

2010

Equine Vaccination, a Paper Mess Waiting to get Solved. Could ICT be the Answer?

Sonja Leskinen

Abo Akademi University, Sonja.leskinen@abo.fi

Follow this and additional works at: <http://aisel.aisnet.org/bled2010>

Recommended Citation

Leskinen, Sonja, "Equine Vaccination, a Paper Mess Waiting to get Solved. Could ICT be the Answer?" (2010). *BLED 2010 Proceedings*. 32.

<http://aisel.aisnet.org/bled2010/32>

This material is brought to you by the BLED Proceedings at AIS Electronic Library (AISeL). It has been accepted for inclusion in BLED 2010 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Equine Vaccination, a Paper Mess Waiting to get Solved. Could ICT be the Answer?

Sonja Leskinen

Turku Centre for Computer Science (TUCS),
Institute of Advanced Management System Research,
Department of Information Technologies (IAMS),
Åbo Akademi University, Finland

Sonja.leskinen@abo.fi

Abstract

Equine sports have long traditions, and is part of the Olympic disciplines. Yet even if the rest of the sports events have welcomed the 21st century and ICT, equine sports are yet to fully embrace the values and help ICT may bring to this noble sport. Horses need to get influenza vaccinations according to regulations, yet the way to register a horse's vaccination and checking that vaccinations are in order is done in a very old-fashioned way, basically manually. The research addresses the question how IS and mobile technology could help the various bodies involved in the equine sports to perform their duties with more ease and precision. In this paper the research topic is what competition riders and horse owners are prepared to divulge of their horses vaccination information.

Keywords: Innovative ICT, information system, mobile technology, equine sports, vaccination database, future solutions.

1 Introduction

Horses have been used throughout history for various tasks, but today they are mainly used as sport horses or leisure horses. A sport horse can be everything from a polo pony, to a trotter, racing horse or a horse doing equestrian sports. "The FEI, founded in 1921, is the international body governing equestrian sport recognized by the International Olympic Committee." (Fédération Equestre Internationale, 2007) Equestrian sports involve seven disciplines; Jumping, Dressage, Eventing, Endurance, Driving, Reining and Vaulting. Furthermore, in dressage and driving there are Para-equestrian disciplines. Of these disciplines, jumping, eventing and dressage are Olympic disciplines. In 2009 there were worldwide 526 international jumping, 126 international dressage and 213 international eventing competitions. At the moment of writing this article FEI's international horse registration database held 161 423 horses. This database

only includes horses that have an international passport (Fédération Equestre Internationale, 2007). If a horse is to compete in international level, it must have a FEI international passport. For horses competing in national or lower level, a national passport will suffice.

In Finland, Suomen Hippos (the Finnish Trotting and Breeding Association) informs that there are approx. 70 000 horses during the time of writing this article (Soini, 2010). This amount includes all horses that are registered in Finland; trotters, leisure horses, and competition horses. The figure might though be a bit misgiving, since if a horse has been imported from another EU country and it has this country's passport, it does not necessarily have to be registered into Hippos. Furthermore, Hippos' database has several horses listed that are not alive anymore. Owners do not always inform Hippos if a horse has had to be put down or sold. Today horses are identified primarily by their national and/or international passport. From 1.7.2009 forward all foals born in Finland and all horses imported to Finland have to have a microchip for identification and a national passport (Skarra, 2009).

When horses are transported within the EU, they are required to be accompanied by a passport (national or international) (93/623/EC). The problem is that, today for the most part, horses are recognized by their passports at borders, since not all horses have a microchip. From 1 July 2009 the new Commission Regulations entered into force that states that equidae born or imported within EC are to have a transponder, a lifetime identification number and a passport (Article 5 and Article 8) (504/2008/EC). A border control personnel is not educated to properly recognize a horse, and therefore has basically very little knowledge on which horses are really being transported (see Figure 1).



Figure 1: Can you identify which horse has which passport?

1.1 Background to equine vaccination

For Equine disciplines, according to FEI rules, a horse has to be vaccinated against horse influenza and in some countries also against other diseases. This information has to be marked on the horse's international passport, if the rider/driver wishes to compete with the horse in international competitions (Article 137) (FEI General Regulations, 2010). Some countries that have equine sports have their own vaccination regulations, that might be the same as the international rules or somewhat differ. Today at international equine sports competitions, and in some countries, such as Finland even at district and national level competitions, the horses vaccination information is checked from the passport at every competition. Because of the vaccination rules, the checking process might take much time.

The horse has to have received at least the two primary course of vaccinations, given 21 to 92 days apart. After this for horses that have received the primary vaccinations before 2009, they must receive in Finland an annual booster vaccination. For horses which have received the primary vaccination after 1.1.2009, the first booster vaccination must be within 6 months (+21 days), and after this an annual booster vaccination. For

internationally competing horses a booster vaccination must be administered every 6 months (max 7 months). No vaccination shall be given within 7 days of competition (Annexe VI) (FEI Veterinary regulations, 2010) and (article 19.1) (SRL Competition regulations I, 2009).

