

HAWAII HEALTH INFORMATION CORPORATION
HAWAII'S SOURCE FOR HEALTHCARE

Implementation Guide

ASCII HL7 Specifications for
Laboratory
Observation Reporting
Technical Specifications and Transmittal
Instructions

Effective for Discharges on or after January 1, 2008



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ASCII File Layout

INTRODUCTION

This document serves as a functional specification and technical requirements for integrating key lab results with Hawaii Health Information Corporation's (HHIC) inpatient database via an ASCII file layout. A library of 32 laboratory tests and the respective LOINC codes will be transmitted from each of our prospective Electronic Laboratory Reporting (ELR) providers.

HHIC uses the results of these lab tests to enhance the content of their existing statewide, all-payer hospital discharge database. The enhanced data set will be used to improve the predicative methodology to measure key patient outcomes, such as inpatient mortality.¹

GENERAL SPECIFICATIONS

These instructions and specification are applicable to participating HHIC institutions submitting data to HHIC, effective with admissions of January, 2008.

Hospitalization-related (**Acute Inpatient**) laboratory results should be obtained from the hospital's clinical laboratory system/laboratory information system. Observed test results (e.g., finger stick) and other test results from glucometers, chemsticks, etc. should not be submitted. Submit test results specific to that laboratory test only. As an example, for the test of hemoglobin, do not submit a hemoglobin value that was reported as part of an arterial blood gas test result.

Units of Measure

Each laboratory test has a unique test code that represents both the laboratory test and the unit of measure. For example, the laboratory test lists Glucose with mg/dL as the unit of measurement. The laboratory test codes were designed to accept the submission of the units of measure used specified in the LOINC system. Please consult with the clinical laboratory system/laboratory information system personnel at your facility if you have questions regarding the laboratory units of measures outlined in Table 1.

Corrected Values

When two results are available for the same date and time the laboratory specimen was collected and one is labeled "corrected," submit the final corrected test result.

¹This effort is supported by CER funding received from The Agency for Healthcare Research and Quality (AHRQ). Todd Seto, MD, from The Queen's Medical Center is the Primary Investigator and will direct the comparative effectiveness research component of the research. Jill Miyamura, PhD, HHIC, is Co-Principal Investigator. HHIC's role is to demonstrate the feasibility of enhancing inpatient all-payer data with clinical (laboratory) data to support the purpose of comparative effectiveness research. More information on the grant, its aims and methodology can be found at <http://www.hcup-us.ahrq.gov/datainnovations.jsp>.¹



Data File Description

The file format will be a delimited text file where each column value is separated by a pipe (|) from the next column. Each line of the text file must contain a single record. An “end of file marker” must follow the line feed of the last record.

The file will be submitted in batch on a quarterly basis (at the beginning—and will move to a more frequent schedule as defined at a later time).

Each submission should include a summary document with the following information: hospital name/ID, time frame of messages submitted, number of messages sent in the batch.

Separate batch files should be submitted for each hospital.

Transmission Options

Data will be transmitted to HHIC in one of the following ways:

1. Secure File Transfer Protocol (SFTP)
2. VPN

HHIC will collaborate with each provider to determine the best method.



