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# PDMP Insight: A Business Intelligence and Data Warehousing Framework for PDMPs

**March 31, 2022**

**Florida Overdose Data to Action  
PDMP Insight  
Business Intelligence (BI) Architecture**



**March 31, 2022  
4:00PM to 5:00PM**

# PDMP Insight

## Moderator

Pat Knue, IIR

PDMP TTAC Director



## Presenters

John Robertson, Data/Business Intelligence Architect

Chief Technology Officer of OmniCore



# PDMP Insight

## Objectives

- Understand the importance of PDMPs focusing on BI as a holistic capability
- Understand why PDMP Insight measures capability progress against an industry standard maturity scale
- Understand the individual components recommended for BI success
- Understand the power of PDMP Insight to support and deepen insightful decision making for the organization
- Review proof-of-concept visualization developed with PDMP Insight

# PDMP Insight

## Key Definitions

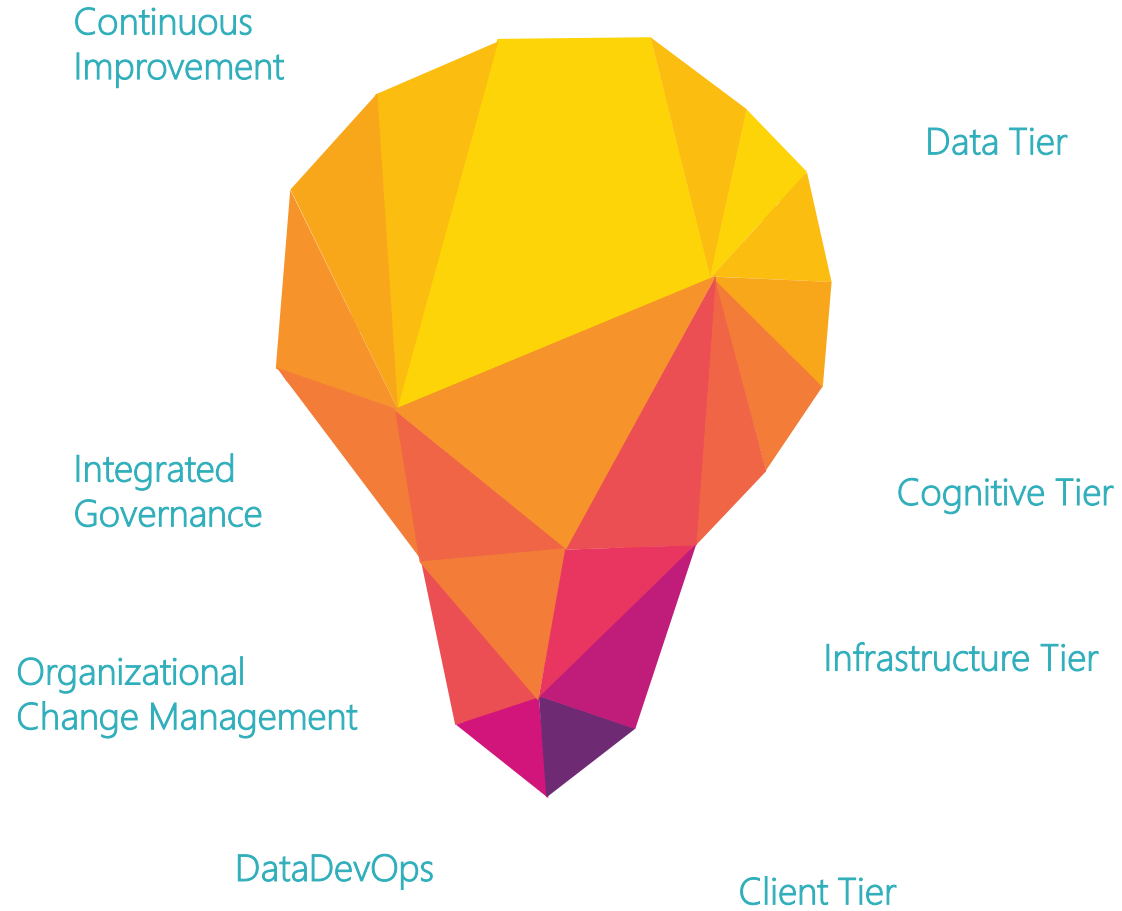
- Business Intelligence – An umbrella term that includes the applications, infrastructure, tools, and best practices that enable access to and analysis of information to improve and optimize decisions and performance.
- Insight – The capacity to gain an accurate and deep intuitive understanding of a person or thing.
- Data Warehouse – A storage scheme designed to hold data extract from many source systems. The warehouse then combines that data in an aggregate, summary form suitable for comprehensive data analysis and reporting for predefined business needs

# PDMP Insight

- A multi-tiered, architectural framework designed to empower PDMPs with the capability to implement and sustain a holistic approach to Business Intelligence (BI).
- The capability is implemented based on right-sizing people, processes, and technology to enhance existing analytics maturity and minimize the disruptive impact of organizational change.
- The core component of the data architecture is an elastic, centralized, modern data warehouse (MDW) optimized for data analysis.

