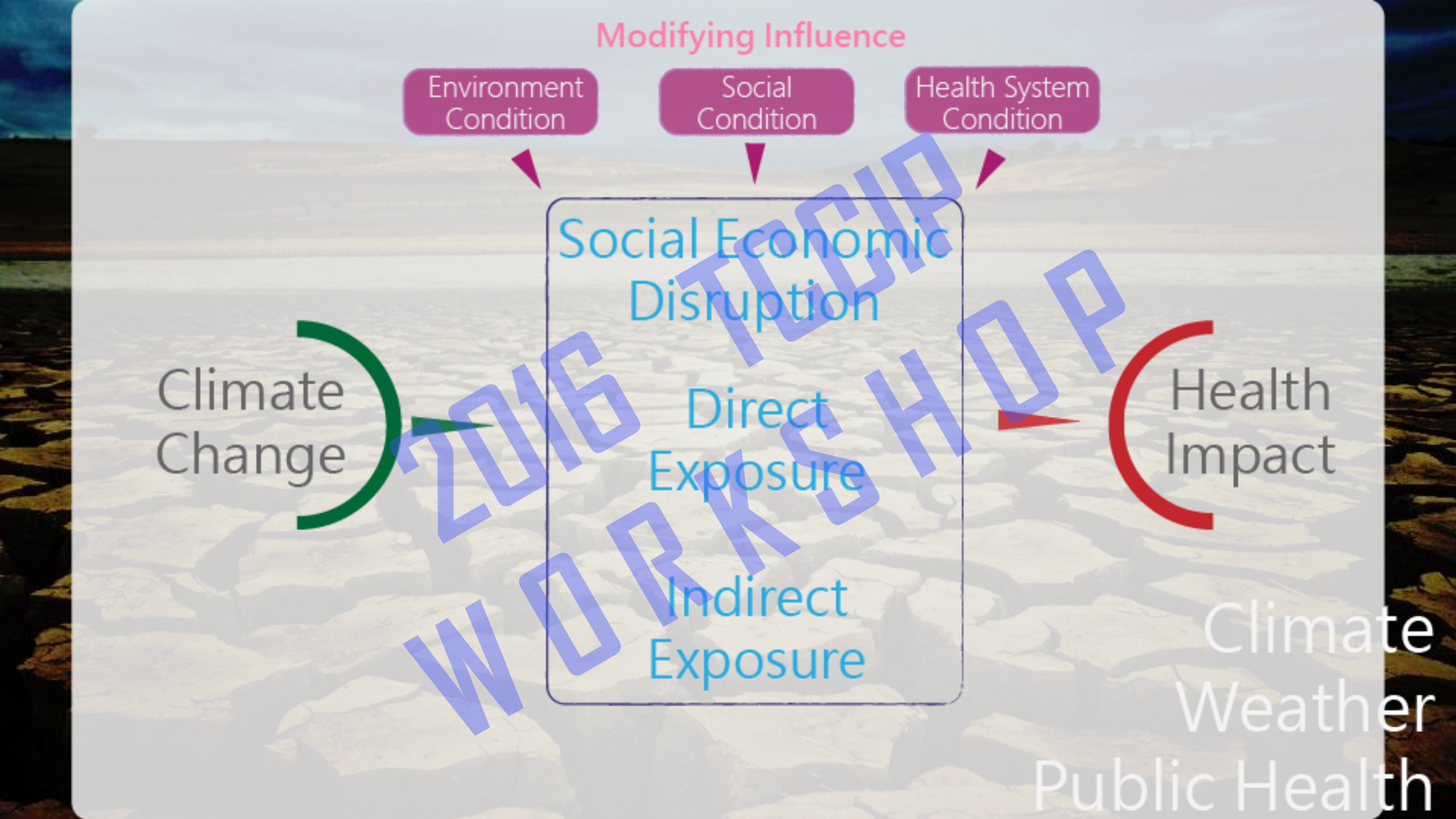
Extreme Temperatures : Health Impacts and Adaptation In Taiwan

Dr. Yu-Chun Wang


Modifying Influence
Environment Condition
Social Condition
Health System Condition
Social Economic Disruption
Direct Exposure
Indirect Exposure
Climate Change
Health Impact
2016 TCIP WORKSHOP
Climate
Weather
Public Health

Medical and Behavioural factors affecting human thermoregulation and the Risk of Heat Illness

