

Influenza Virus

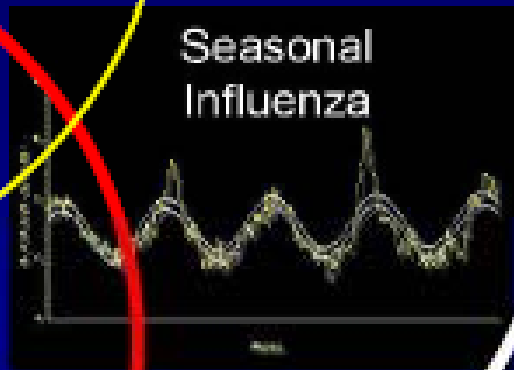
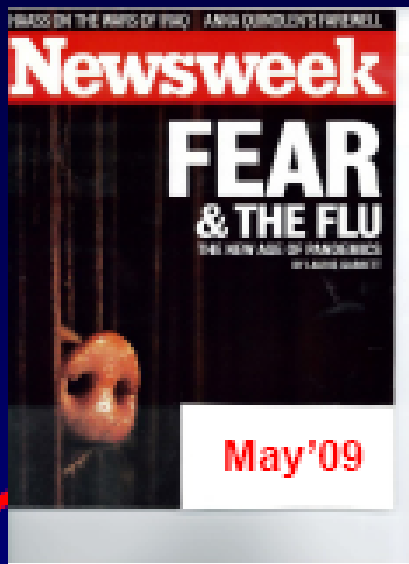
Influenza A H1N1 (Swine Flu)

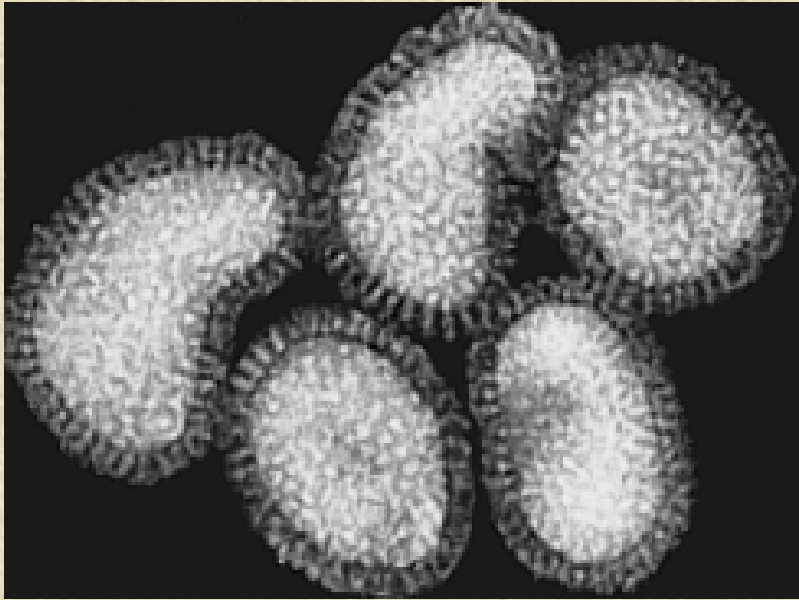
: A Global Pandemic

Dr Muralidhar Tambe

Professor & Head, Department of PSM

B.J.Medical College, Pune





Antigenic drift

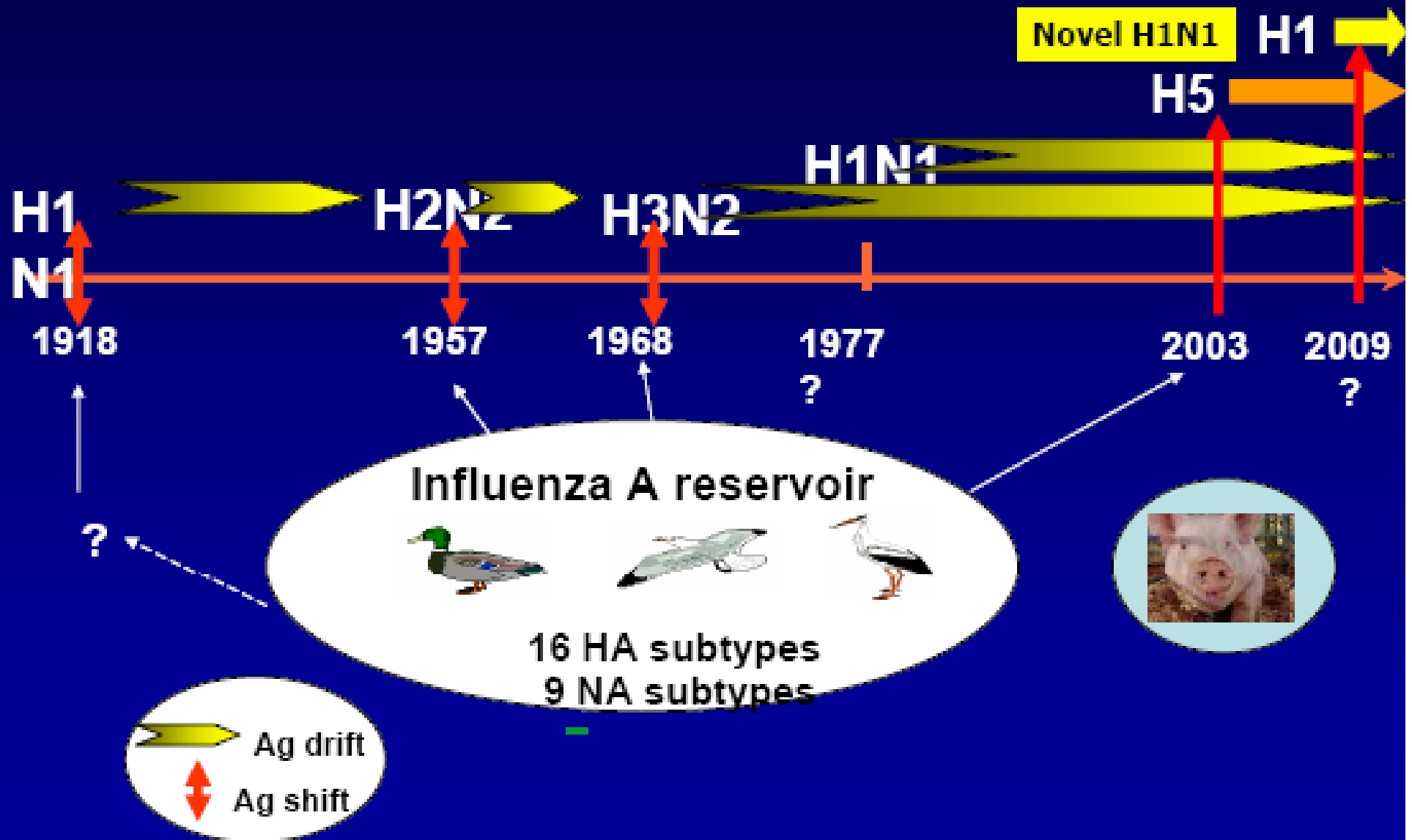
Changes in proteins by genetic point mutation & selection

Antigenic shift

Changes in proteins through genetic re assortment

- RNA Orthomyxoviridae
- Three types
 - A, B, C
- Surface antigens
 - H (haemagglutinin)
 - N (neuraminidase)

