Rationalizing Antiviral Drug Use

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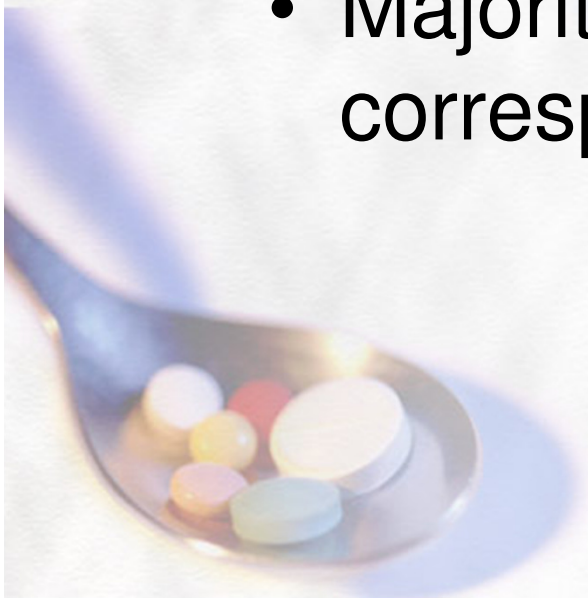
18th PIDSP Convention

February 2, 2010

Viral infections

- Causes majority of morbidity and mortality worldwide
- May cause self-limiting disease, significant sequelae, death, latency
- Majority of viral infections have no corresponding anti-viral agent



Overview

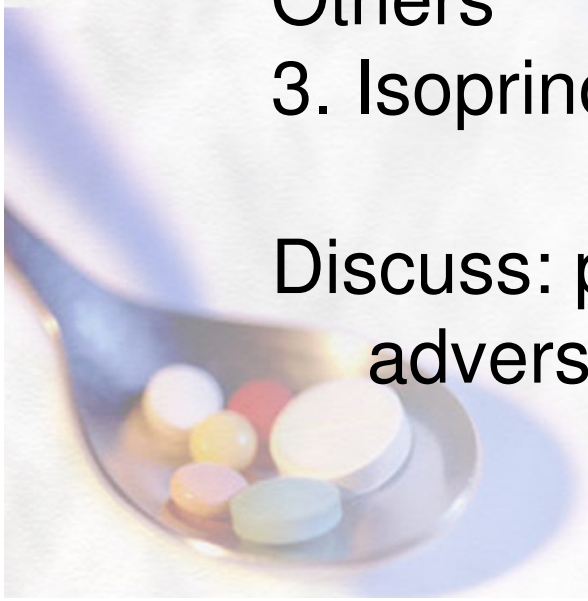
Antivirals

1. Herpes virus group- acyclovir
   valacyclovir
2. Influenza virus- oseltamivir
   zanamivir

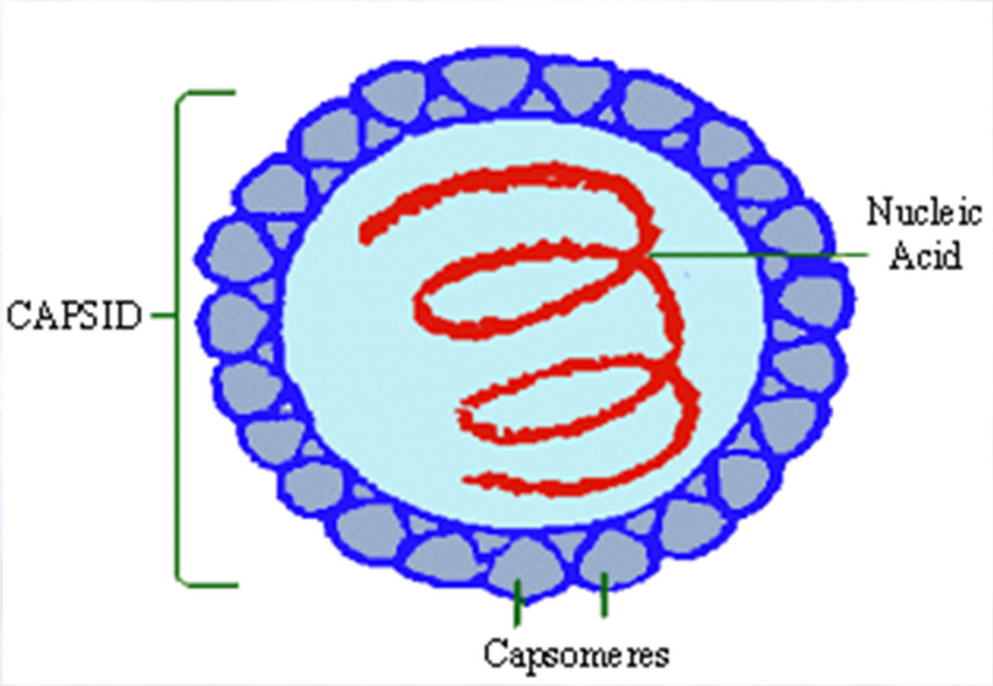
Others

3. Isoprinosine- use and misuse

Discuss: pharmacology, indications, dosages, adverse effects, resistance

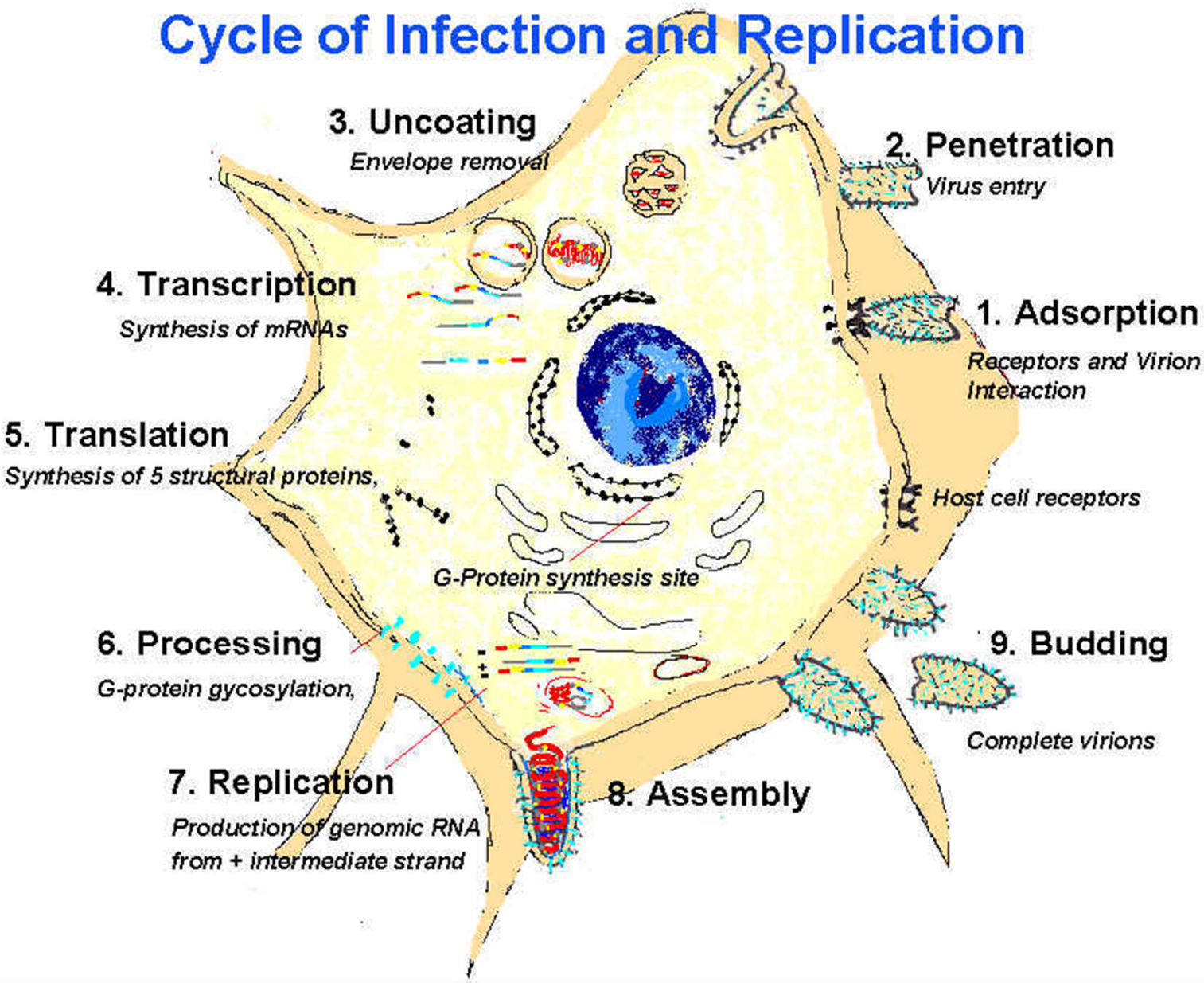


Virus



- Small infective agents made of DNA or RNA enclosed in a protein coat
- Not cells; no metabolic machinery of their own;
- obligate intracellular parasites; use the metabolic process of host cell

Cycle of Infection and Replication



Acyclovir and Valacyclovir

Antiviral	Bioavail (%)	T ½ (hrs)	Excretion
Acyclovir	15-20%	3	Renal
Valacyclovir	54%	2.-3.3	Renal

Valacyclovir- L-valyl ester of acyclovir , no oral preparation

- rapidly converted to acyclovir after oral administration via first-pass enzymatic hydrolysis in the liver and intestine
- Results in serum levels that are 3-5x greater than oral acyclovir and approximate those w/ IV acyclovir.

