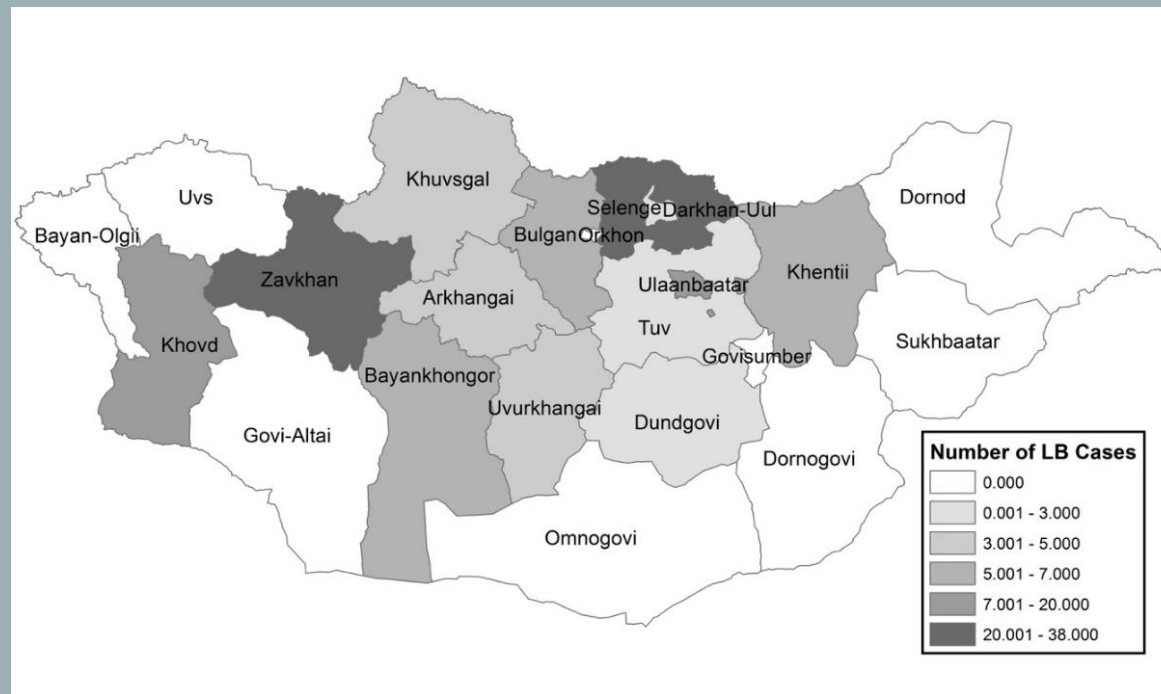


Case-series of Lyme Borreliosis in Mongolia From 2007-2017: Describing the Clinical Spectrum of *Borrelia* in Central Asia.



Madeline Illar

Advisor: Dr. Michael von Fricken

BACKGROUND

- Mongolia has the largest unbroken area of free grazing land in the world
- The number of livestock raised in the country is steadily increasing, and about 34% of the population relies directly on pastoralism for their livelihood
- The Mongolian diet is mainly comprised of meat and dairy products, which makes it necessary for the country to maintain large populations of herding animals including cattle, sheep, goats, horses, and camels
- This puts many individuals at risk of contracting Lyme Disease from ticks because of their close contact with animal hosts



INTRODUCTION

- The first case of Lyme in Mongolia was documented in 2003
- *Borrelia garinii* and *Borrelia afzelii* are known to cause Lyme neuroborreliosis with symptoms including headache, paralysis, and issues with perception and coordination in Europe, Russia, and China, but no studies to date have described cases of Lyme borreliosis in Mongolia
- *B. garinii* and *B. afzelii* are transmitted by the *Ixodes persulcatus* tick in Mongolia
- *Ixodes persulcatus* is a very effective vector because it can transmit *Borrelia* across all molting stages