Circulation of Influenza A Viruses in Humans



Spanish flu hospital, 1918



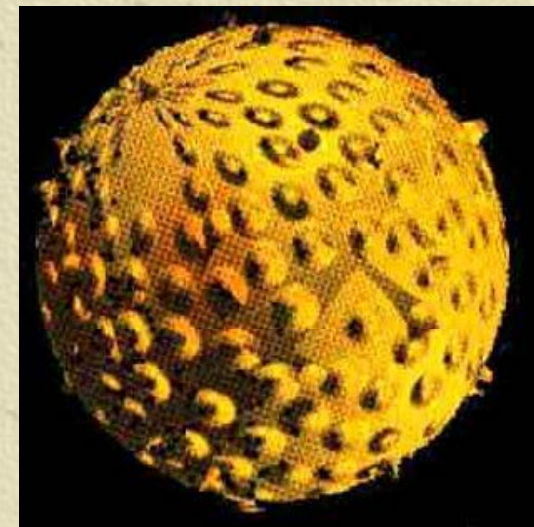
50 to 100 million
total deaths

Asian Flu (H2N2) - 1957 in China

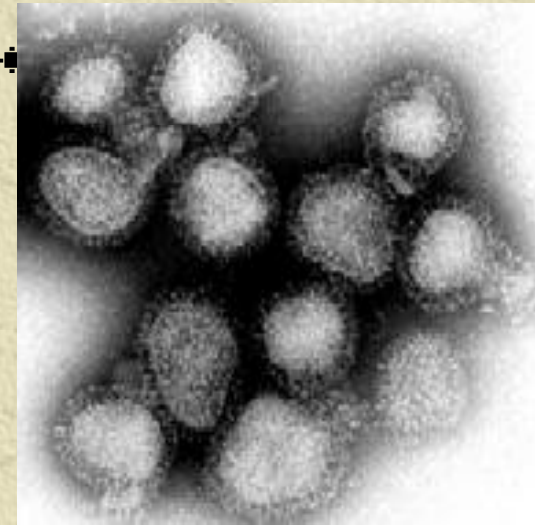
➤ 1 to 4 million deaths worldwide



H2N2



Hong Kong Flu - 1968



avian flu type, H3N2

- 750,000 deaths & nearly 40% of the world's population.
- It resulted in about 34,000 deaths in the United States.

Influenza

Burden of Disease

✦ Seasonal Influenza

- Globally: 250,000 to 500,000 deaths per year

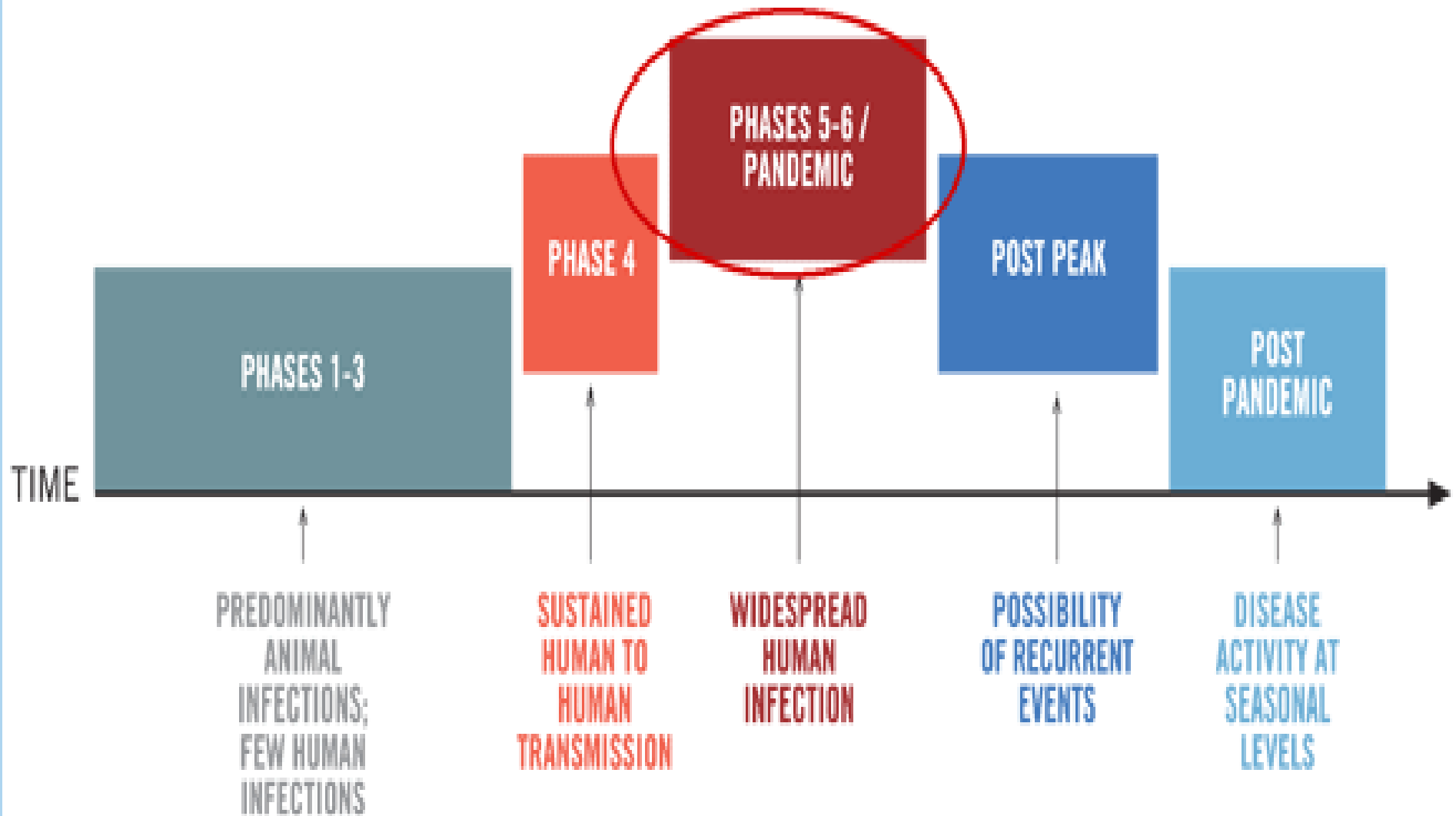
✦ Pandemic Influenza

- An ever present threat

Influenza A H1N1

-
- ✦ First reported in Mexico on 18th March, 2009
 - ✦ The present pandemic is being caused by a new sub type of Influenza A H1N1 virus, which has re-assorted with antigenic segments from American swine, Eurasian Swine, avian and human influenza virus.

