

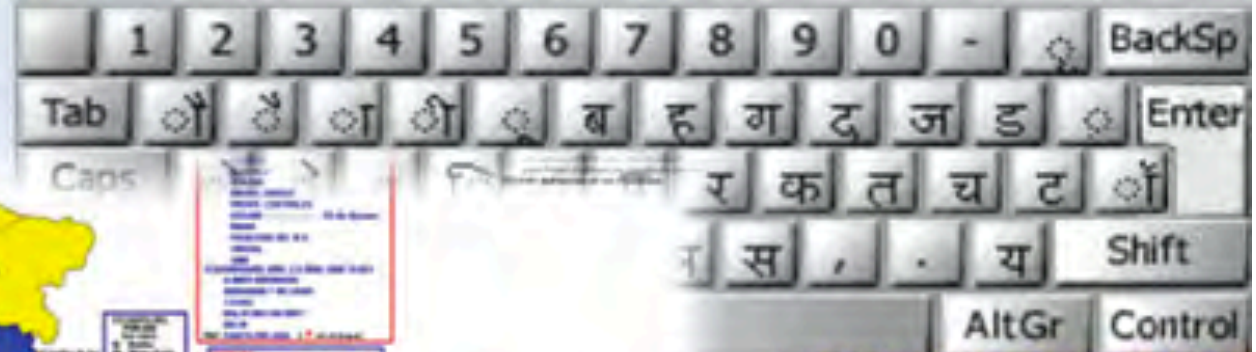
Implementation of Influenza vaccination in India: Accomplishments and Challenges

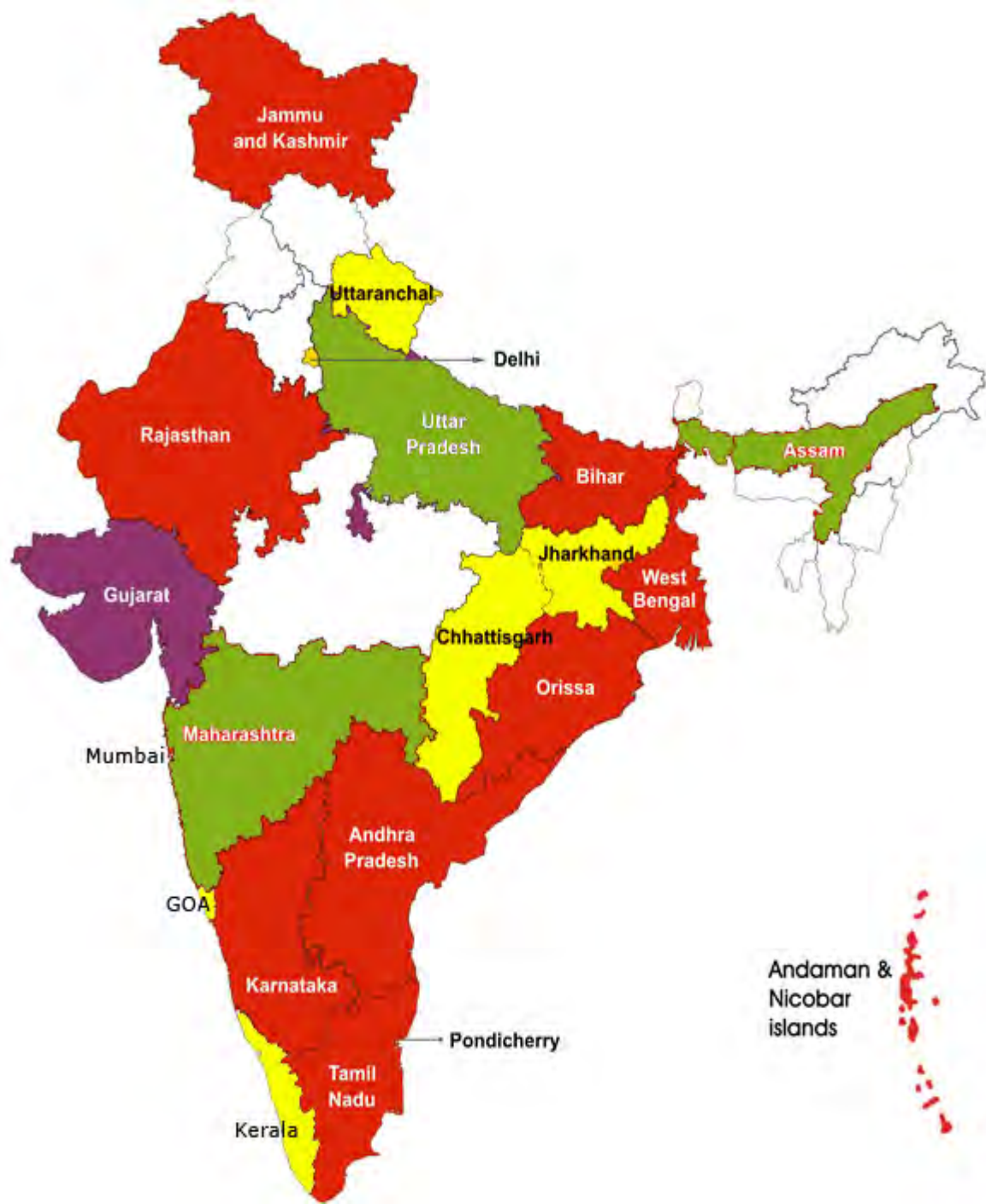
Parvaiz A Koul

MD, FCCP, FACP (USA), FRCP (London)

SKIMS, SRINAGAR, J&K

World Influenza Congress
Beijing
September 7-10, 2018





India: Health of the Nation's States

The India State-Level Disease Burden Initiative

INDIAN COUNCIL OF MEDICAL RESEARCH
 PUBLIC HEALTH FOUNDATION OF INDIA
 INSTITUTE FOR HEALTH METRICS AND EVALUATION



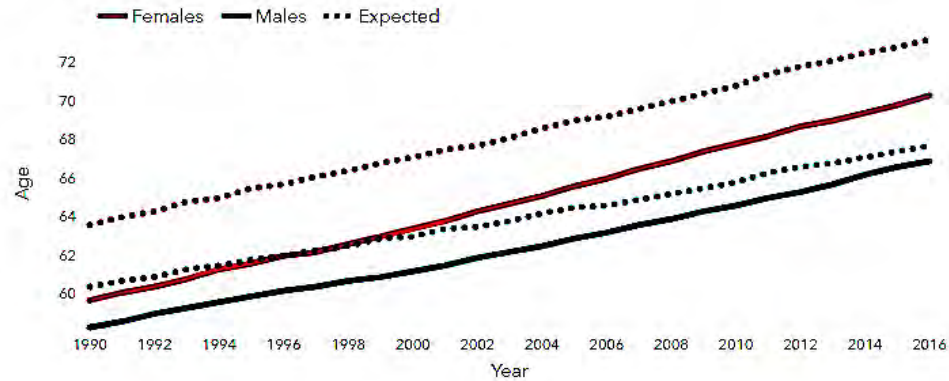
ICMR



Department of Health Research
 Ministry of Health and Family Welfare
 Government of India

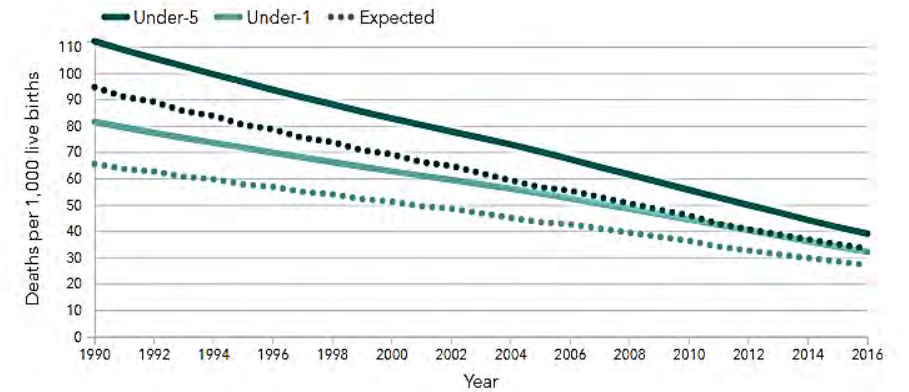
2016 population: **1.3B**
 2016 per capita GDP: **\$5,873**
 2016 fertility rate: **2.0**
 2016 educational attainment (years): **6.4**

How long do people live?



	Expected		Observed	
	1990	2016	1990	2016
Females	63.6	73.2	59.7	70.3
Males	60.4	67.7	58.3	66.9

What is the mortality trend in the under-5 and under-1 age groups?



	Expected		Observed	
	1990	2016	1990	2016
Under-5	94.9	33.4	112.3	39.2
Under-1	65.7	27.2	81.6	32.2

Child mortality, 1990-2016

Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the Global Burden of Disease Study

Leading causes 1990

1 Diarrhoeal diseases
2 Lower respiratory infections
3 Neonatal preterm birth
4 Tuberculosis
5 Measles
6 Ischaemic heart disease
7 Other neonatal
8 COPD
9 Neonatal encephalopathy
10 Iron-deficiency anaemia

Leading causes 2016

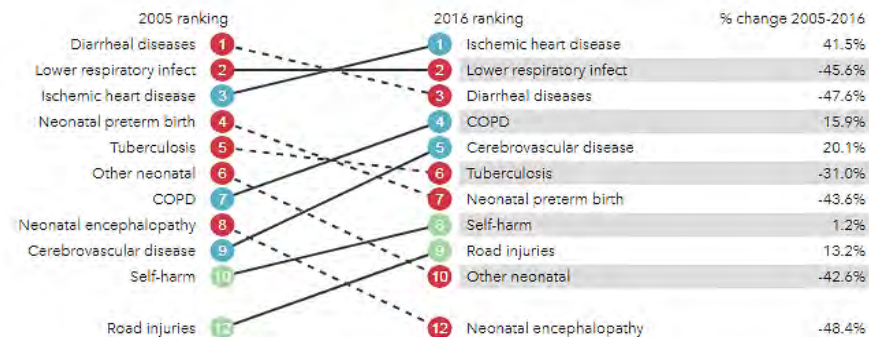
1 Ischaemic heart disease	104.1% (90.1 to 118.8)	33.9% (24.7 to 43.6)
2 COPD	36.3% (21.1 to 56.8)	-10.5% (-20.5 to 2.9)
3 Diarrhoeal diseases	-67.7% (-73.8 to -58.8)	-78.8% (-82.8 to -73.0)
4 Lower respiratory infections	-61.5% (-67.3 to -53.8)	-74.7% (-78.6 to -69.7)
5 Cerebrovascular disease	52.9% (40.4 to 66.7)	0.4% (-7.9 to 9.4)
6 Iron-deficiency anaemia	41.8% (39.9 to 43.8)	-6.9% (-8.2 to -5.6)
7 Neonatal preterm birth	-46.3% (-55.4 to -37.1)	-64.8% (-70.7 to -58.7)
8 Tuberculosis	-44.5% (-50.1 to -39.1)	-63.5% (-67.3 to -60.0)
9 Sense organ diseases	85.3% (83.0 to 87.8)	21.7% (20.1 to 23.3)
10 Road injuries	65.1% (53.4 to 76.6)	8.3% (0.7 to 15.9)

Mean %
change number
of DALYs
1990–2016

Mean %
change all-age
DALY rate
1990–2016

What causes the most premature death?

- Communicable, maternal, neonatal, and nutritional diseases
- Non-communicable diseases
- Injuries



Top 10 causes of years of life lost (YLLs) in 2016 and percent change, 2005-2016, all ages, number



1918: Spanish flu claimed >50 million lives

1918 pandemic! Deaths in Indians

>15 million
perished in
the short span of
one year, was the
single worst-
affected
country in terms
of total mortality.

