Using Data to Improve Decision Making

Commonwealth of PA Public Safety Delivery Center

PCCD CJAB Conference

April 2022



Public Safety Delivery Center

- Office of Administration, Office of Information Technology (OA OIT)
- Agencies supported:
 - Commission on Crime & Delinquency
 - Department of Corrections
 - Justice Network
 - Office of Victim Advocate
 - Parole Board
 - Sex Offender Assessment Board
 - State Police



Why Use Data to Support Decision Making

Improve Strategic Planning

- ✓ Improve Buy-In
- ✓ Become Proactive
- ✓ Reveal hidden insights

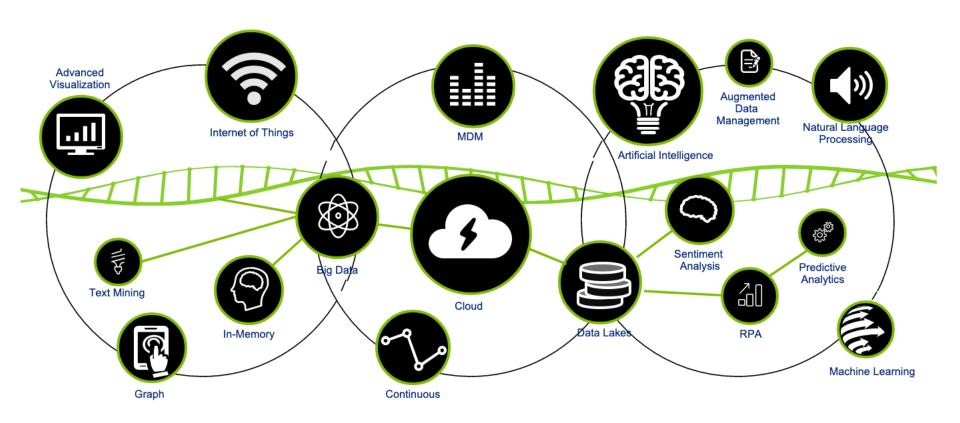
Improve Operational Performance

- ✓ Realize efficiencies
- ✓ Decrease Costs



How to Get Started?

Don't let the lingo intimidate you





How to Get Started?

Have a **Business Centric** Focus

"What information could help us support our vision, mission or strategic goals?"

"What are we trying to improve?"

"Where do we want to be as a department, organization or county?"

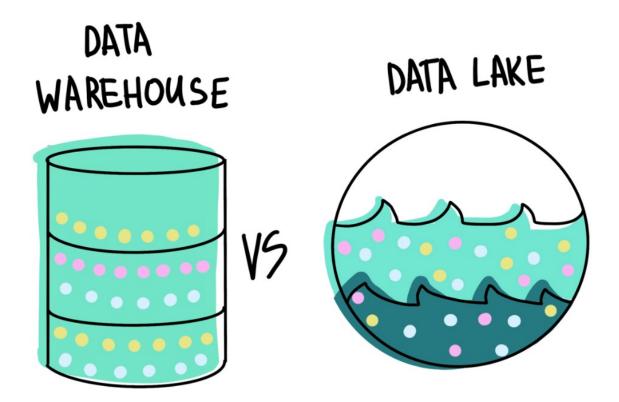


Understand Your Data

- What information do you have access to?
- Internal v. External?
- Structured v. Unstructured?
- Timeliness (real time v. batched data)?



Storage Considerations





Security

Different roles for different users

- Developers
- Data Analysts
- Executives
- Power Users
- Staff
- Public

Role-Based Access Control (RBAC) is a security paradigm whereby users are granted access to resources based on their role in the company.



