



HL7 Generator Tool Overview (CSV File Input)

Version 20200921

Version number	Changes made
20200921	<i>Added capability to customize the file name (Step 5 to Step 5A and 5B) Updated notes around replacement value handling</i>
20201016	<i>Updated instructions to explain how testing lab / reporting facility information is used. Updated instructions to clarify which element in the csv file is used as the look up in the Local Code column on the DropDownValues tab Updated instructions to indicate how to deal with assigning authority</i>
20201125	<i>Added note about use of only the first row per specimen for comments Added Mapping table for content in the COVID-19 LIVD file to specific csv file columns</i>



This tool is built into Microsoft Excel and has various tabs, some of which are for data input and some of which are for configuration data.

Note: When you have to update to a new version of the tool it is recommended to copy over the entire tabs EXCEPT for the Admin tab - copy only your settings (values in Column B) over to it.

Description of Tabs in the HL7 Generator Tool

Instructions Tab: Contains overall instructions and buttons to execute the generation

Gap_Analysis_7-8 Tab: Contains the overall data guidance/constraints provided by CDC and HHS on 7/8/2020

Flatfile_Result_Use Tab: Data entry tab which allows the user to manually enter data into the required fields to generate an HL7 v.2.5.1 compliant message. This provides the file layout and column headers that the imported file must contain – the tab itself is not used when using csv file input option. Column header order is not important when creating the csv input file; the column header names are not case sensitive.

In order to help with population of some of the content use the following table to extract related information for the specific test you are performing using the COVID-19 LIVD file accessible here: <https://www.cdc.gov/csels/dls/sars-cov-2-livd-codes.html>

Column Header in Flatfile HL7 Generator	LIVD Column Name	LIVD Column ID	Comment
Ordered_test_code	LOINC Order Code	H	This is the preferred value to use in the Ordered_test_code column in the csv file and also populate column C in the DropDownValues tab, so that the lookup can properly work to include the version number
Ordered_test_description	LOINC Order Code Long Name	I	



Column Header in Flatfile HL7 Generator	LIVD Column Name	LIVD Column ID	Comment
Ordered_test_code_system	Not explicitly in the LIVD file, but can be assumed by the column header name - should be set to "LN"		
Specimen_type_code	Vendor Specimen Description the first element in the () - a numeric value in most cases.	D	This is the preferred value to use in the Specimen_type_code column in the csv file and also populate column C in the DropDownValues tab, so that the lookup can properly work to include the version number
Specimen_type_description	Vendor Specimen Description the second element in the () - text	D	
Specimen_type_code_system	Vendor Specimen Description the third element in the () - "SCT" in most cases	D	
Test_kit_EUA_ID	Testkit Name ID, when Testkit Name ID Type = "EUA"	M and N	Use the content of this column and append _<Testkit Name ID Type>, so in this case _EUA
Test_kit_model_ID	Testkit Name ID, when Testkit Name ID Type = "DIT"	M and N	Use the content of this column and append _<Testkit Name ID Type>, so in this case _DIT
Test_kit_model_name	Testkit Name ID, when Testkit Name ID Type = "MNT" or "MNM"	M and N	Use the content of this column and append _<Testkit Name ID Type>, so in this case _MNT
Instrument_model_ID	Equipment UID, when Equipment UID Type = "DII"	O and P	Use the content of this column and append _<Testkit Name ID Type>, so in this case _DII



Column Header in Flatfile HL7 Generator	LIVD Column Name	LIVD Column ID	Comment
Instrument_model_name	Equipment UID, when Equipment UID Type = "MNI"	O and P	Use the content of this column and append _<Testkit Name ID Type>, so in this case _MNI
Test_performed_code	LOINC Code	F	This is the preferred value to use in the Test_performed_code column in the csv file and also populate column C in the DropDownValues tab, so that the lookup can properly work to include the version number
Test_performed_description	LOINC Long Name	G	
Test_performed_code_system	Not explicitly in the LIVD file, but can be assumed by the column header name - should be set to "LN"		
Test_result_coded	Vendor Result Description the first element in the () - a numeric value in most cases.	E	This is the preferred value to use in the Test_result_coded column in the csv file and also populate column C in the DropDownValues tab, so that the lookup can properly work to include the version number
Test_result_description	Vendor Result Description the second element in the () - text	E	
Test_result_code_system	Vendor Result Description the third element in the () - "SCT" in most cases	E	

Configuration Tab: Contains two parts that determine data mapping for each message generated by the tool.

1. Static values to be included in specific data fields for all messages generated



- a. If Column E – “Corresponding input column name (to replace if empty)” is populated, the tool will only populate this entry if the corresponding input column is empty. (e.g. for reporting_facility_id – if the csv file has values the tool will use those, if those cells are blank, the tool will use the value from the configuration tab in cell B11. This means: If you are reporting only for one facility you can use the configuration tab values and don’t need ot populate the cells in the csv file, but if you are reporting for many different testing sites, you should only use the csv cell values and leave the configuration cells blank, so that you get an error, when csv file data is missing).
2. References that map valid values from the dropdownvalues tab to the HL7 replacement value for each column configured. The dropdowns are manually configured to the data input fields on the Flatfile_Result_Use tab using data validation.

dropDownValues Tab: Defines specific value sets that are valid for certain HL7 elements and fields. Referenced by Configuration Tab and Flatfile_Result_Use Tab and allows for mapping local codes used in the csv file coded columns (e.g. test_performed_code) that is being imported to the standard codes to be included in the HL7 messages. If the lookup of the local value fails, it will then check to see if the input is in column D (Standard code). If it matches the value in Column D, it will map the replacement value to the HL7 message for that field, if it does not match, the file will error.

Admin Tab: Defines overall flat file configuration (input/output directories for processing, flatfile naming parameters) as well as validations and lookups to be used for various fields

For a video of this section see (The video uses the previous version of the tool, so if some screens look different don’t despair – the screenshots in this document show the updated views): <https://youtu.be/3SdD0D4vPwQ>



Summary of Steps to Generate HL7 Output Files from CSV Input File

Setting up the tool

Step 1: Set up folder structures for files

Step 2: Open the HL7 Generator Tool

Step 3: In *Admin tab*, specify file directory paths

Step 4: In *Admin tab*, specify 'Test' or 'Prod'

Step 5A: For AIMS Routing Service: In *Admin tab*, select “InterPartner” in Cell B13 and specify the *Interpartner “From”* Value in Cell B16, which will be the ID assigned to your organization by the AIMS team.

Step 5B: For direct connections with jurisdictions: In *Admin tab*, select the desired file naming schema in Cell B13 and enter the specific requirements for the jurisdiction you are working with in Cell B14.

Step 6: In *Admin tab*, specify the .csv file name for the tool to look for in the “Input” file directory path

Step 7: In *Admin tab*, specify the delimiter character to note multiple values (repeats) in a single segment.

Step 8: Take test file (named to input filename specified in Step 6) and put in “Input” file directory

Step 9: In *Instructions tab*, click “Process CSV and Generate HL7” button to generate test output

Step 10: In *Configuration tab*, populate static meta-data values.

Step 11: In *dropDownValues tab*, map local lab values to standard values for use in HL7; this includes demographic data, test related data and assigning authority identification

Step 12: In *Configuration tab*, ensure that all standard HL7 values from *dropDownValues tab* are represented in the bottom half of the tab

For videos of the above steps see here (The video uses the previous version of the tool, so if some screens look different don't despair – the screenshots in this document show the updated views):

<https://youtu.be/5ZEK1JXRN5c>



https://youtu.be/6_6v4cCv7y0

Creating the CSV file

Step 13: In *Gap Analysis* tab, view minimum required fields and indicate fields that your lab supports; if your lab is missing required fields, those will either need to be added or default values will need to be defined.