Factors affecting behaviour

- Physical cognitive impairment
- Psychiatric illness
- Infants

Increased heat gain

- Exercise
- Outdoor activity
- Medication

Factors influencing cardiac output

- Cardiovascular disases
- Medication

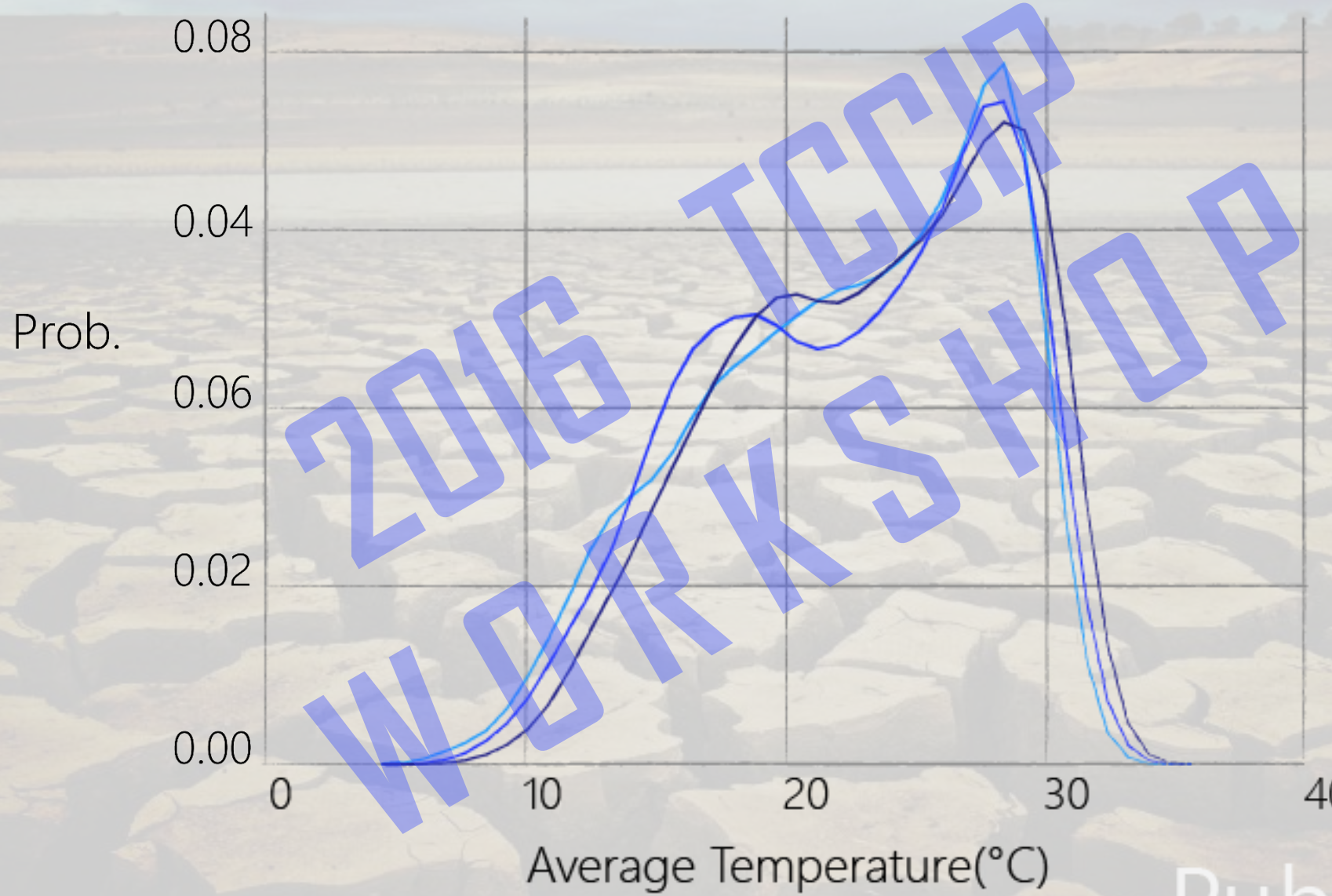
Factors reducing plasma volume

- Diarrhoea
- Pre-existing renal or metabolic