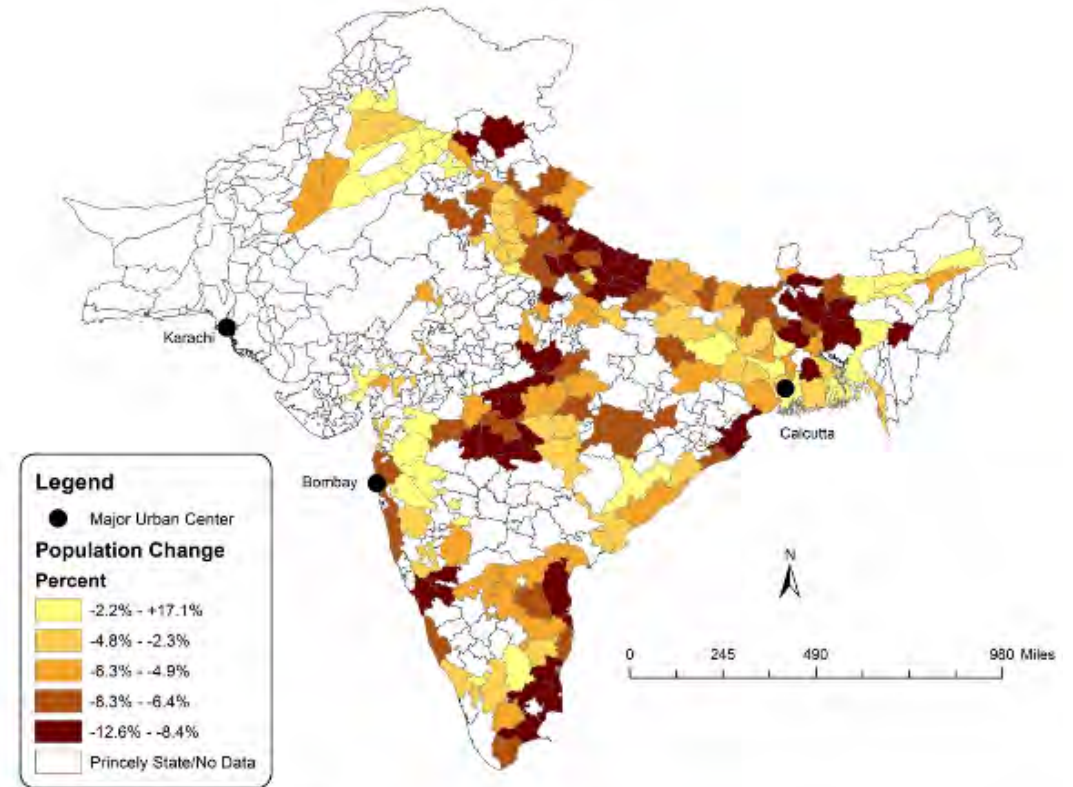


Figure 3 Population change in India, 1918–1919.

Davis K. The Population of India and Pakistan. Princeton, NJ: Princeton University Press; 1951.

Influenza in India

Limited data prior to 2004.

Pandemics in 1781, 1889 and 1918.

National Influenza Center at the Pasture Institute, Coonoor documented A/England/51 (H1N1) between 1950 and 1957.

Reports of H2N2 in 1957.

Reports of 1968 pandemic of Hong Kong from several areas in India.

Several outbreaks in 1990 to 2000 studied in Maharashtra by NIV, Pune (mostly H3N2)

Influenza center in Kasauli, HP reported influenza in various frequencies in adjoining villages.



CDC, USA and ICMR funded

NIV, Pune
 AIIMS, New Delhi
 KEM, Mumbai
 NIGMS, Kolkatta
 RMRC, Dibrugarh
 IGGMC, Nagpur
 CMC, Vellore
 VP Chest, New Delhi
 KIPM, Chennai

***SKIMS, Srinagar

Pandemic and seasonal influenza viruses among patients with acute respiratory illness in Kashmir (India)

Parvaiz A. Koul,^a Muneer A. Mir,^b Nargis K. Bali,^a Mamta Chawla-Sarkar^c, Mehuli Sarkar^c, Samander Kaushik,^b U.H. Khan^a, Feroze Ahmad^a, Babbar Center^d, Renu B Lal^d, Shobha Broor^b

An outbreak of influenza B in an isolated nomadic community in Jammu & Kashmir, India

Umar H Khan¹, Muneer A Mir², Feroze Ahmad¹, M Hussain Mir¹, Nargis K Bali², Renu B Lal³, Shobha S Broor⁴, Parvaiz A Koul¹

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^c National Institute of Child Health and Development, New Delhi, India
^d National Institute of Cholera and Enteric Diseases, Faridkot, Punjab, India



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Resurgence of A/H1N1pdm09 influenza viruses in winter 2012-2013 in Kashmir, India

AUGUST 14, 2013 · RESEARCH

Print Article 6699 Citation PDF, XML Email Tweet

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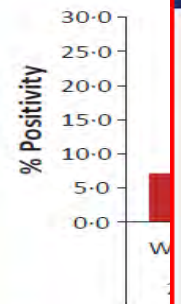


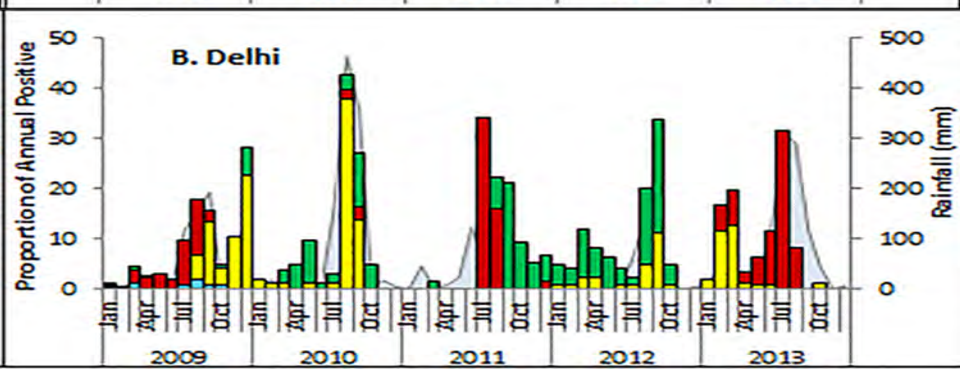
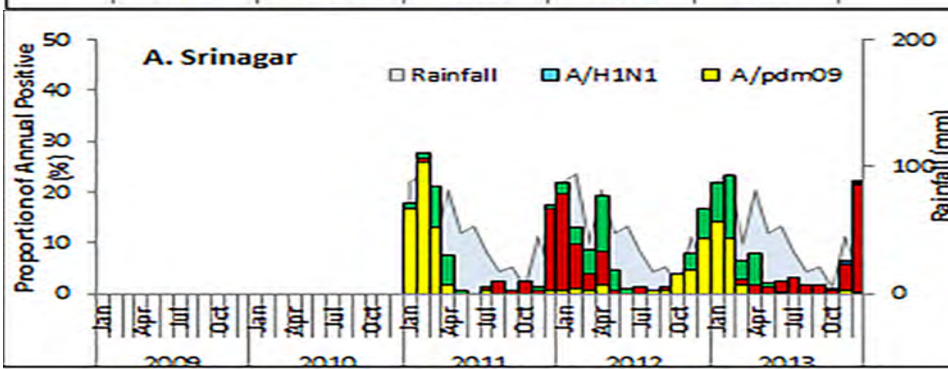
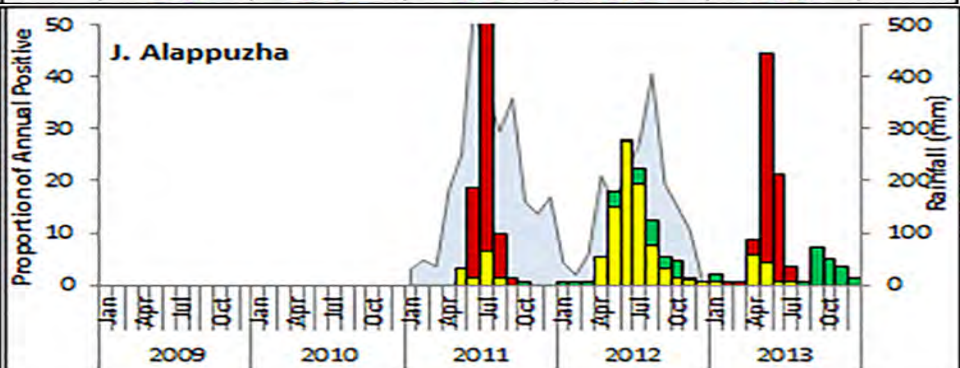
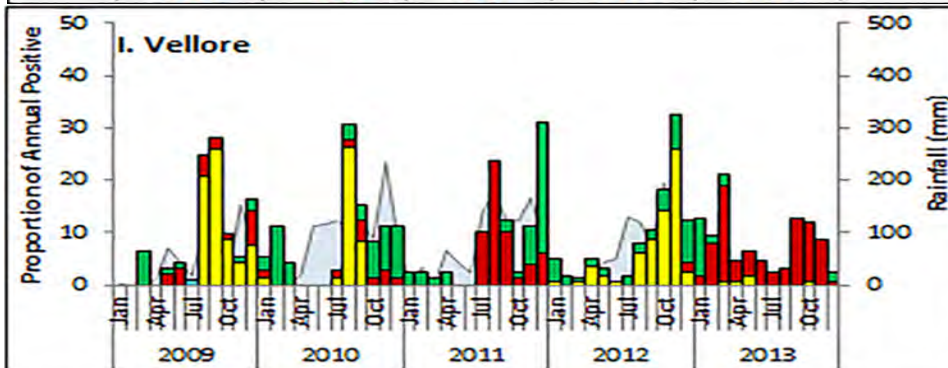
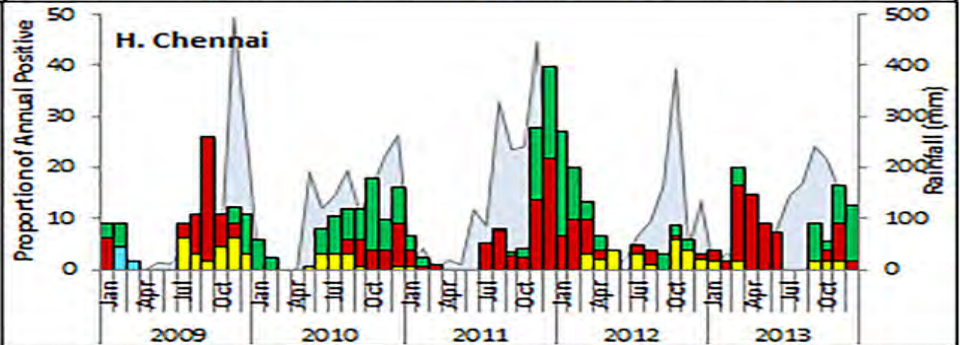
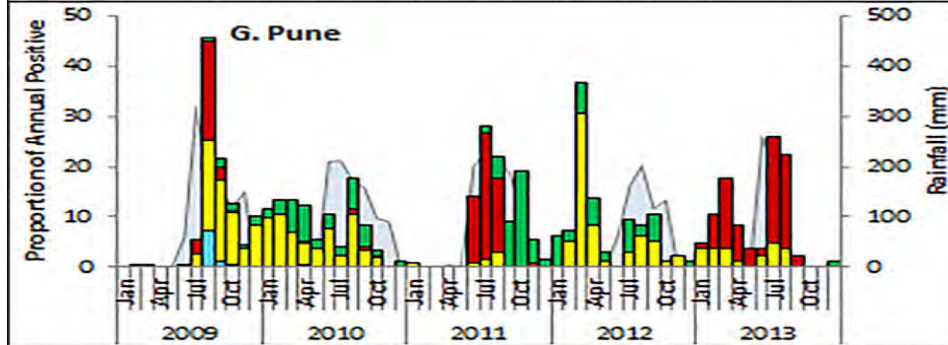
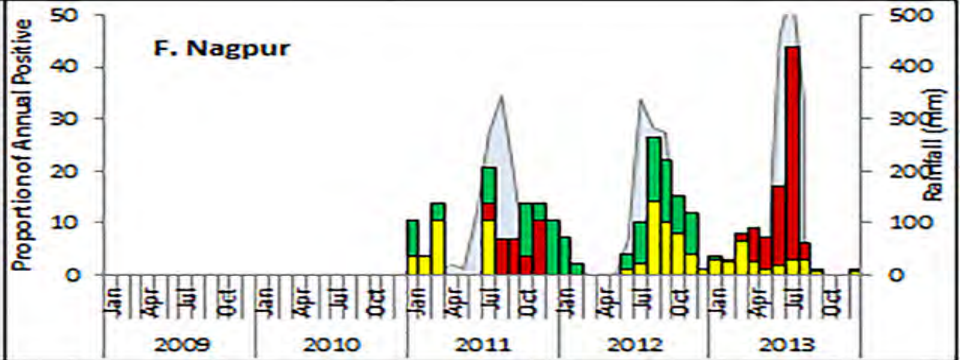
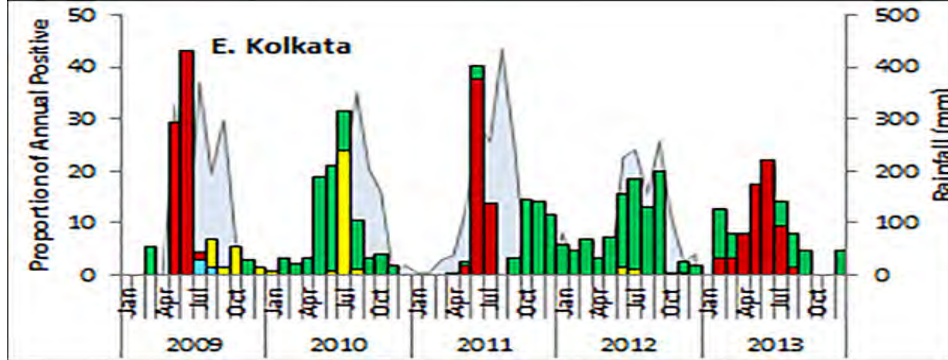
Figure 1. influenza B. Sciences, S of 2009 to