Step 14: Create CSV file for input

Step 15: Validate the csv file using the flat file validator tool: <https://validator.aimsplatform.org/> (select the Flatfile Validator),

Step 16: Take CSV file (named to input filename specified in Step 6) and put in “Input” file directory

Step 17: In *Instructions* tab, click “Process CSV and Generate HL7” button to generate output

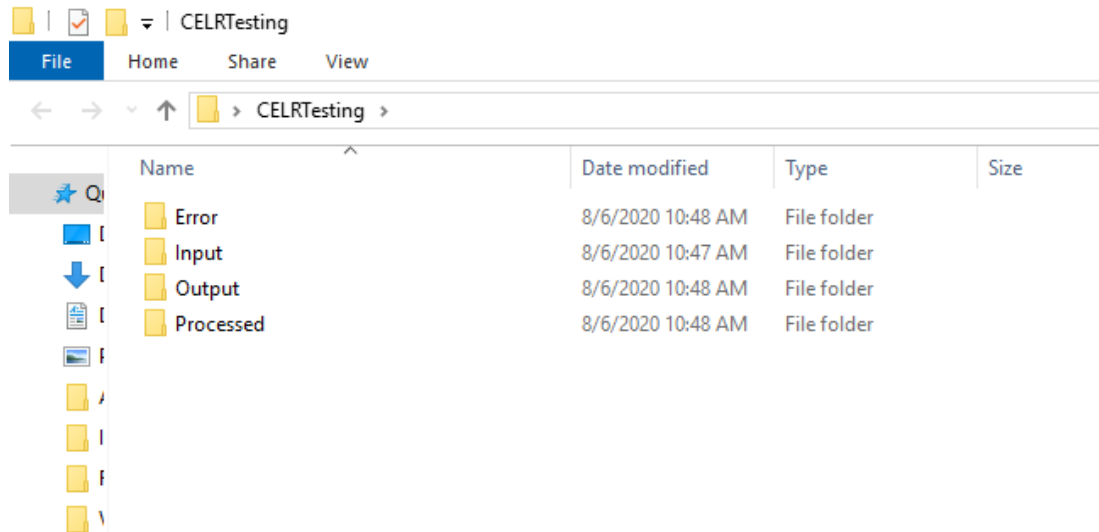
Step 18: Automation of the csv file conversion process

For a video of the above steps see here (The video uses the previous version of the tool, so if some screens look different don’t despair – the screenshots in this document show the updated views): <https://youtu.be/Ryp2z1MZIKg>

Detailed Steps to Generate HL7 Output Files from CSV Input File

Setting up the tool

Step 1: Create a folder structure (suggested on Desktop of your Computer) with four folders: Input, Output, Processed, Error. Write down the full paths of each of the folders.



Step 2: Open the HL7 Generator tool Excel file (*NatELRFlatFile_GapAnalysis_HL7Generator.xlsx*). Enable all content and macros. Click on “Save As” and add your own unique filename to save your specific configurations separate from the base tool file (i.e. *NatELRFlatFile_GapAnalysis_HL7Generator_Testing.xlsx*).

Step 3. Go to the *Admin* tab of the tool. Note that Config items highlighted in orange on the *Admin* tab are the fields that need to be configured. Enter the full directory paths for the Input, Output, Processed and Error Directories from Step 1.

Please note that the tool can process files automatically that are placed in a network drive. Please contact informatics.support@aphl.org to discuss configuration and other necessary considerations for optimal processing performance.



File Home Insert Page Layout Formulas Data Review View ACROBAT Tell me what you want to do...				
PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. Enable Editing				
G34 X ✓ fx REQUIRED_COMBO_4				
	A	B	C	
1	Config Item	Value	Description	FlatFile_Co
2	Input Directory	C:\runMacro\test1\Input		Abnormal flag
3	Output Directory	C:\runMacro\test1\Output		Comments
4	Processed Directory	C:\runMacro\test1\Processed		Date_result_rel
5	Error Directory	C:\runMacro\test1>Error		Disease_symp
6	FlatFile_order_use column to count rows	A		Employed in h
7	FlatFile_Result_Use final column	DP		Employed in h
8				First test
9	Timer on	FALSE		flatfile version
10	Number of Errors before exit	0		Hospitalized
11	Include Batch header and footer	TRUE		ICU
12				Illness_onset_d
13	File Naming option	ManualAndTimeStamp		Instrument ins
14	Manual file Name	ELR~		Instrument mc
15	Current Usage (and MSH-11 mapping)	Prod		Instrument mc
16	InterPartner "From" value	eTrueNorth		Link test to ps
17	InterPartner "To" value	AIMSPlatform		Link test to ps
18	Test result exclude from normal processing	Test_kit_EUA_ID,Test_kit_model_ID,Test_kit_model_name,Test_result_code_system,Tes		Order result s
19	Multiple value separator	;		Order test dat
20	Input file name	csvToConvert.csv		Ordered test c
21	Debug mode	FALSE		Ordered test c
22	Time zone	ET		Ordered test c
23				Ordering facilit

Step 4: On the *Admin* tab, select the appropriate value (Test or Prod) from the drop down for the field *Current Usage (and MSH-11 mapping)*.



File Home Insert Page Layout Formulas Data Review View ACROBAT Tell me what you want to do...			
PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. Enable Editing			
G34 X ✓ fx REQUIRED_COMBO_4			
	A	B	C
1	Config Item	Value	Description
2	Input Directory	C:\runMacro\test1\Input	Abnormal_flag
3	Output Directory	C:\runMacro\test1\Output	Comments
4	Processed Directory	C:\runMacro\test1\Processed	Date_result_rel
5	Error Directory	C:\runMacro\test1>Error	Disease_symp
6	FlatFile_order_use column to count rows	A	Employed_in_h
7	FlatFile_Result_Use final column	DP	Employed_in_h
8			First_test
9	Timer on	FALSE	flatfile_version
10	Number of Errors before exit	0	Hospitalized
11	Include Batch header and footer	TRUE	ICU
12			Illness_onset_d
13	File Naming option	ManualAndTimeStamp	Instrument_ins
14	Manual file Name	ELR~	Instrument_mc
15	Current Usage (and MSH-11 mapping)	Prod	Instrument_mc
16	InterPartner "From" value	eTrueNorth	Link_test_to_pa
17	InterPartner "To" value	AIMSPlatform	Link_test_to_pa
18	Test result exclude from normal processing	Test_kit_EUA_ID,Test_kit_model_ID,Test_kit_model_name,Test_result_code_system,Tes	Order_result_s
19	Multiple value separator	;	Order_test_dat
20	Input file name	csvToConvert.csv	Ordered_test_c
21	Debug mode	FALSE	Ordered_test_c
22	Time zone	ET	Ordered_test_c
23			Ordering_facili

Step 5A: Setting up for Use of InterPartner file naming convention: On the *Admin* tab, in Cell B13 select InterPartner.



NatELRFlatFile_GapAnalysis_HL7Generator_20200921 [Protected View] - Excel

PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. [Enable Editing](#)

B13 ManualAndTimeStamp

	A	B	C	D
1	Config Item	Value	Description	FlatFile_Column
2	Input Directory	C:\runMacro\test1\input		Abnormal_flag
3	Output Directory	C:\runMacro\test1\Output		Comments
4	Processed Directory	C:\runMacro\test1\Processed		Date_result_relea
5	Error Directory	C:\runMacro\test1\Error		Disease_symptom
6	FlatFile_order_use column to count rows	A		Employed_in hea
7	FlatFile_Result_Use final column	DP		Employed_in high
8				First test
9	Timer on	FALSE		flatfile_version_ne
10	Number of Errors before exit	0		Hospitalized
11	Include Batch header and footer	TRUE		ICU
12				Illness onset date
13	File Naming option	ManualAndTimeStamp		Instrument instar
14	Manual file Name	InterPartner		Instrument_mode
15	Current Usage (and MSH-11 mapping)	InputFileNameOnly		Instrument_mode
16	InterPartner "From" value	Manual		Link_test_to_pare
17	InterPartner "To" value	ManualAndTimeStamp		Link_test_to_pare
18	Test result exclude from normal processing	ManualAndInputFileName		Order_result_stat
19	Multiple value separator	ManualAndInputFileNameAndTimeStamp		Order_test_date
20	Input file name	;		Ordered_test_cod
21	Debug mode	FALSE		Ordered_test_cod
22	Time zone	ET		Ordered_test des
23				Ordering facility

On the *Admin* tab, in Cell B16 *Interpartner "From" Value*, input the appropriate value for your organization (example below shows "eTrueNorth"), which will be the ID assigned to your organization by the AIMS team. For more information about setting up the Interpartner filename follow instructions in ["AIMS - CentralizedELR InterPartner Messaging Guide"](#) This step is important when using AIMS routing services.