ORAL Acyclovir/Valacyclovir- results of RCTs

– significantly reduces viral shedding in primary HSV mucocutaneous lesions (orolabial, pharyngeal, genital, rectal, skin, gingivostomatitis and dendritic corneal ulcers

- provides benefit for normal and immunocompromised patients with primary VZV infection; reduces fever by 1 day, ↓ mean no of skin lesions, and time to total crusting by 2 days

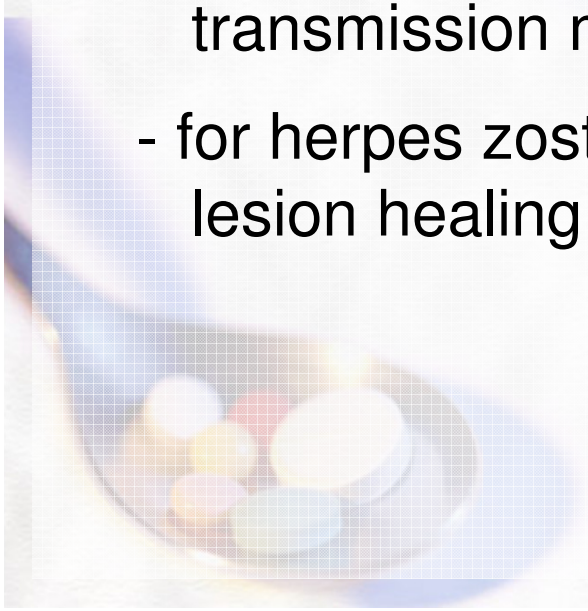
- postexposure prophylaxis may reduce risk of disease in household and close contacts of patients with varicella

ORAL Acyclovir/Valacyclovir- results of RCTs

- will benefit a pregnant mother with varicella but questionable if it will reduce congenital or neonatal disease

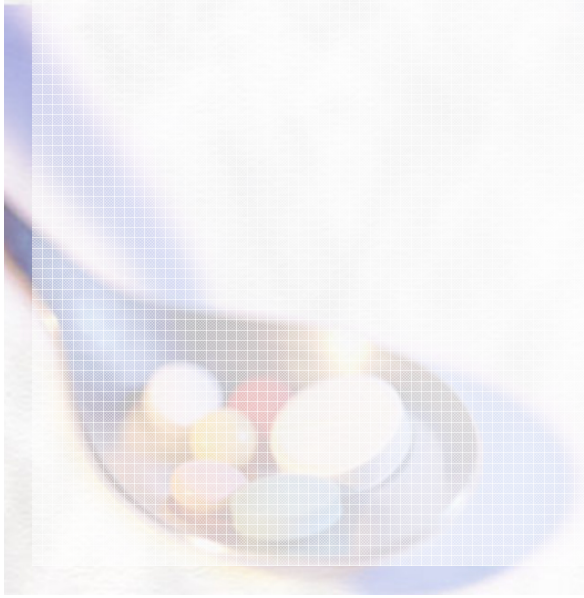
- long-term continuous suppression will benefit patients with frequent recurrent HSV disease, but shedding and transmission may still occur

- for herpes zoster- it reduces viral shedding, time to skin lesion healing and duration of zoster-associated pain



Indications for *IV* Acyclovir

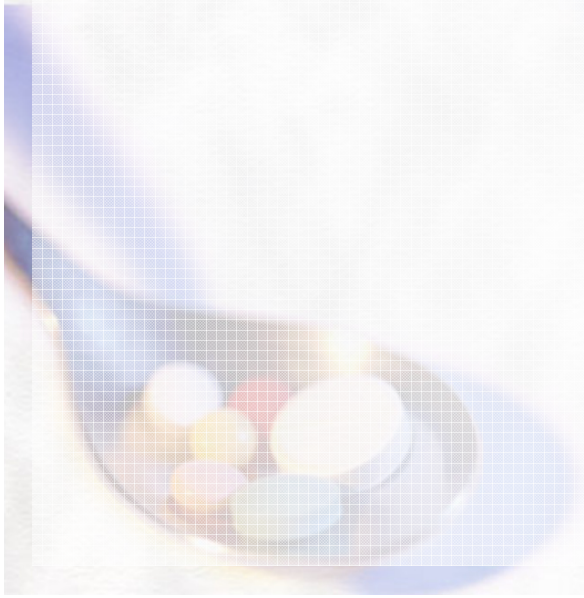
- Used to treat all severe or life-threatening diseases caused by HSV and VZV, including encephalitis, hepatitis, neonatal disease, acute retinal necrosis syndrome, mucocutaneous disease, and zoster with or without visceral disease



Indications for ***TOPICAL*** Acyclovir

Topical – may slightly decrease healing time and viral shedding in primary mucocutaneous lesions of HSV

- minimal clinical benefit for recurrent HSV lesions
- mild clinical benefit in immunocompromised patients with zoster lesions



Treatment of Varicella

- Determined by host factors, extent of infection, and initial response to therapy
- Limited window of opportunity to affect outcome
- In immunocompetent hosts, duration of replication is 72 hours from onset of rash, may be longer in immunocompromised hosts
- For healthy children < 12 yrs, routine use of acyclovir is not recommended- only modest decrease in symptoms

Consider treatment in those considered high risk for moderate to severe varicella

Oral

- those more than 12 years
- those with chronic cutaneous or pulmonary skin disorders
- those receiving long-term salicylate therapy
- those receiving short, intermittent or aerosolized course of corticosteroids
- pregnant women in their second and third trimesters

IV

- therapy for immunocompromised patients including those being treated with chronic corticosteroids
- Pregnant women with serious complications

Treatment of HSV

- Neonatal- regardless of manifestations and clinical findings, IV acyclovir should be given
  14 days for skin, eye and mouth disease (SEM
  21 days for HSV encephalitis

Genital

Primary- oral acyclovir or valacyclovir, IV for severe
Recurrent- intermittent or long term suppressive therapy with oral acyclovir or valacyclovir specially for 6 or more recurrences per year, give suppression therapy for 1 year

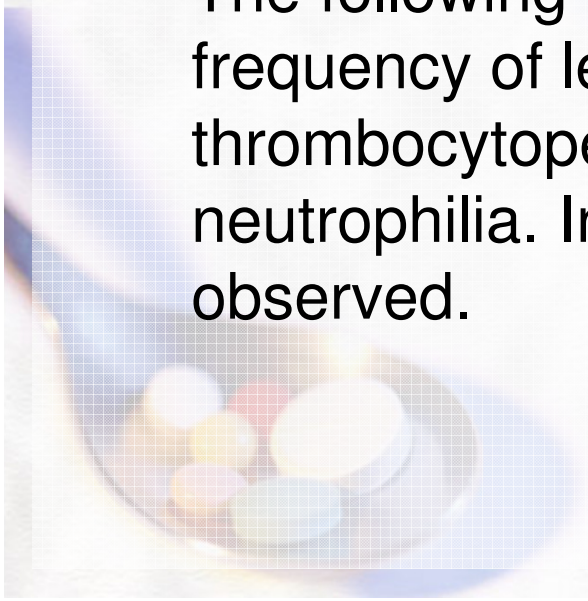
Mucocutaneous

IV acyclovir for immunocompromised
oral acyclovir for immunocompetent

Agent	Indication	Dosage
Acyclovir	HSV, mucocutaneous	5% ointment 6x daily 15 mg/kg/dose (max 200mg/dose)PO 5x daily or 40-80 mg/kg/day in 3-4 div doses for 5-10 days (max dose: 1 gm/day) 5-10 mg/kg/dose IV q 8 hrs
	HSV encephalitis	20 mg/kg/dose IV q 8 hrs
	HSV, neonatal	20 mg/kg/dose IV q 8 hrs
	VZV, chicken pox and zoster	10-20 mg/kg/dose (max 800 mg) PO q 6 hrs 10-20 mg/kg/dose IV q 8 hrs
Valacyclovir	HSV	500-1000mg/dose twice daily
	VZV, zoster	1000mg/dose PO Twice daily 20 mg/kg/dose 3x/day for five days (max 1 gm 3x/day)

