

Digital direct engagement is an effective method for communicating updated test results

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Introduction

The duty to recontact patients with new information that may meaningfully alter medical care was first established in 1999. The issue has grown in urgency since then, and the American College of Medical Genetics and Genomics (ACMG)¹, American Society of Human Genetics², and European Society of Human Genetics³ have all issued updated statements re-examining and re-affirming this duty. Despite the ethical framework and the increasing relevance, little has been published about the methods or effectiveness of recontacting. Color Genomics, a clinical laboratory, utilizes electronic communications to maintain active interactions with individuals, regardless of their physical location. Here we present data on the effectiveness of providing updated information to subset of individuals (500) who received genetic testing ordered by their personal healthcare provider (traditional) or ordered by an independent healthcare provider from an external network (independent).

Methods

All individuals were ordered a Color test by a healthcare provider that analyzes genes in which variants have been associated with elevated risk for common hereditary cancers and/or cardiovascular conditions. Analysis, variant calling, and reporting focused on the complete coding sequence and adjacent intronic sequence of the primary transcript(s), unless otherwise indicated. Laboratory procedures were performed at the Color laboratory under CLIA and CAP compliance. Variants were classified according to the ACMG 2015 guidelines for sequence variant interpretation⁴, and all variant classifications were signed out by a board certified medical geneticist or pathologist.

Results were counted as positive if one or more pathogenic (P) or likely pathogenic (LP) variant was detected and negative if no variant or only a benign, likely benign, or variant of uncertain significance was detected at the time of data collection. At a subsequent date, all individuals (and their providers) were notified by email of a revised report based on new genetic or clinical information including updated risk (due to new information from scientific studies), new health history, and variant reclassification. Revised reports were counted as “accessed” when individuals signed into their Color account and opened the report. The rates at which providers accessed or passed forward updated information could not be assessed due to variability in communication preferences (including fax). All individuals consented to having their de-identified information and sample used in anonymized studies.

Conclusions

- The data presented here demonstrate that digital direct communication mediated by a clinical laboratory is effective for communicating updated test results to individuals.
 - Updates to results can be easily delivered to ~2/3 of clients within 7 days.
- The decreased access rates in the traditional cohort could be attributed to individuals directly discussing reports with their personal healthcare provider.
- To our knowledge, this is the first report on the effectiveness of providing updated information in a clinical laboratory.

References

- Hirschhorn K, Fleisher LD, Godmilow L, et al. *Genet Med*. 1999.
- The American Society of Human Genetics Social Issues Subcommittee on Familial Disclosure. *Am J Hum Genet*. 1998.
- Carrieri D, Jackson L, Howard HC, et al. https://www.eshg.org/fileadmin/eshg/consultations/Recontacting_Draft_ESHG_Recommendations_March_2018_for_membership.pdf.
- Richards S, Aziz N, Bale S, et al. *Genet Med*. 2015.

Results

Figure 1. Workflow for revised genetic testing reports

A revised report is generated based on new genetic or clinical information including updated risk (due to new information from scientific studies, new health history, or variant reclassification. Individuals (and their providers) are then notified by email and prompted to sign into their Color account to see additional details. Individuals with a variant reclassification involving a new pathogenic (P) or likely pathogenic (LP) variant are prompted to schedule a genetic counseling session, which is provided by Color and/or the healthcare provider. Once in their Color account, individuals view a revision notification modal window that appears on the results page in the online interactive report.

