

# Pathways to Precision Cancer Care: Integrating Genetic Services into a Nationwide, Risk-Adjusted Cancer Program



Kelly Tangney, Deanna Brockman, Hannah Hoban, Cynthia L. Neben, Lillian Servais, Anjali D. Zimmer, Scott Topper  
Color Health, Burlingame, CA

## Introduction

Some common cancers are driven by hereditary risk factors, and clear guidance exists to inform risk-adjusted screening protocols for high-risk individuals. But primary care providers often don't recognize significant indications in personal or family history, are unfamiliar with genetic testing, and can't develop or support personalized cancer screening plans.<sup>1</sup> Furthermore, up to 80% of patients do not receive timely follow-up and management for positive screen results.<sup>2</sup>

Here, we describe a model for a fully-supported, risk-informed approach to cancer screening and detection: the Color Virtual Cancer Clinic (VCC). The VCC integrates personal and family history evaluation, genetic testing, genetic counseling, risk-adjusted screening plans, active support for screening gap closure, and immediate follow-up for positive screen results. The program is offered as a health-care benefit offered by self-insured employers (including labor unions) and payers to their members. Below we detail the program implementation and the health outcomes of the first 8617 program participants.

## Methods

Participants self-selected into Color's Virtual Cancer Clinic, offered as a part of their employer-sponsored healthcare. They provided personal and family history through an online platform or in conversation with a Color Medical physician or genetic counselor. Patients who met NCCN testing criteria (or who were enrolled in a population-wide genetics program) were provided at-home clinical genetic testing for 29 genes associated with common hereditary cancers. Positive results were returned by a genetic counselor, who immediately provided an NCCN-informed, risk-adjusted cancer screening plan. Consultations were also optionally available to patients with negative genetic test results.

Cancer screening gaps were identified, and patients were directly supported in addressing those screening gaps through at-home testing (i.e. PSA testing for prostate cancer, FIT testing for colorectal cancer) or by ordering and scheduling support for in-person evaluations (i.e. mammograms or breast MRIs for breast cancer or colonoscopies for colorectal cancer). Care advocacy and telemedicine consultations were provided to make appointments and support patients in keeping them, and to provide appropriate follow-up for positive cancer screening results.

Table 1. Participant demographics

|                                           |                                        | All<br>n (%) | Completed<br>Genetic Testing | Positive Genetic<br>Finding |
|-------------------------------------------|----------------------------------------|--------------|------------------------------|-----------------------------|
|                                           | <b>Total</b>                           | 8617         | 2331                         | 107                         |
| <b>Sex assigned<br/>at birth</b>          | Female                                 | 4993 (57.9%) | 1447 (62.1%)                 | 65 (60.7%)                  |
|                                           | Male                                   | 3624 (42.1%) | 884 (37.9%)                  | 42 (39.3%)                  |
| <b>Age</b>                                | 18-29                                  | 1161 (13.5%) | 326 (14.0%)                  | 17 (15.9%)                  |
|                                           | 30-39                                  | 2625 (30.5%) | 764 (32.8%)                  | 29 (27.1%)                  |
|                                           | 40-49                                  | 2253 (26.1%) | 643 (27.6%)                  | 30 (28.0%)                  |
|                                           | 50-59                                  | 1741 (20.2%) | 414 (17.8%)                  | 20 (18.7%)                  |
|                                           | 60+                                    | 837 (9.7%)   | 185 (8.0%)                   | 11 (10.3%)                  |
| <b>Race/Ethnicity<br/>(self-reported)</b> | Asian                                  | 753 (8.7%)   | 157 (6.7%)                   | 6 (5.6%)                    |
|                                           | Black                                  | 455 (5.3%)   | 91 (3.9%)                    | 1 (0.9%)                    |
|                                           | Hispanic                               | 937 (10.9%)  | 246 (10.6%)                  | 8 (7.5%)                    |
|                                           | Multiethnic                            | 268 (3.1%)   | 85 (3.6%)                    | 2 (1.9%)                    |
|                                           | AI/AN                                  | 12 (0.1%)    | 1 (0.0%)                     | 0 (0.0%)                    |
|                                           | Native Hawaiian<br>or Pacific Islander | 10 (0.1%)    | 4 (0.2%)                     | 0 (0.0%)                    |
|                                           | Unknown                                | 916 (10.6%)  | 78 (3.3%)                    | 2 (1.9%)                    |
|                                           | White                                  | 5266 (61.1%) | 1669 (71.6%)                 | 88 (82.2%)                  |

Of the 8,617 total participants, 2,331 (27.1%) completed genetic testing, which yielded a 4.6% positive rate (107) .

