

ZOOZOSES

人畜共通傳染病對屠檢人員的危害III

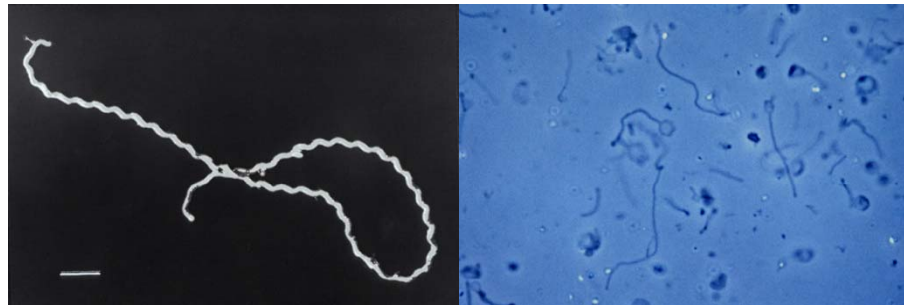
潘銘正 mjpan@ctust.edu.tw



中臺科技大學生命科學研究所



Leptospirosis



Triathlon athletes cases



Lake Springfield, IL

Unexplained acute febrile illness among
athletes participating in TRIATHLONS

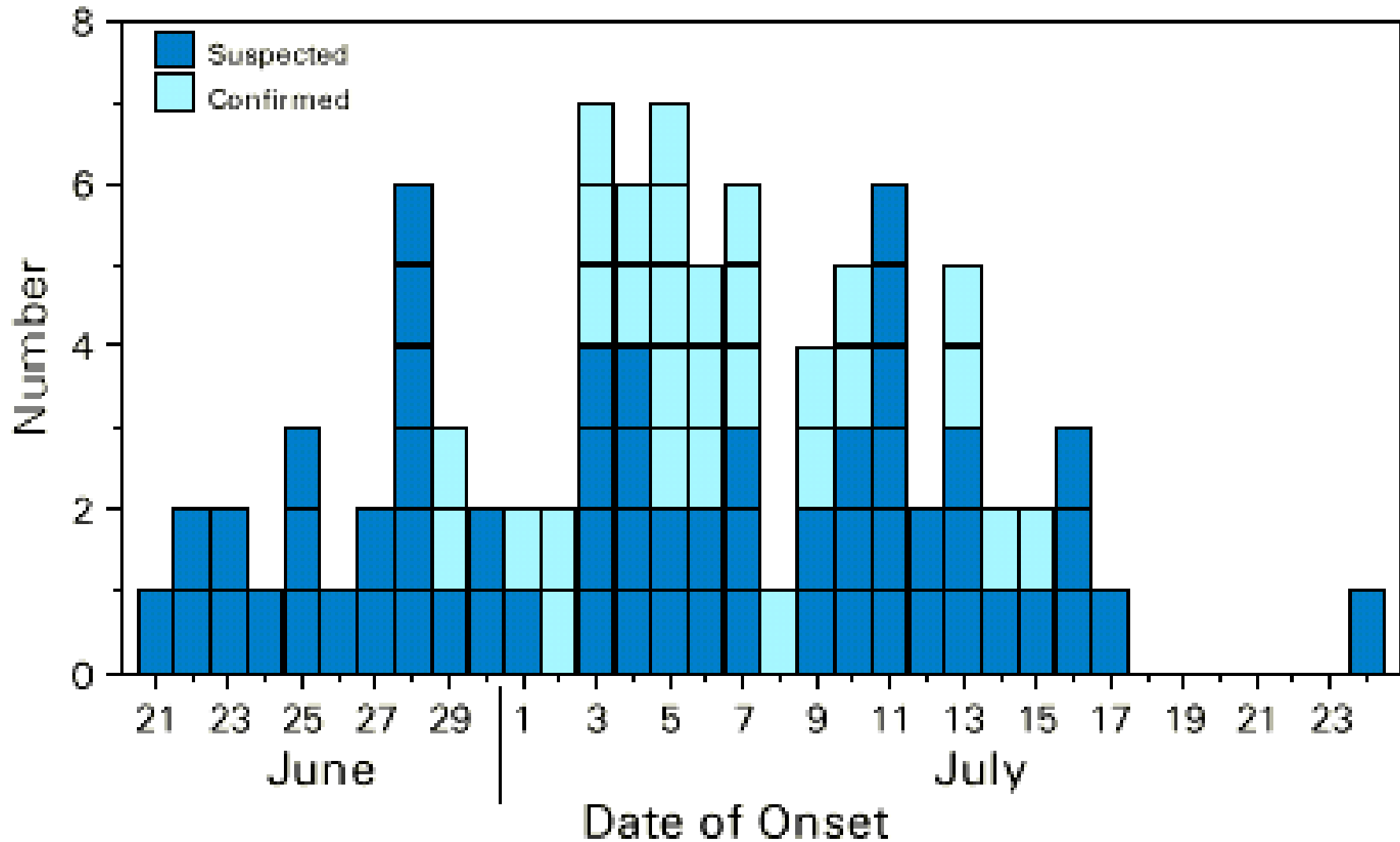


FIGURE 1. Onset of febrile illness among suspected (n=60) and laboratory-confirmed (n=30) case-patients who participated in the Springfield, Illinois, triathlon, by date -June 21-August 13, 1998*

Eco-challenge cases

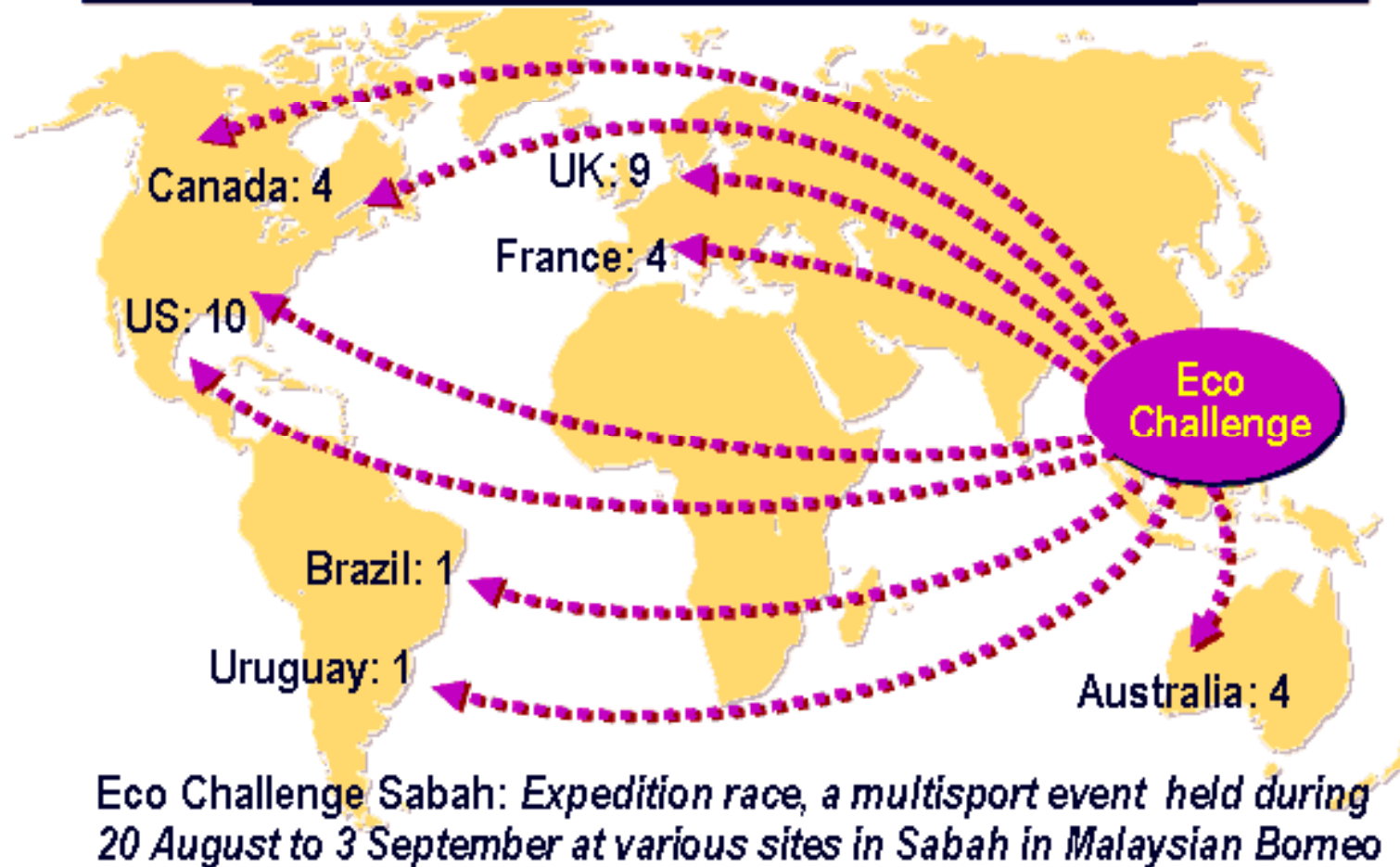


[COURTESY 2000 ECOCHALLENGE]



