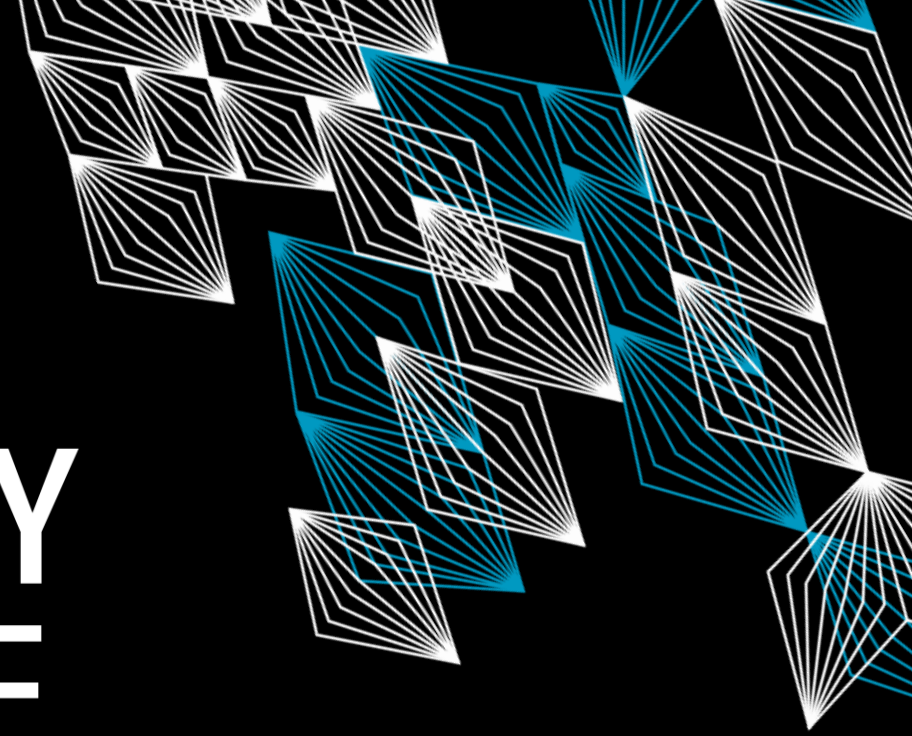
FACULTY OF ELECTRICAL ENGINEERING, MATHEMATICS AND COMPUTER SCIENCE

DATA MANAGEMENT & BIOMETRICS

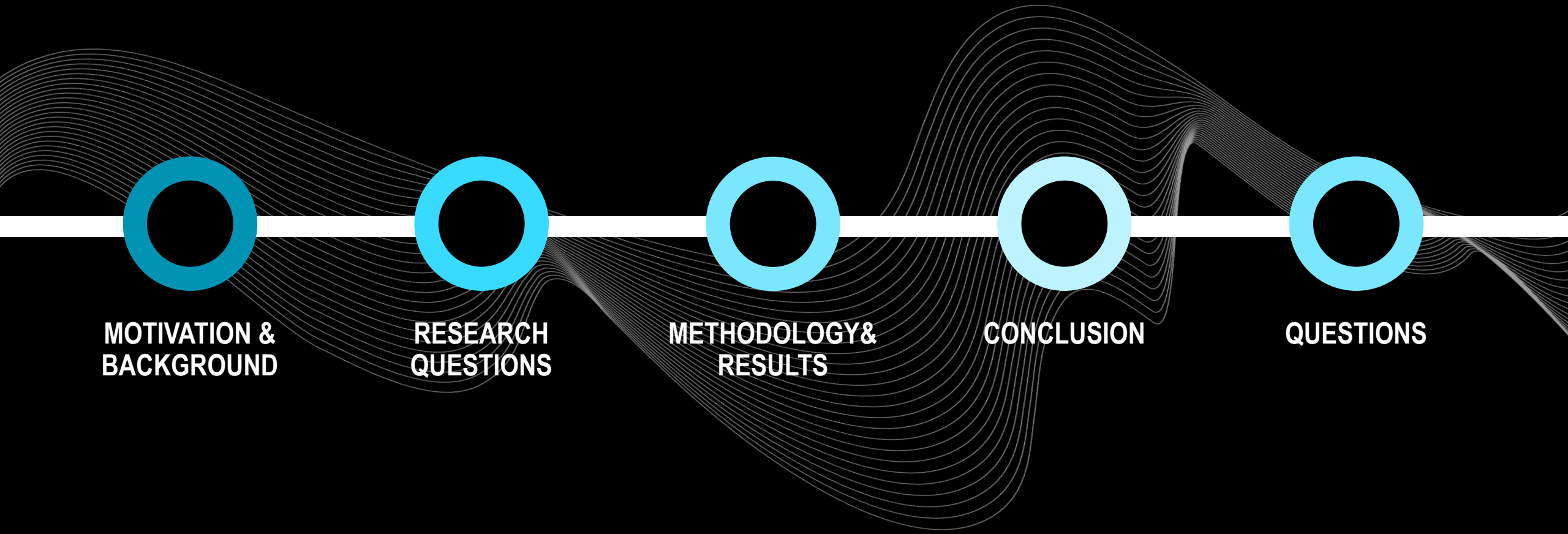


UNIVERSITY OF TWENTE.

THE INFLUENCE OF THE DUTCH WEATHER ON THE HEALTH OF HORSES

JOSJE VAN ‘T PADJE

IN THIS PRESENTATION:



UNIVERSITY OF TWENTE.

1. MOTIVATION & BACKGROUND

ASSUMPTIONS

- High amounts of wind causes colic
- High humidity causes respiratory problems
- High humidity causes fungal infections on the skin
- Muddy pastures cause mud fever
- High sugar in grass, due to cold nights causes, laminitis

DISEASES

2. RESEARCH QUESTIONS

FIRST RESEARCH QUESTION

What is the influence of the Dutch weather on the health of horses?

1. Does the temperature, barometric pressure and high amount of wind influence the occurrence of colic?
2. Is the development of laminitis dependent on stress in the grass, due to cold and drought?
3. Does hot, humid or cold weather worsen or induce respiratory disease?
4. Do skin diseases occur more in periods of heavy rainfall and high humidity?