PANDEMIC INFLUENZA PHASES



The A/H1N1 virus

An unusual cocktail
of avian, swine and human viruses



Bird flu

Human flu



Swine flu

Pigs may harbour several flu viruses simultaneously. The pathogens may mix to create a new viral strain



Transmission

Pig to human

By inhaling viral particles
(there is no risk from eating cooked pork)



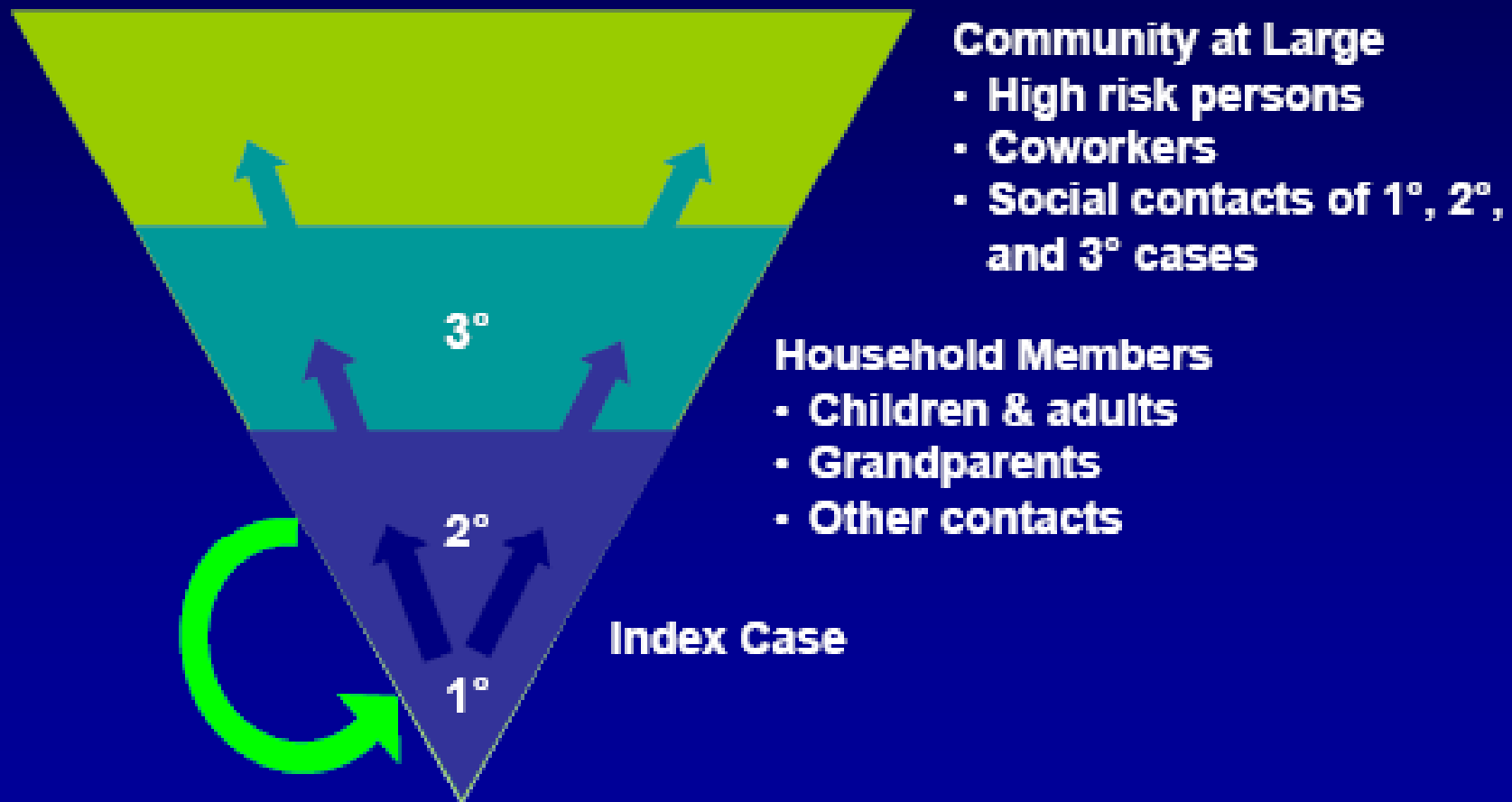
Human to human
By inhaling viral particles



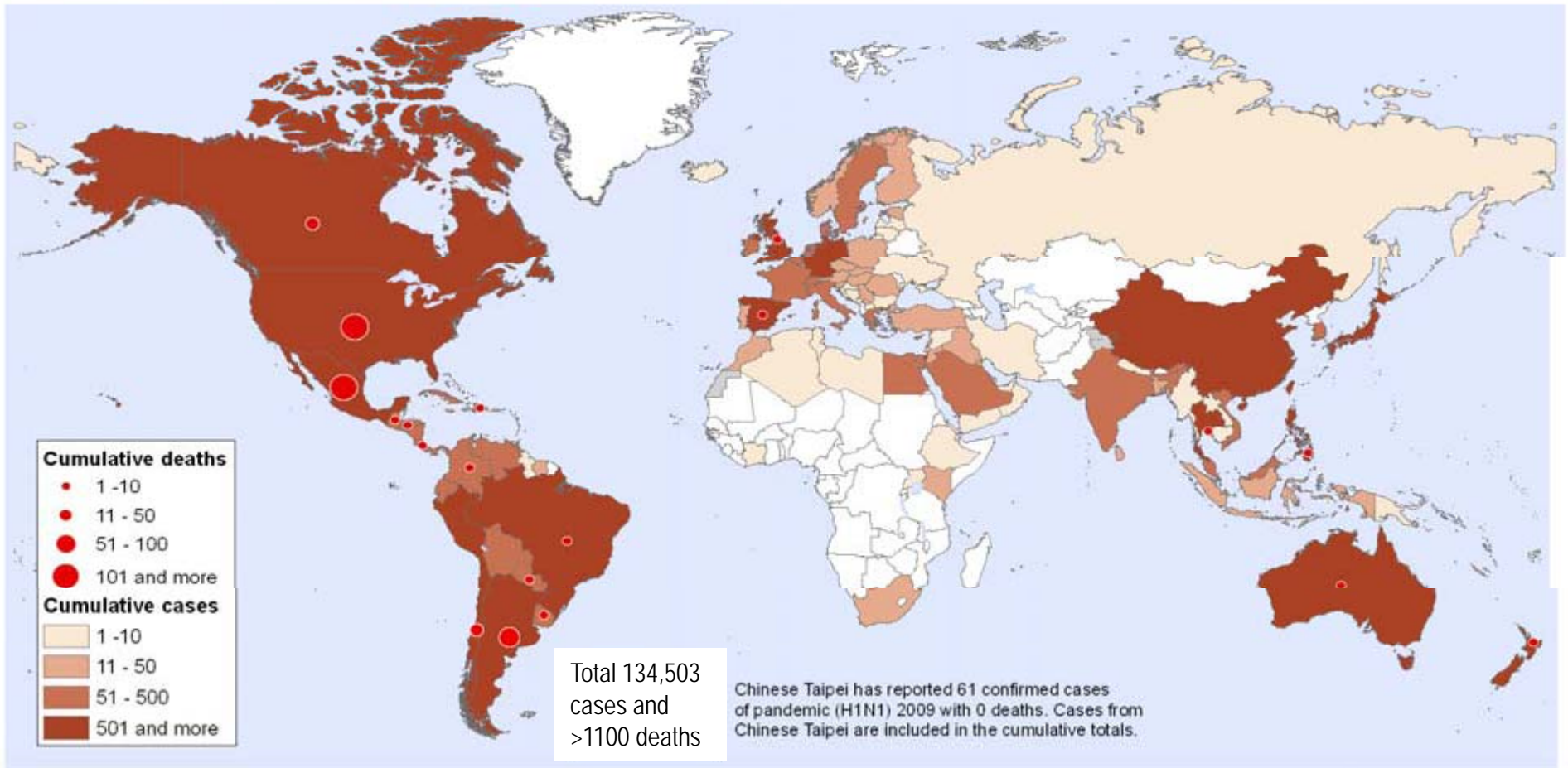
Symptoms

- High fever
- Coughing, sneezing
- Breathing difficulties
- Loss of appetite

Influenza Transmission Cascade



Pandemic H1N1 – No. of Lab. Confirmed Cases



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization



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Pandemic A (H1N1) 2009

Regions	Cumulative total	
	Cases*	Death
WHO Regional Office for Africa (AFRO)	157	0
WHO Regional Office for the Americas (AMRO)	87965	1008
WHO Regional Office for the Eastern Mediterranean (EMRO)	890	1
WHO Regional Office for Europe (EURO)	16556	34
WHO Regional Office for South-East Asia (SEARO)	7358	45
WHO Regional Office for the Western Pacific (WPRO)	21577	30
Grand Total	162038	1154

