

**LABENKO BILISIM A.S.**

**THE ROOT CAUSE OF PHLEBOTOMY PATIENT FLOW CLOGGING PROBLEM**

**WHY APPOINTMENT-  
BASED QUEUE SYSTEMS  
CAN NOT SOLVE THE  
ROOT CAUSE OF BLOOD  
TESTING PATIENT FLOW  
PROBLEM ?**

**HOW COULD IT BE  
SOLVED ?**



**Suleyman Sevinç**  
RESEARCH DIRECTOR

# THE ROOT CAUSE & SOLUTION

## THE ROOT CAUSE

**B**lood tests are widely used by doctors to diagnose medical problems. Nearly one in four patients who sees a doctor will need blood tests. Therefore, they need to visit a blood testing unit to give blood sample. Under such high workload, blood test units may often get quite busy and lengthy waits are not uncommon. To deal with these problems, some hospitals implement an appointment-based queue systems.

However, While appointment based queueing systems may spread out patient load between days, it is likely to create excess patient load everyday who will be serviced on a later day. Therefore, patient numbers in need of phlebotomy service should accumulate quickly between days. This means patients may have to wait for weeks before they can get an appointment leading to delayed diagnostics. Delayed diagnostics may lower the quality of life for patients and may worsen medical problems resulting in increased emergency visits.

Queue based appointment systems are unable to solve the root cause of the phlebotomy patient flow problem, which is to make the phlebotomy patient service more efficient by optimal utilization of resources available.

## THE SOLUTION

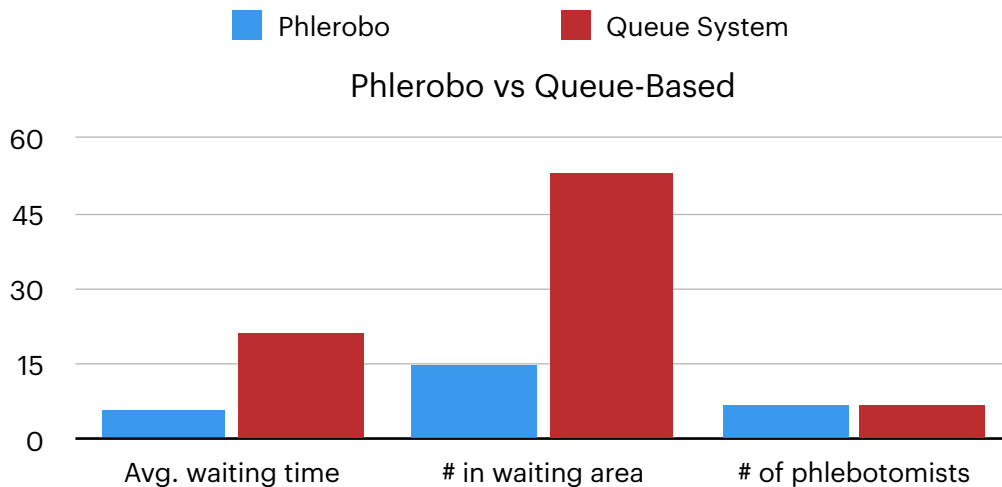
Can we do better ? Can we make better use of resources and take blood testing samples on the same day ?

Fortunately yes we can. Thanks to a tested and proven innovative phlebotomy patient service model developed by Labenko engineers, using the same resources, the rate of patient flow is accelerated by more than three times compared with conventional appointment and queueing based systems.

The system is called PHLEROBO, an acronym derived from words PHLEbotomy and ROBOTics. **Using Phlerobo, patients, in general, can receive the same day phlebotomy service.**

A feature of the Phlerobo system is that it enables targeting of tolerable patient wait times. The master algorithm is capable of predicting expected patient wait times under the current patient load and recommends the right number of phlebotomists through, admin screens to achieve the set targets.

## THE ROOT CAUSE



The algorithm can offer, with great confidence, to individual patients the information about how long it is likely to take to service them.

Phlerobo system provides a patient-facing mobile app, through which patients can see the peak and off-peak times of blood testing units and can choose the right slot for themselves.

Patients can use the mobile app to check into the unit at the time of arrival, receive personalized service calls to guide them in the process, receive notifications when test results are ready and even provide feedback.

Phlerobo system provides phlebotomists with personalized robots that select and label blood tubes and serve them just prior to patient's arrival at the phlebotomist's desk. So that phlebotomists can focus on taking blood.

Here are some additional benefits from Phlerobo; scheduling for repeat and challenge tests such as OGTT, recording every step of the process, monitoring system performance in real time, allowing patient priorities to be set, automatic voice call, kiosk entry and self check in and more.

Phlerobo is the system of unparalleled performance. It is a patented system of excellence. Here are some publications from the literature.

## THE ROOT CAUSE

1. Use of Artificial Intelligence in Phlebotomy Unit, D. Orbatu, O. Yıldırım, Turkish Journal of Biochemistry, Volume 43, Issue Supplement, Pages 22–29, ISSN (Online) 1303-829X, ISSN (Print) 0250-4685.
2. Predicting Patient Waiting Time in Phlebotomy Units Using a Deep Learning Method, H. Javadifard, S. Sevinç, O. Yıldırım, D. Orbatu, E. Yaşar and A. R. Şişman, 2019 Innovations in Intelligent Systems and Applications Conference (ASYU), 2019, pp. 1-4.
3. Estimating how many flebotomists are required in the flebotomy unit: An artificial intelligence study, Orbatu, D., Yıldırım, O. , Pakdemirli, A. , Yaşar, E. , Alaygut, D. , Sevinç, S. and Şişman, A.R. 2020, Medical Science and Discovery. 7, 5 (May 2020), 489–493
4. Predicting Patient Wait Times in the Phlebotomy Unit, Orbatu, Dilek & Yıldırım, Oktay & Yaşar, Eminullah & Şişman, Ali & Sevinc, Suleyman. (2020), Global Journal of Medical Research. 1-5.