

Data-Driven Strategy Basics

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Part 1: “Data-Driven Strategy Basics!” outlines the key concepts and purpose of data-driven strategies. These instructions are pivotal in designing a properly functioning database and processes for data-driven strategies.

Introductions: Dawn Reeby



I am your host and facilitator, Dawn Reeby. I have had the pleasure of partnering with dozens of law enforcement agencies across the United States, developing and improving infrastructure and reliable systems for analysis and policing strategies. My focus has been to create and provide ongoing training, guidelines, documentation, and technical assistance regarding policies, procedures, and compliance issues. Most recently, I have had the pleasure of working together with IADLEST, TxDOT, IACP, and numerous police agencies to simply help where help was needed. I'm excited to be here today with you to ensure the continued growth of your department procedures and efficiency efforts.

Objectives

1. Describe a data-driven strategy.
2. List the benefits of *using* data-driven strategies.
3. List and describe the 7 key principles of the Data Driven Approaches to Crime and Traffic Safety (DDACTS) model.
4. Describe the success factors of several communities that implemented data-driven strategies.

We start this 13-part series with “Data-Driven Basics”. Today we are going to:

1. Describe a data-driven strategy.
2. List the benefits of *using* data-driven strategies.
3. List and describe the 7 key principles of the Data Driven Approaches to Crime and Traffic Safety (DDACTS) model.
4. Describe the success factors of several communities that implemented data-driven strategies.

Objective 1

Describe a data-driven strategy.

Objective 1: Describe a data-driven strategy.

Data-Driven Basics –BIG PICTURE

COMPSTAT



Image Source: <https://www.ny.gov/office-of-the-mayor/news/2019-10/mayor-de-blasio-police-commissioner-bronx-compstat-2-08/0>

For more information, check out these resources:

“Compstat and Organizational Change. A National Assessment” The Police Foundation. <https://www.policefoundation.org/projects-old/compstat-and-organizational-change-a-national-assessment/>

Data-Driven Basics –BIG PICTURE

Data-Driven Strategies

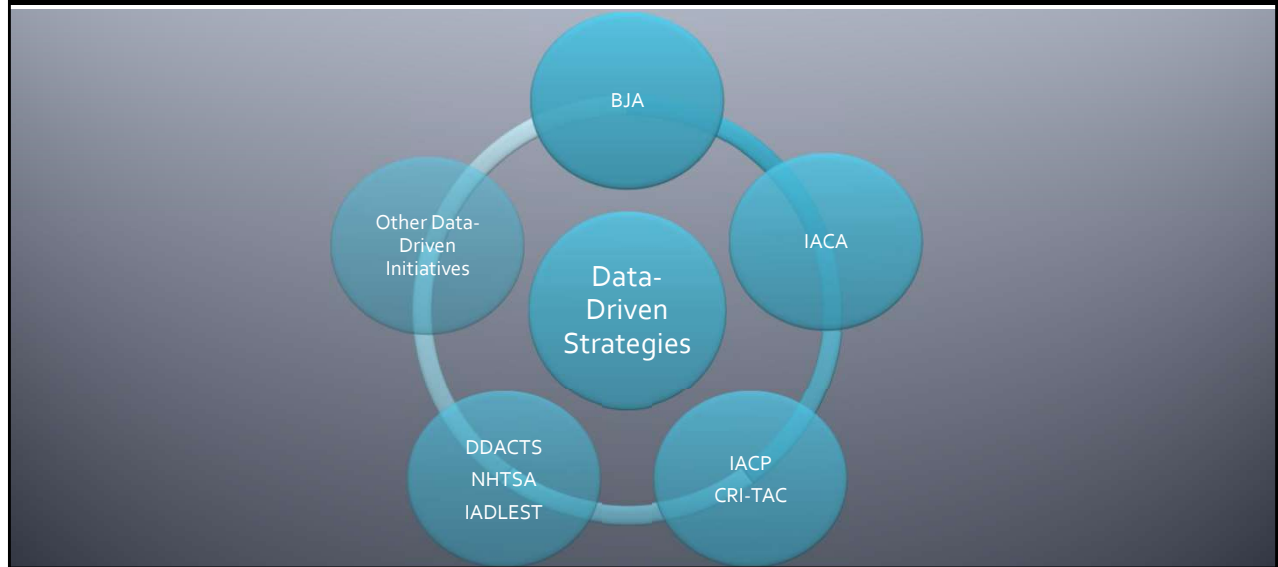
Evolve:

- NHTSA
- DOJ
- BJA
- IADLEST/DDACTS
- IACP/CRI-TAC
- IACA
- Police Foundation



- More on NHTSA: <https://www.nhtsa.gov/>
- More on DOJ: <https://www.justice.gov/>
- More on BJA: <https://bjaojp.gov/>
- More on IADLEST/DDACTS: <https://www.iadlest.org/>
- More on IACP/CRI-TAC: <https://www.theiacp.org/projects/collaborative-reform-initiative-technical-assistance-center-cri-tac>
- More on IACA: <https://iaca.net/>
- More on The Police Foundation: <https://www.policefoundation.org/>

Data-Driven Basics –BIG PICTURE



Overall, this is an exciting time in policing! We have evolved from the stacks of hand-written papers and push pin maps to walls of a constellation of new BIG DATA, or technology advancements in policing. We are living in a data-soaked era from predictive policing to body cameras to risk terrain analysis to spatial studies. We are in a tech crunch filled with smart adults and even smarter kids. As we evolve, we must continue to seek methods that will meaningfully serve the communities that we swear to protect.

POP UP QUESTION 1

True or False:

We live in a data-soaked era that must collaborate and evolve our data-processes to best meet the needs of our communities.

POP UP QUESTION 1: **True** or False:

We live in a data-soaked era that must collaborate and evolve our data-processes to best meet the needs of our communities.

Objective 2

List the benefits of *using* data-driven strategies.

Objective 2: List the benefits of *using* data-driven strategies.