File Home Insert Page Layout Formulas Data Review View ACROBAT Tell me what you want to do...			
PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. Enable Editing			
G34 X ✓ fx REQUIRED_COMBO_4			
	A	B	C
1	Config Item	Value	Description
2	Input Directory	C:\runMacro\test1\Input	FlatFile_Co
3	Output Directory	C:\runMacro\test1\Output	Abnormal flag
4	Processed Directory	C:\runMacro\test1\Processed	Comments
			Date_result_re
5	Error Directory	C:\runMacro\test1\Error	Disease_symp
6	FlatFile_order_use column to count rows	A	Employed in h
7	FlatFile_Result_Use final column	DP	Employed in h
8			First test
9	Timer on	FALSE	flatfile_version
10	Number of Errors before exit	0	Hospitalized
11	Include Batch header and footer	TRUE	ICU
12			Illness_onset_d
13	File Naming option	ManualAndTimeStamp	Instrument ins
14	Manual file Name	ELR~	Instrument mc
15	Current Usage (and MSH-11 mapping)	Prod	Instrument mc
16	InterPartner "From" value	eTrueNorth	Link test to pa
17	InterPartner "To" value	AIMSPlatform	Link test to pa
18	Test result exclude from normal processing	Test_kit_EUA_ID,Test_kit_model_ID,Test_kit_model_name,Test_result_code_system,Tes	Order_result s
19	Multiple value separator	;	Order test dat
20	Input file name	csvToConvert.csv	Ordered test c
21	Debug mode	FALSE	Ordered test c
22	Time zone	ET	Ordered test c
23			Ordering facili

Step 5B: Setting up for Use of other file naming conventions: *When working directly with a jurisdiction they may have other requirements for file naming conventions, which can be configured using cell B14 in the Admin tab.*



File Home Insert Page Layout Formulas Data Review View ACROBAT Tell me what you want to do...			
PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. Enable Editing			
G34 X ✓ fx REQUIRED_COMBO_4			
	A	B	C
1	Config Item	Value	Description
2	Input Directory	C:\runMacro\test1\Input	Abnormal_flag
3	Output Directory	C:\runMacro\test1\Output	Comments
4	Processed Directory	C:\runMacro\test1\Processed	Date_result_rel
5	Error Directory	C:\runMacro\test1>Error	Disease_symptoms
6	FlatFile_order_use column to count rows	A	Employed_in_h
7	FlatFile_Result_Use final column	DP	Employed_in_h
8			First_test
9	Timer on	FALSE	flatfile_version
10	Number of Errors before exit	0	Hospitalized
11	Include Batch header and footer	TRUE	ICU
12			Illness_onset_d
13	File Naming option	ManualAndTimeStamp	Instrument_ins
14	Manual file Name	ELR~	Instrument_ma
15	Current Usage (and MSH-11 mapping)	Prod	Instrument_ma
16	InterPartner "From" value	eTrueNorth	Link_test_to_pe
17	InterPartner "To" value	AIMSPlatform	Link_test_to_pe
18	Test result exclude from normal processing	Test_kit_EUA_ID,Test_kit_model_ID,Test_kit_model_name,Test_result_code_system,Test	Order_result_st
19	Multiple value separator	,	Order_test_dat
20	Input file name	csvToConvert.csv	Ordered_test_c
21	Debug mode	FALSE	Ordered_test_c
22	Time zone	ET	Ordered_test_c
23			Ordering_facilit

Cell B13 in the *Admin* tab allows selection of one of 4 basic file naming schemes:

- Manual – where the filename is defined in the *Admin* tab in cell B14
- Manual with timestamp – uses the value from cell B14 in *Admin* tab and appends with the file creation date and time
- Manual with the name of the input file – uses the value from cell B14 in *Admin* tab and appends with the file name defined in cell B20
- Manual with the name of the input file and timestamp– uses the value from cell B14 in *Admin* tab and appends with the file name defined in cell B20 and the file creation date and time



NatELRFlatFile_GapAnalysis_HL7Generator_20200921 [Protected View] - Excel

File Home Insert Page Layout Formulas Data Review View ACROBAT Tell me what you want to do...

PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. Enable Editing

B13 ManualAndTimeStamp

Config Item	Value	Description	FlatFile_Column
Input Directory	C:\runMacro\test1\input		Abnormal flag
Output Directory	C:\runMacro\test1\Output		Comments
Processed Directory	C:\runMacro\test1\Processed		Date result relea
Error Directory	C:\runMacro\test1\Error		Disease symptom
FlatFile_order_use column to count rows	A		Employed in hea
FlatFile_Result_ Use final column	DP		Employed in high
Timer on	FALSE		First test
Number of Errors before exit	0		flatfile_version nc
Include Batch header and footer	TRUE		Hospitalized
			ICU
			Illness_onset date
File Naming option	ManualAndTimeStamp		Instrument instar
Manual file Name	InterPartner		Instrument_mode
Current Usage (and MSH-11 mapping)	InputFileNameOnly		Instrument_mode
InterPartner "From" value	InputFileNameAndTimeStamp		Link_test_to_pare
InterPartner "To" value	Manual		Link_test_to_pare
Test result exclude from normal processing	ManualAndTimeStamp		Link_test_to_pare
Multiple value separator	ManualAndInputFileName		Order result statu
Input file name	ManualAndInputFileNameAndTimeStamp	_name,Test_result_code_system,Tes	Order result statu
Debug mode	FALSE		Order test date
Time zone	ET		Ordered_test_cod
			Ordered_test_cod
			Ordered_test des
			Ordering facility

On the *Admin* tab, note that Columns D-K contains the logic by which the different data fields are read, transformed and output to the flat file. Please do not change these columns or the tool macros may break.

On the Admin tab, the fields “Timer on” , “Number of Errors before exit” and “Debug mode” should be used by developers or those trained with the macro to perform integration testing. This is documented in “Developer Instructions”. By default “Timer on” and “Debug Mode” should be set to “FALSE” and “Number of Errors before exit” should be set to 0.

If you notice any issues please contact AIMS Technical Assistance at informatics.support@aphl.org.

Step 6: In *Admin* tab, specify the .csv file name for the tool to look for in the “Input” file directory path. Note that the input CSV file that you use MUST be named this or the tool will not process it. Note that Config items highlighted in orange on the *Admin* tab are the fields that need to be configured.



