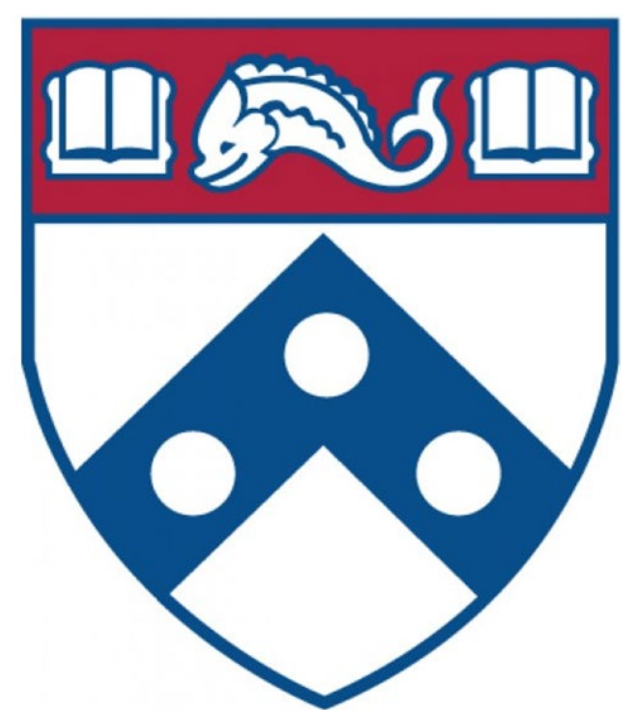


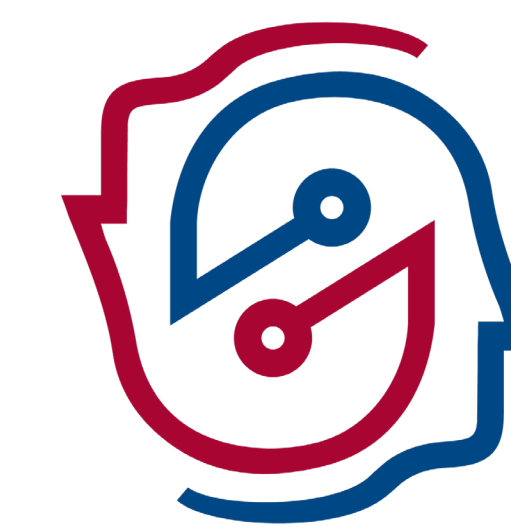


# Implementation and use of educational chatbots to support *APOE* testing for anti-amyloid therapy

Angela Bradbury<sup>1</sup>, Elisabeth Wood<sup>1</sup>, Laynie Dratch<sup>1</sup>, Justin Feng<sup>1</sup>, Aysha Syeda<sup>1</sup>, Ethan Broaddus<sup>1</sup>, Rajia Mim<sup>1</sup>, Meron Azage<sup>1</sup>, Sarah Milinski<sup>1</sup>, Brian Egleston<sup>2</sup>, Sanjeev Vaishnavi<sup>1</sup>

<sup>1</sup>University of Pennsylvania, Philadelphia, PA; <sup>2</sup>Fox Chase Cancer Center, Philadelphia, PA.

