Application of Information Technology in Prevention and Control of HPAI

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Information technology

In narrow sense, we can understand it as :

- Hardware
  - Computer: PC, notebook….
  - PDA: Personal Digital Assistant
  - Mobile phone,
- software
  - Internet: World wide web
  - Common software: Word, Excel, Access, Database…
  - Special software: GIS, Satscan, Stata, Tadinfo….

What can I do use IT ?

- Collect animal health information
- Provide help for implement epidemiology investigate;
- Aid design and implement surveillance plan
- Veterinarian economics research
- Spatial analysis
- Risk assessments
- Develop the databases of epidemiology

Key elements in prevention and control of HPAI

- Early Warning
- Early Reaction
- Co-ordination
- Enabling Research

What is Early Warning

- identified as all disease initiatives based predominantly on epidemiological surveillance, which would lead to improved awareness and knowledge of the distribution of disease or infection and which might permit forecasting the further evolution of an outbreak.

How to achieve early warning

- **Collect animal health information ASAP**
  - **Monitoring the foreign animal disease information**
  - **Sero-Surveillance the situation of HPAI in national;**
  - **Implement epidemiology investigate**

How to achieve early warning

e.g. On global level:

- **The Global Early Warning System (GLEWS) of FAO, OIE and WHO;**

- **Transboundary Animal Disease Information System (TADinfo)**

The Global Early Warning System

- **For Animal Diseases including Zoonoses**
- **OIE and WHO are currently developing the GLEWS as a joint system that builds on the added value of combining and coordinating the alert and response mechanisms of the three organizations.**

Aims of GLEWS

- **Through sharing of information on animal disease outbreaks and epidemiological analysis, the GLEWS initiative aims at improving global early warning as well as transparency among countries.**
- **The response component of the GLEWS has yet to be established and will be complementing the existing response systems of FAO, OIE and WHO in order to deliver rapid coordinated international response to animal disease emergencies.**

Transboundary Animal Disease Information System (TADinfo)

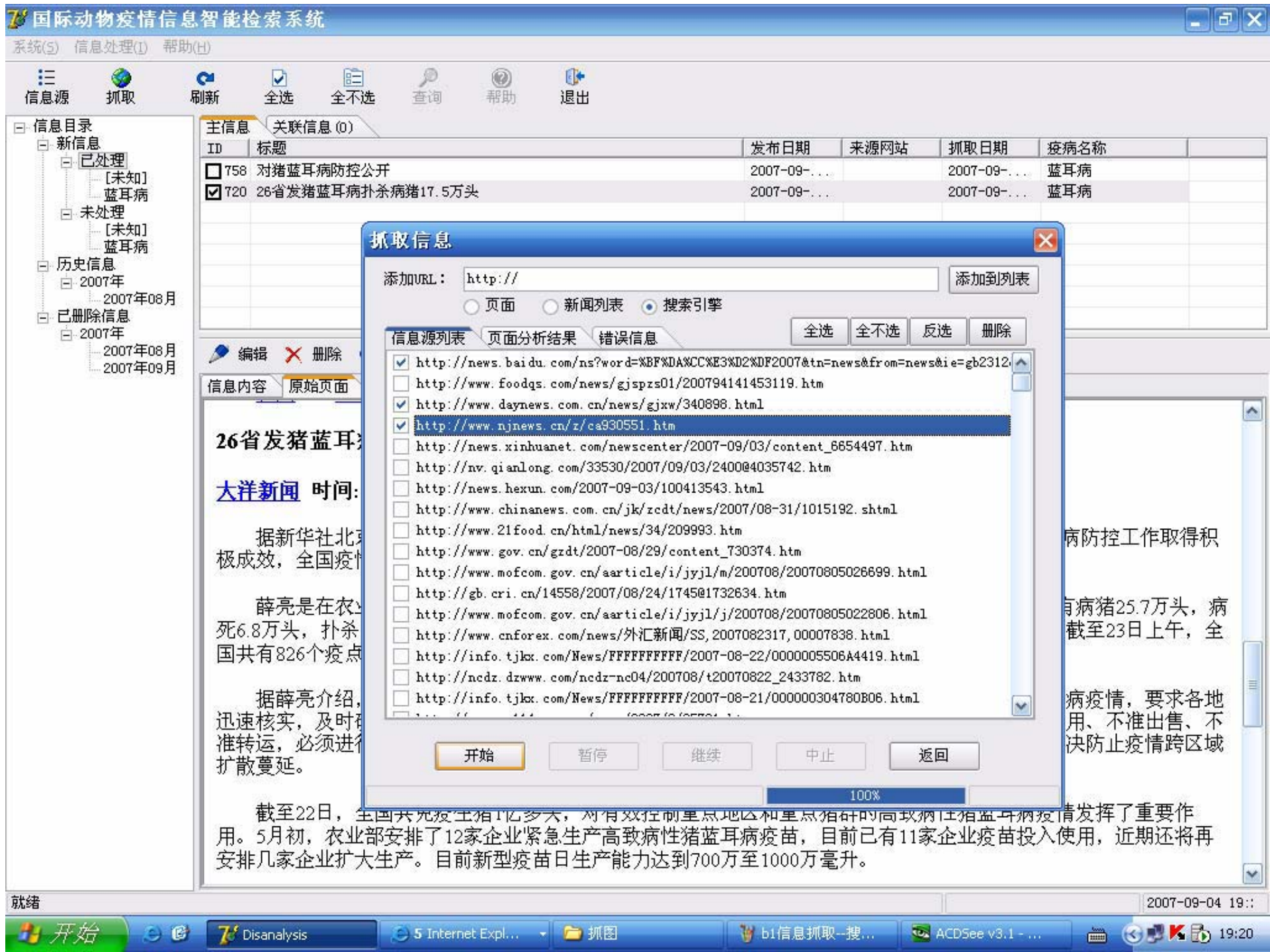
- **Structured in a three-tier system - national, regional and global.**
- **with a user-friendly interface should be available to countries for testing.**
- **Provides capabilities for storage and management of animal disease data.**
- **The program will be able to perform standard and custom analysis on data and depict information both in report format and geographically through an in-built map viewer.**

Early warning In China:

- For foreign animal disease:
  - Global animal disease information search and alarm system (developing)
  - Foreign animal disease information system
- For domestic disease
  - National animal disease information report system
  - National animal serum-bank management system
  - Epidemiology investigation information system

Global animal disease information search and alarm system

- Monitoring foreign animal health information automatically;
  - Scan some special website accoding to the fixed time automatically: OIE, FAO, WHO, APHIS, EURO, some country's Ministry of agriculture
  - Explore the website of main news media agency in time.
  - Download the webpage in accord with some pointed key words
  - Management and storage in database


国际动物疫情信息智能检索系统
系统(S) 信息处理(I) 帮助(H)
信息源 抓取 刷新 全选 全不选 查询 帮助 退出
信息目录
新信息
已处理
[未知]
蓝耳病
未处理
[未知]
蓝耳病
历史信息
2007年
2007年08月
已删除信息
2007年
2007年08月
2007年09月
主信息 关联信息 (0)
ID 标题 发布日期 来源网站 抓取日期 疫病名称
758 对猪蓝耳病防控公开 2007-09-... 2007-09-... 蓝耳病
720 26省发猪蓝耳病扑杀病猪17.5万头 2007-09-... 2007-09-... 蓝耳病
抓取信息
添加URL： http://
添加到列表
页面 新闻列表 搜索引擎
信息源列表 页面分析结果 错误信息
全选 全不选 反选 删除
http://news.baidu.com/ns?word=%BF%DA%CC%E3%D2%DF2007&tn=news&from=news&ie=gb2312
http://www.foodqs.com/news/gjspzs01/200794141453119.htm
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http://www.21food.cn/html/news/34/209993.htm
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http://www.mofcom.gov.cn/aarticle/i/jyjl/m/200708/20070805026699.html
http://gb.cri.cn/14558/2007/08/24/1745@1732634.htm
http://www.mofcom.gov.cn/aarticle/i/jyjl/j/200708/20070805022806.html
http://www.cnforex.com/news/外汇新闻/SS,2007082317,00007838.html
http://info.tjkx.com/News/FFFFFFFFFF/2007-08-22/0000005506A4419.html
http://ncdz.dzwww.com/ncdz-nc04/200708/t20070822_2433782.htm
http://info.tjkx.com/News/FFFFFFFFFF/2007-08-21/000000304780B06.html
开始 暂停 继续 中止 返回
100%
编辑 删除
信息内容 原始页面
26省发猪蓝耳
大洋新闻 时间:
据新华社北
极成效，全国疫
薛亮是在农
死6.8万头，扑杀
国共有826个疫点
据薛亮介绍，
迅速核实，及时
准转运，必须进
扩散蔓延。
病防控工作取得积
有病猪25.7万头，病
截至23日上午，全
病疫情，要求各地
用、不准出售、不
决防止疫情跨区域
截至22日，全国共免疫生猪1亿多头，对有效控制重点地区和重点猪群的高致病性猪蓝耳病疫情发挥了重要作
用。5月初，农业部安排了12家企业紧急生产高致病性猪蓝耳病疫苗，目前已有11家企业疫苗投入使用，近期还将再
安排几家企业扩大生产。目前新型疫苗日生产能力达到700万至1000万毫升。
就绪
2007-09-04 19::
开始 Disanalysis 5 Internet Expl... 抓图 b1信息抓取--搜... ACDSee v3.1 - ... 19:20

Early Reaction

- identified as all actions that would be targeted at rapid and effective containment of, and leading to, the elimination of a disease outbreak, thus preventing it from turning into a serious epidemic. This includes contingency planning and emergency preparedness.

Early Reaction with IT

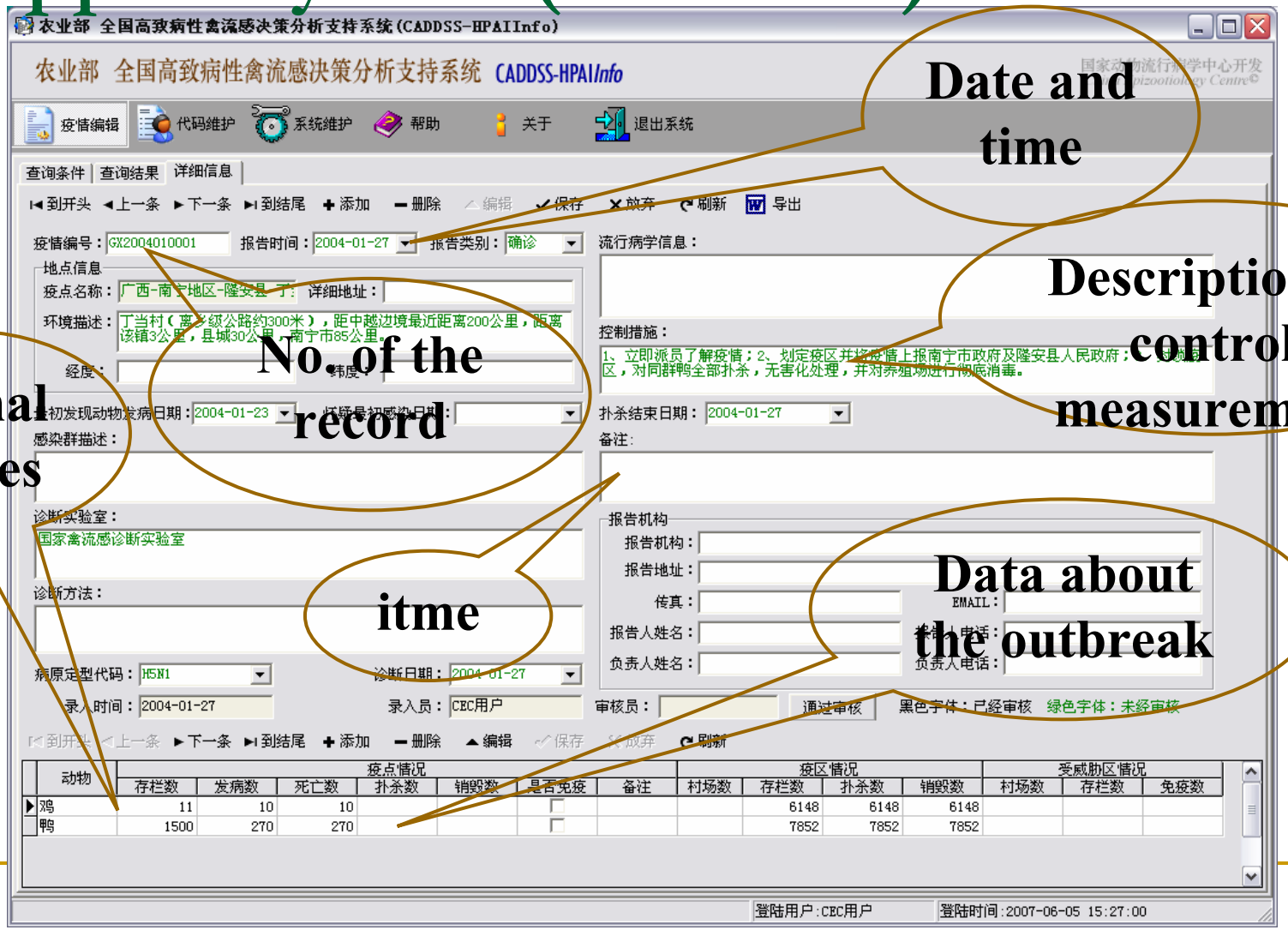
- **Contingent Animal Diseases Decision Support System (CADDSS)**
  - **Active surveillance**
  - **Emergency disease information management**
    - **HPAI**
    - **FMD**
  - **stand-alone**

Contingent Animal Diseases Decision Support System (CADDSS)