# PDMP Insight

Business Tier



# PDMP Insight

## Program Tiers

- Business Tier – All organizational program elements required to define, execute, and manage the capability
- Data Tier – Implements primary components of the Data Architecture - including the MDW – executed through a Data Management Framework (DMF)
- Cognitive Tier – Multi-Dimensional Online Analytical Processing (OLAP) and Cognitive Services (Advanced Analytics/AI/ML)
- Infrastructure Tier – Cloud-based services orchestrated for innovation pipelines that are limitless and life-cycle driven
- Client Tier – Consists of tools for developing BI logic, data visualizations, and data analysis
- DataDevOps Tier – DataOps + DevOps = Formal, standardized design/build processes in the development and deployment of BI components
- Organizational Change Management (OCM) Tier – Manages the impact of BI on the organization's information culture
- Integrated Governance Tier – Seamless integration of PDMP concerns into the existing operational governance model of the PDMP
- Continuous Improvement (CI) Tier – Prioritizes process improvements, maturity growth, and sustainability for the PDMP capability



# PDMP Insight

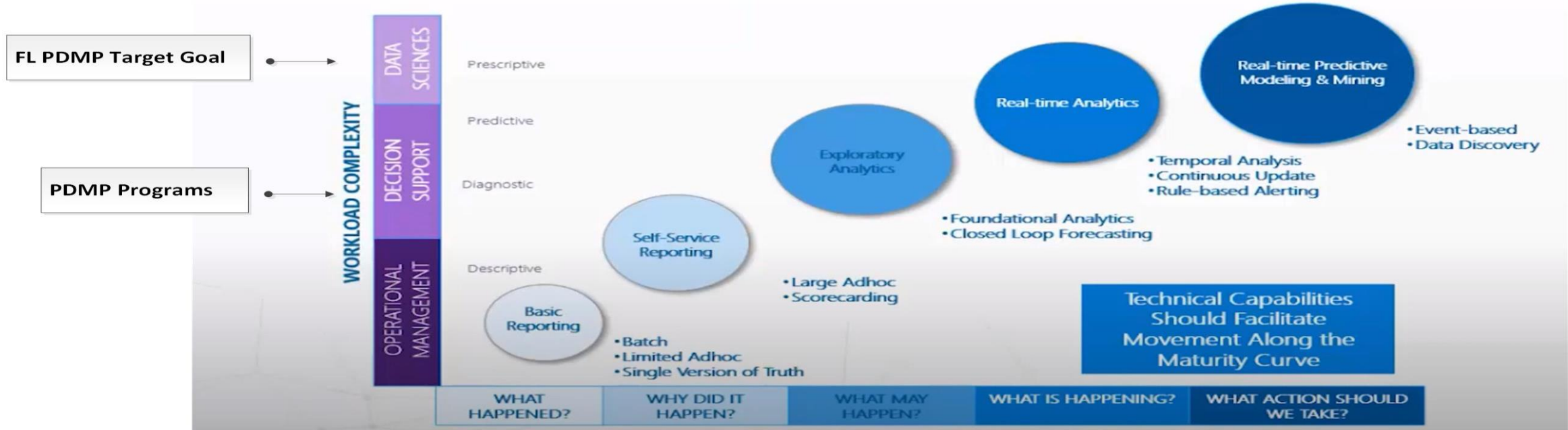
## Program Team

- Architects (BI, Data, Data Warehouse)
- Project Managers
- Epidemiologists
- Business Analysts
- Data Scientists
- Subject Matter Experts
- BI Developers

# PDMP Insight

E-FORCSE Insight Analytical Maturity Model (AMM)

## Analytical Maturity Curve



### Data Sophistication

- Raw Data
- Reporting Database
- Data Warehouse
- OLAP Cubes
- Big Data
- Snapshot
- Streaming/Real Time
- Heterogeneous Datasource Linking

# PDMP Insight

Infrastructure Tier

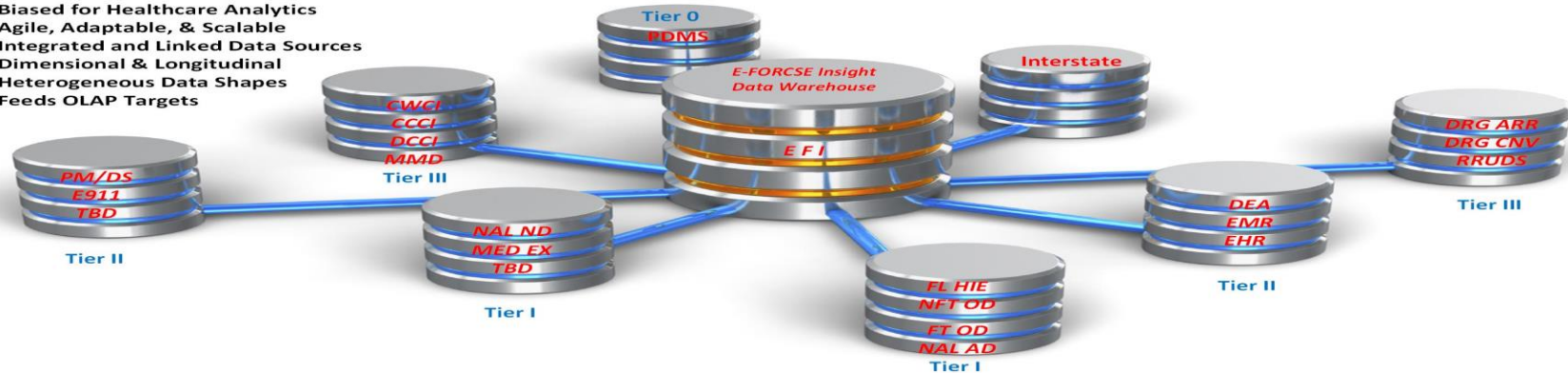


Cloud Infrastructure Services



- Modern Data Warehouse
- Biased for Healthcare Analytics
- Agile, Adaptable, & Scalable
- Integrated and Linked Data Sources
- Dimensional and Longitudinal
- Heterogeneous Data Shapes
- Feeds OLAP Targets

