children and older adults, protect women during and after pregnancy, and prevent medical sequelae of chronic conditions. During the 2016-2017 season, vaccination prevented an estimated 5.3 million influenza illnesses. Table 1 demonstrates the number of influenza-associated pediatric deaths spanning from the 2015 season until the present.

Contrary to what people may believe, the influenza vaccine cannot cause influenza illness. Vaccines are currently developed through one of two methods: (1) viruses that have been inactivated and are, therefore, not infectious or (2) using only a single gene from an influenza virus (as opposed to the full virus) in order to produce an immune response without posing risk for infection. Choosing to receive the vaccine is a safer alternative to risking illness to obtain immune protection. Following vaccination, it takes approximately two weeks for antibodies to develop and provide protection against influenza. Although the CDC recommends that people receive the vaccination by the end of October, getting vaccinated later can still be beneficial.

An influenza vaccine should be repeated every season because the body's immune response from vaccination declines over time, so annual vaccination is needed for optimal protection. Because influenza viruses are constantly changing, the formulation of the vaccine is reviewed on an annual basis and updated as needed. Following the 2017-2018 influenza

season, improvements were made to the vaccine by replacing two of the strains with better matches. It has demonstrated efficacy thus far.

As of January 25, 2019, greater than 1700 employees at Sheppard Pratt Towson campus and 200 employees at Ellicott City campus have been vaccinated. Table 2 below shows both the number of employees vaccinated and those not vaccinated due to allergies, new hires that have not yet started, and those employees who have since left Sheppard Pratt. All patients admitted to either Sheppard Pratt campus are offered the influenza vaccine.

Table 1

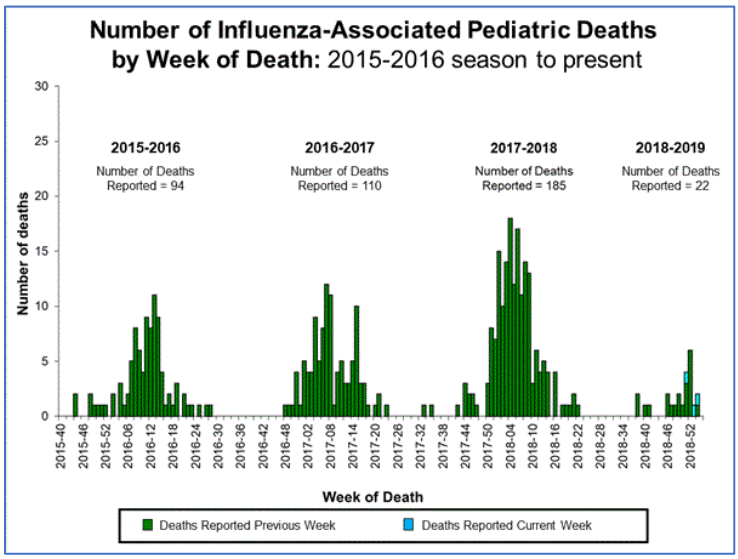
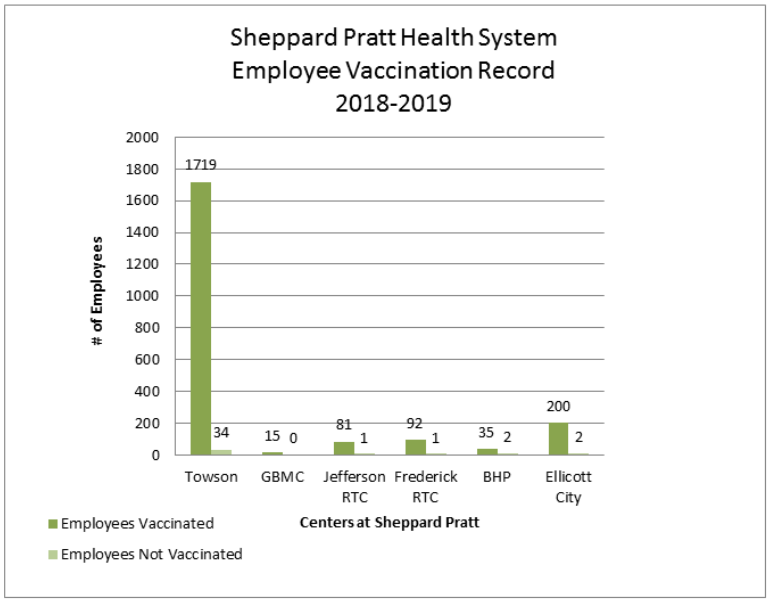


Table 2



References available upon request.

Risks Associated with Long-Term Inhaler Use

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In recent years, the prevalence of asthma has increased at a substantial rate. According to the World Health Organization, at least 253 million people currently suffer from asthma.[1] This is due to the various environmental and comorbid conditions that can exacerbate this chronic disease. Ensuring proper asthma management is especially relevant in our patient population given that Maryland has been deemed a high risk area for pollution. In 2017, a report issued by the Environmental Integrity Project demonstrated the effect of air pollution on the Maryland population, specifically within Baltimore city. One comparison study showed that, in 2010, Baltimore city asthma hospitalization rates were almost three times higher than the US average. In addition, asthma-related hospitalization rates in the entire state of Maryland were 2.2 times higher than the US average; therefore, many patients in this geographic area are likely to utilize inhalers for long term asthma management.[2] This article addresses the usage, potential risk, and adverse effects of long term inhaler usage.

