



## Biosecurity plan and animal health monitoring technology to enhance the operating efficiency of pig farms

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# 綱要 Outline

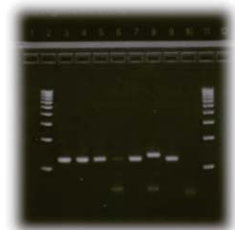
- 判讀及診斷之價值  
The value of diagnostics and Interpretation
- 疾病管控之生物安全策略  
Biosecurity strategy on diseases control
- 臺灣動物健康監測實務介紹  
Practical implementations of animal health monitoring in Taiwan
- 結論  
Conclusions



## The value of diagnostics and Interpretation

### What our diagnostic laboratory does

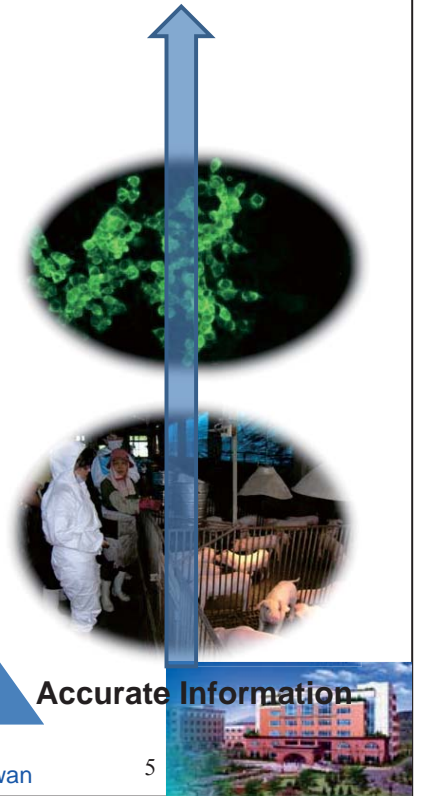
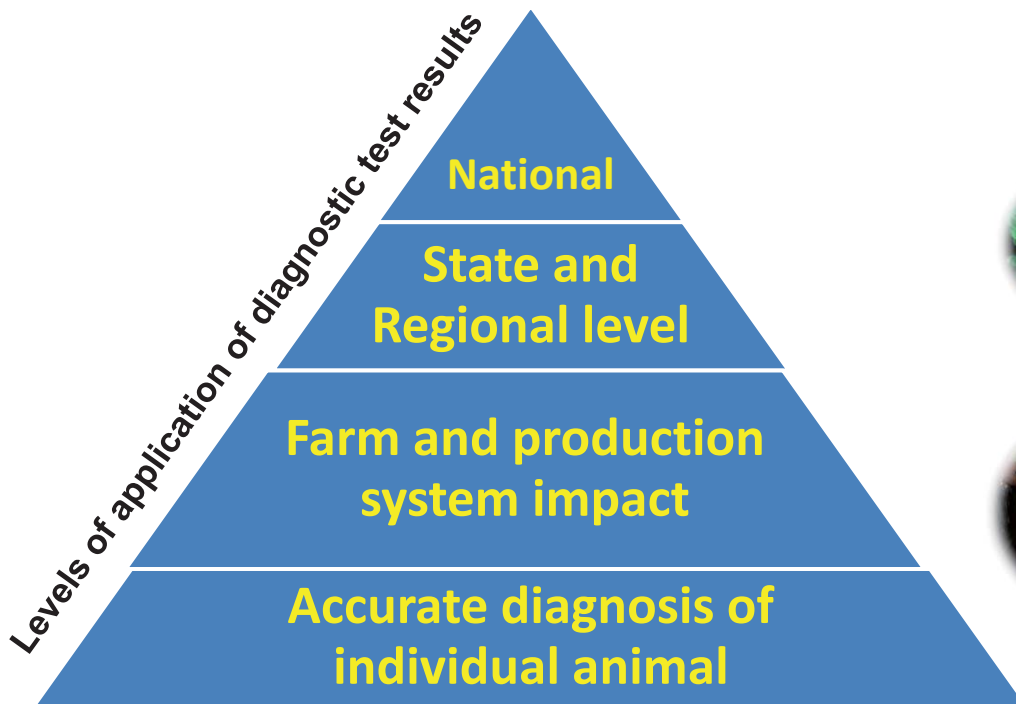
- Accurately determine if disease is present
- Accurately determine which disease is present
- Usually involves laboratory tests
  - Observation of tissue changes (lesions)
  - Laboratory testing, test interpretation, and report results
- Characteristics of good laboratory tests
  - Accurate: specific and sensitive, but never "perfect"
  - Rapid, timely results
  - Economical
- Continuous improvement
  - Test accuracy
  - Test methods
  - Sample types
  - Testing strategies
  - Application of results





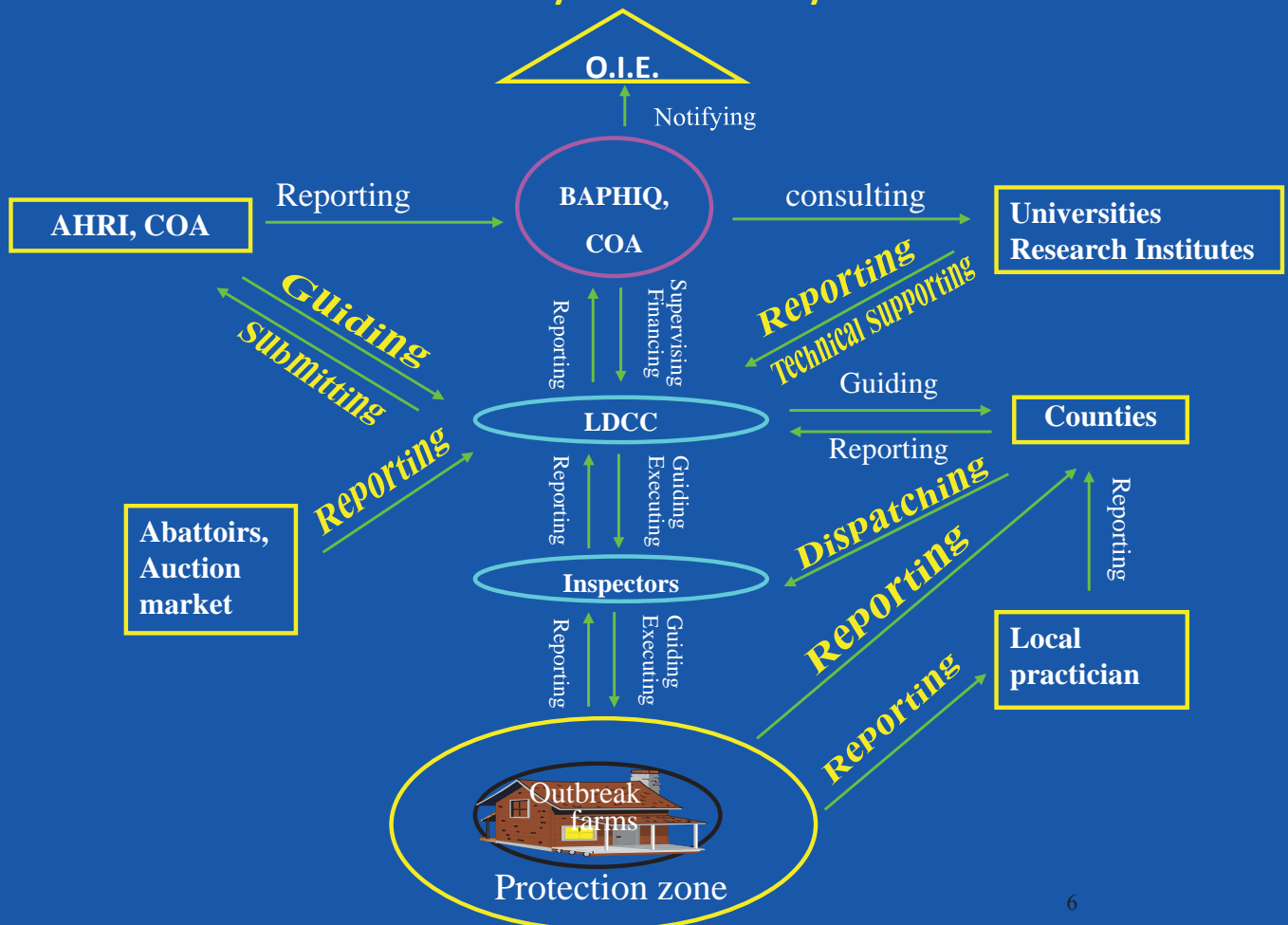
## Values of Accurate, prompt, and Practical Diagnostic Services

