

A Cost Analysis of the Enhancing Linkage of STI and HIV Surveillance Data SPNS Initiative

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Margaret Vaaler and Jon Hecht have no relevant financial interests to disclose.

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Learning Objectives

At the conclusion of this presentation, participants will be able to:

- Understand the role that staff's hours play in the data linkage process, and how to use Bureau of Labor Statistics data to translate these hours to costs.
- Describe the variation in data linkage cost by four jurisdictions as determined by their readiness for data linkage implementation.
- Document how information on the lifetime costs of HIV treatment can be used to evaluate the benefits, in terms of avoided HIV infections, that would be needed for the program to be cost-beneficial.

Introduction

- Burden of HIV and STIs
 - STIs drive a substantial portion of new HIV transmission.
 - Part of the public health response to this increase in STIs is understanding patterns in co-occurring HIV and STI diagnoses. Doing so requires linking HIV and STI surveillance data.
- Challenges with data linkage
 - All HIV surveillance programs use eHARS (Enhanced HIV/AIDS Report System) to report HIV prevalence to the CDC.
 - STI surveillance programs do not use a uniform data system for reporting.
 - Data required to conduct data linkage is not always complete.

Introduction continued 1

- The purpose of the evaluation was to design, pilot, and conduct an evaluation of the technical assistance (TA) provided to assist Ryan White jurisdictions with linking HIV and STI surveillance data.
 - TA was provided by HRSA-funded TA Provider (TAP), Georgetown University.
- Four jurisdictions received TA from the TAP and participated in an evaluation to assess system-level changes in jurisdictions' ability to link HIV and STI data and subsequently use those data to improve quality of care and health outcomes for people with HIV.
 - Alabama, Washington DC, Florida, and Louisiana Departments of Public Health.

Introduction continued 2

- The TAP held monthly meetings with each jurisdiction to monitor progress.
- The jurisdictions completed needs assessments.
- The jurisdictions developed Data Implementation Plans, which outlined jurisdiction-specific focus areas based on the needs assessments.
- The TAP:
 - Completed site visits (virtual and in-person).
 - Developed a Community of Practice for staff in jurisdictions.
 - Created TA work groups tailored to each jurisdictions' focus areas.

Introduction cont.

Stage	Stage at Start	Stage at End
1. Completely disparate systems, no direct linkage between the STI and HIV systems, with ad hoc manual matching for reporting purposes only.	AL	
2. HIV and STI data in separate systems, but unique patient IDs linked regularly via SAS code, link king, or other matching strategy.	FL, LA, DC	LA
3a. HIV and STI data are transferred to and stored within a Data Warehouse, with linked unique IDs, to create a 'master patient record.'		FL, AL
3b. HIV and STI data are primarily stored within a single, fully integrated surveillance system, and single-disease systems are phased out.		DC

Evaluation Questions Guiding the Cost Analysis

- Can the *costs* and potential cost savings of the linking, including the creation and maintenance of sharing agreements, data warehouse creation and maintenance, data standardization, linking, making the data available, creating and disseminating reports to clinics/providers, and training to use the data be quantified?
- Can the *benefits* from jurisdictional health policy improvements or improvements to clinical delivery be quantified, in the form of improved policy solutions and improved client health (e.g., viral suppression, retention in care, STI management and treatment, interventions of PrEP for partners)?

Cost Analysis Approach

- Sources for cost analysis:
 - Subaward allocation totals by jurisdiction.
 - Jurisdictions reported time spent (in hours) on project-related activities.
 - Reporting period was from Sept. 2020 to April 2022.
 - Jurisdictions reported by staff employee category (e.g., Data Manager, Epidemiologist).
 - Jurisdictions reported time for the following activity categories 1) preparation, 2) legal activities, 3) training, 4) linking activities, and 5) reporting.

Cost Analysis Approach continued 1

- Abt staff mapped the occupation categories of staff at the jurisdiction health departments with state-specific occupation categories from the Bureau of Labor Statistics (BLS).
- These salary estimates provide the median hourly wage.
- We added a BLS estimate for fringe benefits per hourly wage rate to obtain hourly compensation rates.
 - Fringe benefits: insurance, retirement contributions, social security, Medicare costs, etc.
- The average fringe benefit cost for state and local government employees in 2021 was 38.3%.

TAP Staff Augmentation

- We also accounted for time spent by TAP staff who performed linkage activities beyond routine TA work.
 - TAP staff writing SAS code on behalf of health department staff.
 - TAP staff working as a project manager in two jurisdictions.
- This was due to:
 - Staffing shortages or turnover
 - COVID-19
- Their time is included in the cost analysis because the TAP was performing more than normal TA.