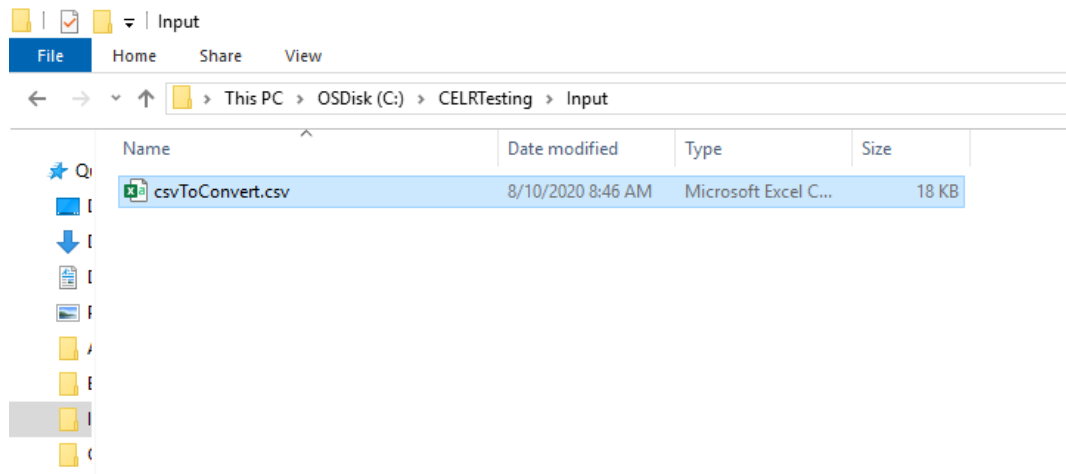
File Home Insert Page Layout Formulas Data Review View ACROBAT Tell me what you want to do...			
PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. Enable Editing			
G34			REQUIRED_COMBO_4
	A	B	C
1	Config Item	Value	Description
2	Input Directory	C:\runMacro\test1\Input	Abnormal_flag
3	Output Directory	C:\runMacro\test1\Output	Comments
4	Processed Directory	C:\runMacro\test1\Processed	Date_result_rel
5	Error Directory	C:\runMacro\test1>Error	Disease_sympt
6	FlatFile_order_use column to count rows	A	Employed_in_h
7	FlatFile_Result_Use final column	DP	Employed_in_h
8			First_test
9	Timer on	FALSE	flatfile_version
10	Number of Errors before exit	0	Hospitalized
11	Include Batch header and footer	TRUE	ICU
12			Illness_onset_d
13	File Naming option	ManualAndTimeStamp	Instrument_ins
14	Manual file Name	ELR~	Instrument_mo
15	Current Usage (and MSH-11 mapping)	Prod	Instrument_mo
16	InterPartner "From" value	eTrueNorth	Link_test_to_pa
17	InterPartner "To" value	AIMSPlatform	Link_test_to_pa
18	Test result exclude from normal processing	Test_kit_EUA_ID,Test_kit_model_ID,Test_kit_model_name,Test_result_code_system,Tes	Order_result_st
19	Multiple value separator	;	Order_test_dat
20	Input file name	csvToConvert.csv	Ordered_test_c
21	Debug mode	FALSE	Ordered_test_c
22	Time zone	ET	Ordered_test_d
23			Ordering_facilit

Step 7: In *Admin* tab, specify the delimiter character to note multiple values (repeats) in a single field. Note that the default character used is a semicolon (;). Use this delimiter to list multiple values in the Disease_symptoms column. In the output, each value will be mapped to a separate OBX segment.



File Home Insert Page Layout Formulas Data Review View ACROBAT Tell me what you want to do...			
PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. Enable Editing			
G34 REQUIRED_COMBO_4			
	A	B	C
1	Config Item	Value	Description
2	Input Directory	C:\runMacro\test1\Input	Abnormal_flag
3	Output Directory	C:\runMacro\test1\Output	Comments
4	Processed Directory	C:\runMacro\test1\Processed	Date_result_rel
5	Error Directory	C:\runMacro\test1\Error	Disease_symp
6	FlatFile_order_use column to count rows	A	Employed_in_h
7	FlatFile_Result_Use final column	DP	Employed_in_h
8			First test
9	Timer on	FALSE	flatfile_version
10	Number of Errors before exit	0	Hospitalized
11	Include Batch header and footer	TRUE	ICU
12			Illness_onset_d
13	File Naming option	ManualAndTimeStamp	Instrument_ins
14	Manual file Name	ELR~	Instrument_mc
15	Current Usage (and MSH-11 mapping)	Prod	Instrument_mc
16	InterPartner "From" value	eTrueNorth	Link_test_to_pa
17	InterPartner "To" value	AIMSPlatform	Link_test_to_pa
18	Test result exclude from normal processing	Test_kit_EUA_ID,Test_kit_model_ID,Test_kit_model_name,Test_result_code_system,Tes	Order_result_s
19	Multiple value separator	;	Order_test_dat
20	Input file name	csvToConvert.csv	Ordered_test_c
21	Debug mode	FALSE	Ordered_test_c
22	Time zone	ET	Ordered_test_c
23			Ordering_familie

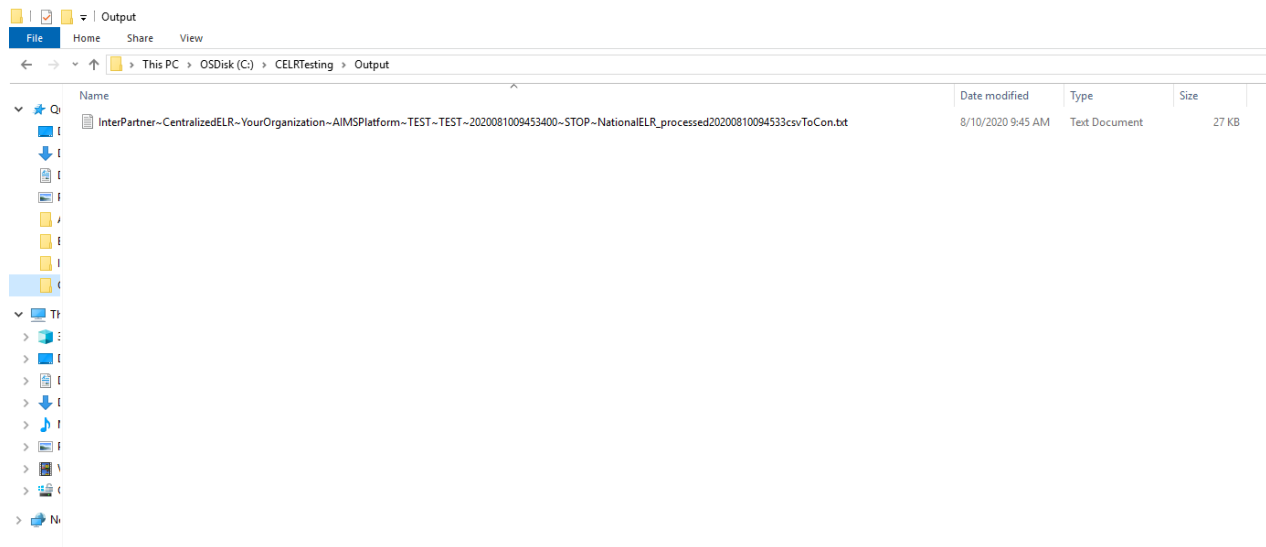
Step 8: Take the CSV file you intend to use (or a test validation CSV file provided by AIMS) and place it in the “Input” file directory that you specified in Step 3. Rename the file to the input CSV filename you specified in the *Admin* tab in Step 6 (make sure the filename matches exactly or the tool will not process it)



Step 9: Under the *Instructions* tab, click the “Process CSV and generate HL7” button to generate a test output. If a runtime error pops up, go through Steps 1 to 8 (especially Step 3 and Step 6) to ensure that all setup steps are correct. If no runtime error is generated or no message appears, the tool should take you to the *Admin* tab to the Input File Name field. Go to the Output directory set up in Step 3 to find an output file generated from the input CSV. The output is generated as an HL7 batch file. If there are errors in processing, such as missing required fields, improper data, wrong format, or lookup failure, it will not output an HL7 file and output the error file in the “Error” directory.



Output folder showing generated file:



Step 10: Go to the *Configuration* tab. The top part of the tab specifies static values that will be sent with every HL7 message generated (i.e. your lab address and CLIA number) and which fields they are mapped to in the HL7 message. If a field is left empty on the “Flatfile_Result_Use” tab, the field will be automatically populated with the appropriate value from the “Configuration” tab if column E “Corresponding input column name (to replace if empty)” is configured. Populate all fields in Column B, *Answer (local value)* that are highlighted in yellow. The tool will reference these values to populate the appropriate field when generating the HL7 message. You will need to create 1 tool file for each submitting laboratory, if you are a data aggregator. Be sure to get the right values for MSH-5 (Cells B32 and B33) and MSH-6 (Cells B34 and B35) from the jurisdiction you are working with – if you are using the AIMS routing service make sure these fields are left blank.