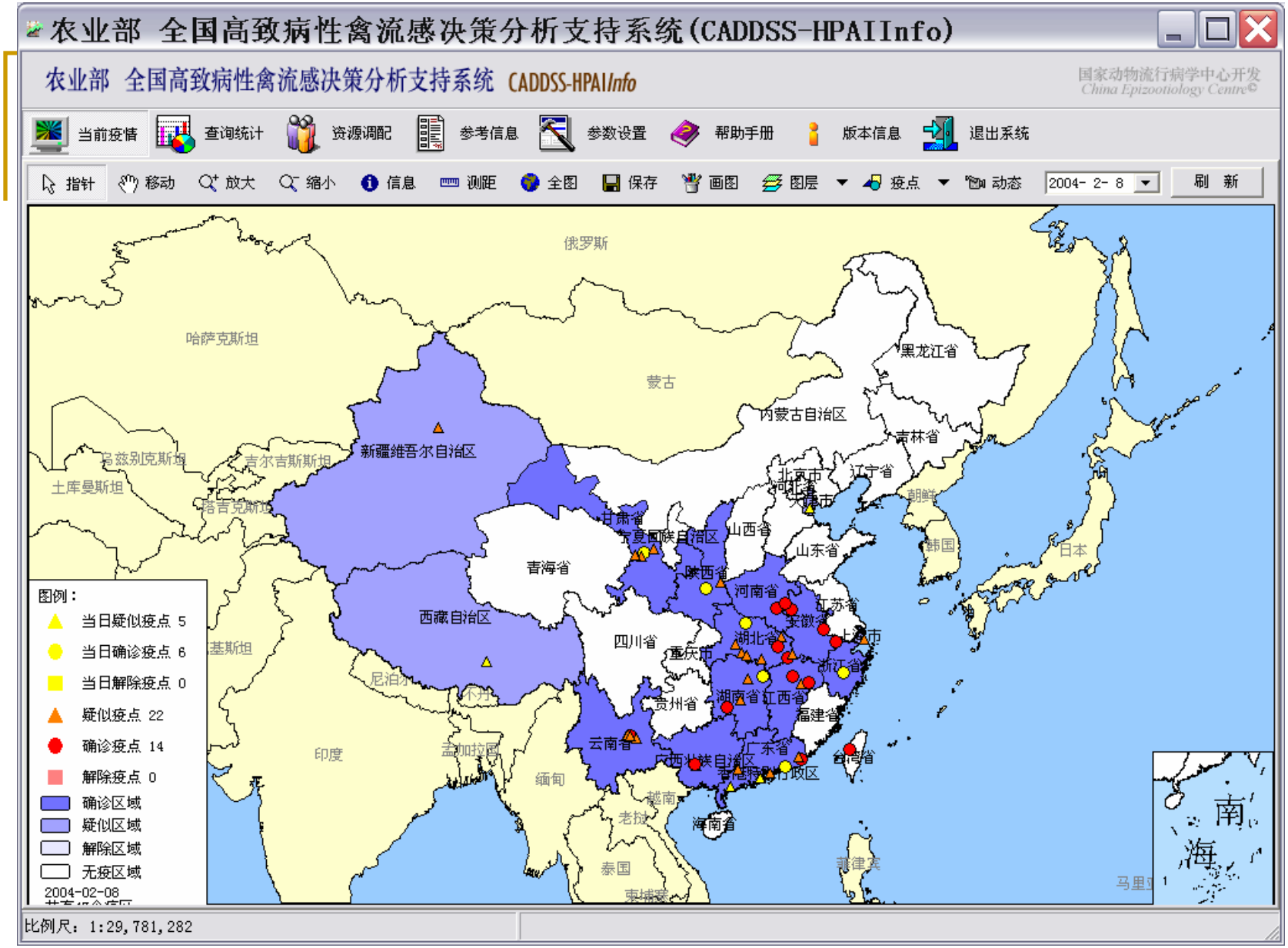
Highly Pathogenic Avian Influenza (HPAI)

In China

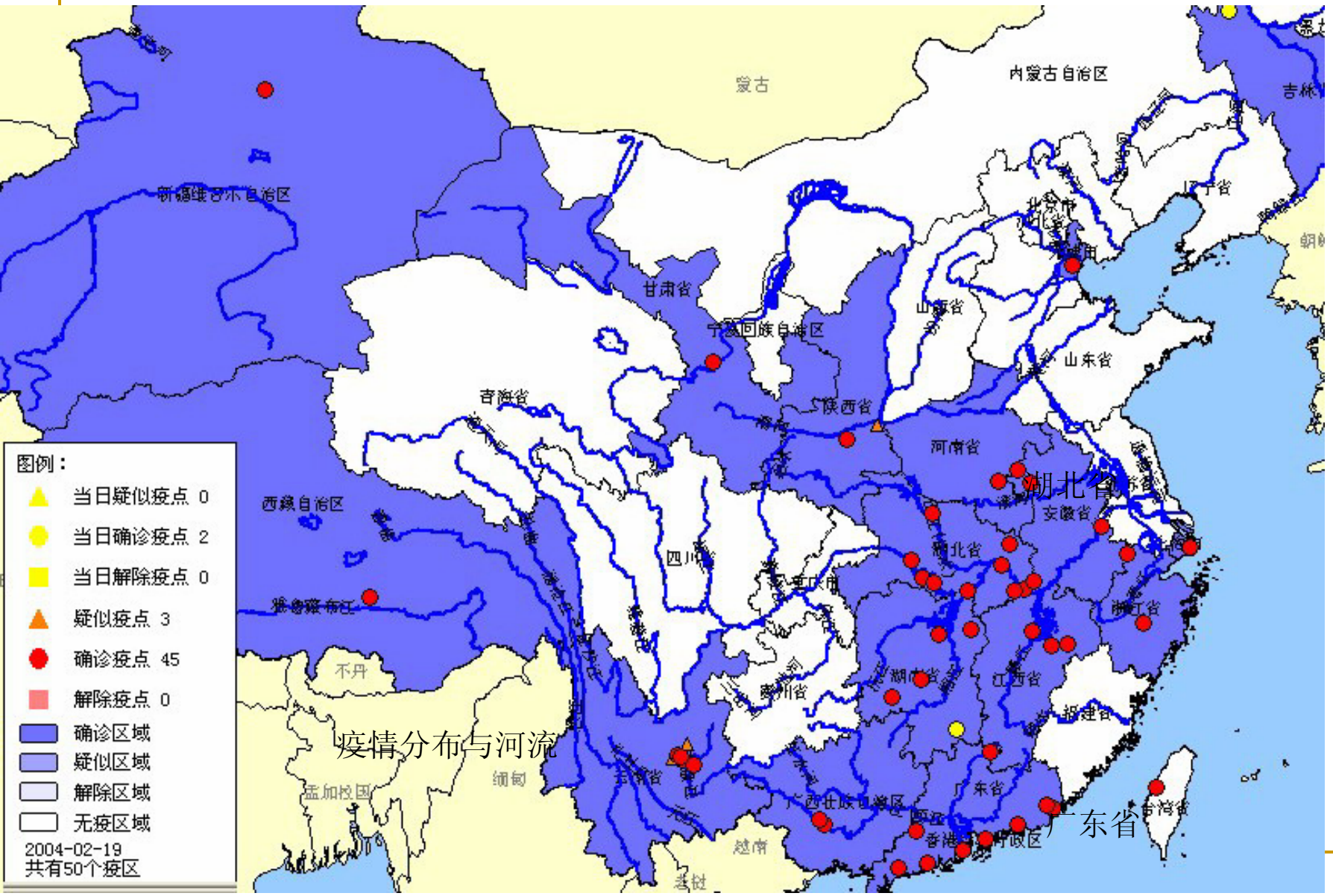
Contingent Animal Diseases Decision Support System (CADDSS)



HPAI in China on Feb 8th, 2004

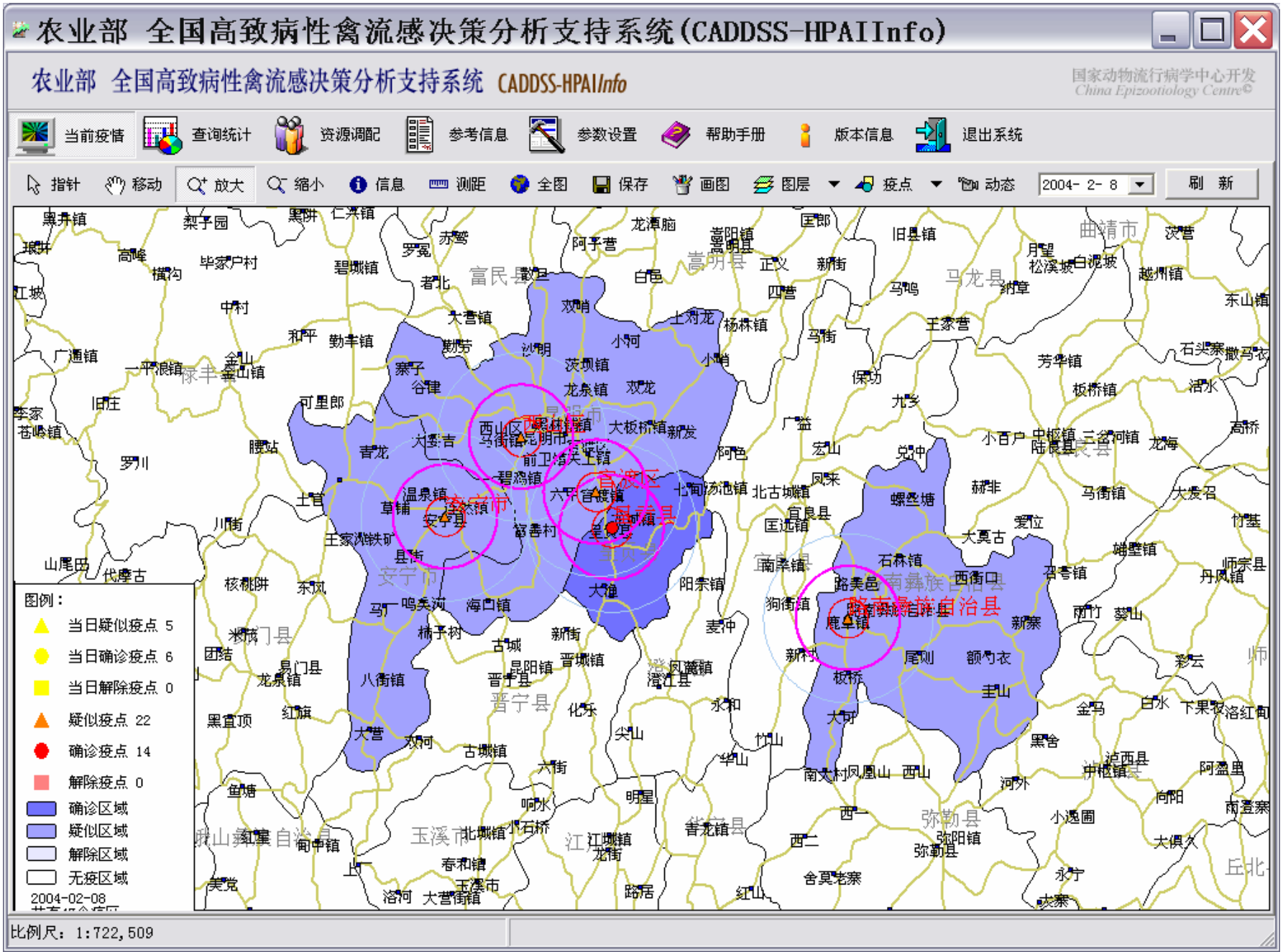


HPAI in China From Jan 26th to Mar 10th, 2004

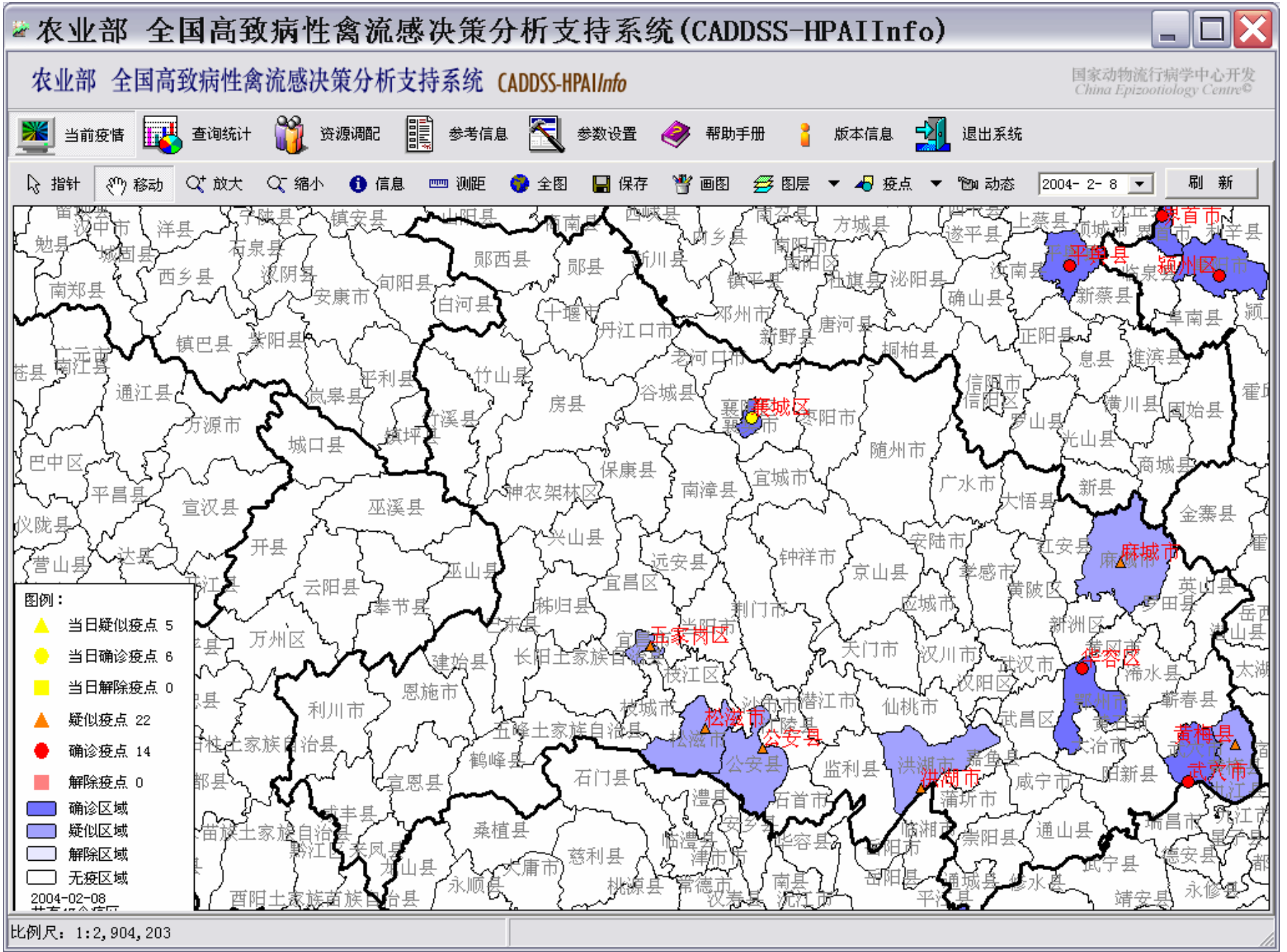

蒙古
内蒙古自治区
吉林
新疆维吾尔自治区
甘肃省
宁夏回族自治区
山西省
山东省
青海省
陕西省
河南省
湖北省
安徽省
西藏自治区
四川省
湖南省
江西省
浙江省
福建省
广东省
香港特别行政区
不丹
缅甸
越南
孟加拉国
图例：
当日疑似疫点 0
当日确诊疫点 2
当日解除疫点 0
疑似疫点 3
确诊疫点 45
解除疫点 0
确诊区域
疑似区域
解除区域
无疫区域
2004-02-19
共有50个疫区

