In the name of GOD

Respiratory infections

(Including Influenza)

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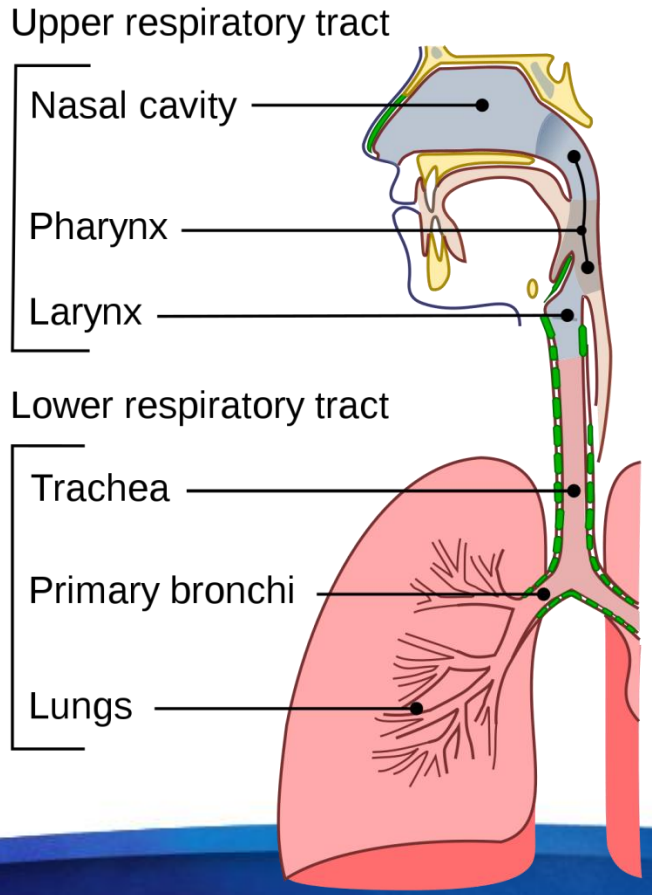
Objectives

At the end of this session you should be able to explain the followings about RIs:

- Types.
- Signs and symptoms.
- Transmission routes.
- Prevention in community.
- Prevention in hospitals.

Respiratory infections TYPEs

- Upper Respiratory Infections:
  - Common Cold
  - Sinusitis
  - Pharyngitis
  - Epiglottitis
  - Laryngitis
- Lower Respiratory Infections:
  - Bronchitis
  - Bronchiolitis
  - **Pneumonia**



Mortality

- Globally more than **1.5 million deaths** annually from respiratory infections are attributable to the environment, including at least 42% of lower respiratory infections and 24% of upper respiratory infections in developing countries.

WHO: Preventing disease through healthy Environments
https://www.who.int/quantifying_ehimpacts/publications/preventingdisease5.pdf

DEFINITION

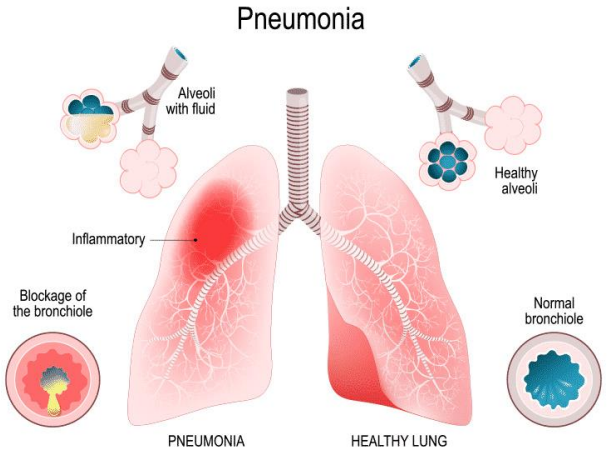
- Community-acquired pneumonia (**CAP**):

a syndrome in which acute infection of the lungs develops in persons who have not been hospitalized recently and have not had exposure to the health care system

Pneumonia has been studied since the late 1800s

Risk Factors of CAP

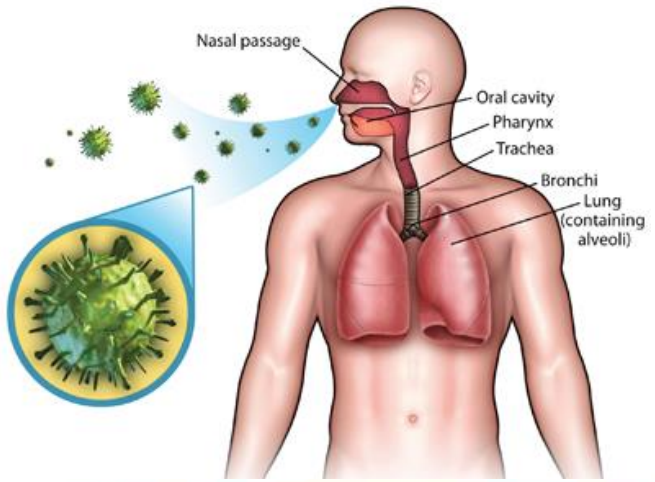
- advanced age
- chronic lung disease
- cardiovascular disease
- diabetes mellitus
- Malnutrition
- immunocompromising conditions
- and lifestyle factors:
  - Smoking / excessive alcohol consumption



Thomas M. File, Jr., M.D., and Julio A. Ramirez, M.D. **Community-Acquired Pneumonia**. N Engl J Med 2023;389:632-41.

Respiratory infections Causes

- Viruses:
  - New Coronavirus (SARS-CoV-2)
  - Influenza (H1N1, H3N2, Type b)
  - Respiratory syncytial virus (RSV)
  - Parainfluenza, Rhinoviruses, …
- Bacteria:
  - Pneumococcus
  - Haemophilus influenza
  - Staphylococcus aureus



CAUSES

Common Causes	Less Common Causes	Uncommon Causes
Infectious		
Streptococcus pneumoniae, Haemophilus influenzae, Staphylococcus aureus, influenza virus, other respiratory viruses†	*Pseudomonas aeruginosa* or other gram-negative rods, *Pneumocystis jirovecii, Moraxella catarrhalis,* mixed microaerophilic and anaerobic oral flora	*Mycobacterium tuberculosis,* nontuberculous mycobacteria, nocardia species, legionella species, *Mycoplasma pneumoniae,*‡ *Chlamydophila pneumoniae,*‡ *Chlamydophila psittaci, Coxiella burnetii, Histoplasma capsulatum,* coccidioides species, *Blastomyces dermatitidis,* cryptococcus and aspergillus species

- In the pre-antibiotic era, **Streptococcus pneumoniae** caused 95% of cases of pneumonia, and it is now detected in only about 10 to 15% of inpatient cases
  - /Pneumococcal vaccine/

- Thomas M. File, Jr., M.D., and Julio A. Ramirez, M.D. **Community-Acquired Pneumonia**. N Engl J Med 2023;389:632-41.
- Daniel Musher M.D., Anna R. Thorner M.D. **Review article: Community-Acquired Pneumonia**. N Engl J Med 2014;371:1619-28.

- **COPD**:
  - increased risk for H. influenzae and Mor. Catarrhalis
  - also **P. aeruginosa** and other gr- bacilli

- **Atypical bacterial**:
  - Mycoplasma / Chlamydophila pneumoniae
  - wide variation in the reported incidence
  - polymerase-chain-reaction (**PCR**) techniques

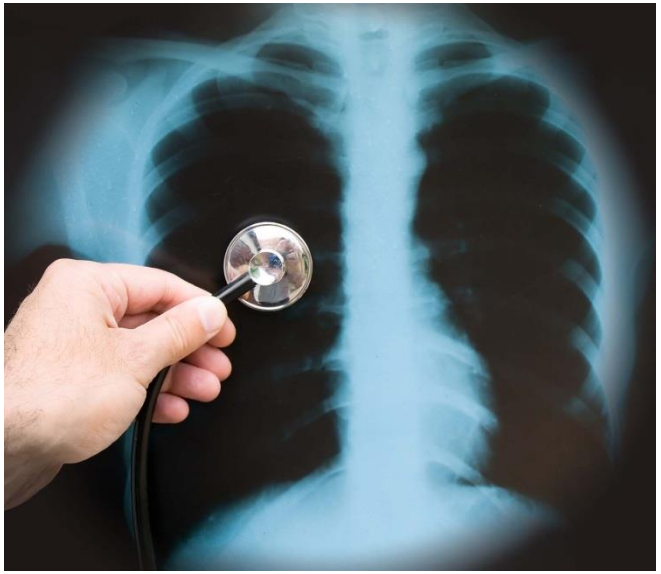
- **Legionella**:
  - in certain locations and specific exposures
  - Urine **Ag**

