Flock characteristics at farms with avian influenza H5N1 in 2021/2022

At the time of writing, 28 and 35 NVWA specialist team visits had been conducted due to suspicion of avian influenza (AI) in the fourth quarter of 2021 and first quarter of 2022, respectively. Table 1 gives an overview of the past history of the flocks at the poultry farms visited by the specialist team, whereby the PCR test was positive for AI type H5. It also indicates which clinical abnormalities were detected and which abnormalities were found upon necropsy. There was no production drop in layers in the days prior to testing, and there was only a slight decrease in feed and water intake. The cases were reported mainly because of increased losses in a specific section of the house. No specific abnormalities were found at necropsy, yet lesions of diverse origin could be found. The necropsy results were often 'negative', showing only local and random haemorrhage in some animals. Localised increased losses were also the reason for reporting in broilers and turkeys, as well as a limited number of seriously ill animals, again with lesions of diverse origin and often 'negative' necropsy results. In the case of ducks, a serious decrease in feed and water intake suggested the presence of the H5N1 virus. The AI PCR was negative in the duck cases of increased losses without decreased feed intake.

Visiting date	Age	Losses*	Losses	Proventriculus**	Skin**	Cyanosis and/or haemorrhage in parts of the head	Cyanosis and/or haemorrhage in feet	Intestinal haemorrhage	Swollen heads	Respiratory signs	Neurological signs	Decreased water/feed intake	Production drop (%)				
													none	0-25	25-50	50-75	75-100
Layer breeders																	
28/02/2022	33 wks	<0.5%	spread	-	-	-	-	-	-	+	-	+	-				
Total percentage positive				**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**100%**	**0%**	**100%**	**0%**				
Layer pullets																	
03/01/2022	15 wks	<0.5%	local	-	+	+	+	-	+	+	-	-	n.a.				
31/01/2022	12 wks	<0.5%	local	-	-	+	+	-	-	-	-	-	n.a.				
23/02/2022	17 wks	<0.5%	only 5 animals	+	+	-	+	-	-	+	+	+	n.a.				
Total percentage positive				**33%**	**67%**	**67%**	**100%**	**0%**	**33%**	**67%**	**33%**	**33%**					
Layers																	
25/10/2021	50 wks	<0.5%	local	+	-	-	-	-	-	-	-	-	-				
07/11/2021	48 wks	<0.5%	local	-	-	-	-	-	-	+	-	-	-				
21/11/2021	22/42/83 wks	<0.5%	local	-	-	-	-	-	-	-	-	+	-				
22/01/2022	54 wks	<0.5%	local	+	-	+	-	-	-	-	-	-	-				
08/02/2022	48 wks	>0.5%	unknown	-	-	-	-	-	0	0	0	+	0				
14/02/2022	36/70 wks	>0.5%	local	-	-	-	-	0	0	0	0	-	-				
15/02/2022	80 wks	<0.5%	local	-	-	+	-	-	-	-	+	-	-				
05/03/2022	61/66/67/68 +7 wks	>0.5%	local	-	-	-	-	-	-	+	-	-	-				
10/03/2022	85 wks	<0.5%	local	+	-	+	-	-	+	+	-	-	-				
Total percentage positive				**33%**	**0%**	**33%**	**0%**	**0%**	**11%**	**33%**	**11%**	**22%**	**0%**				
Reproduction stock (meat)																	
01/02/2022	52/53 wks	<0.5%	unknown	-	-	-	-	-	-	-	-	0	0				
Total percentage positive				**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**				
Broilers (regular)																	
29/10/2021	4.5 wks	<0.5%	unknown	0	0	+	+	0	0	0	0	0	n.a.				
14/11/2021	5 wks	0	unknown	0	0	0	0	0	0	0	0	0	n.a.				
16/12/2021	6 wks	>0.5%	spread	-	-	-	-	-	+	+	-	-	n.a.				
03/01/2022	5 wks	>0.5%	local	-	+	+	+	-	-	+	+	-	n.a.				
23/01/2022	3.5 wks	<0.5%	spread	-	-	-	-	-	-	-	+	+	n.a.				
27/02/2022	6 wks	<0.5%	local	+	-	-	+	-	-	-	-	-	n.a.				
01/03/2022	5 wks	>0.5%	spread	-	-	-	-	-	-	-	+	-	n.a.				
Total percentage positive				**14%**	**14%**	**29%**	**43%**	**0%**	**14%**	**29%**	**43%**	**14%**					
Broilers (slower growth)																	
23/01/2022	7 wks	<0.5%	local	-	-	+	-	+	-	+	-	-	n.a.				
Total percentage positive				**0%**	**0%**	**100%**	**0%**	**100%**	**0%**	**100%**	**0%**	**0%**					
Duck meat breeders																	
24/01/2022	25 wks	none	n.a.	-	-	-	-	-	-	-	-	+				+	
02/02/2022	42/53/61/86 wks	<0.5%	unknown	0	0	0	0	0	0	0	0	+				+	
Total percentage positive				**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**100%**				**100%**	
Meat ducks																	
03/11/2021	4 wks	<0.5%	unknown	-	-	-	-	-	-	-	+	+	n.a.				
05/11/2021	5.5/2 wks	none	n.a.	-	-	-	-	-	-	-	-	+	n.a.				
30/01/2022	21/12/4 wks	<0.5%	only 2 animals	-	-	-	-	-	-	-	-	+	n.a.				
04/02/2022	4 wks	<0.5%	spread	0	0	0	0	0	0	+	+	+	n.a.				
Total percentage positive				**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**25%**	**50%**	**100%**					

