Description of the burden of severe influenza in diabetic patients during four consecutive seasons (2012/13 – 2015/16) in the Global Influenza Hospital Surveillance Network (GIHSN)

Guglieri-López B[1], Puig-Barberà J[1], Pisareva M[2], Unal S[3], Siqueira M[4], Ruiz-Palacios GM [5], Baselga-Moreno V[1], Stolyarov K[2], Durusu-Tanriover M[3], Komurian-Pradel F[6], Guerrero-Almeida ML[5], Mira-Iglesias A[1], Bagci Bosi T[7], Picot V[6], López-Labrador FX[1,8], Badur S[9], Costa-Caetano B[4], Díez-Domingo J[1], Moura FEA[10], Sánchez-Catalán MJ[1], Sominina A[2] for the Global Influenza Hospital Surveillance Network (GIHSN).

[1]Fundación para el Fomento de la Investigación Sanitaria y Biomédica de la Comunidad Valenciana (FISABIO), Valencia, Spain; [2]Research Institute of Influenza, WHO National Influenza Centre of Russia (Russian Federation); [3]Turkish Society of Internal Medicine, Ankara, Turkey; [4]Fundação Oswaldo Cruz (Fiocruz); [5]National Institute of Medical Sciences and Nutrition Salvador Zubirán (INCMNSZ); [6]Fondation Mérieux, Laboratoire des Pathogènes Emergents, U1111-CIRI, Lyon, France; [7]Hacettepe University, Faculty of Medicine, Department of Public Health, Ankara, Turkey; [8]Centro de Investigación Biomédica en Red de Epidemiología y Salud Pública, CIBER-ESP, Instituto de Salud Carlos III, Spain; [9]National Influenza Reference Laboratory, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey; [10]Universidade Federal do Ceará, Fortaleza, Brazil.

INTRODUCTION

Diabetes mellitus affects 415 million people worldwide. Diabetic patients have an increased risk of developing complications, including influenza disease, compared to people with no underlying medical condition. The aim of this analysis is to describe the burden of influenza-related hospital admissions in a cohort of diabetic patients during four consecutive influenza seasons.
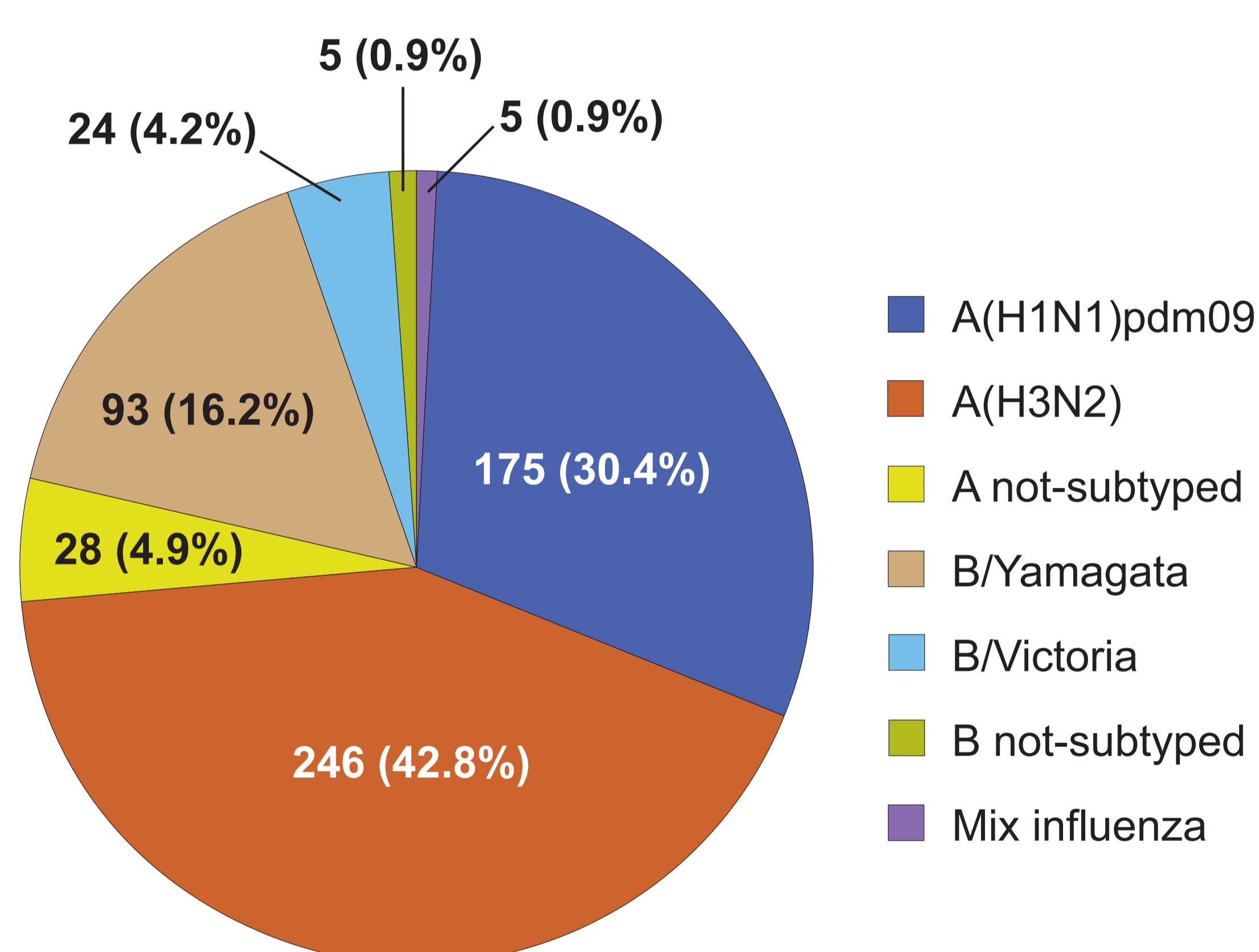
METHODS