Objectively assess impact in context



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## Veterinary Service System





## Organization of Animal Disease Diagnostic Center

動物疾病診斷中心

病歷處理室

病理學檢驗室

血清學檢驗室

病毒檢驗室

細菌檢驗室

禽病檢驗室

水生動物疾病檢驗室

中毒檢驗室

電子顯微鏡室

動物疾病診斷中心

### 家畜衛生試驗所動物疾病診斷中心

### Animal Health Research Institute ,Animal Disease Diagnostic Center



Advantages of this type of laboratory system

#### Academic Environment

Objective information for producers

Applied Research and Teaching

**Accredited** full service Lab

**Dedicated resource** to diagnostic services

Swine Production and Disease Issues are Producer-Driven



Veterinarian

•Research  
•Education



Diagnostic Laboratory credible results





# 區域及國家級實驗室診斷系統之價值 Value of Diagnostic Laboratory System Regional and National Level

## Identify trends and threats with accurate data

**New or Emerging Diseases**

Example: PCV2, PRRSV

**Provide specimens and testing for Surveillance**

Food safety monitoring:

Example: Salmonella

Zoonotic infections:

Example: Influenza

Eradication:

Example: Brucellosis, tuberculosis

National Security:

Example: CSF, FMD, ASF

**Food security: optimizing production / feeding people**

**Conservation of resources: environmentally sustainable production**

**Trade and commerce**

## Data for regulatory and business decisions



## 精準、即時與實用的診斷服務

### Values of Accurate, prompt, and Practical Diagnostic Services

- 個體/群體診斷 Individual animal / group level diagnosis
- 農場/系統層級 Farm / System Level
  - 結合生產與疾病數據 Integrate disease data with production / 經濟效益數據 economic data
  - 影響經營管理之決定 Influence management decisions
  - 作為農場研究及田間試驗之依據 Support field trials and on-farm research



The value a diagnostic laboratory system starts with **ACCURATE, TIMELY, and USEFUL** diagnosis **at the Farm-Individual Pig Level**

Cooperation / Communication / Team approach

producer ↔ veterinarian ↔ laboratory

WHAT IS THE DIAGNOSTIC QUESTION?

Is there **EVIDENCE** for:

- Infection?
- Disease?
- Presence of specific pathogens?
- Individual animal impact?
- Herd impact?
- Efficacy of Interventions?

## DIAGNOSTIC PROCESS

Collect Information  
Diagnostic testing

Think, Analyze, Research

**DIAGNOSTIC ACCURACY**  
Does it "make sense"?

Treatment, Control  
Identify Opportunities  
Continuous Improvement

Issue / Complaint:

↓  
History and Records

Clinical Observations: LOOK AT THE PIGS

Necropsy and Gross Lesions

Differential Diagnosis --> "What is wrong?"

Laboratory Testing: Tests, Results, Objective Interpretations

What is your diagnostic question?

What decision(s) will be impacted by the results?

Which test(s) are needed?

Which specimens should be collected?

How many animals should be sampled?

Histopathologic Lesions: *Compatible or Not compatible*

Diagnosis: What is found

Interpretation and Conclusions: Prioritize

Intervention: What actions are taken?

Assessment of outcome/monitoring strategy:

Did it work? How do you know?

## DIAGNOSTIC PROCESS

Collect Information

Think, Analyze, Research

**DIAGNOSTIC ACCURACY**  
Does it "make sense"?

Treatment, Control  
Identify Opportunity  
Continuous Improvement



## Diagnostic Laboratory Tools

Must use the appropriate tool for the job (question) you have !!!

- Serology** → **Detects specific Antibodies**
- Pathology** → **Lesions of disease**
- Histopathology** → **Effect and impact of disease**  
**Compatible with cause identified**
- Bacteriology** → **Pathogenic bacteria**
- Virology** → **Pathogenic viruses**
- Molecular Diagnostics** → **Nucleic acid of Agent**
- Chemistry** → **Chemicals, nutrients, toxin**



