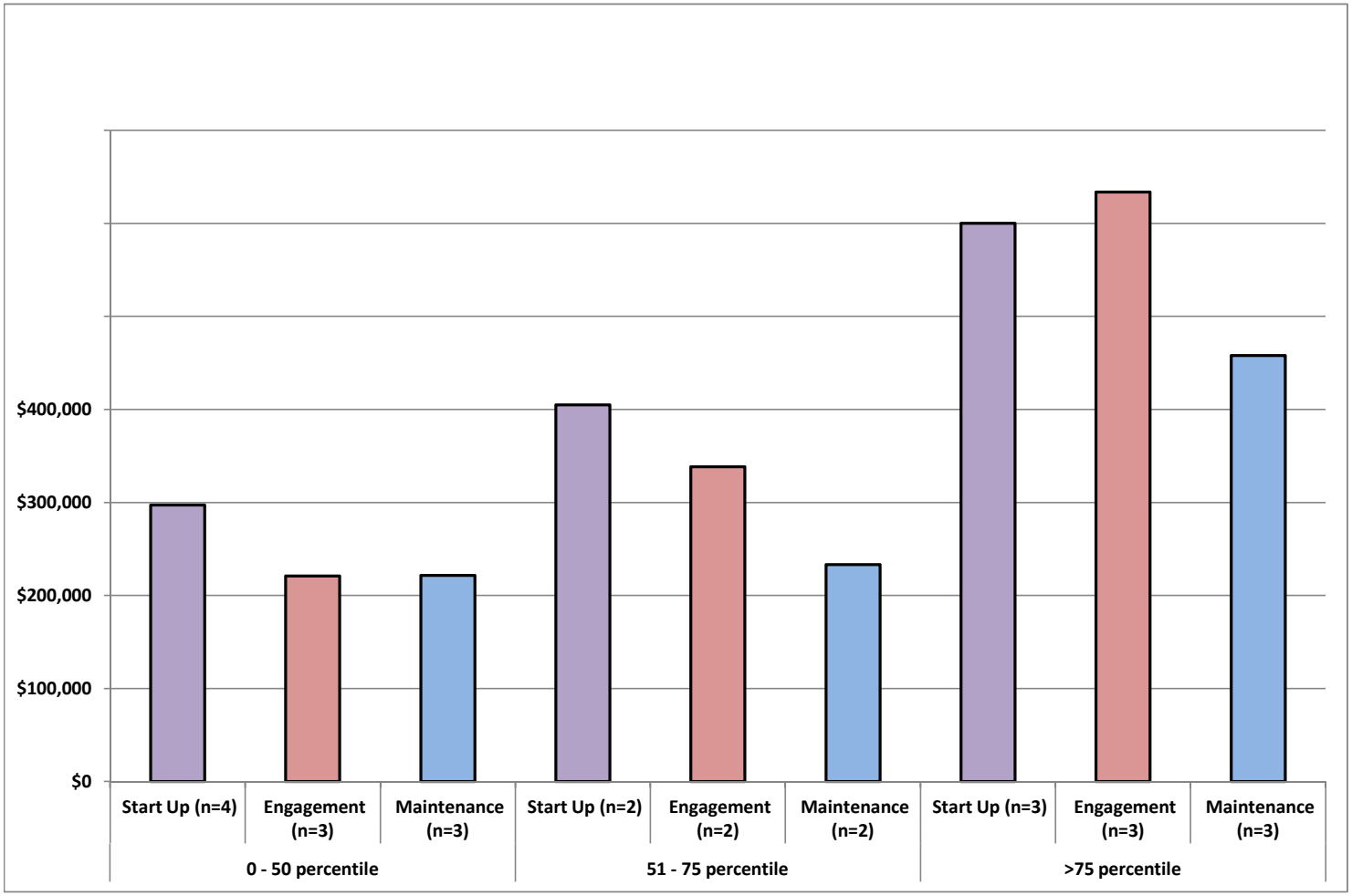
Workbook Legend	
Worksheet Name	**Description**
Cost Average Summary	Provides average costs for start-up, engagement and maintenance phases of ELR, grouped by population size for the nine participating states.
Deleware - Tennessee	State Profiles that capture information about each state's ELR architecture and system function
Definition	Provides definitions of each aspect of architecture and system function captured in the state profiles.
Population Grouping	Worksheet shows assignment of population to small, medium, and large for purposes of the Cost Average Summary graph

Grouped by Population Size (in percentile)	ELR Phase	Average
0 - 50 percentile	**Start Up (n=4)**	$297,375
	Engagement (n=3)	$221,000
	Maintenance (n=3)	$221,500
51 - 75 percentile	**Start Up (n=2)**	$405,000
	Engagement (n=2)	$338,250
	Maintenance (n=2)	$233,250
>75 percentile	**Start Up (n=3)**	$600,000
	Engagement (n=3)	$633,500
	Maintenance (n=3)	$458,000



Delaware

In Delaware, electronic laboratory reporting (ELR) is primarily supported by six people, among them representing three FTEs. ELR is received and processed The majority of ELR reports received by the state are consumed in the Delaware Electronic Reporting and Surveillance System (DERSS). The receipt of ELR for positive test results and test orders for state reportable conditions are sent to the DERSS and to Enhanced HIV/AIDS Reporting System (eHARS). Currently, ELR is received in HL7 2.3.1 and v2.3z format.