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Table 1. Flock characteristics at the farms with avian influenza H5N1 in 2021/early 2022 (see explanation and continuation of table on next page)

Table continuation

Visiting date	Age	Losses*	Losses	Proventriculus**	Skin**	Cyanosis and/or haemorrhage in parts of the head	Cyanosis and/or haemorrhage in feet	Intestinal haemorrhage	Swollen heads	Respiratory signs	Neurological signs	Decreased water/feed intake	Production drop (%)				
													none	0-25	25-50	50-75	75-100
Turkeys																	
20/12/2021	17 wks	>0.5%	spread	-	-	-	-	-	-	+	-	-	n.a.				
19/02/2022	10 wks	>0.5%	spread	0	0	0	0	0	0	+	+	+	n.a.				
27/02/2022	21 wks	0	unknown	0	0	0	0	0	0	0	0	0	n.a.				
02/03/2022	3/10/15 wks	<0.5%	unknown	-	-	-	-	-	-	-	-	+	n.a.				
Total percentage positive				**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**50%**	**25%**	**50%**					
Backyard poultry																	
05/11/2021	various	>0.5%	5/50	+	-	+	-	-	-	-	-	0	n.a.				
Total percentage positive				**100%**	**0%**	**100%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**					

+ = yes; - = no; 0 = unknown
* Actual percentage of losses on day of reporting
** Haemmorrhage

Increase in clinical outbreaks of M.g. in the commercial poultry sector

Monitoring and prevention of *Mycoplasma gallisepticum* (M.g.) in breeding animals is covered by EU legislation (Animal Health Regulation, EU 2019/2035). Monitoring of M.g. at layer farms and farms housing meat turkeys is established at the national level in the Regeling houders van dieren (Rules for Animal Husbrandry). An infection is generally harmful for the commercial poultry sector. In breeding animals, an M.g. infection results in the eggs and the offspring not being suitable for sale.

Early Warning System (EWS)

There has been low prevalence of M.g. throughout the commercial poultry sector over the past decade. An increased number of clinical outbreaks was reported to GD via the EWS for M.g. and via the M.g. surveillance programme from the fourth quarter of 2021 up to January 2022, in layers, turkeys and recently also in breeding flocks (see figures 1 and 2).

Monitoring of M.g.

The monitoring results show that clinical outbreaks of M.g. have also regularly been detected in backyard poultry (figures 1 and 2).