## References

- Dusic EJ et. al. Barriers, interventions, and recommendations: Improving the genetic testing landscape. *Front Digit Health*. 2022 Nov 1;4:961128.
- Atlass SJ et. al. A Multilevel Primary Care Intervention to Improve Follow-Up of Overdue Abnormal Cancer Screening Test Results. *JAMA*. 2023;330(14):1348-1358.

## Results

Figure 1. Program process

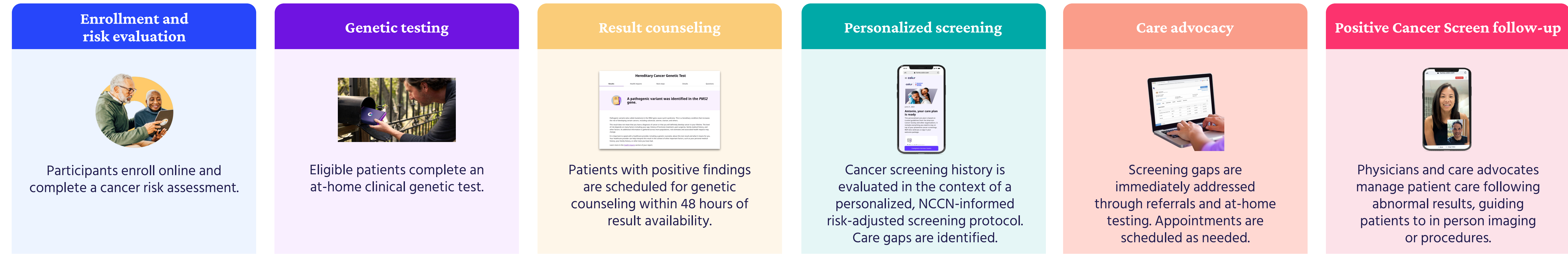
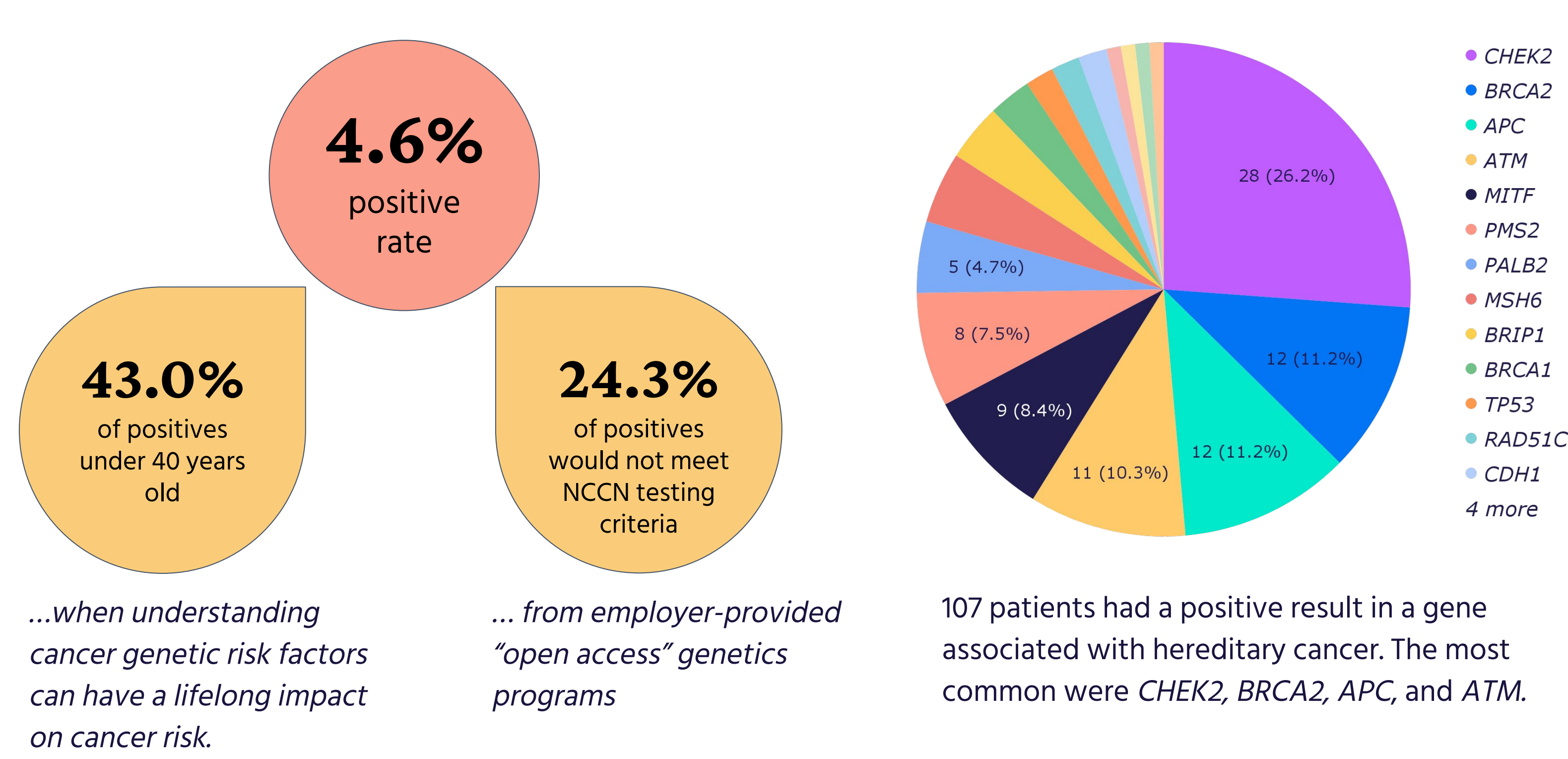