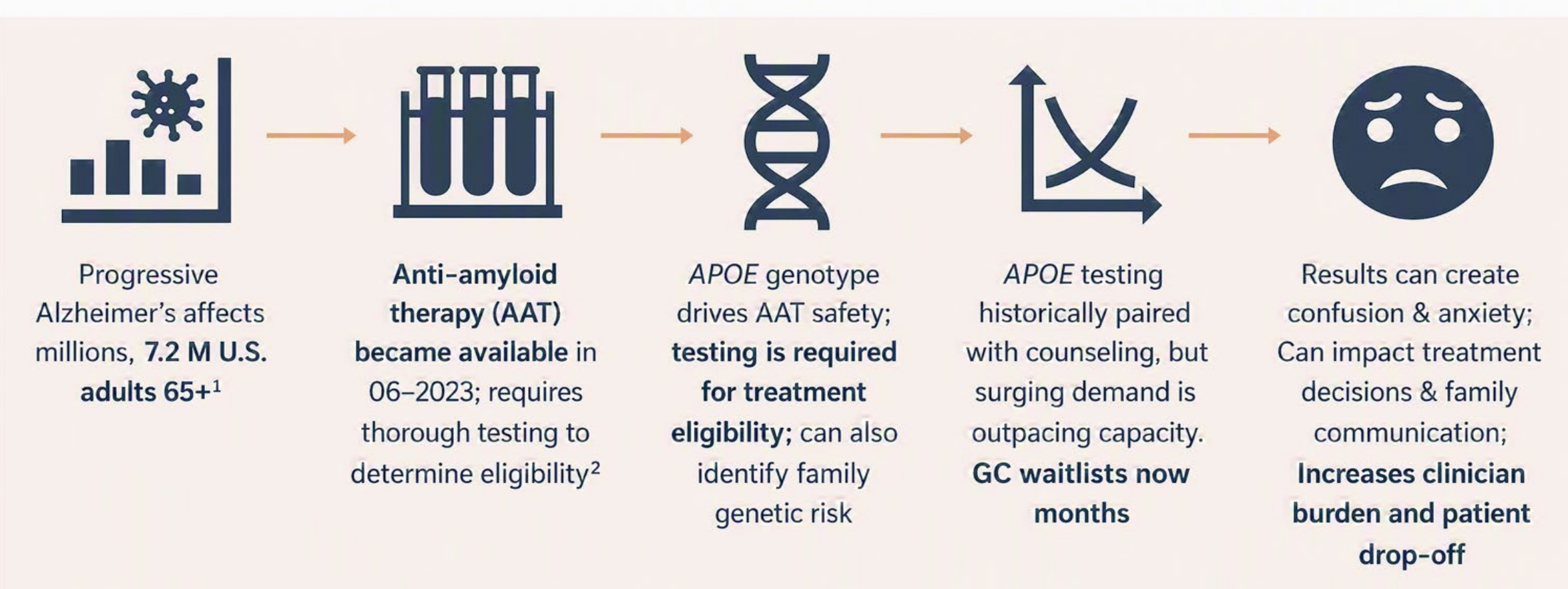
Tech Abstract #47; AAIC Abstract #0915



PennAITech

## BACKGROUND

APOE TESTING IS NOW RECOMMENDED FOR PATIENTS UNDERGOING EVALUATION FOR ANTI-AMYLOID THERAPY THAT THE EXISTING CARE MODEL IS NOT BUILT TO SUPPORT