Pneumonia DIAGNOSIS

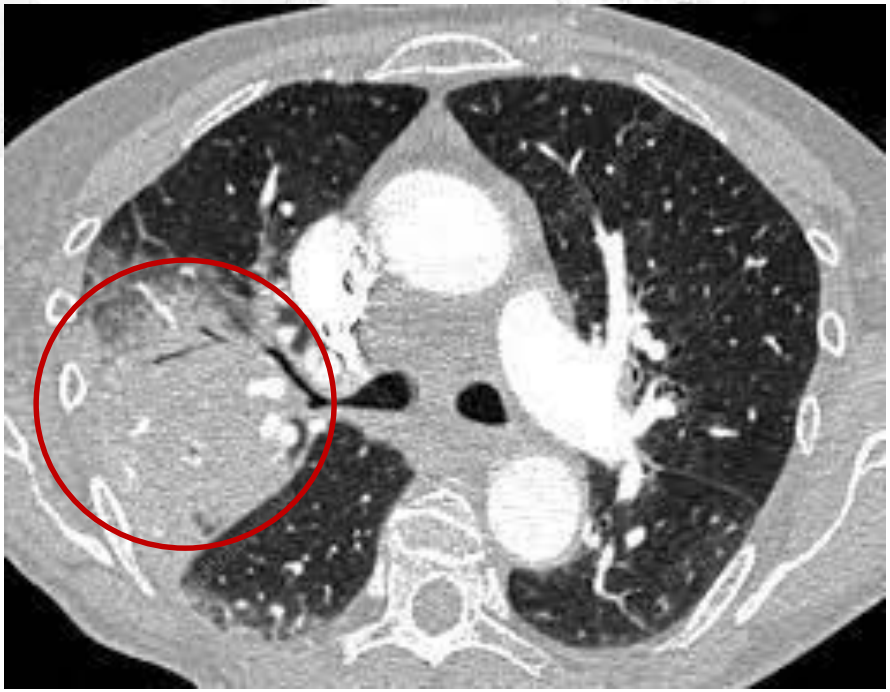
- newly recognized lung infiltrate on chest imaging

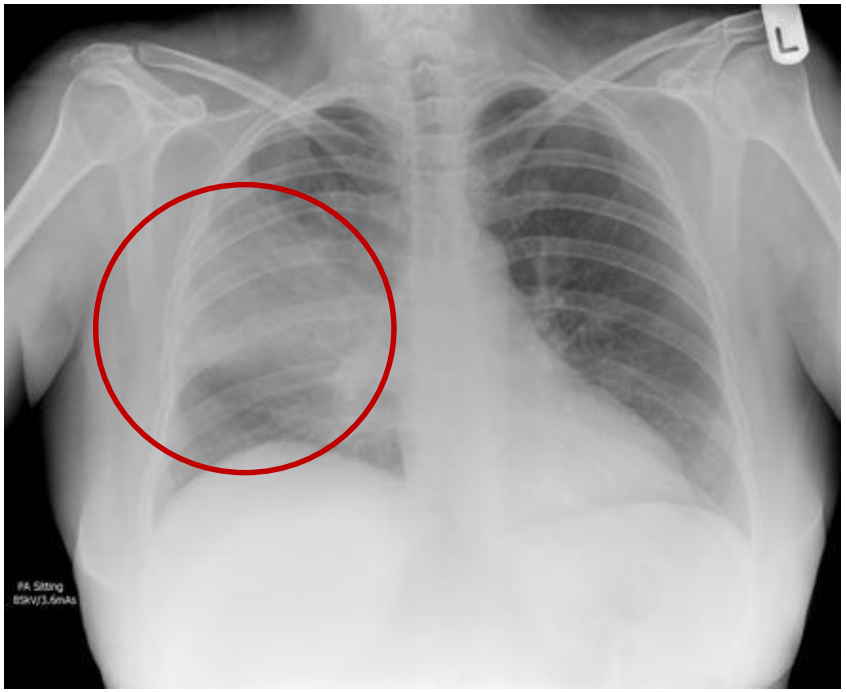
  +

  - Fever
  - Cough
  - sputum production
  - shortness of breath
  - Rales on auscultation
  - Leukocytosis
  - Confusion (Elderly)
  - Pleuritic chest pain



Pneumonia lung graph





Determine Cause

- Gram’s staining and culture of sputum
- Blood cultures
- Legionella and pneumococcal urinary antigens
- PCR
  - Myc. Pneumoniae
  - Chl. Pneumoniae
  - and respiratory viruses

Determine Cause

- Sputum S & C: 80% positive for pneumococcus
  - good-quality specimen (10 PMN per epithelial cell)
  - before, or within 6 to 12 hours of AB
  - Nebulization with hypertonic saline (induced sputum) increase the likelihood of obtaining a valid sample

- Blood/C: 20-25% positive for pneumococcus
  - in fewer cases of pneumonia caused by other
  - hematogenous *Staph. Aureus:* nearly always positive
  - inhalation or aspiration *Staph. Aureus: 25% positive*

Determine Cause

- Urine antigen:
  - in 77-88% / bacteremic pneumococcal pneumonia
  - in 64% / nonbacteremic pneumococcal pneumonia
  - about 74% / Legionella pneumophila serotype1

- PCR (atypical causes):
  - virus / in 20-40% of adults hospitalized for CAP
  - positive virus PCR NOT exclude bacterial pneumonia
  - 20% with bacterial pneumonia co-infected with a virus
  - Mycoplasma, chlamydia , …

Suggestive of CA-MRSA pneumonia

Table 3. Clinical Features Suggesting Community-Acquired MRSA Pneumonia.*
Cavitary infiltrate or necrosis
Rapidly increasing pleural effusion
Gross hemoptysis (not just blood-streaked)
Concurrent influenza
Neutropenia
Erythematous rash
Skin pustules
Young, previously healthy patient
Severe pneumonia during summer months

Treatment

- Scoring of Disease Severity
- Empirical Therapy / Specific Therapy
- Duration of Therapy
- Outcomes

Scoring of Disease Severity

- Ultimately depends on the physician's judgment
- Pneumonia Severity Index (PSI)
- CURB-65 score:
  - Confusion / Urea>20 / RR>30 / SBP<90 / Age>65
- SMART-COP score:
  - SBP / Multilobar / Alb / RR / HR / confusion / oxygen / pH
- IDSA/ATS Criteria to Define Severe CAP

IDSA/ATS Criteria to Define Severe CAP

American Thoracic Society and Infectious Diseases Society of America Criteria to Define Severe CAP	
Major Criteria	Septic shock treated with vasopressors Respiratory failure necessitating mechanical ventilation
Minor Criteria	Respiratory rate ≥30 breaths/min Confusion or disorientation or both Hypothermia (core temperature <36°C or 96.8°F) Hypotension necessitating aggressive fluid resuscitation Leukopenia (white-cell count <4000 cells/μl) Thrombocytopenia (platelet count <100,000 per μl) Uremia (blood urea nitrogen level ≥20 mg/dl) Ratio of PaO_2 to FIO_2 ≤250 Multilobar (≥2) infiltrates
Severe CAP	One major criterion or ≥3 minor criteria

Empirical Therapy

TABLE 69-4 Guide to Empirical Choice of Antimicrobial Agent for Treating Adult Patients with Community-Acquired Pneumonia or Health Care–Acquired Pneumonia

PATIENT CHARACTERISTICS	PREFERRED TREATMENT OPTIONS
Outpatient	
Previously Healthy	
No recent antibiotic therapy	Macrolide[a] or doxycycline (100 mg 2 times/day)
Recent antibiotic therapy[b]	A respiratory fluoroquinolone[c] alone, an advanced macrolide[d] plus oral β-lactam[e]
Comorbidities (COPD, Diabetes, Renal Failure or Congestive Heart Failure, or Malignancy)	
No recent antibiotic therapy	An advanced macrolide plus oral β-lactam or a respiratory fluoroquinolone
Recent antibiotic therapy	A respiratory fluoroquinolone alone or an advanced macrolide plus a β-lactam
Suspected aspiration with infection	Amoxicillin-clavulanate or clindamycin (600 mg IV q8h or 300 mg PO q6h)
Influenza with bacterial superinfection	Vancomycin, linezolid, or other coverage for MRSA, including community-acquired MRSA[f]
Inpatient	
Medical Ward	
No recent antibiotic therapy	A respiratory fluoroquinolone alone or an advanced macrolide plus an intravenous β-lactam[g]
Recent antibiotic therapy	An advanced macrolide plus an intravenous β-lactam, or a respiratory fluoroquinolone alone (regimen selected will depend on nature of recent antibiotic therapy)
Intensive Care Unit (ICU)	
Pseudomonas infection is not a concern	A β-lactam[g] plus either an advanced macrolide or a respiratory fluoroquinolone
Pseudomonas infection is not a concern but patient has a β-lactam allergy	A respiratory fluoroquinolone, with or without clindamycin
Pseudomonas infection is a concern[h] (cystic fibrosis, impaired host defenses)	Either (1) an antipseudomonal β-lactam[i] plus ciprofloxacin (400 mg IV q8h or 750 mg PO q12h), or (2) an antipseudomonal agent plus an aminoglycoside[j] plus a respiratory fluoroquinolone or a macrolide
Pseudomonas infection is a concern but the patient has a β-lactam allergy	Aztreonam (2 g IV q8h) plus aminoglycoside plus a respiratory fluoroquinolone
Health Care–Associated Pneumonia[k]	
—	Either (1) an antipseudomonal β-lactam plus ciprofloxacin or levofloxacin or (2) an antipseudomonal agent plus an aminoglycoside plus a respiratory fluoroquinolone or a macrolide plus vancomycin or linezolid (for MRSA coverage)