疫情分布与河流

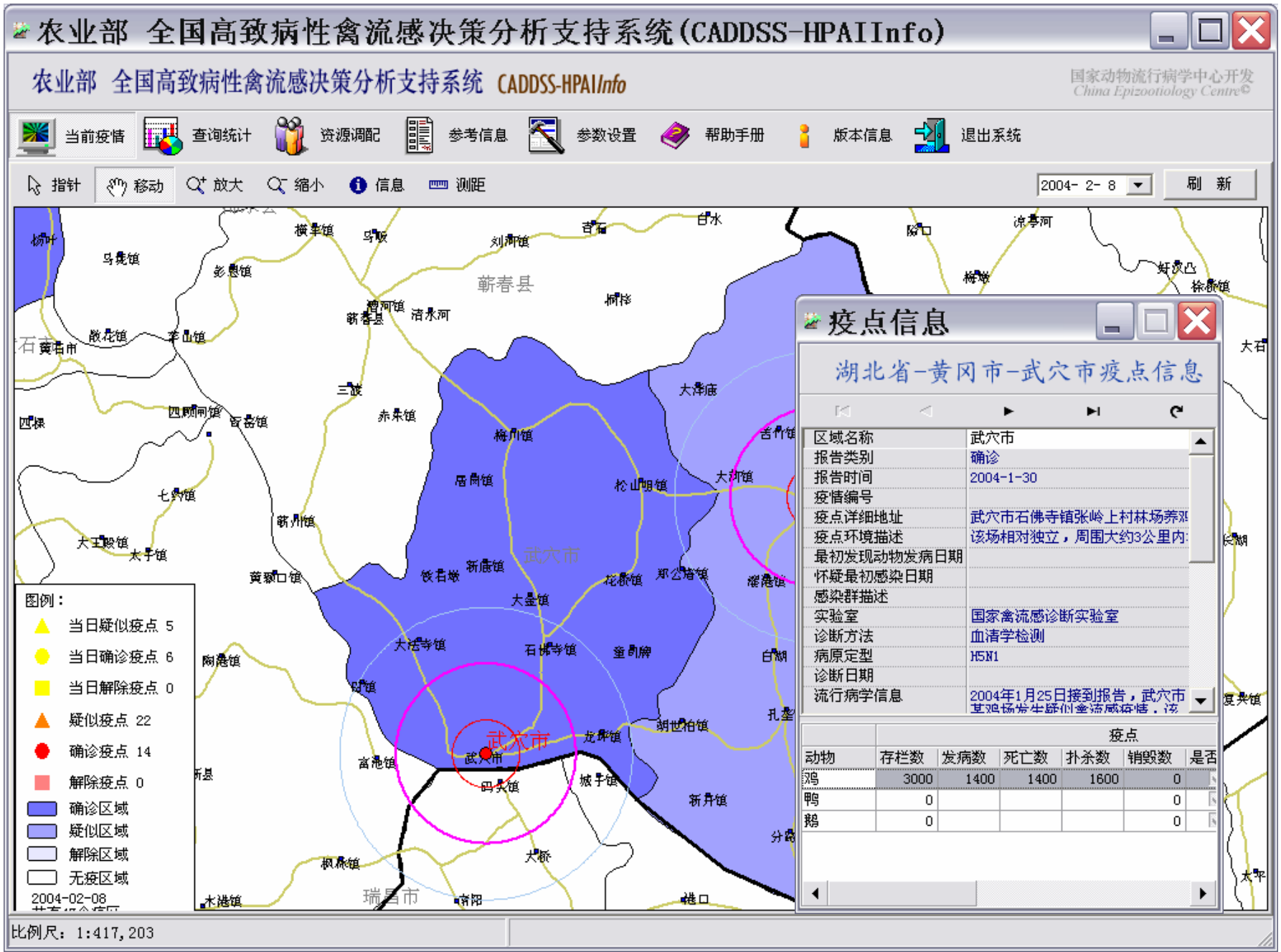
HPAI in China on Feb 8th, 2004 (Yunan Province)

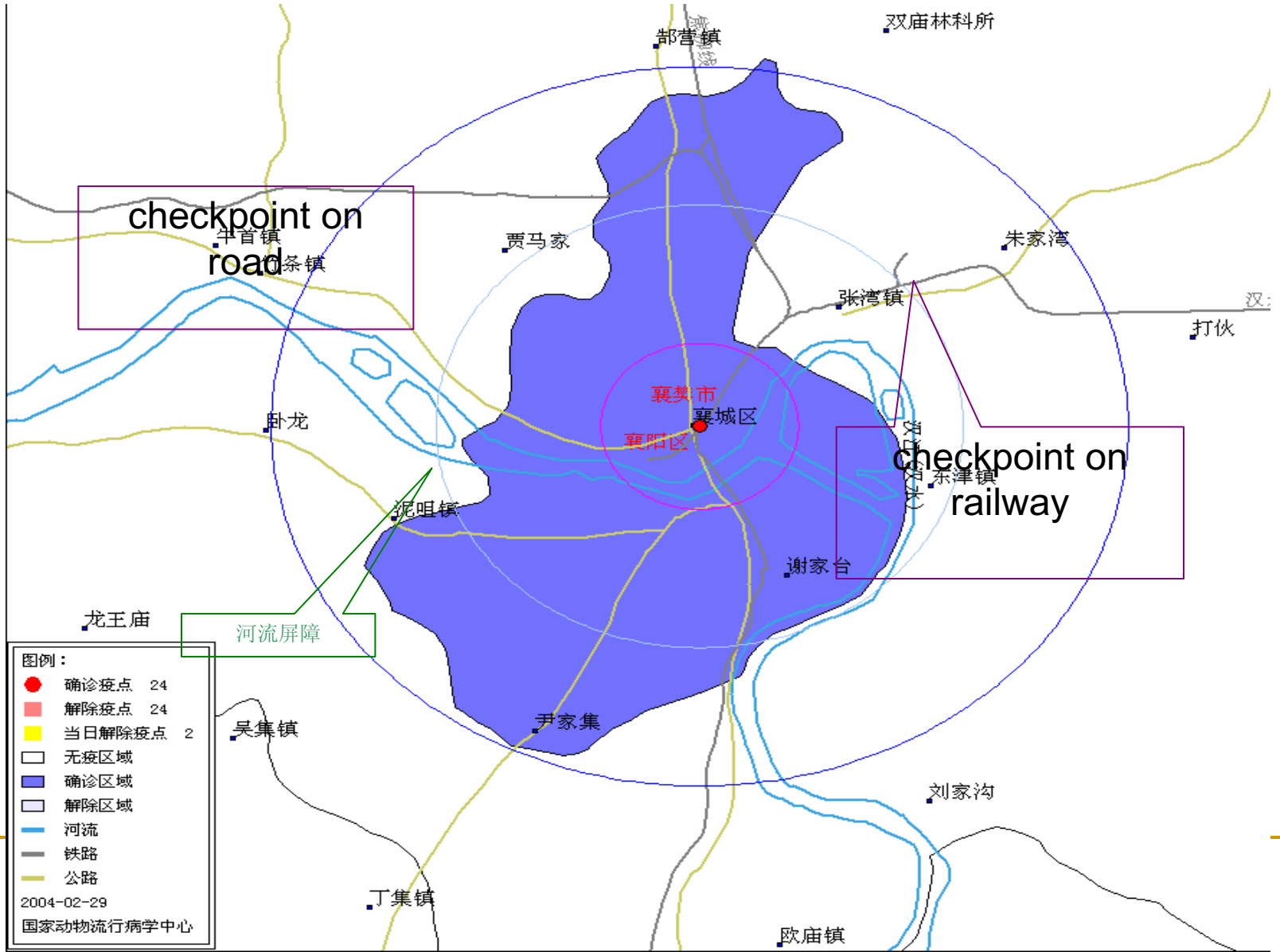


HPAI in China on Feb 8th, 2004 (Hubei Province)



HPAI in China on Feb 8th, 2004 (Hubei Province)




checkpoint on road
checkpoint on railway
河流屏障
双庙林科所
郜营镇
贾马家
朱家湾
张湾镇
打伙
襄樊市
襄城区
襄阳区
卧龙
泥咀镇
东津镇
谢家台
龙王庙
尹家集
吴集镇
刘家沟
丁集镇
欧庙镇
图例：
确诊疫点 24
解除疫点 24
当日解除疫点 2
无疫区域
确诊区域
解除区域
河流
铁路
公路
2004-02-29
国家动物流行病学中心

Enabling Research with IT

National animal health information system（NAHIS）

The first Information system about animal health on the national level, which bound with GIS technology in China.

- **CAHEC's daily working basis & cooperating platform crossing different fields of sections.**

- **An integration of Veterinary, Epizootiology, Economics, Statistics, GIS and Computer technologies or expertise.**

What NAHIS for ?

- To make the best use of the gathered information and process it in ways that provide maximum value, and present it in forms, charts or even graphically for national veterinary policy-makers and epidemiologists to use in implementing appropriate actions to achieve effective disease control.

- You can easily find out information with NAHIS by freely combining time, area, animal, and disease 4 dimensions Parameters queries. With GIS, data and the manipulated results can be viewed visually or even dynamically. All the results can be directly printed out or save as files for later use. More ever, some of the results can be generated as Microsoft Word document automatically, such as: providing periodical assessments of the productivity and overall health status of livestock populations in the country.

- etc.

Object:

- China's veterinary administrators demand more quantitative and reliable information to provide the basis for their decision-making, and for national animal health policy evaluation.

- Clinical veterinarians also urge for well-organized or even visualized data, which can help them evaluate progress in diseases control and decide on future directions for their efforts.

Structure:

NAHIS

- **Hardware**
  - LAN for Intranet
  - LAN for Internet
  - Desktop

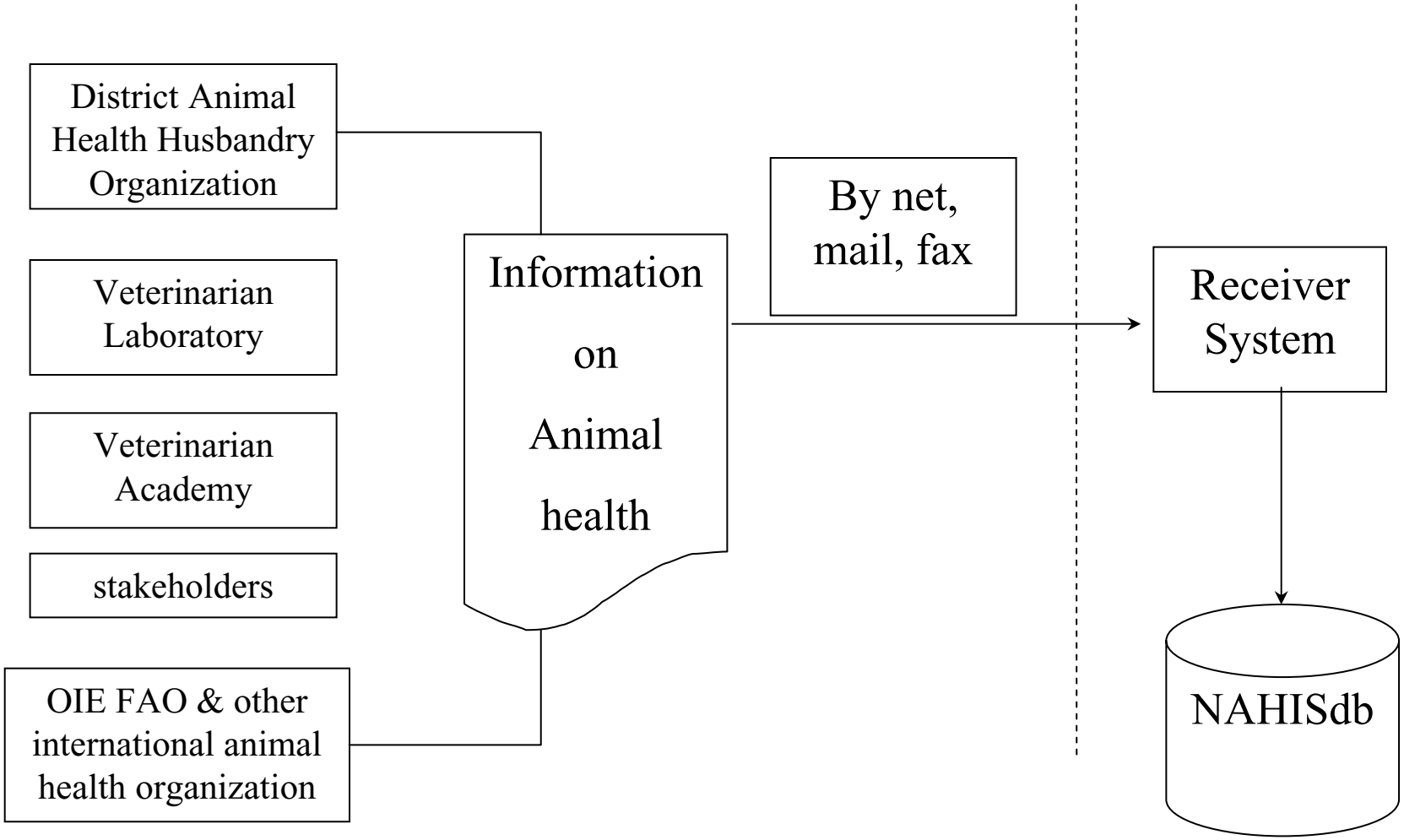
- **Software**
  - Oracle 9i
  - ArcGIS 8.3
  - C/S Applications
  - B/S Applications
  - 3rd Party Apps.

