



# Veterinary Epidemiological Bulletin Sri Lanka



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## Disease Outbreak Management

### 1.1 Introduction

*“Prevention is better than cure”.*

State Veterinarians who are empowered with authority under the Animal Disease Act No. 59 of 1992 should be able to prevent outbreaks of contagious diseases by primarily maintenance of acceptable herd immunity at vulnerable locations at all times. So our field Veterinarians at vulnerable give priority for implementing contagious disease control strategies. Usually after an outbreak of any economically important disease like Foot and Mouth Disease consequences can be dire. Outbreak can ruin the farming industry and cost millions of rupees. Great economic losses occur as the result of impaired general productivity and due to disruption of normal commercial activities caused by embargo on animal transport and closure of slaughter houses and interference of normal agricultural practices due to stoppage of milk collection and artificial inseminations.

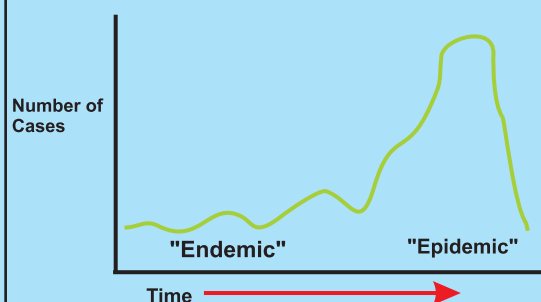
Apparently Veterinarians detect disease outbreaks all the time. It was a Veterinary Public Health Specialist who detected the Index case of 2001 UK Foot and Mouth Disease outbreak during a routine practice. In order to control this outbreak over 10 million sheep and cattle have been slaughtered. In Sri Lanka too almost all the outbreaks are detected by the Veterinary Surgeons though they are not always recorded

### What is an outbreak

An excess over the expected (usual) level of a disease within a geographical area at a particular time in a defined population is known as an outbreak. It could be a single case or several number of cases affecting one or more than one species.

The existing level of disease is referred as to as “endemic” and the level that exceeds endemic situation is known as “epidemic”.

### “ENDEMIC” vs. “EPIDEMIC”



**Objectives of Outbreak Investigation**

- To assess the extent or magnitude of the problem
- To know the involvement in terms of time, place and individuals /population
- To understand the conditions and factors responsible
- To identify the cause, and modes of transmission
- To determine the measures to control because of their importance in terms of morbidity, mortality, economic and social consequences and also in terms of the institutional image.
- To make recommendations to prevent recurrence

**Steps involved in Outbreak Investigation**

1. Verification of diagnosis
2. Confirmation of the aetiology / cause
3. Defining the population at risk
4. Rapid search for all cases and their characteristics
5. Data collection and analysis
6. Formulation of Hypothesis
7. Testing of Hypothesis
8. Evaluation ecological factors
9. Compiling the Report

**Disease Outbreak Management strategies**

1. Reduce contact rate.

It is an efficient way to limit the transmission of a disease. Different strategies are available.

- Isolation of diseases positive animals. e.g. Bovine Tuberculosis
- Tracing in-contact animals and quarantine the same.
- Contact distancing (movement restrictions, close live markets, ban animal show, exhibition etc...)

2. Reduce source of infection

Reducing the source of infection decrease the probability of disease transmission.

- Identification of cases for intervention by appropriate screening test. It affects both contact rate and transmission probability.
- Treatment / slaughter of disease positive animals.
- Identification and control of other infectious sources (contaminated fomites, carcasses)

3. Reduce Infectiousness

Infectiousness should be reduced in both magnitude and duration by containment and bio security measures.

4. Reduce susceptibility

Diseases susceptibility is reduced by vaccination and also treatment for other conditions that the animal would contract the disease. Example ; Infectious Bursal Disease.

5. Transmission interruption

Animal and animal products movement control from and to infected areas can intervene into the diseases propagation propagation cycle. Application of basic bio-security measures prevent the propagation of the infectious cycle.

6. Increase Herd immunity

It decrease the number of susceptible animals and thereby interrupt the disease propagation cycle

**Utilizing disease transmission dynamics in disease control**

Here the disease control strategies described above are analyzed upon the impact of disease transmission.