Cost Analysis Approach continued 2

Month	Hours per Month	Staff Category	BLS Occupation Category	BLS Median Hourly Wage Rate	Hourly Compensation Wage Rate	Total Cost
May 2021	2	Epidemiologist	Epidemiologist	\$33.49	\$46.32	\$92.63
June 2021	18	HIV Surveillance Director	Medical and Health Services Managers	\$39.71	\$54.92	\$988.54
June 2021	40	Other: IT	Information Security Analysts	\$39.30	\$54.35	\$2,174.08

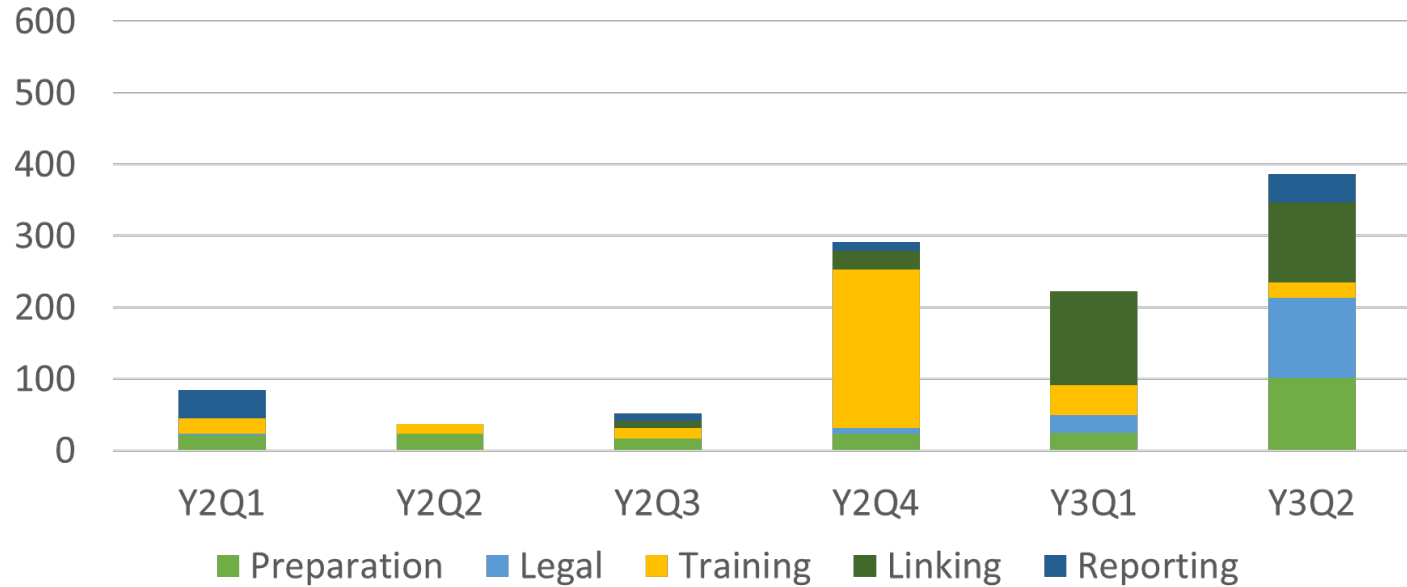
Overall Findings by Jurisdiction

Jurisdiction	Total Cost of Staff Time	Total Staff Hours	Average No. of Staff in a month	Min. No. of Staff in a Month	Max No. of Staff in a Month
Alabama	\$62,574	1,354	9	5	17
Washington DC	\$145,224	1,999	15	7	22
Florida	\$66,664	1,863	29	10	51
Louisiana	\$145,331	2,984	25	18	33