India

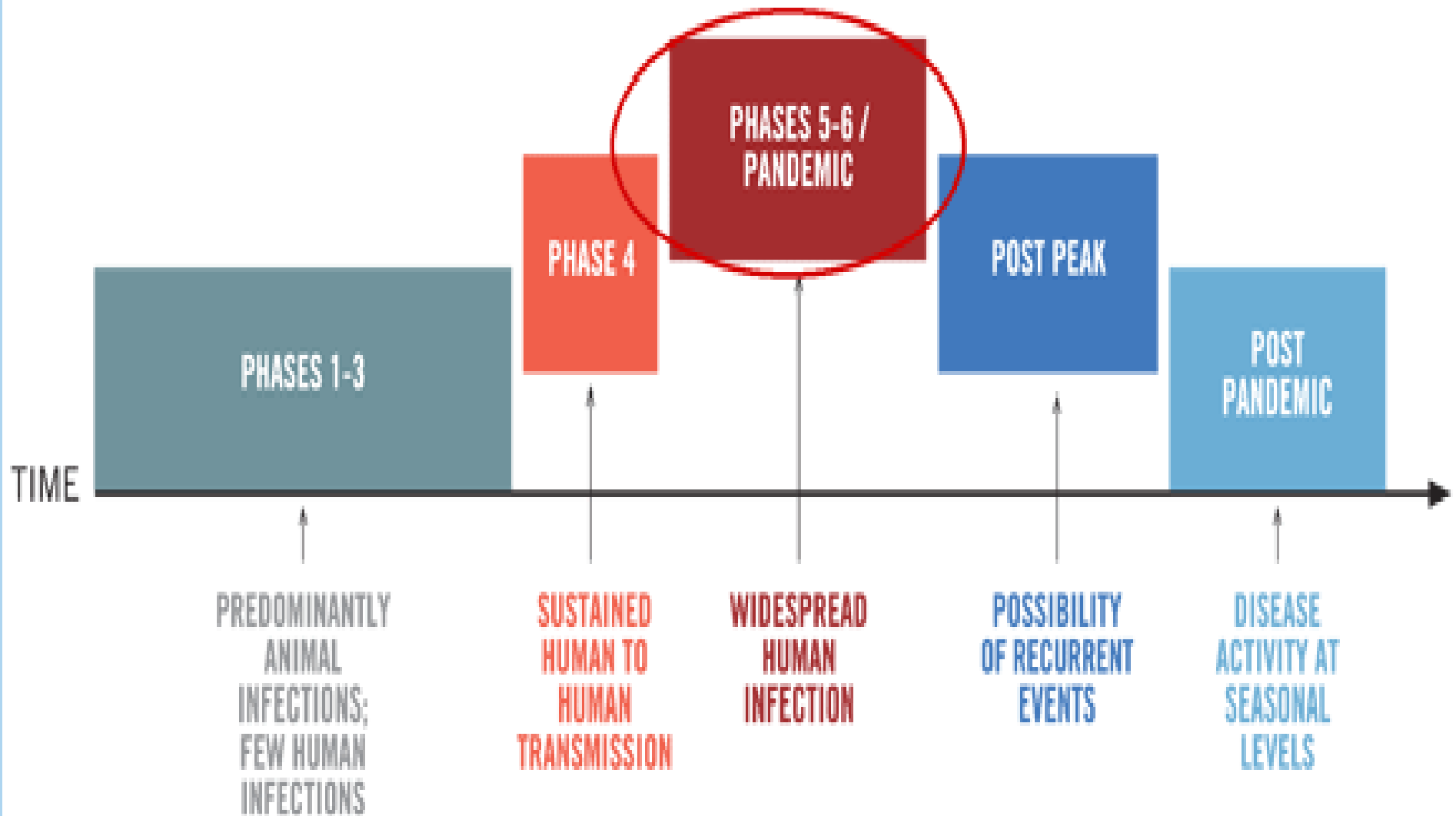
-
- ✦ The first case of influenza A H1N1 was reported in India on 11.05.09 from Hyderabad
 - ✦ 711 positive out of 2479 persons tested
 - ✦ **Maharashtra: 212** cases (Mumbai-26, **Pune - 159**, Panchgani-25 & others-2)
 - ✦ A majority are school children

Cases in SEARO

-
- ✦ **Bangladesh: 24 cases**
 - ✦ **Bhutan: 2 cases**
 - ✦ **India: 342 cases**
 - ✦ **Indonesia: 172 cases**
 - ✦ **Myanmar: 4 cases**
 - ✦ **Nepal: 16 cases**
 - ✦ **Sri Lanka: 42 cases**
 - ✦ **Thailand: 6,776 cases / 44 deaths**

(case fatality rate 0.45%)

PANDEMIC INFLUENZA PHASES



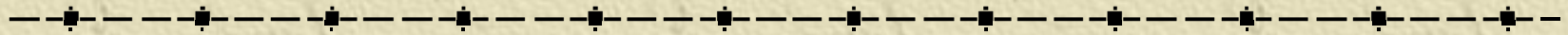


World Health Organization

(11th June 2009)

Upgraded the phasing of pandemic influenza from Phase 5 to Phase 6
“A public health emergency” of international concern

WHO PHASES OF PANDEMIC ALERT



Phase 1: No animal influenza virus circulating among animals has been reported to cause infections in humans.

Phase 2: Animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans, and is therefore considered a specific potential pandemic threat.

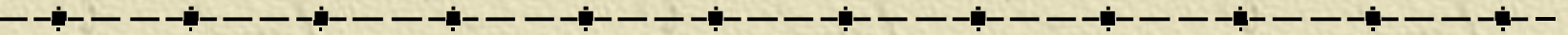
Phase 3: An animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but not resulted in human-to-human transmission sufficient to sustain community-level outbreaks.

Phase 4: Human-to-human transmission of an animal or human-animal influenza reassortant virus able to sustained “community-level outbreaks” has been verified.

Phase 5: The same identified virus has caused sustained community level outbreaks in two or more countries in one WHO region.

Phase 6: The pandemic phase, is characterized by community level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5.

Phase 6 (Pandemic phase)



- ✦ Community level outbreaks in at least one other country in a **different WHO region** in addition to the criteria defined in Phase 5.
- ✦ Indicates- a global pandemic

Why Are We Concerned? (H1N1 vs Seasonal Influenza)

- ✦ H1N1 - High Transmission Risk (20-30%) Seasonal Influenza (5-15%)
- ✦ H1N1 - young & healthy adults (20-60 yrs) Seasonal flu (≥ 65 years)

- ✦ WHO estimates
 - ✦ 2 billion cases
 - ✦ 2 - 7.4 million deaths
- ✦ WHO predicts worse economic disruption than past Pandemics (absenteeism may go up to 70%.)