12 (14.3%) positive for Influenza B

City, State		2009	2010	2011	2012	2013	Total
Srinagar, Jammu & Kashmir	Sample Tested	NA	NA	771	1414	1735	3920
	Influenza Positives			162 (21.2%)	238 (16.8%)	305 (17.6%)	705 (18.0%)
Delhi,	Sample Tested	1053	663	1006	1511	1338	5571
	Influenza Positives	311 (29.5%)	103 (15.5%)	76 (7.6%)	145 (9.6%)	174 (13.0%)	809 (14.5%)
Dibrugarh, Assam	Sample Tested	642	731	599	695	242	2909
	Influenza Positives	111 (17.3%)	89 (12.2%)	74 (12.4%)	156 (22.4%)	34 (14.0%)	464 (16.0%)
Lucknow, Uttar Pradesh	Sample Tested	NA	NA	951	1776	1257	3984
	Influenza Positives			94 (9.9%)	340 (19.1%)	118 (9.4%)	552 (13.9%)
Kolkata, West Bengal	Sample Tested	455	896	1038	2211	962	5562
	Influenza Positives	72 (15.8%)	181 (20.2%)	242 (23.3%)	206 (9.3%)	63 (6.5%)	764 (13.7%)
Nagpur, Maharashtra	Sample Tested	NA	NA	590	917	1172	2679
	Influenza Positives			29 (4.9%)*	99 (10.8%)	165 (14.1%)	293 (10.9%)
Pune, Maharashtra	Sample Tested	1746	1298	853	1029	962	5888
	Influenza Positives	391 (22.4%)	279 (21.5%)	142 (16.6%)	95 (9.2%)	85 (8.8%)	992 (16.8%)
Chennai, Tamil Nadu	Sample Tested	18821**	7811**	1523	1291	751	5959
	Influenza Positives	1718 (9.1%)	667 (8.5%)	208 (13.7%)	104 (8.1%)	55 (7.3%)	560 (9.4%)
Vellore, Tamil Nadu	Sample Tested	482	399	543	1021	587	3032
	Influenza Positives	92 (19.1%)	72 (18%)	80 (14.7%)	163 (16%)	127 (21.6%)	534 (17.6%)
Alappuzha, Kerala	Sample Tested			824	2457	1342	4623
	Influenza Positives	NA	NA	154 (18.4%)	215 (8.8%)	137 (10.2%)	506 (10.9%)
All Centers Total	Sample Tested	23199	11798	8698	14322	10348	44127
	Influenza Positives	2695(11.6%)	1391 (11.8%)	1261 (14.5%)	1761 (12.3%)	1263 (12.2%)	8371 (14%)

* Influenza was detected by isolation in MDCK cells.

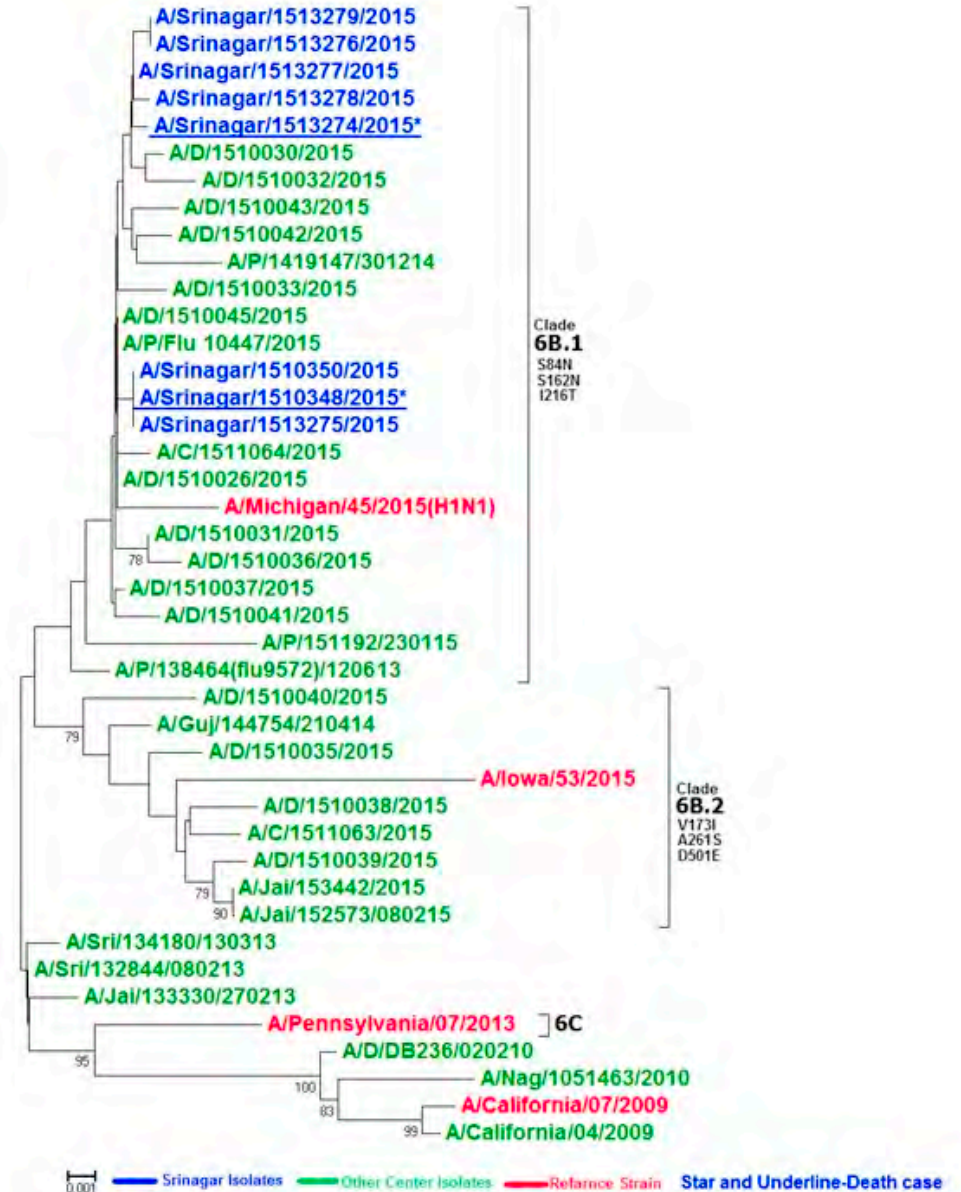
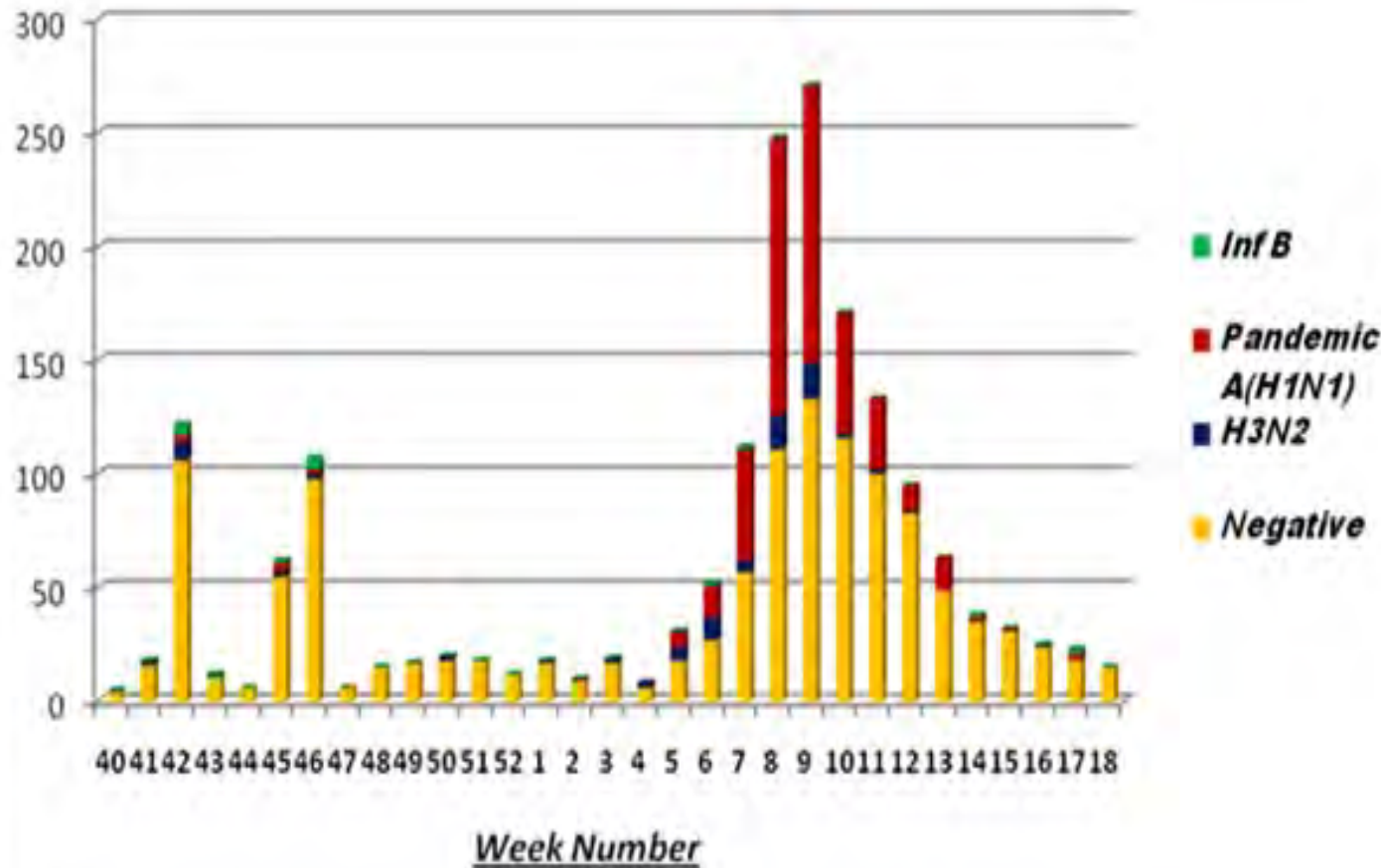
** A total of 24231 specimens were tested only for influenza A during 2009–2010 due to pandemic surge in testing capacity.