The Basic reproduction number ( $R_0$ ) measures the maximum reproductive potential for an infectious disease.

$$R_0 = cpd$$

The effective reproduction number  $R$  ;

$$R = R_0 \times (t) = cpdx(t)$$

Infection rate at time  $t$ :

$$I(t) = cpP(t)$$

Control Point	Control Strategy
Contact rate between an infected host and susceptible animals. ( $c$ )	Reduce contact rate
Probability of in-contact individual being infectious ( $p$ )	Reduce sources of infections (i.e. infectious individuals)
Transmission probability per contact ( $d$ )	Reduce infectiousness, reduce susceptibility, interrupt transmission
Duration of infectiousness ( $d$ )	Reduce infectiousness
Fraction of the population that is susceptible ( $x$ )	Increase herd immunity

**Importance of outbreak report writing**

In addition to above strategies of outbreak management, Diseases Control reports are useful for document the action, share new sights, as performances records ,to prevent future outbreaks, assist in investigation of similar outbreaks and evidence provided for legal issues. Outbreak reports are prepared at different stages ; preliminary, “on-going” , weekly and final / summary report to indicate the outbreak is resolved

## 2. Status of Livestock Diseases

### 2.1 Bovine Diseases

#### 2.1.1 Bovine Babesiosis

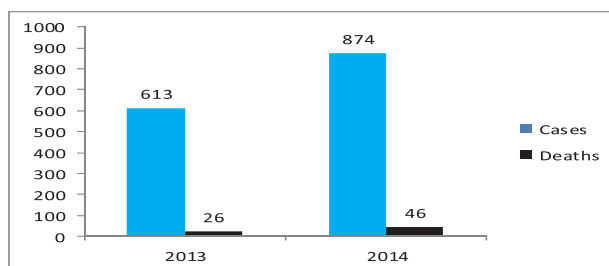
A total of 874 cases with 46 fatalities of Bovine Babesiosis have been reported during the first quarter of 2014. Total pre-immunization number in this period is 575. Out of that, 555 were from Badulla District and 20 from Colombo District. The comparison of this data with the year 2013 same quarter is indicated below.

The number of cases and deaths reported is remarkably high when compared with the previous year. This is a phenomena observed when active surveillance and control measures are introduced against an existing disease.

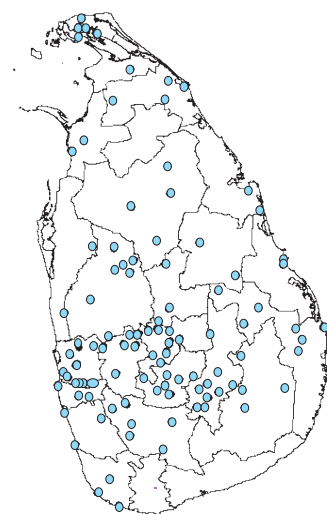
#### Prevalence and control measures of Bovine Babesiosis

Province	Cases	Deaths
Western	202	15
Eastern	192	1
Central	142	9
Uva	137	9
Sabaragamuwa	66	3
Northern	62	4
North Central	39	1
North Western	30	4
Southern	4	0
Total	874	46

Category	First Quarter	
	2013	2014
Pre-immunization	252	575
Cases	613	874
Deaths	26	46



#### Spatial Distribution of Bovine Babesiosis First Quarter 2014



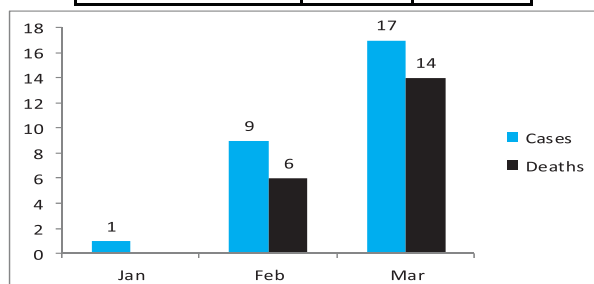
#### 2.1.2. Black Quarter

There were 24 cases of Black Quarter reported in 2014 first Quarter. Prophylactic vaccination was carried out in 8 districts at identified locations during this period.