HEALTH CARE DATA SET

**HHIC Laboratory Information AHRQ Project
ASCII File Layout**

TABLE1. SUMMARY OF REQUIRED Laboratory Tests and LOINC

	Lab Test	Lab Test Name	LOINC	Units	LOINC SHORTNAME
Chemistry	Albumin	Albumin	1751-7	g/dL	Albumin SerPl-mCnc
	Alkaline phosphatase	Alkaline phosphatase	6768-6	U/L;units/L	ALP SerPl-cCnc
	Blood urea nitrogen (BUN)	Urea nitrogen	3094-0	mg/dL	BUN SerPl-mCnc
	Bilirubin (total)	Bilirubin	1975-2	mg/dL	Bilirub SerPl-mCnc
	Calcium	Calcium	17861-6	mg/dL	Calcium SerPl-mCnc
	Chloride	Chloride	2075-0	mmol/L	Chloride SerPl-sCnc
	Creatine kinase-MB	Creatine kinase.MB	13969-1	ng/mL; ug/L	CK MB SerPl-mCnc
	Creatinine	Creatinine	2160-0	mg/dL	Creat SerPl-mCnc
	Glucose	Glucose	2345-7	mg/dL	Glucose SerPl-mCnc
	Gamma glutamyl transferase	Gamma glutamyl transferase	2324-2	U/L;units/L	GGT SerPl-cCnc
	Potassium	Potassium	2823-3	mmol/L	Potassium SerPl-sCnc
	Phosphate	Phosphate	2777-1	mg/dL	Phosphate SerPl-mCnc
	BNP	Natriuretic peptide.B	30934-4	pg/mL	BNP SerPl-mCnc
	Sodium	Sodium	2951-2	mmol/L	Sodium SerPl-sCnc
	Troponin I	Troponin I.cardiac	10839-9	ug/L;ng/mL	Troponin I SerPl-mCnc
	SGOT	Aspartate aminotransferase	1920-8	U/L;units/L	AST SerPl-cCnc
SGPT	Alanine aminotransferase	1742-6	U/L;units/L	ALT SerPl-cCnc	
Blood Gas	pO2	Oxygen	2703-7	mm Hg	pO2 BldA
	pCO2	Carbon dioxide	2019-8	mm Hg	pCO2 BldA
	pH (arterial)	pH	2744-1		pH BldA
	Base excess	Base excess	1925-7	mmol/L	Base excess BldA-sCnc
	Bicarbonate	Bicarbonate	1960-4	mmol/L	HCO3 BldA-sCnc
Hematology	Hemoglobin	Hemoglobin	718-7	g/dL	Hgb Bld-mCnc
	Hematocrit	Hematocrit	4544-3	L/L;%	Hct Fr Bld Auto
	Partial thromboplastin time (PTT)	Coagulation surface induced	14979-9	Sec	aPTT Time PPP
	Prothrombin time (PT)	Coagulation tissue factor induced	5902-2	Sec	PT Time PPP
	INR	Coagulation tissue factor induced.INR	34714-6	INR(POC)	INR PPP
	Platelet count	Platelets	777-3	10 ⁹ /L	Platelet # Bld Auto
	White blood count (WBC)	Leukocytes	6690-2	10 ³ /uL	WBC # Bld Auto
Microbiolog	Blood culture		600-7		
	Urine culture		630-4		
	Sputum culture		6460-0		



HEALTH CARE DATA SET

**HHIC Laboratory Information AHRQ Project
ASCII File Layout**

Data Field Layout

DATA ELEMENT	DATA TYPE	HL7 Location (for reference)
Sending Facility	A	MSH-4
*Account Number	A	PID-18
Medical Record Number	A	PID-3
*Date of Birth	D	PID-7
Gender	A	PID-8
*Social Security Number	N	PID-19
*Patient First Name	A	PID-5
*Patient Last Name	A	PID-5
*Patient Middle Initial	A	PID-5
*Admission Date/Time	D	PV1-44
*Discharge Date/Time	D	PV1-45
Ordering Physician First Name	A	OBR-16
Ordering Physician Last Name	A	OBR-16
Ordering Physician Middle Initial	A	OBR-16
Physician Identifier	N	OBR-16
Receiving Application	A	MSH-5
Create Date/Time	D	MSH-7
Patient Class	A	PV1-2
Hospital Test (order)	A	OBR-4
Hospital Test (result - LOINC)	A	OBX-3
Observation Date/Time	D	OBR-7
Results Rpt/Status Chng-Date/Time	D	OBR-22
Results Status	A	OBR-25
Observation Value	A	OBX-5
Units (of Measure)	A	OBX-6
Reference Ranges	A	OBX-7
Abnormal Flags	A	OBX-8
Observation Results Status	A	OBX-11
Comments	A	NTE-3

*for linking lab file to HHIC patient files



Sending Facility

Data Element: Sending Facility

HL7 Location: MSH-4

Data Type: Alpha

Definition: Identifies the sender (the owner of the message information). When sending, **LAB** will use "Hospital Name."

NOTE: For files submitted by Clinical Laboratory, this number will be their internally assigned number for the hospitals.

Account Number

Data Element: Account Number

HL7 Location: PID-18

Data Type: Alphanumeric

Definition: The number assigned to the patient's visit by the hospital. The account number is typically used for charge and/or billing purposes.

Instructions: Valid characters: A through Z, 0 through 9, . (period), and - (hyphen).
Do not leave this field blank.



Medical Record Number

Data Element: Medical Record Number

HL7 Location: PID-3

Data Type: Alphanumeric

Definition: The number assigned to the patient's medical/health record by the hospital. The medical record number is typically used to do an audit of the history of treatment.