- Medications

Factors affecting sweating

- Dehydration
- Ageing
- Diabetes, Scleroderma
- Cystic fibrosis
- Medications

Taipei



Climate
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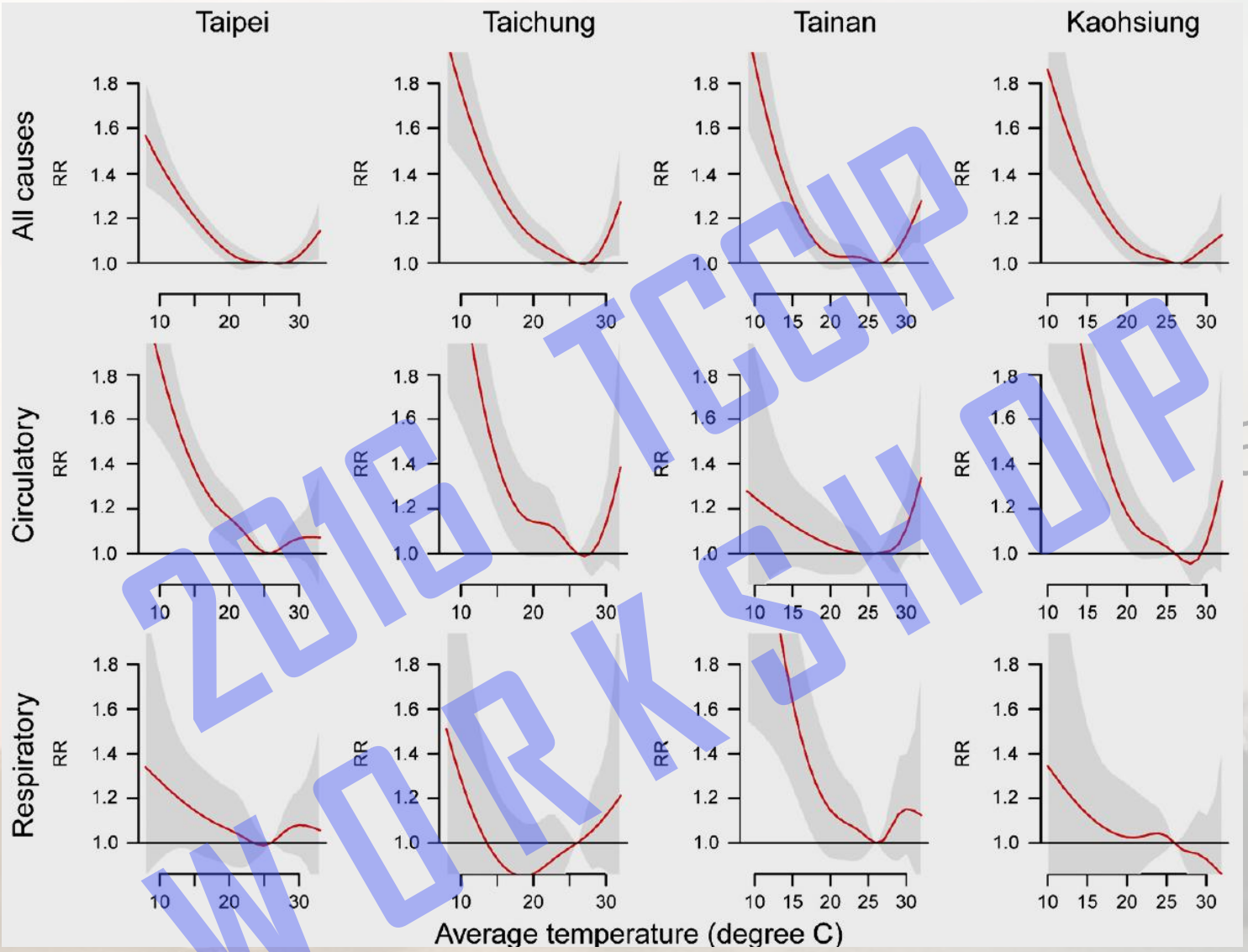
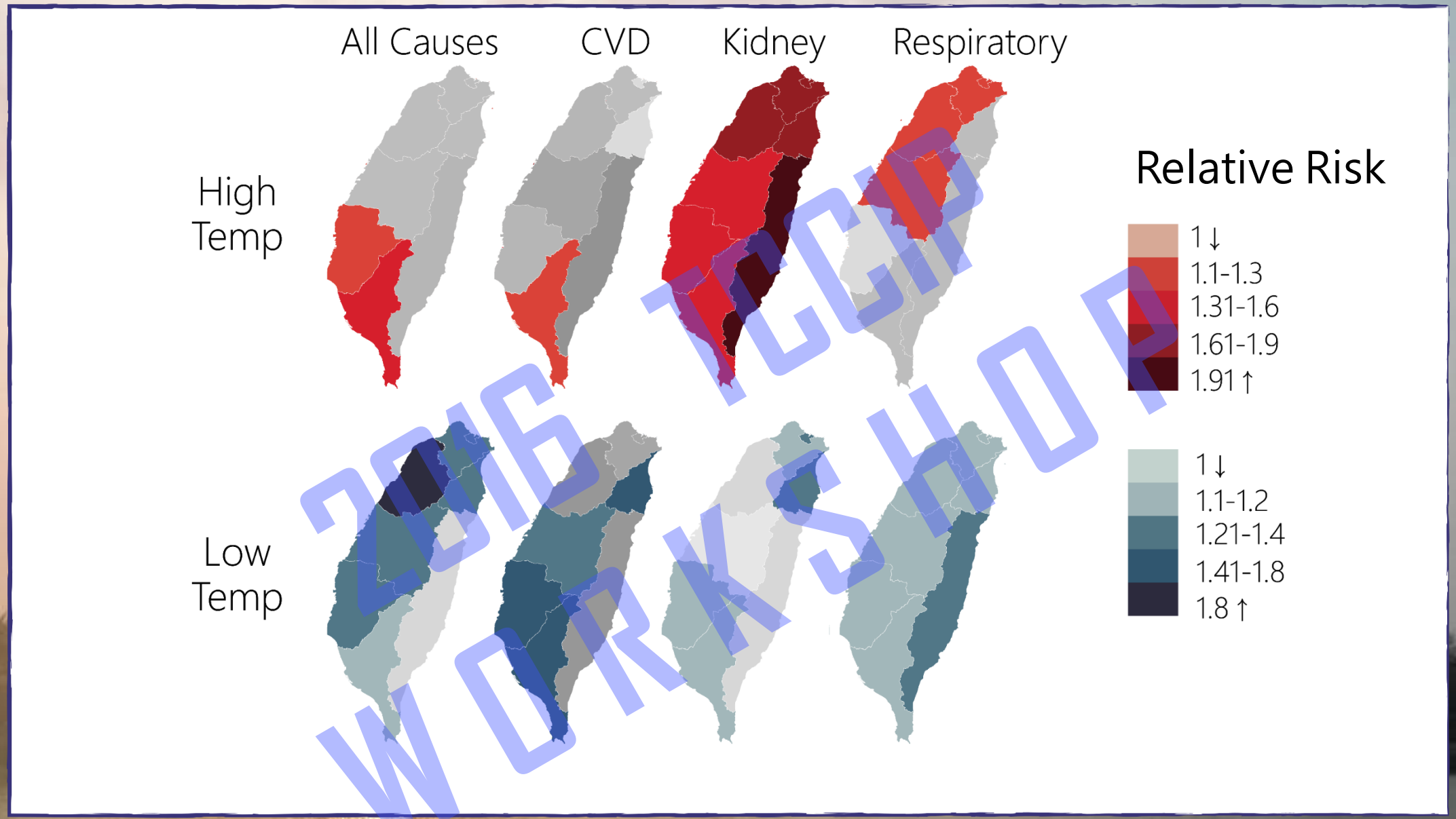
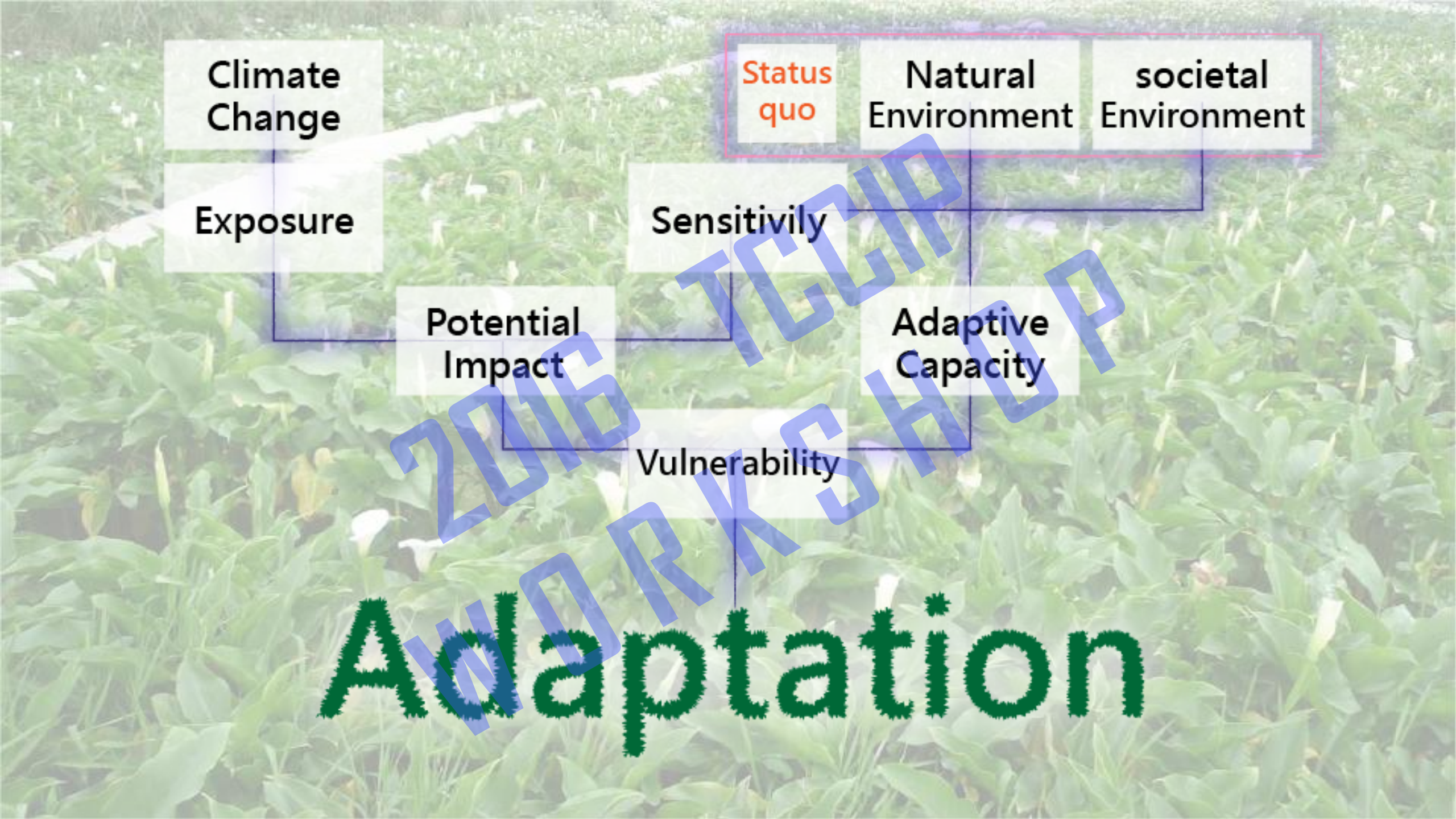