	ELR System Characteristic	Description
Architecture	Enterprise Application Integration (EAI) System	There are two EAIs used. The state uses a NEDSS-based legacy HL7 integration engine (state developed and coupled within DERSS), as well as the CDC funded COTS product, Orion Health's Rhapsody Integration Engine (Rhapsody). Rhapsody is installed as a stand-alone system. Along with Rhapsody, the state also uses NEDSS Message Subscription Service (MSS) to process and route incoming ELR of positive test results for state reportable diseases and PHINMS for message transport .
	Integration to Standards System (e.g.	N/A
	List surveillance systems receiving ELR	ELR is routed to the appropriate disease surveillance information systems: DERSS, STD/MIS (future; post-receipt of new version of STD/MIS), eHARS, Lead / HHLPSS, the Delaware Cancer Registry, DelVAX (Delaware immunization registry), and the electronic medical record system (EMR). NOTE: Some systems are in test versus production status.
	Compatible system (e.g. program assignment)	ELR received in DERSS serves as management tool and use to identify co-morbidity
	Management of Local Codes	Manages local codes in DERSS. At this time, it is unknown if Rhapsody also stores local codes for other conditions.
	Management of Mapping to standards	Manages mappings in legacy HL7 integration engine in DERSS.
System Functions	Web-based services	Rhapsody 4.1 (TEST environment till end-October) provides web-based services for content validation, content translation, and subscription. Currentlly in production with Rhapsody v3.4.
	HL7 Message Validation	Rhapsody provides structural validation and legacy HL7 integration engine in DERSS provides content validation.
	Routing	Management of routes is configured in Rhapsody to send ELR messages to the appropriate surveillance application.
	Alerting (email, SMS)	Not currently active
	Reporting	Legacy HL7 integration engine produces daily reports of ELR system status and performance. Use DERSS to export data for epidemiological analyses.

Volume of Cases			
Population Size (Range)	1 - 5,000,000		
Total number of Cases by Condition Type	Cases*	With Lab Info	Initiated by ELR
General Communicable Disease	8,400	80-85%	75 - 80%
HIV/AIDS	135	100%	80-85%
Sexual Transmitted Disease	8,600	100%	0***
Tuberculosis	20	85%	0****
Cancer	6,600	8%	3%
Environment Health	15	100%	0
Reporting Entities	Eligible Hospitals	Independent Labs	Public Health Labs
Estimated Number in Jurisdiction	8	6	1
Number currently in TEST with ELR	6	0	N/A
Number currently in production with ELR	0	4	1

*Counts are approximate, and represent a 12-month period.
**Does not include chronic hepatitis C

***Electronic results are transmitted to us by multiple labs, but are not yet receivable by the STD program's system (STDMIS). Upon availability of a newer version of STDMIS, it is anticipated these results will be captured.

****Virtually always initiated by a call / faxed report of possible / suspected case, with follow-on report of laboratory results

Engagement Process (optional)

FYI: We are in the midst of working through health information exchange (HIE) / non-HIE transmissions; no estimates available at this time. [Need to verify HIE flow]

Messaging Function	Eligible Hospital Range of Hours Spent	Independent Labs Range of Hours Spent	Public Health Lab Range of Hours Spent
HL7 Message (structure and Content) Validation			
Management of Local Codes			
Management of Mapping to standards			
Routing			

Florida

In Florida, electronic laboratory reports received by the state are processed and stored in a central ELR database. Results of interest (those meeting the case definition or identified as needing further investigation) are pulled from the ELR database and consumed in the Merlin electronic disease surveillance system for general communicable diseases, and heavy metals (i.e. lead, mercury, etc). All results received in the central ELR database are accessible via user driven search queries from a search screen within the Merlin surveillance application - for example both positive and negative test results for specimens tested at the state public health lab (outbreak specimens, etc) can be searched. HL 2.5.1, 2.3.1, 2.3.X, flat files.

	ELR System Characteristic	Description
Architecture	Enterprise Application Integration (EAI) System	Florida uses a COTS product, Cloverleaf, to process and translate incoming ELR messages for state reportable conditions. ELR data inserted and stored in a central ELR database.
	Integration to Standards System (e.g. VADS, RELMA, UMLS)	N/A. FLDOH receives and process all results sent to the integration broker (Cloverleaf) and populates the central ELR database. The sending facility and application will send either local or LOINC® codes. Translation to standards acceptable to Florida are performed by the Cloverleaf interface engine.
	List surveillance systems receiving ELR	ELR is pulled out of the central ELR database by the appropriate disease surveillance information system: Merlin, Prism (STD); each system identifies and consumes records of interest in different ways according to the application design; Merlin functions are completly automated with results accessible by epidemiologists responsible for conducting case investigations in each of the 67 counties as soon as the results are received by the department
	Areas of integration with NEDSS Compatible system (e.g. program assignment)	N/A
	Management of Local Codes	Local codes are managed from within the Merlin application in the form of "filters;" Filter rules are set up per laboratory sending facility/application and are applied to local or standard codes (LOINC®) depending on the facility ability to send standard or local codes.
	Management of Mapping to standards	The Cloverleaf software is used to transform incoming ELR messages into a format used to insert the data into the Central ELR database. Most incoming ELR messages are converted to HL7 2.3.1.