For older horses, the person checking vaccination information might have to go through many vaccinations and determine if the vaccination schedule is done according to regulations. It does not help either that mixed into the influenza vaccination information, there might be tetanus vaccination information, horses national passports might vary and the vaccination information is not always in the right order (see Figure 2). At larger competitions there needs to be one person whose only task is to check the vaccination information, and yet this official might not be able to check all the vaccination information's in time. In the strictest sense of the rules, you are not even allowed to bring your horse to the competition site, until the vaccination information has been checked. In practice at many national competitions in Finland, this has not been possible. During the author's study at competitions summer 2009, it was found that some riders never brought their horse's passport to the secretary office to be checked, horses that had been competing for many years did not have their influenza vaccination records in accordance to regulations etc. Horse influenza is very contagious, and even horses with the vaccination might get sick, although most often in a lesser degree (Hautala, 16.10.2009). This is why FEI and SRL (Equestrian Federation of Finland) has a very strict policy when it comes to influenza vaccinations.

Horses used for leisure or breeding might not have received influenza vaccinations, but if the horse is to take part in a national or district equestrian sport event in Finland they have had to have received horse influenza vaccinations in accordance to national federation regulations.

Today's horse influenza vaccination protocols and monitoring procedures are insufficient. With the amount of horses taking part in competitions, to get the competition to go smoothly it is virtually impossible with today's system in Finland to be sure that all the horses participating in the competition have their vaccinations in

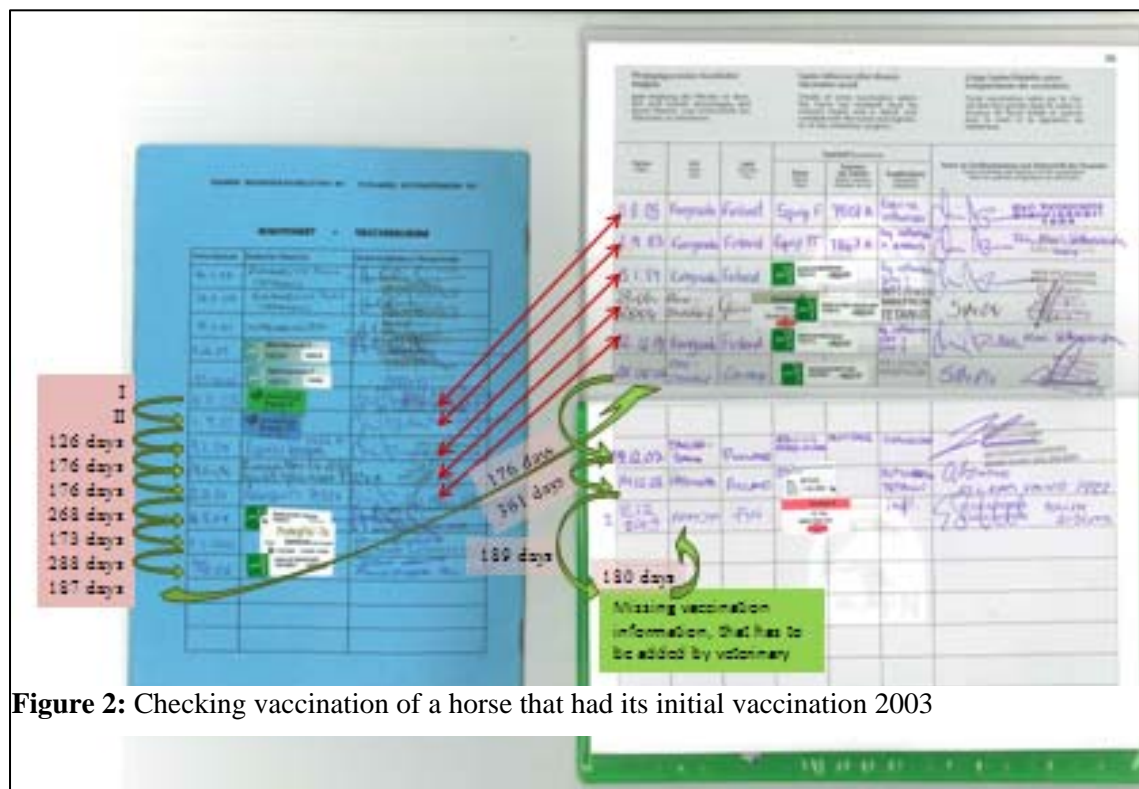


Figure 2: Checking vaccination of a horse that had its initial vaccination 2003

order. When the official or veterinary at a competition notices that a horse's vaccinations are not in order, it usually is already too late; the horse is at the competition site.

1.2 Motivation for research

This study is only a first step into a larger research. There are no standards for how to report equine vaccination and medical information. Furthermore this information is still recorded for large parts manually. A horse's vaccination and medication information does not have a central database or similar where all relevant information, for authorities, veterinaries, competition organizers etc. can be found. This paper addresses how IS and mobile technology can be used to help the various bodies involved in the equine sports. The aim is to find a way for all involved to perform their duties with more ease and precision. The main research question in this paper is what competition riders and horse owners are prepared to divulge of their horses vaccination information?