## Serology → Detects specific antibodies in blood

**Population tool:    **Diagnosis of infection****  
**Does not confirm disease**

**Many test “types”: ELISA / IFAT / CF / AGID / SN**

**Serology Applications are very useful for**

**Confirm a previous infection (or maternal antibody in young)**

**Determine IF herd is infected**

**Monitor WHEN infection occurs**

**Determine HOW MANY have been infected**

**Monitor vaccination COMPLIANCE**

**Monitor status for elimination or eradication projects**





# 疾病管控之生物安全策略

## Biosecurity strategy on diseases control



## Biosecurity strategy on diseases control

### Biosecurity is a “Relative” Term







## Entering guard control



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## Biosecurity

- Three components
  - Bio-Exclusion
  - Bio-Management
  - Bio-Containment





## Wash hands

### Shoes changing station



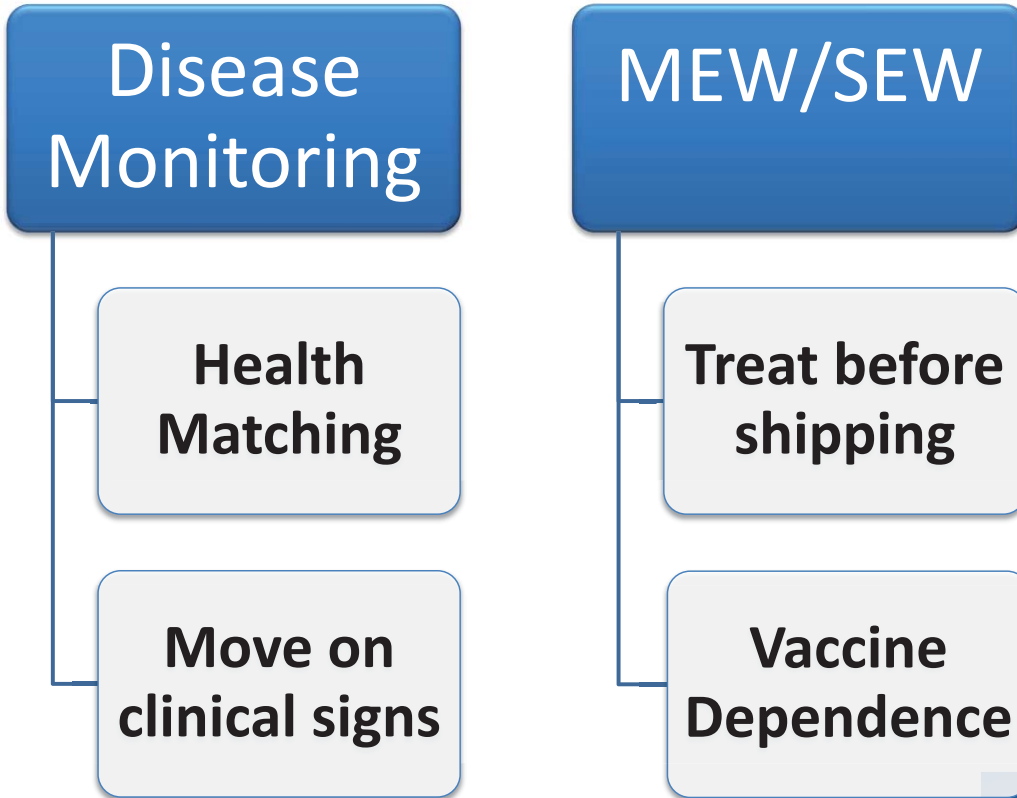
A bad disinfectant tub



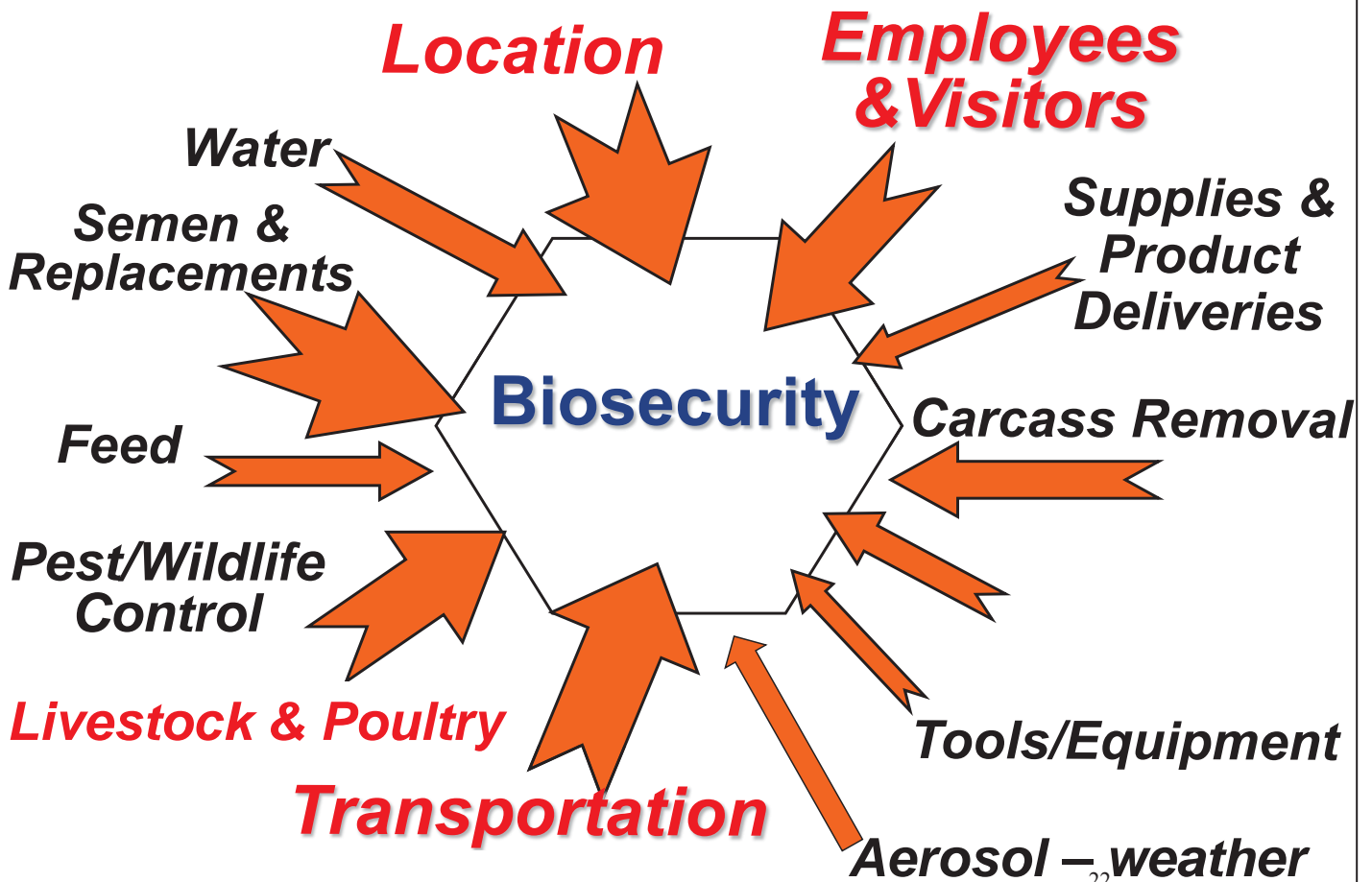
## How can we move germplasm without the risk of new disease?

