Executive Summary: Enhancing Early Detection of Alpha-Gal Syndrome in Rural Primary Care

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Main Points

A total of 559 individuals completed the White Alpha-gal Syndrome Allergy Questionnaire (WASA-Q) during the study, indicating high patient participation, strong community involvement, and widespread interest in Alpha-gal Syndrome (AGS) awareness across all age groups (4 months to 97 years) (presented in Figure 1).

The main points related to the White Alpha-gal Syndrome Allergy Questionnaire (WASA-Q):

- 72 patients requested further evaluation: 29 completed IgE testing, with 19 returning positive results for AGS.
- 170 symptomatic patients declined further screening, highlighting gaps in follow-through and potential underdiagnosis.
- Screening participation included individuals aged 4 months to 97 years, indicating broad demographic representation.
- Workflow integration improved provider confidence and diagnostic accuracy.
- The project contributed to six additional AGS diagnoses post-implementation, with the clinic expressing plans to continue the initiative.
- Outcomes aligned with Quadruple Aim and Healthy People 2030 objectives, supporting improved patient care, population health, cost reduction, and provider satisfaction.

Background and Purpose

Alpha-Gal Syndrome (AGS) is a tick-borne allergic condition caused by the Lone Star tick, mainly affecting people in rural southeastern U.S. Despite its increasing occurrence, AGS is often underdiagnosed because of limited awareness and the absence of standard protocols (Carpenter et al., 2023; Iglesia et al., 2024; Thompson et al., 2023; Wilson et al., 2024). This diagnostic gap leads to greater health problems: extended suffering for patients and families, misdiagnoses, and a higher healthcare

burden (CDC, 2024; Commins, 2020; Council of State and Territorial Epidemiologists, 2021; Office of Disease Prevention and Health Promotion, n.d.).

The purpose of this DNP project was to develop, implement evidence-based education and screening protocols, and evaluate the use of the White Alpha-Gal Allergy Syndrome Questionnaire (WASA-Q) and the White Alpha-Gal Syndrome Algorithm (WASA) in a rural primary care setting (shown in Figures 1 and 2). The project aimed to enhance education, community awareness, early identification and diagnosis, clinical decision-making, and public health equity for underserved populations in Person County, North Carolina (Institute for Healthcare Improvement, n.d; Office of Disease Prevention and Health Promotion, n.d.).

Methodology

This evidence-based quality improvement initiative was guided by the Iowa Model of Evidence-Based Practice, which promotes the systematic integration of research into clinical workflows. The project was carried out in Person County, North Carolina, an area known for rural health disparities and limited access to timely allergy diagnosis and treatment.

Due to AGS's extensive multisystem effects and symptoms, the inclusion criteria during the initial implementation phase involved inviting every patient or guardian to complete the WASA-Q. If the patient reported positive symptoms on the WAS-Q and checked 'yes' for further screening, then the medical assistants recorded that information in the patient's check-in on the EMR. During the reimplementation phase, patients aged 5 and above were included in the WASA-Q. The symptoms related to AGS often present with many of the same signs seen in newborns to 5-year-olds. Therefore, these patients were exempt from the WASA-Q unless their symptoms persisted beyond the typical duration of the diagnosed condition or if providers suspected a case of AGS. The WASA was implemented as a step-by-step guide for providers to deliver evidence-based care, including testing, education, prescribing, and referrals.

The primary drivers included reducing undiagnosed AGS cases and improving clinical recognition:

- Increase access to AGS education and health screening
- Reduce AGS-related morbidity and mortality
- Advance health equity through early diagnosis and intervention

Secondary drivers involved implementing a three-part intervention:

- AGS primary care screening and treatment protocol
- An evidence-based, the White Alpha-Gal Syndrome Allergy Questionnaire (WASA-Q)
- A clinically evidence-based algorithm for standardized decision-making, the White Alpha-Gal Syndrome Algorithm (WASA)

Implementation strategies were based on six core objectives, including increasing provider and community awareness, as well as enhancing assessment protocols and diagnosis accuracy. Two educational sessions were conducted: an initial individual session during the early implementation phase and a second session, held as a luncheon group session, before reimplementation with the entire practice participating. Repeated adjustments to the screening framework were made based on ongoing feedback from providers and patients, ensuring responsiveness and cultural relevance to the realities of rural clinical settings.

Results

During the 12-week implementation period, this high level of participation demonstrated strong community engagement and heightened awareness of AGS as an emerging allergic condition (presented in Figure 3).

Among the screened individuals:

- 72 patients requested further testing: 29 completed laboratory analysis, with 19 confirmed AGS diagnoses.

- 170 symptomatic individuals declined follow-up testing; demographic breakdown revealed higher hesitancy among female participants.
- Educational materials were frequently taken home, reflecting interest but requiring more durable content solutions.
- Commitment to ongoing screening, six additional AGS diagnoses post project completion
- Weekly evaluations and reimplementation luncheons strengthened staff engagement and collaboration.