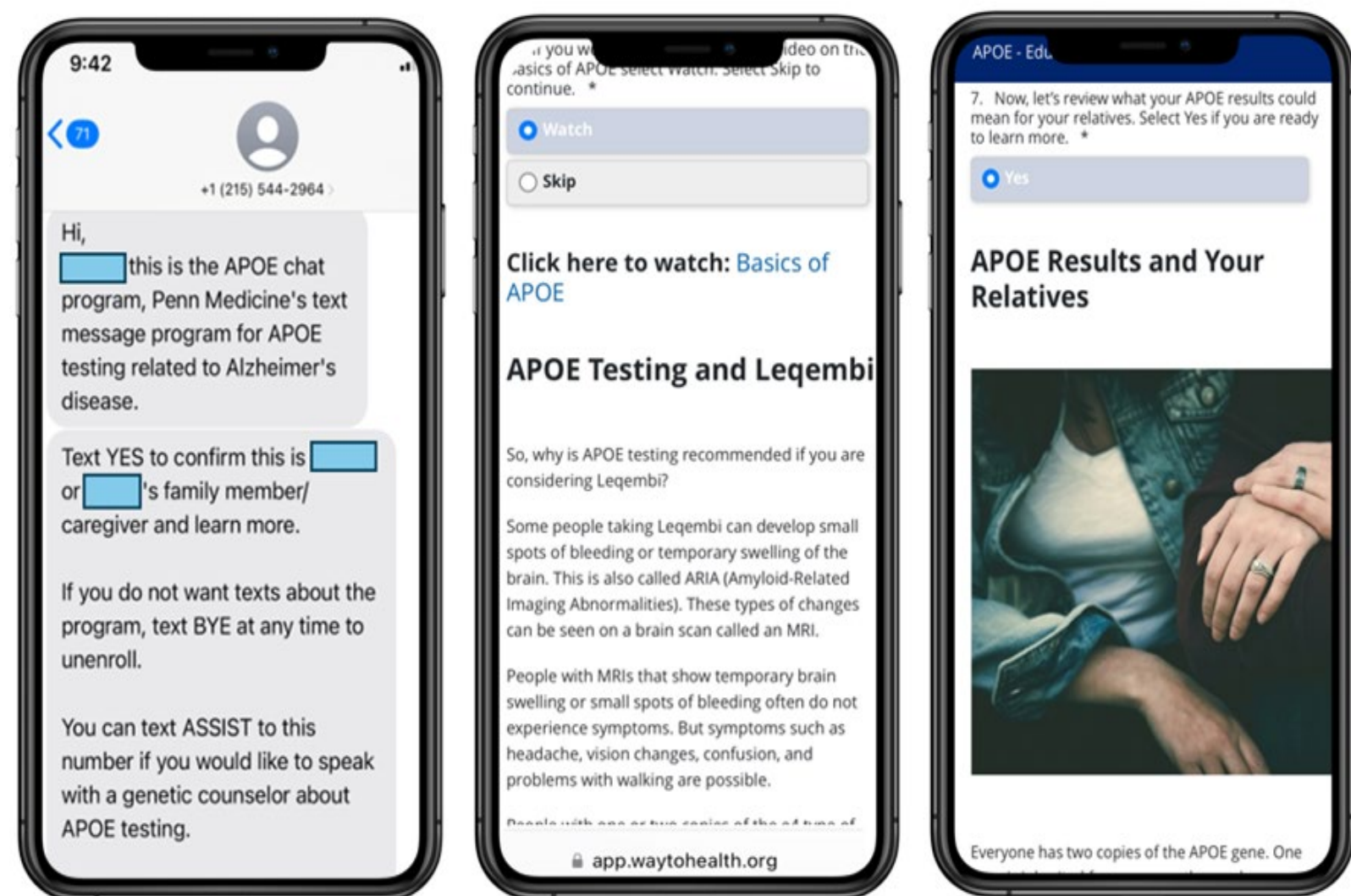


<sup>1</sup> Alzheimer's Association. 2024 Alzheimer's Disease Facts and Figures. *Alzheimers Dement.* 2024.

<sup>2</sup> Appropriate Use Recommendations for Anti-Amyloid Monoclonal Antibodies in Alzheimer's Disease. *J Prev Alzheimers Dis.* 2023.

## CLINICAL APOE CHATBOT PROGRAM

- Adapting from randomized studies in clinical genetics (Abstract #0959, NCT06459583, NCT05427240, NCT04242667), we developed a patient-centered education chatbot to provide information on AD and implications of *APOE* testing for patients considering anti-amyloid therapy at the University of Pennsylvania (IRB exempt Quality/Improvement project).
- The initial version (V1) included implications of various *APOE* genotype results and was sent to patients after results were released in the EHR. Exit interviews with patients & caregivers informed modifications for version 2 (V2).
- V2 includes an Education Chat sent at *APOE* ordering (prior to results) and a Result Chat with genotype specific explanations (6 results types) sent at result release.
- Patients can send individual questions through the platform and are answered by program staff or genetic counselors.
- The chatbots are hosted on the Way to Health Platform and sent via SMS & email.
- Descriptive statistics were used to describe characteristics and chatbot use.