E-FORCSE Insight Enterprise Data Tier



Client Tier



KPI's ■ Dashboards ■ Scorecards ■ Public Website ■ Reporting

Data/Text Mining & Analysis  
Metrics & Measures  
Growth  
Trends  
Prediction



Machine Learning



E-FORCSE Insight Analytical Processing Tier



automated data mining survey responses customer transcripts qualitatively spot cause classification insights ad-hoc analysis product reviews sentiment analysis customer dashboards consumer trends ad-hoc analysis early warning

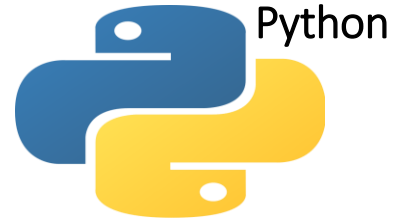
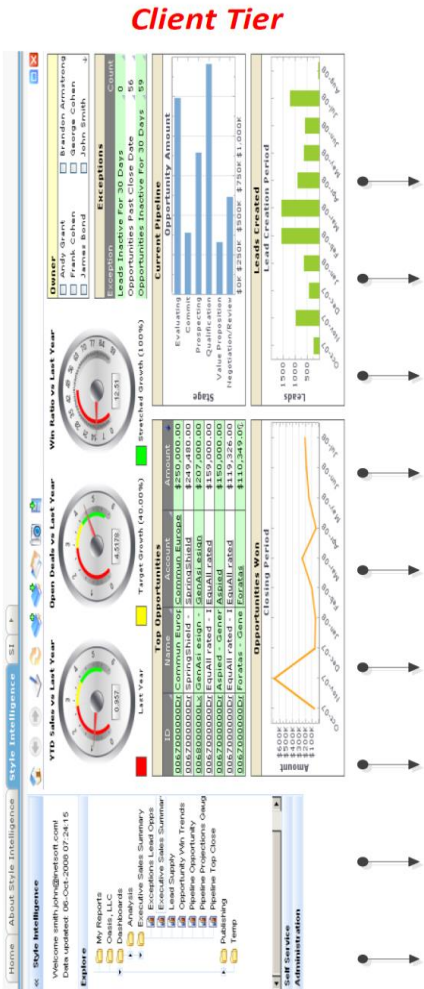
Data Matching  
Textual Analysis



# PDMP Insight

\* Client Tier \*

- Toolset Agnostic
- Standardization recommended for formal artifact development



Data/Text Mining & Analysis  
 Metrics & Measures  
 Growth  
 Trends  
 Prediction



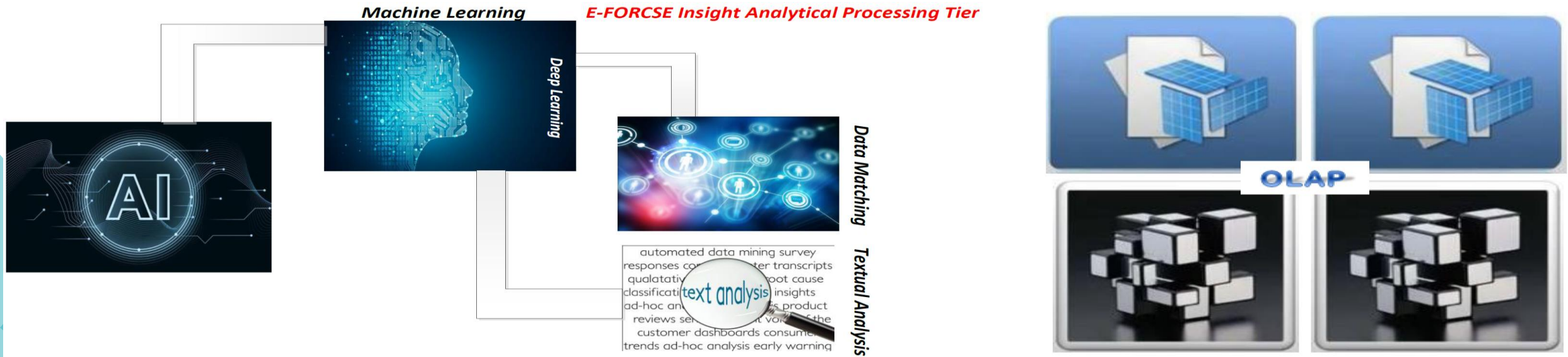
# PDMP Insight

\* Analytical Tier \*

Online Analytical Processing – Data Cubes for simplified rollup based /drill down/drill through analysis

## Cognitive Services

- Machine Learning (ML) deep analysis facilitates entity (patient, drug, etc.) data pattern matching and rationalization of unstructured data sources (fatal OD/non-fatal OD information)
- Artificial Intelligence (AI) greatly enhances the prospect of an enterprise predictive model when informed by deep machine learning, data analysis outcomes, data mining results, longitudinal data trends, and supervised engagement.