Figure 2. Genetic testing results

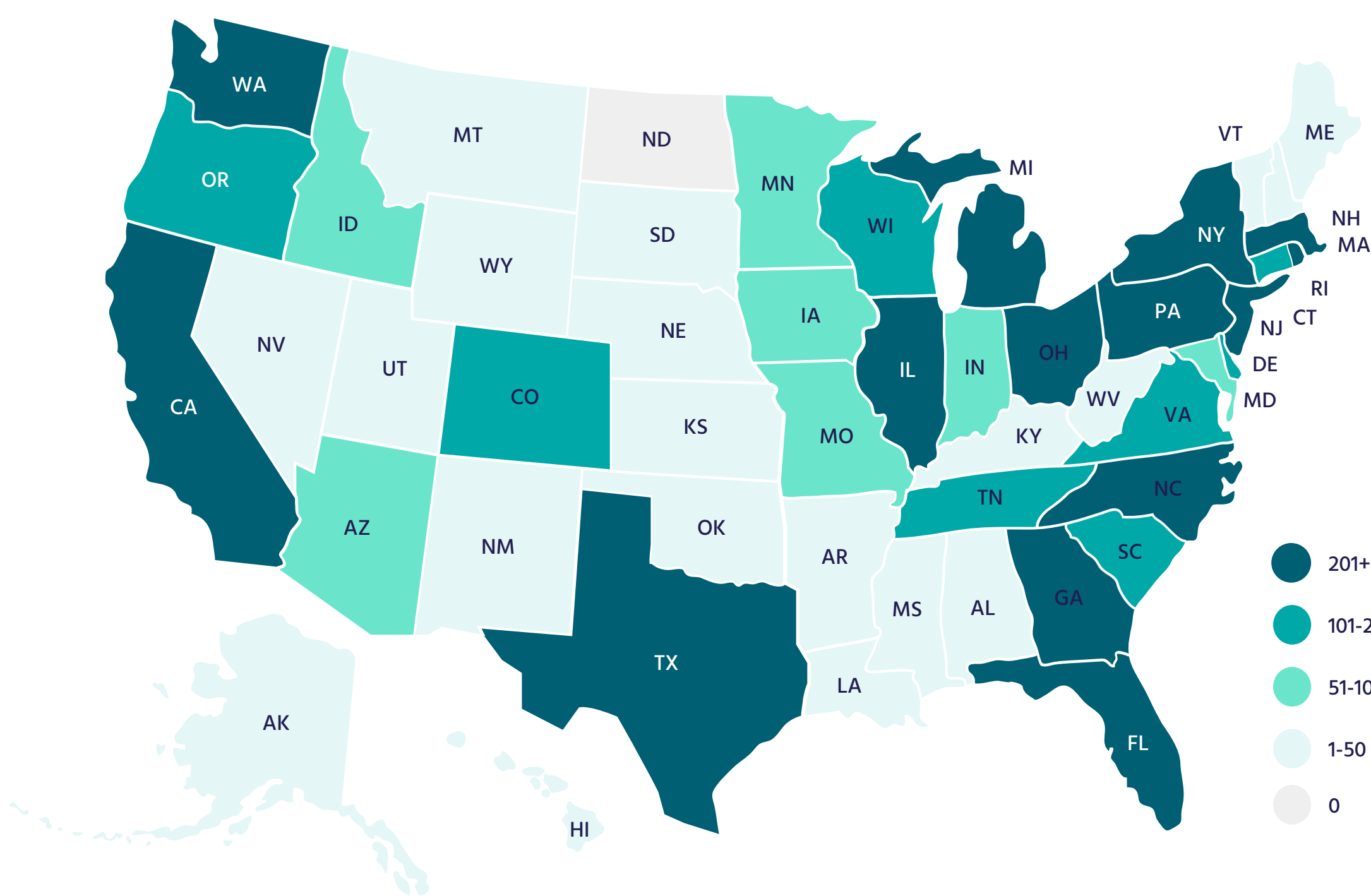


NCCN provides risk-adjusted screening guidelines for individuals with positive findings in these genes, which can recommend alternate screening technologies (i.e. breast MRI vs mammograms) and an earlier or more frequent testing cadence. Of the 87 participants with positive genetic test results who completed a risk consult, 48 (55.2%) had gaps in their recommended, personalized cancer screening plans. These included outstanding needs for colonoscopies, breast imaging, PSA testing, dermatology consults and others. The care team helped schedule screenings or consults for 28 of these patients (58.3%), including 4 mammograms, 10 breast MRIs, 8 colonoscopies, 4 upper endoscopies, and 5 at-home PSA tests. The care team also made 13 referrals to local high-risk specialists such as breast and gynecologic surgeons, dermatologists, gastroenterologists, and genetics clinics for additional management. The remaining patients received counseling and a written, multi-year genetics-informed cancer screening plan. 19 chose to pursue follow-up without assistance, and 1 declined the recommended screening.