[COURTESY 2000 ECOCHALLENGE]

Outbreak of leptospirosis (confirmed and suspect cases) among 312 participants, Eco Challenge 2000, Malaysia



Of the 309 athletes from 26 countries who participated, 109 fell ill and 25 became severely ill, requiring prolonged hospitalization

鉤端螺旋體病

臨床症狀、診斷及治療指引

(學者專家及醫學會等審查後修正版)



疫情通報專線：0800-024582
全球資訊網：<http://www.cdc.gov.tw>
衛生署疾病管制局關心您



衛生署疾病管制局
九十二年五月

Leptospire history



Dr. Weil

- Discovery of the infective agent
 - *L. icterohaemorrhagiae*
 - Stimson (1907)
 - Huberner & Reiter (1915)
 - Inada et al (1916)
 - Ido, Hoki, Ito, & Wani (1916)
- Creation of Genus *Leptospira*
 - Noguchi (1917-8)

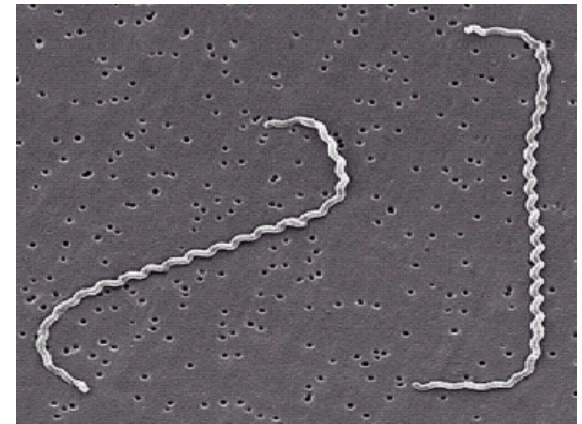


野口英世
(明治9年~昭和3年)



Microbiology

- **0.1 μm x 6 – 20 μm**
- **Pointed ends bent into distinct hooks**
- **Helical amplitude is 0.1 to 0.15 μm
and wavelength is 0.5 μm**
- **Highly motile**
- **Pass through 0.22-0.45 μm
filters**



Levett, 2001

L. interrogans sensu lato

	Genospecies	No. of serovar	Pathogenecity
1	<i>Leptospira interrogans sensu stricto</i>	81	Pathogenic
2	<i>Leptospira borgpetersenii</i>	42	Pathogenic
3	<i>Leptospira inadai</i>	10	Pathogenic
4	<i>Leptospira noguchii</i>	20	Pathogenic
5	<i>Leptospira santarosai</i>	58	Pathogenic
6	<i>Leptospira weilii</i>	15	Pathogenic
7	<i>Leptospira kirschneri</i>	26	Pathogenic
8	<i>Leptospira biflexa</i>	2	Non-pathogenic
9	<i>Leptospira meyeri</i>	4	?
10	<i>Leptospira wolbachii</i>	2	Pathogenic
11	<i>Leptospira fainei</i>	1	Pathogenic
12	<i>Turneria parva</i>	1	Non-pathogenic
13	<i>Leptonema illini</i>	3	Non-pathogenic
14	<i>Leptospira genomospecies 1</i>	1	?
15	<i>Leptospira alexanderi</i>	6	Pathogenic
16	<i>Leptospira genomospecies 3</i>	1	?
17	<i>Leptospira genomospecies 4</i>	1	?
18	<i>Leptospira genomospecies 5</i>	1	?

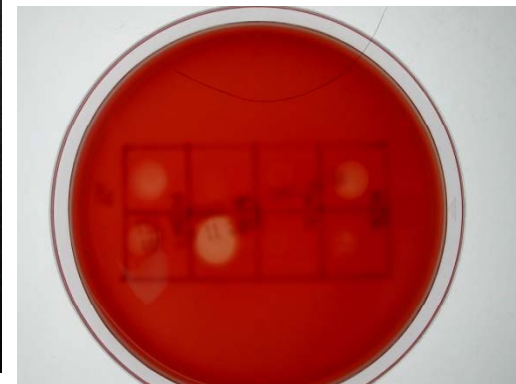
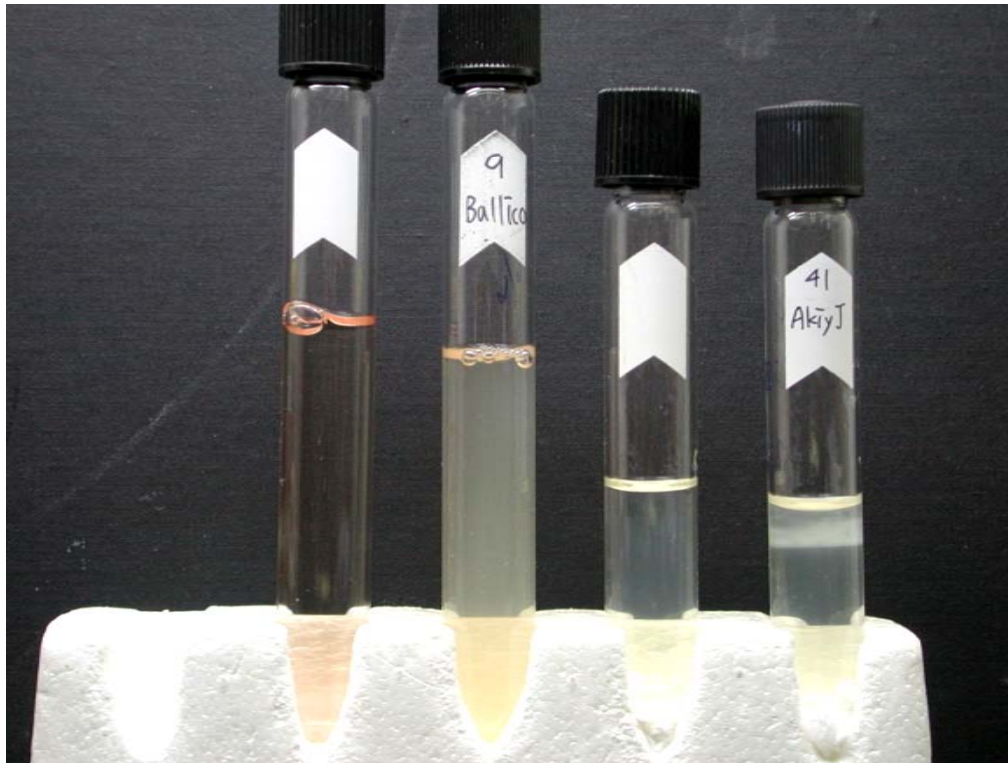
Cultural characteristics

- **Obligate aerobes**
- **Generation time: 4.5 (7-12) hrs at 30°C**
- **Require vitamins B₁ and B₁₂, long-chain fatty acids, cannot synthesize fatty acids *de novo***

Cultural characteristics

- Use ammonium salts as nitrogen source
- Resist pyrimidine analogue such as 5-fluorouracil (5-FU)
- EMJH medium (tween-albumin medium)

Cultural characteristics



Laboratory diagnosis

- Isolation by direct culture
- Microscopic methods
 - Dark-field microscopy
 - Basic fuchsin or silver stain
 - Immunofluorescent stain
 - Immunoenzymatic stain
 - *In situ* hybridization

Laboratory diagnosis

- **Serological tests**
 - **Agglutination**
 - **Microscopic (MAT),**
Macroscopic
 - **Microcapsule, Latex particles**

Laboratory diagnosis

- Counterimmunoelectrophoresis (CIE)
- ELISA (Ig M), Dipstick, RIA, ERIA
- IHA
- Detection by nucleic acid probes
- DNA amplification, PCR

Microscopic agglutination test (MAT)