# PDMP Insight

## \* Business Tier \*

- Business Case
- Project Management Plan & Schedule
- Business Requirements Management – Functional, Technical With Traceability Matrix (RTM)
- Business Process Management & Analysis
- Agile Business Processes
- Standards Driven (Modeling, DataDevOps)

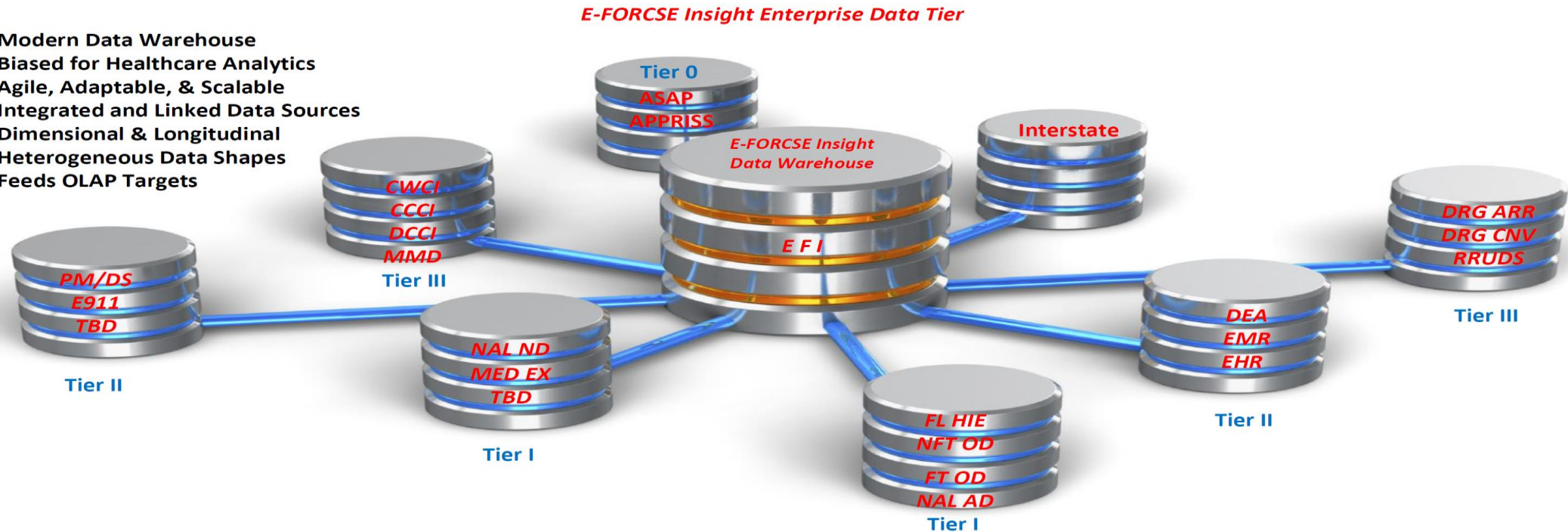
*Agile DataOps*  
*CI/CD*



# PDMP Insight

\* Data Tier \*

- Modern Data Warehouse
- Biased for Healthcare Analytics
- Agile, Adaptable, & Scalable
- Integrated and Linked Data Sources
- Dimensional & Longitudinal
- Heterogeneous Data Shapes
- Feeds OLAP Targets



- Dimensionality – Facts & Conformed Dimensions (unique patient identification regardless of data source)
- Data Integration – Multi-sourced and transitioned between bronze, silver, & golden “states”

# PDMP Insight

## \* Data Tier \* - Data Integration

### Tier I

- PDMP Data
  - Dispensations
  - Search/Query
  - User Activity

### Tier II

- HIE
- Nonfatal Overdose
- Fatal Overdose
- Naloxone Administration
- Naloxone/Narcan Dispensing
- Medical Examiner Reports
- DEA
- EMR/EHR
- E911
- Interstate Information
- Sales