System Functions	Web-based services	Cloverleaf does that Content validation, content translation, and subscription; web-based services are not utilized
	HL7 Message Validation	Cloverleaf validates every HL7 message to ensure it has the proper message structure and segments and certain required fields (date of birth, patient name, specimen ID, accession number)
	Routing	Results are populated into the centeral ELR database. The surveillance application, Merlin, maintains filters by laboratory, test and specimen that are used to identify records of intersts and "pull" them into the surveillance application; the process is completely automated and records of interest are immediately available to disease investigators in each of the 67 counties via county specific Merlin ELR Task Lists as soon as results are popluated into the ELR database
	Alerting (email, SMS)	From within Merlin, laboratory disease specific email alerts with results of interest can be sent to any user of the Merlin system; Merlin alerts are maintained on user profiles; Cloverleaf - alerts sent out if a laboratory facility does not send in any results for the day
	Reporting	Produce daily, weekly, monthly, and yearly reports of ELR system status, performance, and/or trends; Cloverleaf - produces reports of daily volume, status of types of results sent out; monthly report on data content to ensure overall content remains at an acceptable level

Volume of Cases			
Population Size (Range)	15,000,000 - 20,000,000		
Total number of Cases by Condition Type	Cases*	With Lab Info	Initiated by ELR
General Communicable Disease	51000	>95%	
HIV/AIDS	8700	>95%	
Sexual Transmitted Disease	99000	>95%	
Tuberculosis	850	>95%	
Cancer (2008, Newly diagnosed cases)	105200		
Environment Health			
Reporting Entities	Eligible Hospitals	Independent Labs	Public Health Labs
Estimated Number in Jurisdiction	228	446	5
Number currently in production with ELR	25	15	5

Engagement Process (optional)

Messaging Function	Eligible Hospital Range of Hours Spent	Independent Labs Range of Hours Spent	Public Health Lab Range of Hours Spent
HL7 Message (structure and Content) Validation			
Management of Local Codes			
Management of Mapping to standards			
Routing			

Idaho

In Idaho, electronic laboratory reporting (ELR) is primarily supported by 1.5 number of FTE(s). All ELR reports received by the state are consumed in the NEDSS Base System (NBS). The receipt of ELR for positive test results for state reportable diseases is sent to the NBS via Rhapsody. Currently, ELR is received in HL7 2.3.1 format.

	ELR System Characteristic	Description
Architecture	Enterprise Application Integration (EAI) System	The state uses CDC funded COTS product, Orion Health's Rhapsody Integration Engine (Rhapsody) and NEDSS Message Subscription Service (MSS) to process incoming receipt of ELR for positive test results for state reportable conditions. Rhapsody is installed as a stand-alone system.
	Integration to Standards System (e.g. VADS, RELMA, UMLS)	Only with PHIN VADS via MSS.
	List surveillance systems receiving ELR	NEDSS Base System (NBS) and Enhanced HIV/AIDS Reporting System (eHARS).
	Areas of integration with NEDSS Compatible system (e.g. program assignment)	N/A. Rhapsody/MSS is installed as a stand alone system and ELR is routed to the appropriate disease surveillance information system.
	Management of Local Codes	Manages local codes in NEDSS Message Subscription Service
	Management of Mapping to standards	Manages mappings in NEDSS Message Subscription Service
System Functions	Web-based services	Rhapsody provides web-based services for Content validation, content translation, and subscription
	HL7 Message Validation	Rhapsody and MSS provide structural and content validation
	Routing	Management of routes are configured in Rhapsody to send ELR messages to the appropriate surveillance application
	Alerting (email, SMS)	Within Rhapsody, the system can generate email alerts in the event of a receipt of immediate reportable condition. Use alerting extensively in ELR process. Whenever an ELR message is received that fails validation, is unrecognized, is missing standard codes, has unrecognized specimen sources, etc. then Rhapsody sends Project Manager an email.
	Reporting	Produce daily, weekly, monthly, and yearly reports of ELR system status, performance, and/or trends using the NBS to export data for analysis

Volume of Cases			
Population Size (Range)	1 - 5,000,000		
Total number of Cases by Condition Type	Cases*	With Lab Info	Initiated by ELR
General Communicable Disease	3,598	3,203	792
HIV/AIDS	83		
Sexual Transmitted Disease	4,377	4,377	
Tuberculosis	15	15	0
Cancer			
Environment Health	81		
Reporting Entities	Eligible Hospitals	Independent Labs	Public Health Labs
Estimated Number in Jurisdiction	52	24	1
Number currently in production with ELR	4	7	1

Engagement Process (optional)

Messaging Function	Eligible Hospital Range of Hours Spent	Independent Labs Range of Hours Spent	Public Health Lab Range of Hours Spent
HL7 Message (structure and Content) Validation	100 - 400	50 - 250	450
Management of Local Codes	0	0	30
Management of Mapping to standards	0 - 60	0 - 10	50
Routing	50 - 150	5 - 100	400

1 Message Validation – this includes validating message structure and content, working with the lab to try and adjust format and especially content. It also includes the parallel validation where we match all incoming ELR's to manual reports for 90 days and follow-up on any discrepancies. This often last longer than 90 days as we require 90 days error free. The PHL hours also include the validation of the CDC reporting messages such as PHLIS, PHLIP and LRN.

2 Local codes are allocated by the Labs so the only Lab that worked on local codes is the State Lab. This however was on the Lab side and not really on the message side. If John is only looking at the messages once they come out of the LIMS system then it should be zero as well.

3 I assumed that this was the mapping of local codes to standard codes. Many of the Labs do this themselves but for some Labs we have had to either ask for changes or in some cases do the complete mapping for them.

Under the routing category I included the changes we make in Rhapsody to reformat/exclude messages from Labs that cannot meet our exclusion criteria, labs that mix reportable/non-reportable results and the Labs that send comments as results or results as comments. For the State Lab, I also include all the routing and reformatting necessary to include the PHLIS, PHLIP and
4 LRN reporting.

Kansas

In Kansas, electronic laboratory reporting (ELR) is primarily supported by 3.0 FTE(s). The majority of future ELR reports received by the state will be consumed in the Kansas electronic disease surveillance system, TriSano. The receipt of ELR for positive test results for state reportable diseases will be sent to TriSano via Rhapsody. ELR will be received in HL7 2.5.1 format.