Antigen

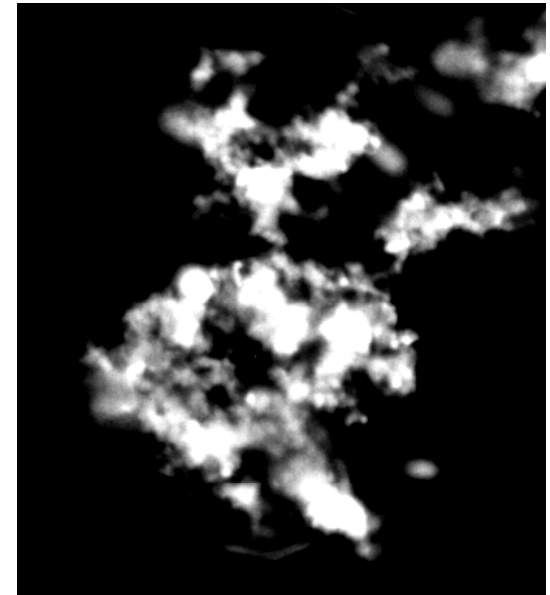
bratislava grippotyphosa

shermani balcanica

kennewicki autumnalis

canicola icterohaemorrhagiae

titer $\geq 1 : 100$ as positive



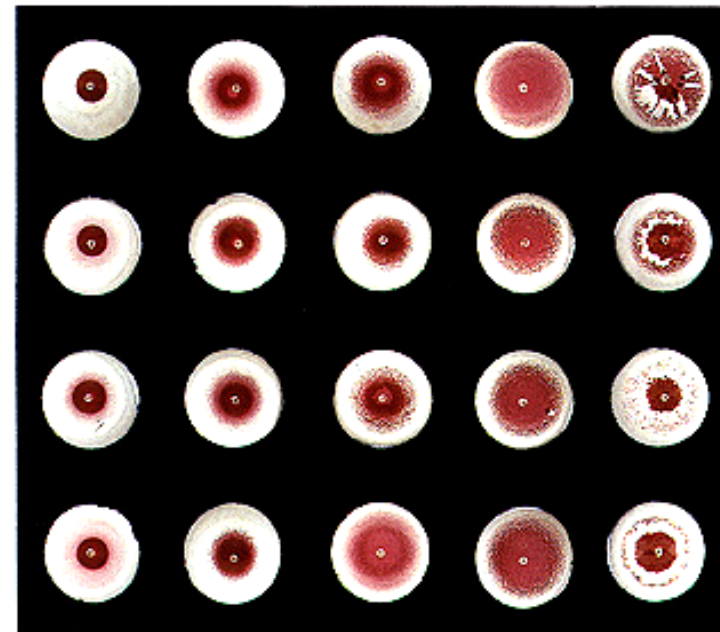


MC test

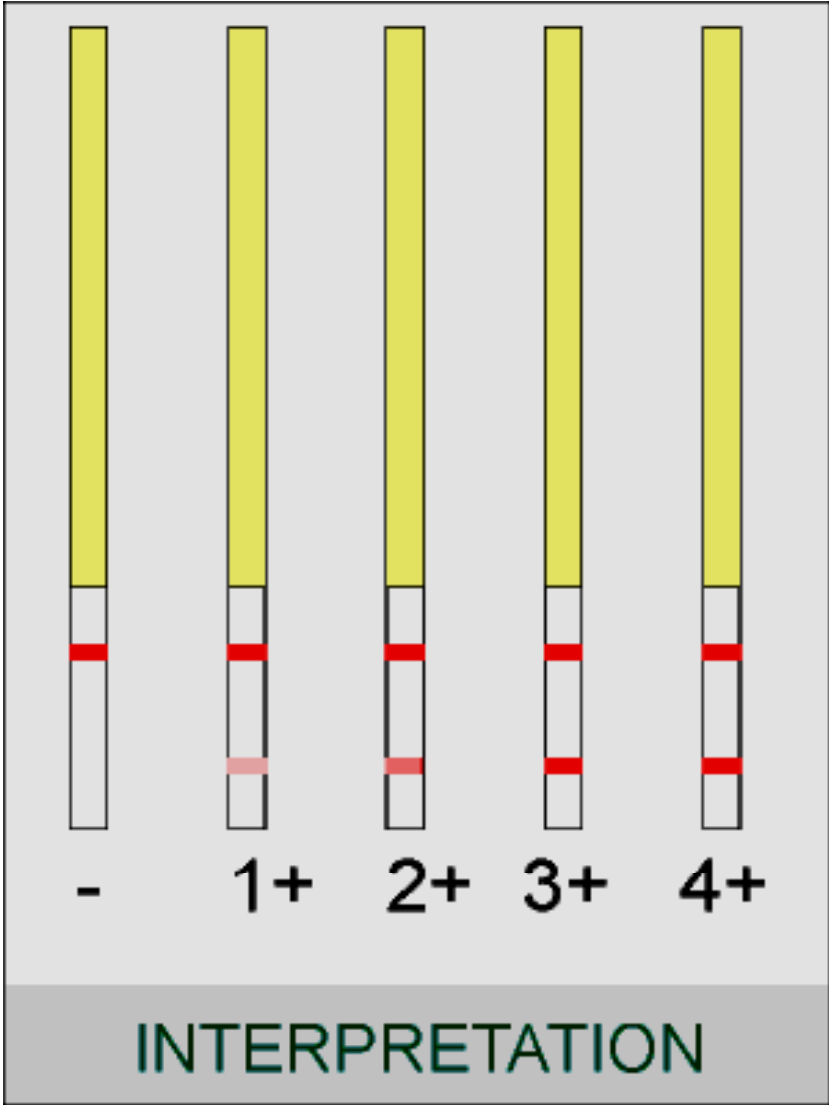
Reaction Patterns of Leptospira-MC Test

レプトスピラ-MC(KW) 反応パターン

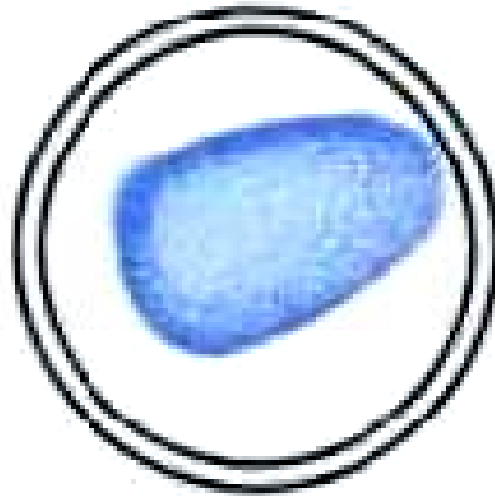
陰性 non-reactive	保留 pending	陽性 reactive		
(-)	(±)	(1+)	(2+)	(3+)



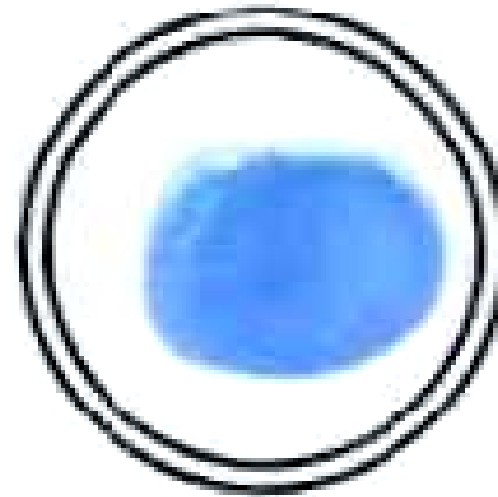
株式会社日本凍結乾燥研究所
JAPAN LYOPHILIZATION LABORATORY



