



COLLEGE of AMERICAN
PATHOLOGISTS

Laboratory Quality Solutions

Direct Transmission of PT Results

User Guide, Part 3 of 3
Laboratory Setup Guide



TABLE OF CONTENTS

INTRODUCTION	3
What is Direct Transmission?.....	3
How does Direct Transmission Work?	3
Checklist for Direct Transmission Setup Process.....	5
Checklist for Transmitting Your First Live PT Kit	6
READINESS ASSESSMENT.....	7
Complete/Verify Readiness	7
TECHNICAL AND REPORT SETUP	7
Allocate IS and LIS Admin Resources	7
Provide Agent Installation and Setup Instructions	7
Provide LIS Report Instructions.....	7
CAP-REQUIRED DATA ELEMENTS	8
Understand the CAP Required Information	8
Review the Standard Ordering Convention	8
Create New Patients	9
Create New Providers.....	10
Follow the New Order Entry Method.....	11
E-LAB SOLUTION SUITE.....	12
Set Up/Validate Permissions	12
LABORATORY TEST CODES	13
Obtain Your Laboratory's Test Codes.....	13
Test Compendium Report	13
TEST CODE MAPPING.....	14



Purpose of CAP Code Mapping	14
Understanding CAP Mapping Codes	15
Using the Hub for Test Code Mapping.....	16
How to Refresh CAP Codes in the Hub	16
How to Upload Your Laboratory Codes to the Hub	19
How to Map Your Laboratory Test Codes to CAP Codes	21
Resolving UOM Conversion Mismatches	24
Using Filters in the Hub	26
How to Unmap Test Codes	27
How to Edit Mapped Test Codes	29
Confirm Your Mapped Codes	31
How to Run the Report to in Live Mode to Transmit a PT Kit	35
Reviewing and Approving Results in e-LAB Solutions Suite	37
Email Notifications	38
TROUBLESHOOTING	39
Overview	39
Troubleshooting in the Hub	39
Troubleshooting the Agent	48
GLOSSARY OF TERMS	49
APPENDIX	50
Alternate Methods for Mapping CAP Codes	50

INTRODUCTION

What is Direct Transmission?

Direct transmission is a proficiency testing (PT) results reporting solution that allows a laboratory to transmit PT data directly to the College of American Pathologists (CAP). This delivery option provides laboratories with the ability to electronically transmit quantitative PT results from their laboratory information system (LIS) to the PT Result Forms Data Entry interface in e-LAB Solutions Suite, providing faster and more accurate results reporting.

How does Direct Transmission Work?

Direct transmission sends data from the laboratory's LIS to the "hub," a cloud-based service that facilitates the exchange of clinical data between a laboratory's LIS and other systems. The hub translates your test codes to CAP PT codes and then routes the PT results directly to e-LAB Solutions Suite where it automatically populates the result form(s).

This process:

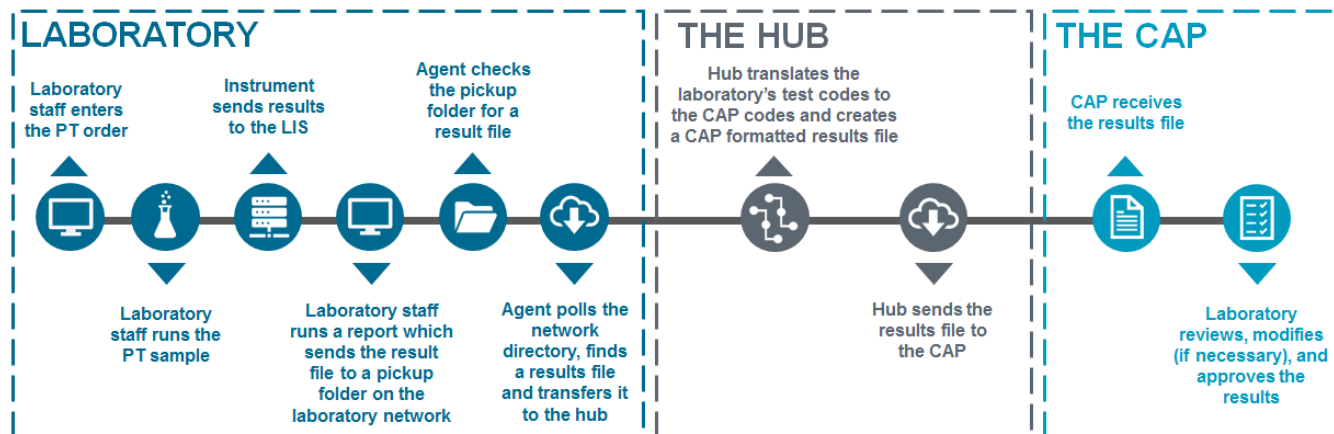
- reduces manual data entry clerical errors, the largest cause of PT failure.
- saves the laboratory hours of data entry on an annual basis.
- meets the Clinical Laboratory Improvement Amendments (CLIA) and the CAP's Laboratory Accreditation Program checklist requirement to treat PT specimens like real patient specimens

Transmission Mechanism

The PT extract report pulls the PT results for a given kit. The PT results file, or output, is saved to a location on your laboratory's network and picked up by a transfer application, called the "agent," which regularly checks your network location for new results.

The agent delivers the PT results file to the hub. The hub will transfer received results to the CAP's e-LAB Solutions Suite Result Form Data Entry interface, populating the result form for the appropriate program with the test results.

The CAP requires your laboratory's seven-digit CAP number and PT-related information (the kit number and specimen ID) to be transmitted along with the PT results extracted from the LIS using a standardized ordering convention.



Data Eligible for Transmission

Direct transmission is currently limited to quantitative (ie, numeric) data only. Laboratories utilizing direct transmission to report Quality Cross Check (QCC) results will only be able to do so for two instruments. Third instrument results cannot be directly transmitted to the CAP at this time. You can enter results for the third instrument online via e-LAB Solutions Suite.

Direct transmission does not include:

- Interpretations (eg, normal/abnormal, present/absent, susceptible/resistant)
- Textual or encoded data (eg, bacterial species/genus identifications, blood cell identifications)
- Method or instrument codes*
- Exception codes (eg, code 11, unable to analyze)
- Calibration Verification/Linearity (CVL) programs

**Note:* Method or instrument codes are not transmitted but will be prepopulated on the result form based on your previous mailing transmission.



Checklist for Direct Transmission Setup Process

The table below reflects the setup activities required before using direct transmission to transmit your PT results. Relevant reference documents and suggested roles are included. Use the table below to monitor the progress for the direct transmission setup.

Step	Activity(ies)/Task(s)	Reference(s)	Suggested Role(s)
1	Complete/verify the readiness assessment.	Readiness assessment	Laboratory staff
2	Allocate a technical resource to setup a server, install the agent, create network folders, and assign appropriate permissions.	Technical requirements and agent installation	IT/IS
3	Install the LIS reports.	Reports installation	LIS vendor or LIS analyst (for Meditech and
4	Review the CAP-required data elements and create new patient(s) and provider(s).	Laboratory setup guide	Laboratory staff or registration and credentialing departments
5	Validate laboratory staff permissions to access the direct transmission hub in e-LAB Solutions Suite.	Laboratory setup guide	Laboratory staff
6	Obtain your laboratory's test codes and upload them into the direct transmission hub.	Laboratory setup guide	Laboratory staff or LIS analyst/admin
7	Map your laboratory's test codes to the CAP's test codes for the quantitative analytes you will be transmitting.	Laboratory setup guide	Laboratory staff or LIS analyst/admin
8	Run the PT extract report in test mode to send a file and confirm your mappings by transmitting a previously approved CAP PT kit.	Laboratory setup guide	Laboratory staff or LIS analyst/admin

Checklist for Transmitting Your First Live PT Kit

The table below shows the steps required to transmit your laboratory's first live PT kit. Relevant reference documents and suggested roles are included.

Step	Activity(ies)/Task(s)	Reference(s)	Suggested Role(s)
1	Create a new order (based on your LIS ordering convention) for each PT specimen in your kit.	Laboratory setup guide	Laboratory staff
2	Process the specimens via the kit instructions.	Kit instructions and result form	Laboratory staff
3	Run the extract report for the PT kit ready for transmission to the CAP.	Laboratory setup guide	Laboratory staff
4	Verify the transmitted PT results within e-LAB Solutions Suite Result Form Data Entry, approve, and submit them to the CAP.	Laboratory setup guide	Laboratory staff

READINESS ASSESSMENT

Complete/Verify Readiness

To use direct transmission, your laboratory must comply with certain technical requirements and a standard ordering convention (see below). At a high-level, this includes being able to confirm the following:

1. Your systems align to the technical requirements in the Technical Requirements and Agent Installation document.
2. You can place your 7-digit CAP number, 8-digit kit number, and specimen ID (eg, CHM-01) in the prescribed fields for your LIS .

TECHNICAL AND REPORT SETUP

Allocate IS and LIS Admin Resources

Each organization may use a different process for allocating resources. Follow your current process to request assistance from IT/IS and your LIS administrators. Once you allocate these resources, you are ready to provide them with the information they need to complete their role as part of the setup.

Provide Agent Installation and Setup Instructions

Once you have secured your resource from the IS/IT departmental area, you can provide them with the Technical Requirements and Agent Installation document. To complete the setup, the CAP web specialists will need your IS/IT resource contact information to complete the process. The CAP web specialists may setup a web meeting to walk your IS/IT resource through the setup process and answer any questions.

Provide LIS Report Instructions

After the IS/IT resource has completed the technical setup, send your LIS administrator the report installation guide provided to you. The guide is a complete step-by-step document and should guide your LIS administrator through the process easily. If there are any issues encountered while following the guide, the CAP web specialists are available for support.

CAP-REQUIRED DATA ELEMENTS

Understand the CAP Required Information

The CAP requires a few key pieces of information for reporting PT results to the CAP using direct transmission.

