

# Maternal serum screen positive results – What do patients elect next?

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## I. Introduction and Purpose

The options available to patients for aneuploidy screening and diagnostic testing have expanded since the launch of non-invasive cell-free DNA screening (cfDNA) in 2011. The goal of this study was to evaluate patient preferences for follow-up testing when referred for genetic counseling due to a positive maternal serum screening (MSS).

The study included 4170 patients referred for genetic counseling in 2016 due to screen positive MSS indicating increased risk for aneuploidy. Patients who were screen positive for only ONTDs were excluded. At physician direction, patients were offered the option of either cfDNA or diagnostic testing. 90.43% of patients included in the study population were screen positive for Down syndrome (DS), 7.31% were screen positive for trisomy 18 (T18), and 2.25% were screen positive for both. Patient MSS data and decisions regarding follow-up testing were evaluated retrospectively via database analysis.

## II. Findings

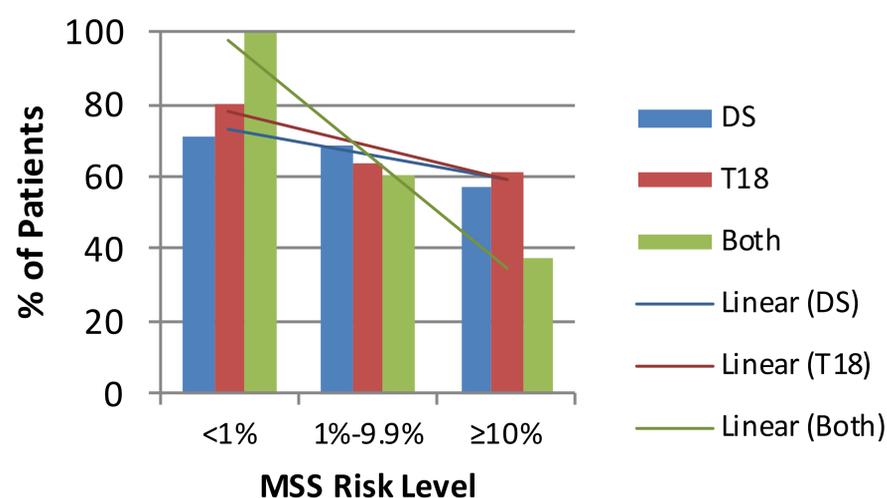
68.2% of the total patient population chose to pursue cfDNA while 17.19% chose diagnostic testing. 15.59% of patients declined any further testing.

### Disorders

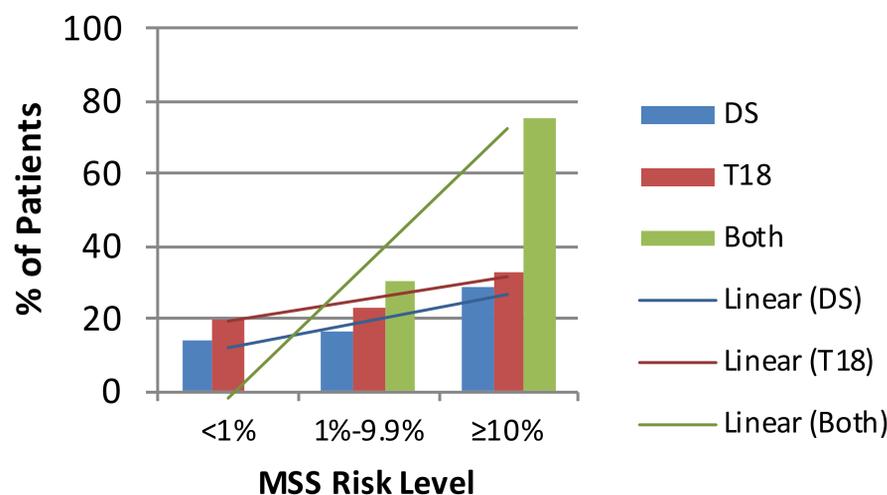
Patients were split into cohorts based on the disorder for which they were screen positive. Patients were most likely to elect cfDNA testing when positive for DS (68.79%), followed by patients positive for T18 (63.93%) and least likely when positive for both disorders (58.51%). A similar but opposite trend was seen for decisions regarding diagnostic testing: highest for patients who were screen positive for both disorders (30.85%), followed by patients positive for T18 (24.26%) and lowest for those positive for DS (16.28%). The difference in diagnostic procedure election between patients MSS positive for DS vs. T18 is statistically significant (p-value 0.0001).

### Risk Levels

Patients were then stratified into cohorts by risk level and disorder: risks <1%, risks 1-9.9%, and risks ≥10%. As seen in Figures 1 and 2, as level of risk increased, patients preferred diagnostic testing over cfDNA. This finding was significant for DS (p<0.0001) and a similar trend was noted in those patients positive for T18 and both disorders, though not statistically significant. Also notable, the rate of decline of all further testing was consistent among all the risk level cohorts in the group positive for DS, though this trend was not observed in the groups positive for T18 or both disorders.



**Figure 1.** Patients who elected cfDNA based on risk level cohort and specific disorder



**Figure 2.** Patients who elected diagnostic procedure based on risk level cohort and specific disorder

## III. Discussion

Patient decisions regarding additional testing were influenced by both the disorder and the level of risk, with an increased number of patients pursuing diagnostic testing for more clinically severe disorders and higher risk levels. Of interest, regardless of the disorder for which they were screen positive, a large proportion of patients (greater than 84% in all cohorts) pursued some sort of follow up measure. Familiarity with Down syndrome, available resources, treatment options, and longer lifespan may reassure prospective parents and influence their decisions towards non-invasive follow up. Conversely, patients are less familiar with T18 and the significantly increased risks of major birth defects, miscarriage, and/or shortened postnatal life span may contribute to the follow-up testing decisions.

The rate of patients declining all testing was relatively consistent across all risk levels, indicating a subset of patients who may avoid any additional testing due to extrinsic reasons such as religious beliefs and/or cultural affiliations.

## IV. Conclusion

This study demonstrates that following genetic counseling, patients overwhelmingly prefer to pursue non-invasive options as follow up to a screen positive result. However, decisions trend towards diagnostic testing when patients are at risk for a more clinically severe disorder or are determined to be at higher risk for the disorder. Providing genetic counseling assists with a more accurate explanation of disorders and risk levels, ultimately benefiting the patient's informed decision making process.