流感的防治

長庚紀念醫院　兒童醫學中心
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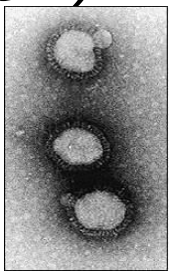
流行性感冒（流感，Influenza）



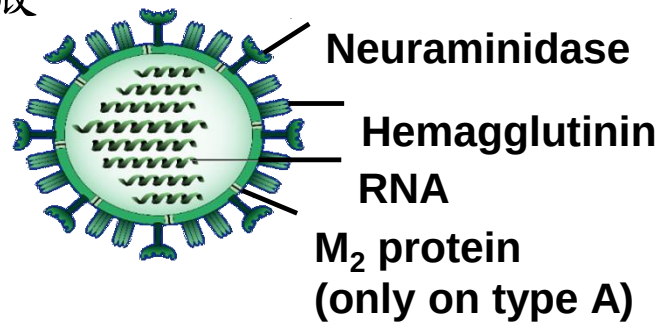
- 正黏液病毒科(Orthomyxoviridae)
- 基因體含8段(A、B型)或7段(C型)單股RNA
- 依核蛋白(NP)及M蛋白可分為A型、B型、C型及D型

—A流感病毒：**人畜共通，會感染人類、哺乳動物與鳥類**，可能引起較嚴重的疾病，造成全球大流行，病毒變異迅速。

—B流感病毒：只會感染人類，引起的疾病與A流感相似，造成的流行較小。

—C流感病毒：較少引起疾病且較輕微

—D流感病毒：感染牛類，未引起人類感染



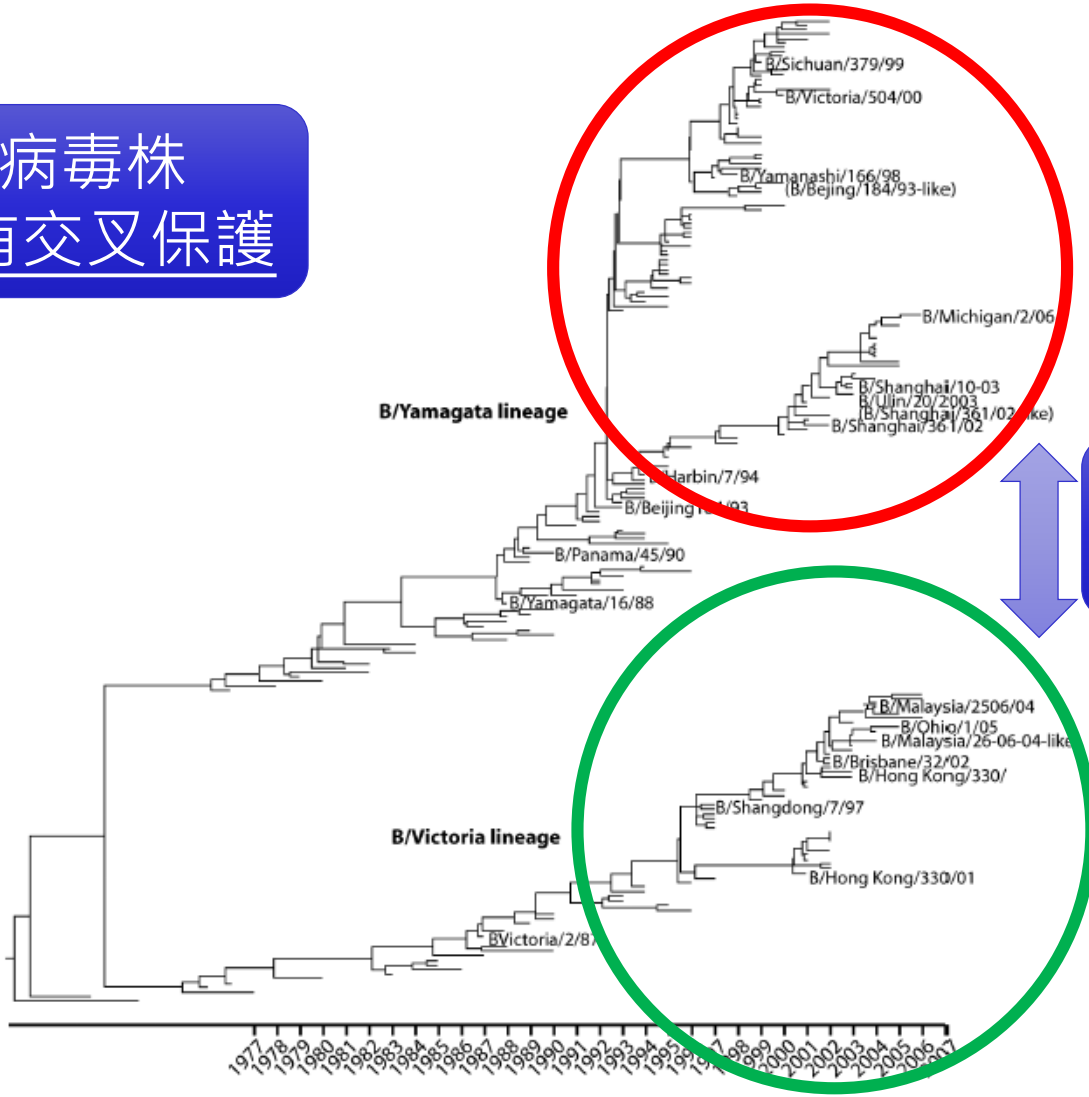
A流感病毒的分型與變異

- 依HA（血球凝集素）的不同來區分
  - —HA：1~18種亞型
  - —NA：1~11種亞型
- 抗原微變（drift）
- 抗原移型（shift）

	Human	Pig	Horse	Bird	Bats
H types					
H1	✓	✓		✓	
H2	✓	✓		✓	
H3	✓	✓	✓	✓	
H4		✓		✓	
H5	✓	✓		✓	
H6	✓			✓	
H7	✓		✓	✓	
H8				✓	
H9	✓	✓		✓	
H10	✓			✓	
H11-H16				✓	
H17-H18					✓
N types					
N1	✓	✓		✓	
N2	✓	✓		✓	
N3				✓	
N4				✓	
N5				✓	
N6	✓			✓	
N7	✓		✓	✓	
N8	✓		✓	✓	
N9	✓			✓	
N10-N11					✓

兩種B型流感病毒株抗原　演化差異大

兩種B型病毒株
幾乎沒有交叉保護



山形株

兩種B型病毒株
分開演化

維多利亞株

兩種B型流感病毒株的抗原演化史(1970~2006)

- Ambrose CS,*et al*. *Hum Vaccin Immunother*. 2012; 8: 81-8.

流感

- 潛伏期短，約二天。（1-5天）
- 台灣地區，一年四季均可能，但以冬天為主
- 傳染途徑：以飛沫為主
- 傳染期：發病一週內

流感的症狀

- 症狀突發
- **發燒，超過38ºC**
- **全身性症狀**
  - 畏寒、冒冷汗、寒顫、頭痛、肌肉酸痛、全身倦怠
- **呼吸道症狀**
  - 咽部疼痛、咳嗽等

甚麼是類流感?

Table 2. Signs and Symptoms of Uncomplicated Influenza[a]

General	Head, Eyes, Ears, Nose, Throat	Neuromuscular	Gastrointestinal[b]	Pulmonary
Fever[c,d]	Headache	Myalgia, arthralgia	Abdominal pain	Nonproductive cough
Chills	Nasal congestion[d]	Weakness	Vomiting	Pleuritic chest pain
Malaise	Rhinorrhea[d]	Chest pain	Diarrhea[d]	
Fatigue	Sore throat/hoarseness			

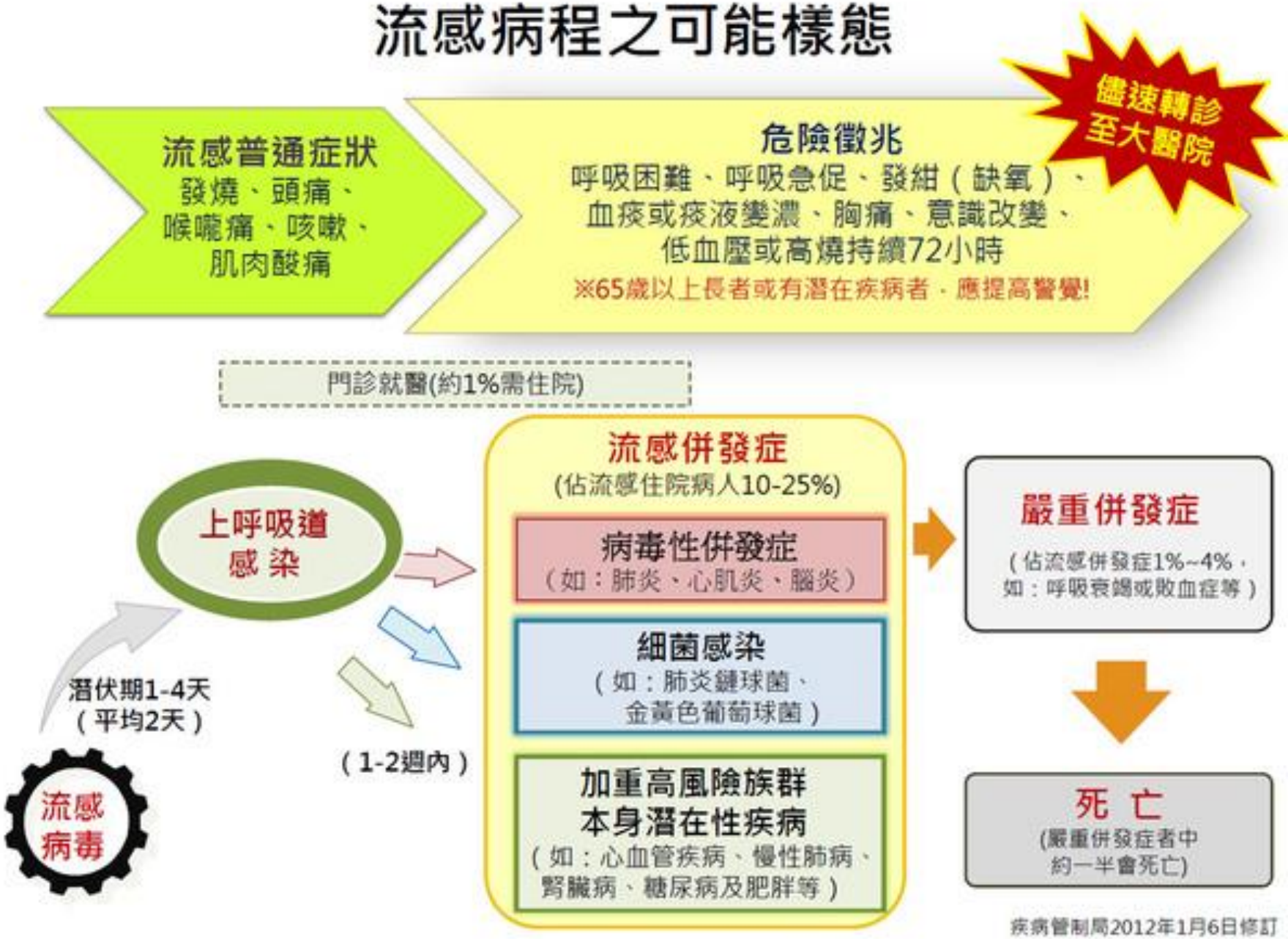
- G-I symptoms vary with age: Diarrhea is more common among infants, young children, and school-aged children; abdominal pain may be present among school-aged children; vomiting may be present among adults
- Nasal congestion and rhinorrhea may be present among infants and young children
- **Fever can be age-specific**: High fever or fever alone may be the only sign in infants and young children; fever may be absent or low grade in infants and the elderly

(IDSA Influenza Clinical Guidelines CID 2019;68(6):e1-47)

流感與感冒的不同

項目	流感 (Influenza)	感冒 (Cold)
疾病類別	急性病毒性呼吸道疾病	上呼吸道感染的疾病
致病原	流感病毒，可分為A、B、C三型因為它很容易發生變異，所以容易發生大流行。	大約200多種，包括比較常見的：鼻病毒、副流感病毒、呼吸道細胞融合性病毒、腺病毒等。
臨床症狀	主要為發燒、頭痛、肌肉痛、疲倦、流鼻涕、喉嚨痛以及咳嗽等症狀。	症狀較輕微，常見包括打噴嚏、流鼻水、鼻塞及喉嚨痛，偶有輕微咳嗽、發燒或全身酸痛的情形。
併發症	最常見的併發症是肺炎，包括病毒性及細菌性肺炎，其他還包括中耳炎、鼻竇炎、腦炎、腦病變、雷氏症候群及其他嚴重之繼發性感染等。	急性中耳炎、急性鼻竇炎、下呼吸道感染。
治療方法	依照醫師處方給予抗流感病毒藥物治療以及支持療法。	感冒是自己會好的，如果症狀嚴重，可就醫吃藥緩解症狀。
預防方法	注重呼吸道衛生及咳嗽禮節，接種流感疫苗。	注重呼吸道衛生及咳嗽禮節

流感病程之可能樣態



疾病管制局2012年1月6日修訂

流感併發重症高危險群

- 6 個月到 59 個月的兒童
- 50 歲(含)以上的成人
- 有以下疾病的成人及兒童: 慢性肺疾病(含氣喘)、心血管疾病(單純高血壓除外), 腎臟, 肝臟, 神經學, 血液性, 或代謝性疾病(含糖尿病)
- 有免疫低下的人(含藥物導致或HIV感染導致)
- 流感季期間懷孕婦女
- 6個月大到18歲需接受長期阿斯匹靈(aspirin)治療者
- 護理之家或常照中心的住民
- 過度肥胖者(BMI值 ≥40)

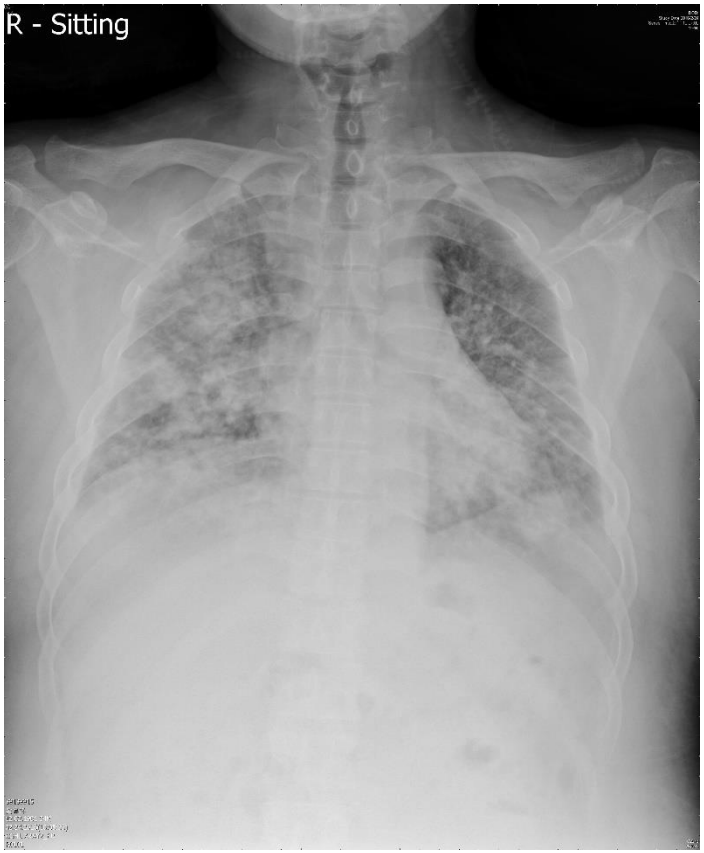
(從美國CDC的建議修飾而來)

