The Impact of Influenza Disease
It’s More Serious Than You Might Think
Influenza Is the Most Burdensome Infectious Disease in the United States

2017-2018 Influenza Season: 49 million illnesses, 960,000 hospitalizations, and 79,000 deaths\(^1\)

CDC Estimates of Annual Influenza Disease Burden in the United States, 2010-2018\(^1\)

Cumulative Laboratory-Confirmed Influenza Hospitalization Rates, 2009-2018\(^2\)

Potential Complications of Influenza

DIRECT effects

- Asthma and COPD<sup>a</sup> exacerbations
- Ear/sinus infections
- Bronchitis and pneumonia

INDIRECT effects: Multi-Organ Systems

- Acute myocardial Infarction (AMI)
- Ischemic heart disease
- Cerebrovascular disease/stroke

EXACERBATION of:

- Renal disorders
- Diabetes

<sup>a</sup>COPD = chronic obstructive pulmonary disease.


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Influenza Can Lead to Severe Health Outcomes Related to Cardiovascular Disease and Diabetes

Cardiovascular Disease

Severe cardiovascular events significantly increase 1-3 days post-influenza infection.¹

<table>
<thead>
<tr>
<th>Rates of AMI increased nearly</th>
<th>Rates of stroke elevated nearly</th>
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<tbody>
<tr>
<td>10-fold</td>
<td>8-fold</td>
</tr>
<tr>
<td>95% CI, 2.7-40.5 (n=1,227)</td>
<td>95% CI, 1.07-56.9 (n=762)</td>
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</tbody>
</table>

- **Subjects:** 1,989 patients aged 59-77 years
- **Study period:** January 1, 2004 - December 31, 2014
- **Inclusion criteria:** laboratory-confirmed respiratory infection and a first AMI or stroke

Diabetes Mellitus (DM)

People with DM are at increased risk for influenza-related severe outcomes compared to people without DM.²-⁴

- **3x** more likely to be hospitalized²-³
- **4x** more likely to be admitted to the ICU²-³

- **Subjects:** 162 patients aged <1 to 85 years
- **Study period:** May 25 - July 1, 2009
- **Inclusion criteria:** positive for influenza A(H1N1)pdm09 and hospitalized

- **2x** more likely to die²,⁴

- **Subjects:** 196 patients ≥18 years
- **Study period:** Apr 1, 2009 – Mar 31, 2010
- **Inclusion criteria:** fatal cases of laboratory-confirmed cases of influenza A(H1N1)pdm09

Influenza Immunization Can Decrease Severe Events Related to Cardiovascular Disease and Diabetes

Cardiovascular Disease

Meta-analysis: estimates of interventional efficacy in secondary prevention of myocardial infarction\(^1\):

- **Influenza Vaccine**: 15%-45%
- **Smoking Cessation**: 32%-43%
- **Statins**: 19%-30%
- **Antihypertensive Drugs**: 17%-25%

Diabetes

In 124,503 people with type 2 DM, influenza vaccination was associated with significant reductions in hospital admission rates\(^2\):

- **Acute Myocardial Infarction**: 19%
- **Stroke**: 30%
- **Heart Failure**: 22%
- **Influenza or Pneumonia**: 15%
- **All-Cause Death**: 24%

Disparities Exist in Influenza Vaccination Coverage

Vaccination coverage, 2017-2018 influenza season

Healthy People 2020 goal of 70% for all adults

An Unfortunate and Persistent Issue

Flu Immunization Rates and Population Health Outcomes Vary Significantly Among Patients 50+ with Chronic Health Conditions

Chronic conditions, such as **heart disease & diabetes** increase the risk of influenza-related hospitalization & other severe outcomes\(^2\)\(^-\)\(^5\)

**Compared to non-Hispanic white adults,\(^6\)**

- **30%**
  - African Americans are 30% more likely to die from heart disease
- **70%**
  - Hispanics are 70% more likely to be diagnosed with diabetes

**Disparities in immunization rates exist in people of color\(^1\)**

**Clinical & real-world evidence demonstrate differentiated influenza vaccines can improve influenza-related outcomes,\(^7\)**

- but **access limitations** can hamper underserved populations\(^8\)**

**References:**
Thank you!