	ELR System Characteristic	Description
Architecture	Enterprise Application Integration (EAI) System	Engine (Rhapsody), installed as a standalone tool, and will be used to processes incoming receipt of ELR for state reportable diseases.
	Integration to Standards System (e.g. VADS, RELMA, UMLS)	No
	List surveillance systems receiving ELR	N/A. When the ELR feed is active it will be routed to the TriSano for general communicable disease, TB, and STD. In the future, Lead and HIV results will be routed to the appropriate system.
	Areas of integration with NEDSS Compatible system (e.g. program assignment)	Rhapsody is installed as a stand-alone system. ELR will be routed to the appropriate disease surveillance information system: TriSano, eHARS, lead
	Management of Local Codes	A decision has not been made.
	Management of Mapping to standards	Everything that comes into Rhapsody will be mapped to HL7 2.5.1 standards
System Functions	Web-based services	Not known at this time
	HL7 Message Validation	It is expected that Rhapsody will provide structural validation and the programs will conduct content validation.
	Routing	Management of routes are configured in Rhapsody to send ELR messages to the appropriate surveillance application
	Alerting (email, SMS)	Within Trisano, the system will be able to generate email alerts in the event of a receipt of immediate reportable condition
	Reporting	Once ELR is in production, the system will produce daily, weekly, monthly, and yearly reports of ELR system status, performance, and/or trends using the Trisano Analysis Visualization and Reporting tool

Volume of Cases			
Population Size (Range)	1 - 5,000,000		
Total number of Cases by Condition Type	Cases	With Lab Info	Initiated by ELR
General Communicable Disease	8477	7117	0
HIV/AIDS	186		0
Sexual Transmitted Disease	11703		0
Tuberculosis	4541	4541	0
Cancer			
Environment Health			
Reporting Entities	Eligible Hospitals	Independent Labs	Public Health Labs
Estimated Number in Jurisdiction	126*	18	1
Number currently in production with ELR	0	0	0

* This is the number of hospitals in Kansas; the number of eligible hospitals for ELR is not known at this time

Engagement Process (optional)**

Messaging Function	Eligible Hospital Range of Hours Spent	Independent Labs Range of Hours Spent	Public Health Lab Range of Hours Spent
HL7 Message (structure and Content) Validation			
Management of Local Codes			
Management of Mapping to standards			
Routing			

**Kansas cannot calculate this information at this time, as we have not been through the engagement process yet.

Nebraska

In Nebraska, all electronic laboratory reporting (ELR) reports received by the state are consumed in the NEDSS Base System (NBS). The receipt of ELR for positive and negative test results for state reportable conditions are sent to the NBS via Rhapsody. Currently, ELR is received in HL7 2.3.1 format

	ELR System Characteristic	Description
Architecture	Enterprise Application Integration (EAI) System	The state uses CDC funded COTS product, Orion Health's Rhapsody Integration Engine (Rhapsody) to process incoming receipt of ELR for state reportable conditions. Rhapsody is installed as a stand-alone system.
	Integration to Standards System (e.g. VADS, RELMA, UMLS)	Only with PHIN VADS.
	List surveillance systems receiving ELR	ELR is routed to the appropriate disease surveillance information system: NBS. STD/MIS, Enhanced HIV/AIDS Reporting System, and STELLAR (lead) receive an ELR extract.
	Areas of integration with NEDSS Compatible system (e.g. program assignment)	STD/MIS and Enhanced HIV/AIDS Reporting System (eHARS). All ELR, including lead. The method of exporting is different for each receiving surveillance application.
	Management of Local Codes	? [This is unknown at this time]
	Management of Mapping to standards	? [This is unknown at this time]
System Functions	Web-based services	Rhapsody provides web-based services for Content validation, content translation, and subscription
	HL7 Message Validation	Rhapsody provides structural validation. Program conducts content validation.
	Routing	Management of routes are configured in Rhapsody to send ELR messages to the appropriate surveillance application
	Alerting (email, SMS)	Within NBS, the system can generate email alerts in the event of a receipt of immediate reportable condition
	Reporting	Produce daily, weekly, monthly, and yearly reports of ELR system status, performance, and/or trends using the NBS Reporting Database to export data for analysis

Volume of Cases			
Population Size (Range)	1 - 5,000,000		
Total number of Cases by Condition Type	Cases*	With Lab Info	Initiated by ELR
General Communicable Disease	5,456		
HIV/AIDS	4,505		
Sexual Transmitted Disease	110,334		
Tuberculosis	31		
Cancer			
Environment Health	6,753		
Reporting Entities	Eligible Hospitals	Independent Labs	Public Health Labs
Estimated Number in Jurisdiction	116	43	4
Number currently in production with ELR	8	12	1**

* Lab tests (including negative test, antibiotic susceptibilities) recieved by program area and ELR type between June 1, 2011 – September 30, 2011

** Partially in production for select conditions

Engagement Process (optional)

Messaging Function	Eligible Hospital Range of Hours Spent	Independent Labs Range of Hours Spent	Public Health Lab Range of Hours Spent
HL7 Message (structure and Content) Validation	48-72	48-72	48-72
Management of Local Codes			
Management of Mapping to standards			
Routing	1-2	1-2	1-2

Massachusetts

In Massachusetts, electronic laboratory reporting (ELR) is primarily supported by a total of 2.25 FTE(s). All ELR reports received by the state are consumed in the MAVEN system. The receipt of ELR test results for state reportable diseases is sent to MAVEN via state developed ELR portal. The ELR portal was developed in collaboration with Diagnosis 1 (D1). Currently, ELR is received in HL7 v2.3.1 format, but the system is capable of receiving v2.5.1.