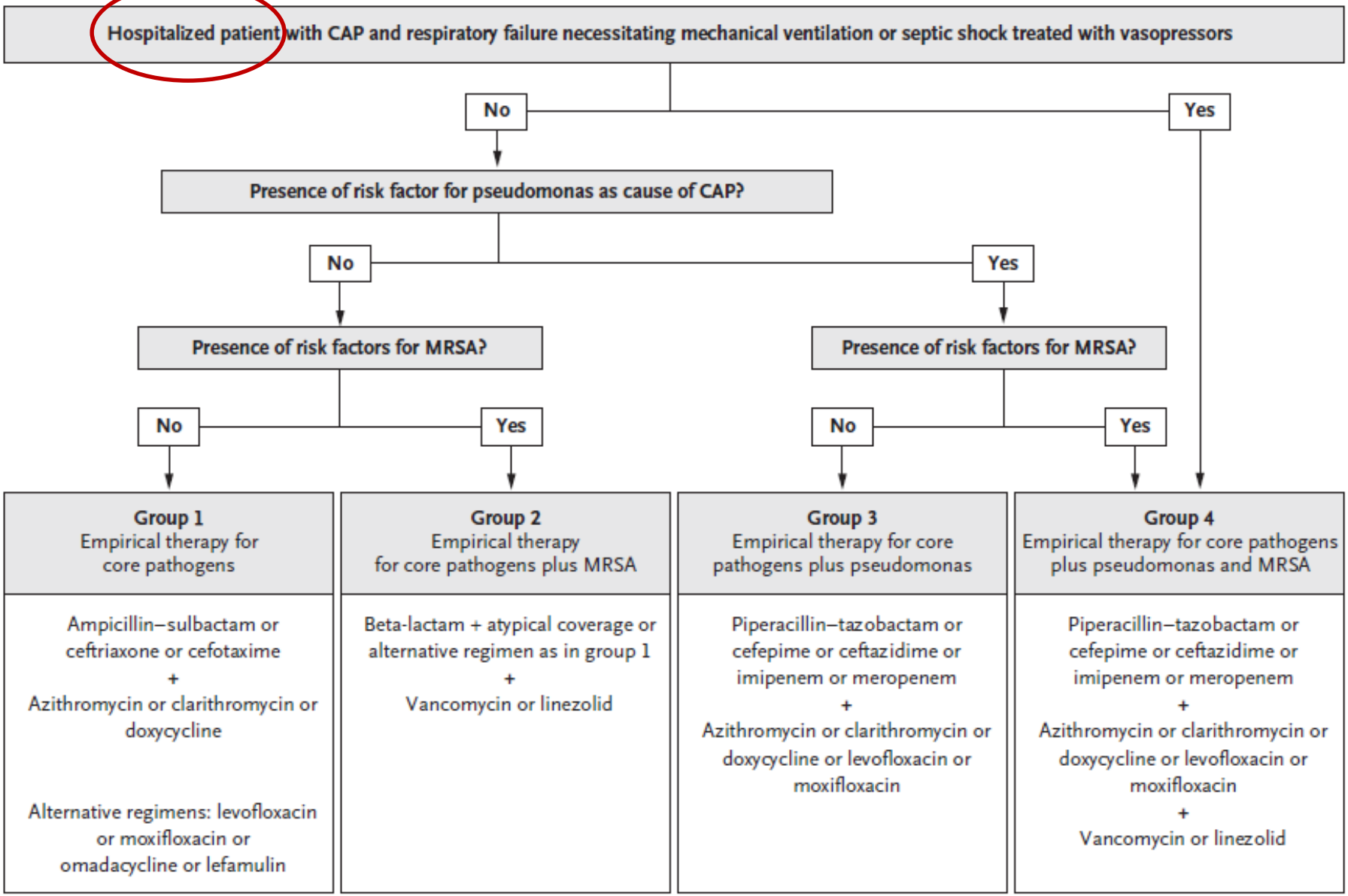


Figure 4. Empirical Therapy for Hospitalized Patients with CAP.

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Arch Clin Infect Dis. 2023 February; 18(1):e133876. https://doi.org/10.5812/archcid-133876.
Published online 2023 April 5. Systematic Review

Treatment of Patients with Community-Acquired Pneumonia: Official Practice Guideline of the Infectious Diseases and Tropical Medicine Research Center Advisory Committee

Backbone: • monotherapy with respiratory Fluoroquinolone (preferred) OR • Cephalosporin (second and third generations) OR Amoxicillin-clavulanate + Ciprofloxacin (preferred) OR Macrolide		
Penicillin allergy or other intolerance?		
Yes		No
Able to use cephalosporin? [1]		• Monotherapy with respiratory Fluoroquinolone OR • Combination: Amoxicillin-clavulanate or Second-generation cephalosporin (cefuroxime) or Third generation cephalosporin[3] (cefotaxime, ceftriaxone) PLUS Ciprofloxacin (preferred) or Macrolide[2] (azithromycin >clarithromycin)
Yes	No	
• Preferred: Respiratory FQ: Levofloxacin, Moxifloxacin [4] OR • Second generation cephalosporin (cefuroxime) PLUS Ciprofloxacin (preferred) OR Macrolide▼ (azithromycin> clarithromycin) OR (alternative recommendation) • Third generation cephalosporin [3] (cefotaxime, ceftriaxone) PLUS Ciprofloxacin (preferred) OR Macrolide[2] (azithromycin> clarithromycin)	Respiratory FQ: Levofloxacin, Moxifloxacin [4]	

Duration of Therapy

- Early in the antibiotic era: about 5 days
  - even a single dose of penicillin was curative
- The standard duration: 5-7 days 
- WRONG CONCEPT in outpatient therapy:
  - 10-14 days/ concern about insufficient AB therapy
- Hematogenous *Staph.aureus pneumonia:* 4 weeks
- but lobar Staph.aureus pneumonia: 2 weeks

Outcomes

- 30-day death rate for hospitalized CAP: 10-12%
- 30-day re-admission after discharge: 18%
- In those who survive for 30 days, mortality is substantially increased at 1 year.
- in the case of pneumococcal pneumonia, mortality remains elevated for 3 to 5 years.
- suggesting that CAP serves as a marker for underlying conditions that limit lifespan.

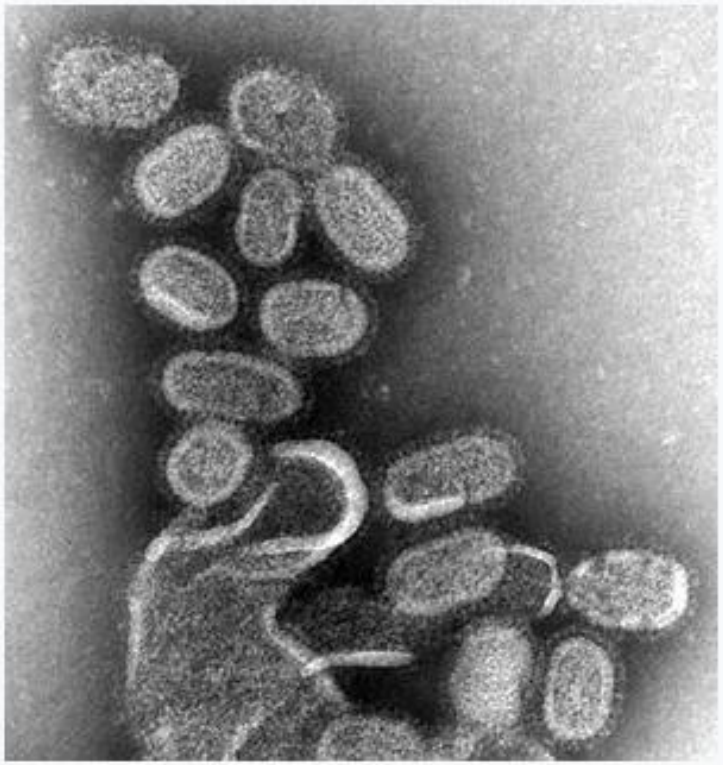
آنفلوانزای فصلی

Seasonal Influenza

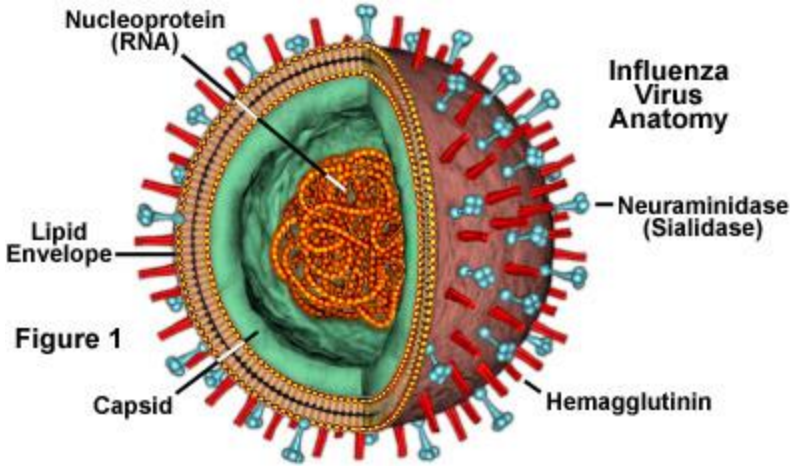
ویروس آنفلوانزا

Influenza

Other names: Flu, the flu, Grippe



Influenza virus, magnified approximately 100,000 times



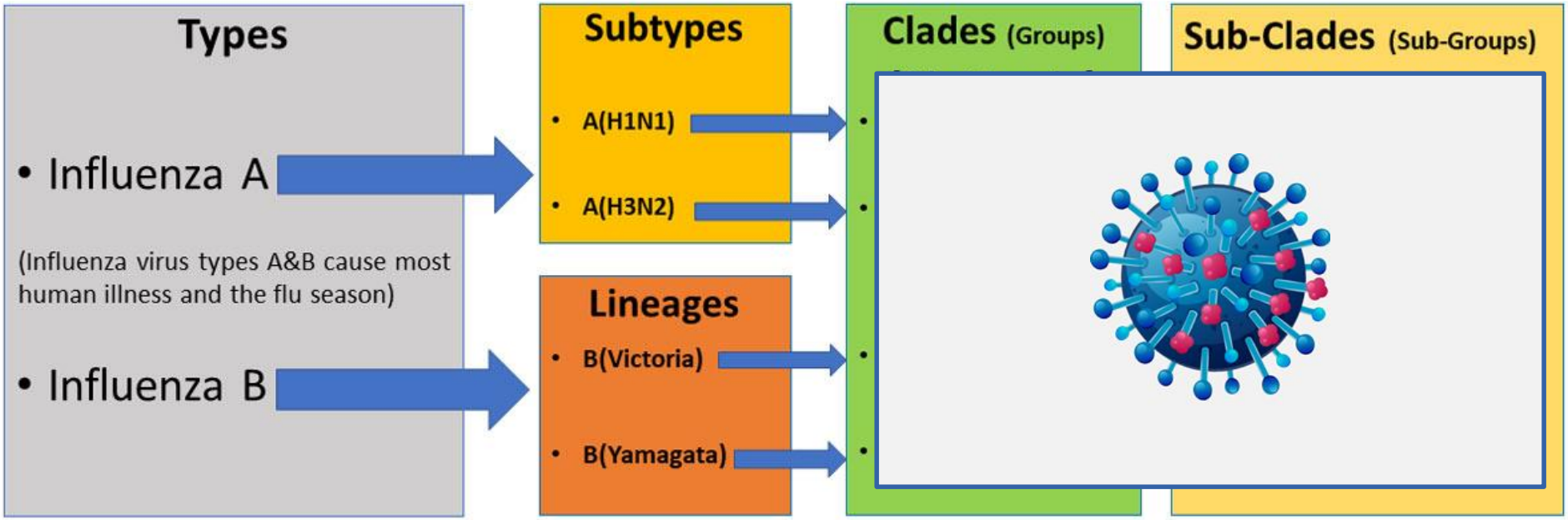
- ۱۵ نوع H (هماگلوتینین)
- ۹ نوع N (نورآمینیداز)

