**Use of milk electrical conductivity for the differentiation of mastitis causing pathogens**

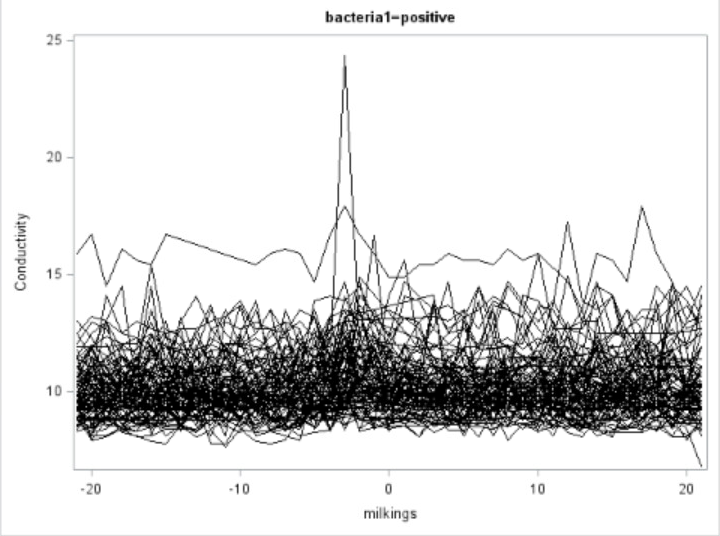
S. Paudyal1, P. Melendez2, D. Manriquez1, A. Velasquez1, G. Pena2, I. N. Roman-Muniz1, P. J. Pinedo1\*

*1Department of Animal Sciences, Colorado State University, Fort Collins, CO 80523, USA*

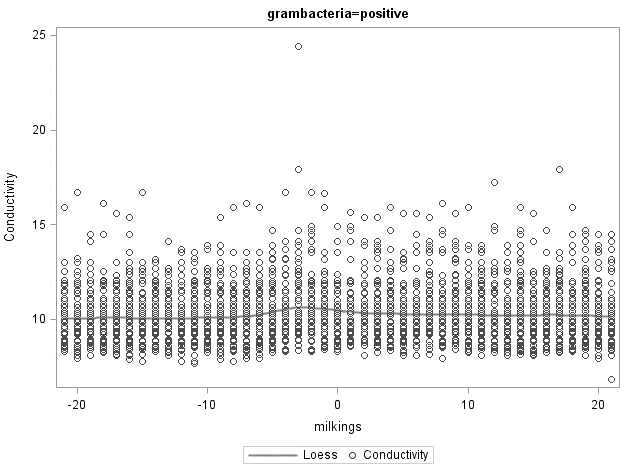
*2Department of Clinical Sciences, College of Veterinary Medicine, University of Missouri, Columbia, MO 65201, USA*