ELR System Characteristic		Description
Architecture	Enterprise Application Integration (EAI) System	The state uses a collaboratively state developed (with D1) ELR portal to processes incoming receipt of ELR for test results for state reportable diseases.
	Integration to Standards System (e.g. VADS, RELMA, UMLS)	N/A
	List surveillance systems receiving ELR	The ELR portal is installed as a stand-alone system. ELR is routed to MAVEN and then, if necessary, also routed to the appropriate legacy disease surveillance information system: STD/MIS, eHARS (future), and Lead
	Areas of integration with NEDSS Compatible system (e.g. program assignment, deduplication)	All ELR goes into MAVEN and is exported to the appropriate surveillance application: STD/MIS and STELLAR. eHARS (Future)
	Management of Local Codes	Management of local codes is performed in the ELR portal, under Mapping
	Management of Mapping to standards	Management of mappings is handled in the ELR portal, under Mapping
System Functions	Web-based services	D1 does not call on any external applications for services. Content validation, content translation, and subscription are all stored and performed within D1.
	HL7 Message Validation	ELR portal conducts structural and content validation
	Routing	MAVEN is used to receive all incoming ELR test results and then, if necessary, also routed to the appropriate legacy surveillance application
	Alerting (email, SMS)	Within MAVEN, the system can generate reports of receipt of immediate reportable conditions via email, text notification.
	Reporting	Both ELR portal and MAVEN produce daily, weekly, monthly, and yearly reports of ELR system status, performance, and/or trends

Volume of Cases			
Population Size (Range)	5,000,000 - 10,000,000		
Total number of Cases by Condition Type	Cases*	Total Laboratory Results Received	Laboratory Reports Received Via ELR
General Communicable Disease	50,000	106,000	93,000
HIV/AIDS	630	2,000	0
Sexual Transmitted Disease	27,000	35,000	20,000
Tuberculosis	500	4,000	4,000
Cancer	N/A	N/A	N/A
Environmental Health			20,000
Reporting Entities	Eligible Hospitals	Independent Labs	Public Health Labs
Estimated Number in Jurisdiction	73	7	1
Number currently in production with ELR	61	2	1

* This represents the number of suspect, probable and confirmed events reported to MDPH..

Engagement Process (optional)

Messaging Function	Eligible Hospital Range of Hours Spent	Independent Labs Range of Hours Spent	Public Health Lab Range of Hours Spent
HL7 Message (structure and Content) Validation	10 - 20	10 - 20	10 - 20
Management of Local Codes	0	0	0
Management of Mapping to standards	0	0	0
Routing	0	0	0

The state provides a list of reportable conditions, test type, and results to the trading partner. If a trading partner uses a local LOINC® code, the code is mapped to the appropriate test type for the reportable condition. All mappings are performed by the trading partner and not the Public Health authority. Routing of conditions is automated and performed by the MAVEN system. Hence minimal effort is spent in this activity. However, the majority of time spent by the Public Health is on HL7 message structure and content validation.

New York

In New York, electronic laboratory reports from clinical laboratories are received and processed for all state reportable conditions (i.e., GCD, STD, TB, HIV, Cancer, and Lead) via the Electronic Clinical Laboratory Reporting System (ECLRS) as the state's primary hub for ELR. A portion of ELR reports received by the state are integrated with the Communicable Disease Electronic Surveillance System (CDESS) which includes GCD, STD, and TB. ECLRS is also the hub for hospitals to report emergency department data. Currently, ELR is available in HL7 2.3.1 and 2.5.1 format.

	ELR System Characteristic	Description
Architecture	Enterprise Application Integration (EAI) System	The state uses custom built mandatory system, ECLRS, for clinical laboratories to submit and process incoming receipt of ELR for state reportable conditions.
	Integration to Standards System (e.g. VADS, RELMA, UMLS)	Only with RELMA and CLUE
	List surveillance systems receiving ELR	ECLRS is installed as a secure web-based system. ELR is routed to the appropriate disease surveillance information system: CDESS (integrated with STD case management, Syphilis serology tracking,TB, Hepatitis tracking, Perinatal Hepatitis, Contacts, Rabid animals), Lead (push to the surveillance system), congenital (pull), cancer (pull), HIV (pull and integrated with eHARS), external database for syndromic surveillance
	Areas of integration with NEDSS Compatible system (e.g. program assignment)	N/A
	Management of Local Codes	Assigns local test codes to diseases in ECLRS
	Management of Mapping to standards	Mapping LOINC®/SNOMED to test type, test results, and specimen source in ECLRS
System Functions	Web-based services	ECLRS provides web-based services for content validation, content translation, and subscription
	HL7 Message Validation	ECLRS provide structural and content validation
	Routing	Management of routes are configured in ECLRS to send or make available ELR messages to the appropriate surveillance application
	Alerting (email, SMS)	Within ECLRS, the system can generate phone calls of receipt of immediate reportable conditions, email notification for failed file submission
	Reporting	ECLRS, using the QA module, produce daily, weekly, monthly, and yearly reports of ELR system status, performance, and/or trends

Volume of Cases			
Population Size (Range)	15,000,000 - 20,000,000		
Total number of Cases by Condition Type	Cases*	With Lab Info	Initiated by ELR
General Communicable Disease	415,972	415,972	
HIV/AIDS	563,981	563,981	563,981
Sexual Transmitted Disease	224,360	224,360	
Tuberculosis	31,496	31,496	
Cancer	53,103	53,103	
Environment Health	894,185	894,185	
Reporting Entities	Eligible Hospitals	Independent Labs	Public Health Labs
Estimated Number in Jurisdiction	248	246	9
Number currently in production with ELR	245	238	9

