



登革熱、屈公病之診斷及治療

高雄市立小港醫院

內科部 感染科

感染控制室主任

張科 醫師

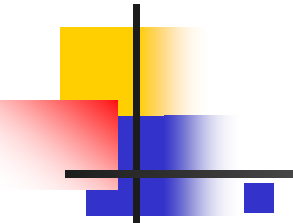


高雄市政府衛生局函

- 各級醫療院所非具公務身分之本市執業醫師，發現本市登革熱疑似個案時，依循「法定傳染病通報系統」完成登革熱疑似個案通報及採檢程序（不含登革熱主動監視系統或症狀監視系統之不明熱採檢），經行政院衛生署疾病管制局檢驗結果確定為「陽性個案」，且符合當年度流行季之確診前10例，可獲獎勵金新台幣5千元整，第11例後依醫院評鑑等級，區分為區域級（含）以上醫院，前200名每例可獲獎勵金新台幣1千元整，區域級以下醫院前100名每例可獲獎勵金新台幣2千元整（不分區、累計制）。

中華民國99年3月20日

高雄市政府衛生局函



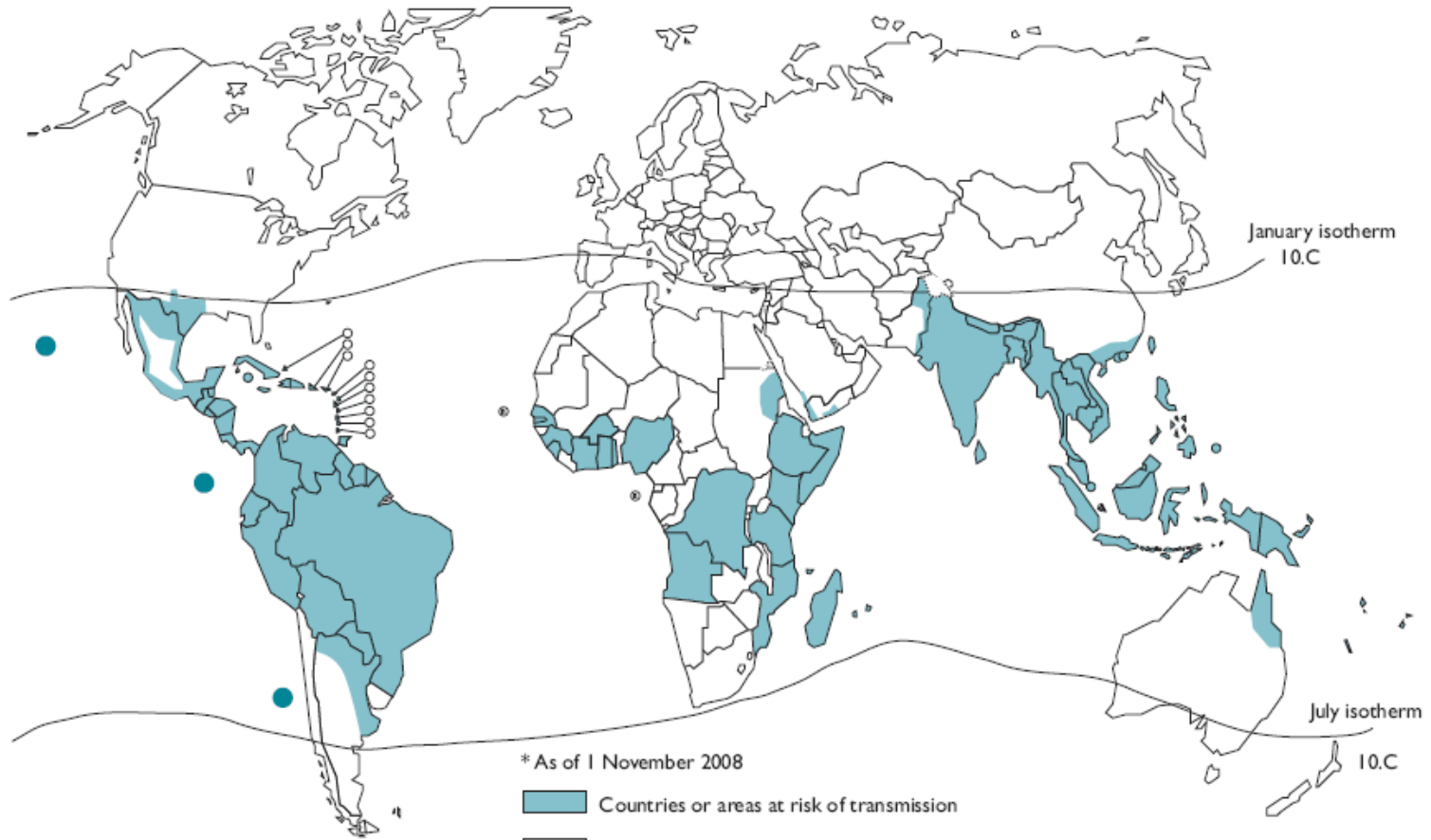
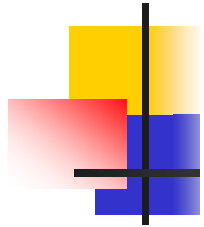
■ 另本轄醫療院所倘出現蓄意規避通報或經本市衛生主管機關認定，統計確診個案就診應通報而未通報年度累計達5例(含)以上，以致延誤緊急防疫時間而危及市民健康安全者，將依違反醫師法第25條規定，提送醫師公會或本市醫師懲戒委員會議處，並依「傳染病防治法」第39及第64條規定處以新台幣9萬元以上45萬元以下罰鍰。

中華民國99年1月20日

高市衛疾管字第0990003156號

全球登革熱流行分布圖

Dengue, 2008*



Source: ©WHO, 2009. All rights reserved.

2010年東南亞國登革熱疫情概況

印度	泰國	寮國	柬埔寨	越南
27196例	115845例	22772例	12347例	109304例
104死亡	141死亡	45死亡	37死亡	84死亡

馬爾地夫	斯里蘭卡	馬來西亞	新加坡	印尼	菲律賓
737例	34105例	46171例	5364例	80065例	131976例
1死亡	241死亡	134死亡	0死亡	>511死亡	788死亡

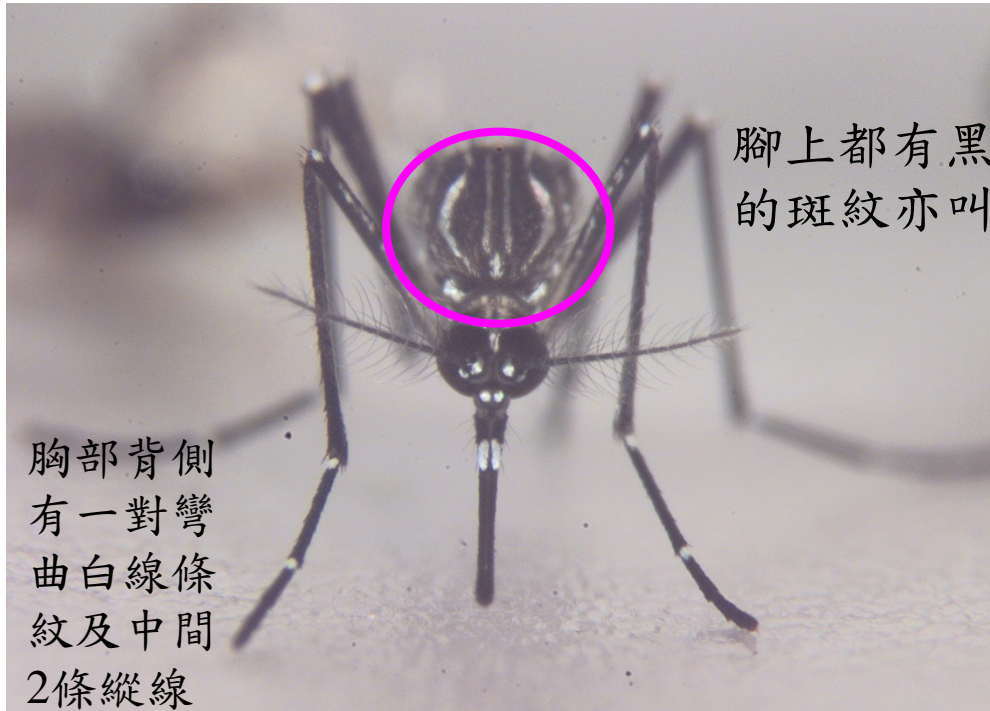
登革熱的簡介

- 登革熱俗稱「天狗熱」或「斷骨熱」，是一種藉由病媒蚊叮咬而感染的急性傳染病，主要呈現發燒、出疹、肌肉骨骼疼痛等症狀，依抗原性可分為 I、II、III、IV 型。
- estimated annual occurrence: 100 million cases of dengue fever
 - 250,000 cases of dengue hemorrhagic fever
 - a mortality of 25,000 per year



台灣傳播登革熱的病媒蚊

Aedes aegypti



胸部背側
有一對彎
曲白線條
紋及中間
2條縱線

腳上都有黑白相間的斑紋亦叫花腳蚊

吸血多次 戶內活動

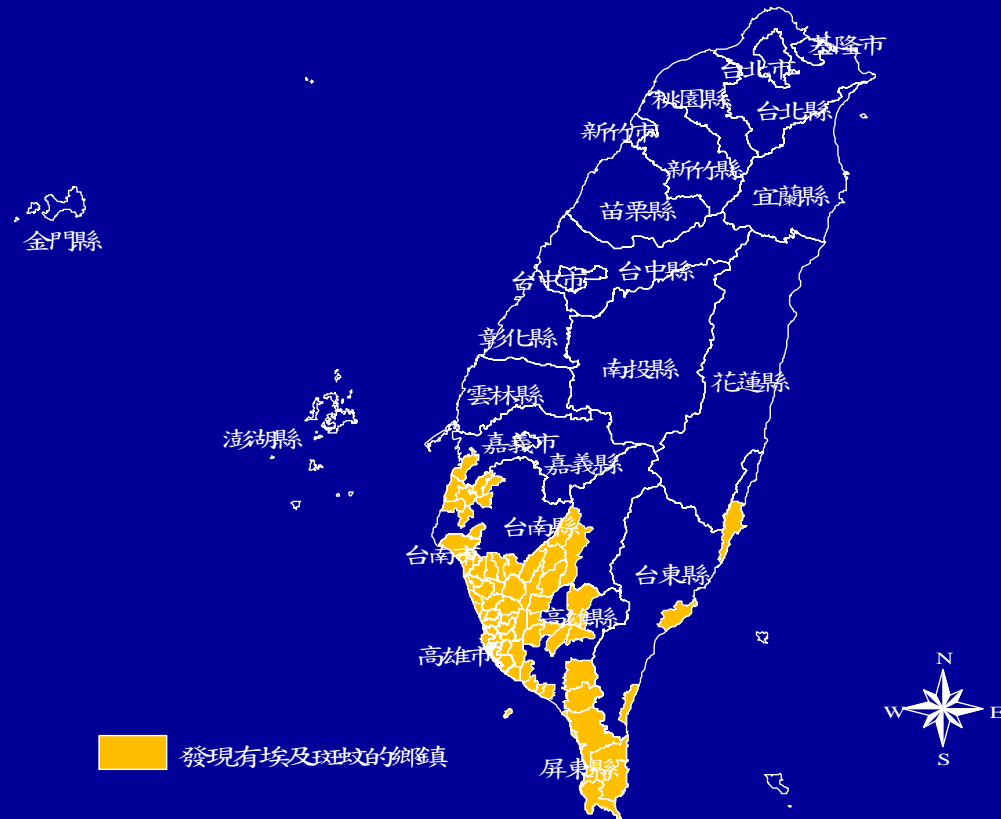
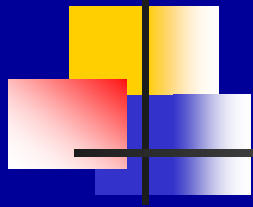
Aedes albopictus