You must enter CAP PT-related information in your LIS at the time you place the testing order (order entry) using a standardized ordering convention. This information includes:

1. **CAP number**—A unique, seven-digit identification number assigned to each laboratory. This number never changes for the respective laboratory.
2. **Kit number**—A unique, eight-digit number assigned to each PT kit shipped from the CAP and can be found on the result form. This number changes from mailing to mailing.
3. **Specimen ID**—An alpha-numeric identification assigned to each specimen included in a PT kit (eg, CHM-01). This information can be found on the specimen label.

Note: The fields utilized for these data elements will vary by LIS, as described in the next section.

Review the Standard Ordering Convention

To help the CAP identify your specific PT results response, you must place the three CAP-required data elements in designated fields in your LIS. The table below shows where the CAP-required data elements will be captured for your respective LIS.

Standard Ordering Convention					
	SCC Soft	Sunquest	Meditech Expanse	Meditech Client Server	Meditech Magic
CAP #	Provider NPI (within provider record)	Physician code (within physician record)	Provider first name (within provider record)	Submission code (within provider record)	Phone comment (within laboratory site)
Kit #	Req # or CS Req #	Order comment field	Comments under specimen tab	Comments under specimen tab	Comment in the order entry
Specimen #	Patient first name	Patient first name	Patient first name	Patient first name	Proficiency set ID

Your LIS will also dictate other required information to complete an order; this varies by LIS.

Create New Patients

Before an order can be created for direct transmission, patients must be created for each CAP PT specimen. These newly created patients are fictitious patients that will not go through any medical billing processes.

The responsibility for creating patients may vary from organization to organization. You may have the appropriate access to create patients or this may be a function done by another department such as scheduling and registration. If you do not have the appropriate access to create a patient, then you will need to allocate a resource for further assistance.

Creating a patient within an electronic medical record system involves specific required patient demographic information (eg, patient first name, patient last name, patient date of birth, patient social security number). If the patient creation happens within another department, then the laboratory will need to provide the patient names. In most cases, the patient name includes the specimen ID being resulted.

For example:

Patient Registration

Patient First Name: CHM-01
Patient Last Name: CAPPT
Patient Address: 325 Waukegan Rd, Northfield, IL 60093
Patient Phone: 847-832-7000
Patient Sex: M.
Patient SSI: 999-999-9999
Patient DOB: 1/1/2001
Marital Status: S

In this example, the specimen ID, "CHM-01," is in the Patient First Name field.

The key piece of information needed for CAP use from patient demographics is the specimen ID. All other information can be populated at the discretion of your team with fictitious data.

New patients created are required for each specimen being processed for PT. However, once the patients are created, they can be used from year to year to create new orders against these patients to satisfy the PT process.

Create New Providers

A new provider record must be created for use with direct transmission. This step must be done only once, placing your CAP number in a specific field depending on your LIS. Then, since the information is already stored, all you will need to do is select an ordering provider at the time you create future orders for PT specimens.

The responsibility for creating providers may vary from organization to organization. You may have the appropriate authority and access to create patients or this may be a function done by another department (eg, credentialing). If you do not have the appropriate authority and access to create a provider, then you will need to allocate a resource for further assistance.

Within the provider record, the national provider identifier (NPI) is the key data element that will be transmitted. All other data elements will be ignored. All other fields that are required to complete the provider build is up to the discretion of your organization.

For example:

Provider Record

Provider First Name: Doctor

Provider Last Name: CAPPT

Provider NPI: 1234567

Provider Address: 325 Waukegan Rd, Northfield, IL 60093

Provider Phone: 847-832-7000

In this example, the provider NPI, "1234567," is in the Provider NPI field.

Follow the Standard Ordering Convention table to identify the exact position of the CAP number. Also, you may need to setup numerous providers if you are considered a multi-facility and have several CAP numbers within your organization.

Exception: For Meditech Magic, instead of creating a new provider, follow your process to create a new laboratory site. Your CAP number will go in the site's phone comment field.



Follow the New Order Entry Method

Using the Standard Ordering Convention for your LIS and your ordering process, follow the high-level steps below to create an order. The steps may vary from organization to organization and may also be in a different order.

1

Sign into your LIS and perform a Patient Search to locate your desired specimen ID (patient) to process (eg, "CAPPT CHM-01" for a Chemistry specimen).

2

Create an order for the selected patient (order entry).

3

Select the appropriate ordering provider (laboratory site for Meditech Magic) that is storing your CAP number (eg, "Doctor CAPPT").

4

Add the Kit number within the appropriate location (eg, "12345678" in the Order Comment Field). Look up the appropriate location within the Standard Ordering Convention table in this document.

5

Select the tests to be processed under the respective specimen ID (patient) (eg, Glucose and Sodium).

6

Complete the order based on your LIS minimum required fields.

E-LAB SOLUTION SUITE

Set Up/Validate Permissions

Laboratory staff must be given appropriate permission by their site administrator in e-LAB Solutions Suite to access hub information.

Site administrators can view the current access/permissions of laboratory staff by going to cap.org.

- Click **Access e-LAB Solutions Suite** and log in.
- Click **Manage Lab User's Online Access/Permissions**.

The table below explains the permission type, hub access type, and actions the user can take.

e-LAB Solutions Suite PT Permissions Type	Hub Access Type	What you can do in the hub
View Reports and Enter Data	View Only	View <ul style="list-style-type: none"> ▪ Transmissions received from the LIS and sent to the CAP ▪ Mappings for laboratory test codes to CAP codes ▪ Unit of Measure (UOM) conversions
Approve Data	Client Admin	View and Edit <ul style="list-style-type: none"> ▪ Transmissions received from the LIS and sent to the CAP (view) ▪ UOM conversions (view) ▪ Mappings for laboratory test codes to CAP codes (view/edit) ▪ Alerts (view/edit)

Note: To access the hub, click **Set-up Direct Transmission** under the Proficiency Testing/Quality Improvement heading.

LABORATORY TEST CODES

Obtain Your Laboratory's Test Codes

Prior to mapping, you must obtain a list of your laboratory's tests, including the code, description, UOM, and specimen type. You may already have access to this or need to work with your LIS staff to obtain one. Some of the LISs will have a Test Compendium Report available on the LIS report menu. See below for some high-level notes on the report.

Note: To make mapping easier, work with your LIS staff to limit the tests to **quantitative tests only**.

Test Compendium Report

Locate the test compendium report from your LIS report menu. You may need to contact your LIS administrator that installed the report to obtain the report name. You will select and open the report as you do all other LIS reports.

There are no report parameters to enter for this test compendium report. Click the **OK**, **Submit**, or **Run** to initiate the report to run the query and extract the information in a comma separated values (CSV) file that will be placed in a specific location on your network (typically a temporary folder). You can use this report in the test code mapping process defined in the next section of this document.

TEST CODE MAPPING

Purpose of CAP Code Mapping

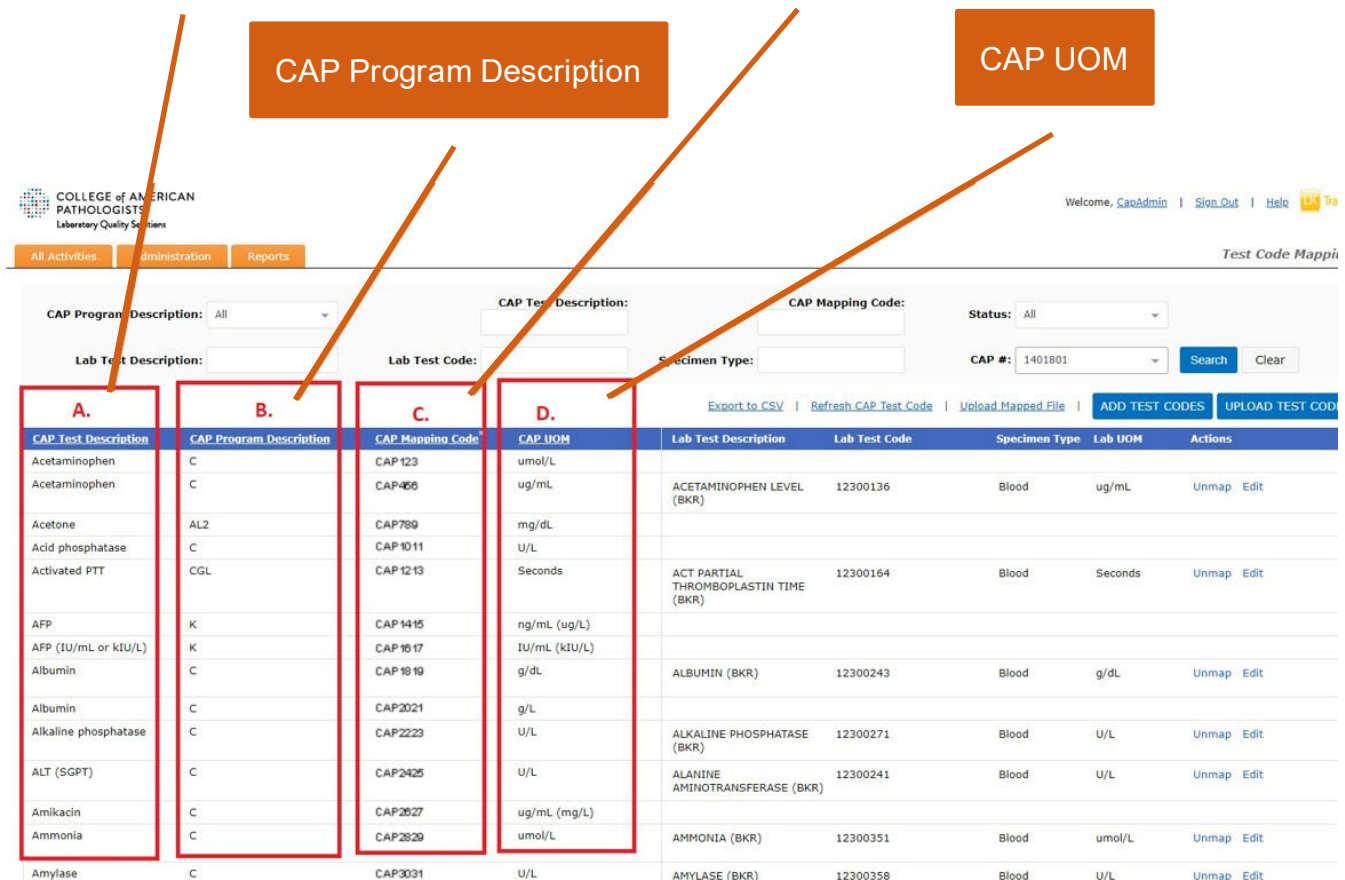
Before your laboratory can directly transmit results to the CAP, you must map your laboratory's LIS test codes to the CAP codes. The CAP maintains a list of standardized codes that must be mapped to the laboratory's test codes. The mapping process allows recognition of each laboratory's test code(s) and matches it to the correct CAP code(s). The hub provides the mechanism to link them. The hub uses the CAP mapping codes to identify the results from your laboratory's instruments and populate them directly into e-LAB Solutions Suite for verification.