*3Zoetis, Parsippany, NJ 07054, USA*

\*Corresponding author: Pablo Pinedo. E-mail: pablo.pinedo@colostate.edu

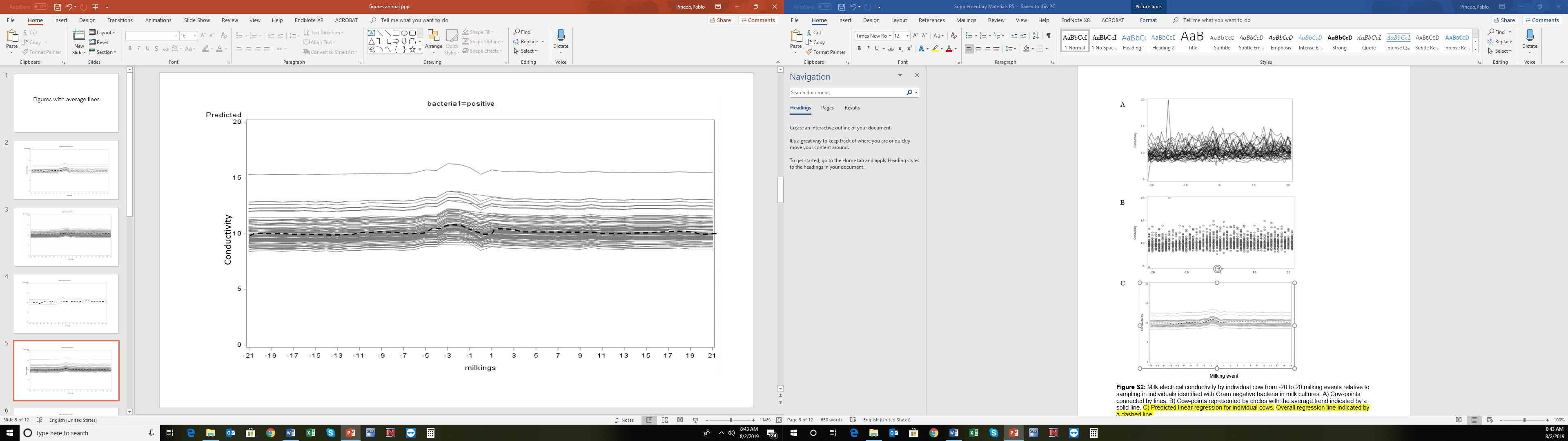


A



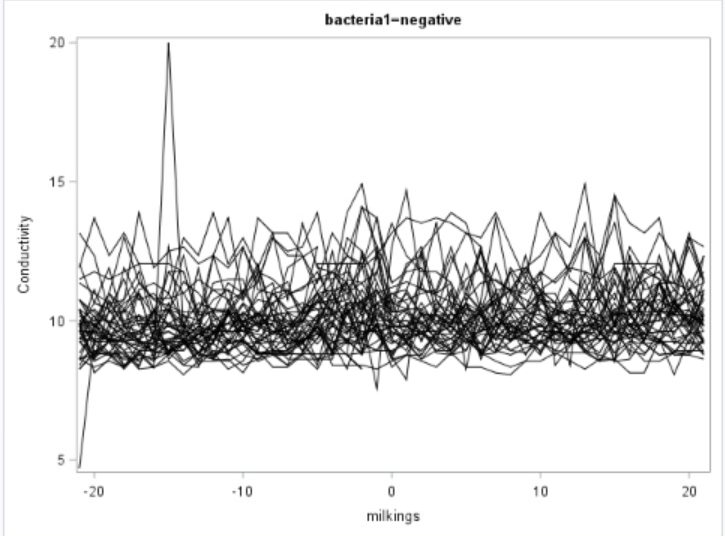
B

C

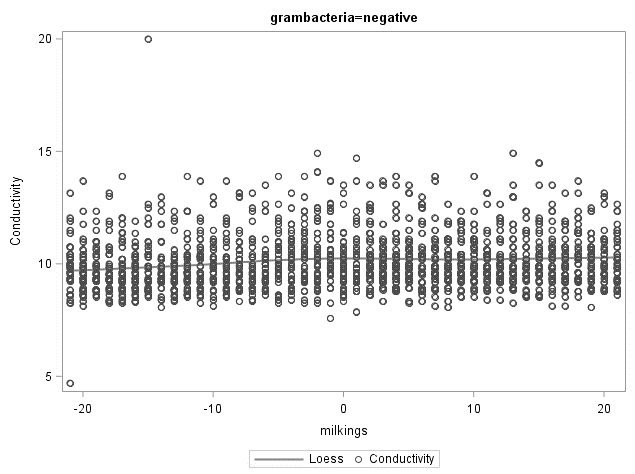


Milking event

**Figure S1:** Milk electrical conductivity by individual cow from -20 to 20 milking events relative to sampling in individuals identified with Gram positive bacteria in milk cultures. A) Cow-points connected by lines. B) Cow-points represented by circles with the average trend indicated by a solid line. C) Predicted linear regression for individual cows. Overall regression line indicated by a dashed line.



