

Outbreaks and Control Strategy of FMD in Korea



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Lee Byeong-yong, DVM



Ministry for Food, Agriculture, Forestry and Fisheries

General Animal Health Division



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FMD Outbreak Situation

FMD epidemics in KOREA

❖ Five epidemics of FMD from 2000 to 2010

❖ 1st : Mar 2000, 15 Cattle farms, Ring Vaccination, O Pan-Asia

❖ 2nd : May 2002, 15 Pig+1Cattle farms, O Pan-Asia type

❖ 3rd : Jan 2010, 6 Cattle+1 Deer farms, A type

❖ 4th : April 2010, 8 Cattle+5 Pig farms, O type

❖ 5th : Nov 2010, 153 Cases (3,743 farms), Nationwide, O type Vacc.

Overview of FMD outbreaks in 2000

No of infected farms		15 (all cattle)
Duration		23 days(Mar 24 - April 15)
Region		3 Provinces (6 Cities/Counties)
No of culled (500 m radius)	Cattle	2,021
	Pig	63
	Others	132
	Total	2,216
Eradication policy		Stamping out (Ring vaccination, 10km radius)
Vaccinated heads		1st - 860,700, boost - 661,700
Economic losses(USD)		Approximately 300 million
Causes of FMD invasion (presumed)		Imported hay, Tourist
FMD-free status		Sep 16, 2001

Regional Distribution of FMD outbreaks in 2000

- FMD positive : 15 outbreaks
- Total 182 farms ; 2,216 heads destroyed

Gyeonggi (3)

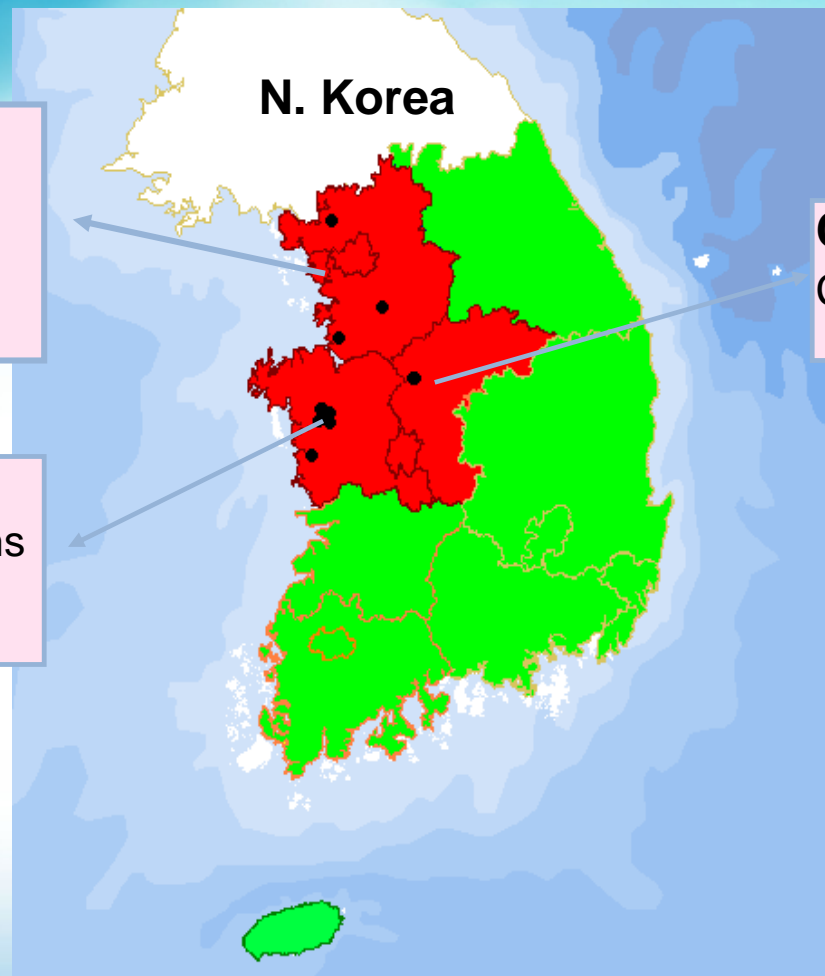
Paju : 1 farm
Yongin: 1 farm
Hwasong: 1 farm