CAP Test Description

CAP Mapping Code

CAP Program Description

CAP UOM



The screenshot shows the CAP Test Code Mapping interface. Callouts point to the following fields:

- CAP Test Description:** Points to the 'CAP Test Description' dropdown menu.
- CAP Mapping Code:** Points to the 'CAP Mapping Code' input field.
- CAP Program Description:** Points to the 'CAP Program Description' dropdown menu.
- CAP UOM:** Points to the 'CAP UOM' dropdown menu.

The interface also includes a table with the following columns: CAP Test Description, CAP Program Description, CAP Mapping Code, CAP UOM, Lab Test Description, Lab Test Code, Specimen Type, Lab UOM, and Actions. The table contains data for various tests including Acetaminophen, Acetone, Acid phosphatase, Activated PTT, AFP, Albumin, Alkaline phosphatase, ALT (SGPT), Amikacin, Ammonia, and Amylase.

*Data is for illustrative purposes only.



Understanding CAP Mapping Codes

Each laboratory has its own test codes originating from their instrumentation or LIS. For example, when testing for glucose, one laboratory system might issue results for “glu” and another for “glucose, serum.” The CAP system contains standardized test codes and naming conventions, to easily collect and analyze data from hundreds of laboratories.

CAP mapping codes consist of:

- **CAP Test Description-** List of tests that can be submitted via direct transmission.
- **CAP Program Description-** The program code containing the test. Some tests are in multiple programs. The programs that display in the hub will be based on the laboratory’s order.
- **CAP Mapping Code**—The standardized code unique to the test and unit of measure that ties the result to the PT event. These codes are used to populate the result form with the laboratory’s result.
- **CAP UOM**—The unit of measure associated with the test for the program shown.

Note: Every CAP test description has an associated CAP mapping code. There can be multiple CAP mapping codes for the same analyte for different UOMs or specimen types. If a test exists in multiple programs, and the CAP Test Description and CAP UOM is the same, then the CAP mapping code is the same; however, if the CAP UOM is different, then the CAP mapping code is also different. For example:

In this example, the test for
“25-OH Vitamin D” exists in
three different programs.

CAP Test Description	CAP Program Description	CAP Mapping Code *	CAP UOM
% Inhibition	CGS5	CAP123	%
11-deoxycortisol	Y	CAP456	nmol/L
11-deoxycortisol	Y	CAP789	ng/mL
17-hydroxycorticosteroids	N	CAP1011	mg/L
17-hydroxyprogesterone	Y	CAP1213	ng/dL
17-hydroxyprogesterone	Y	CAP1415	nmol/L
17-ketosteroids	N	CAP1617	mg/L
25-OH Vitamin D	ABVD	CAP1819	nmol/L
25-OH Vitamin D	VITD	CAP2021	nmol/L
25-OH Vitamin D	ABVD	CAP2023	ng/mL

*Data is for illustrative purposes only.

Using the Hub for Test Code Mapping

The hub is essential to the code mapping process. The hub contains:

- A pre-populated list of CAP PT programs your laboratory has ordered for the current year that are eligible for direct transmission.
- An automatic conversion of a test's UOM(s) when the CAP UOM is different than your laboratory's UOM, except molecular to mass/mass to molecular. *Note:* The UOM conversion list contains the most common conversion factors. If you do not see a conversion listed, contact the CAP.
- A mechanism to test the code mapping prior to transmitting results for your first PT event.

There are three acceptable methods for mapping your laboratory's test codes to the CAP's codes using the hub:

- **Method 1:** Upload your codes to the hub and match them directly to CAP mapping codes
- **Method 2:** Download the CAP mapping codes to a spreadsheet and match to your laboratory's test codes
- **Method 3:** Manually add and match your laboratory's test codes to CAP mapping codes in the hub

The CAP recommends Method 1, described in further detail below. If Method 1 is not appropriate for your laboratory, you may use either of the other two methods. For example, your laboratory might have previously mapped codes manually or is part of a multi-facility organization that wishes to reuse an existing spreadsheet. Refer to the Appendix for a complete description of the other two methods.

How to Refresh CAP Codes in the Hub

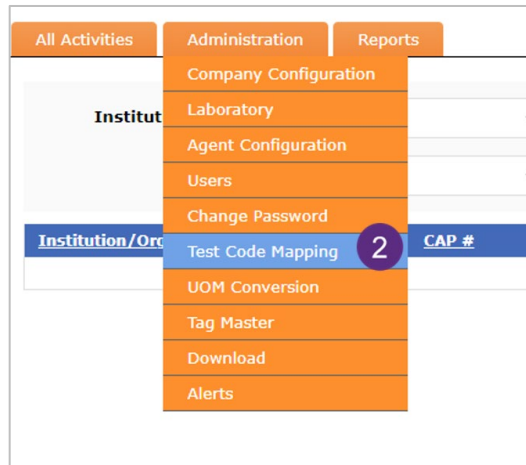
Prior to mapping test codes, you should first refresh the CAP codes in the hub following the process.

Step	Instructions
1	Go to cap.org and click Access e-LAB Solutions Suite . Log in, then click Set-up Direct Transmission .



Step Instructions

2 Hover over the **Administration** tab and click **Test Code Mapping**.



3 Refresh the CAP test codes.

- If this is the first time your laboratory has logged into the hub, you must “refresh” the CAP test codes. *Note:* The CAP fields will appear blank until you follow the steps in this section.

A screenshot of the 'Test Code Mapping' page. The page has tabs for 'All Activities', 'Administration', and 'Reports'. Below the tabs are search filters for 'CAP Program Description', 'CAP Test Description', 'CAP Mapping Code', 'Status', 'Lab Test Description', 'Lab Test Code', 'Specimen Type', and 'CAP #'. There are 'Search' and 'Clear' buttons. Below the filters are links for 'Export to CSV', 'Refresh CAP Test Code' (highlighted with a red circle and the number 3), 'Upload Mapped File', 'ADD TEST CODES', and 'UPLOAD TEST CODES'. At the bottom is a table with columns: 'CAP Test Description', 'CAP Program Description', 'CAP Mapping Code', 'CAP UOM', 'Lab Test Description', 'Lab Test Code', 'Specimen Type', 'Lab UOM', and 'Actions'. The table is currently empty.

Note: You should also refresh the CAP test codes when:

- your laboratory orders a new PT program, and
- at the beginning of each calendar year.
- If you have access to multiple laboratories, click the CAP # drop-down menu and select the CAP # for the site you want to map.



Step Instructions

4

Click **Refresh CAP Test Codes**.

- The CAP code data associated with the CAP PT programs your laboratory has ordered for the current year displays on the left side of the screen. *Note:* The hub is pre-populated with the CAP PT programs your laboratory has ordered for the current year.
- The CAP codes display in CAP Mapping Code order. Use the sorting feature in the column headers to change the order.

The screenshot shows the 'Test Code Mapping' interface. At the top, there are tabs for 'All Activities', 'Administration', and 'Reports'. Below these are search filters for 'CAP Program Description', 'CAP Test Description', 'CAP Mapping Code', 'Status', 'Lab Test Description', 'Lab Test Code', 'Specimen Type', and 'CAP #'. A red text overlay says 'Click on the Column Headings to re-sort the CAP test codes'. Below the filters is a table with the following data:

CAP Test Description	CAP Program Description	CAP Mapping Code	CAP UOM
% Inhibition	CGSS	CAP123	%
11-deoxycortisol	Y	CAP456	nmol/L
11-deoxycortisol	Y	CAP789	ng/mL
17-hydroxycorticosteroids	N	CAP1011	mg/L
17-hydroxyprogesterone	Y	CAP1213	ng/dL
17-hydroxyprogesterone	Y	CAP1415	nmol/L
17-ketosteroids	N	CAP1617	mg/L

*Data is for illustrative purposes only.

The next step is to prepare a CSV file with your laboratory's test codes and uploading it to the hub. After uploading, you will manually map your test codes to the CAP test codes. The steps in the uploading and mapping processes are described in the next section.

Note: Prior to uploading and mapping codes, you must download your laboratory's test codes from your LIS. See the Test Compendium Report section.



How to Upload Your Laboratory Codes to the Hub

Step Instructions

1

Export your test codes from your LIS with the following columns.

Note: You can also create an CSV with the following columns and populate it with your laboratory's test code data.

	A	B	C	D
1	LabTestDescription	LabTestCode	SpecimenType	LABUOM
2				
3				
4				
5				
6				
7				
8				
9				
10				

Important: The column headers in your CSV file must match **EXACTLY** the column headings you see above. If your columns are different, the upload of mapped test codes will fail.