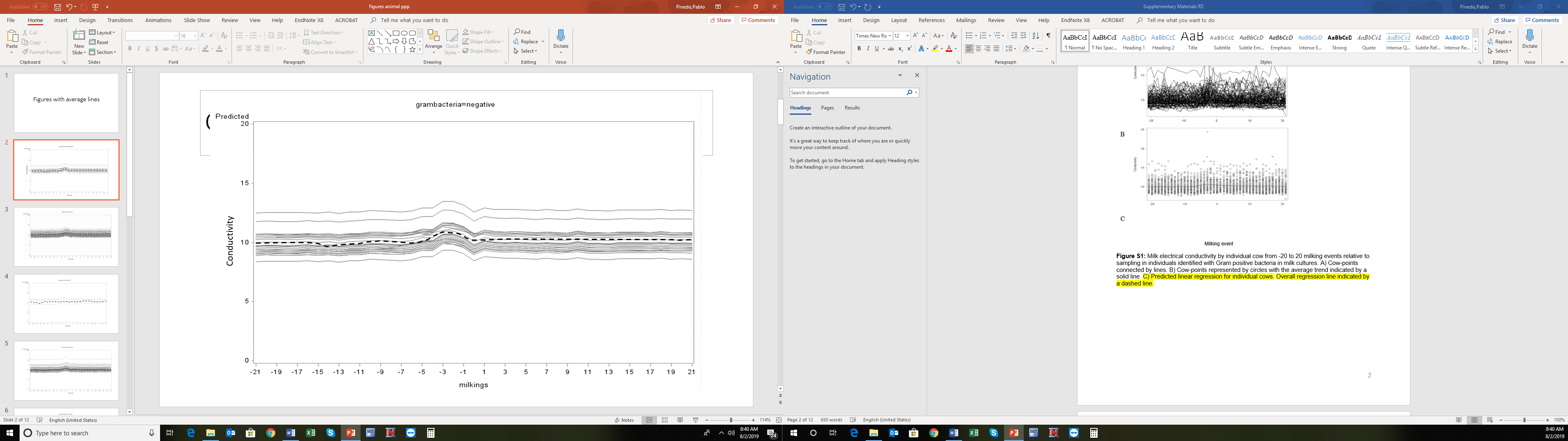
A



B

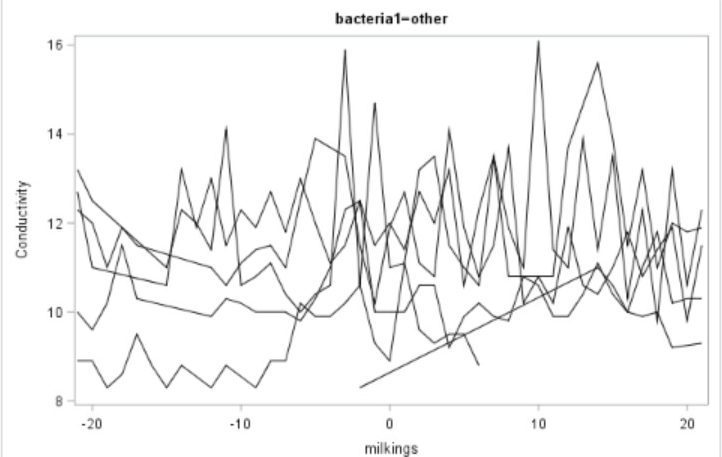
A

C

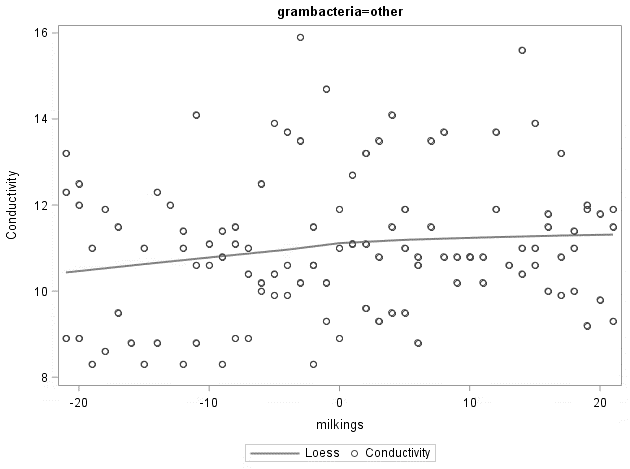


Milking event

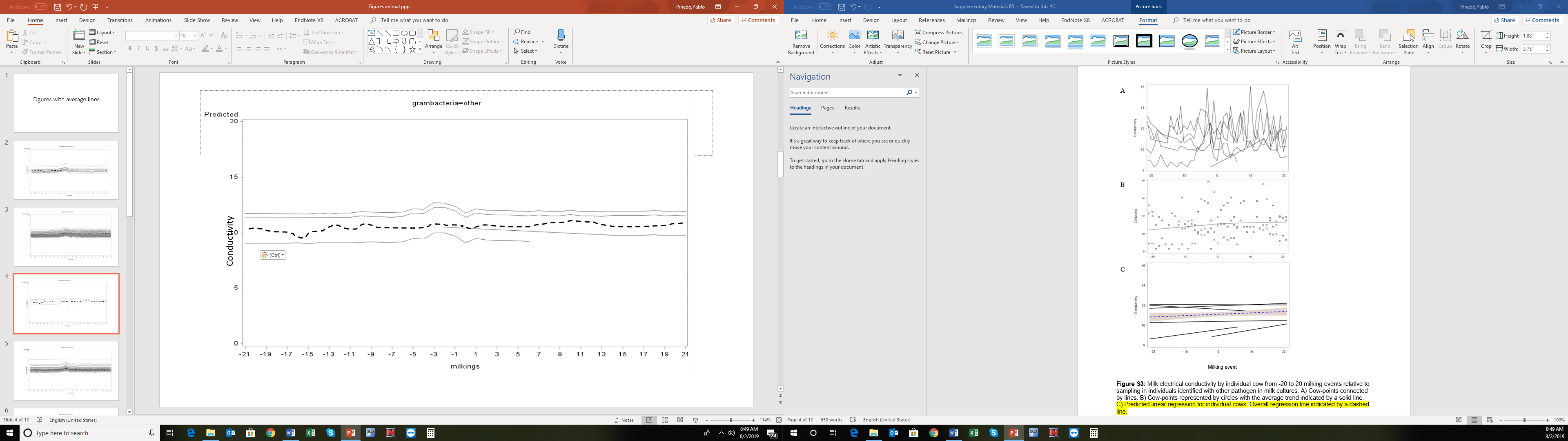
**Figure S2:** Milk electrical conductivity by individual cow from -20 to 20 milking events relative to sampling in individuals identified with Gram negative bacteria in milk cultures. A) Cow-points connected by lines. B) Cow-points represented by circles with the average trend indicated by a solid line. C) Predicted linear regression for individual cows. Overall regression line indicated by a dashed line.



A