Benefits of Data-Driven Strategies

- Identify patterns and trends as they emerge
- Identify investigative leads
- Develop deployment strategies
- Increase deterrence
- Identify and repair data quality issues
- Reduce crime, social harm, and crashes
- Recover uncommitted patrol time
- Recover budget funding
- Make communities safer by arresting repeat offenders
- Transparency

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Benefits of Data-Driven Strategies

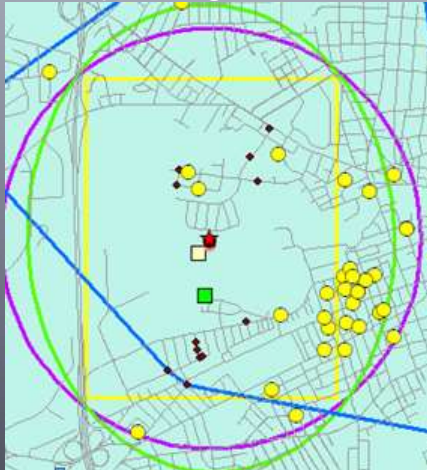
Identify Patterns and Trends

Incident Type	Average	Usual Range	2019	2020	Change from Avg.	Notes
PROPERTY CRIME						
↓Residential Burglary	39.6	32–48	36	31	-22%	Picked up a little in the fall but not enough to overwhelm low Jan-Sep.
↓Commercial Burglary	32.1	24–41	24	19	-41%	Dropped precipitously with copper and metal no longer hot targets.
Theft from a Vehicle	262.9	205–321	349	226	-14%	Back down after high 2008 as GPS market declined. Still lots of patterns.
↓Theft from a Building	102.1	88–116	82	64	-37%	Decreases in health club thefts and scrap metal thefts.
Theft from a Person	26.8	20–34	24	23	-14%	One fall pattern along Endicott Street but volume otherwise normal.
↓Theft from a Residence	57.8	51–65	61	49	-15%	Low with fewer domestic and yard thefts.
↓Theft of a Bicycle	23.1	18–28	26	16	-31%	Plummeted. No recurrence of summer 2008 patterns.
Theft of Services	21.1	15–27	16	20	-5%	Normal level of dine-and-ditch scams and gas drive-offs.
↑Shoplifting	266.0	225–307	273	325	+22%	Shot up particularly around holidays as retailers buffed security forces.
↓Auto Theft	52.5	36–69	33	23	-56%	Lowest level in at least 30 years. No patterns in 2009.
Arson	2.6	0–5	1	3	+15%	Port-a-potty, car, and dumpster, all during the fall.
↑Fraud & Forgery	119.6	98–141	109	146	+22%	Big increase with numerous incidents of credit card fraud and identity theft.
Employee Theft	22.5	16–29	22	25	+11%	Relatively normal levels. One mail kiosk reported three.

Here is an example of how to automate the identification of patterns or trends through a threshold analysis. Because you have direct access to your data, you can program the query to alert when a certain crime type goes above or below the threshold, or the normal range.

Benefits of Data-Driven Strategies

Identify Investigative Leads



Suspect is small; climbing through very small windows.

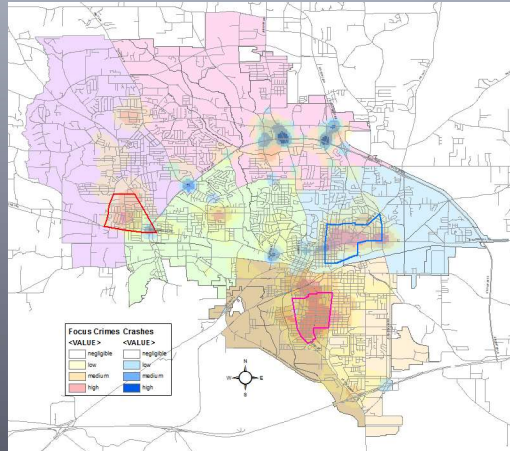
Analyze suspects who reside within 1 standard deviation of series and fit the MO of the series.

Provide suspect list to detectives.

This is an example of providing investigative leads. You become aware of a crime series involving a “small” male climbing through very small windows. You decide to analyze suspects who live, work, and play within 1 standard deviation of the series and who fit the MO. As such, you can provide a list of possible suspects to detectives.

Benefits of Data-Driven Strategies

Develop Deployment Strategies



City in Texas identified areas where high densities of crashes and crimes.

Here, a city in Texas identified areas where high densities of crashes and crimes occurred using multiple years of data. By doing so, they were able to develop deployment strategies that were targeted and measurable.

Benefits of Data-Driven Strategies

Identify and repair data quality issues

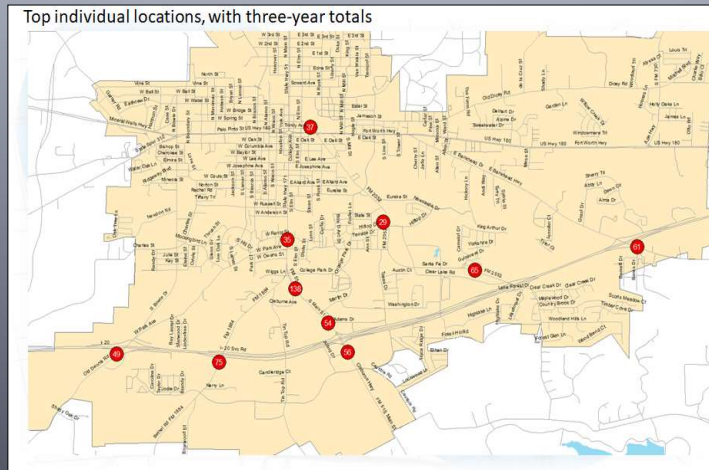
Common Errors
• Most of our crime occurred at our police department
• HWY/Major thoroughfare – officers aren't clear what address to record; or missing street #s
• Free typing/mis-spellings
• Missing data
• Duplicate master data
• Address file doesn't match mapping files