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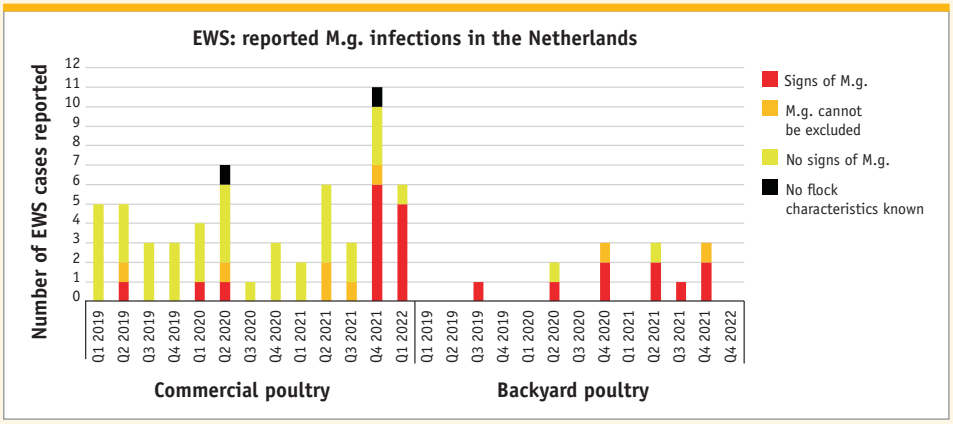

Figure 1. Overview of EWS reports of M.g. in commercial poultry and backyard poultry (2019 through 1st quarter of 2022)

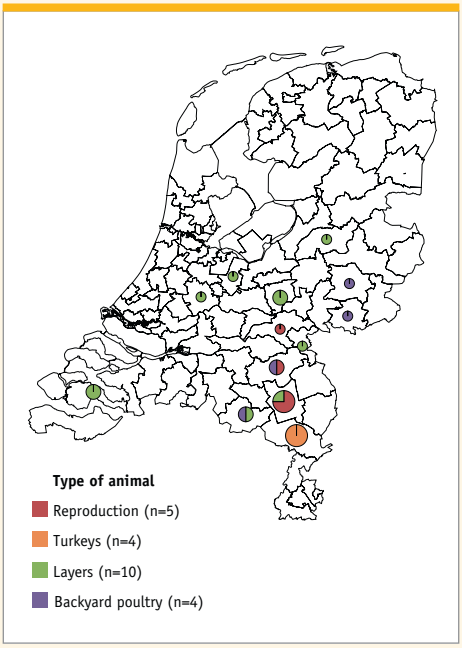

Figure 2. Geographic overview of M.g.-positive poultry flocks (commercial and backyard) in the period from 2021 through 1st quarter of 2022

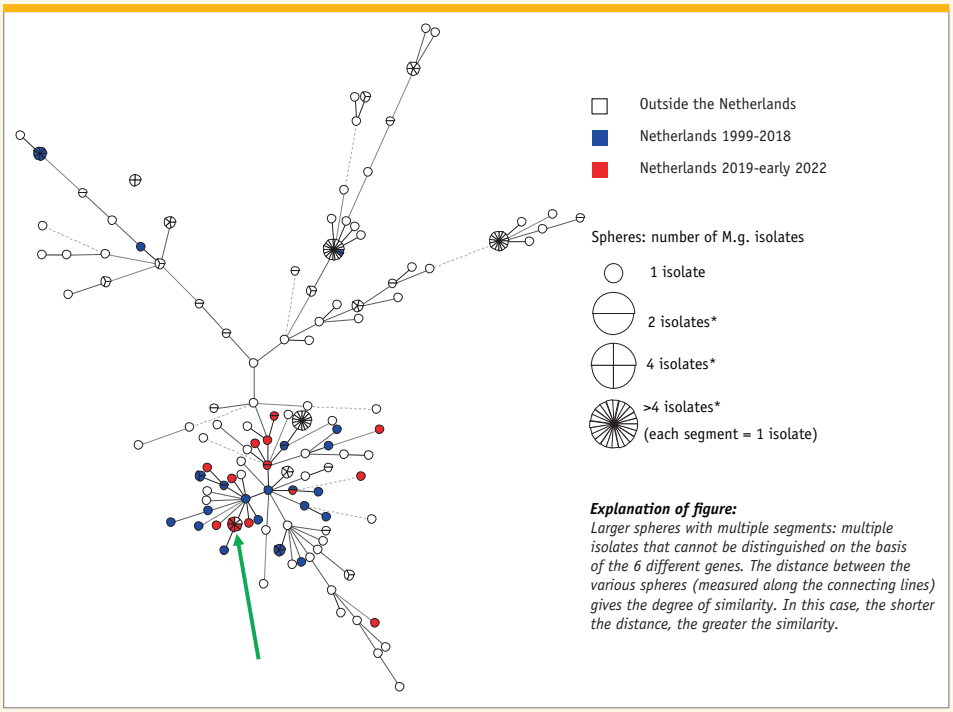

Figure 3. Overview of M.g. genotypes found in various types of poultry in the Netherlands in the period from 2019 through January 2022 (Source: GD)