B

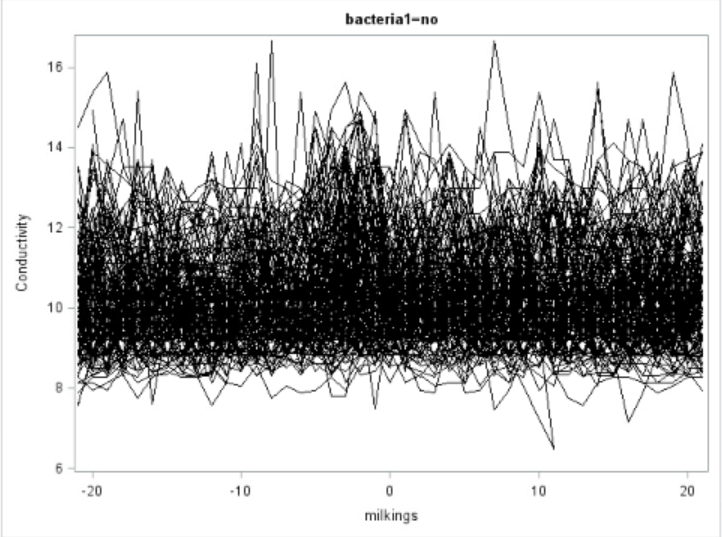


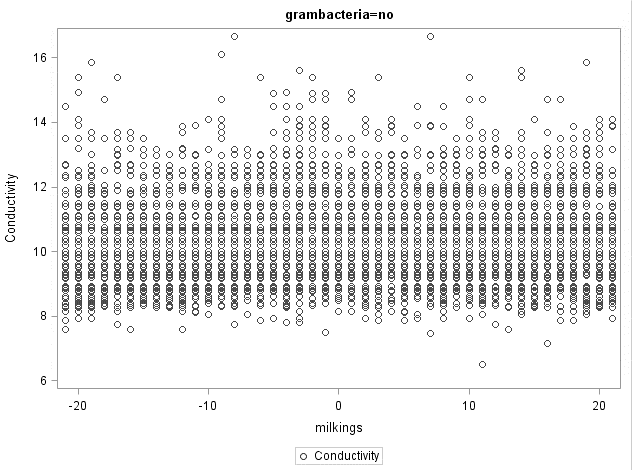
C

Milking event

**Figure S3:** Milk electrical conductivity by individual cow from -20 to 20 milking events relative to sampling in individuals identified with other pathogen in milk cultures. A) Cow-points connected by lines. B) Cow-points represented by circles with the average trend indicated by a solid line. C) Predicted linear regression for individual cows. Overall regression line indicated by a dashed line.