Design Considerations

Data Tools

- Think of Data Tools as Commodities
- As simple as Excel, as complex as MDM





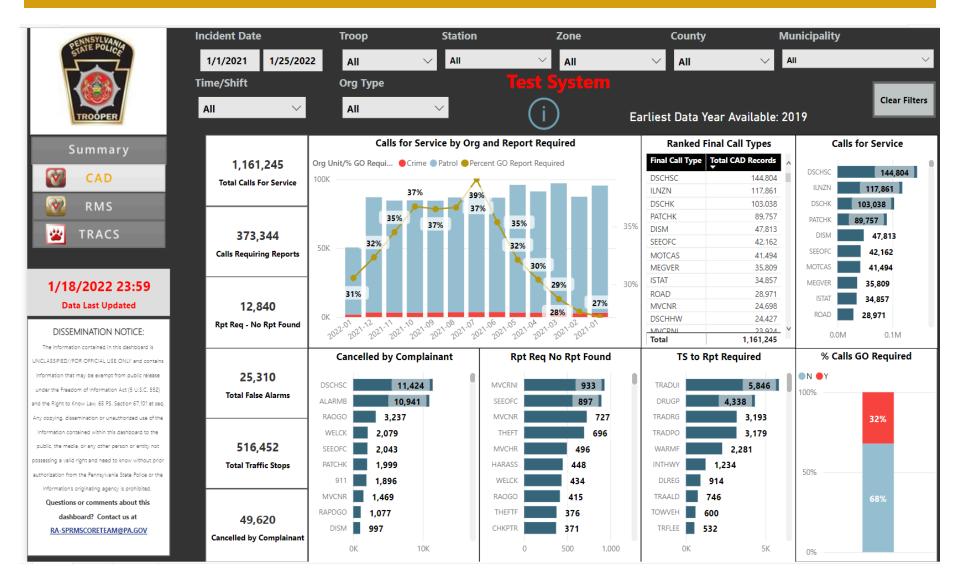
Examples

Examples from:

PSP JNET DOC PBPP

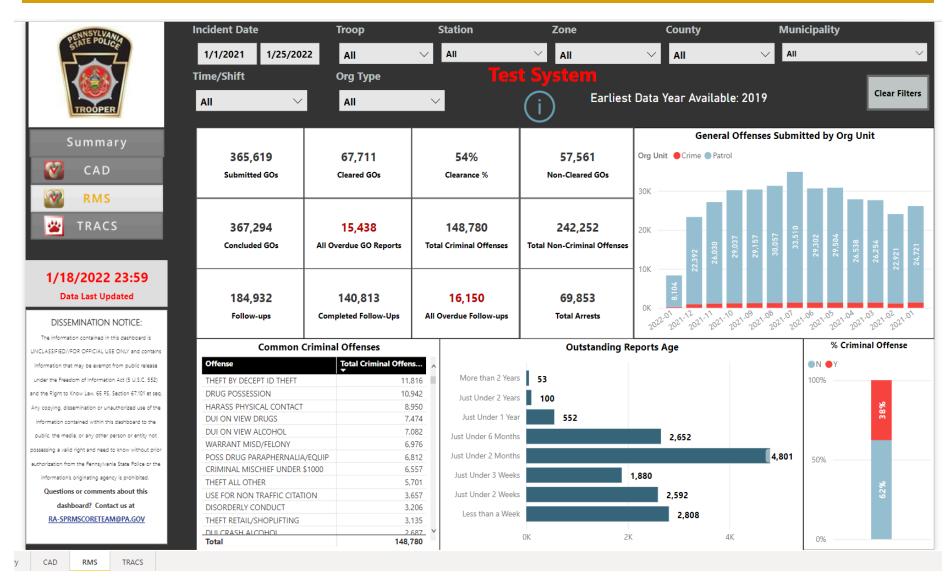


Example - PSP CAD Report



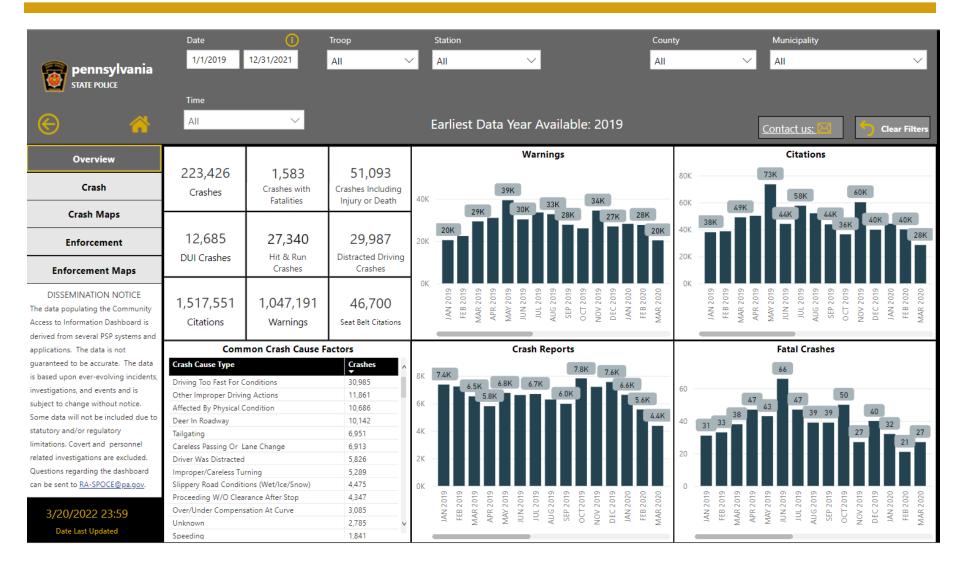


Example - PSP RMS Dashboard





Example - PSP CAID Dashboard





Feedback

"Data analysis and visualization is creating efficiencies in how the PSP manages its finite resources to their maximum potential. The PSP is also extremely close to using holistic data analysis for individual and group performance management. Both benefits are only achievable through a robust relationship with IT professionals and a mutual understanding of business goals."