This paper is structured in the following way: Section 2 presents the research background, and introducing research that has been done in this area. In section 3 the research methodology and design is introduced. Section 4 introduces this study's findings, while in section 5 the findings are further discussed. Conclusions and implications are presented in section 6. Discussion on further research is reserved for section 7. Here the author's next steps in the equine research are also presented.

2 Research background

This study's aim is to find what IT can do for equine sports. At competition sites, many tasks are today supported by IT, but at the same time some tasks are still done manually. One such task at competitions is checking that the horse's influenza vaccination record is in accordance to current regulations. As stated before this can take up much time so it is clearly a bottleneck in the system.

Although the equine sports do not involve as much money as other horse sports that rely on betting income, such as racing and trotting, it still involves a considerable amount of money. Sponsorship deals are commonplace in equine sports; competitions, competition series, riders and horses etc. can have sponsorship deals. E.g. Rolex is the sponsor for the Rolex FEI World Cup™ in Jumping. Furthermore horses are perceived partially as valuable sports equipments and athletes, therefore a horse competing successfully at international level can cost a considerable amount of money, prices going up to millions of Euros.

2.1 Related research

Much research into IS support for vaccination information, or IS involvement in the horse industry has not been done. The previous researches done, tangent to this paper are more focused on medication data, especially for livestock animals and animal identification. In Australia, Trevarthen and Michael (2008) did an extensive research on how dairy farms use RFID technology to help farm management. At farms, it was difficult to manage a large herd, and vital information about every cow was traditionally on a paper-based system. Now at some dairy farms, RFID technology is used to get cow monitoring and herd monitoring systems in IS. In this study the cows RFID tags information was received either with an ID code from the database or by scanning. E.g. the milking station has a RFID reader that automatically identifies the cow and inputs

the cow's milking information and other valuable information into the system. The farmer can also add information into the system with his PDA or directly input data into the computer. This type of ICT is in full-scale use in e.g. Australia.

Some similar kind of approach could also be usable with equine sports. In both cases mobility and IS technology can support various users' work. The system has to be easy to use, and reduce the need for duplication work and duplication data.

After the author had done the field work for this study, Hippos started to develop their horse database. From 1.1.2010 onward all horses competing in trotting have to have received horse influenza vaccinations according to Hippos regulations (very similar to FEI regulations). In Finland there are over 500 trotting competitions per year, and three times more trotters than equine sport horses. Since the equine sports in Finland had had in use influenza vaccination regulations for many years, Hippos could develop their system from the basis of the Equestrian Federation of Finland's know-how. They decided to have the vaccination information included into the already existing horse database. Only veterinaries and racetrack personnel are allowed to enter data into this system. The database is working to Hippos' satisfaction, since it is easy to check the horse's vaccination record from it. The horse's owner cannot see his/her horse's vaccination information (Hippos, 2010).

The Equestrian Federation of Finland has also realized the problem with checking at each competition the horse's passports for vaccination information. Today when entering a competition the owner or rider can give the horse's vaccination information during the entering process. Then competition organizers can then see if the horse's vaccination information is entered, but still the competitor must prove that this information is correct, by showing the horse's passport at the competition's secretary's office (SRL KIPA, 2010).

Many researchers have undertaken the issue with animal identification. Proper identification is important to be able to trace back where an animal is from in order to prevent and control diseases amongst animals, and to prevent harmful diseases to enter consumer consumption (Disney, et al., 2001; Petersen, et al., 2002; Wang, Zhang and Wang, 2006). One research has been studying the need for a clinical database at equine clinics. This research was done in Sweden and it evaluated the need for computerized medical records (Penell, et al., 2009).

In human medicine the same issues are being tackled. Ideally a patient's relevant medical information could be accessed when needed where ever needed, without compromising the patient's rights for privacy. In many countries there are various designs how this could and somewhat is done; now one of the many tasks is to get a harmonious standardized system that would work everywhere. Especially CEN/TC 251 and HL7 tackle these issues and since 2006 also coordinate and collaborate on various issues. Both organizations' aims are to get framework and standards for electronic health information (CEN, 2010; HL7, 2010).

2.2 Research rationale

The research objectives for the study are the following:

- To find out how well people understand the current vaccination regulations.

- To obtain a view on what and in what form are horse owners and competition riders willing to reveal about their horses' vaccination information.
- Determine if they require help in remembering when to vaccinate the horse.
- What is the best way for a reminder to reach them and how much would they be willing to pay for this service.

As mentioned before horses are used in various sports, but this research concentrates on vaccination information on equine sports. In Figure 3 some of the various activities horses are used in are presented, and the governing of equine sports is mapped out. National and district competitions are organized by riding clubs, or organizations that the national federation has given a competition organizing permit. The competitions are governed by the national federation and must abide by their regulations. International competitions are governed by international regulations. In Finland some specific organizations and riding clubs may organize international competitions in co-operation with the national federation (SRL, 21.1.2010).