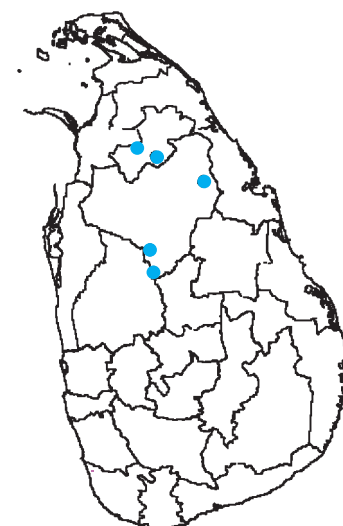
#### Disease occurrence and control measures against Black Quarter first quarter 2014

District	Vaccination
Kurunegala	7935
Anuradhapura	5503
Colombo	3500
Batticaloa	3498
Ampara	1791
Puttlam	756
Mannar	597
Trincomalee	580
Total	24160

VS Range	Cases	Deaths
Palagala	9	6
Horawupothana	6	6
Galnewa	5	5
Vavuniya	3	2
Mannar	1	0
Total	24	19



#### Spatial Distribution First Quarter 2014



### 2.1.3 Bovine Brucellosis :

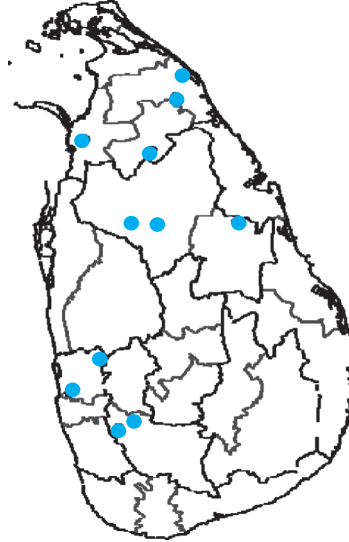
A total of 48 cases of Bovine Brucellosis have been reported during first quarter of 2014. The table below indicates the occurrence of cases in the same Veterinary Range during the same quarters of two consecutive years.

**Brucellosis Cases (Jan - Mar)**

#### Disease Occurrence and control measures against Bovine Brucellosis

	First Quarter	
	2013	2014
Vaccination (S-19)	294	108
RBPT	148	112
MRT	104	46
Cases	25	48

#### Spatial Distribution of Bovine Brucellosis



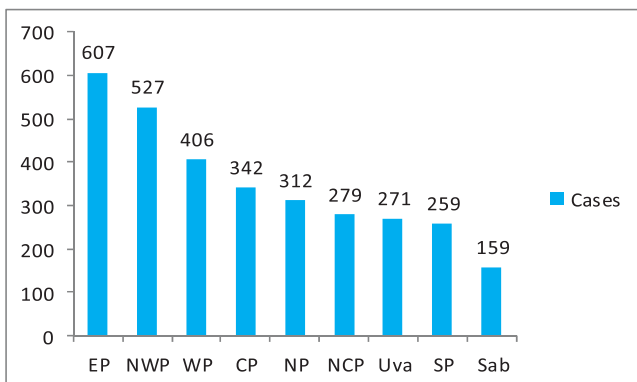
Veterinary Range	2013	2014
Kinniya	14	0
Kaduwela	1	0
Mannar	4	6
Musali	4	10
Siyambalanduwa	1	0
Oddusuddan	1	1
Trincomalee	0	3
Medirigiriya	0	2
Talawa	0	1
Tirappane	0	8
Murunkan	0	6
Puthukudiiruppu	0	2
Vavuniya South	0	1
Kiriella	0	2
Kuruwita	0	1
Mahara	0	1
Mirigama	0	4
Total	25	48

### 2.1.4 Mastitis :

In the first quarter, of 2014 a total of 3162 mastitis cases were reported among cattle. In comparison, year 2013 first quarter has recorded 3029 cases Further, 315 number of Caprine Mastitis cases have been reported in the first quarter 2014.

In addition to the issuance of intra mammary infection for treatment of mastitis, ABST were carried out by Veterinary Investigation Officers upon request of Veterinary Surgeons and a total of 268 ABST have been performed during this period.