Adaptations of Public Health to Climate Change

Types of climate information relevant for health Decision-Making

Time Scale	Example Climate Information Products	Example application areas
Long Range Climate information (decades)	Climate change scenarios Dynamic climate models, Global Circulation Models	Long term health infrastructure investments, research, demographic/population models, health systems planning Increase understanding of disease trends, epidemic behaviour on a regional scale
Mid-term Climate information (annual to multi-year)	Status of El Nino Inter-annual forecasts Dynamic climate models	Mid-term policy decisions for disease control, research
Short-Term Climate Information (Decadal, Monthly, Seasonal, Annual)	Risk indexes of Cyclones, Floods, Dust Storm, Wind Storms, Extreme Temperature, Fire Temperature/precipitation Outlooks of (6, 3, 1 month) average, maximum and minimum Seasonal trends Tercile forecasts Dynamic and Statistical climate models	Short term operational investment in preparedness, outbreak prevention, resource needs Example, adaptation of WHO/national response plans based on El Nino/La Nina forecasts
Weather Information (Hourly, Daily, Weekly)	Daily Weather: temperature, precipitation, humidity, etc Weather statistics: real-time monitoring, historic time-series, summary statistics	Short term operational decisions Risk announcements, trigger response plans, staff placement, delivery of supplies

Early Warning Systems

Real-time Extreme Temperatures Warning System in metropolitan Taipei

Mortality risk and dengue fever epidemics based on seasonal climate outlook in metropolitan Kaohsiung