## RESULTS

- v1 was deployed from March 2024-July 2025.
- v2 deployment began in December 2025.

| Table 1 Patient characteristics |                                                                                                        |                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|                                 | Patients sent a chat*<br>N= 1,467                                                                      | Patients completed chat^<br>N=459                                                                  |
| Average age (range)             | 71.9 (20-93)                                                                                           | 71.5 (31-93)                                                                                       |
| Biological sex (n, %)           | Female: 816 (55.4%)<br>Male: 651 (44.6%)                                                               | Female: 276 (60.1%)**<br>Male: 183 (39.9%)                                                         |
| Race (n, %)                     | White: 1232 (84.0%)<br>Black: 108 (7.4%)<br>Unknown: 55 (3.8%)<br>Other: 43 (2.9%)<br>Asian: 27 (1.8%) | White: 393 (85.6%)<br>Black: 36 (7.8%)<br>Unknown: 14 (3.1%)<br>Other: 9 (2.0%)<br>Asian: 7 (1.5%) |
| Ethnicity (n, %)                | Hispanic/Latino: 44 (3.0%)<br>Not Hispanic/Latino: 1382 (94.2%)<br>Unknown: 41 (0.3%)                  | Hispanic/Latino: 15 (3.3%)<br>Not Hispanic/Latino: 435 (94.8%)<br>Unknown: 9 (0.2%)                |
| APOE e4 genotype (n, %)         | Homozygote: 118 (9.9%)<br>Heterozygote: 523 (43.8%)<br>Non-carrier: 554 (46.4%)                        | Homozygote: 50 (12.4%)^^<br>Heterozygote: 182 (45.1%)<br>Non-carrier: 172 (42.6%)                  |

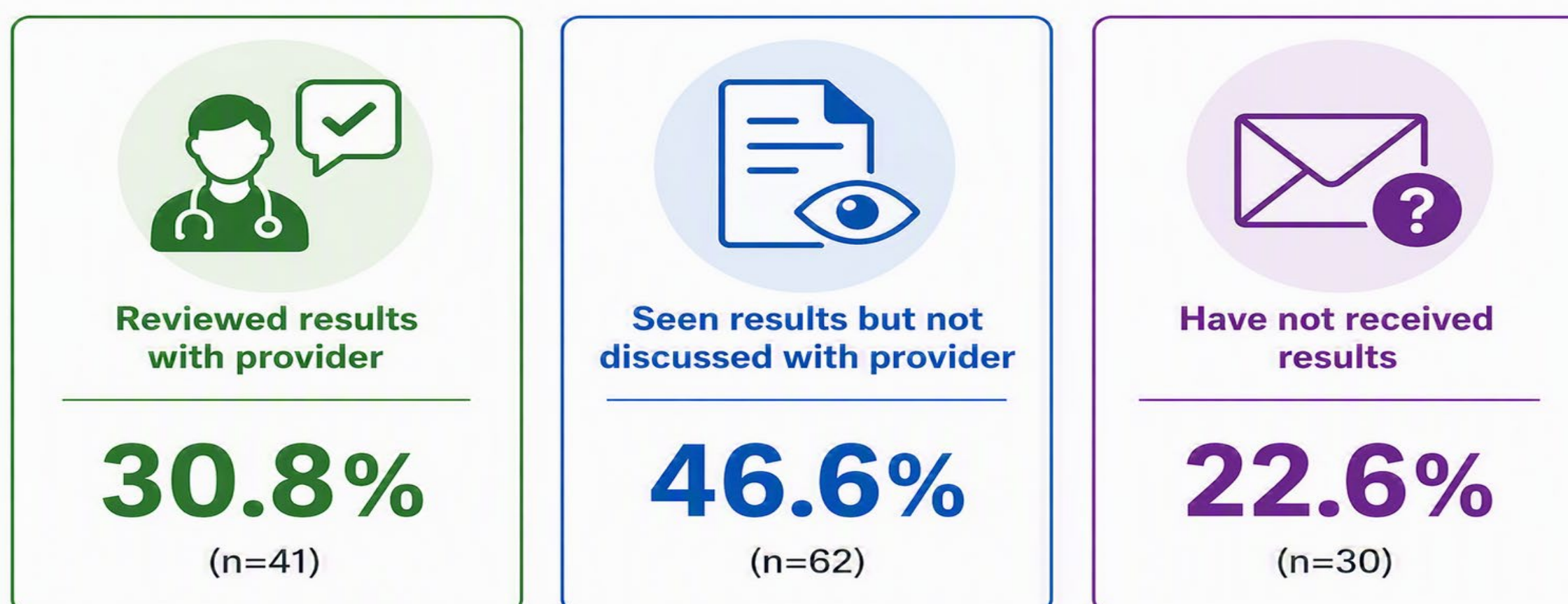
\*Individual patients sent a V1 or V2 chat; ^completed in part or full; women were more likely to complete the chat then men (p=0.019). Homozygotes were more likely to complete the chat (42%) as compared to heterozygotes (35%) and non-carriers (31%), p=0.05.