Latex agglutination

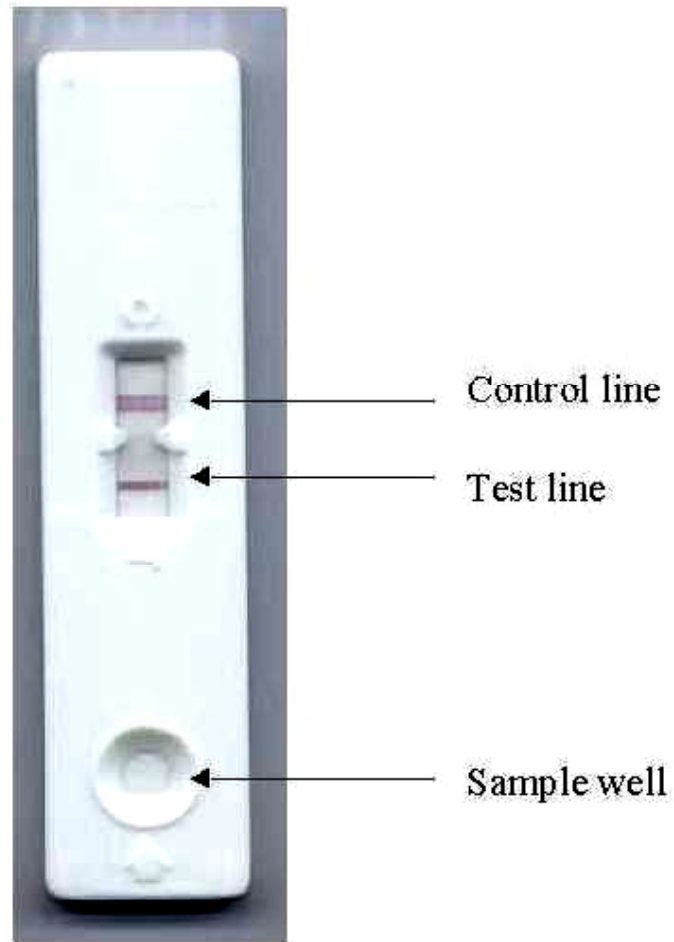


5 sec

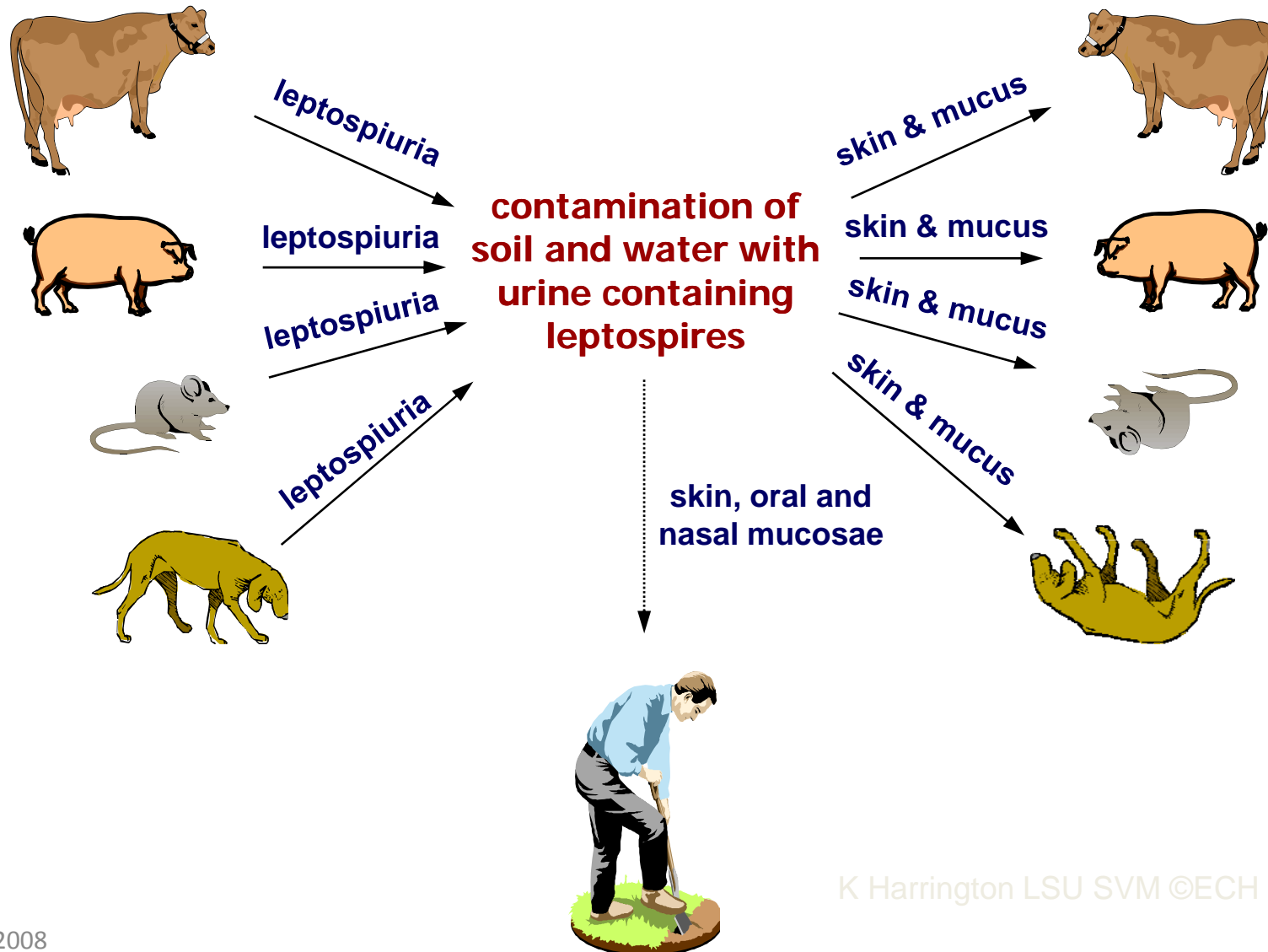


No agglutination

Lepto-lateral flow



Transmission

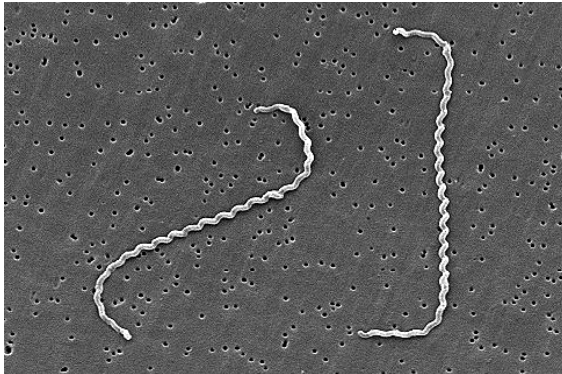


K Harrington LSU SVM ©ECH 1999

Main clinical features of leptospirosis in animals

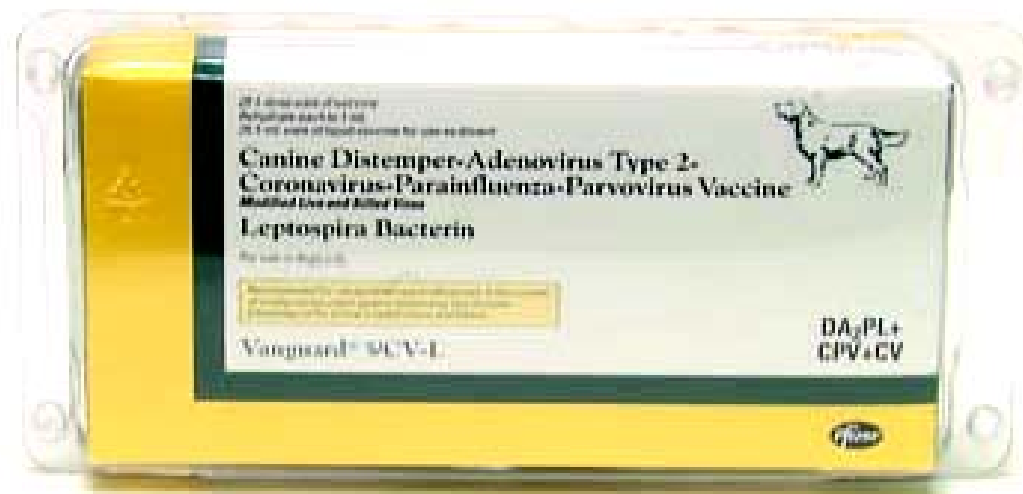
	Cattle	Pigs	Dogs	Rodents
Fever	+	+	+	+
Conjunctivitis	+	?	+	+
Jaundice	+	+	(+)	(+)
Mastitis	+	-	-	-
Pneumonia	+	-	-	-
Abortion/ stillbirth	1-3	2-4	-	-

Canine leptospirosis



Levett, 2001

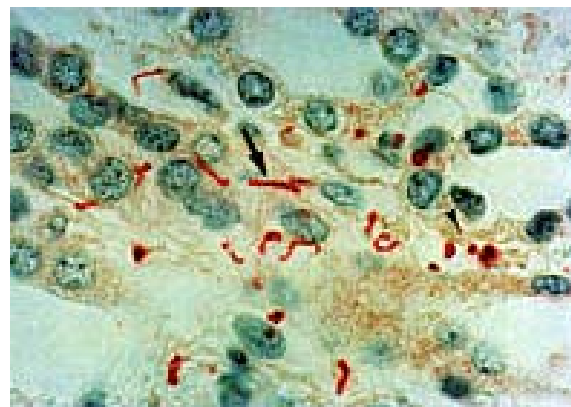




Swine leptospirosis

- ★ 重要性

經濟上的嚴重損失
對人類健康造成危害



- ★ 臨床症狀

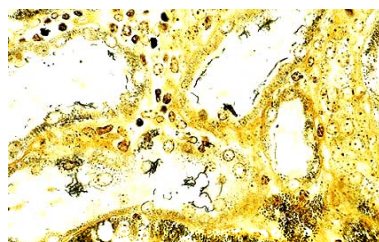
母豬流產、產下虛弱小豬



- ★ 病理變化

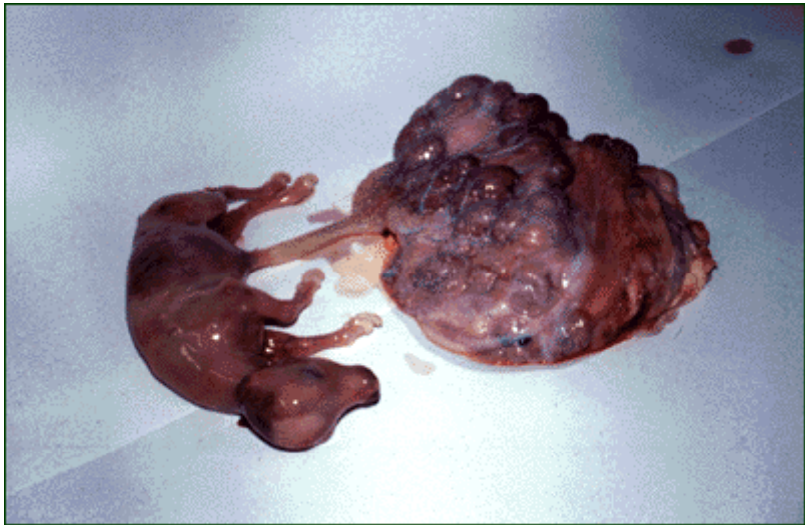
間質性腎炎

腎臟間質有白色小點





Bovine leptospirosis





Leptospirosis in humans



Leptospirosis in humans



**Early sign:
calf muscle pain
and tenderness**

小腿肚痛

Clinical features

- **Presents in four broad clinical categories**
 - **a mild, influenza-like illness**
 - **Weil's syndrome**
 - **Meningitis / meningoencephalitis**
 - **Pulmonary haemorrhage with respiratory failure**

Clinical features (cont.)