The 2015 Outbreak of Severe Influenza in Kashmir, North India: Emergence of a New Clade of A/H1n1 Influenza Virus

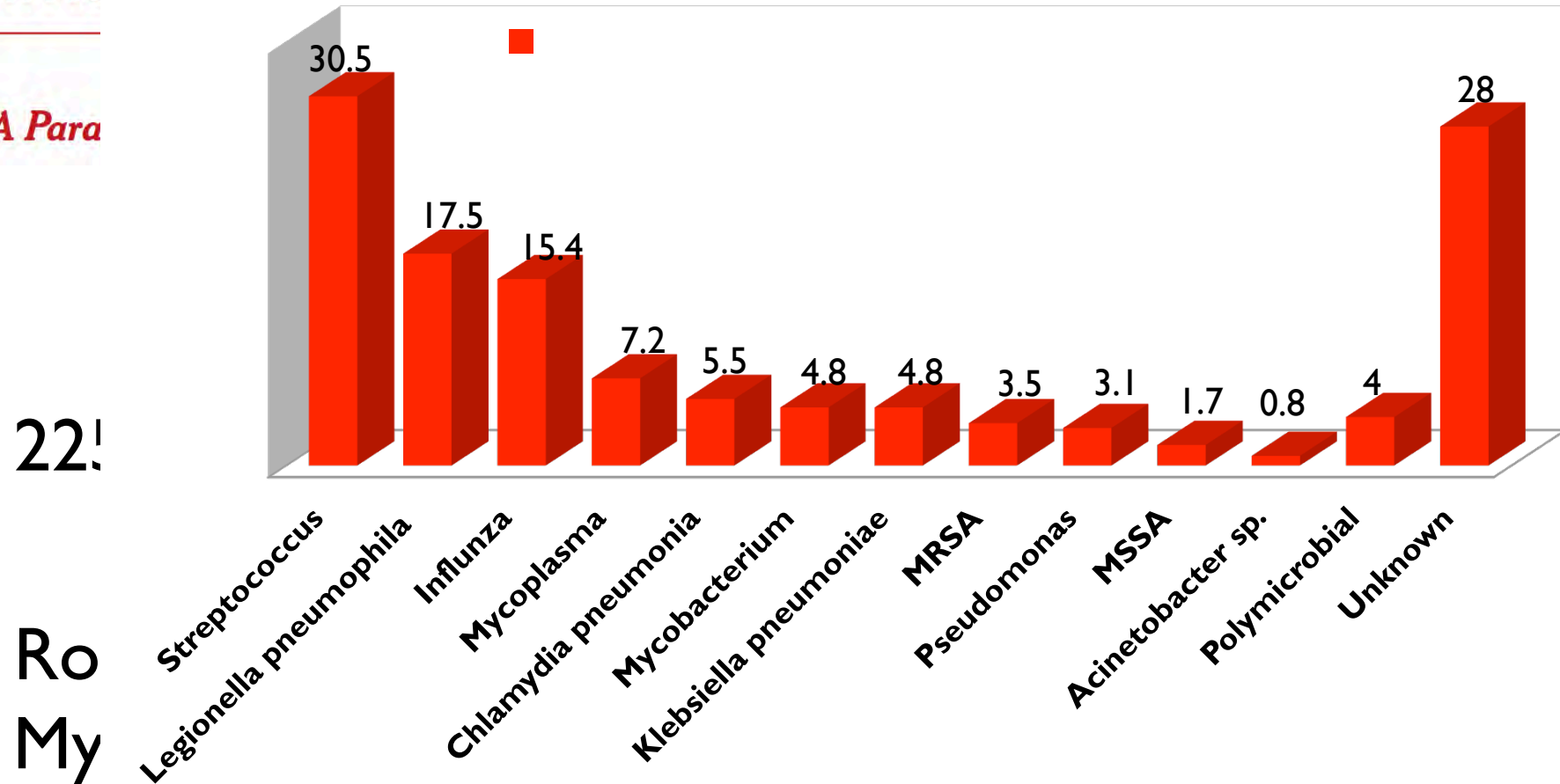
AUGUST 8, 2018 · RESEARCH ARTICLE

Parvaiz Koul Varsha Potdar Hyder Mir Mandeep Chadha



Microbial etiology in hospitalized North Indian adults with community-acquired pneumonia

Reyaz A Para



22!

Ro

My

RT PCR for influenza



Burden of Obstructive Lung Disease Initiative

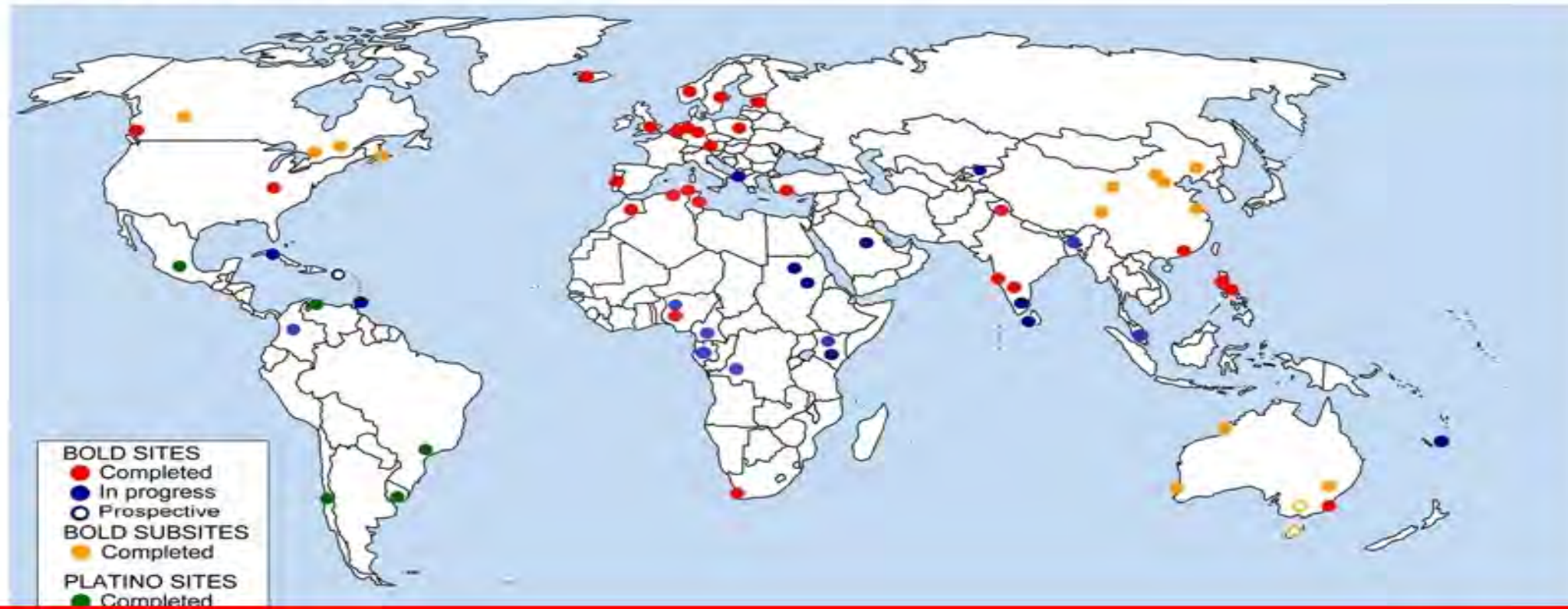
Imperial College
London

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Progress to date



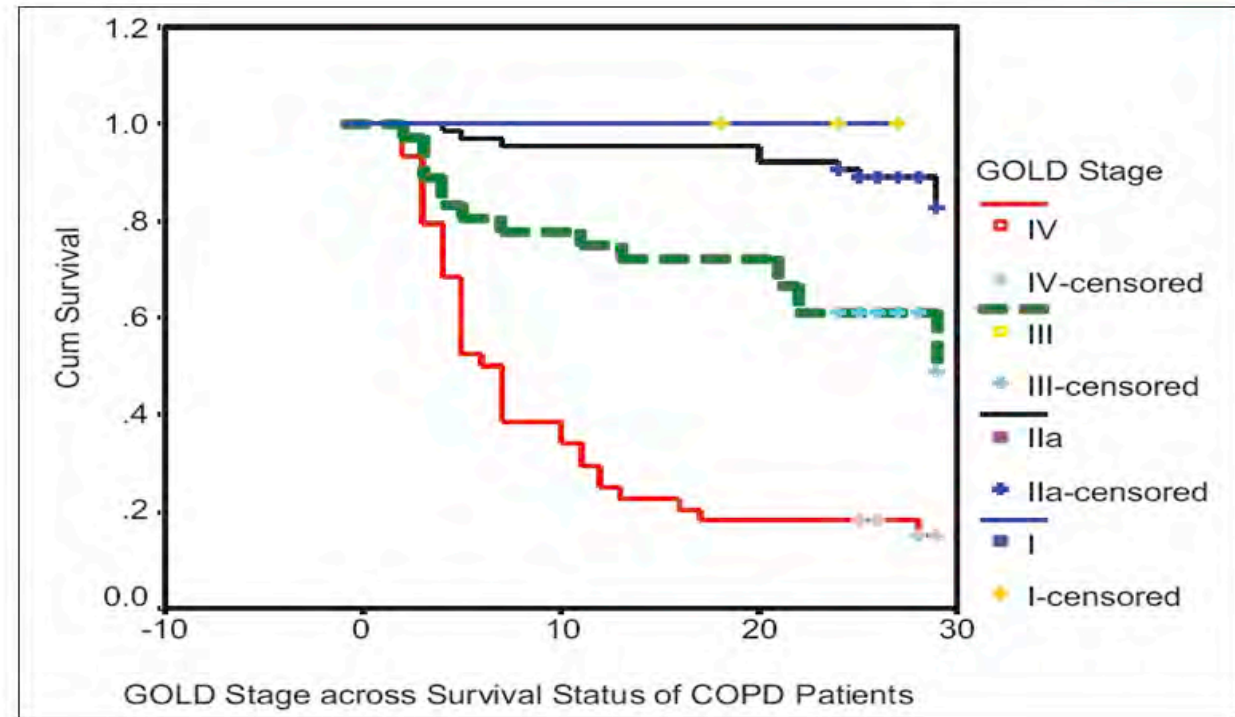
Two-year mortality in survivors of acute exacerbations of chronic obstructive pulmonary disease: A North Indian study

Koul PA, Dar HA, Jan RA, Shah S, Khan UH.



151 cases with AECOPD

39.7% mortality at 2 years

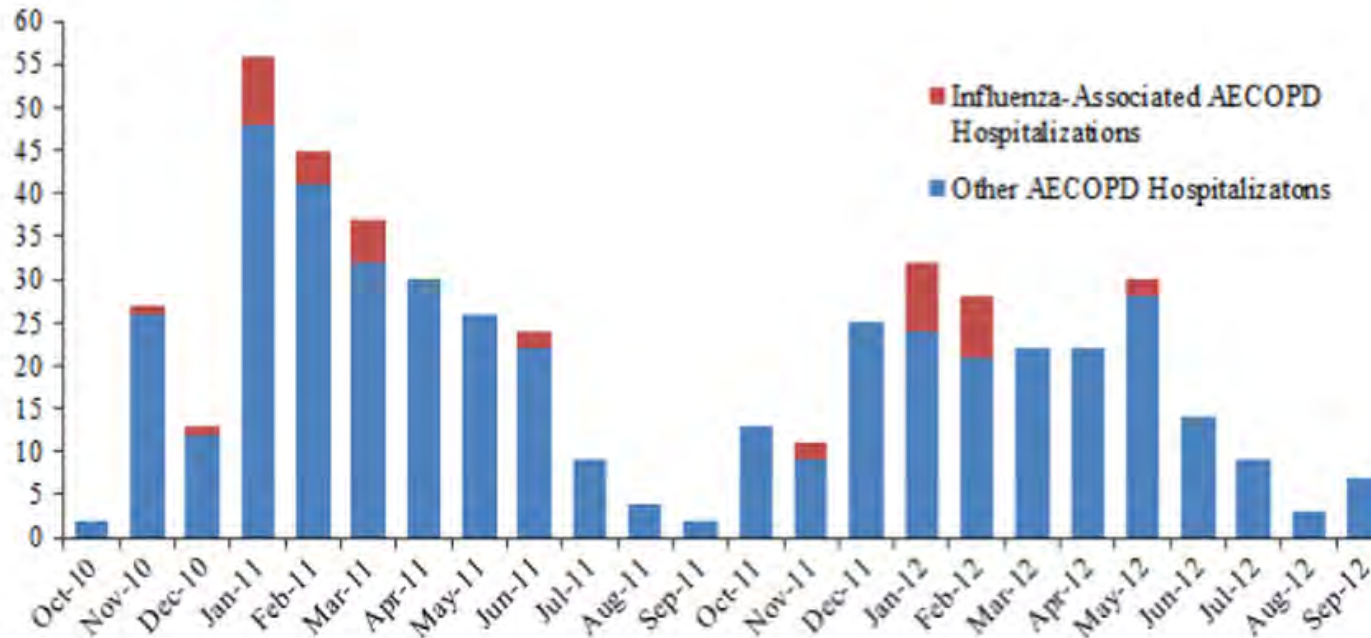


Koul et al. Lung India 2017;34:511-6



Contribution of influenza to acute exacerbations of chronic obstructive pulmonary disease in Kashmir, India, 2010–2012

Parvaiz A. Koul,^a Umar H. Khan,^a Romana Asad,^a Rubaya Yousuf,^a Shobha Broor,^b Renu B. Lal,^c Fatimah S. Dawood^c



8% (40) AECOPD attributed to influenza, H3 (17), pH1N1 (12) and B (11)

Patients with influenza were more likely to die (OR 3.4) during hospitalization.