Early Warning Systems

Real-time Extreme Temperatures Warning System

Advice on preventing temperature-related illness

Vulnerable population

Keep out of the heat

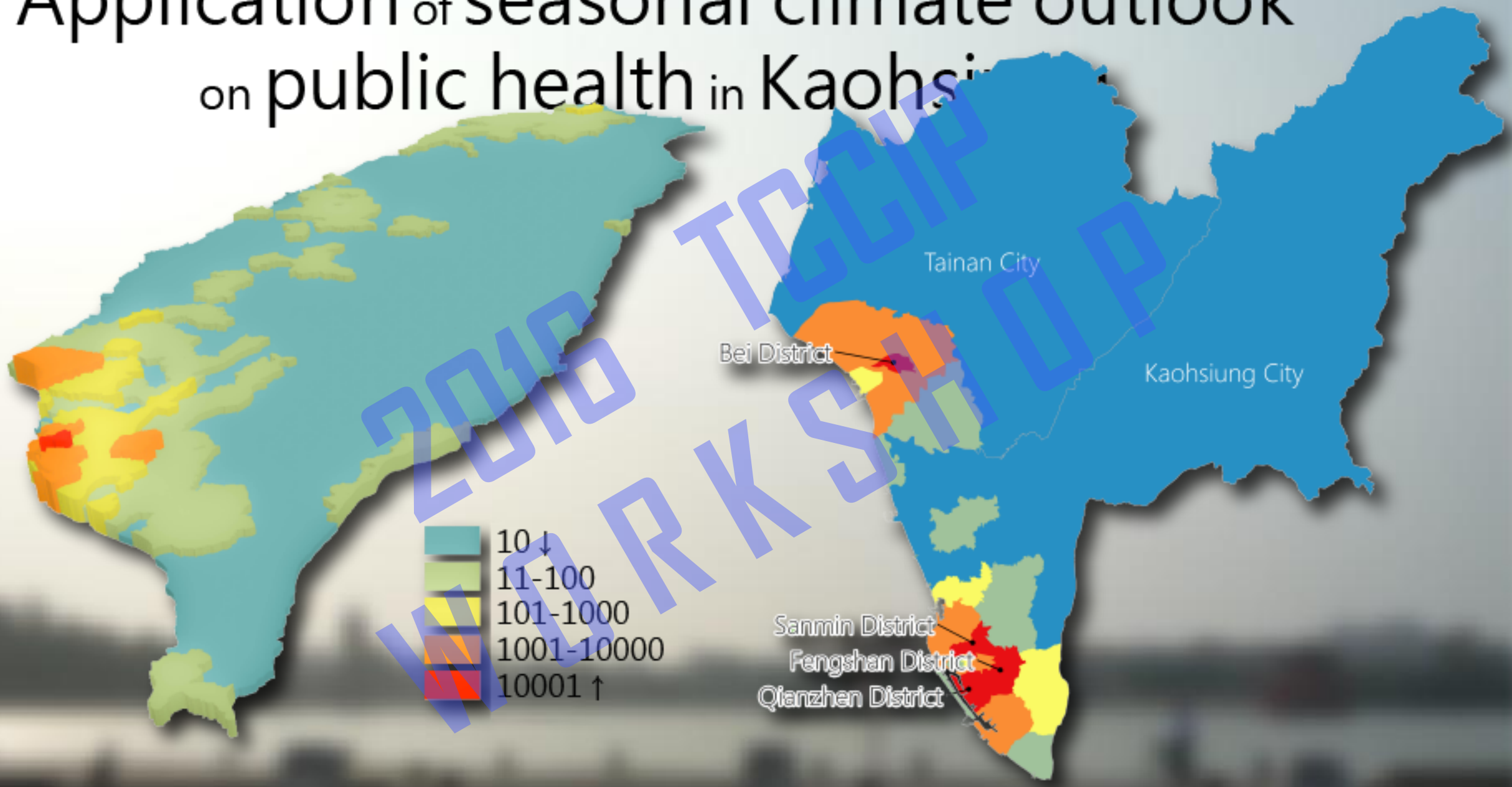
Advice on food, drinks and nutrition

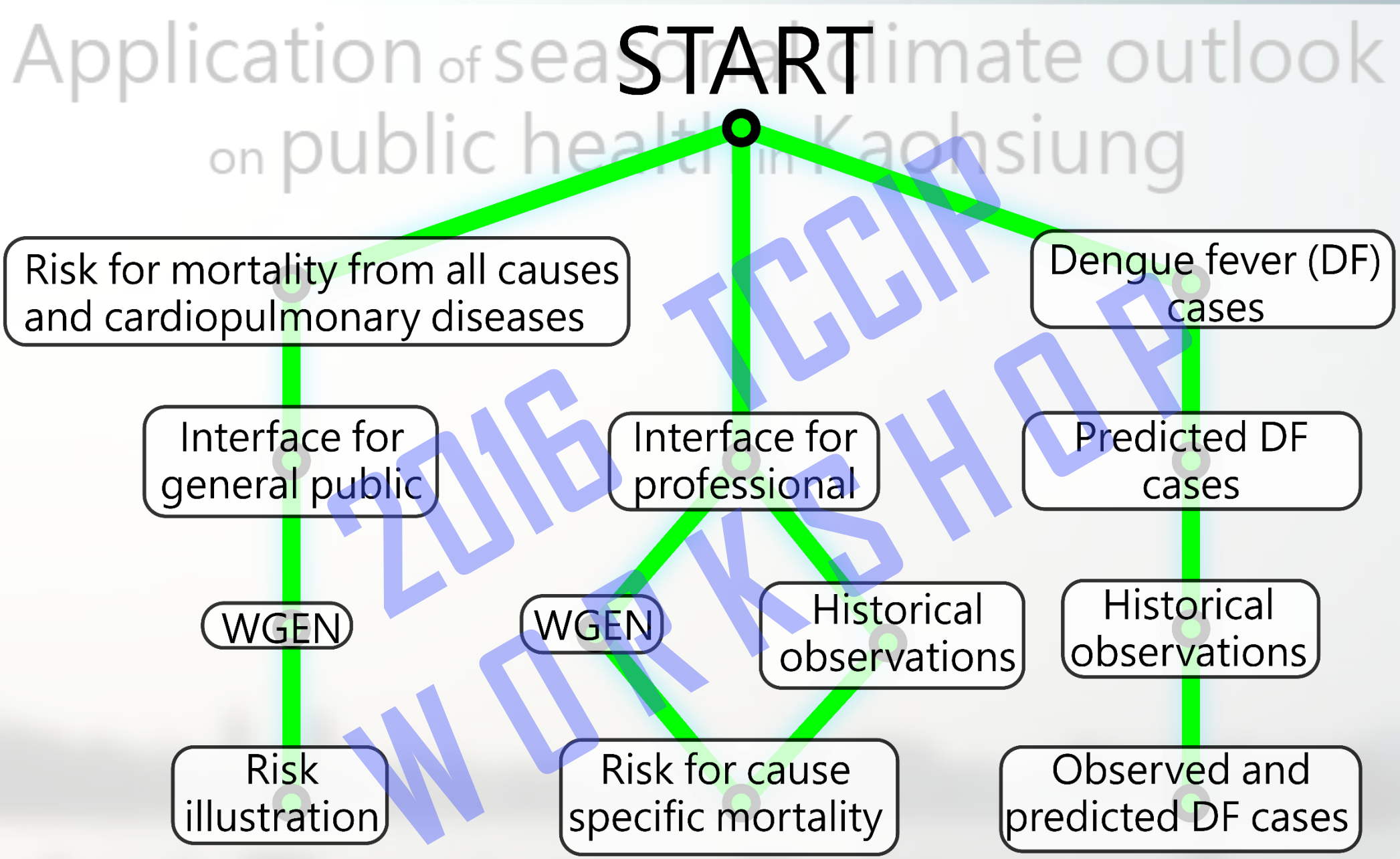
Personal behavior

Advice on medical service

Helping others

Application of seasonal climate outlook on public health in Kaohsi





Central Weather Bureau

Climate and Public Health

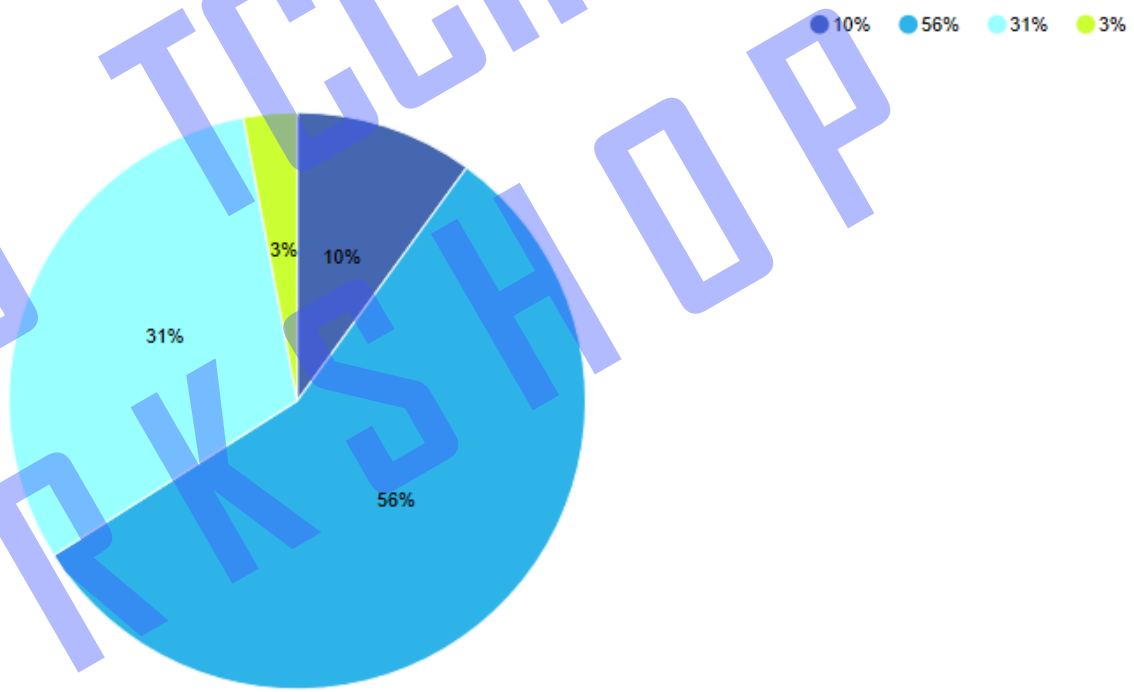
Integrated Services System

- 高雄地區慢性病健康風險與建議
- 應用氣候預報資訊預測高雄地區慢性病健康風險
- 應用氣候預報資訊預測高雄地區登革熱通報病例

最大機率法則設定

1月 計算結果

冷季(11~4月) 寒冷危險(＜17℃) 嚴重警戒(17～20℃) 警戒預備(20～23℃) 安全(＞23℃)