Content of data:

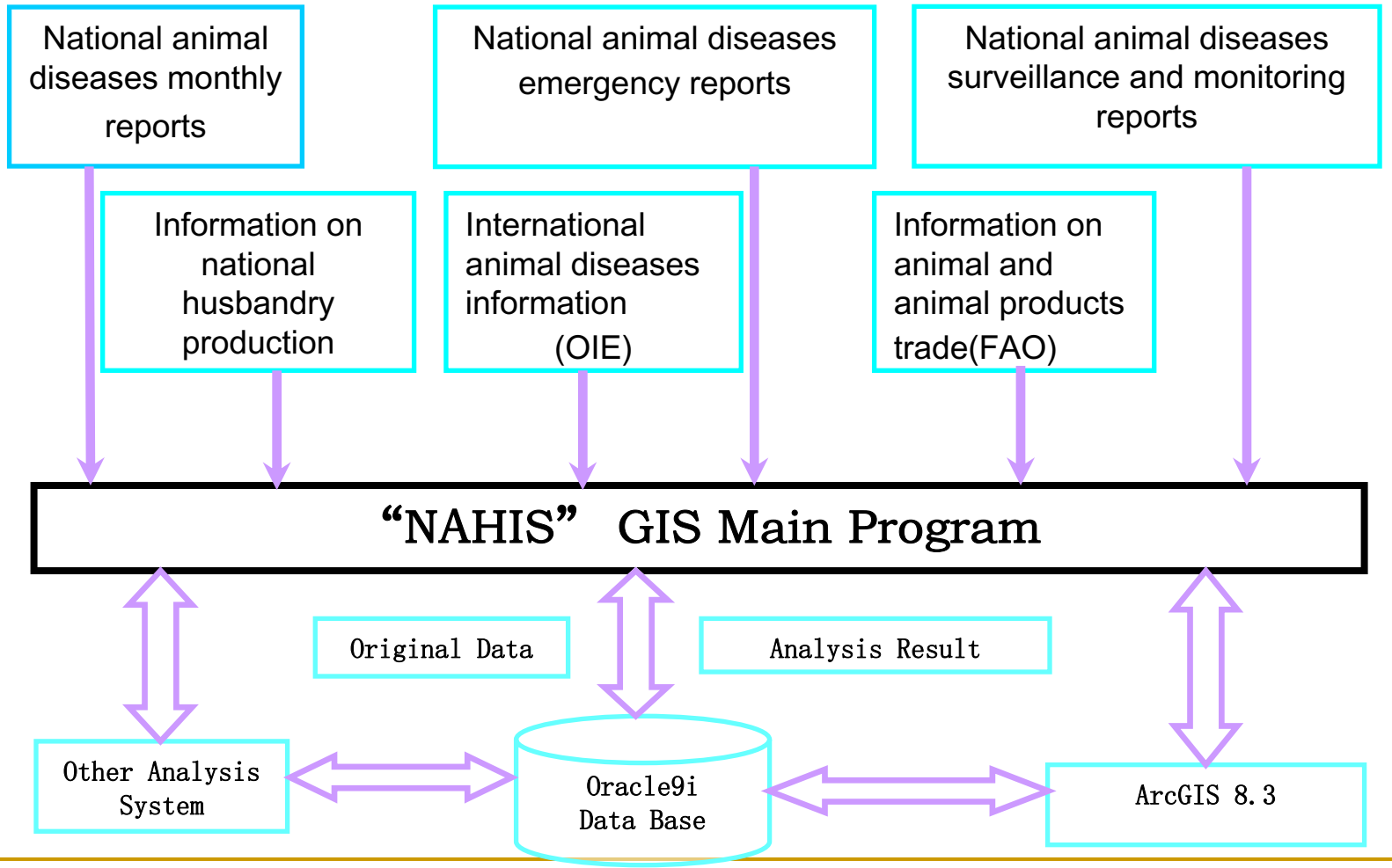
- **Disease information from National animal diseases reports system:**

  Emergency------Monthly-----Year
- **National animal diseases surveillance and monitoring reports;**
- **International animal diseases information;**
- **Information on national husbandry production;**
- **Information on animal and animal products trade;**
- **Information on animal health relevant law and standards;**
- **Information on animal health and production relevant experts and organizations;**

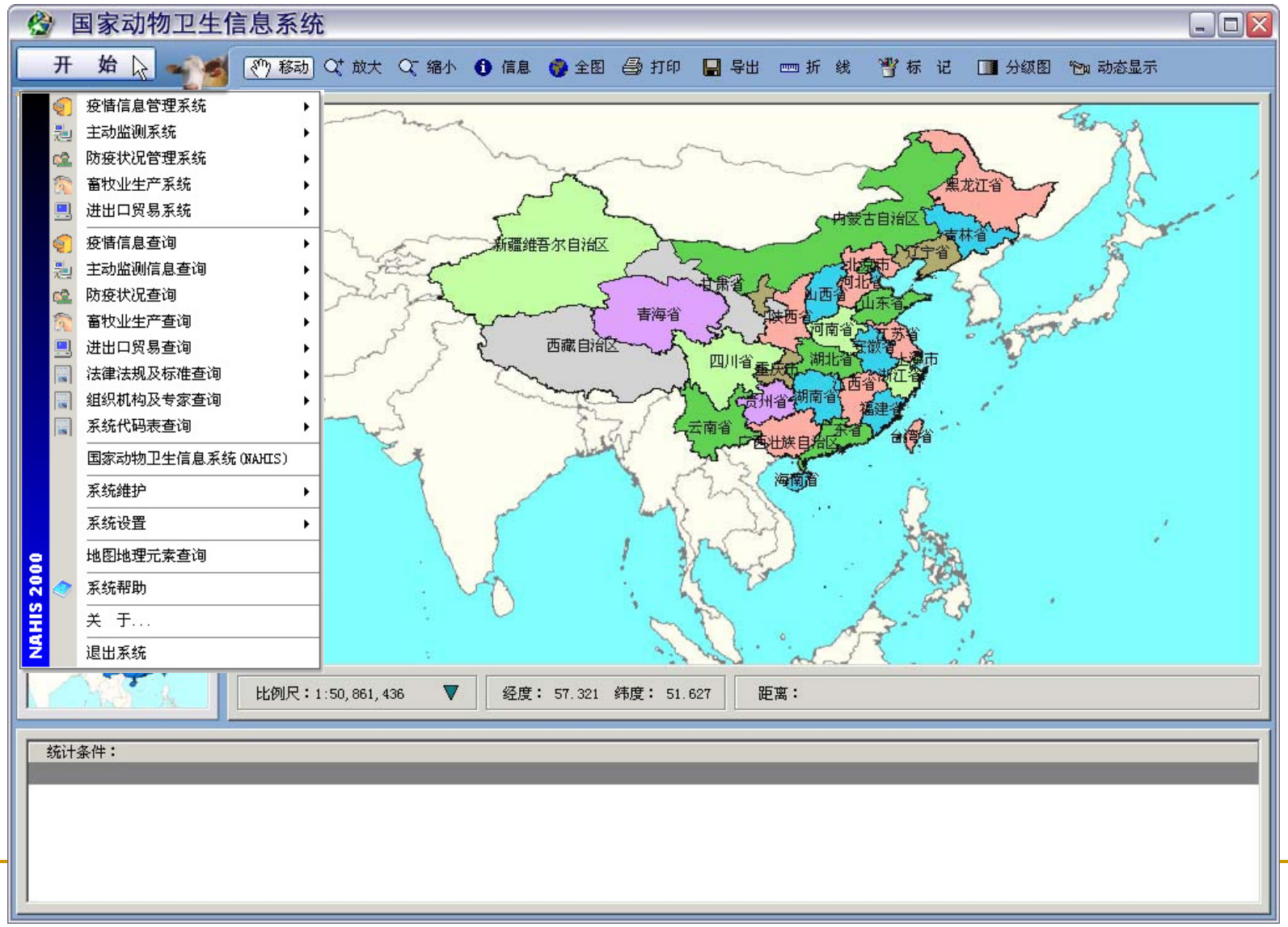
NAHIS data flow



NAHIS topology _C/S



What NAHIS looks like ? (C/S)



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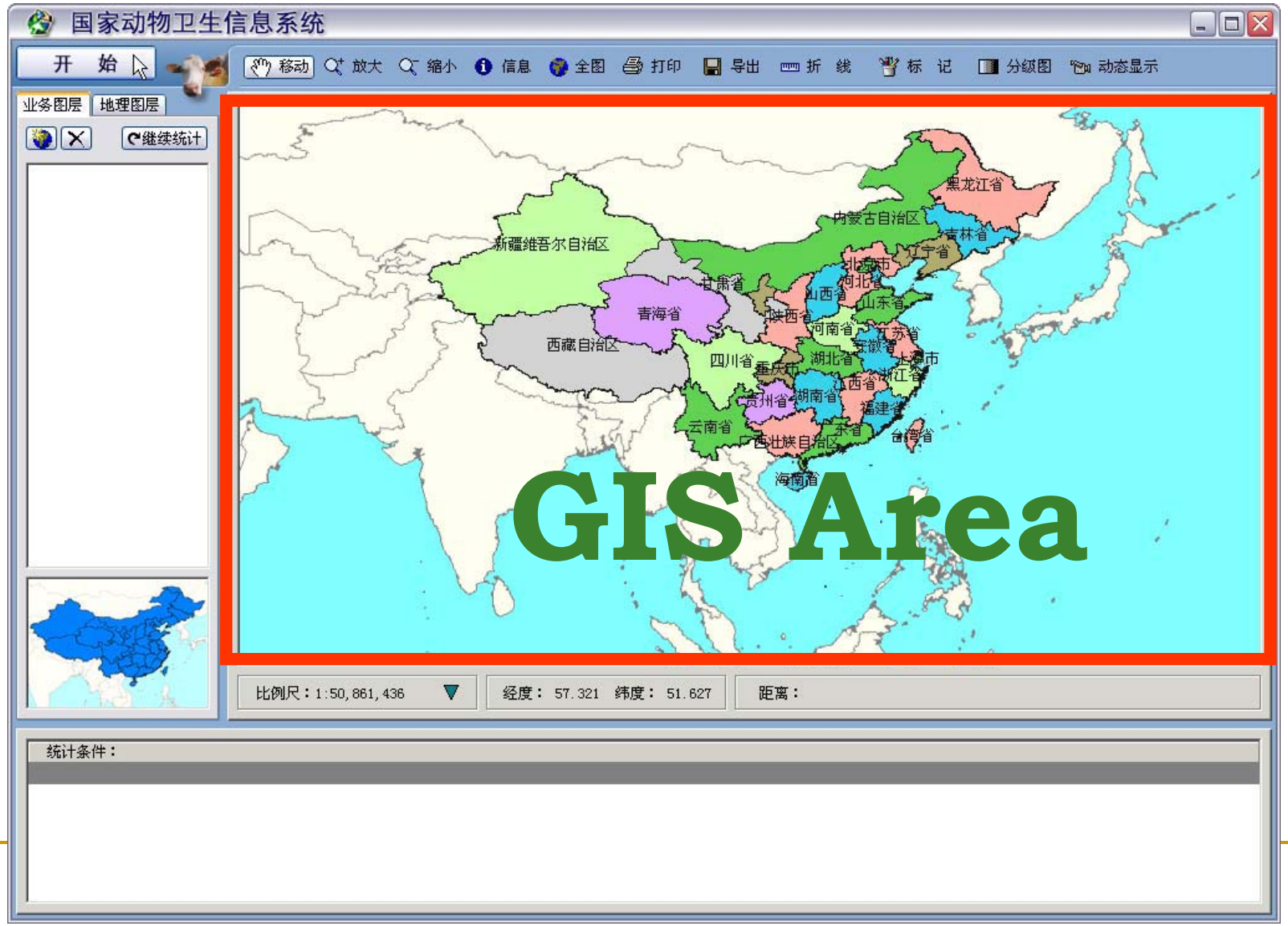

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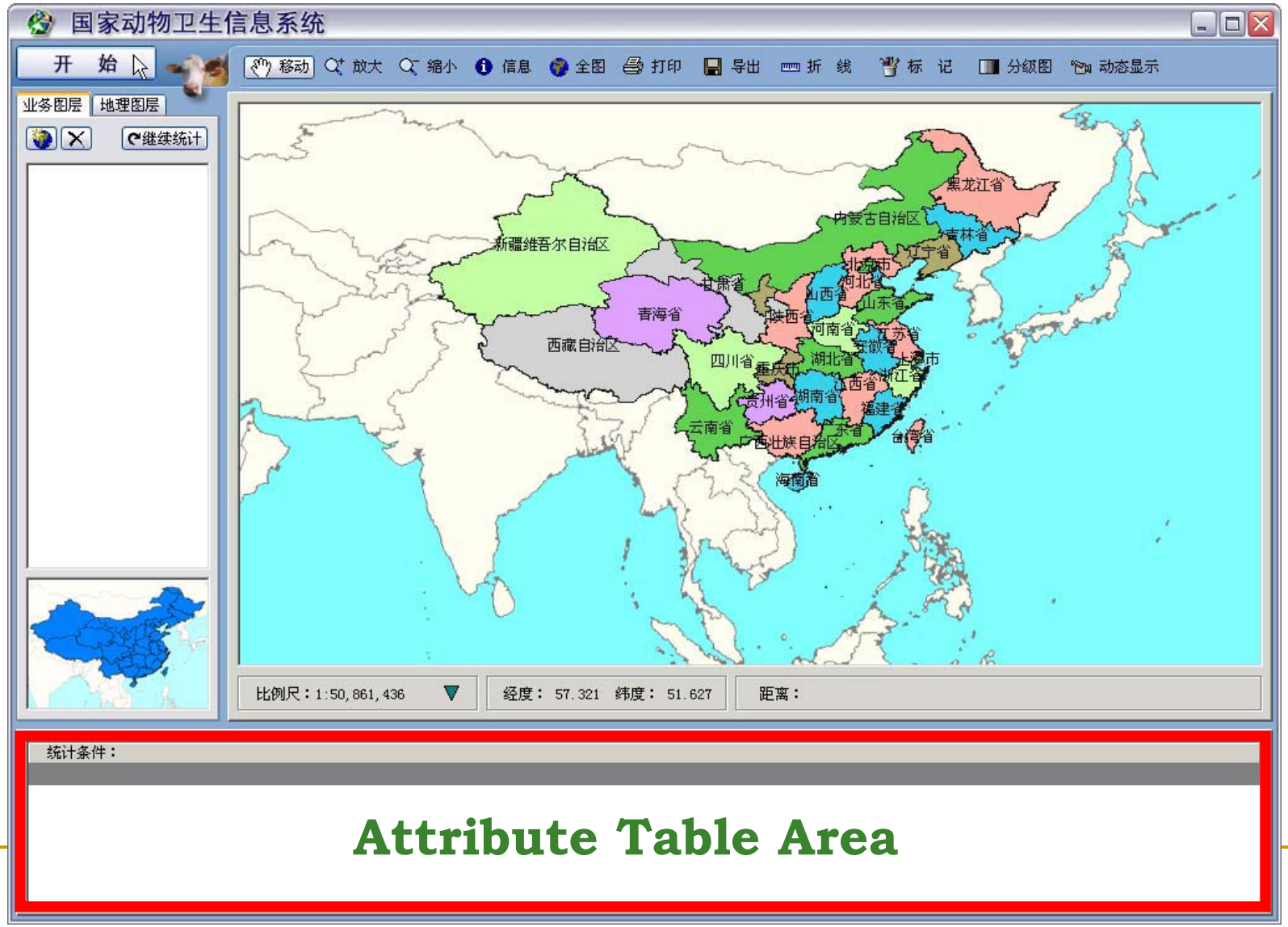