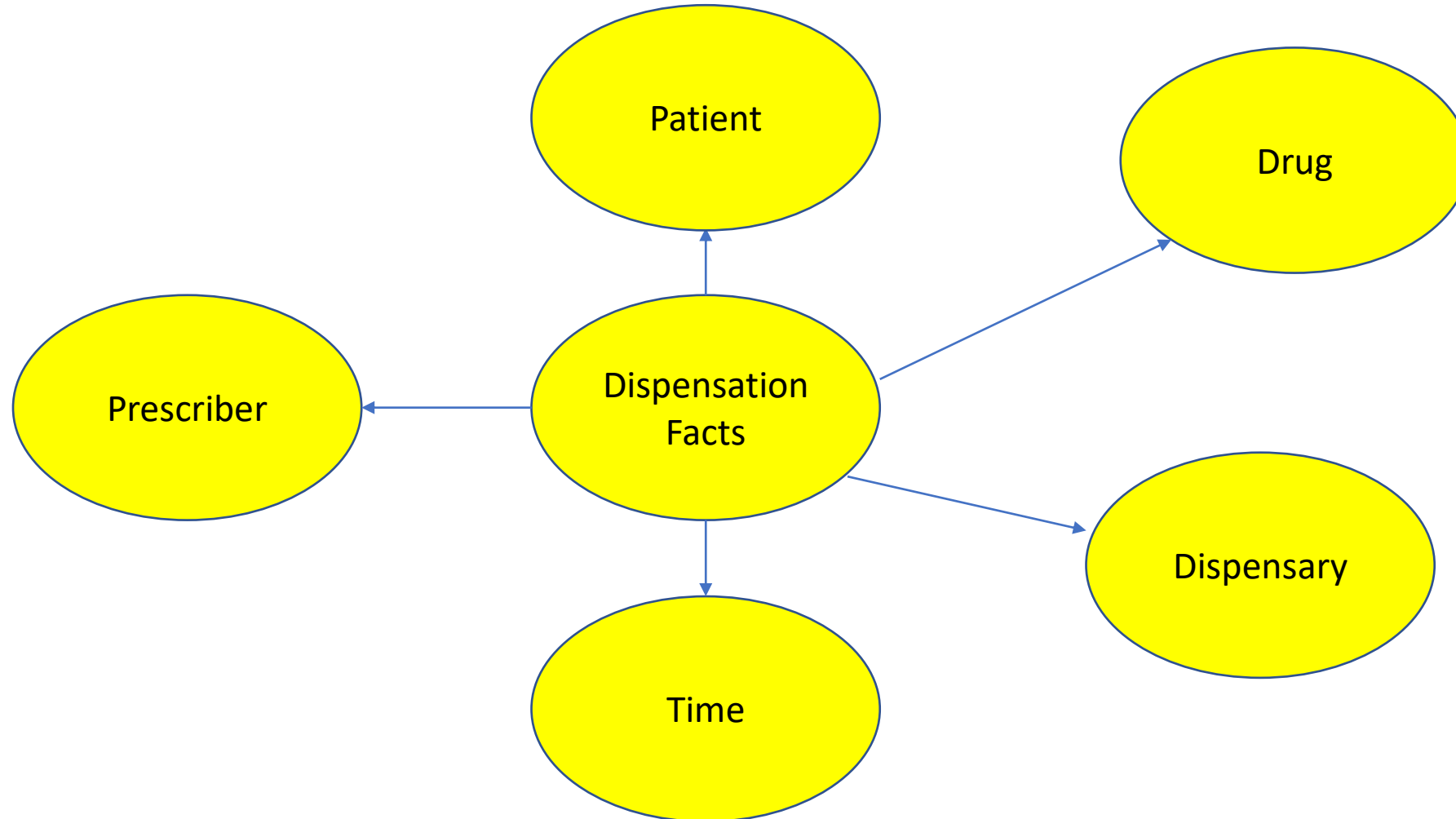
### Tier III

- Drug Related Arrests
- Drug Related Convictions
- Child Welfare Case Information
- Drug Court Case Information
- Medical Marijuana Dispensing
- Risk Ratings – Urine Drug Screens