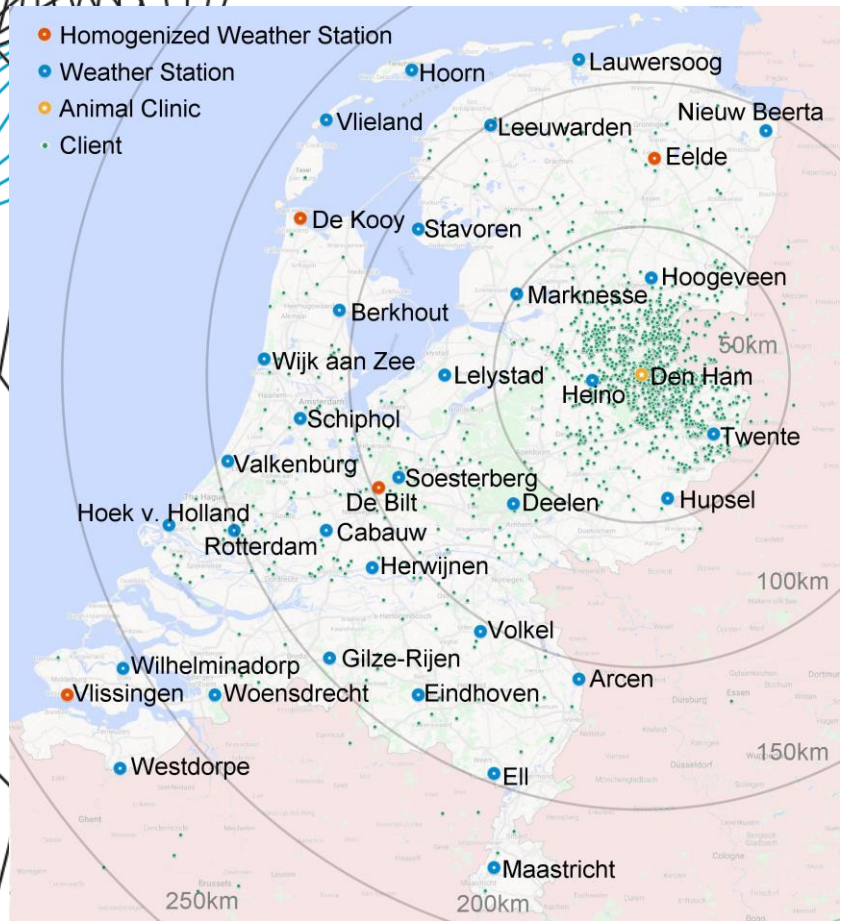
SECOND RESEARCH QUESTION

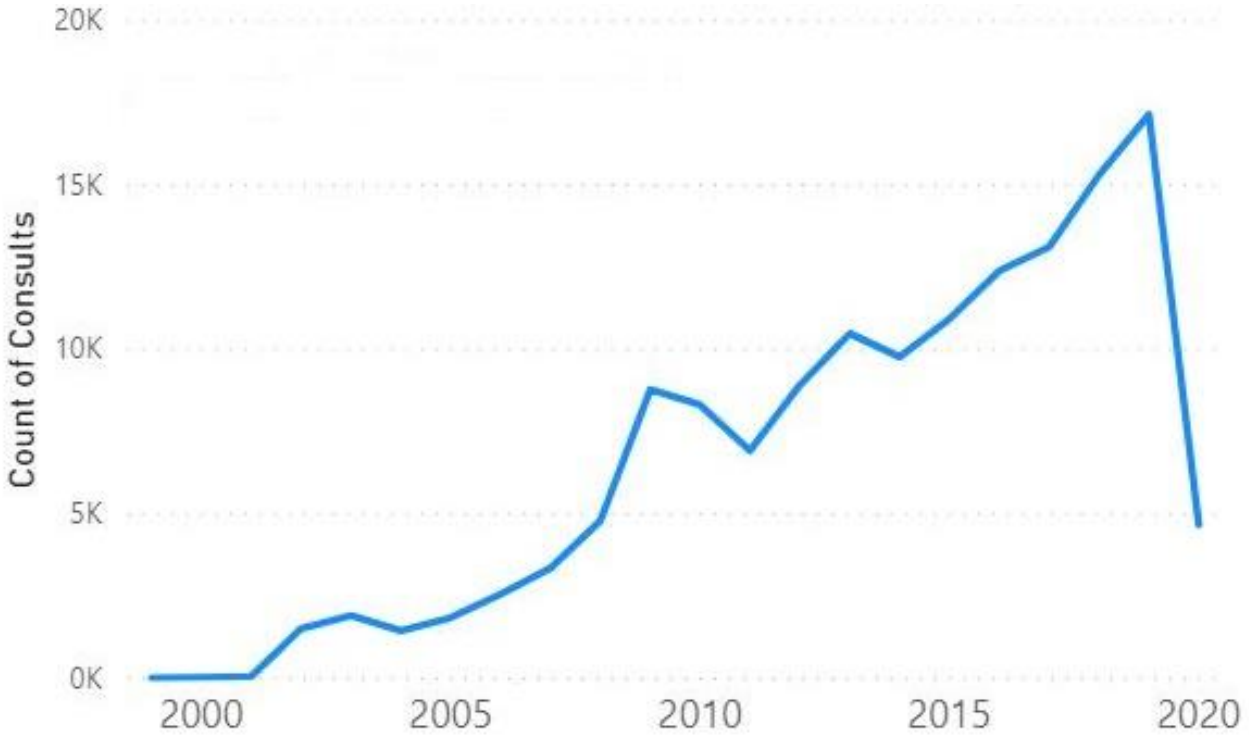
To what extent can the Dutch weather be used to predict the occurrence of ...

a. … colic ?
b. … laminitis?
c. … respiratory disease?
d. … skin disease?

3. METHODOLOGY & RESULTS

DATA



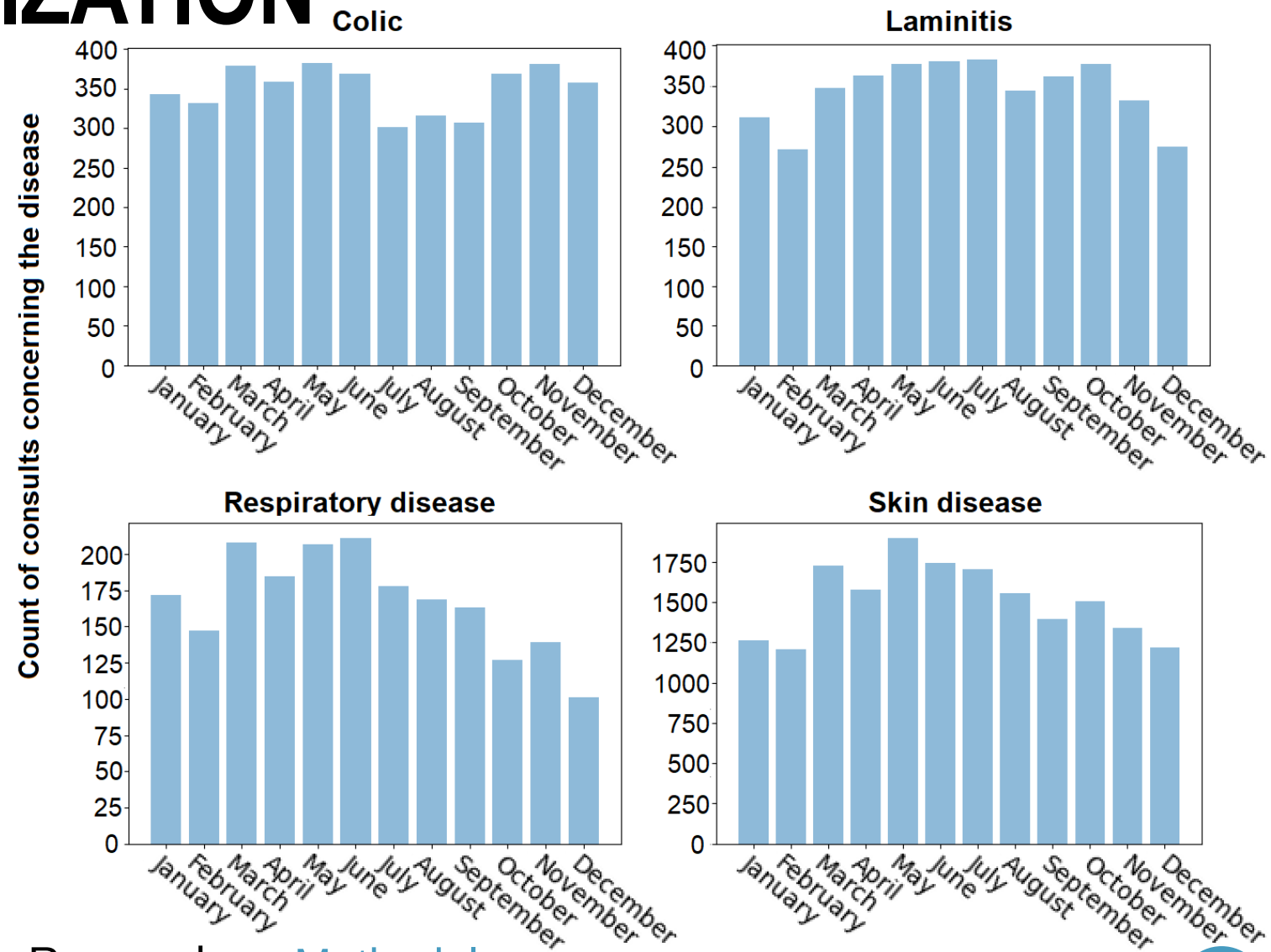


144.400 lines in total
58.927 consults over 21 years

LABELLING CONSULTS

Disease	Keyword(s)	# Consults (keyword)	# Consults (labelling)	Accuracy (keyword)	Accuracy (labelling)
Colic	Koliek	765	4196	0.99557	0.98893
Laminitis	Hoefbevangen	196	5037	0.99077	0.97509
Respiratory	Snot, Luchtweg, Bronchitis, Longontsteking	273	2007	0.99336	0.98727
Skin	Schimmel, Mok	638	18135	0.99520	0.84613

