

Epidemiological and Genetical Studies in Norwegian Pig Herds

I. Design of a Disease Recording System

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Lingaas, F. and K. Rønningen: Epidemiological and genetical studies in Norwegian pig herds. I. Design of a disease recording system. Acta vet. scand. 1990, 31, 243–249. – The study was based on 70 pig herds in the south-eastern part of Norway during the period from 1984 to 1986. The purpose was to design a health card system based on individual disease records covering diseases in sows, piglets and slaughter pigs. It is concluded that individual health records on a herd basis may well be suited for use in epidemiological and genetical studies of disease frequencies and disease resistance. Feedback of results to farmers and veterinarians seems to be important for satisfactory follow-up in the herds.

swine; diseases; preventive veterinary medicine; health cards.

Introduction

Sufficient information on disease patterns in livestock is a prerequisite for adequate disease control at the herd level. A system for recording diseases would therefore be of help in disease control in pig herds. Individual health recording has been performed with good experiences in Norwegian cattle (*Solbu* 1983), but the authors are not aware of any earlier studies based on individual health records in Norwegian pig populations. A system of disease recording in pigs based on health cards was evaluated in a project started in Hedmark county in the end of 1983. In Hedmark combined pig and grain farming is a common husbandry practice. The purpose of the project was to perform epidemiological and genetical studies in the pig herds, and to design a suitable health card for practical use in the herds. This paper will mainly deal with the practical problems associated with disease recording, feed-back routines and use of disease records.

Material and methods

Disease recordings

In 1983 disease recording was started in 70 herds in which herd performance was already being recorded (*Anon.* 1986). Animals used for breeding were marked with individual numbers for identification purposes, and performance criteria such as the number of piglets born (dead/alive), number of piglets alive at 3 weeks etc., were recorded and reported to a central unit. The mean number of sows was 25 in the investigated herds, which is somewhat higher than the overall mean of herds on recording performance in Norway ($n = 18$). Two different types of health cards were produced, one type being distributed to half of the farms and the other type to the other half. One type, the "individual card", was designed as an individual card for each sow, similar to the one used with dairy cattle (*Solbu* 1983). The second type, the "herd card" (Fig. 1a), was designed for individual entries on a single herd card.

DISEASES OF THE SOW									DISEASES IN PIGLETS						NOTES	
SOW NO.	DATE	HORMONE TREATM.	DYSTOCIA	MMA	MASTITIS	METRITIS	ANDREXIA	OTHER DIS.	DIARRHOEA			ARTHRITIS	RESP. DIS.	OTHER DIS.		NO.
									NEON.	3WEEK	WEAN.					
CODE NO.:	5-9	10	11	12	13	14	15-29	30	31	32	33	34	35-50			

Figure 1a. The herd health card used in the disease recording project. All disease codes are shown in Table 1.

Both designs included separate columns for the most common diseases, while less frequent diseases had number-codes. Recorded diseases and disease codes are given in Table 1.

The herds were visited 4 times a year by the same person. Disease-records and information on performance, management and hygiene was collected.

Disease reports

Disease frequencies were expressed as "Number of treatments per 100 sows during one year" and derived in the following way:

$$\frac{\text{No. of rec. treatments} \times 100 \times 365}{\text{No. of sows in the herd} \times \text{Period length in days}}$$

Disease reports were sent to farmers and veterinarians. The farmers were notified of the disease frequency in their own herd compared to the overall disease frequency. This information was given for the previous 3-month-period and for the previous year. The veterinarians received reports on all herds.

Evaluation by farmers and veterinarians

In connection with any health card system it is important to know the extent to which the different disease-categories are actually reported. Questionnaires were sent to all the 70 farmers and the 10 veterinarians who had participated in the project, to get an evaluation of the health card system.

Results

The herd card was preferred over the individual card by both farmers and veterinarians. An important disadvantage of the individual card is that in large pig herds, there was a rapid accumulation of considerable numbers of cards due to the high turnover rate of animals. It is also the view of both veterinarians and farmers that the herd card gave the best overview of herd disease problems. The percentage of diseases recorded on the herd cards also tended to be higher than on the individual cards.