臨床個案

- 黃o祥，35歲，男性
- **過去病史：無**
- 就診日期：2016/02/25
- 就診主訴：
  - 發燒及呼吸急促 x 3天
  - 咳嗽 2週
  - 全身倦怠
  - 無肌肉痠痛

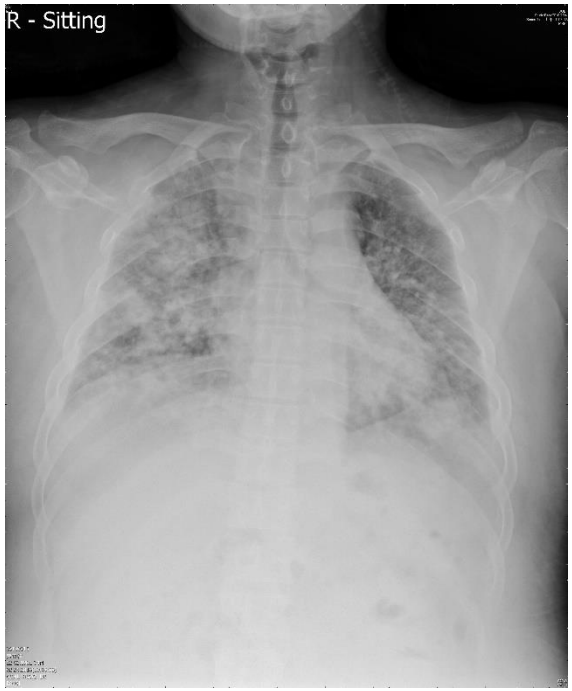
- 就診經過：
  - 02/25：急診就診：低血氧，胸部X光：雙側肺炎 => 氣管內管插管

    =>加護病房住院，克流感使用

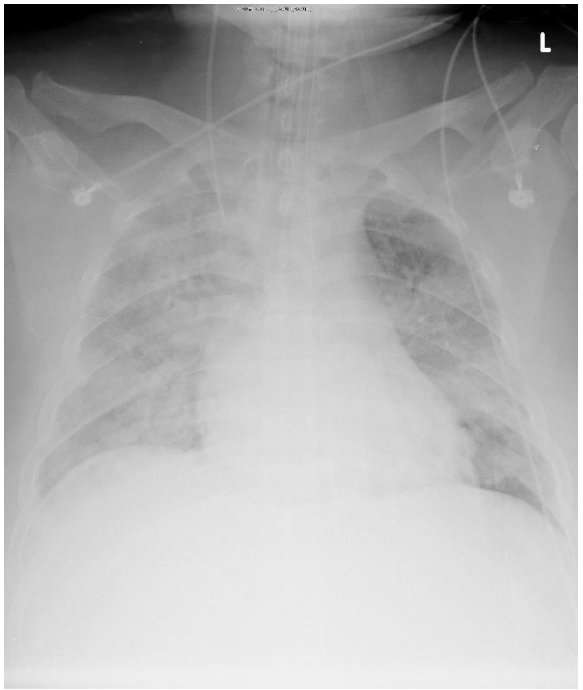


- 就診經過：
  - 病毒培養： A 型流感 (H1N1)
  - 02/26~03/02：急性腎損傷併腎病症候群 => 利尿劑＋白蛋白使用，呼吸狀況改善

02/25

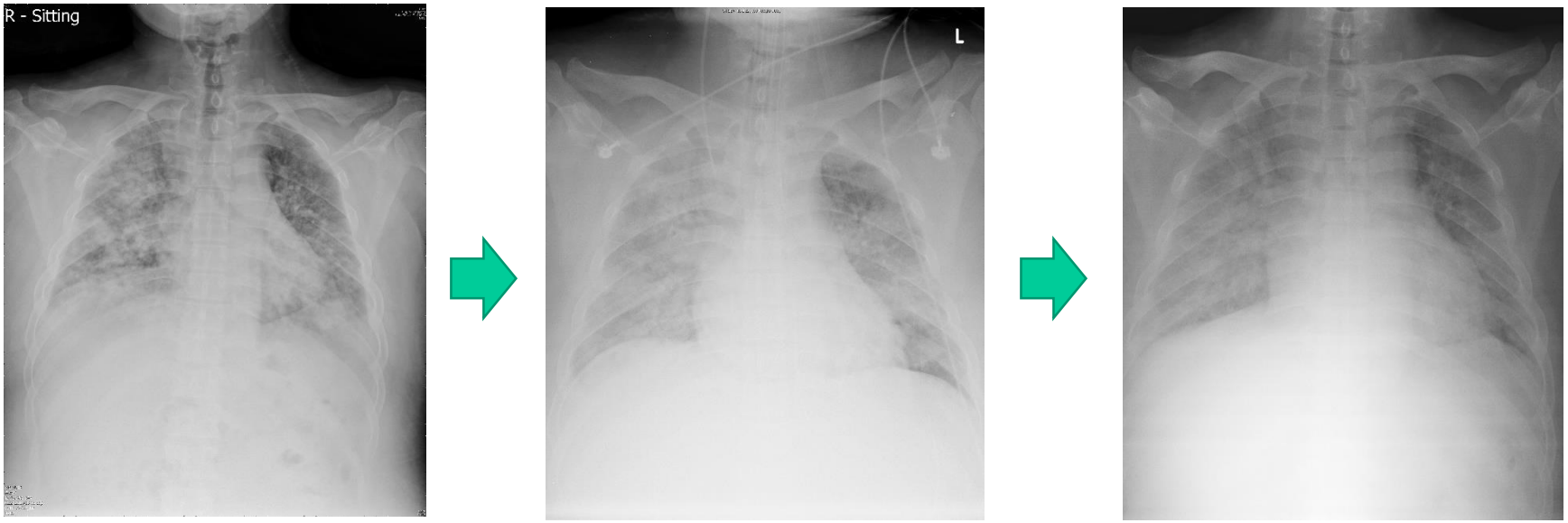


02/27



- 就診經過：
  - 03/03：拔除氣管內管
  - 03/14：轉入一般病房持續治療
  - 03/23：病況改善出院

02/25　　02/27　　03/21



病例 2

- 七歲小女生，生長發育正常
- 過去沒有特殊疾病
- 這個流感季有接種流感疫苗

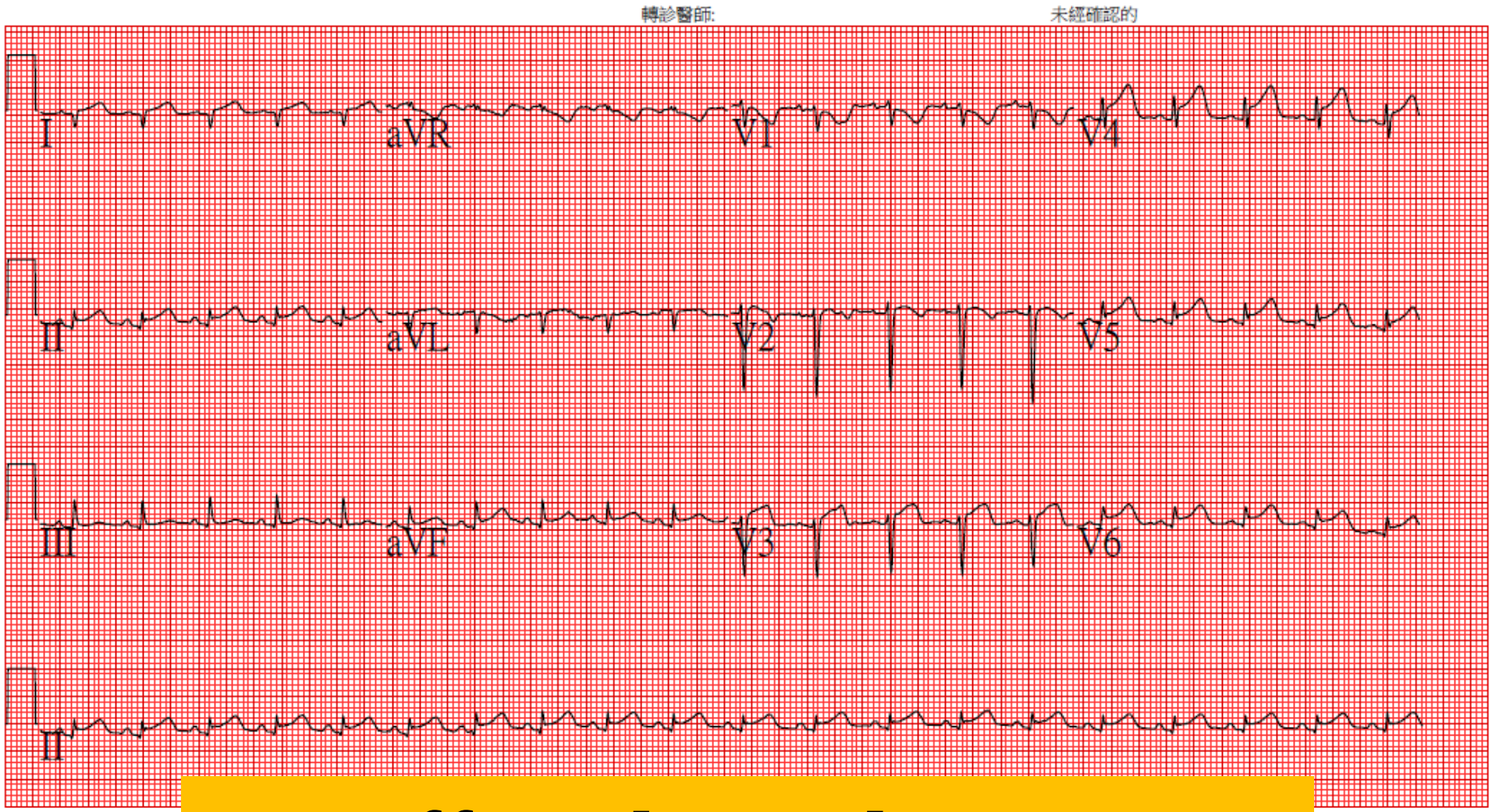
- 主述:
  - 肌肉疼痛, 倦怠以及全身無力兩天
- 現病史:
  - 12/28 ~ 12/31有發燒
  - 到診所就診: 流感快篩證實 B流感, 12/30~12/31 服用克流感
  - 1/3 出現頭暈, 呼吸喘, 肌肉疼痛, 倦怠, 到某家醫院急診就診, 留觀檢查無異常, 出院
  - 1/4 來本院門診就診, 建議住院, 沒有床位, 轉急診先處置

檢驗室檢查

檢驗項目	單位	1070104	1070104
血液組(B)			
WBC	1000/uL	11.1	8.5
RBC	million/uL	4.79	5.44
Hemoglobin	g/dL	14.4	14.7
Hematocrit	%	37.3	42.6
MCV	fL	77.9	78.3
MCH	pg/Cell	30.1	27.0
MCHC	gHb/dL	38.6	34.5
RDW	%	12.8	12.9
Platelets	1000/uL	203	202
Segment	%	76.0	57.9
Lymphocyte	%	17.0	35.2
Monocyte	%	5.0	6.7

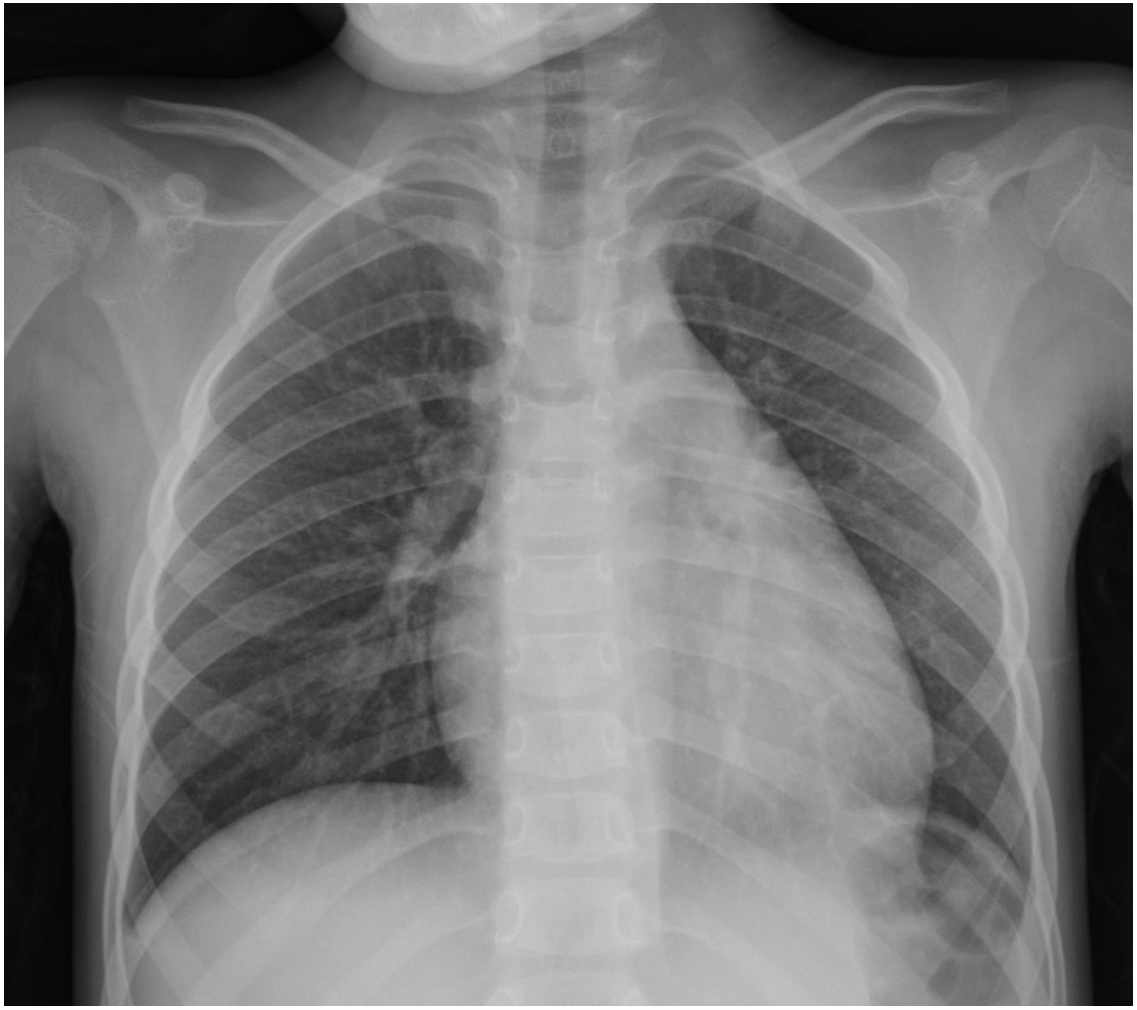
檢驗項目	單位	1070104
生化組(B)		
Ca(Calcium)	mg/dL	
Na(Sodium)	mEq/L	
K(Potassium)	mEq/L	4.3
Cl(Chloride)	mEq/L	
Mg(Magnesium)	mEq/L	
Lactate(B)	mg/dL	
CK-MB	ng/mL	105.7
Troponin-I	ng/mL	0.763
Sugar	mg/dL	89
NT-ProBNP	pg/mL	
BUN	mg/dL	
Creatinine	mg/dL	0.54
AST/GOT	U/L	113