VISUALIZATION

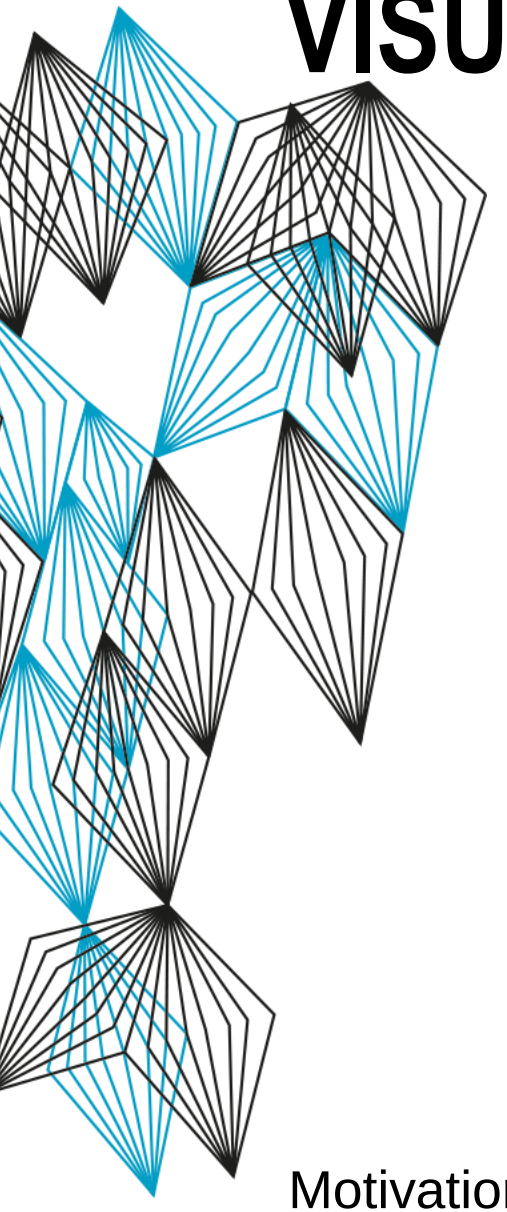


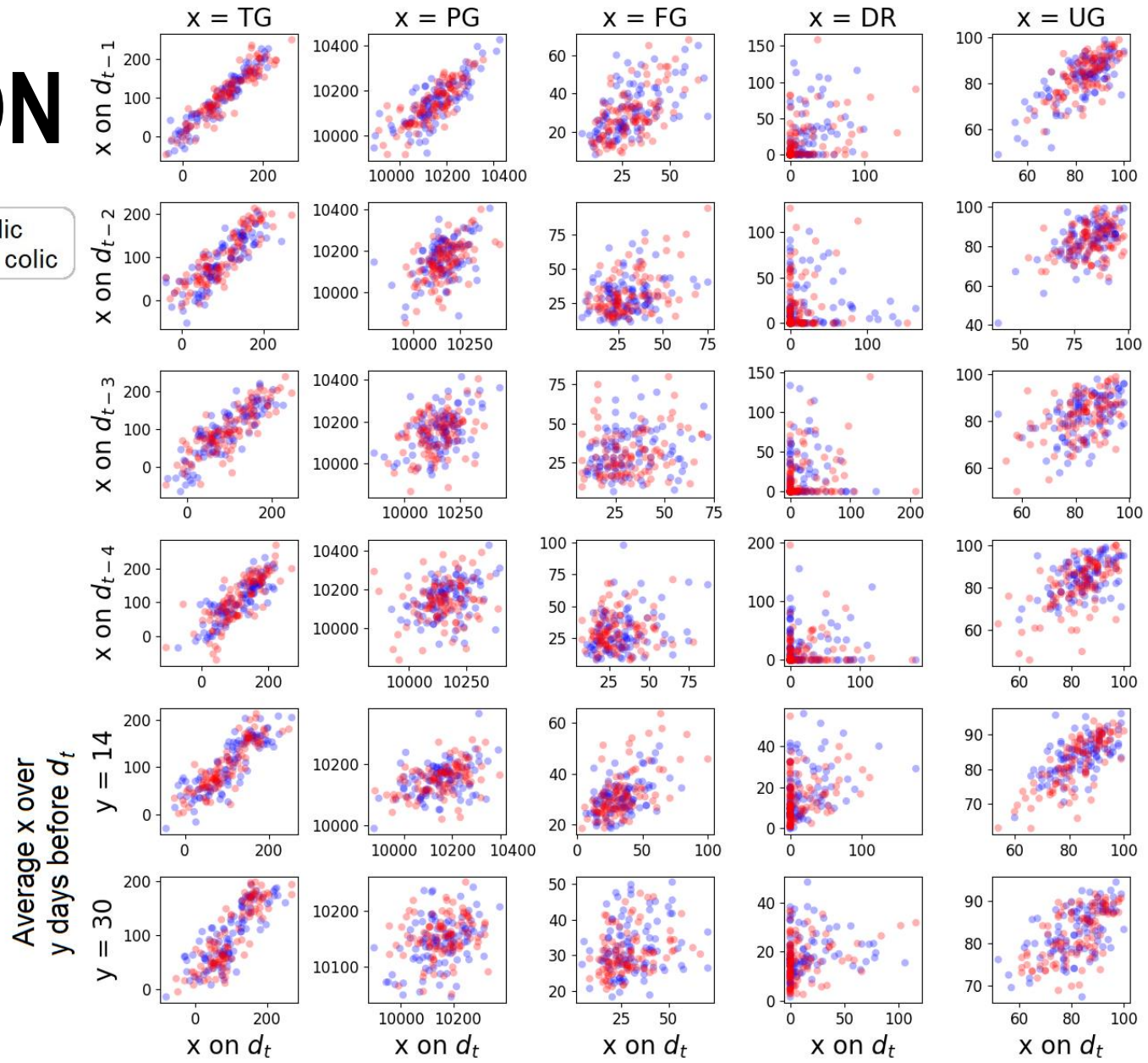
VISUALIZATION

group A group B

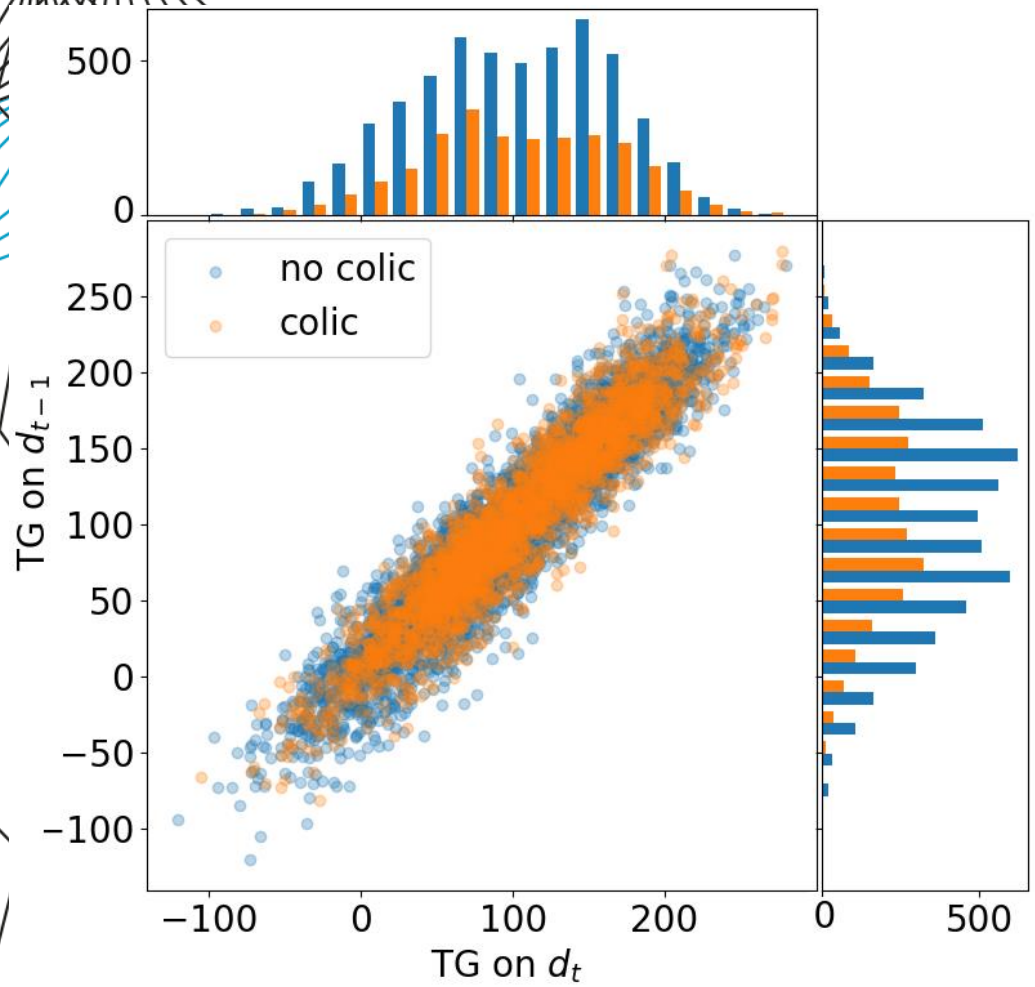
	DDVEC	FHVEC	FG	FHX	FHXH	FHN	...	UXH	UN	UNH	EV24	Date	Colic
1	195	29	30	40	11	20	...	6	85	14	2	1998-11-13	0
2	105	9	13	30	12	0	...	20	92	14	2	1998-11-14	0
3	228	7	12	30	22	0	...	11	97	23	2	1998-11-15	1
4	348	17	24	40	5	10	...	2	75	13	5	1998-11-16	0
5	253	10	13	20	1	0	...	23	67	13	3	1998-11-17	1
6	241	15	18	40	11	0	...	9	92	11	2	1998-11-18	0
7	60	13	17	30	6	0	...	1	64	12	5	1998-11-19	0
8	124	5	10	20	12	0	...	2	74	14	5	1998-11-20	0
9	148	15	17	30	12	10	...	1	75	13	6	1998-11-21	1
...	...	...	...	...	...	...	...	...	...	...	...	...	
7811	282	16	18	40	10	0	...	5	53	12	15	2020-04-01	1
7812	248	40	43	70	14	20	...	24	57	11	13	2020-04-02	1
7813	277	18	21	50	14	10	...	4	56	12	11	2020-04-03	0
7814	162	19	24	30	6	10	...	2	37	15	27	2020-04-04	0
7815	132	33	35	60	12	20	...	4	28	15	32	2020-04-05	0
7816	201	16	32	50	17	10	...	24	29	14	33	2020-04-06	1
7817	87	19	23	40	15	10	...	4	45	12	31	2020-04-07	0
7818	9	9	13	20	9	0	...	4	41	13	31	2020-04-08	0
7819	25	15	21	40	14	0	...	5	42	12	32	2020-04-09	1