- **Nonspecific symptoms**
- **First stage symptoms lasts 3 to 7 days, typical flu-like**
 - **fever**
 - **severe headache**
 - **muscle pain**
 - **chills**
- **90 to 95% of the cases not serious and clear up on their own**

Bharti, et al., 2003

Clinical features (cont.)

- **5 to 10% of the patients develop a serious disease**
 - **Weil's syndrome**
 - jaundice
 - acute liver and renal failure
 - hypotension
 - rash
 - anemia
 - shock
 - **Meningitis / meningoencephalitis**
 - **Pulmonary haemorrhage with respiratory failure**

Bharti, *et al.*, 2003

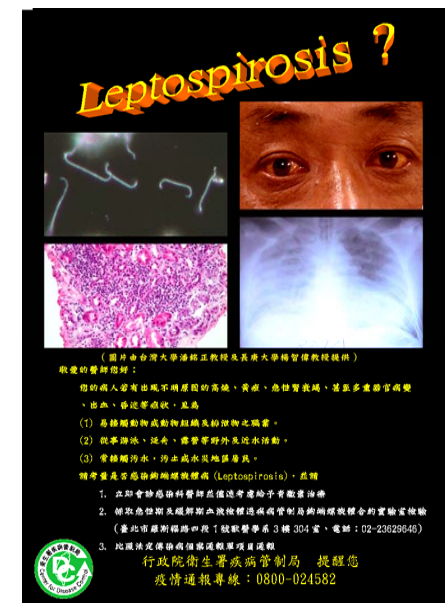
Clinical features (cont.)

- **Clinical diagnosis is difficult because of the varied and non-specific presentation**
- **Confusion with other diseases**

WHO, 2003

Differentiate from patients with severe headache, myalgia and fever such as

- ★ **Leptothangamushi syndrome**
- ★ **Dengue fever**
- ★ **Viral hepatitis**
- ★ **Typhoid fever**
- ★ **Relapsing fever**
- ★ **Rickettsial infection**
- ★ **Malaria**



Case report

- **Case 1: fever, abdominal pain, acute renal failure, jaundice, hemophagocytosis, pancytopenia, agamaglobulinemia ;
mortality**
- **Case 2: fever, abdominal pain, acute renal failure, jaundice, respiratory failure, aseptic meningitis ;
survived after Penicillin treatment**

First survival case of severe leptospirosis (Weil's Disease)





NKF The Official Journal of the
National Kidney Foundation

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Leptospirosis: An Ignored Cause of Acute Renal Failure in Taiwan

Chih-Wei Yang, MD, Ming-Jeng Pan, PhD, Mai-Szu Wu, MD, Yu-Ming Chen, MD, Yu-Tang Tsen, MD, Chun-Liang Lin, MD, Cheng-Hung Wu, MD, and Chiu-Ching Huang,

Case definition-Taiwan

- Suspected
- Seropositive
 - $\geq 1:100$
- Probable
 - $\geq 1:400$
- Confirmed
 - Four-fold rise
 - Isolation +



(圖片出處 Barbara A. et al. Infectious Disease 2nd p204)

敬愛的醫師您好：

您的病人若有出現不明原因的高燒、黃疸、急性腎衰竭、血、多重器官衰竭、昏迷等症狀，且為

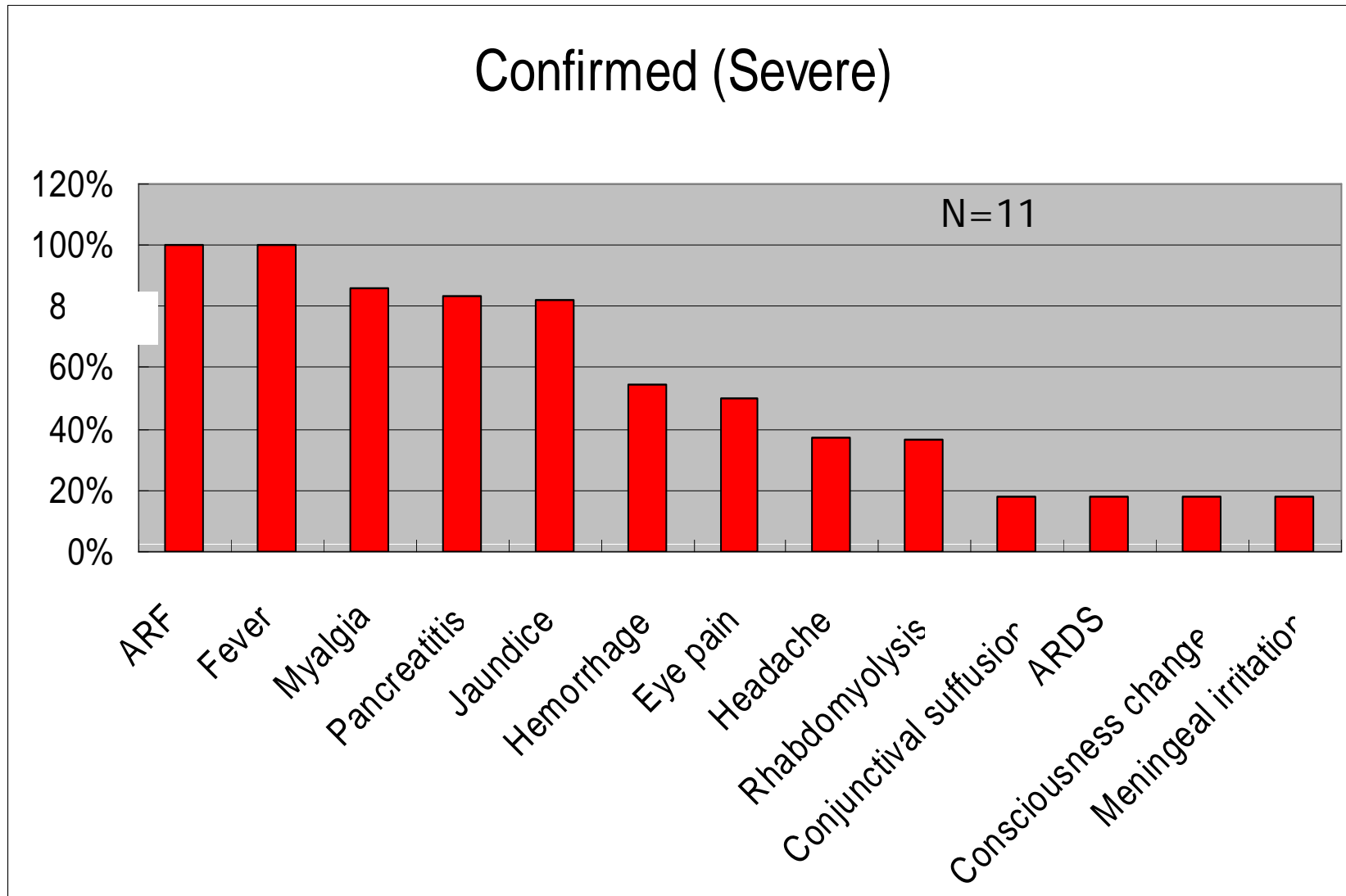
- (1) 農牧業者、獸醫師、肉品加工廠工作者、廚房工作者。
- (2) 茶、肉販及從事游泳、激流泛舟、露營等野外活動。
- (3) 常接觸污水，如下水道工作人員或水災地區居民。

請考慮是否感染的嗜螺菌體病(Leptospirosis)，並請

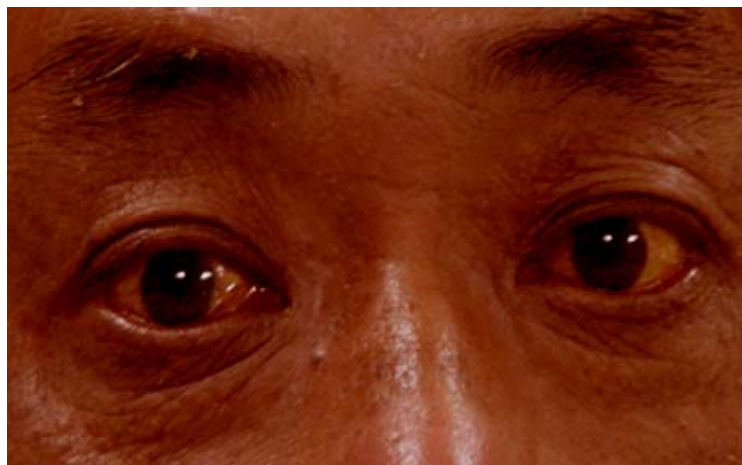
1. 立即會診感染科醫師
2. 採取急性期血液檢體送疾病管制局檢驗
3. 經新感染症候群通報系統通報