預警建議　極端溫度預警系統

- 高雄地區慢性病健康風險與建議
- 應用氣候預報資訊預測高雄地區慢性病健康風險
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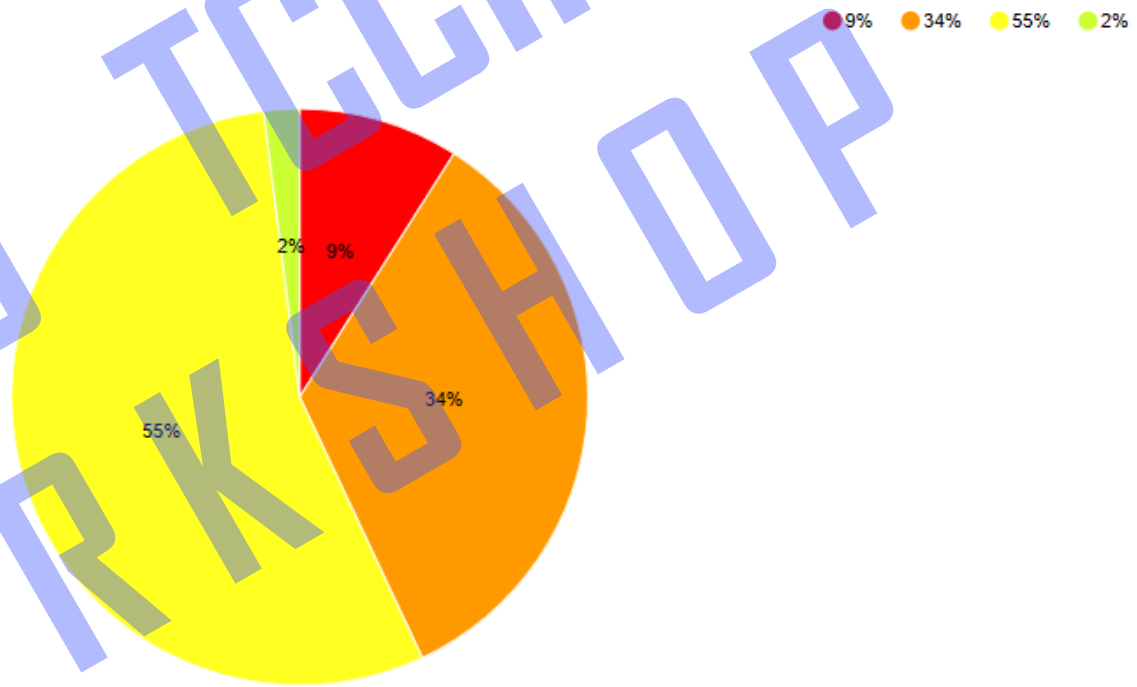
最大機率法則設定

7月 計算結果

熱季(5~10月) 高溫危險(≥ 31℃) 嚴重警戒(29.5 ~ 31℃) 警戒預備(28 ~ 29.5℃) 安全(＜28℃)

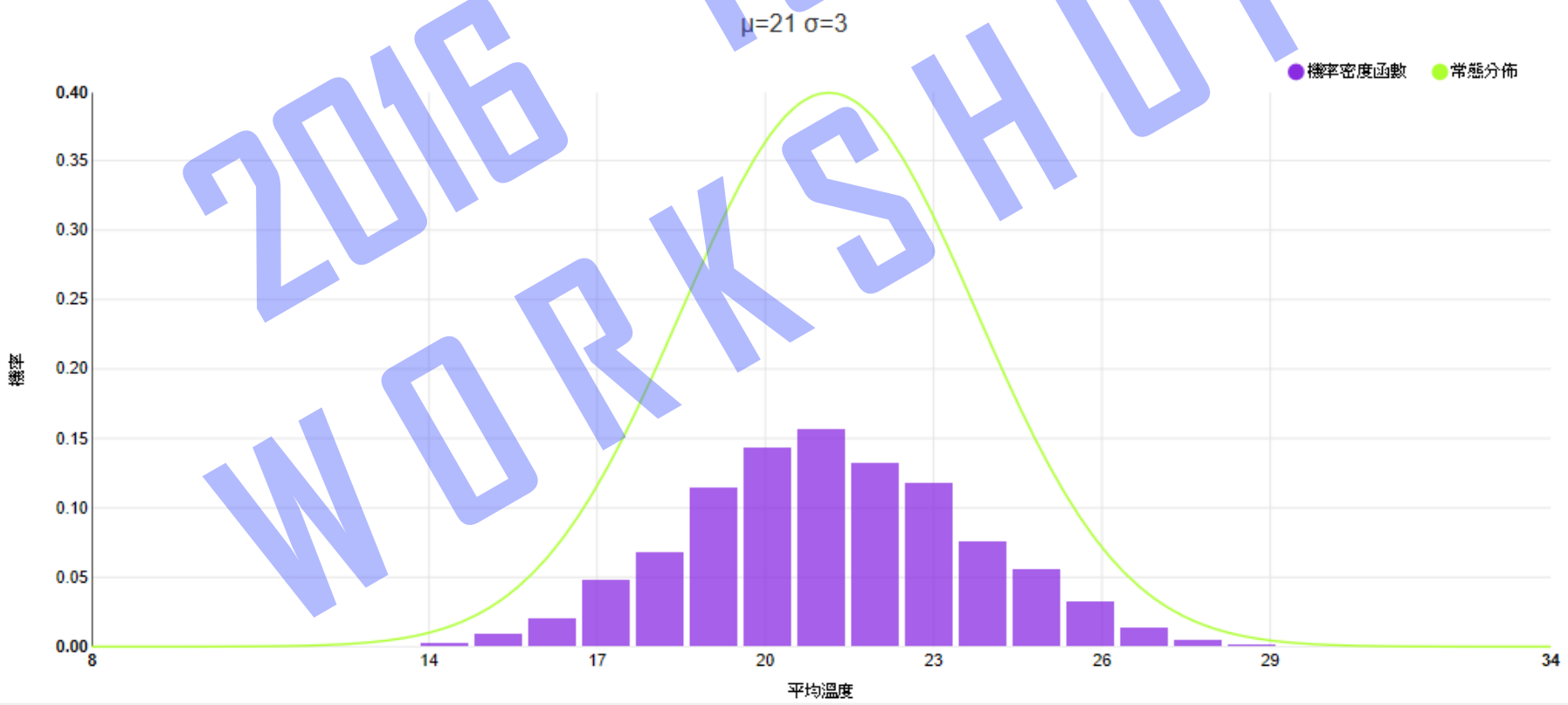


預警建議　極端溫度預警系統

2月 計算結果

月	溫度	機率(%)	次數	全死因	心血管疾病死因	呼吸道疾病就醫
Feb	14	0.25	7	1.370 (1.352~1.389)	1.747 (1.694~1.802)	1.580 (1.576~1.584)
Feb	15	0.893	25	1.330 (1.315~1.344)	1.669 (1.629~1.711)	1.544 (1.541~1.547)
Feb	16	2.036	57	1.291 (1.128~1.301)	1.596 (1.565~1.626)	1.508 (1.506~1.510)
Feb	17	4.786	134	1.254 (1.245~1.262)	1.525 (1.503~1.548)	1.471 (1.469~1.473)