Major Sean Georgia, Director, Bureau of Communications and Information Services



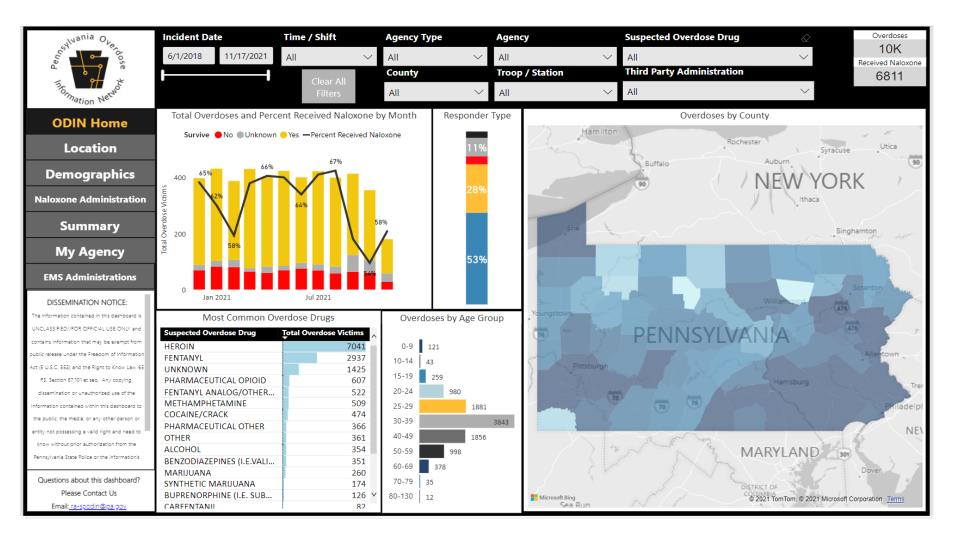
ODIN

Overdose Information Network (ODIN)

- A statewide criminal justice application developed in coordination with the Pennsylvania State Police and the Liberty Mid-Atlantic HIDTA that:
- Tracks overdoses, naloxone administration, and identifiable drug markings
- Is accessible through the JNET portal
- Provides real-time information and intelligence on drug markings and those trafficking narcotics
- Enables the sharing of overdose and naloxone administration information with state and local policy and decision makers in treatment, prevention, education, and law enforcement to assist in creating effective treatment and prevention strategies