بعنوان مثال H1N1 یا H3N2

Influenza virus A / Pandemic

انواع ویروس آنفلوانزا

Human Seasonal Influenza Viruses



Influenza A B / Epidemic

اپیدیمولوژی آنفلوانزا

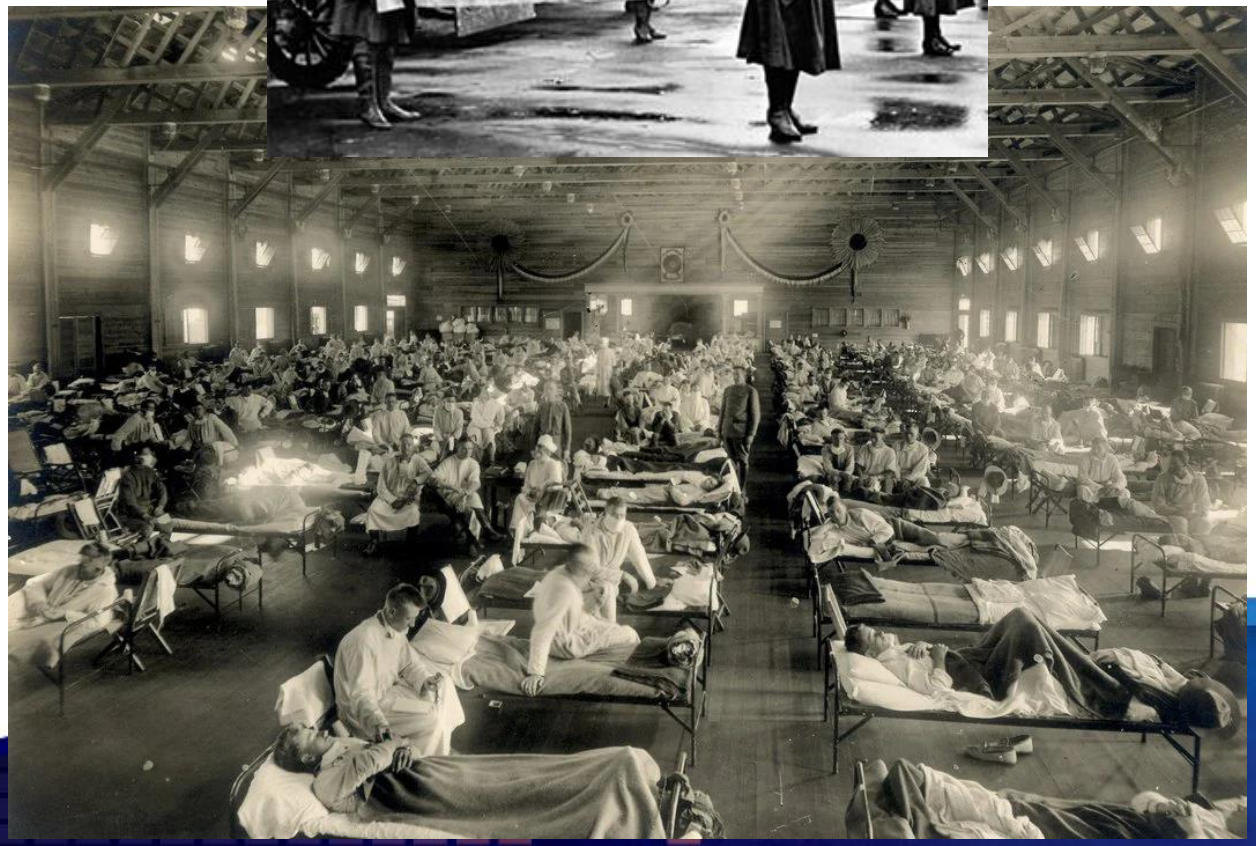
- **فراوانی:**
  - ابتلا به آنفلوانزای فصلی، ۳۰۰ میلیون تا ۱ میلیارد نفر در سال.
  - که سالیانه ۵-۳ میلیون نفر به آنفلوانزای شدید مبتلا می شوند.

- **مورتالیتی:** سالیانه بیش از ۶۵۰-۲۹۰هزار مرگ از آنفلوانزا وجود دارد.

تاریخچه پاندمی ها

Name	Date	World pop.	Subtype	Infected (est.)	Deaths worldwide
1889–90 flu pandemic	1889–90	1.53 billion	Likely H3N8 / H2N2	20–60% (300–900 million)	1 million
Spanish flu	1918–20	1.80 billion	H1N1	33-56% (500- >1billion)	17–100 million
Asian flu	1957–58	2.90 billion	H2N2	>17% (>500 million)	1–4 million
Hong Kong flu	1968–69	3.53 billion	H3N2	>14% (>500 million)	1–4 million
2009 swine flu pandemic	2009–10	6.85 billion	H1N1	11–21% (0.7–1.4 billion)	151,700–575,400
seasonal flu	Every year	7.75 billion	A/H3N2, A/H1N1, B, ...	5–15% (340 million – 1 billion)	290,000–650,000/year

تصاویری از پاندمی آنفلوانزای ۱۹۱۸ اسپانیا



مرحله بندی سازمان بهداشت جهانی برای پاندمی آنفلوانزا

WHO **Pandemic** Influenza Phases (2009)	
Phase	Description
Phase 1	No animal influenza virus circulating among animals have been reported to cause infection in humans.
Phase 2	An animal influenza virus circulating in domesticated or wild animals is known to have caused infection in humans and is therefore considered a specific potential pandemic threat.
Phase 3	An animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks.
Phase 4	Human to human transmission of an animal or human-animal influenza reassortant virus able to sustain community-level outbreaks has been verified.
Phase 5	Human-to-human spread of the virus in two or more countries in one WHO region.
Phase 6	In addition to the criteria defined in Phase 5, the same virus spreads from human-to-human in at least one other country in another WHO region.
Post peak period	Levels of pandemic influenza in most countries with adequate surveillance have dropped below peak levels.
Post pandemic period	Levels of influenza activity have returned to the levels seen for seasonal influenza in most countries with adequate surveillance.