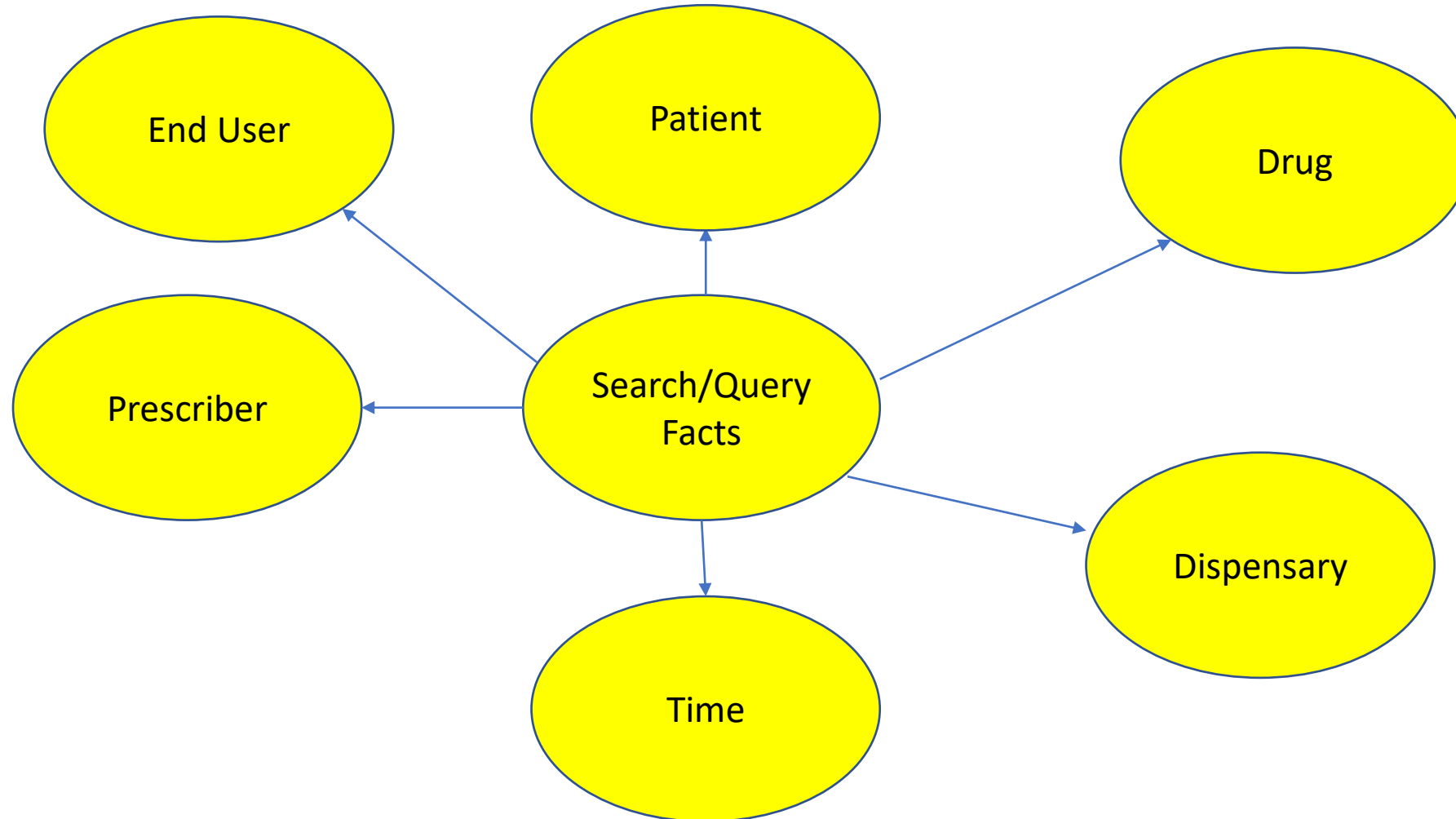
# PDMP Insight

\* Data Tier \* - Dimensional Data Model (PDMP Data)



# PDMP Insight

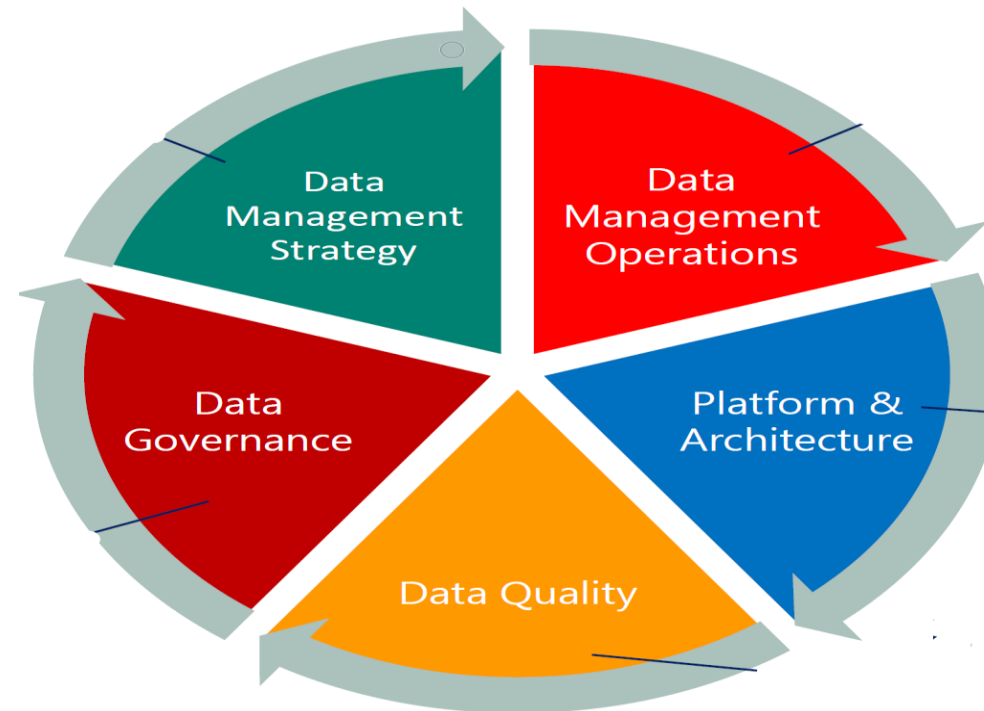
\* Data Tier \* - Dimensional Data Model (PDMP Data)