TA Focus Areas and Progress in Alabama

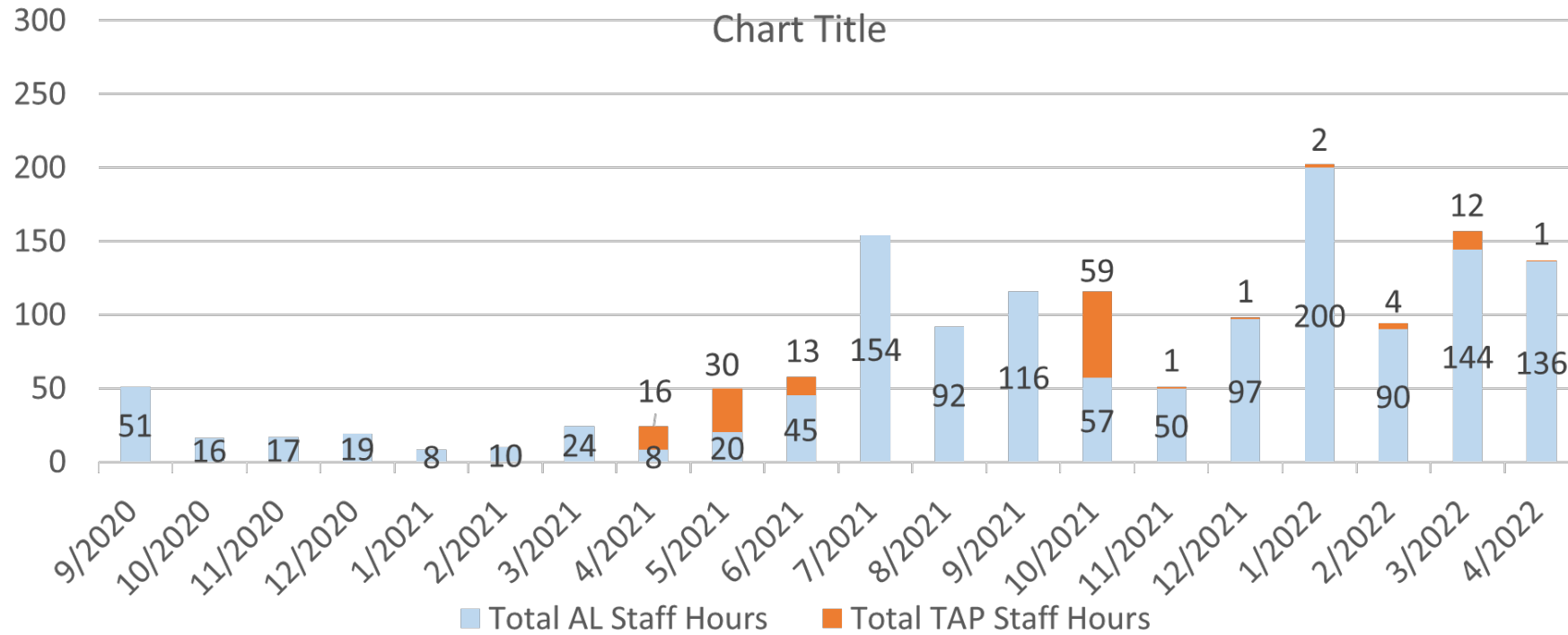
- Focus Areas:
 - Staffing support
 - Data integration within a single system
 - Improve data to care (D2C) capacity
- Progress:
 - Development of central linkage data warehouse to enhance availability of timely, comprehensive HIV/STI data.
 - Design, test, implement, and publish data dashboards to inform prevention, outreach, and education efforts.
 - HIV/RW provider collaboration-building to enhance care provision capacity.

Time Spent on Project Activities by Quarter in Alabama



Activity	Y2Q1	Y2Q2	Y2Q3	Y2Q4	Y3Q1	Y3Q2
Reporting	39	0	10	12	0	40
Linking	-	0	10	26	132	112
Training	22	13	15	222	42	22
Legal	2	0	0	8	24	112
Preparation	22	24	17	23	25	101

Staff Hours by Month in Alabama



Date	Total TAP Staff	Total AL Staff
Sep-20	-	51
Oct-20	-	16.5
Nov-20	-	17
Dec-20	-	19
Jan-21	-	8
Feb-21	-	10
Mar-21	-	24
Apr-21	16	8
May-21	30	20
Jun-21	13	45
Jul-21	-	154
Aug-21	-	92
Sep-21	-	116
Oct-21	59	57
Nov-21	1	50
Dec-21	1	97
Jan-22	2	200
Feb-22	4	90
Mar-22	12.5	144
Apr-22	1	136

Total Costs for Alabama

	Costs in Year 2	Description	Costs in Year 3	Description	Total
Staff Cost	\$22,549	Total cost of staff time	\$40,025	Total cost of staff time	\$62,574
Total Subaward Cost	\$120,000	HIV Server BH-Works	\$146,610	Supplement personnel Technical supplies SAS and Tableau training Conferences and Workshop attendance and travel	\$266,610
Total Cost for Alabama	\$142,549		\$186,635		\$329,184