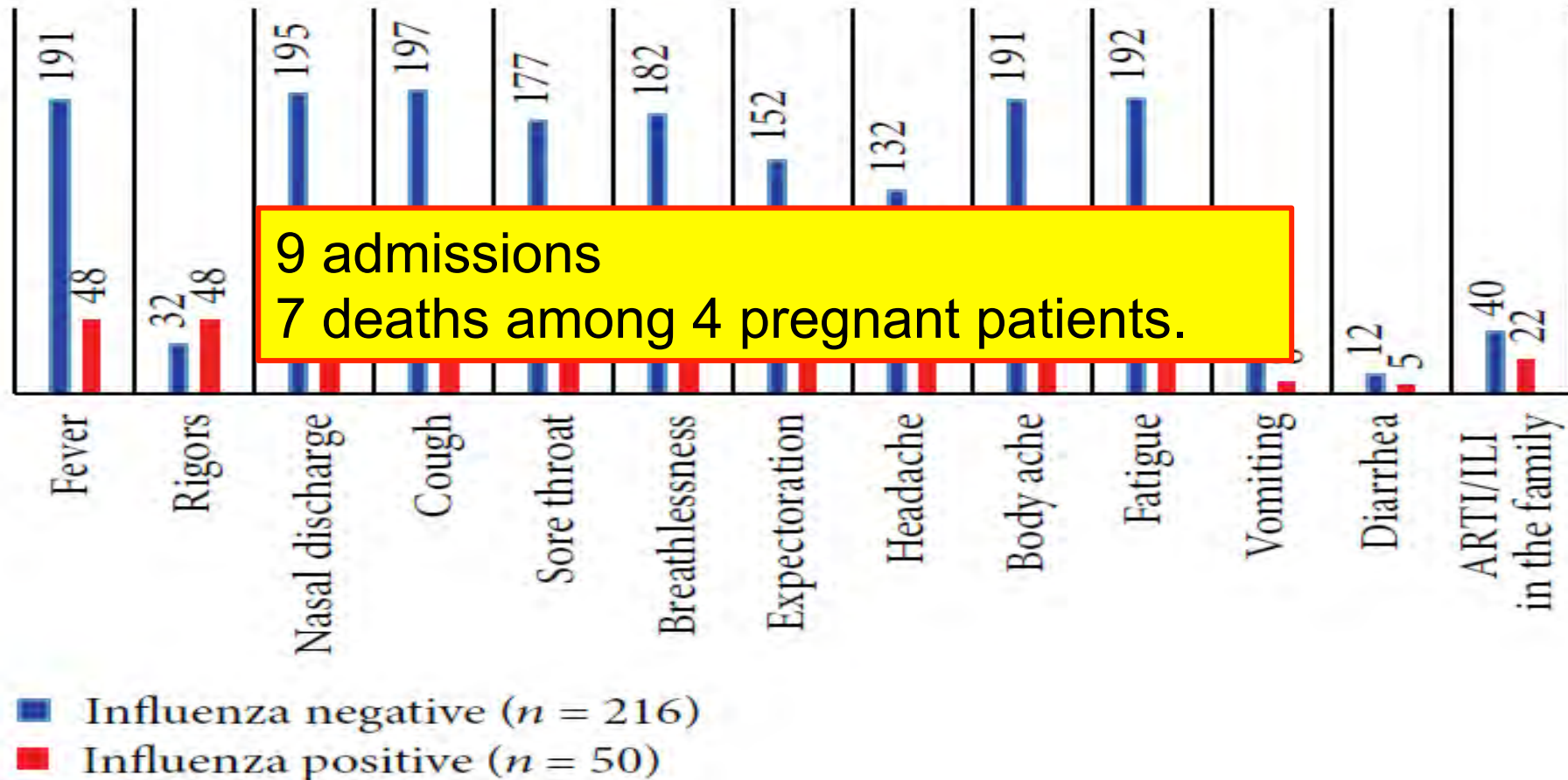
Influenza not MERS CoV among returning Hajj and Umrah pilgrims with respiratory illness, Kashmir, north India, 2014–15

Parvaiz A. Koul^{a,*}, Hyder Mir^a, Siddhartha Saha^b, Mandeep S. Chadha^c, Varsha Potdar^c, Marc-Alain Widdowson^d, Renu B. Lal^b, Anand Krishnan^e

- Disembarking passengers (n = 8753) from Saudi Arabia (October 2014 to April 2015)
- 977 (11%) reported symptoms and 300 (age 26–90, median 60 years; 140 male) consented to participate in the study.
- None of the 300 participants tested positive for MERS-CoV; however, 33 (11%) tested positive for influenza viruses (A/H3N2 = 13, A/H1N1pdm09 = 9 and B/Yamagata = 11).

Influenza Illness in Pregnant Indian Women: A Cross-Sectional Study

Parvaiz A. Koul,¹ Nargis K. Bali,² Hyder Mir,¹ Farhat Jabeen,³ and Abida Ahmad⁴





8.4 billion people travel in trains in India

56% increase in Air travel

Outbreaks in countries with weak public health systems are more likely to spread across international border



What do physician bodies/societies in India recommend?

Association of Physicians of India

- There is insufficient evidence to recommend routine influenza vaccination in India for the general population.

Indian Chest Society

- Insufficient evidence for Influenza vaccination in asthma COPD or for prevention of pneumococcal pneumonia

Others

Indian Academy of Paediatrics 2013
Geriatric Society of India 2015
FOGSI (Obstetricians & Gynecologists of India): April 2015

Recent recommendation for health care workers by the MOHFW (2015)

Recommendations for Vaccination Against Seasonal Influenza in Adult High Risk Groups: South Asian Recommendations

A Muruganathan¹, Santanu Guha², YP Munjal³, SS Agarwal⁴, KK Parikh⁵, Vivekanand Jha⁶, Anjani Kumar Jha⁷, Ijanti Abeywicreme⁸, Mangesh Tiwaskar⁹, Milind Y Nadkar¹⁰, Jyotirmoy Pal¹¹, Shohael Mahmud Arafat¹², Anupam Prakash¹³, Jayant Panda¹⁴, V Ramasubramanian¹⁵, Sampath Kumari¹⁶, Bibhuti Saha¹⁷, Sekhar Chakraborty¹⁸, Somusundaram¹⁹, Jain²⁰, MK Ghosh²¹, Parvaiz A Koul²²

Table Weighted rates of use of respiratory medications and influenza vaccine among BOLD sites

BOLD sites	Any bronchodilators or any inhaled corticosteroids		Influenza vaccine	
	Standardised population weighted rate* % (SE)	Standardised rate for clinical need [†] n (%) [‡]	Standardised population weighted rate* % (SE)	Standardised rate for clinical need [†] n (%) [‡]
High-income countries				
Bergen, Norway	8.9 (1.1)	4 (32.2)	21.7 (1.5)	7 (38.8)
Hannover, Germany	8.4 (1.1)	9 (52.9)	37.9 (2.0)	4 (42.2)
Krakow, Poland	7.7 (1.1)	8 (37.6)	7.2 (1.0)	1 (12.4)
Lexington, KY, USA	22.9 (1.9)	25 (56.9)	38.5 (2.2)	20 (39.8)
Lisbon, Portugal	9.3 (0.9)	8 (32.4)	25.8 (2.2)	7 (27.3)
London, England	18.2 (2.2)	19 (58.1)	40.2 (2.5)	23 (60.9)
Maastricht, the Netherlands	13.1 (1.6)	15 (45.5)	41.4 (2.2)	16 (50.4)
Reykjavik, Iceland	15.6 (1.3)	9 (51.1)	32.9 (1.7)	7 (35.2)
Salzburg, Austria	5.5 (0.7)	14 (36.4)	18.9 (1.2)	4 (24.4)
Sydney, VIC, Australia	17.4 (1.6)	10 (52.9)	33.4 (2.0)	6 (40.1)
Tartu, Estonia	4.3 (0.8)	2 (30.7)	6.2 (1.0)	0 (6.2)
Uppsala, Sweden	15.2 (1.5)	5 (47.5)	21.0 (1.8)	2 (15.3)
Vancouver, Canada	16.8 (1.3)	13 (50.2)	45.9 (1.7)	13 (52.5)
Low- and middle-income countries				
Adana, Turkey	4.9 (0.7)	8 (16.0)	2.1 (0.6)	1 (1.5)
Cape Town, South Africa	7.8 (0.9)	18 (26.7)	4.8 (0.8)	2 (2.5)
Ile-Ife, Nigeria	0.6 (0.3)	1 (25.6)	0.6 (0.3)	0 (0.2)
Guangzhou, China	1.1 (0.4)	2 (27.2)	0.5 (0.3)	0 (0.5)
Manila, Philippines	3.7 (0.7)	7 (37.0)	0.8 (0.4)	0 (1.0)
Mumbai, India	3.9 (1.5)	3 (35.7)	0.4 (0.3)	1 (4.9)
Nampitan and Talugtug, the Philippines	3.6 (0.8)	6 (11.3)	0.3 (0.2)	1 (2.7)
Pune, India	1.2 (0.3)	3 (20.4)	0	0
Sousse, Tunisia	3.5 (0.8)	5 (30.6)	56.6 (3.2)	9 (69.7)
Srinagar, India	2.4 (0.6)	4 (41.9)	0	0



Short Communication:

Influenza and Pneumococcal vaccination in patients with diabetes

* P.A. Koul¹, M.A. Bhat¹, S. Ali¹, S. Rahim¹, S.J. Ahmad¹, S. Ahmad¹, R. Yusuf¹, S.R. Masoodi²

Table 1: Vaccination rates in different groups of patients

Group	Total number	Vaccinated for Influenza	Vaccinated for Pneumococcus
		n (%)	n (%)
Total	1100 (100)	99 (9.0)	97 (8.8)
Age			
< 65 years	879 (79.9)	70 (7.96)	67 (7.6)
≥ 65 year	221 (22.1)	29 (13.1)	30 (9.05)
Sex			
Males	415 (37.7)	66 (15.9)	65 (15.7)
Females	685 (62.3)	33 (4.8)	32 (4.7)
Type of diabetes			
Type 1	1 (0.09)	0 (0)	0 (0)
Type 2	1099 (99.01)	99 (9.01)	97 (8.8)
Duration of diabetes			
< 5 years	538 (48.9)	42 (7.8)	43 (7.99)
5-10 years	393 (35.7)	39 (9.9)	38 (9.67)
>10 years	169 (15.4)	18 (10.7)	16 (9.5)
Has a doctor told you of the requirement of the vaccination?			
Yes	97 (8.8)	97 (100)	96 (98.9)
No	1003 (91.2)	2 (0.2)	1 (0.1)
Do you know of a requirement of vaccination?			
Yes	115 (10.5)	97 (84.3)	96 (83.5)
No	985 (89.5)	2 (0.2)	1 (0.1)



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CLINICAL ARTICLE

Poor uptake of influenza vaccination in pregnancy in northern India

Parvaiz A. Koul^{a,*}, Nargis K. Bali^b, Saima Ali^c, Syed J. Ahmad^c, Muneer A. Bhat^c, Hyder Mir^c, Shabir Akram^c, Umar H. Khan^a

^a Department of Internal and Pulmonary Medicine, Sher-i-Kashmir Institute of Medical Sciences, Srinagar, India

^b Department of Microbiology, Sher-i-Kashmir Institute of Medical Sciences, Srinagar, India

^c Influenza Surveillance Project, US Centers for Disease Control and Prevention and the Indian Council of Medical Research, New Delhi, India

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ABSTRACT

Objective: To study the uptake of influenza vaccination among pregnant women in northern India and physicians' beliefs and practices regarding vaccination. **Methods:** A questionnaire-based survey was undertaken between October 2012 and April 2013. Pregnant women attending an obstetric hospital in Srinagar, India, and healthcare personnel were asked to participate. **Results:** Among 1000 women aged 18–41 years (13.6% first trimester, 26.8%

100% Not vaccinated

Participants

82 Unvaccinated

Obstericians

Koul PA, et al, Poor uptake of influenza vaccination in pregnancy in northern India. Int J Gynecol Obstet (2014), <http://dx.doi.org/10.1016/j.ijgo.2014.05.021>

