



Supplementary Item 1:

Details of statistical modelling method

Daily mean measurements of motility for each region of the intestine were pooled for statistical analysis. Statistical analysis comprised an initial assessment of the data to explore covariate distributions and associations. Final inferences were based on conventional random effects generalised linear models using MLwiN 2.10 software [15]. Results were considered significant at a value of $P < 0.05$. The response variables were l/100kgBW/day for daily drinking water intake, kg/100kgBW/day for daily faecal output, %DM for daily faecal dry matter output, and contractions/minute for intestinal motility. Individual horses were classified as “level 2 units” and the ‘within-horse’ measurements (i.e. the response variables) as “level 1 units”. Random effects were included for “horse” (level 2) to account for the correlated nature of the data. A categorical predictor variable was included as an indicator of time with respect to being stabled. The mean of each response variable (e.g. contractions/ min) was taken for the period whilst at pasture prior to stabling (pastured baseline measurement/reference category), and this was compared to the response variable for each day post stabling (day post stabling). Therefore the random effects models took the general form:

$$Y_{ij} = \alpha + \beta_1 X_{ij} + \beta_2 X_j + u_j + e_{ij} \quad (1)$$

$$u_j \sim N(0, \sigma_j^2), e_{ij} \sim N(0, \sigma_e^2)$$

where Y_{ij} is the i^{th} repeated measurement of the relevant response variable in horse j , α the regression intercept, X_{ij} the categorical covariate indicating time with respect to stabling, β_1 the coefficients for covariates X_{ij} , X_j the covariates at horse level (such as region of colon), β_2 the coefficients for covariates X_j , u_j the random effect to reflect residual variation between horses (assumed to be distributed normally with variance, σ_j^2) and e_{ij} the residual error (assumed to be distributed normally with variance, σ_e^2).

Model fit was evaluated using conventional residual analysis (graphical assessment of residuals, checking for normality, and any evidence of data outliers that may have had an excessive influence of the model parameters).