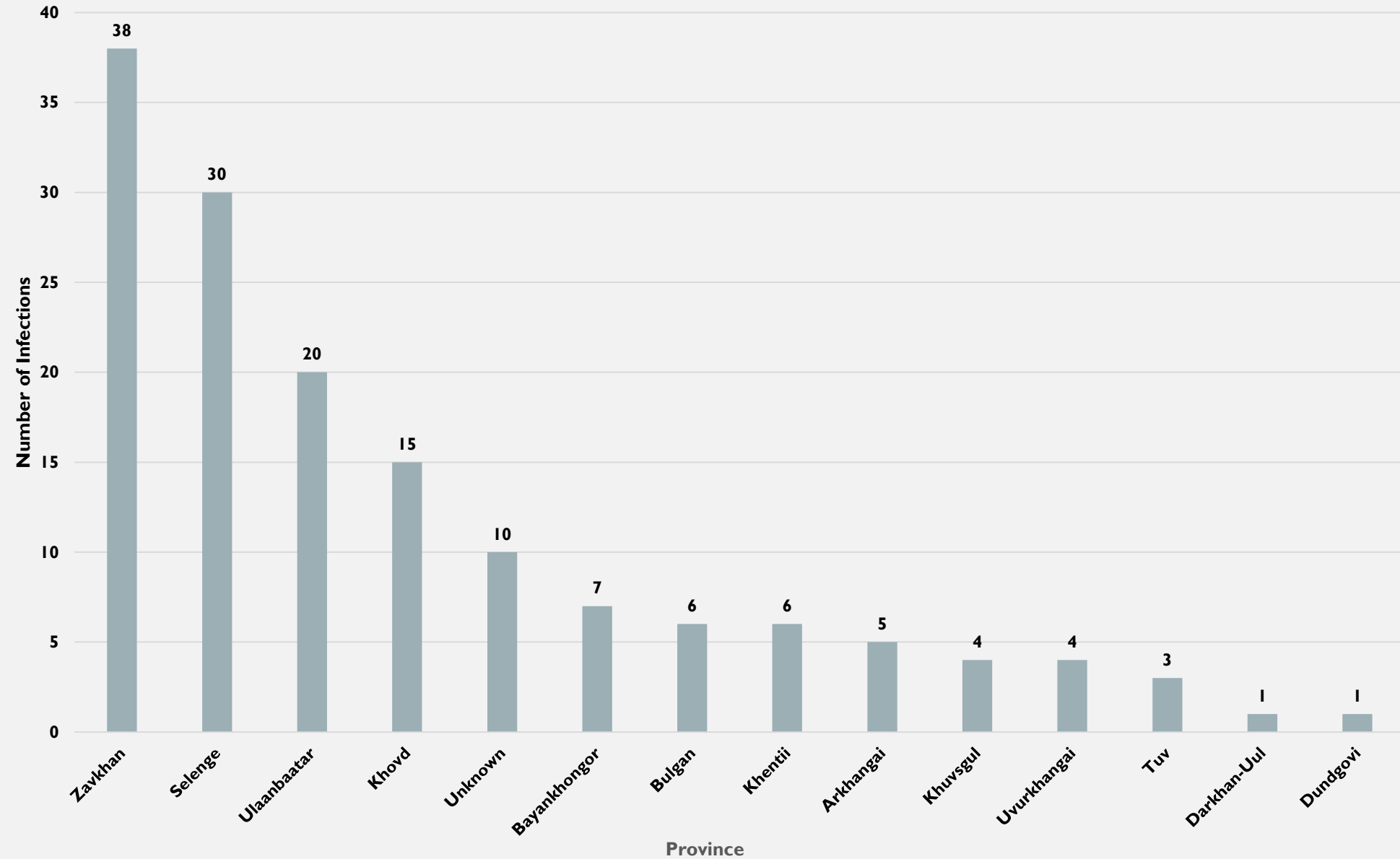


METHODS

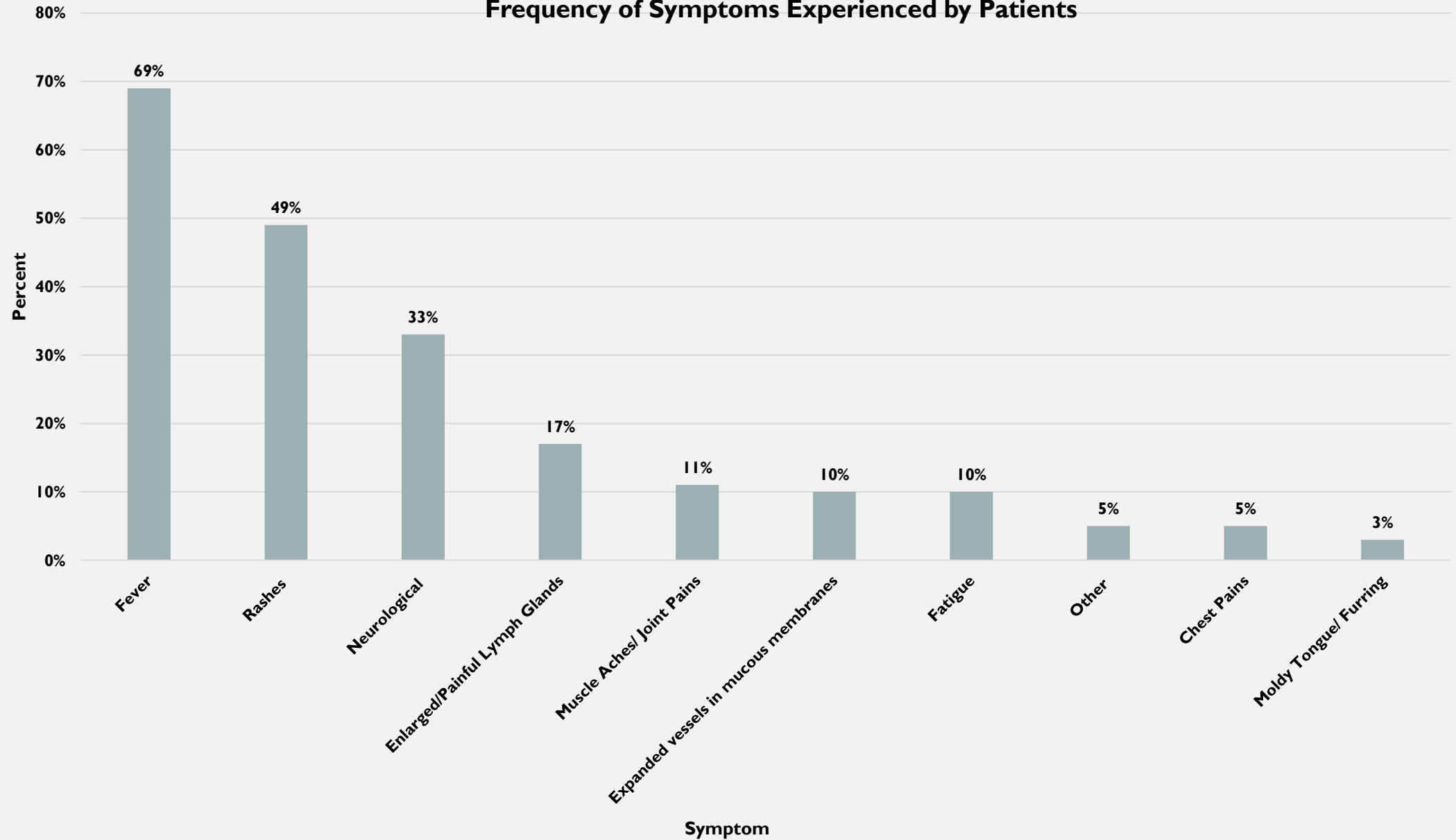
- Data was collected retrospectively using medical records from local hospitals in Mongolia, coordinating between the National Center of Communicable Disease (NCCD) and the National Center for Zoonotic Disease (NCZD), from 2007 and 2017
- Sociodemographic information, medical history of tick bites and related symptoms were gathered and paired with a record of diagnosis methods and results
- All included patients received IIFA testing, ELISA testing, or both to confirm diagnosis
 - Patients were excluded if these tests were not positive, or not conducted- even if they were given a Lyme diagnosis in hospital
- Patients who contracted Lyme outside of Mongolia were also excluded