Strengths and Limitations

Strengths observed include:

- High patient participation and diagnostic yield
- Real-time workflow integration and tool refinement
- Alignment with national health priorities
- Strong provider engagement and sustainability potential

Limitations observed include:

- Limited follow-through among symptomatic patients
- Staffing constraints and temporary interruptions affected momentum
- Need for tailored outreach to hesitant demographic groups
- Pending lab results limited immediate diagnostic completeness

Implications and Conclusions

This project highlighted the importance of AGS screening in practice, promoting health equity and enhancing diagnostic capacity. The initiative supported national public health objectives, encouraged clinical collaboration, and provided actionable insights for future practice.

Key implications include:

- Targeted education and screening promote informed decision-making.

- Earlier identification of AGS
- Reduction of morbidity and mortality
- Reducing unnecessary referrals, emergency visits, and misdiagnoses—ultimately improving patient safety and quality of life.

In conclusion, public participation, flexible implementation, and compassionate leadership led to significant changes. The project established a benchmark for expanding AGS screening in similar environments and reinforced the value of evidence-based, person-centered care. Future efforts should prioritize EMR integration, CME education, and public health campaigns to decrease AGS-related morbidity and mortality and enhance outcomes for vulnerable populations. This model isn't just effective, it's replicable, scalable, and essential for closing rural health gaps.

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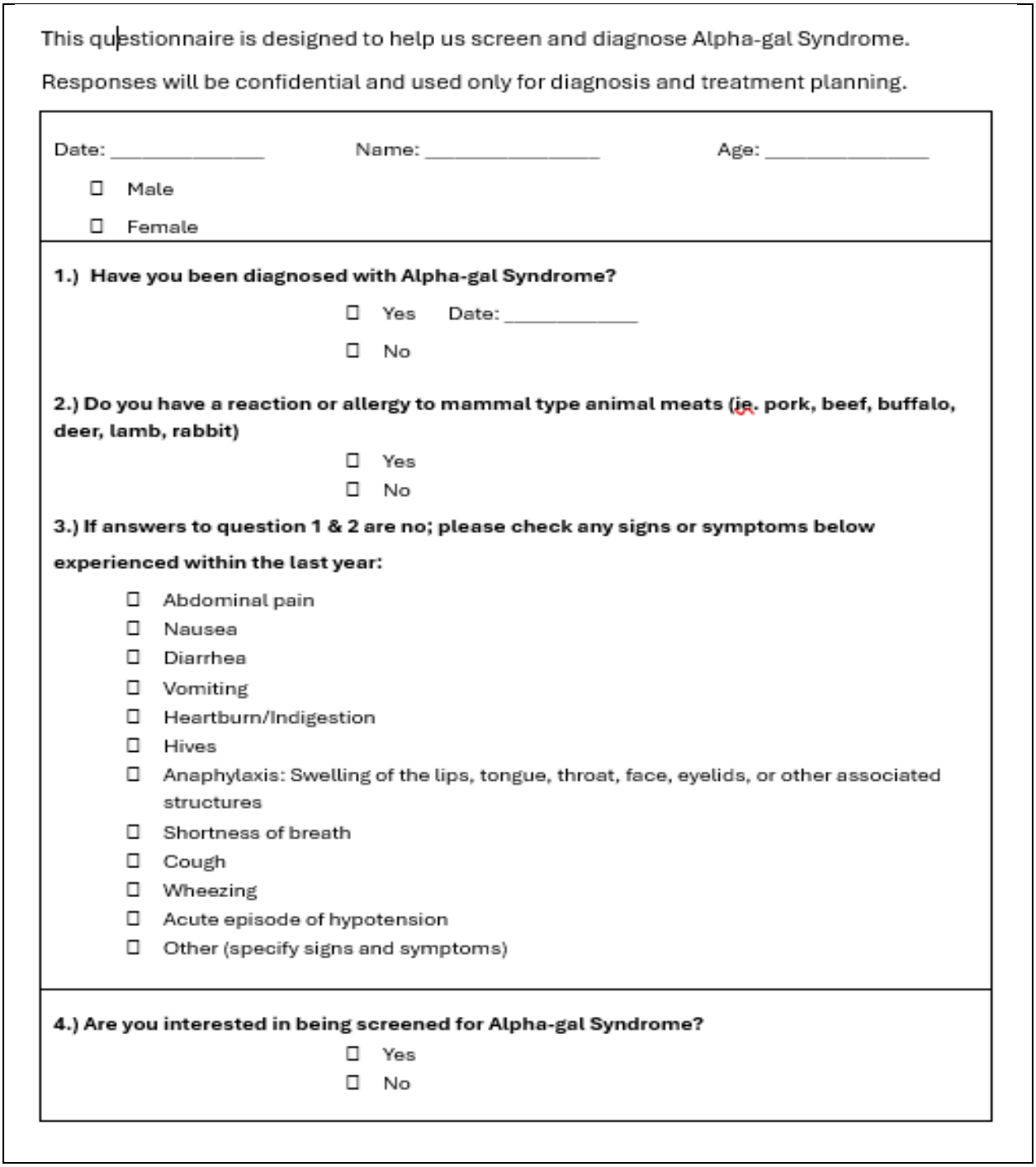
Figure 1