# PDMP Insight

\* Data Tier \*

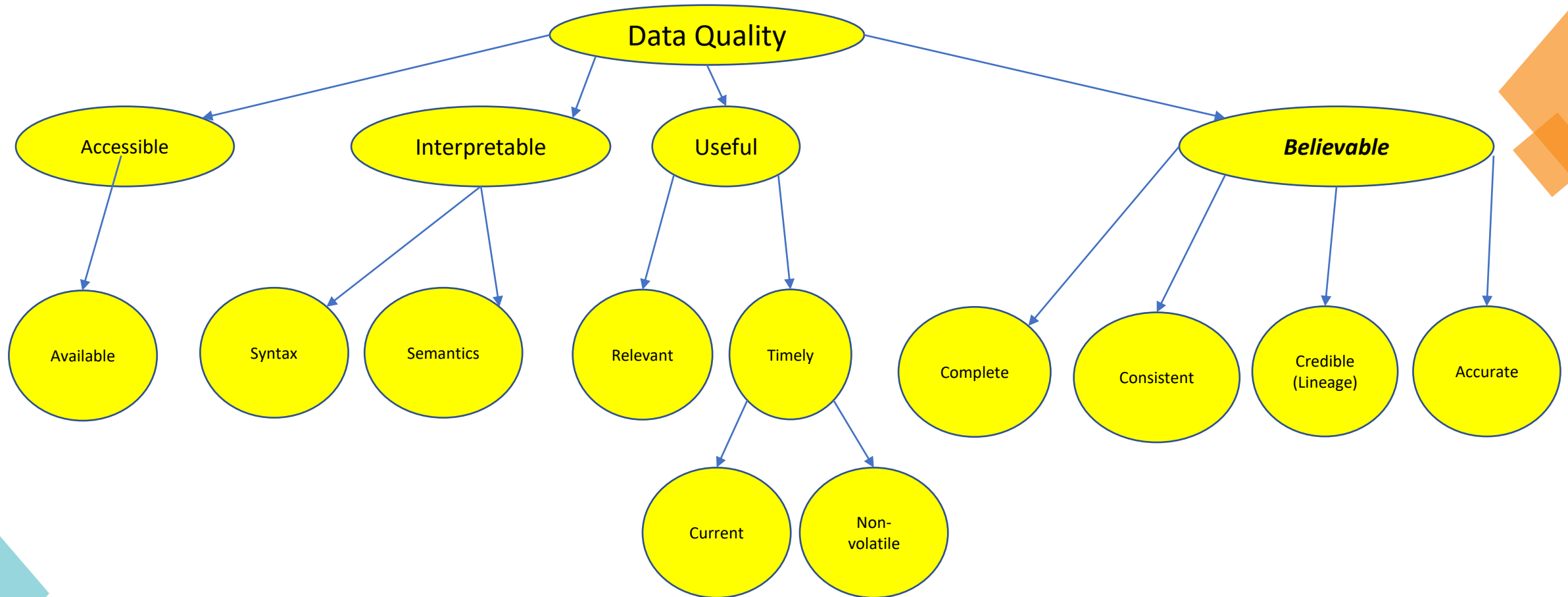
Data Management Framework (DMF)



- Data Governance
- Data Quality Assurance
- Data Meaning via Data Dictionary

# PDMP Insight

\* Data Tier \* - Dimensional Data Quality For BI



# PDMP Insight

## \* Data Tier \* - Data Dictionary Documents and Defines Meaning

Florida Department of Health  
Information Data Warehouse Requirements  
EFI Unified, Standardized Healthcare Data Elements

Fiscal Year: **2020-21**  
Business System Data Source: **ASAP via APPRISS**  
Definition Basis: **Native**  
Data Element Number: **101005**  
Data Element Name: **Date Sold (Situational)**



### Description

This field is used to determine the date the prescription was dispensed (left the pharmacy), not the date it was prepared. This date could be captured from the point-of-sales (POS) system, if the pharmacy has a POS system, and there is a bidirectional flow with the pharmacy management system in order to capture and report this date. Or it could be captured and reported from a will-call management system, integrated with the pharmacy management system.