Common Errors

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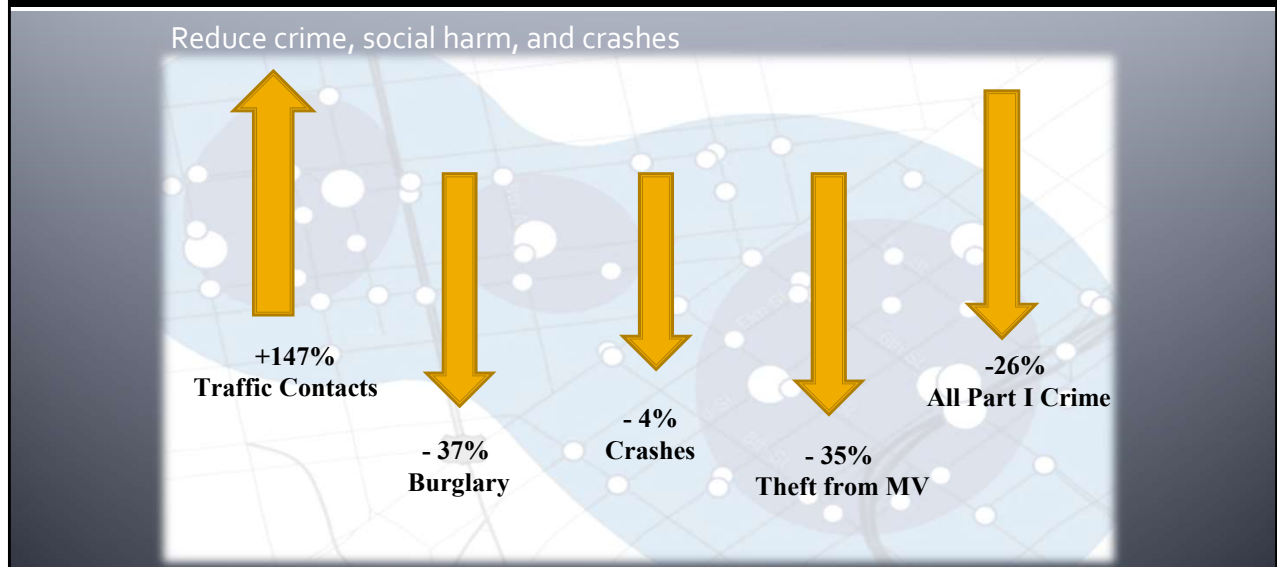
Benefits of Data-Driven Strategies

Increase deterrence



Direct access to your data can help your department understand exactly when and where to deploy or route officers, thus increasing deterrence.

Benefits of Data-Driven Strategies



A city in Texas was able to deeply impact crashes, crimes, and social harms by using data trends to develop strategies. Here, direct access to their data allowed them to easily measure progress. And wow! Look at these numbers!

Benefits of Data-Driven Strategies

Recover uncommitted patrol time

The screenshot shows a data query interface with two tables: UnitsDispatched and DispatchDetail. The UnitsDispatched table has fields: CallNum, Seq, DispatchedBy, Unit, and UnitType. The DispatchDetail table has fields: CallNum, Troop, Barracks, CallDate, and CallTime. An arrow points from the CallNum field in DispatchDetail to the CallNum field in UnitsDispatched. Below the tables is a query grid with the following fields: CallDate, Arrived, DateCleared, Cleared, ReasonText, ONSCENE, HOURSONSCENE, MINUTESONSCENE, and Shift. The grid shows that all these fields are selected in the query.

Field:	CallDate	Arrived	DateCleared	Cleared	ReasonText	ONSCENE	HOURSONSCENE	MINUTESONSCENE	Shift
Table:	DispatchDetail	UnitsDispatched	UnitsDispatched	UnitsDispatched	DispatchDetail				UnitsDispatched
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:									
or:									

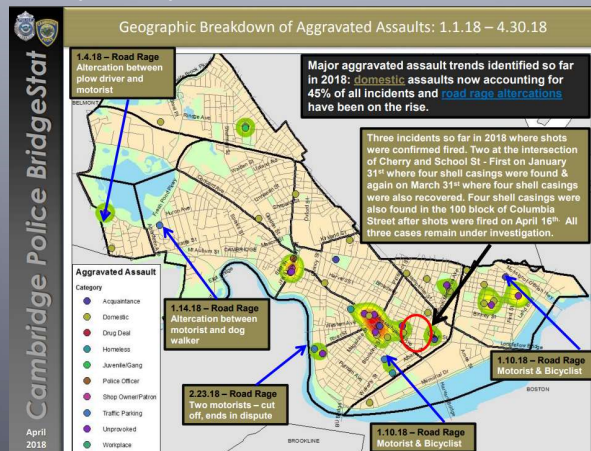
1% reduction in crashes = 30 fewer crashes
= 69 patrol hours recovered, valued at \$4,018.25

Direct access to data can provide the opportunity to set up queries that help identify length of time on calls, response time, calls that continue to bog officers down, etc. You may also discover hours on particular days when officers routinely have uncommitted time and can employ proactive strategies during those select times.

For technical training on how to develop queries like this one, see Part 3 (How to Connect to Your Data), Part 4 (Everything Tables and Linking), Part 5 (Creating Master Tables Using 'Make Table' and 'Append' Queries), Part 7 (Making Analytics Easier with Expressions), Part 8 (How to Identify Top Locations, Offenders, and More), and Part 9 (How to Create Rocking Reports and Automation Processes).

Benefits of Data-Driven Strategies

Transparency



Cambridge, MA Monthly Community Report

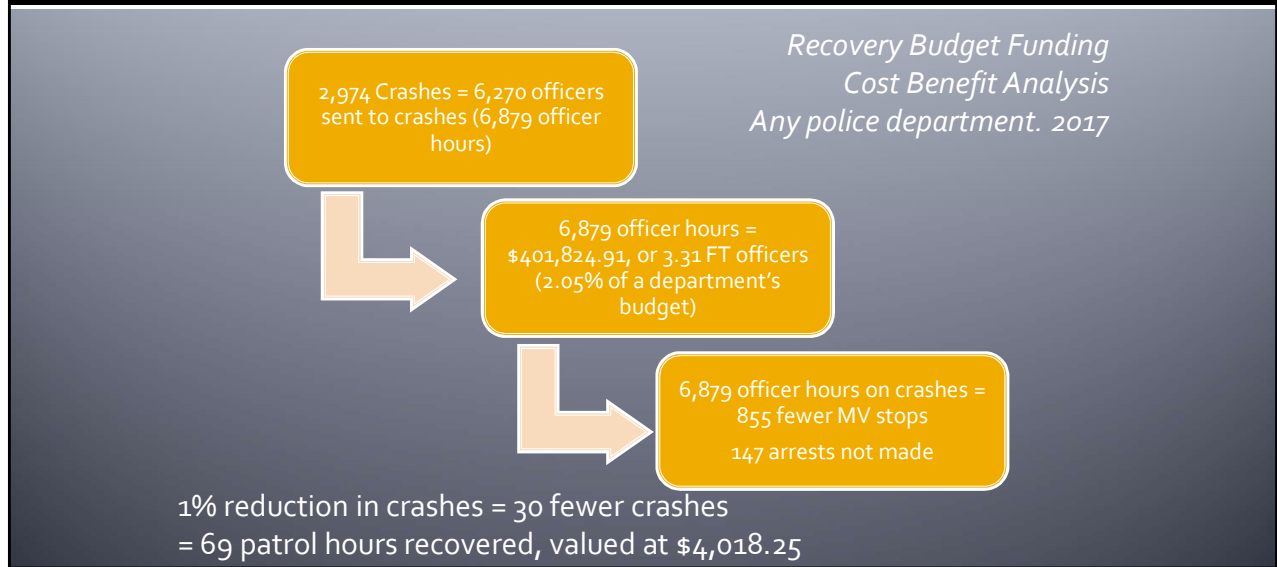
Proactive policing efforts can facilitate transparency. With easy access to data, analysts can spend time analyzing instead of inputting or cleaning, and they can set up automated reports to facilitate with information dissemination. (Cambridge, MA shares data like this with the public each month on their website.)

