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# Dealing with Massive Data

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# Increase in Test Volume: (Oh No!)



COVID-19 testing really hit us over the head with a massive increase in the absolute number of accessions ordered per day.

# Three Ways to Handle the Problem:

1. Get the data into CGM SCHUYLAB more efficiently
2. Perform the analyses and accept results faster
3. Release the results quickly and with little staff involvement

This is what it looks like

# The Solution to Everything:

- *Automate it!*



# OK: That's It!

Now you understand everything.

Short demo, wasn't it?

Well... maybe we should go into a bit more detail...

# What are the parameters we are dealing with?

- Increased number of samples
- No increase in personnel (maybe even decrease)
- New types of tests – PCR and other SARs Ag/Ab tests
- New use-cases for the tests (ie airport testing)
- Increased urgency in results of Covid testing
- Laboratory is now in high profile

Your goal should be to eventually have 80% of your samples entered and processed automatically.

# How Do We Accomplish This?

CGM SCHUYLAB has three ways of getting information into your system electronically

- We can input batch orders via Survey – New!
- CGM SCHUYNET can send us orders
- We can receive orders from EMRs or HISs via a System Interface

All of these methods are faster, and require far less work by your techs, than manual requisition entry.

# Inputting Orders via Survey

Do you have a large number of accessions from one client with the same tests on each patient?

Examples of this would be airline, cruise ship, or employee batch testing.

- *The Survey Feature*

*The Survey Feature has 3 ways of importing orders into CGM SCHUYLAB:*

- *Demographics*
- *Anonymous*
- *CSV*



# Inputting Orders via Survey

Demographics and Anonymous are chiefly for Public Health fairs and veterinary Herd-and-Flock ordering; it is the *CSV Import* that has gotten a workout during COVID-19.



# Receiving Orders via SchuyNet

Are your Doctors and Clinics comfortable with the internet?

- *CGM SCHUYNET Orders and Results*



# Receiving Orders via SchuyNet

The screenshot displays the SchuyNet interface with the following sections:

- Patient Six Test** (with edit icon):
  - MRN: BIOT00000380390
  - Dob: 3/03/1990 Age: 31 Gender: F
  - Address:(Not Provided)
  - Phone:(Not Provided)
  - Primary Doctor: (Not Provided)
  - Medicare:(Not Provided) Medicaid:(Not Provided)
- Accession Clinical Notes**: 0 / 990
- Quick Order** table:

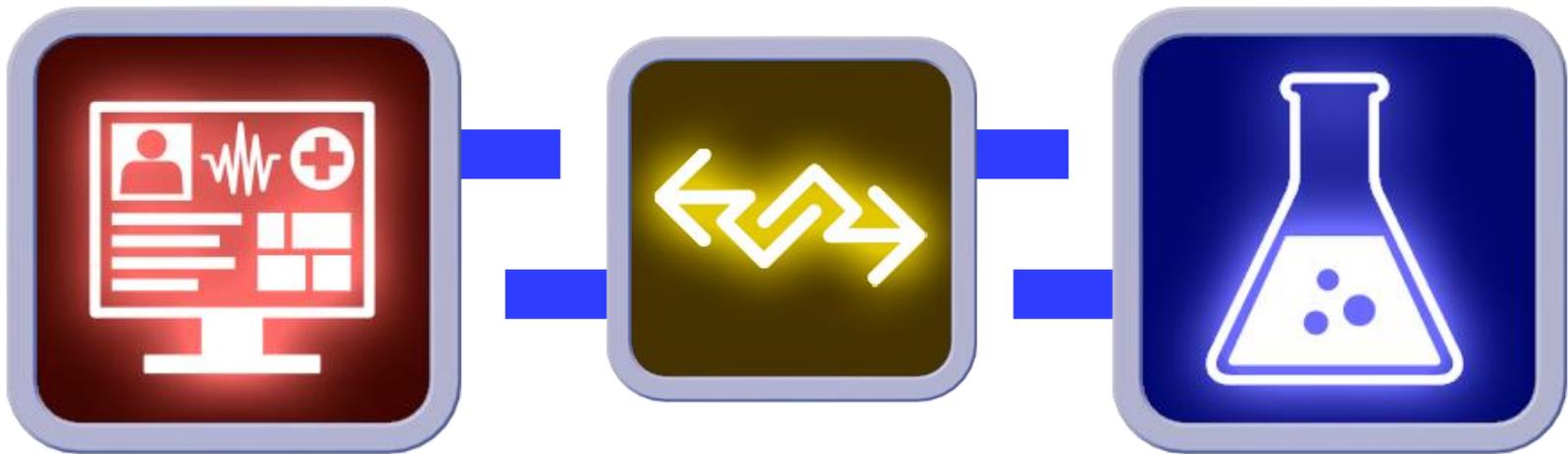
CODE	RWD	SENDOUT	CLIENT
CBC	K	UIBC	B12
		CBCRWD	CBCWRW02
- Selected Procedures & Search**: Search for a Procedure
- Accession Information** table:

Collection Date: *	Time: *	By:
21/09/2021	14:07:13	
- Search for a Ordering Doctor - Last, First \*
- Search for a Ordering Client \*

Your medical provider customers place the orders and the demographics and tests are transmitted from CGM SCHUYNET into CGM SCHUYLAB.

# Receive Data from System Interface

- Clients with a Practice Management system, EMR, EHR, or HIS system?
  - *System Interface*



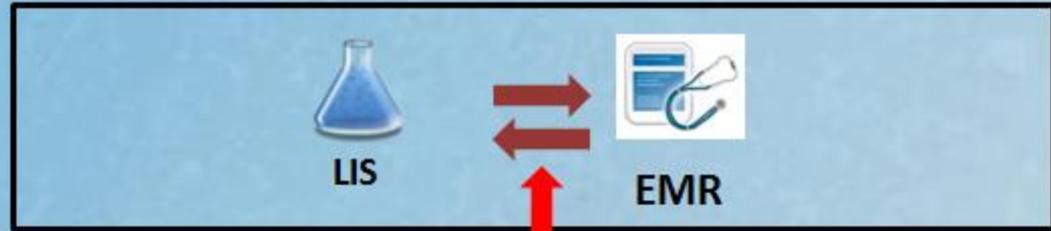
# HL7 System Interface

## Health Level 7

The Standard Format for Exchanging Health Information



*You could look it up!*



Order Message

HL7 Messages

```
MSH|^~\&|Allscripts||SchuyLab|2624|20140107163408||ORD^R01^ORD_R01|79-6|P|2.5.1
PID|1||123037||McDog^Toto||19371230|F||324 S. Yellow Brick Rd. #107^^Los
Angeles^CA^90020
PV1|1||||54687^Tinman^Jacob
ORC|RE|196083|196083||||1||20140107163408||54687^Tinman^Jacob
OBR|1|196083|196083|CBC^COMPLETE BLOOD COUNT (CBC)^L|||201311261000|||||201311261214|
1TT,1L|54687^Tinman^Jacob|||||20131126141212|||F||1^^^20131126141212^^R
```

# How Do You ID Your Samples?



CGM SCHUYNET and EMRs may be able to barcode the samples when they are drawn. When your samples arrive in your laboratory, are they already barcoded?

- *If so: Samples can be run without re-labeling...*
- *...or you may re-label them with in-lab numbers*



# Taking Control

Does your lab want to have more control over electronic entries?