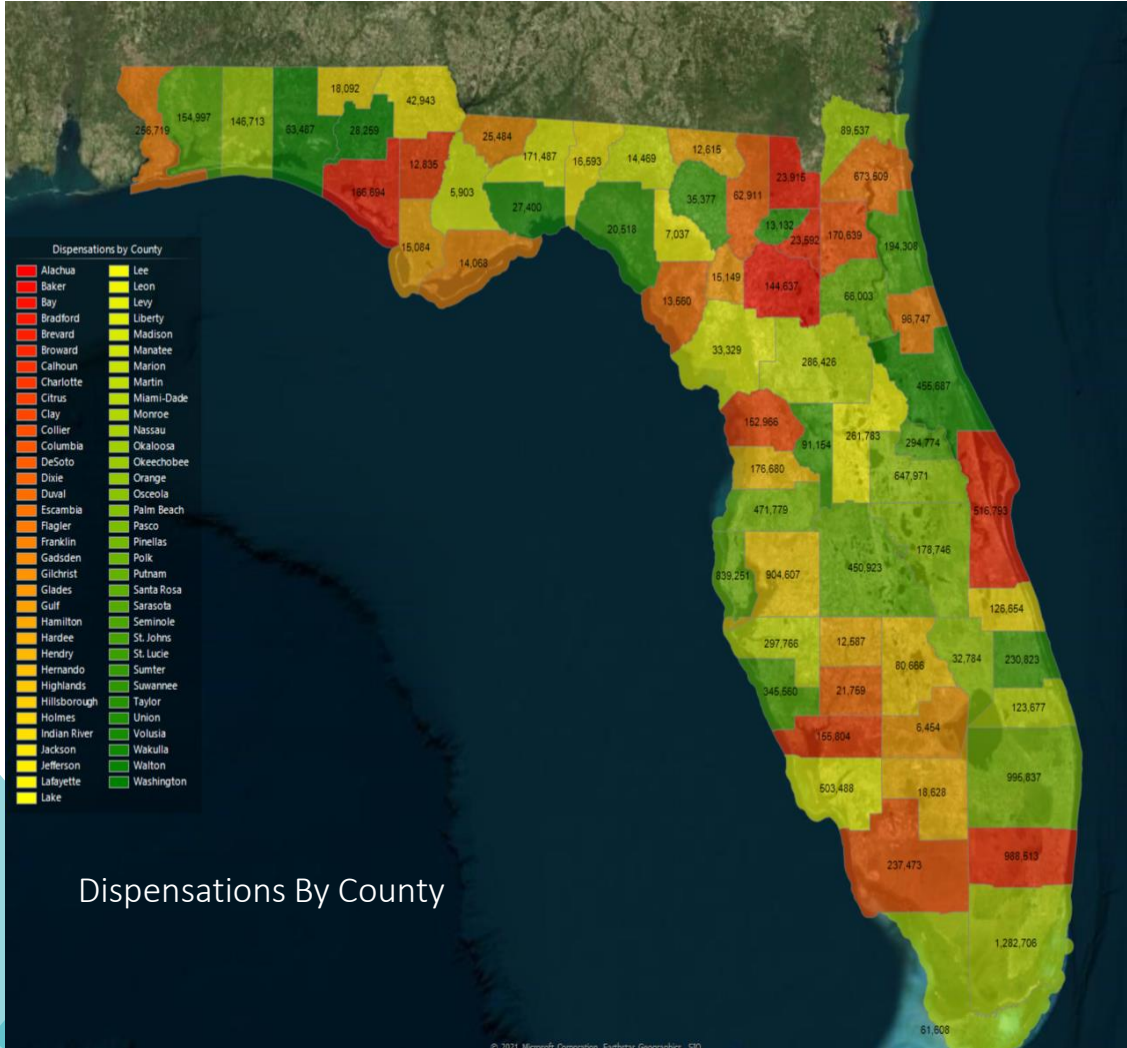
### Code Definition/Example

N/A

<b>Length:</b>	8				
<b>Data Type:</b>	Date				
<b>Year Implemented:</b>	2019-20				
<b>Format:</b>	YYYYMMDD				
<b>DW Instantiation Points: (Schema.Table.Column) (Red = Origin)</b>	<b>asap.DispensingRecord.DateSold</b> <b>dbo.FactDispensing.DateSold</b>				
<b>EFI Notes:</b>	Specify additional subject matter expertise here....				
<b>Extended Reference Data:</b>	<a href="#">{ Links to Full Code Table }</a>				
<b>Sample Query:</b>	select datesold, count(*) as 'Dispensings' from dbo.factdispensing group by datesold order by dispensings desc				
<b>Change Log:</b>	<table border="1"> <thead> <tr> <th>Date</th> <th>Purpose</th> </tr> </thead> <tbody> <tr> <td>9/1/2019</td> <td>Data element added</td> </tr> </tbody> </table>	Date	Purpose	9/1/2019	Data element added
Date	Purpose				
9/1/2019	Data element added				

# PDMP Insight

## Drill Down Data Visualization Example From E-FORCSE BI



Outcome 2: Reduction of the quantity of pharmaceutical controlled substances obtained by individuals

Performance Measure: Characteristics of controlled substances reported to the PDMS.

\* Miami-Dade County \*

Data Characteristics	RY21	RY20-21 Change (%)
Prescription (Rx)	1,271,825	
Days Supply	33,532,102	
Patient	355,998	
Pharmacy	1,663	
Prescriber	20,814	
Population 18 years and over	2,188,432	

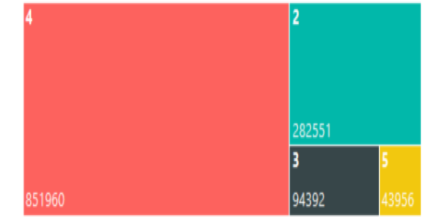
Table 2. Characteristics of schedule II through schedule V prescriptions dispensed to Florida residents 18 years of age and older.

Top 10 Drugs Dispersed By Name

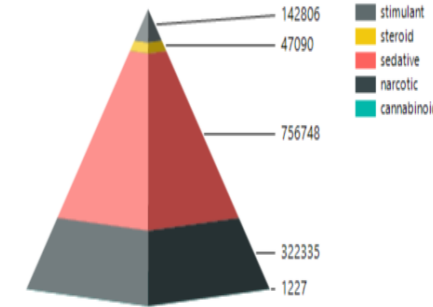


- ALPRAZOLAM 0.25 MG TABLET
- ALPRAZOLAM 0.5 MG TABLET
- ALPRAZOLAM 1 MG TABLET
- CLONAZEPAM 0.5 MG TABLET
- CLONAZEPAM 1 MG TABLET
- OXYCODONE-ACETAMINOPHEN 5-325
- TEMAZEPAM 15 MG CAPSULE
- TEMAZEPAM 30 MG CAPSULE
- TRAMADOL HCL 50 MG TABLET
- ZOLPIDEM TARTRATE 10 MG TABLET

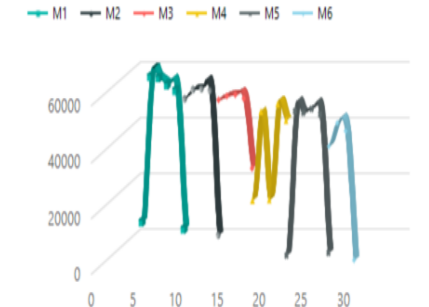
Drugs Dispersed By Schedule



Top 5 Drugs Dispersed By Type



Dispensations Over Time (By Month, By Week #)



# Open Discussion



# Contact Information

## Moderator

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## Presenters

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