ABSTRACT
The fecal marker calprotectin derived from neutrophilic granulocytes is increasingly used in the diagnosis and monitoring of patients suffering from chronic inflammatory bowel diseases. The increasing amount of this analysis is a challenge in the routine laboratory and urgently ask for enhanced automation.

INTRODUCTION
Fecal Calprotectin (fCP) is a cytoplasmic protein mainly derived from neutrophilic granulocytes. It is considered as a high sensitive inflammation marker. Calprotectin is well established as an aid in diagnosis of chronic inflammatory bowel disease (IBD) to differentiate between inflammatory and non-inflammatory (e.g. IBS) diseases. As well as for monitoring and therapy follow up of IBD patients. The Synlab laboratory in Castenedolo is the main laboratory nearby Brescia where the fCP method is run on most clinical chemistry analyzers. At Synlab Italy the method runs on Beckman AU5800 since spring 2017 and replaced the manual ELISA method (Calprest, Eurospital). To perform a workflow analysis with the two ICP methods we chose the time periods May-Dec2016 (ELISA, n=12’945) and May-Dec2017 (BÜHLMANN fCAL® turbo, n=16’538) and we assumed that the total number of customers remained stable. A comparison between the TAT (total analysis time) from laboratory check-in at Castenedolo to results and from check-in to reports signature was done.

MATERIALS
The BÜHLMANN ICAL® turbo can be applied on most clinical chemistry analyzers. At Synlab Italy the method runs on Beckman AU5800 since spring 2017 and replaced the manual ELISA method (Calprest, Eurospital).

RESULTS
The ICAL turbo method allowed a daily ICP routine activity in our lab. With the manual ELISA method the median time to result was 74.4 hours and 75% (3rd Quartile) of all requests were completed after 115.1 hours. With the turbidimetric test a significant reduction was achieved. With a median of 29.4 hours (3rd quartile of 52.3 h).

DISCUSSION
• The evaluated method allowed a better management of calprotectin testing and a smaller TAT, due to a shorter workflow.
• The method is now running on a big clinical chemistry high performance analyser, able to perform a huge amount of routine tests by not specifically dedicated Personnel, but able to run the main part of the clinical chemistry ones.
• This method allowed the daily measurement of the fCP with shortening of the times from the check-in to the results up to the signature of the reports, thanks to its improvement.
• The concern that fecal material could damage the hydraulic components of the instrumentation was unfounded. It was only necessary to have a greater number of instrumental washes without a particular increase in work for the technicians.
• Fecal specimen collection systems, with automatic extraction, instead of manual, results in shorter processing times.

CONCLUSION
The ICAL turbo is a highly accurate and clinically proven method. The introduction of the turbidimetric method on a high throughput analyser allowed the daily measurement and a 2.5 times (median) faster closing of our requests. Fecal sample extracts on clinical chemistry analysers is new. Since introduction we didn’t observe any significant problems for the instruments or difficulties for the technicians involved.

The introduction of a quantitative extraction device could further streamline the work flow in the laboratory and circumvent the laborious and time consuming extraction itself leading to additional significant reduction of the TAT.

Decentralized sample extraction in a dedicated device would be the final step in fCP simplification and automation.

REFERENCES
3. Instruction for use BÜHLMANN ICAL® turbo assay. BÜHLMANN Laboratories AG, Switzerland