[Cambridge Police Department](http://www.cambridgema.gov/~media/Files/policedepartment/BridgeStat/BridgeStat_April2018_FINAL.ashx?la=en). (April 2018) "BridgeStat Report.." Cambridge, MA.

Retrieved from

http://www.cambridgema.gov/~media/Files/policedepartment/BridgeStat/BridgeStat_April2018_FINAL.ashx?la=en

Benefits of Data-Driven Strategies



After collecting and analyzing agency data, a Cost Benefit Analyses found that:

- 2,974 crashes occurred in this department. This was equivalent to 6,270 officers sent to crashes (or 6,879 officer hours)
- The cost of 6,879 officer hours = \$401,824.91, or 3.31 FT officers. This represented 2.05% of this department's budget
- 6,879 officer hours on crashes = 855 fewer MV stops
- 147 arrests not made

1% Reduction in Crashes =

30 Few Crashes

69 patrol hours
recovered
(\$4,018.25)

9 MV stops
(rate of 0.12 per
hour)

At current rates, every 1% reduction in crashes means a minimum of:

30 fewer crashes

69 patrol hours recovered, valued at \$4,018.25

9 MV stops recovered at the current rate of 0.12 per hour

So, in sum, if officers spent less time on crashes, reactive approaches, they would have more time for proactive approaches (MV stops and citizen contacts). If we can save \$4,000 with just a 1% decrease in crashes, imagine the amount of money a department could save if they developed data-driven strategies aimed at reducing crashes more than 1%.

POP UP QUESTION 2

Data-driven policing can help reduce crashes, crimes, social harms and can help police departments save time and **MONEY?**

POP UP Question 2. **True** or False.

Data-driven policing can help reduce crashes, crimes, social harms and can help police departments save time and **money!**

Objective 3

List and describe the 7 key principles of the Data Driven Approaches to Crime and Traffic Safety (DDACTS 2.0) model.

Objective 3: List and describe the 7 key principles of the Data Driven Approaches to Crime and Traffic Safety (DDACTS 2.0) model.

What is DDACTS?

- Operational model
- Builds trust, transparency, accountability, & legitimacy
- Is actionable
- Is place-based
- Is a cost-effective approach
- Focuses on highly visible patrols, engagement of partners, and regular evaluation & adjustment

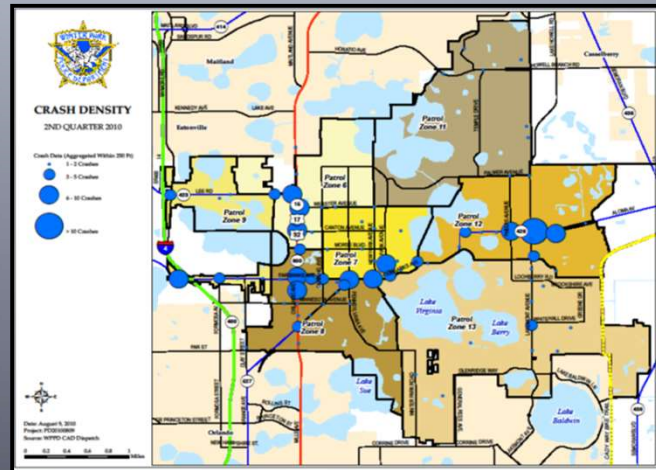
Data-Driven Approaches to Crime and Traffic Safety (DDACTS 2.0) is a law enforcement operational model supported by a partnership among the Department of Transportation's National Highway Traffic Safety Administration (NHTSA), and the Bureau of Justice Assistance (BJA) and the National Institute of Justice (NIJ). In partnership with IADLEST, experts work to deliver on-site and virtual training and technical assistance to law enforcement agencies throughout the country. These services are free to all law enforcement agencies.

This model provides a cost-effective approach that employs targeted, analysis-driven highly visible patrols, engagement of partners and stakeholders, regular evaluation and adjustment of operations and emphasis on identified desired outcomes.

What DDACTS Can Do For You

Provide an understanding of trends

- Winter Park, Florida felony **crash** hot spots

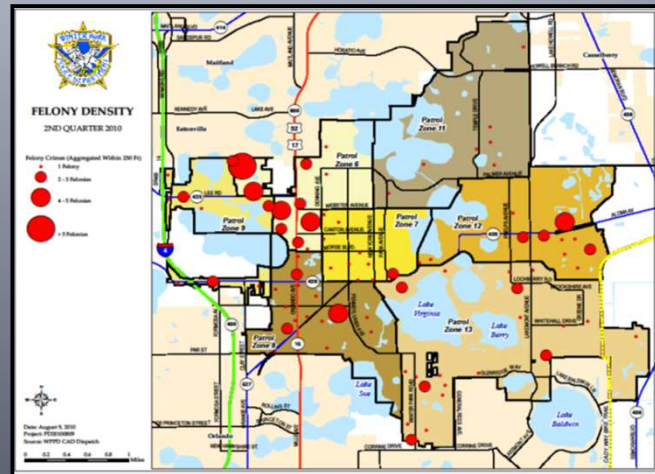


This slide shows the crash data in Winter Park Florida, prior to their implementation. The larger the circle, the more crashes.

What DDACTS Can Do For You

Provide an understanding of trends

- Winter Park, Florida felony **crime** hot spots

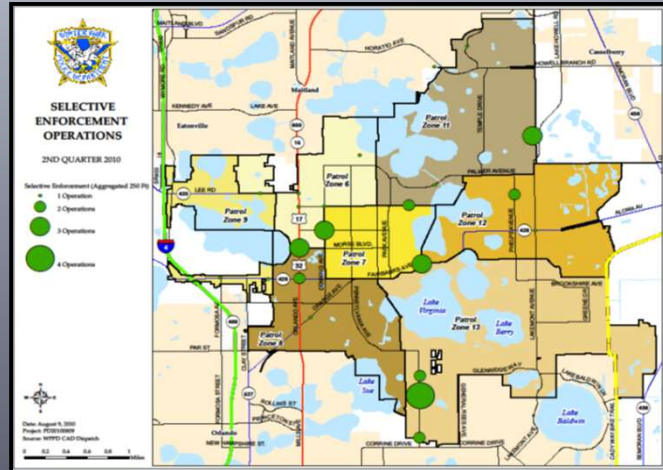


This map shows the felony crime data in Winter Park Florida, prior to their implementation. The larger the circle, the more felony crime.