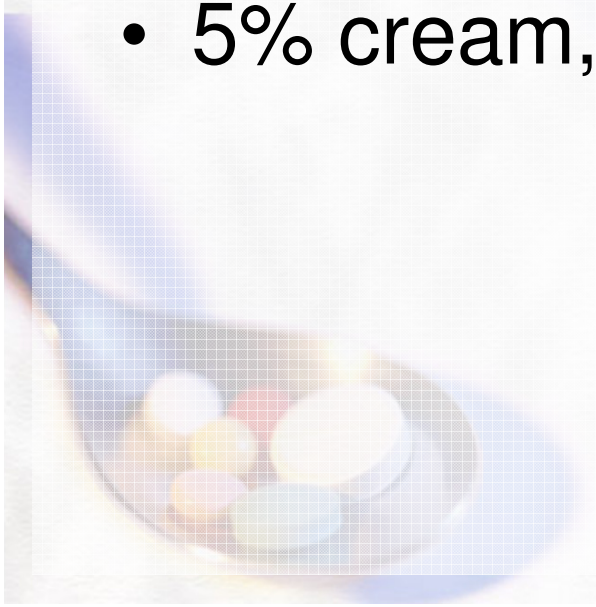
Adverse effects of Acyclovir/Valacyclovir

- Nausea and vomiting- 0.7-2.7%
- Diarrhea- 2-3%
- Thrombophlebitis if given IV- 9%
- Renal dysfunction- slight elevation of BUN and creatinine (5-10%); slow infusion reduces the risk
- The following hematologic abnormalities occurred at a frequency of less than 1%:anemia,neutropenia, thrombocytopenia, thrombocytosis, leukocytosis, and neutrophilia. In addition, anorexia and hematuria were observed.



Preparations (Acyclovir)

- 200mg, 400mg and 800mg tablet
- 200mg/5mL suspension, 60mL, 120mL- not available
- 25mg/mL, 10mL vial (IV infusion)
- 5% cream, 2gm tube



Acyclovir resistance

- One of 4 types of mechanisms:

(1) absent production of viral thymidine kinase (TK-negative mutants)

(2) a partial decrease in the production of viral thymidine kinase (TK-partial mutants)

(3) altered viral thymidine kinase substrate specificity that results in phosphorylation of thymidine but not acyclovir (TK-altered mutants); and

(4) altered viral DNA polymerase (DNA polymerase mutants)

INFLUENZA A (H1N1)

Department of Health, Manila, Philippines

Home

Daily Influenza A (H1N1) Updates

Update 54 - WHO Commends DOH for Anti-A (H1N1) Efforts, Adopts Weekly Reporting System of Cases as Recommended by WHO

9 July 2009

The Department of Health (DOH) today expressed gratitude to the World Health Organization (WHO) over the commendation it gave to the government agency for its swift and tireless efforts in dealing with the novel virus A (H1N1).

The WHO letter dated June 30, 2009 and signed by WHO Regional Director Dr. Shin Young-soo put on record "my personal appreciation of the exceptional collaboration established between the Government of the Philippines and the World Health Organization in the fight against Pandemic H1N1 2009. I commend your leadership and tireless efforts in responding to this emerging threat to the health of the people of the Philippines".

"We are very grateful that our efforts were recognized and didn't go to waste. We appreciate that the WHO finds our response efficient and that it is confident on the quality of our laboratory diagnoses," Health Secretary Francisco T. Duque III said.

The WHO letter further said that "Contact tracing has also been thorough, allowing the DOH to detect further cases and slow down the spread of the virus. The efficiency of the response indicated to me that the Philippines has the fundamental capacity to detect and respond to the new influenza virus. I should add that WHO is also confident about the quality of the laboratory diagnoses carried out by the Research Institute for Tropical Medicine and about the epidemiological activities conducted by the National Epidemiology Center (NEC)".

Influenza in Pediatric Patients

- Consistently higher attack rates
- rates of hospitalization are high, specially in children <2 yrs
- Higher rates of complication in children <3 yrs, or with chronic medical conditions

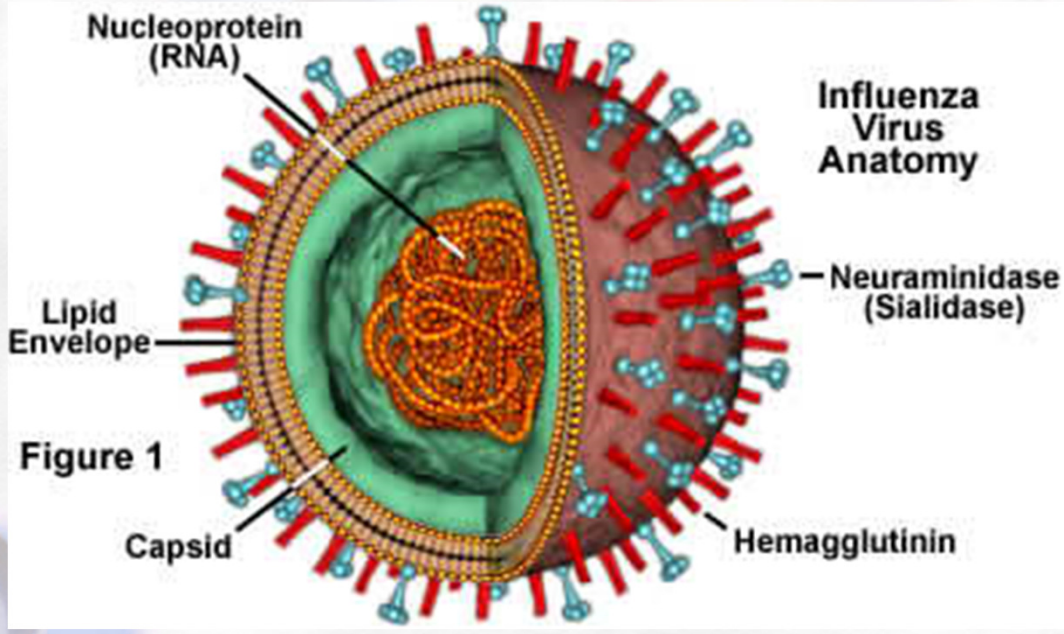
  - secondary bacterial infections (pneumonia, sepsis)

  - viral pneumonia

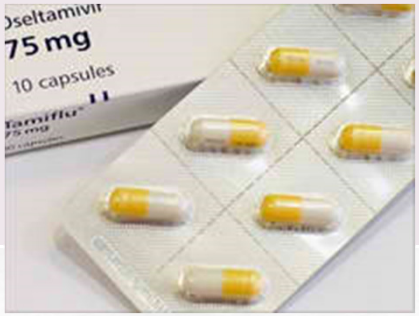
Vaccination is underutilized

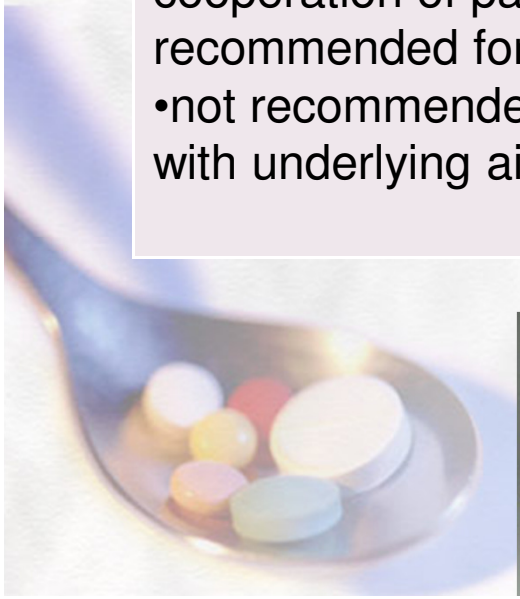
Influenza

- Requires neuraminidase to escape from cell
- Requires neuraminidase to penetrate mucus

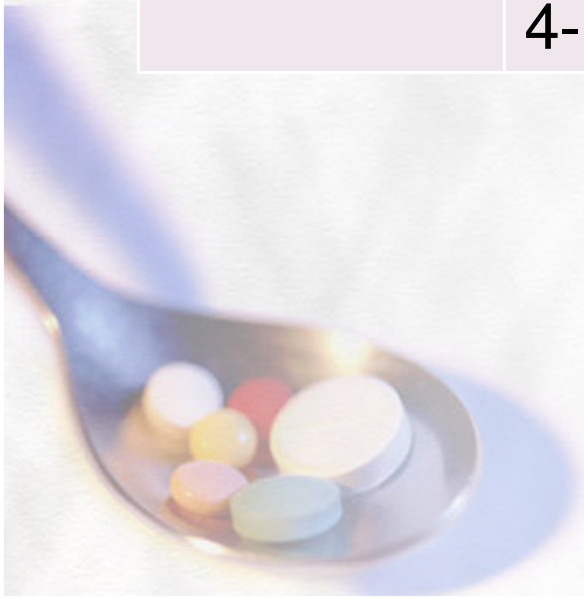


Zanamivir	Oseltamivir
Analogues of *N*-acetylneuraminic acid, inhibits viral neuraminidase	
Inhaled dry powder and deposited in the oropharnyx , some in tracheobronchial tree and lungs	Capsule, good oral bioavailability Oseltamivir phosphate metabolized to active oseltamivir carboxylate
Effective for treatment of influenza A and B- provide relief of symptoms by 1.5 days and decrease viral shedding	
effective in preventing viral infection and in preventing viral disease	
5 mg/puff, 2 puffs 2x/day for 5 days	75 mg 2x/day for 5 days
•Dependent on understanding and cooperation of patient, not recommended for <7 years •not recommended for those persons with underlying airway disease	