With characteristics of flu

- ✦ Adapted for human transmission
- ✦ Rapid transmission
- ✦ Invisible transmission
- ✦ Enlarged through outbreaks in schools
- ✦ Enlarged through outbreaks in medical establishments

Places of transmission

✦ Families

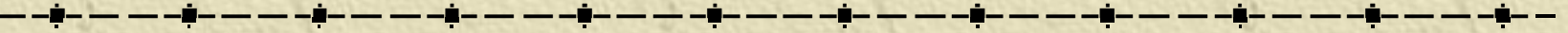
✦ Schools

✦ Medical establishments

✦ Shops-Malls, Cinema Theatres

✦ Workplaces

Spread



- ✦ Novel influenza A (H1N1) spreads in the same way as regular seasonal influenza viruses; mainly through the coughs and sneezes
- ✦ Does not spread by eating pork

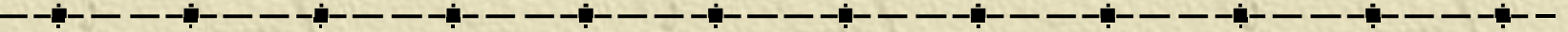
Communicability

- ✦ From 1 day before to 7 days after the onset of symptoms or till resolution of illness.
- ✦ Children may spread the virus for a longer period.

Incubation & Communicability

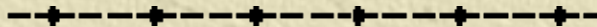
- ✦ The estimated incubation period is unknown
- ✦ could range from 1-7 days, and more likely 1-4 days Infection

Risk Factors



- ✦ Pregnancy
- ✦ Existing cardiovascular disease
- ✦ Chronic respiratory disease
- ✦ Immunodeficiency disorders
- ✦ Diabetes and
- ✦ Cancer

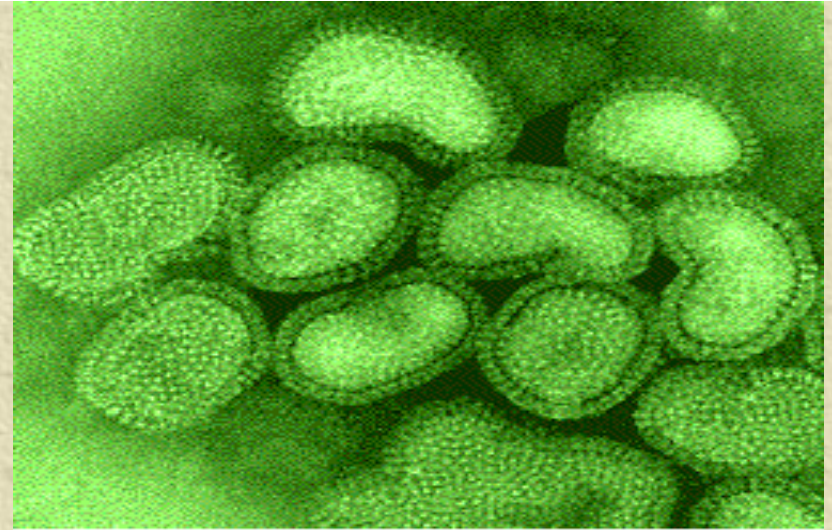
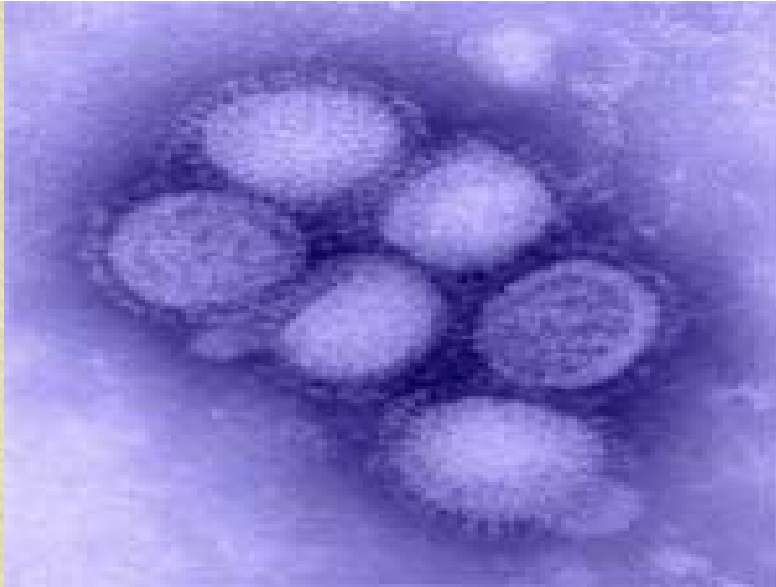
Prevention and Control Measures





Prevention and Control Measures



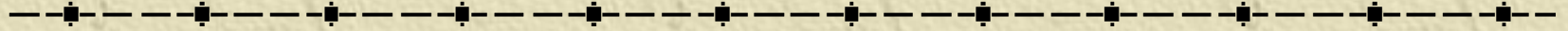


Influenza Virus

Influenza A H1N1 (Swine Flu)

: Prevention and Control

Dr Muralidhar Tambe
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✦ Hard non-porous surfaces 24-48 hours

◆ Plastic, stainless steel

- Recoverable for > 24 hours
- Transferable to hands up to 24 hours

✦ Cloth, paper & tissue

- ◆ Recoverable for 8-12 hours
- ◆ Transferable to hands 15 minutes

✦ Unwashed hands : up to 30

- ◆ Potential for indirect contact transmission

*

Influenza A (H1N1) virus

- ✦ Destroyed by heat (75-100°C).
- ✦ In addition, several chemical germicides, including chlorine, hydrogen peroxide, detergents (soap), iodophors (iodine-based antiseptics), and alcohols

Control Strategy

-
- ✱ i) surveillance and early detection
 - ✱ ii) pharmaceutical intervention
 - ✱ iii) non-Pharmaceutical intervention
 - ✱ iv) clinical management and
 - ✱ v) risk communication.

