***Introduction and Objectives***

Teats of dairy cattle may be in direct contact with bedding materials for 40 to 60% of the day, making bedding materials an important potential source of exposure to mastitis pathogens (Cook, 2005; Hogan, 2012; Tucker, 2004). Mastitis due to environmental pathogens, such as those commonly found in bedding material, has now become the “most common and costly form of mastitis in modern dairy herds” that have implemented standard mastitis control practices which limit the effect of contagious pathogens (Klaas, 2018). Work exploring how bedding materials relate to a cow’s risk of getting mastitis has understandably been focused on the most commonly-used bedding materials and housing systems in the dairy industry. However, there is growing interest and adoption amongst dairy producers of a bedded pack system to house dairy cattle. Smaller-scale dairy farmers with aging facilities may be looking to implement a bedded pack system on their farms as a sustainable, cost-effective, loose-housing option which integrates well into pasture-based production systems, as both the dairy industry and consumers look to move away from traditional housing systems that restrict cow movement (Barkema et al., 2015). As interest in this type of facility grows, it will be important to better understand how milk quality, udder health and hygiene looks for farms using a bedded pack system. Previous work describing mastitis risk and hygiene for actively-managed, composting bedded packs specifically have comparable milk quality and udder health to more traditional housing systems (Favero, 2015; Albino, 2018; Eckelcamp 2016 “Understanding…”; Black, 2013; Barberg, 2007; Heins, 2018). However, direct head-to-head comparisons of milk quality, udder health, and hygiene on bedded pack farms to other more traditional housing systems of similar size and management style are limited. To date, this research has only directly compared actively-managed composting bedded packs and sand-bedded freestalls, and primarily conventionally-managed dairy farms (Eckelcamp 2016 “Sand…”; Lobeck 2011).

Organic farms in the Northeast have expressed particular interest in bedded pack systems, as many of them are pasture-based and these loose-housing structures integrate well into their farm systems. Currently, the most common type of dairy cattle housing for organic farms in Vermont is a tiestall barn, followed by freestall barns as a distant second (Andrews 2021). As attitudes about confinement housing of dairy cattle evolve amongst the general public, many small to mid-size dairy farms in the Northeast are looking to replace their aging tiestall facilities. Many are considering converting to a bedded pack system, as the initial investment is smaller than a new freestall barn (Bewley 2012). Understanding mastitis risk for bedded packs will be especially important for organic dairy farmers, as they have limited options for treating intramammary infections. Furthermore, as previous research directly comparing bedded packs to other housing systems has been limited to freestalls with sand (an uncommon housing type of organic farms in the Northeast), a direct comparison of udder health and hygiene on bedded pack systems and tiestall barns would be a more readily useful tool for organic farms in the Northeast deciding whether or not the facility may be a good option for them.

In order to better inform organic dairy producers in the Northeast who may be interested in using a bedded pack barn, we carried out a cross-sectional, observational study on organic dairies in Vermont which aimed to compare udder health and hygiene measures for the two most common housing systems in the state (freestalls, tiestalls) with farms using a bedded pack. The objectives of this project were to (1) Identify whether bulk tank milk quality, udder health and hygiene outcomes were associated with facility type; and (2) Determine if bedded pack systems are a viable option for winter housing in VT when cows are not turned out to pasture.