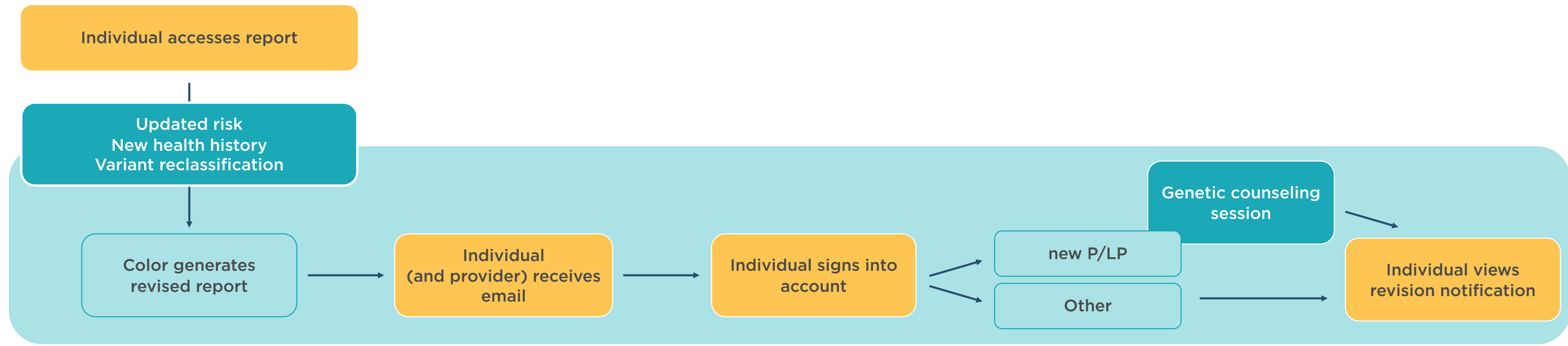


Figure 2. Sample revision notifications in online interactive report

Sample revision notification modal windows for revised reports based on new health history and variant reclassification: same result.