額外死亡或就醫風險=(1-相對風險) x 100%



- 高雄地區慢性病健康風險與建議
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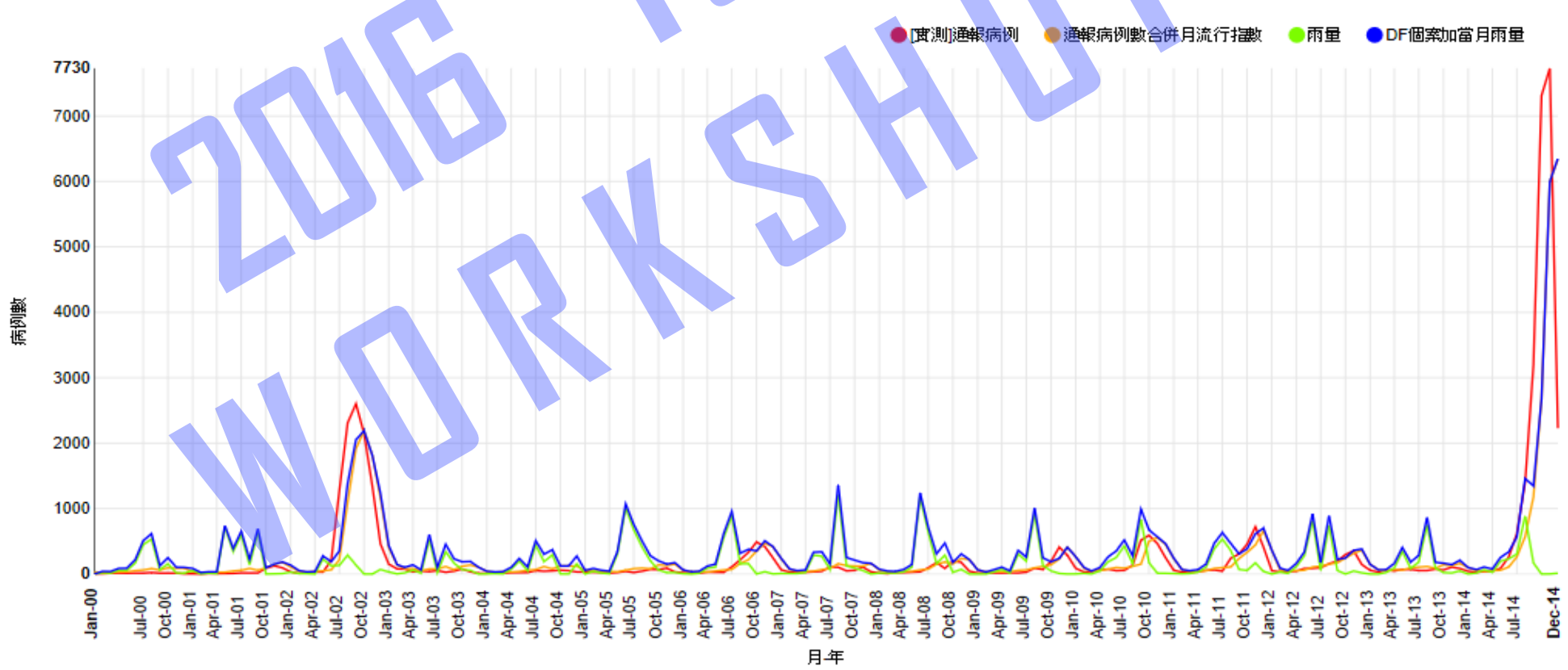
◉ 通報病例 ○ 確定病例 ○ 預測病例

圖表範圍 2000-01-01 2014-12-01 顯示資料

日期	[實測]通報病例	通報病例數合併月流行指數	雨量	DF個案加當月雨量
2014/12/01	2223	6,338.34	13.28	6,351.49
2014/11/01	7730	5,998.23	1.48	5,999.58
2014/10/01	7312	2,673.89	0.00	2,673.76
2014/09/01	3199	1,177.94	169.25	1,347.05



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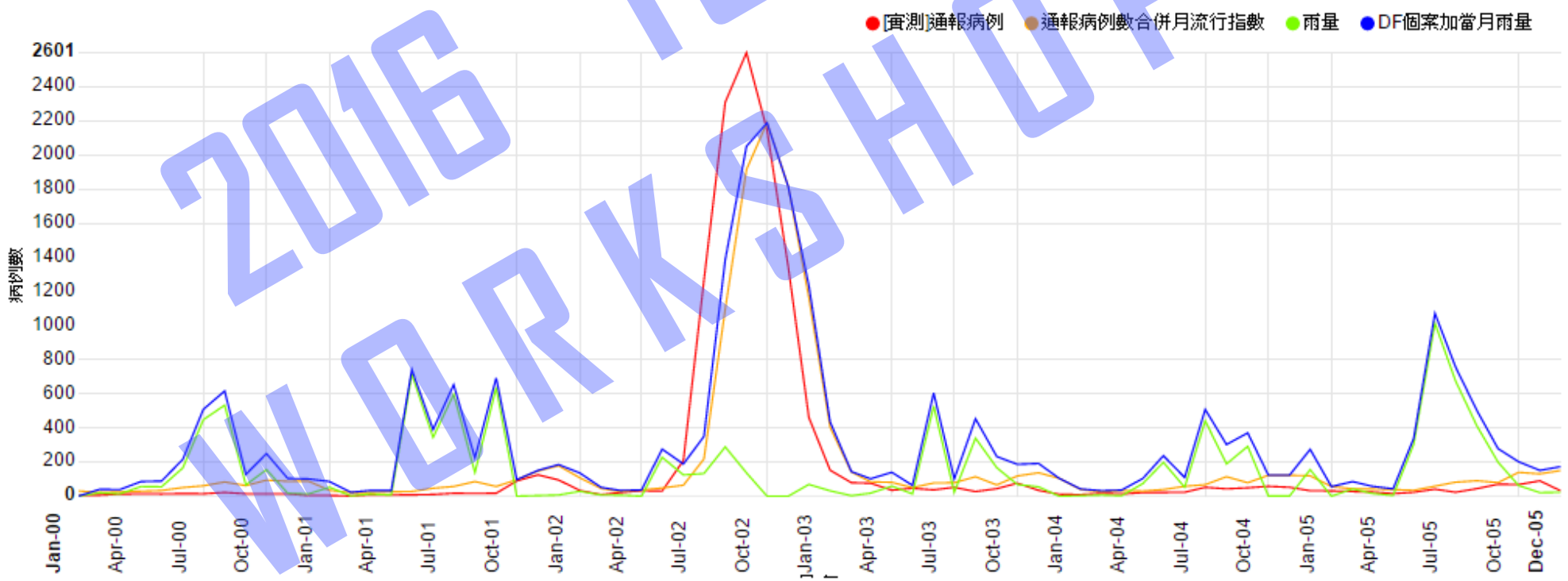
圖表範圍 2000-01-01 2005-12-01 顯示資料

日期	[實測]通報病例	通報病例數合併月流行指數	雨量	DF個案加當月雨量
2005/12/01	32	149.94	23.12	172.93
2005/11/01	90	130.59	20.66	151.13