Chungnam (11)

Hongsong: 10 farms
Poryong: 1 farm

Chungbuk (1)

Chungju: 1 farm



**Serotype O,
Pan-Asia type**

Overview of FMD outbreaks in 2002

No of infected farms		16 (15 pigs, 1 cattle)
Duration		53 days(May 2 – June 23)
Region		2 Provinces (4 Cities/Counties)
No of culled (500 m radius, 3 km - pigs)	Cattle	1,372
	Pig	158,708
	Others	75
	Total	160,155
Eradication policy		Stamping out (No vaccination)
Economic losses(USD)		Approximately 143 million
Causes of FMD invasion (presumed)		Foreign worker, Tourist
FMD-free status		Nov 29, 2002

Regional Distribution of FMD outbreaks in 2002

- FMD positive : 16 outbreaks
- Total 162 farms ; 160,155 heads destroyed

Gyeonggi (14)

Pyongtaek: 1 pig farm

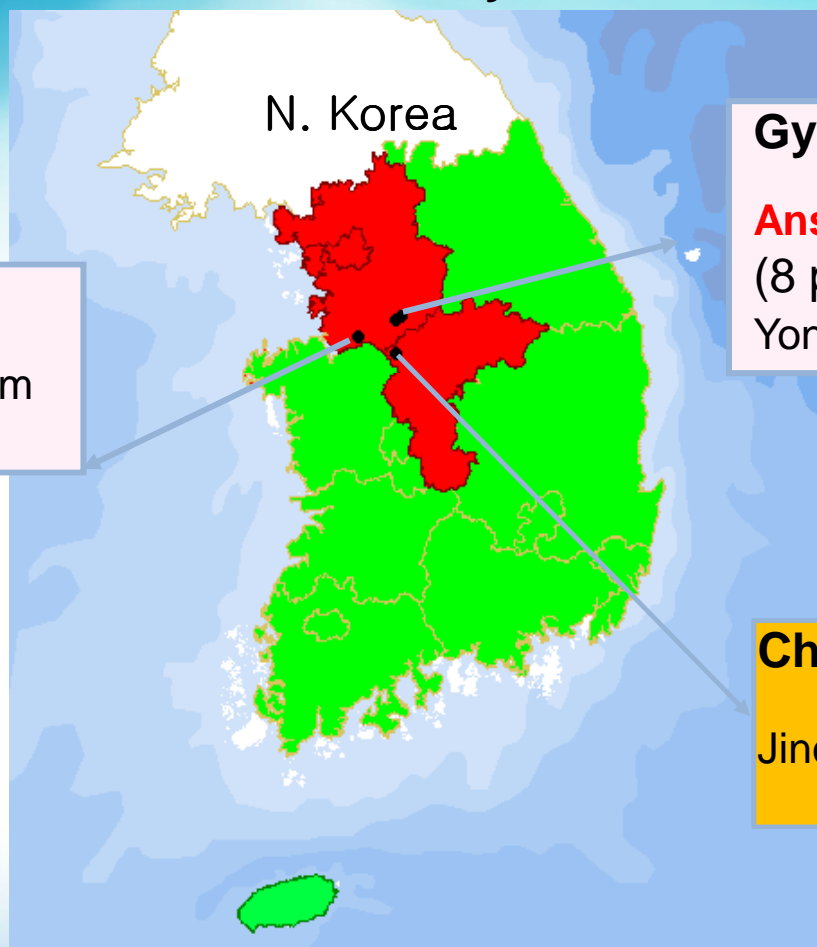
Gyeonggi (14)

Anseong: 9 farms
(8 pigs, 1 cattle)
Yongin: 4 pigs farms

Chungbuk (2)

Jincheon: 2 pigs farms

**Serotype O,
Pan-Asia type**



Overview of FMD A type outbreak in 2010

No of infected farms		6 (all cattle)
Duration		28 days(Jan 2 – Jan 29)
Region		Gyeonggi Province (2 Counties ; Pocheon, Yeoncheon)
No of culled	Cattle	2,905
	Pig	2,953
	Others	98
	Total	5,956
Eradication policy		Stamping out (No vaccination)
Economic losses(USD)		Approximately 29 million
Causes of FMD invasion (presumed)		Foreign worker, Intl. parcel, Tourist
FMD-free status		Sep 27, 2010