Int J Gynecol Obstet (2014), <http://dx.doi.org/10.1016/j.ijgo.2014.05.021>



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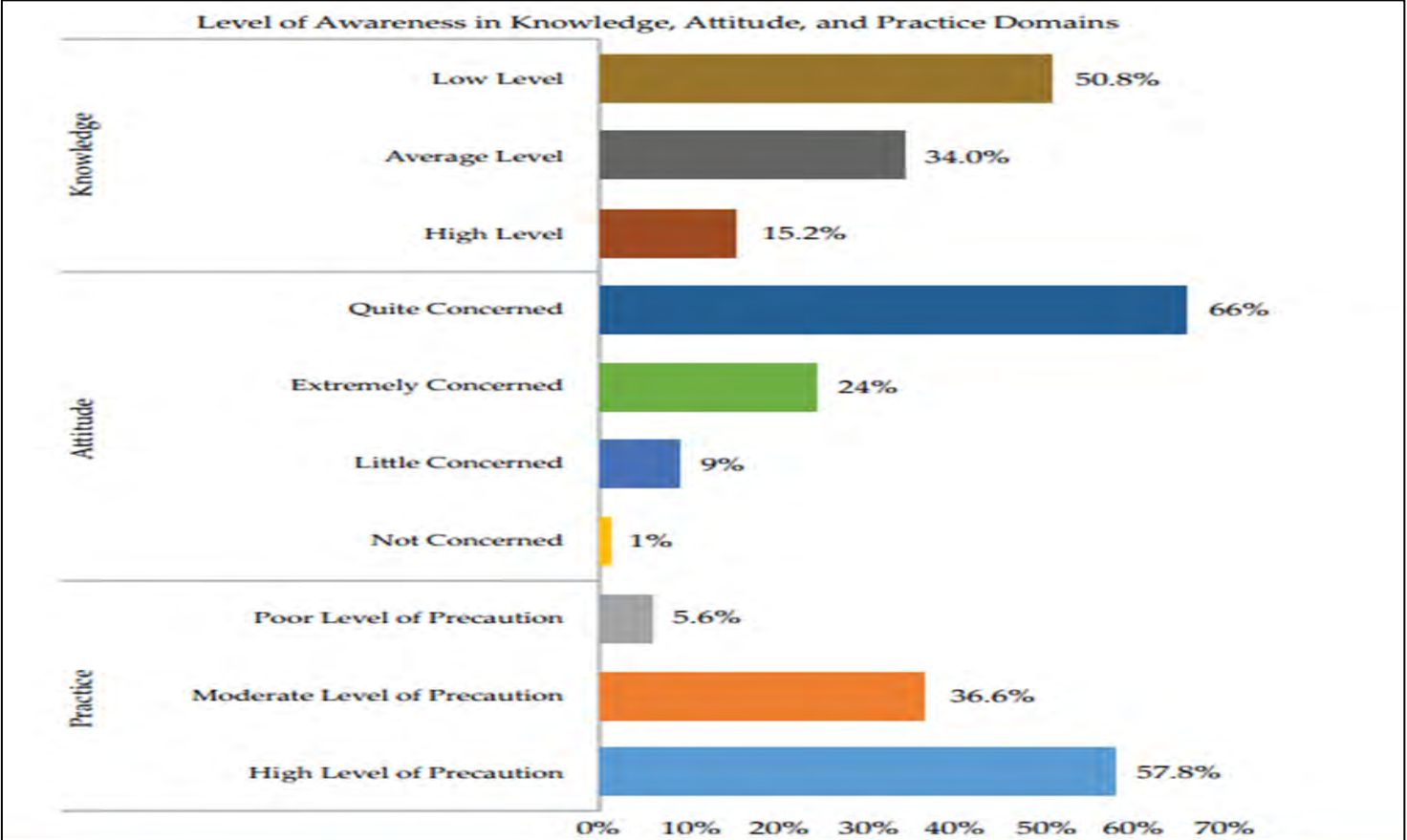
Influenza vaccination in north Indian patients with heart failure

Parvaiz A. Koul *, Saima Ali, Hyder Mir, Syed J. Ahmad, Shabir Akram Bhat, Muneer A. Bhat

Age group	Vaccinated (<i>n</i> = 14) <i>N</i> (%)	Non-vaccinated (<i>n</i> = 306) <i>N</i> (%)	Total vaccinated of the age group <i>N</i> (%)
<18 years	0 (0)	3 (1)	0 (0)
18–39 years	0 (0)	26 (8.5)	0 (0)
40–59 years	4 (28.6)	96 (31.4)	4 (4)
≥60 years	10 (71.4)	181 (59.2)	10 (5.2)

Knowledge, Attitude, and Behavioural Response of Corporate Employees in India towards Influenza: A Questionnaire Based Study

Parvaiz A Koul¹, Nargis K Bali², Sandeep Sonawane³



Seasonal influenza vaccine uptake amongst frontline healthcare workers (HCWs) in England

Winter season 2014 to 2015

HCWs staff group (direct patient care)	Seasonal influenza doses administered in 2014 to 2015		
	Number of HCWs with direct patient care	Number vaccinated	Vaccine uptake (%)
All doctors (excluding GPs)	109,718	59,405	54.1
GPs only	27,315	17,152	62.8
Qualified nurses (excluding GP practice nurses)	350,683	171,261	48.8
Qualified nurses (GP practice nurses only)	18,281	11,777	64.4
All other professionally qualified clinical staff	162,976	90,087	55.3
Support to clinical staff	285,570	172,801	60.5
Support to GP staff	32,767	19,274	58.8
All HCWs with direct patient care	987,310	541,757	54.9

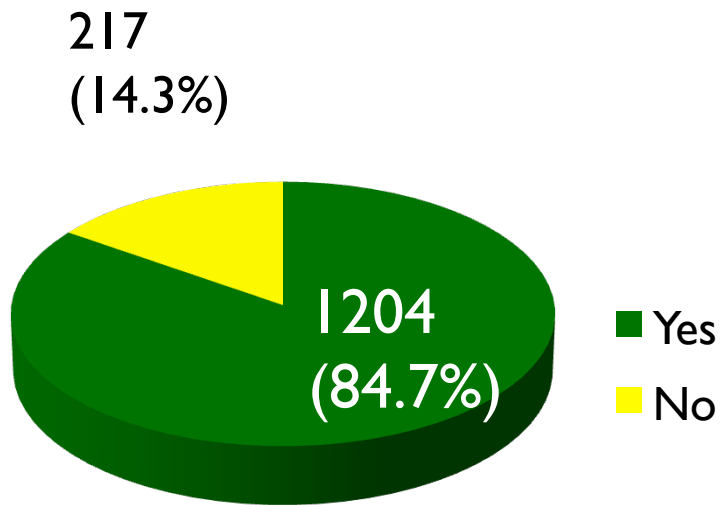
Knowledge, attitude, and practices about the seasonal influenza vaccination among healthcare workers in Srinagar, India

Nargis K. Bali,^a M. Ashraf,^a Feroze Ahmad,^a Umar H. Khan,^a Marc-Alain Widdowson,^b Renu B. Lal^b, Parvaiz A. Koul^a

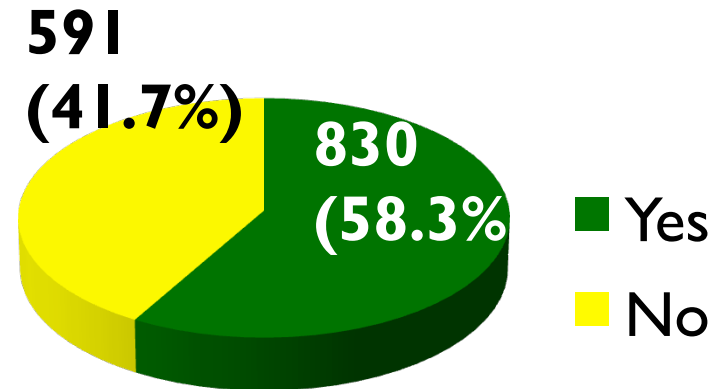
^aSheri-Kashmir Institute of Medical Sciences, Srinagar, Kashmir, India. ^bInfluenza Division, Centers for Disease Control and Prevention, Atlanta, GA, USA.

Correspondence: Parvaiz A Koul, Department of Internal & Pulmonary Medicine, Sheri-Kashmir Institute of Medical Sciences, Soura, Srinagar 190011, J&K, India. E-mail: parvaizk@gmail.com

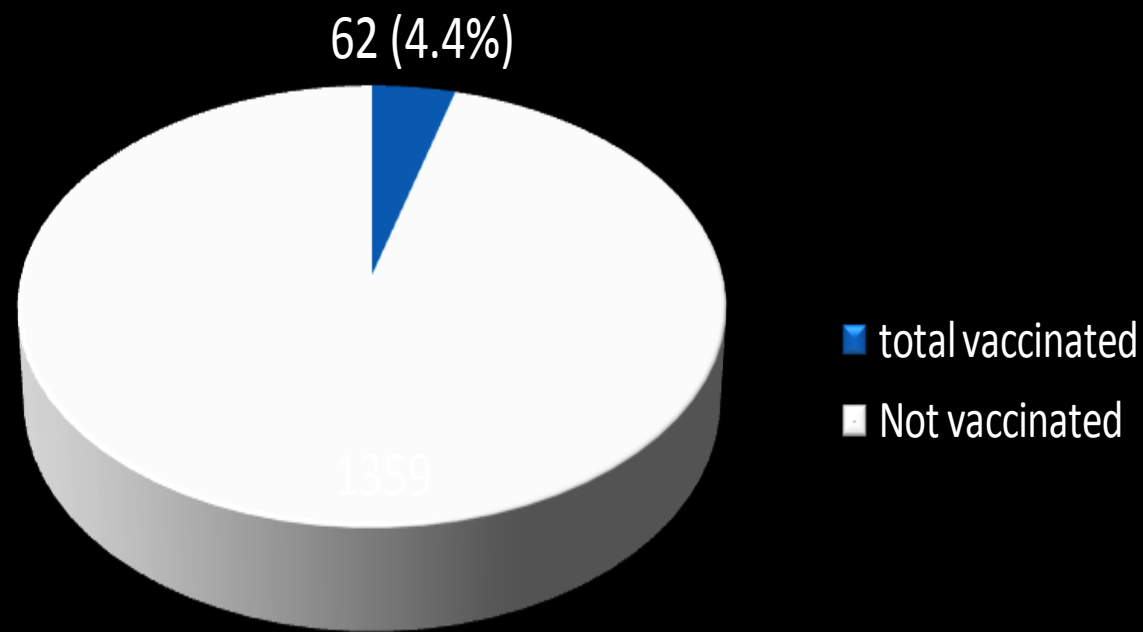
Is Influenza a potentially severe disease?



Do you know of a vaccine against Influenza?

