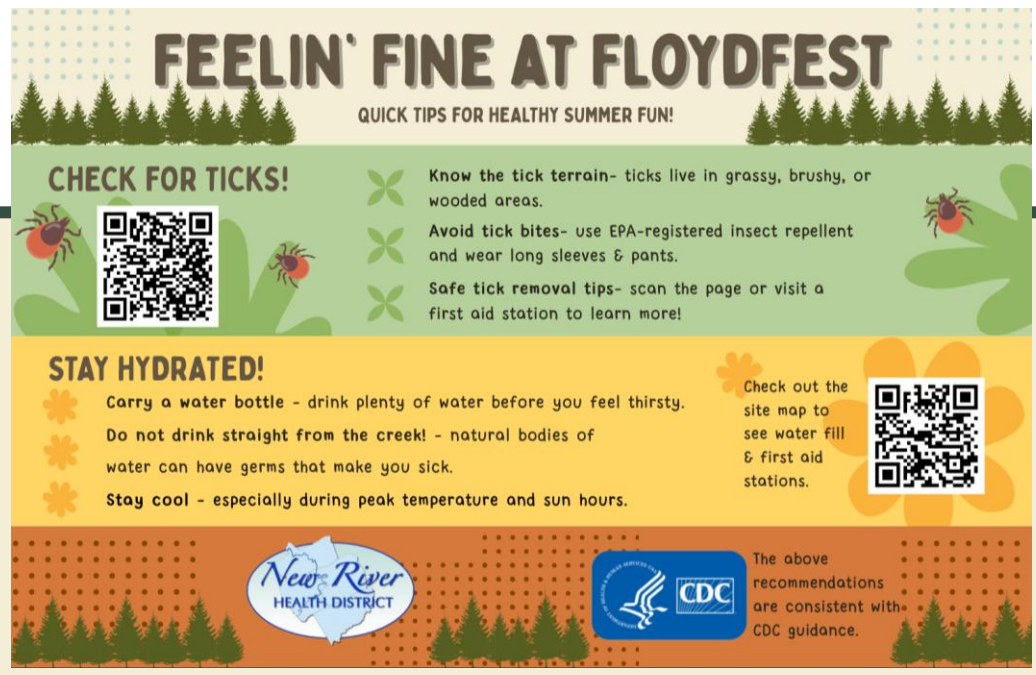


Assessing Tickborne Disease Risk in the New River Health District



Project Highlights

- Objective 1:**
- Completed a literature review of tickborne diseases (TBDs) in Virginia & constructed a risk matrix using likelihood and severity scores.
- Objective 2:**
- Created a tailored educational flyer to support EP&R for a summer music festival.



Additional Experiences

- Shadowing Opportunities:**
- Assisted with **communicable disease investigations** with District Epidemiologists.
 - Attended a **hotel inspection** with Environmental Health Specialists.
 - Attended an **infection prevention assessment** of a long-term care facility.

- Meetings and Discussions:**
- Regional and state **epidemiology** calls.
 - Extreme heat and hurricane preparedness **EP&R webinars**.
 - Measles preparedness** talks.
 - Interviewed individual about experience with **alpha-gal syndrome**.
 - Weekly VDH forum discussion.