White Alpha-gal Syndrome Allergy Questionnaire (WASA-Q)



This questionnaire is designed to help us screen and diagnose Alpha-gal Syndrome.

Responses will be confidential and used only for diagnosis and treatment planning.

Date: _____ Name: _____ Age: _____

- ☐ Male
- ☐ Female

1.) Have you been diagnosed with Alpha-gal Syndrome?

- ☐ Yes Date: _____
- ☐ No

2.) Do you have a reaction or allergy to mammal type animal meats (ie. pork, beef, buffalo, deer, lamb, rabbit)

- ☐ Yes
- ☐ No

3.) If answers to question 1 & 2 are no; please check any signs or symptoms below experienced within the last year:

- ☐ Abdominal pain
- ☐ Nausea
- ☐ Diarrhea
- ☐ Vomiting
- ☐ Heartburn/Indigestion
- ☐ Hives
- ☐ Anaphylaxis: Swelling of the lips, tongue, throat, face, eyelids, or other associated structures
- ☐ Shortness of breath
- ☐ Cough
- ☐ Wheezing
- ☐ Acute episode of hypotension
- ☐ Other (specify signs and symptoms)

4.) Are you interested in being screened for Alpha-gal Syndrome?

- ☐ Yes
- ☐ No

Note. Initials changed to name for clinic patient identification.

Figure 2

White Alpha-gal Syndrome Algorithm (WASA)