نقشه آنفلوانزای فصلی در جهان بر اساس ماه

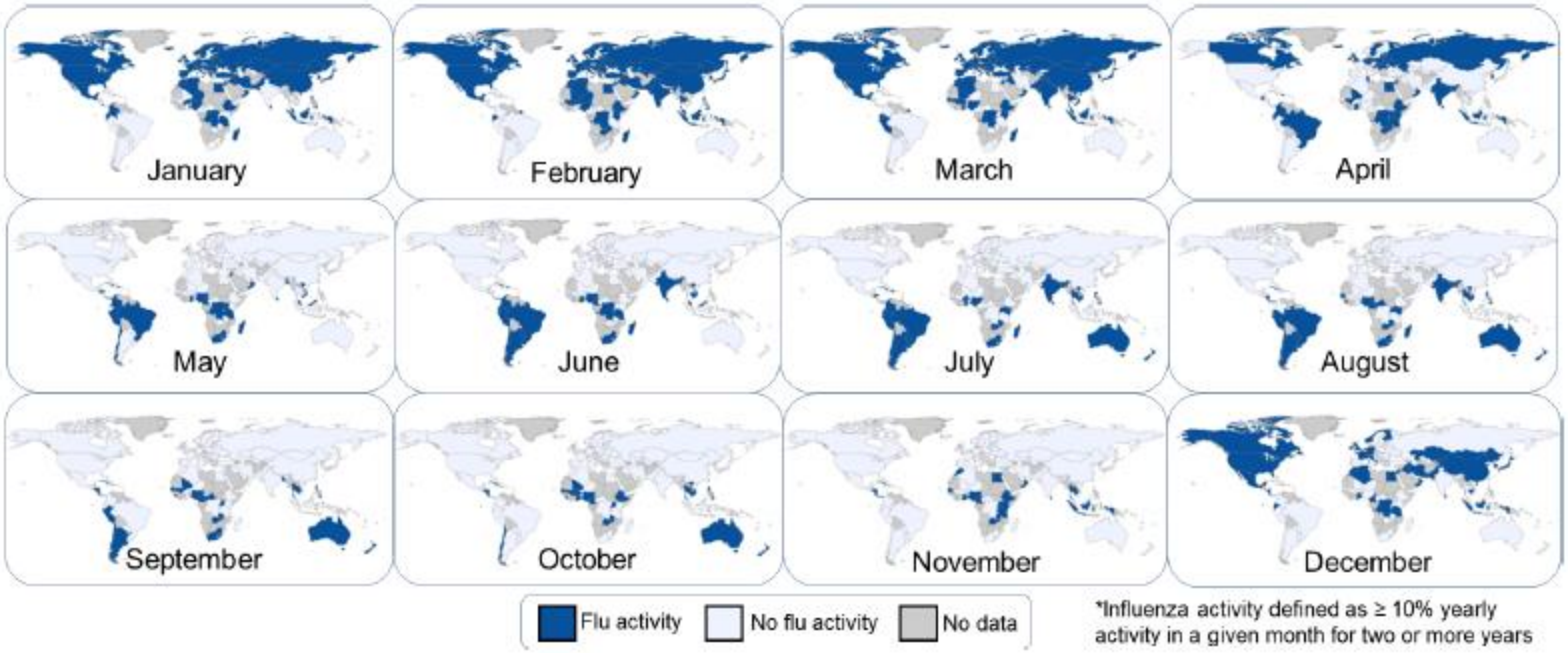
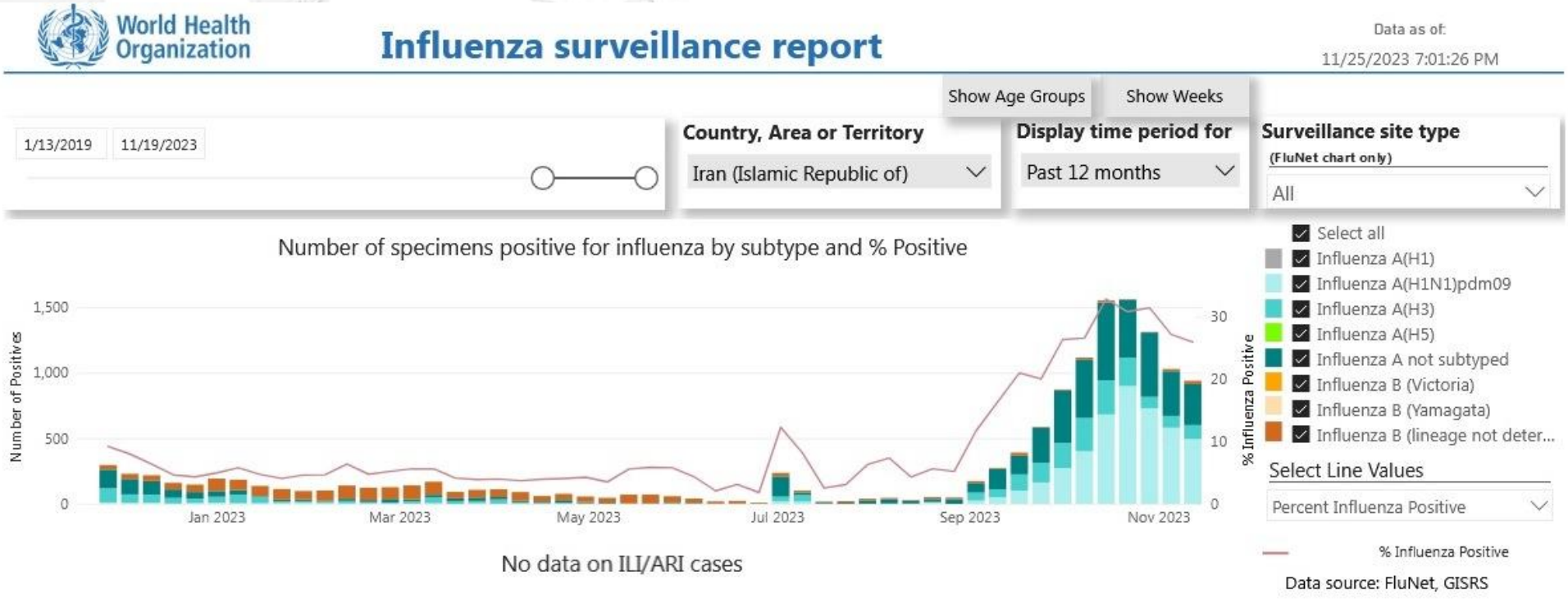
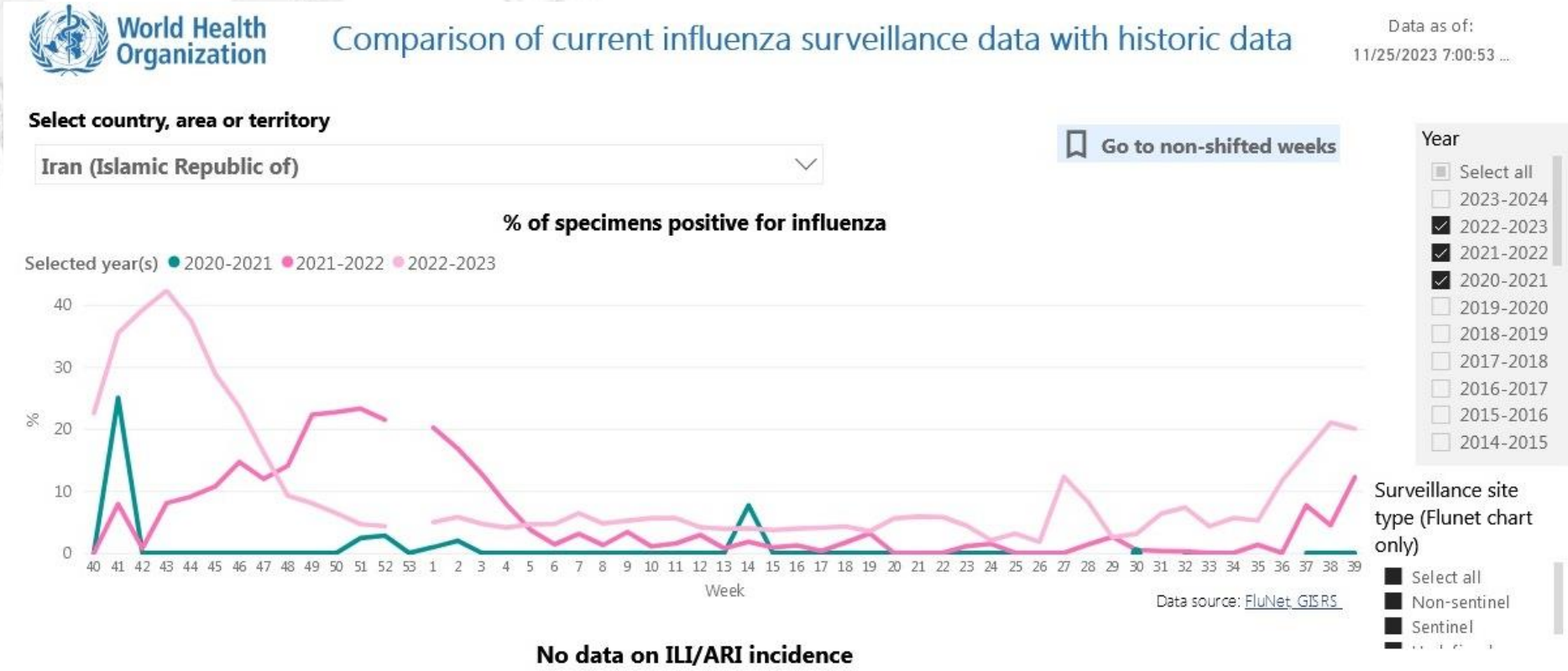


Fig 2. Global maps of monthly influenza activity, 2011–2016.