Community outreach: **tick education**

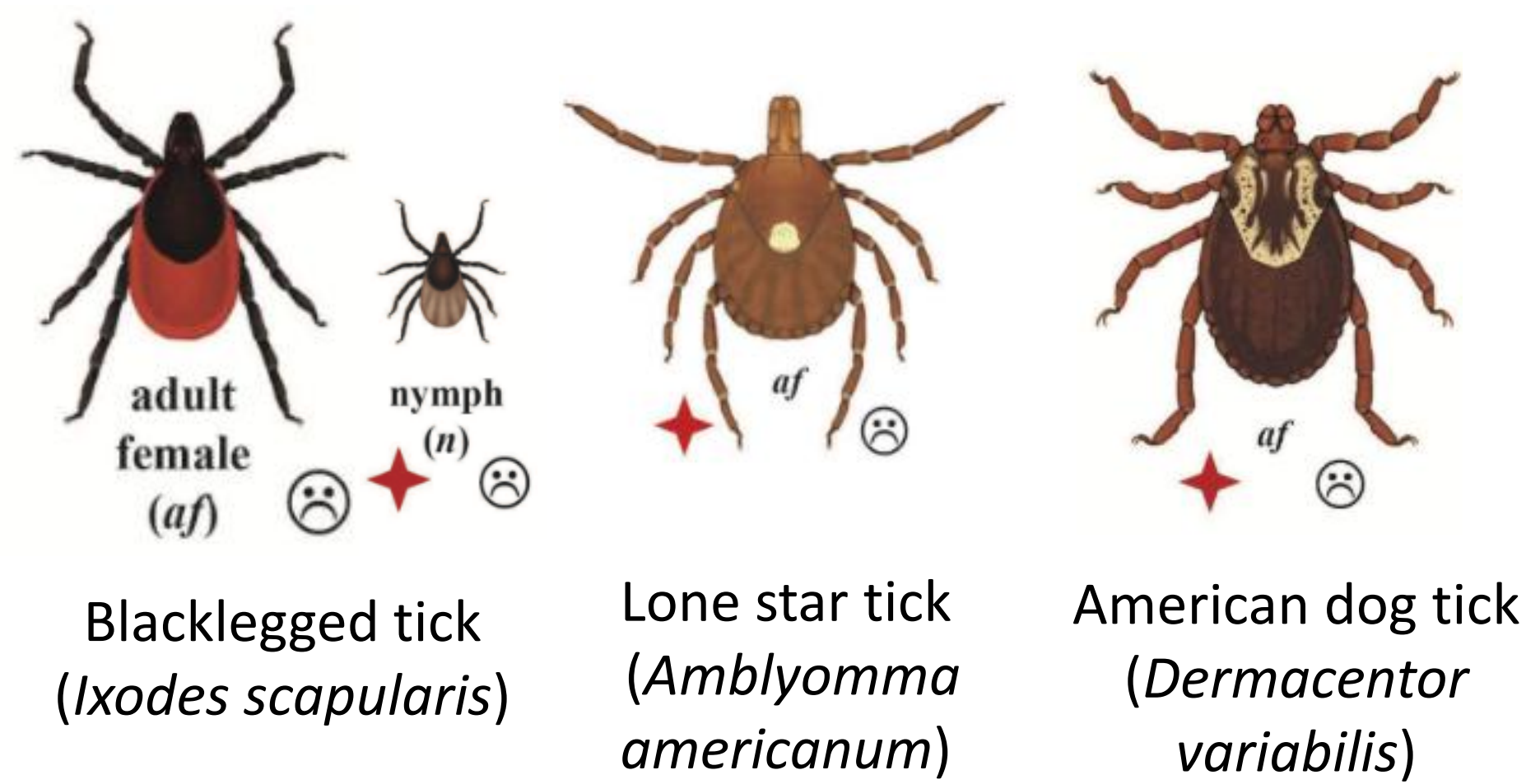
Outputs

- Why are TBDs important?**
- TBDs are a group of bacterial, parasitic, or viral infections that are transmitted via tick bites.
 - The rising incidence of TBDs and expansion of tick populations in the United States causes substantial morbidity.
 - The NRHD is a hotspot for Lyme disease in Virginia.

Figure 1. 5x5 Risk matrix of TBDs in the NRHD

Disease Severity →		1	2	3	4	5
← Likelihood of Infection	1 Rare	Insignificant	Minor	Moderate	Major	Death
	2 Unlikely	Spotted Fever Rickettsiosis (<i>R. parkeri</i>)	Babesiosis (<i>B. microti</i>)		Rocky Mountain Spotted Fever (<i>R. rickettsii</i>)	
	3 Possible		Anaplasmosis (<i>A. phagocytophilum</i>)	Ehrlichiosis (<i>E. chaffeensis</i>)		
	4 Likely			Lyme disease (<i>B. burgdorferi</i>)		
	5 Certain					

Figure 2. Primary disease transmitting ticks in the NRHD



*Not imaged: Guld Coast tick (*Amblyomma maculatum*)

Images from VDH Tick Identification website (2026)

What Was Considered?

- Cumulative incidence and relative proportion of each disease during three-year period (2022-2024).
- Past documentation of established infected host-seeking nymph/adult tick populations.
- Case fatality and hospitalization rates.
- Frequency of severe complications.
- Cases with long-term sequelae.
- Availability of treatment.

Public Health Significance

- Diagnostic Challenges**
- Most TBDs are treatable, but recovery is optimal if caught early.
 - Disease most severe among high-risk patients (age or immune status).
 - Delayed treatment can be due to:
 - Non-specific signs/symptoms.
 - Variable clinical presentations.
 - Socioeconomic barriers.
 - Limitations of serologic testing.
- Prevention & One Health Approach**
- Education on preventing tick bites, safe tick removal, and disease awareness.
 - Transmission is dependent on dynamic ecological factors that involve human, animal, and environmental interactions.
 - Understanding complex life cycles and environmental changes can inform disease mitigation strategies.

Limitations & Challenges

- Passive Surveillance Considerations:**
- Provides understanding of expected cases in a region at a given time.
 - Lack of asymptomatic or mild cases → Underestimation of total cases. → Bias towards severe cases.
 - Reporting by zip code rather than location of tick exposure.
 - Changes to case definitions can influence temporal trends.
 - Grouping of diseases due to antigenic similarity of pathogens (ex. anaplasmosis and ehrlichiosis).
- Data Availability:**
- Unavailable surveillance data for alpha-gal syndrome and Bourbon & Heartland viruses.
 - Limited clinical description of cases → Disease severity defined by the literature and not specific to NRHD.
 - Lack of non-cases (controls) to evaluate for comparison.

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