Instruction: Valid characters: A through Z, 0 through 9, . (period), and - (hyphen).
Do not leave this field blank.

Date of Birth

Data Element: Date of Birth

HL7 Location: PID-7

Data Type: Date

Definition: Month, day, and year (including century) of birth of the patient.

Instruction: YYYYMMDD
If the month, day or year of birth is a single digit, use a preceding zero.
There should be no blanks in this field.
Do not leave this field blank.



Gender

Data Element: Gender

HL7 Location: PID-8

Data Type: Alpha

Definition: Sex of patient

M = Male

F = Female

U = Unknown

Social Security Number

Data Element: Social Security Number

HL7 Location: PID-19

Data Type: Numeric

Definition: The number assigned by the Social Security Administration.

Instructions: Valid characters: 0 through 9, no hyphens or spaces.
If SSN is unknown leave blank.



Patient First Name

Data Element: Patient First Name

HL7 Location: PID-5

Data Type: Alphanumeric

Definition: The patient's first name.

Instructions: Exclude middle names and middle initials
Uppercase only

Patient Last Name

Data Element: Patient Last Name

HL7 Location: PID-5

Data Type: Alphanumeric

Definition: The patient's last name.

Instructions: Uppercase Only



Patient Middle Initial

<i>Data Element:</i>	Patient Middle Initial
<i>HL7 Location:</i>	PID-5
<i>Data Type:</i>	Alphanumeric
<i>Definition:</i>	The patient's middle initial.
<i>Instructions:</i>	Include only the first middle initial. Uppercase only.

Admission Date/Time

<i>Data Element:</i>	Admission Date/Time
<i>HL7 Location</i>	PV1-44
<i>Data Type:</i>	Date
<i>Definition:</i>	Month, day, year and time of admission to the hospital as an acute care patient.
<i>Instruction:</i>	YYYYMMDDHHMMSS If the month, day or year of admission is a single digit, use a preceding zero. There should be no blanks in this field. Do not leave this field blank.



Discharge Date/Time

- Data Element:** Discharge Date/Time
- HL7 Location:** PV1-45
- Data Type:** Date
- Definition:** Month, day, year and time of discharge from the hospital as an acute care patient.
- Instruction:** YYYYMMDDHHMMSS
If the month, day or year of discharge is a single digit, use a preceding zero. There should be no blanks in this field.
Do not leave this field blank.

Ordering Physician First Name

- Data Element:** Physician First Name
- HL7 Location:** OBR-16
- Data Type:** Alphanumeric
- Definition:** The physician's first name.
- Instructions:** Exclude middle names and middle initials
Uppercase only



Ordering Physician Last Name

Data Element: Physician Last Name

HL7 Location: OBR-16

Data Type: Alphanumeric

Definition: The physician's last name.

Instructions: Uppercase Only

Ordering Physician Middle Initial

Data Element: Physician Middle Initial

HL7 Location: OBR-16

Data Type: Alphanumeric

Definition: The physician's middle initial.

Instructions: Include only the first middle initial.
Uppercase only.



Physician Identifier

Data Element: Physician Identifier

HL7 Location: OBR-16

Data Type: Numeric

Definition: Either the National Provider Identifier (NPI) that is issued to the individual physician by CMS or the identifier that is assigned to each physician by the hospital.

Instructions: Leave blank if unknown.

Hospital or Lab Reporting Results

Data Element: [Hospital or Lab Reporting Results](#)

HL7 Location: MSH-5

Data Type: Alpha

Definition: Name of the hospital or lab that is processing the order.



Create Date/Time

Data Element: Create Date/Time

HL7 Location: MSH-7

Data Type: Date

Definition: Date and time the message was created.

Instructions: YYYYMMDDHHMMSS
If the month, day or year of create date is a single digit, use a preceding zero.
There should be no blanks in this field.
Do not leave this field blank.

Patient Class

Data Element: Patient Class

HL7 Location: PV1-2

Data Type: Alpha

Definition: Patient Class

E Emergency Department visits
I Inpatient Admission
O Outpatient



Hospital Test (Order)

Data Element: Hospital Test (Order)
HL7 Location: OBR-4
Data Type: Alpha
Definition: This is the local (ordered) test code.

Hospital Test (result - LOINC)

Data Element: Hospital Test (result - LOINC)
HL7 Location: OBX-3
Data Type: Alpha
Definition: LOINC Code
Instructions: It is strongly recommended that OBX-3 be populated with as specific a LOINC®code as defined in Table 1 to prevent any misinterpretation of reported results.