EKG

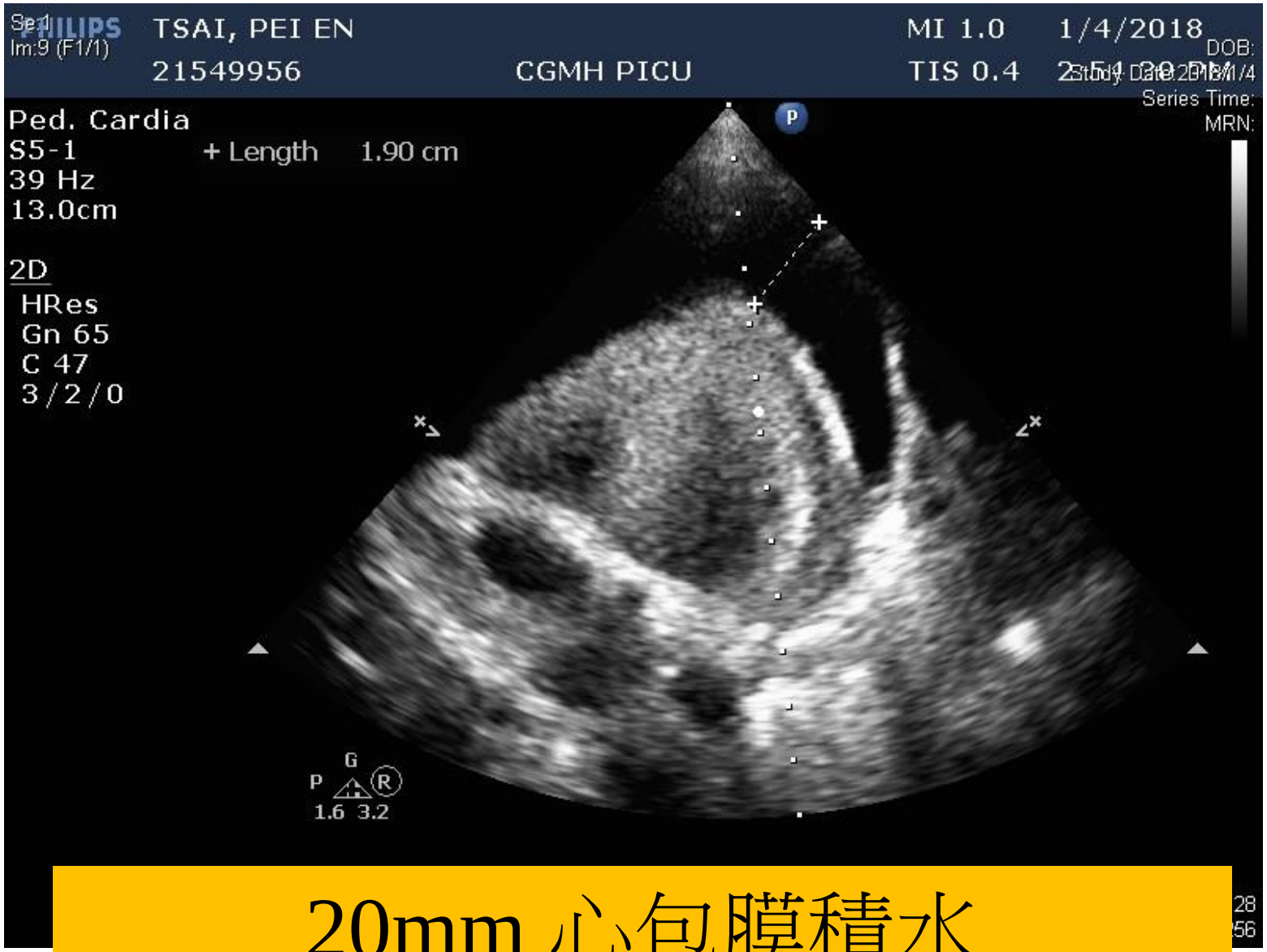


Diffused ST elevation

胸部X光檢查



兒科加護病房

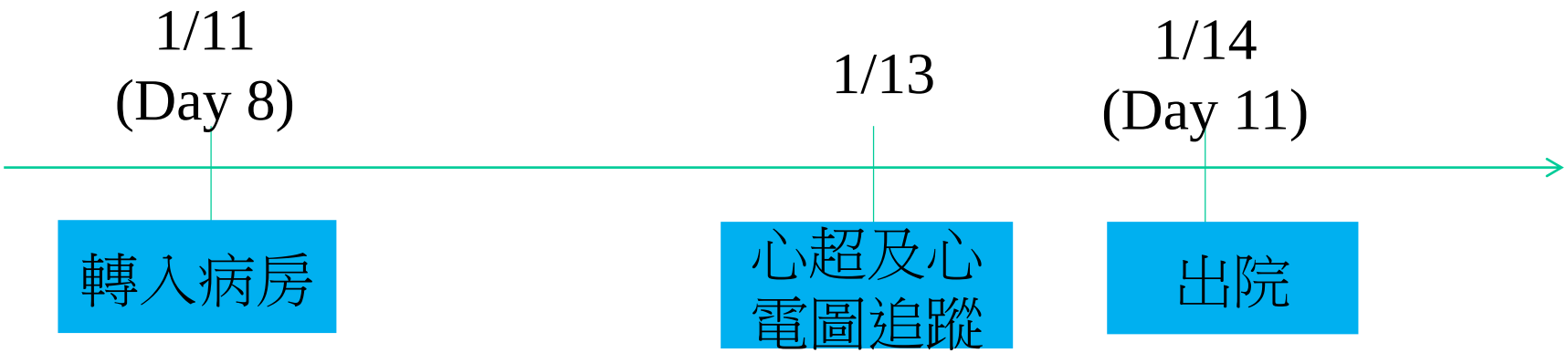
- 

20mm 心包膜積水

兒科加護病房

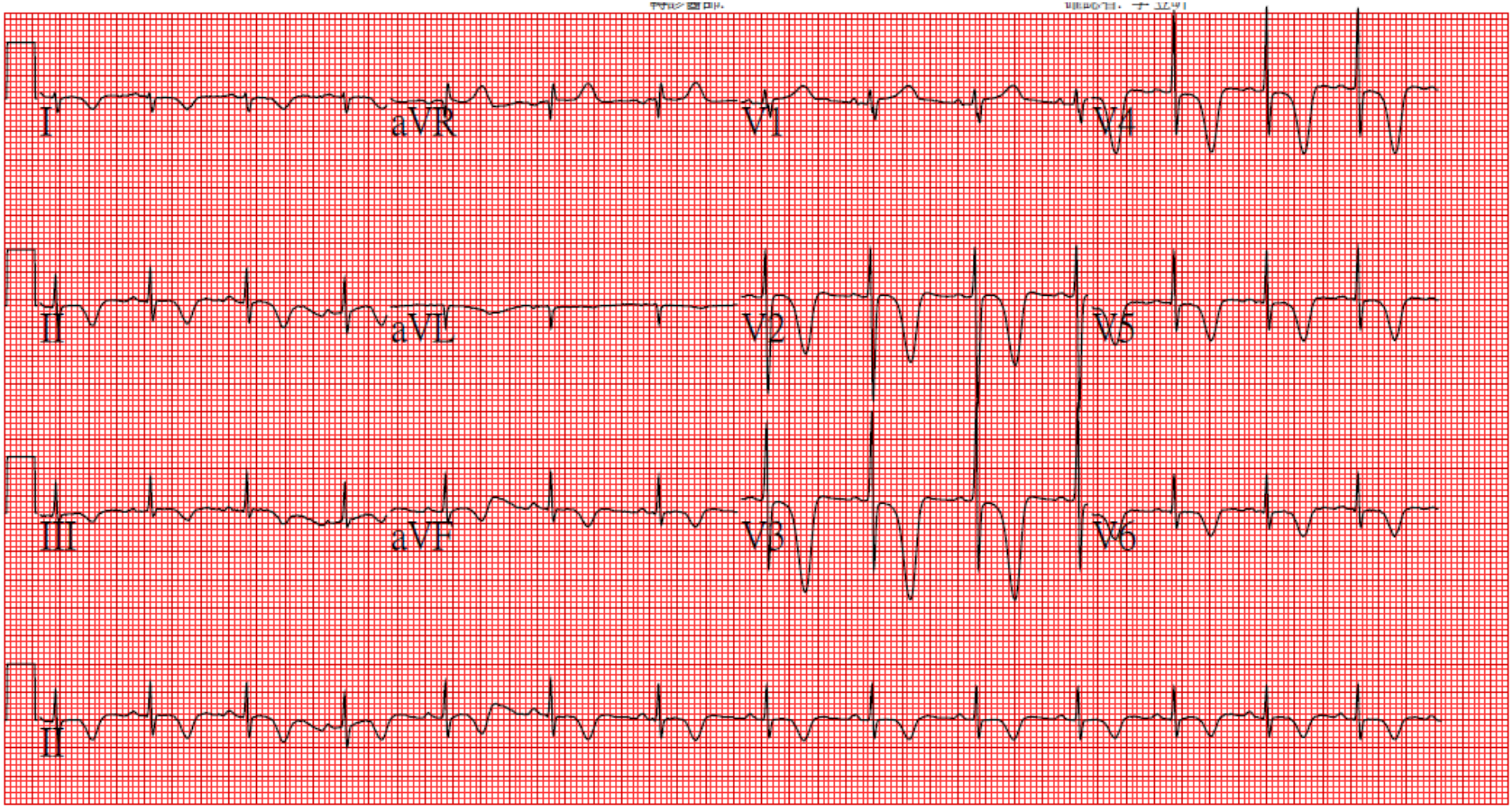
醫療處置:

- 心包膜穿刺並置放引流管 引流: 155ml
- 給予”強“心藥物
  - Milrinone 0.25mg/kg/min
  - Dopamine 6mcg/kg/min
- 靜注型免疫球蛋白IVIG (0.5mg/kg/dose)

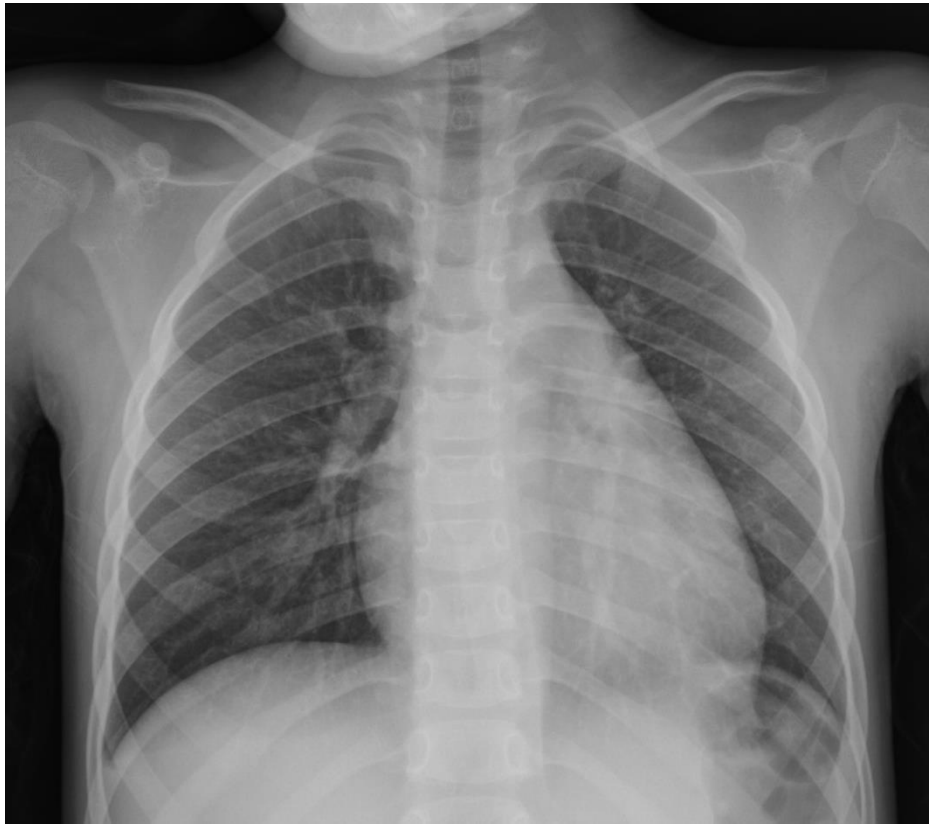


- 心超:
  - 無心包膜積水
  - 正常心臟超音波圖
- 心電圖:
  - 廣泛性 T 波倒置
  - QT波延長

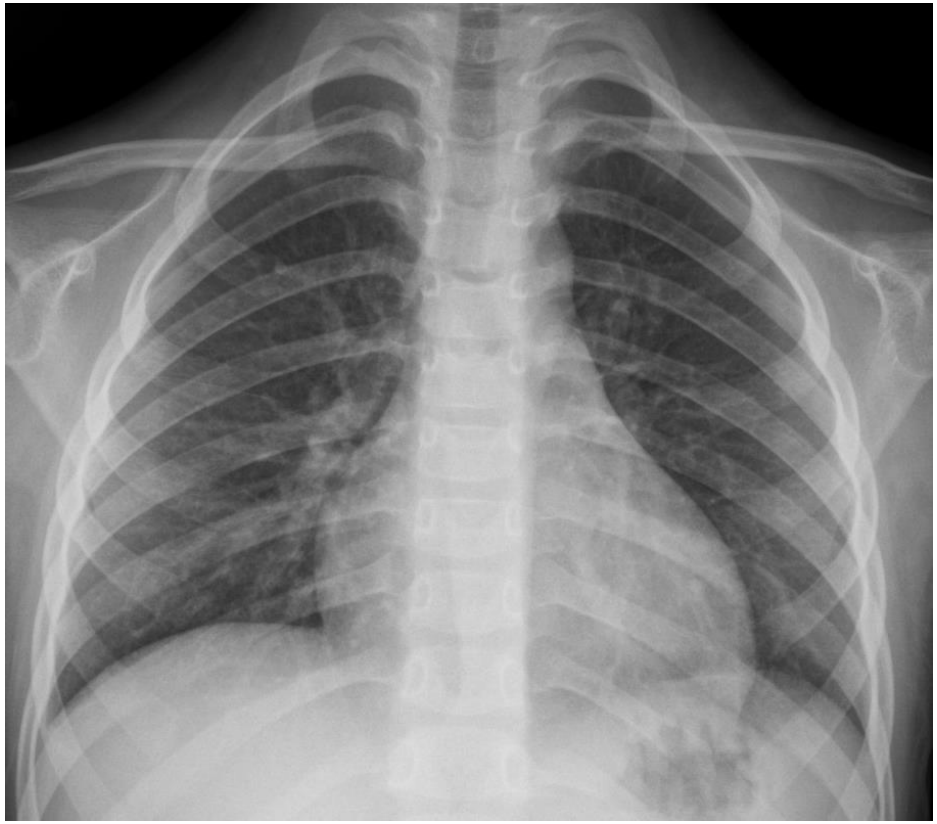
1/13 EKG



1/4 CXR住院時



1/14 CXR出院時



最後診斷

- B流感, 併發急性心肌炎及急性心包膜炎合併心包膜填塞及休克

Comparison of clinical presentation between hospitalized children with influenza in CGMH (Wang YH et al JMII 2003, Lin CH et al PIDJ 2006)