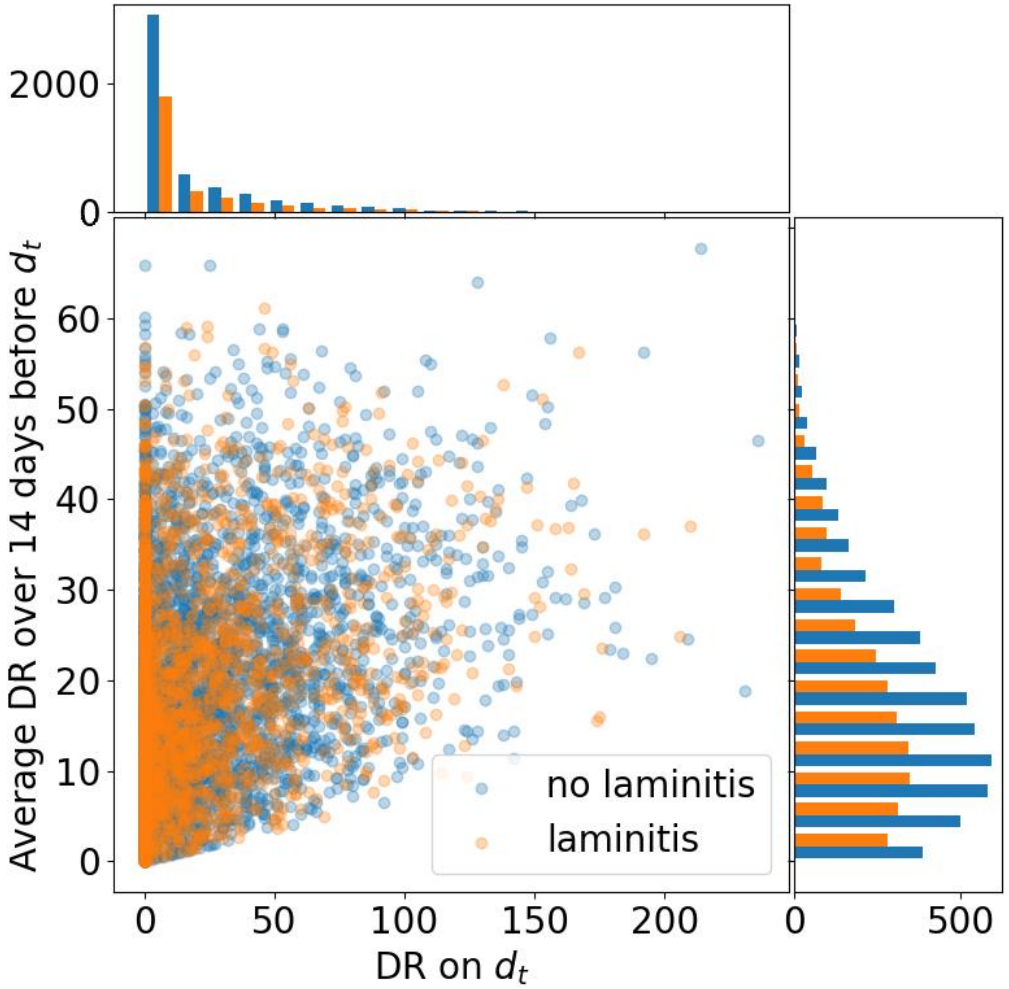
VISUALIZATION





VISUALIZATION





CORRELATIONS

group A group B

	DDVEC	FHVEC	FG	FHX	FHXH	FHN	...	UXH	UN	UNH	EV24	Date	Colic
1	195	29	30	40	11	20	...	6	85	14	2	1998-11-13	0
2	105	9	13	30	12	0	...	20	92	14	2	1998-11-14	0
3	228	7	12	30	22	0	...	11	97	23	2	1998-11-15	1
4	348	17	24	40	5	10	...	2	75	13	5	1998-11-16	0
5	253	10	13	20	1	0	...	23	67	13	3	1998-11-17	1
6	241	15	18	40	11	0	...	9	92	11	2	1998-11-18	0
7	60	13	17	30	6	0	...	1	64	12	5	1998-11-19	0
8	124	5	10	20	12	0	...	2	74	14	5	1998-11-20	0
9	148	15	17	30	12	10	...	1	75	13	6	1998-11-21	1
...	...	...	...	...	...	...	...	...	...	...	...	...	
7811	282	16	18	40	10	0	...	5	53	12	15	2020-04-01	1
7812	248	40	43	70	14	20	...	24	57	11	13	2020-04-02	1
7813	277	18	21	50	14	10	...	4	56	12	11	2020-04-03	0
7814	162	19	24	30	6	10	...	2	37	15	27	2020-04-04	0
7815	132	33	35	60	12	20	...	4	28	15	32	2020-04-05	0
7816	201	16	32	50	17	10	...	24	29	14	33	2020-04-06	1
7817	87	19	23	40	15	10	...	4	45	12	31	2020-04-07	0
7818	9	9	13	20	9	0	...	4	41	13	31	2020-04-08	0
7819	25	15	21	40	14	0	...	5	42	12	32	2020-04-09	1