疫情通報專線：0800-024582
行政院衛生署疾病管制局 提醒您

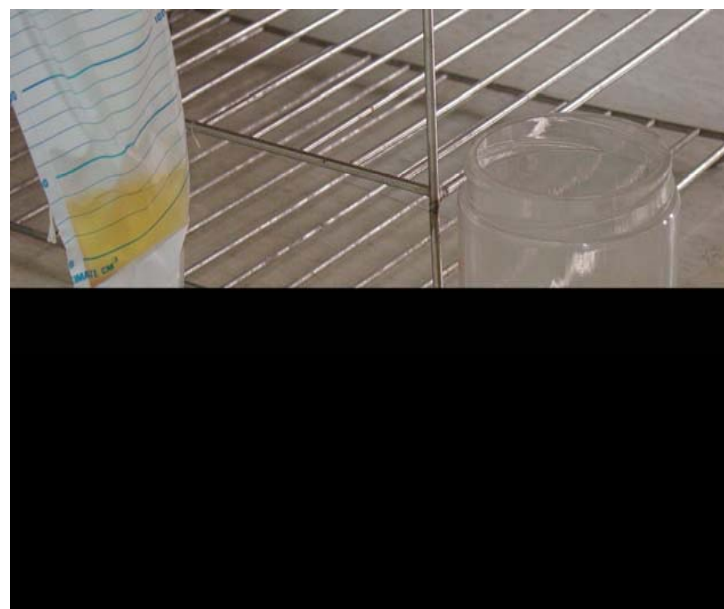
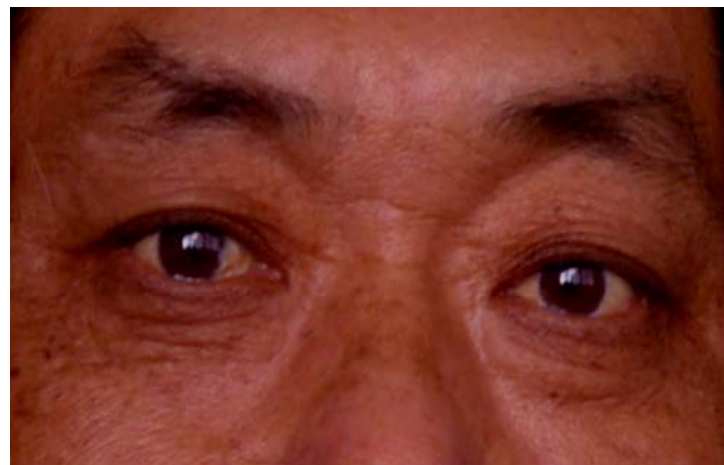
Leptospirosis in CGMH



治療前



治療後



8/25/2008

長庚 楊智偉 教授 提供



慈濟醫學中心 王立信副院長提供

8/25/2008

45

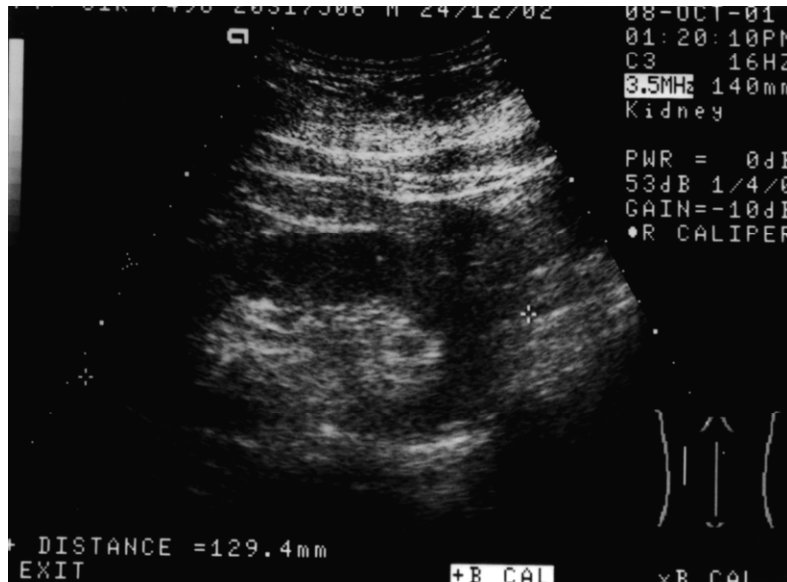
超音波檢查

腎臟腫大

長庚 楊智偉 教授 提供

2001-10-8 13.3 cm

2001-11-12 10.3 cm



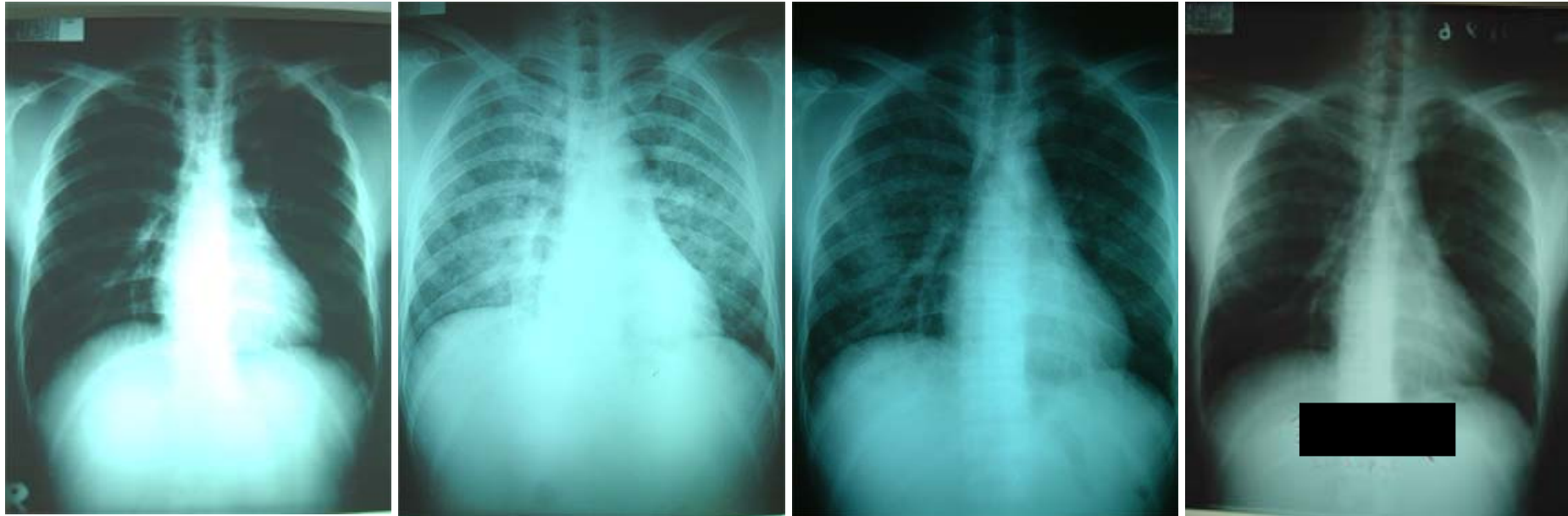
治療前

治療後

吳x昌 20317506 2001-10-6 ~ 10-18

鈎端螺旋體感染與肺出血

長庚 楊智偉 教授 提供



2002-9-1

2002-9-2

2002-9-3

2002-9-6

Fever, Hemoptysis **Start penicillin** →

Dyspnea,
Thrombocytopenia **Dipstick Lepto
IgM + + +**

Discharged

鍾X麒 20504647
MAT *L. shermani*,
1:6400->800

青黴素的效用

治療前

劉 x 昌 3989228 (1)