| Table 2 Chatbot engagement and completion |             |             |               |              |
|-------------------------------------------|-------------|-------------|---------------|--------------|
|                                           | Overall     | Homozygotes | Heterozygotes | Non-carriers |
| V1 Result chat^ (n=1,155)                 |             | N=112       | N=476         | N=500        |
| Engagement                                | 497 (43%)   | 53 (47.3%)  | 221 (45%)     | 201 (40.2%)  |
| No reply                                  | 548 (47.4%) | 53 (47.3%)  | 211 (43%)     | 245 (49%)    |
| Decline                                   | 101 (8.7%)  | 6 (5.4%)    | 41 (8.4%)     | 49 (9.8%)    |
| Message failure                           | 9 (0.8%)    | 0 (0%)      | 3 (0.6%)      | 5 (1%)       |
| Partial or full completion                | 219 (19%)   | 29 (25.9%)  | 103 (21.6%)   | 80 (16%)     |
| V2 Education chat (n=326)                 |             |             |               |              |
| Engagement                                | 154 (47.2%) | 3 (30%)     | 25 (61%)      | 26 (56.5%)   |
| No reply                                  | 147 (45.1%) | 7 (70%)     | 13 (31.7%)    | 17 (37%)     |
| Decline                                   | 24 (7.4%)   | 0 (0%)      | 3 (7.3%)      | 3 (6.5%)     |
| Message failure                           | 1 (0.3%)    | 0 (0%)      | 0 (0%)        | 0 (0%)       |
| Partial or full completion                | 70 (21.5%)  | 1 (10%)     | 14 (34.1%)    | 8 (17.4%)    |
| V2 Result chat^ (n=332)                   |             | N=37        | N=134         | N=161        |
| Engagement                                | 153 (46.1%) | 18 (48.6%)  | 65 (48.5%)    | 70 (43.5%)   |
| No reply                                  | 171 (51.5%) | 19 (51.4%)  | 66 (49.3%)    | 86 (53.4%)   |
| Decline                                   | 5 (1.5%)    | 0 (0%)      | 2 (1.5%)      | 3 (1.9%)     |
| Message failure                           | 3 (0.9%)    | 0 (0%)      | 1 (0.7%)      | 2 (1.2%)     |
| Partial or full completion                | 133 (40.1%) | 16 (43.2%)  | 59 (49.3%)    | 58 (36%)     |

^V1 Result chat has general information about all *APOE* results, not specific to the recipient.  
V2 Result chat has genotype-specific information specific to the recipient.

