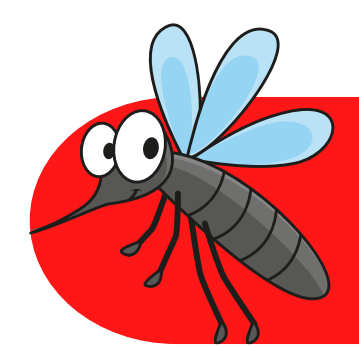




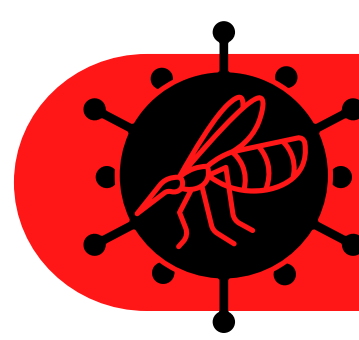
# App-Based Mosquito Surveillance and Community Engagement in St. Louis: Insights from a Mixed-Methods Study Evaluation of the Mosquito Alert STL Initiative

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## Mosquito Alert STL (MASTL)

- MASTL conducts community outreach through public events and workshops, builds partnerships with local organizations, gains visibility through news coverage, and engages audiences via active social media presence.
- MASTL Partners include Saint Louis County and City Health Departments, Missouri Botanical Garden, and Saint Louis University.
- The Mosquito Alert smartphone app allows reporting of mosquito photos, breeding sites, bites, and locations.
- Reports are validated by entomologists and findings are shared with users and agencies.
- Goals of MASTL are to promote citizen science, support local vector control, and advance climate adaptation and sustainability.



## Background

- Mosquito-borne diseases (West Nile, dengue, chikungunya, Zika) cause 700,000+ global deaths annually.
- Climate change and urbanization expand mosquito habitats, increasing U.S. risk.
- St. Louis has reported 600+ West Nile cases in two decades; vulnerable communities face disproportionate exposure.