RESULTS

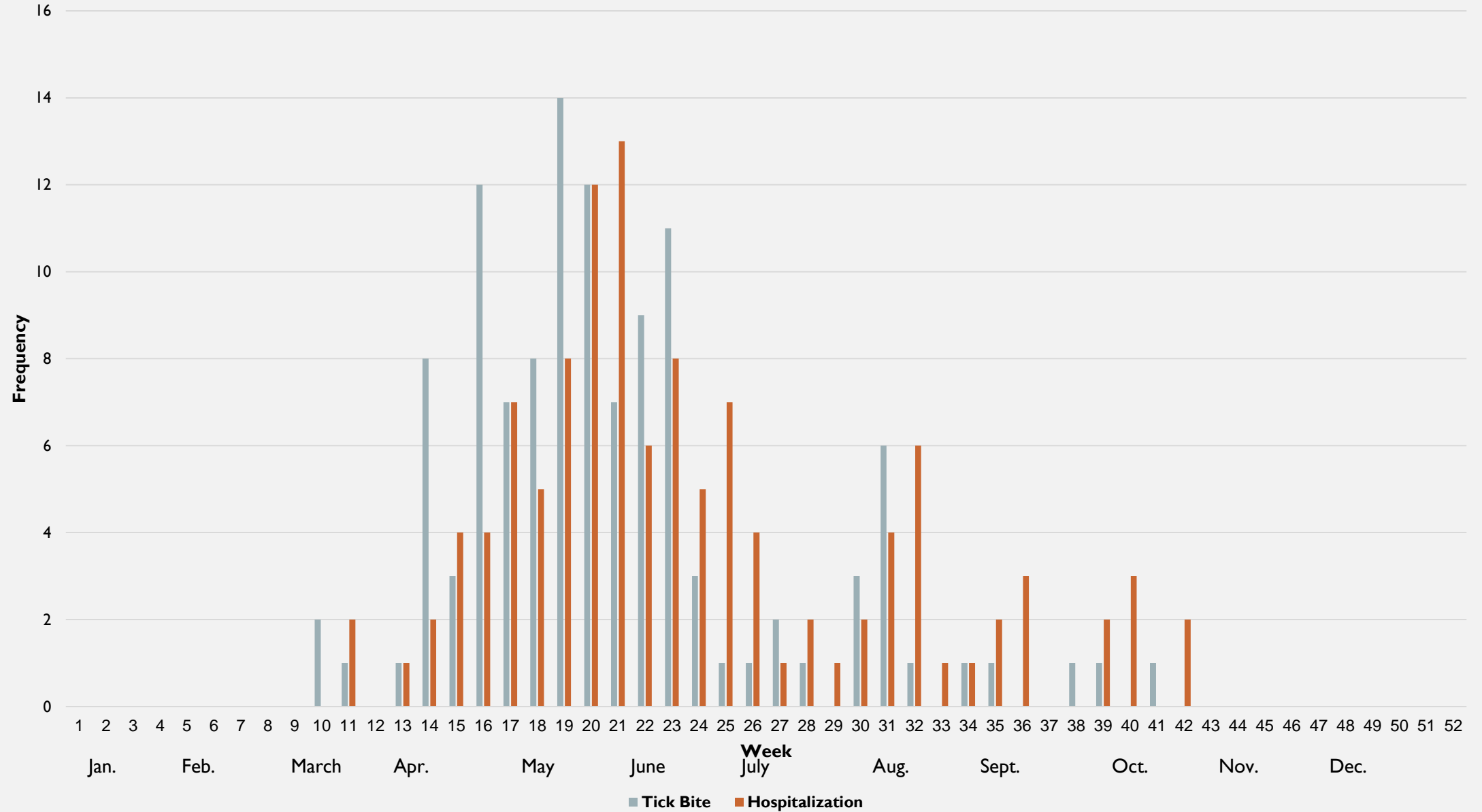
Number of Borreliosis Infections by Province from 2007-2017



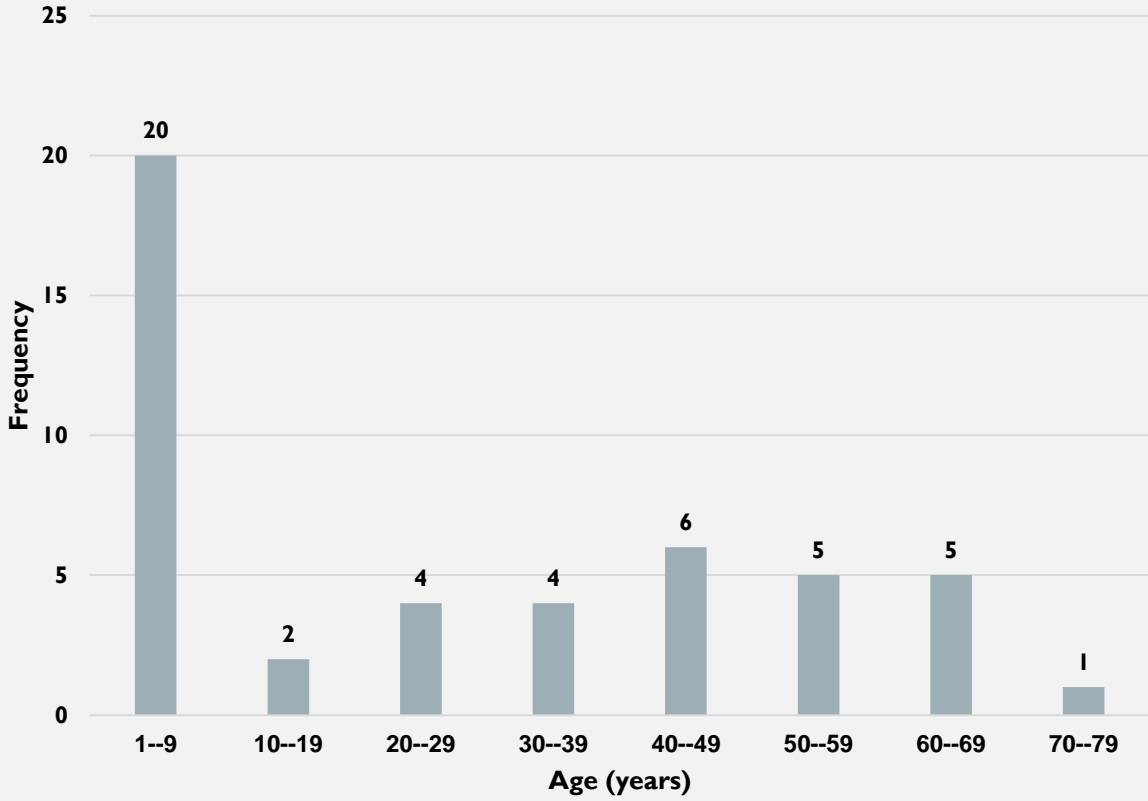
Frequency of Symptoms Experienced by Patients