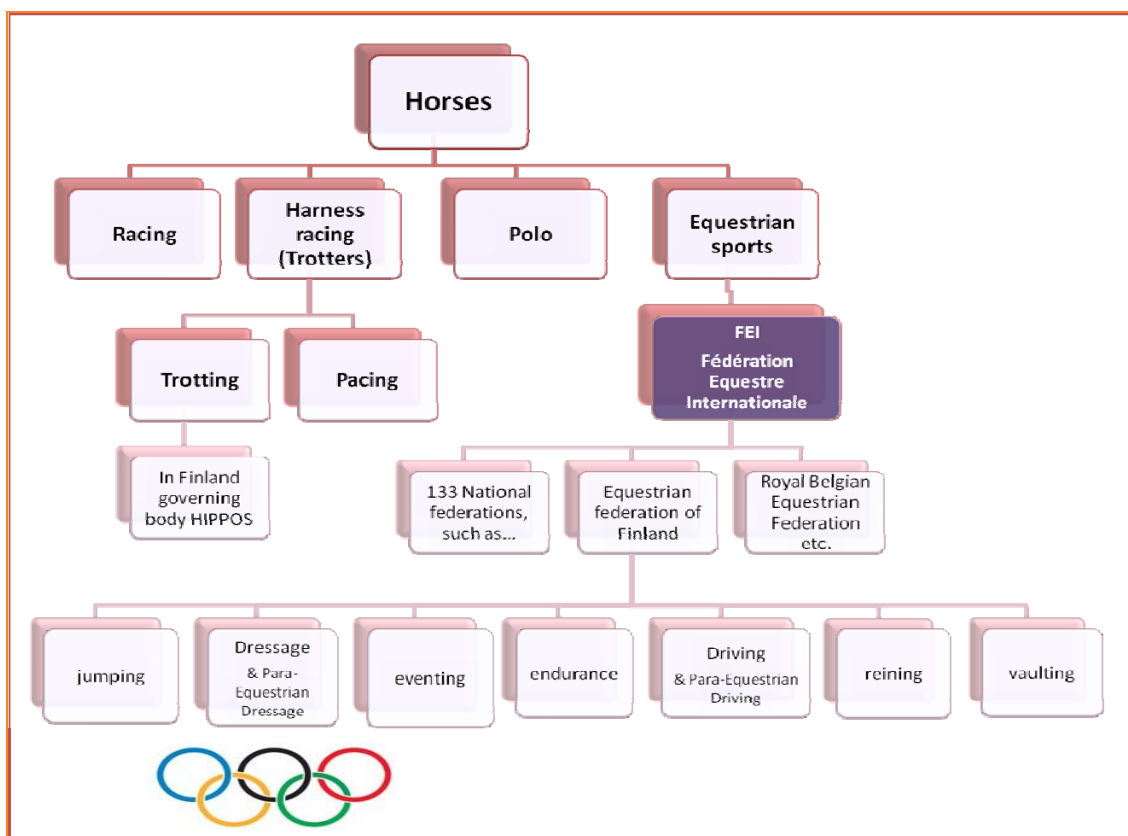


Figure 3: A diagram over well known horse sports, and how the equine sports are governed

3 Methodology and research design

In order to find answers to the research objectives a study was done during the summer of 2009. The study was exploratory in nature, to get a better understanding of the interest holders' opinion of the research objective. For this study people were interviewed at Finnish and international riding competitions and studying the customs of vaccination control at these competitions. Three disciplines were chosen, since they

are the most popular equine sport disciplines in Europe, mainly jumping, dressage and eventing. These three disciplines are also the disciplines in competition at the Olympic Games. For this study only equine sports disciplines were chosen, to better support the author's extensive knowledge in the field.

3.1 Questionnaire design

The interviews were done by means of a questionnaire. The questionnaire was developed according to the "Flowerpot-designed questionnaire" (Shiu, et al., 2009). The author wanted to find out about the vaccination protocols in order to achieve better understanding of where and how this information becomes a bottleneck at competitions and what respondents are willing to divulge of their horse's vaccination information. This way the author would get a better understanding on how IT and mobile technology could be used, to ease the problematic areas. The respondent's background information that was of interest was: Age, are you a horse owner, are you a competition rider, competition level and discipline. At the international competitions the nationality was also asked.

In this study a structured questionnaire was used. The questionnaire about views on vaccination was done by giving various statements, where the respondent would choose his/her answer from one of the following statements: I am completely of the same opinion, I am somewhat of the same opinion, I am somewhat of a different opinion and I am of a different opinion. The author used a forced scale in order to find out if the respondents were for or against the statement (Shiu, et al., 2009).

In the three disciplines, the athletes can be divided into six categories. These are: senior riders, Young riders, Juniors, Pony riders, Children and Veterans. Young athletes have their own categories according to age and horse. Pony riders are children who are competing with a pony (small horse which's height is max. 148 cm at the withers). For nation level (in Finland) the pony rider must be at least 10 years old to take part in pony rider category's competitions, and 12 for eventing. For international level, in any of the three disciplines the age requirement for pony riders is 12 years. A person may compete as a junior rider beginning from the year he/she turns 12 years for national level (in Finland) and 14 years for international level. The junior is allowed to take part in junior classes until the year he/she reaches 18. A person may compete as a Young rider from the year they turn 16 and they can move to the category, senior riders, the year they turn 18, or in the latest the year they turn 22 (FEI Rules for Dressage Events, 2010; FEI Rules for Eventing, 2010; FEI Rules for Jumping Events, 2010).