CORRELATIONS

	d_t		d_{t-1}		d_{t-2}		d_{t-3}		d_{t-4}		$avg14$		$avg30$	
	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$
DDVEC	0.82917	0.35608	0.63337	0.90222	0.79121	0.41347	0.63936	-0.72608	0.19181	-2.30417	0.28172	-0.87379	0.38961	-0.51013
FHVEC	0.01399	-0.76387	0.20979	-0.39589	0.50749	-0.21324	0.38561	-0.27110	0.79920	0.08339	2.00E-03	-0.60492	2.00E-03	-0.82950
FG	0.01998	-0.68584	0.31568	-0.29360	0.45754	-0.23566	0.37762	-0.26128	0.72128	0.10616	2.00E-03	-0.59902	2.00E-03	-0.78888
FHX	4.00E-03	-1.17543	0.27972	-0.44238	0.22577	-0.49253	0.18781	-0.55380	0.51548	0.27358	2.00E-03	-0.81869	2.00E-03	-1.04504
FHN	0.05594	-0.50122	0.92507	0.01793	0.93307	0.01902	0.75724	0.10035	0.60739	0.12914	0.03796	-0.30806	7.99E-03	-0.38434
FXX	0.36763	-0.64850	0.36963	0.66358	0.69331	0.28593	0.55544	0.46497	0.03996	1.50386	0.52348	-0.23007	0.02398	-0.68720
TG	0.23576	1.54996	0.16783	1.77569	0.14585	1.97262	0.10390	2.22266	0.06394	2.44107	0.09391	1.98827	0.10789	1.86580
TN	0.86913	0.22227	0.61139	0.58979	0.59540	0.58710	0.68332	0.44145	0.37762	0.97807	0.60539	0.49658	0.64336	0.43663
TX	0.08991	2.77860	0.09391	2.65047	0.04995	3.08160	0.01598	3.78279	7.99E-03	4.00532	0.01598	3.37241	0.02597	3.21569
T10N	0.03197	-2.73724	0.14386	-1.86777	0.07792	-2.11051	0.02398	-2.60678	0.15984	-1.69085	0.01199	-2.37851	5.99E-03	-2.41088
SQ	0.03996	1.76681	0.18382	1.17527	2.00E-03	2.37073	0.01199	2.19483	4.00E-03	2.89358	2.00E-03	1.89383	2.00E-03	1.81896
SP	0.07393	1.11729	0.20380	0.79168	2.00E-03	1.79751	9.99E-03	1.59284	4.00E-03	2.16013	2.00E-03	1.36862	2.00E-03	1.38121
Q	0.13387	24.58175	0.34765	14.97431	0.08392	28.99317	0.07992	29.22613	0.04196	33.35421	0.10589	22.14958	0.15584	18.46423
DR	0.03996	-1.25179	0.18182	-0.81915	0.02597	-1.34612	0.90909	0.05580	0.99101	-0.01271	0.01199	-0.73090	2.00E-03	-0.98614
RH	0.02597	-2.04794	0.96903	-0.05926	0.24775	-1.05909	0.82917	0.19626	0.83317	-0.19471	5.99E-03	-0.86904	2.00E-03	-1.17424
RHX	0.07193	-0.66611	0.67732	0.13538	0.94705	-0.04517	0.41758	0.28984	0.51149	0.23741	0.14785	-0.18624	4.00E-03	-0.31075
UG	2.00E-03	-0.92264	2.00E-03	-1.10100	2.00E-03	-1.33326	2.00E-03	-1.47911	2.00E-03	-1.52943	2.00E-03	-1.09409	2.00E-03	-1.01837
UX	0.23976	0.10784	0.80320	-0.02862	0.61538	-0.05179	0.42957	-0.08358	0.15385	-0.13969	0.18781	0.06583	2.00E-03	0.13225
UN	2.00E-03	-1.52685	2.00E-03	-1.66415	2.00E-03	-1.96612	2.00E-03	-2.42351	2.00E-03	-2.36496	2.00E-03	-1.87380	2.00E-03	-1.81880
PG	0.21379	-2.45405	0.02597	-4.51918	9.99E-03	-5.58359	5.99E-03	-6.21809	7.99E-03	-6.64415	5.99E-03	-3.68130	0.41159	-0.65011
PX	0.29570	-1.92431	0.02997	-4.08816	0.01399	-4.52851	0.01399	-4.98560	0.02198	-4.86161	9.99E-03	-3.03114	0.85115	-0.10605
PN	0.15584	-2.92185	0.02398	-5.02700	5.99E-03	-6.78208	2.00E-03	-7.60243	4.00E-03	-8.15551	4.00E-03	-4.35857	0.17383	-1.27217
EV24	0.16384	0.40344	0.38561	0.24001	0.11389	0.47538	0.09990	0.47608	0.05395	0.55513	0.14386	0.36106	0.20579	0.29607

CORRELATIONS

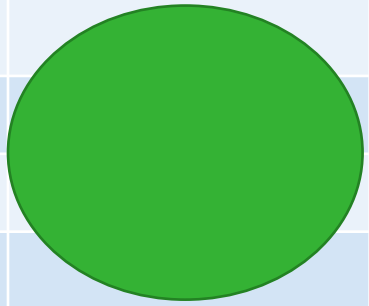
	d_t		d_{t-1}		d_{t-2}		d_{t-3}		d_{t-4}		$avg14$		$avg30$	
	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$
DDVEC	0.82917	0.35608	0.63337	0.90222	0.79121	0.41347	0.63936	-0.72608	0.19181	-2.30417	0.28172	-0.87379	0.38961	-0.51013
FHVEC	0.01399	-0.76387	0.20979	-0.39589	0.50749	-0.21324	0.38561	-0.27110	0.79920	0.08339	2.00E-03	-0.60492	2.00E-03	-0.82950
FG	0.01998	-0.68584	0.31568	-0.29360	0.45754	-0.23566	0.37762	-0.26128	0.72128	0.10616	2.00E-03	-0.59902	2.00E-03	-0.78888
FHX	4.00E-03	-1.17543	0.27972	-0.44238	0.22577	-0.49253	0.18781	-0.55380	0.51548	0.27358	2.00E-03	-0.81869	2.00E-03	-1.04504
FHN	0.05594	-0.50122	0.92507	0.01793	0.93307	0.01902	0.75724	0.10035	0.60739	0.12914	0.03796	-0.30806	7.99E-03	-0.38434
FXX	0.36763	-0.64850	0.36963	0.66358	0.69331	0.28593	0.55544	0.46497	0.03996	1.50386	0.52348	-0.23007	0.02398	-0.68720
TG	0.23576	1.54996	0.16783	1.77569	0.14585	1.97262	0.10390	2.22266	0.06394	2.44107	0.09391	1.98827	0.10789	1.86580
TN	0.86913	0.22227	0.61139	0.58979	0.59540	0.58710	0.68332	0.44145	0.37762	0.97807	0.60539	0.49658	0.64336	0.43663
TX	0.08991	2.77860	0.09391	2.65047	0.04995	3.08160	0.01598	3.78279	7.99E-03	4.00532	0.01598	3.37241	0.02597	3.21569
T10N	0.03197	-2.73724	0.14386	-1.86777	0.07792	-2.11051	0.02398	-2.60678	0.15984	-1.69085	0.01199	-2.37851	5.99E-03	-2.41088
SQ	0.03996	1.76681	0.18382	1.17527	2.00E-03	2.37073	0.01199	2.19483	4.00E-03	2.89358	2.00E-03	1.89383	2.00E-03	1.81896
SP	0.07393	1.11729	0.20380	0.79168	2.00E-03	1.79751	9.99E-03	1.59284	4.00E-03	2.16013	2.00E-03	1.36862	2.00E-03	1.38121
Q	0.13387	24.58175	0.34765	14.97431	0.08392	28.99317	0.07992	29.22613	0.04196	33.35421	0.10589	22.14958	0.15584	18.46423
DR	0.03996	-1.25179	0.18182	-0.81915	0.02597	-1.34612	0.90909	0.05580	0.99101	-0.01271	0.01199	-0.73090	2.00E-03	-0.98614
RH	0.02597	-2.04794	0.96903	-0.05926	0.24775	-1.05909	0.82917	0.19626	0.83317	-0.19471	5.99E-03	-0.86904	2.00E-03	-1.17424
RHX	0.07193	-0.66611	0.67732	0.13538	0.94705	-0.04517	0.41758	0.28984	0.51149	0.23741	0.14785	-0.18624	4.00E-03	-0.31075
UG	2.00E-03	-0.92264	2.00E-03	-1.10100	2.00E-03	-1.33326	2.00E-03	-1.47911	2.00E-03	-1.52943	2.00E-03	-1.09409	2.00E-03	-1.01837
UX	0.23976	0.10784	0.80320	-0.02862	0.61538	-0.05179	0.42957	-0.08358	0.15385	-0.13969	0.18781	0.06583	2.00E-03	0.13225
UN	2.00E-03	-1.52685	2.00E-03	-1.66415	2.00E-03	-1.96612	2.00E-03	-2.42351	2.00E-03	-2.36496	2.00E-03	-1.87380	2.00E-03	-1.81880
PG	0.21379	-2.45405	0.02597	-4.51918	9.99E-03	-5.58359	5.99E-03	-6.21809	7.99E-03	-6.64415	5.99E-03	-3.68130	0.41159	-0.65011
PX	0.29570	-1.92431	0.02997	-4.08816	0.01399	-4.52851	0.01399	-4.98560	0.02198	-4.86161	9.99E-03	-3.03114	0.85115	-0.10605
PN	0.15584	-2.92185	0.02398	-5.02700	5.99E-03	-6.78208	2.00E-03	-7.60243	4.00E-03	-8.15551	4.00E-03	-4.35857	0.17383	-1.27217
EV24	0.16384	0.40344	0.38561	0.24001	0.11389	0.47538	0.09990	0.47608	0.05395	0.55513	0.14386	0.36106	0.20579	0.29607