治療後



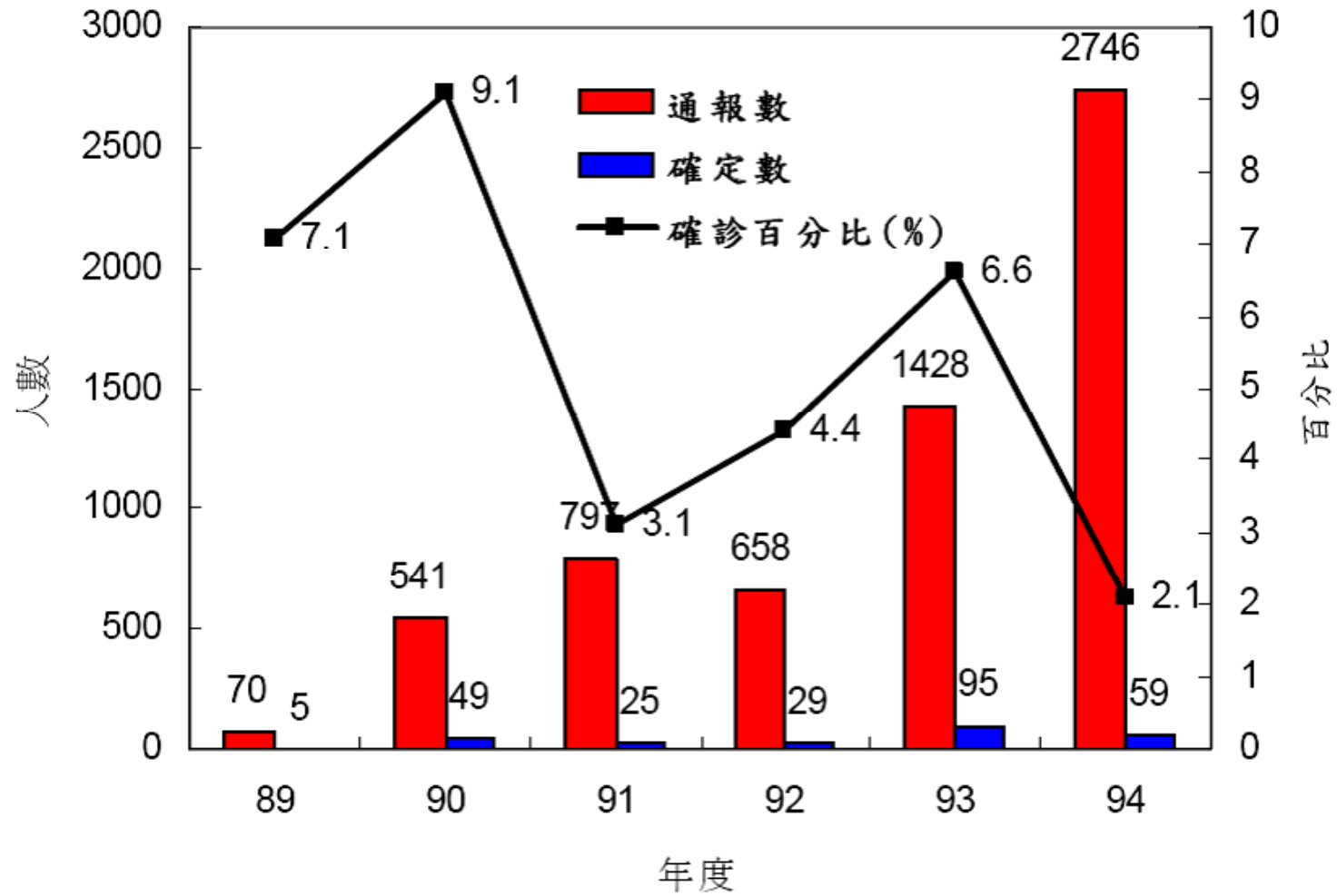
Nov 28, 1996

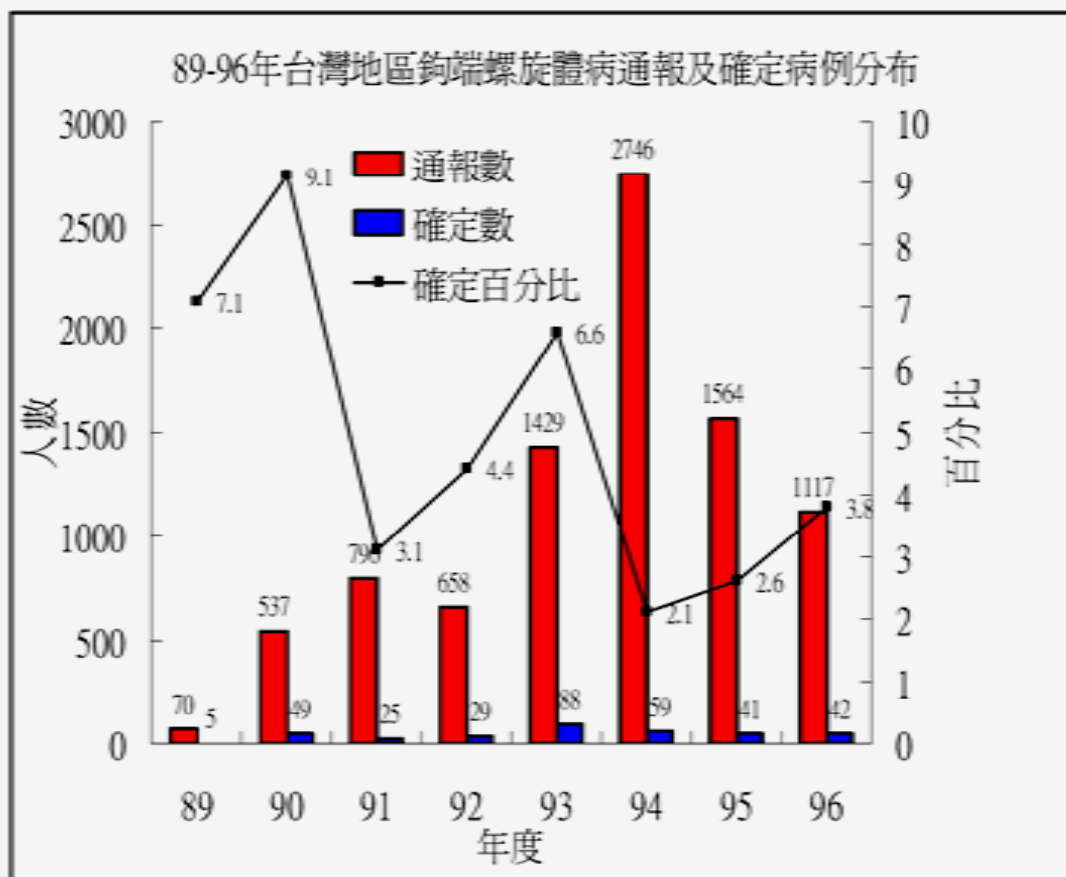


Nov 30, 1996

長庚 楊智偉 教授 提供

89-94年台灣地區 鉤端螺旋體病通報及確定病例分布







89-96年鉤端螺旋體病

確定病例居住區域分佈情況如下：

居住區別	發病年份(民國)								總計(百分比)
	89	90	91	92	93	94	95	96	
台北區	1	20	10	4	10	14	10	19	88(26%)
北區		10	5	3	4	7	6	7	42(12%)
中區	2	2	1	7	27	11	8	5	63(19%)
南區	1	3	2	1	7	5	1	1	21(6%)
東區		4	5	5	29	4	2	1	50(15%)
高屏區	1	10	2	9	11	18	14	9	74(22%)
總計	5	49	25	29	88	59	41	42	338(100%)



89-96年臺灣地區鉤端螺旋體病確定病例月份分布

發病月份	發病年份(民國)						總計
	89	90	91	92	93	94	
01			1	2	1	3	7(3%)
02		1	1	1	6	2	11(4%)
03		2	2	1	5		10(4%)
04		1	4		10		15(6%)
05		5	3	1	8	5	22(8%)
06		4	2	1	9	9	25(9%)
07	1	2	2	4	10	11	30(11%)
08	1	4		2	15	12	34(13%)
09	2	7	2	2	14	6	33(13%)
10	1	13	3	3	9	5	34(13%)
11		7	3	6	3	3	22(8%)
12		3	2	6	5	3	19(7%)
百分比	5(2%)	49(19%)	25(9%)	29(11%)	95(36%)	59(23%)	262(100%)



89-96年臺灣地區

鉤端螺旋體病通報及確定病例性別比例

年份	通報數				確定數			
	女	百分比 (%)	男	百分比 (%)	女	百分比 (%)	男	百分比 (%)
89	21	30	49	70	1	20	4	80
90	175	33	362	67	5	10	44	90
91	262	33	534	67	3	12	22	88
92	178	27	480	73	7	24	22	76
93	431	30	998	70	21	22	67	78
94	1026	37	1720	67	8	14	51	86
95	548	35	1016	65	7	17	34	83
96	326	29	791	71	6	14	36	86
平均	371	31	744	69	7	17	35	83