- *The Check-In module*

All orders coming into CGM SCHUYLAB from outside sources can be filtered by the Check-In option. This module lets you examine the samples that physically arrive in your lab, at the same time that you look at the order, and make sure:

- *The samples are present for all tests ordered*
- *The samples are in good and adequate condition*

# Taking Control with Check-In

CGM SCHUYLAB - External Order Check-in

Help Patient Accession Devices Worksheet Print Features Tools

**Drink, John**  
ID: 103847 Dr. 13  
One Health Service  
DOB: U Other ID:  
Accn #00000000 11/19/2017 10:08

SchuyLab  
J LAB 1  
10/22/2021 14:51

F9 Cancel F10 Done

Requisition: 61 App: List... Assign ID

Accession: 00000295 Recv Date: 10/22/2021 Time: 14:51 By: J

Order/Delete Tests  
Order

Code	Name	Show all test:
▲ CBC	CBC	<input type="checkbox"/>
▲ 224	ELECTROLYTES	<input type="checkbox"/>

Draw Date: 11/19/2017 at 10:08 by: "  
Ordering Client: One Health Service  
Ordering Doctor:

Unresolved Issues

Delete

F1 Help  
F2 Patient  
F3 Accession  
F4 Devices  
F5 Worksheet  
F6 Print  
F7 Features  
F8 Tools

# The Accessions Are Present

The Accessions have been created and the samples are present in your laboratory.

It is now time to do the testing. How do we speed this part of the processing?

# Speeding the Analyses - Barcodes

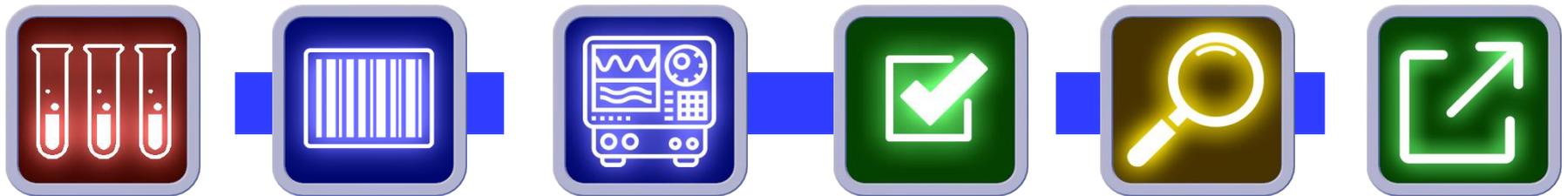


Barcoding is 'old hat' right now, but we all know that it improves the security of patient identification and is worth more than an FTE in terms of speeding the processing of tests. CGM SCHUYLAB has specific barcode labels configured for individual analyzers and departments; we also have separate label sets for Microbiology and Cytology.

Using barcodes lets you get the samples on the analyzers more quickly and with better patient ID.

# Doing the Analyses

Your samples are in the lab and their orders are in the LIS – processing begins.



# Done with Analyses!

Your analyses are finished. How do we improve on getting those results to the doctors quickly?

# AutoVerification



CGM SCHUYLAB has a wonderful Auto Verification module. It has general rules that are easy to set up. But. You can also configure individual tests to have specific acceptance criteria for Auto Verification.

Literature suggests that we try for 80% of your results autoverified.

# Doing the Analyses - AutoVerification

10/26/2021 9:42

Name: Description:

All tests flagged for rerun are stored  
 No other verification performed

Verified results are stored, but not accepted

All verified or none  
 Including reruns

Results must not be abnormal  
 Unless affirmative delta check

Results must not be critical

Results must pass delta check

Test	Do Not Verify if:
PTCTRL	!CULTURE Abn

**Update Verification Rule**

Test: PT

( )

& ||

Condition(s):  
PTCTRL Abn

NOT

Value

Remark

ICD

Rx

Patient Type

Gender

Age

Sequence

Delete Cancel OK

# Do You Want Oversight?



Your samples came in electronically. They were already barcoded, so you just put them on the instruments. The analyses were done and then autoverified.

Now is the time to release your results – Do you want this to happen automatically (and quickly) or do you want to review the results manually before they go out into the world?