Symptoms	Flu A (n = 84) No. (%)	Flu B (n = 92) No. (%)	*p* value
Fever	76 (91)	90 (98)	.049
Cough	68 (81)	80 (87)	.277
Sore throat	-	12 (13)	-
Coryza	60 (71)	68 (74)	.712
Seizure	4 (4.8)	5 (5.4)	1.000
Nausea/vomiting	29 (35)	18 (20)	.025
Diarrhea	13 (16)	12 (13)	.644
Abdominal pain	8 (9.5)	15 (16)	.183
Headache	7 (8.3)	7 (7.6)	.859
Myalgia	**2 (2.4)**	**18 (20)**	**.000**
Visual hallucination	**-**	**10 (11)**	-
Confusion state	**18 (22)**	**4 (4.3)**	**.001**

Comparison of clinical presentation between hospitalized children with influenza in CGMH (Wang YH et al JMII 2003, Lin CH et al PIDJ 2006)

Clinical diagnosis	Flu A (n = 84) No. (%)	Flu B (n = 92) No. (%)	*p* value
Bronchiolitis/ bronchopneumonia	33 (39)	37 (40)	.900
Pneumonia	**17 (20)**	**9 (9.8)**	.051
Croup	3 (3.6)	2 (2.1)	.671
URI	14 (17)	27 (29)	.047
CNS dysfunction	**26 (31)**	**11 (12)**	**.000**
Conjunctivitis	1 (1.2)	7 (7.6)	.066
Myositis	**-**	**11 (12)**	-
Concomitant bacterial infection	8 (9.5)	9 (9.8)	.849

Influenza B-associated rhabdomyolysis in Taiwanese children (Wu CT et al Acta Paed 2010;99:1701-4)

- A retrospective analysis in patients aged <17 years in **CGMH** in Taiwan, **2000–2007**
- Definition of rhabdomyolysis
  - Gross pigmenturia without haematuria
  - An initial CK level over five times the upper limit of the normal range (>1000 IU／L)
  - Excluded other potential conditions other than flu B
- **24 cases** analyzed
- a 7:3 male : female ratio
- Mean age **7.2** ± 1.9 years, range 3.9–12 years
  - 63% aged 6 ~ 9 years

Table 2 Clinical manifestations of influenza B-associated rhabdomyolysis in children

Symptom/sign	Influenza B (24) (%)
Fever	24 (100)

Table 3 Laboratory findings on admission

Characteristics	Mean ± SD	Range	95% CI
CK (U/L)	4212 ± 4327	1022–21 473	1385–5040
AST (U/L)	145 ± 111	57–506	47–162
Myoglobin (blood) (mg/L)	1164 ± 761	546–2536	359–1767
Myoglobin (urine) (mg/L)	1154 + 1163	190–4021	415–1893

(Wu CT et al Acta Paed 2010;99:1701-4)

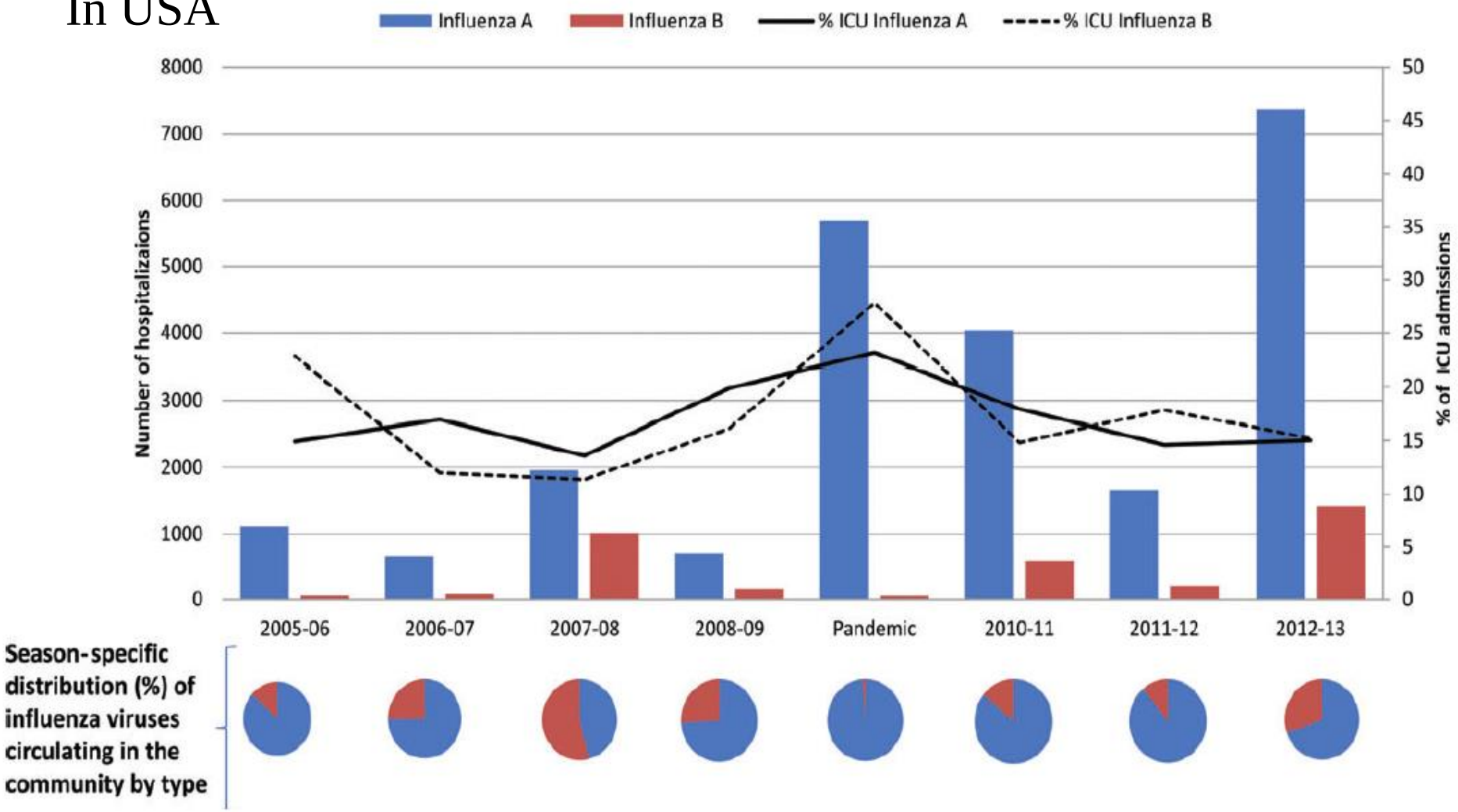
Influenza B-associated rhabdomyolysis in Taiwanese children (Wu CT et al Acta Paed 2010;99:1701-4)

- Median **interval** between the onset of influenza and onset of IBAR was **3.4 days** (range, 1–14)
- **Calf muscles** involved in all cases
- Mean initial blood creatine kinase of 4212 U/L
- Median time to **clinical recovery** was **5 days** (range 1–24)
- No patient had renal failure

Conclusion: **Outcomes of IBAR are good with proper medical care**

Comparing Clinical Characteristics Between Hospitalized Adults With Laboratory-Confirmed Influenza A and B Virus Infection

In USA



(CID 2014:59:252-5)

Hospitalization for Influenza A Versus B

(Tran D et al Pediatrics 2016;138(3):e20154643)

- Using active surveillance data from the **Canadian** Immunization Monitoring Program Active at **12 pediatric hospitals**
  - Compared clinical characteristics and outcomes of children ≤16 years admitted with laboratory-confirmed influenza B or seasonal influenza A
- Over 8 nonpandemic influenza seasons (2004-2013),
  - identified **1510 influenza B** and **2645 influenza A** cases
  - **median ages** were 3.9 and 2.0 years, respectively ($P < .0001$)
  - influenza B patients more likely to **have a vaccine-indicated condition** (OR, 1.30; 95% CI, 1.14–1.47)

TABLE 4 Treatment and Illness Severity of Hospitalized Patients by Influenza Type

Treatment	Influenza Type[a]			
	Seasonal A (n = 2645)	Influenza B (n = 1510)	Unadjusted OR/P	Adjusted OR/P[b]
Antiviral				
Antibiotic	400/2643 (15.1)	202/1508 (13.4)	0.87 (0.72–1.04)	—
Measures of illness severity	1913/2640 (72.5)	1050/1508 (69.6)	0.87 (0.76–1.00)	—
Respiratory complications				
Croup	101 (3.8)	51 (3.4)	0.88 (0.62–1.24)	—
Pneumonia (radiologically confirmed)	595 (22.5)	364 (24.1)	1.09 (0.94–1.27)	—
Extrarespiratory complications				
Myositis	18 (0.7)	101 (6.7)	10.46 (6.31–17.35)	6.95 (4.15–11.64)
Myocarditis	6 (0.2)	6 (0.4)	1.75 (0.56–5.45)	—
Hepatitis	24 (0.9)	22 (1.5)	1.61 (0.90–2.89)	—
Meningitis	6 (0.2)	4 (0.3)	1.17 (0.33–4.15)	—
Encephalitis	42 (1.6)	36 (2.4)	1.51 (0.97–2.37)	—
Length of hospital stay, median (IQR), d	3.0 (2.0–5.0)	3.0 (2.0–5.0)	0.60	—
Mortality				
Attributable to influenza	10 (0.4)	16 (1.1)	2.82 (1.28–6.23)	2.65 (1.18–5.94)
All-cause	10 (0.4)	18 (1.2)	3.18 (1.46–6.90)	2.95 (1.34–6.49)
Admitted to ICU	337 (12.7)	190 (12.6)	0.99 (0.82–1.19)	—
Required mechanical ventilation[c]	212 (62.9)	124 (65.3)	1.11 (0.76–1.61)	—
Required extracorporeal membrane oxygenation[c]	7 (2.1)	6 (3.2)	1.54 (0.51–4.64)	—
Length of ICU stay, median (IQR), d[c]	3.0 (1.0–6.5)	3.0 (1.0–7.0)	0.62	—

(Tran D et al Pediatrics 2016;138(3):e20154643)

Hospitalization for Influenza A Versus B

(Tran D et al Pediatrics 2016;138(3):e20154643)

- Proportion of **deaths** attributable to influenza **significantly greater for influenza B** (1.1%) than influenza A (0.4%)
  - Adjusted for age and health status, **OR was 2.65** (95% CI, 1.18–5.94)
  - A similar adjusted OR was obtained for **all-cause mortality** (**OR, 2.95**; 95% CI, 1.34–6.49)
- Among healthy children with influenza B, **age ≥10 years** (relative to <6 months) was associated with the greatest odds of **ICU admission** (**OR, 5.79**; 95% CI, 1.91–17.57)

Hospitalization for Influenza A Versus B

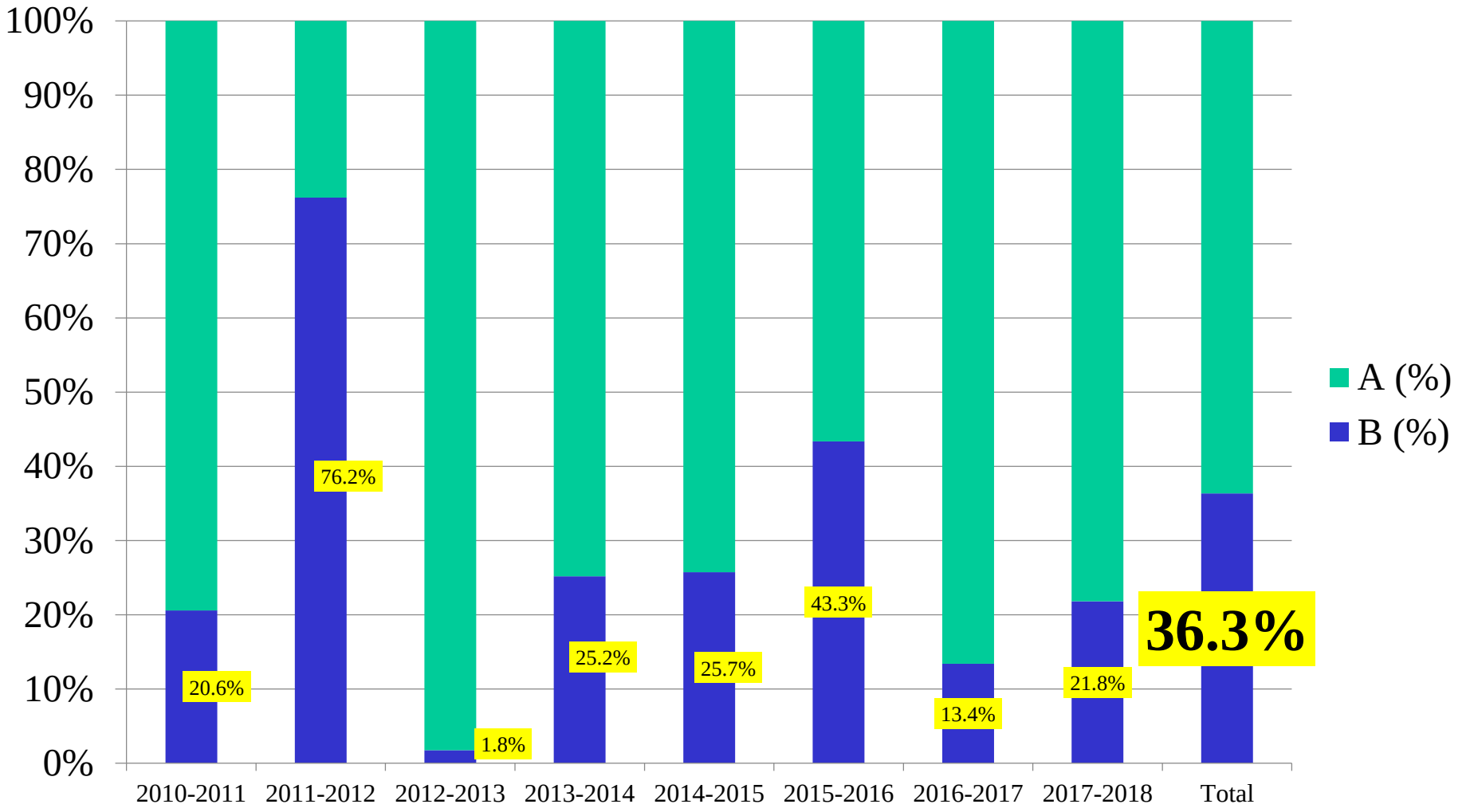
(Tran D et al Pediatrics 2016;138(3):e20154643)

CONCLUSIONS:

- **Mortality** associated with **pediatric influenza B infection was greater** than that of influenza A
- Among healthy children hospitalized with **influenza B**, **those 10 years and older** had a significant **risk of ICU admission**

Subtypes of Influenza in Taiwan

2000 – 2010 Influenza A (61%) vs. **B (39%)**

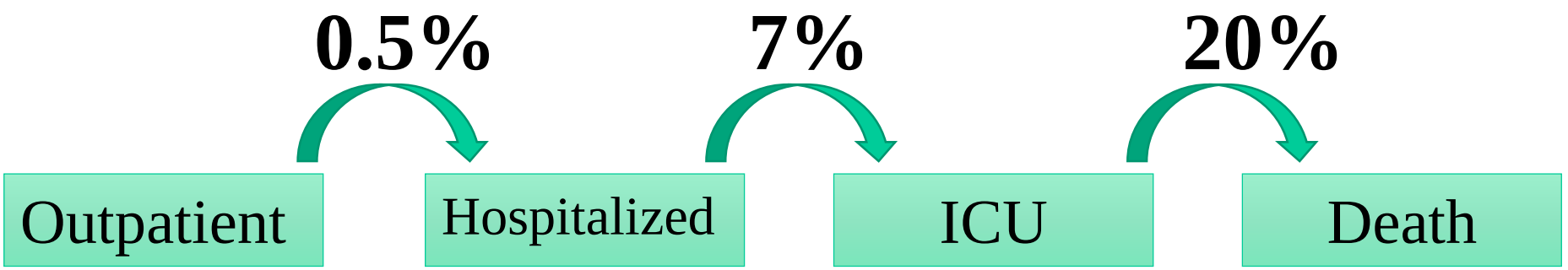


2010 – 2018 Taiwan CDC 病毒監測

Yang MC et al. *Hum Vaccin Immunother*. 2017 Jan 2;13(1):81-89.