Surveillance

-
- ✦ Surveillance at community level, ports and airports and border crossings would be strengthened to detect early clusters of influenza like illness
 - ✦ Airports-Mumbai, Pune, Nagpur since 2.4.2009
 - ✦ Mumbai Port Trust since 29.04.2009



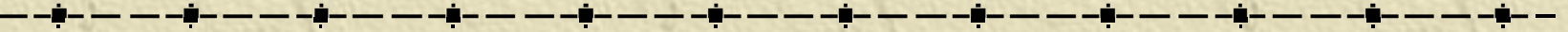
Airport Screening in India



Principles of Infection Control

- ✦ Good hand hygiene
- ✦ Cleaning of contaminated surfaces
- ✦ Early isolation of suspected cases
- ✦ Correct use of personal protective equipment when required
- ✦ Seasonal influenza immunisation for high risk

Hand Hygiene



- ✦ **Hands can be cleaned with soap and water**
- ✦ **Dry with disposable hand towel**
- ✦ **Alternatives used alcohol based hand cleaner**
(Not effective if hands are visibly soiled – hands must first be cleaned, e.g. use hand wipes)

Patients Cared for at Home

- ✦ **Potential for transmission!**
- ✦ **Must educate family caregivers**
- ✦ **Fever / symptom monitoring**
- ✦ **Infection control measures**
- ✦ **Hand washing**
- ✦ **Use of available material as PPE**
- ✦ **Handle laundry with gloves; do not shake to prevent aerosolization.**
- ✦ **Use disposable or dedicated dishes, utensils**
- ✦ **Decontaminate the home environment**
- ✦ **Frequent cleaning before disinfection**

Isolation & Quarantine

- ✦ Cases -to be isolated in health care facilities to maintain strict infection control.
- ✦ Contacts should be advised to remain at home (voluntary home quarantine) for at least 7 days after the last contact with a person under investigation.
- ✦ Contact tracing and chemoprophylaxis to the contacts

Advisory for Asymptomatic Contacts:

- ✦ Remain at home (home quarantine) for at least 7 days after the last exposure with a case.
- ✦ Initiate self-health monitoring (regular temperature charting, twice a day) or respiratory symptoms (cough, sore throat, running nose, difficulty in breathing etc.) for 7 days after the last exposure to the case patient.
- ✦ Active monitoring (e.g. daily visits or telephone calls) for 7 days after the last exposure shall be done by the identified Local Health Officials.

Social distancing measures

- ✦ **Social distancing measures** such as closure of school, college, business, cinemas, theatres and markets. Mass gatherings such as festivals, weekly markets, sporting events, religious and social congregations, funerals etc need to be discouraged or cancelled
- ✦ Travel advisory – to defer non essential travel.
- ✦ Health care providers are at increased risk - (5 doctors in India)

Early detection and isolation

- ✦ Heighten surveillance for outbreaks
- ✦ Maintain close relationship with WHO influenza laboratory network – NIV, Pune
- ✦ Promptly detect and refer suspected cases

Measures to prevent outbreaks in high-risk institutions -Schools

✦ All schools to perform preventive measures –

- ✦ Morning inspection
- ✦ Temperature measurement,
- ✦ School suspension for the sick,
- ✦ Outbreak notification,
- ✦ Better and revise contingency plans so as to suspend school when necessary

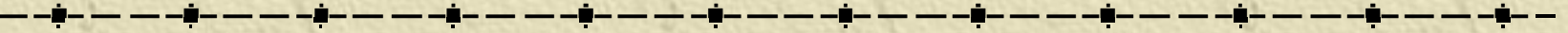
High Risk Personnel in Health Care Settings

-
- ✦ Medical and nursing staff involved in clinical examination at airport and quarantine centre
 - ✦ Medical personnel involved in sample collection
 - ✦ RRT while transporting suspect case in the ambulance
 - ✦ Health staff involved in managing a suspect case at the health facility
 - ✦ Full complement of PPE and N 95

Selected interventions: experiences and lessons

Strategies	Practice/Experiences	Remarks
School closure	7-14 days closure (US, UK, Canada, Japan) (Spain-military school)	Limited impact on spread of disease Issue: closure vs dismissal Need to keep children at home Legal issues/public health act
Suspension of mass gatherings	Churches, malls, theaters (Mexico-two weeks)	Disruptive, difficult to enforce Need for public messages Issues: ethical issues, continuity; access to services; economic implicat
Passenger screening	Symptomatic travelers asked to delay their journeys and referred for medical evaluation (Mexico, US, Canada)	SEA: 2.5 million incoming passengers (quarter from affected areas) Approx: screen 1 million to identify one positive Issues: asymptomatic, incubating not detected; cost-effectiveness
Contact tracing and prophylaxis	Chemoprophylaxis for immediate contacts (UK for schools with case)	Often late from possible exposure Repeated exposure if cases continue; side effects, compliance, cost

Medium Risk

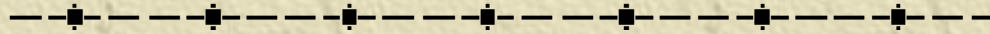


- ✦ Paramedical staff involved in public health screening at the airports.
- ✦ Staff handling dead body of a suspect/ probable/ confirmed case
- ✦ Three layered surgical mask.

PPE



MASKS

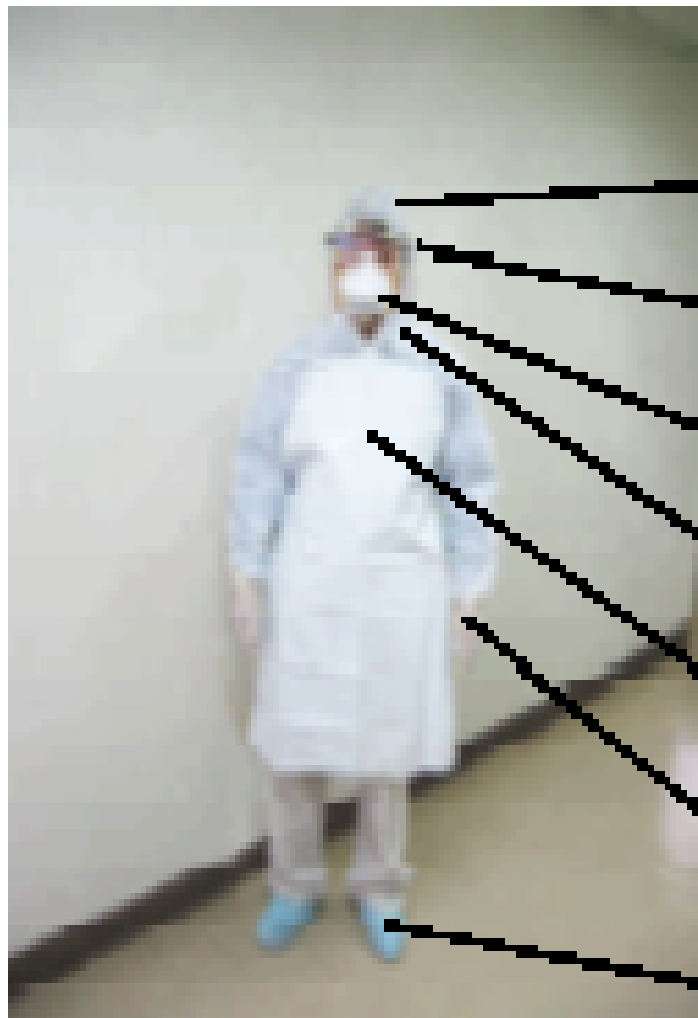


COVERS NOSE & MOUTH

Single disposable high filtration mask recommended



Use of full personal protective equipment



Full Personal Protective Equipment

→ Hair cover (Cap)

→ Eye wear (goggles)

→ Mask

→ Gown

→ Apron

→ Gloves

→ Shoe covers



Chemoprophylaxis

✦ Oseltamivir is the drug of choice.-till 10 days after last exposure
(maximum period of 6 weeks)

✦ For weight <15kg 30 mg OD

✦ 15-23kg 45 mg OD

✦ 24-<40kg 60 mg OD

✦ >40kg 75 mg OD

✦ For infants:

✦ < 3 months not recommended unless situation judged critical due to
limited data on use in this age group

✦ 3-5 months 20 mg OD

✦ 6-11 months 25 mg OD

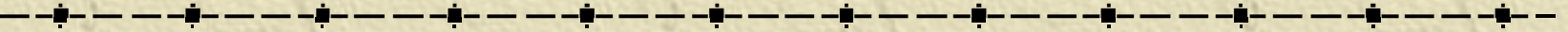
Chemoprophylaxis to whom?