胸部背面有一條白線

吸到飽 戶外活動

白線斑蚊分布於全台灣1500公尺以下的平地及山區 埃及斑蚊在台灣之分布(下圖)

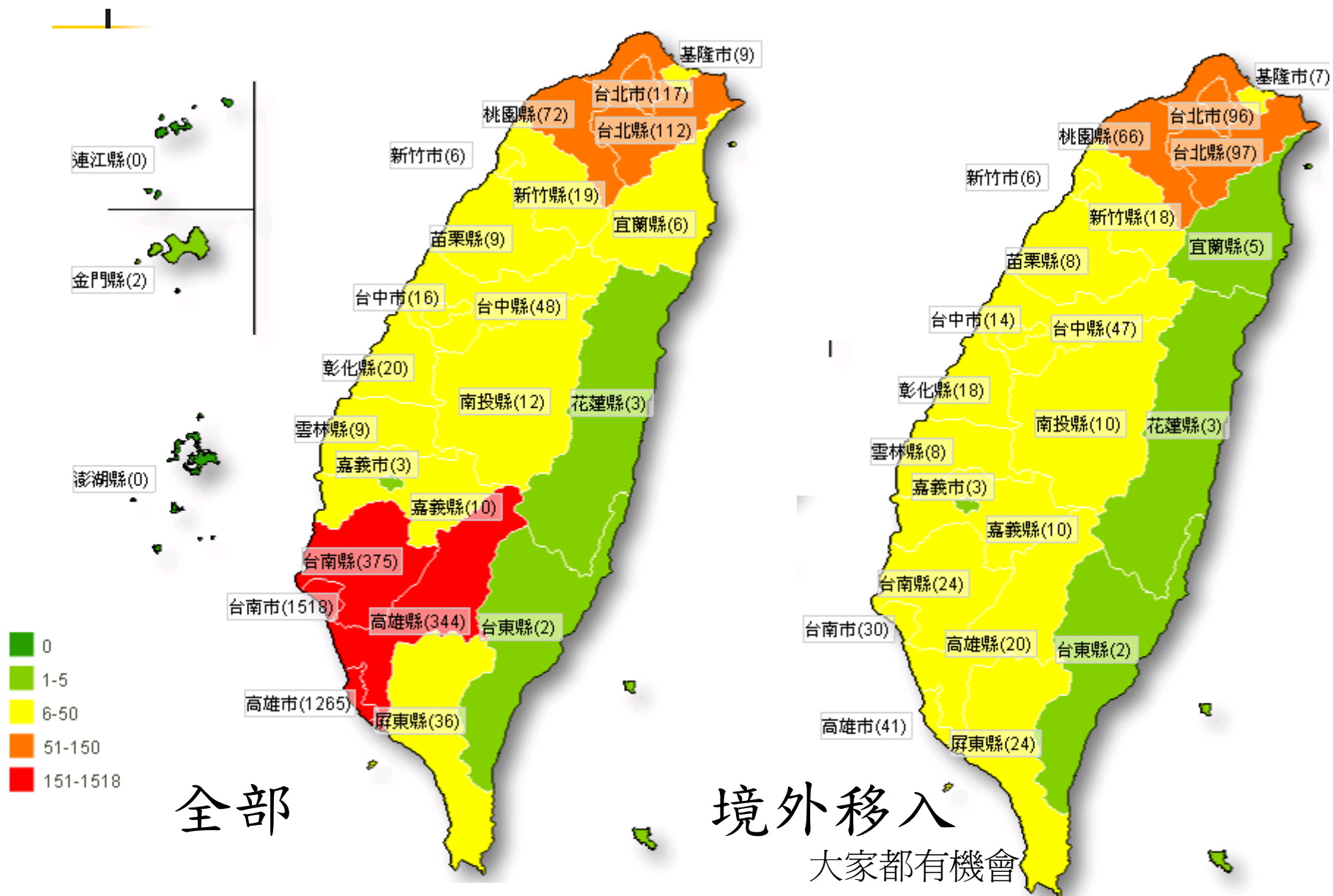




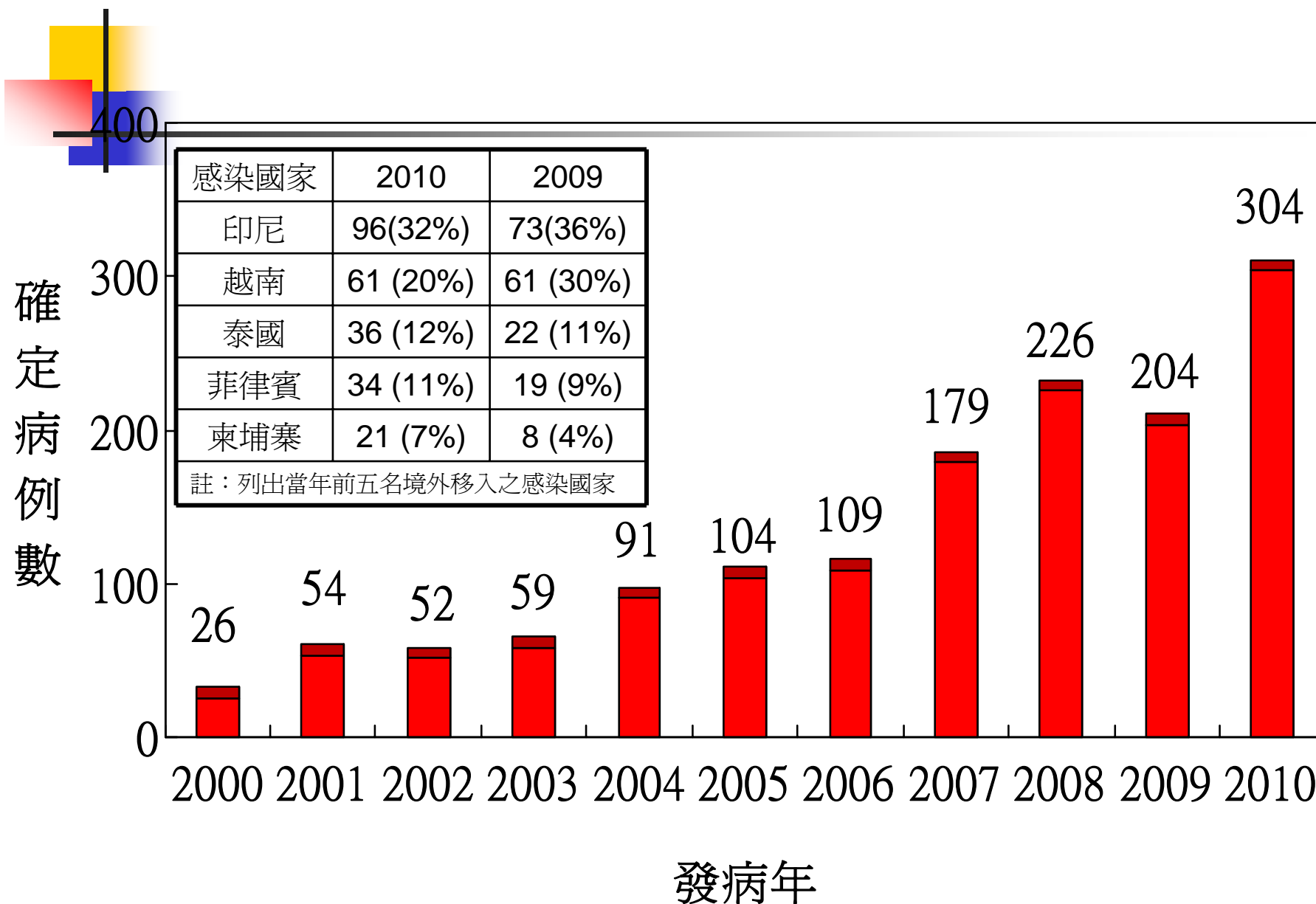
DF/DHF在臺灣流行情形

- There was three outbreaks of dengue virus infection in 1915, 1931, and 1942 in Taiwan
- then endemic dengue infection did not appear in the island until 1981
- 5387 cases in 2002 in Kaohsiung
 - 91.5% were aged > 20 years old

2006年1月到2009年4月



台灣區登革熱境外移入確定病例趨勢圖



2008年台灣登革熱病毒分型-國家別

感染國家	總計	I	II	III	IV	未分型
未確定	2	1				1
印尼	48	8	11	3	10	16
印度	3	1				2
宏都拉斯	1	1				
東加	4	1				3
柬埔寨	10	1	1	1		7
泰國	30	11	2	2		15
馬來西亞	8	3	3	1		1
菲律賓	25		3	9		13
越南	73	30	3	5		35
新加坡	7	3	1			3
孟加拉	1			1		
緬甸	14	3		1		10
中華民國	488	174	30		1	283
總計	714	237	54	23	11	389

分析核心基因以探討台灣第三型登革熱 病毒的親源關係之研究

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高雄醫學大學附設醫院 ³檢驗部 ⁵內科部 感染內科

⁴市立小港醫院 內科部

登革熱是一種以蚊子為媒介的全世界最重要之傳染病。目前為止，根據病毒不同基因的親源關係分析，第三型登革熱病毒被分為五個基因型，即第一至第五基因型。為了探討 2005 和 2006 年於南台灣分離的第三型登革熱病毒株基因變異和分子演化的特性，我們分析 12 株病毒之核心基因的 290 個核苷酸序列，並和基因資料庫中各國第三型登革熱病毒株 (包括 4 株 1998 和 1 株 1999 台灣分離株) 做比較。我們發現 2005 和 2006 年病毒株在此段核苷酸序列，有 5.4—6.2% 的差異，且由親源關係分析可知這 2 年病毒株分別屬於不同的基因型，因此可以推論 2005 年和 2006 年的第三型登革熱病毒並不是同一流行株所造成的連續性傳播。另外，和第三型登革熱病毒之原始株 (H187) 比較，可知這些核苷酸變異多發生在遺傳密碼的第三個核苷酸位置，而呈現非同義的變異。除此之外，我們的結果顯示，2006 年的 8 個登革熱和 2 個出血性登革熱病毒株，在此 290 個核苷酸序列中並沒有明顯的差異性。另外，根據親源關係分析的結果，可知 1998、1999 和 2006 年的台灣第三型登革熱病毒株是屬於第三基因型。值得注意的是，2005 年 2 個台灣病毒株明顯地屬於不同的基因型。由此台灣登革熱第三型病毒的分子流行病學分析，我們可以清楚地瞭解各年之間的登革熱流行，是否為連續性或是地方性登革熱病毒的再次出現，或者是其他國家的境外移入株導致的流行。

關鍵詞：核心基因，第三型登革熱病毒，親源關係分析

(高雄醫誌 2008;24:55—62)

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DF: Fever (2- 7 days) with ≥ 2 of the followings:

- **Headache**
- **Retro-orbital pain**
- **Myalgia/ arthralgia**
- **Rash**
- **Nausea and vomiting**
- **Haemorrhagic manifestations (positive tourniquet test(*), petechiae, gum bleeding, epistaxis, menorrhagia, or GI bleeding)**
- **Leukopenia**



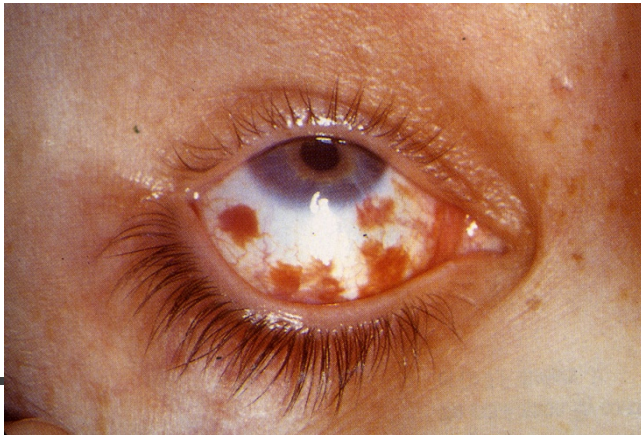
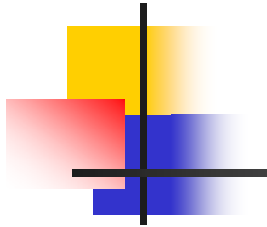
典型登革熱的臨床症狀