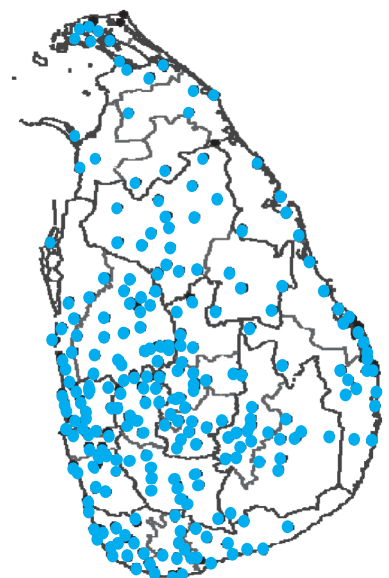
#### Provincial Distribution of Reported Cases of Mastitis



#### Mastitis Cases First Quarter (2014/2013)

Month	Cases	
	2014	2013
January	1065	958
February	1021	1075
March	1076	996
Total	3162	3029

#### Location of Cases of Mastitis First Quarter 2014



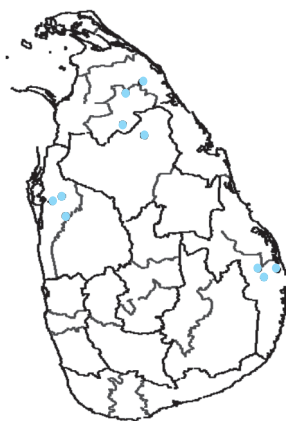
## 2.1.5 Foot and Mouth Disease

The FMD outbreak which originated from Northern Province in December 2013 and expanded to 7 Provinces (56 Veterinary ranges) during the first quarter of 2014

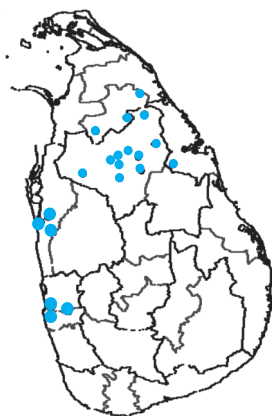
**Distribution of FMD Cases During First Quarter 2014**

Province	Affected VS Ranges	Cases	Deaths
North Central	Aralaganwila, Galenbindunuwewa, Horoupathana, Kahatagasdigiliya, Kebithigollawa, Kekirawa, Medirigiriya, Mihintale, Nochxhiyagama, Anuradhapura (Central), Padaviya, Rambewa, Thirappane	7728	196
Northern	Tellippalai, Kopai, Vaddukoddai, Mantai West, Mantai East, Oddusuddan, Tunukkai, Vavuniya, Vavuniya North, VavuniyaSouth, Cheddikulam.	6945	65
Eastern	Ampara, Uhana, Sammanturai, Kalmunai, Padavisripura, Kuchchuvvely, Kantale, Trincomalee.	2209	85
North Western	Maho, Pannala, Kotawehera, Galgamuwa, Puttlam, Vanathavillu, Karuwalagaswewa, Anamaduwa, Serukele, Mahakumbukkadawala.	1234	95
Western	Biyagama, Colombo, Dompe, Kaduwela, Katana, Mahara, Negombo Padukka, Welisara.	706	328
Sabaragamuwa	Ruwanwella, Yatiyantota	8	
Central	Dambulla	3	1
Southern	Karandeniya	3	
	Total	18836	770

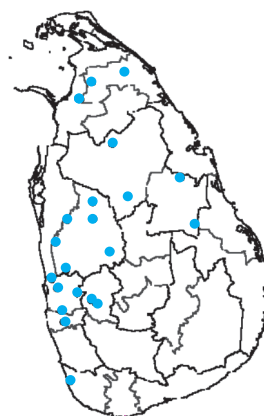
**Mbntly Distribution of FMD**



January

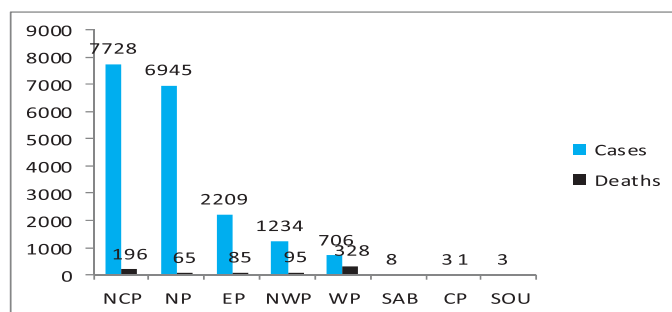
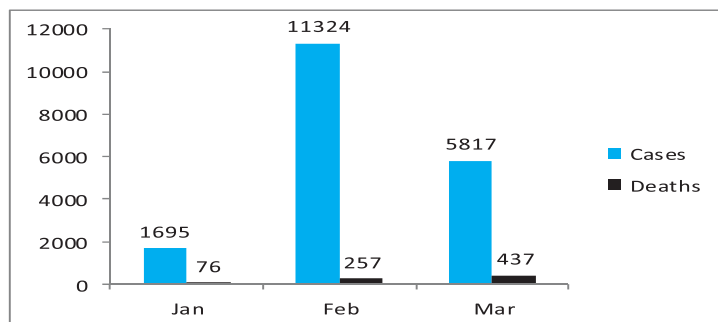