	d_t		d_{t-1}		d_{t-2}		d_{t-3}		d_{t-4}		$avg14$		$avg30$	
	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$
DDVEC	0.68332	0.99963	0.62937	1.03204	0.44555	1.59177	0.69530	-0.87269	0.57542	1.39391	0.97502	0.04850	0.63736	-0.36285
FHVEC	2.00E-03	-1.60210	0.01598	-0.92115	0.01798	-0.84112	0.44156	-0.27576	0.06993	-0.74727	2.00E-03	-0.99222	2.00E-03	-0.87446
FG	2.00E-03	-1.46041	0.02198	-0.84379	0.01399	-0.80630	0.72128	-0.12382	0.16184	-0.52334	2.00E-03	-0.83679	2.00E-03	-0.73776
FHX	9.99E-03	-1.40937	0.09391	-0.85673	0.32967	-0.47985	0.84116	0.11713	0.18182	-0.66166	0.01199	-0.67557	4.00E-03	-0.61737
FHN	2.00E-03	-1.65112	7.99E-03	-0.86376	2.00E-03	-1.11679	0.24975	-0.37319	2.00E-03	-1.03508	2.00E-03	-0.97175	2.00E-03	-0.78872
FXX	0.03996	-1.76024	0.62937	-0.36615	0.90110	0.12672	0.38561	0.81961	0.59141	-0.48174	0.31369	-0.45388	0.17982	-0.44918
TG	2.00E-03	8.52992	2.00E-03	7.82240	2.00E-03	7.45474	2.00E-03	6.88147	2.00E-03	7.23046	2.00E-03	7.35517	2.00E-03	6.24172
TN	2.00E-03	4.32979	4.00E-03	4.44834	0.01199	3.85551	4.00E-03	4.22468	2.00E-03	4.30363	2.00E-03	4.06207	4.00E-03	3.12171
TX	2.00E-03	12.31797	2.00E-03	11.01053	2.00E-03	10.81129	2.00E-03	9.79062	2.00E-03	9.49560	2.00E-03	10.42815	2.00E-03	9.07429
T10N	0.50949	1.11121	0.40559	1.32320	0.49550	1.14817	0.22378	2.01371	0.25375	1.83271	0.30370	1.42126	0.67133	0.53733
SQ	2.00E-03	5.03541	2.00E-03	4.97738	2.00E-03	7.14560	2.00E-03	5.76194	2.00E-03	4.26927	2.00E-03	4.85564	2.00E-03	4.68911
SP	4.00E-03	2.07533	2.00E-03	2.44914	2.00E-03	4.14940	2.00E-03	3.21934	0.03197	1.66084	2.00E-03	2.30269	2.00E-03	2.38366
Q	2.00E-03	140.37891	2.00E-03	132.05512	2.00E-03	153.83697	2.00E-03	134.12079	2.00E-03	124.01567	2.00E-03	128.96279	2.00E-03	119.04022
DR	0.01399	-1.83572	0.01399	-1.82948	2.00E-03	-2.58433	0.45954	0.55924	0.98901	0.00226	2.00E-03	-1.29379	2.00E-03	-1.39548
RH	0.03796	-2.22396	0.20979	-1.30973	0.08991	-1.66588	0.09590	1.84806	0.79720	0.25743	0.02797	-0.80249	2.00E-03	-1.18823
RHX	0.02597	-1.02641	0.76923	0.14137	0.66334	-0.18767	0.11588	0.76950	0.88312	0.06723	0.90310	-0.01772	0.03796	-0.23197
UG	2.00E-03	-1.56112	2.00E-03	-1.70178	2.00E-03	-2.20593	2.00E-03	-2.01202	0.00200	-1.61016	0.00200	-1.76412	0.00200	-1.71951
UX	0.02597	0.27864	0.86513	0.01820	0.68531	-0.04533	9.99E-03	-0.31558	0.20979	0.15115	0.77123	0.01975	0.72328	0.01997
UN	2.00E-03	-3.39189	2.00E-03	-3.03723	2.00E-03	-3.80596	2.00E-03	-3.63216	2.00E-03	-3.09680	2.00E-03	-3.24331	2.00E-03	-3.09241
PG	0.55544	-1.42041	0.47752	-1.65851	0.44555	-1.87276	0.08192	-4.34328	0.06993	-4.11286	0.35365	1.32836	0.09391	1.79315
PX	0.30170	-2.32862	0.16983	-3.10523	0.19181	-3.01224	0.10390	-3.80203	0.13986	-3.39753	0.51149	0.86189	0.15584	1.43897
PN	0.93706	-0.11149	0.85914	-0.50535	0.63337	-1.21839	0.07992	-4.71376	0.04595	-4.98379	0.25774	1.76621	0.04595	2.23335
EV24	2.00E-03	2.44873	2.00E-03	2.25875	2.00E-03	2.61720	2.00E-03	2.24614	2.00E-03	2.16436	2.00E-03	2.21734	2.00E-03	2.00110

	d_t		d_{t-1}		d_{t-2}		d_{t-3}		d_{t-4}		$avg14$		$avg30$	
	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$
DDVEC	0.07592	-3.26807	0.04196	-3.54738	0.12587	2.59529	0.01199	4.67398	0.77722	0.51509	0.34965	-0.74608	0.92707	0.06351
FHVEC	4.00E-03	-0.95194	7.99E-03	-0.86365	2.00E-03	-1.03007	2.00E-03	-1.71063	2.00E-03	-1.39857	2.00E-03	-1.36719	2.00E-03	-1.13249
FG	4.00E-03	-0.92094	5.99E-03	-0.80574	4.00E-03	-0.95467	2.00E-03	-1.53571	2.00E-03	-1.25912	2.00E-03	-1.28536	2.00E-03	-1.03917
FHX	0.03397	-0.84029	0.07393	-0.68092	0.04795	-0.81406	2.00E-03	-1.54427	2.00E-03	-1.20859	2.00E-03	-1.24295	2.00E-03	-0.98435
FHN	4.00E-03	-0.90092	2.00E-03	-0.84519	2.00E-03	-1.07761	2.00E-03	-1.32450	2.00E-03	-1.18656	2.00E-03	-1.16396	2.00E-03	-0.97722
FXX	0.30569	-0.69664	0.36563	-0.60272	0.94106	-0.06918	0.01399	-1.59388	0.06593	-1.29359	2.00E-03	-1.19265	4.00E-03	-0.75927
TG	2.00E-03	8.96700	2.00E-03	8.53544	2.00E-03	8.72333	2.00E-03	8.31940	2.00E-03	9.01164	2.00E-03	7.73463	2.00E-03	7.52751
TN	2.00E-03	6.03729	2.00E-03	5.80932	2.00E-03	5.12304	2.00E-03	5.06298	2.00E-03	5.58235	2.00E-03	4.82460	2.00E-03	4.88957
TX	2.00E-03	11.64580	2.00E-03	10.81523	2.00E-03	11.89521	2.00E-03	11.21403	2.00E-03	11.83533	2.00E-03	10.50553	2.00E-03	10.04014
T10N	7.99E-03	3.19876	5.99E-03	3.26003	0.10589	1.90693	0.08392	1.90660	0.01998	2.68962	0.03596	1.93601	0.01998	2.08089
SQ	2.00E-03	4.09395	2.00E-03	3.57599	2.00E-03	5.71260	2.00E-03	4.59882	2.00E-03	4.05770	2.00E-03	4.31941	2.00E-03	4.09992
SP	4.00E-03	1.64525	0.01998	1.46750	2.00E-03	3.10365	2.00E-03	2.45364	4.00E-03	1.82083	2.00E-03	2.05785	2.00E-03	1.90323
Q	2.00E-03	106.22960	2.00E-03	99.76362	2.00E-03	125.38723	2.00E-03	104.57881	2.00E-03	102.14283	2.00E-03	107.00402	2.00E-03	104.87470
DR	0.07992	-1.02911	0.16783	-0.78939	2.00E-03	-1.72423	0.02597	-1.34237	0.09790	-0.95528	2.00E-03	-1.31512	2.00E-03	-1.01238
RH	0.14186	-1.17799	0.24575	-0.98538	0.03397	-1.79669	0.21179	-1.06688	0.99700	0.00629	5.99E-03	-0.70724	0.01399	-0.51234
RHX	0.52747	-0.22723	0.31568	-0.36569	0.42358	-0.28375	0.70330	-0.13713	0.29171	0.38878	0.79121	0.03305	0.66334	0.04449
UG	2.00E-03	-1.36374	2.00E-03	-1.40549	2.00E-03	-1.78219	2.00E-03	-1.52247	2.00E-03	-1.49821	2.00E-03	-1.48839	2.00E-03	-1.47832
UX	0.02997	0.18762	0.71129	0.02856	0.14585	0.14183	0.08991	0.15916	0.25774	0.10543	2.00E-03	0.13990	2.00E-03	0.11236
UN	2.00E-03	-2.76012	2.00E-03	-2.54213	2.00E-03	-3.32745	2.00E-03	-2.90082	2.00E-03	-2.79798	2.00E-03	-2.91268	2.00E-03	-2.81641
PG	0.08392	-3.51491	0.03796	-4.28841	0.07393	-3.64778	0.05195	-3.67582	0.02198	-4.36648	0.25974	-1.44340	0.33167	-0.88823
PX	0.02398	-4.36529	0.01798	-4.82841	0.06993	-3.40272	9.99E-03	-4.67366	0.01598	-4.36960	0.04396	-2.26276	0.04196	-1.63168
PN	0.40559	-1.90712	0.13387	-3.47640	0.09990	-3.51450	0.17982	-2.81684	0.05994	-3.96272	0.79321	-0.40976	0.98501	-0.06746
EV24	2.00E-03	1.91494	2.00E-03	1.77218	2.00E-03	2.16418	2.00E-03	1.82057	2.00E-03	1.81709	2.00E-03	1.85813	2.00E-03	1.81789