- 第一期(第一天到第三天):急性前期,畏寒.全身無力.骨頭酸痛.後眼球痛.關節痛.喉嚨痛像流行性感冒,食慾不振.乾嘔.嘔吐,睡不著
- 第二期(第四天):緩解期,燒退(**danger**),症狀減輕,
- 第三期(第五天到第六天):急性後期,體溫回升(雙峰型的發燒),症狀重現
- 第四期(第六天以後):恢復期,燒退,病人出紅疹,**2-4**週後才完全恢復

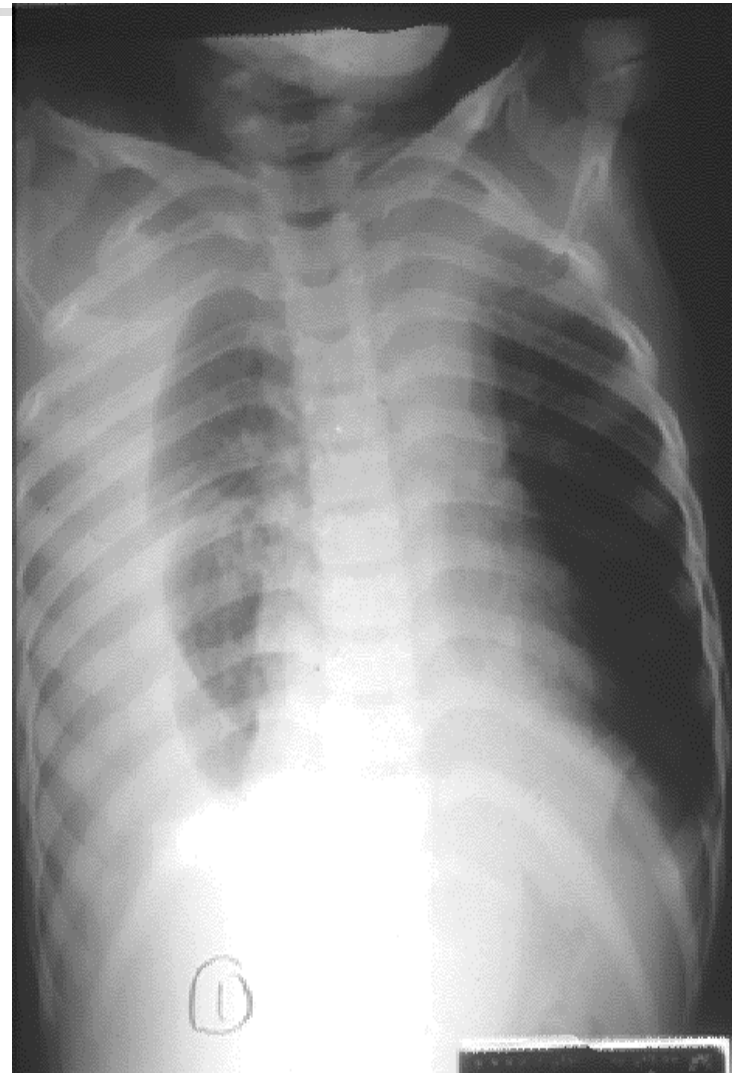


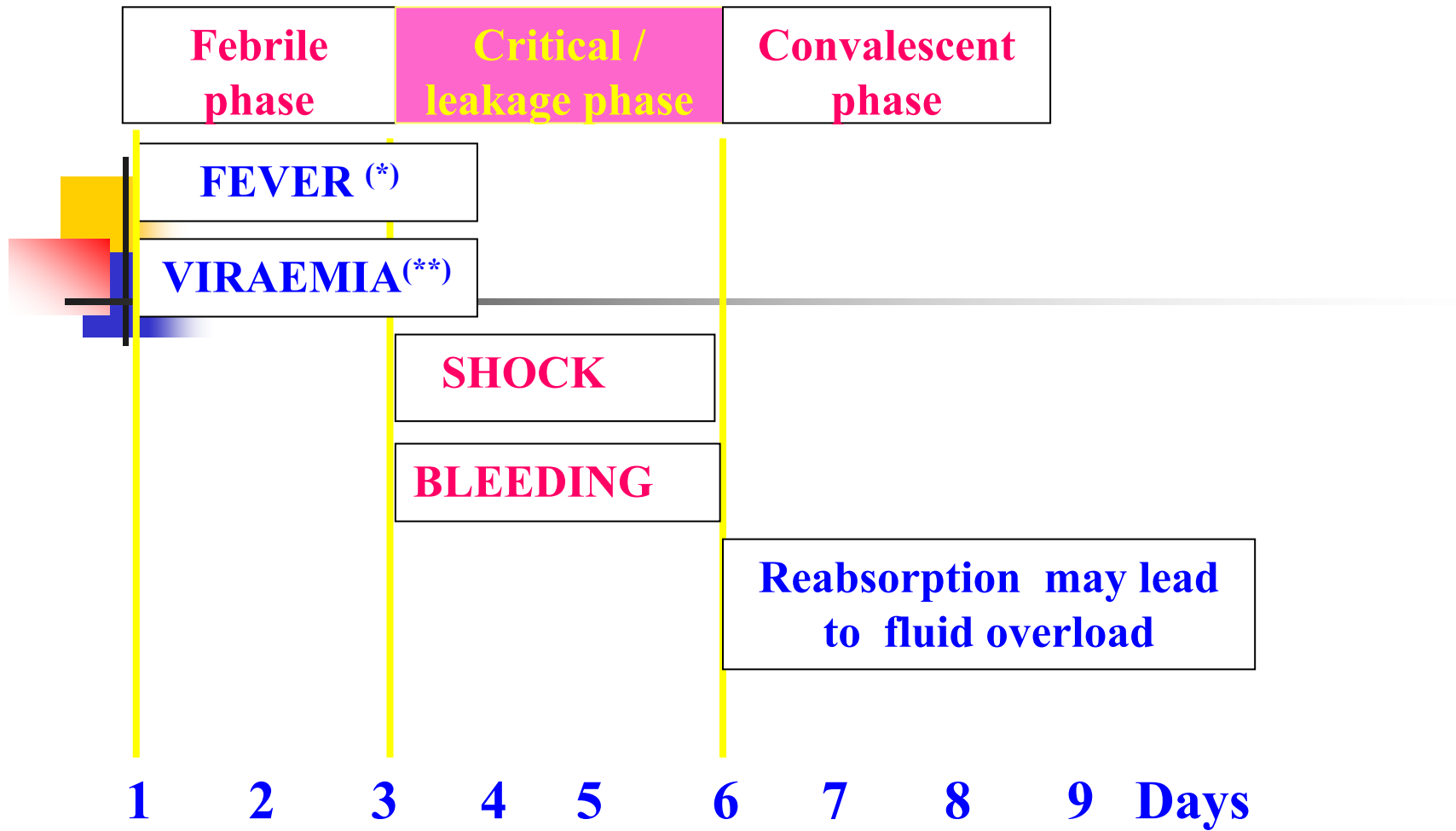
Dengue fever 檢驗數據特色

- ❖ 紅血球正常,白血球在第3-6天會下降到2000-3000,開始bandemia, 後期單核球增多
- ❖ **GOT和GPT輕微升高(GOT > GPT)**
- ❖ 血小板下降(十萬以下)
- ❖ **PT(minor) 和 APTT延長(major)**
- ❖ **Albumin decrease**
- ❖ **Platelet lowest: days 7**
- ❖ **WBC decreased: days 5**
- ❖ 病毒血症發病前一天,後五天
- ❖ 病毒在蚊子經八至十二天增殖
- ❖ 潛伏期三至八天 甚至十天以上



**Wilder-Smith
, N Engl J Med, 2005**

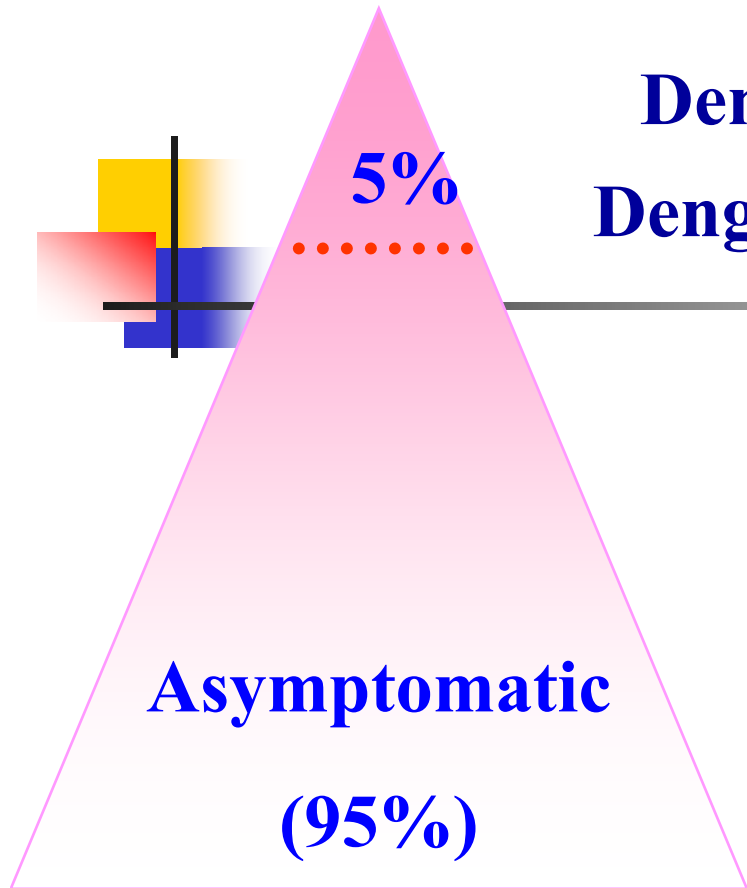




Complications

Disease course of DHF

給水適當 第七八天以後減量 以免肺積水



*** Dengue virus- 4 serotypes**
(DEN-1, DEN-2, DEN-3, DEN-4)

*** Transmitted by *Aedes- aegypti***

CASE DEFINITION (WHO 1997)



- DHF: high fever, hemorrhagic signs, thrombocytopenia, hemoconcentration
- DSS: all of the above plus
 - rapid, weak pulse or undetectable pulse
 - narrow blood pressure, hypotension or BP = 0
 - cold, clammy skin and restlessness



DHF

以下四項皆須具備

1.發燒

■ 2.出血傾向:符合以下一項以上:

- (1)血壓帶試驗陽性
- (2)點狀出血、瘀斑、紫斑
- (3)黏膜、腸胃道、注射點滴處或其他地方出血
- (4)血便、吐血

■ 3.血小板下降(十萬以下)

■ 4.血漿滲漏(plasma leakage):因微血管滲透性增加之故,須符合以下一項以上:

- (1)血比容上升**20%**以上(依據不同年紀標準)
- (2)輸液治療後:血比容下降**20%**
- (3)肋膜積水或腹水

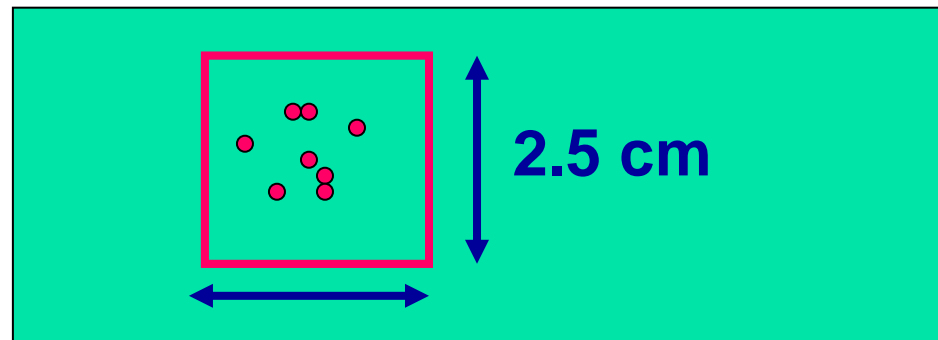
■ DHF 不是DF 加出血 一定要有血漿滲漏(plasma leakage)



GRADING SEVERITY OF DHF (WHO 1997)

- Grade I: fever + positive tourniquet test
- Grade II: fever + spontaneous bleeding (skin or other hemorrhage)
- Grade III (DSS): shock with rapid, weak pulse, narrow blood pressure or hypotension, cold, clammy skin, restlessness
- Grade IV (DSS): profound shock with undetectable blood pressure or pulse

The tourniquet test is performed by inflating a blood pressure cuff to a point mid-way between the systolic and diastolic pressure for five minutes. The test is considered positive when **>20 petechiae** in a **2.5 cm (1 inch) square** are observed.



