Supplementary Table 1. Summary of feed ingredients and nutrient composition for diets fed to cows during the study**.**

Nutrient composition (% DM, unless otherwise noted)	Prepartum	Postpartum	
		Fresh ($<$ 21 DIM)	High ($>$ 21 DIM)
DM, % of as fed	57.31	53.09	55.09
NE_L (Mcal/kg)	0.28	0.34	0.36
TDN	62.72	76.73	77.97
CP	14.61	16.59	16.26
NPN	0.72	0.91	1.02
SolubleP,% CP	39.15	44.01	42.02
RUP	5.77	5.25	5.74
RDP	8.84	11.34	10.52
Ether Extract	2.48	4.27	4.38
NDF	42.38	19.57	17.96
ADF	31.26	16.11	14.84
aNDFom	-	25.52	24.53
NFC	28.07	47.79	49.24
Forage	74.17	48.75	43.86
Starch	12.42	28.66	31.00
Sugar	3.12	3.96	4.08
Ca	1.12	0.92	0.84
P	0.42	0.4	0.4
Salt	0.13	0.45	0.5
Na	0.09	0.43	0.47
Cl	0.29	0.51	0.49
Mg	0.45	0.33	0.32
K	1.19	1.43	1.3
S	0.42	0.24	0.24
DCAD (mEq/100g)	-0.23	25.71	24.84
Co (ppm)	0.91	0.98	1.09
Cu (ppm)	19.05	16.80	17.65
I (ppm)	1.31	1.46	1.64
Mn (ppm)	98.09	65.79	68.76
Se (ppm)	0.36	0.27	0.3
Zn (ppm)	87.51	78.94	84.84
Vitamin A (UI)	114818	96378	160540
Vitamin D (UI)	34445	27241	45376
Vitamin E added (UI)	1906	513	854
Monensin (g/ton)	29.23	16.03	12.11
Rumensin (mg)	395.06	288.68	405.32

Supplementary Table 2. Associations between covariest with RT, PA, LT and MY patterns by disorder.

	METB-DIG[1]	DA+1[2]	CKET[3]	INDIG[4]
Rumination time (min/d; LSM ± SEM)				
Primiparous[5]	498.5 ± 9.1	484.5 ± 11.2	497.8 ± 10.3	513.7 ± 10.3
Multiparous[5]	526.8 ± 8.1	535.6 ± 10.6	527.8 ± 8.9	549.0 ± 9.8
P-value	< 0.001	< 0.001	< 0.001	< 0.001
Risk factor[6]	510.6 ± 9.1	511.3 ± 11.5	508.1 ± 10.6	528.8 ± 10.5
No Risk factor[6]	513.6 ± 8.2	509.4 ± 10.6	514.1 ± 9.1	533.8 ± 9.9
P-value	0.89	0.54	0.31	0.87
Warm season[7]	541.6 ± 7.8	539.6 ± 10.6	541.1 ± 8.9	560.3 ± 9.7
Cool season[7]	483.7 ± 9.5	480.5 ± 11.5	484.6 ± 10.5	502.3 ± 10.6
P-value	< 0.001	< 0.001	< 0.001	< 0.001
Physical activity (min/d; LSM ± SEM)				
Primiparous	876.4 ± 9.8	863.4 ± 11.3	875.5 ± 11.2	893.1 ± 10.5
Multiparous	875.1 ± 8.6	888.2 ± 10.7	877.8 ± 11.2	900.8 ± 9.9
P-value	0.86	< 0.001	0.72	0.26
Risk factor	866.5 ± 9.6	869.5 ± 11.6	866.3 ± 11.2	905.9 ± 10.0
No Risk factor	885.0 ± 8.8	878.7 ± 10.7	886.8 ± 9.7	887.9 ± 10.5
P-value	0.01	*P* = 0.52	0.007	0.01
Warm season	896.5 ± 8.4	891.0 ± 10.7	895.8 ± 9.6	918.5 ± 9.8
Cool season	854.9 ± 10.2	860.5 ± 11.6	857.2 ± 11.5	875.4 ± 10.8
P-value	< 0.001	0.001	< 0.001	< 0.001
Lying time (min/d; LSM ± SEM)				
Primiparous	709.4 ± 10.7	710.3 ± 12.8	701.1 ± 12.3	683.8 ± 12.3
Multiparous	811.4 ± 9.4	786.8 ± 12.8	797.5 ± 10.5	776.5 ± 11.5
P-value	< 0.001	< 0.001	< 0.001	< 0.001
Risk factor	767.4 ± 11.2	756.0 ± 13.2	762.8 ± 12.9	737.6 ± 12.2
No Risk factor	753.3 ± 9.6	748.4 ± 12.1	750.7 ± 11.0	724.9 ± 11.7
P-value	0.09	0.18	0.20	0.13
Warm season	752.5 ± 9.1	744.8 ± 12.1	748.3 ± 11.0	721.8 ± 11.5
Cool season	768.2 ± 11.2	759.6 ± 13.4	765.2 ± 13.2	738.5 ± 12.6
P-value	0.08	0.14	0.11	0.06
Milk yield (kg/d; LSM ± SEM)				
Primiparous	21.4 ± 0.6	21.2 ± 0.8	22.9 ± 0.7	21.2 ± 0.7
Multiparous	32.8 ± 0.5	34.3 ± 0.8	34.3 ± 0.6	33.1 ± 0.6
P-value	< 0.001	< 0.001	< 0.001	< 0.001
Risk factor	27.8 ± 0.6	28.9 ± 0.8	29.4 ± 0.7	28.0 ± 0.7
No Risk factor	26.5 ± 0.5	26.6 ± 0.8	27.9 ± 0.6	26.3 ± 0.6
P-value	0.005	0.005	0.002	< 0.001
Warm season	27.8 ± 0.5	27.7 ± 0.8	29.2 ± 0.6	27.7 ± 0.6
Cool season	26.4 ± 0.6	28.0 ± 0.9	28.0 ± 0.7	26.5 ± 0.7
P-value	0.007	0.58	0.02	0.02