Since the categories Children and Veterans are very rarely used in Finnish competitions and the categories were not present at any of the competitions where research was done, the categories are omitted from the study. Furthermore the author makes the following assumption that all riders between 21-18 are Young riders and people under 18 are juniors. This simplified categorizing has been made, since for athletes under 18, the person responsible for the horse's vaccination is often a parent of the rider, whether he/she is a pony rider or a junior rider.

3.2 Research methodology

In order to increase the response rate, respondents of the questionnaire in Finland got a ticket for Helsinki International Horse Show's 16.10.2009 "Welcome to Helsinki Performance" show. According to FEI regulations the rider or driver of the horse is

responsible that the horse has been vaccinated according to FEI regulations at the competition site (Article 118) (FEI General Regulations, 2010). This is why the questionnaire was only intended for people who either own a horse or compete with a horse. Even that the rider or driver of the horse is responsible that the horse has been vaccinated against horse influenza; at home this responsibility might fall in the hands of the horse's owner. It all comes down to various possibilities such as; the horses owner and rider are the same person or in the same family, the owner cares for the horse, and the rider only rides and competes the horse once and awhile or the horse is totally cared for by the rider.

The data collection was conducted at the following riding competitions:

- Niinisalo, Finland. National three-day-event competition (CCN*), 10-12 July 2009.
- Falsterbo, Sweden. International jumping and dressage competition (CSIO 5*-TL NC, CDI 3* CDIO 4*) 16-19 July 2009
- Salo, Finland. National jumping competition (CSN 2*, Tapiola GP) 31 July - 2 August 2009.
- Verden, Germany. International jumping and dressage competition (CSI 2*, CDI 3* CH-M-YH-D) 6-9 August 2009.
- Lempäälä, Finland. National dressage competition (CDN 2*, Finnish championship) 15-16 August 2009.

At the competitions in Finland questionnaires were handed out to riders with their competition information and timetable pamphlet. Questionnaires were also handed out in various places of the competition site. Respondents could return the filled questionnaires to either the author or to a box by the competition secretary's office. At Falsterbo competition the author attached the questionnaire to horseboxes, where the rider could see it. The answer box was by the international stable-area secretary office. From Falsterbo competition there were 3 responses, which lead to experiment another strategy, where horses would not be likely to try to eat up the questionnaire or the questionnaire tossed away by grooms. At Verden the author asked personally people to answer the questionnaire. This was proven to be a much better approach since in Verden 64 non-Finnish people filled in the questionnaire.

4 Results of the Study

4.1 Results background

319 people answered the questionnaire. Of the respondents, 248 people listed themselves as horse owners and 224 were competition riders. In Table 1 the responders' frequency at the above mentioned competition sites can be seen.

	Frequency	Percent	Cumulative Percent
Falsterbo SWE	3	0,9	0,9
Kangasala FIN	71	22,3	23,2
Lempäälä FIN	40	12,5	35,7
Niinisalo FIN	45	14,1	49,8
Not defined competition site	10	3,1	53,0
Salo FIN	73	22,9	75,9
Verden GER	77	24,1	100,0
Total	319	100,0	

Table 1: Responders frequency for Study

Of the respondents, 21,6 % were Juniors, 9,1 % Young riders and 69,3 % Senior riders. People were urged to choose only one of the three disciplines, while the fourth option was else. This fourth option was meant for use of people who might compete in one of the other FEI disciplines etc. Despite the request to only choose one discipline, ten respondents chose more than one discipline. In these situations the author chose to invalidate the answer from statistics involving disciplines (see Table 2).

Categories	Disciplines					Total
	does not compete	Dressage	Eventing	Jumping	Other disciplines	
junior	4	18	10	35	0	67
senior	86	40	18	67	2	213
young rider	5	6	3	15	0	29
Total	95	64	31	117	2	309

Table 2: Category and discipline ratio amongst respondents

People were also asked their competition level, if they are competition riders. The levels were district, national and international level (see Table 3). If the person had chosen more than one level, the author in compiling the statistics used the highest level, and other levels were omitted. The highest level in the questionnaire was competing in international level, next national level, and the lowest level is competing in district level.

Categories	Level				Total
	does not compete	district	national	international	
junior	4	15	40	10	69
young ri	5	4	11	9	29
senior	86	37	53	45	221
total	95	56	104	64	319

Table 3: Categories and Level ratio in questionnaire answers

As can be seen from the tables above there is a good representation of riders and horse owners. This table also gives an idea of how many of the respondents should know the international and national horse influenza vaccination rules.

4.2 Vaccination study results

As mentioned in chapter 2.2 the aim of the research was to find answers to the following questions: How well do competition riders and horse owners understand the current vaccination regulations? What are they willing to reveal about their horses' vaccination information and what is the right medium for this? Do they require help in remembering when to vaccinate the horse? What is the best way to remind them and how much would they be willing to pay for this service?