* Cases/per specimen accession/per year

Engagement Process (optional)

Messaging Function	Eligible Hospital Range of Hours Spent	Independent Labs Range of Hours Spent	Public Health Lab Range of Hours Spent
HL7 Message (structure and Content) Validation	30-100	40-200	30-150
Management of Local Codes	5-15	10-30	10-30
Management of Mapping to standards	5-15	10-30	10-30
Routing	1-2	1-2	1-3

Daily routine tasks

- Provide assistance to Local Health Departments & State with questions on lab reports
- Provide assistance to hospitals & labs with issues regarding submission of data & data quality
- Provide assistance to labs installing automated transmission software
- Provide assistance to Labs coding LOINC/SNOMED

New Jersey

In New Jersey, electronic laboratory reporting (ELR) is primarily supported by 1.5 FTE(s). The majority of ELR reports received by the state are consumed in the NEDSS Compatible System, includes all state reportable general communicable diseases and sexually transmitted diseases (STDs). The receipt of ELR for positive test results for state reportable diseases is sent to the Communicable Disease Reporting and Surveillance System (CDRSS) via Rhapsody. Currently, ELR is received in HL7 2.3.1 and 2.3z formats.

	ELR System Characteristic	Description
Architecture	Enterprise Application Integration (EAI) System	The state uses CDC funded COTS product, Orion Health's Rhapsody Integration Engine (Rhapsody) to process incoming receipt of ELR for positive test results for state reportable communicable diseases and stored in an Oracle data base.
	Integration to Standards System (e.g. VADS, RELMA, UMLS)	Only with PHIN VADS (i.e., SNOMED) and RELMA
	List surveillance systems receiving ELR	Rhapsody is installed as a stand-alone system. ELR is routed to the appropriate disease surveillance information system: CDRSS (includes STD)
	Areas of integration with NEDSS Compatible system (e.g. program assignment)	N/A
	Management of Local Codes	Do not accept Local Codes.
	Management of Mapping to standards	Standardize LOINC® codes are mapped to the reportable condition using ELR module in CDRSS
System Functions	Web-based services	Content validation, content translation, and subscription
	HL7 Message Validation	Rhapsody provides structural validation. Program conducts content validation
	Routing	Rhapsody is used to receive all incoming ELR messages with positive and negative test results and route to the appropriate surveillance application; CDRSS (includes STD)
	Alerting (email, SMS)	Within CDRSS, the system can generate reports of receipt of immediate reportable conditions
	Reporting	Produce daily, weekly, monthly, and yearly reports of ELR system status, performance, and/or trends using the CDRSS

Volume of Cases			
Population Size (Range)	5,000,000 - 10,000,000		
Total number of Cases by Condition Type	Cases*	With Lab Info	Initiated by ELR
General Communicable Disease (June 1, 2011 - Sept 30, 2011	19,746	100%	Automated ELR- 70% Manual ELR - 30%
HIV/AIDS			
Sexual Transmitted Disease (June 1, 2011 - Sept 30, 2011)	15,072	100%	Automated ELR- 70% Manual ELR - 30%
Tuberculosis			
Cancer			
Environment Health			
Reporting Entities	Eligible Hospitals	Independent Labs	Public Health Labs
Estimated Number in Jurisdiction	73	5 major labs	1
Number currently in production with ELR	Automated - 6 Manual ELR - 73	5	1

Engagement Process (optional)

Messaging Function	Eligible Hospital Range of Hours Spent	Independent Labs Range of Hours Spent	Public Health Lab Range of Hours Spent
HL7 Message Validation	80-140 (Depends on hospital system)	100-160 (We have done as little as 20 hours and as long as almost 8 months with Quest)	ongoing
Management of Local Codes	0	0	0
Management of Mapping to standards	35-50 (this includes feedback on incorrect codes)	50- 100 (this includes feedback on incorrect codes)	Ongoing as we provide our PHL with the proper codes.
Routing			

Tennessee

In Tennessee, electronic laboratory reporting (ELR) is primarily supported by a team of 5 people, of which only 1 is designated 100% for ELR. The others split their time. All ELR reports received by the state are consumed in the NEDSS Base System, as well as other respective surveillance systems. The receipt of ELR for reportable test results for state reportable diseases is sent to the surveillance systems via Electronic Data Interchange (EDI), Orion's Rhapsody or through extracts from NBS, as is the case with STD records going to PRISM. Currently, ELR is received in production in HL7 v 2.3.1 format from 2 national laboratories; however TN has the capability to receive ELR in HL7 v 2.5.1 format in production as well. In March of 2011 TN moved 6 hospitals, representing 1 hospital system, sending ELR via HL7 2.5.1 into production. Later in June, that hospital system was removed from production to correct vocabulary issues. They will be returned to production status during the fall of 2011.