	d_t		d_{t-1}		d_{t-2}		d_{t-3}		d_{t-4}		$avg14$		$avg30$	
	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$
DDVEC	0.61339	-1.00635	0.62138	-0.79231	0.46354	1.39700	0.81119	0.44251	0.93107	-0.01224	0.27572	-0.84293	0.06793	-1.07064
FHVEC	2.00E-03	-1.89937	2.00E-03	-1.93026	2.00E-03	-2.13818	2.00E-03	-1.91030	2.00E-03	-1.78916	2.00E-03	-1.98978	2.00E-03	-1.91542
FG	2.00E-03	-1.76458	2.00E-03	-1.69187	2.00E-03	-1.94089	2.00E-03	-1.72293	2.00E-03	-1.59646	2.00E-03	-1.83670	2.00E-03	-1.75899
FHX	2.00E-03	-1.96519	2.00E-03	-1.76690	2.00E-03	-2.20544	2.00E-03	-1.57482	2.00E-03	-1.37767	2.00E-03	-1.83831	2.00E-03	-1.73899
FHN	2.00E-03	-1.64685	2.00E-03	-1.61689	2.00E-03	-1.62977	2.00E-03	-1.75014	2.00E-03	-1.79628	2.00E-03	-1.72204	2.00E-03	-1.63817
FXX	4.00E-03	-2.19696	0.01399	-1.75273	4.00E-03	-2.19173	0.07592	-1.29235	0.07193	-1.35063	2.00E-03	-1.91539	2.00E-03	-1.84315
TG	2.00E-03	13.56052	2.00E-03	13.32466	2.00E-03	12.66883	2.00E-03	12.35755	2.00E-03	13.06435	2.00E-03	12.15348	2.00E-03	10.72479
TN	2.00E-03	9.08091	2.00E-03	8.79280	2.00E-03	7.31058	2.00E-03	7.13564	2.00E-03	8.07982	2.00E-03	7.34097	2.00E-03	6.06338
TX	2.00E-03	17.64260	2.00E-03	17.62742	2.00E-03	17.53799	2.00E-03	17.14324	2.00E-03	17.62220	2.00E-03	16.54893	2.00E-03	14.97312
T10N	2.00E-03	4.82495	2.00E-03	4.42302	0.03596	2.64073	0.03596	2.62545	4.00E-03	3.92453	9.99E-03	2.89283	0.08991	1.63449
SQ	2.00E-03	6.56390	2.00E-03	6.58729	2.00E-03	8.20271	2.00E-03	7.59952	2.00E-03	7.35143	2.00E-03	6.83054	2.00E-03	6.73269
SP	2.00E-03	2.72811	2.00E-03	3.00988	2.00E-03	4.24912	2.00E-03	3.99669	2.00E-03	3.45767	2.00E-03	3.13026	2.00E-03	3.15841
Q	2.00E-03	180.02619	2.00E-03	182.36102	2.00E-03	203.09665	2.00E-03	192.09764	2.00E-03	188.11195	2.00E-03	182.76076	2.00E-03	176.84148
DR	2.00E-03	-1.66241	0.05994	-1.15529	2.00E-03	-2.89286	2.00E-03	-2.06187	0.07792	-1.06043	2.00E-03	-1.76062	2.00E-03	-1.68144
RH	0.02198	-1.81470	0.92907	-0.12103	0.05594	-1.61615	0.11588	-1.20488	0.91109	-0.08371	2.00E-03	-0.92011	2.00E-03	-0.91047
RHX	0.21978	-0.46364	0.32168	0.38294	0.81518	0.08639	0.83317	0.08259	0.20380	0.45812	0.33367	0.12296	0.72527	0.03541
UG	2.00E-03	-2.09654	2.00E-03	-2.23934	2.00E-03	-2.66566	2.00E-03	-2.66248	2.00E-03	-2.45419	2.00E-03	-2.37983	2.00E-03	-2.38332
UX	2.00E-03	0.34940	0.01598	0.25814	0.11389	0.15047	0.41159	0.08147	0.02398	0.23168	2.00E-03	0.21490	2.00E-03	0.19513
UN	2.00E-03	-4.22428	2.00E-03	-4.48520	2.00E-03	-5.04837	2.00E-03	-5.06212	2.00E-03	-4.90932	2.00E-03	-4.65803	2.00E-03	-4.63906
PG	0.25574	-2.17790	0.24176	-2.15853	0.59341	-0.96515	0.28971	-2.01152	0.09191	-3.35950	0.94505	-0.09669	0.25175	0.99891
PX	0.02398	-3.80384	0.05395	-3.46286	0.23976	-2.21697	0.07792	-3.40627	0.03397	-4.03235	0.12388	-1.63219	0.60340	-0.45077
PN	0.95504	-0.07640	0.83716	-0.42911	0.79121	0.54475	0.73926	-0.67797	0.21778	-2.51291	0.17782	1.67632	7.99E-03	2.62148
EV24	2.00E-03	3.17689	2.00E-03	3.17941	2.00E-03	3.47281	2.00E-03	3.30292	2.00E-03	3.28678	2.00E-03	3.16063	2.00E-03	3.00490

PREDICTIONS

	Single classifiers	Ensemble Predictions		
		Bagging	Boosting	Voting
Linear Regression				
Support Vector Machine				
Decision Tree				
Neural Network				

PREDICTIONS

	Single classifiers	Ensemble Predictions		
		Bagging	Boosting	Voting
Colic	0.67749 (LR)	0.70102 (DT)	0.69207	0.68338
Laminitis	0.65162 (SVM, NN)	0.64680 (DT)	0.62583	0.63555
Respiratory	0.79847 (SVM)	0.79847 (SVM)	0.79463	0.79847
Skin	0.66803 (LR)	0.74194 (DT)	0.72225	0.66215

6. CONCLUSION

ANSWER TO FIRST RESEARCH QUESTION

What is the influence of the Dutch weather on the health of horses?

1. Does the temperature, barometric pressure and high amount of wind influence the occurrence of colic?
2. Is the development of laminitis dependent on stress in the grass, due to cold and drought?
3. Does hot, humid or cold weather worsen or induce respiratory disease?
4. Do skin diseases occur more in periods of heavy rainfall and high humidity?