Observation Date/Time

Data Element: Observation Date/Time

HL7 Location: OBR-7

Data Type: Date

Definition: Month, day, year and time of lab test.

Instruction: YYYYMMDDHHMMSS
If the month, day or year of observation is a single digit, use a preceding zero. There should be no blanks in this field.
Do not leave this field blank.

Results Rpt/Status Chng Date/Time

Data Element: Results Rpt/Status Chng Date/Time

HL7 Location: OBR-22

Data Type: Date

Definition: Month, day, year and time of lab test.

Instruction: YYYYMMDDHHMMSS
If the month, day or year of results is a single digit, use a preceding zero. There should be no blanks in this field.
Do not leave this field blank.



Results Status

- Data Element:*** Results Status
- HL7 Location:*** OBR-25
- Data Type:*** Alpha
- Definition:*** The current status of the results of the lab test.
- Instruction:*** Only test status of "F" for finalized should be included.

Observation Value

- Data Element:*** Observation Value
- HL7 Location:*** OBX-5
- Data Type:*** Alpha
- Definition:*** Result of lab test.



Units

Data Element: Units
HL7 Location: OBX-6
Data Type: Alpha
Definition: Units of measure.

Reference Ranges

Data Element: Reference Ranges
HL7 Location: OBX-7
Data Type: Alpha
Definition: Reference range. If numeric, the values of this field may report several values in one of the following three formats:

1. lower limit-upper limit when both lower and upper limits are defined, e.g., for potassium "3.5 - 4.5"
2. > lower limit if no upper limit, e.g., ">10"
3. < upper limit if no lower limit, e.g., "<15"



Abnormal Flags

Data Element: Abnormal Flags

HL7 Location: OBX-8

Data Type: Alpha

Definition: Abnormal flags should be used for reporting microbiology sensitivity data. Abnormal flags for antimicrobial sensitivity reporting should conform to the recommendations of National Committee of Clinical Laboratory Standards (NCCLS, <http://www.nccls.org>). For most reported findings, the allowable values are S, I, or R, and should be provided in addition to the numeric value in OBX-5. When findings other than susceptibility results are sent, the abnormal flag should be valued (e.g., "H", "N", or "A") to distinguish between tests that are interpreted as normal and those that are interpreted as abnormal.

Observation Results Status

Data Element: Observation Results Status

HL7 Location: OBX-11

Data Type: Alpha

Definition: F= completed. Correct and final results



Hawaii Health
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HEALTH CARE DATA SET

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Created: July 21, 2011
Revised: August 4, 2011

Comments

Data Element: Comments

HL7 Location: NTE-3

Data Type: Alpha

Definition: Contains the comment contained in the segment.



Appendix A: HHIC Use Only – Edits Applied After Receipt

Proposed Edits Applied During or After Receipt of the Data File

Duplicate Laboratory Record

Two or more laboratory records were submitted representing the same laboratory test collected at the same date and time.

Resolution: Remove duplicate laboratory records so only one valid laboratory record exists for a single laboratory test collected at a specified date and time.

Failure to Link Laboratory Record with Discharge Record

The laboratory record did not link to a unique inpatient discharge record. The fields used to perform this link are the Medical Record Number, Admission Date, and Account Number.

Resolution: Verify and correct the Medical Record Number, Admission Date, and Account Number.

Admission Lab Algorithm

For the purpose of improving the severity of illness model, the admission lab results will be incorporated into existing risk models, e.g. 3M's APR-DRGs or other appropriate models. While lab results throughout the inpatient stay may be found to have an important predictive component, the results of selected admission labs (the 32 identified for this study) are known to improve the predictive power of existing risk models such as 3M's APRDRGs. Thus, the admission lab results of the 32 lab tests identified for this study will be identified for this purpose. HHIC will use the following algorithm.²

The first lab value on the day of admission will be used as the "admission lab" because it is most likely to reflect the patient's status prior to any major interventions. If a value is not available, particularly if the patient was admitted late in the day (e.g., after 6 PM), then next day values will be used if no major procedure is documented on the day of admission. If no value is available using this algorithm, a value within seven days prior to admission that is closest to the day of admission can be used. Otherwise, the value will be considered missing.

Future Validations/Definitions/Edits

Further validations and edits will be applied over the course of working with data files. These will be published as they are incorporated.

² The proposed algorithm is subject to change following as we work with providers and work with data in more detail.