TA Focus Areas and Progress in Washington DC

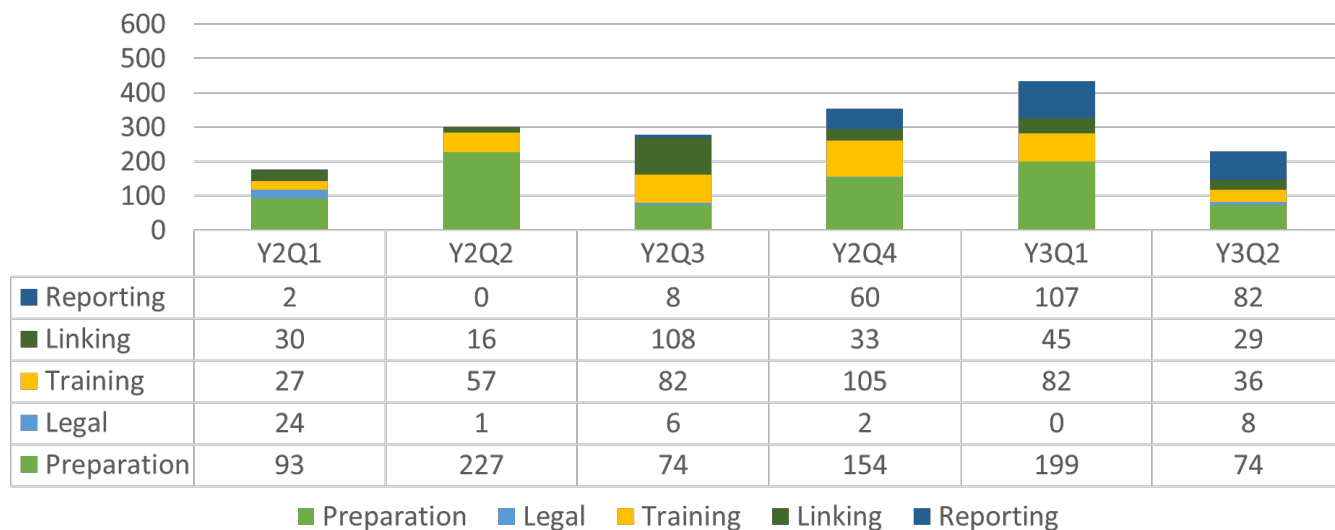
Focus Areas:

- Enhance the Strategic Information Division (SID) data linkage process.
- Enhance data sharing between the surveillance and the Ryan White data systems.
- Enhance D2C activities for people with HIV in the DC region.

Progress:

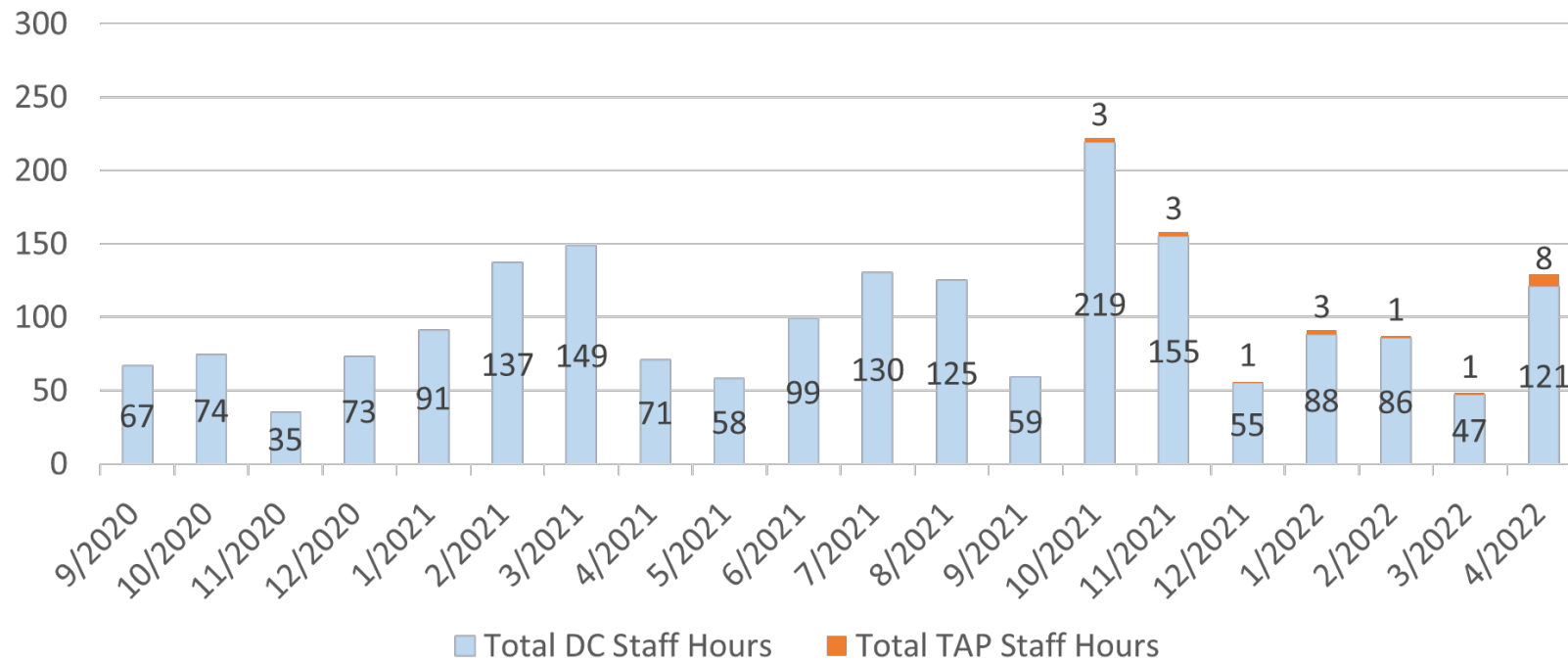
- Documented of data systems processes, and structures within the SID and the Care and Treatment Division (CTD).
- Defined parameters and mechanisms for data sharing between SID and CTD.
- Improved cooperation between SID and CTD D2C efforts.