[1]METB-DIG = comparison for cows that had at least one metabolic-digestive disorder (displaced abomasum, clinical ketosis, and indigestion; METB-DIG), compared with cows with metabolic-digestive disorders and at least another non-metabolic-digestive health disorder (i.e., mastitis, metritis, and pneumonia; METB-DIG+1) detected ± 7 d around clinical diagnosis (CD) of METB-DIG and cows with no clinical health disorders.

[2]DA+1 = refers to the comparison of cows with displaced abomasum (all had at least one other health disorder detected ± 7 d of CD of DA) and cows in the NCHD group.

[3]CKET = refers to the comparison of cows diagnosed with clinical ketosis (CKET) only during the period of interest and cows with clinical ketosis and at least another clinical health disorder (i.e., mastitis, metritis and pneumonia, another METB-DIG disorder; CKET+1) detected ± 7 d around CD of ketosis with cows with no clinical health disorders.

[4]INDIG = refers to the comparison of cows diagnosed with indigestion (INDIG) only, and cows with indigestion and at least another clinical health disorder (i.e., mastitis, metritis and pneumonia, another METB-DIG disorder; INDIG+1) detected ± 7 d around CD of indigestion with cows with no clinical health disorders.

[5]Parity group.

[6]Risk factor recorded.

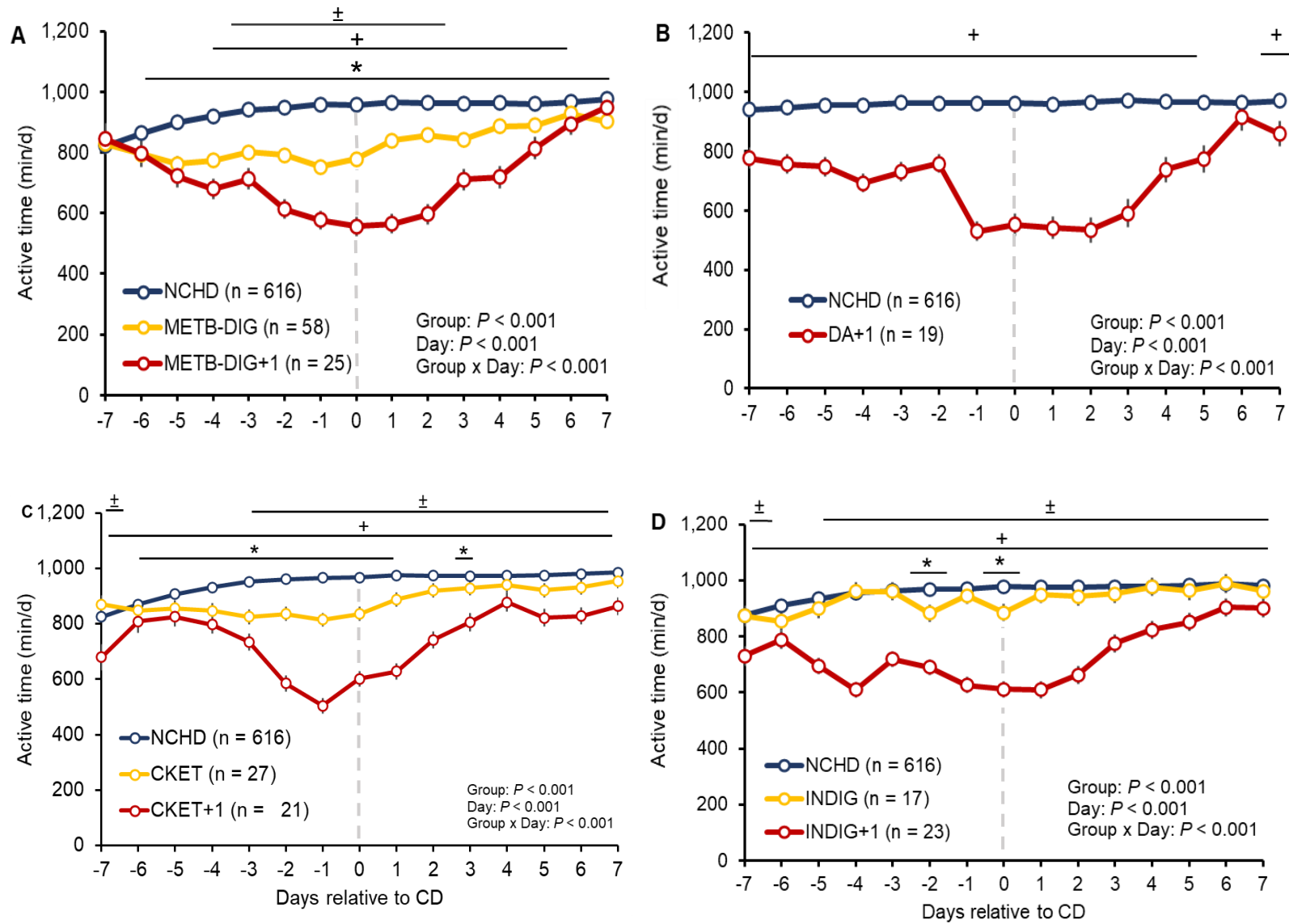[7]Season of calving.

 All values presented as LSM ± SEM.

SUPPLEMENTARY FIGURE LEGENDS

Figure 1. Pattern of daily active time (**AT**) from 7 before to 7 d after clinical diagnosis (**CD**) of health disorders of interest for (A) all cows with metabolic-digestive disorders combined (**METB-DIG**, n = 58; **METB-DIG+1**, n = 25), (B) cows with displaced abomasum (**DA+1**, n = 19), (C) cows with clinical ketosis (**CKET**, n = 