Genotyping of M.g. strains

Genotyping of M.g. strains derived from several geographic regions (including the Netherlands) has shown a large variety of M.g. strains to be involved in M.g. outbreaks (Figure 3). Genotyping of M.g. strains over the period from 2019 to early 2022 shows that there is a high level of diversity in M.g. strains (see red spheres in Figure 3). However, several recent M.g. outbreaks all involved the same genotype, which may suggest an epidemiological relationship (see green arrow in Figure 3).

Previous genotyping of M.g. strains showed how the same genotypes can be involved in M.g. outbreaks in various types of commercial poultry (as well as in M.g. outbreaks in commercial and backyard poultry). The latter fact reinforces the necessity of a widescale approach to M.g. in commercial poultry farming, and the continued monitoring of M.g. outbreaks in backyard poultry.

There is a lot of variation in the genotypes involved in M.g. outbreaks in Dutch poultry. However, the same genotype was involved in the most recent M.g. outbreaks at a meat turkey farm and four broiler breeding farms (4th quarter of 2021 through January 2022) (see red circle by green arrow, each segment is a strain involved in an outbreak). Outside the Netherlands, this genotype was also found twice.

Insight into Erysipelas strains in Dutch poultry

Erysipelas is caused by the bacteria *Erysipelothrix rhusiopathiae*. This bacteria is assumed to be generally present in the environment. In chickens, erysipelas causes skin abnormalities and increased losses due to peritonitis and sepsis. Erysipelas is detected at approximately five to ten poultry farms annually, particularly at layer farms (see Figure 4).

Vaccination against erysipelas

Due to the economic interests and the risk of people becoming infected, flocks are often vaccinated against erysipelas once an infection has been detected, to prevent new outbreaks. Previous field studies have shown a continued risk of losses caused by erysipelas, even after vaccination. A possible cause of erysipelas occurring despite vaccination is that the vaccine offers inadequate protection. Field studies must now determine whether there is a possibility of improving the autovaccine, based on the genetic information derived from 46 erysipelas isolates from Dutch farms.

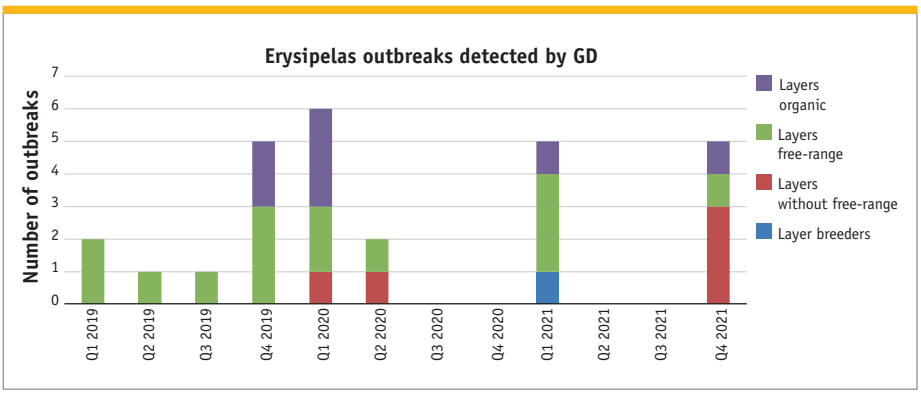

Figure 4. Monitoring data for erysipelas (2019 through 2021)*
With respect to layer type (free range/non-free range), see remarks under the animal health barometer.