	Bioavailability	Metabolism/ excretion	T ½
Oseltamivir	75%	Liver, to active drug-carboxylate	6-10 hrs
Zanamivir	Topical action 4-17%	Renal excretion	2.5-5.1 hrs



Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Recommendations and Reports / Vol. 60 / No. 1
January 21, 2011

Antiviral Agents for the Treatment and Chemoprophylaxis of Influenza

Recommendations of the Advisory Committee on Immunization Practices (ACIP)

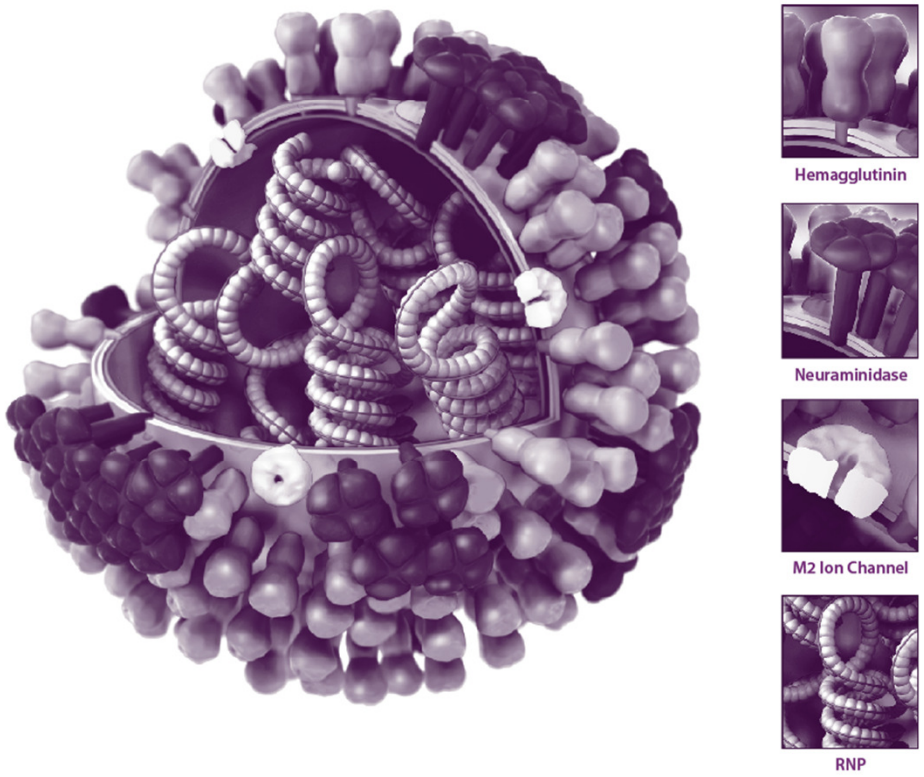


TABLE 2. Summary of antiviral resistance among influenza viruses worldwide, December 2010*

	Influenza A viruses		Influenza B viruses†
Antiviral	2009 H1N1	H3N2	B
Adamantanes (not recommended currently)	Resistant	Resistant	No activity
Oseltamivir	Susceptible	Susceptible	Susceptible
Zanamivir	Susceptible	Susceptible	Susceptible

* Information regarding antiviral resistance is updated weekly and is available at http://www.cdc.gov/flu/weekly. Rare instances of infection with oseltamivir-resistant 2009 H1N1 virus strains have been reported; >99% of influenza viruses circulating since September 2009 have been sensitive to oseltamivir.

† Yamagata and Victoria lineages

TABLE 1

Frequency of oseltamivir-resistant influenza A(H1N1)2009 viruses from different countries, Asia-Pacific region, 17 March 2009 to 17 March 2010 (n=1,488)

Region / country	Isolates tested by NA enzyme inhibition assay			Clinical specimens tested by pyrosequencing[a]		Total frequency of oseltamivir resistance
	No. tested	No. oseltamivir-resistant[b]	No. zanamivir-resistant	No. tested	No. with H275Y mutation[c]	
Australasia	808	5	0	312	7	1.1% (12/1,120)
Australia	649	5	0	312	7	1.3 % (12/961)
New Zealand	159	0	0	0	-	0
South-east Asia	252	4	0	3	0	1.6% (4/255)
Brunei	12	0	0	0	-	0
Cambodia	10	0	0	0	-	0
Malaysia	64	0	0	0	-	0
Philippines	32	0	0	0	-	0
Singapore	128	4	0	0	-	3.1% (4/128)
Thailand	6	0	0	0	-	0
Other[d]	0	0	0	3	0	0
South Asia and east Asia	24	0	0	0	-	0% (0/24)
Sri Lanka	3	0	0	0	-	0
Macau	21	0	0	0	-	0
South Pacific	62	0	0	27	0	0% (0/89)
Fiji	17	0	0	1	0	0
Guam	5	0	0	5	0	0
New Caledonia	12	0	0	6	0	0
Tahiti	28	0	0	1	0	0
Other[e]	0	-	-	14	0	0
Total	**1,146**	**9**	**0**	**342**	**7**	**1.1% (16/1488)**

NA: neuraminidase.

[a] None of the 342 clinical specimens had a corresponding isolate, therefore each one of the 1,488 samples tested (isolates and clinical specimens) represents an individual patient.

[b] Viruses were considered resistant if the IC50 exceeded 200 nM. All oseltamivir-resistant strains detected in NA enzyme inhibition assay were confirmed to contain the H275Y mutation.

[c] Only includes specimens that contained at least 50% of the H275Y mutation according to allele quantitation pyrosequencing analysis.

[d] Papua New Guinea (n=2), East Timor (n=1).

[e] Nauru (n=1), Palau (n=1), Kosrae (n=4), Yap (n=3), Chuuk (n=3), Pohnpei (n=2).

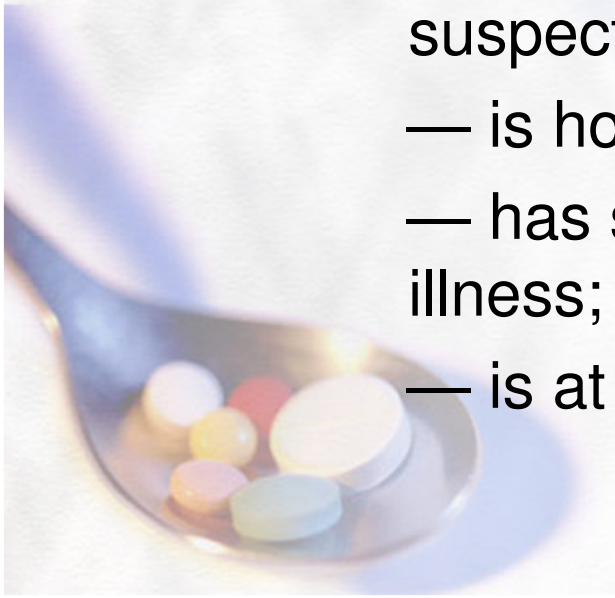
Influenza Treatment Recommendations

- Early antiviral treatment can reduce the risk of complications from influenza (e.g., pneumonia, respiratory failure, and death).
- Antiviral treatment is recommended as early as possible for any patient with confirmed or suspected influenza who

  — is hospitalized

  — has severe, complicated, or progressive illness; or

  — is at higher risk for influenza complications.

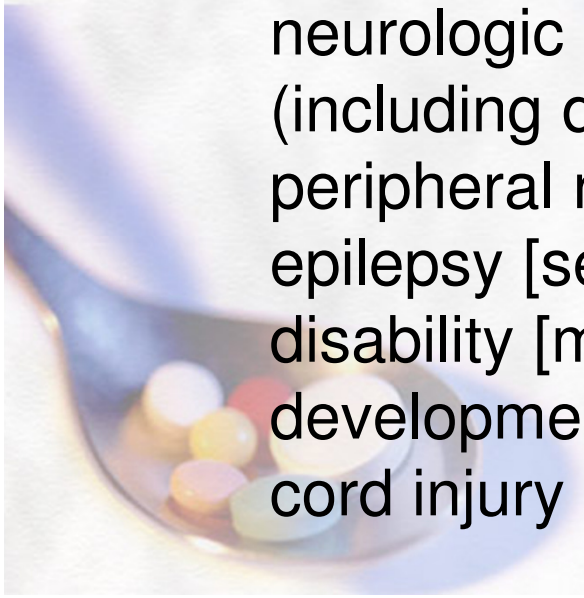


Persons at higher risk for influenza complications recommended for antiviral treatment include:

— children aged <2 years;*

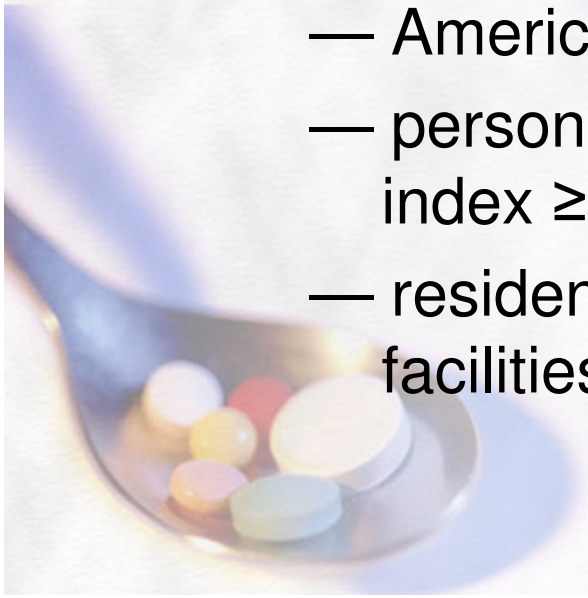
— adults aged ≥65 years

— persons with chronic pulmonary (including asthma), cardiovascular (except hypertension alone), renal, hepatic, hematological (including sickle cell disease), metabolic disorders (including diabetes mellitus), or neurologic and neurodevelopment conditions (including disorders of the brain, spinal cord, peripheral nerve, and muscle such as cerebral palsy, epilepsy [seizure disorders], stroke, intellectual disability [mental retardation], moderate to severe developmental delay, muscular dystrophy, or spinal cord injury

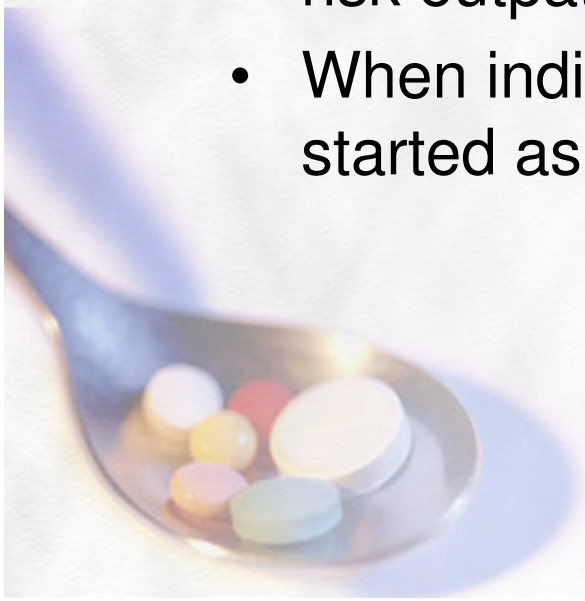


Persons at higher risk for influenza complications recommended for antiviral treatment include:

- — persons with immunosuppression, including that caused by medications or by HIV infection;— women who are pregnant or postpartum (within 2 weeks after delivery
- — persons aged <19 years who are receiving long-term aspirin therapy
- — American Indians/Alaska Natives
- — persons who are morbidly obese (i.e., body-mass index ≥40)
- — residents of nursing homes and other chronic-care facilities.

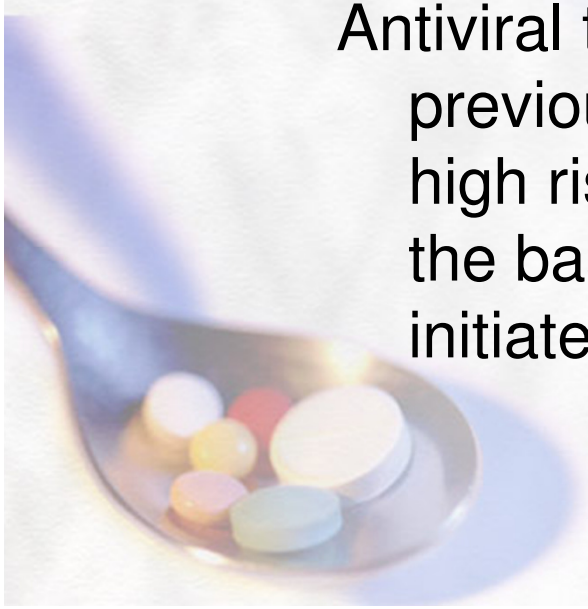


- Clinical judgment, on the basis of the patient's disease severity and progression, age, underlying medical conditions, likelihood of influenza, and time since onset of symptoms, is important to consider when making antiviral treatment decisions for high-risk outpatients.
- When indicated, antiviral treatment should be started as soon as possible after illness onset.



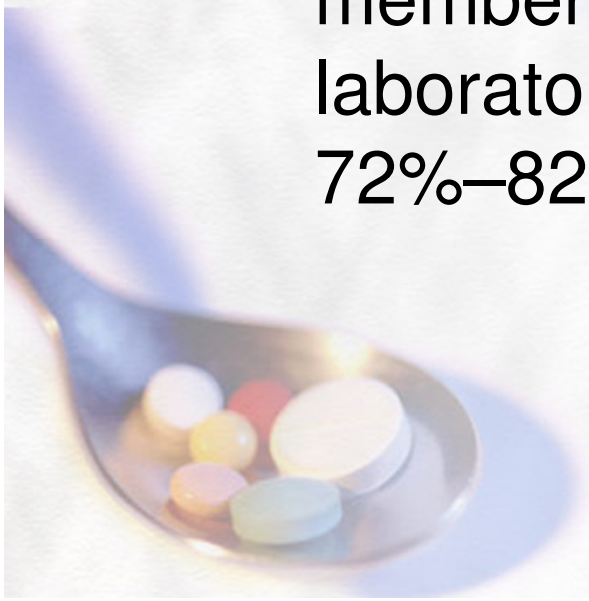
The greatest benefit is when antiviral treatment is started within 48 hours of influenza illness onset. However, antiviral treatment might still be beneficial in patients with severe, complicated, or progressive illness and in hospitalized patients when administered >48 hours from illness onset.•

Antiviral treatment also can be considered for any previously healthy, symptomatic outpatient not at high risk with confirmed or suspected influenza on the basis of clinical judgment, if treatment can be initiated within 48 hours of illness onset.



Post exposure chemoprophylaxis

- In randomized, placebo-controlled trials, both oseltamivir and zanamivir were efficacious in the prevention of influenza illness among persons administered chemoprophylaxis after a household member or other close contact had laboratory-confirmed influenza (zanamivir: 72%–82%; oseltamivir: 68%–89%)

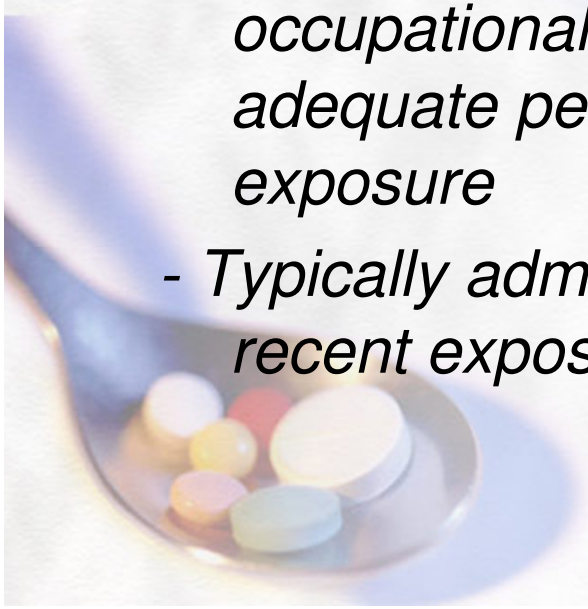


Post exposure chemoprophylaxis

- *Consider for family or other close contacts of a person with a suspected or confirmed case who are at higher risk for influenza complications but have not been vaccinated against the influenza virus strains circulating at the time of exposure*

Unvaccinated health-care workers who have occupational exposures and who did not use adequate personal protective equipment at the time of exposure

- *Typically administered for 10 days after the most recent exposure*



Pre-exposure prophylaxis

- community studies of healthy adults administered antiviral medications during influenza virus activity, both oseltamivir and zanamivir had similar efficacy in preventing febrile, laboratory-confirmed influenza illness (zanamivir: 84%; oseltamivir: 82%)
- Studies also have demonstrated efficacy for prevention of influenza among patients in institutional settings
- preexposure chemoprophylaxis must be administered for the duration of time when exposure might occur.
- Regimens as long as 28 days for zanamivir, and 42 days for oseltamivir, have been well tolerated, but no published data are available regarding use of regimens lasting >6 weeks