What DDACTS Can Do For You

Provide an understanding of trends

- Winter Park, Florida enforcement/contact hot spots

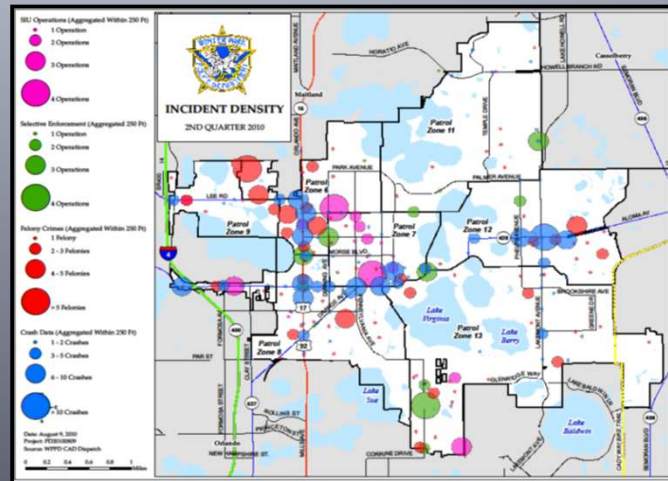


This map shows the traffic enforcement data in Winter Park Florida, prior to their implementation. The larger the circle, the more tickets.

What DDACTS Can Do For You

Provide an understanding of trends

- Winter Park, Florida **spatial analysis** of activity versus enforcement/contact



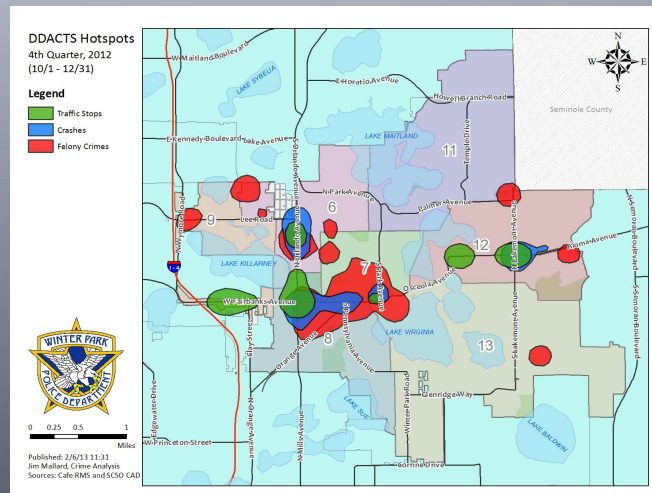
This map shows all of the crashes, crime and enforcement efforts for Winter Park Florida. The Green traffic enforcement and pink selective enforcement is NOT where the actual crime and crashes are occurring.

DDACTS 2.0 establishes a clear relationship between crashes and crime. The DDACTS model finally establishes the fact that there IS a relationship between traffic crashes and crime.

What DDACTS Can Do For You

Provide an understanding of trends

- Winter Park, Florida **better align** of enforcement/contact with activities for greatest impact



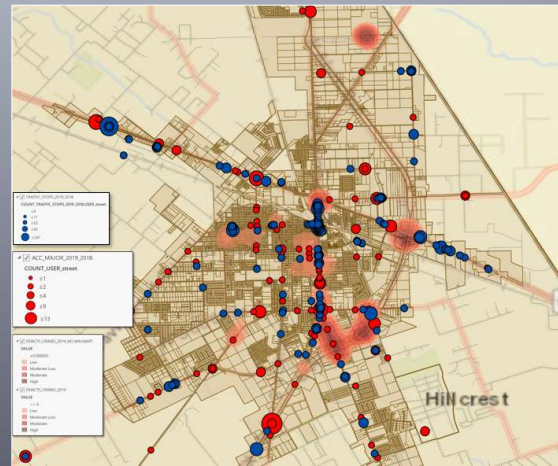
This map shows Winter Park Florida's efforts. Enforcement activities are more aligned with crimes and crashes, hence their subsequent reductions.

The value of Guiding Principle #6 is demonstrated here. But notice there is still work to be done. Management should direct resources specifically to where the blue and red overlap.

What DDACTS Can Do For You

Provide an understanding of trends

- **Analysis** of activity in the zones

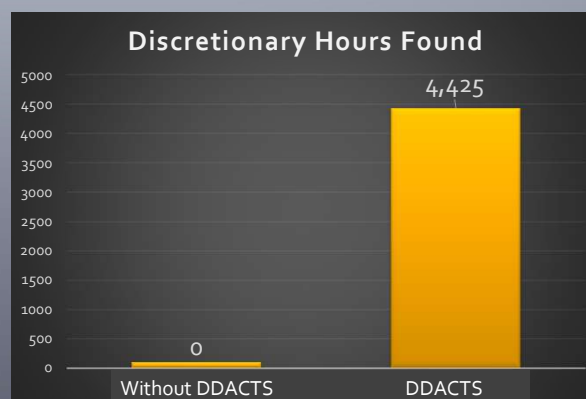


Top crash and crime locations within the hot spot zones.

What DDACTS Can Do For You

Find Discretionary Hours

- Found 4,425 hours of **discretionary time** for Winter Park, Florida Police Department



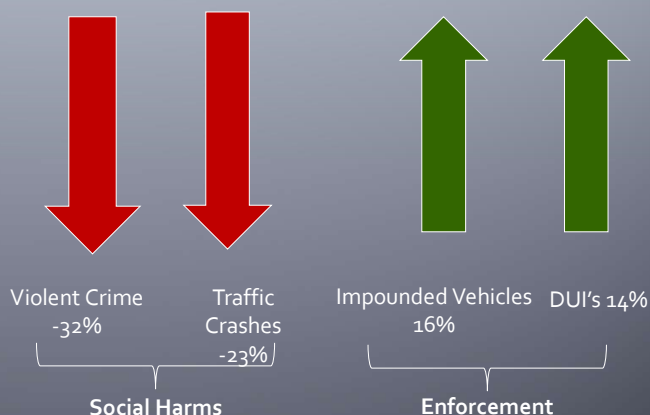
In Winter Park, the officers began working the hot spot areas in 15-minute daily time increments utilizing their “down” or “discretionary” time. The city of Winter Park was able to log all these extra hours without any additional officers, or money allocated to DDACTS:

- 3305 Traffic Stops
- 2515 Citations
- 1859 Verbal or Written Warnings
- 170 Field Contact Cards
- 165 Arrests
- 4425 Hours of “Discretionary Time”
- 10,416 Contacts
- Discretionary Time = No \$ Increase

What DDACTS Can Do For You

Decrease crash and social harms

- Decreased violent crime and crashes and increased drunk driving arrests in Philadelphia.