Flu in Taiwan

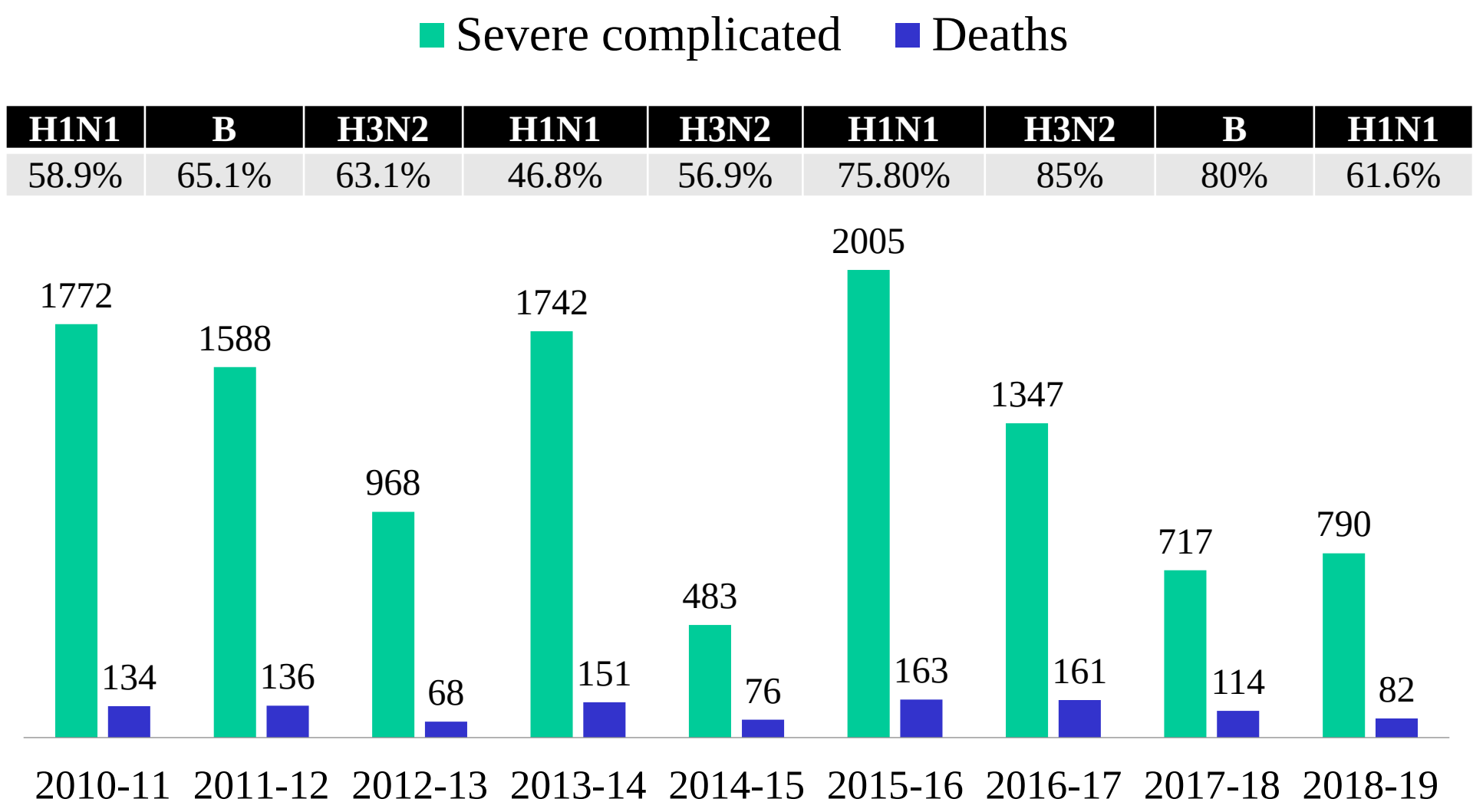
- In Taiwan, among outpatient cases of influenza, about 0.5% require hospitalization, of which 7% of the patients with serious complications need intensive care, and of which the mortality rate is about 20%.



https://www.cdc.gov.tw/professional/info.aspx?treeid=78b629884c927028&nowtreeid=E02C24F0DACDD729&tid=9BA8ECA515DCAAF5

1. 疾病管制署健保IC卡資料庫次級資料2011年至2015年肺炎或流感門診及住院就診人次分析(未歸人)

Laboratory-confirmed complicated influenza and influenza-associated deaths in Taiwan



https://www.cdc.gov.tw/submenu.aspx?treeid=1f07e8862ba550cf&nowtreeid=bcc260c5073450d7

流感併發重症累計病例數比較(10/1-9/30)

流感季 (10月至隔年9月)	流感併發重症確定病例數 (有接種流感疫苗者[1])								流感併發重症死亡病例數 (有接種流感疫苗者[1])					
	H1N1	H3N2	A未分型[2]	B型	H1N1 &B型	H3N2 &B型	A未分型 &B型	總計	H1N1	H3N2	A未分型[2]	B型	H3N2 &B型	總計
2019-20	93	10	1	0	0	0	0	104	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018-19	1348	497	74	75	0	0	0	1994	199	68	15	14	0	296
	116	98	6	8	0	0	0	228	13	12	0	0	0	25
2017-18	190	316	34	575	0	0	2	1117	30	49	4	120	0	203
	19	61	6	115	0	0	0	201	3	8	0	18	0	29
2016-17	60	1244	59	96	0	2	0	1461	12	187	13	20	1	233
	9	242	3	12	0	0	0	266	1	34	0	2	0	37
2015-16	1506	89	71	257	1	0	0	1924	310	14	27	57	0	408
	59	15	5	32	0	0	0	111	14	5	1	7	0	27

Updated: 2019/10/27 註[1]：指接種當季疫苗14天後發病者、註[2]：因病毒量過少，致無法分型

抗流感病毒藥物使用建議

（台灣感染症醫學會 updated 2019/10）

診斷

- 臨床醫師在評估病患是否有流感時
  - 應以患者之**臨床症狀及流行病學依據逕行診斷**
  - 搭配年齡、潛在疾病、發病時間、疾病嚴重程度等條件給予適當處置
  - **不得以實驗室檢驗**，特別是流感快篩的結果，**作為診斷及用藥依據**。
- **臨床診斷**
- **流行病學診斷**
- **實驗室診斷**

抗流感病毒藥物使用建議

（台灣感染症醫學會 updated 2019/10）

診斷

- **臨床診斷**
  - 病人感染流感後常出現**類流感症狀**(influenza-like illness)，表現主要為合併**高燒**之急性呼吸道疾病，且經常伴有肌肉酸痛、頭痛及**極度倦怠感**。
  - 需特別注意，易產生併發症的**高危險族群**，感染流感時**可能會缺乏如發燒等典型之類流感症狀**。
  - 流感可引起肺炎，亦可能產生**肺部以外的疾病表現**（如心肌炎、腦炎、細菌感染及慢性疾病惡化等）。
  - 即使病人已於該流感季期間接種流感疫苗，並不能以此排除流感的可能性。
- **流行病學診斷**
- **實驗室診斷**

流感的診斷

- 臨床診斷
- 流行病學的診斷
- 實驗室檢驗的診斷
  - 病毒培養與鑑定
  - 快速抗原偵測(流感快篩)
  - RT-PCR檢測
  - 血清學檢測

抗流感病毒藥物使用建議

(台灣感染症醫學會 updated 2019/10)

實驗室診斷

- 實驗室方法
  - 流感快篩
    - 為操作簡單之流感抗原檢測方法，只需15-30分鐘便可判斷檢驗結果。
    - 考慮採檢時機、操作者採檢技術差異、及流感快篩檢驗工具之敏感性（低至中度），**於流感流行期間，若快篩結果為陰性，仍不能排除流感**
  - 病毒核酸檢測(RT-PCR)
    - 分子生物學檢驗，敏感性高，檢驗時間通常只需數小時。
  - 病毒培養
    - 為傳統之檢驗方法，利用細胞來培養檢體中的流感病毒，檢驗時間約需數天至14天。
  - 血清抗體檢測：
    - 不適用於急性期疾病之診斷，因檢驗時需使用成對血清檢體(paired sera)，包括急性期及恢復期之血清，兩者之間隔要至少10天；若兩者之血清效價有至少4倍以上之差異，表示患者近期曾受到感染。

Interpretation of Influenza Testing Results on Respiratory Specimens

Test and Characteristics	Low Influenza Activity[a]		High Influenza Activity[b]	
Rapid influenza diagnostic test (antigen detection: immunoassay or immunofluorescence assay) • Low to moderate sensitivity • High specificity ➢ Should not be used for testing of patients with progressive illness and hospitalized patients	*Negative result* NPV is high: ➢ Likely to be a true-negative result if an upper respiratory tract specimen was collected <4 days after illness onset ➢ If epidemiologically linked to an influenza	*Positive result* PPV is low: ➢ Likely to be a false-positive result ➢ Confirm with molecular assay	*Negative result* NPV is low: ➢ May be a false-negative result, especially if upper respiratory tract specimen was collected >4 days after illness onset, cannot exclude influenza virus infection ➢ Do not withhold antiviral treatment if clinically indicated ➢ Confirm with molecular assay	*Positive result* PPV is high: ➢ Likely to be a true-positive result
Molecular assay (nucleic acid detection: rapid molecular assay[c], multiplex PCR, RT-PCR) • High sensitivity • Very high specificity ➢ Can be used for both outpatients and hospitalized patients ➢ RT-PCR assays should be used for hospitalized patients	*Negative result* NPV is high: ➢ Very likely to be a true-negative result, especially if an upper respiratory tract specimen was collected <4 days after illness onset	*Positive result* PPV is low: ➢ False-positive result is possible	*Negative result* NPV is low: ➢ May be a true-negative result in a patient without lower respiratory tract disease ➢ Consider potential for a false-negative result, especially if an upper respiratory tract specimen was collected in a hospitalized patient ➢ For hospitalized patients on mechanical ventilation who tested negative on upper respiratory tract specimens, collect lower respiratory tract specimens (endotracheal aspirate, BAL fluid) for testing	*Positive result* PPV is high: ➢ Likely to be a true-positive result

(IDSA Influenza Clinical Guidelines CID 2019;68(6):e1-47)

Rapid Tests for Influenza, Respiratory Syncytial Virus, and Other Respiratory Viruses: A Systematic Review and Meta-analysis (Bruning AH et al CID 2017;65:1026-32)

- Evaluating these tests against PCR as the reference standard
- Of 179 studies included, **134 evaluated rapid tests for influenza viruses**, 32 for respiratory syncytial virus (RSV), and 13 for other respiratory viruses
- Summary **sensitivity and specificity estimates of tests for influenza were 61.1% and 98.9%**
- For RSV, summary sensitivity was 75.3%, and specificity, 98.7%

Table 2. Subgroup Analyses: Accuracy Estimates

	Pooled Sensitivity (95% CI)	Pooled Specificity (95% CI)
Influenza		
Virus type		
Influenza A	68.1 (58.9–76.0)	99.2 (98.5–99.6)
H1N1	54.0 (47.6–60.3)	99.1 (98.5–99.5)
Influenza B	71.0 (56.8–82.1)	99.6 (99.2–99.8)
Influenza A+B	61.1 (53.3–68.3)	98.9 (98.4–99.3)
Population		
Children	66.1 (52.9–79.3)	98.3 (97.2–99.5)
Adults	34.1 (14.0–54.1)	99.2 (98.2–100.0)
Point-of-care testing	62.1 (47.6–74.7)	98.4 (96.7–99.2)
Rapid test		
QuickVue Influenza A+B	44.6 (29.1–60.0)	99.3 (98.8–99.9)
Sofia Influenza A+B	75.3 (59.2–91.5)	95.3 (91.5–99.2)
BinaxNow Influenza A&B	44.1 (23.3–64.9)	99.4 (98.6–100.0)
Directigen Flu A+B	35.8 (11.8–59.7)	99.2 (98.0–99.4)
mariPOC	76.1 (53.5–98.7)	99.4 (98.3–100.0)

Rapid Tests for Influenza, Respiratory Syncytial Virus, and Other Respiratory Viruses: A Systematic Review and Meta-analysis (Bruning AH et al CID 2017;65:1026-32)

- A **growing need for rapid**, sensitive, and specific identification of viral pathogens to allow effective prompt antimicrobial therapy, decrease extra diagnostic testing, and implement pathogen-specific infection control measures
- **More sensitive and specific rapid multiplex molecular assays are in development**
  - Potential to rapidly and accurately identify not only respiratory viruses but also bacteria
  - **Fully automated molecular methods** are **commercially available** and presented as designed to be operated at the point of care
- Non-molecular rapid tests will still have a role in practical patient care
  - Be aware of their availability and performance characteristics

Multiplex PCR system for the rapid diagnosis of respiratory virus infection: systematic review and meta-analysis (Huang HS et al CMI 2017; online)

- A summary of evidence for the diagnostic accuracies of **three multiplex PCR systems** on the detection of viral respiratory infections
  - BioFire FilmArray RP (**FilmArray**), Nanosphere Verigene RV+ test (**Verigene RV+)** and Hologic Gen-Probe **Prodesse assays**
- A comprehensive search up to 1 July 2017
- Twenty studies of 5510 patient samples eligible for analysis

Characteristics of BioFire FilmArray RP, Nanosphere Verigene RV+ Test and Hologic Gen-Probe Prodesse assays

Name	BioFire FilmArray	Verigene	GenProbe Prodesse
Technology	Melting curve analysis	Gold nanoparticles with silver signal amplification	Melting curve analysis
Assays	Respiratory panel	Respiratory virus plus test	ProFlu+, ProFAST+, ProAdeno+, ProParaflu+, Pro hMPV+
Targets	• Adenovirus • Coronavirus HKU1 • Coronavirus NL63 • Coronavirus 229E • Coronavirus OC43 • hMPV • Human Rhinovirus/enterovirus • FluA • FluA/H1 • FluA/H3 • FluA/H1−2009 • Influenza B • Parainfluenza virus 1 • Parainfluenza virus 2 • Parainfluenza virus 3 • Parainfluenza virus 4 • RSV	• FluA-H1 • FluA-2009 H1N1 • FluA-H3 • FluA • Influenza B • RSV A • RSV B	• ProFlu+: FluA, influenza B, RSV • ProFAST+: Seasonal FluA/H1, seasonal FluA/H3, 2009 H1N1 influenza • ProAdeno+: Adenovirus • ProParaflu+: Parainfluenza 1, parainfluenza 2, parainfluenza 3 • Pro hMPV+: hMPV
Throughput	1 sample per instrument	1 sample per processor	14 samples per run
Run time (hours)	1	<2.5	4–5
Hands-on time	2 minutes	5 minutes	1.5 hours
Sample preparation included?	Yes	Yes	No
Reagent storage conditions	Room temperature	2–8°C and –20°C	–70°C

FluA, influenza A virus; hMPV, human metapneumovirus; RSV, respiratory syncytial virus.