- The Global Influenza Hospital Surveillance Network (GIHSN) is an international public-private collaboration created in 2012 to improve understanding of influenza epidemiology with the goal of informing public health policy decisions. Nine countries participated in the GIHSN from 2012 to 2016, with a total of 44 participating hospitals (**Figure 1**), recruiting emergency admissions satisfying a predefined subset of symptoms.

- Non-institutionalised patients residing in a pre-defined hospital catchment area, reporting symptoms of influenza-like illness within 7 days prior to admission and not having been discharged in the previous 30 days were included in the study. Nasopharyngeal and pharyngeal swabs were collected from patients meeting the inclusion criteria and tested by reverse transcription-polymerase chain reaction (RT-PCR) for influenza. In addition, influenza-positive samples were sub-typed. Patients were considered vaccinated if they had received the current season's influenza vaccine at least 14 days before symptom onset.

RESULTS

- During the four consecutive influenza seasons (from 2012/2013 to 2015/2016), 47,586 eligible admissions were identified. After applying the exclusion criteria, 34,708 admissions were included, and 3573 were diabetic patients. A total of 575 admissions in diabetic patients (16.1%) were positive for influenza. The number of different strains is described in **Figure 2**. The characteristics of diabetic patients and the risk of influenza disease in those patients are described in **Table 1**.

Figure 2. Distribution of influenza strains among diabetic patients

- 175 (30.4%) — A(H1N1)pdm09
- 246 (42.8%) — A(H3N2)
- 28 (4.9%) — A not-subtyped
- 93 (16.2%) — B/Yamagata
- 24 (4.2%) — B/Victoria
- 5 (0.9%) — B not-subtyped
- 5 (0.9%) — Mix influenza

CONCLUSIONS

The present study allowed the collection of good quality data to describe the burden of influenza in a cohort of diabetic patients during four consecutive influenza seasons. Overall, the elderly group (>85 years) has a significant lower risk of being admitted with influenza compared to the reference age group (75-84 years), whereas the age groups 18-49 and 65-74 years have a significant higher risk. Moreover, diabetic patients with two or more underlying conditions (mainly elderly group) have less risk of influenza than those only with diabetes. Finally, patients vaccinated in the current season present lower risk of developing influenza disease.