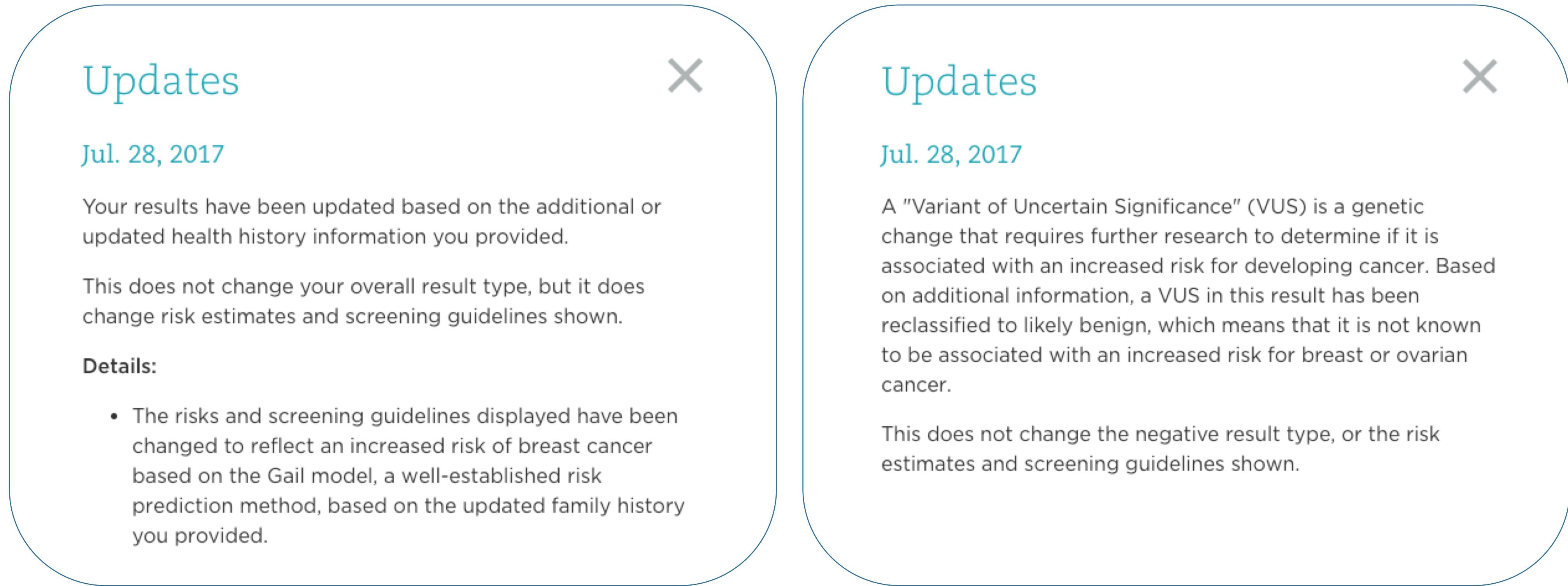
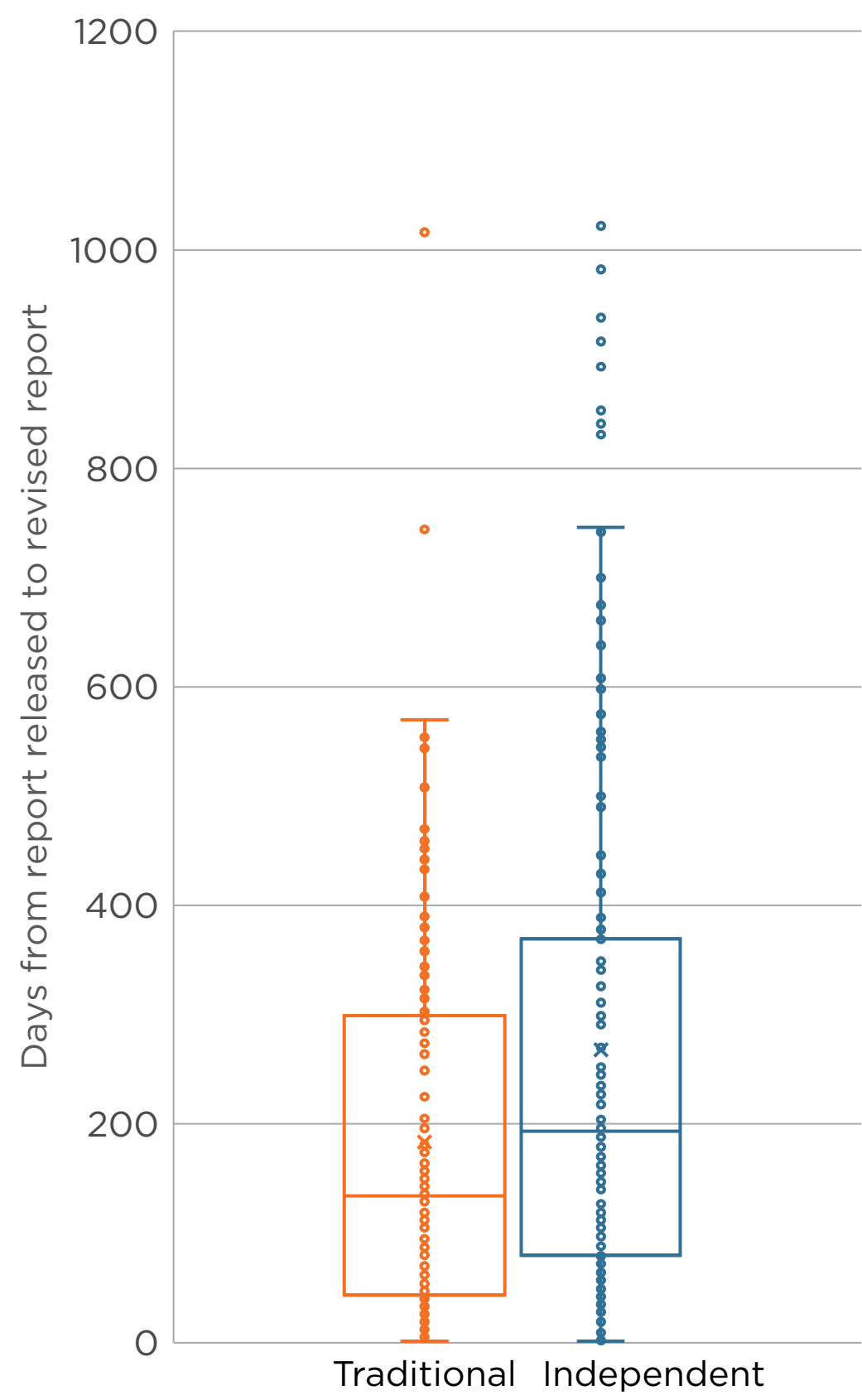


Figure 3. Generation and access rate of genetic testing reports

(A) Revised reports were generated after a median of 134 days (Q1-Q3 = 44-295) in the traditional cohort (n = 230) compared to a median of 194 days (Q1-Q3 = 81-370) in the independent cohort (n = 270) (p < 0.002).