February



March

**Reported Cases and Deaths of FMD**



## 2.2 Caprine Diseases

### 2.2.1 Contagious Pustular Dermatitis :

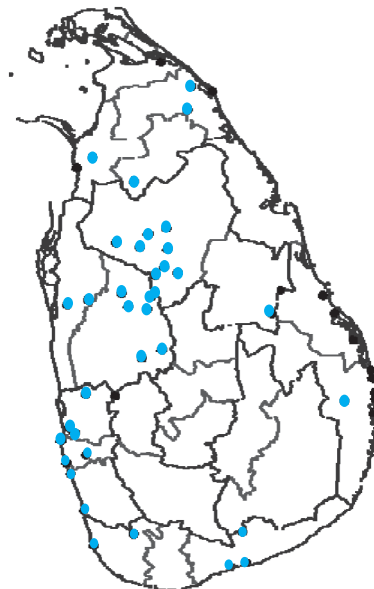
During the first quarter 2014, 481 cases of Contagious Pustular Dermatitis has been reported with 8 deaths.

**Occurrence of CPD in the First Quarter 2014**

**Reported Cases and Deaths Jan-Mar 2014**

Month	Cases	Deaths
Jan	153	4
Feb	243	3
Mar	87	1
Total	483	8

Province	Cases	Deaths
North Central	131	4
Eastern	99	0
Northern	94	0
North Western	80	1
Southern	37	1
Western	26	0
Sabaragamuwa	12	2
Uva	2	0
Central	2	0
Total	483	8



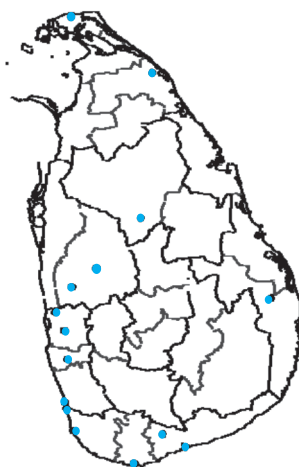
### 2.3 Rabies :

In the first quarter, 2014 , rabies has been reported in livestock (43 cases) as well as in dogs (09 cases). Sri Lanka has been donated with 300,000 doses of anti Rabies vaccines by OIE and by the end of the first quarter 2014, a total of about 135,000 doses have been utilized for field level dog immunization program through VS offices in the country.

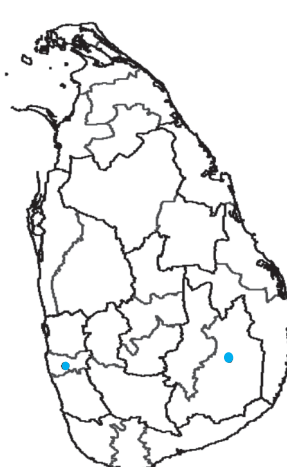
**Rabies Vaccination First Quarter 2014**

Province	Vaccination
Eastern	25875
North Western	24149
Northern	21987
Uva	20170
Sabaragamuwa	18090
North Central	11477
Southern	9158
Western	3462
Total	134368

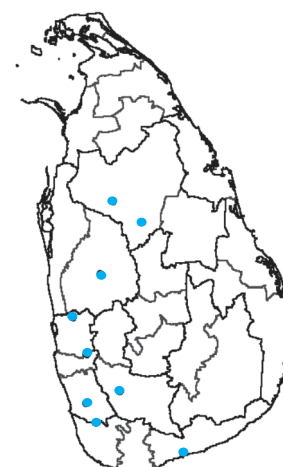
**Geographical Distribution of Rabies Cases in First Quarter 2014**