ANSWER TO FIRST RESEARCH QUESTION

1. Does the temperature, barometric pressure and high amount of wind influence the occurrence of colic?

	d_t		d_{t-1}		d_{t-2}		d_{t-3}		d_{t-4}		$avg14$		$avg30$	
	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$
TG	0.23576	1.54996	0.16783	1.77569	0.14585	1.97262	0.10390	2.22266	0.06394	2.44107	0.09391	1.98827	0.10789	1.86580
TN	0.86913	0.22227	0.61139	0.58979	0.59540	0.58710	0.68332	0.44145	0.37762	0.97807	0.60539	0.49658	0.64336	0.43663
TX	0.08991	2.77860	0.09391	2.65047	0.04995	3.08160	0.01598	3.78279	7.99E-03	4.00532	0.01598	3.37241	0.02597	3.21569
T10N	0.03197	-2.73724	0.14386	-1.86777	0.07792	-2.11051	0.02398	-2.60678	0.15984	-1.69085	0.01199	-2.37851	5.99E-03	-2.41088
PG	0.21379	-2.45405	0.02597	-4.51918	9.99E-03	-5.58359	5.99E-03	-6.21809	7.99E-03	-6.64415	5.99E-03	-3.68130	0.41159	-0.65011
PX	0.29570	-1.92431	0.02997	-4.08816	0.01399	-4.52851	0.01399	-4.98560	0.02198	-4.86161	9.99E-03	-3.03114	0.85115	-0.10605
PN	0.15584	-2.92185	0.02398	-5.02700	5.99E-03	-6.78208	2.00E-03	-7.60243	4.00E-03	-8.15551	4.00E-03	-4.35857	0.17383	-1.27217
DDVEC	0.82917	0.35608	0.63337	0.90222	0.79121	0.41347	0.63936	-0.72608	0.19181	-2.30417	0.28172	-0.87379	0.38961	-0.51013
FHVEC	0.01399	-0.76387	0.20979	-0.39589	0.50749	-0.21324	0.38561	-0.27110	0.79920	0.08339	2.00E-03	-0.60492	2.00E-03	-0.82950
FG	0.01998	-0.68584	0.31568	-0.29360	0.45754	-0.23566	0.37762	-0.26128	0.72128	0.10616	2.00E-03	-0.59902	2.00E-03	-0.78888
FHX	4.00E-03	-1.17543	0.27972	-0.44238	0.22577	-0.49253	0.18781	-0.55380	0.51548	0.27358	2.00E-03	-0.81869	2.00E-03	-1.04504
FHN	0.05594	-0.50122	0.92507	0.01793	0.93307	0.01902	0.75724	0.10035	0.60739	0.12914	0.03796	-0.30806	7.99E-03	-0.38434
FXX	0.36763	-0.64850	0.36963	0.66358	0.69331	0.28593	0.55544	0.46497	0.03996	1.50386	0.52348	-0.23007	0.02398	-0.68720

ANSWER TO FIRST RESEARCH QUESTION

2. Is the development of laminitis dependent on stress in the grass, due to cold and drought?

	d_t		d_{t-1}		d_{t-2}		d_{t-3}		d_{t-4}		$avg14$		$avg30$	
	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$
TG	2.00E-03	8.96700	2.00E-03	8.53544	2.00E-03	8.72333	2.00E-03	8.31940	2.00E-03	9.01164	2.00E-03	7.73463	2.00E-03	7.52751
TN	2.00E-03	6.03729	2.00E-03	5.80932	2.00E-03	5.12304	2.00E-03	5.06298	2.00E-03	5.58235	2.00E-03	4.82460	2.00E-03	4.88957
TX	2.00E-03	11.64580	2.00E-03	10.81523	2.00E-03	11.89521	2.00E-03	11.21403	2.00E-03	11.83533	2.00E-03	10.50553	2.00E-03	10.04014
T10N	7.99E-03	3.19876	5.99E-03	3.26003	0.10589	1.90693	0.08392	1.90660	0.01998	2.68962	0.03596	1.93601	0.01998	2.08089
DR	0.07992	-1.02911	0.16783	-0.78939	2.00E-03	-1.72423	0.02597	-1.34237	0.09790	-0.95528	2.00E-03	-1.31512	2.00E-03	-1.01238
RH	0.14186	-1.17799	0.24575	-0.98538	0.03397	-1.79669	0.21179	-1.06688	0.99700	0.00629	5.99E-03	-0.70724	0.01399	-0.51234
RHX	0.52747	-0.22723	0.31568	-0.36569	0.42358	-0.28375	0.70330	-0.13713	0.29171	0.38878	0.79121	0.03305	0.66334	0.04449

ANSWER TO FIRST RESEARCH QUESTION

3. Does hot, humid or cold weather worsen or induce respiratory disease?

	d_t		d_{t-1}		d_{t-2}		d_{t-3}		d_{t-4}		$avg14$		$avg30$	
	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$
TG	2.00E-03	8.52992	2.00E-03	7.82240	2.00E-03	7.45474	2.00E-03	6.88147	2.00E-03	7.23046	2.00E-03	7.35517	2.00E-03	6.24172
TN	2.00E-03	4.32979	4.00E-03	4.44834	0.01199	3.85551	4.00E-03	4.22468	2.00E-03	4.30363	2.00E-03	4.06207	4.00E-03	3.12171
TX	2.00E-03	12.31797	2.00E-03	11.01053	2.00E-03	10.81129	2.00E-03	9.79062	2.00E-03	9.49560	2.00E-03	10.42815	2.00E-03	9.07429
T10N	0.50949	1.11121	0.40559	1.32320	0.49550	1.14817	0.22378	2.01371	0.25375	1.83271	0.30370	1.42126	0.67133	0.53733
UG	2.00E-03	-1.56112	2.00E-03	-1.70178	2.00E-03	-2.20593	2.00E-03	-2.01202	0.00200	-1.61016	0.00200	-1.76412	0.00200	-1.71951
UX	0.02597	0.27864	0.86513	0.01820	0.68531	-0.04533	9.99E-03	-0.31558	0.20979	0.15115	0.77123	0.01975	0.72328	0.01997
UN	2.00E-03	-3.39189	2.00E-03	-3.03723	2.00E-03	-3.80596	2.00E-03	-3.63216	2.00E-03	-3.09680	2.00E-03	-3.24331	2.00E-03	-3.09241

ANSWER TO FIRST RESEARCH QUESTION

4. Do skin diseases occur more in periods of heavy rainfall and high humidity?

	d_t		d_{t-1}		d_{t-2}		d_{t-3}		d_{t-4}		$avg14$		$avg30$	
	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$	P-value	$\overline{X}_a - \overline{X}_b$
DR	2.00E-03	-1.66241	0.05994	-1.15529	2.00E-03	-2.89286	2.00E-03	-2.06187	0.07792	-1.06043	2.00E-03	-1.76062	2.00E-03	-1.68144
RH	0.02198	-1.81470	0.92907	-0.12103	0.05594	-1.61615	0.11588	-1.20488	0.91109	-0.08371	2.00E-03	-0.92011	2.00E-03	-0.91047
RHX	0.21978	-0.46364	0.32168	0.38294	0.81518	0.08639	0.83317	0.08259	0.20380	0.45812	0.33367	0.12296	0.72527	0.03541
UG	2.00E-03	-2.09654	2.00E-03	-2.23934	2.00E-03	-2.66566	2.00E-03	-2.66248	2.00E-03	-2.45419	2.00E-03	-2.37983	2.00E-03	-2.38332
UX	2.00E-03	0.34940	0.01598	0.25814	0.11389	0.15047	0.41159	0.08147	0.02398	0.23168	2.00E-03	0.21490	2.00E-03	0.19513
UN	2.00E-03	-4.22428	2.00E-03	-4.48520	2.00E-03	-5.04837	2.00E-03	-5.06212	2.00E-03	-4.90932	2.00E-03	-4.65803	2.00E-03	-4.63906

ANSWER TO FIRST RESEARCH QUESTION

What is the influence of the Dutch weather on the health of horses?

1. Does the temperature, barometric pressure and high amount of wind influence the occurrence of colic?
2. Is the development of laminitis dependent on stress in the grass, due to cold and drought?
3. Does hot, humid or cold weather worsen or induce respiratory disease?
4. Do skin diseases occur more in periods of heavy rainfall and high humidity?

ANSWER TO SECOND RESEARCH QUESTION

To what extent can the Dutch weather be used to predict the occurrence of ...

a. … colic ?	70.1% accurate
b. … laminitis?	65.2% accurate
c. … respiratory disease?	79.8% accurate
d. … skin disease?	74.2% accurate

QUESTIONS?