Figure 4. Genetics-informed cancer screening plan

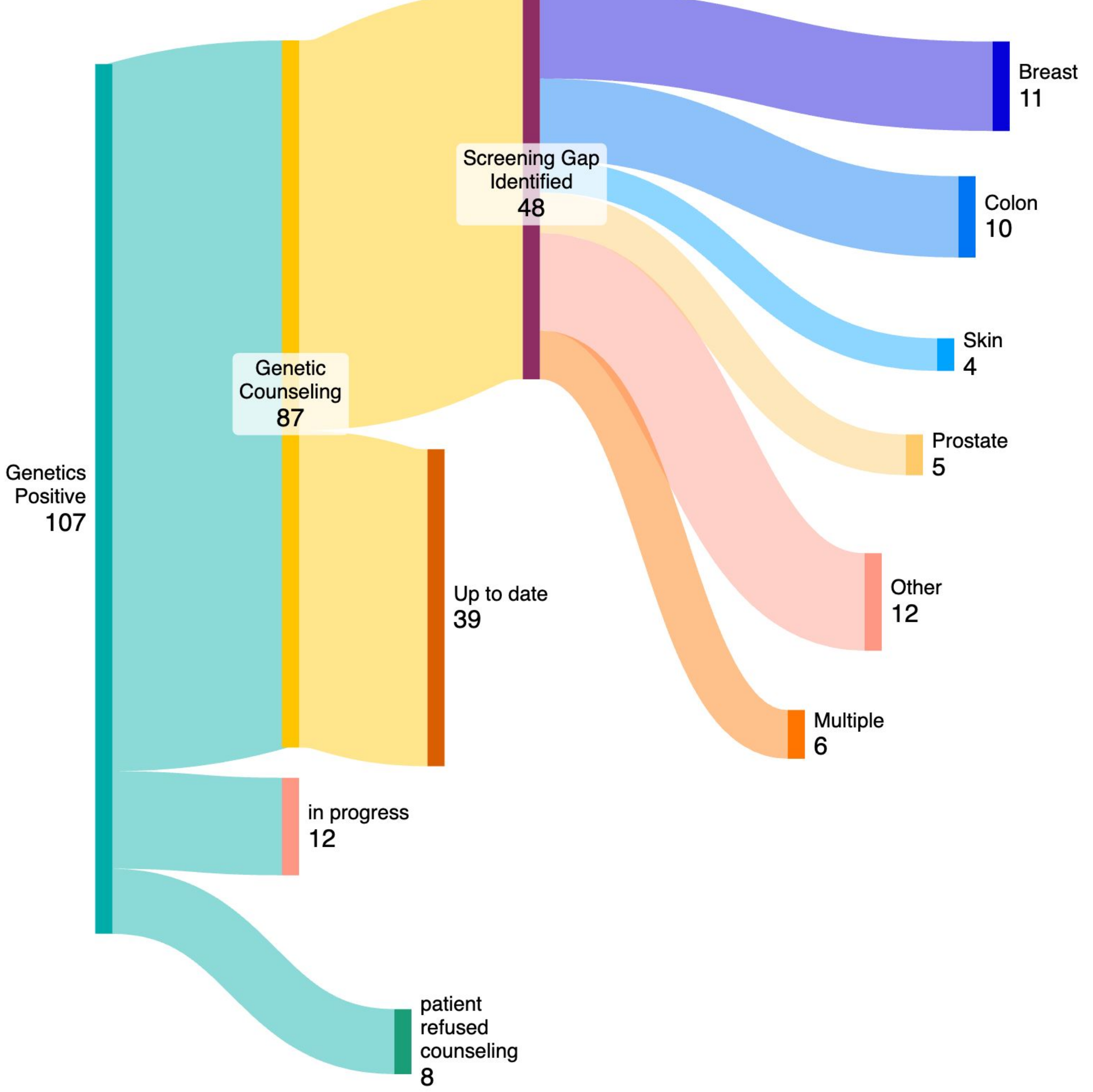


Figure 5. Nationwide reach



50 state medical group supports patients nationwide. In this study, patients were located in 49 states, the District of Columbia, and Puerto Rico, with the highest concentration in California and Pennsylvania.

Figure 3. Screening Gaps identified in Genetics positive patients



## Conclusions

Taken together, these data suggest that a virtual, personalized cancer management model enables broad access to risk assessment and follow-up care. Integrating genetics into a cancer clinic enables a novel access point to comprehensive cancer risk assessment. The participant support services made available through this clinic – namely, genetic counselors, physicians, and care advocates – can help minimize health system burden and expedite risk-adjusted cancer screening and prevention for patients.

- Through this program to date, over a quarter of participants (27.1%) completed genetic testing, and about 4.6% received a positive genetic test result that could inform their cancer screening plans and care management.
- Most participants (65.1%) with positive genetic findings had gaps in their genetics-informed cancer screening, highlighting the need for personalized risk assessment and education. Participants were able to pursue follow-up testing independently or through the clinic care team who helped to schedule screenings or consults.
- Integrating genetics into a cancer clinic enables a novel access point to comprehensive cancer risk assessment. The participant support services made available through this clinic – namely, genetic counselors, physicians, and care advocates – can help minimize the burden and expedite risk-adjusted cancer screening and prevention for patients.

Questions? [scott@color.com](mailto:scott@color.com)