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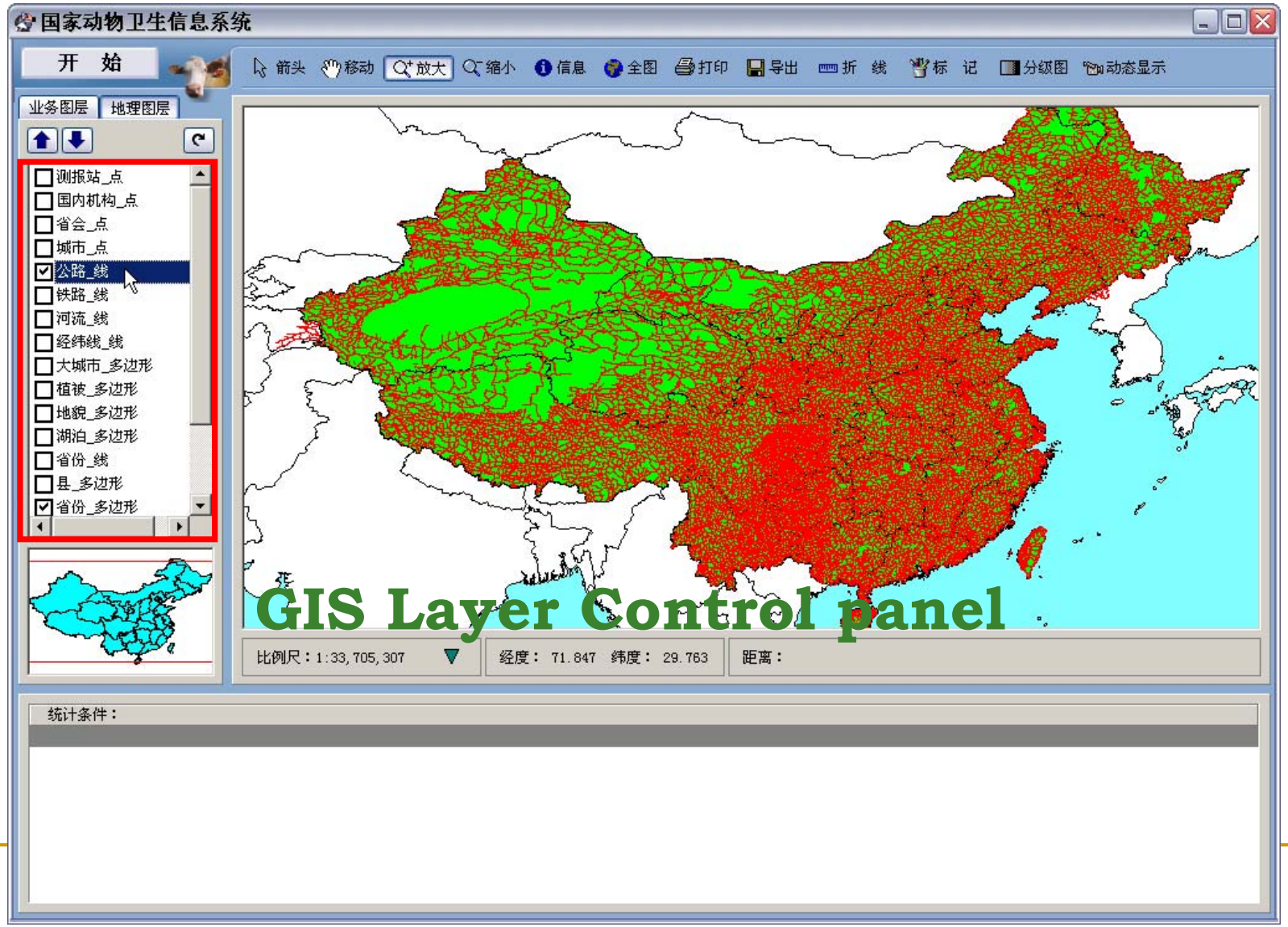

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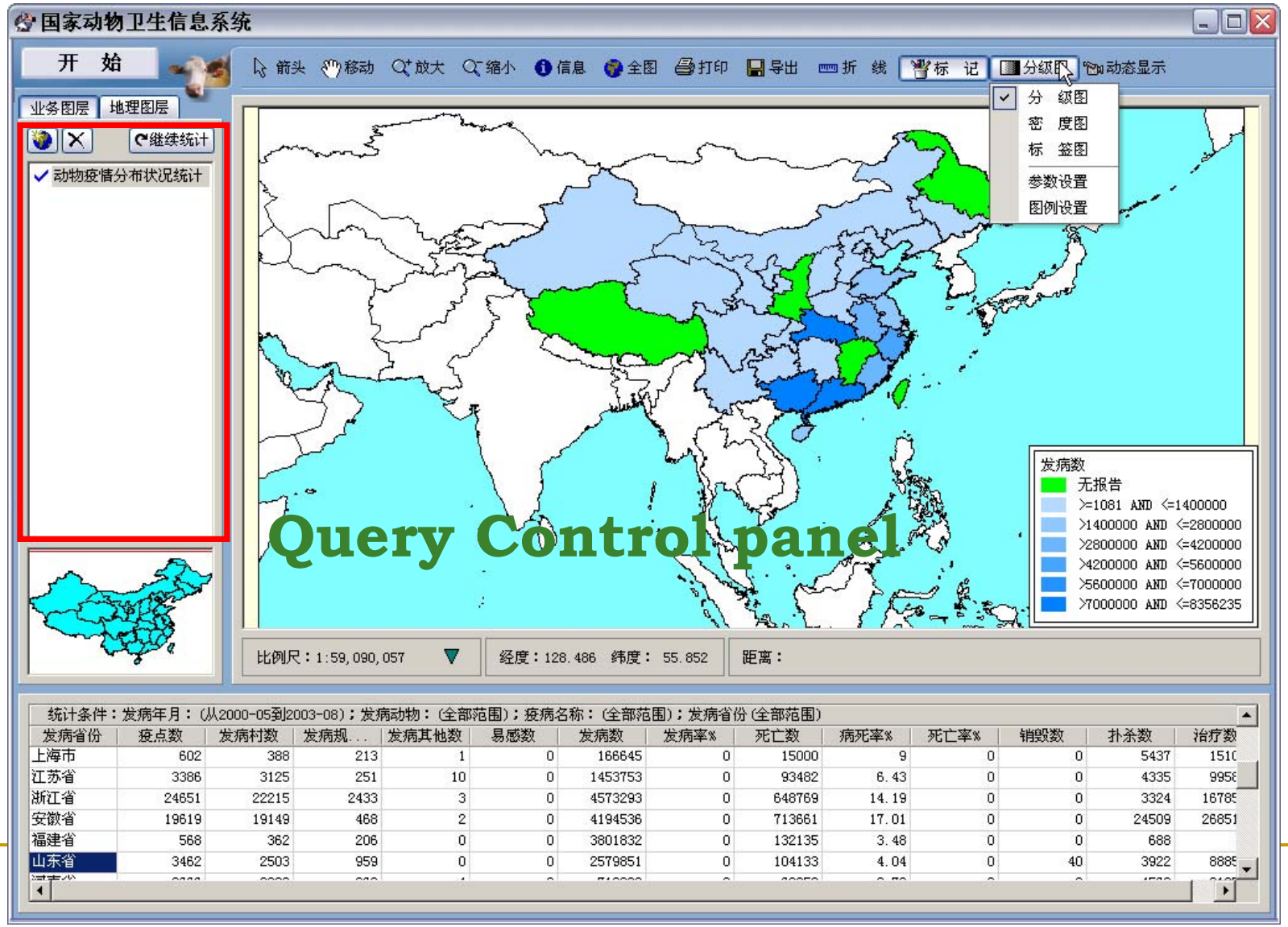