Positive Tourniquet Test



midway between systolic and diastolic blood pressures **five**

Clinical diagnosis of DHF based on WHO's criteria, 1997

Clinical: * **Fever**

* **Bleeding manifestations**

* **Shock**

Laboratory:

* Evidence of Plasma leakage: Rising Hct \geq 20%.

* Thrombocytopenia \leq 100000/mm³.

Diagnosis

Grading severity

*Grade I | **Non-shock**

*Grade II | **DHF**

*Grade III | **DSS**

*Grade IV |

D/D Dengue fever and Rickettsial diseases

Fever with headache without obvious focus

Relative bradycardia

No

Yes

Eschar

Yes

No

1. 來自疫區如：東南亞、高雄小港、旗津區
2. 頭痛、肌肉、關節酸痛、眼窩痛、背痛、紅疹等症狀
3. 實驗室檢驗結果：
 - ① WBC < 5000/ul 或正常
 - ② PLT < 10萬/ul
 - ③ GOT、GPT 上升且 GOT > GPT
 - ④ aPTT 延長、PT 正常
- 前三天 Segment elevation
- 後三天 monocytosis

爬山, 離島
花東旅遊
史, 柴山, 壽山
↓
大坪頂

考慮 scrub typhus

- ① WBC < 5000/ul 或正常
- ② PLT 稍低
- ③ GOT、GPT 上升且 GOT < GPT
- ④ aPTT 延長、PT 正常
- 動物接觸史
- Anticardiolipin Ab elevation

↓
考慮
Q fever

- ① WBC < 5000/ul 或正常
- ② PLT 稍低
- ③ GOT、GPT 上升且 GOT > GPT
- ④ aPTT 延長、PT 可能不正常
- OX 19 (+)

↓
考慮
Murine typhus

少數符合
但仍無法排除

進入院內醫令進行
登革熱主動疫情監視通報

疫區 + 2項以上臨床
症狀 + 實驗室檢驗
結果多數符合

進入院內醫令進行
登革熱一般傳染病
通報

登革熱評估表（甲表）沒有抽血數據時

檢查項目	預估值
I. 流行病學	4
一週內剛從東南亞回來或和國內流行區有地緣關係	
II. 發燒	2
疼痛症狀: 頭痛、全身酸痛	1
腸胃道症狀: 食慾不振、腹痛、嘔心、下痢	1
沒有咳嗽、流鼻水	1
出疹（手腳 或身體）	3
出血	3
III 鑑別診斷	-8
發燒天數大於一星期	
有明顯其他病原菌感染例如恙蟲病、Q 熱、病上 呼吸道感染	-10
合計分數	

登革熱評估表(乙表)有抽血數據時

檢查項目	預估值
I. 流行病學 一週內剛從東南亞回來或和國內流行區有地緣關係	3
II. 發燒	1
疼痛症狀: 頭痛、全身酸痛	1
腸胃道症狀: 食慾不振、腹痛、嘔心、下痢	1
沒有咳嗽、流鼻水	1
出疹 (手腳 或身體)	2
出血	1
III. 抽血檢查 白血球血小板有下降趨勢	2
GOT、GPT 輕度上升	1
APTT 延長	2
III 鑑別診斷 發燒天數大於一星期	-8
有明顯其他病原菌感染例如恙蟲病、Q熱、病上 呼吸道感染	-10
合計分數	

資料來源-- 韓明榮局長

登革熱指數分級表

分級	分數	得病可能性	防治
五級	10-15	非常可能	大規模防治
四級	6-9	很有可能	小規模防治
三級	4-5	五分五	追當事人
二級	2-3	可能性低	暫不噴藥
一級	0-1	可能性非常低	暫不噴藥

資料來源-- 韓明榮局長

Warning signs of shock

- Clinical deterioration while the temperature falls to normal level.
- Abrupt change from fever to hypothermia.
- Severe abdominal pain.
- Repeated vomiting.
- Vomiting with blood, blood in the stool, gingival bleeding, severe epistaxis.
- Lethargy, or restlessness/ irritability.



Diagnosis: Laboratory

- **Serology: MAC-ELISA, HI**
- **Virus isolation, RT-PCR.**
- 有時兩次才知結果
- Combination of
 - 登革病毒核酸檢驗陽性者 (RT-PCR)
 - 病毒培養，分離出病毒者
 - 血清抗登革病毒之IgM或IgG抗體為陽性，而抗日本腦炎病毒之IgM抗體陰性者 (paired serum)
 - NS1 Ag rapid test

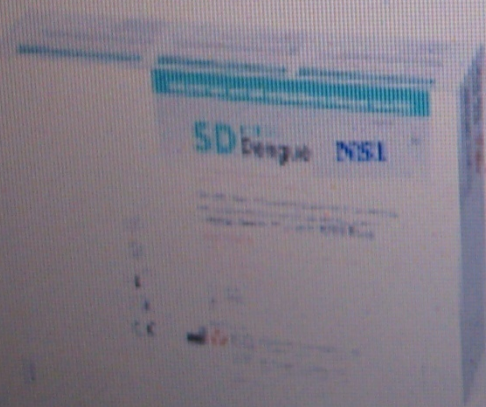


衛生署疾病管制局

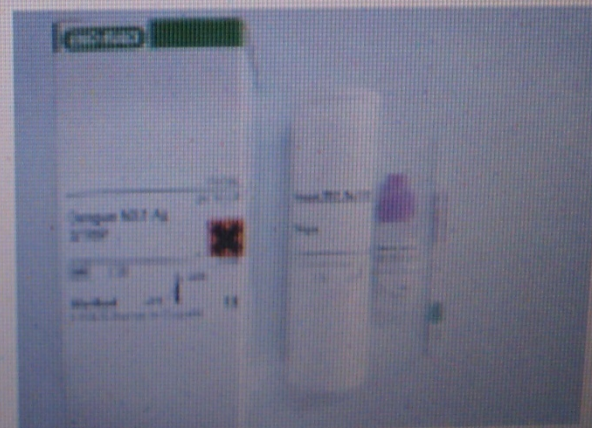
Dengue NS1 Ag Assay for Early Diagnosis of the Dengue Virus Infection

Dengue NS1 Rapid Test Kit

Standard Diagnostics
Dengue NS1 kit



Bio-Rad Dengue NS1 kit



Taiwan CDC
<http://www.cdc.gov.tw>



Dengue NS1 Rapid Test Kit Sensitivity in Primary Infection (Bio-Rad)

Dengue infection	Positive /Total case	Positive rate
DENV-1	39/40	97.5%
DENV-2	10/18	56%
DENV-3	15/20	75%
DENV-4	6/9	67%
Total	70/87	80.5%

資料來自疾管局 黃智雄博士



Advantages of Bio-Rad Ag STRIP rapid test

- Rapid, Simple
- High sensitivity with longer detection time (1-9 DPO) for primary infection
- Excellent specificity (100%)
- Real time detection allowing early medical treatment
- No emergency control measures (insecticide spray) will be needed.

資料來自疾管局 黃智雄博士



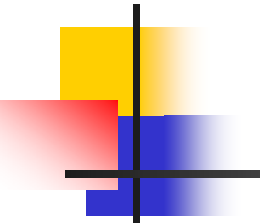
登革熱通報

- 第二類法定傳染病
- 24小時內通報
- 天人交戰

熱煙式噴霧器 vs 壓力式噴霧器



實施化學防治之原則

- 
- 接到疑似病例通報，以病例可能感染地點及病毒血症期間停留地點為中心，以其周圍半徑50公尺為原則，強制執行病媒蚊孳生源清除及查核後，縣市政府依流行病學疫情調查、社區診斷及臨床數據等資料進行綜合研判，經評估如有必要，始實施成蟲化學防治措施
 - 成蟲化學防治應噴藥地點，建議以下列地點為執行原則：
 - (一)感染地點及病毒血症期間停留達2小時以上地點。
 - (二)活動地點其布氏指數在2級(含)以上，或成蚊指數在0.2以上之地點。
 - (三)高風險區之孳生源列管點。
 - (四)群聚點或擴大採檢後新增確定病例地點。
 - (五)經地方主管機關評估有需要執行化學防治之場所。



TREATMENT

- No specific treatment
- To treat shock due to the loss of plasma from the vascular compartment
- Avoid aspirin
- Supportive care ,
- Adequate fluid supply
- Fluid (water, fruit juice, etc)