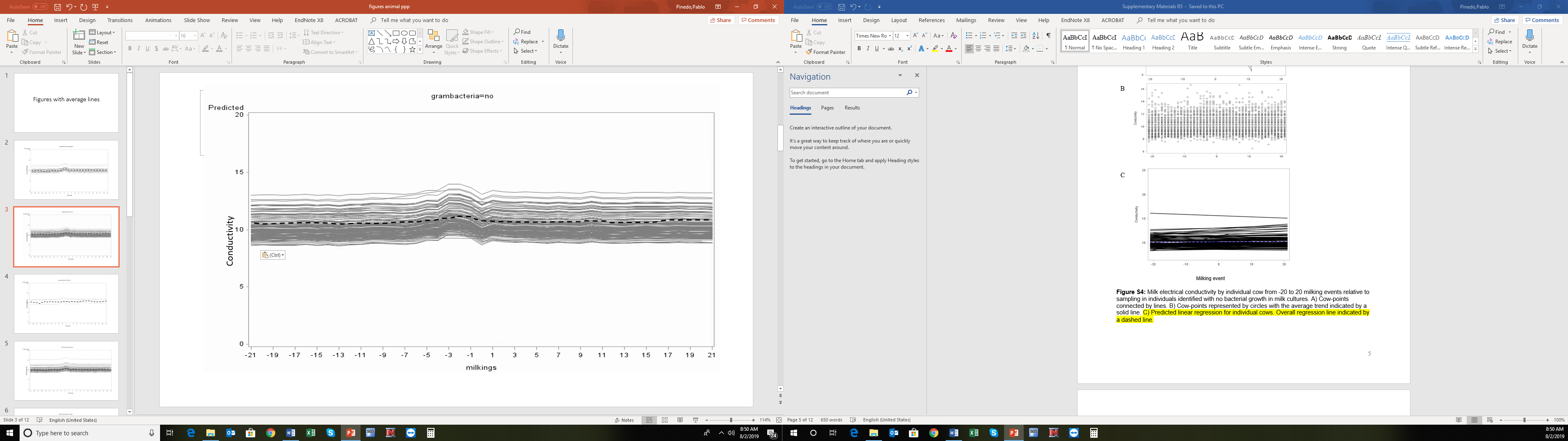
A





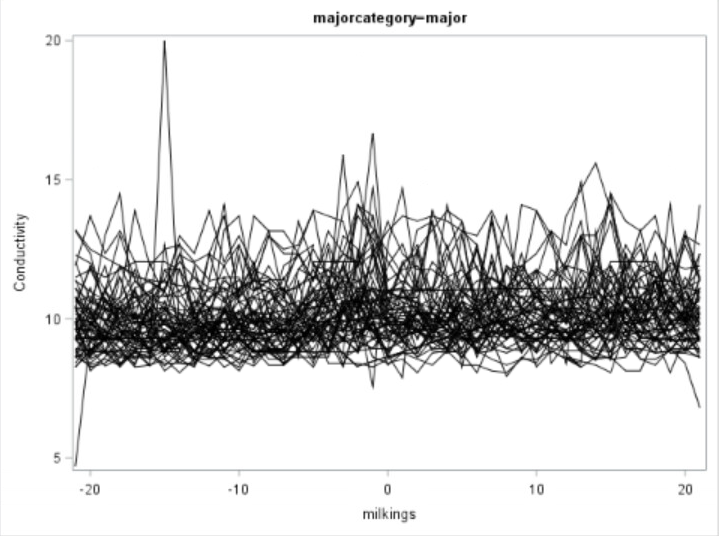
B

C

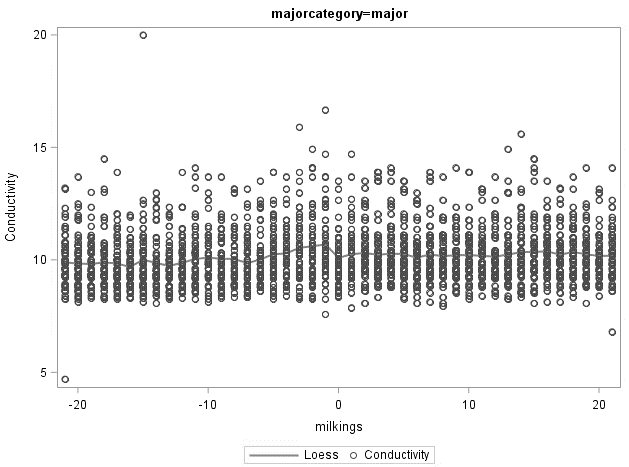


Milking event

**Figure S4:** Milk electrical conductivity by individual cow from -20 to 20 milking events relative to sampling in individuals identified with no bacterial growth in milk cultures. A) Cow-points connected by lines. B) Cow-points represented by circles with the average trend indicated by a solid line. C) Predicted linear regression for individual cows. Overall regression line indicated by a dashed line.