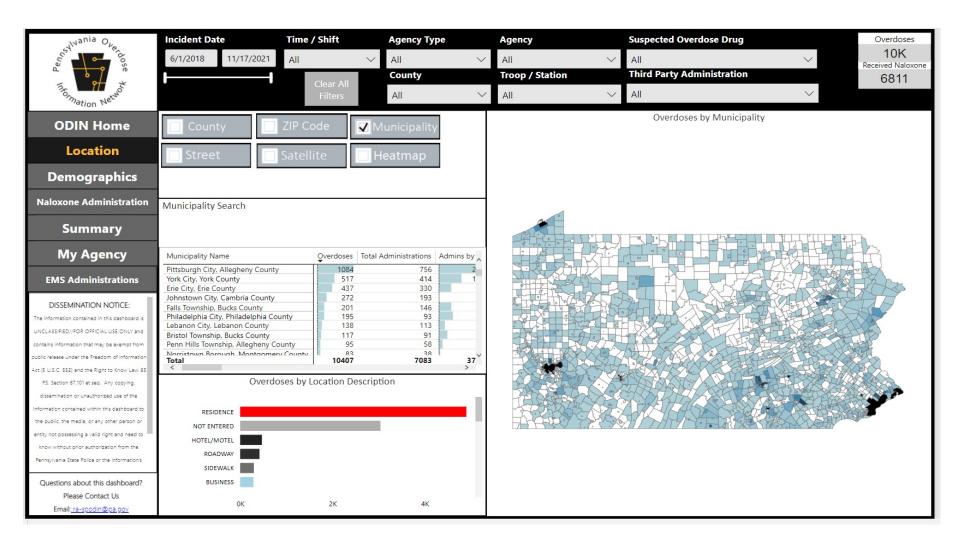


ODIN



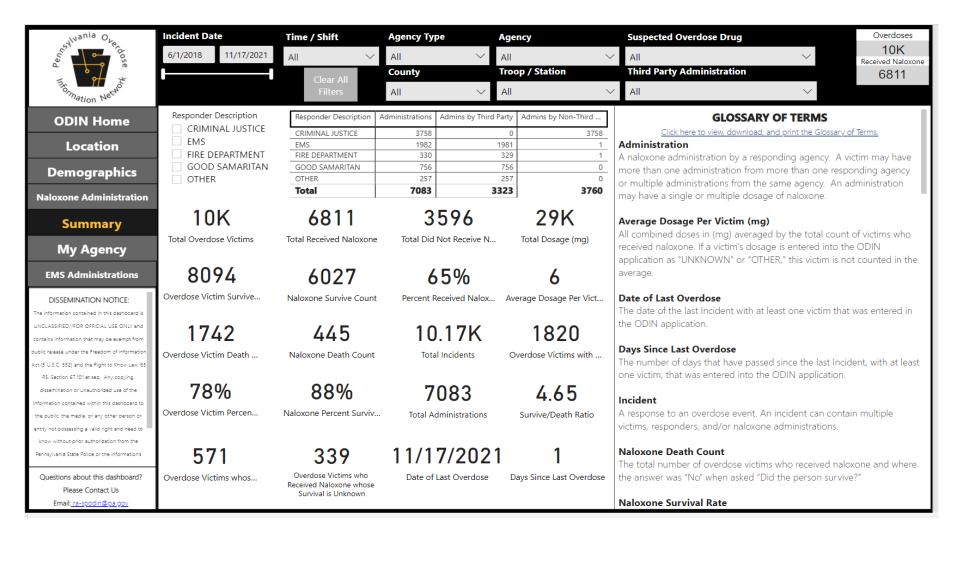


ODIN





-ODIN



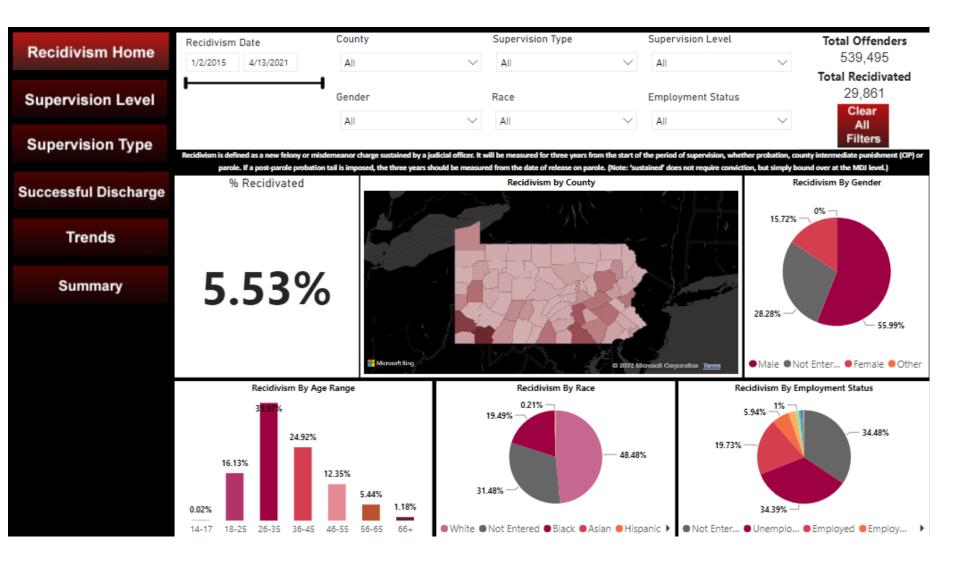


JNET Recidivism Dashboard

- Partnership with County Chief Adult Probation and Parole Officers Association & the Administrative Office of Pennsylvania Courts
- Leverages AOPC Court Case Event information & County Electronic Reporting Probation and Parole (ER2P) Information
- How do agencies measure successful outcomes?
 - Different measurements of Recidivism
 - Does programming work?
 - How do outcomes compare across between comparable counties?
 - Does county size or classification impact outcomes?



JNET Recidivism Dashboard





- Analytics tool for The Bureau of Intelligence and Investigations (BII).
- Request: Ability to assess the drug vulnerability of inmates and institutions.
- Solutions: Predictive Analytics utilizing machine learning.

The assessment predicts which inmates are most likely be found in possession of drugs.



 Use machine learning to analyze, build model and predict the drug violation risk for inmates.

Machine learning is a method of data analysis that automates analytical model building. It is a branch of artificial intelligence based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention.



Target:

 How likely the inmate will make any drug-related misconduct. (Drug-Misconduct history)

Factors:

- Age, Sex, Marital Status
- Problems Areas:
 - Assault, Sex Offense, Minor Victim, Drug, Alcohol, Escape,
 Walk Off, Mental Health, Suicide, Domestic Violence
- Others
 - Years served, Z-coded, Total Misconducts