Time Spent on Project Activities by Quarter in Washington DC



Quarter	Reporting	Linking	Training	Legal	Preparation
Y2Q1	2	30	27	24	93
Y2Q2	0	16	57	1	227
Y2Q3	8	108	82	6	74
Y2Q4	60	33	105	2	154
Y3Q1	10	45	82	0	199
Y3Q2	82	29	36	8	74

Staff Hours by Month in Washington DC



Date	Total DC Staff Hours	Total TAP Staff Hours
Sep-20	67	-
Oct-20	74	-
Nov-20	35	-
Dec-20	73	-
Jan-21	91	-
Feb-21	137	-
Mar-21	149	-
Apr-21	71	-
May-21	58	-
Jun-21	99	-
Jul-21	130	-
Aug-21	125	-
Sep-21	59	-
Oct-21	219	3
Nov-21	155	3
Dec-21	55	1
Jan-22	88	3
Feb-22	86	1
Mar-22	47	1
Apr-22	121	20 8

Total Costs for Washington DC

	Costs in Year 2	Description	Costs in Year 3	Description	Total
Staff Costs	\$86,285		\$58,939		\$145,224
Total Subaward Costs	\$100,000	Project Manager System Analyst Developer Conduent (contractor for maintenance of DC PHIS) Laptop, docking station, phone + plan	\$116,275	Personnel to supervise data management Project Manager, System Analyst, and Developer, and a subject matter expert Fringe Phone + plan Indirect	\$236,275
Total costs for Washington DC	\$186,285		\$175,214		\$381,499

TA Focus Areas and Progress in Florida

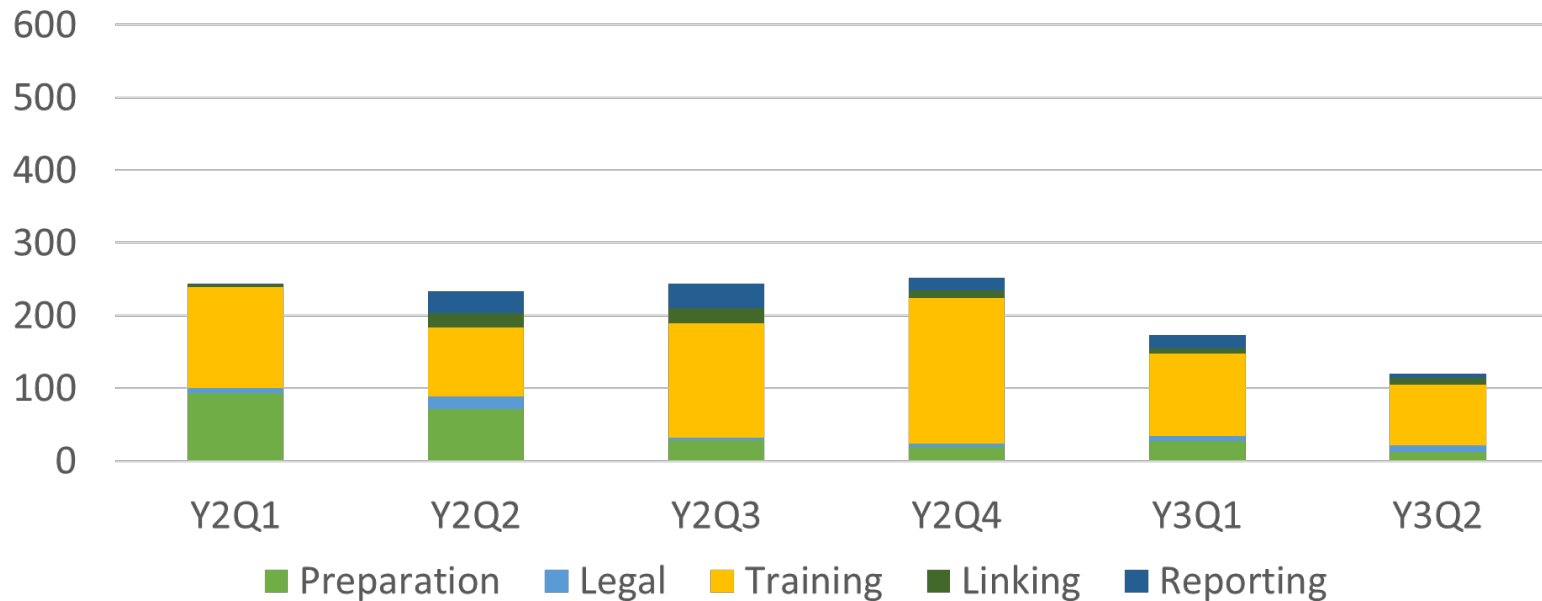
Focus Areas:

- Legal agreements for data sharing between the six Ryan White Part A areas.
- Enhance capacity for data integration between data systems.
- Establish data sharing pathways between Florida and Ryan White Part A areas.