Disease recording on an individual basis may be hampered by poor identification systems. In most herds participating in the

DATE	SOW NO.	DISEASES OF THE SOW							DISEASES IN PIGLETS					DISEASES IN FATTENERS					NOTES			
		DYSTOCIA	MMA	MASTITIS	METRITIS	ANDREXIA	NONSP. FEVER	OTHER DIS.	DIARRHOEA		ARTHRITIS	SKIN DIS.	RESP. DIS.	OTHER DIS.	CONGEN. DEF.	NO. OF ANIMALS	DIARRHOEA	RESP. DIS.		HOOF-/LEG DIS.	OTHER DIS.	
									NEON.	31 WEEK												
CODE NO.:	1	2	3	4	5	6	7-20	30	31	32	33	34	35	36-43	50	51	52	53-57				

Figure 1b. The herd health card recommended for future use. All disease codes are shown i Table 2.

Table 1. Diseases recorded in the project on health cards in pigs.

Hormone treatment of the sow

- Code 5. HCG + Oestradiol
- Code 6. HCG + PMSG
- Code 7. Prostaglandines for birth induction
- Code 8. Other hormone treatments

Diseases of the sow

- Code 10. Dystocia
- Code 11. MMA-syndrome
- Code 12. Mastitis
- Code 13. Metritis
- Code 14. Unspecific reduced appetite
- Code 15. Abscesses/phlegmons
- Code 16. Agalactia
- Code 17. Diarrhoea
- Code 18. Abortion
- Code 19. Hoof/joint diseases
- Code 20. Deficiency diseases
- Code 21. Respiratory diseases
- Code 22. Erysipelas
- Code 23. Skeletal/muscular disease
- Code 24. Urinary tract diseases
- Code 25. Non-specific fever
- Code 26. Other diseases

Diseases in piglets

Recorded by the veterinarian

- Code 30. Neonatal diarrhoea
- Code 31. 3-week diarrhoea
- Code 32. Diarrhoea at weaning
- Code 33. Arthritis
- Code 34. Respiratory diseases
- Code 35. Skin diseases
- Code 36. Deficiency diseases
- Code 37. Trauma/injury
- Code 38. Other diseases

Recorded by the farmer

- Code 39. Splay-leg
- Code 40. Cryptorchism
- Code 41. Atresia ani
- Code 42. Umbilical hernia
- Code 43. Scrotal hernia
- Code 44. Shivering
- Code 45. Hermaphroditism

Table 2. The recommended health card.

Diseases of the sow

- Code 1. Dystocia
- Code 2. MMA-syndrome
- Code 3. Mastitis
- Code 4. Metritis
- Code 5. Anorexia
- Code 6. Non-specific infection, not at farrowing
- Code 7. Abscesses/phlegmons
- Code 8. Agalactia
- Code 9. Reproduction disorder
- Code 10. Diarrhoea
- Code 11. Birth induction/prolonged pregnancy
- Code 12. Abortion
- Code 13. Hoof/joint diseases
- Code 14. Deficiency diseases
- Code 15. Respiratory diseases
- Code 16. Erysipelas
- Code 17. Skeletal/muscular disease
- Code 18. Urinary tract diseases
- Code 19. Other diseases

Diseases in piglets

- Code 30. Neonatal diarrhoea
- Code 31. Diarrhoea at > 1 week of age
- Code 32. Arthritis
- Code 33. Skin diseases
- Code 34. Respiratory diseases
- Code 35. Other diseases in piglets

Congenital defects

- Code 36. Splay-leg
- Code 37. Cryptorchism
- Code 38. Atresia ani
- Code 39. Deformed or mummified piglets
- Code 40. Umbilical hernia
- Code 41. Scrotal hernia
- Code 42. Shivering
- Code 43. Hermaphroditism

Diseases in fatteners

- Code 50. Diarrhoea
- Code 51. Respiratory diseases
- Code 52. Hoof/joint diseases
- Code 53. Abscesses/phlegmons
- Code 54. Tail biting/cannibalism
- Code 55. Slow growing pigs
- Code 56. Muscular degeneration
- Code 57. Other diseases

Table 3. The farmers' subjective opinion on the % recorded diseases on the health card.