- Algorithms
 - Linear Regression

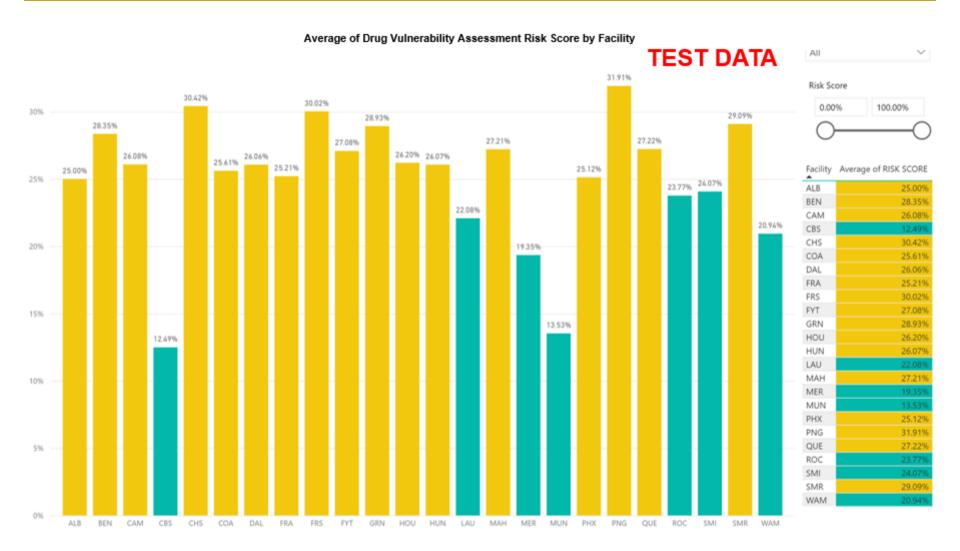
 - Polynomial Regression(Tried 2~5, 2 is best)
 Random Forest
 K-th Nearest Neighbor(KNNL) K-th Nearest Neighbor(KNN, 5ied 1~20, 2 is best)
 Evaluation
 Accuracy
 E1-Score/contrision matrix)
- Evaluation

 - F1-Score(confusion matrix)

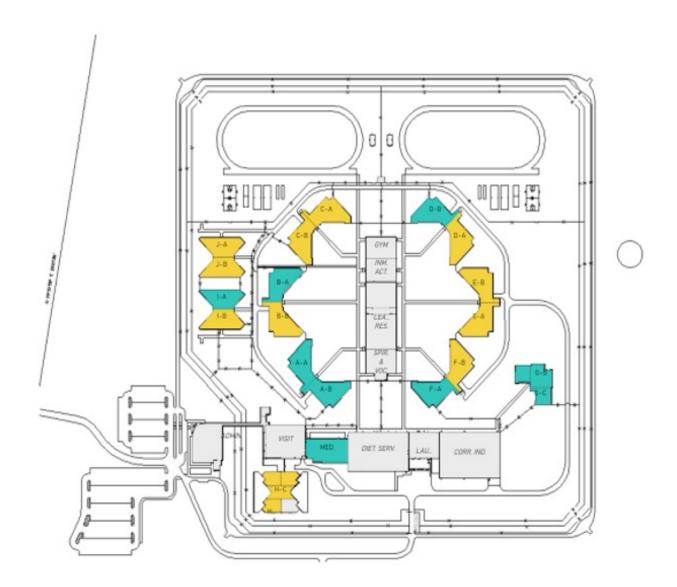


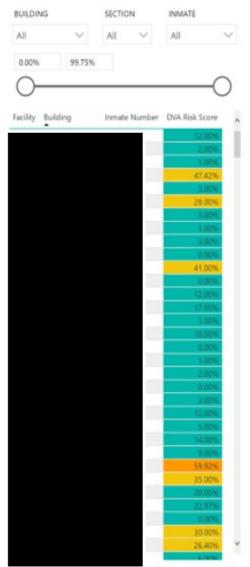
- 1. Gather the business requirements
- 2. Gather and clean the historical data
- Build multiple models based on multiple scenarios (based on existing data and describe on previous slide)
- 4. Evaluate the models and select the best one.
- 5. Prediction output and visualization
- 6. Modify and finalization
- 7. Production
- 8. Retraining the model