Overview of Ganghwa FMD outbreak in 2010

No of infected farms		11 (7 cattle, 4 pigs)
Duration		29 days(April 8 – May 6)
Region		4 Provinces (4 Cities/Counties)
No of culled	Cattle	10,858
	Pig	38,274
	Others	742
	Total	49,874
Eradication policy		Stamping out (No vaccination)
Economic losses(USD)		Approximately 124 million
Causes of FMD invasion (presumed)		Tourist
FMD-free status		Sep 27, 2010

Overview of massive FMD epidemic in 2010/2011

No of infected farms		153 farms (3,748 heads)
Duration		145 days(Nov 28 – April 21)
Region		11 Provinces (75 Cities/Counties)
No of culled	Cattle	150,864
	Pig	3,318,298
	Goat+Deer	10,800
	Total	3,479,962
Eradication policy		Stamping out → Vaccination
Economic losses(USD)		Approximately 2 billion (1.7 bil. for animal compensation)
Causes of FMD invasion (presumed)		Tourist, Foreign worker, Livestock product

FMD Transmission route and alert levels

- 2010.11.28. FMD occur in Gyeongbuk

11.29. Alert level “Caution”

* Case confirmed

- 12.14. Spread to Gyeonggi

12.15. Alert level “Warning”

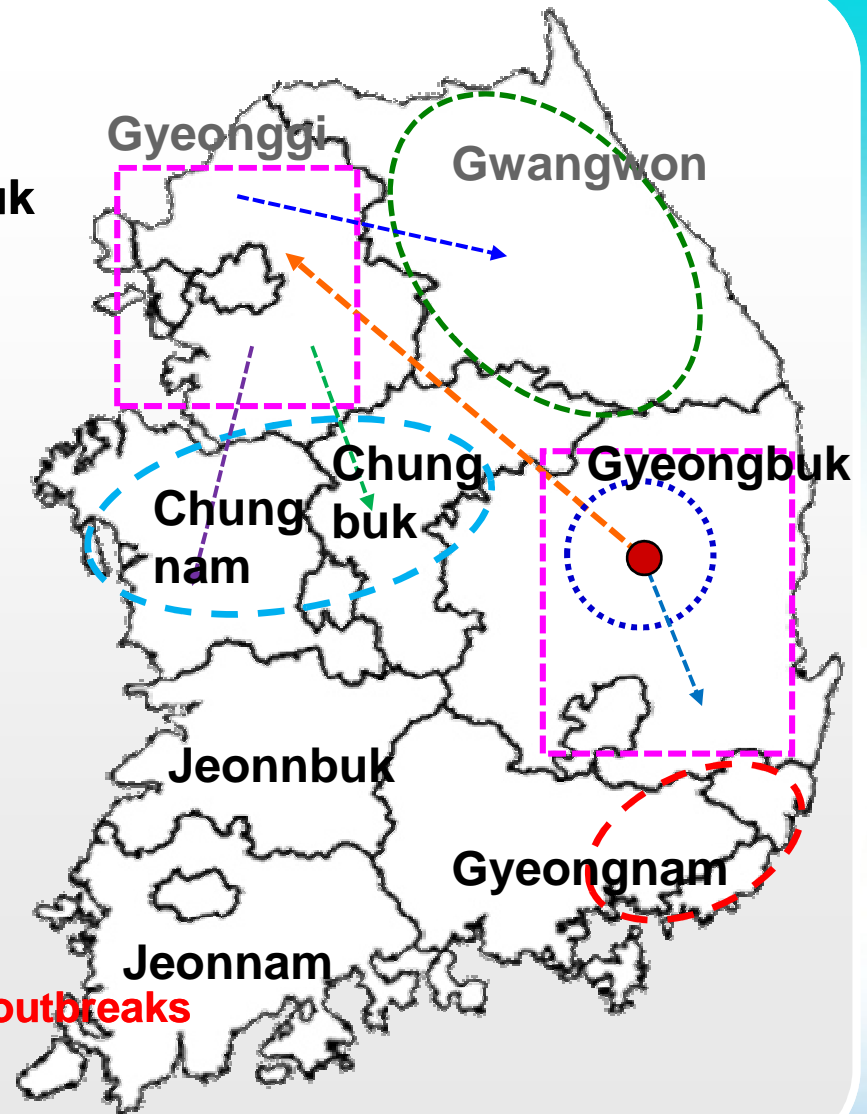
* Transmission

- 12.21. Spread to Gwangwon

- 12.23. Spread to Incheon

12.29. Alert level “Critical”

* Wide spread transmission & new type outbreaks



FMD Control Strategic plan

Lesson learnt : major causes of FMD amplification

- ❖ **Initial reaction failure** because of Judgment Error of local vet official
- ❖ Occurrence in **huge pig complex**(frequent people movement and traffic)
- ❖ **Spread before showing specific symptoms** (during latent period, 2wks)
- ❖ **Less effect on disinfection** because of **severe cold** during winter
- ❖ **Inadequate animal farming and animal disease control system**
 - low consciousness of the disease among officials and farmers
 - poor sanitation and densely populated environment