- **There are numerous methods**
  - Some are tried and true
  - Some are practical while others are not
  - Some are very costly
    - Some are inexpensive
- **Some significantly reduce risk**
  - Some do not work





# Biosecurity Considerations



# How to develop a biosecurity plan of pig farm

## Considerations

- Workers' moving flow
- Pigs' moving flow
- Equipment installation
- Sanitation flow



Easy to carry out



## Establish a biosecurity network

Washing first





# Cleanness of the boots is critical



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## Establish a biosecurity network Cleaning in the major part



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# Daily Biosecurity Priorities

- **Other low risk but addressable issues**

- Feed trucks
- Feed mill
- Feed ingredients
- Supplies
- Maintenance tools
- Contract vendors and equipment
- Waste management equipment
- Animals
- Air and Others?



[www.reliablefilter.com](http://www.reliablefilter.com)



# Daily Biosecurity Priorities

- **It's the trucks**

- Most of the controllable risk after semen and replacements is the pig trailer
- Is your truck wash eliminating risk or disseminating disease?
- Is dispatching a biosecurity nightmare?
- Trailer Baking – what's it worth





# Biosecurity

- **People are always ultimately involved but:**
  - Rely on Teaching and Training with some mandates & rules
  - Sustainable biosecurity system
    - Long term acceptance and commitment
    - Must walk the walk not just talk the talk
    - A new biosecurity culture is required



# Biosecurity

- **Understand Your Farm – Your System**
  - If little biosecurity then the mountain is tall
  - Estimate the cost to train, motivate, and monitor people responses
  - Consensus method of training – every detail





# Biosecurity

- **Your Farm – Your System**
  - Define and designate key people and their roles
  - Empower people at all critical control points
  - Sell the plan



# Biosecurity Non-negotiable Issues

- **All Replacement must be healthy and enter through a functional isolation**
- **All semen supply must be biosecure and PRRS and PR free**
- **Location – location – location**
  - If production centers are in pig dense areas – isolated dedicated multiplication
- **Create Health Pyramids**







# Rodents and birds are the high risk animals for biosecurity plan



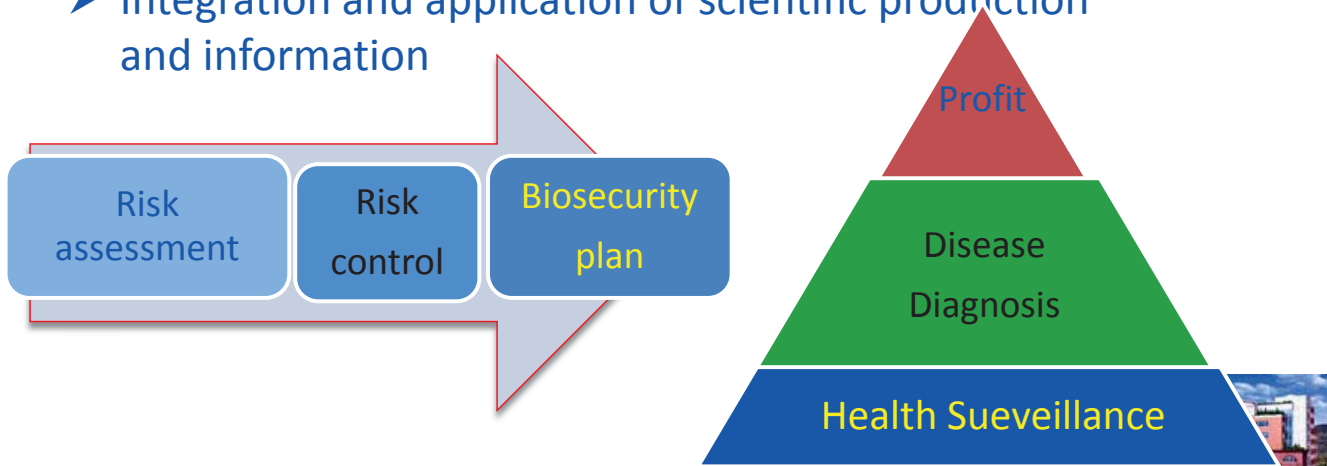
# Birds are the high risk animals for biosecurity plan