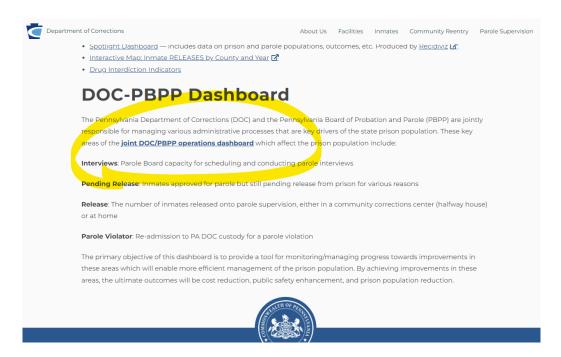






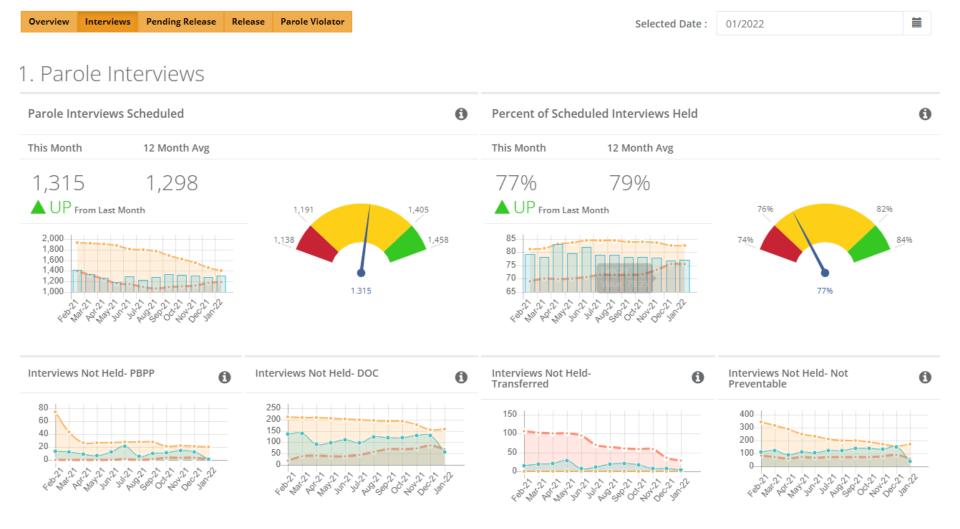
DOC/Parole Joint Metrics Dashboard

- Publicly accessible dashboard
 - DOC Website → Statistics → Dashboard
- Provide a tool for monitoring/managing progress towards improvements in different key areas which will enable more efficient management of the prison population.
 - By achieving improvements in these areas, the ultimate outcomes will be cost reduction, public safety enhancement, and prison population reduction.





DOC/Parole Joint Metrics Dashboard





DOC/Parole Joint Metrics Dashboard

4. Parole Violators



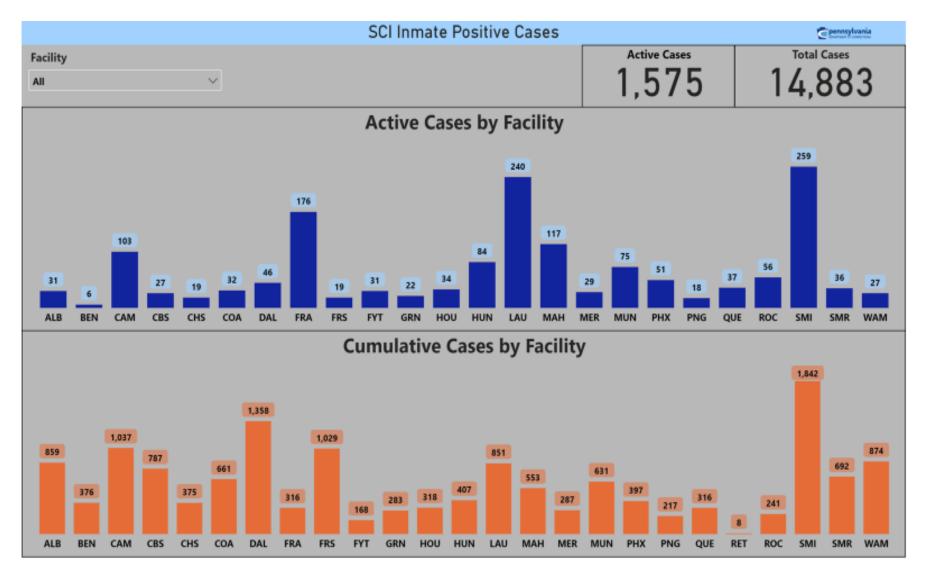


DOC COVID 19 Dashboard

- The COVID dashboard provides the agency with transparency with the public on COVID status for inmates and staff
- Leadership uses the data to make decisions on how to reduce the impact of COVID
- The data is used for mapping COVID positives (both staff and inmates) within the SCIs so SCIs can quarantine accordingly
- Data impacts inmate SCI assignments via population management
- Data is helpful to leadership in determining rules related to inperson visitation for inmates
- Supports the department's position in legal cases