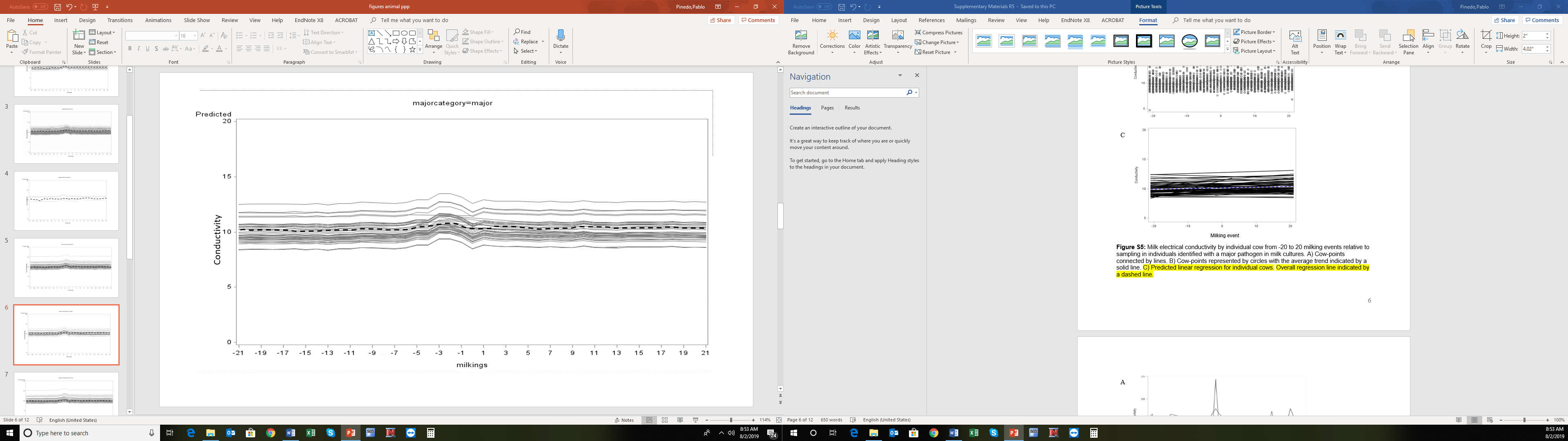


A



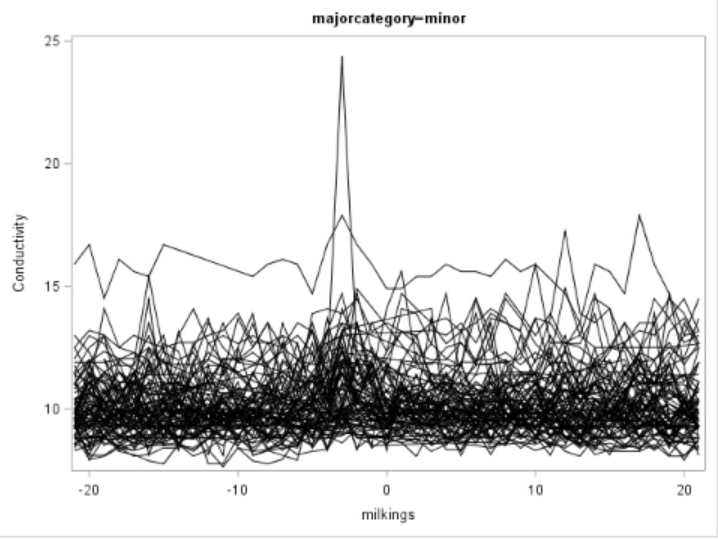
B

C

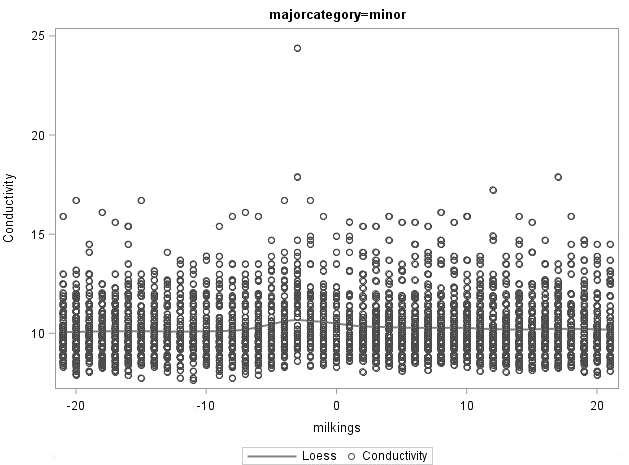


Milking event

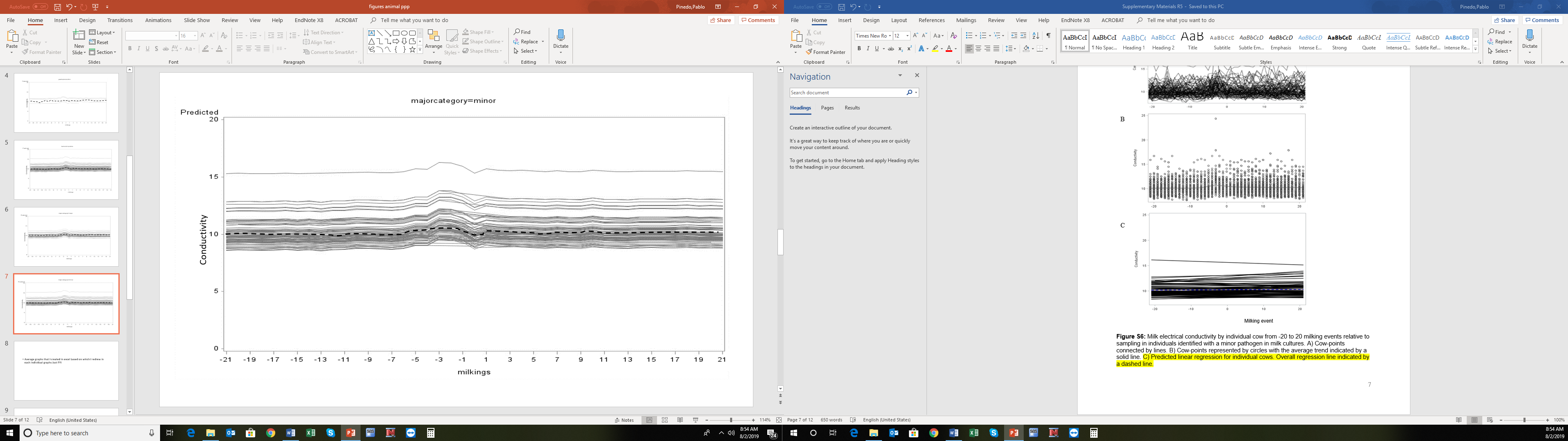
**Figure S5:** Milk electrical conductivity by individual cow from -20 to 20 milking events relative to sampling in individuals identified with a major pathogen in milk cultures. A) Cow-points connected by lines. B) Cow-points represented by circles with the average trend indicated by a solid line. C) Predicted linear regression for individual cows. Overall regression line indicated by a dashed line.