Animal health barometer for poultry 2021

Disease/disorder/ health characteristic	Brief description (numbers at farm level)	1st quarter 2021	2nd quarter 2021	3rd quarter 2021	4thquarter 2021	Trend (over 2 years)
Execution decree (EU) 2018 /1882 of the Animal Health Regulation (AHR) (EU) 2016 /429 (Category A disease)						
Avian influenza in the Netherlands (H5/H7) (Source: GD, WBVR, national government)	**Highly pathogenic AI (H5/H7):**	**H5N8:** 2 farms, 2x backyard poultry	**H5N8:** 1 farm, 2x backyard poultry	**H5N8:** 1x backyard poultry	**H5(N1):** 9 farms, 11x backyard poultry	↑
	Serology (first detection in flock): *(Antibodies for H5/H7)*	**H5N2:** 1 farm	Not detected	Not detected	Not detected	↓
ND in the Netherlands (Source: GD, OIE)	Commercial poultry	Not detected	Not detected	Not detected	Not detected	-
Execution decree (EU) 2018 /1882 of the Animal Health Regulation (AHR) (EU) 2016 /429 (Categories B through E)						
Campylobacteriosis	No data available	-	-	-	-	N/A
Avian influenza in the Netherlands (H5/H7) (Source: GD, WBVR, national government)	**Low pathogenic AI (H5/H7):**	Not detected	Not detected	Not detected	Not detected	-
Avian mycoplasmosis (Source: GD)						
M. gallisepticum[A]	**Serological monitoring by GD:**					
	Reproduction sector:	0 farms	0 farms	0 farms	1 farm	-
	Layer pullets:	0 farms	0 farms	0 farms	0 farms	-
	Layers:					
	- *not vaccinated and infected:*	0 farms	5 farms	3 farms	3 farms	↑
	- *vaccinated and infected:*	1 farm	4 farms	2 farms	5 farms	-
	Turkeys:	0 farms	0 farms	0 farms	3 farms	-
	Reports in EWS[C] based on positive serology and/or voluntary PCR testing:					
	Reproduction sector:	-	-	-	1 farm	-
	Layers:	2 farms	6 farms	3 farms	7 farms	-
	Turkeys:	-	-	-	3 farms	-
	Backyard poultry	-	3 cases	1 case	3 cases	-
M. meleagridis (Source: GD)		N/A	N/A	N/A	N/A	
Salmonellosis (non-zoonotic salmonella) (Source: GD)						
Salmonella arizonae		N/A	N/A	N/A	N/A	
Salmonella Gallinarum (SG)		Not detected	Not detected	Not detected	Layers: 1 farm	-
Salmonella Pullorum (SP)		Not detected	Not detected	Layers: 1 farm	Not detected	-
West Nile fever	Not monitored	N/A	N/A	N/A	N/A	N/A
Article 2.1 Designation of animal diseases 'Rules for Animal health' of the Dutch Animal Act						
Avian chlamydiosis (Source: GD)		Not detected by GD	Not detected by GD	Not detected by GD	Not detected by GD	-

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Table continuation

Disease/disorder/ health characteristic	Brief description (numbers at farm level)	1st quarter 2021	2nd quarter 2021	3rd quarter 2021	4thquarter 2021	Trend (over 2 years)
Article 2.2. Designation of zoonoses 'Rules for Animal health' of the Dutch Animal Act						
Salmonellosis (zoonotic salmonella) (at flock level) (Source: NVWA)						
S. Enteritidis	Reproduction:	1 flock	2 flocks	0 flocks	0 flocks	↓
	Layer pullets:	0 flocks	0 flocks	0 flocks	0 flocks	-
	Layers:	5 flocks	8 flocks	14 flocks	6 flocks	-
S. Typhimurium	Reproduction:	3 flocks	0 flocks	2 flocks	0 flocks	-
	Layer pullets:	0 flocks	0 flocks	0 flocks	0 flocks	-
	Layers:	0 flocks	0 flocks	0 flocks	0 flocks	-
Other types of salmonella (*S.* Hadar, *S.* Infantis, *S.* Java, *S.* Virchow)	Reproduction:	0 flocks	0 flocks	0 flocks	1 flock (S.I.)	-
Other OIE-list poultry diseases in the Netherlands subject to compulsory notification						
Infectious laryngotracheitis (ILT) (Source: GD; EWS)	**Reported in EWS[C]:**					
	Layer breeders:	-	-	-	1 farm	-
	Broiler breeders:	-	-	-	1 farm	-
	Broilers:	1 farm	-	3 farms	-	-
	Backyard poultry:	1 case	1 case	1 case	1 case	-
M. synoviae[B] (Source: GD)	**Serological monitoring and/or dPCR by GD:**			**% of positive farms versus farms tested**		
	Grandparent stock (incl. pullets) (meat):	0%	0%	0%	0%	-
	Broiler breeder pullets:	4%	24%	0%	9%	-
	Broiler breeders:	11%	31%	38%	19%	-
	Grandparent stock (incl. pullets) (laying)	0%	0%	0%	0%	-
	Rearing layers:	0%	0%	0%	11%	-
	Layer breeders:	3%	2%	10%	16%	↑
	Layer pullets:	27%	11%	21%	14%	↓
	Layers:	73%	74%	71%	66%	-
	Turkeys:	19%	4%	17%	17%	↑
Infectious bronchitis (IB) (Source: GD)	**Types most commonly detected by GD:**					
	Broilers:	D388	D388	D388	4-91	
	Layers:	4-91/D181	D181	4-91	4-91	
Gumboro (IBD) (Source: GD; EWS)	**Reported in EWS[C]:**					
	Broilers:	5 farms	6 farms	2 farms	2 farms	↓
	Backyard poultry:	-	-	1 case		-
Turkey Rhinotracheitis (TRT) (Source: GD)	**Detected by GD:**					
	Grandparent stock (meat):	-	-	1 farm	-	
	Broilers:	2 farms	6 farms	3 farms	2 farms	
	Layers:	1 farm	-	-	-	
	Meat turkeys:	-	-	-	1 farm	