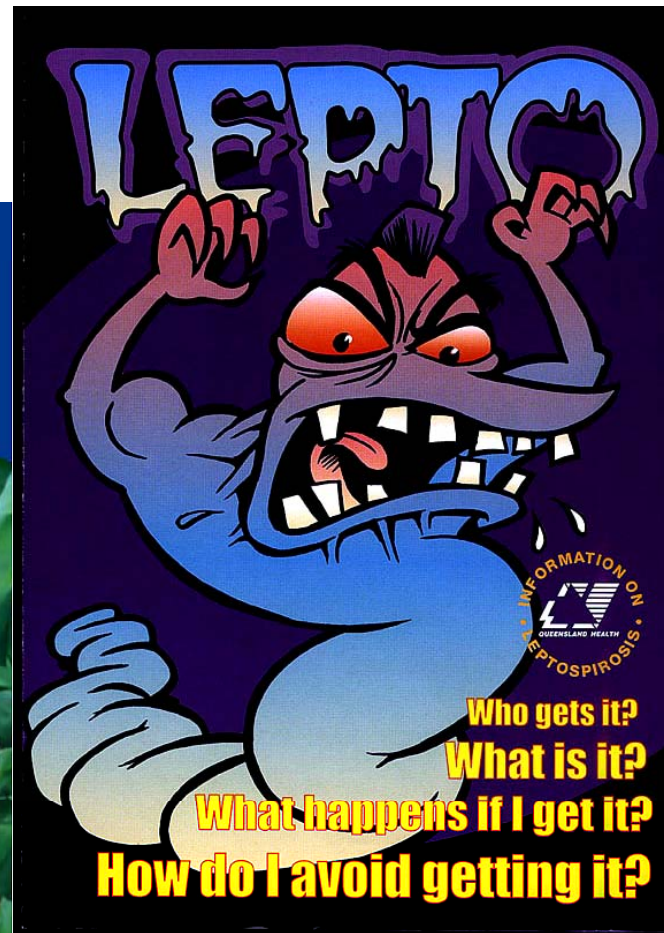
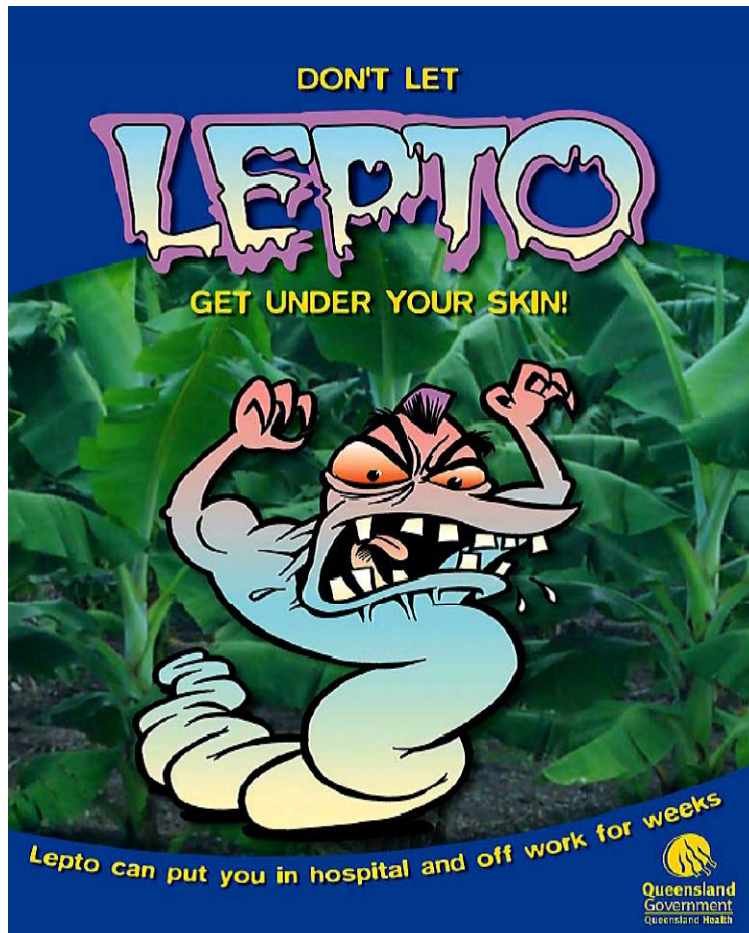
89-96年臺灣地區鉤端螺旋體病確定病例年齡分布

發病年齡	89	90	91	92	93	94	95	96	總計 (百分比)
≤20	1	2	0	1	2	0	0	1	7 (2%)
21-30	2	11	5	0	8	7	2	5	40 (11.8%)
31-40	1	7	4	7	15	13	9	4	60 (17.8%)
41-50	0	14	4	9	17	10	8	11	73 (21.6%)
51-60	1	7	4	7	23	11	11	11	75 (22.2%)
61-70	0	5	6	4	17	11	5	7	55 (16.3%)
≥71	0	3	2	1	6	7	6	3	28 (8.3%)
總計	5	49	25	29	88	59	41	42	338 (100%)



89-96年臺灣地區鉤端螺旋體病確定病例職業分布

職業	89	90	91	92	93	94	95	96	總計
公共行政業(公務、國防、國際等機構)					1		1		2
水電燃氣業				1					1
住宿及餐飲業			2	1	2	2	5	1	13
批發及零售業				3		1	1		5
其他服務業			1	3	9	3	1	3	20
其它		1	1	5	22	19	11	15	74
家管				1	4	1	1		7
現役軍人			1		1			2	4
無			1	5	17	9	9	7	48
禽畜相關業者							1	2	3
農、林、漁、牧業	1	2	2	1	14	16	8	7	51
運輸、倉儲及通信業				1		2		1	4
製造業					3		1		4
學生				1	1				2
營造業					2		1	2	5
醫療保健及社會福利服務業					1	1			2
礦業及土石採取業					1	1	1		3
護士					2				2
(空白)	4	46	17	7	8	4		2	88
總計	5	49	25	29	88	59	41	42	338





8/25/2008

57

Cutaneous infection in meatworkers

<i>Organism</i>	<i>Frequency</i>
No growth	4
Skin flora	7
Staphylococcus aureus	16
Escherichia coli	1
Group B β -haemolytic streptococci and E. coli	1
Mixed growth coliforms and Enterococcus faecalis	1
Staphylococcus aureus and E. coli	1
Staphylococcus aureus and Streptococcus pyogenes	1
Staphylococcus aureus and Citrobacter freundii	1
Total	33

PPE (personal protective equipment) at work



High efficiency particulate air (HEPA) mask for tuberculosis precaution

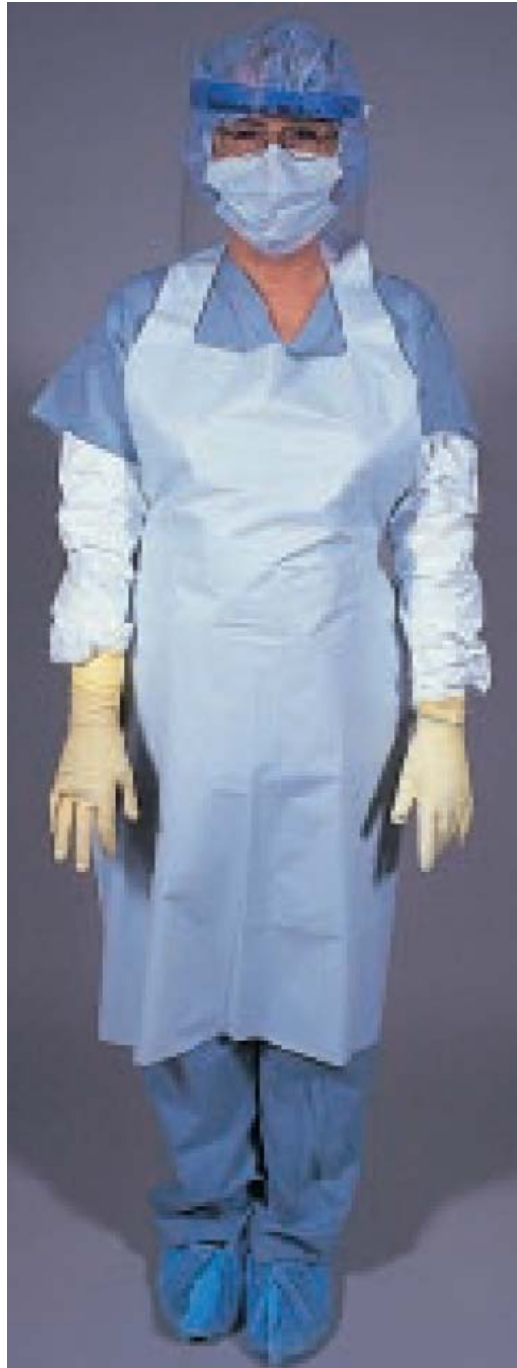


Hardin, 2000

Battery powered HEPA filtered hood, for suspected cases of tuberculosis

Hardin, 2000





8/25/2008








Hardin, 2000



Hardin, 2000






Directions for Washing Hands

HOW

-  Wet hands with running water
-  Place soap into palms
-  Rub together to make a lather
-  Scrub hands vigorously for 20 seconds
-  Rinse soap off hands
-  Dry hands with disposable paper towels, not on clothing



WHEN

- After going to the toilet 
- Upon exiting animal areas 
- Before eating 
- Before preparing foods 
- After removing soiled clothes or shoes 

* Sign available at <http://www.nasphv.org/documents/compendia/animals.html>. Additional resources on animals in public settings or zoonotic diseases are available at <http://www.cdc.gov/healthypets>.

Hand-washing agents

- **Liquid soap dispensed by a hand or foot pump is recommended**
- **Alcohol-based hand sanitizers can be used if soap and water cannot be made available and are effective against multiple common disease agents (e.g., shiga toxin-producing *E. coli*, *Salmonella*, and *Campylobacter*). However, they are ineffective against certain organisms (e.g., bacterial spores, *Cryptosporidium*, and certain viruses)**

Hand-washing agents

- **The U.S. FDA recommends using an alcohol-based hand sanitizer with a concentration of 60% or higher to be effective against common disease agents**
- **Hand sanitizers are less effective if hands are visibly soiled. Therefore, visible contamination and dirt should be removed to the extent possible before using hand sanitizers**



- **“Hand Gel Not an Infection Cure-all”** January 30, 2008
- **Doctors and nurses on the go often skip soap and water in favor of an alcohol-based hand gel, thinking the quick-acting goo will kill bacteria on their hands and curb the spread of infection. It turns out that's not enough**