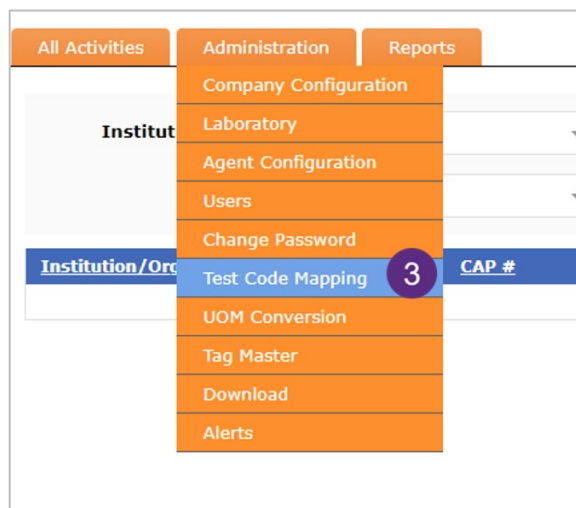
Tip: Before you upload your laboratory's test codes, you may want to review the list and remove any test codes that are not applicable to quantitative PT to simplify the mapping process.

2

Go to cap.org and click **Access e-LAB Solutions Suite**. Log in, then click **Set-up Direct Transmission**.

3

Hover over the Administration tab and click **Test Code Mapping**.





Step Instructions

4 Click **Upload Test Codes**.

Test Code Mapping

Navigation: All Activities | Administration | Reports

Search filters:

- CAP Program Description: All
- CAP Test Description: [Text Box]
- CAP Mapping Code: [Text Box]
- Status: Unmapped
- Lab Test Description: [Text Box]
- Lab Test Code: [Text Box]
- Specimen Type: [Text Box]
- CAP #: [Text Box]

Buttons: Search, Clear

Actions: Export to CSV | Refresh CAP Test Code | Upload Mapped File | **ADD TEST CODES** | **UPLOAD TEST CODES**

CAP Test Description	CAP Program Description	CAP Mapping Code	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
% Inhibition	CGS5	CAP123	%					
11-deoxycortisol	Y	CAP456	nmol/L					
11-deoxycortisol	Y	CAP789	ng/mL					
17-hydroxycorticosteroids	N	CAP1011	mg/L					

*Data is for illustrative purposes only.

5 Click **Browse** and select the mapped CSV file.

Upload CSV File

CAP #: 7201

CSV File Name: Choose File No file chosen

- Only **CSV** file format is allowed to upload.
- Data format must be: **CAPTestDescription, CAPProgramDescription, CAPMappingCode, CAPUOM, LabTestDescription, LabTestCode, SpecimenType, LABUOM**
- Please note that when CAP UOM and Lab UOM do not match and if conversion factor is available, we will automatically convert the test (analyte) results to CAP UOM. Review the [list of UOM conversions](#).
- Be sure to review test (analyte) results in Results Form Data Entry (e-LAB Solutions Suite).

☒ I have read and agreed to the conversions.

Submit

6 Read the UOM conversion disclaimer. If you agree to the conditions, click the “**I have read and agreed to the conversions.**” checkbox.

7 Click **Submit**.



How to Map Your Laboratory Test Codes to CAP Codes

Step Instructions

1 Enter a search parameter.

CAP Test Description	CAP Program Description	CAP Mapping Code *	CAP UOM
Acetaminophen	C	CAP123	umol/L
Acetaminophen	C	CAP456	ug/mL
Acid phosphatase	C	CAP789	U/L
Albumin	C	CAP1011	g/dL
Albumin	C	CAP1213	g/L
Alkaline phosphatase	C	CAP1415	U/L
ALT (SGPT)	C	CAP1617	U/L
Amikacin	C	CAP1819	ug/mL (mg/L)
Ammonia	C	CAP2021	umol/L
Amylase	C	CAP2223	U/L
Apolipoprotein A1	C	CAP2425	mg/dL
Apolipoprotein A1	C	CAP2627	g/L
Apolipoprotein B	C	CAP2829	g/L
Apolipoprotein B	C	CAP3031	mg/dL
AST (SGOT)	C	CAP3233	U/L
Bilirubin, direct	C	CAP3435	mg/dL
Bilirubin, direct	C	CAP3637	umol/L
Bilirubin, total	C	CAP3839	umol/L

*Data is for illustrative purposes only.

2 Click **Search**. The test codes display based on your search criteria.

3 Click the **magnifying glass icon** associated with the code you want to map.

4 Click the **box associated with the laboratory code** to select it.

Note: Use the **Search** field to look for a specific laboratory test code.



Step Instructions

SELECT/ADD LABORATORY TEST CODES

CAP Test Description: Albumin
CAP Mapping Code: CAP123*

CAP Program Description: C
CAP UOM: g/L

Search

Select	Lab Test Code ↑	Lab Test Description	Specimen Type	Lab UOM
<input type="checkbox"/>	ACEM	ACETAMINOPHEN	SERUM	mcg/mL
<input checked="" type="checkbox"/> 4	ALB	Albumin	Blood	g/L
<input type="checkbox"/>	ALKP	ALKALINE PHOSPHATASE	Serum	U/L
<input type="checkbox"/>	INR	INR	Blood	
<input type="checkbox"/>	LDH	LDH	SERUM	Units/L
<input type="checkbox"/>	PROTH	PROTHROMBIN TIME	Blood	Seconds

1 - 6 of 6 items Records per page: 50

5 Map Cancel

*Data is for illustrative purposes only.

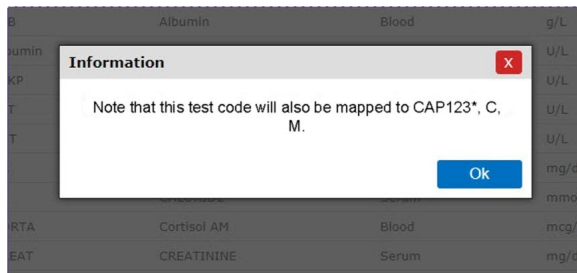
Note: While this example shows selecting one laboratory test code, you can map **multiple laboratory test codes** to **one CAP code**.

5 Click **Map**.



Step Instructions

6 Click **OK**.



*Data is for illustrative purposes only.

The laboratory code is now mapped to the CAP mapping code.

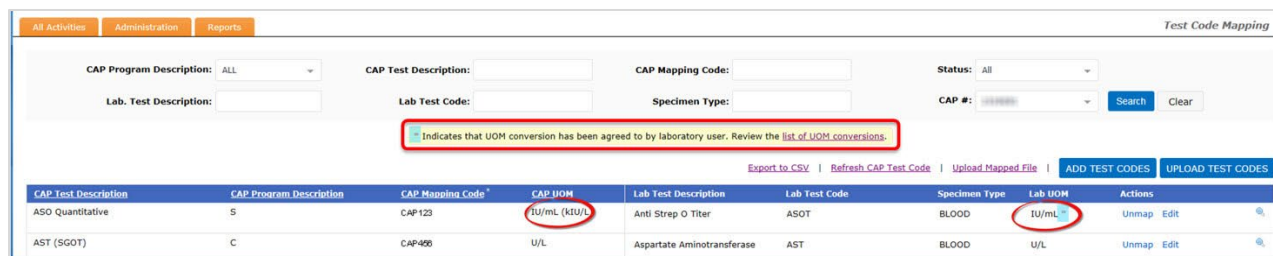
Note: if you want to remove a test code that you uploaded, hover over the far, right side of that specific test and click the X.

CAP Test Description	CAP Program Description	CAP Mapping Code	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
Acetaminophen	C	CAP123	umol/L					
Acetaminophen	C	CAP456	ug/mL					
Acid phosphatase	C	CAP789	U/L					
Albumin	C	CAP123	g/L	Albumin	ALB	Blood	g/L	Unmap Edit
Alkaline phosphatase	C	CAP1415	U/L					
ALT (SGPT)	C	CAP1617	U/L					
Amikacin	C	CAP1819	ug/mL (mg/L)					
Ammonia	C	CAP2021	umol/L					
Amylase	C	CAP2223	U/L					
Apolipoprotein A1	C	CAP2425	mg/dL					
Apolipoprotein A1	C	CAP2627	g/L					
Apolipoprotein B	C	CAP2829	g/L					
Apolipoprotein B	C	CAP3031	mmol/L					

*Data is for illustrative purposes only.

Resolving UOM Conversion Mismatches

When the system encounters a UOM mismatch, it puts an asterisk (*) next to the laboratory UOM and displays a mismatch message at the top of the screen.



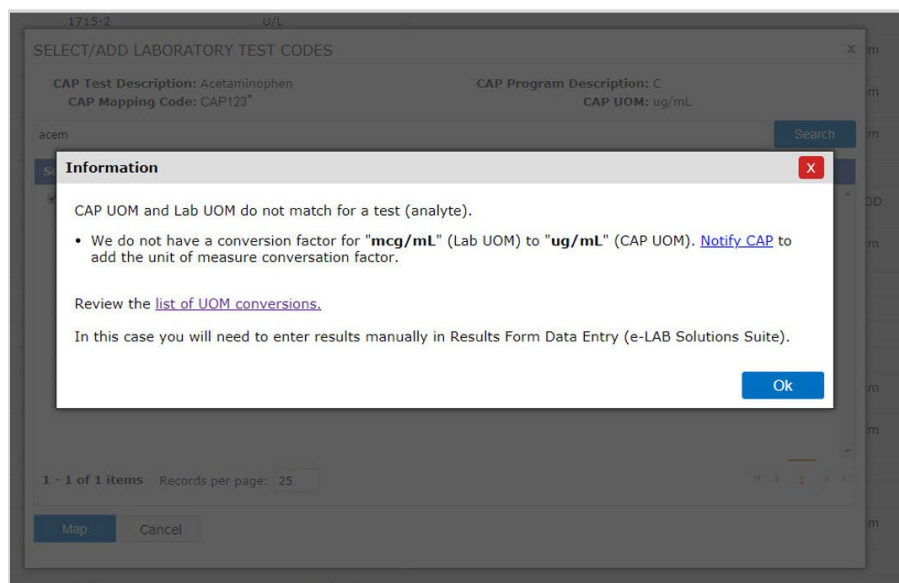
Indicates that UOM conversion has been agreed to by laboratory user. Review the [list of UOM conversions](#).