In the majority of the cases, the respondents did find the national and international vaccination regulations clear and understandable. Only a few disagreed with this, and for the most part these respondent's were non-competitors. A forced Likert scale of four was used in the study, 1 being of same opinion and 4 being of different opinion.

For the Agree and Disagree values and percentages, 1 and 2 (I am completely of the same opinion and I am somewhat of the same opinion) results are combined together for "Agree", whereas 3 and 4 (I am somewhat of a different opinion and I am of a different opinion) are combined together for "Disagree". The way the questionnaire was constructed, was interpreted by some respondents that they should choose mail, e-mail, SMS or no need for service option. This is why all respondents did not express the specific opinion on each option. For these people often only one favored option was marked as either "I am completely of the same opinion" or "I am somewhat of the same opinion". However this did not impact the research in a negative way. In tables 4 and 5 the amount of respondents not voicing an opinion to statements are listed as »Missing«

	My horses vaccination information could be public in		I would like my veterinary to help me keep my horses vaccinations on time	I would like to get a remainder when the vaccination is expiring via			
	The Internet	A national Database		Mail	e-mail	SMS	I do not need this service
Agree	143	233	133	70	159	132	113
percentage	44,8 %	73,0 %	41,7 %	21,9 %	49,8 %	41,4 %	35,4 %
Disagree	121	64	72	106	49	68	104
Percentage	37,9 %	20,1 %	22,6 %	33,2 %	15,4 %	21,3 %	32,6 %
Missing	55	22	114	143	111	119	102
Percentage	17,2 %	6,9 %	35,7 %	44,8 %	34,8 %	37,3 %	32,0 %
Total	319	319	319	319	319	319	319
Percentage	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %

Table 4: Study results

As can be seen in Table 4 the majority of the respondents are ready to have their horse's vaccination information freely available in the Internet and an even larger majority is positively inclined towards a national database where the vaccination information would be stored. Respondents are overall eager to receive help from their veterinary to keep their horse's vaccinations on time, but there are some variables into how this would be done. Mailing is not considered to be a good option, while e-mail and SMS reminders are perceived as good options. Over a third of the respondents did not feel the need to have any kind of reminder service, while at the same time, almost as many people felt a need for the service. From discussions at competition sites, it became clear that respondents, who owned more than one horse, were keener to get a vaccination reminder service, than people who only had one horse. This is naturally true since one horse's vaccination date is easier to remember than several horses' vaccination dates. In afterthought, it would have been important also to include the question "How many horses do you own / compete with?"

In Table 5 we can see a few patterns. The results on the respondents' answers on the possibility to have vaccination information on a database, has gotten throughout all the various categories, a positive inclination. Also the option on having the information on the Internet has gotten positive responses except in the category "Young riders" Since these people are 18-21 it could be assumed that they are knowledgeable of the hazards that Internet might have, and are therefore skeptical on whether the security aspects can be sufficient. Overall the option to have vaccinations on a national database had a more positive feedback from all categories in comparison to the Internet option.

		My horses vaccination information could be public in		I would like my veterinary to help me keep my horses vaccinations on time	I would like to get a remainder when the vaccination is expiring via			
		The Internet	A national Database		mail	e-mail	SMS	I do not need this service
Junior	Agree	34	46	31	14	32	32	27
	Disagree	26	19	18	26	13	16	22
	Missing	9	4	20	29	24	21	20
	Agree (%)	49,3	66,7	44,9	20,3	46,4	46,4	39,1
	Disagree (%)	37,7	27,5	26,1	37,7	18,8	23,3	31,9
	Missing (%)	2,8	1,3	6,3	9,1	7,5	6,6	6,3
	total answers	69	69	69	69	69	69	69
Young Rider	Agree	10	22	13	11	19	16	9
	Disagree	17	7	7	14	5	8	15
	Missing	2	0	9	4	5	5	5
	Agree (%)	34,5	75,9	44,8	37,9	65,5	55,2	31,0
	Disagree (%)	58,6	24,1	24,1	48,3	17,2	27,6	51,7
	Missing (%)	0,6	0,0	2,8	1,3	1,6	1,6	1,6
	Total answers	29	29	29	29	29	29	29
Senior	Agree	99	165	89	45	108	84	77
	Disagree	78	38	47	66	31	44	67
	Missing	44	18	85	110	82	93	77
	Agree (%)	44,8	74,7	40,3	20,4	48,9	38,0	34,8
	Disagree (%)	35,3	17,2	21,3	29,9	14,0	19,9	30,3
	Missing (%)	13,8	5,6	26,6	34,5	25,7	29,2	24,1
	Total answers	221	221	221	221	221	221	221
owner	Agree	108	180	100	56	121	95	94
	Disagree	94	53	58	82	45	57	78
	Missing	46	15	90	110	82	96	76
	Agree (%)	43,5	72,6	40,3	22,6	48,8	38,3	37,9
	Disagree (%)	37,9	21,4	23,4	33,1	18,1	23,0	31,5
	Missing (%)	18,5	6,0	36,3	44,4	33,1	38,7	30,6
	Total answers	248	248	248	248	248	248	248
Competitor	Agree	95	163	97	54	112	95	83
	Disagree	94	49	55	78	35	49	74
	Missing	35	12	72	92	77	80	67
	Agree (%)	42,4	72,8	43,3	24,1	50,0	42,4	37,1
	Disagree (%)	42,0	21,9	24,6	34,8	15,6	21,9	33,0
	Missing (%)	15,6	5,4	32,1	41,1	34,4	35,7	29,9
	Total answers	224	224	224	224	224	224	224