(B) 82.7% (190) of the traditional cohort (71.9% within 7 days) accessed their original report compared to 96.0% (260) of the independent cohort (92.4% within 7 days) (solid lines).

47.8% (110) of the traditional cohort accessed their revised report (41.7% within 7 days) compared to 67.0% (181) in the independent cohort (67% within 7 days) (dashed lines).

For reference, the access rates for new personalized genetic insights from Color Discovery: Alcohol Flush Response were 57.6% in a subset of individuals from a traditional cohort and 56.1% in a subset of individuals from an independent cohort.

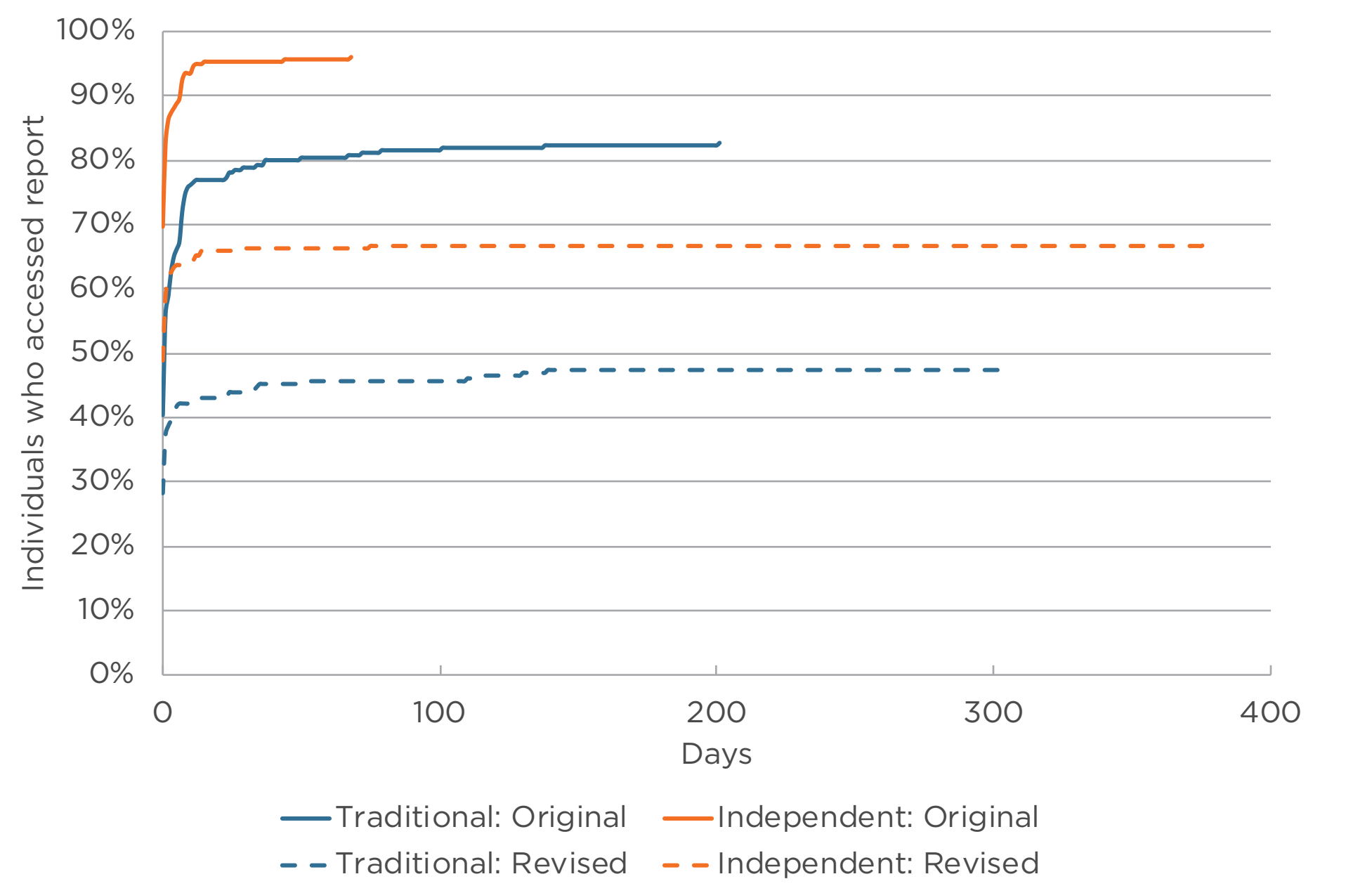
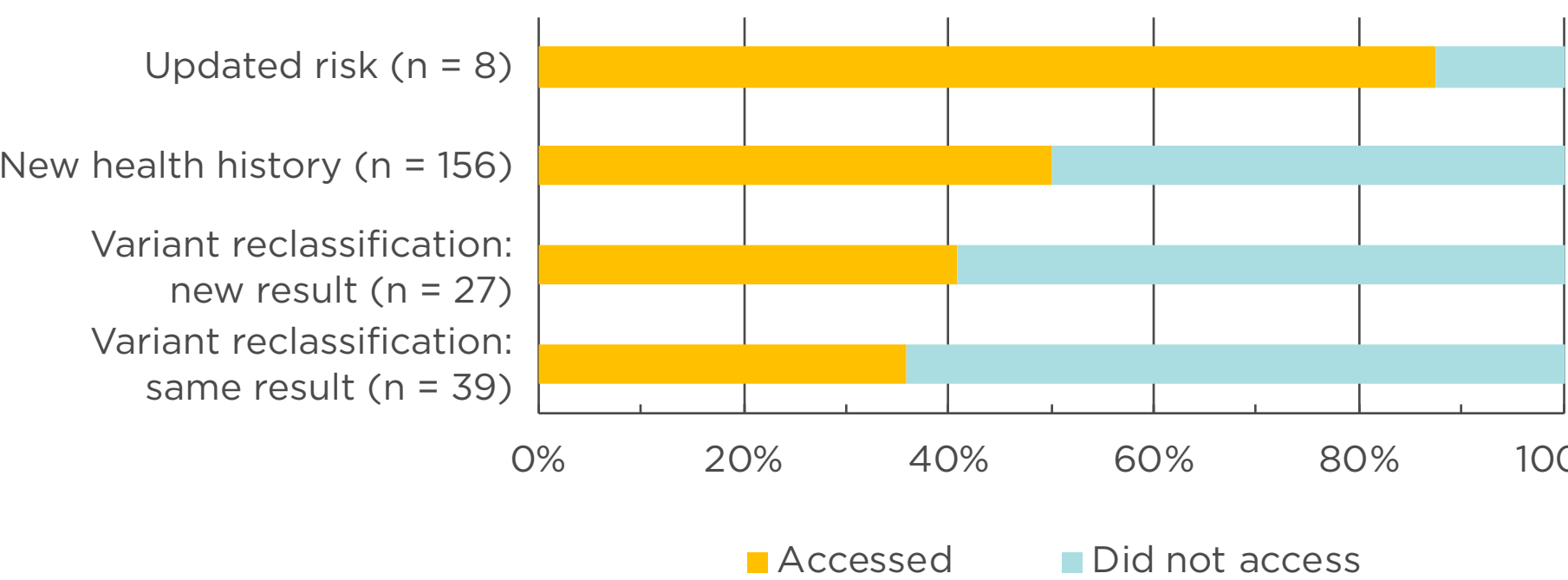


Figure 4. Generation and access rate of genetic testing reports by cohort type

(A) In the traditional cohort, individuals with updated risk accessed revised reports most frequently (87.5%, 7), followed by new health history (50.0%, 78), variant reclassification: new result (40.7%, 11), and variant reclassification: same result (35.9%, 14). Chi-Square Test, p = 0.044.



(B) In the independent cohort, individuals with updated risk accessed revised reports most frequently (87.5%, 7), followed by new health history (69.1%, 85), variant reclassification: new result (66.7%, 12), and variant reclassification: same result (63.6%, 77). Chi-Square Test, p = 0.496