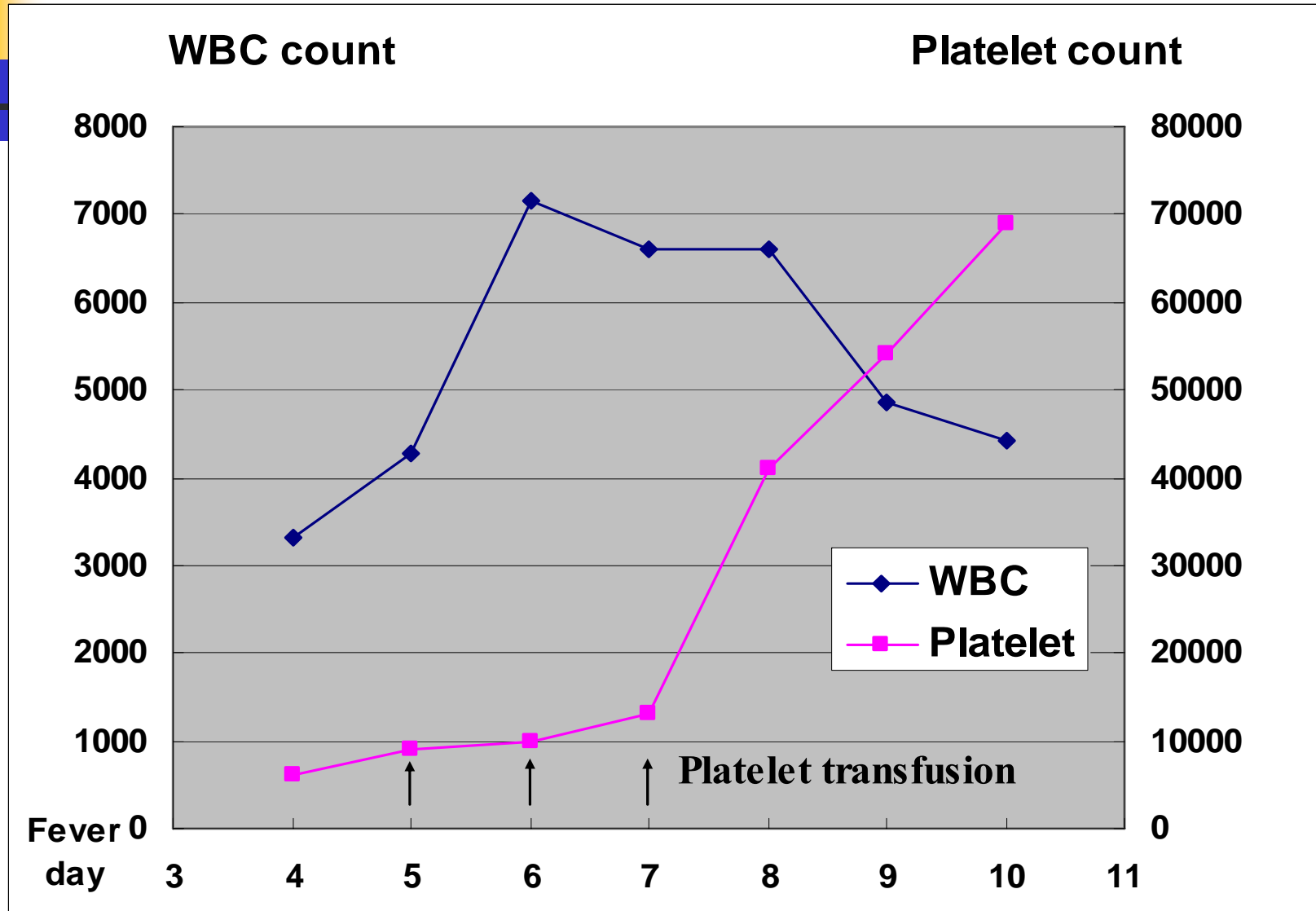
輸血適應症

- | 適應症 | 劑量 |
|---|------------|
| ■ 全血 腸胃道出血合併血比容小於35%
■ 或血比容快速降低大於20% | 20ml/kg |
| ■ 新鮮冷凍血漿 腸胃道出血合併瀰漫性血管內凝血症 | 10-20ml/kg |
| ■ 血小板 腸胃道出血合併血小板小於兩萬 | 1U/5-10kg |
| ■ Cryoprecipitate 腸胃道出血加上fibrinogen 小於1g/kg | 1U/6kg |
- 摘自CDC 登革熱治療指引 講義

胃出血→先打PPI 不要先做胃鏡，避免trauma induce bleeding
酸痛 又疑似 dengue → 不要打aspergic ketone，避免bleeding

Why did these DHF patients in Vietnam have low mortality?

登革出血熱的個案白血球與血小板的變化



Indications for Hospital Discharge



- Absence of fever for 24 hours (without anti-fever therapy) and return of appetite
- Visible improvement in clinical picture
- Stable hematocrit
- 3 days after recovery from shock
- Platelets $\geq 50,000/\text{mm}^3$
- No respiratory distress from pleural effusions or ascites



KMUH and KMHKH experience

- 1998 – 2007
 - 294 DEN-2 / 91 DEN-3
 - DEN-2:
 - more prolonged aPTT (early in the course)
 - Earlier nadir of WBC (4th vs. 5th)
 - Earlier nadir of PLT (6th vs. 7th)
 - DEN-3: more myalgia, skin rash, febrile days
- J Microbiol Immunol Infect. 2009 Dec;42(6):471-8



Suspect dengue fever but not dengue fever

- Rickettsial
(Q fever, murine typhus, scrub typhus)
- Infectious mononucleosis-monocyte predominant, no petechia, young,
- Human immunodeficiency virus-risk factor, sex history, drug abuser,
- Hepatitis A- no severe thrombocytopenia
- Chickenpox-trace history and vesicle
- Acute tonsilitis- see throat; Influenza-family, fever, knock out
- Mycoplasma pneumonia- dry cough
- Salmonella infection-food history

Fever + RUQ pain –Gall bladder wall thickening- acute cholecystitis ?

- Leucocytosis-
dengue fever is not likely
- No leucocytosis-
dengue fever, malaria, hepatitis
(HAV, HBV, HCV)
must be considered





Summary

- No commercial vaccine
- Tourquet test: 多做，特別是難抽血者或不易或不願抽血者。
- 發燒 :注意疫情資訊
xx區 xx里 ,三民區xx里
- 考慮有無登革熱。
無法判定--- 可先住院以利鑑別診斷
- 在醫院可多抽血，以利鑑別診斷。
- 血小板 ----除非胃出血 否則盡量不輸 。
- 漏接比率降至最低。
- Dengue score:輔助角色，可運用之

出國防蚊叮咬 避免屈公病上身



更新日期: 2009/02/06 11:23

(中央社訊息服務20090206 11:22:57, 台北)衛生署疾病管制局於今日確認本(2009)年首例屈公病境外移入病例,個案係40歲女性,於本年1月22日赴馬來西亞探親,1月30日開始出現發燒、關節痛、出疹等症狀,當日返國後直接至醫院就醫,並由醫師通報。本案是衛生署自2007年10月15日公告將屈公病納入第二類法定傳染病以來,除經由機場篩檢而被發現的11名個案之外,首例由醫師通報之確定個案。

該局表示,屈公病(Chikungunya fever)是由屈公病毒(Chikungunya virus)感染所引起,傳播媒介與登革熱同為埃及斑蚊及白線斑蚊,主要症狀為發燒、頭痛、噁心、嘔吐等,但更常見因關節疼痛而無法站直的情形。潛伏期約為2-12天,平均3-7天。全球流行區域涵蓋非洲撒哈拉沙漠以南、亞洲及南美洲的熱帶及亞熱帶區域,於泰國、馬來西亞、緬甸、菲律賓、印尼等鄰近東南亞國家,以及印度、斯里蘭卡等南亞國家均曾發生流行。

我國去(2008)年共有9例屈公病境外移入確定病例,皆是由機場發燒篩檢所發現,分別來自印尼4例、馬來西亞3例、印度及孟加拉各1例。

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Y! 民調中心

時事投票 | 前期投票

西洋情人節快到了,「開心談戀愛,理性談分手」你能做到多少?
(投票期間: 2009/02/05~2009/02/10)

» 前往投票
» 看目前投票結果

Y! 打造完美時間與人脈公式

Patient data



- **Name:** Ox葉
- **Gender:** female
- **Age:** 40 y/o
- **Hospitalization:** 98/1/30 ~ 2/2
- **Travel history :** 1/22 ~ 1/30 to 馬來西亞
- **Chief complaint :** Fever was noted this noon (20090130)

Lab data

WBC (x10 ³ /ul)	4.07
RBC (x10 ³ /ul)	4.14
Hb (g/dl)	13
HCT (%)	39.3
MCV (fl)	94.9
MCHC	33.1
PLT (x10 ³ /ul)	139
Neutrophil (%)	85.5
Lymphocyte (%)	9.6
Monocyte (%)	4.7
Basophil (%)	0.2
Eosinophil (%)	0
Thrombocytopenia (%)	0

- Neutrophilia
- Thrombocytopenia

Na	135
K	3.6
BUN (mg/dL)	8.7
Creatinine	0.91
GOT (IU/L)	20
GPT (IU/L)	12
PT	10.9
PTc	10.8
INR	1.11
PTT	31.7
PTTc	28.3
CRP	2.1

- Pronged PTT
- Normal liver function

Appearance	Y/C
Glucose	-
Bilirubin	-
Ketone	-
SG	1.02 5
OB	-
PH	6.0
Protein	+/-
Urobilin	0.1
Nitrite	-
RBC	0-2
WBC	5- 10
Epitheli	5- 10
Crystal	-
Cast	-
Pyuria	-

Tentative diagnosis



Fever

- Chikungunya fever?
- Dengue fever ?
- Influenza?
- Bronchitis
- Urinary tract infection

Plan

- collect blood, urine, sputum culture
- closely observe her fever pattern



Result

- 2009.01.30 sample PCR Positive
EIA IgM (-) IgG (-)
- 2009.02.13 sample EIA IgM (+) IgG (+)

Chikungunya fever

Ko Chang, et al Diagnosis and management of imported chikungunya fever
in Taiwan : a case report Kaohsiung Journal of Medical Sciences 2010;26:256-60



Chikungunya fever

- 屈公病（Chikungunya fever）是感染屈公病毒（Chikungunya virus）所引起，屈公病毒，主要分布在非洲、東南亞及印度，該病毒最早在1952年從坦尚尼亞一位發燒病人的血清中分離出
- 致病原：
 - Chikungunya virus分類上是屬於Togaviridae科Alphavirus屬
- 潛伏期：2～12天，平均2～4天



同義詞

- CHIKV Fever
- Buggy Creek virus infection
- Knuckle fever(關節熱)
- Semliki Forest virus infection

流行病學

■ 全球流行區域涵蓋非洲撒哈拉沙漠以南、亞洲及南美洲的熱帶及亞熱帶區域，曾於東南亞流行的國家包括泰國、馬來西亞、印尼、印度、斯里蘭卡、緬甸、菲律賓等

■ 臺灣

- 2006年首次發現在新加坡感染之境外移入個案
Emerging Infectious Diseases • www.cdc.gov/eid •
Vol. 14, No. 8 : 1325-1326, August 2008
- 2007年共有3例境外移入病例，感染地均來自印尼。
- 第二類傳染病

傳染方式



- 經由埃及斑蚊傳播，爲人-蚊-人循環
- 傳播須經由具有感染之病媒蚊叮咬，人不會直接傳染給人
- 病人在發病前2 天及發病後約5 天內，血液裡就會有病毒，此時期若蚊蟲吸取病人的血液，病毒會在蚊體內繁殖後具有感染力



臨床症狀:

- 大部分會出現發燒、頭痛、疲勞、噁心嘔吐、肌痛、出疹及關節痛，與登革熱症狀非常類似。
- Polyarthralgia (96 %),
- Fever (89 %)
- Gastrointestinal symptoms (47 %)
- Maculopapular skin rash (40 %)
- 一般症狀會持續幾天到二週，部分感染屈公病的病人會持續數週的倦怠感。有些個案關節會痛到無法行動，並持續數週或數月，因此“Chikungunya”在非洲的土著語言中，原意指「痛的將身體彎起來」



Course of Illness

- Fever typically lasts for 2-3 days and comes down
- Fever may reoccur after 3 days – ‘saddle back’ fever
- Some rare cases – fever lasts up to a couple of weeks
- Patients do have prolonged fatigue for several weeks
- High fever & crippling joint pain marked this epidemic
- Joint pain, intense headache, insomnia and an extreme degree of prostration may last for 5 to 7 days
- Life long immunity

CHIKV and Dengue

Nimmannitya AJTMH 1969; 18: 954

	CHIK=32	DEN=135
Headache	68%	45%
Myalgia/arthralgia*	40%	12%
Rash*	59%	12%
Conjunctivitis*	56%	33%
Lymphadenopathy	31%	41%
Vomiting	59%	58%
Abdominal pain	32%	50%
Diarrhoea	16%	6%
Hepatomegaly*	43%	19%
Splenomegaly	3%	6%
Bleeding	13% (nose)	1.5% (gum)-19% (nose)
Shock*	0	7%, 28%



Laboratory abnormalities

- Leukopenia, anemia, thrombocytopenia
- Lymphopenia, hypocalcemia
- GOT ↑ , GPT ↑



Laboratory Diagnosis of Chikungunya in Taiwan

- Real Time RT-PCR
- ELISA (Capture IgM/IgG)
- Virus Isolation
- IFA



Who are at greater risk?