CAP Test Description	CAP Program Description	CAP Mapping Code *	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
ASO Quantitative	S	CAP123	IU/mL (ktU/L)	Anti Strep O Titer	ASOT	BLOOD	IU/mL	Unmap Edit
AST (SGOT)	C	CAP406	U/L	Aspartate Aminotransferase	AST	BLOOD	U/L	Unmap Edit

*Data is for illustrative purposes only.

When your laboratory is mapping test codes and a mismatch occurs, the system checks to see if a UOM conversion factor exists. If it exists, the system will convert the laboratory's PT results to the CAP UOM.

If there is no conversion factor, the system displays the following message, stating that there is no conversation in the system. Your laboratory will not be able to map that laboratory test code and must enter the results for that test in Result Form Data Entry in e-LAB Solutions Suite. Click **Notify CAP**.



Information

CAP UOM and Lab UOM do not match for a test (analyte).

- We do not have a conversion factor for "mcg/mL" (Lab UOM) to "ug/mL" (CAP UOM). [Notify CAP](#) to add the unit of measure conversion factor.

Review the [list of UOM conversions](#).

In this case you will need to enter results manually in Results Form Data Entry (e-LAB Solutions Suite).

Ok

*Data is for illustrative purposes only.



You can access the system's test code conversions in either of the following ways:

Click on the hyperlink in the **Upload CSV File** popup.

OR

Hover over the **Administration** tab and click **UOM Conversions**.



Using Filters in the Hub

The filter options on the hub's test code mapping page allow you to quickly find CAP programs and test codes within the hub.

To use a filter option, select or enter the filter criteria in the filter option field(s) and click **Search**.

Note: You must click **Clear** after you have used a filter option(s) and want to use a different filter(s).

Test Code Mapping

CAP Program Description: ALL
 CAP Test Description:
 CAP Mapping Code:
 Status: All
 Lab. Test Description:
 Lab Test Code:
 Specimen Type:
 CAP #: 13342000
 Search Clear

[Export to CSV](#) | [Refresh CAP Test Code](#) | [Upload Mapped File](#) | [ADD TEST CODES](#) | [UPLOAD TEST CODES](#)

CAP Test Description	CAP Program Description	CAP Mapping Code *	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
CA 125	TM	CAP123	U/mL					
Luteinizing hormone	Y	CAP456						
Digoxin	C	CAP789	ng/mL					
Digoxin	CZQ	CAP1011	ng/mL					
Troponin I, quant, ng/mL	CAR	CAP1213						
PSA, free	K	CAP1415	ng/mL (ug/L)					
Timothy grass	SE	CAP1617						
Cortisol, Urinary Free	N	CAP1819	ug/L					
Anti-Sm, quant	S2	CAP2021						
Plasma cells	BMD	CAP2223						

1-10 of 1326 records Records per page: 10

*Data is for illustrative purposes only.



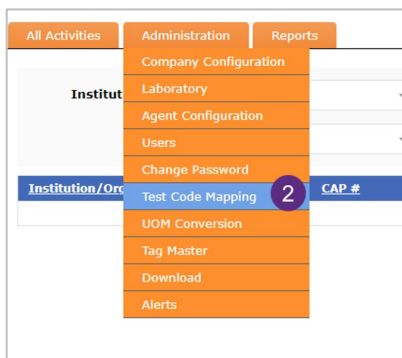
How to Unmap Test Codes

There may be instances when you need to unmap a test code (eg, change a UOM, remove/add a test code).

Step Instructions

1 Go to cap.org and click Access e-LAB Solutions Suite. Log in, then click **Set-up Direct Transmission**.

2 Hover over the **Administration** tab and click **Test Code Mapping**.



3 Use the mapping filter(s) to enter **search criteria** to find the test code you want to unmap.

CAP Test Description	CAP Program Description	CAP Mapping Code	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
% Inhibition	CGSS	CAP123	%					
11-deoxycortisol	Y	CAP456	nmol/L					
11-deoxycortisol	Y	CAP789	ng/mL					
17-hydroxycorticosteroids	N	CAP1011	mg/L					
17-hydroxyprogesterone	Y	CAP1213	ng/dL					
17-hydroxyprogesterone	Y	CAP1415	nmol/L					
17-ketosteroids	N	CAP1617	mg/L					
25-OH Vitamin D	ABVD	CAP1819	ng/mL					

*Data is for illustrative purposes only.

4 Click **Search**.



5 Click **Unmap**.

Test Code Mapping

Navigation: All Activities | Administration | Reports

Search filters:

- CAP Program Description: All
- CAP Test Description: Amylase
- CAP Mapping Code:
- Status: Mapped
- Lab Test Description:
- Lab Test Code:
- Specimen Type:
- CAP #: 4197601

Buttons: Search, Clear

Actions: Export to CSV | Refresh CAP Test Code | Upload Mapped File | ADD TEST CODES | UPLOAD TEST CODES

CAP Test Description	CAP Program Description	CAP Mapping Code	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
Amylase	C	CAP123	U/L	AMYLASE (BKR)	12300358	Blood	U/L	5 Unmap Edit
Amylase	CZQ	CAP456	U/L	AMYLASE (BKR)	12300358	Blood	U/L	Unmap Edit
Amylase	FLD	CAP789	U/L	AMYLASE (BKR)	12300358	Blood	U/L	Unmap Edit
Amylase	U	CAP1011	U/L	AMYLASE (BKR)	12300358	Blood	U/L	Unmap Edit

*Data is for illustrative purposes only.

6 Click **Yes**.

Confirm [X]

Are you sure you want to unmap this Lab Test Code?

6 Yes No



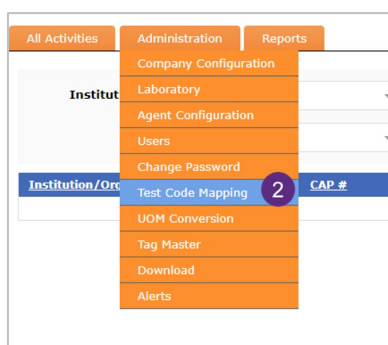
How to Edit Mapped Test Codes

Important: Editing a test code refers to unmapping and remapping the test code rather than editing the actual laboratory test code information.

Step Instructions

1 Go to cap.org and click **Access e-LAB Solutions Suite**. Log in, then click **Set-up Direct Transmission**.

2 Hover over the **Administration** tab and click **Test Code Mapping**.



3 Use the mapping filter(s) to enter **search criteria** to find the test code you want to unmap.

CAP Test Description	CAP Program Description	CAP Mapping Code *	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
% Inhibition	CG55	CAP123	%					
11-deoxycortisol	Y	CAP456	nmol/L					
11-deoxycortisol	Y	CAP789	ng/mL					
17-hydroxycorticosteroids	N	CAP1011	mg/L					
17-hydroxyprogesterone	Y	CAP1213	ng/dL					
17-hydroxyprogesterone	Y	CAP1415	nmol/L					
17-ketosteroids	N	CAP1617	mg/L					
25-OH Vitamin D	ABVD	CAP1819	ng/mL					

*Data is for illustrative purposes only.

4 Click **Search**.



Step Instructions

5 Click **Edit**.

Test Code Mapping

All Activities Administration Reports

CAP Program Description: CAP Test Description: CAP Mapping Code: Status: Mapped

Lab Test Description: Lab Test Code: Specimen Type: CAP #: 1187201

Search Clear

Export to CSV Refresh CAP Test Code Upload Mapped File ADD TEST CODES UPLOAD TEST CODES

CAP Test Description	CAP Program Description	CAP Mapping Code *	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
Albumin	C	CAP123	g/dL	ALBUMIN (BKR)	12300243	Blood	g/dL	Unmap Edit 5
Albumin	FLD	CAP456	g/dL	ALBUMIN (BKR)	12300243	Blood	g/dL	Unmap Edit
Albumin	M	CAP789	g/dL	ALBUMIN (BKR)	12300243	Blood	g/dL	Unmap Edit

*Data is for illustrative purposes only.

6 Edit the **laboratory data** as desired.

Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
6 ALBUMIN (BKR)	12300243	Blood	g/dL	7 Save Cancel

7 Click **Save**.



Confirm Your Mapped Codes

The CAP strongly recommends that you confirm that the mapping is correct after you have finished mapping your laboratory's test codes to the CAP codes. To confirm your mappings, you must simulate a PT transmission by running the report in test mode. The following steps describe how to run the report in test mode.

Step	Instructions
1	Select a valid kit and specimen number from a prior PT activity that is past the due date but within 90 days. If you use a kit within 90 days, skip to step 4.
2	Log the PT specimen into your LIS using the kit and specimen ID numbers per your LIS ordering convention. <i>Important:</i> You only need to order and enter the results for one specimen for the PT you are confirming to verify your mapping.
3	Accession one specimen and run it for the analytes you want to test on the instrument.
4	Locate the PT extract report from your LIS report menu. The report will group all the PT information by the kit number that is unique to a CAP Mailing. You may need to contact your LIS resource that installed the report to obtain the report name.
5	Select and open the report as you do all other LIS reports.



Step Instructions

6 Run the CAP PT extract report in test mode.

Once you open the report, you will be asked to enter report parameters based on your LIS, including your desired eight-digit kit number and the type of file, in this case, it is a test or validation file (see table below). A test or validation file will **not** post the resulted information to the CAP online result form. However, the data will be acknowledged by the CAP and processed where you are eligible to receive error notifications. You can use this to confirm test code mappings and other changes without impacting your online result form.

Test Mode Report Parameters Based on LIS			
	SCC Soft	Sunquest	Meditech Expanse/Client Server/Magic
CAP kit number parameter	KIT	KITUID	KIT Number
Test mode parameter	Enter "T" in the middle initial of the PT patient*	Change the default "Result Submission" to "TEST" in ENV	Change the default "L" to "T" in Environment

*To transmit a test PT results file for Soft, you will need to adjust the patient demographic, instead a report parameter.