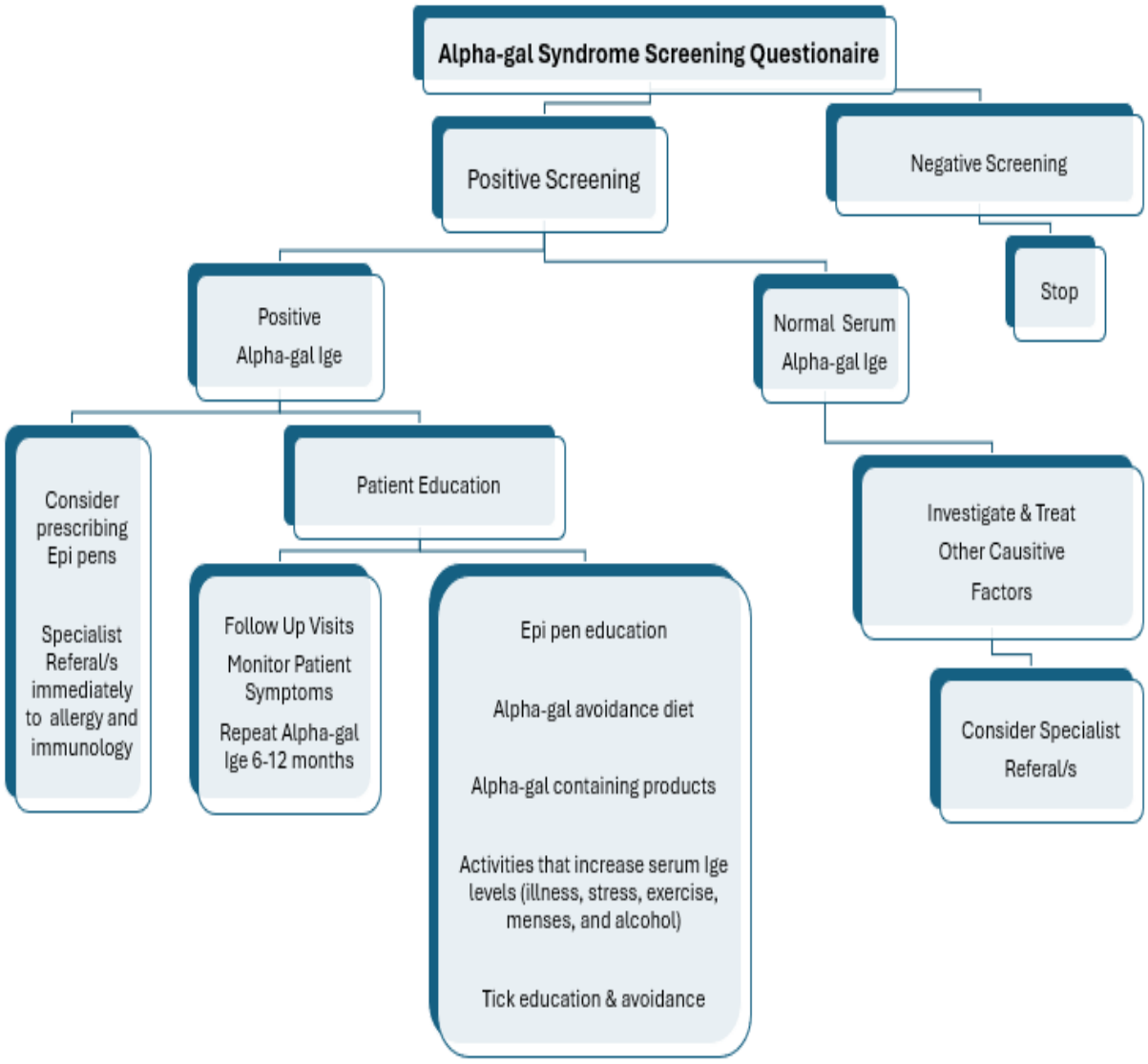
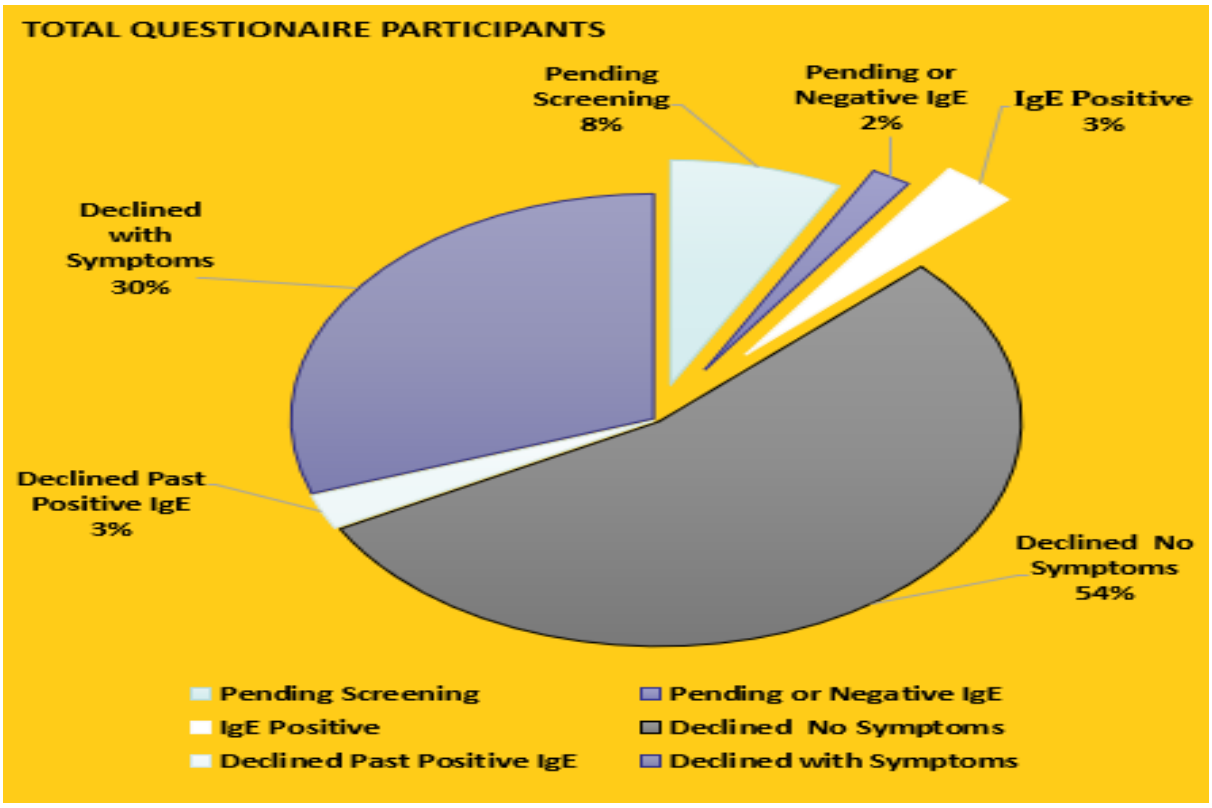


Figure 3

Alpha-gal Screening Questionnaire Outcomes



Note. N = 559. Participants' ages ranged from 4 months to 97 years. Of the total respondents, 72 patients requested further screening, leading to 29 completed laboratory tests, with 19 confirmed positive AGS IgE results. Additionally, 43 patients had pending laboratory results, while 487 declined further testing, despite 170 reporting positive symptoms. Among symptomatic patients who refused further screening, 112 were female, 55 were male, and 3 were unidentified by sex.