Methylation-specific quantitative real-time PCR in detection of fetal trisomy 21
LifeCodexx AG | please note: we are a company, not a hospital, Konstanz, Germany

Objective
Current non-invasive prenatal testing (NIPT) methods for the detection of fetal trisomy 21 (T21) are primarily based on next generation sequencing (NGS) strategies which are quite costly in clinical application and hence are limited to patients who can afford the testing. We describe the results of a blinded study - with respect to the test accuracy - of a newly developed NIPT based on quantitative real-time PCR (qPCR) for prenatal testing of fetal T21 (qNIPT).

Methods
In the study maternal plasma samples were collected from 1,044 pregnant women and blinded by an independent Contract Research Organization. After extraction of cell-free DNA and methylation-specific digestion of DNA samples a multiplex qPCR was performed. The primary qPCR data was finally evaluated with our CE marked data analysis software.

Results
The study results of successfully analysed maternal plasma samples (n=966) demonstrated a positive percentage agreement (PPA; equates to sensitivity) of 100 % (lower 1-sided 95% confidence interval of 91.8 %; n=35/35) and a negative percentage agreement (NPA; equates to specificity; n=931/931) of 100% compared to NGS-based results. The negative predictive value (NPV) for the novel qNIPT and confirmatory NGS testing was 100 % (lower 1-sided 95 % confidence interval of 99.68 %).

Conclusion
Our results suggest that the proprietary qNIPT is a very reliable and robust method suitable for clinical routine in accordance with international medical associations. The assay represents a more cost-efficient solution over NGS testing and will also be able to provide results in the shortest possible time. In summary, the application of qNIPT could have the potential to become a NIPT solution on a global scale for pregnant women of all ages and risk groups. Further studies which aim to include the determination of trisomy 13 and trisomy 18 are currently underway.