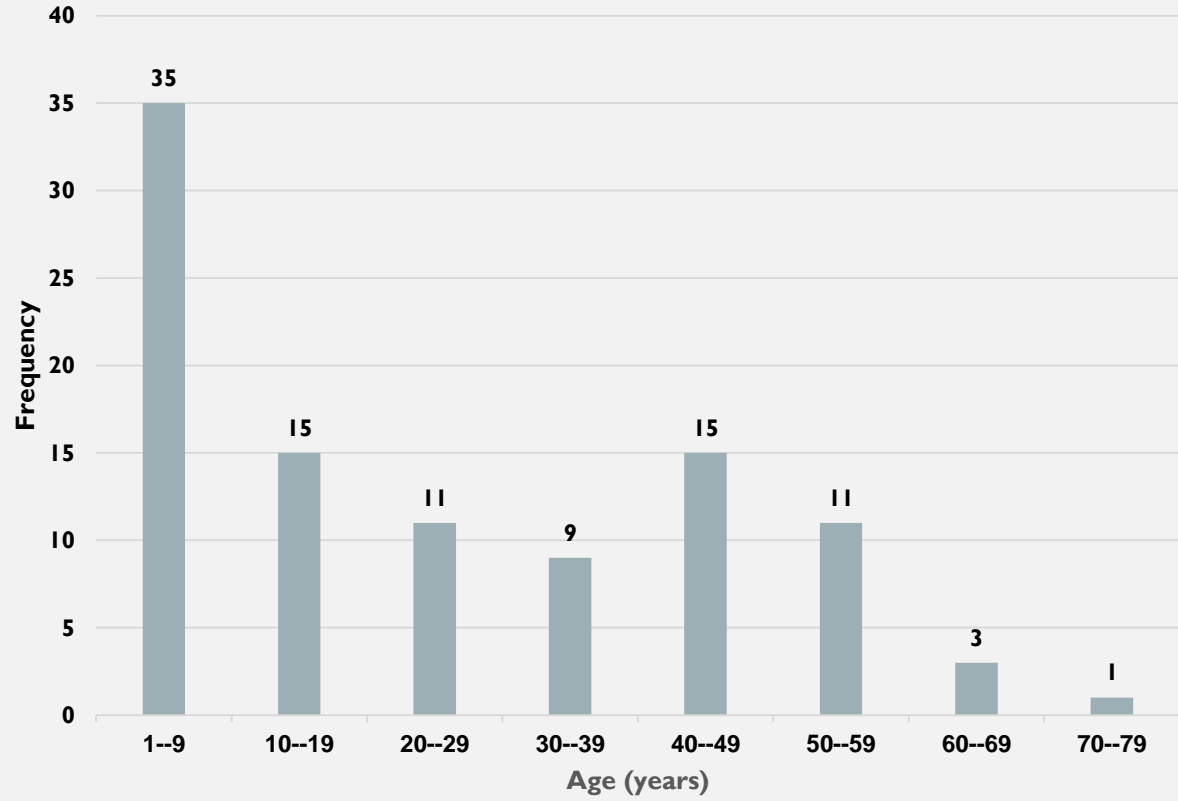
Frequencies of Tick Bites and Hospitalizations by Week