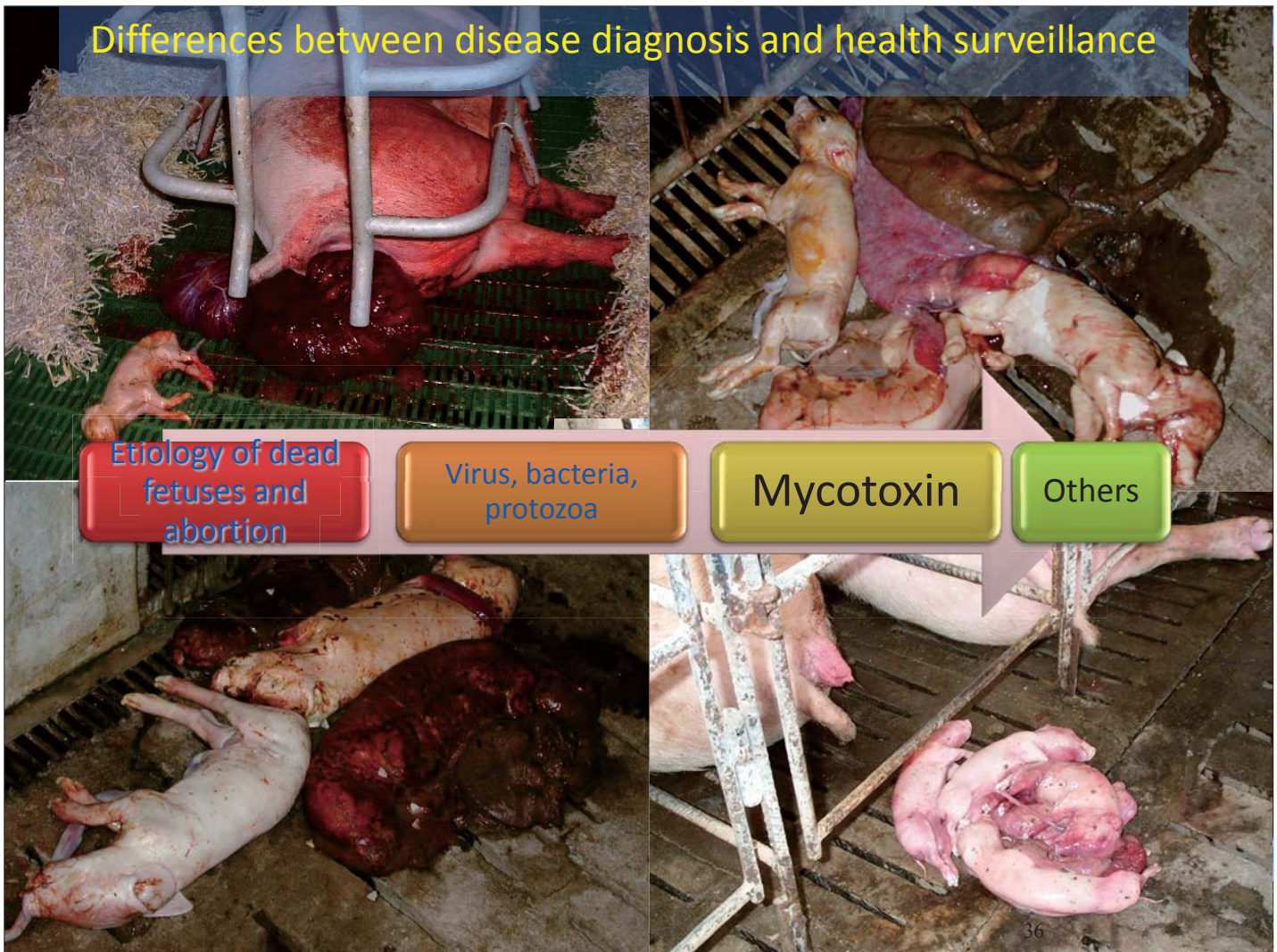


### Differences between disease diagnosis and health surveillance

- Productive medicine and preventive medicine
- Developing of the new production system and responding to reemerging diseases and environment protection and animal protection
- Integration and application of scientific production and information



### Differences between disease diagnosis and health surveillance





# Clinical skin hemolytic lesion and acute septicemia

- Complication of CSF and Salmonella
- Complication of PCVAD, PRRS and Salmonella
- PDNS
- Acute infection of *S. choleraesuis*
- Acute bacterial septicemia
- Serum hypersensitivity? Organ vaccine



# Changes of pig disease



- Used to be bacterial and mycoplasmic infections
- Illness induced by immunosuppressive viruses
- ISVs is Swine Influenza, PRRS, PR, CSF, PCV2, etc.....





## Profiting foundations

- Attitude and concept towards vaccine use
- Qualified lab and veterinarian
- Correctly interpret the diagnosis record
- Appropriate biosecurity plan



## Determination factors of profiting for a farm

- Attitude and concept of producer
- Object of sampling and examination
- Interpretation for the test report
- Concept of cost accounting
- Risk assesement for a farm





## New actions for disease surveillance in a pig farm

- To develop recording habit
- To develop monthly report for culled and dead pigs
- To develop necropsy record
- To develop a data base for examination reports
- To develop medication and vaccination records
- To establish the antibody baseline for healthy herd



## Successful cases introducing and experience sharing

- To improve the pig production system- swine production medicine
- To revise the thinking model
- To revise the feeding and management processes
- Precisely follow the revised operation procedure
- Establish the antibody baseline for healthy herd

## Questions and discussion



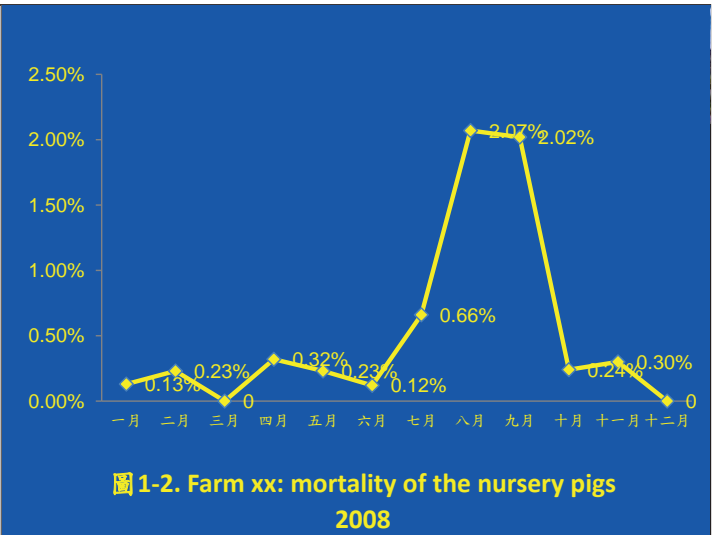
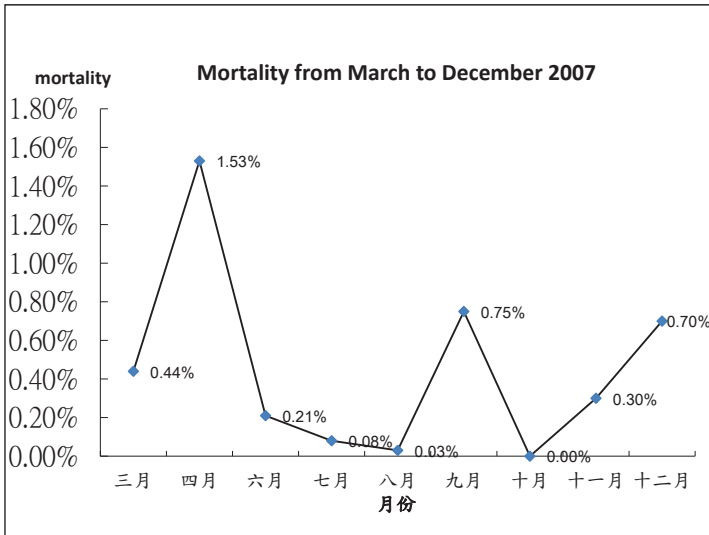