The 22nd District of North Philadelphia was one of the worst sections of the city. This is where an officer in the Game Stop had the gun battle with two armed suspects and another officer was killed in a street robbery two blocks from the precinct after leaving at 7am. USED Traffic unit in CONJUNCTION with district officers implemented data-driven strategies. The Traffic Unit was not available every tour but did assist when there was no sporting event, concert, etc. in the city. As enforcement went up, they experienced a decrease in violent crime and crashes as well as an increase in drunk driving arrests.

What DDACTS Can Do For You

Targeted Approach

- Maximize time, efforts, resources
- Renews emphasis on traffic safety
- Provides a flexible approach
- Meets CALEA accreditation standards
- Increases agency accountability and productivity
- Targeted, highly-visible patrol



Free image from Canva

Other benefits:

- **Maximizes time, efforts, and resources**
- **Renews emphasis on traffic safety**
- **Provides a flexible approach** - depending on agency culture, manpower, supervision, a multitude of deployment strategies are available and are determined agency-by-agency.
- **Meets CALEA accreditation standards** – Helps agencies meet CALEA standards 45.1.1, 61.1.1, 61.1.6. that deal with crime prevention strategies, effective resource deployment and using intelligence led policing to reduce traffic crashes and crime. For more on accreditation, see “Benchmark Analytics. Accreditation 101: The Benefits of State and National Police Accreditation” Posted on July 17, 2019 by Amy Vracar. <https://www.benchmarkanalytics.com/blog/accreditation-101-the-benefits-of-state-and-national-police-accreditation/>
- **Increases agency accountability and productivity**- Produces a plan to deploy agency resources in a more effective manner and illuminates the process to stakeholders.
- **Targeted Highly Visible patrols** – The DDACTS model supports using officers in a strategic, but highly visible manner. The public will see them working.

What DDACTS Can Do For You

Additional Benefits

- Cost effective
- Fewer calls for service
- Builds stronger relationships with partners
- Increased field contacts
- Increased deterrence
- Gained intelligence

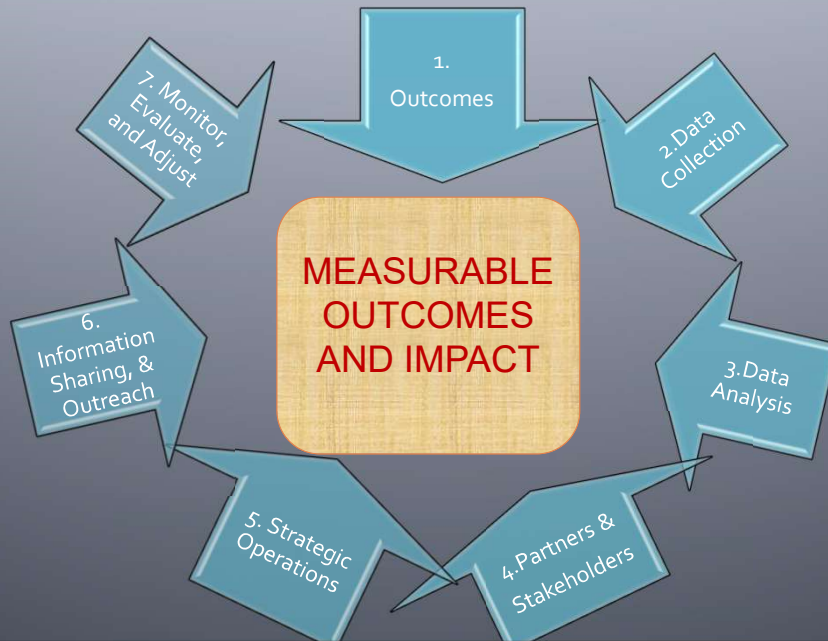


Free image from Canva

Additional Benefits

- **Cost Effective Approach** – Using DDACTS deploys agency’s resources in the most cost-effective manner. Officers are not just “wandering around”. Instead, they are focused and intentional.
- **Fewer Calls for Service** – With continued use, agency’s calls for service will start to decrease.
- **Increased deterrence** – When officers are deployed to the specific hot spots, offenders will be deterred from committing crimes in those areas.
- **Increased field Contacts** – Officers need to record as much information as possible from each traffic stop and contact and share this information with others in the agency.
- **Reduction in Social Harm** – Agencies WILL have reductions in crashes and all types of crime when using the model.
- **Builds stronger relationships with stakeholders and partners** – Agencies will develop stronger, long-term relationships with stakeholders and partners.