The first key principle of long term asthma management is reducing impairment. Inhalers are highly effective in delivering medication directly into the lungs with minimum systemic toxicity. If patients utilize an albuterol inhaler beyond their asthma classification, the potential exists for adverse effects. For example, short-acting beta-2 agonists (SABAs), such as albuterol, are pro-inflammatory, so the overuse of this medication can lead to increased airway hyper-responsiveness and beta-2 receptor impairment. Eventually, persistent overuse over a long period of time will increase the severity of illness. These adverse effects also stand true for long-acting beta-2 agonist (LABA) agents, such as salmeterol. Improper use of LABAs for an extended duration can lead to cardiac complications and asthma-related deaths.

Inhaled corticosteroids (ICS), another notable asthma treatment option, are viewed therapeutically as the gold standard and first line treatment in the management of symptoms requiring maintenance therapy. This is due to the potent anti-inflammatory nature of ICS agents; however, overuse can lead to multiple systemic side effects. These systemic side effects become apparent when high doses of ICS agents are administered over long periods of time, especially in the setting of improper inhaler utilization. A 2006 study conducted at the University of Aarhus found that high doses of ICS over extended time periods may result in impaired growth in children, decreased bone mineral density, skin thinning and bruising, and cataracts.[8]

If the first key principle is followed correctly, patient risk will be reduced significantly. Three methods exist to reduce improper usage of the albuterol rescue inhaler and ensure appropriate treatment based on asthma severity. The first method, called “rule-of-twos,” defines albuterol overuse as requiring use of the inhaler greater than twice a week (except for exercise) ***or*** awakening from sleep due to asthma symptoms more than two times in one month.[5] The second method is to check if the patient has filled more than one albuterol canister within a year. Frequency of refills may be an indication of how well a patient’s asthma is controlled. The third and final method would be to reference databases, such as the

Healthcare Effectiveness Data and Information Set (HEDIS), which utilize the asthma medication ratio (AMR) to determine overusage.[7]

To ensure optimal long-term asthma management that is both safe and effective, healthcare providers should take the aforementioned steps to avoid improver inhaler use and ensure appropriate pharmacologic management based on asthma severity.

References available upon request.

Risks Associated with Long-Term Proton Pump Inhibitor Use

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Proton pump inhibitors (PPIs) are one of the most widely prescribed medications used for treatment of Gastroesophageal Reflux Disease (GERD), *H. pylori* infection, duodenal or gastric ulcers, and for prevention of stress ulcers. Common PPIs are pantoprazole (Protonix), omeprazole (Prilosec), lansoprazole (Prevacid), esomeprazole (Nexium), dexlansoprazole (Dexilant), and rabeprazole (AcipHex). PPIs work by suppressing gastric acid production and therefore increasing the pH of the stomach.

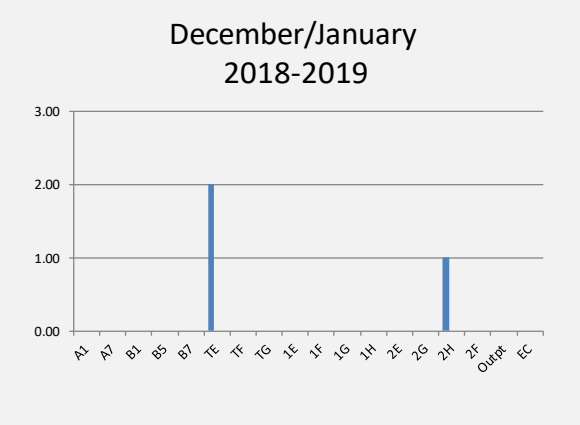
In general, PPIs are well tolerated and adverse effects are minimal with short term use. However, long-term use of PPIs is associated with potential adverse effects such as *Clostridium difficile* infection, hip fractures, osteoporosis, electrolyte imbalance, and vitamin B_{12} deficiency.[1] The American Geriatrics Society Beers criteria has placed PPIs as a class of medications to avoid in the elderly population due to its risk of *C. difficile* infection, bone loss, and fractures. It is recommend to "avoid scheduled use for > 8 weeks unless for high risk patients (e.g., oral corticosteroids or chronic NSAID use), erosive esophagitis, Barrett's esophagitis, pathological hypersecretory condition, or demonstrating the need for maintenance treatment (e.g. due to failure of drug discontinuation trial or Histamine H_2-receptor antagonists [H_2 blockers])."[2] There has been recent research into a link between PPI use and dementia. Current studies on the topic show conflicting results and many have been noted to have methodological concerns.[3]

The American Gastroenterological Association's guidelines were updated in 2017 to provide best practice prescribing for PPI medications.[4] These guidelines include a focus on using the lowest effective PPI dose and limiting use to the short term when possible to prevent adverse effects. Because PPIs are available both over the counter and by prescription it is difficult to define usual length of use. Continuing patient education on duration of therapy is needed, and patients should be made aware of the possibility of rebound symptoms following withdrawal of prolonged PPI therapy. Therefore, weaning the use of PPIs over time instead of stopping abruptly can prevent acid hypersecretion. Adjunct therapy with H_2 blockers or other antacids support the transition off of PPIs.[5]

References available upon request.

Adverse Drug Reactions (ADRs)

Number of ADRs reported



You may report an ADR by calling x3784 or entering the data into the Sunrise Allergies System.

Formulary changes

- Addition: NAC (N-Acetylcysteine) 600 mg capsules ($0.07/capsule, 100 count bottle)

Drug shortages

1. Buspar: 10 mg bulk unit dose (nationwide shortage)
2. Haloperidol: 0.5 mg, 1 mg, and 2 mg tablets unavailable; 5mg and 10mg tablets on short supply
3. Labetalol injection (ECT)
4. Methyldopa: 250 mg
5. Trifluoperazine: 1 mg, 2 mg, 5 mg, and 10 mg
6. Lorazepam: 0.5 mg and 1 mg
7. Clonazepam: 0.5 mg
8. Alprazolam: 0.25 mg