- Pregnant women
- Elderly people
- Newborns
- Women in general
- Diabetics
- Immuno-compromised patients
- Patients with severe chronic illnesses



CHIKV Morbidity

- a self-limiting illness
- Causes of prolonged morbidity are
 - Severe dehydration
 - Electrolyte imbalance and
- Incidence of prolonged arthritis
 - about 3 to 5%



Mortality

- A few deaths have been reported
- It was thought to be due mainly to
 - Inappropriate use of antibiotics
 - Virus can cause thrombocytopenia
 - These drugs can cause gastric erosions – thus
 - Leading to fatal upper GI bleed
 - Use of steroids for the joint pains & inflammation



Treatment

- Rest to the patient and mild movements of joints
- Cold compresses to inflamed joints
- Analgesics and NSAIDS
 - Paracetamol±Ibuprofen or aceclofenac or diclofenac
 - Naproxen sodium
 - Aspirin should be avoided
- Hydroxy chloroquine sulphate (HCQS) 200 mg/qd
- Chloroquine phosphate 250 mg/qd



Differential Diagnosis

Feature	CHIKV	Dengue
Presentation	A+F±mild rash	A+F+Rash
Arthralgia	Moderate	Severe
Arthritis	Not common	Frequent
Bone pains	None	Break bone fever
Thrombocytopenia	Mild (Not < 1K)	May be severe
Hemorrhage	None	May be present
Shock syndrome	Never	May occur
Immunity (IgG)	Life long	2 nd attack fatality

	Dengue fever	Chikungunya fever
病原體	Dengue virus	Chikungunya virus
媒介	埃及斑蚊, 白線斑蚊	埃及斑蚊 為主, 白線斑蚊也可
途徑	人-蚊-人, 不會人傳人	
潛伏期	3-14天(症狀通常出現在被叮咬後4-7天)	2-12天(平均2-4天)
疫區	東南亞, 高雄疫區	東南亞, 非洲, 台灣以境外移入者居多
症狀	Relative bradycardia(-) 發燒(破骨熱) 後眼窩痛, 頭痛 肌肉痛, 骨頭痛(較嚴重), 關節痛 出血(38.8%) 出疹較晚(約燒退後出現) 發燒7天 少數馬鞍型發燒(5-6%)	Relative bradycardia(-) 發燒, 關節痛, 頭痛, 肌肉痛, 骨頭痛 - 約70%患者從發病開始即出現, 嚴重的關節痛, 可持續數週-數月 - 多關節: finger/toe/wrist/ankle 出血(6.4%) 出疹較早(與其它症狀同時出現) 馬鞍型發燒
	GOT>GPT 2-5x ↑, PTT ↑ Plt ↓ ↓, WBC ↓ ↓, band, segment initial,	- GOT >GPT ↑ 1.5~2x, Plt ↓, WBC ↓ - Lymphopenia initial Hypocalcemia



Welcome to



Kaohsiung

醫院 診所



蚊帳掛至退燒即可





噴藥方式- 2011

(高市衛生局)

- 噴藥範圍之決定目前已非採九宮格方式，現階段實施方式為群聚之登革熱確定個案之住所、工作地及活動地點，經本局研判周圍半徑20~50公尺範圍，以街道為區隔實施噴藥及100公尺強制地毯式孳生源檢查。
- 若個案持續增加，應規劃以村里或區域性擴大噴藥。

罐裝一次按壓~壓力式噴霧器



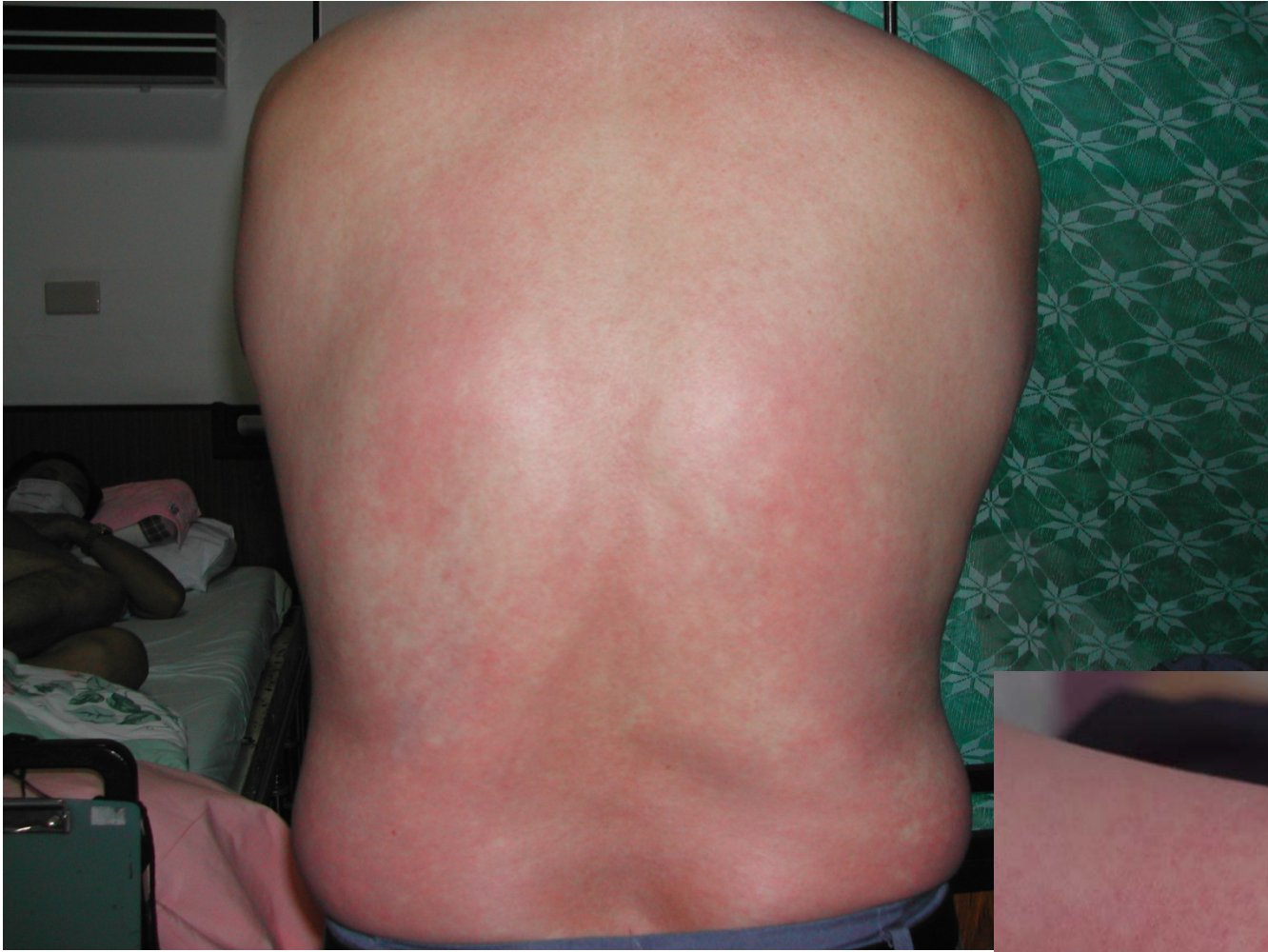
東南亞地區登革熱病例數

國家別	泰國	印尼	越南	馬來 西亞	菲律賓	緬甸	新加坡	印度	台灣
年份									
2000	18617	33443	24116	7103	8146	1884	673	650	139
2001	139327	45904	42878	16368	24952	15695	2372	3306	281
2002	114800	40377	31754	32767	16489	16047	3945	1926	5388
2003	62767	51934	47731	31545	29505	7907	4788	12754	145
2004	17290	74621	78669	35926	23040	6000	9459	1400	427
2005	40000	62000	35700	35983	21537	13000	14210	1011	306
2006	20000	8548	11000	34386	14915	264	3051	9161	1074
2007	62999	134847	68000	38000	24689	11577	8637	567 [#]	2179
2008	85513	101646	78512	45649	19658	-	6567	-	714

註：

#印度病例數為WHO統計 2007年1月到7月資料。

*台灣病例數統計包含本土病例及境外移入病例。



Abdominal echo finding in dengue fever cases



Finding:

gall bladder wall thickening



DHF WITHOUT SHOCK (GRADE I, II)

- Can be treated at the outpatient clinic
- Antipyretic
- Fluid (water, fruit juice, etc)

- From day 1 to day 3
 - can return home
 - recommendations to the mothers: the signs of hemorrhage, vomiting, abdominal pain

門診醫令畫面

- [看診畫面]

A 基本資料 診間醫令 掛號相關 個案管理 糖尿管理 診斷書 IC卡 院內指標查詢 藥品查詢 **最新疫區**

病患基本資料

姓名 陳珠 病歷號碼 100277411 身分證號 E200495195 女 年齡 83.07 看診號 1 特殊療程

身分別 健保 健保卡號 優待身分 兼掛 療程一般

案件類別 09-西醫其他專案 給付類別 4-普通疾病 ditto

候診區人數：15 暫存區人數：0 完成區人數：0

Reg 號	姓名	病歷號碼	收
1	陳珠	100277411	
2	趙邱阿邊	103855517	
3	張國峰	102831105	
4	王德良	100804282	
11	曾琇玲	101165687	
12	呂耀庭	103885408	
13	郭簡玉蘭	101810572	
14	辛立祥	101402591	
16	黃林月	103094040	
17	林輝煌	102177355	
18	賴天角	103295919	
19	蕭徐桂枝	101879634	
21	尤鳳桂	101085521	
22	吳柏毅	102876159	
23	預掛初診病人1		

網址 http://192.168.3.11/3370/show.asp?P_id=132&P_classify=k 移至 連結

高雄市立小港醫院 院內網站
Kaohsiung Municipal Hsiao-Kang Hospital

公告日期	2006/08/29	公告地點	院內
公告類型	最新疫區-登革熱專區	公告期限	2006/12/30
公告主題	登革熱疫區		
相關網址	http://www.kcg.gov.tw/~kmedoc/indexc.htm		
相關檔案	登革熱篩檢表.doc		
內文	<p>一、本週 (8/19-8/24) 因本土登革熱發病病例0例，檢驗確定病例25例，95年累計至8/24境外移入9例，本土病例01例。</p> <p>(一) 本週本土確定病例分佈：前鎮區竹南里3例、瑞平里4例、瑞和里2例、瑞西里3例、瑞東里3例、瑞豐里1例、盛興里1例、瑞華里1例、竹東里1例，苓雅區普照里1例、人和里1例，小港區六苓里1例、濟南里1例，前金區三川里1例，鼓山區華豐里1例。</p> <p>(二) 持續針對個案居住地及工作地區實施擴大疫調及接觸者採血、緊急噴藥、病媒蚊密度調查、孳生源清除、衛教宣導、誘蚊產卵器施放等防治措施。總計疫調243戶、擴大採血113人 (發現陽性個案2人)、孳生源清除1338戶、捕獲成蚊398隻、噴藥消毒674戶及辦理市場空地學校消毒。</p> <p>(三) 8/24—8/26於前鎮區瑞西里等5里，進行宣傳車沿街廣播呼籲民眾配合「孳生源」髒亂點環境大掃蕩活動，及播放韓局長登革熱防治錄音帶，向民眾宣導加強環境自我管理「巡、倒、清」清除孳生源工...</p>		

年別	報告 病例	確定 病例	登革 出血熱	主要流行地區 (本土病例數)	病毒型 別(病例 數)	備註
2000	857	140	1	台南市(109)、屏東縣(2) 台北縣、高雄縣各 1 例	IV(12) 台南市	本土(113) 境外(27)
2001	1121	270	11 (1 死)	高雄市(前鎮區)(197)、高雄 縣(10)、台北市(4)、彰化縣 (3)、屏東縣(1)	II 高雄市 III 彰化 縣	本土(215) 境外(55)
2002	15743	5388	242 (21 死)	高雄市(2832)、高雄縣 (1979)、屏東市(380)、台南 市(66)、台南縣(18)、澎湖縣 (12)	I、II	本土 (5336) 境外(52)
2003	1583	145	2 (1 死)	高雄市(58)、高雄縣(13)、屏 東縣(12)、台南市(2)、雲林 縣(1)	II	本土(86) 境外(59)
2004	1451	427	7	屏東縣(281)、高雄市(36)、 高雄縣(12)、台南市(4)、台 中縣(1)、台中市(1)、桃園縣 (1)	I、IV	本土(336) 境外(91)