- ✦ Close household contacts of a confirmed case
- ✦ School children – close contacts of a confirmed case
- ✦ Travellers to affected countries
- ✦ Health care providers?

In addition to Standard Precautions

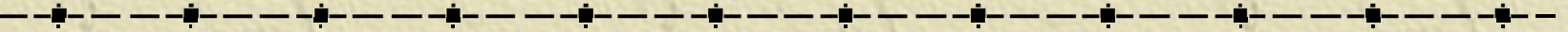
-
- ✦ Limit patient movement
 - ✦ Isolate or cohort patients
 - ✦ Do not touch eyes, nose, mouth with hands
 - ✦ Avoid contaminating environmental surfaces

Decontamination of Dishes and Eating Utensils



- ✦ Use disposable items when available
- ✦ Wash with detergent and hot water
- ✦ Wear rubber gloves

Managing Linens and Laundry in hospital



✦ Use Standard Precautions

- ✦ Gloves and hand hygiene
- ✦ Gown
- ✦ Mask

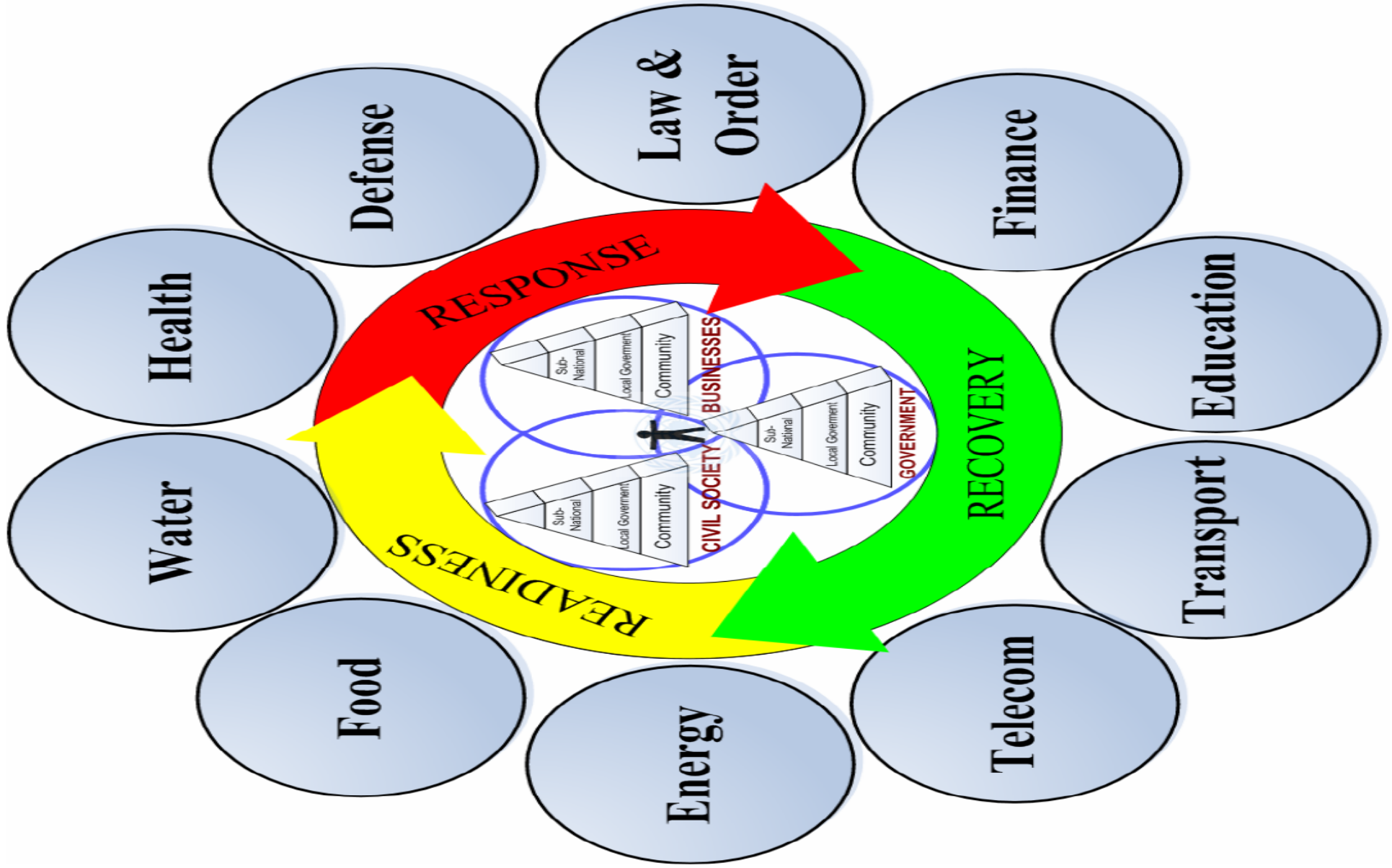
✦ Avoid aerosolization – do not shake

✦ Fold or roll heavily soiled laundry

✦ Remove large amounts of solid waste first

✦ Place soiled laundry into bag in patient room

Whole of Society Pandemic Readiness



THE EPIDEMIC DISEASES ACT, 1897

Act No. 3 of 1897¹

An Act to provide for the better prevention of the spread of Dangerous Epidemic Diseases.

[4th February, 1897.]

WHEREAS it is expedient to provide for the better prevention of the spread of dangerous epidemic disease; It is hereby enacted as follows:—

1^a. (1) This Act may be called the Epidemic Diseases Act, 1897. Short title and extent.
(2) It extends to the whole of India except ²[the territories which, immediately before the 1st November, 1956, were comprised in Part B States.]³

2^a. (1) When at any time the ⁴[State Government] is satisfied Power to take special measures and prescribe regulations as to dangerous epidemic disease. that ⁵[the State] or any part thereof is visited by, or threatened with, an outbreak of any dangerous epidemic disease, the ⁶[State Government], if ⁷[it] thinks that the ordinary provisions of the law for the time being in force are insufficient for the purpose, may take, or require or empower any person to take, such measures and, by public notice, prescribe such temporary regulations to be observed by the public or by any person or class of persons as ⁸[it] shall deem necessary to prevent the outbreak of such disease or the spread thereof, and may determine in what manner and by whom any expenses incurred (including compensation if any) shall be defrayed.

⁹This Act has been amended in its application to—

(1) the Punjab by the Epidemic Diseases (Punjab Amendment) Act, 1944 (Punjab Act 3 of 1944); in East Punjab by East Punjab Act 1 of 1947;

(2) the C. P. and Berar by the C. P. and Berar Epidemic Diseases (Amendment) Act, 1945 (C. P. and Berar Act 4 of 1945).

¹⁰Subs. by the A. O. 1950.

¹¹Subs. by the Adaptation of Laws (No. 2) Order, 1956 for "Part B States".

¹²The word "and" at the end of sub-section (2), and sub-section (3), rep. by Act 10 of 1914, s. 3 and Sch. II.

¹³For notifications issued under this section, see different local Rules and Orders.

¹⁴Subs. by the A. O. 1937, for "G. G. in C."