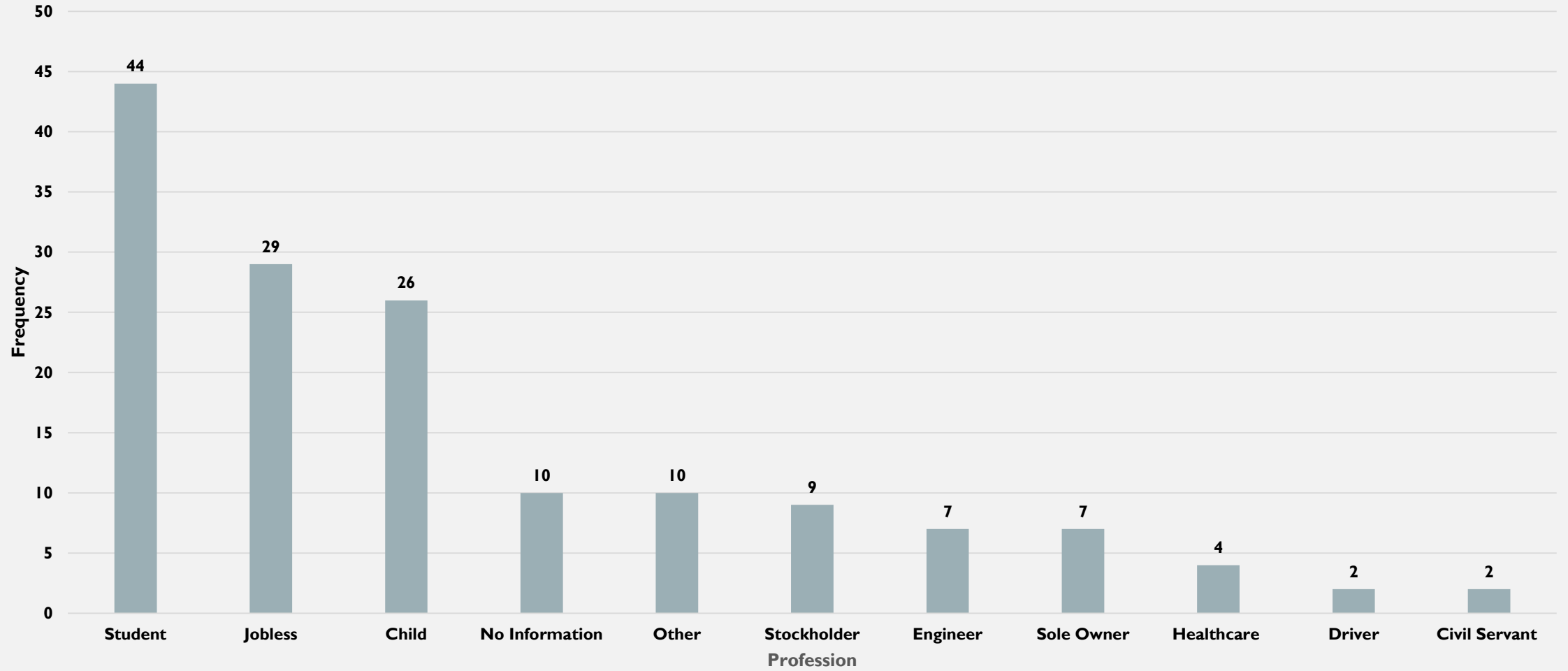
Frequency of Male Patients by Age



Frequency of Female Patients by Age



Frequency of Lyme Patients by Profession



DISCUSSION

- The majority of cases occurred in Northern Mongolia, in Zavkhan and Selenge
- A large proportion of patients (37%) were under the age of ten
- Twice as many women sought treatment as men
- People who work outdoors in any capacity, even non-herders, are 10 times more likely to contract Lyme
- April through June are peak months for transmission
- The majority of patients reported a fever
- About a third of patients experienced neurological symptoms
- About half of patients reported a rash or inflammation around the bite site

RELEVANCE

- Lyme borreliosis has only been present in the Mongolian population for the past 14 years
- Many patients experience infections without "classic" symptoms (rash)
- It is important to educate high-risk groups about prevention
- Medical professionals should be informed of symptoms, current testing methods, and appropriate course of treatment
- Future research should be dedicated to establishing disease presentation by region