Table 5: Study results divided into various categories

Again, throughout the categories, the need for help from veterinarians to keep the vaccination on time is beheld positively. This is in line with what the author expected that people are struggling to remember when to vaccinate which horse etc. This also indicates that the veterinarians or other instances that could be responsible of the reminder service have a possibility to significantly improve their customer service. Especially horse owners, who often are the ones responsible in taking care of the horse's vaccination, are positively inclined to the option. People would like to get a reminder of vaccination expiration, as can be seen in all categories. In how the vaccination reminder should be offered to the horse owners (or riders in some cases) it was obvious that mail was not considered a very good option. The majority of the respondents preferred to get the reminder by e-mail, but also SMS had a majority support by all in the various categories.

The question "I do not believe that I need this [a reminder] service" got overall a very neutral reception. Apart from the Young rider's category, the "Agree" and "Disagree" percentages were within 10 points apart. The "Agree" category got slightly more responses, except in the Young rider's category, where over half of the respondents did not agree with the statement "I do not believe that I need this service". As discussed before, this might be in correlation with how many horses the respondent is responsible for, i.e. either competing with the horse or owning it. The way the question was formulated, might also have confused some responders.

The questionnaire also held a question concerning what people would be willing to pay for a reminder service, if any. The options on costs were 0 €, 1 €, 5 € and 10 €. The mean for the results was 2,63 € and 37,7 percent were not ready to pay for a reminder service, while 9,6 percent considered this service to be worth 10 €. The largest group, 28.4% of the respondents were willing to pay for the reminder service 5 €

5 Discussion

Based on the study the author can conclude that people are in need and would be positively inclined to a vaccination database and a vaccination reminder service. Since mobility and mobile applications give more freedom, it would be advisable that the services offered to horse owners, competition riders, competition officials, veterinaries and border control would also have mobile applications to help the process. For veterinaries a mobile service would most likely prove to be beneficial, since many veterinaries travel around when working. For horse owners and/or competition riders a mobile reminder service or an e-mail reminder service would most likely be beneficial. A larger question remains; who would be the body behind these services?

For a unified database, FEI could be an option, since they would benefit of an up to date data on horse's vaccination information. The problem then lies with horses that do not compete, or do not compete in equine sport, such as trotters and racehorses. For these FEI is not necessarily the most logical choice to uphold vaccination data. Another idea would be to have vaccination data in the country's official horse breeding association, but does every country have such an organization, or what if they have several? Maybe for EU there could be a comprehensive database for all horses within the EU region? This solution would create a conclusive database, but within the competitive sports; equine, trotting and racing, competitions can include competitors from outside the EU. A pharmaceutical company that supplies influenza vaccinations could instigate the database, but will they have vaccination customers in all the countries? Since it is rather

clear from the research done for this article that a common database would be preferred it is likely that one or several of the bodies mentioned before will initiate a vaccination database. If the database is successful, other countries, sports and institutes will voice interest towards it, and the problems mentioned before will find solutions.

For the various mobile services suggested earlier the same issues will arise as with the database. Who is in charge? Who will offer and maintain the service? The same bodies could also here be an answer to this question, but also private veterinaries. One solution would be that veterinaries are allowed to upload vaccination data of their customers' horses from the database. Then the veterinary can send a SMS or an e-mail reminding the customer to update their horse's influenza vaccination (or tetanus etc.). Since some respondents to the questionnaire were willing to pay for the reminder service, whether it be via SMS or e-mail, this could be a way to partially finance the upkeep of the database and mobile and/or e-mail service.

6 Conclusions and implications

Based on the study it is obvious that there is a need for more efficient systems within the equine sport disciplines. Technology has already been used in various degrees at competitions to ease up the registration, time schedules and result service, but vaccination control, amongst others, is still dealt with manually. When during a two-day competition even in a relatively small equine country, such as Finland, there might be over 800 competitions starts time is of essence. The vaccination information added during entering to a competition, mentioned in section 2.1. relies on horse owners, riders and drivers honesty to enter the valid vaccination dates. (SRL KIPA, 2010). This is why the author suggests that the information should be entered by a veterinary, or in some cases the competition officials, which would be a more trustworthy source.

The database that Hippos uses for trotting competitions is nice, and certainly helps the competition organizers in their work, but it does not help the owner or rider/driver of the horse. At the moment this system does not have a reminder service, or any kind of mobile services. Veterinaries have to input vaccination data on a computer, it is though in the authors opinion, that since veterinaries are often on the move, the vaccination input application should also be available on a mobile device. Rarely owners take their horses to a clinic or a vet to get the horse vaccinated, the veterinaries travel to the stables to do this task.