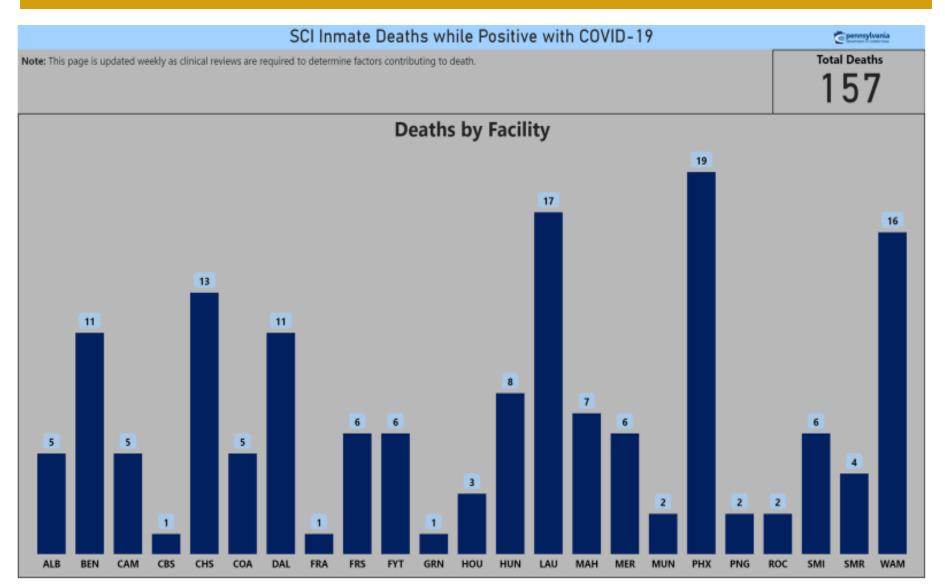


►COVID 19 Dashboard



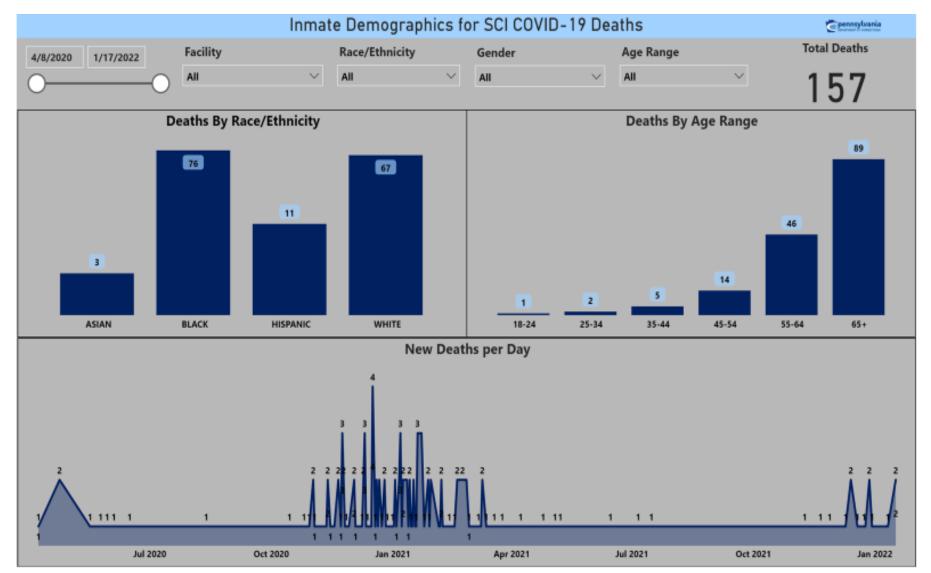


COVID 19 Dashboard

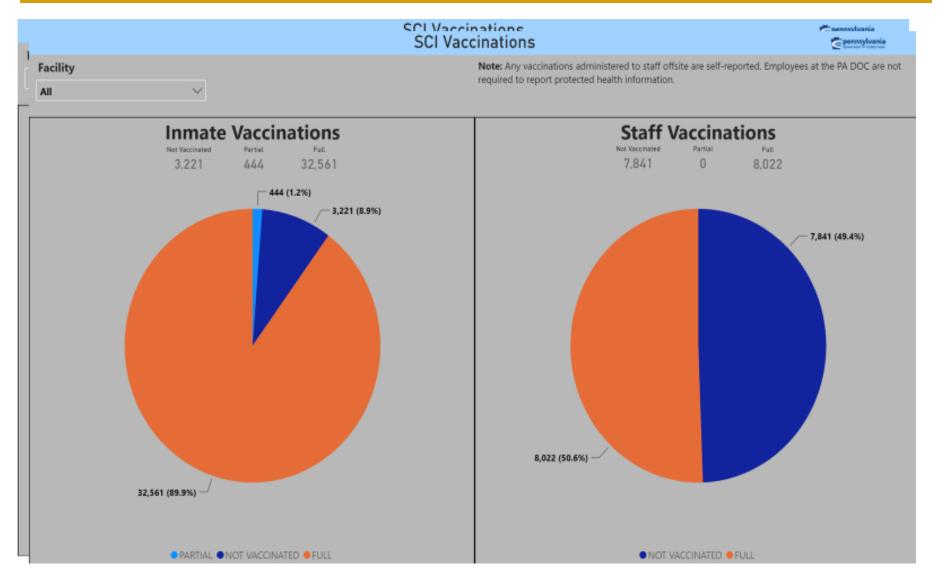




COVID 19 Dashboard



COVID 19 Dashboard



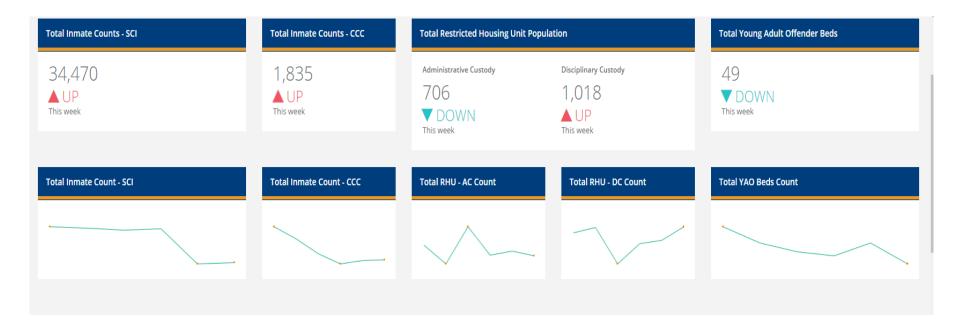


DOC Executive Dashboard

- Dashboard to display the combined information from all facilities.
 - Current month information and the trending information from previous months.
 - Easily interpreted visual representations of an increase or decrease in the reported KPIs.
- Dashboard also displays by facility, so leadership can also view facility specific information.



DOC Executive Dashboard - Statewide





DOC Executive Dashboard - Facility

TEST DATA 3. Security Operations Statistics Is Operating properly? PIDS Operations Heartbeat Detector Heartbeat Detector 1DVS Operations 100 Electronic Drug Detection Equipment Operations 100 Equipment Operations 100 Equipment Operations 100 Equipment Operations 100 Equipment Operations

4. Contraband Find Incidents Statistics

Weapons			
	This week	Year to Date	
Staff	0	0	
Inmate	0	0	
Visitors	0	0	
Contractors	0	0	

Drugs		
	This week	Year to Date
Staff Inmate	0	0 3
Visitors Contractors	0	0

Cell Phones		
	This week	Year to Date
Staff	0	0
Inmate	0	0
Visitors	0	0