نوع ویروس در گردش در ایران بر اساس نمودار WHO



نمودار مقایسه ای سه ساله ایران بر اساس نمودار WHO



تشخیص اولیه آنفلوانزا بالینی است

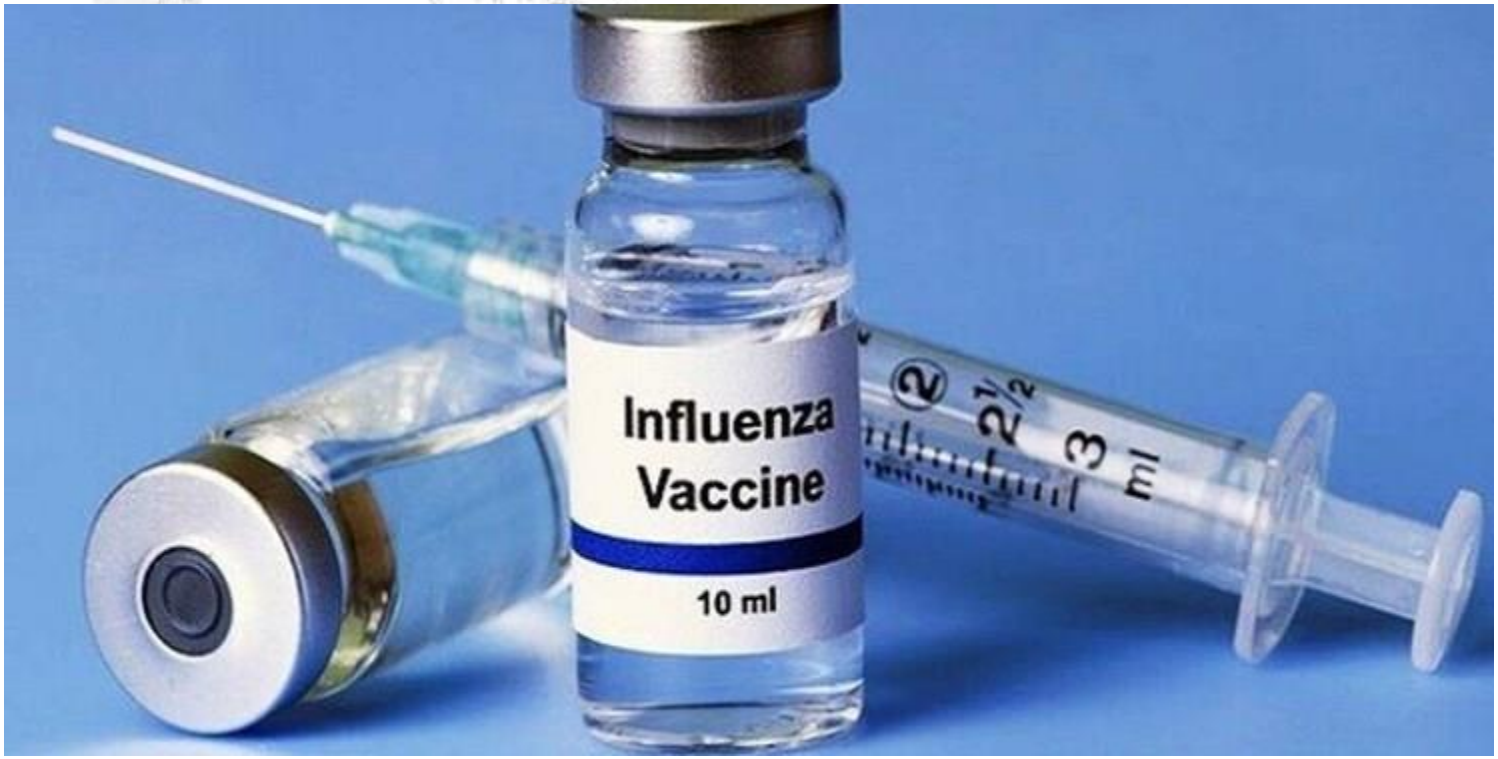
- شروع حاد
- تب
- آب ریزش
- **گلودرد**
- سرفه
- سردرد
- اسهال
- **بدن درد**

پیشگیری در جامعه

- بهترین راه پیشگیری از آنفلوانزای فصلی: **واکسن**
- شستن دست (مهمترین و شایعترین راه انتقال، دست است)
- دوری از افراد بیمار (استفاده از ماسک پارچه ای، دست ندادن)
- در صورت ابتلا به آنفلوانزا، استراحت در منزل (استعلاجی!)
  - حالت معمول: ۷-۵ روز دفع ویروس در ترشحات تنفسی
  - مصرف اسلتامیویر: بعد از ۴۸ ساعت کاهش شدید در میزان ویروس
- آداب سرفه (دستمال و دور انداختن، سرفه در آرنج نه کف دست)

پیشگیری در جامعه

بهترین راه پیشگیری از آنفلوانزا



واکسن آنفلوانزا

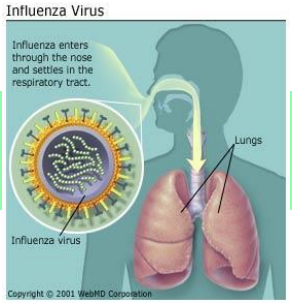
- واکسن آنفلوانزا برای همه افراد با سن بالای ۶ ماه توصیه می شود
  - فرض بر این است که شیرخوار زیر ۶ ماه هم ایمنی را از مادر گرفته
- ایمنی ۲ هفته پس از تزریق واکسن ایجاد می شود
  - افراد پرخطر (نقص ایمنی) : مواجهه طی این دو هفته، کموپروفیلاکسی (اسلتامیویر ۱ عدد روزانه)
- واکسن هر سال با سال قبل متفاوت است
- انواع واکسن (IM غیرزنده، اسپره بینی که ویروس ضعیف شده است)
- در هر سال بین آبان و اردیبهشت، ۳ دوره شیوع آنفلوانزا داریم (H1N1, H3N2, Type b)، لذا واکسن حتی در وسط فصل سرما هم توصیه می شود.

Vaccine: A (H1N1, H3N2), B (Victoria, Yamagata)

افراد پرخطر / مستعد عوارض آنفلوانزا

- اطفال زیر ۵ سال (خصوصا زیر ۲ سال)
- افراد مسن (۶۵ ساله و بالاتر)
- خانم حامله
- مراکز مراقبت (خانه سالمندان، بهزیستی، ...)
- مشکلات سیستم عصبی (صرع، فلج مغزی، عقب مانده ذهنی)
- بیماری ریوی(آسم، COPD)، بیماری قلبی (نارسایی، بیماری عروق کرونر)
- بیماری کبدی، بیماری کلیوی، بیماری خونی (SCA)، غدد (دیابت)
- HIV، کانسر، کورتون تراپی
- چاق BMI>40

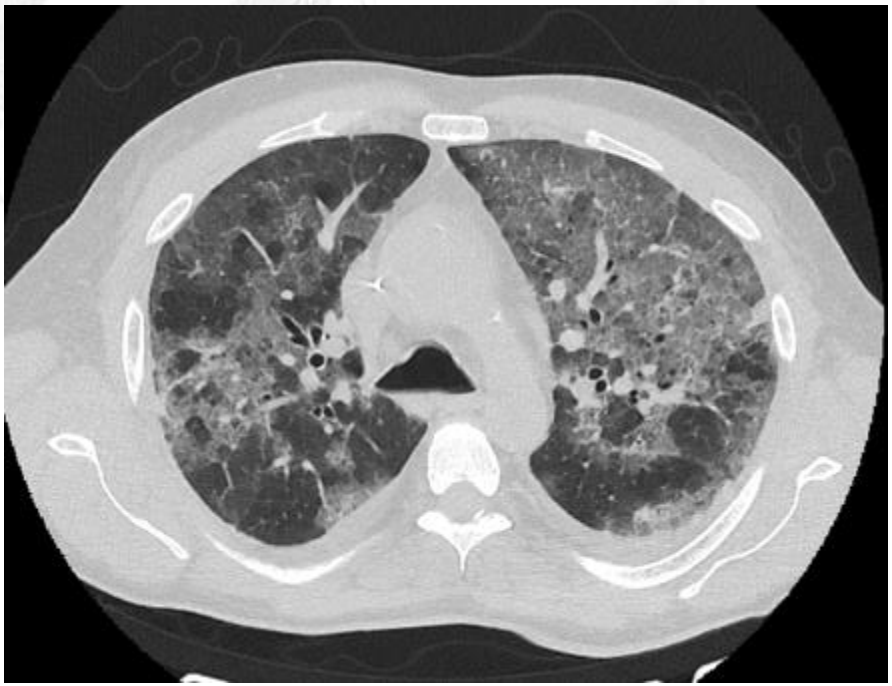
عوارض آنفلوانزا



- پنومونی (خود آنفلوانزا / باکتریال)
  - در پنومونی خود آنفلوانزا (ویروسی) علائم اولیه تنفسی که ایجاد شده دائما تشدید می شود
  - در پنومونی post-influenza (باکتریال) علائم اولیه فروکش کرده و سپس تشدید می شود
  - پنوموکوک (شایعترین)، استافیلوکوک اورئوس (مهمترین)، هموفیلوس، موراکسلا، ...
- انسفالیت (خود آنفلوانزا / واکنش ایمنی)
  - ۳۰٪ در مرحله علائم تنفسی و ۷۰٪ پس از بهبودی علائم تنفسی (طی ۳ هفته بعد)
- سینوزیت / اوتیت / برونشیت

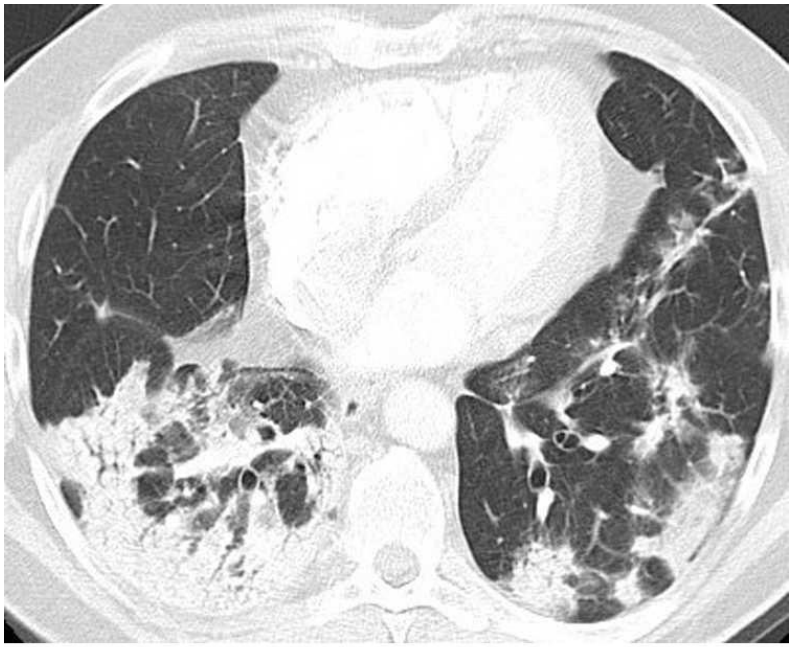
عوارض آنفلوانزا

Influenza pneumonitis



Diffuse Patchy GGO lesions

Post-Flu pneumonia



Braz J Infect Dis. 2021;25:

Localized lobar Consolidation with airbronchogram

نکات ویزیت و درمان

- بیمار با علائم تنفسی: احتیاطات استاندارد (استفاده از **ماسک جراحی**)
  - شرح حال و معاینه بالینی: آنفلوانزا
  - آزمایش تشخیصی (؟) / اسلتامیویر (؟) / بستری (؟)