Accuracy estimates of included studies

Test	Sensitivity (95% confidence interval)	Specificity (95% confidence interval)	LR+ (95% confidence interval)	LR− (95% confidence interval)	AUC (95% confidence interval)
Influenza A virus					
FilmArray	0.911 (0.848, 0.949)	0.995 (0.988, 0.998)	186 (74.9, 368)	0.0928 (0.052, 0.153)	0.99 (0.98, 1)
Verigene	0.949 (0.882, 0.979)	0.982 (0.944, 0.995)	65.2 (15.9, 185)	0.058 (0.0206, 0.122)	0.99 (0.98, 1)
Prodesse	0.954 (0.871, 0.985)	0.983 (0.973, 0.989)	57.65 (40.48, 76.94)	0.053 (0.022, 0.0896)	0.99 (0.99, 1)
Summary	0.940 (0.902, 0.964)	0.987 (0.979, 0.992)	76.9 (42.4, 126)	0.06 (0.03, 0.101)	0.99 (0.98, 1)
Influenza B virus					
FilmArray	0.822 (0.689, 0.905)	0.994 (0.980, 0.998)	167.50 (40.9, 503.00)	0.188 (0.093, 0.313)	0.98 (0.94, 1)
Prodesse	0.963 (0.907, 0.986)	0.992 (0.969, 0.998)	136.73 (30.5, 385)	0.04 (0.014, 0.097)	0.99 (0.99, 1)
Summary	0.932 (0.877, 0.963)	0.993 (0.986, 0.997)	154.4 (66.5, 304)	0.072 (0.034, 0.124)	0.99 (0.99, 1)
RSV					
FilmArray	0.911 (0.821, 0.958)	0.987 (0.971, 0.994)	73.1 (29.4, 150)	0.09 (0.0412, 0.172)	0.98 (0.98, 0.99)
Verigene	0.977 (0.929, 0.993)	0.993 (0.962, 0.999)	219.30 (23.5, 868)	0.027 (0.0076, 0.072)	0.99 (0.98, 1)

FilmArray, Verigene RV+ and ProFlu+ demonstrated a summary sensitivity for FluA of 0.911 (95% CI, 0.848-0.949), 0.949 (0.882 - 0.979) and 0.954 (0.871-0.985), respectively

Multiplex PCRs demonstrated **high diagnostic accuracy**, with area under the receiver operating characteristic curve equal to or more than 0.98 for 5 viruses (**flu A & B, RSV, adenovirus, hMPV**) except for adenovirus (AUROC 0.89)

Multiplex PCR system for the rapid diagnosis of respiratory virus infection: systematic review and meta-analysis (Huang HS et al CMI 2017; online)

Conclusions:

- Point estimates calculated from eligible studies showed that the **three mPCRs** (FilmArray, Verigene RVt and ProFlut) are **highly accurate** and may provide important diagnostic information for early identification of respiratory virus infections.
- In patients with low pretest probability for FluA, these three mPCRs can predict a low possibility of infection and may justify **withholding empirical antiviral treatments**

抗流感病毒藥物使用建議

(台灣感染症醫學會 updated 2019/10)

實驗室診斷

- **採檢方法**
  - 依照不同的流感檢驗工具，檢體種類可分為上呼吸道檢體（鼻腔拭子、鼻咽拭子、鼻腔沖洗液、鼻腔抽取液、咽喉拭子）、下呼吸道檢體（痰、氣管沖洗液）及血清。
  - 目前依疾管署規範，**通報流感重症**之**採檢項目**為**咽喉拭子及血清**，但有些研究顯示以**鼻咽拭子及下呼吸道檢體**進行 RT-PCR 陽性率較高。
  - **重症病人**如已接受插管治療或支氣管鏡檢查，為增加診斷率，可考慮另外採集**下呼吸道檢體**作流感病毒RT-PCR檢驗。
  - 若有感染**新型 A型流感**之可能，除應採集咽喉拭子及血清檢體外，建議**一併採集痰液或下呼吸道抽取物**（氣管沖洗液、深部痰），通報新型A型流感並採檢送驗。
  - 當預備進行呼吸道**採檢**時，應導引病患至**負壓或通氣良好之單獨房間**實行**操作**，同時醫護人員需穿著適當的個人防護裝備。

流感的治療

- 症狀治療
- 抗病毒藥物：
  - M_2 channel blockers: amantadine, rimantadine
  - Neuraminidase inhibitors: oseltamivir, zanamivir, peramivir, laninamivir
  - Polymerase inhibitor: favipiravir
  - Cap-dependent endonuclease inhibitor: **baloxavir**
- 輔助治療(adjunctive therapy)

抗病毒藥物治療的效益

- 臨床試驗中，於發病後早期（48小時內）開始治療，可降低病毒量、縮短流感病程、減緩症狀
- 許多觀察性研究指出，對於出現嚴重症狀或可能出現併發症之高風險族群，即使超過48小時給藥，仍可減低出現併發症之風險、縮短住院日數、降低死亡率
- 考慮病患潛在疾病與症狀，必要時及早使用

抗流感病毒藥物使用建議

（台灣感染症醫學會 updated 2019/10)

抗流感病毒藥物給藥時機

- 疑似或確診為流感之輕症患者。
- 疑似或確診為流感之輕症患者，且為流感高傳播族群。
- 疑似或確診為流感之輕症患者，且為流感重症高風險族群。
- 疑似或確診為流感且已出現危險徵兆者，依臨床醫師判斷需轉送醫院治療或有住院必要之病人。
- 疑似或確認為流感重症者，包括生命徵象不穩定及需入住加護病房之病人。
- 需要投予流感預防性藥物者。

抗流感病毒藥物使用建議

（台灣感染症醫學會 updated 2019/10)

抗流感病毒藥物給藥時機

- 疑似或確診為流感之輕症患者，且為**流感重症高風險族群**。
- 當決定給予抗病毒藥劑治療，就應儘快給予，**不需等到檢驗確診才給藥**。另研究顯示症狀開始後48小時內開始治療，療效最佳。
- 然而有些研究顯示病情較嚴重或需住院病人若症狀超過48小時才投予抗流感藥物，仍有縮短住院天數或減低死亡率的助益。
- 疑似或確認為流感重症者，包括生命徵象不穩定及需入住加護病房之病人。
  - 建議**立即給予**抗流感病毒藥物治療。

台灣目前四種已上市之抗流感藥物使用對象、劑量與療程(IDST update 2019/10/17)

藥物	Oseltamivir		Zanamivir		Peramivir		Baloxavir	
使用方式	吞服；無法吞服者（如需使用鼻胃管者）則打開膠囊泡水或糖漿服用		經口吸入		單次點滴靜脈注射15 分鐘以上		單次口服	
適用年齡	成人及兒童(含足月新生兒)		5 歲(含)以上		小兒(早產兒及新生兒除外)及成人		成人和青少年(12歲以上)	
標準治療劑量	輕症	重症	輕症	重症	輕症	重症	輕症	重症
	13 歲以下依體重調整劑量；13 歲(含)以上或體重40kg 以上者75mg BID*		10mg BID	不建議使用	成人單次300mg 、小兒10mg/kg	成人600mg QD	單次服用40mg;體重80kg或以上80mg	現無臨床數據
標準療程	5天	5天*	5天		單次	可依症狀連續多日反覆投予	單次	

*有些專家建議針對流感重症病患，可考慮投予加倍之抗流感病毒藥物劑量(如oseltamivir 150mg BID)，或延長用藥期間，但目前尚未有臨床研究支持此用法。

公費流感抗病毒藥劑種類

藥物學名	Oseltamivir	Zanamivir	Peramivir	Favipiravir
商品名	Tamiflu 克流感	Relenza 瑞樂沙	Rapiacta	Avigan
包裝	75 毫克膠囊 10 入之盒裝	盒裝有碟型吸入器 1 枚，及含 4 孔規則間隔之泡囊 5 入	點滴用注射袋 300mg	淡黃色的膜衣錠，每錠200mg
使用方式	口服	吸入	注射	口服
使用對象	成人及兒童（含足月新生兒）	五歲以上	小兒（早產兒與新生兒除外）與成人	成人
標準治療劑量	75mg 每天2次，共5天	每天 2 次，每次吸 2 孔，共 5 天	每日300mg	第 1 日每回服用 1600mg，每日2回。第 2 至 5 天每回 600mg，每日2回。總投藥期間為 5 天。
小兒是否需調整劑量	是	否	是	本藥劑具致畸胎性，禁使用於兒童，且無小兒投藥經驗
腎功能不佳是否調整劑量	是	否	是	是
備註	可能出現輕微噁心及嘔吐，未成年病患需注意神經精神症狀	用於慢性呼吸系統病患時需特別注意支氣管痙攣及呼吸困難等症狀	提供新型A型流感通報病例使用，且需由醫院申請並經醫療網指揮官同意	無我國藥物許可證，提供新型A型流感通報病例使用（限於其他抗流感病毒藥物無效或效力不足的情況），且需由醫院申請並經醫療網指揮官同意。本藥劑具致畸胎性，孕婦及有懷孕可能的婦人禁止使用

公費流感抗病毒藥劑使用對象

一、符合「流感併發重症」通報病例(屬第四類法定傳染病需通報於法定傳染病通報系統)

二、孕婦經評估需及時用藥者(領有國民健康署核發孕婦健康手冊之婦女)

三、未滿5歲及65歲以上之類流感患者

四、確診或疑似罹患流感住院(含急診待床)之病患

註：罹患流感因病況嚴重而需住院治療的病患，並不包括門診病人，依此條件使用公費藥劑者須備有「住院紀錄」

四、具重大傷病、免疫不全(含使用免疫抑制劑者)或流感高風險慢性疾病之類流感患者

註：

1.重大傷病：IC卡註記為重大傷病或持有重大傷病證明紙卡者。

2.流感高風險慢性疾病之ICD CODE為B20 , Z21 , D80-84 , D86 , D89 , E08-13 , E66 , E85 , G09 , G20 , G30-32 , G35-37 , G40 , G45-46 , G65 , G70 , G72 , I00-02 , I05-09 , I11-13 , I20-22 , I24-25 , I27-28 , I34-37 , I42-43 , I44-45 , I47-49 , I50-51 , I60-62 , I63 , I67-69 , I70 , I72 , I73-74 , I77 , I79 , J40-45 , J47 , J60-70 , J82 , J84 , J96 , J98 , J99 , K70-72 , K73-76 , B18-19 , M05-06 , M30-31 , M32-34 , M35 , M94.1 , N00-01 , N03 , N05 , N04 , N18-19 , N26-27 , Q89.01 , Z90.81。

五、肥胖之類流感患者(BMI>=30)

公費流感抗病毒藥劑使用對象

六、經疾病管制署各區管制中心防疫醫師認可之類流感群聚事件
　　註：選填此項者需填寫群聚編號

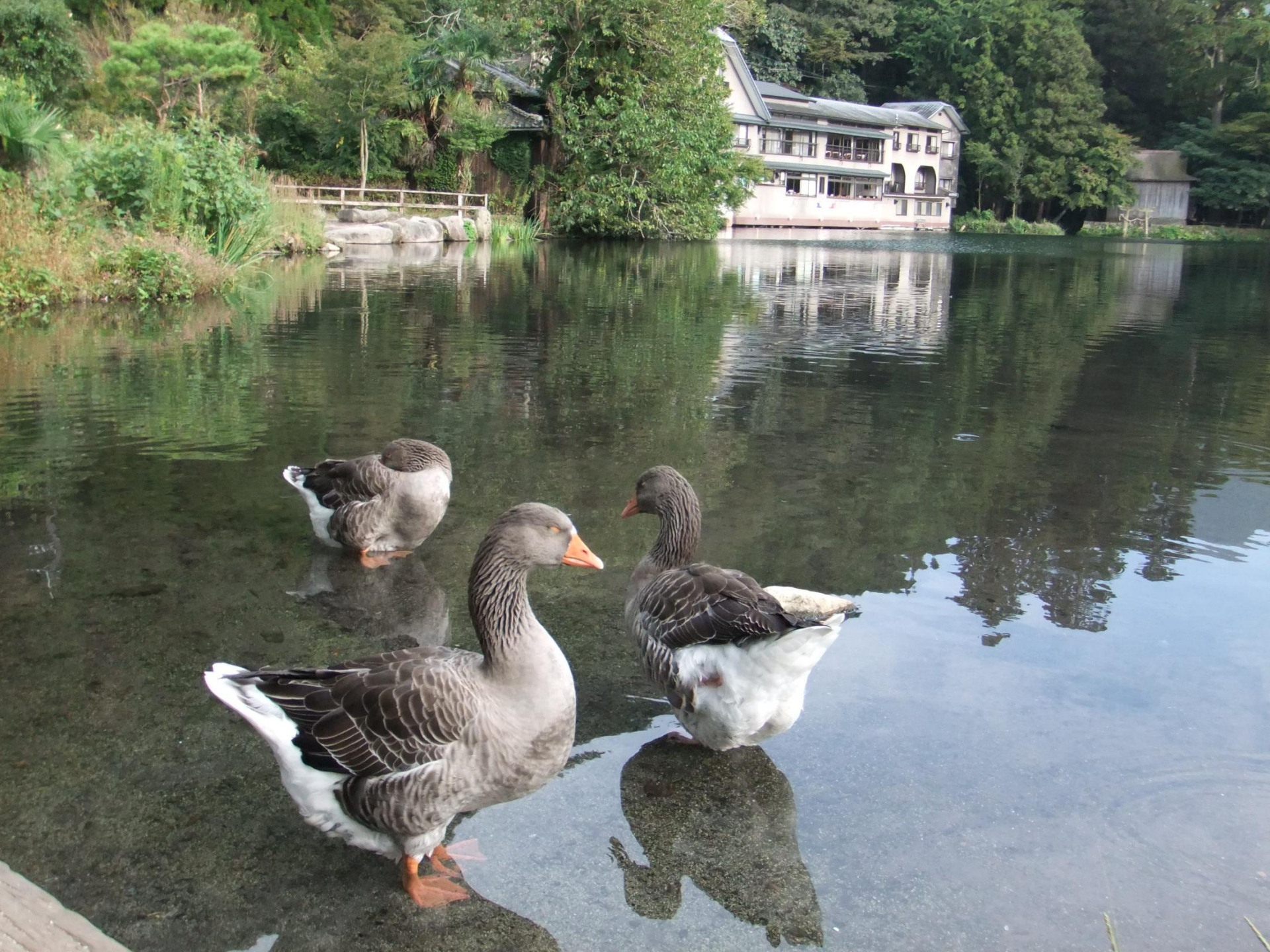
七、符合新型A型流感通報定義者(屬第五類法定傳染病需通報於法定傳染病通報系統)