Progress:

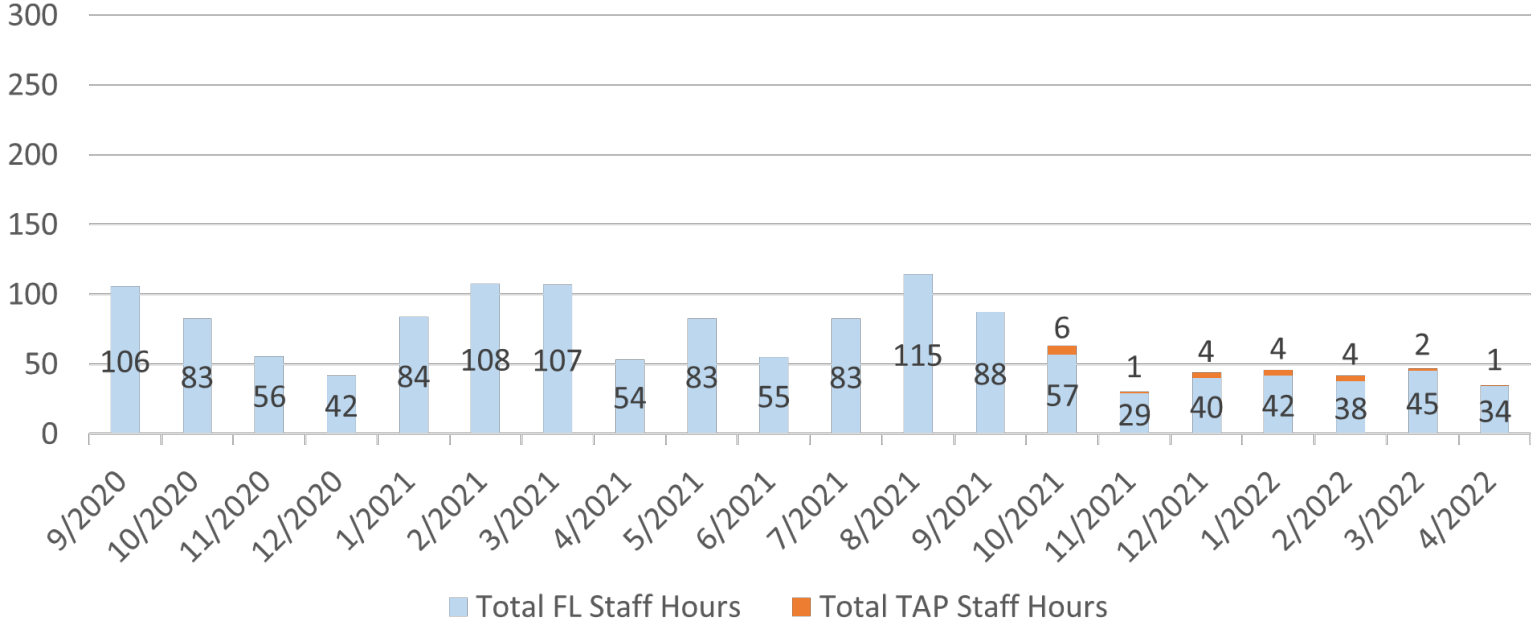
- Completed STI Tracking and Reporting System (STARS) enhancements.
- Enhanced HIV-STI data sharing via utilization of the data warehouse.
- Enhanced D2C efforts through increased collaboration and data sharing with the Ryan White Part A areas.

Time Spent on Project Activities by Quarter for Florida



Year	Rporting	Linking	Training	Legal	Preparation
Y2Q1	1	4	139	7	93
Y2Q2	30	20	95	18	71
Y2Q3	34	21	158	3	29
Y2Q4	17	11	201	4	20
Y3Q1	19		114	7	27
Y3Q2	6	9	84	9	12

Staff Hours by Month in Florida



Date	Total FL Staff Hours	Total TAP Staff Hours
Sep-20	106	-
Oct-20	83	-
Nov-20	56	-
Dec-20	42	-
Jan-21	84	-
Feb-21	108	-
Mar-21	107	-
Apr-21	54	-
May-21	83	-
Jun-21	55	-
Jul-21	83	-
Aug-21	115	-
Sep-21	88	0
Oct-21	57	6
Nov-21	29	1
Dec-21	40	4
Jan-22	42	4
Feb-22	38	4
Mar-22	45	2
Apr-22	34	24