	ELR System Characteristic	Description
Architecture	Enterprise Application Integration (EAI) System	The state uses CDC funded COTS product, Orion Health's Rhapsody Integration Engine (Rhapsody) and NEDSS Message Subscription Service (MSS) to process incoming receipt of ELR for test results for state reportable conditions and events. All labs received electronically via transport mechanisms other then the PHIN MS, like via SFTP, will be funneled through an outward facing EDI engine, Cloverleaf. *See attached diagram.
	Integration to Standards System (e.g. VADS, RELMA, UMLS)	PHIN VADS is integrated with MSS however the integration is not automated. In addition, TN uses RELMA and UMLS for LOINC® and SNOMED validation, respectively.
	List surveillance systems receiving ELR	Rhapsody is installed as a stand-alone system and receives as well as sends ELR and sends case notifications. ELR is routed to the appropriate disease surveillance information system: NBS, Prism (STD), and eHARS & Lead. The state transforms originally received messages in cloverleaf and, if necessary, transforms in to 2.3.1 or proprietary message/document/xml for consumption in NBS.
	Areas of integration with NEDSS Compatible system (e.g. program assignment)	Currently all ELR process to NBS. STD & HIV labs are sent to PRISM via an NBS extract. HIV labs are routed to eHARS for importation. Lead labs are routed to the Lead surveillance program (external contracted partner). Labs received for patients residing in Alabama will be routed and transported to Alabama via PHIN MS.
	Management of Local Codes	TN DOES NOT map labs' local test codes to LOINC® on their behalf. We will validate their codes for consistency against their descriptions, as well as to filter out any that would not yield a reportable observation.
	Management of Mapping to standards	Manages mappings in MSS. TN DOES NOT map labs' local test codes to LOINC® on trading partners' behalf.
	Web-based services	Rhapsody provides web based services for Content validation, content translation, and subscription.

System Functions	HL7 Message Validation	Rhapsody and MSS provide structural validation and limited content validation. Additional validation is performed using the CDC's MQF, as well as manually. Manual validation tends to pick up most of the detailed problems.
	Routing	Management of routes and configuration are performed in Rhapsody to send ELR messages to the appropriate surveillance application or other public health partners.
	Alerting (email, SMS)	Currently, Rhapsody is not used for alerting. Other alerting mechanisms will be deployed external to the EDI engine.
	Reporting	ELR internal control measures need to be further refined and implemented within and external to Rhapsody and Cloverleaf to report on the ELR system status. Current available information available in the NBS only pertains to lab observations received via ELR messages and cannot be used to estimate the affect on investigations and case reporting, or to calculate relative descriptive measures as NBS is not used for all surveillance activities for all the surveillance programs (like STD, HIV, and Lead; basically no denominator for total labs received). TN aims to implement an ELR repository where the information can be queried and internal control measures, metrics, and validation reports can be generated instead of messages being stored as payload in archives and worker queues.

Volume of Cases			
Population Size (Range)	5,000,000 - 10,000,000		
Total number of Cases by Condition Type	Cases*	With Lab Info	Initiated by ELR
General Communicable Disease			
HIV/AIDS			
Sexual Transmitted Disease			
Tuberculosis			
Cancer			
Environment Health			
Reporting Entities	Eligible Hospitals	Independent Labs	Public Health Labs
Estimated Number in Jurisdiction	131	12	1
Number currently in production with ELR	0	2*	0

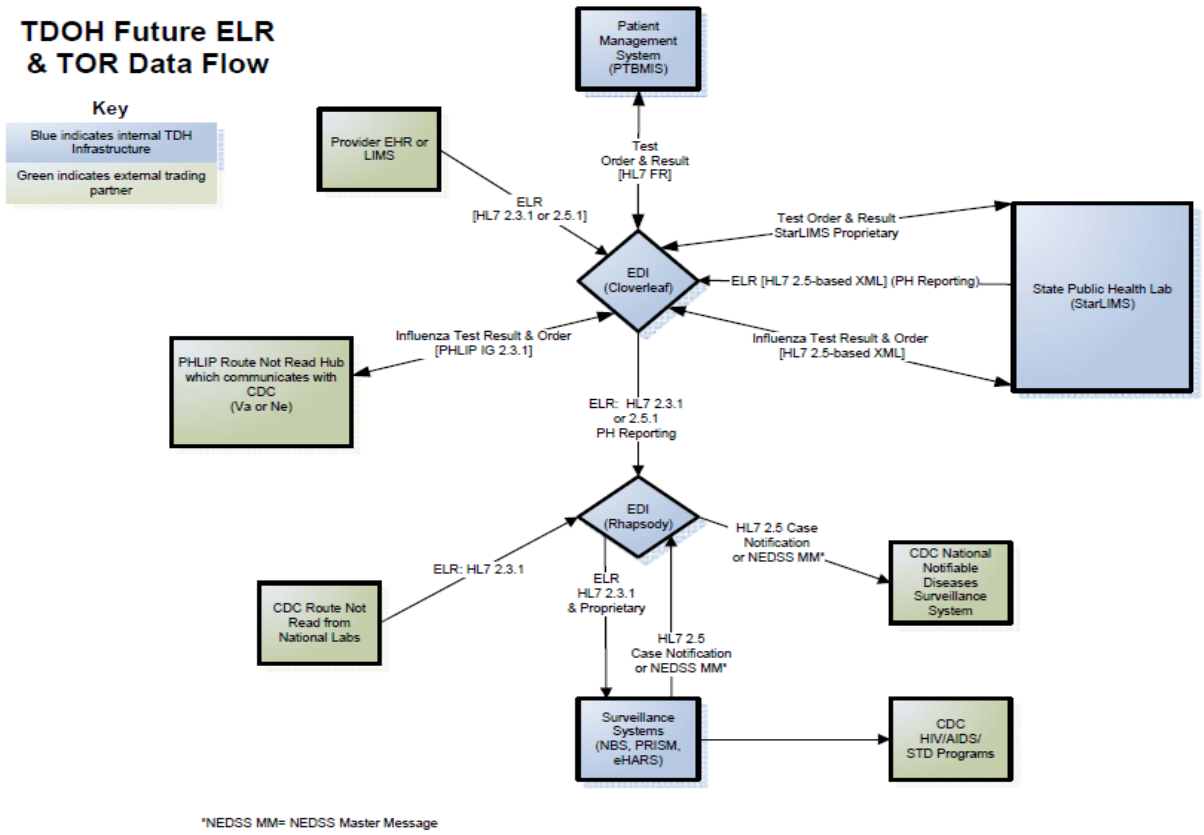
***For the purpose of these numbers, the national labs (Mayo and LabCorp) are counted as 1 each**