**Bovine - 34**



**Caprine -10**



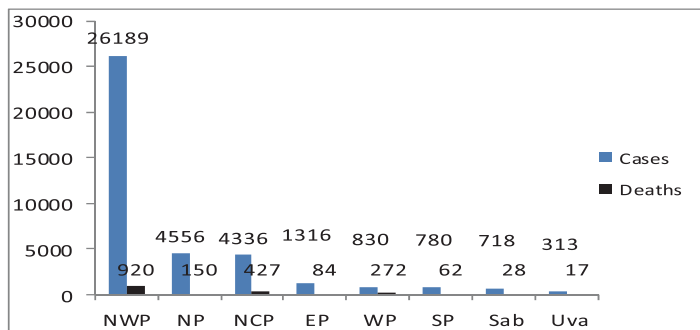
**Canine -09**

## 2.4 Poultry Diseases

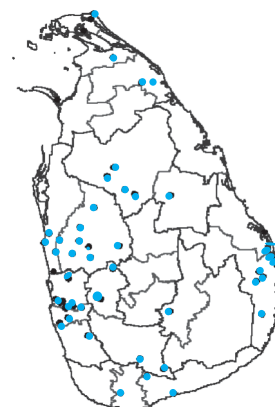
### 2.4.1 Gumboro Disease :

The first quarter 2014 reported 39,038 cases of Gumboro leading to 960 deaths. Prevalence is highest in the North Western Province as most of the reported cases were detected in North Western Province where the poultry population too remains as the highest in the country.

**Occurrence of Gumboro : First Quarter 2014**



Month	Cases	Deaths
January	14964	802
February	11924	455
March	12150	703
<b>Total</b>	<b>39038</b>	<b>1960</b>



### 2.4.2 Newcastle disease (NCD) :-

A total of 5844 cases and 652 deaths have been reported during the first quarter 2014. The estimated poultry population is 18,000,00, and the disease prevalence is 325 per 100,000 birds.

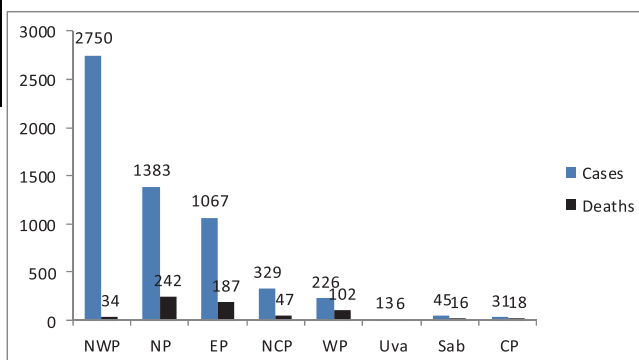
**Prevalence of NCD**

	2014	2013
Cases	5844	9827
Deaths	652	1634
Vaccination	536990	667922

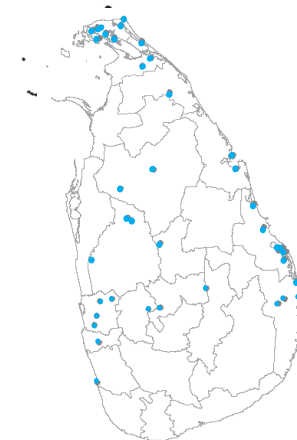
**Cases of NCD in 2014**

Month	Cases	Deaths
January	3018	252
February	1536	192
March	1290	208
<b>Total</b>	<b>5844</b>	<b>652</b>

**Occurrence of NCD at Provincial Level**



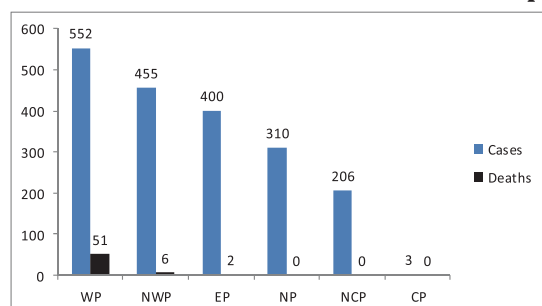
**Location of NCD Cases First Quarter - 2014**



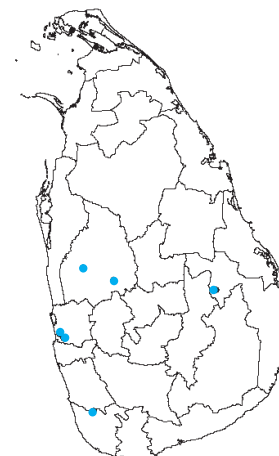
### 2.4.3 Salmonellosis:

A total of 1922 cases of Salmonellosis have been reported during the period under review; 59 birds succumbed to the disease.