Note: For Meditech Expanse, Client Server, or Magic, you need to select a kit that was ordered within the last 90 days. If you select a kit that was ordered more than 90 days ago, you will need to create a new order for that kit.

For more details, refer to the Reports Installation guide.

7 Once you enter your report parameters, click **OK**, **Submit**, or **Run** to initiate the report to run the query and extract the information in a CSV file that will be placed in the pickup folder designated during setup, making it available for pickup.



Step Instructions

- 8** You will receive an email that includes the analyte details and success or failure status for each. The email will be a summary of the data that you transmitted but provide the results for each test transmitted in the file.

Example email #1 (some failures):

From: noreplyuat@cap.org <noreplyuat@cap.org>

Sent: Thursday, December 13, 2018 2:02 PM

Subject: Direct Transmission Test Submission CAP#:XXXXXXX Kit#:30958092

Overall Status:

Submission Date: 2018-12-13T14:01:55

Specimen: CHM-11

CAP #: XXXXXX Kit #: 30958092 Mailing: CC2018

Challenge	CAP Mapping Code	Response Value	Unit of Measure	Analyte	Result
1	CAP123	1.0	ng/mL	Digoxin	Successful
2	CAP456	70.00	mg/dL	LDL, calculated	Successful
3	CAP789	2.0	mmol/L	Lithium	CAP test code not defined for one (or a combination) of the following: Survey, CAP Mapping code or 2nd instrument.
4	CAP1011	250.	U/L	ALT (SGPT)	Successful
5	CAP1213	10.00	mg/dL	Calcium	Invalid qualifier
6	CAP1415	10.00	mg/dL	Calcium	Successful
7	CAP1516	100.	U/L	Amylase	Invalid length / precision of field
8	CAP1718	100.00	mg/dL	LDL, measured	Invalid specimen and analyte combination

If your message has invalid qualifiers or other failures, as in the example above, resolve the issues and resubmit until all challenges are successful.



Step Instructions

Example email #2 (all results successful):

From: noreplyuat@cap.org <noreplyuat@cap.org>

Sent: Friday, January 25, 2019 9:16 AM

Subject: Direct Transmission Test Submission Successful CAP#:XXXXXXX Kit#:30037671

Overall Status: Successful

Submission Date: 2019-01-25T

09:16:18

Specimen: CMQ-04

CAP #: XXXXXXX Kit #: 30037671 Mailing: CMQB2017

Challenge	CAP Mapping Code	Response Value	Unit Of Measure	Analyte	Result
1	CAP123	1.010		Specific gravity	Successful
2	CAP456	1.010		Specific gravity	Successful
3	CAP789	1.010		Specific gravity	Successful



How to Run the Report to in Live Mode to Transmit a PT Kit

Step

Instructions

1

Find/create the PT patient.

• Search for the appropriate PT patient.

• If necessary, follow your laboratory’s process for creating a PT patient.

2

Enter the PT order.
Enter the order as you normally would with the exception of the following PT-specific order entry parameters. The PT order parameters differ by LIS type. See the Standard Ordering Convention table.

3

Run the PT specimen(s).

4

Locate the PT extract report from your LIS report menu.

5

Enter report parameters based on your LIS, including your desired eight-digit kit number and the type of file; in this case, it is a live file (see table below). A live file is an actual proficiency testing result transmission, where the results will be posted to the CAP online result form.

Live Mode Report Parameters Based on LIS			
	SCC Soft	Sunquest	Meditech Expanse/Client Server/Magic
CAP kit number parameter	KIT	KITUID	KIT Number
Live mode parameter	Leave middle initial of the PT patient blank*	Leave the default Result “Submission” in ENV	Leave the default "L" in Environment

*To submit an active PT kit for SCC Soft, you will need to adjust the patient demographic, instead a report parameter.



Step Instructions

6

Run the Extract Report.

Once you enter your report parameters, click **OK**, **Submit**, or **Run** (depending on your LIS) to initiate the report to run the query and extract the information to a CSV file that will be placed in a specific location on your network, making it available for pickup.

You may run the report multiple times. The online result form will only update information that is new to the CAP based on the data most recently sent.

Note: Third instrument results for QCC programs cannot be directly transmitted to the CAP at this time. You must manually enter results for a third instrument online via e-LAB Solutions Suite.

Reviewing and Approving Results in e-LAB Solutions Suite

To review and approve your laboratory's PT results, wait at least 30 minutes until after running the extract report for your data to be available. Go to cap.org, click **Access e-LAB Solutions Suite**, log in, and click **Result Form Data Entry**.

On-time reporting of PT results remains the responsibility of the laboratory. Implementation of the technology still requires that laboratories ensure that results are populated correctly prior to approving and submitting to the CAP. Any results that did not transmit such as qualitative data, must be entered and reviewed per your normal process.

Important: Any data received by any means (fax, online entry, or direct transmission) after midnight Central Time (CST) of the due date on the result form will not be evaluated, resulting in a failure for all analytes included in the specific PT event.

Email Notifications

Who gets the email notifications?

When you completed the direct transmission enrollment form, you identified two contacts: the laboratory lead point of contact and the LIS coordinator/LIS manager. Both contacts will receive all system-generated email notifications. To make any changes to these contacts, call the CAP customer contact center.

What if I am a contact for email notifications, but I have not been receiving them?

Contact your IT/IS department to verify they are not being blocked by a security policy.

TROUBLESHOOTING

Overview

There are several scenarios that will require you to troubleshoot a problem and take corrective action. These scenarios are:

- Partial results made it to the CAP.
- Results file made it to the hub, but no results made it to the CAP.
- Results made it from the hub to the CAP but had errors.
- Results file did not make it to the hub.

You will know if a results file did not successfully reach the CAP because:

1. Your laboratory will not receive a successful mapping email as part of mapping confirmation.
2. Your laboratory contact will receive an error email when results file transferred to the CAP with errors.
3. Your result form is not populated or only partially populated.

When troubleshooting, check the result form in e-LAB Solutions Suite first, then work backwards to determine the problem and your course of action. Allow 30 minutes from submission before you check the result form. If you don't receive an error email and the result form is not populated, you must utilize the hub to determine the source of the problem.

Troubleshooting in the Hub

The hub provides a summary of transactions and their status. When you access the hub, you will see the Test Code Mapping page. To troubleshoot issues with transmissions, select the All Activities tab from the top menu. This dashboard of the hub provides a summary and the status of transmissions from the laboratory. It defaults to show transmissions sent that day for all laboratories a user is authorized to view.

Use Filters to Change the Dashboard View in the All Activities Tab

The All Activities tab allows users to view the state of transmissions, errors and delivered files. Filters can be used to change the dashboard view.

- **Institution/Org:** Select your specific laboratory from the drop-down menu.
- **Period:** Select a pre-defined timeframe from the drop-down menu.
- **From: and To:** Select a date range using the calendar icons.



COLLEGE of AMERICAN
PATHOLOGISTS
Laboratory Quality Solutions

Welcome, Mary Jones | Sign Out | Help | Transfer

All Activities Administration Reports Activities

Institution/Org: CAP Test Lab

LIS Location ID: From: 10/24/2018 To: 10/24/2018

CAP #: Last: 0 Hrs

LIS: Tags: Search Clear

Period: Today Select Date Range Today Yesterday Last 7 days Last 30 days This Week Last Week This Month Last Month

LIS Location ID	LIS	P	Available	Pending	Delivered	D	Unprocessed	Errors	Tags
No Records Found!									

Check Transmission Status

The screen below shows the results file transmission status. Click the various fields to access additional information.

COLLEGE of AMERICAN
PATHOLOGISTS
Laboratory Quality Solutions

Welcome, | Sign Out | Help | Transfer

All Activities Administration Reports Activities

Institution/Org: All

LIS Location ID: CAP #: Last: 0 Hrs

LIS: Tags: Search Clear

Period: Select Date Range From: 11/01/2019 To: 01/14/2020

UPLOAD PT RESULTS FILE

Institution/Org	CAP #	LIS Location ID	LIS	P	Available	Pending	Delivered	D	Unprocessed	Errors	Tags
ABC Hospital	1234567	Main Laboratory	EPIC			1	1		33	3	

- Pending:** Files that have been sent from the agent to the hub but have not been sent to the CAP yet.
- Delivered:** Files that have been successfully sent to the CAP and had no mapping errors on the hub.
- P or D:** Click on the icon in the P (Pickup) or D (Delivery) columns to view the last time the hub tried to pick up or deliver a file.
- Errors:** Files that contained file format or mapping errors when the hub processed them.
 - If there are mapping errors, a partial submission of the tests that have the correct mapping will be sent to the CAP.



- If a file has an error, it doesn't mean it failed to send results to the CAP. Egregious errors will halt the transmission (eg, missing kit number, kit number not eight digits, or missing CAP number).

Note: During troubleshooting, you won't typically click on the # in the **CAP #** column; however, clicking will show a list of files that were sent during a given time period, the original file received from the laboratory, and the transformed file that was delivered to the CAP.

To determine what errors have occurred in a file and find out how to correct them, follow the steps below.

Step Instructions

- 1 Click the number in the **Errors** column in the row for your desired laboratory.

The screenshot shows the CAP interface with a table of data. The 'Errors' column has a circled number 1, indicating the step to click on the number in the Errors column.

All the files with errors display.

- 2 Click the number in the Attempt column to see specific errors for a file.

The screenshot shows the CAP interface with a table of data. The 'Attempt' column has a circled number 2, indicating the step to click on the number in the Attempt column.



Step Instructions

Additional details will display.

- a. **Error Description:** Existing errors
- b. **Original:** The data file that the hub received.
- c. **Delivered:** The transformed .xml file that was delivered to the CAP.

Note: This will primarily be used by the CAP's customer contact center to help diagnosis issues.

- d. If it is a mapping error, once you have fixed it you can resend the file directly from this page by clicking **Resend File**.