# Review

CGM SCHUYLAB has *three* Review modules, which are optional tools that may be used during processing. The first two take place whilst the samples are being processed or before they are billed; Results Review happens after the results are done.

- Demographics Review
- QA Review
- Results Review

# Demographic Review

The benefit of Demographic Review is to allow your lab to *get the samples on the analyzers* faster than you could before...because you now have a safety net in place to catch errors.

An accession can be put on the analyzers with just a patient name and an Accession number. You finalize the demographics in parallel with the analysis taking place.

# QA Review

QA Review – If the Accessioner or Supervisor finds a genuine problem, ie missing information that would keep this accession from reporting to the correct doctor or from being billed, this order is shunted to a specialist who has customer-contact privileges.

# After the Analyses – Result Review

Results Review - This feature is the 'final step' in the process and lets you look at all of the results of the entire accession and see if they make sense.

Your lab can limit the Approval to a single department or use a global approval process.

# Taking More Control – Result Review

Requiring the lab to review results before they are released improves your oversight, but also increases your TAT.

You need to decide the worth of greater control vs. the value of getting results to the doctors faster.

# NB: Balance: Release vs. Review

Some of our sites auto-verify all results and then Review the results post-release in Results Review. This is an option in CGM SCHUYLAB.

# Auto Release



You may also set up rules that bypass Result Review and auto-release *some* types of results, but which require manual Result Review and approval for other types of results.

CGM SCHUYLAB can let you set up rules to automatically release routine normal tests, whilst still letting you Review more specialized testing and abnormal results. Each department can have different rules.

# Done with the Analyses!

Now we need to...

# Release the Results Using:

- CGM SCHUYNET
- System Interfaces
- Auto Faxing
- Patient Portal



# Result Delivery

Electronic delivery of results bypasses mountains and rivers and road conditions and gets your results in the doctors' hands with the speed of infrastructure. It removes the need for lab personnel to be involved in result delivery.

# Result Delivery

By and large, the same systems that delivered the orders to your lab can be used to deliver the results: If the orders are received from SchuyNet and System Interfaces, the doctors generally expect the results to come back via those systems.