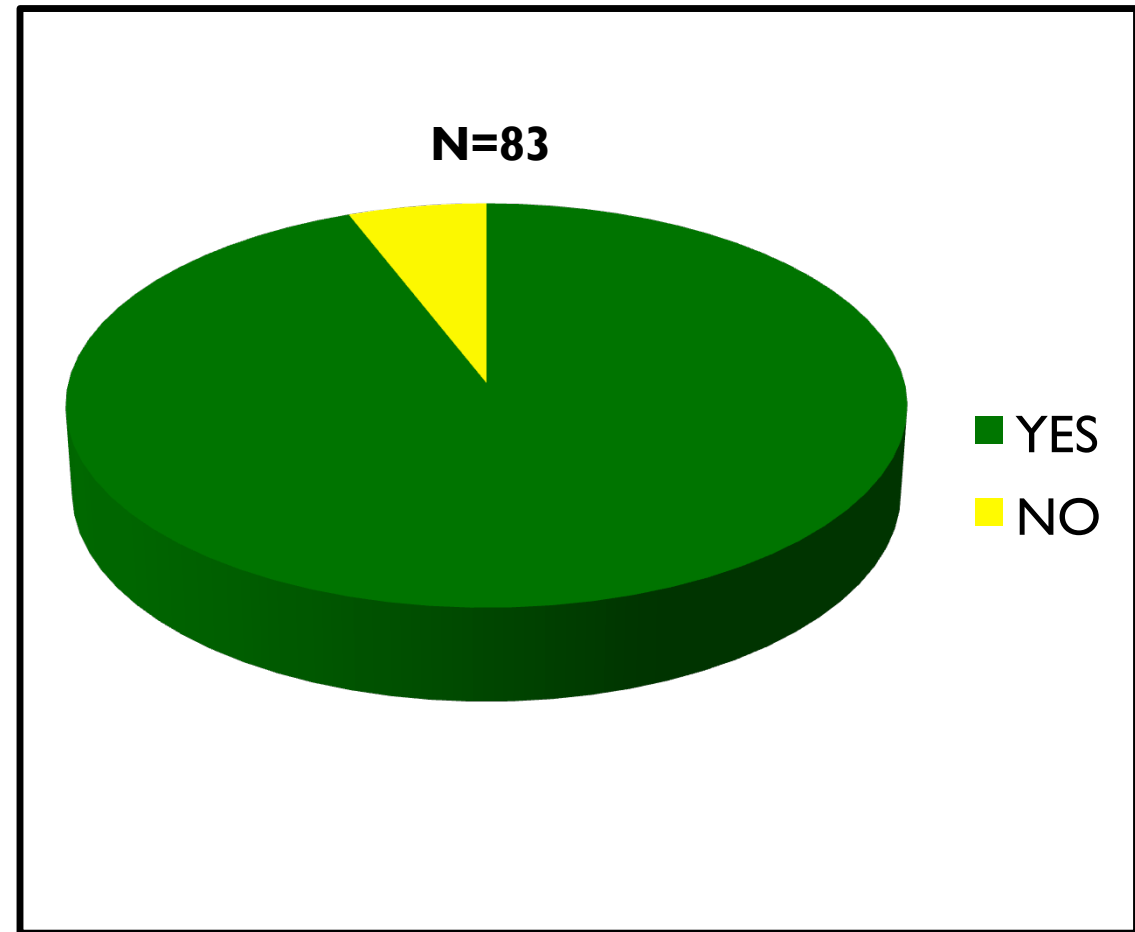


Have you ever received the influenza vaccine?

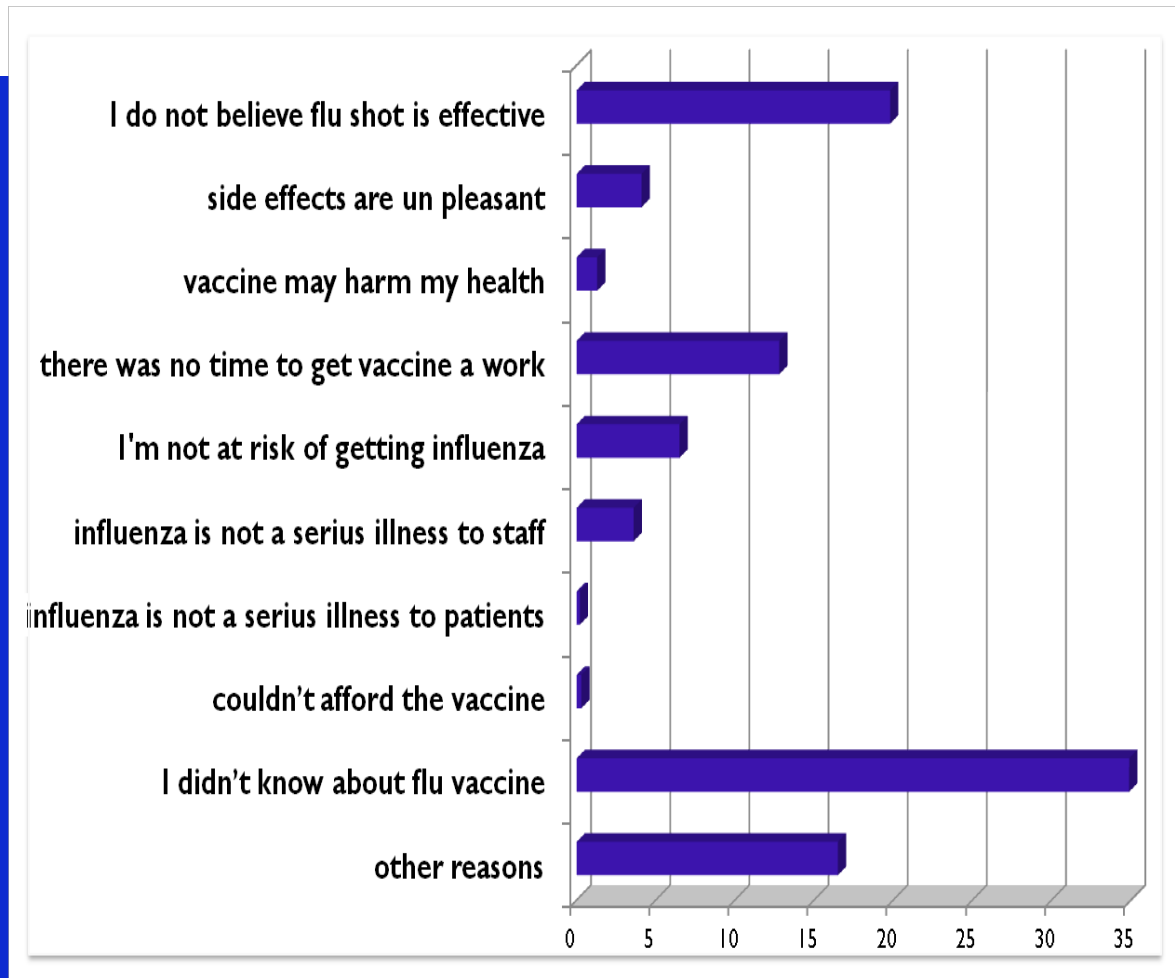


35 received it more than once in last 5 years.

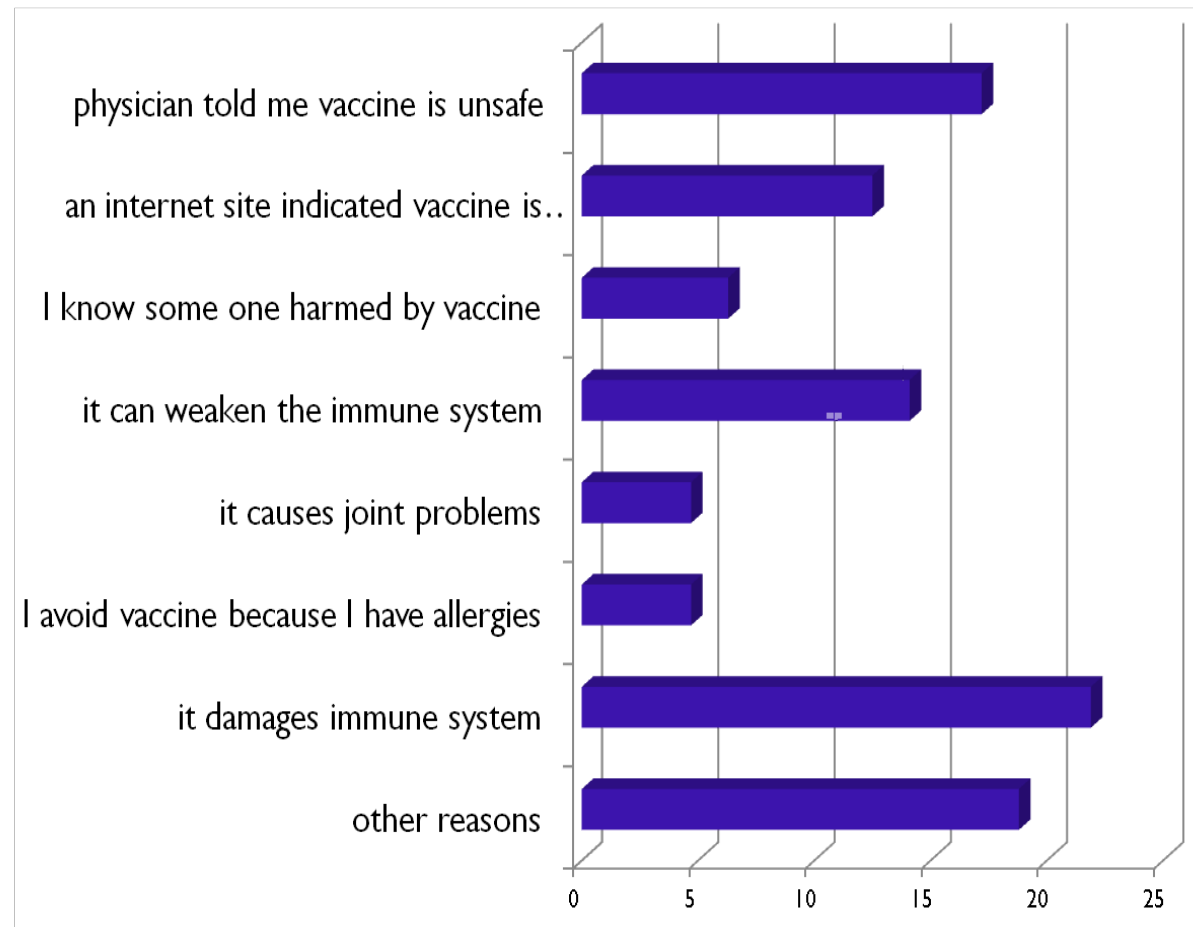
Do you consider Influenza vaccine safe?



If you received the vaccine zero times in the past 5 years, please indicate the most important reason for not participating (n=1359)



Reasons members considered the influenza vaccine unsafe (n = 83).



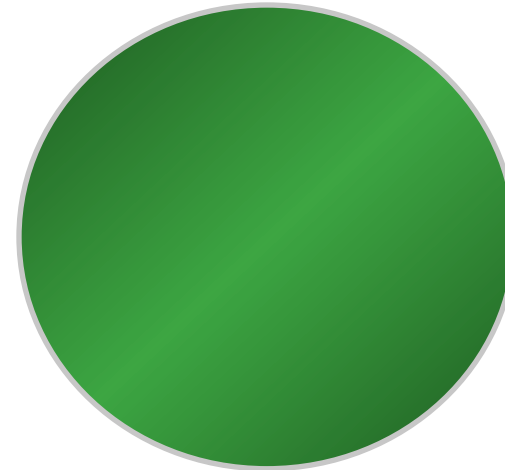
'Others : "Not at risk of influenza complications and not in contact with patients," "allergy to egg yolk," "don't want to get sick," "have overactive immune system," "a lot of people get the flu even though they got the shot." " my gut feeling that it is not effective"

The Affordability paradox

Did you take the pandemic flu vaccine?

Free Vaccine availability as a part of employee health program desired by participants.

Hospital policies don't exist for free influenza vaccination.



No

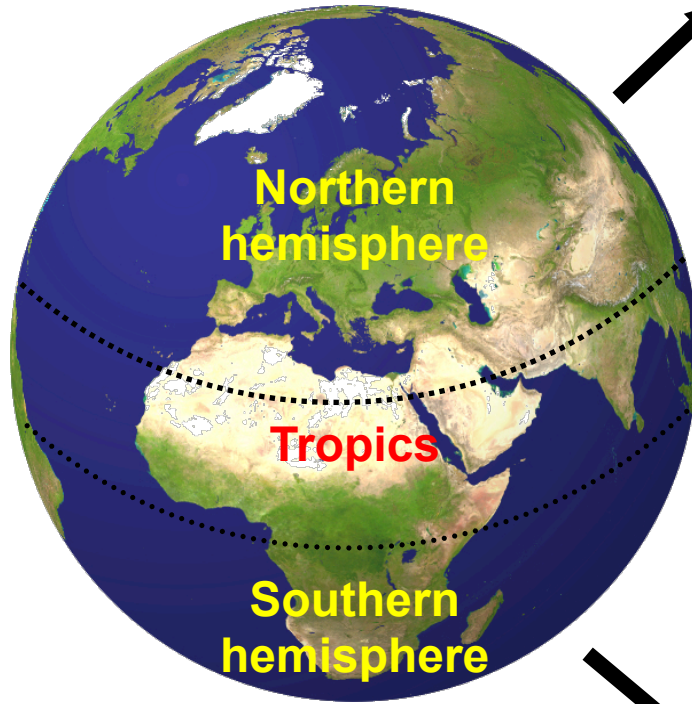


Yes

Provided
free of cost

Physicians most resistant to change.