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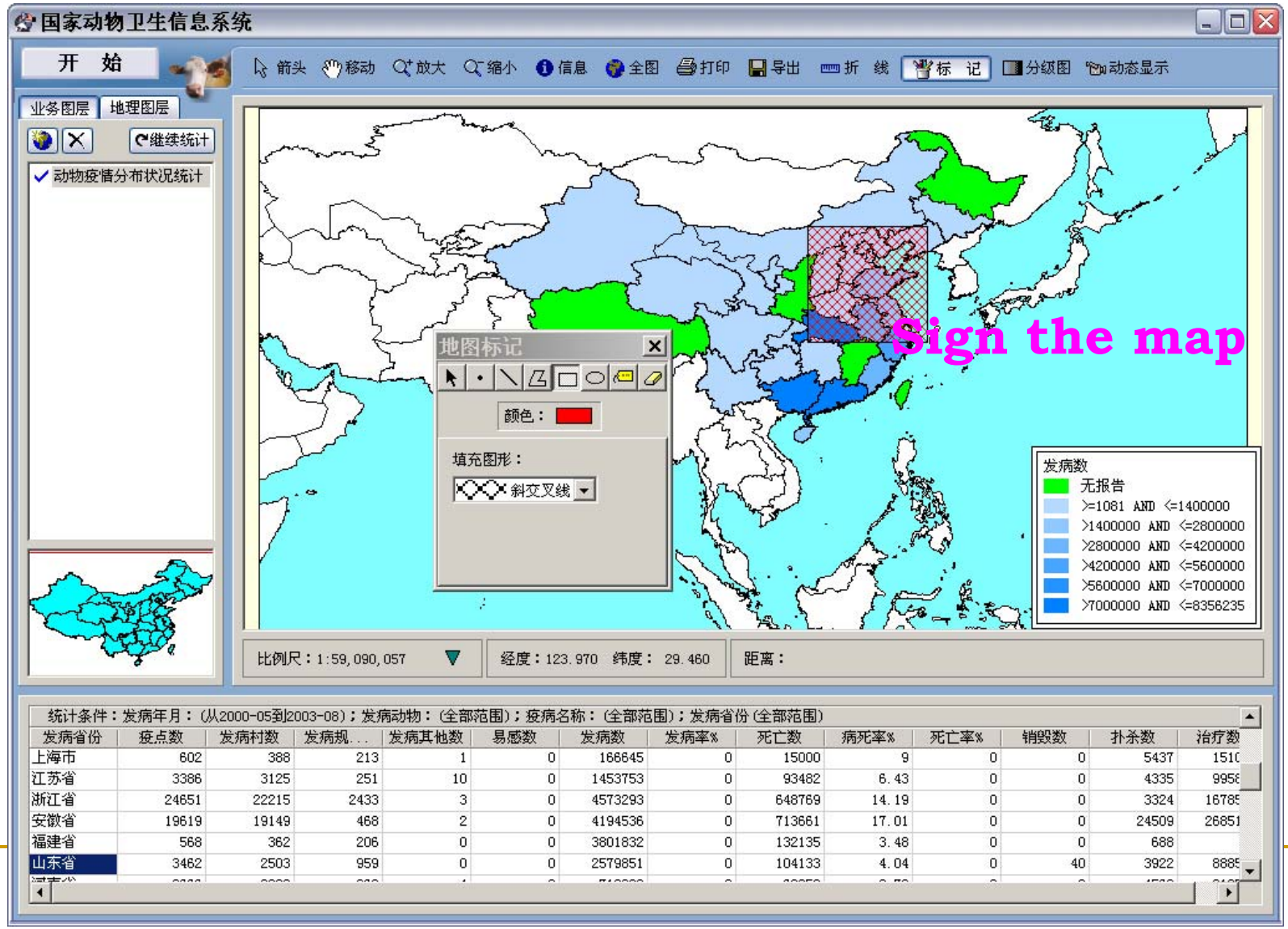
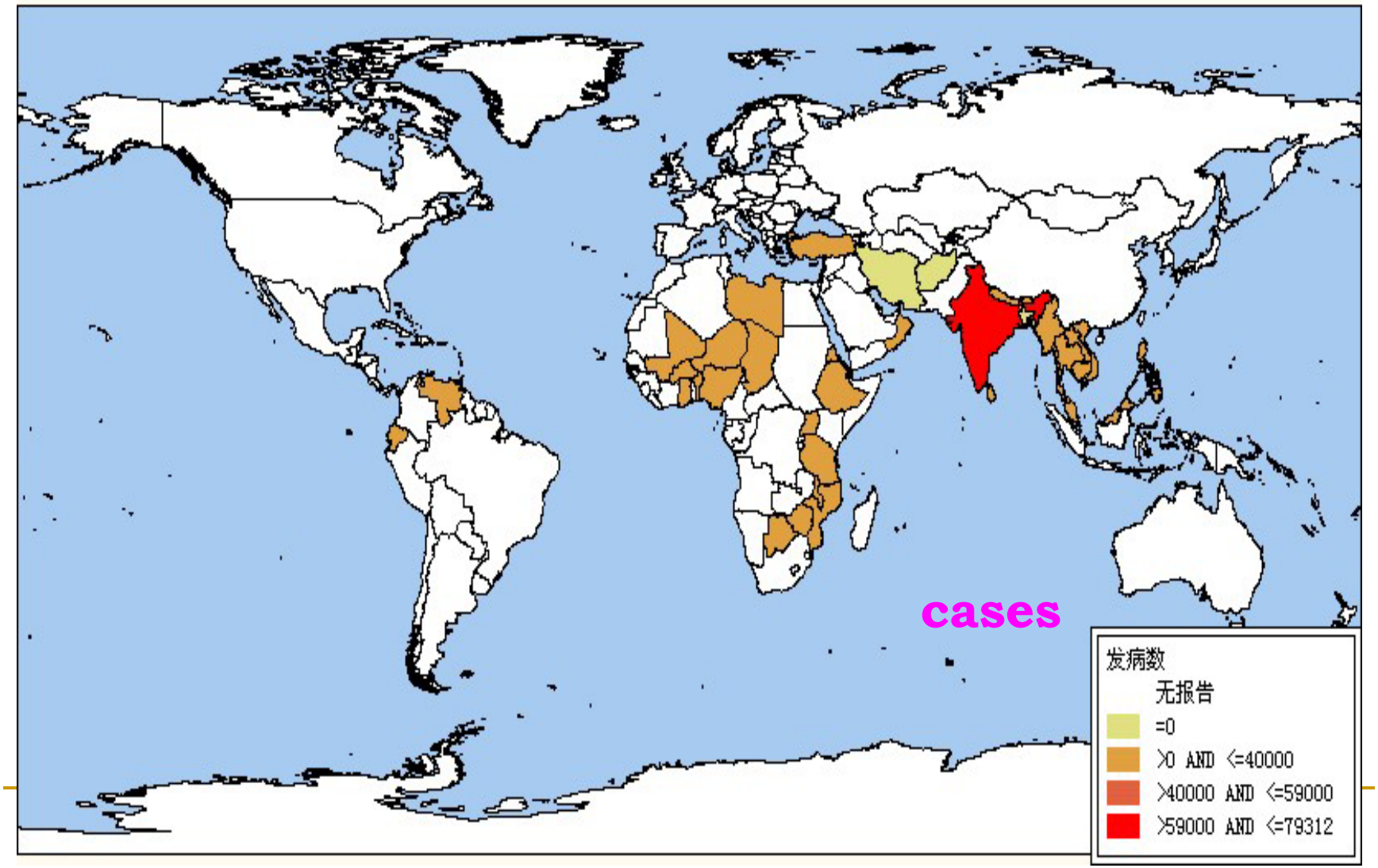
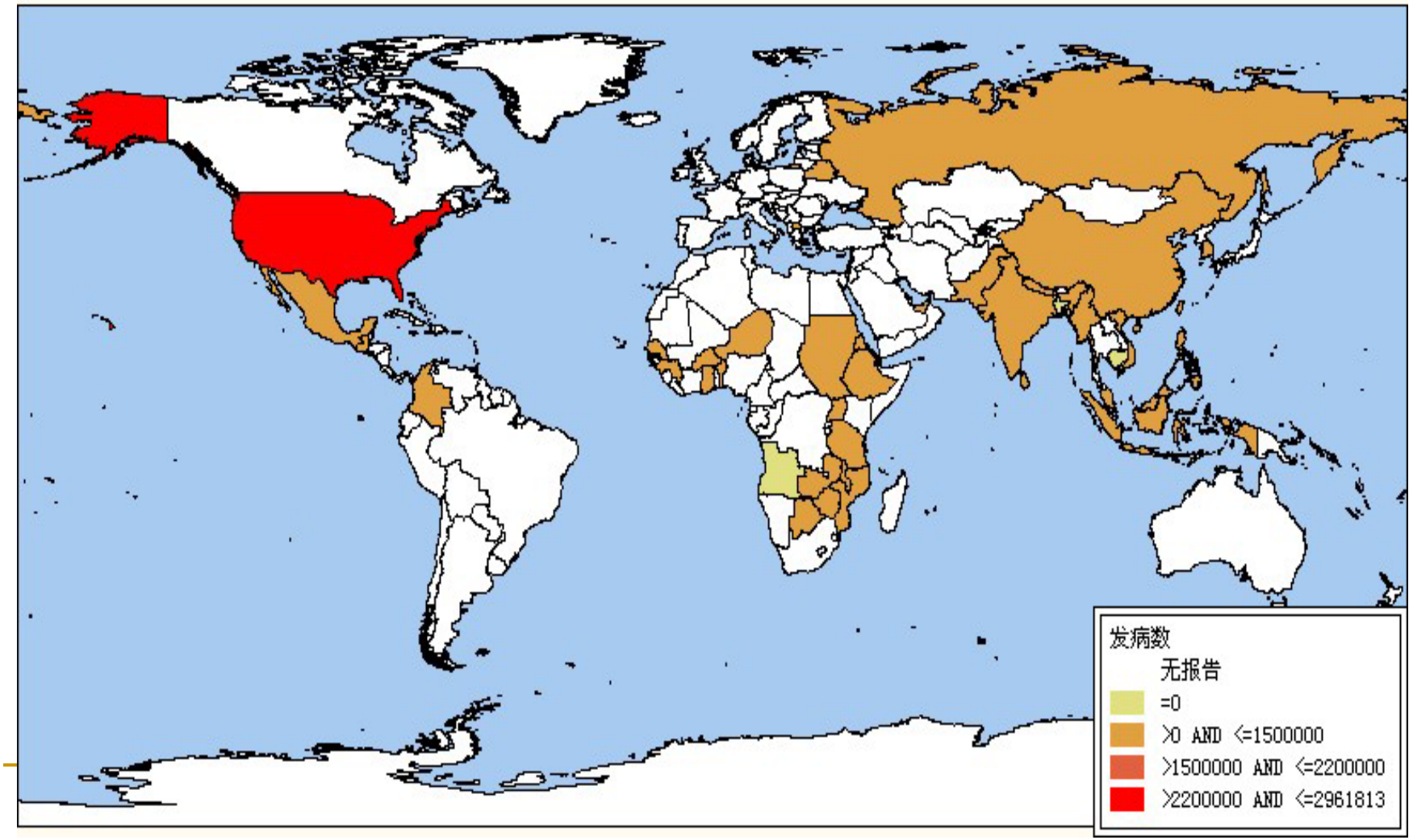


some examples

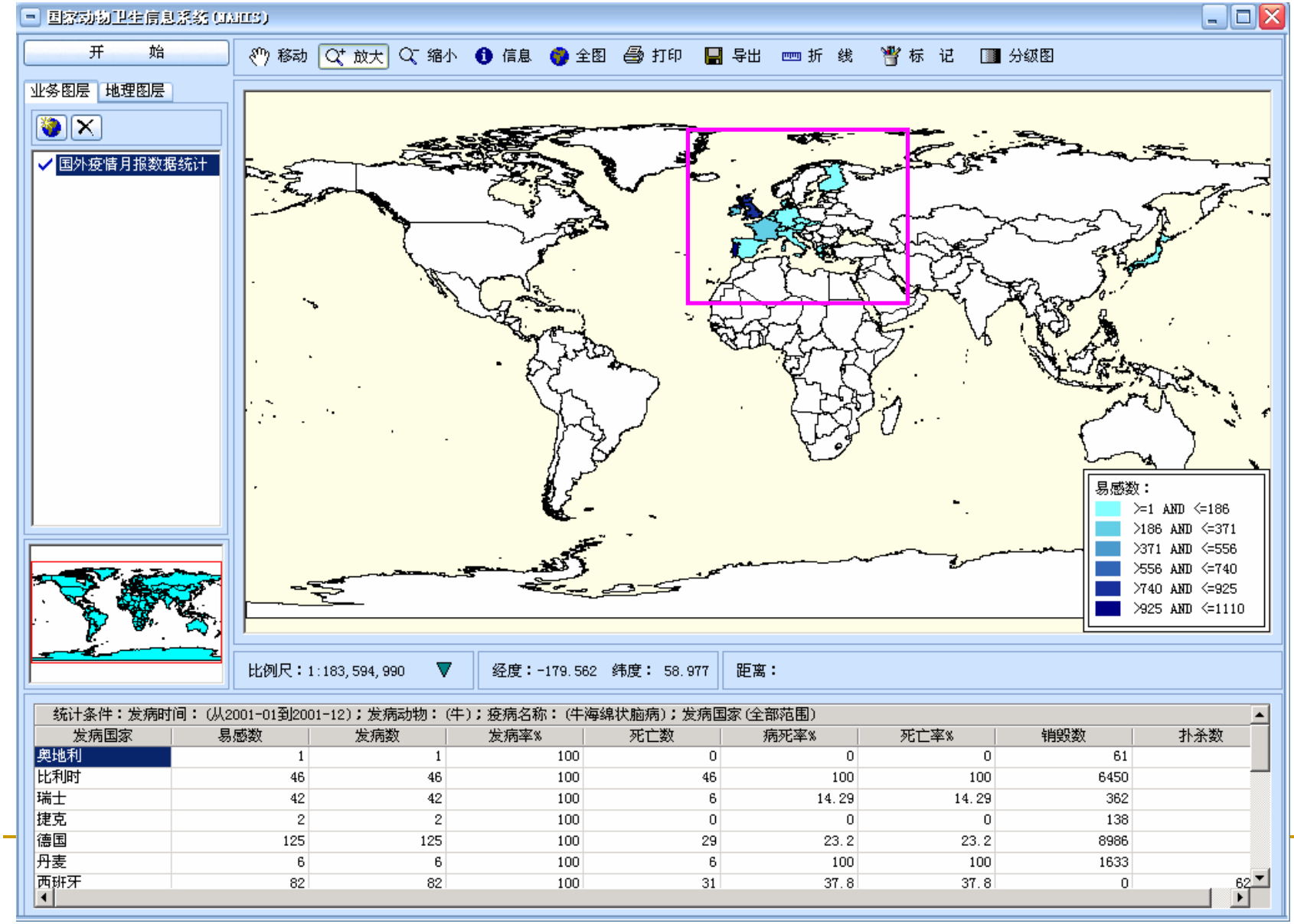
Global FMD in Jan-Jun, 2003.