For the Philippines- for the H1N1 Pandemic

- Pre-exposure prophylaxis

  was NOT recommended

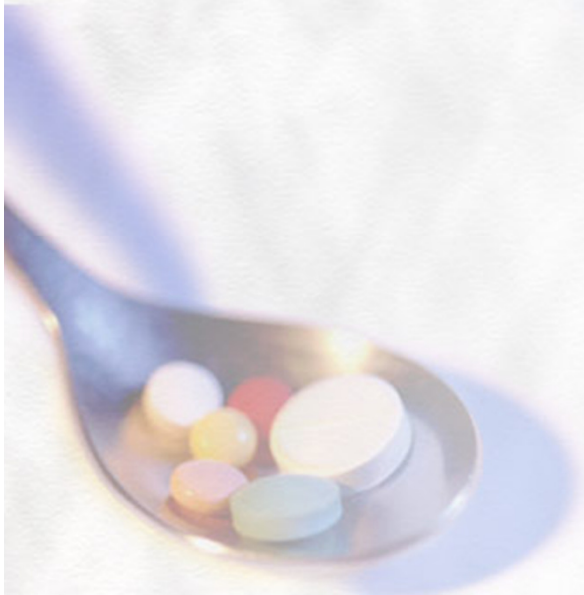


TABLE 1. Recommended dosage and schedule of influenza antiviral medications* for treatment† and chemoprophylaxis§

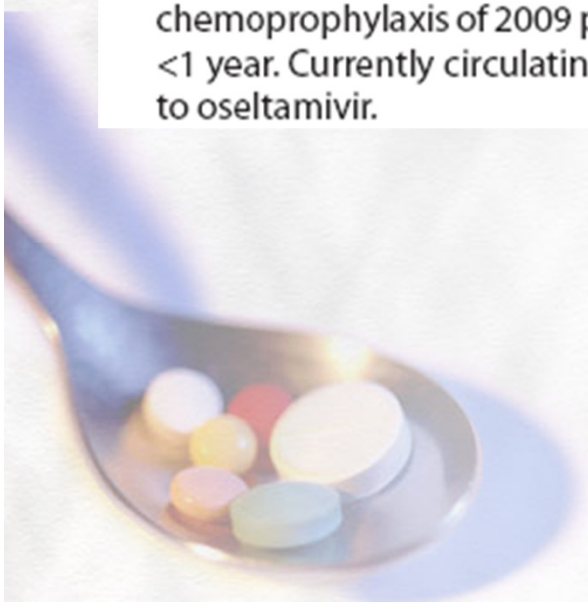
Antiviral agent		Age group (yrs)				
		1–6	7–9	10–12	13–64	≥65
Zanamivir	Treatment, influenza A and B	NA	10 mg (2 inhalations) twice daily	10 mg (2 inhalations) twice daily	10 mg (2 inhalations) twice daily	10 mg (2 inhalations) twice daily
	Chemoprophylaxis, influenza A and B	NA for ages 1–4	Ages 5–9 10 mg (2 inhalations) once daily	10 mg (2 inhalations) once daily	10 mg (2 inhalations) once daily	10 mg (2 inhalations) once daily
Oseltamivir¶	Treatment,** influenza A and B	Dose varies by child's weight**	Dose varies by child's weight**	Dose varies by child's weight** >40 kg = adult dose	75 mg twice daily	75 mg twice daily
	Chemoprophylaxis, influenza A and B	Dose varies by child's weight††	Dose varies by child's weight††	Dose varies by child's weight†† >40 kg = adult dose	75 mg once daily	75 mg once daily

AGE GROUP		TREATMENT*	CHEMOPROPHYLAXIS
ADULTS		75 mg capsule BID x 5 days	75 mg capsule OD x 5-7 days after last known exposure
Children 12 months and older	< 15 kg	30 mg BID x 5 days	30 mg OD x 5-7 days after last known exposure
	15-23 kg	45 mg BID x 5 days	45 mg OD x 5-7 days after last known exposure
	24-40 kg	60 mg BID x 5 days	60 mg OD x 5-7 days after last known exposure
	> 40 kg	75 mg BID x 5 days	75 mg OD x 5-7 days after last known exposure
6-11 months		25 mg BID x 5 days	25 mg OD x 5-7 days after last known exposure
3-5 months		20 mg BID x 5 days	20 mg OD x 5-7 days after last known exposure
< 3 months		12 mg BID x 5 days	NOT recommended

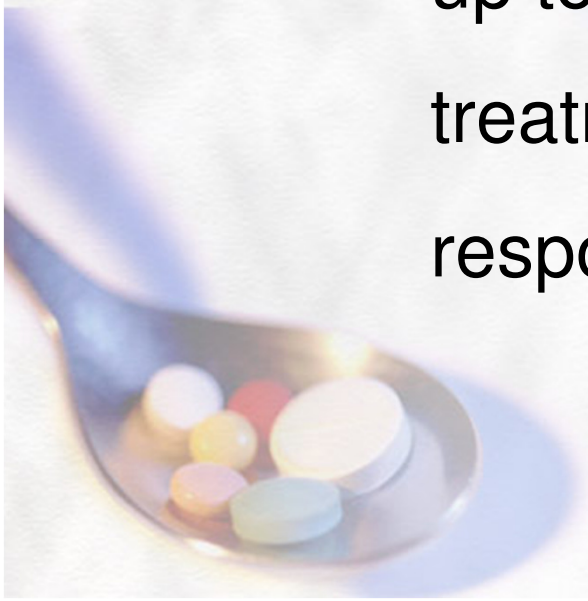
TABLE 4. Dosing recommendations for treatment or chemoprophylaxis of children aged <1 year using oseltamivir*

Age	Recommended treatment dose for 5 days†	Recommended chemoprophylaxis dose for 10 days†
<3 mos	3 mg/kg/dose twice daily	Not recommended unless situation judged critical because of limited data on use in this age group
3–11 mos	3 mg/kg/dose twice daily	3 mg/kg/dose once daily

* Oseltamivir is not approved by the Food and Drug Administration (FDA) for use in children aged <1 year. An Emergency Use Authorization (EUA) was issued by the FDA on April 28, 2009, and expired on June 23, 2010 (available at http://www.fda.gov/downloads/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/UCM216494.pdf). This EUA allowed use of oseltamivir for treatment or chemoprophylaxis of 2009 pandemic influenza A (H1N1) virus infection during the pandemic in infants aged <1 year. Currently circulating 2009 H1N1, seasonal influenza A (H3N2), and B viruses have similar sensitivity to oseltamivir.

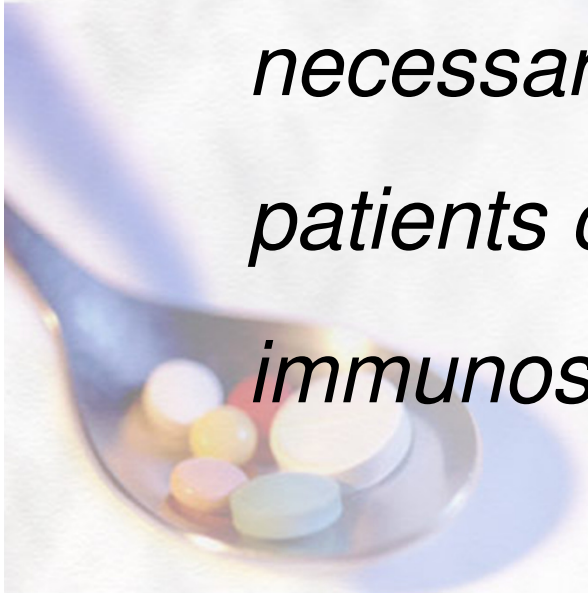


- *For patients with severe or progressive illness, consideration may be given to the use of higher doses of oseltamivir up to 150 mg bid, and longer duration of treatment depending on clinical response.



Duration of treatment for Influenza

- The recommended duration of treatment is 5 days
- *Longer treatment regimens might be necessary in severely ill hospitalized patients or persons with immunosuppression.*



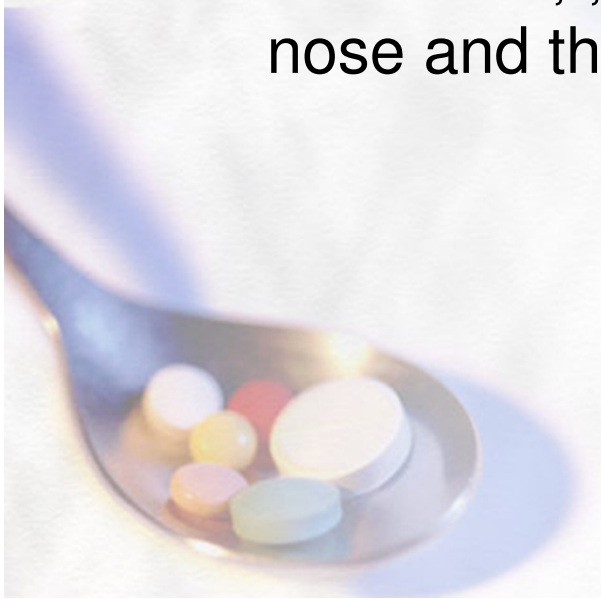
Adverse effects

Zanamivir-

not recommended in those with underlying pulmonary diseases- may experience bronchospasm