Disinfection Site



High-way tollgate

Lesson learnt : major causes of FMD amplification



24 cm snow

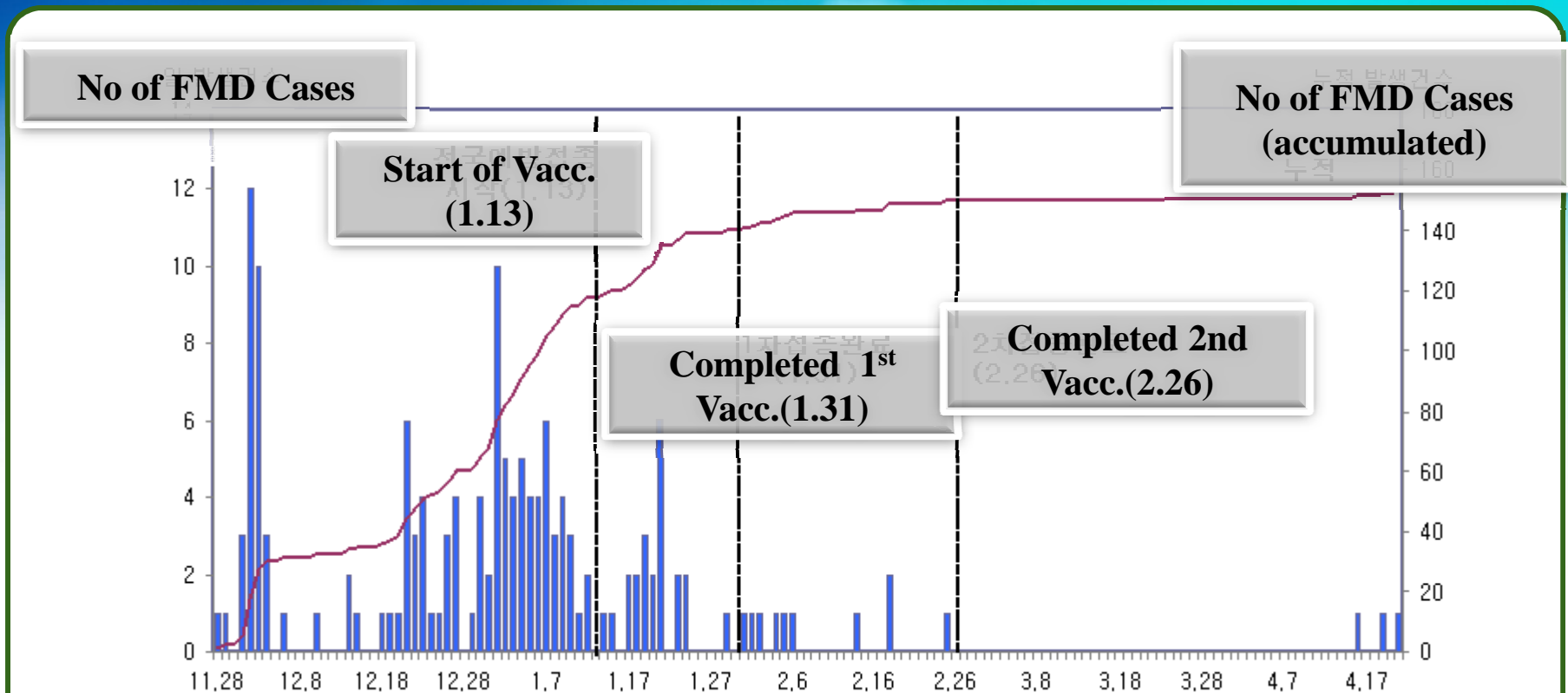


Heavy snow on the road



Too below temp

FMD Outbreaks Situation after blanket Vaccination



- O Manisa Monovalent vaccination : Jan 13, 2011
- Trivalent vaccination(O+A+Asia 1) : After September, 2011
- Outbreaks reduced after vaccination

FMD vaccination schedule in Korea

Species	Ages	Dose	Remark
Cattle	Calf : 2 months(1 st), 3 months(2 nd) Adult : every 4-7 months interval	2 ml	Compulsory
Pig	Pregnant pig : 3-4 WK to parturition Boar : every 4-7 months interval Piglet : 8-14 weeks Gilt : 2 months(1 st), 3 months(2 nd)	2 ml	
Goat	Young : 2 months(1 st), 3 months(2 nd) Adult : every 1 year interval	1 ml	
Deer	Young : 2 months(1 st), 3 months(2 nd) Old : every 4-7 months interval	2 ml	

FMD Vaccination Management



- FMD **vaccination certificate** required for trade and slaughter
- Active serological surveillance : SP/NSP antibody tests
- Strengthen FMD **vaccination compliance by farm visits**
- Serological testing to determine vaccination compliance
- **Fines for non-compliance** : up to 5 million won
- **Civil servants (28,000)** in **charge of compliance of farms**

Border Quarantine



- **Obligatory report and sanitation procedure** for people visiting from animal disease outbreak countries
 - * Target : livestock related workers coming from visits to outbreak countries
 - * Revision for act on the prevention of contagious animal diseases
- Operation of **detector dogs** : 43 dogs(Handlers 16)
- Airport and harbor : **foot disinfection carpet**
- Food waste in airport or ferry : Regular audit(discard, etc)
- Strengthen border quarantine and foreign worker education

Establishment of rapid reaction system



- **Improvement of disease control manual: Strengthen control measures at the early outbreak stage**