八、新型A型流感極可能/確定病例之密切接觸者(接觸者名冊經傳染病防治醫療網區正/副指揮官或其授權人員研判需給藥者)
　　註：選填此項者需填寫所接觸之個案的法傳編號

九、動物流感發生場所撲殺清場工作人員(接觸者名冊經傳染病防治醫療網區正/副指揮官或其授權人員研判需給藥者)
　　註：選填此項者需填寫禽畜場名稱或編號

公費流感抗病毒藥劑擴大使用對象

- 擴大使用期間 ： 流感流行季
  - 每年 12 月 1 日至隔年 3 月 31 日
  - 將視每年疫情狀況調整
- 擴大使用對象：
  - 有類流感症狀，且家人/同事/同班同學有類流感發病者
    - 係指該就醫之類流感患者，其家人/同事/同班同學有類流感發病



流感的預防

- 接種流感疫苗
  - 目前預防流感的最有效方式
- 暴露後預防藥物 Post-exposure prophylaxis
  - 特殊高風險族群、群聚事件
- 感染管制措施
  - 醫療機構、長期照顧機構、人口密集機構
- 個人衛生
  - 咳嗽禮節、手部衛生、有症狀時戴口罩

流感疫苗的作用

- 針對病毒的表面抗原產生免疫力，尤其是血球凝集素，能降低感染的可能性以及疾病的嚴重度(若發生感染時)
- 所產生的抗體只能對抗一種流感病毒的型別或亞型
  - 針對不同型別或亞型的病毒不具保護力或有限的保護力
- 所產生的抗體只能對抗一種流感病毒株的抗原
  - 針對同型別或亞型病毒的新變異株不具完全的保護力

流感疫苗的產製方法

- 製造過程及技術需要”種子病毒(seed virus)“的製造
  - **以雞胚胎來繁衍**
  - **以細胞株來繁衍**
- 以基因技術來產製疫苗

滅菌的（去活化）流感疫苗

- 台灣地區目前使用的疫苗
- 每劑疫苗含三種流感病毒株
  - 每年更新病毒株
  - 二株A流感病毒，一株B流感病毒

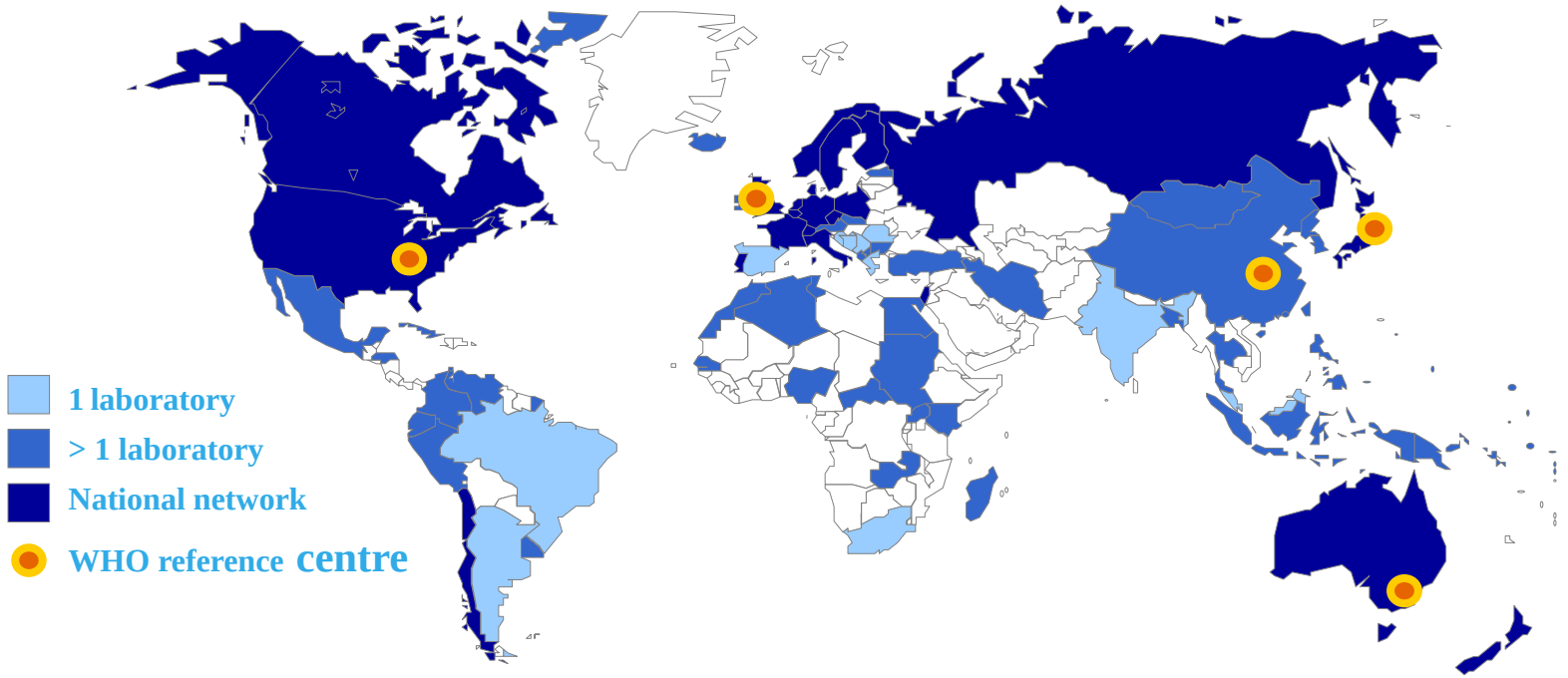
含四種流感病毒株(二A，二B)的疫苗在2013已問世

流感疫苗的病毒株

- 每年更新
- 根據新近分離出來的**流感病毒抗原性分析**, **流行病學資料**, 以及人們**接種後的血清學分析研究**

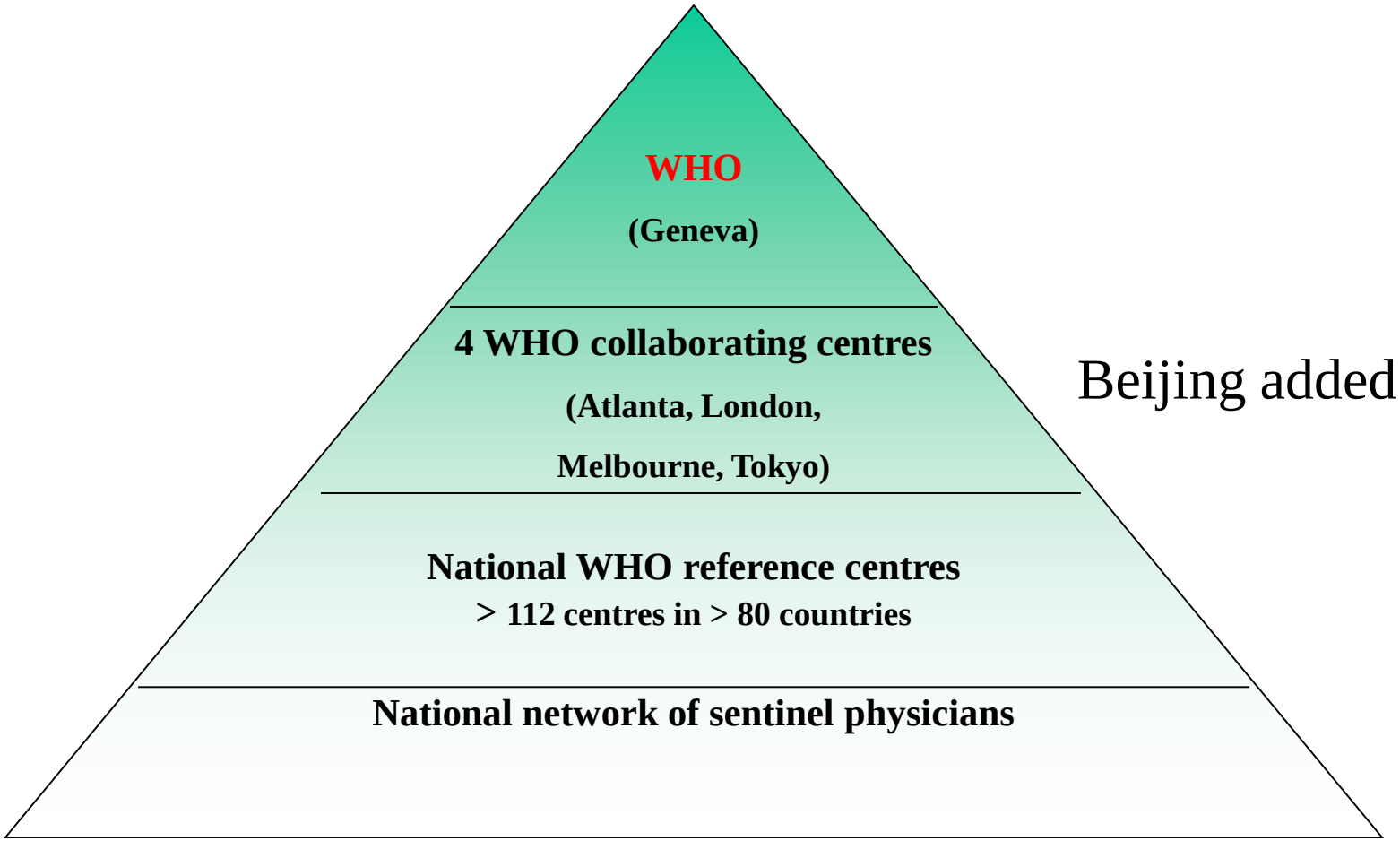
流感監測網

- 由世界衛生組織協調組成的全球流行病學監測網 (包含112 中心, >80 國家)
- 每年:
  - 採檢175,000 – 200,000 樣本
  - 分析2000 – 4000 流感病毒株



流感監測網

- 一個國際的監測網，提供流感個案的訊息及流行中的流感病毒株



Hannoun C. Role of international networks for the surveillance of influenza. Eur Journal of Epidemiol 1994;10:459-61

It is recommended that quadrivalent vaccines for use in the 2018-2019 northern hemisphere influenza season contain the following:

- an A/Michigan/45/2015 (H1N1)pdm09-like virus;
- an A/Singapore/INFIMH-16-0019/2016 (H3N2)-like virus;
- a B/Colorado/06/2017-like virus (B/Victoria/2/87 lineage); and
- a B/Phuket/3073/2013-like virus (B/Yamagata/16/88 lineage).

建議四價，扣除一價

It is recommended that the influenza B virus component of trivalent vaccines for use in the 2018-2019 northern hemisphere influenza season be a B/Colorado/06/2017-like virus of the B/Victoria/2/87-lineage.

It is recommended that trivalent vaccines for use in the 2017-2018 northern hemisphere influenza season contain the following:

– an A/Michigan/45/2015 (H1N1)pdm09-like virus;
– an A/Hong Kong/4801/2014 (H3N2)-like virus; and
– a B/Brisbane/60/2008-like virus.

建議三價，外加一價

It is recommended that quadrivalent vaccines containing two influenza B viruses contain the above three viruses and a B/Phuket/3073/2013-like virus.

- an A/Brisbane/02/2018 (H1N1)pdm09-like virus;
- an A/Kansas/14/2017 (H3N2)-like virus;
- a B/Colorado/06/2017-like virus (B/Victoria/2/87 lineage); and
- a B/Phuket/3073/2013-like virus (B/Yamagata/16/88 lineage).

World Health Organization

Recommended composition of influenza virus vaccines for use in the 2019-2020 northern hemisphere influenza season

2019/02/21 in Beijing

It is recommended that quadrivalent vaccines for use in the 2019-2020 northern hemisphere influenza season contain the following:

- an A/Brisbane/02/2018 (H1N1)pdm09-like virus;
- an A(H3N2) virus to be announced on 21 March 2019*;
- a B/Colorado/06/2017-like virus (B/Victoria/2/87 lineage); and
- a B/Phuket/3073/2013-like virus (B/Yamagata/16/88 lineage).

It is recommended that the influenza B virus component of trivalent vaccines for use in the 2019-2020 northern hemisphere influenza season be a B/Colorado/06/2017-like virus of the B/Victoria/2/87-lineage.

* In light of recent changes in the proportions of genetically and antigenically diverse A(H3N2) viruses, the recommendation for the A(H3N2) component has been postponed. **Till 3/21**

Table 2. Antigenic Analysis of A(H3N2) Viruses – Haemagglutination Inhibition Assay
(with 20nM Oseltamivir, 4 HA units/50 microliters)

		REFERENCE FERRET ANTISERA								
		2a1	2a1b		2a2	3C.3a				
	REFERENCE VIRUSES	EGG SN/X307A	EGG UE/240	EGG NL/10260	EGG SZ/8060	SIAT KS/14	EGG KS/14	3C Clade	DATE COLLECTED	PASSAGE
1	A/Singapore/INFIMH-16-0019/2016 X-307A	**2560**	320	160	160	80	80	2a1	REASS	E5E2E9/E1
2	A/Abu Dhabi/240/2018	640	**10240**	5120	160	80	40	2a1b	2018/01/01	E6
3	A/Netherlands/10260/2018	1280	10240	**5120**	160	160	80	2a1b	2018/02/15	E4/E2
4	A/Hong Kong/681/2018	2560	5120	5120	320	640	640	2a1b	2018/04/09	E6/E2
5	A Switzerland/8060/17	640	80	80	**2560**	40	40	2a2	2017/12/21	E5/E2
6	A/Kansas/14/2017	80	80	80	80	**160**	80	3a	2017/12/14	S3
7	A/Kansas/14/2017	160	160	320	40	640	**1280**	3a	2017/12/14	E7
TEST VIRUSES										
8	A/Florida/15/2019	80	160	160	80	160	20	2a1b	2019/02/04	S2
9	A/Hawaii/09/2019	80	320	40	40	80	<20	2a1b	2019/02/09	S1
10	A/California/127/2018	160	320	160	40	80	<20	2a1b	2018/12/31	S1
11	A/Hawaii/08/2019	160	320	80	80	160	<20	2a1b	2019/02/01	S1
12	A/New Mexico/09/2019	160	160	160	80	160	<20	2a1b	2019/02/05	S1
13	A/New Mexico/10/2019	160	160	160	80	160	<20	2a1b	2019/02/10	S1
14	A/Delaware/12/2019	40	80	80	20	80	<20	2a1b	2019/02/04	S1
15	A/Vermont/06/2019	40	80	80	40	160	<20	2a1b	2019/02/06	S1
16	A/Vermont/09/2019	80	160	160	80	80	<20	2a1b	2019/02/11	S2
17	A/Brisbane/34/2018	40	40	160	40	320	320	3a	2018/03/17	E2/E1
18	A/Lousiana/14/2019	40	40	20	20	320	160	3a	2019/02/06	S1
19	A/Maine/08/2019	40	80	40	20	320	160	3a	2019/02/06	S1
20	A/New Hampshire/13/2019	40	40	40	20	320	160	3a	2019/02/15	S1
21	A/North Dakota/12/2019	80	80	80	40	320	160	3a	2019/02/10	S1
22	A/South Dakota/10/2019	40	40	40	20	320	160	3a	2019/02/18	S1
23	A/Tennessee/09/2019	20	20	40	20	320	160	3a	2019/02/04	S1
24	A/Texas/45/2019	40	40	20	20	320	160	3a	2019/02/07	S1
25	A/Iowa/11/2019	40	40	40	40	640	320	3a	2019/02/07	S1
26	A/Wyoming/06/2019	80	80	160	40	2560	640	3a	2019/02/04	S1

2019-2020流感季流感疫苗

- 抗原成分
  - an A/Brisbane/02/2018 (H1N1)pdm09-like virus; ← 與前一季不同
  - an A/Kansas/14/2017 (H3N2)-like virus; ← 與前一季不同
  - a B/Colorado/06/2017-like virus (B/Victoria/2/87 lineage);
  - a B/Phuket/3073/2013-like virus (B/Yamagata/16/88 lineage).