Note: Even though there may be mapping errors for some analytes, a partial file of the ones that did map successfully is sent to the CAP. Also, due to the way laboratories order the tests (eg, panels), there may be tests sent in the file from the LIS that should not be sent to the CAP. These will show up as mapping errors but need no resolution by the laboratory. You can ignore this type of error once you have confirmed the mapping of a specific program.

3 Find your error(s) and review the recommended resolution(s) found in the [Mapping Validation Errors](#) or [Results File Rejected by the hub Errors](#) table(s).

If you cannot determine how to correct an error(s), call the CAP customer contact center at 800-323-4040, +001-847-832-7000 option 1.



Mapping Validation Errors

Error Code	Error Message	Mapping Issue	Resolution
Not applicable	Validation Error: Mapping or unit of measure (UOM) error for test code/codes: {1}. Please fix the issue and then re-send the file.	File transferred to the hub with errors	<p>There will be a list of laboratory test codes that have no mapping or there is an UOM conversion issue.</p> <p>For mapping errors, review each of the listed codes and map where needed. <i>Note:</i> Not all test codes that come across in the result file will have a mapping. For example, any tests that have qualitative responses will not be mapped and will always generate an error code.</p> <p>For UOM conversion errors, make sure that the UOM on the mapping page matches the one on the incoming results file. If not, go back to mapping and correct the UOM to match the results file.</p>
Not applicable	Quantitative tests missing on CAP submission email	Successful email but found mapping and/or UOM error(s) when verifying results	If there are quantitative tests associated with the kit that are not on the CAP email, log in to the hub and review the errors to see what issue arose.

Key: {0} = Field(s)

{1} = Test Code(s)

Results File Rejected by the hub Errors

Error Code	Error Message	Mapping Issue	Resolution
E-112	Invalid CAP Number	Results file rejected by the hub	Check the CAP number entered in the LIS. It must be a seven-digit number and match the number that was defined in the hub.
Not applicable	Validation Error: Invalid CSV format	Results file rejected by the hub	Most likely, the file doesn't have (pipes) between the required fields.
E-1000	Multiple Kits within the file	Results file rejected by the hub	More than one kit number is in the incoming file. Work with your LIS report writer to determine why more than one kit is being included in the report.
E-1002	Blank file	Results file rejected by the hub	Report generated a file with no data. Re-run the PT Extract Report.
E-1015	Kit # missing or invalid	Results file rejected by the hub	Review the kit # on the order in the LIS and verify it is an eight-digit number.
Not applicable	Validation Error: {0} is blank or invalid for tests: {1}	Results file rejected by the hub	Required field is missing or has some other issue. Need to review in the LIS.
Not applicable	Unexpected Error: Translation error occurred	Results file rejected by the hub	Call the CAP customer contact center at 800-323-4040, +001-847-832-7000 option 1.
Not applicable	Validation Error: All analytes failed validation and/or mapping	No mapping exists for the kits mailing in the hub for tests in the file extracted from the LIS. No data sent to the CAP.	Check the mapping to be sure it has been done for this transmitted program.

Key: {0} = Field(s)
{1} = Test Code(s)



Error Emails with Fault Codes

Fault Code	Fault Description	Long Description	Next Steps	Email Message
102	Invalid username and/or password	Please validate that the user name and password received from the CAP for this service have been entered correctly in the CAP profile.	Call CAP customer contact center	<p>For users transmitting PT results using Data Innovations Instrument Manager:</p> <p>The username and/or password are incorrect. Verify that this information is entered correctly.</p> <p>For users transmitting PT results directly from their LIS:</p> <p>The hub connection to the CAP is failing to authenticate. Call the CAP customer contact center at 800-323-4040, +001-847-832-7000 option 1.</p>
103	Laboratory not authorized	Your laboratory's CAP number is not authorized for direct transmission.	Call CAP customer contact center	The CAP is unable to receive PT results by direct transmission. Call the CAP customer contact center at 800-323-4040, +001-847-832-7000 option 1.
104	Invalid CAP/Kit Combination	Validate that the kit number entered in the LIS during PT ordering matches the kit number on the result form.	Laboratory verification	An invalid kit number has been entered into the LIS when the order for PT was placed. Review the kit # provided on your printed result form and re-enter the correct number.
105	Invalid Kit/Specimen combination	Validate that the kit number and specimen ID entered in the LIS during PT ordering matches the result form and specimen label.	Laboratory verification	An invalid kit # and/or specimen ID has been entered in the LIS when the order for PT was placed. Review the kit # provided on your printed result form and on the specimen label for the correct specimen ID and re-enter the correct information in the LIS.
106	Kit too late	PT results submission is past the due date printed on the result form.	Laboratory verification	Submission of PT results is past the due date—transmitted results will not be evaluated. Review the printed result form and kit instructions for the due date.



Fault Code	Fault Description	Long Description	Next Steps	Email Message
111	Invalid survey	PT program being transmitted is not enabled for direct transmission. Please enter your results online in e-LAB Solutions Suite.	External LOINC spreadsheet	This program is not enabled for PT result reporting by direct transmission. Please enter results online in e-LAB Solutions Suite.
201	CAP test code not defined for one (or a combination) of the following: survey, CAP mapping code or 2nd instrument.	Validate that your LIS test code is mapped to the correct CAP mapping code.	Laboratory verification	Results were detected for an analyte for which there is no field(s) available on the result form. Verify that your test code is mapped to the appropriate CAP test code.
202	Invalid specimen and analyte combination	PT result for the analyte/specimen is being ignored because there is no field on the result form for this specimen.	Email warning to the laboratory; no action on their part.	The PT result value is not defined for the kit #—there is no field(s) available in result form data entry.
203	Invalid length / precision of field	The length and/or precision of the result do not fit into the program's result form.	Laboratory verification	A PT result value was transmitted that is out of the range defined in result form data entry. Validate the required whole number and decimal place for the impacted field on the result form.
204	Invalid unit of measure	The unit of measure embedded in the CAP mapping code does not match the result form unit of measure options,	PT operations	The UOM associated with the CAP test code does not match the UOM options on the result form. Call the CAP customer contact center at 800-323-4040, +001-847-832-7000 option 1.
205	Invalid qualifier	The qualifier ("<", ">") transmitted does not match what is expected on the result form.	An email warning to the laboratory, no action on their part.	The qualifier that was transmitted does not match what is required in result form data entry. For example, a "less than" value was used for a "greater than" value response.



Fault Code	Fault Description	Long Description	Next Steps	Email Message
212	Result Form for the Kit has already been approved.	Result form for the kit has already been approved. Please view the kit transaction history screen in e-LAB Solutions Suite, result form data entry, to see who approved the kit in your laboratory.	Laboratory verification	PT results have already been approved. Go to e-LAB Solutions Suite, result form data entry. Kit transaction history to see who approved the results.

Key: {0} = Field(s)
{1} = Test Code(s)

Troubleshooting the Agent

Results File is not Transmitted to the Hub

The following table outlines possible issues and causes. Unless otherwise specified, you should contact your LIS administrator for help in resolving these issues.

Issue	Possible Problem/Potential Resolution
Report runs but no file is found in the pickup folder	<ul style="list-style-type: none"> The appropriate CAP printer was not defined or no printer selected (SCC Soft LIS only). Report setup issues. Security changed, not enabling access for the report to write to the pickup location The file was moved by the agent; verify in the archive folder or the hub.
The report runs and the file is in the appropriate folder, but it is not picked up and sent to the hub for further processing	<ul style="list-style-type: none"> Verify that the agent is in a "Running" status. Verify that the agent is running under the Admin credentials. Verify that the connection configuration has a status of "ON". Verify that the connection configuration is pointed to the correct location. Verify that the drive location is available and online to the network. Verify that there are no security changes to access that folder path. Verify that the files extension is CSV and matches the extension defined in the agent.
Extract file is empty	Verify kit number was entered correctly in the extract report and matches the kit for the CAP PT that was ordered in the LIS.



GLOSSARY OF TERMS

1. **CAP number** – A unique, seven-digit identification number assigned to each laboratory.
2. **Specimen ID** – An alpha-numeric identification assigned to each specimen included in a PT kit (eg, CHM-01). This information can be found on the specimen label.
3. **Kit number** – A unique, eight-digit number assigned to each PT kit shipped from the CAP that can be found on the result form.
4. **Ordering convention** – A standardized way of entering CAP PT-related information into the LIS to start PT kit processing and begin the process of electronic transmission of results. Laboratories are required to enter their CAP number, kit number, and specimen ID in prescribed fields.
5. **PT extract report** – A report that you will run in your LIS to generate a CSV file containing PT results for a given PT kit. This file will be placed in your laboratory's designated pickup folder.
6. **PT results file** – Output generated by the PT extract report that contains your PT results
7. **Test compendium report** – A report that you will run to query your LIS for a complete list of your laboratory's test codes, description, UOM, and specimen type. This report will be saved to a temporary location on your computer.
8. **Hub** – A cloud-based interface providing secure PT data transfer between your laboratory's LIS and the CAP. When your PT results reach the hub, it will transform the file into a format that is recognizable to the CAP. Part of this transformation involves the translation of your laboratory's test codes to CAP codes. This type of interface connectivity is widely used in clinical laboratories to facilitate the exchange of clinical data between laboratories and physician office practices.
9. **Agent** – A light-weight software application that transfers the CSV file containing PT results from the laboratory's local network to a cloud-based interface known as the hub.
10. **Network path** – A designated location on your local server for the pickup folder that will receive the PT results file.
11. **Laboratory test codes** – Each laboratory has its own code originating from instrumentation or the LIS to describe each test the laboratory performs. These test codes vary from laboratory to laboratory, for example, when testing for glucose, one laboratory system might issue results for "glu," another for "test 29," and another for "glucose, serum."
12. **CAP Codes** – A master list of standardized clinical laboratory test codes that correspond to a single PT result. Each CAP code encompasses information including the analyte being tested, the unit of measure of the test result, and the specimen matrix (eg, blood or urine).
13. **Test code mapping** – A setup step performed in the hub during which the laboratory matches the codes it uses to describe each test that it performs to the corresponding CAP codes. This ensures that each result transmitted to the CAP is accurately reported and captured on the result form in e-LAB Solutions Suite.