Influenza circulates in seasonal patterns



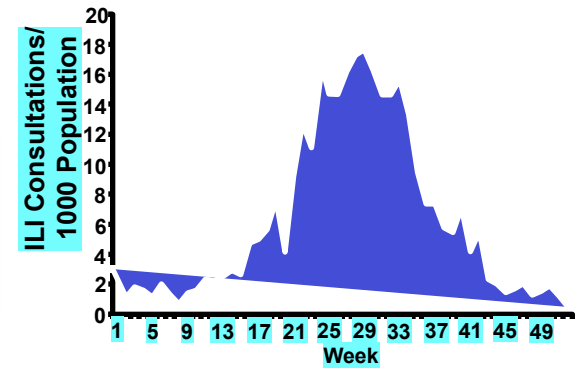
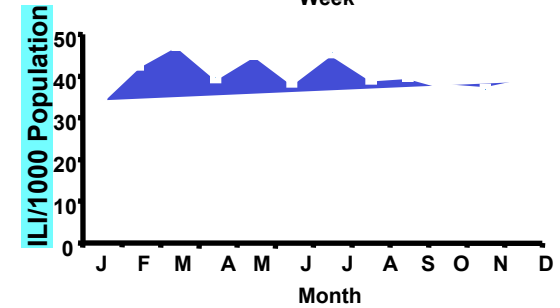
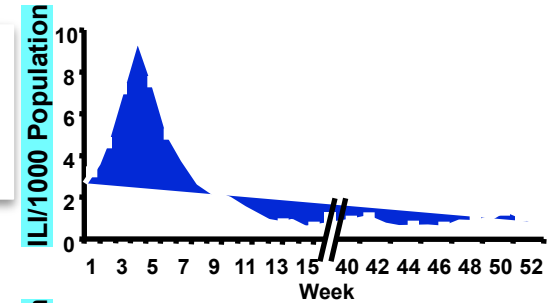
Globe image: www.phimap.com

ILI = influenza-like illness.

Influenza activity peak: November-March^{2,3}

Year-round activity^{3,4}

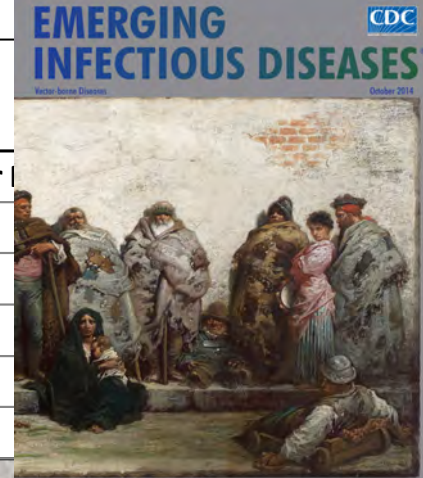
Influenza activity peak: April-September^{4,5}



Differences in Influenza Seasonality by Latitude, Northern India

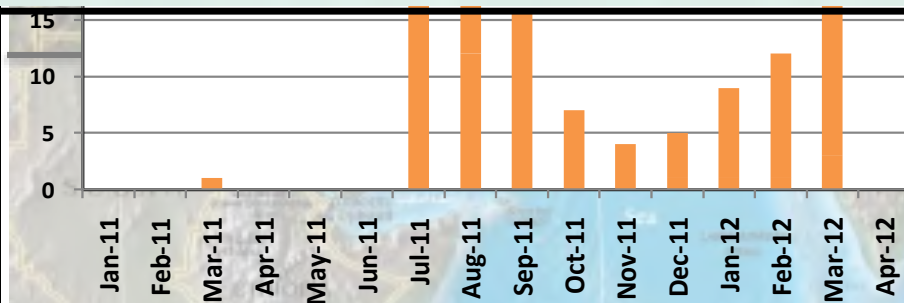
Parvaiz A. Koul¹✉, Shobha Broor^{1,2}, Siddhartha Saha, John Barnes, Catherine Smith, Michael Shaw, Mandeep Chadha, and Renu B. Lal

Author affiliations: Sheri-Kashmir Institute of Medical Sciences, Srinagar, India (P.A. Koul); All India Institute of Medical Sciences, New Delhi, India (S. Broor); Centers for Disease Control and Prevention, Atlanta, Georgia, USA (S. Saha, J. Barnes, C. Smith, M. Shaw, R.B. Lal); National Institute of Virology, Pune, India (M. Chadha)



Abstract

The seasonality of influenza in the tropics complicates vaccination timing. We investigated influenza seasonality in northern India and found influenza positivity peaked in Srinagar (34.09°N) in January–March but peaked in New Delhi (28.66°N) in July–September. Srinagar should consider influenza vaccination in October–November, but New Delhi should vaccinate in May–June.

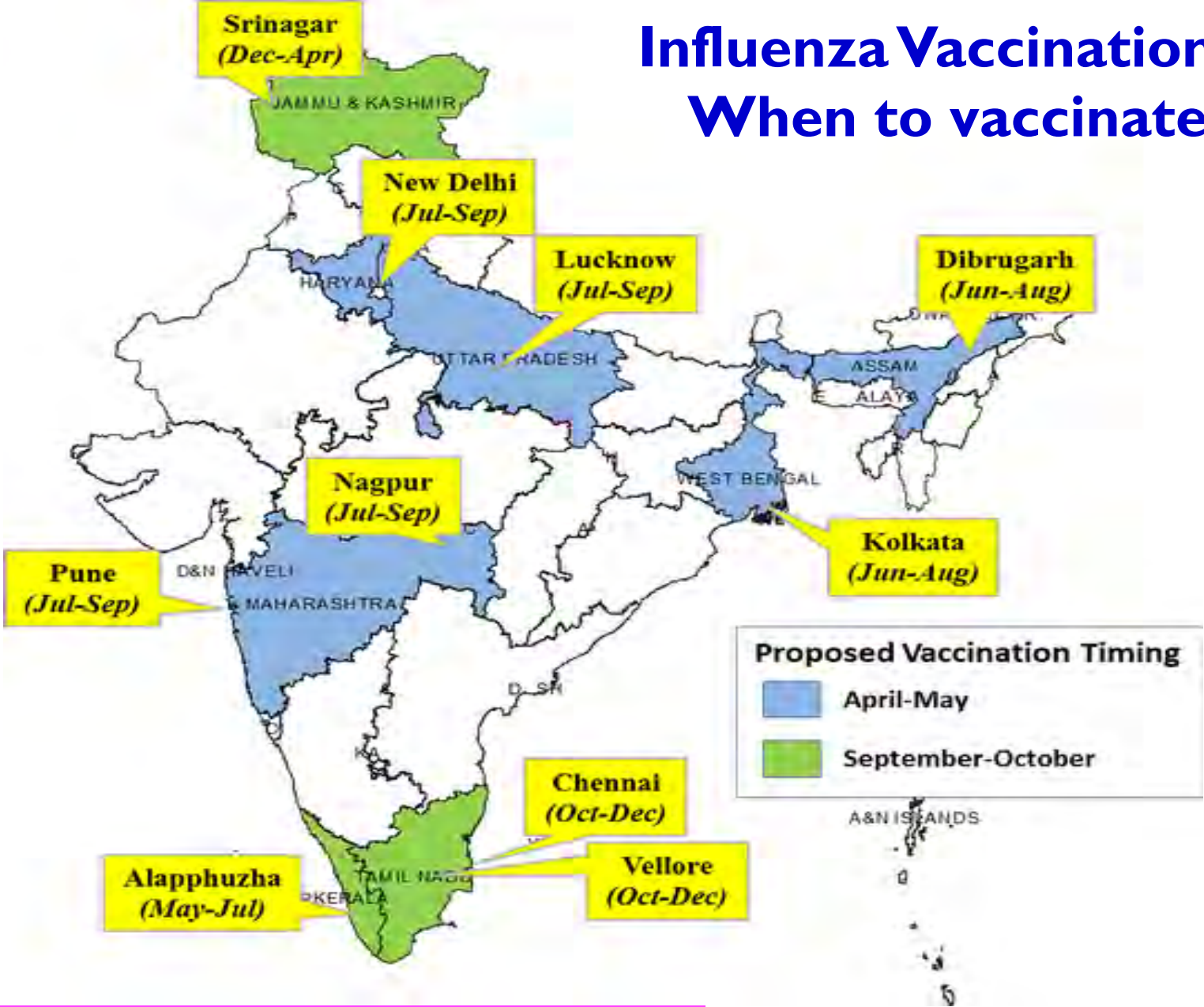


Divergent seasonal patterns of influenza types A and B across latitude gradient in Tropical Asia

Siddhartha Saha,^a Mandeep Chadha,^b Yuelong Shu,^c Group of Asian Researchers on Influenza (GARI)*

- **Influenza A circulation:**
 - Between November and March during winters in areas lying above 30 N latitude
 - During monsoon months of June–November in areas between 10 and 30 N latitude
 - No specific seasonality for influenza A virus circulation in areas lying closer to the equator.
- **Influenza B circulation:**
 - Coincides with influenza A circulation in areas lying above 30 N.
 - In areas south of 30 N Asia, influenza B circulated year round at 3–8% of annual influenza B positives during most months with less pronounced peaks during post-monsoon period.

Influenza Vaccination in India : When to vaccinate where?



Vaccine
development

Lab networks

MOHFW
recommendati
ons

Accomplishments

Surveillance

Bodies and
societies

Awareness



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Letter to the Editor

The biggest barrier to influenza vaccination in pregnant females in India: Poor sensitization of the care providers

Parvaiz A. Koul^{*},*Influenza Laboratory, Department of Internal & Pulmonary Medicine, Sher-I-Kashmir Institute of Medical Sciences, Soura, Srinagar, J&K, India*

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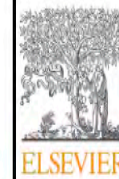
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The final report of the World Health Organization working group on Influenza Epidemiology and Immunization during Pregnancy [1], is timely. As is evident from the report, data regarding uptake of vaccination and vaccine effectiveness from low-and middle-income countries are scant. Virtually no data exist from India, the second most populous country (population > 1.2 billion) with a history of devastating past and recent outbreaks of influenza [2]. Documentation of lab confirmed influenza (LCI) has increased recently resultant on capacity enhancement following the setting up of a network of laboratories under the aegis of a cooperative agreement between the CDC, USA and the Indian Council of Medical Research (ICMR), New Delhi followed by another network of Viral Diagnostic laboratories across the

the 91 obstetricians, caring for the 1000 pregnant women, had themselves received influenza vaccine despite the knowledge that health-care workers constituted a high risk group for influenza [4]. These results were consistent with an earlier study of about 1421 health-care workers in the same geographical area, where the uptake of influenza vaccine was only 4.4% despite the participants reporting adequate knowledge about the severe and potentially lethal nature of influenza infection and having adequate knowledge about the availability of a vaccine against influenza [5]. Misperceptions and misconceptions regarding the safety and efficacy of influenza vaccination and a disconnect between perceptions and practice was demonstrable in the study [5]. The Ministry of Health and Family Welfare of the Govern-



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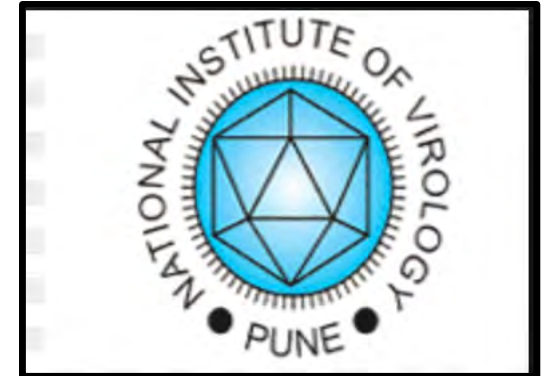
Influenza vaccination in India: Challenges for universal adoption

Parvaiz A. Koul^{*}, Nargis K. Bali*Departments of Internal & Pulmonary Medicine and Clinical Microbiology, Sher-I-Kashmir Institute of Medical Sciences, Srinagar, J&K, India*

- ▶ Inadequate and patchy surveillance
- ▶ Disconnect between perceptions and practice
- ▶ Misperceptions and misconceptions are abundant
- ▶ Physician societies and bodies do not universally recommend vaccination
- ▶ Universal vaccination programs do not recommend vaccination.
- ▶ Cost may be an impediment (PDS type subsidization can be explored)
- ▶ Influenza vaccination has to timed differently for different regions of the country.

Koul PA, Bali NK. Influenza vaccination in India: Challenges for universal adoption. *Vaccine* (2015), <http://dx.doi.org/10.1016/j.vaccine.2015.07.021>

Acknowledgements



Global Influenza
Hospital Surveillance
Network