Figure 1. Participating countries and hospitals from the GIHSN during the 2012/13 to 2015/16 seasons

- Spain (Valencia Region) 10 hospitals
- France 5 hospitals
- Czech Republic 1 hospital
- St Petersburg 3 hospitals
- Moscow 1 hospital
- Beijing 5 hospitals
- Mexico 4 hospitals
- Curitiba 1 hospital
- Fortaleza 1 hospital
- Turkey 8 hospitals
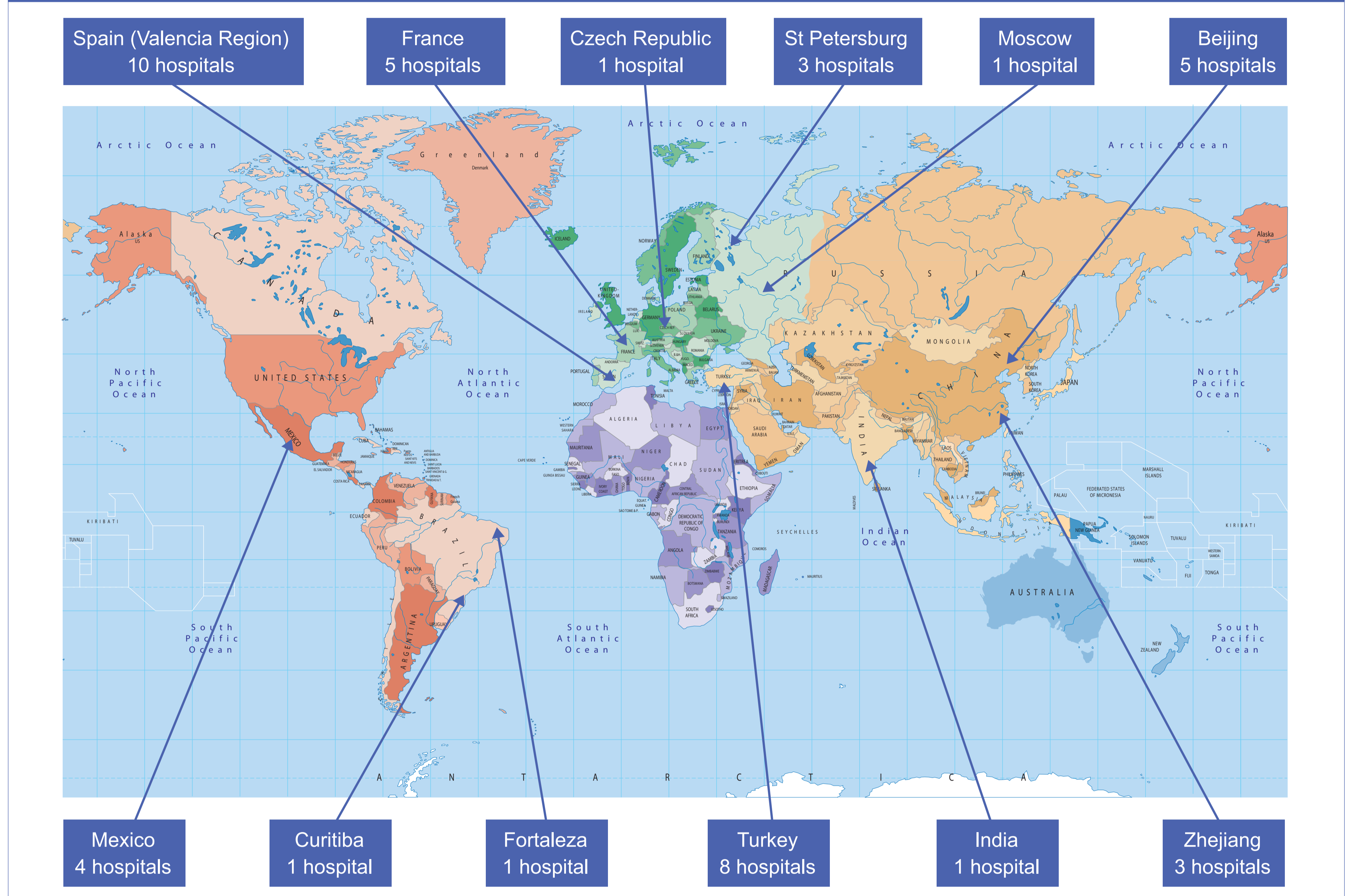- India 1 hospital
- Zhejiang 3 hospitals