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Table continuation

Disease/disorder/ health characteristic	Brief description (numbers at farm level)	1st quarter 2021	2nd quarter 2021	3rd quarter 2021	4thquarter 2021	Trend (over 2 years)
Other poultry diseases						
Erysipelas *(Erysipelothrix rhusiopathiae)* (Source: GD)	**Detected by GD:**					
	Layer breeders:	1 farm	-	-	-	-
	Layers:	4 farms	-	-	5 farms	-
Histomonosis (Source: GD)	**Detected by GD:**					
	Reproduction (meat sector):	8 farms	-	4 farms	3 farms	
	Reproduction (layer sector):	-	-	2 farms	-	
	Layer pullets:	2 farms	2 farms	-	1 farm	
	Layers:	-	2 farms	3 farms	1 farm	
	Backyard poultry:	-	-	1 case	-	
Avibacterium paragallinarum (Source: GD; EWS)	**Reported in EWS[C]:**					
	Layers:	3 farms	4 farms	3 farms	7 farms	-
	Backyard poultry:	2 cases	6 cases	6 cases	3 cases	↑
Pasteurella multocida (Source: GD)	**Detected upon necropsy:**					
	Layer pullets:	1 farm	-	-	-	-
	Layers:	2 farms	-	2 farms	7 farms	-

In Figure 4 and in the barometer, the housing type is used as registered with GD. For free range and organic farms, this does not necessarily mean that the animals actually had free range access at the time of the finding. Free range may be denied for veterinary reasons. For example, in the context of AI prevention, there has been a mandatory confinement for all poultry in the following periods:

- February 12, 2020 to April 29, 2020.
- From October 23, 2020 to June 19, 2021 (parts of Overijssel, Gelderland, North Brabant and Limburg), June 30, 2021 (parts of Drenthe) or July 6, 2021 (rest of the Netherlands).
- From October 26, 2021 (still ongoing at the time of publication of this flyer).

↑ Increase or strong increase
↑ Limited increase
– Situation unchanged
↓ Limited decrease
↓ Decrease or strong decrease

A Based on serological monitoring
B Based on serological monitoring and/or the differentiating M.s.-PCR
C Early Warning System

Monitoring ANIMAL HEALTH

Animal health monitoring

Since 2002, Royal GD has been responsible for animal health monitoring in the Netherlands, in close collaboration with the veterinary sectors, the business community, the Ministry of Agriculture, Nature and Food Quality, vets and farmers. The information used for the surveillance programme is gathered in various ways, whereby the initiative comes in part from vets and farmers, and partly from Royal GD. This information is fully interpreted to achieve the objectives of the surveillance programme – rapid identification of health issues on the one hand and monitoring trends and developments on the other. Together, we team up for animal health, in the interests of animals, their owners and society at large.

GD2265/04-22