**Reported Cases and Deaths of Salmonellosis**



Month	Cases	Deaths
January	1081	46
February	54	4
March	787	9
<b>Total</b>	<b>1922</b>	<b>59</b>

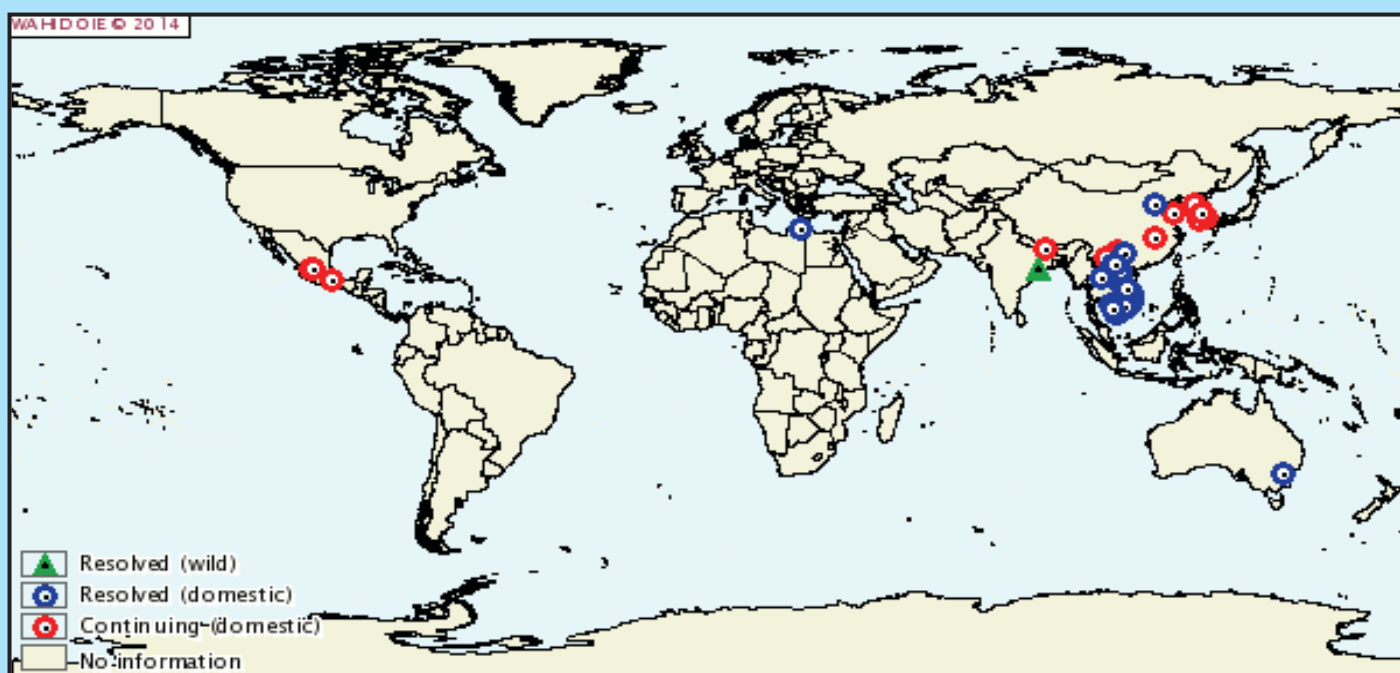


### 3. Highly Pathogenic Avian Influenza

#### 3.1 Highly Pathogenic Avian Influenza Surveillance Program Jan - Mar 2014

Se. No.	District	Commercial Poultry		Pooled dropping and cloacal swabs	
		No. Tested Serum Samples	Results	No. tested for AIV *	Results
1.	Badulla	59	(-) ve	-	-
2.	Chilaw	15	(-) ve	-	-
3.	Homagama	90	(-) ve	15	(-) ve
4.	Jaffna	30	(-) ve	128	(-) ve
5.	Trincomalee	15	(-) ve	-	-
	<b>Total</b>	<b>209</b>		<b>143</b>	

#### 3.2 Global situation of HPAI outbreaks: Jan - Mar 2014



Virus	Country
H7N2	Australia
H5N1	Cambodia, China (People's Rep. of), India, Libya, Nepal, Vietnam
H5N2	China (People's Rep. of)
H5N8	Korea (Rep. of)
H5N6	Laos

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