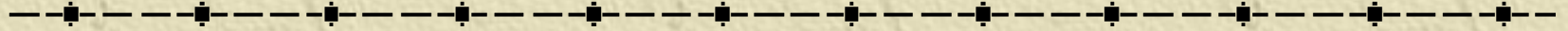
¹⁵Subs., *ibid.*, for "India".

¹⁶Subs., *ibid.*, for "he".

Epidemic Diseases Act-1897 (Amended 1945)

- ✦ ... the district magistrates are empowered to take measures to prevent an outbreak, including stopping social gatherings if needed
- ✦ Inspection of people travelling by railways ... or quarantine them in hospital

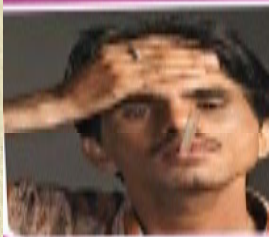
Do's and Dont's for the public:





Dont's


- ✦ Take medicines without consulting the physician.
- ✦ Spit outdoors.
- ✦ Aspirin not to be used in children.
- ✦ Shake hands, hug and kiss socially, or use other contact greetings.



Do's

- ✦ Cover your mouth and nose with a handkerchief or tissue while coughing or sneezing.
- ✦ Wash your hands every time after coughing or sneezing, thoroughly with soap and water, before and after touching your nose, eyes or mouth.
- ✦ Avoid Crowded places.
- ✦ Seek treatment if you have these symptoms - to protect your family, especially children, from the infection
- ✦ Sleep well, stay physically active and effectively manage stress.
- ✦ Drink plenty of water and eat nutritious food.

IEC Material






स्वाईन फ्लू

(इन्फ्लूएन्झा व्हायरस-ए H1 N1)

इन्फ्लूएन्झा ए (H1 N1) या डुकरांपासून उदभवलेल्या (स्वाईन फ्लू) विषाणुमुळे मेक्सिको देशात १८ मार्च २००९ पासून इन्फ्लूएन्झा ए (H1 N1) चा प्रादुर्भाव माणसास होऊन साथ सुरू झाली आहे.

जागतिक आरोग्य संघटनेने ही साथ जगभर पसरण्याची भिती व्यक्त केली असल्याने या साथीची लागण आपल्या देशात होऊ नये म्हणून जागतिक आरोग्य संघटनेच्या पॅन्डेमिक फेज-५च्या मार्गदर्शक सुचनांना अनुसरून केंद्र शासनाने देशातील सर्व आंतरराष्ट्रीय विमानतळे व बंदरांवर परदेशातून येणाऱ्या प्रवाशांची तपासणी सुरू केली आहे. महाराष्ट्रामध्ये मुंबई, पुणे व नागपूर या आंतरराष्ट्रीय विमानतळांवर तसेच मुंबई बंदर व जवाहरलाल नेहरू बंदर मुंबई येथे ही तपासणी केली जात आहे.


प्रतिबंधक उपाय योजना म्हणून आपण हे अवश्य जाणून घेऊया.

इन्फ्लूएन्झा व्हायरस काय आहे? <ul style="list-style-type: none">हा विषाणुमुळे होणारा आजार आहे.याचा संसर्ग एका माणसापासून दुसऱ्या माणसाला होतो.	 लक्षण : <ul style="list-style-type: none">ताप येणे, खोकला, घसा दुखणे,अतिसार, उलट्या होणे,श्वास घेण्यास त्रास होणे.
हे करा... <ul style="list-style-type: none">हात सातत्याने साबण व पाण्याने धुवावेत.गर्दीमध्ये जाणे टाळा.स्वाईन फ्लू रुग्णापासून किमान एक हात दूर राहा.खोकताना, शिकताना तोंडाला रुमाल लावा.भरपूर पाणी घ्या.पुरेशी झोप घ्या.पोष्टिक आहार घ्या.	  हे टाळा : <ul style="list-style-type: none">इस्टाटोलन अथवा अलिंगनसार्वजनिक ठिकाणी थुंकणे.डॉक्टरांच्या सल्ल्याशिवाय औषध घेणे.

आपण आजारी असाल तर....

- शक्य तितक्या कमी लोकांशी संपर्क ठेऊन घरीच विश्रांती घ्या.
- पातळ पदार्थ मोठ्या प्रमाणात घ्या.

सार्वजनिक आरोग्य विभाग, महाराष्ट्र शासन.



रा.फो.सि.मु. पुणे, पी-५६ (१,५०,००० प्रती)-५-०९



आपके परिवार को खतरनाक H1N1 फ्लू से बचाए रखने के आसान तरीके



छींकते और खींसते वक़्त अपने मुँह और नाक को रुमाल या कपड़े से अवरुध्द करें



नाक, आँख या मुँह को छूने से पहले और बाद में हाथ अच्छी तरह साबुन से धोएं



लगातार छींक आने, बुखार और खींसी होने पर सार्वजनिक जगहों से दूर रहें



इनमें से कोई भी लक्षण हो तो तुरन्त डॉक्टर से संपर्क करें:

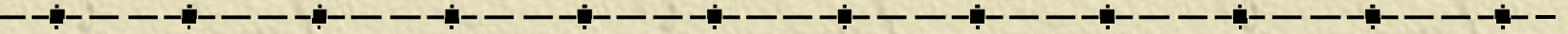
- बुखार
- खींसी
- गले में इतरास या सूजन
- सीरा लेने में तकलीफ़

असहजक नोपिस्टॉम वेन, मेसनस डीस्ट्रिक्ट ऑफ कम्प्यूटेशनल सिस्टीमस को **011-23921401** पर कॉल करें.



इन्फेक्शन रोको, बनो हीरो!

Creating a 24 X 7 helpline



✦ National Helpline (011 23921401)

✦ Pune Swine Flu Control Room : Office of the Jt. Director (Health Services), Central Building , Pune, 020-26124299, [24X7]


✦ Dr Ladda - 9422000910

If a large number of cases occur...

- ✦ Domestic care / hospital care / ICU care
- ✦ Hospital Surge Capacity
- ✦ Triage
- ✦ Medical practitioners -to report any cluster of ILI to toll free no.1075

Questions to be answered

- ✦ Why cases in Mexico and US differ so much in the severity?
 - ✦ In Mexico – many patients have experienced rapidly progressive pneumonia, respiratory failure and acute respiratory distress syndrome (ARDS) requiring mechanical ventilation.
 - ✦ In USA – same strain of virus, but more mild cases - Weakened virus?
- ✦ “Super spreaders” and outbreaks in medical settings?
- ✦ Pandemic H1N1 2009 virus continues to evolve
- ✦ The widespread occurrence of the virus increases the chances of mutation and reassort with other virus A influenza sub-types in case of dual infection
- ✦ Virulence of virus going to increase ?
- ✦ Level of medical services
- ✦ Vaccination?

- 
-
- ✦ 8 JULY 2009 -Denmark, Japan and Hong Kong, China informed WHO of the appearance of H1N1 viruses resistant to the antiviral drug oseltamivir (known as Tamiflu) based on laboratory testing
 - ✦ The viruses, while resistant to oseltamivir, remain sensitive to zanamivir.
 - ✦ There is no evidence to indicate the development of widespread antiviral resistance among pandemic H1N1 viruses.



Thank You

muralidhartambe@rediff.com