## Methods

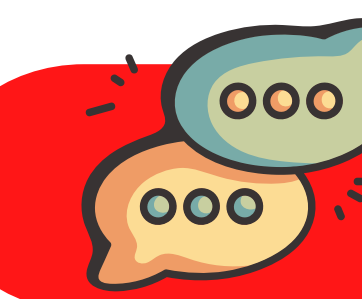
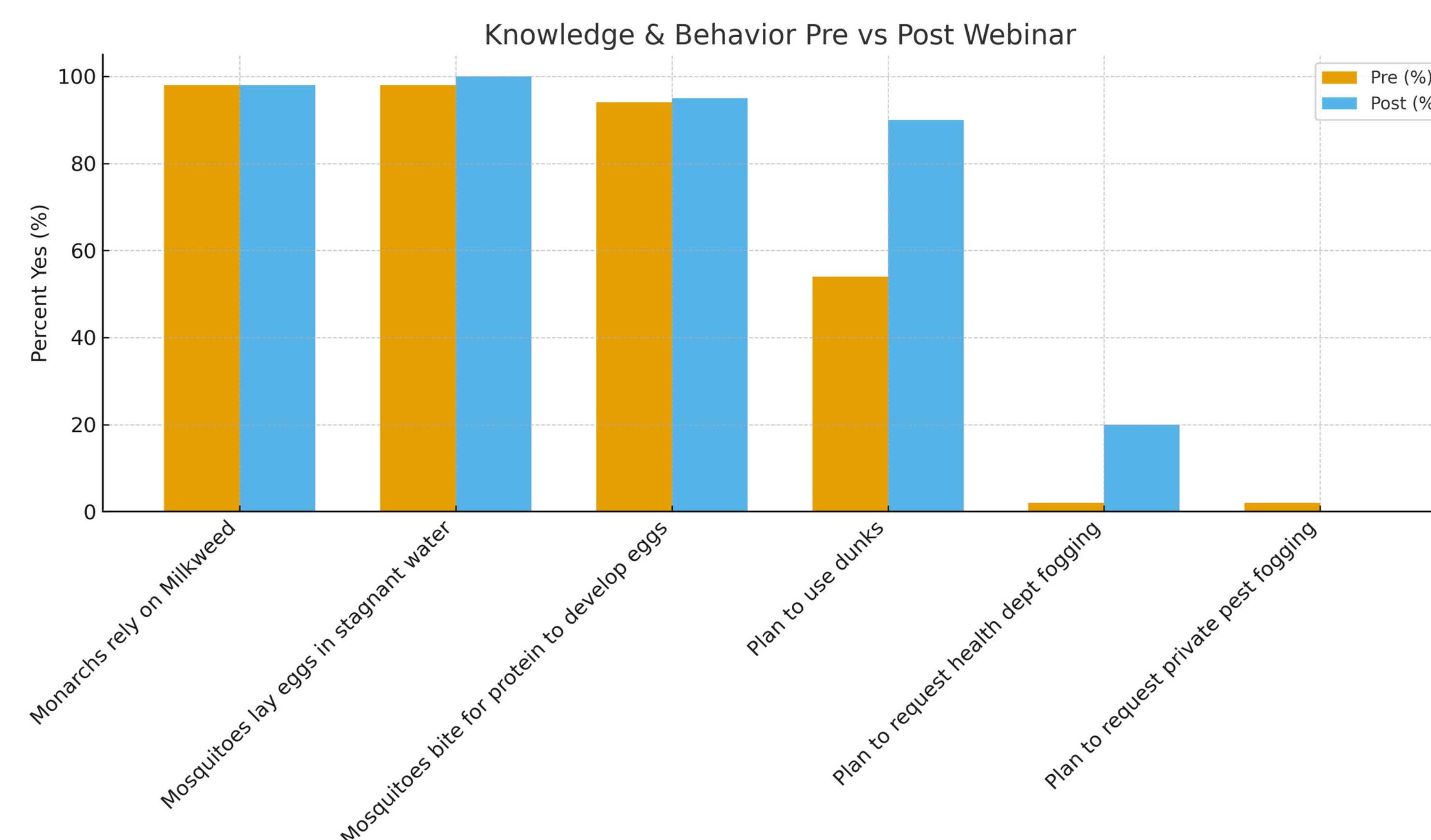
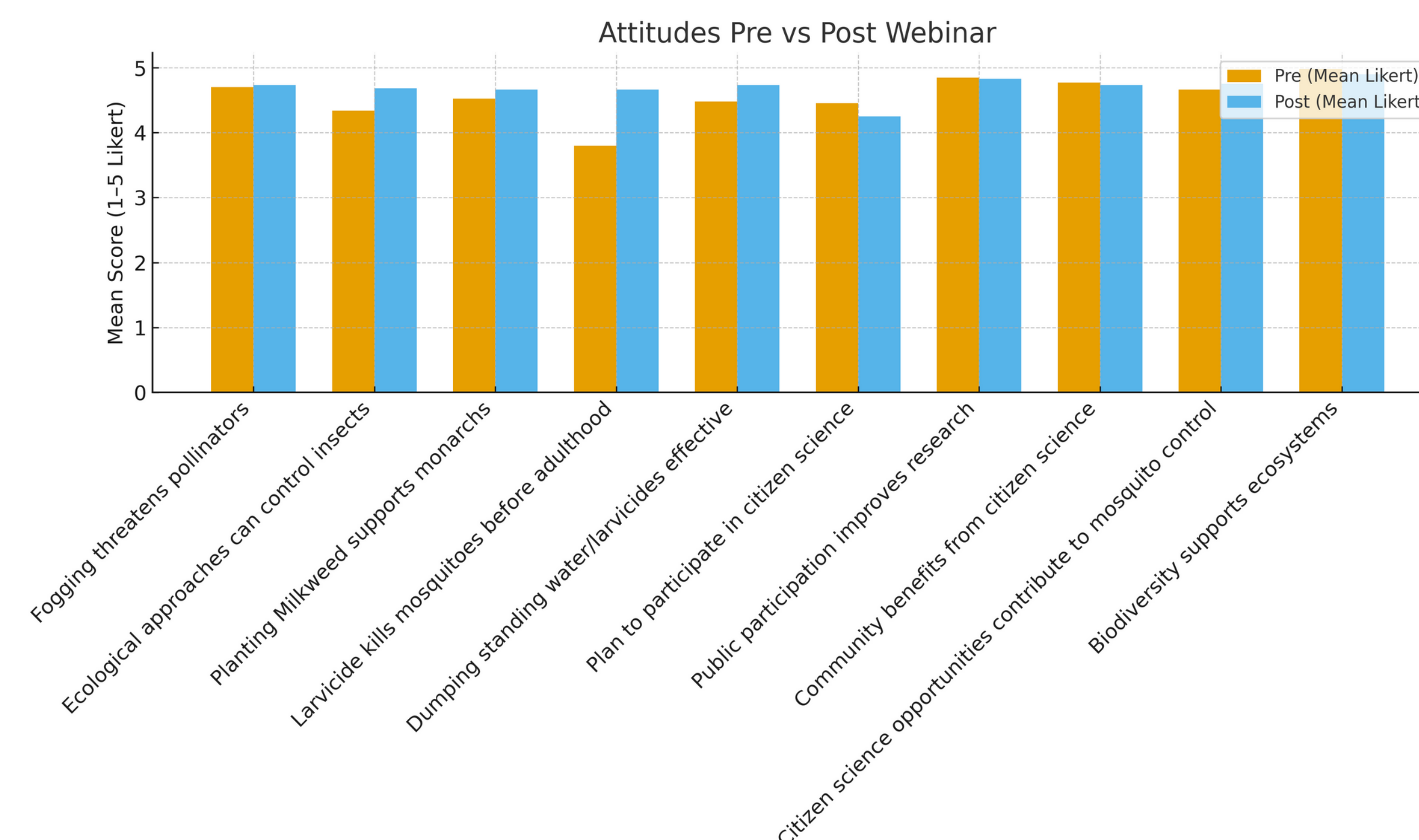
### MASTL objectives:

- Evaluate early implementation of the Mosquito Alert STL app and outreach efforts.
- Assess institutionalization of MASTL within local public health and community organizations.
- Inform future adaptations to strengthen citizen science, vector control, and climate-health action.
- **Design:** Mixed-methods evaluation of MASTL implementation.
- **Quantitative survey** (n=37; 10 app users vs. 27 non-users) → Knowledge, attitudes, behaviors, ecosystem beliefs, citizen science participation.
- **Educational webinar** (n=98 pre/post surveys) → Knowledge and behavioral intentions.
- **Qualitative interview** (n=11 community organizations) → Institutional perspectives, barriers, and sustainment strategies.
- **Analysis:** Fisher's exact test, t-tests, Wilcoxon rank-sum test



## Results

- **Quantitative Survey (n=37):** No demographic differences; app users showed higher digital engagement, stronger climate/ecosystem concern, and more EPA-approved repellent use, while non-users scored slightly higher on mosquito knowledge (not significant).
- **Webinar (n=98):** Larvicide use intention rose (54% → 90%,  $p < 0.001$ ); improved ecological control knowledge.
- **Qualitative Interviews (n=11):** Strong mission alignment; benefits in empowerment, literacy, equity; barriers include capacity, training, usability; recommendations for clearer outreach, culturally tailored messaging, and sustained communication.



## Discussion

### Key Findings:

- App users: high engagement, no knowledge gains.
- Greater ecological concern & EPA-repellent use.
- Webinars: ↑ larvicide use (54%→90%), ↑ ecological support.
- Partners: mission fit, but need training/resources.

**Strengths:** First U.S. Mosquito Alert project, mixed-methods design, strong community partnerships.

**Limitations:** Small sample; cross-sectional design; possible selection bias, self reported data



## Conclusion

- MASTL app increases engagement and ecological concern but alone does not improve mosquito knowledge.
- Educational webinars significantly enhance ecological control knowledge and behavioral intentions.
- Lasting impact requires digital tools + education + sustained community partnerships.