- **تشخیص:**
- تست تشخیصی سریع (شناسایی Ag): سواپ در محلول معرف، مثبت آن بیشتر از منفی ارزش دارد
- **PCR ترشحات تنفسی** (سواپ حلق، عمیق بینی، آسپیرای تراشه، BAL): مثبت یا منفی ارزش دارد
- PCR: تعیین ماهیت در اپیدمی اخیر، تایید تشخیص در موارد بیماری شدید با شک تشخیصی

- **درمان: اسلتامیویر** ۱ کپسول (75mg) هر ۱۲ ساعت برای ۵ روز
  - نقص ایمنی: 150mg BD / دیالیزی: 75mg Daily / پنومونی شدید یا انسفالیت : ۱۰ روز
  - شک به پنومونی پس از آنفلوانزا: اضافه کردن سفتریاکسون و ونکومایسین

احتیاطات تماسی و قطرات

- اتاق مجزا / همگروهی / فاصله ۲-۱ متر
- بهداشت دست، ماسک جراحی
- جابجایی:
  - هماهنگی با واحد مقصد جهت حداقل زمان انتظار
  - رعایت احتیاطات در مقصد
  - ماسک جراحی برای بیمار
- اندیکاسیون ماسک N95: پروسیجرهای ایجادکننده آئروسل
  - اینتوباسیون احیاء قلبی ریوی
  - ساکشن راههای هوایی به شیوه باز
  - القاء خلط sputum induction
  - برونکوسکوپی

پوشش واکسن آنفلوانزا و موانع انجام آن در پرسنل

J PREV MED HYG 2021; 62: E377-E381

RESEARCH PAPER

Influenza vaccination coverage and obstacles in healthcare workers (HCWs) and the follow up of side effects: a multicenter investigation in Iran

MAHBOUBEH HAJIABDOLBAGHI[1], NAZANIN GHORBANIAN HAVASTIN[1], SHIRIN AFHAMI[2], MAHNAZ MONTAZERI[3], ESMAEIL MOHAMMADNEJAD[4], PARVIN REZAEI[5], MITRA HAJINOORI[6], AZAM GHAHAN[7], AKRAM AFIFEH[8], ROGHAYEH BABAEI VESROUDI[9], AZAR HADADI[2], ALI ASADOLLAHI-AMIN[10], ARASH SEIFI[1]

پوشش واکسن آنفلوانزا و موانع انجام آن در پرسنل

Summary

Introduction. *Seasonal influenza is an annual common occurrence in cold seasons; but the COVID-19 pandemic is also currently ongoing. These two diseases can't be distinguished from their symptoms alone; therefore, the importance of preventing influenza by vaccination is more than ever. Due to the high exposure of hospital personnel, widespread influenza vaccination of these high-risk groups seems to be a necessity. This Study conducted to determine vaccination coverage in the personnel of four tertiary referral collegiate hospitals in 2019 and to further investigate individual obstacles for Influenza vaccination.*

Methods. *In this cross-sectional descriptive study, 637 personnel were selected randomly from distinctive hospitals in a list-wised. Ones vaccinated filled the side effects questionnaire and who not vaccinated filled the vaccination obstacles questionnaire. The study was approved by the ethics committee of Tehran University of Medical Sciences with this reference number: IR.TUMS.IKHC.REC.1398.218*

Results. *The mean vaccination coverage was 29.4% and the coverage difference among centers was not statistically significant ($p = 0.192$). The following items had the most impact on personnel decision: confidence about one's immune system ($p < 0.05$), the experience of side effects from previous vaccinations ($p = 0.011$), attitude about vaccination in colleagues ($p = 0.021$) and work experience ($p < 0.05$). About 23% of vaccinated individuals reported side effects following vaccination and the most common side effect was mild cold symptoms with 12.3% prevalence.*

Conclusion. *The results of the current study revealed that influenza vaccination coverage among HCWs is not satisfactory in Iran. Hospital authorities and infection control units should plan to remove the obstacles of influenza vaccination.*

پوشش واکسن آنفلوانزا و موانع انجام آن در پرسنل

Fig. 1. Percent of influenza vaccination by the occupation of personnel.

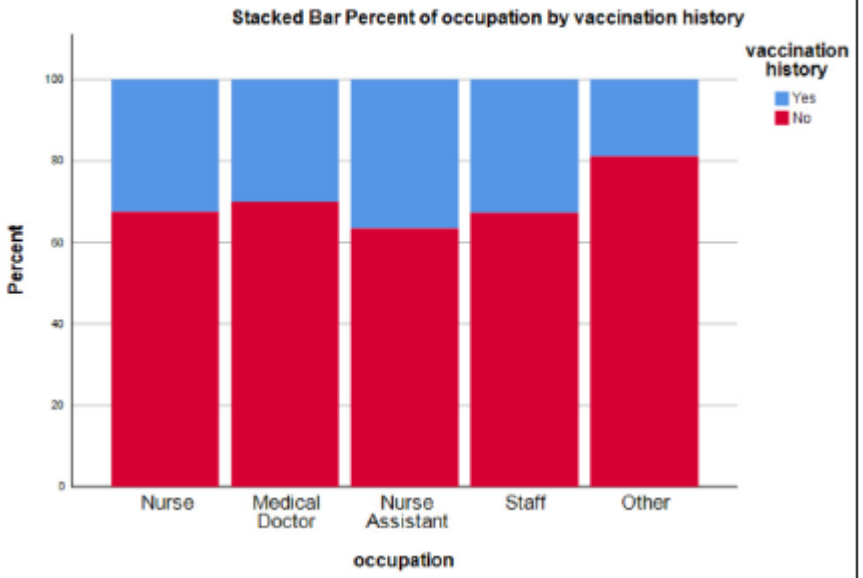


Fig. 2. Percent of influenza vaccination by hospital wards.

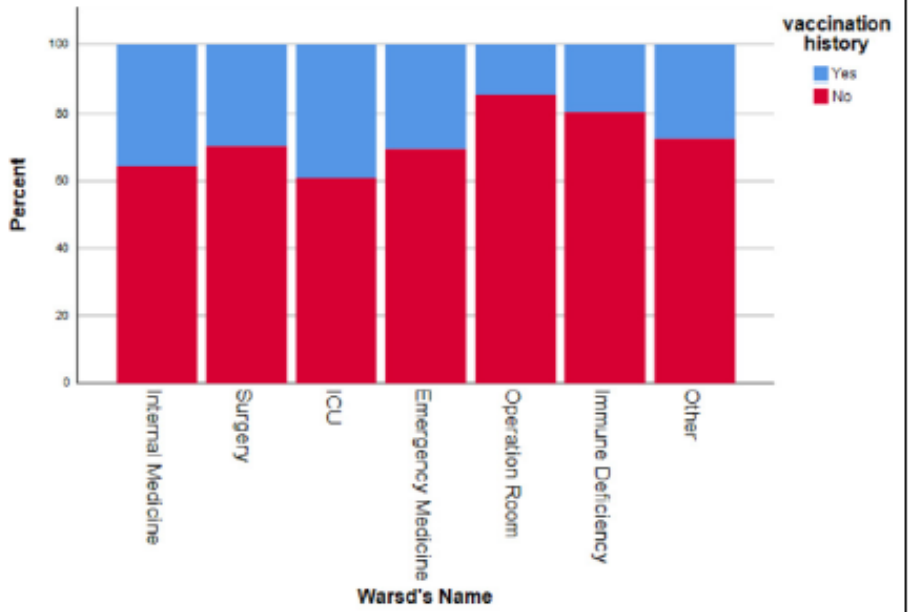


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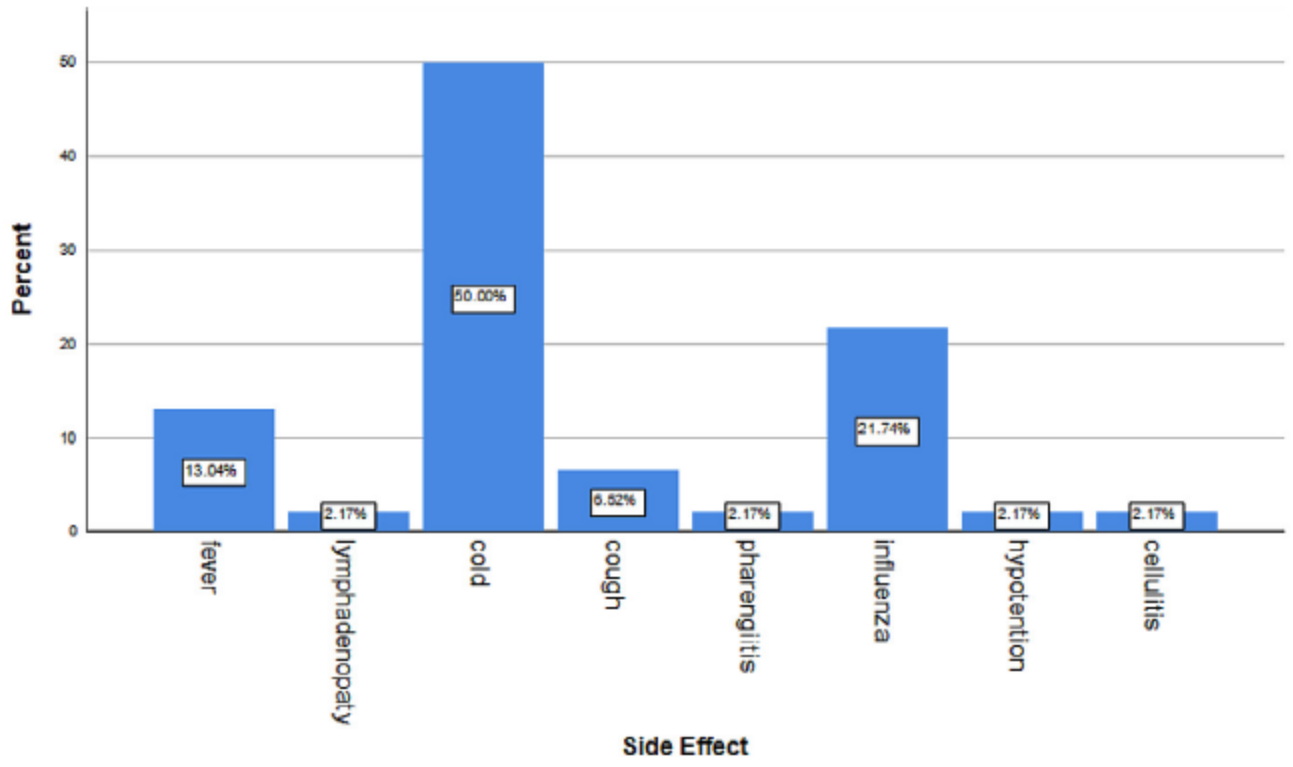
Fig. 3. Relative frequency of side effects following influenza vaccination.