HL7 Generator Instructions, CSV Input, 20200102, BNA/1, 1/1/2020						
Hnat23747476, GapAnalysis, HL7Generator, updatedInstructions.docx - Excel						
Cheng, Benson						
Cheng, Benson						
Share Comments						
File Home Insert Draw Page Layout Formulas Data Review View Deloitte Tools Help Acrobat Search						
Normal Page Break Preview Page Custom Views Sub Formula Bar Zoom 100% Zoom to Selection New Window Arrange Freeze Split View Side by Side View Side by Side Synchronize Scrolling Switch Windows +						
Workbook Views Show Gridlines Headings Zoom Window All Pages + Unhide Reset Window Position Windows + Macros +						
1 Static Values Do not move these columns. The macro code references specific cells.						
2	Data on this tab is assumed to be the same for each site, where testing is performed, so could be pre-populated for manual user entry or populated automatically if entry is blank					
3	Question	Answer (local value)	More information about the question	Mapping to HL7	Corresponding input column name (to replace if empty)	Additional mapping instructions
4	Testing Laboratory Street	202 South Monroe-FromStatic		OBX-24.1	Testing_lab_street	
5	Testing Laboratory Street 2	842 11-FromStatic		OBX-24.2	Testing_lab_street2	
6	Testing Laboratory City	Little Rock-From Static		OBX-24.3	Testing_lab_city	
7	Testing Laboratory State	AR		OBX-24.4	Testing_lab_state	
8	Testing Laboratory County	55519		OBX-24.9	Testing_lab_county	
9	Testing Laboratory Zip	72205		OBX-24.5	Testing_lab_zip_code	
10	Name of the reporting facility	Public Health Laboratory, AR-FromStatic		MSH-4.1	Reporting_facility_name	MSH-4.3
11	Identifier of the reporting facility	AR-LittleRock-SPH-FromStatic	This can be a CLIA number or an OID	MSH-4.2	Reporting_facility_id	OID
12	Name of the reporting system	AR-LittleRock-SPH-FromStatic2		MSH-3.1	Report_facility_data_source_app	MSH-3.3
13	OID for the reporting system (if known)	dummyMSH2OID		MSH-3.2		OID
14	Testing Lab ID assigner	testingLabIDAssignerRequired	System id assigner for ORC-5, OBX-5, and SPM2.2			
15	Testing Lab ID assigner OID	testingLabIDAssignerOIDRequired				
16	Name of the testing laboratory	UAMC-FromStatic		OBX-23.1	Testing_lab_name	
17	CLIA number of the testing laboratory	0401044189-FromStatic		OBX-23.10	Testing_lab_id	
18	Name of the organization that assigns the Patient identifier	dummyOID	Patient_ID_assigner	PID-3.4.1-1		
19	OID of organization that assigns the Patient identifier	Public Health Laboratory, AR-FromStatic	Patient ID assigning OID	PID-3.4.2-1		
20	Name of the organization that assigns the Patient identifier	Public Health Laboratory, AR-FromStatic	Patient_ID_assigner 2	PID-3.4.1-1		
21	OID of organization that assigns the second Patient identifier	dummyOID2	Patient ID assigning OID	PID-3.4.2-1		
22	Test instrument or kit		If more than one test is performed, copy this row as often as needed	OBX-17.1		populate if OBX-17.1 empty
23	Test instrument or kit		If more than one test is performed, copy this row as often as needed	OBX-17.1		populate if OBX-17.1 empty
24	Test instrument or kit		If more than one test is performed, copy this row as often as needed	OBX-17.1		populate if OBX-17.1 empty
25	Default Specimen Type Description	Specimen of unknown material	Default value if Specimen_type_description is not populated, enter this value	SPM-4.2	Specimen_type_description	
26	Default specimen type code	118924002	Default value if not populated	SPM-4.1	Specimen_type_code	
27	Software vendor	software vendor				
28	Software version or release number	v1.2				
29	Software Name	software name				
30	Binary ID	Binary ID unknown				
31	Install date	20181208	Date in HL7 format YYYYMMDD			
32	Receiving Application Name	US-WHO Collab LabSys		MSH-5.1		
33	Receiving Application OID	2.16.840.1.114322.4.3.3.7		MSH-5.2		
34	Receiving Facility Name	CDC-EPH Surv Branch	This field can be left blank, if using the AIMS routing service	MSH-6.1		
35	Name of the health department receiving the data	2.16.840.1.114322.4.1.10418		MSH-6.2		Based on the name, look up the OID for use in MSH-6.2 and also the information
36						
37						
38						
39						
40						
41						
42						
43						

The bottom part of the *Configuration* tab refers to cells on the *dropDownValues* tab and indicates which range of dropdown values are mapped to particular HL7 fields. See next step for more details on the *dropDownValues* tab.



HL7 element / Field Name	Local Code	Standard Code
Patient_ID_type	C2 C7	
Patient_gender	C29 C33	
YAU	C273 C275	
Patient_race	C15 C20	
Patient_ethnicity	C23 C25	
Patient_state	C28 C87	
Ordering_facility_state	C28 C87	
Ordering_provider_state	C28 C87	
Testing_lab_state	C28 C87	
Ordered_test_code_system	C89 C91	
Test_result_code_system	C93 C95	
Result_status_code	C97 C100	
Specimen_type_code_system	C102 C105	
Specimen_source_site_code_sys	C107 C109	
Patient_died	C111 C112	Must have more than one in range
Patient_location	C114 C121	
Symptomatic_for_disease	C273 C275	
Disease_symptoms	C351 C351	
Patient_age_units	C134 C137	
Pregnant	C139 C142	
Abnormal_flag	C144 C161	
Ordered_test_code	C167 C169	
Test_performed_description	C176 C203	
Test_result_code	C206 C219	
Test_result_description	C206 C219	
Test_result_free_text	C206 C219	
Specimen_type	C238 C238	
Specimen_type_free_text	C238 C238	
Specimen_source_site_code	C260 C262	
Specimen_source_site_desc	C260 C262	
Order_result_status	C97 C100	
Test_result_units	C224 C236	
First_test	C273 C275	
Employed_in_high_risk_setting	C277 C292	
Patient_occupation	C294 C313	
Patient_residency_type	C318 C317	
Result_units	C300 C307	
Patient_ID_assigner	C354 C358	
Patient_ID_2_assigner	C354 C358	
Patient_county	C1100 C4245	
Ordering_facility_county	C1100 C4245	
Ordering_provider_county	C1100 C4245	
Testing_lab_county	C1100 C4245	

Step 11: The *dropDownValues* tab maps input values from your lab for certain fields that may be plaintext or locally coded to standard values to be included in the HL7 output. Note that any input values in the Column C of the *dropDownValues* tab will be replaced with corresponding values in Column G of the same row.

- On the *dropDownValues* tab, enter any transformation values for particular data fields as new rows at the bottom of the tab, if additional values are needed, else update to your local values in column C.
- Ensure that Column A, *HL7 element / Field Name* matches the name of the data column in Row 1 of the *Flatfile_Result_Use* tab.
- Also ensure that each row in Column C, *Local Code* represents all the local values that could be received from your system.
 - Notes:
 - For all coded entries the following hierarchy applies:
 - If the input value for the code (i.e. *Ordered_test_code* or *Test+performed_code*, or *Test_result_coded* or *Specimen_type_code* or *Specimen_source_site_code*) matches a value in the Local Code (Column C) or the



Standard Code(Column D) then the entire replacement value will be used and entries in the respective *_code_system fields will be ignored; if the input value does not match the values from the respective fields in the input file will be used.