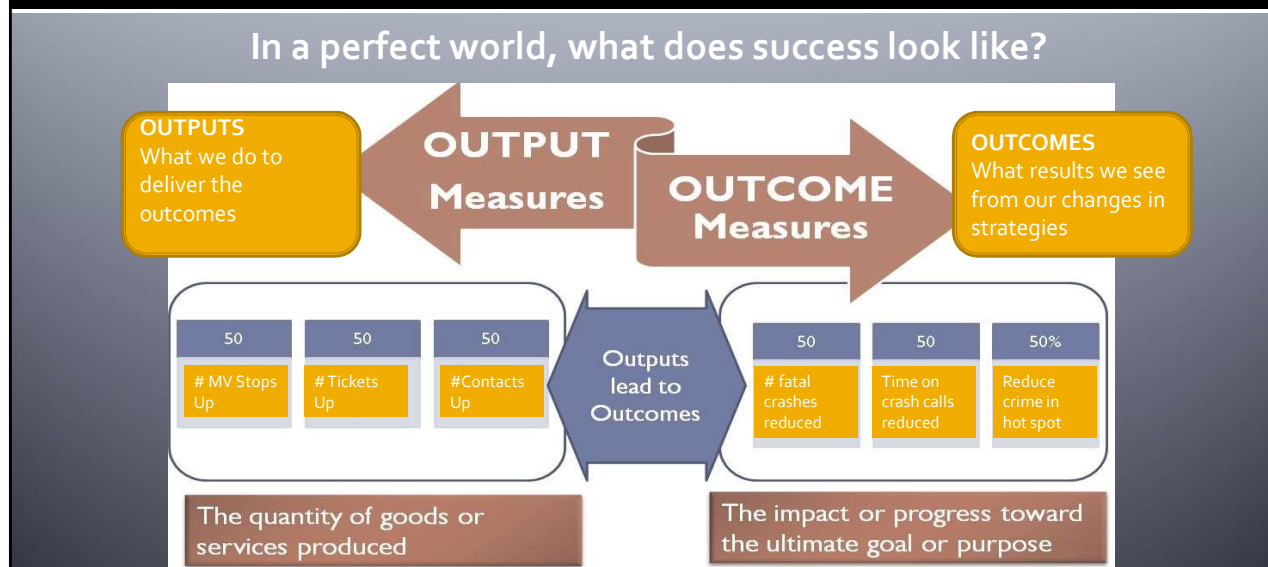
DDACTS 7 Guiding Principles



DDACTS 2.0 focuses on 7 basic principles:

1. Outcomes over Outputs
2. Data Collection
3. Data Analysis
4. Partners and Stakeholders Participation
5. Strategic Operations
6. Information Sharing and Outreach
7. Monitoring, Evaluation, and Adjustments

1. Outcomes



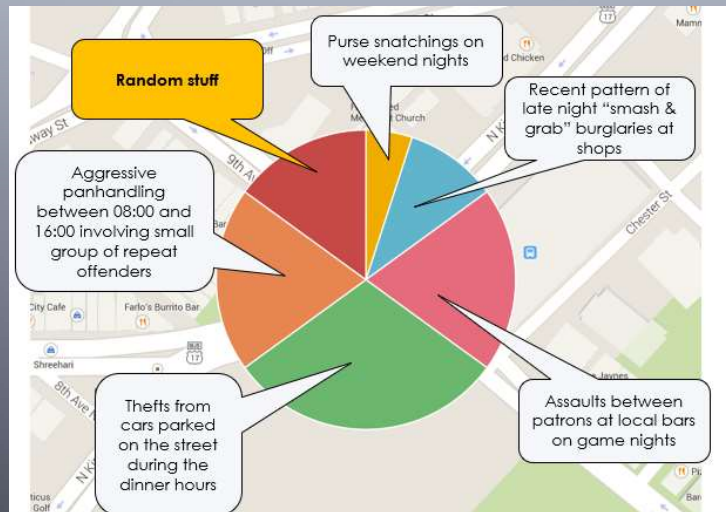
“1. Outcomes — Goals and objectives that emerge during hot spot identification and strategic plan preparation are developed into outcome measures. These measures are used to assess effectiveness relating to reductions in crashes, crime, traffic violations; cost savings; the use of specific operational techniques and personnel deployment. The DDACTS model supports increased measurement of outcomes and decreased measurement of outputs in determining the effectiveness and efficiency of law enforcement operations.” *(Operational Guideline)*

2. Data Collection



“2. Data Collection — Accurate and timely crash, crime, calls for service and enforcement related data, including location, incident type, time of day, and day of week are the building blocks of DDACTS. Additional data may include arrests, citations, warnings, motor vehicle stops, citizen complaints, field interviews, and other nontraditional data such as the location of parolees and probationers, individuals with suspended or revoked licenses, and known offenders.” (*Operational Guidelines*)

3. Data Analysis



“3. Data Analysis — The creation of actionable analysis products, including maps that overlay crash, crime, and enforcement-related data allows agencies to identify problem locations, or hot spots. Additional analysis, through a number of proven evaluation techniques, can distinguish causation factors for each type of incident, delineate spatial and temporal factors, and consider environmental influences on crashes, crimes, and other disorder or social harm.” (*Operational Guideline*)

4. Partners and Stakeholders



Free image from Unsplash.

“4. Partners and Stakeholders Participation — Partnerships among law enforcement agencies and with local stakeholders are essential and provide opportunities and support for decreasing social harm and improving the quality of life in a community.”
(Operational Guidelines)

5. Strategic Operations



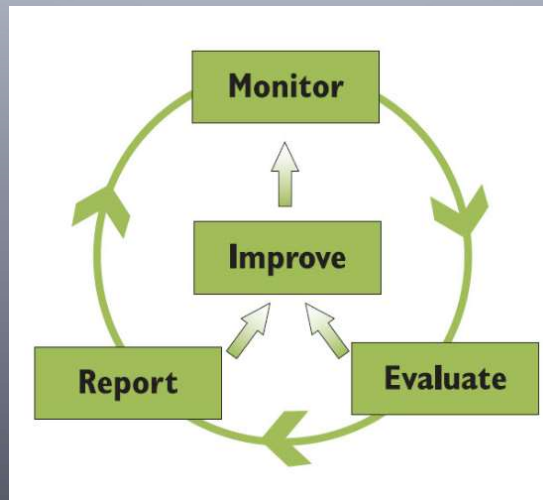
“5. Strategic Operations — Based on analysis, agencies are able to identify high activity hot spots, likely to include incidents of crashes, crimes, and other calls for service. These hot spots can then be targeted with strategic, highly visible traffic and other enforcement efforts at the most appropriate places and times. As discussed in the previous paragraph, hot spot analysis guides the realignment of workflow and operational assignments to focus highly visible traffic enforcement efforts and increase the efficiency of reducing social harm.” *(Operational Guideline)*

6. Information Sharing and Outreach



“6. Information Sharing and Outreach — Built into the model are opportunities to share comprehensive results and actionable information internally and externally, promote community participation, and document accomplishments. Regularly generated progress reports give management the documentation needed to keep officers informed, hold meetings with community members, and report to government administrators and elected officials. Progress reports also provide the basis for ongoing media relations.” *(Operational Guideline)*

7. Monitor, Evaluate, and Adjust



“7. Monitoring, Evaluation, and Adjustments — Data collection and analysis procedures allow supervisors to monitor, evaluate, and adjust strategic operations and account for enforcement activity. They also provide an opportunity on a regular basis to assess crash and crime reduction, cost savings, and other outcome measures that define success. The DDACTS model is place-based and thus needs to keep pace with ever changing data.” *(Operational Guidelines)*

POP UP QUESTION 3

True or False:

It's ok to develop your strategic operations prior to analyzing the data since you probably already know what your hotspots are?