圖 1-2. Farm xx: mortality of the nursery pigs 2008

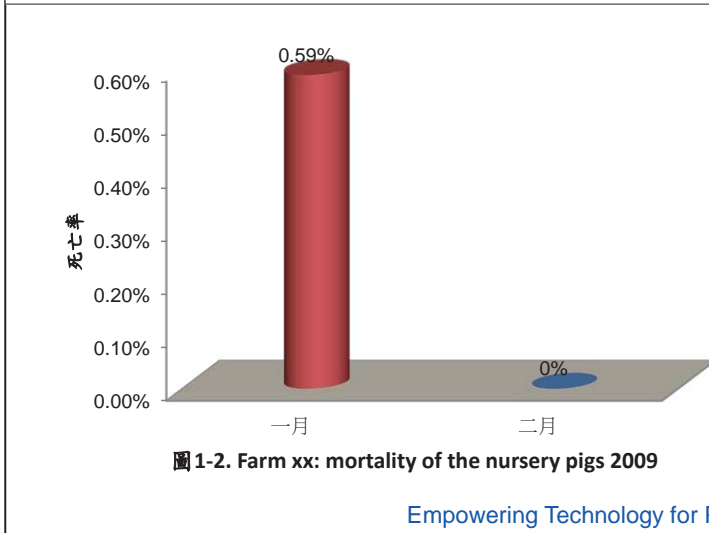


圖 1-2. Farm xx: mortality of the nursery pigs 2009

### Farm xx: mortality of the nursery pigs in Jan. 2009

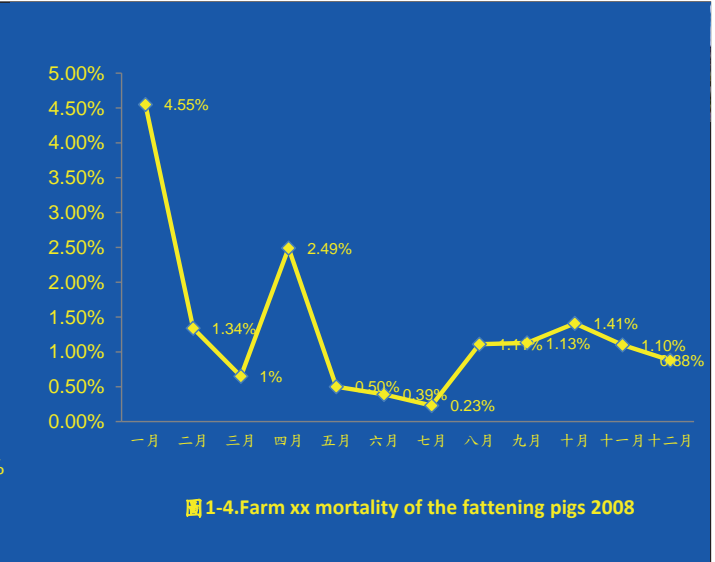
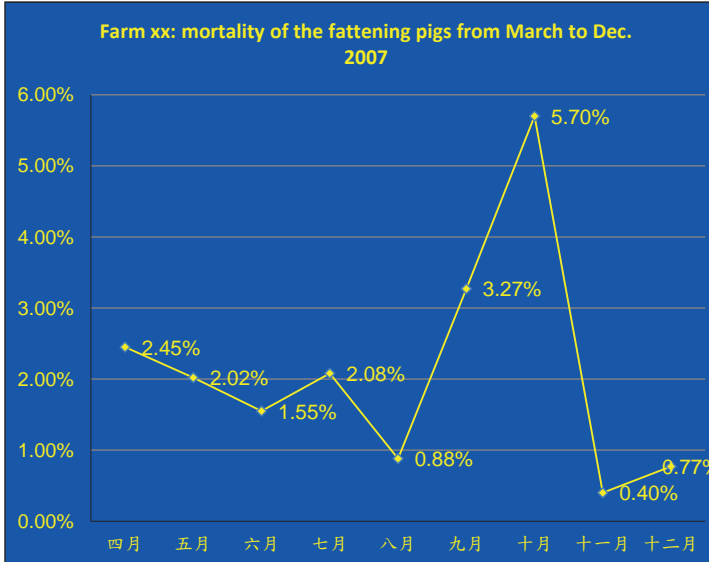
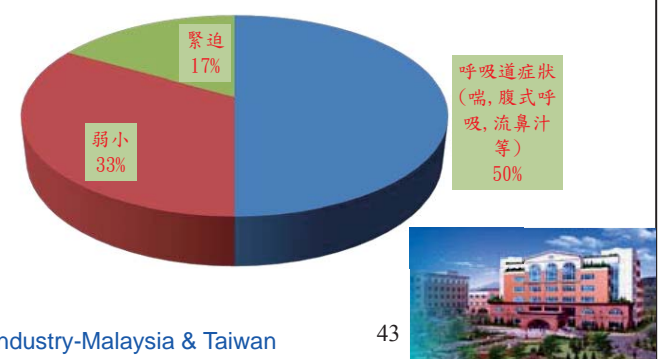


圖 1-4. Farm xx mortality of the fattening pigs 2008

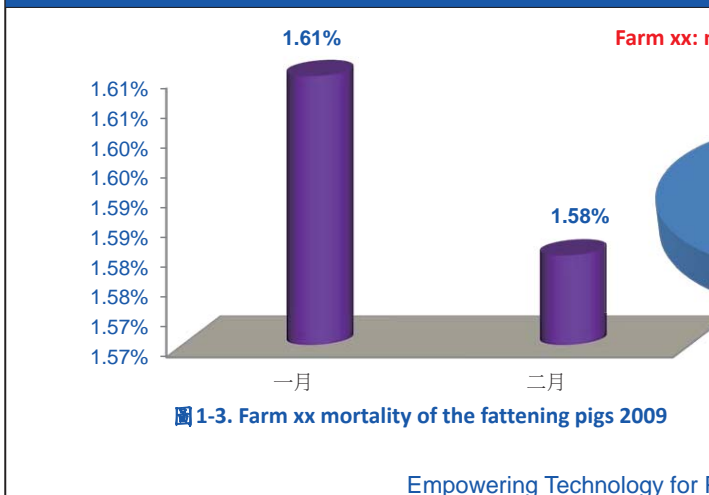
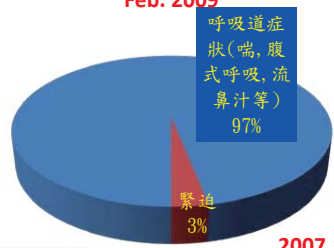
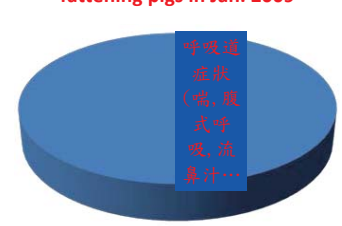


圖 1-3. Farm xx mortality of the fattening pigs 2009

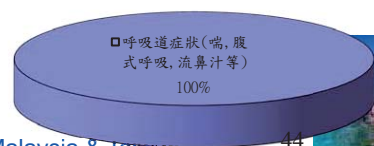
### Farm xx: mortality of the fattening pigs in Feb. 2009