# Results on CGM SCHUYNET



**REPORTS IN QUEUE**

REPRINT LAST    DOWNLOAD - EVERYTHING IN ONE PDF    DOWNLOAD SELECTED IN ONE PDF

Report Name: 00000000 Test, Patient | Report ID: 202110270001  
[View](#) ↓

Report Name: 00000018 Test, John | Report ID: 202110270002  
[View](#) ↓

Report Name: 00000058 Test, Iliad | Report ID: 202110270003  
[View](#) ↓

# Results on Your EMR



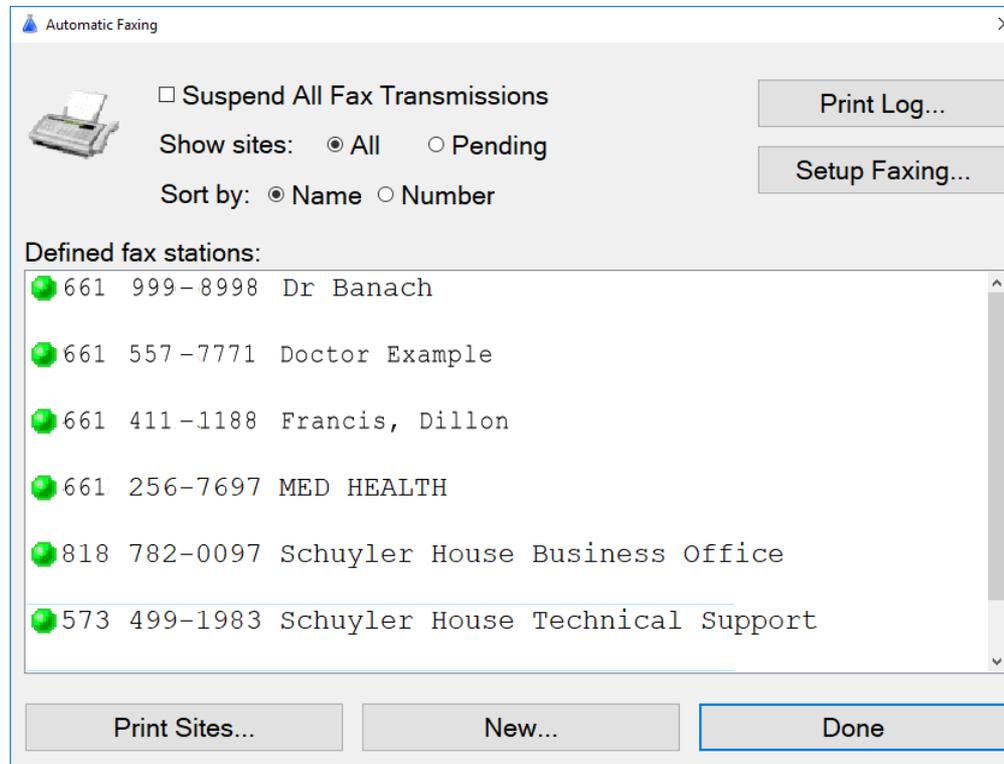
System Interfaces – results are seen on the same EMR/HIS on which they were ordered.





# AutoFax the Results

## Auto Faxing





# Patient Portal Results

CGM SchuyNet Switch Patient ▾ Jan Test ▾ Sign Out

**I want to...**

- ...see my most recent laboratory results
- ...see my previous laboratory results
- ...view my personal information

## Welcome Jan Test

Here are your most recent results

**Specimen Collected:** Oct 27, 2021 2:10 PM  
**Ordered Items:** CBC,SLIDE

[Download Report](#) [View Report](#)

Have additional questions concerning your results? Please consult your doctor.

### HEMATOLOGY

Test	Result	Units	Reference Range	Learn More Online	Graph past results
White Blood Cell	10	10 <sup>9</sup> /L	-		
Red Blood Cells	50	10 <sup>12</sup> /L	-		
Hemoglobin	23 (Critical Low)	g/L	-		
Hematocrit	40	L/L	-		
MCV	50	fL	-		

# Patient Portal Results

On the patient's phone

The screenshot shows a mobile patient portal interface. At the top is a blue header with the text 'CGM SchuyNet' and a hamburger menu icon. Below the header, the user is greeted with 'Welcome Jan Test'. A light blue box contains the text 'Here are your most recent results'. The main content area displays specimen collection details: 'Specimen Collected: Oct 27, 2021 2:10 PM' and 'Ordered Items: CBC,SLIDE'. A message follows: 'Have additional questions concerning your results? Please consult your doctor.' Below this is a blue button labeled 'Download Report'. The section is titled 'HEMATOLOGY' and lists a result for 'White Blood Cell' with a value of 10, units of 10<sup>9</sup>/L, and a reference range of '-'. The interface is clean and uses a blue and white color scheme.

CGM SchuyNet

Welcome Jan Test

Here are your most recent results

Specimen Collected: Oct 27, 2021 2:10 PM  
Ordered Items: CBC,SLIDE

Have additional questions concerning your results? Please consult your doctor.

Download Report

**HEMATOLOGY**

White Blood Cell  
Result: 10  
Units: 10<sup>9</sup>/L  
Reference Range: -

# What Does the Future Hold?



# What Does the Future Hold?

Coming Soon in 3.4 CGM SCHUYLAB

- Multiple Languages – in beta testing
- Texting
- Inventory

By the end of 2022:

Credit card payments on the Patient Portal, Blood Bank Feature completion, Sample Tracking, Health Card Validation, Anatomical Pathology Feature, Standing Orders

**CGM LAB**

 **VIRTUAL USER CONFERENCE**

**2021**