Contractors	0	0

Other			
	This week	Year to Date	
Staff	0	0	
Inmate	0	0	
Visitors	0	0	
Contractors	0	0	



Other DOC Dashboards

- Intelligence Management System (IMS) is used to track Security Threat Group (STG) and other activity that could jeopardize the safety and security of facilities, reentrants and staffs.
- Office of Victim Advocate (OVA) dashboard to assist OVA to generate reports needed to received grant funding for different types of services provided to victims. Also used to show data over period of time.
- Inmate Grievance Dashboard to monitor the grievances filed by inmates to identify trends of dissatisfaction within DOC or within individual facilities. This allows for proactively addressing issues that, if not addressed, could lead to security issues, lawsuits or other problematic behaviors.

A lot more dashboards – used for quality assurance, grant funding, trends (inmates, staffs, progress), and other information for better decision makings.

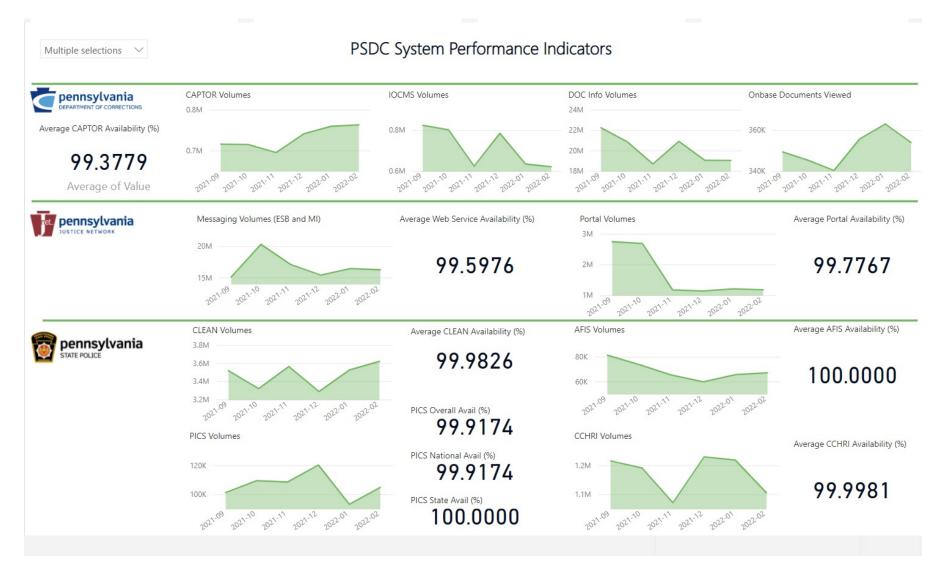


PSDC Executive Dashboard

- Dashboard for PSDC IT Management team to monitor our progress.
 - Critical Applications Performance Indicators (availability, response time, number of transactions, etc)



► PSDC Executive Dashboard





Questions?