## Status of Genetic Test Results and Provider Discussion

Among participants (N=133) who viewed genotype-specific information via the chatbot

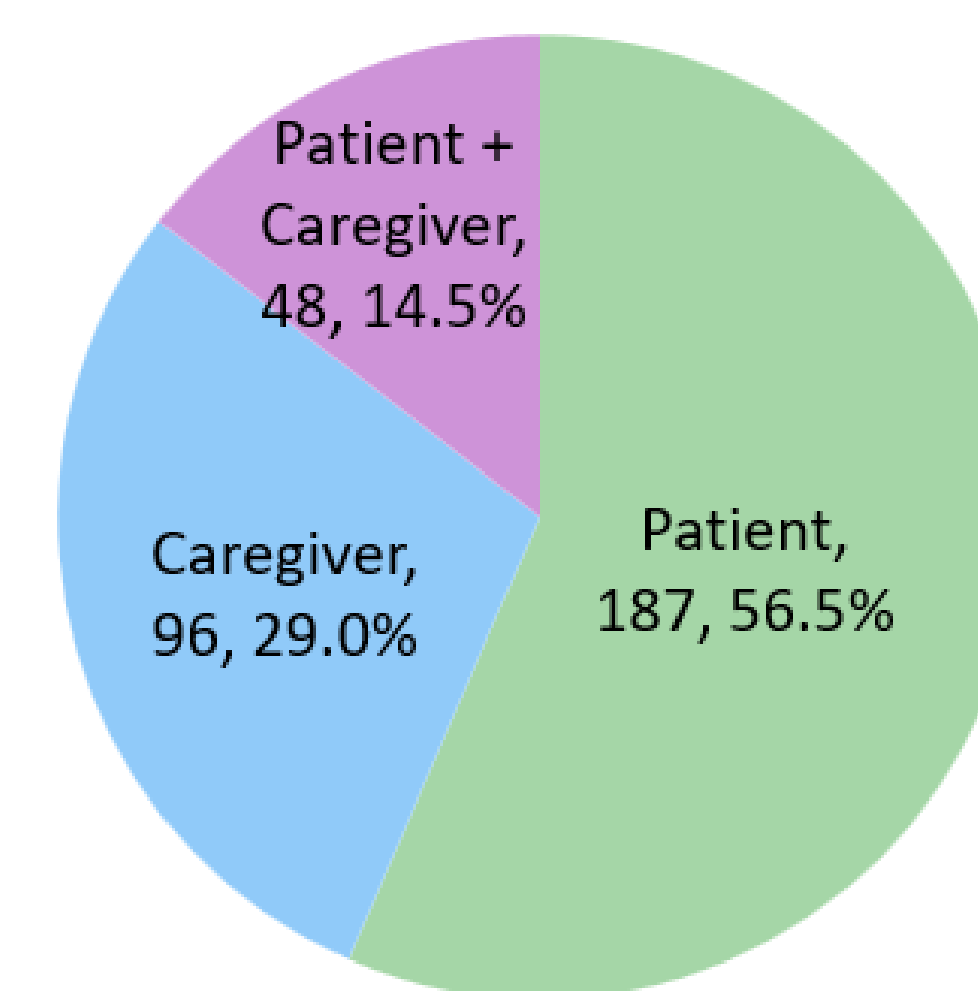


Percentages may not sum to 100% due to rounding.