Table 1. Characteristics and risk of influenza of diabetic patients included in the study

	Influenza positive n	Influenza positive %	Influenza negative n	Influenza negative %	P-value	OR	95%CI		P-value
Sex					0.338				
Male	303	52.7	1645	54.9		1.00			
Female	272	47.3	1353	45.1		1.090	0.910	1.310	0.338
Mean Age (standard deviation)	71	14.5	73	14.1	0.000				
Age					0.000				
1 to 4	4	0.7	9	0.3		2.53	0.77	8.30	0.126
5 to 17	2	0.3	19	0.6		0.60	0.14	2.59	0.493
18 to 49	36	6.3	132	4.4		1.55	1.04	2.32	0.031
50 to 64	107	18.6	405	13.5		1.28	0.99	1.67	0.063
65 to 74	170	29.6	751	25.1		1.28	1.02	1.62	0.030
75 to 84	184	32.0	1047	34.9		1.00			
>85	72	12.5	565	18.8		0.73	0.54	0.97	0.030
Socioeconomic class					0.000				
Qualified	105	18.3	449	15.0		1.00			
Skilled	63	11.0	252	8.4		1.07	0.76	0.51	0.707
Low or unskilled	317	55.1	1955	65.2		0.69	0.54	0.88	0.003
Unknown	90	15.7	342	11.4		1.13	0.82	0.49	0.462
Underlying conditions (number)					0.044				
Diabetes only	121	21.0	525	17.5		1.00			
Diabetes and others	454	79.0	2473	82.5		0.80	0.64	0.99	0.044
Admission in the last 12 months					0.009				
No	363	63.1	1713	57.1		1.00			
Yes	212	36.9	1279	42.7		0.78	0.65	0.94	0.009
Smoking habits					0.010				
Never	281	48.9	1398	46.6		0.84	0.65	1.08	0.17
Ex-smoker	195	33.9	1201	40.1		0.68	0.52	0.88	0.004
Current smoker	95	16.5	395	13.2		1.00			
Signs/Symptoms									
Fever	480	83.5	2016	67.2	0.000	2.55	2.01	3.23	0.000
Headache	200	34.8	993	33.1	0.298	1.08	0.90	1.31	0.400
Malaise	449	78.1	2302	76.8	0.294	1.10	0.89	1.37	0.391
Myalgia	217	37.7	1016	33.9	0.077	1.19	0.99	1.43	0.064
Cough	527	91.7	2500	83.4	0.000	2.35	1.70	3.24	0.000
Sore throat	177	30.8	738	24.6	0.003	1.37	1.13	1.67	0.002
Dyspnea	449	78.1	2522	84.1	0.001	0.68	0.55	0.85	0.001
Admitted to the ICU									
Yes	38	6.6	153	5.1		1.36	0.95	1.97	0.10
No	505	87.8	2775	92.6		1.00			
Discharge diagnosis					0.000				
Pneumonia & Influenza	226	39.3	846	28.2		1.00			
Respiratory disease	184	32.0	1113	37.1		0.62	0.50	0.77	0.000
Heart disease	41	7.1	435	14.5		0.35	0.25	0.50	0.000
Cerebrovascular disease	0	0.0	5	0.2		-			
Other	94	16.3	532	17.7		0.66	0.51	0.86	0.002
Vaccinated in the corresponding season					0.000				
Yes	249	43.3	1625	54.2		0.65	0.54	0.78	0.000
No	326	56.7	1373	45.8		1.00			

THE SIXTH ESWI INFLUENZA CONFERENCE 10-13 SEPTEMBER 2017

Global Influenza Hospital Surveillance Network

GENERALITAT VALENCIANA

Fundación para el Fomento de la Investigación Sanitaria y Biomédica de la Comunitat Valenciana