27; **CKET+1**, n = 21) and (D) cows with indigestion (**INDIG**, n = 17; **INDIG+1**, n = 23) compared with cows with no clinical health disorders (**NCHD**, n = 616). All cows with DA had at least another health disorder. For the NCHD group, Day 0 was the average DIM at CD for all cows with metabolic-digestive disorders (i.e., 9 DIM), DA+1 (i.e., 11 DIM), CKET (i.e., 11 DIM), and INDIG (i.e., 10 DIM). Values are LSM ± SEM. Within a day, differences between groups based on the LSD post-hoc mean separation test are represented as follows: *Disorder only (i.e., METB-DIG, DA, CKET, INDIG) different from NCHD; +Disorder+1 different from NCHD; ±Disorder only different from Disoder+1.

Figure 2. Pattern of daily high active time (**HAT**) from 7 before to 7 d after clinical diagnosis (**CD**) of health disorders of interest for (A) all cows with metabolic-digestive disorders combined (**METB-DIG**, n = 58; **METB-DIG+1**, n = 25), (B) cows with displaced abomasum (**DA+1**, n = 19), (C) cows with clinical ketosis (**CKET**, n = 27; **CKET+1**, n = 21) and (D) cows with indigestion (**INDIG**, n = 17; **INDIG+1**, n = 23) compared with cows with no clinical health disorders (**NCHD**, n = 616). All cows with DA had at least another health disorder. For the NCHD group, Day 0 was the average DIM at CD for all cows with metabolic-digestive disorders (i.e., 9 DIM), DA+1 (i.e., 11 DIM), CKET (i.e., 11 DIM), and INDIG (i.e., 10 DIM). Values are LSM ± SEM. Within a day, differences between groups based on the LSD post-hoc mean

separation test are represented as follows: *Disorder only (i.e., METB-DIG, DA, CKET, INDIG) different from NCHD; +Disorder+1 different from NCHD; ±Disorder only different from Disoder+1.

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