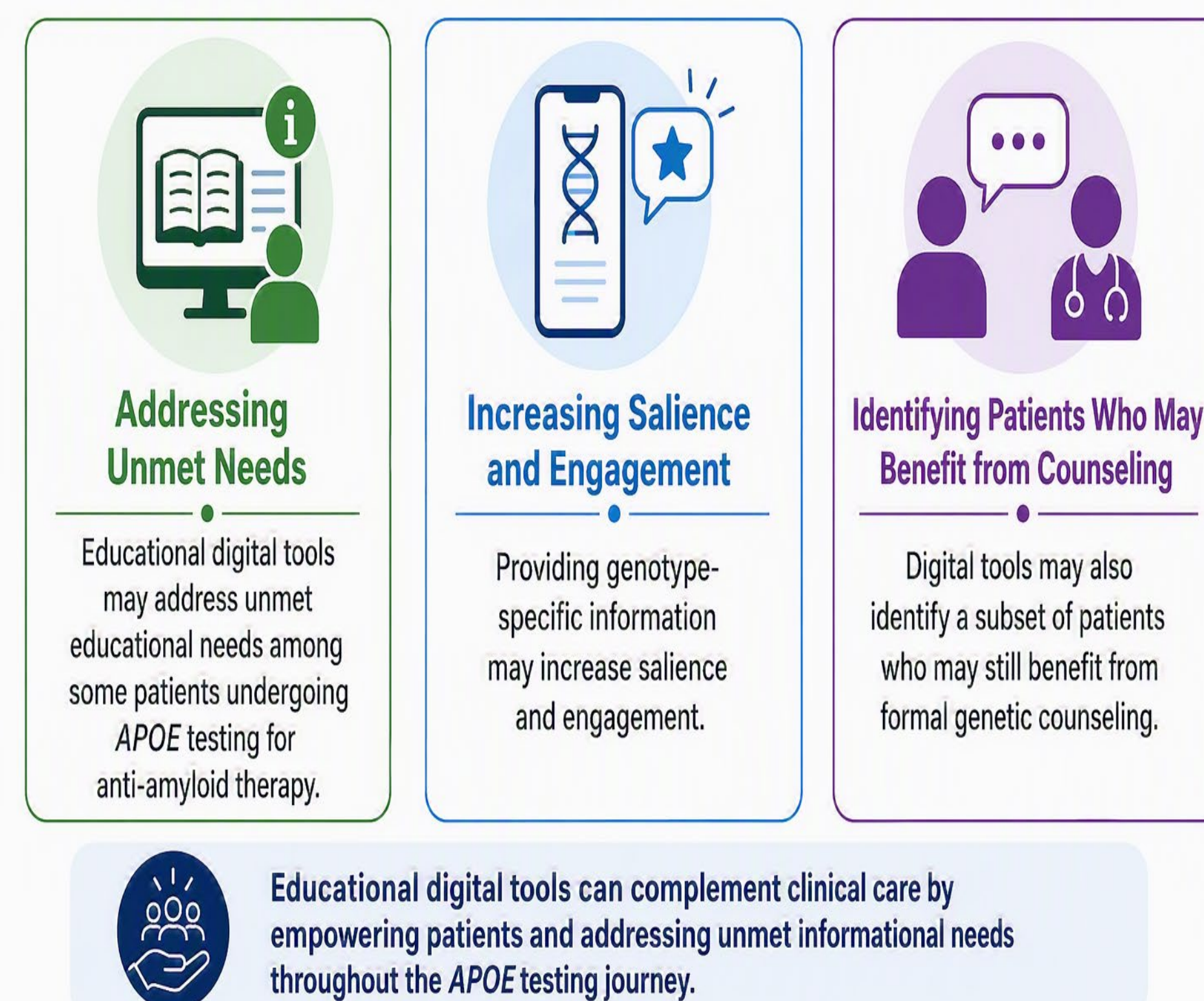
## RESULTS

- 62 patients asked individual questions or asked for assistance in the chat.
- APOE* questions (21), Information on chat (11), requested assistance then no response (11), requested to speak with someone (9), general sharing (7), medical team question (2).
- 11 individuals were referred for genetic counseling

Who is completing the chat?



## Conclusions



Supported by PennAITech : NIA grant P30AG073105.

Questions or comments:

angela.bradbury@pennmedicine.upenn.edu