Global situation Newcastle disease in Jan-Jun, 2003

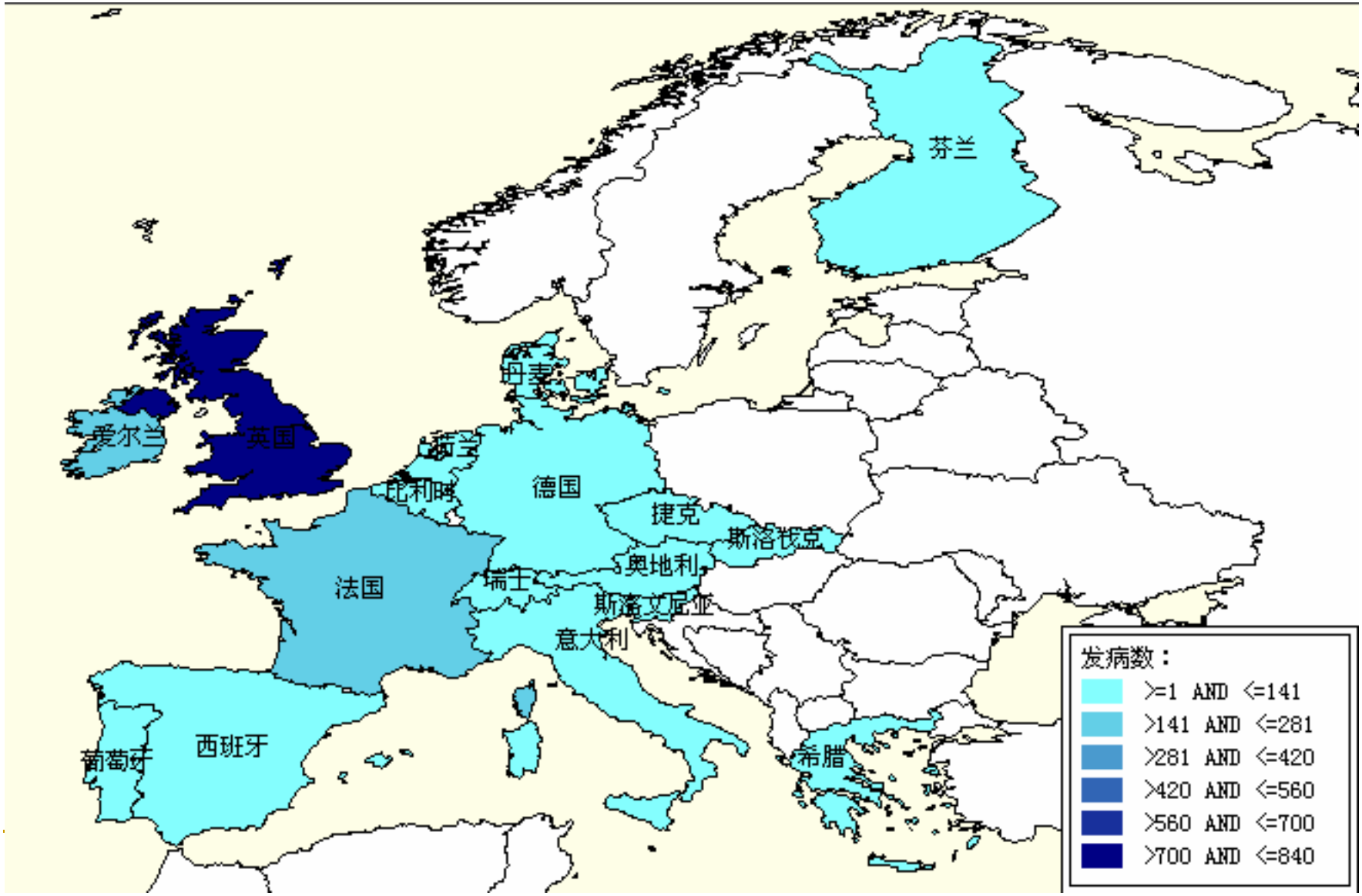


BSE in 2001

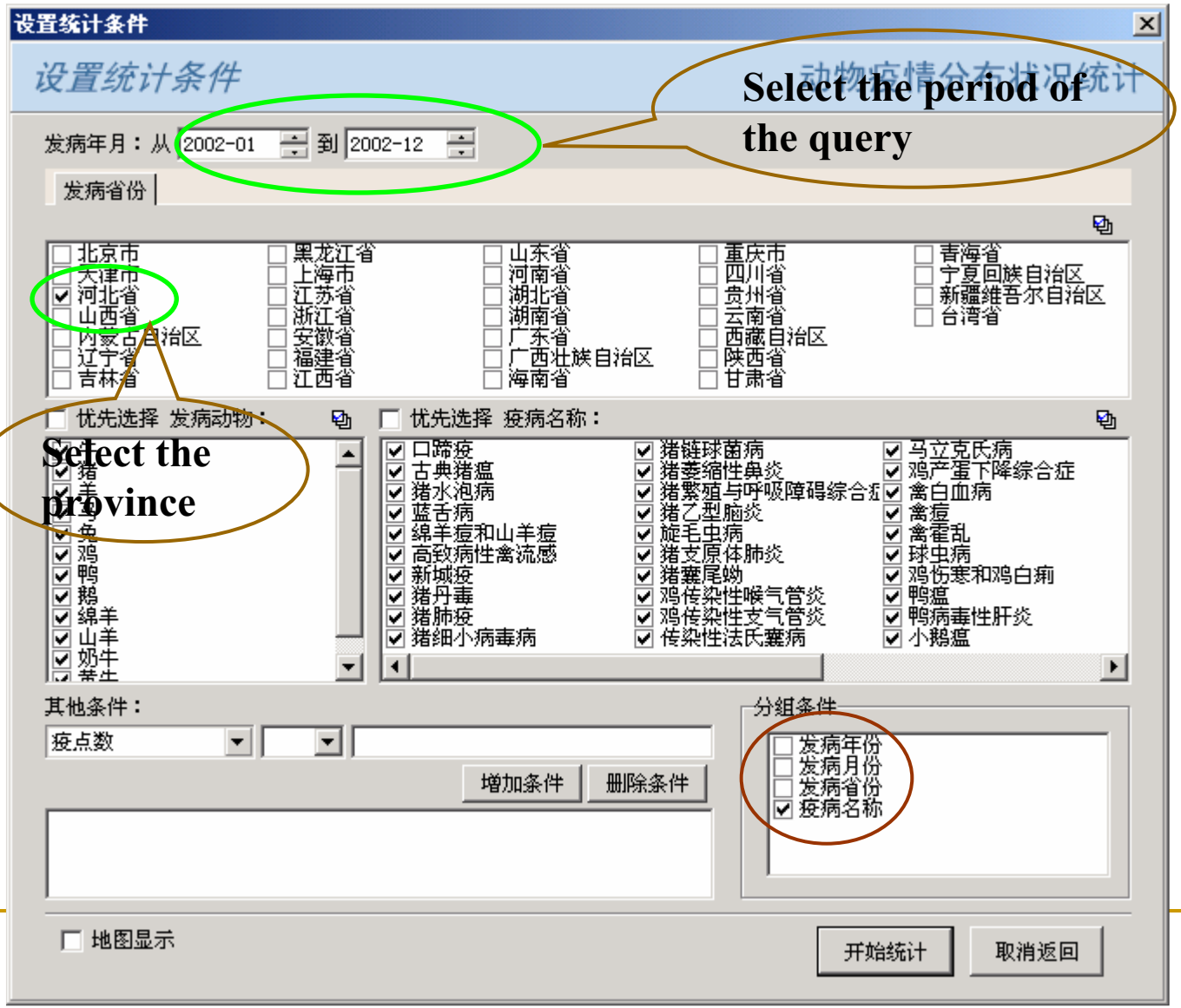


发病国家	易感数	发病数	发病率%	死亡数	病死率%	死亡率%	销毁数	扑杀数
奥地利	1	1	100	0	0	0	61	
比利时	46	46	100	46	100	100	6450	
瑞士	42	42	100	6	14.29	14.29	362	
捷克	2	2	100	0	0	0	138	
德国	125	125	100	29	23.2	23.2	8986	
丹麦	6	6	100	6	100	100	1633	
西班牙	82	82	100	31	37.8	37.8	0	62

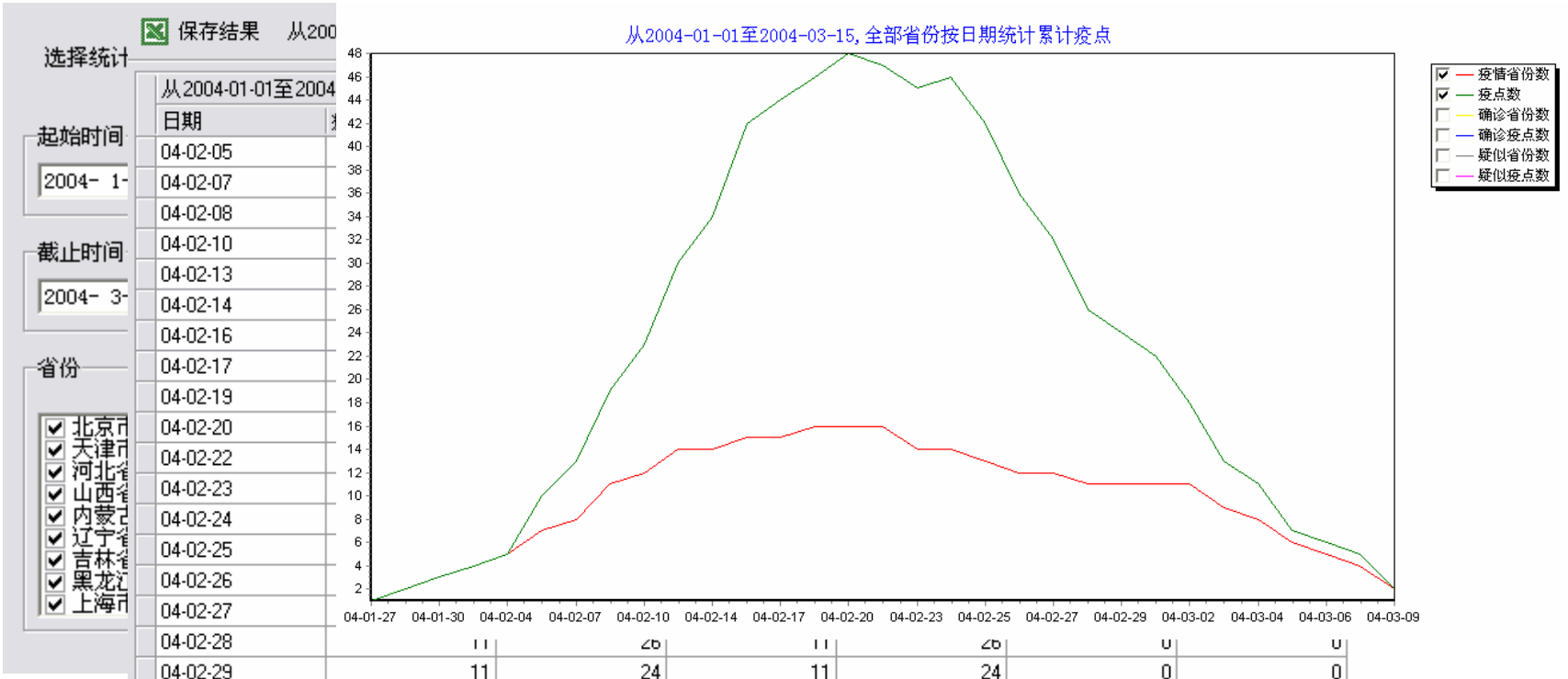
BSE in 2001(Europe)



Data Query


设置统计条件
设置统计条件
Select the period of the query
发病年月：从 2002-01 到 2002-12
发病省份
北京市
天津市
河北省
山西省
内蒙古自治区
辽宁省
吉林省
黑龙江省
上海市
江苏省
浙江省
安徽省
福建省
江西省
山东省
河南省
湖北省
湖南省
广东省
广西壮族自治区
海南省
重庆市
四川省
贵州省
云南省
西藏自治区
陕西省
甘肃省
青海省
宁夏回族自治区
新疆维吾尔自治区
台湾省
Select the province
优先选择 发病动物：
优先选择 疫病名称：
口蹄疫
古典猪瘟
猪水泡病
蓝舌病
绵羊痘和山羊痘
高致病性禽流感
新城疫
猪丹毒
猪肺疫
猪细小病毒病
猪链球菌病
猪萎缩性鼻炎
猪繁殖与呼吸障碍综合征
猪乙型脑炎
旋毛虫病
猪支原体肺炎
猪囊尾蚴
鸡传染性喉气管炎
鸡传染性支气管炎
传染性法氏囊病
马立克氏病
鸡产蛋下降综合症
禽白血病
禽痘
禽霍乱
球虫病
鸡伤寒和鸡白痢
鸭瘟
鸭病毒性肝炎
小鹅瘟
其他条件：
疫点数
增加条件
删除条件
分组条件
发病年份
发病月份
发病省份
疫病名称
地图显示
开始统计
取消返回

Result of the query



日期					
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04-02-29	11	24	11	24	0	0
04-03-01	11	22	11	22	0	0
04-03-02	11	18	11	18	0	0
04-03-03	9	13	9	13	0	0
04-03-04	8	11	8	11	0	0
04-03-05	6	7	6	7	0	0
04-03-06	5	6	5	6	0	0
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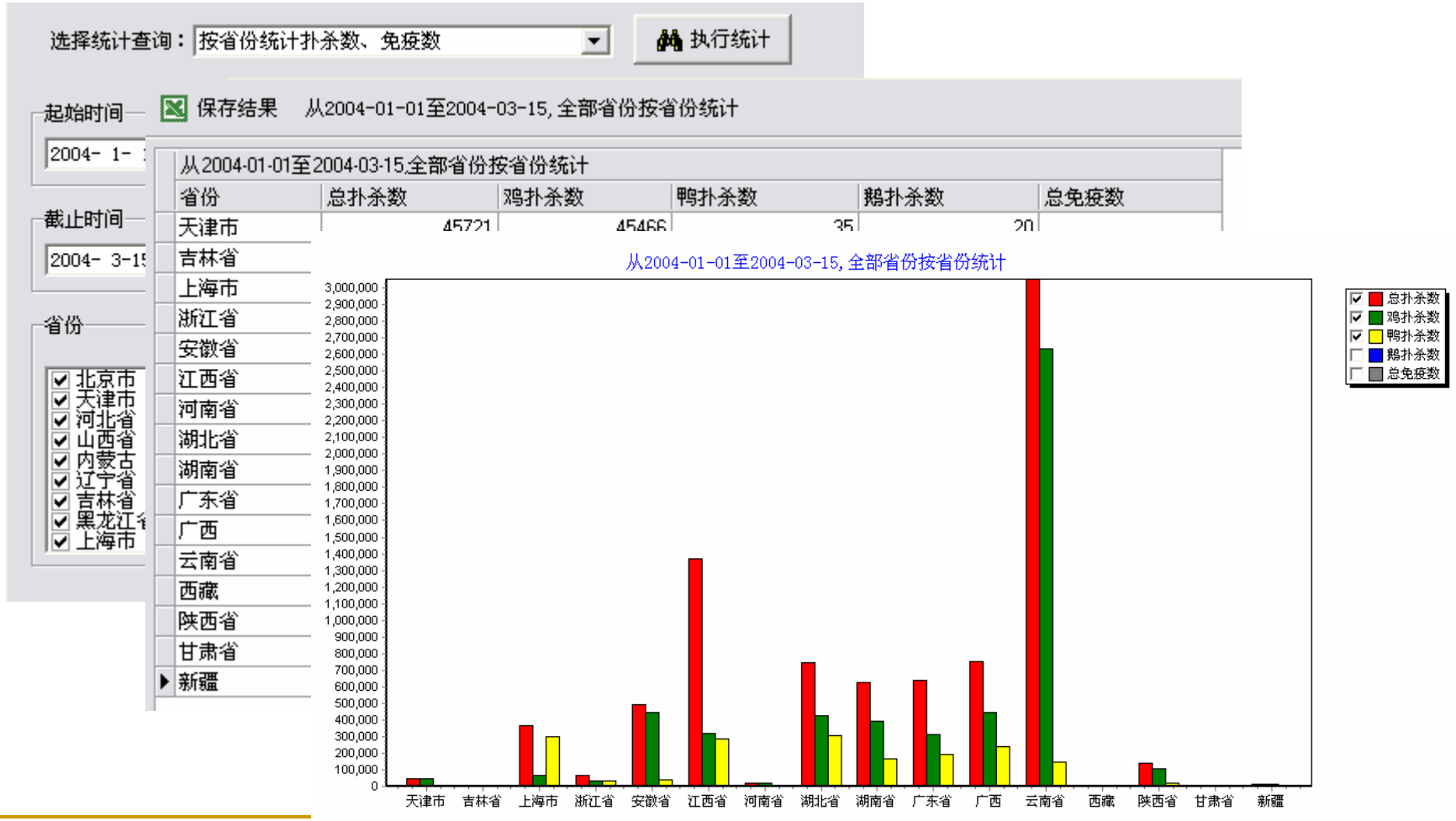
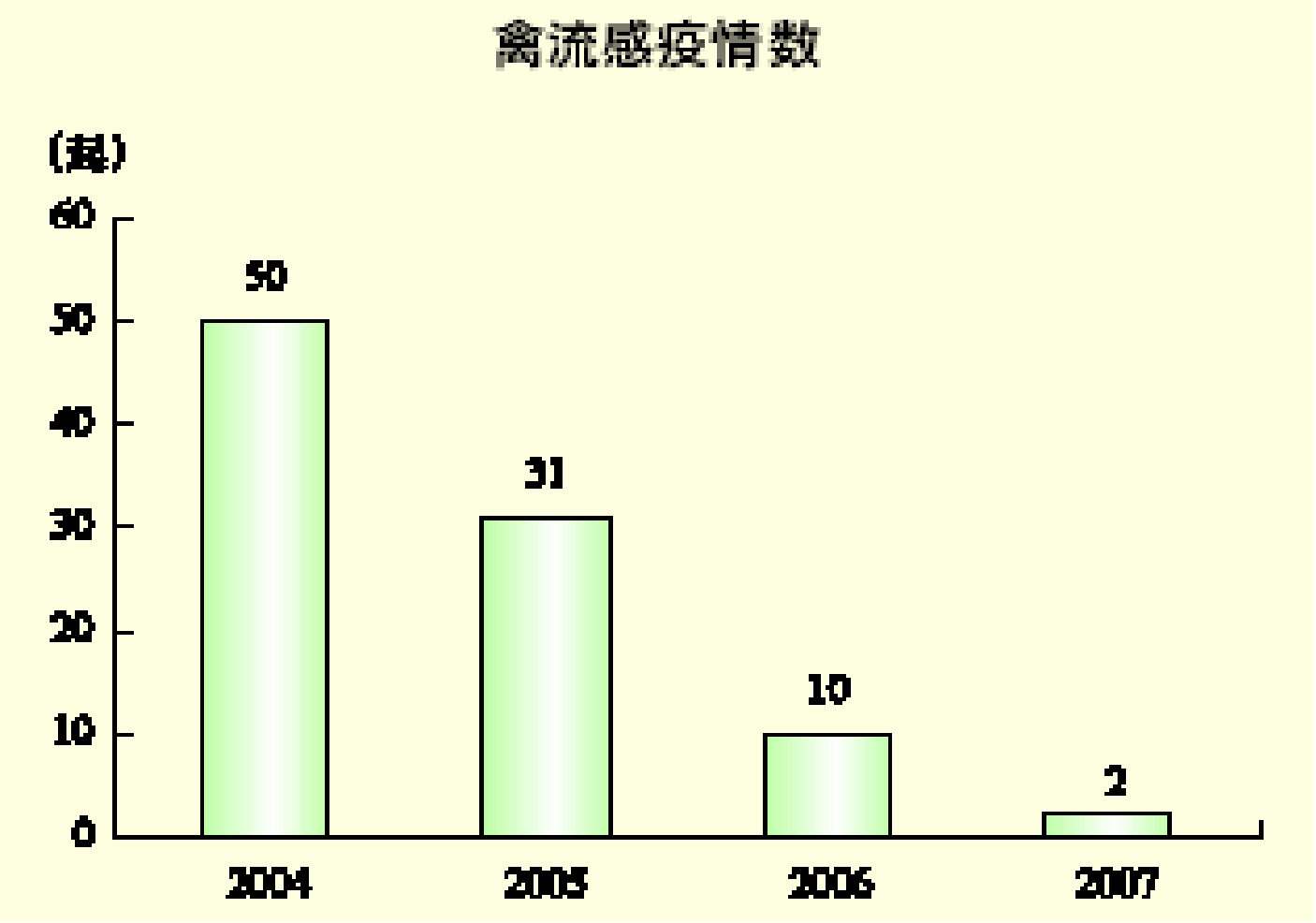
Result of the query