- If you need to map different local codes to the same standard codes (for example Detected and D both need to be mapped to detected, then you need to create a second version of the standard code entry in column D, or the tool will not process properly (the tool uses the replacement value from Column G, so that will not affect the HL7 file output values.
- For identification of assigning authorities (so that identifiers across organizations will be unique):
 - Ensure you have local values that will be in the csv file represented in column C for these elements:
 - Patient_ID_assigner
 - If used: Submitter_sample_ID_assigner
 - Seek help in creating the replacement value in column G as an OID will be required as well as the suffix of '&ISO'
- Transformation for county values starts on row 1100 (scroll way down!) – because many counties have the same name in different states, it is recommended that you include the state in the same field (we may update the tool in the future to use a combined search, but for now) to get the right county mapped.
- Column G *Replacement Value* is the standard value that will populate and replace your local code in the output file. Verify that that this replacement value is correct. In most instances you will want to use the standard code found in Column D. For example, in the screen below, a Local Code value of “Medical Record Number” in cell C2 (yellow) will be replaced with the value of “MR” as specified in cell G2, which is the standard code populated in cell D2 (orange).



NatELRFlatFile_GapAnalysis_HL7Generator - Excel

File Home Insert Page Layout Formulas Data Review View ACROBAT Tell me what you want to do... Riki Merrick

Clipboard Font Alignment Number Styles Cells Editing

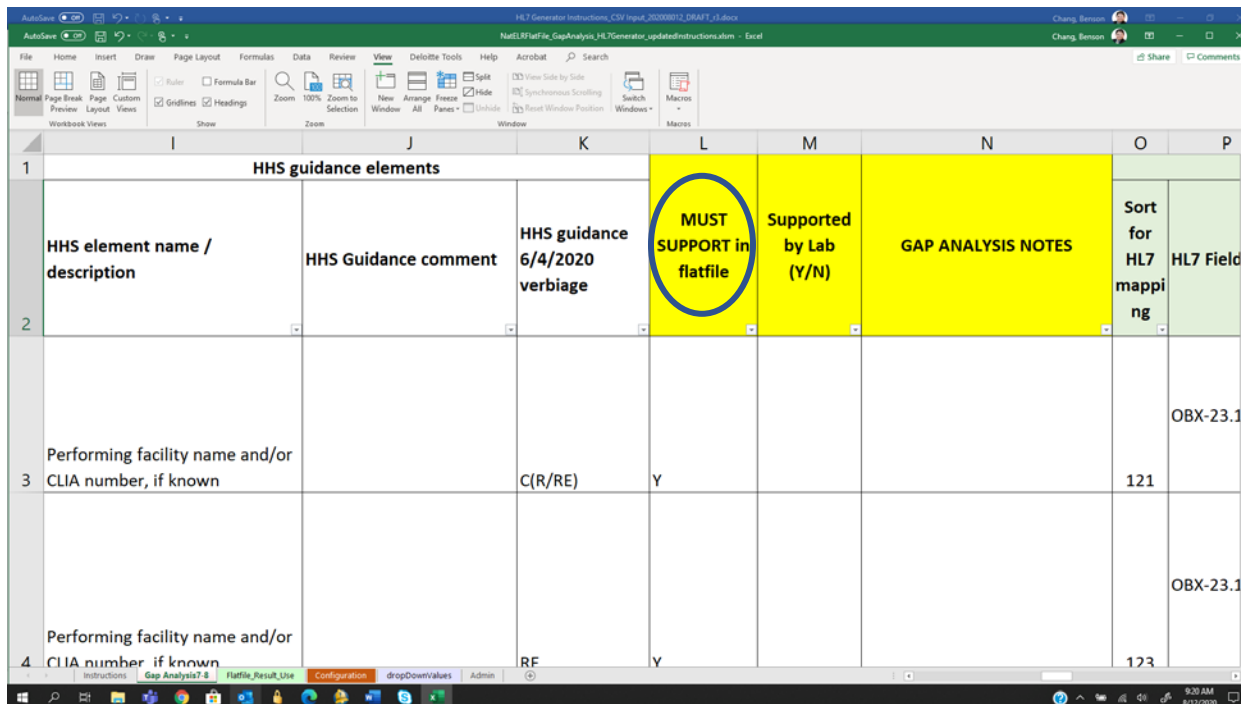
G379

HL7 element / Field name	Local Description	Local Code	Standard Code	Standard Code Description	Standard Code System	Replacement Value	Comment
Patient_ID_Type		Medical Record Number	MR	Medical Record Number		MR	
Patient_ID_Type		Specimen Identifier	SID	Specimen Identifier		SID	
Patient_ID_Type		Patient Internal ID	PI	Patient Internal ID		PI	
Patient_ID_Type		Social Security Number	SS	Social Security Number		SS	
Patient_ID_Type		Patient External ID	PT	Patient External ID		PT	
Patient_ID_Type		Public Health Case ID	PHC	Public Health Case ID		PHC	
Patient_gender		Male	M	M		M	
Patient_gender		Female	F	F		F	
Patient_gender		Other	O	O		O	
Patient_gender		Unknown	U	U		U	
Patient_gender		Ambiguous	A	A		A	
Patient_race		American Indian or Alaska Native	1002-5	American Indian or Alaska Nat	HL70005	1002-5^American Indian or Alaska Native^HL70005	
Patient_race		Asian	2028-9	Asian	HL70005	2028-9^Asian^HL70005	
Patient_race		Black or African American	2054-5	Black or African American	HL70005	2054-5^Black or African American^HL70005	
Patient_race		Native Hawaiian or Other Pacific Islander	2076-8	Native Hawaiian or Other Pacific Islander	HL70005	2076-8^Native Hawaiian or Other Pacific Islander^HL70005	
Patient_race		White	2106-3	White	HL70005	2106-3^White^HL70005	
Patient_race		Other Race	2131-1	Other Race	HL70005	2131-1^Other Race^HL70005	
Patient_race		Asked but no answer / unknown	ASKU	Asked but unknown	NULLFL	ASKU^Asked but unknown^NULLFL	
Patient_ethnicity		Hispanic or Latino	H	Hispanic or Latino	HL70189	H^Hispanic or Latino^HL70189	
Patient_ethnicity		Not-Hispanic or latino	N	Not-Hispanic or latino	HL70189	N^Not-Hispanic or latino^HL70189	
Patient_ethnicity		Unknown	U	Unknown	HL70189	U^Unknown^HL70189	
Patient_ethnicity		Asked but no answer / unknown	ASKU	Asked but unknown	NULLFL	ASKU^Asked but unknown^NULLFL	

Step 12: Once you are done entering transformation values in the *dropDownValues* tab, go back to the *Configuration* tab and ensure that all values from the *dropDownValues* tab match those listed in the bottom half of the tab. For example, it specifies that rows C15 through C20 will be input values for the field Patient_Race.

Creating the CSV file

Step 13: Go to the *Gap Analysis7-8* tab. Filter on Column L, *MUST SUPPORT in flatfile* = Y. This displays the minimum data fields that must be populated in the input and output file.



Make sure ALL comments are entered in the FIRST ROW for each specimen – the tool currently ONLY uses the data from that first row!