7 Further research

It is clear that a convergent database, where all horses competing under FEI regulations have their vaccination information, would ease the work for competition secretary office. The question is how to get it implemented around the world, and how to get veterinaries to use the system. A software program, which sends the horse's owner a message when the horse's vaccination needs to be renewed could be simply added to the database. This option could also be used by veterinaries, to ensure continuous customer relationship. The next step in research would be to find ways for veterinaries to use the database so that aids them in their work. Could a mobile application be of use? Since veterinaries might also work with other animals than just horses, could even other animals benefit from a vaccination database, e.g. pets?

From results upheld from this study, the author also suggests further research and investigation into how a horse's medical information could be placed into a database

and would horse owners allow it? What kind of safety measures need to be taken, so that only certain people will be allowed to access the horse's medical information? Could an international animal health database help prevent or control the spreading of epidemics?

References

- Disney, W.T., Green, J.W., Forsythe, K.W., Wiemers, J.F. and Weber, S. (2001). Benefit-cost analysis of animal identification for disease prevention and control, *Revue scientifique et technique*, **20** (2), 385-405.
- European Committee for Standardization. (2010). CEN/TC 251 Health Informatics. Retrieved 29.04.2010, from <http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6232&title=CEN/TC%20251>
- Fédération Equestre Internationale. (2010). *Rules for Jumping Events 23rd ed.* Switzerland:
- Fédération Equestre Internationale. (2009 (including updates for 01.01.2010)). *Rules for Eventing 23rd ed.* Switzerland:
- Fédération Equestre Internationale. (2009 (including modifications for 01.01.2010)). *Rules for Dressage Events 23rd ed.* Switzerland:
- Fédération Equestre Internationale. (1 January 2010). *General Regulations 23rd edition.* Switzerland: Fédération Equestre Internationale
- Fédération Equestre Internationale. (5th May, 2010). *Veterinary Regulations 12th ed.* Switzerland:
- Fédération Equestre Internationale. *FEI* Retrieved 29.01.2010, from www.fei.org
- Hautala, K. (16.10.2009). Hevosinfluenssa tarttuu helposti (Horse influenza transmits easily), *Hevosurheilu*, 15.
- Hippos. (2.2.2010). *Heppa-Järjestelmä (Horse-system)* Retrieved 20.2.2010, from <http://heppa.hippos.fi/heppa/app>
- HL7. (2010). Unlocking the Power of Health Information. Retrieved 29.4.2010, from <http://www.hl7.org>.
- Penell, J.C., Bonnett, B.N., Pringle, J. and Egenvall, A. (2009). Validation of computerized diagnostic information in a clinical database from national equine clinic network, *Acta Veterinaria Scandinavica*, **51** (50), Retrieved 2.2.2010, from <http://www.actavetscand.com/content/51/1/50>
- Petersen, B., Knura-Deszczka, S., Pönsen-Schmidt, E. and Gymnich, S. (2002). Computerised food safety monitoring in animal production, *Livest.Prod.Sci.*, **76** (3), 207-213.
- Shiu, E., Hair, J., Bush, R. and Ortinau, D. (2009) *Marketing Research*. New York, Ny, U.S.A: McGraw-Hill Higher Education
- Skarra, P. (2009). Rekistöröinti takaa hevosten oikeusturvan: Anna hevosellesi identiteetti, *HIPPOS Suomen Ratsastajainliiton jäsenlehti*, SRL info 7-8.

- Soini, P. (2010) *Toimintasuunitelma 2010 (Strategy 2010)*.
- SRL. (21.1.2010). *Kilpailujen järjestämismääräykset.- ja ohjeet (Competition organizing regulations and directions)* Retrieved 24.2.2010, from <http://www.ratsastus.fi/asp/system/empty.asp?P=157&VID=default&SID=892152782274198&A=closeall&S=0&C=29578>
- SRL. (1.1.2009). *Kilpailusäännöt I (Competition rules I)*. Helsinki, Finland:
- Suomen Ratsastajainliitto ry (The Equestrian federation of Finland). (20.2.2010). *Kisapalvelu - KIPA (Competition service)* Retrieved 20.2.2010, from <http://kipa.ratsastus.fi/>
- The Commission of the European Communities. (8 June 2008). *Commission Regulation*. (504/2008/EC) Brussels, Belgium: European Union.
- The Commission of the European Communities. (20 October 1993). *Commission Decision*. (93/623/EC) Brussels, Belgium: European Union.
- Trevarthen, A. and Michael, K. . (2008). The RFID-Enabled Dairy Farm: Towards Farm Management. *In 7th International Conference on Mobile Business*, Barcelona, Spain, 7-8 July, 2008, pp. 241-250. ICMB.
- Wang, N., Zhang, N. and Wang, M. (2006). Wireless sensors in agriculture and food industry—Recent development and future perspective, *Comput.Electron.Agric.*, **50** (1), 1-14.