Total Costs for Florida

	Costs in Year 2	Description	Costs in Year 3	Description	Total
Staff Costs	\$48,801	Total cost of staff time	\$17,863	Total cost of staff time	\$66,664
Total Subaward Costs	\$127,083	Two Developers to work w/STARS software on STI investigations, data analysis, integration w/other systems. Business Process Analyst Laptops, MSDN licenses, MS Visio license	\$146,336	Two Developers, Business Process Analyst	\$273,419
Total Costs for Florida	\$175,884		\$164,199		\$340,083

TA Focus Areas and Progress in Louisiana

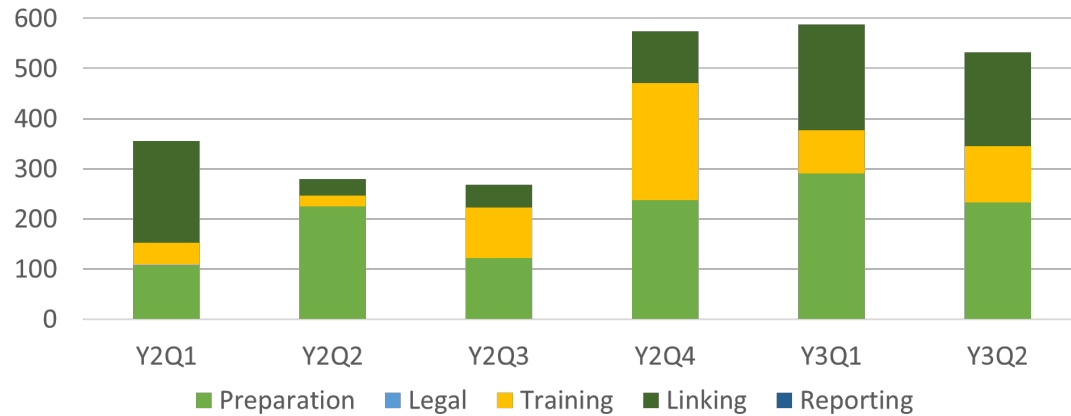
Focus Areas:

- Coordinate data sharing for the STI/HIV/Hepatitis Program data systems.
- Transition linkage database (LA LINKS) away from a Microsoft Access system.
- Enhance D2C activities via usage of Ryan White data.

Progress:

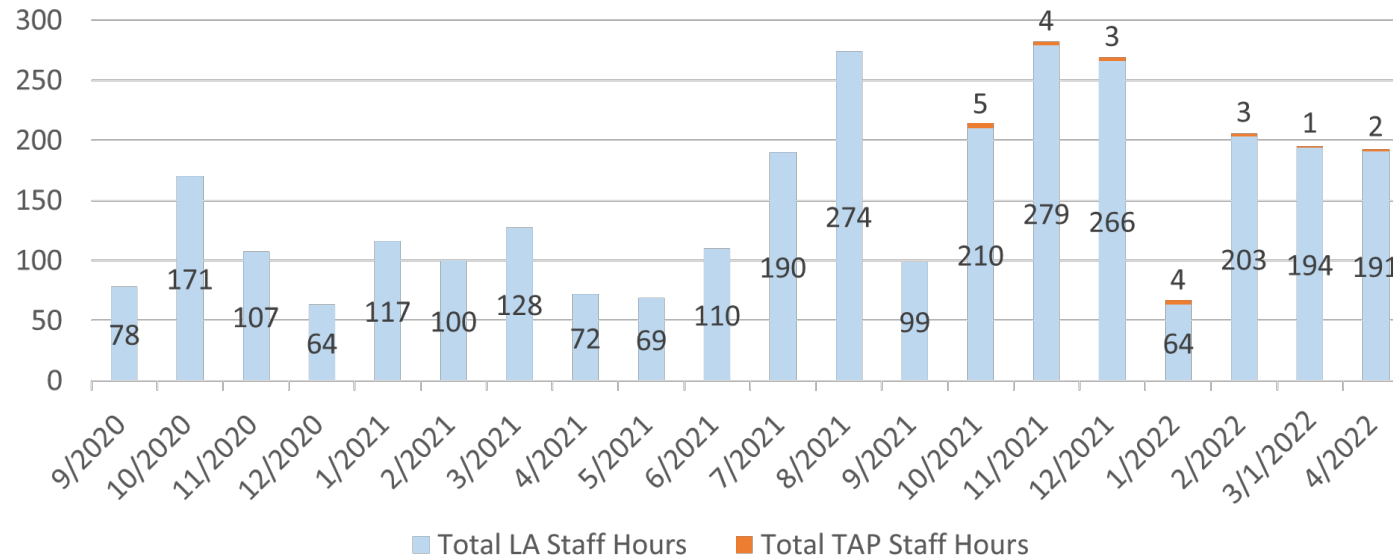
- Document and formalize SHHP data system process and workflows.
- Integrate HIV data into Patient Reporting Investigation Surveillance Manager (PRISM) system, document processes.
- Utilize Ryan White data in linkage to care efforts.