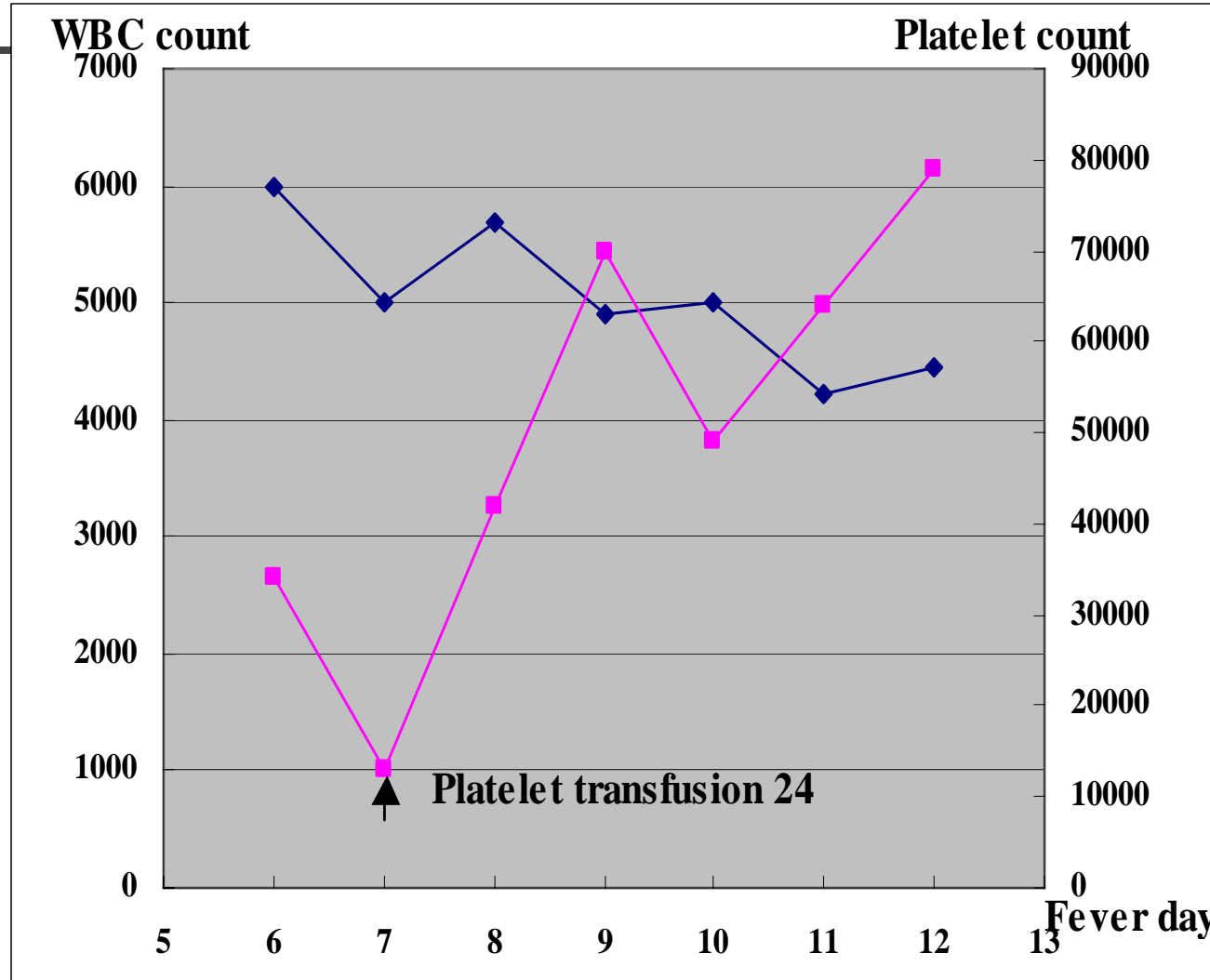


Dengue fever

- estimated annual occurrence: 100 million cases of dengue fever
 - 250,000 cases of dengue hemorrhagic fever
 - a mortality of 25,000 per year
- International travelers may both acquire and **spread** dengue virus infection
- an increasing proportion of febrile travelers returning from the tropics
 - from 2 % in the early 1990s → 16 % more recently

登革熱的個案施教-2

Dynamic changes of blood WBC count and platelet count in a patient with DHF



Evaluation of Two New Commercial Tests for the Diagnosis of Acute Dengue Virus Infection Using NS1 Antigen Detection in Human Serum

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1 Centre National de Référence des Arbovirus et Virus Influenza, Région Antilles-Guyane, Institut Pasteur de la Guyane, Cayenne, French Guiana, **2** Unité d'Epidémiologie des Maladies Emergentes, Institut Pasteur, Paris, France, **3** Unité d'Epidémiologie des Maladies Infectieuses, Institut Pasteur de Dakar, Dakar, Sénégal

Abstract

Background: We compared the performance of two new commercial tests for the detection of dengue NS1 protein during the clinical phase of dengue virus (DENV) infection—an immunochromatographic test allowing rapid detection of the NS1 antigen, Dengue NS1 Ag STRIP (Bio-Rad Laboratories - Marnes La Coquette, France), and a two-step sandwich-format microplate enzyme-linked immunosorbent assay (ELISA), pan-E Dengue Early ELISA (Panbio - Brisbane, Australia)—with a one-step sandwich-format microplate ELISA, the Platelia Dengue NS1 Ag test (Bio-Rad).

Methods: We tested 272 serum samples from patients with dengue disease. Of these, 222 were from patients with acute infection of one of the four dengue serotypes, detected by RT-PCR and/or virus isolation. Forty-eight acute-phase serum samples from patients not infected with dengue virus were also included.

Results: The sensitivity of the Platelia Dengue NS1 Ag test on acute serum samples (n = 222) was 87.4% (95% confidence interval: 82.3% to 91.5%); that of Dengue NS1 Ag STRIP was 81.5% (95% CI: 75.8% to 86.4%) after 15 minutes and 82.4% (95% CI: 76.8% to 87.2%) after 30 minutes. Both tests had a specificity of 100% (97.5% CI, one-sided test: 92.6% to 100.0%). The pan-E Dengue Early ELISA had a sensitivity of 60.4% (95% CI: 53.4% to 66.8%) and a specificity of 97.9% (95% CI: 88.9% to 99.9%).

Conclusion: Our findings support the use of diagnostic tools based on the NS1 antigen detection for the diagnosis of acute DENV infection. The immunochromatographic test, Dengue NS1 Ag STRIP—the first rapid diagnostic test for DENV infection—was highly sensitive and specific, and would therefore be a suitable first-line test in the field. The pan-E Dengue Early ELISA was less sensitive than the Platelia test; this two-step ELISA should be combined with DENV IgM antibody detection for the diagnosis of DENV infection.



Vaccines against Dengue and Yellow Fever.*

Developer	Type of Vaccine	Stage of Development
Yellow fever		
7 Manufacturers	17D (live, attenuated)	Licensed
Dengue		
Acambis and Sanofi Pasteur	Live, attenuated chimeric dengue–yellow fever	Phase 2; soon to enter phase 3
WRAIR and GlaxoSmithKline	Live, attenuated	Phase 2
NIH, Biologicals E (India), Panacea (India)	Live, attenuated chimeric dengue–dengue	Phase 1
Mahidol University (Bangkok)	Live, attenuated	Preclinical†
CDC, Inviragen, Shantha (India)	Live, attenuated chimeric dengue–dengue	Preclinical
Hawaii Biotech	Recombinant, subunit	Preclinical
U.S. Navy	DNA	Preclinical

Monath, N Engl J Med, 2007

Emerging Infectious

Diseases • www.cdc.gov/eid •

Vol. 14, No. 8 : 1325-1326, August 2008



Letter

Two Imported Chikungunya Cases, Taiwan

Pei-Yun Shu,* Cheng-Fen Yang,* Chien-Ling Su,* Chung-Yu Chen,* Shu-Fen Chang,* Kun-Hsien Tsai,* Chia-Hsin Cheng,* and Jyh-Hsiung Huang *

Centers for Disease Control, Taipei, Taiwan,
Republic of China

Emerging Infectious

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Centers for Disease Control, Taipei, Taiwan,
Republic of China

Emerg Infect Dis. 2009

May; 15(5): 836-837

Chikungunya Outbreak, Singapore, 2008

Yee S. Leo, Angela L.P. Chow, Li Kiang

Tan, David C. Ley, Li Lin, and Lee C. Ng

In Singapore, although dengue fever has been endemic since the 1960s, the first chikungunya case was not reported until 2006.

In 2007, *10 imported cases were reported to* Singapore's Ministry of Health (5).

Notably, Taiwan reported a case involving a returning student from Singapore in November 2006, suggesting the possibility of autochthonous transmission in Singapore (6).

Emerging Infectious

Diseases • www.cdc.gov/eid •

Vol. 15, No. 11: 1854-1856, November 2009



Letter

Imported Chikungunya Virus Strains, Taiwan, 2006-2009

Jyh-Hsiung Huang, Cheng-Fen Yang, Chien-Ling Su,
Shu-Fen Chang, Chia-Hsin Cheng, Sheng-Kai Yu,
Chien-Chou Lin, and Pei-Yun Shu

Centers for Disease Control, Taipei, Taiwan, Republic
of China

Clinical symptoms of imported chikungunya cases, Taiwan

■Fever	65.4%
■Rash	19.2%
■Headache	11.5%
■Arthralgia	11.5%
■Muscle pain	7.7%

Identity of imported chikungunya cases, Taiwan

Identity	Cases number	Percentage
Expatriates	10	33%
Foreign worker	9	30%
Foreign spouse	2	7%
Nationals	9	30%



Conclusions

- We characterized 22 chikungunya virus (CHIKV) strains isolated from imported cases identified in Taiwan since 2006.
- The travelers were infected in 6 countries including Indonesia, Malaysia, Singapore, Bangladesh, India and Thailand.
- Phylogenetic analysis showed these CHIKVs were clustered into endemic Indonesian strains of Asian genotype, E1-226(A) and E1-226(V) India strains of East/Central/South African genotypes.



Concurrent Isolation of Chikungunya Virus and Dengue Virus from Co-infected Case Imported from Singapore

Abstract

We report a cluster of two imported cases returned from Singapore to Taiwan, one was co-infected with chikungunya virus and dengue virus type 2, the other was infected with the same dengue virus. Both viruses were successfully isolated from the co-infected case using antibody neutralization and plaque purification technique.

Summary data of imported case co-infected with CHIKV and DENV from Singapore(1)

Patient	Case 1 (brother)	Case 2 (younger brother)
Infections	CHIKV and DENV-2	DENV-2
Age	12	10
Gender	male	male
Travel period in Singapore	17-20 April 2009	17-20 April 2009
Onset of disease	22 April 2009	24 April 2009
Clinical symptoms	Fever Headache Vomiting Arthralgia Rash Skin itch	Fever Headache Muscle pain Abdominal pain

Summary data of imported case co-infected with CHIKV and DENV from Singapore(2)

Laboratory findings		
Real-time RT-PCR	Day2 CHIKV+, $10^{5.6}$ PFU/mL DENV-2+, $10^{1.3}$ PFU/mL	Day 4 DENV-2+, $10^{3.1}$ PFU/mL
Virus isolation	CHIKV and DENV-2	DENV-2
DENV IgM/IgG (ELISA OD value)	0.13/0.106 (day 2) 1.383/0.702 (day 24)	0.217/0.104 (day 4) 1.718/1.004 (day 22)
CHIKV IgM/IgG (ELISA OD value)	0.087/0.098 (day 2) 2.074/1.611 (day 24)	0.141/0.092 (day 4) 0.168/0.144 (day 22)

小港醫院發現入夏首例 登革熱 共有五位醫師獲獎

今夏首例本土登革熱 現蹤高市

黃筱珮／台北報導 中時 94.08.20

今年入夏以來第一例本土登革熱病例現蹤！衛生署疾病管制局昨天表示，患者居住在高雄市小港區，感染第三型登革熱病毒，由於患者最近未出國、且感染的是國內不常見的病毒型，疾管局推測可能有一個境外移入病例未被檢出，潛伏社區中，而成為傳染源。

疾病管制局副局長施文儀警告，高雄縣市曾於民國九十一年發生登革熱病毒第二型大流行，九十三年則流行第一和第四型病毒，如今出現第三型病毒，四種型別的登革熱病毒在南部齊聚，若重複感，發生

高市新聞 B8

新聞集錦

獎勵 登革熱通報

▲衛生局長韓明榮昨特別頒發登革熱通報獎金給7名線上醫師，7名受表揚的醫師分別為小港醫院張科、葉怡亨、謝效烝、蔡維中、郭軒5位醫師，賴顯忠診所賴顯忠和旗津醫院許智能。（記者楊菁菁）



骨科病房發現登革熱個案



Chikungunya in Taiwan

- Serum samples obtained from fever screening at airports were also screened for imported chikungunya case since March, 2006.
- The first imported chikungunya case was detected at Taoyuan international airport on Nov.20, 2006 from Singapore where he attended an international language school.
- Chikungunya was added as a category2 reportable infectious disease in Taiwan since October, 2007.