Prevention in care-centers

Always follow these standard precautions

Perform hand hygiene before and after every patient contact

Clean and reprocess shared patient equipment

Use personal protective equipment when risk of body fluid exposure

Follow respiratory hygiene and cough etiquette

Use and dispose of sharps safely

Use aseptic technique

Perform routine environmental cleaning

Handle and dispose of waste and used linen safely

Transmission-based Precautions

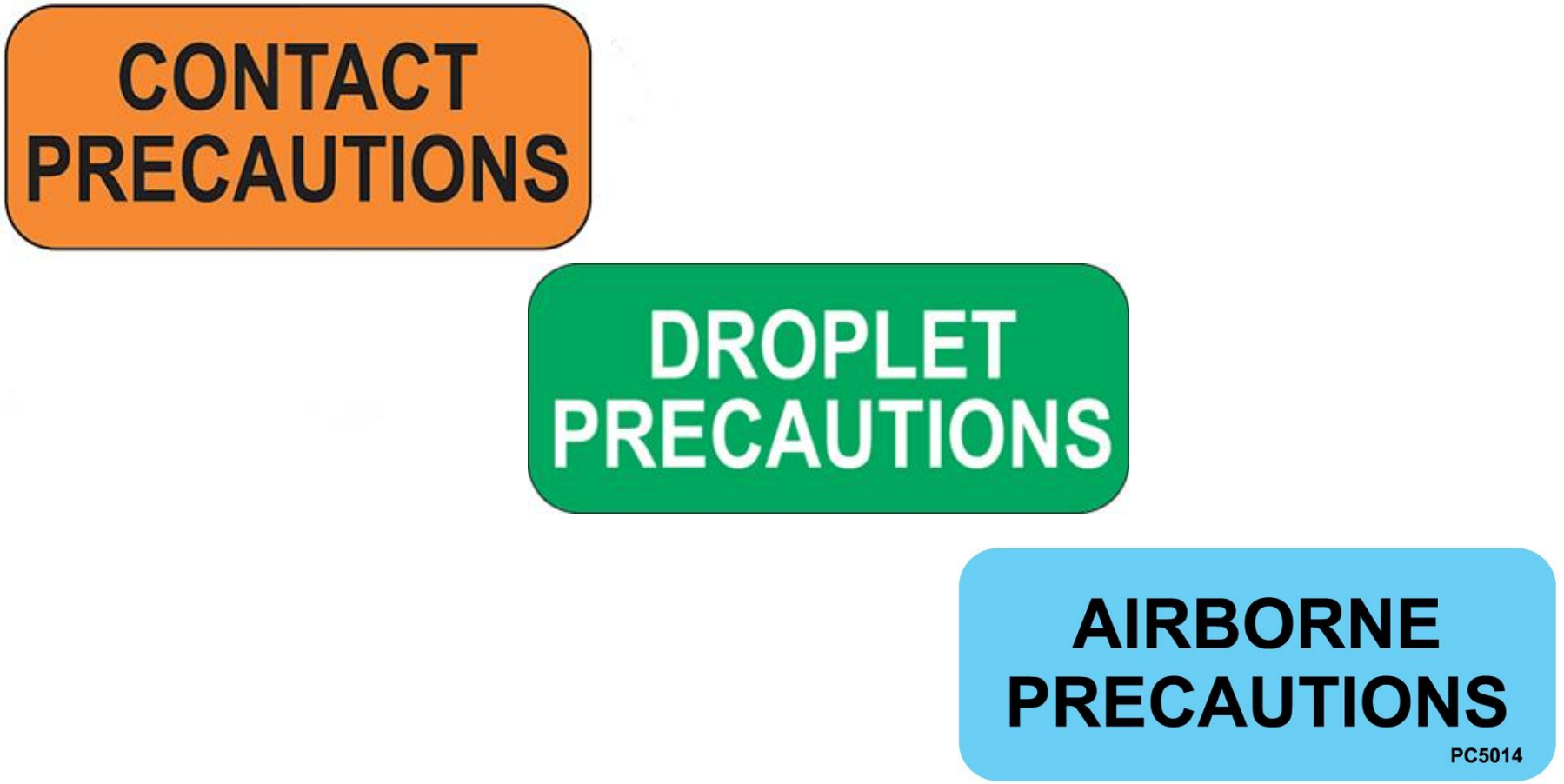


TABLE 300-3 Indications for Transmission-Based Precautions

CONTACT PRECAUTIONS	DROPLET PRECAUTIONS	AIRBORNE PRECAUTIONS
Syndromes (Before Pathogen Identification)		
Acute diarrhea with likely infectious cause	Meningitis	Vesicular rash*
Vesicular rash*	Petechial or ecchymotic rash with fever	Maculopapular rash with cough, coryza, and fever
Respiratory tract infection in infants and young children*	Paroxysmal or severe persistent cough during periods of pertussis activity	Cough, fever, upper lobe pulmonary infiltrate
History of infection or colonization with MDRO†	Respiratory tract infection in infants and young children*	Cough, fever, any pulmonary infiltrate in an HIV-infected patient (or at high risk for HIV infection)
SSTI or UTI with recent stay in a facility where MDROs† are prevalent		Cough, fever, any pulmonary infiltrate, recent travel to regions with outbreaks of SARS or avian influenza*
Abscess or draining wound that cannot be covered		
Cough, fever, any pulmonary infiltrate, and recent travel to regions with outbreaks of SARS or avian influenza*		
Known or Suspected Pathogens or Infections		
Adenovirus pneumonia*; conjunctivitis*	Adenovirus pneumonia*; conjunctivitis*	Measles
Burkholderia cepacia pneumonia in cystic fibrosis	Diphtheria, pharyngeal	MERS*†
Clostridium difficile infection	*Haemophilus influenzae* meningitis, epiglottitis; pneumonia (infants, children)	Monkeypox*
Conjunctivitis, acute viral	Influenza	Tuberculosis, pulmonary, laryngeal; draining lesion (e.g., from osteomyelitis)*
Decubitus ulcer, infected, drainage not contained	Meningococcal infections	SARS*
Diarrhea, infectious, in diapered or incontinent patient	Mumps	Smallpox*
Diphtheria, cutaneous	*Mycoplasma pneumoniae* pneumonia	Varicella*
Ectoparasites (lice, scabies)	Parvovirus B19	Zoster (disseminated; immunocompromised patient until dissemination ruled out)*
Enteroviral infections (infants, young children)	Pertussis	
Furunculosis (infants, young children)	Plague, pneumonic	
Hepatitis A, E (diapered or incontinent patient)	Rhinovirus*	
HSV (neonatal, disseminated, severe primary mucocutaneous)	Rubella	
Human metapneumovirus	SARS*	
Impetigo	Streptococcal (group A) pneumonia; serious invasive disease; major SSTI*; pharyngitis, scarlet fever (infants or young children)	
MDRO† infection or colonization	Viral hemorrhagic fevers*	
MERS*†		
Monkeypox*		
Norovirus		
Parainfluenza infection (infants, children)		
Rhinovirus*		
Rotavirus		
RSV infection (infants, children, immunocompromised)		
Rubella, congenital		
SARS*		
Smallpox*		
Staphylococcus aureus major SSTI		
Streptococcal (group A) major SSTI*		
Tuberculous draining lesion		
Vaccinia: fetal, generalized, progressive, eczema vaccinatum		
Varicella*		
Viral hemorrhagic fevers*		
Zoster (disseminated; immunocompromised until dissemination ruled out)*		

STOP

CONTACT PRECAUTIONS

STOP

EVERYONE MUST:

Clean their hands, including before entering and when leaving the room.

PROVIDERS AND STAFF MUST ALSO:

Put on gloves before room entry.
Discard gloves before room exit.

Put on gown before room entry.
Discard gown before room exit.

Do not wear the same gown and gloves for the care of more than one person.

Use dedicated or disposable equipment.
Clean and disinfect reusable equipment before use on another person.

CDC

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

CS314589-A

STOP

DROPLET PRECAUTIONS

STOP

EVERYONE MUST:

Clean their hands, including before entering and when leaving the room.

Make sure their eyes, nose and mouth are fully covered before room entry.

or

Remove face protection before room exit.

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STOP

AIRBORNE PRECAUTIONS

STOP

EVERYONE MUST:

Clean their hands, including before entering and when leaving the room.

Put on a fit-tested N-95 or higher level respirator before room entry.

Remove respirator after exiting the room and closing the door.

Door to room must remain closed.

CS19-306149-A

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Centers for Disease Control and Prevention

Infection Prevention and Control Training Movies

https://icdc.behdasht.gov.ir/IPC-Training-Movies


Thank You!