- reports of oropharyngeal and facial edema

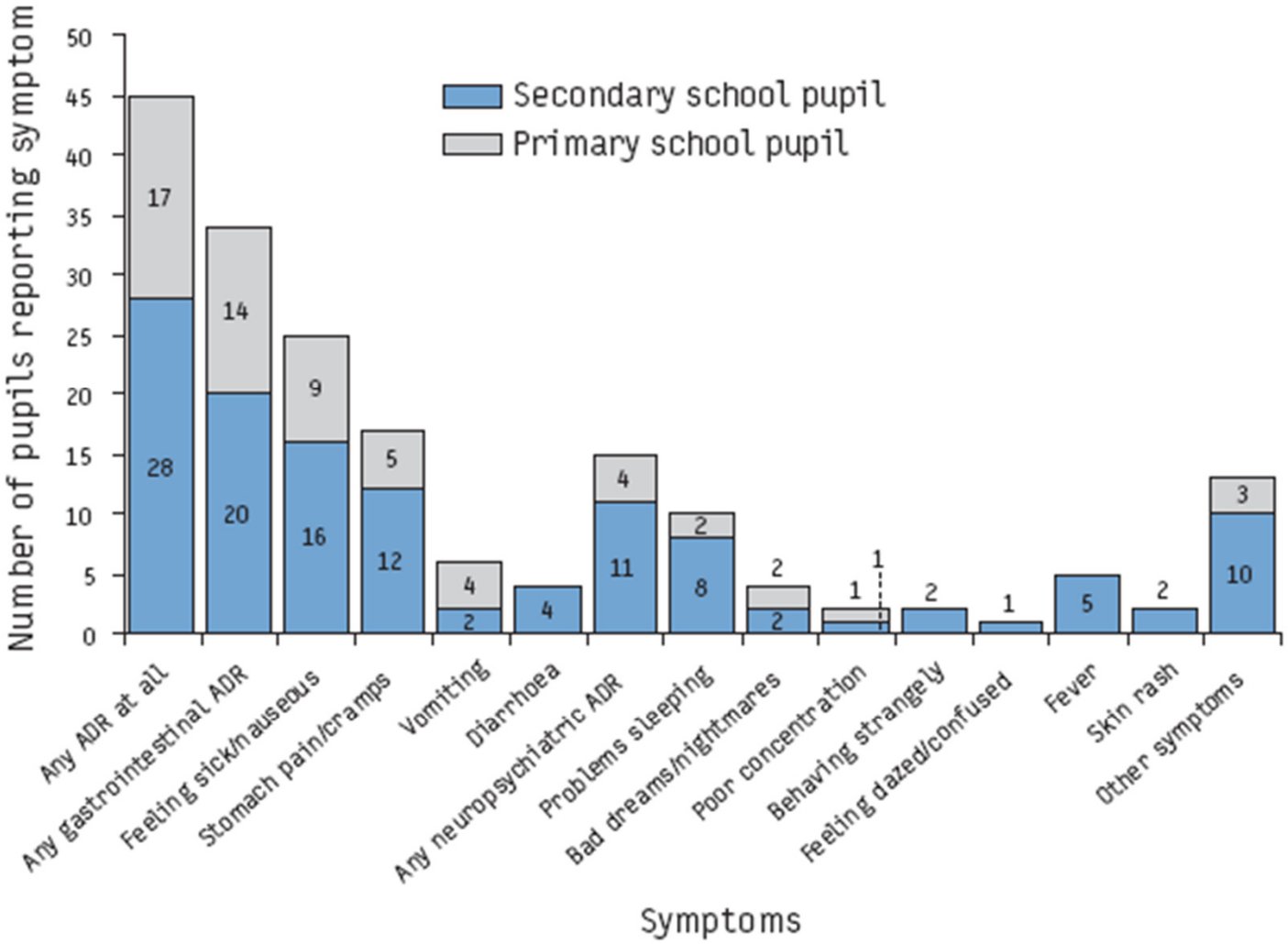
- diarrhea, , nausea. Vomiting, nasal signs, ear nose and throat infections



Adverse events - Oseltamivir

- Nausea and vomiting most common, 1% discontinued drug
- Transient neuropsychiatric events (self-injury or delirium) have been reported postmarketing among persons taking oseltamivir; the majority of reports were among Japanese adolescents and adults
- Several analyses and reviews - oseltamivir is not associated with an increased risk for neuropsychiatric events
- USFDA advise- those receiving oseltamivir be monitored closely for abnormal behavior
- Limited safety data on oseltamivir treatment for seasonal influenza in children aged <1year have not demonstrated any age-related safety concerns, but careful attention to dosing is essential

Main symptoms reported by schoolchildren taking oseltamivir for prophylaxis in three London schools, May 2009 (n=85)



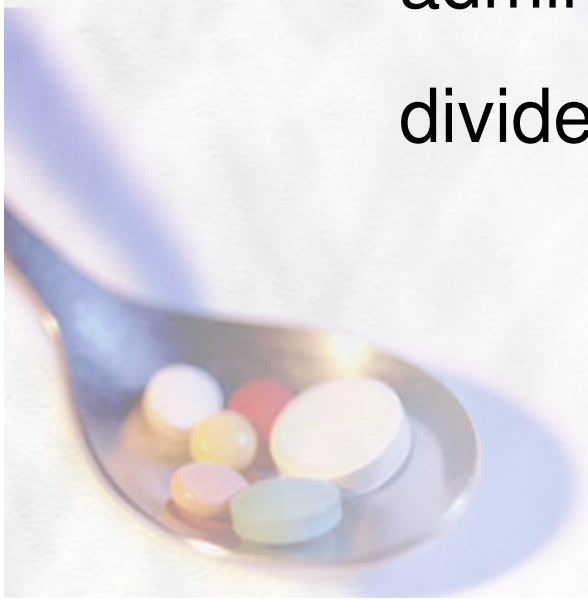
ADR = Adverse drug reaction

Isoprinosine

- Indications And Clinical Uses: May be beneficial in retarding neurological deterioration and prolonging life in patients with slowly progressive subacute sclerosing panencephalitis (SSPE).
- Inosiplex is not indicated for any condition other than SSPE.
- Manufacturers' Warnings In Clinical States: Because the purine (inosine) moiety of inosiplex is rapidly catabolized to uric acid, resulting in elevations of serum and uric acid, it should be used with care in patients with a history of gout, urolithiasis, nephrolithiasis, or renal dysfunction. Uricosuric agents may be administered to patients with severely elevated serum uric acid levels.

Dose of Isoprinosine

- Dosage: Adults and Children: The recommended dosage is 50 mg/kg/day, up to a maximum of 3 g/day, administered orally in 3 to 4 equally divided doses during waking hours.



THE JOURNAL OF INFECTIOUS DISEASES • VOL. 126, NO. 2 • AUGUST 1972

Isoprinosine: Lack of Antiviral Activity in Experimental Model Infections

L. A. Glasgow and G. J. Galasso, Editors

From the Department of Microbiology, University of Utah College of Medicine, Salt Lake City, Utah, and the National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland

This report is a condensation of data from a collaborative study proposed and sponsored by the Antiviral Substances Program of NIAID. The individual reports were prepared by the following persons: S. Baron and M. Worthington, NIAID, NIH; A. Friedman-Kien, New York University College of Medicine; J. C. Duenwald, Washington State University, L. A. Glasgow, M. Harmon, B. Janis, E. Kern, J. C. Overall, Jr., C. B. Smith, D. A. Stringfellow, and S. Westerberg, University of Utah College of Medicine; B. C. Easterday and E. H. Weinberg, University of Wisconsin.*

Recently there has been much interest in isoprinosine as a broad-spectrum antiviral compound. The activity of this substance was evaluated in a coordinated study at five institutions. Experimental models in five species of animals were established using 11 viruses. Criteria for selection were: (*1*) representation of most major groups of viruses, (*2*) reproduction of natural routes of infection, and (*3*) simulation of potentially treatable viral infections of man. No therapeutic effect could be demonstrated in infections with encephalomyocarditis virus, type 2 *Herpesvirus hominis*, influenza, and rabies viruses in mice; vaccinia virus in rabbits; rhinotracheitis and panleukopenia viruses in cats; distemper virus in ferrets; and influenza and transmissible gastroenteritis viruses in swine. The only antiviral activity observed in this extensive series of experiments was suppression of fibroma virus lesions in rabbits given 600 mg/kg per day of isoprinosine. Although antiviral activity is not precluded in other viral infections in animals or in man, these results clearly fail to substantiate the potential of isoprinosine as a potent, broad-spectrum antiviral substance.

American Journal of the Medical Sciences:
ORIGINAL ARTICLE: PDF Only

Antiviral activity of isoprinosine in vitro and in vivo

Abstract

Isoprinosine, a derivative of inosine, has been found to exert slight activity in tissue cultures infected with herpesvirus hominis, vaccinia, poliomyelitis (type 3), enteric cytopathogenic human orphan (echo) virus (type 11), and Eastern equine encephalitis virus. It exerts no activity in tissue cultures infected with measles, mumps, and Western equine encephalitis virus. In contrast, the drug appears to decrease morbidity and mortality in animals infected with herpesvirus and influenza virus. It was without effect on encephalo-myocarditis virus infection in mice.

ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, Mar. 1973, p. 332-334

Vol. 3, No. 3
Printed in U.S.A.

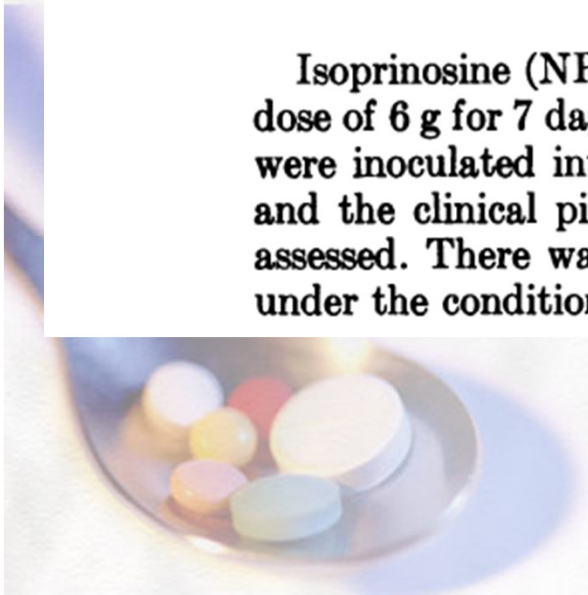
Trial of the Antiviral Action of Isoprinosine Against Rhinovirus Infection of Volunteers

A. J. SOTO, T. S. HALL, AND SYLVIA E. REED

Common Cold Unit, Harvard Hospital, Salisbury, Wilts, England

Received for publication 20 November 1972

Isoprinosine (NPT-10381) was given orally to a group of 22 volunteers at a daily dose of 6 g for 7 days; a control group of 23 volunteers received placebo. Volunteers were inoculated intranasally with both rhinovirus type 9 and rhinovirus type 31, and the clinical picture, extent of virus shedding, and serological responses were assessed. There was no evidence that the compound had useful antiviral activity under the conditions of this trial.



Isoprinosine in the Treatment of Chronic Active Hepatitis Type B

1990, Vol. 22, No. 6 , Pages 645-648

Janusz Cianciara[1], Tomasz Laskus[1†], Elzbieta Gabinska[1] and Teresa Loch[1]

[1]Departments of Hepatology and Immunopathology, Institute of Infectious and Parasitic Diseases, Warsaw, Poland

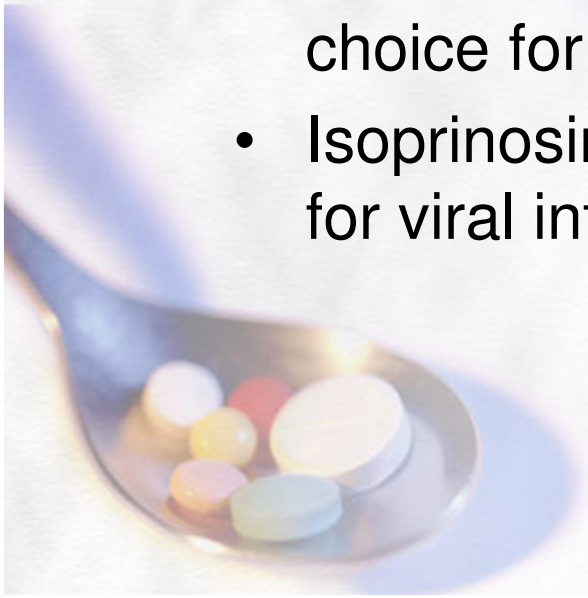
[†]*Correspondence*: Tomasz Laskus, Institute of Infectious and Parasitic Diseases, Wolska 37, 01-201, Warsaw, Poland

21 patients with chronic active hepatitis B (CAH-B) were treated for 1–2 years with isoprinosine, while another 18 patients served as control group. All patients were initially DNA polymerase (DNAp) and HBeAg positive. Nine (43%) treated patients became persistently negative for DNAp, seroconverted to anti-HBe and showed histological remission on follow-up biopsy. Among simultaneously followed controls 5 (28%) lost DNAp and 4 (22%) also lost their HBeAg. However, only 2 (11%) seroconverted to anti-HBe. Histological improvement was seen in 5 (28%) controls. Thus, it seems that isoprinosine may exert a beneficial effect on the course and outcome of CAH-B.

Summary

- Most viral infections do not have a corresponding viral agent
- Acyclovir and valacyclovir are effective agents against

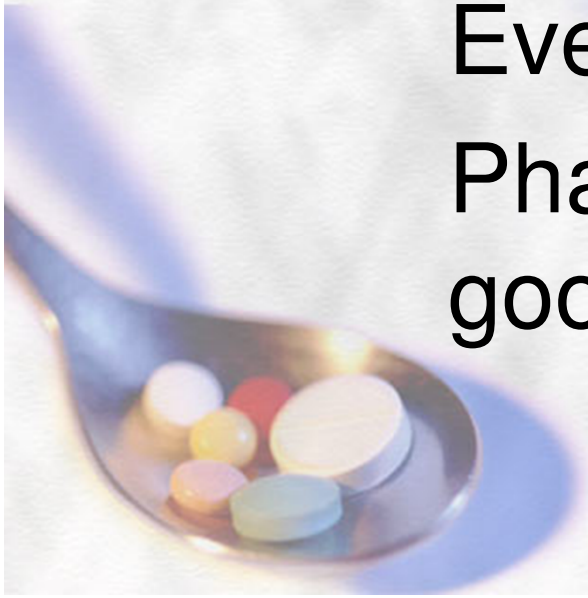
  VZV, and HSV
- Oseltamivir and Zanamivir are the current drugs of choice for influenza
- Isoprinosine has not been proven to be of benefit for viral infections, except for SSPE



Old Drugs for Any Disease

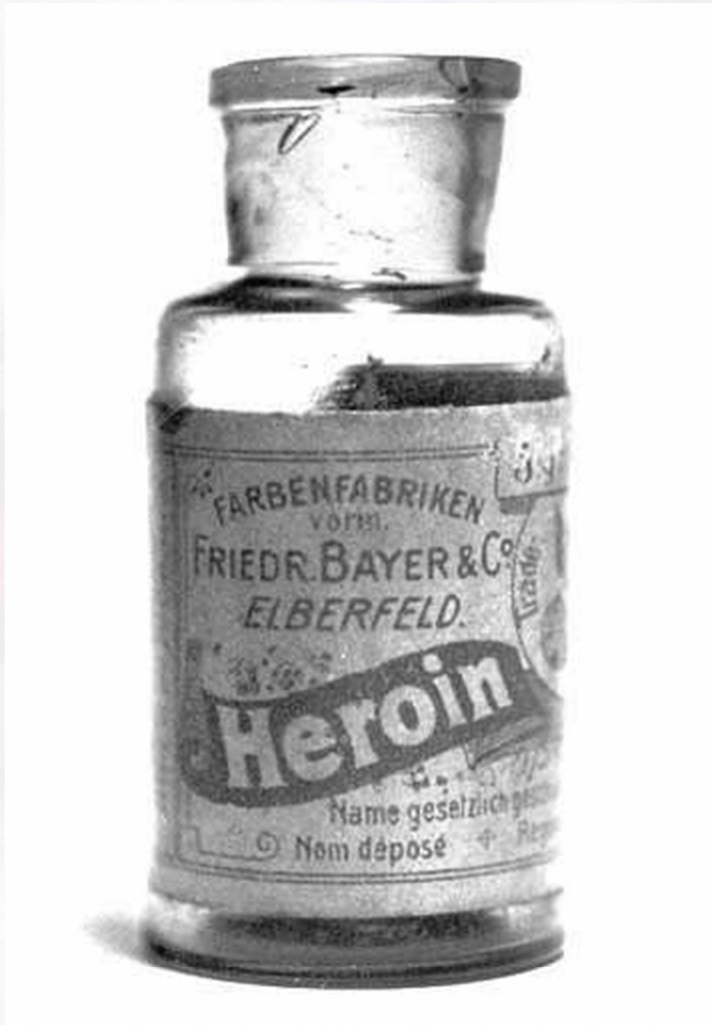
Even viral infections!!

Pharmacology in the good old days!



At 40% alcohol plus 3 grams of opium per tablet, it didn't cure you, but you didn't care...

Opium for newborns



A bottle of Bayer's 'Heroin'.
Between 1890 and 1910 heroin was sold as **a non-addictive substitute** For morphine. It was also used to treat children suffering with a strong cough.

Other References

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- Feigin and Cherry's Textbook of Pediatric Infectious diseases, 6th Edition, 2009
- Liley LL, Harrington S , Snyder JS. Pharmacology and the Nursing Process, 5th Edition, 2007
- Kithcing A., et el. Oseltamivir adherence and side effecrs among children in 3 London schools affected by influenza A(H1N1) , May 2009 – an internet based cross-sectional survey. EUROSURVEILLANCE Vol . 14 · Issue 30 · 30 Jul Y 2009
- 2009 Report of the Committee on Infectious diseases 28th edition

THANK YOU!