APPENDIX

Alternate Methods for Mapping CAP Codes

Method 2: Download the CAP mapping codes to spreadsheet and match to your laboratory's test codes

With this option, map codes in a CSV file and upload it to the hub.

*A CSV file is a data file format that allows for the transfer of data from one program/application to another. In the case of PT direct transmission, a CSV file allows for data transfer between your laboratory's LIS and the hub.

Step	Instructions
1	Go to cap.org and click Access e-LAB Solutions Suite . Log in, then click Set-up Direct Transmission .
2	Hover over the Administration tab and click Test Code Mapping .
3	Click Export to CSV . <i>Note:</i> If you used sorting feature to filter the CAP codes, only the data meeting the filter criteria will be exported.

Test Code Mapping

All Activities
Administration
Reports

CAP Program Description: All

Lab Test Description:

CAP Test Description:

Lab Test Code:

CAP Mapping Code:

Specimen Type:

Status: All

CAP #:

Search

Clear

3

[Export to CSV](#)

[Refresh CAP Test Code](#)

[Upload Mapped File](#)

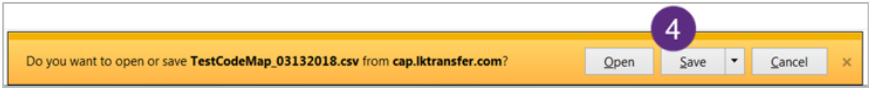
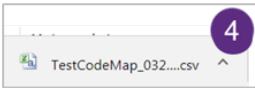
[ADD TEST CODES](#)

[UPLOAD TEST CODES](#)

CAP Test Description	CAP Program Description	CAP Mapping Code	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
% Inhibition	CGS5	CAP123	%					
11-deoxycortisol	Y	CAP456	nmol/L					
11-deoxycortisol	Y	CAP789	ng/mL					
17-hydroxycorticosteroids	N	CAP1011	mg/L					
17-hydroxyprogesterone	Y	CAP1213	ng/dL					
17-	Y	CAP1415	nmol/L					

*Data is for illustrative purposes only.



Step	Instructions
4	<p>Save the exported CSV file.</p> <p>Internet Explorer users: Click Save.</p>  <p>Google Chrome users: Once the file downloads, click the file to open it.</p>  <p>Click Save to save the exported CSV file.</p> <p><i>Note:</i> The default CSV file name is TestCodeMap_date of export.csv. You will access this file to map your test codes to the CAP codes, then uploading the file back into the hub. You may rename the file.</p>



Step Instructions

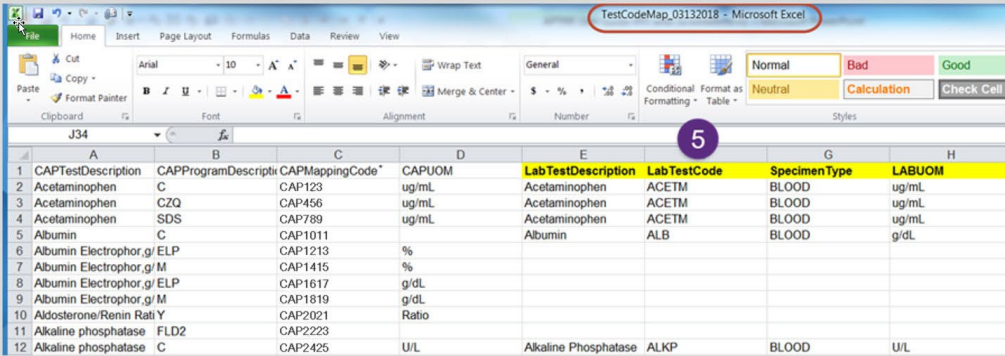
- 5** Open the file in Excel and enter your laboratory's test description, test code, specimen type, and UOM into the corresponding **LabTestDescription**, **LabTestCode**, **SpecimenType**, and **LABUOM** columns.

After you've entered all your data, **save** the file.

Important:

Do **not** change (rename) the column headings.

Do **not** reorder the columns. The columns in your CSV file must **EXACTLY** match the column headings you see below. If your columns are different, the upload of mapped test codes will fail.



	A	B	C	D	E	F	G	H
	CAPTestDescription	CAPProgramDescription	CAPMappingCode*	CAPUOM	LabTestDescription	LabTestCode	SpecimenType	LABUOM
1	Acetaminophen	C	CAP123	ug/mL	Acetaminophen	ACETM	BLOOD	ug/mL
2	Acetaminophen	CZQ	CAP456	ug/mL	Acetaminophen	ACETM	BLOOD	ug/mL
3	Acetaminophen	SDS	CAP789	ug/mL	Acetaminophen	ACETM	BLOOD	ug/mL
4	Albumin	C	CAP1011		Albumin	ALB	BLOOD	g/dL
5	Albumin Electrophor. g/ELP		CAP1213	%				
6	Albumin Electrophor. g/M		CAP1415	%				
7	Albumin Electrophor. g/ELP		CAP1617	g/dL				
8	Albumin Electrophor. g/M		CAP1819	g/dL				
9	Aldosterone/Renin Ratio		CAP2021	Ratio				
10	Alkaline phosphatase	FLD2	CAP2223					
11	Alkaline phosphatase	C	CAP2425	U/L	Alkaline Phosphatase	ALKP	BLOOD	U/L
12								

*Data is for illustrative purposes only.

Optional: You may delete any rows related to tests that are listed but your laboratory does not perform.

Note: You only have to map one instance of a CAP Mapping Code and the upload process will populate the code for all programs associated with that code.



Step Instructions

- 6 Go back to the **Test Code Mapping** screen on the hub and click **Upload Mapped File**.

CAP Test Description	CAP Program Description	CAP Mapping Code *	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
% Inhibition	CG55	CAP123	%					
11-deoxycortisol	Y	CAP345	nmol/L					
11-deoxycortisol	Y	CAP789	ng/mL					
17-hydroxycorticosteroids	N	CAP1011	mg/L					
17-hydroxyprogesterone	Y	CAP1213	ng/dL					
17-hydroxyprogesterone	Y	CAP1415	nmol/L					
17-ketosteroids	N	CAP1617	mg/L					

*Data is for illustrative purposes only.

- 7 Click **Browse** and select the mapped CSV file.

Upload CSV File

CAP #: 7201

CSV File Name: Choose File No file chosen

- Only **CSV** file format is allowed to upload.
- Data format must be:
CAPTestDescription, CAPProgramDescription, CAPMappingCode, CAPUOM, LabTestDescription, LabTestCode, SpecimenType, LABUOM
- Please note that when CAP UOM and Lab UOM do not match and if conversion factor is available, we will automatically convert the test (analyte) results to CAP UOM. Review the [list of UOM conversions](#).
- Be sure to review test (analyte) results in Results Form Data Entry (e-LAB Solutions Suite).

☒ I have read and agreed to the conversions.

Submit

- 8 Read the UOM conversion disclaimer. If you agree to the conditions, click the “**I have read and agreed to the conversions.**” checkbox.



Step Instructions

- 9 Click **Submit**. You'll see the laboratory data you mapped in the CSV file on the right side of the screen as shown below.

CAP Test Description	CAP Program Description	CAP Mapping Code*	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions	
Albumin	C	CAP123	g/dL	ALBUMIN (BKR)	12300243	Blood	g/dL	Unmap	Edit
Albumin	FLD	CAP456	g/dL	ALBUMIN (BKR)	12300243	Blood	g/dL	Unmap	Edit
Albumin	M	CAP789	g/dL	ALBUMIN (BKR)	12300243	Blood	g/dL	Unmap	Edit
CA 125	TM	CAP1011	U/mL	AMPHETAMINE/METHAMPHETAMINE URINE (BKR)	12300353	Urine, Unspecified Source		Unmap	Edit
Glucose	AQI	CAP1213	mg/dL	GLUCOSE (BKR)	12301830	Serum	mg/dL	Unmap	Edit
Glucose	C	CAP1415	mg/dL	GLUCOSE (BKR)	12301830	Serum	mg/dL	Unmap	Edit
Glucose	CZQ	CAP1617	mg/dL	GLUCOSE (BKR)	12301830	Serum	mg/dL	Unmap	Edit
Glucose	FLD	CAP1819	mg/dL	GLUCOSE (BKR)	12301830	Serum	mg/dL	Unmap	Edit
Glucose	M	CAP2021	mg/dL	GLUCOSE (BKR)	12301830	Serum	mg/dL	Unmap	Edit

*Data is for illustrative purposes only.

Method 3: Manually add and match your laboratory's test codes to CAP mapping codes in the hub.

Follow these steps to manually enter your laboratory's test codes and then map them to the CAP Test Codes.



Step

Instruction

1

Go to cap.org and click Access e-LAB Solutions Suite. Log in, then click Set-up Direct Transmission.

Hover over the Administration tab and click **Test Code Mapping**.

Click **Add Test Codes**.

CAP Test Description	CAP Program Description	CAP Mapping Code	CAP UOM	Lab Test Description	Lab Test Code	Specimen Type	Lab UOM	Actions
% Inhibition	CGS5	CAP123	%					
11-deoxycortisol	Y	CAP456	nmol/L					
11-deoxycortisol	Y	CAP789	ng/mL					
17-hydroxycorticosteroids	N	CAP1011	mg/L					

*Data is for illustrative purposes only.

2

Enter the **Lab Test Code**, **Lab Test Description**, **Specimen Type** and **Lab UOM** for each test you want to map to a CAP test code.

If you need additional lines to enter more codes, click **Add**.

Lab Test Code	Lab Test Description	Specimen Type	Lab UOM
ALB	Albumin	Serum	u/l
CL	Chloride	Serum	mmol/L
COAM	Cortisol AM	Serum	mcg/dL
COPM	Cortisol PM	Serum	mcg/dL
CPK	CPK, Total	Serum	Units/L

3

Click **Save**.