Swine Disease in Hebei Province in 2002

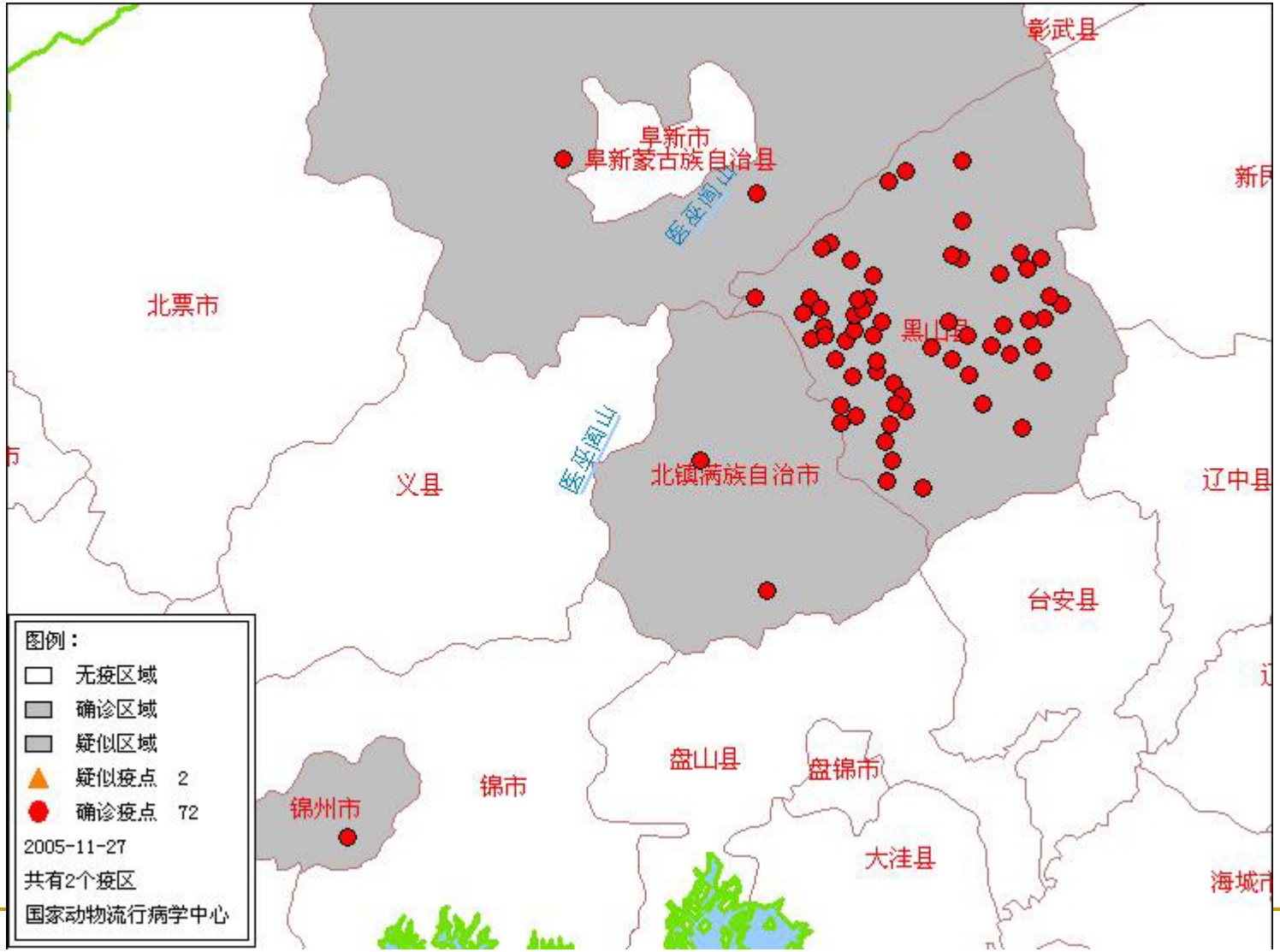
Result of the query



Spatial analysis on an HPAI outbreak in one province

- Area of the county: 2000Km^2
- Include 456 villages;
- Layer stock in 2004: 20M;
- From 26th Oct to 10th November in 2005, 55 infected villages of 18 towns were confirmed;
- 18 millions poultry in 190 villages were culled.

Map of outbreak in the county



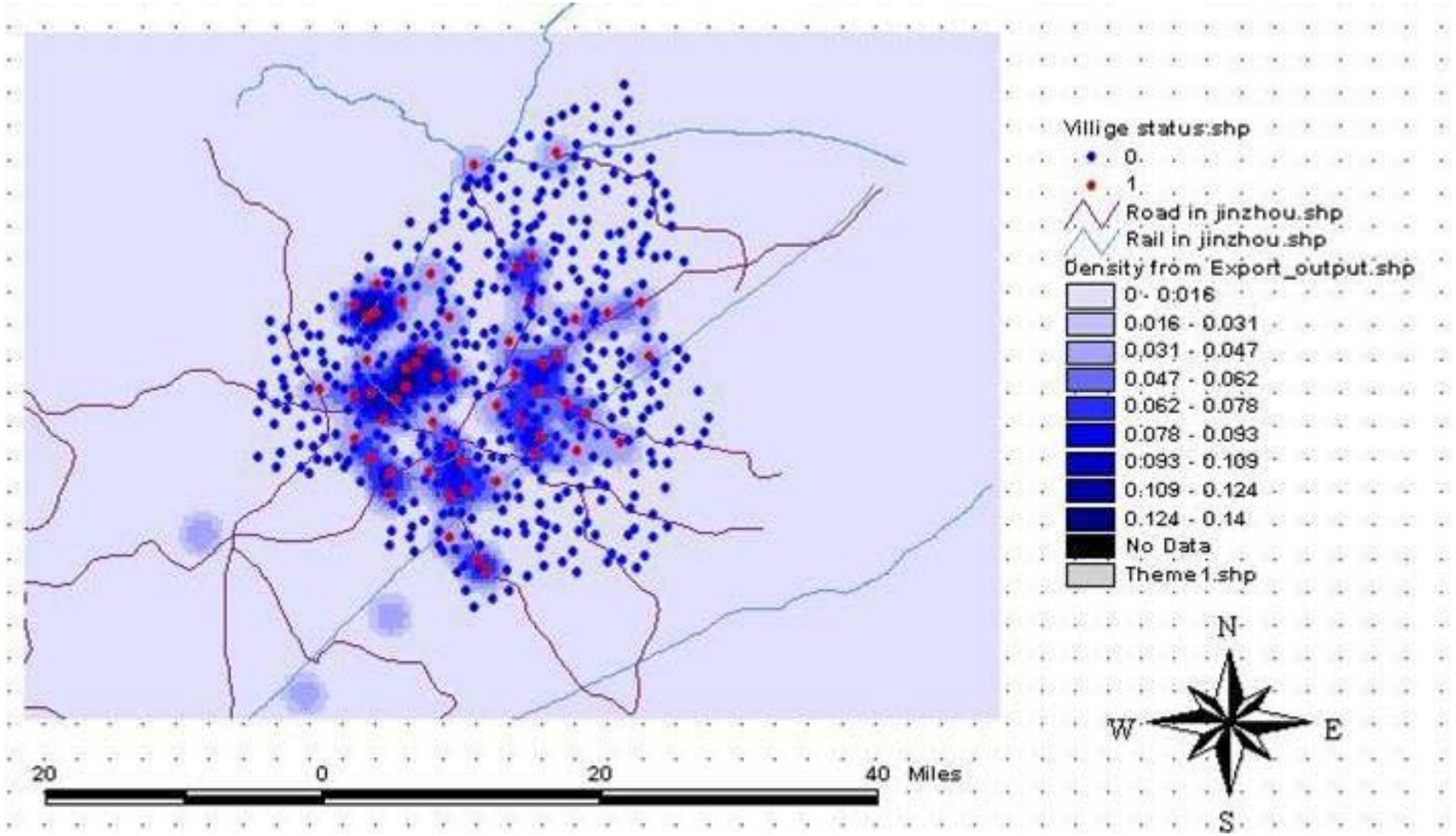
Material:

- All the village's(456) name and location;
- Affected village's(55) name and location;
- population of main town(29) in the county;
- main roads and railway;

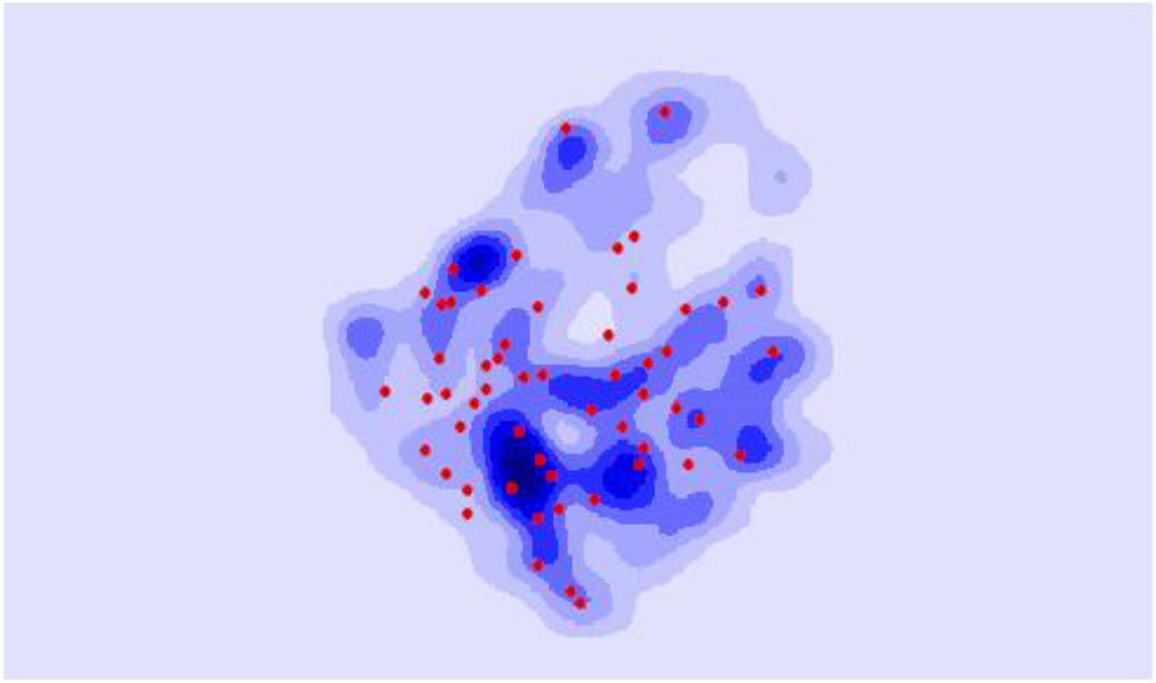
Method

- Plot the distribution of villages using “ArcView GIS”;
- Create a kernel density surface based on plotted point data;
- Use “STATA” to identify the relationship of the cases with risk factory, such as the distance from affected village to town, road and railway and population.

kernel density surface



density analysis of Phat



Villige status.shp
0
1
Density of phat.shp
0 - 0.009
0.009 - 0.019
0.019 - 0.028
0.028 - 0.037
0.037 - 0.046
0.046 - 0.056
0.056 - 0.065
0.065 - 0.074
0.074 - 0.083
No Data

20 0 20 40 Miles

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S

THANK YOU

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