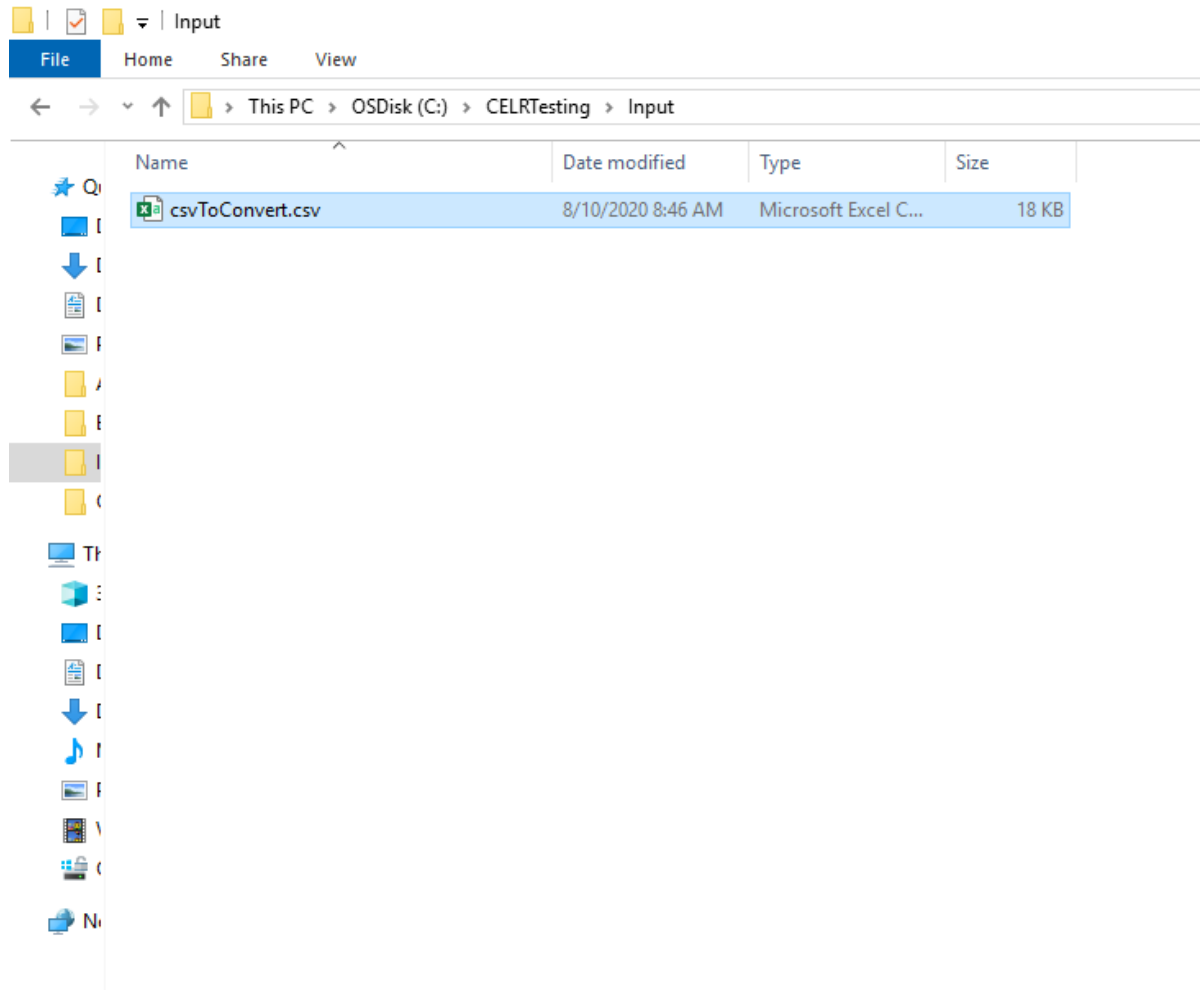
Version 20201125



Note that every column header listed on the *Gap Analysis* 7-8 tab MUST be included in the CSV file, even if your lab does not send all of the data. Column headers are not case sensitive and can be sent in any order.

Step 15: Validate the csv file using the flat file validator tool: <https://validator.aimsplatform.org/> to ensure it has all column headers, data in all required elements and that the entries are formatted correctly; if you are using standard codes the tool will also validate those values (they are under warnings). See the document *Flatfile Validator Use Instructions* for more details.

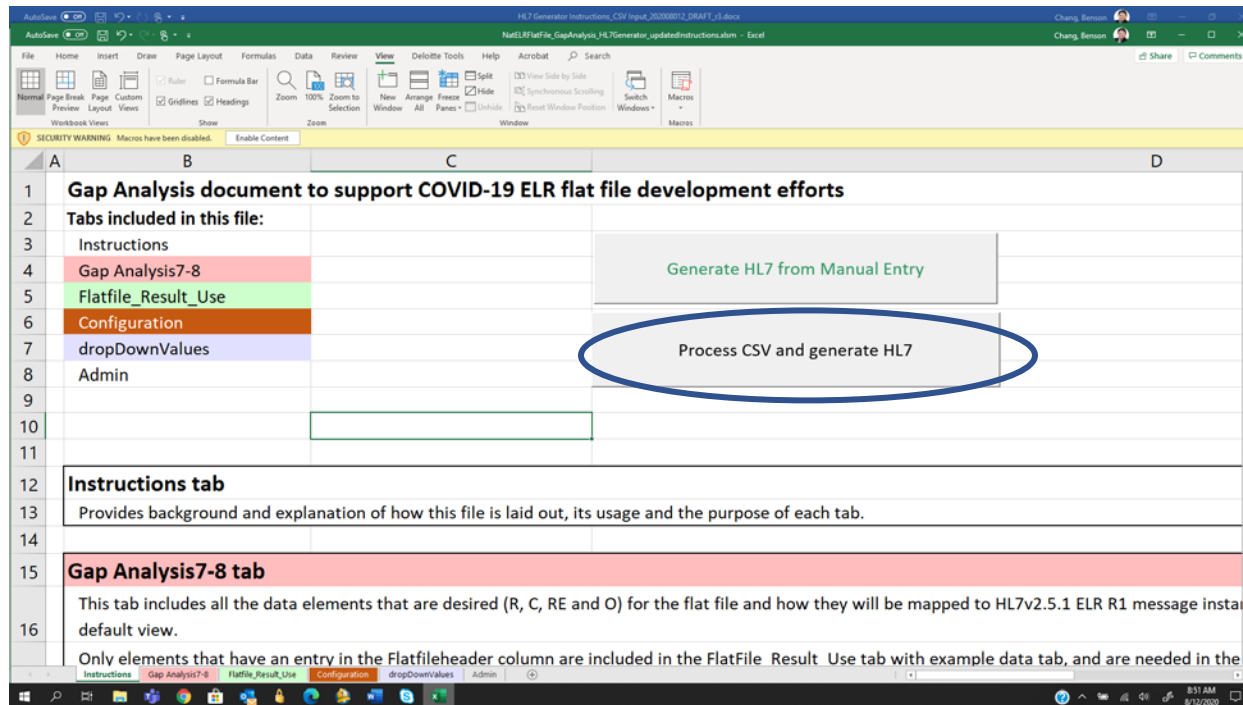
Step 16: Take the CSV file and place it in the “Input” file directory that you specified in Step 3. Rename the file to the input CSV filename you specified in the *Admin* tab in Step 6 (make sure the filename matches exactly or the tool will not process it)



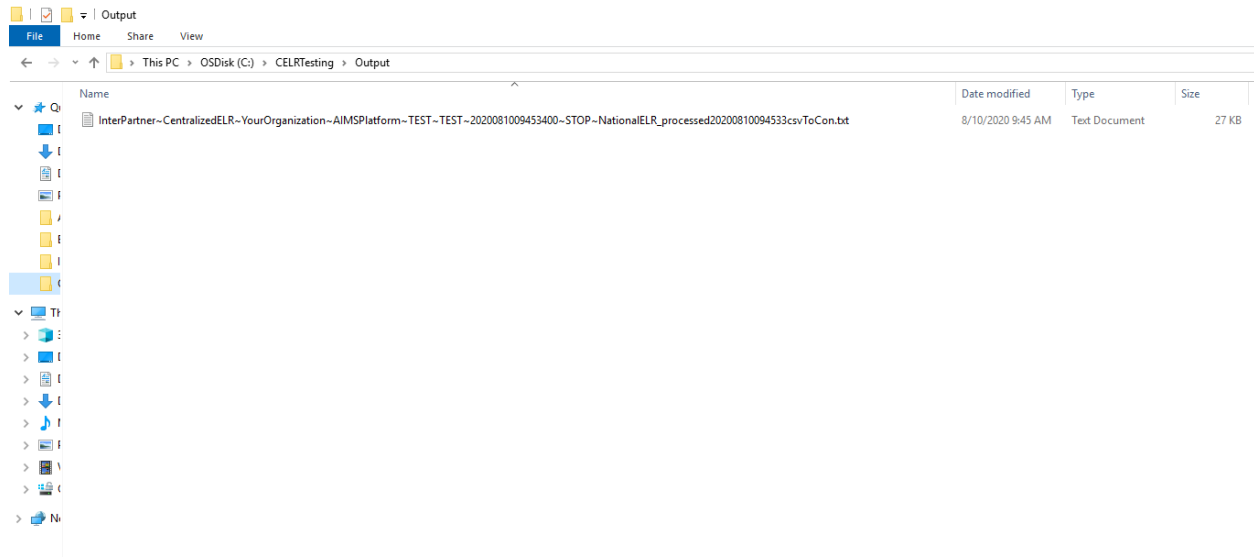
Step 17: Under the *Instructions* tab, click the “Process CSV and generate HL7” button to generate an output file. If a runtime error pops up, go through Steps 1 to 8 (especially Step 3 and Step 6) to ensure that all setup steps are correct. If no runtime error is generated or no message