Time Spent on Project Activities by Quarter for Louisiana



Year	Reporting	Linking	Training	Legal	Preparation
Y2Q1	0	204	44	2	107
Y2Q2	0	34	22	0	225
Y2Q3	0	46	101	0	122
Y2Q4	0	103	233	0	238
Y3Q1	0	211	86	0	291
Y3Q2	0	187	113	0	233

Staff Hours by Month for Louisiana



Date	Total LA Staff Hours	Total TAP Staff Hours
Sep-20	78	0
Oct-20	171	-
Nov-20	107	-
Dec-20	64	-
Jan-21	117	-
Feb-21	100	-
Mar-21	128	-
Apr-21	72	-
May-21	69	-
Jun-21	110	-
Jul-21	190	-
Aug-21	274	-
Sep-21	99	-
Oct-21	210	5
Nov-21	279	4
Dec-21	266	3
Jan-22	64	4
Feb-22	203	3
Mar-22	194	1
Apr-22	191	2

Total Costs for Louisiana

	Costs in Year 2	Description	Costs in Year 3	Description	Total
Staff Costs	\$71,637	Total cost of staff time	\$73,694	Total cost of staff time	\$145,331
Total Subaward Costs	n/a		\$167,645	One-time initial setup costs of Epitrax, migration of data sources and migration of historical records. Indirect.	\$167,645
Total Costs for Louisiana	\$71,637		\$241,339		\$312,976

Implementation Costs by Jurisdiction

	Total Staff Hours	Total Cost of Staff Hours	Total Subaward Allocations	Total Cost across Jurisdictions
Alabama	1,354	\$62,574	\$266,610	\$329,183
Washington D.C.	1,999	\$145,224	\$236,275	\$381,499
Florida	1,863	\$66,664	\$273,419	\$340,083
Louisiana	2,984	\$145,331	\$167,645	\$312,976
Total	8,200	\$419,792	\$943,949	\$1,363,741

Introduction: Break-even Analysis

- It is not feasible to conduct a cost-benefit analysis (CBA) of the data linkage program.
 - The benefits of data linkage will not be fully realized for several years.
 - It is difficult to directly attribute avoided cases of HIV to the usage of linked data.
- Despite the inability to conduct a CBA, a break-even analysis (BEA) can provide useful information.
 - BEA estimates the benefits that a program or policy would need to achieve to be cost-beneficial (i.e., to at least break even).

Inputs for the Break-even Analysis

- Total program cost across all four jurisdictions.
 - Total undiscounted 3-year cost of \$1,363,741.
 - Total annualized cost of \$447,200 or \$437,645 at 3% and 7% discount rates, respectively.
- Annual medical treatment cost per case of HIV.
 - Lifetime cost of medical treatment per case of HIV was recently estimated at \$420,285 over an average length of 33 years (Bingham et al., 2021).
 - Annual cost of medical treatment per case of HIV is thus \$12,736 on an undiscounted basis.
 - This annual cost ranges from \$20,239 or \$32,954 when annualized at 3% and 7% discount rates, respectively.

Findings from the Break-even Analysis

Number of Annual Avoided HIV Cases Needed to Break Even Across Jurisdictions

Location	3% Discounting	7% Discounting
Alabama	5	3
Washington DC	6	4
Florida	6	3
Louisiana	5	3
Total	22	13

Findings from the Break-even Analysis continued

- Only a small number of HIV cases need to be avoided on an annual basis for the program to at least break even.
- This annual number of avoided cases needed to break even would likely decrease over time.
- While it cannot be known with certainty, it is reasonable to expect that the program would at least break even.

Implications of Findings

- Cost of staff time and decisions on how to spend subaward money was reflected by the stage at implementation for each jurisdiction and their project goals.
- Staff skillset, staff turnover influenced project implementation.
 - Implementation requires staff time taken away from routine work.
 - Importance of IT staff dedicated to linkage activities.
 - Leadership support.
 - Importance of documentation of linkage workflows for staff transitions.
- Based on the number of HIV cases, the program would need to help avoid in order to break even, the program is likely to be cost-beneficial.

Recommendations for the Future

- Future data linkage projects should consider:
 - The staff availability (including IT) to conduct an enhanced linkage project.
 - Current resources and needs for additional money for an enhanced linkage project.
 - The stage at implementation for each jurisdiction considering an enhanced linkage project.
- Evaluation of project benefits
 - Project benefits will be easier to evaluate once jurisdictions have had more time to use the linked data.
 - In the interim, break-even analysis can provide useful insights on potential benefits.

Questions, comments, and discussion

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