Transmission

Reservoir

- Non-human primates in Africa
- No animal reservoir is found in India
- Maintained in nature by man-mosquito-mancycle
- Vector-*Aedes aegypti*, *Ae. Albapcticus* mosquito
- Same vector as for Dengue and Yellow fevers
- Vehicle of transmission-None
- No known mode other than mosquito bite
- Incubation Period-2 days to 12 days



Symptoms

- Sudden onset of fever, chills
- Headache, nausea, vomiting, abdominal pain
- Joint pain with or without swelling
- Low back pain and rash
- Very similar to those of Dengue but unlike in Dengue, no hemorrhagic or shock syndrome



Clinical Features

- Incubation period is 2-12 d; usually 3-7days
- Viremia last for 5 days (infective period)
- Silent CHIKV-inapparent infections in children
- Flu-like symptoms, Severe headache and chills
- High grade fever(40°C or 104°F),
- Arthralgia or arthritis – lasting several weeks
- Conjunctival suffusion and mild photophobia
- Nausea, vomiting, abd. Pain,severe weakness



Chikungunya

- Human Disease
 - Chikungunya (Swahili): That which bends up.
 - Severe arthritis/arthralgia/myalgia
 - High fever (103-104F)
 - Rash
 - Hemorrhagic manifestation have been reported
 - Generalized
 - Usually acute (Several days to several weeks, though 20% of individuals have long-term joint complaints)
 - Rarely if ever fatal
 - Apparent-to-inapparent infection ratio varies from 1:3 to 1:50 for CHIK and related viruses
 - Reunion Island: 1:3 or population had clinically apparent disease (approximately 250,000 cases).
 - Infected individuals develop a high titer viremia



The Arthralgia

- The small joints of the lower and upper limbs
- Migratory poly arthralgia – not much effusions
- Larger joints may also be affected (knee, ankle)
- Pain worse in the morning – less by evening
- Joints may be swollen & painful to the touch
- Some patients have incapacitating joint pains
- Arthritis may last for weeks or months.



Course of Illness

- Fever typically lasts for 2-3 days and comes down
- Fever may reoccur after 3 days – ‘saddle back’ fever
- Some rare cases – fever lasts up to a couple of weeks
- Patients do have prolonged fatigue for several weeks
- High fever & crippling joint pain marked this epidemic
- Joint pain, intense headache, insomnia and an extreme degree of prostration may last for 5 to 7 days
- Life long immunity, once one suffers this infection



Who are at greater risk?

- Pregnant women
- Elderly people
- Newborns
- Women in general
- Diabetics
- Immuno-compromised patients
- Patients with severe chronic illnesses

Table 2.3

Criteria for differential diagnosis of dengue haemorrhagic fever and chikungunya fever^a

Criteria	Dengue haemorrhagic Fever (%)	Chikungunya Fever (%)
Duration of fever:		
2-4 days	23.6	62.5
5-7 days	59.0	31.2
> 7 days	17.4	6.3
Haemorrhagic manifestations:		
positive tourniquet test	83.9	77.4
scattered petechiae	46.5	31.3
confluent petechial rash	10.1	0.0
epistaxis	18.9	12.5
gum bleeding	1.5	0.0
melaena/haematemesis	11.8	0.0
Hepatomegaly	90.0	75.0
Shock	35.2	0.0



CHIKV Morbidity

- Chikungunya is a self-limiting illness
- Causes of prolonged morbidity are
 - Severe dehydration
 - Electrolyte imbalance and
 - Loss of glycemic control
- Recovery is the rule
- Incidence of prolonged arthritis
 - In about 3 to 5%




Mortality

- A few deaths have been reported – Example
- It was thought to be due mainly to
 - Inappropriate use of antibiotics and NSAIDs
 - Virus can cause thrombocytopenia
 - These drugs can cause gastric erosions – thus
 - Leading to fatal upper GI bleed
 - Use of steroids for the joint pains & inflammation
 - This is dangerous and completely unwarranted



Pregnancy and CHIKV

- Mother to fetus transmission can occur
- Reported between 3 to 4.5 months of gestation
- Maternal IgG develops in 2 weeks after CHIKV
- This passes through placenta – confers protection
- Intra-partum risk is 48% if mother has viremia
- Neonatal infections are very mild; fully



Vertical maternal-fetal transmission of
the Chikungunya virus. Ten cases in
newborns among 84 pregnant women

*Robillard PY, Boumahni B, Gerardin P, Michault A,
Fourmaintraux A, Schuffenecker I, Carbonnier
M, Djemili S, Choker G, Roge-Wolter M, Barau G.*

Rub Med. 2006 May; 35(5 Pt 1):785-8.



Pregnancy-CHIKV

- June 2005 to Jan 2006, 84 pregnant women with CHIKV
- In 88% cases the newborns are asymptomatic
- 10 newborns had severe attacks, 4 meningo-encephalitis
- 3 with intravascular coagulations; No infants died
- One case of severe intra cerebral hemorrhage
- Had severe thrombocytopenia
- All confirmed by specific serology or PCR or both
- Women had severe intra-partum viremia & fever



Differential Diagnosis

Feature	CHIKV	DENGUE
Presentation	A+F±mild rash	A+F+Rash
Arthralgia	Moderate	Severe
Arthritis	Not common	Frequent
Bone pains	None	Break bone fever
Thrombocytopenia	Mild (Not < 1K)	May be severe
Hemorrhage	None	May be present
Shock syndrome	Never	May occur
Immunity (IgG)	Life long	2 nd attack fatality



Laboratory Diagnosis

1. Four fold or more rise of HI Antibody
2. IgM capture ELISA using MAbs
3. Indirect Immuno Fluorescence Test (IFT)
 - On infected cells from tissues
4. Virus Isolation – Infant Swiss Albino mice
 - Vero BHK-21 cell lines are used
5. Nucleic acid amplification by PCR & RT



Laboratory Diagnosis

- IgM capture ELISA – Good serological test
- Not commercially available
- NIV – Pune, NICD – Delhi only
- Positive after 5-10 days & lasts up to 6 months
- HI Antibody appears on day 3 or 4
- RT – PCR confirmatory – before the 5th day



Value of RT - PCR

- Real Time PCR scores over conventional PCR
- Positive in the phase of viremia – up to 5 days
- Transportation of sample to be at 2° to 8°c
- It is a confirmatory test with high specificity
- Its sensitivity is very high; detects even 1 copy
- After the viremia ceases – it will be negative
- We do not have the HI Ab or IgM capture



Treatment

- There is no specific treatment for CHIKV
- No vaccine or preventive pill is available
- The illness is usually self-limiting
- It will resolve with time over a week to 10 days
- No relapses occur – no second attacks
- Convalescence may take longer
- Symptomatic treatment only



Treatment

- Rest to the patient and mild movements of joints
- Cold compresses to inflamed joints
- Liberal fluid intake or IV fluids
- Analgesics and NSAIDS
 - Paracetamol±Ibuprofen or aceclofenac or diclofenac
 - Naproxen sodium (Naprasyn, Xenobid)
 - Aspirin should be avoided
- Hydroxy chloroquine sulphate (HCQS) 200 mg/qd
- Chloroquine phosphate 250 mg/qd



What not to give ?

- No indication for antibiotics
- Never use costly, Large spectrum drugs
- No indication for long acting steroids
- No indication for short term steroids also in the acute phase of illness
- Rarely, if the joint swelling persists – we may consider use of steroids in short burst.



Management of cases

- Rest in bed will help hasten recovery
- Infected persons should be protected
 - from further mosquito exposure
 - staying indoors and/or under a mosquito net
 - during the first few days of illness
 - This is to reduce transmission to others

Differential diagnosis and Summary

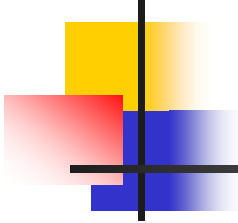
- Dengue fever : **fever + 5 pain**, endemic area thrombocytopenia, leucocytopenia, GOT>GPT, aPTT prolong
- Chikungunya fever: joint tenderness, skin rash early, travel history, initial screening of NS1 dengue fever negative
- Scrub typhus: **eschar**, fever, abnormal liver function, headache, myalgia, OX-K(+) climb mountain 柴山,大坪頂,花東,蘭嶼綠島
- Murine typhus: rat, fever, abnormal liver function, severe headache, meningitis-like, **dizziness, OX-19(+), GOT>=GPT, PT prolong, aPTT prolong**
- Q fever: dog, cat, sheep, fever, abnormal liver function, headache, **anticardiolipin Ab, some GOT<=GPT, aPTT prolong**
- Leptospirosis: rat, dog, fever, myalgia, **結膜充血, jaundice, renal function impairment**, after flood, young man ,
- Avian influenza: fever, cough, dyspnea
- Malaria: typical s/s, lab. Finding , **Travel History**
- influenza : family contact , knock down; Acute tonsillitis, Mycoplasma pneumonia:, Salmonella: raw food

98~99年臺灣埃及.白線斑蚊分布調查統計分析

98年調查	完成里數	白線斑蚊幼蟲數	埃及斑蚊幼蟲數	白線：埃及
台南縣	60%	30,577	1,282	23.8 : 1.0
台南市	88%	11,216	11,836	1.0 : 1.0
高雄市	57%	6,162	25,418	1.0 : 4.1
高雄縣	78%	24,878	8,911	2.8 : 1.0
屏東縣	67%	34,767	5,692	6.2 : 1.0

縣市合併	白線：埃及	共同區域	白線：埃及
大台南都	3.2 : 1.0	台南縣市	3.2 : 1.0
大高雄都	1.0 : 1.1	高高屏	1.6 : 1.0
屏東縣	6.2 : 1.0		

- 1、斑蚊幼蟲〔孑孓〕室內/室外分布比率 = 20% 室內〔陽性容器〕：80% 室外〔陽性容器〕！ 99.01.14
- 2、斑蚊成蚊室內/室外分布比率 = 9隻埃及/室內：1隻白線/室內〔室外反之〕！
- 3、斑蚊成蚊生命週期〔28度C〕 = 30天 / 埃及：14天 / 白線！
- 4、斑蚊成蚊病毒複製傳播效能 = <7天 / >28度C， 8~12天 / 20~27度C， >20天 / <20度C， 停止 / <15度C



Dengue NS1 Rapid Test Kit Sensitivity in Primary Infection (Bio- Rad)

Dengue infection	Positive /Total case	Positive rate
DENV-1	39/40	97.5%
DENV-2	10/18	56%
DENV-3	15/20	75%
DENV-4	6/9	67%
Total	70/87	80.5%



Advantages of Bio-Rad Ag STRIP rapid test

- Rapid
- Simple
- High sensitivity with longer detection time (1-9 DPO) for primary infection
- Excellent specificity (100%)
- Real time detection allowing early medical treatment
- No emergency control measures (insecticide spray) will be needed.