A



B

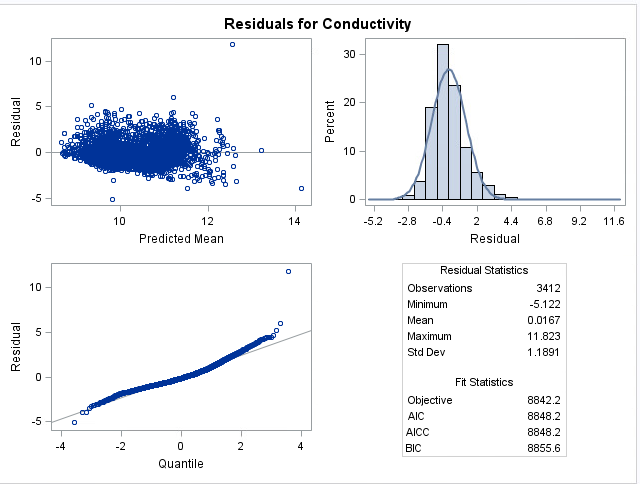


C

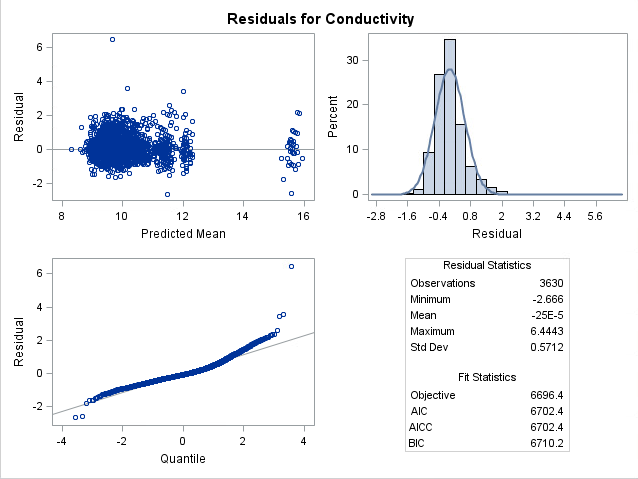
Milking event

**Figure S6:** Milk electrical conductivity by individual cow from -20 to 20 milking events relative to sampling in individuals identified with a minor pathogen in milk cultures. A) Cow-points connected by lines. B) Cow-points represented by circles with the average trend indicated by a solid line. C) Predicted linear regression for individual cows. Overall regression line indicated by a dashed line.

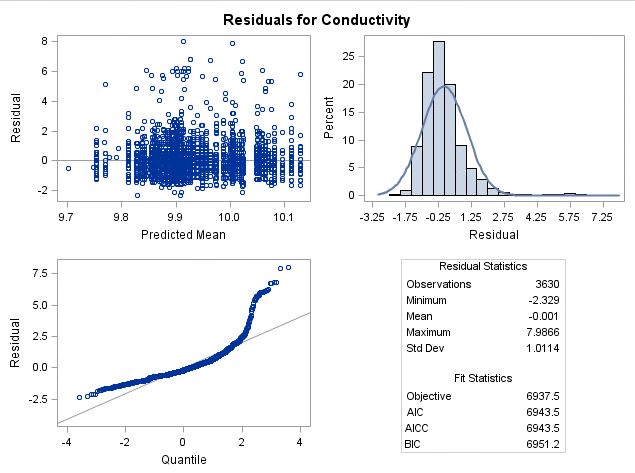
**Figure S7:** Average (SE) milk yield (d-1; broken line) and conductivity (solid line) in latent mastitis cases from d -7 to d 7 relative to sampling.



**Figure S8:** Residual influence diagnostics component of PROC MIXED (SAS) for milk electrical conductivity in the overall study population. AIC = Akaike's Information Criterion; AICC = Akaike's Information Criterion correction; BIC = Bayesian information criterion



**Figure S9:** Residual influence diagnostics component of PROC MIXED (SAS) for milk electrical conductivity in the high electrical conductivity group. AIC = Akaike's Information Criterion; AICC = Akaike's Information Criterion correction; BIC = Bayesian information criterion



**Figure S10:** Residual influence diagnostics component of PROC MIXED (SAS) for milk electrical conductivity in the control group. AIC = Akaike's Information Criterion; AICC = Akaike's Information Criterion correction; BIC = Bayesian information criterion

**Supplementary Material S1:** Examples of SAS codes used for repeated measures analyses (A) and for graphic representation of individual cow EC across milking events (B).

A)

proc mixed data = treatmentsgraph1;

       class grambacteria milkings farm Lact\_no;

      model conductivity = grambacteria milkings farm DIM1 LAct\_no grambacteria\*milkings/ s;

                random animalid;

                    repeated milkings/ type = cs sub = animalid(farm);

                Lsmeans grambacteria/pdiff;

              lsmeans milkings/pdiff;

              lsmeans grambacteria\*milkings/pdiff;

   run;

B)

proc mixed data = Totalcalculations3 plots (maxpoints = none) = residualpanel;

       class animalid grambacteria DIM milkings farm Lact\_no;

      model conductivity =  grambacteria milkings farm DIM LAct\_no grambacteria\*milkings/s outpm=resm vciry residual;

                random animalid;

                    repeated milkings/ type = cs sub = animalid(farm);

                  run;