% Diseases recorded	No. of replies in each percentage group						NR*
	> 90	80-90	70-80	60-70	50-60	< 50	
Diseases in the sow	31	14	8	2			
Diarrhoea in piglets	22	9	7	2	1	13	1
Arthritis in piglets	15	9	9	7	2	13	
Scrotal hernia	22	9	8		1	13	2
Cryptorchism	26	9	3	2	3	6	6

* NR = No reply.

Norwegian pig herd performance recording scheme, however, most of the breeding sows are well marked. This allows for easy control of the identity of sows, and of piglets until weaning. Because of difficulties with identification, diseases in slaughter pigs were not recorded. Diseases of slaughter pigs are, however, very important, and should be reported in the future. Based on experience gained from the health card project a new health card was designed. Though this health card was almost identical to the herd card used in the project, codes were added for recording diseases in slaughter pigs. The new health card is shown in Fig. 1b, the corresponding codes being provided in Table 2.

As can be seen, diseases in sows and piglets are recorded on an individual basis, while diseases in slaughter pigs are recorded as the number of pigs treated instead of by individual numbers.

There was a satisfactory response to the questionnaires; replies were received from 55 (79 %) of the farmers and 9 (90 %) of the veterinarians. The replies of the farmers are summarized in Table 3.

It is obvious from Table 3 that disease recording is relatively good as regards the common diseases in sows and piglets treated by veterinarians. The replies from veterinarians correspond well with those from the farmers.

Table 4. An example of a herd disease report of the type sent to the farmers.

THE FREQUENCY OF TREATMENTS PR. 100 SOWS DURING ONE YEAR (Last quarter 09.15.85 - 12.25.85).					
Disease category	(Tab. 1)	Last quarter		Previous year	
		This herd	All herds	This herd	All herds
All diseases	(5-45)	103.5	57.5	137.7	47.2
Most important	(10-33)	69.0	54.6	105.3	41.6
Rec. by farmer	(39-45)	34.5	1.6	24.3	3.9
MMA-syndrome	(11)	20.7	23.4	27.0	16.4
Mastitis	(12)	13.8	6.4	16.2	4.2
Metritis	(13)	6.9	3.2	5.4	2.5
Neonatal diarrhoea	(30)	6.9	5.2	2.5	4.2
Arthritis	(33)	12.2	4.5	7.4	4.2

An example of a herd disease report of the type sent to farmers is given in Table 4.

The disease reports which were sent to the veterinarians gave information on the same disease categories as those sent to the farmers, but with separate results for each herd. The results for the herd in Table 4 show that the herd in question had a higher frequency of recorded diseases compared to the overall disease frequency.

The opinion of the farmers and veterinarians of the feed-back system varied (Table 5).

Table 5. Subjective opinion on the value of the feed-back system.

	Farmers	Veterinarians
No value	4	-
Valuable for special situations	17	5
Good help for evaluation of problems	32	4
No reply	2	-

All of the veterinarians considered the feed-back system to be of some value. Half of the veterinarians replied that the overview of diseases was valuable in special situations, while the other half considered the feed-back statistics to be a valuable tool in obtaining a general overview of the disease pattern in the district. Most of the farmers were satisfied with the feed-back system.

Discussion

Most of the entries on the health card are based on veterinary diagnosis. This was done to achieve a high reliability, as there is probably less divergence between veterinarians than between farmers regarding the definition of a disease. Some diseases must, however, of necessity be registered by the farmers, especially congenital defects, as well as diseases for which the veterinarian is not consulted. The simultaneous testing of

the individual health card and the herd card, made the advantages of the herd card obvious. The system with a separate card for each animal, as practiced in Norwegian dairy cattle herds (Solbu 1983), gave a good documentation of the health status of the individual sow and its litter through several years. In this way it was possible to select the sows with low disease incidence for breeding purposes. However, it was difficult to get an overview over the disease incidence in the herds using individual health cards, and the high turnover rate of sows in the herds resulted in extra work to follow up the system. The herd card gave an overview of herd problems and was easy to follow up. These latter two factors were considered the most important, and were the main reasons for choosing the herd card.