三價

四價

- 疫苗特性：不活化疫苗
- 接種途徑：肌肉注射
- 接種劑量與間隔：
  - 三價疫苗
    - 6個月以上3歲(35M)以下：0.25mL
    - 3歲(36M)以上：0.5mL
  - 四價疫苗
    - 6個月以上均接種0.5mL

※國小學童於學校集中接種，全面施打1劑

※ 8歲(含）以下首次接種者接種2劑，且間隔至少4週

流感疫苗接種禁忌與注意事項

禁忌症

- 已知對疫苗的成份有過敏者，不予接種
- 過去注射曾經發生嚴重不良反應者，不予接種

注意事項

- 發燒或正患有急性中重度疾病者，宜待病情穩定後再接種
- 出生未滿6個月，因無使用效益及安全性等臨床資料，故不予接種
- 先前接種本疫苗6週內曾發生Guillain-Barré 症候群(GBS)者，宜請醫師評估
- **已知對「蛋」之蛋白質有嚴重過敏者，可在門/住診由熟悉處理過敏症狀之醫事人員提供接種，並於接種後觀察30分鐘，無不適症狀再離開**
- 其他經醫師評估不適合接種者，不予接種

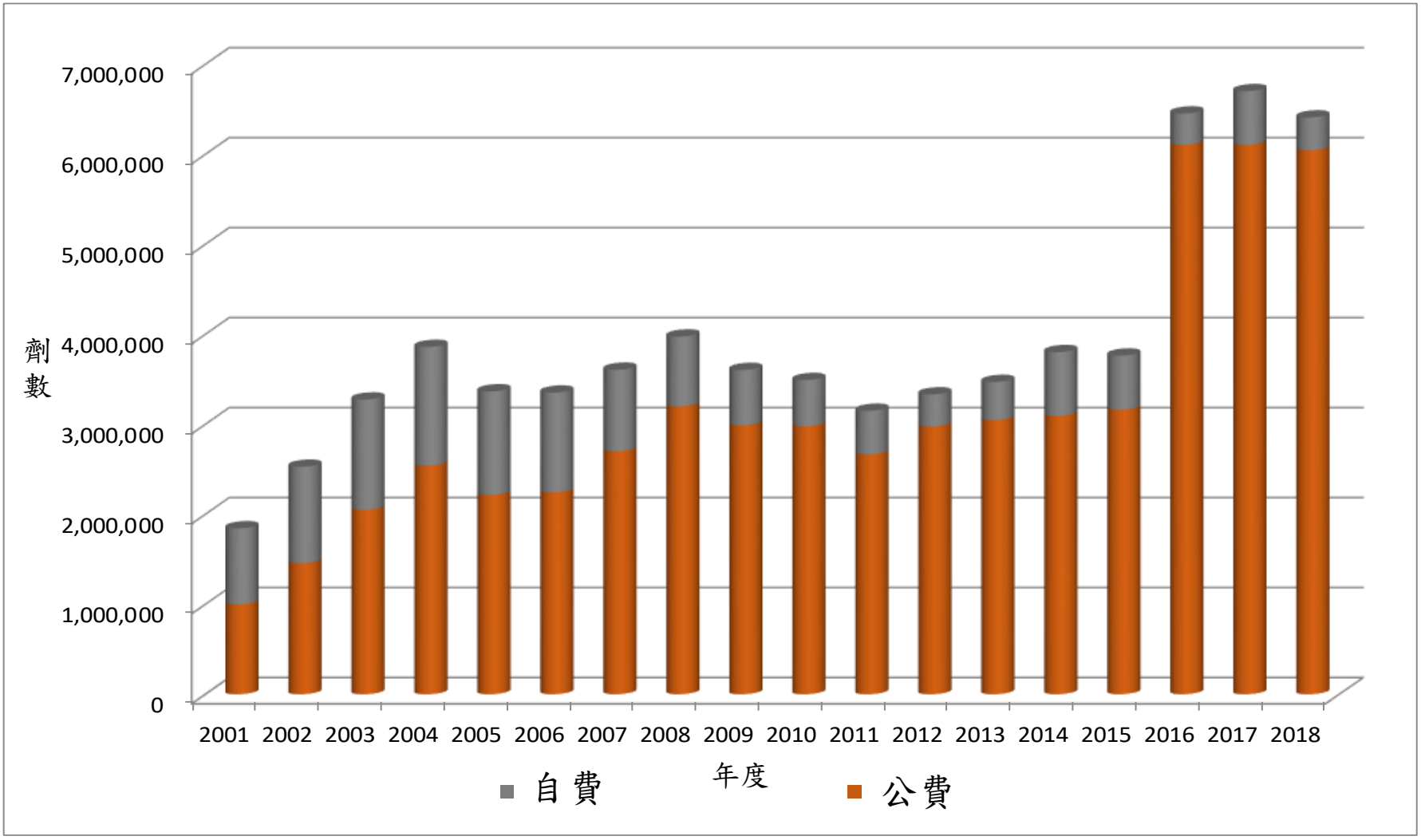
接種後注意事項

- 接種疫苗後有極低的可能性發生立即型過敏反應，嚴重時可能導致過敏性休克。為了能在事件發生後立即進行醫療處置，接種疫苗後應於接種單位或附近稍做休息，並觀察至少30分鐘以上，待無不適後再離開

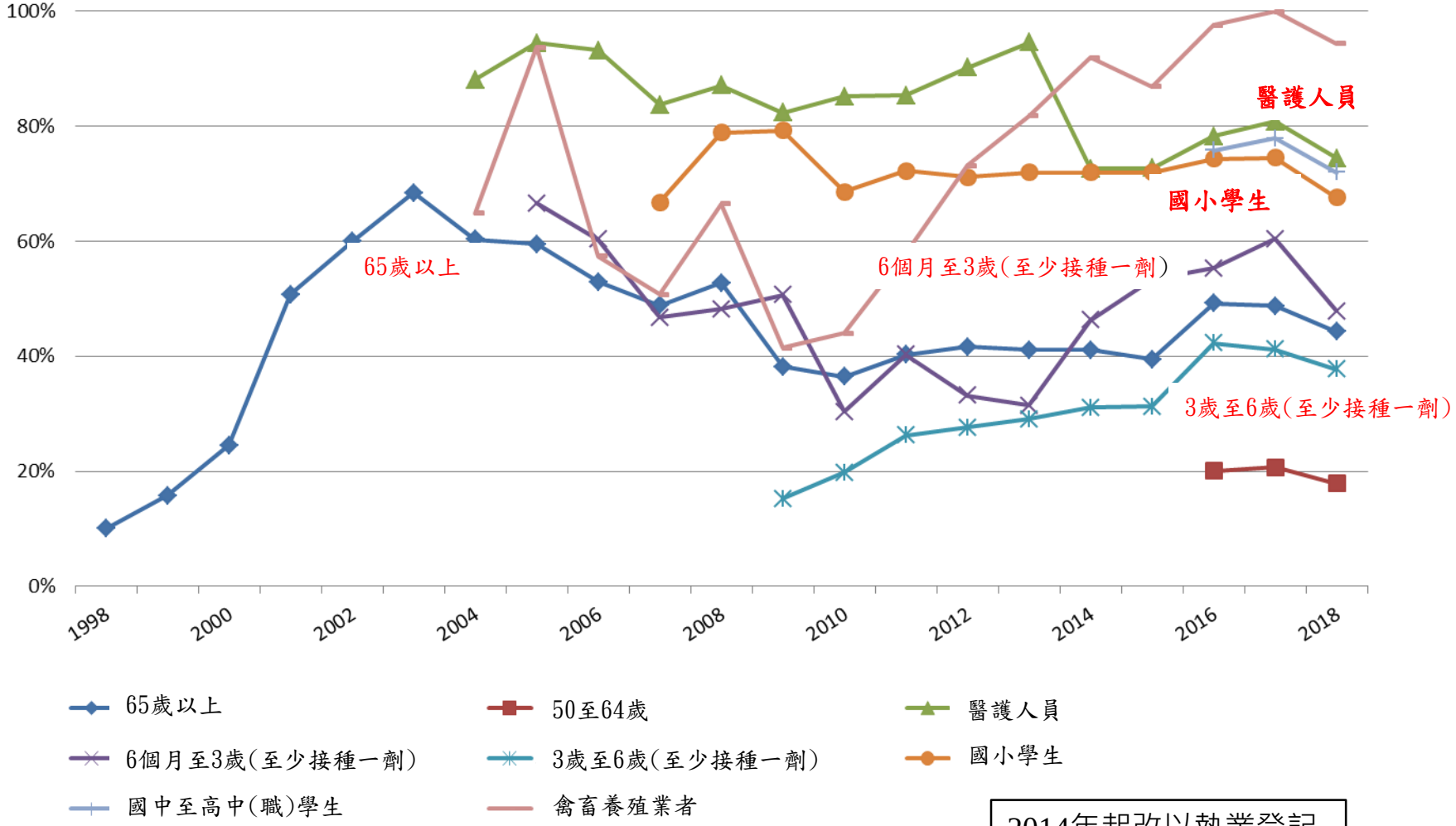
流感疫苗計畫實施對象納入時程表

87年	65歲以上高危險群老人流感疫苗接種先驅計畫
90年	65歲以上老人
92年	醫事防疫人員、禽畜業者
93年	6個月-2歲幼兒
96年	國小學童(1-2年級)
97年	2-3歲幼兒、國小學童(3-4年級)
98年	3-6歲幼兒
101年	國小學童(5-6年級)
102年	60-64歲高風險慢性病患
103年	50-59歲高風險慢性病患、孕婦
105年	19-49歲高風險慢性病患、產後6個月內婦女、50-64歲成人、國高中生
106年	6個月內嬰兒父母、托嬰中心及幼兒園托育及專業人員

我國流感疫苗使用量


7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
劑數
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
年度
自費
公費

歷年各類對象流感疫苗接種率



2014年起改以執業登記人數為分母統計接種率

2018年度資料截至2019/3/7

108年公費流感疫苗接種對象

一、滿6個月以上至國小入學前幼兒
二、國小、國中、高中、高職、五專一至三年級學生
三、50歲以上成人
四、高風險慢性病、罕見疾病及重大傷病患者
五、孕婦及6個月內嬰兒之父母
六、幼兒園托育人員及托育機構專業人員
七、安養、養護、長期照顧等機構對象及其所屬工作人員
八、醫事及衛生等單位之防疫相關人員
九、禽畜養殖等相關行業工作人員、動物園工作人員及動物防疫人員

*高風險族群
高傳播族群

流感疫苗的保護效果

- 隨當年度流行病毒型別不同而有差異
- 在65歲以下的成人，保護效力約在70~90%之間
- 對老年人的保護力稍差，約可減少30～70%流感及肺炎（P&I）住院率
- 在幼兒的研究，完整施打流感疫苗可降低70%嬰幼兒因流感引起的住院比例

The efficacy of influenza vaccination

Effectiveness and Efficacy* (95% CI)	Children[&]	adults	elders
TIV	*Preventing influenza-like illness*		
	36 % (24-46 %)	**20 % (11-29 %)**	**41 % (27-53 %)**
	Preventing lab-confirmed infection		
	59 % (41-71 %)	**61 % (48-70 %)**	**58 % (34-73 %)**
LAIV	*Preventing influenza-like illness*		
	33 % (28-38 %)	**10 % (4-16 %)**	**N/A**
	Preventing lab-confirmed infection		
	80 % (68-87 %)	**62 % (45-73 %)**	**N/A**

* affected by age, immune status of the vaccinee and the antigenic matches.
& lack of RCT evidence for efficacy of TIV to prevent ILI in children under 2 yrs.

Bridges CB JAMA 2000, Jefferson T et al Cochrane Database 2008 & 2010 & 2012

The efficacy of influenza vaccination

Category	Efficacy	Children 2-16 y/o	Adults	Elderlies
Prevent influenza-like illness	Disease reduction rate	28% to 20%	21.5% to 18.1%	6% to 3.5%
	Risk ratio (95% CI)	0.72 (0.65-0.79)	0.84 (0.75-0.95)	0.59 (0.47-0.73)
	NNV	12	29	42
Prevent lab-confirmed influenza	Disease reduction rate	30% to 11%	2.3% to 0.9%	6% to 2.4%
	Risk ratio (95% CI)	0.36 (0.28-0.48)	0.41 (0.36-0.47)	0.42 (0.27-0.66)
	NNV	5	71	30

NNV, number needed to vaccinate

(Cochrane Syst Rev 2018, Issue 2)

Influenza Vaccination in Older Adults

(Andrew MK et al Drugs & Aging 2019; 36:29–37)

- Older adults are particularly **vulnerable to poor outcomes** from influenza over both short- and long-term time horizons
- Although immune responses generally decline with age, the prevention of influenza with vaccination is an important strategy to support healthy aging

Table 1 Influenza vaccine formulations available for older adults

Vaccine	Type	Content	Dose, mL	Route
Inactivated tri- or quadrivalent vaccine	Subunit	15 ug HA per antigen	0.5	IM
Adjuvanted inactivated trivalent influenza vaccine	Subunit	MF59 adjuvant 15 ug HA per antigen	0.5	IM
High-dose inactivated trivalent influenza vaccine	Subunit	60 ug HA per antigen	0.5	IM
Recombinant quadrivalent influenza vaccine	Recombinant	45 ug rHA per antigen	0.5	IM

HA hemagglutinin, *rHA* recombinant hemagglutinin, *IM* intramuscularly


Thank you for your attention!!