appears, the tool should take you to the *Admin* tab to the Input File Name field. Go to the Output directory set up in Step 3, and you will find the output file generated from the input CSV.



Output folder showing generated file:



If the output file is not present, check the Error directory for the “NationalELRLog<timestamp>.txt” or “CSVLoadErrorLog<timestamp>.txt” for errors.

Step 18: Automation of the csv file conversion process

To automate the csv file conversion process:

1. Create a text file and change the extension of the file to “.bat”
2. The text of the batch file should be: “C:\Windows\System32\cscript.exe C:\runMacro\MacroLauncher.vbs //nologo”. The path of MacroLauncher.vbs is configurable.
3. Create a text file and change the extension to “.vbs” The name of the vb script should be “MacroLauncher.vbs” with the following text:

'Input Excel File's Full Path

ExcelFilePath = "C:\runMacro\NatELRFlatFile_GapAnalysis_HL7Generator.xlsm"

'Input Module/Macro name within the Excel File

MacroPath = "Module1.LoadCSV"



```
'Create an instance of Excel  
Set ExcelApp = CreateObject("Excel.Application")  
  
'Do you want this Excel instance to be visible?  
ExcelApp.Visible = False 'or "False"  
  
'Prevent any App Launch Alerts (ie Update External Links)  
ExcelApp.DisplayAlerts = False  
  
'Open Excel File  
Set wb = ExcelApp.Workbooks.Open(ExcelFilePath)  
  
'Execute Macro Code  
ExcelApp.Run MacroPath  
  
'Save Excel File (if applicable)  
wb.Save  
  
'Reset Display Alerts Before Closing  
ExcelApp.DisplayAlerts = False  
  
'Close Excel File  
wb.Close  
  
'End instance of Excel  
ExcelApp.Quit  
  
'Leaves an onscreen message!  
  
'MsgBox "Your Automated Task successfully ran at " & TimeValue(Now), vbInformation
```



'Note: change the Excel file path to the path of the excel macro enabled file on your local system

4. Open the Windows task scheduler as administrator and create a new scheduled task called HL7Generator and configure the following:
 - a. Under General click "Run whether use is logged on or not"

A screenshot of the 'HL7Generator Properties (Local Computer)' dialog box in Windows Task Scheduler. The 'General' tab is selected. The 'Name' field is 'HL7Generator'. The 'Location' field is empty. The 'Author' field is 'AzureAD\JohnPark'. The 'Description' field is empty. In the 'Security options' section, the 'When running the task, use the following user account:' dropdown is set to 'AzureAD\JohnPark'. Below this, the radio button 'Run whether user is logged on or not' is selected. There are also checkboxes for 'Do not store password. The task will only have access to local computer resources.' and 'Run with highest privileges', both of which are unchecked. At the bottom, there is a 'Hidden' checkbox (unchecked) and a 'Configure for:' dropdown menu set to 'Windows Vista™, Windows Server™ 2008'. 'OK' and 'Cancel' buttons are at the bottom right.

HL7Generator Properties (Local Computer)

General Triggers Actions Conditions Settings History (disabled)

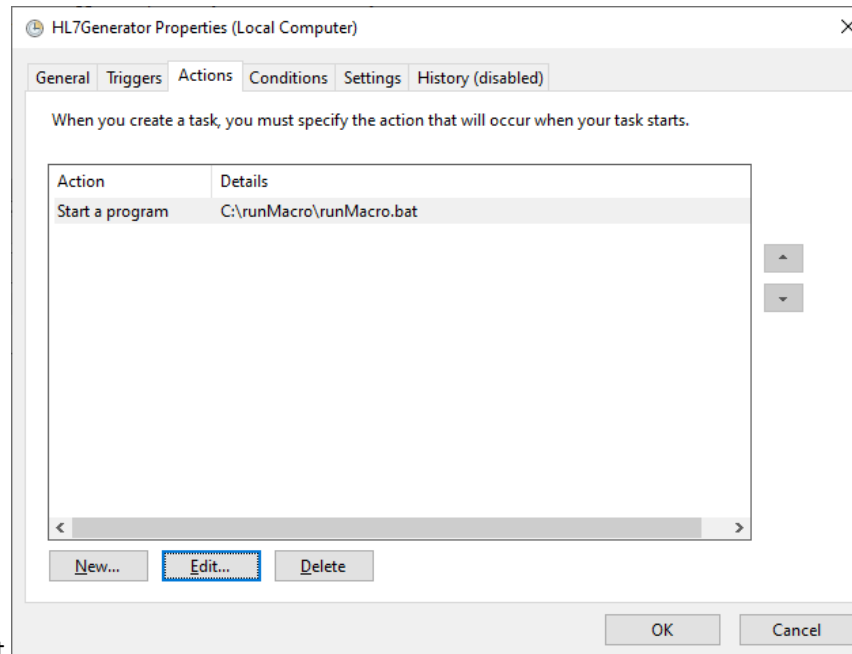
When you create a task, you can specify the conditions that will trigger the task.

Trigger	Details	Status
One time	At 12:05 AM on 8/12/2020	Enabled

New... Edit... Delete

OK Cancel

b. Under Triggers, select the schedule desired



c. Under Actions, select runMacro.bat

The scheduled task can be tested by right clicking on “HL7Generator” and clicking “Run”

Trouble shooting other tool outputs etc.

When the scheduled task runs the following happens:

1. The macro reads the CSV and loads all the information
2. If the load is successful it removes it from the “Input” directory and places it in the “Processed” directory renamed with “prc” and the timestamp pre-pended to the name.
3. It processes the CSV and outputs the HL7 batch to the output directory only if there are no errors (although there could be warnings in the NationalELRLog file). The HL7 file will generate if there are warnings.
4. If there are errors, it will output the error file (and warnings if any) to the error directory describing what happened. Possible outputs are:
 - a. A file named “NationalELRLog<timestamp>.txt with: “Not generating HL7 because of the following errors:” (with a list of the errors that prevented processing)



- i. Use the error entries to fix the data being input into CSV file
 - b. A file named "CSVLoadErrorLog<timestamp>.txt" with: "File not processed because it could not be found."
5. If there are no errors, it will output a file named "NationalELRLog<timestamp>.txt" with: "HL7 batched produced with no errors" and may have warnings in the file.

Note: the CSV to HL7 conversion was benchmarked to process 2000 records in about 2 minutes. Performance will vary based on data entry and number of rows per distinct HL7 record. Macros have a limitation where it cannot fully utilize the resources of multi core processor computers. If more than 2000 rows at a time need to be processed, please refer to the Developer's guide to implement parallel processing with the CSV file. Parallel processing separates the file into smaller files and processes them in parallel with multiple instances of the vb script that invokes the macro enabled excel document.