Bringing laboratory diagnostics closer to patient:
the advantages of preanalytical automation in E. Gulbis Laboratory

Jānis Stašulāns[1,2], Didzis Gavars[1,2], Egils Gulbis[1,2], Mikus Gavars[1], Justīne Grundmane[1,3], Anna Stašulāne[1,2]

[1]E. Gulbis laboratory, [2]Riga Stradins University, [3]University of Latvia

Introduction

E. Gulbis laboratory developed our own automated sample collection devices which are new additions in the medical sector in Latvia and are equipped to handle various tests. This study primarily addresses the need for further development in the preanalytical phase automation in laboratory and hospital environment.
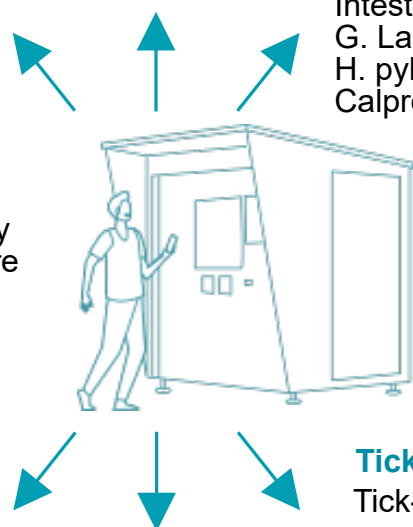
Urine tests
Test strip
Microscopy
STD panel
Alfa-amylase
Microalbuminuria,
DPD
Ureaplasma and
Microplasma culture
with
antibiotic susceptibility
Microflora urine culture
Drugs of abuse

H. Pylori breath test

Faecal analysis
Coprogram
Occult blood
Intestinal parasites
G. Lamblia antigen
H. pylori antigen
Calprotectin

Saliva analysis
Covid-19 (PCR)

Human papillomavirus DNA test

Tick testing
Tick-borne
encephalitis RNA
Borrelia
burgdorferi DNA

Aims

The study assessed the usability of automated (contactless) sample collection devices with the goal to introduce an automated and effective solution for the management of self-collected samples. The study is primarily aimed to formulate the conclusions about the data and use of automation in the self-sample kit collection.

Methods

Results were collected from 18 automated (contactless) sample collection devices used by E. Gulbis Laboratory. Data collection was carried out using the E. Gulbis Laboratory information system, which tracks and stores anonymized clinical details about patients during laboratory visits, using MySQL database queries. Saliva kits for SARS-CoV-2 PCR testing was chosen in this study due to it being the most performed test collected from the automated (contactless) sample collection devices.

Results

Sixty-four thousand two hundred fifty-seven (64 257) saliva kits for SARS-CoV-2 PCR testing were conducted. The average processing time in automated devices located in the capital city was 11.13 hours, in the suburbs – 15.52 hours, rest of the country – 17.60 hours. It was found that 3.92% of them were positive (SARS-CoV-2 virus RNA found in saliva sample). The average age of patients that choose an automatic device to hand in their saliva sample kits was 33.94 years.

Conclusions

These devices are being used not only for processing saliva tests, but are equipped to handle even more various tests, thence making sample kit distribution available 24 hours a day and laboratory diagnostics more accessible for patients in remote locations. This new addition of automation in the preanalytical phase helped to increase the volume of tests done each day and saved valueable workforce resources.

Patients can now easily make use of preventative and diagnostic measures including various faecal tests such as faecal analysis, as well as basic urine tests. The newest additions are the easy – to – perform H. pylori breath test and high-risk human papillomavirus DNA test with extended typing, which are paving the way for safe and patient–friendly preventative screening.

Time until result depending on location of device
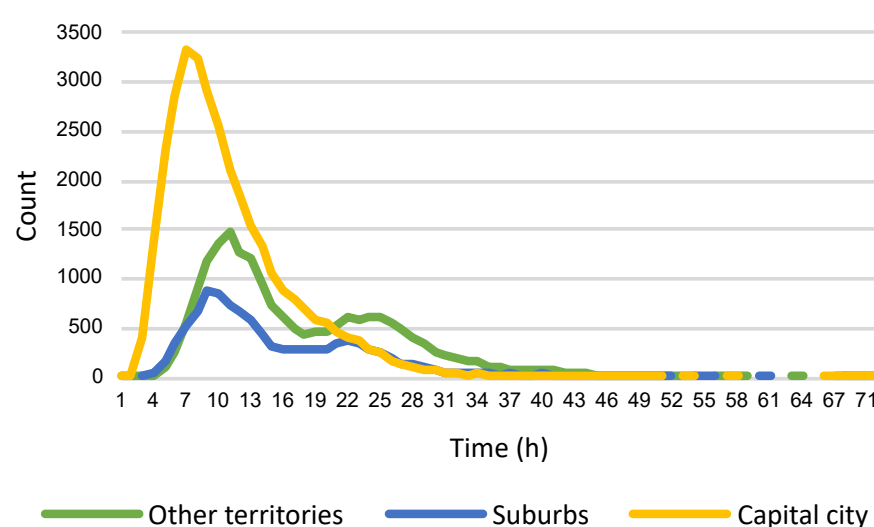
Process Flow

1. Patient authorises in the hospital or laboratory web page

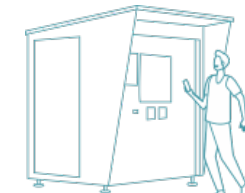**2.** Patient receives code in their mobile device

3. Patient receives their testing kit at the terminal

4. Patient submits their sample by following instructions

5. Patient dispenses their testing kit in the terminal

6. Courier or laboratory personnel picks up completed testing kits

7. Laboratory processes tests for the patient