Feed-back seems to be extremely important with regard to keeping the percentage of recorded diseases at an acceptable level. Disease recording will always require some extra effort, and it is therefore important to make the beneficial effects obvious both for the farmers and veterinarians. Farmers receive, however, a lot of reports during the year from different sources. The results from herd performance control are received most frequently, but data on disease recorded on post-mortem examination at the slaughterhouse are also sent to the farmer. Add to these the reports from the health card system, and it is obvious that there is a danger that the farmer will be inundated with reports which he will then ignore. It would therefore be a great advantage if the different information could be gathered in one single report. This would also allow an easier comparison of performance results with the disease records.

A disease recording system is a valuable aid in preventive veterinary medicine. Efficient use of the information generated depends on

a rapid data flow from the herds to a central unit and back to the farmers and veterinarians. The system should also allow for generation of special disease reports. This would include instances as when there is a rapid increase in disease frequencies, when reduced feed conversion or growth rates are detected, or before visits to the herds. Breeders' associations and research institutions may also have access to necessary data for different purposes.

A central unit should collect data from the herd visits and receive information from slaughterhouses on frequencies of diseases found at post-mortem inspection. The reports to the farmers and veterinarians should contain information on herd performance, clinical disease and disease in carcasses and should be issued at least 4-6 times a year. In Norwegian herd performance recording scheme most of the information collected from the herds is entered into portable (hand-held) mini-computers, data subsequently being sent to the central unit via telephone lines. This permits disease reports to be issued within a week after the collection of disease data, optimal use of such information therefore being possible.

Treatment of pigs with drugs in the period prior to slaughter may sometimes result in the slaughter of animals containing drug residues. Such carcasses should be detected and condemned at meat inspection. Undetected, carcasses with drug residues may represent a public health problem. One important advantage of a health card system in this context is that it allows the use of drugs in a herd to be monitored by checking the health card before slaughter. The veterinarians and farmers considered the health card to be a valuable tool for this purpose.

The practical value of recording diseases for breeding purposes depends on the breeding system. In Norway, there is a single large

artificial insemination centre for boars and about 70 % of all sows in Norway are bred by artificial insemination. It would therefore be possible to obtain health records on a great number of offspring if disease recording were to be carried out in breeding herds and normal commercial herds. Even though the heritabilities for diseases generally are low, it should prove possible to get reliable information on the breeding value of boars with regard to the most common diseases.

Conclusions

Disease recording in pigs can be conveniently and efficiently implemented using herd-health cards, and can provide information on diseases in sows, piglets and slaughter pigs. Diseases in sows and piglets can also be recorded on an individual basis. The individual recording of diseases in slaughter pigs would be necessary if genetical disease resistance were to be investigated, but is probably not realistic. Diseases in slaughter pigs are best recorded on a quantitative basis by herd.

Routine feed-back of results to farmers and veterinarians is important in keeping the percentage recorded diseases at an acceptable level. The reports should contain information on performance, clinical disease, and disease detected at meat inspection. Collection of data can be done using portable computers, a system which allows disease reports to be returned to the farmers and veterinarians quickly, preferably in less than 1 week. The disease reports containing information on both herd incidence and overall incidence in the district, were judged as useful both by farmers and veterinarians.

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Sammendrag

Epidemiologiske og genetiske studier av sjukdommer i norske svinebesetninger. I. Utforming av et praktisk registreringsystem.

Undersøkelsen bygger på sjukeomsregistreringer i 70 norske svinebesetninger fra 1984 til 1986. Formålet var å konstruere et helsekort basert på individuelle sjukeomsregistreringer. Registreringene omfattet sjukdommer på purke og påsmågris fram til avvenning. Forsøket viste at oppfølging var viktig for å holde registreringene på et tilfredsstillende nivå. Det ble konkludert at individuelle registreringer på besetningskort var best egnet for innsamling av data for epidemiologiske og genetiske studier av sjukdommer hos svin.

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