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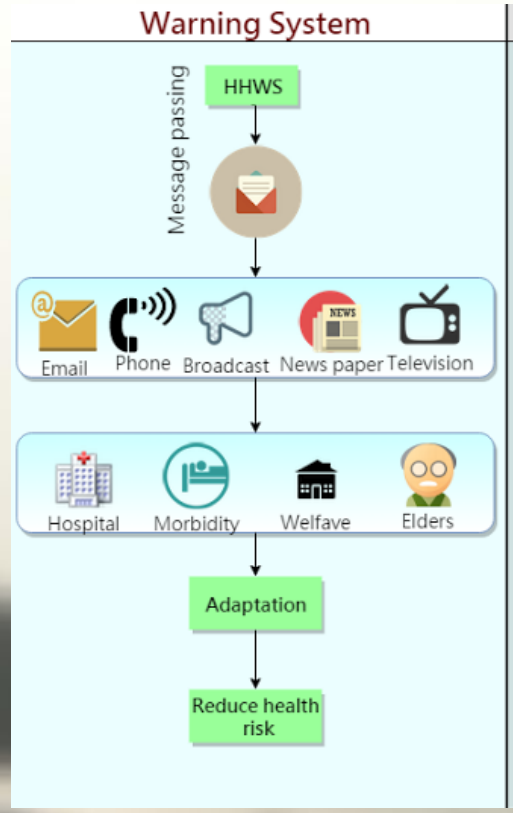
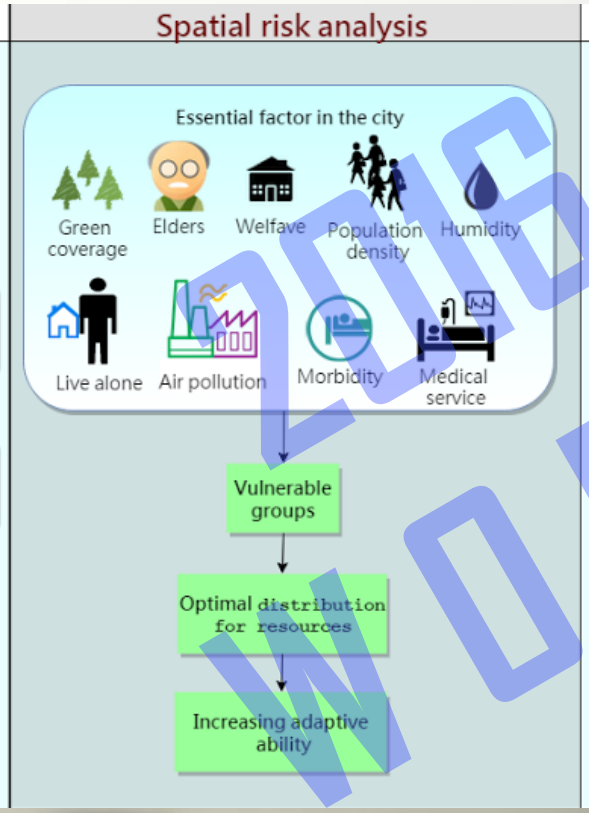
Integrated Services System

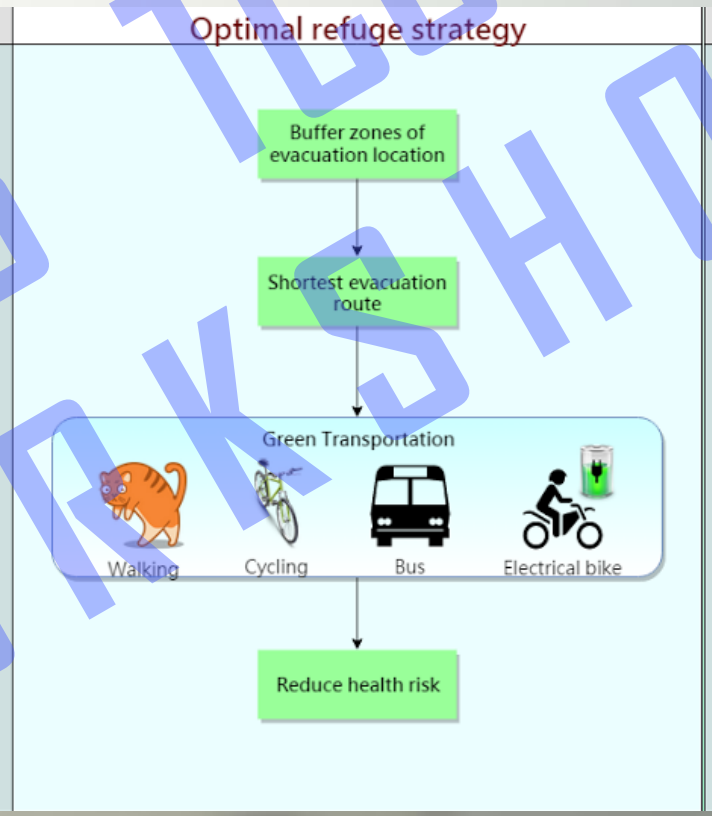
- Web：
  http://cwb.etws.tw/
- QR code：

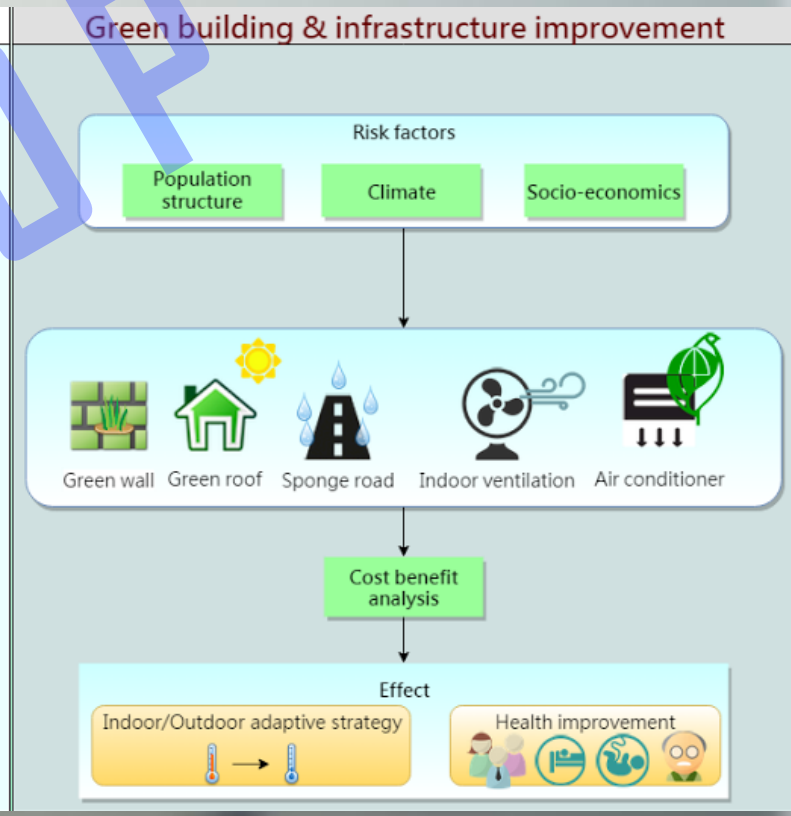
Future works

Regional Adaptation plans to Heatwave









Thank you!