 - * **Nationwide standstill for temporary restriction of movement** in case of introduction of new serotype (SAT1,2,3, C type) or strain : within 48 hours
 - * Emergency vaccination
- **Operation of emergency disease control center(Risk period : Nov – May)**
- **Disease control exercises(CPX)**
 - * Field simulation, Table-top simulation, Evaluation

Improvement of disease control manual for rapid response

[Vaccine Strain outbreaks]

- **Only infected animal destroyed**
- **Restrict movement** of infected and epidemiologically linked farms
- **Movement control posts** and **disinfection**
- **Shi - Provincial officers** dispatched to outbreak areas



Improvement of disease control manual for rapid response

Introduction of new FMD serotype (SAT 1,2,3, C type)

- **Standstill for restriction of movement**

- All farms, livestock related worker, vehicles and establishment

- **Emergency vaccination**

- **Highest National Emergency level (critical) issued**

- * 1. Heightened interest (FMD in neighboring countries) → 2. Caution (Case confirmed) → 3. Warning (Transmission) → 4. Critical (Widespread transmission & new type outbreaks)

- **Culling : within 500m radius of outbreak farm**

Improvement of disease control manual for rapid response

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Action plan for FMD Free status

◆ Reconginion of FMD free country from **OIE : 2014**

FMD Free country plan (3 step)

- **(Step 1) Set up infrastructure for eradication (April 2011~September 2013)**
 - Maintain non-outbreak, more than 80% of antibody formation
 - Expand examination(NSP, SP test), strengthen surveillanc(included wild animal), etc.
- **(Step 2) Confirm FMD free status (October 2013~December 2015)**
 - **FMD free country where vaccination is practised (May 2014)**
- **(Step 3) Risk assessment test against suspension of vaccination(2016~)**

Thank you for your attention !!