### Farm xx: mortality of the fattening pigs in Jan. 2009

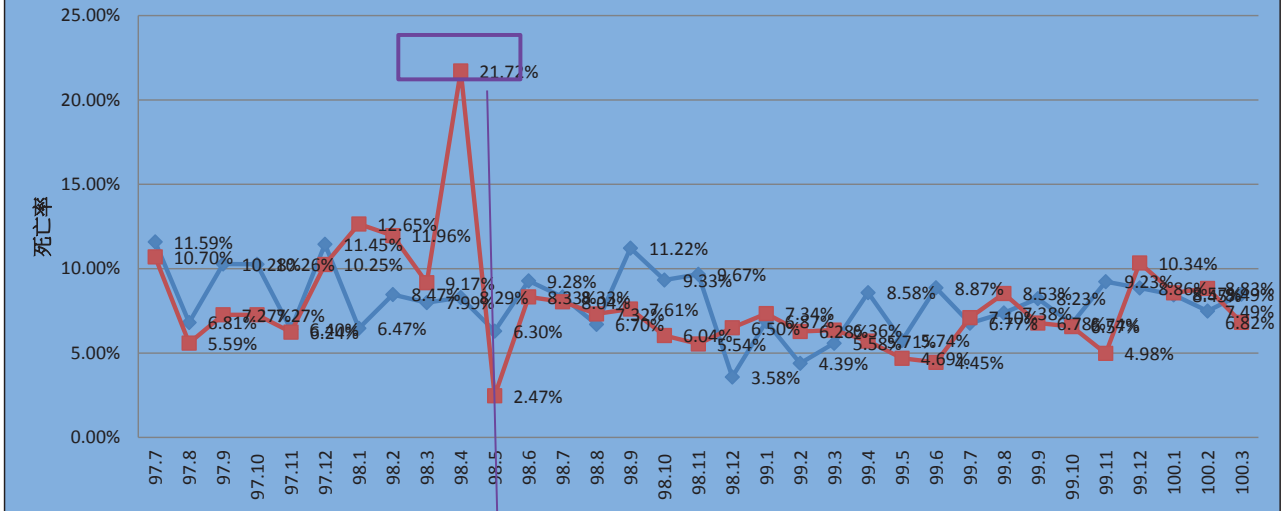


### 2007.10xx死亡率 (斃死)

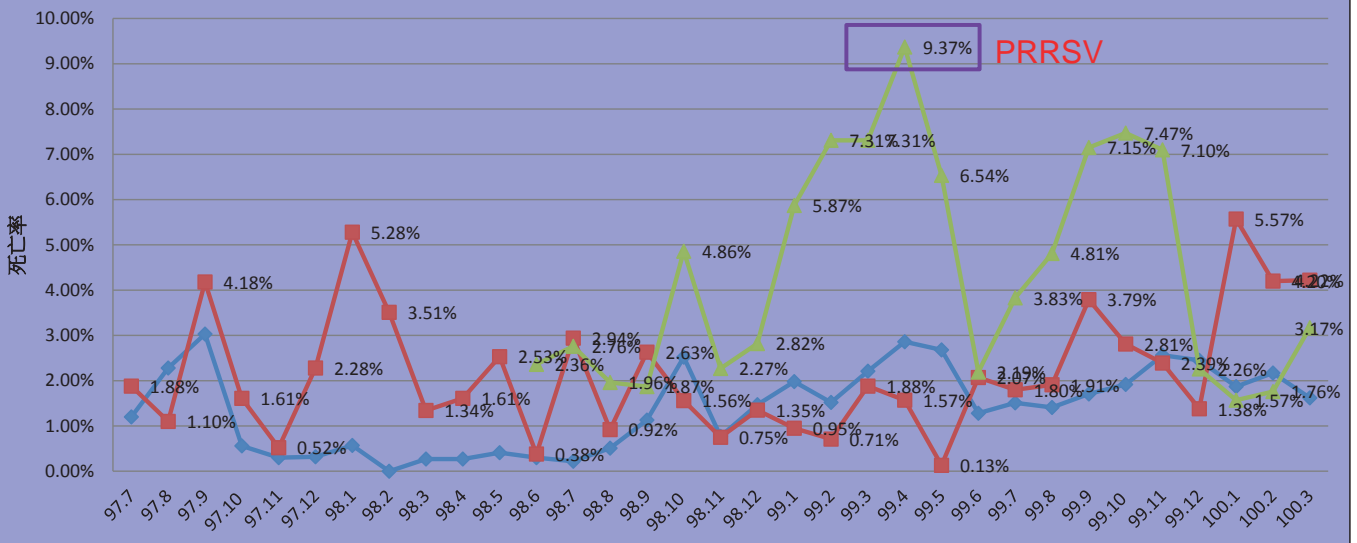




### Piglet loss of farms AA and BB in the past years

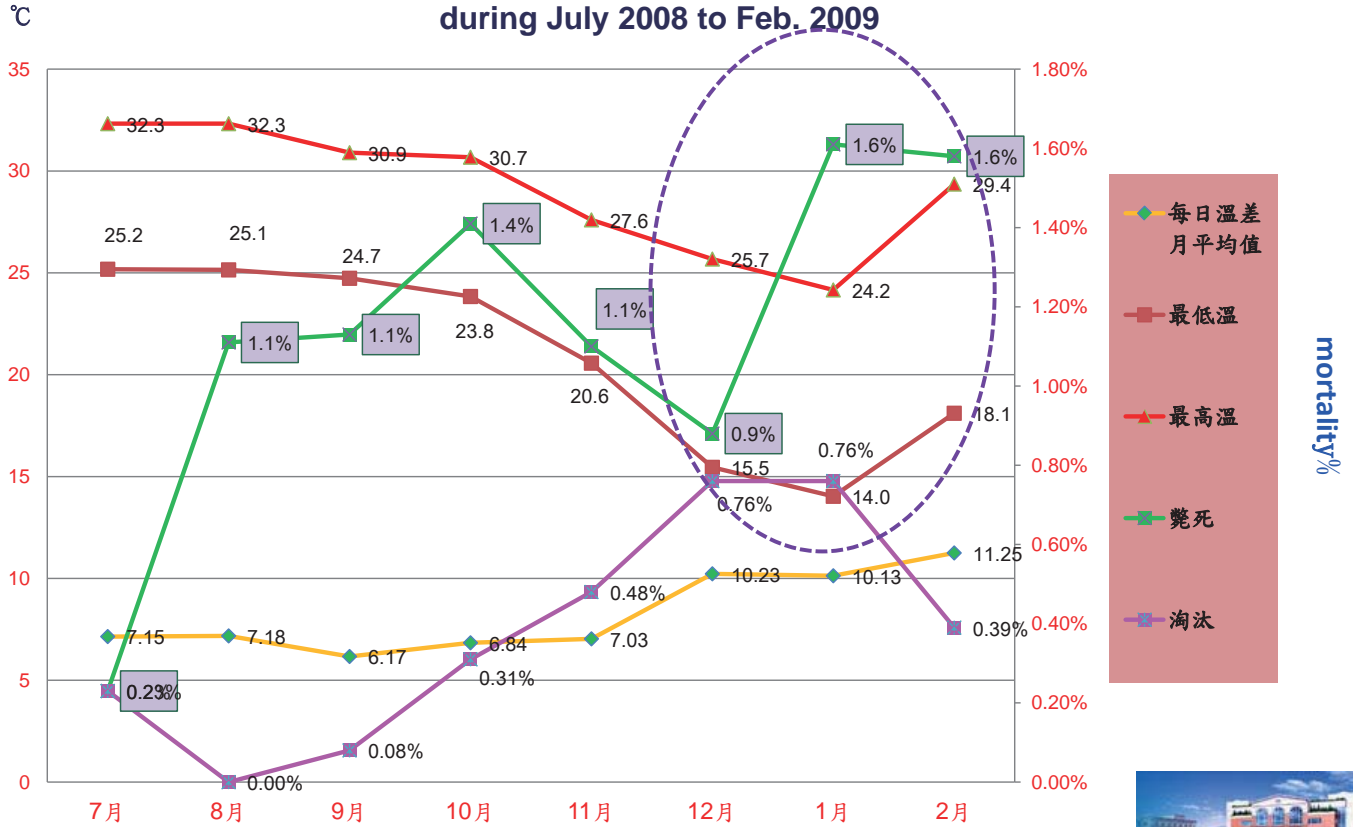


### Nursery pig loss of farms AA, BB and CC in the past years

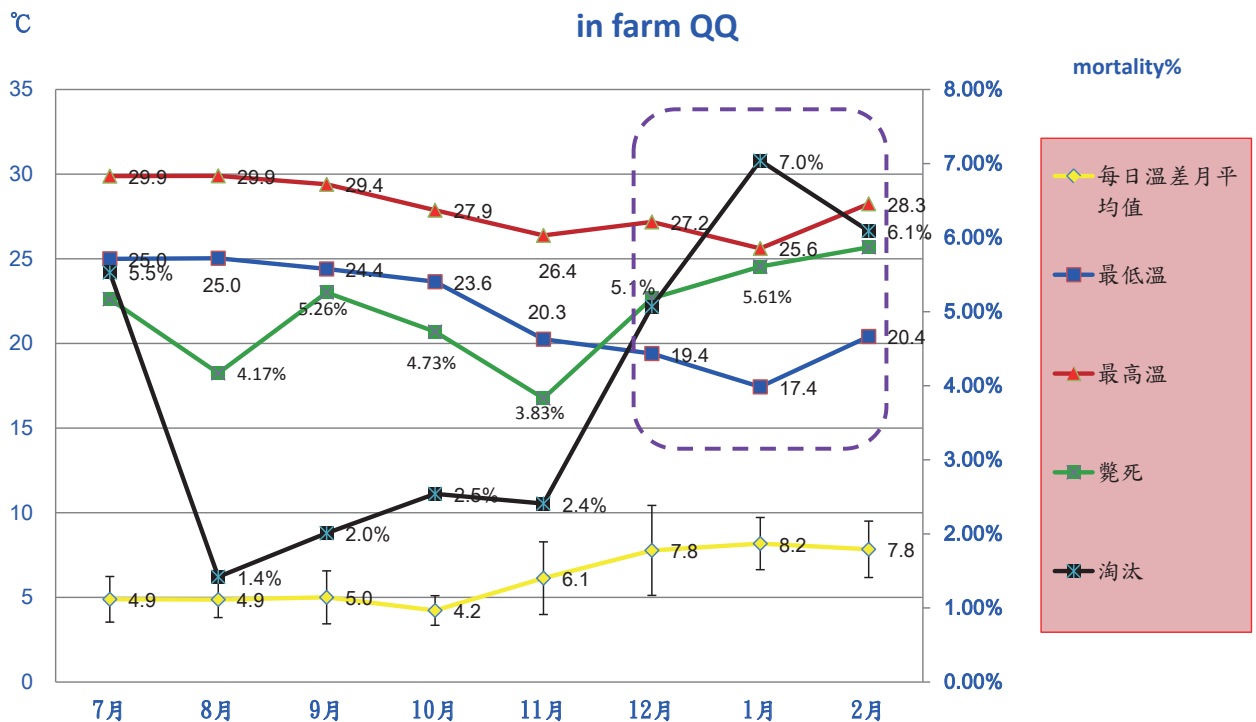




### Relationship between mortality of the fattening pigs and temperature during July 2008 to Feb. 2009



### Relationship between mortality of the nursery pigs and temperature in farm QQ

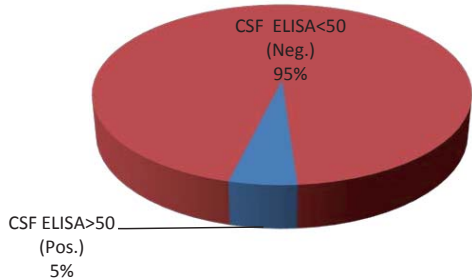




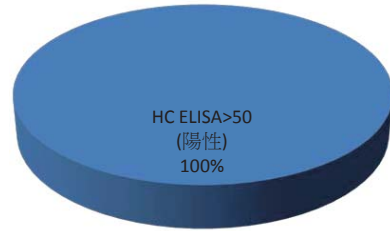


### Practical counseling on pig farm

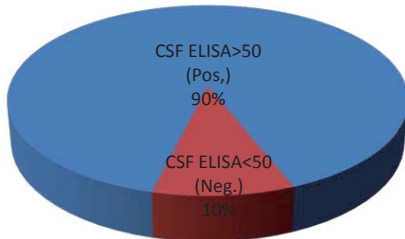
2010-012 Farm A: distribution of the antibody to CSF in 5-week-old piglets



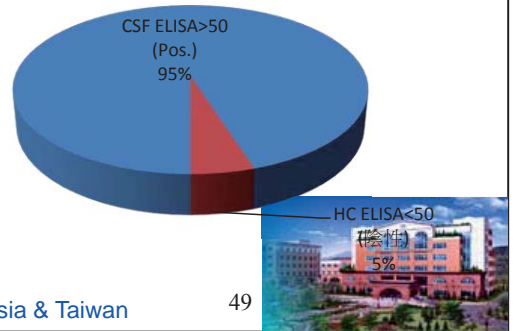
2010-012\_Farm A: distribution of the antibody to CSF in 12-week-old pigs



2010-013 Farm B: distribution of the antibody to CSF in 12-week-old pigs



2010-013 Farm B: distribution of the antibody to CSF in marketing pigs



Notice the ground flatness and injection site



Abscess





- Flatness and slope of the ground
- Any nutritious problems
- Any mycotoxic problems



Warming, ventilation and disease





## Conclusions

- Technique platform of “Develop the biosecurity and biodefence for breeding stock” has been applied to establish biosecurity plans and standard operation procedures for the pig breeding farms.
- Reduce the incidence of disease through detail recording on the animal status of the herd and accomplishing early warning system by owners.
- Detection of serum antibodies and by polymerase chain reaction (PCR) technology for health surveillance on important pathogens.



## Conclusions

- Analyze vaccination program and biosecurity plan been conducted in those farms were recommended.
- Working on swine production medicine training for swine producers. Results revealed that finishing rate has been effectively increased by 15% in pig farms.





謝謝聆聽！敬請指教！