Engagement Process (optional)

Messaging Function	Eligible Hospital Range of Hours Spent	Independent Labs Range of Hours Spent	Public Health Lab Range of Hours Spent
HL7 Message Validation & vocabulary validation^	189-4536 (1week to 6 months)	189-4536 (1week to 6 months)	Planned for fall 2011
Management of Local Codes	0	0	0
Management of Mapping to standards	0	0	0
Routing ** total time spent for	NA	NA	NA

^We estimate anywhere from about a week to about 6 months to validate a new trading partners HL7 message structure and content to move to production. This time includes the back and forth with the trading partner, testing their changes and updates. Depending on whether or not the TP has already started LOINC® coding and whether or not they have a copy of the actual HL7 standard and the actual HL7 Implementation guide usually determines how long this process takes. Also, the more trading partners we are working with at a time also have a direct affect the length of time it takes to move one to production. Testing with the state lab is planned for fall 2011. Work has already begun to develop a streamlined testing plan and they have already LOINC'd their catalog of tests. Regarding the management of mapping to standards, I would imagine any of this work would be grouped into this time; keeping in mind that TN does not LOINC code tests for trading partners, nor do we provide them with a list of

**This represents the time it took to get our routing to where it is today. Because our routing was designed to handle labs based on types of trading partners, and not specific trading partners, the routing currently in place moves lab observation data to where it needs to go regardless of where it came from, thus requiring little manipulations to bring on a new trading partner. That said, routing for this purpose, does not include the setting up and testing of transport to deliver the messages to our internal EDI engine (Rhapsody) or the constant updates and refinement we make regularly.


TDOH Future ELR & TOR Data Flow
Key
Blue indicates internal TDH Infrastructure
Green indicates external trading partner
Patient Management System (PTBMIS)
Provider EHR or LIMS
Test Order & Result [HL7 FR]
ELR [HL7 2.3.1 or 2.5.1]
Test Order & Result StarLIMS Proprietary
EDI (Cloverleaf)
ELR [HL7 2.5-based XML] (PH Reporting)
State Public Health Lab (StarLIMS)
Influenza Test Result & Order [PHLIP IG 2.3.1]
PHLIP Route Not Read Hub which communicates with CDC (Va or Ne)
Influenza Test Result & Order [HL7 2.5-based XML]
ELR: HL7 2.3.1 or 2.5.1 PH Reporting
EDI (Rhapsody)
HL7 2.5 Case Notification or NEDSS MM*
CDC National Notifiable Diseases Surveillance System
ELR: HL7 2.3.1
CDC Route Not Read from National Labs
ELR HL7 2.3.1 & Proprietary
HL7 2.5 Case Notification or NEDSS MM*
Surveillance Systems (NBS, PRISM, eHARS)
CDC HIV/AIDS/ STD Programs
*NEDSS MM= NEDSS Master Message

	A	B
1		
2	**Architecture and system functionality**	**Description**
3	Enterprise Application Integration (EAI) System	The EAI system consists of middleware (i.e., software and hardware) to receive/send/route electronic messages and to process and transform data to a specific format/standard (e.g., HL7 v2.3.1, 2.5.1, CDA). EAI can be used to manage mapping to standard vocabulary, message structural/content validation, alerting, and reporting. Some examples of the middleware are Orion Rhapsody, Mirth, and Cloverleaf used as primary EAI engine. The EAI system may include an EAI engine coupled with built web-based services (see definition below), such as NEDSS Message Subscription Services. In other states (e.g., MA and NY state), the EAI system is a state/vendor-developed system that may act as the primary data broker/hub.
4		
5	Integration to Standards	The ability of the middleware to talk/connect with another system housing data standards (e.g., terminology, vocabulary, codes). Examples of such a system include CDC's PHIN VADS, RELMA for LOINC codes, and UMLS for SNOMED.
6		
7	List surveillance systems receiving ELR from the EAI engine	List surveillance systems receiving/pulling ELR directly from the EAI engine or associated database
8	Areas of integration with NEDSS Compatible system (e.g., program assignment)	The NEDSS compatible system serves as a intermediate hub for incoming ELR, associates results/tests to a condition, and routes to the appropriate surveillance application
9		
10	Management of local codes	Describe how your system stores and manages sets of local codes
11		
12	Management of mapping to standard [vocabulary]	Describe how your system manages mapping of local codes to standard codes
13		
14	Web-based services	Does your system use secure external applications to support message validation and to apply business rules? If so, describe where and how this is done. List web-based services that are used?
15		
16	HL7 Message validation	Does your system conduct structural and content validation? If so, describe where and how this is done.
17		
18	Routing	Describe how messages are routed in your system and where the routing is managed.
19		
20	Alerting	Does your system send out alerts (e.g., email, pager, phone call, text) for any or all reportable conditions? If so, describe where and how this is done.
21		
22	Reporting	Does your system produce any reports about the system status (e.g., Daily reports of incoming ELR by sending facility)? If so, please describe which system component is used to produce these reports.
23		

State	Population Size	Groupings
Delaware	897,934	Small
Florida	18,801,310	Large
Idaho	1,567,582	Small
Kansas	2,853,118	Small
Massachusetts	6,547,629	Medium
Nebraska	1,826,341	Small
New Jersey	8,791,894	Large
New York	19,378,102	Large
Tennessee	6,346,105	Medium

Category	Percentile	Population Size range
Small	0 to 50%	0 to 4369356
Medium	50% to 75%	4369357 to 6708787
Large	75% and greater	> 6708787