POP UP QUESTION 3: True or **False**:

It's ok to develop your strategic operations prior to analyzing the data since you probably already know what your hotspots are?

Objective 4

Describe the success factors of several communities that implemented data-driven strategies.

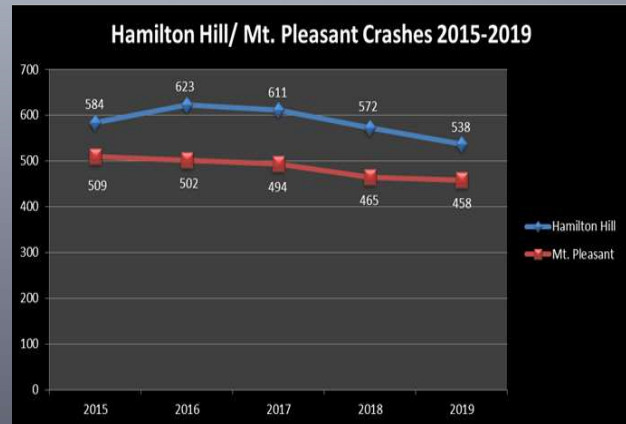
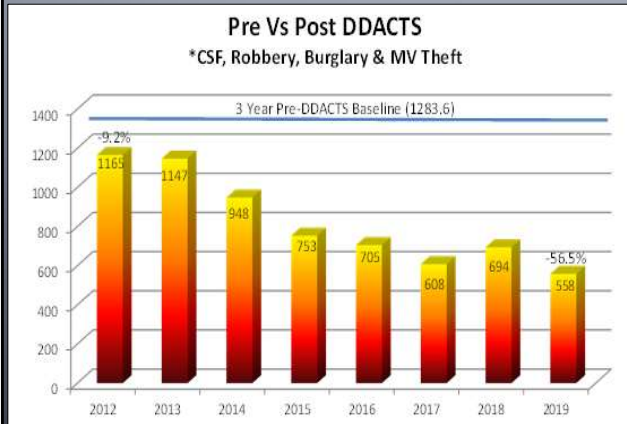
Objective 4: Describe the success factors of several communities that implemented data-driven strategies.

What size agencies will DDACTS work with?

Site	Population	Officers
Philadelphia (PA) Police	1,558,378	6,734
Metro-Nashville (TN) Police	635,475	1,413
Mesa (AZ) Police	452,725	777
Kansas City (KS) Police	150,000	339
Gilbert (AZ) Police	240,000	240
Greenville (NC) Police	90,000	185
Schenectady (NY) Police	66,000	149
Everett (MA) Police	42,000	100
Shawnee (KS) Police	66,839	96
Cleburne (TX) Police	30,000	54

This shows an example of agencies of all sizes across the country that have implemented the DDACTS philosophy. Members of close to 800 agencies have attended a workshop and the value of implementing this philosophy is that no matter the size of the agency, it is flexible enough to bring value to agencies of any size.

Success Stories – Schenectady, NY



Success Story – Schenectady, NY

The long-term effect of the agency’s efforts to decrease traffic crashes and crime throughout the city has continued to be successful with reductions of focus crimes (confirmed shots fired, robberies, burglaries, and motor vehicle thefts) and traffic crashes with and without injuries. The images reveal Schenectady’s pre-DDACTS focus crime baseline with the total of focus crimes reported citywide for each occurring year (2012 – 2019). Note that after an assessment approximately two years into DDCTS, the agency discovered that they could have greater impact when concentrating on the two zones where they saw the greatest concentrations of activity, and as such reduced their zones from four to two zones.

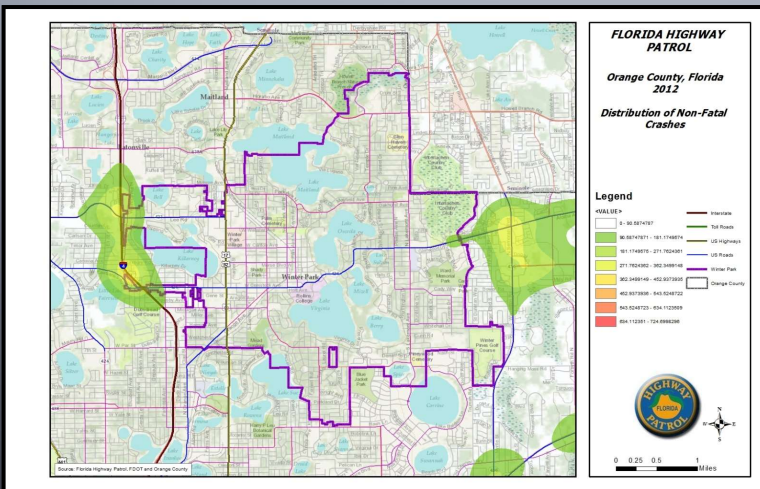
Reported traffic crashes within the DDACTS zones during 2019 compared to a four-year average reduced by 8.8% (1091.5/996). There was a gradual reduction of each of the two DDACTS locations. To date (March 2020), the DDACTS efforts continue to successfully reduce the number of victims being affected by traffic crashes and crimes. Schenectady’s crash and crime success have rested on many factors, but the continuation of monitoring focused enforcement has ensured resources maintain on course.

Success Stories – Greenville, NC



The Greenville Police Department successfully refocused officers' attention in the two designated DDACTS Zones (East and South). Within the first six months, both areas individually and combined saw reductions in Part 1 crimes and crashes. The City overall also saw a reduction in Part 1 crimes and crashes, but not to the same degree as seen with the East and South DDACTS Zones.

Success Stories – Winter Park, FL



Winter Park, Florida reached out to its bordering jurisdiction where crashes were occurring just outside the City.

Worked together to find solutions.

Winter Park, FL

As Winter Park PD found when they reached out to a neighbor with bordering jurisdictions (FHP), it was discovered that crashes were occurring just outside the city limits of Winter Park while Winter Park was working crashes just inside their city limits. Without the exchange of information, each agency would have been working in a void. By working together, the data void was filled and both agencies could coordinate their efforts on successful Strategic Operations in both jurisdictions.

Success Stories – Winter Park, FL

Residential
Burglary:
-16%



Theft from
Vehicle:
-32%



Total Part 1:
-23%



Commercial
Burglary:
-20%



Winter Park, Florida results.

POP UP QUESTION 4

True or False:

Using data to drive strategies can help develop strategic operations that increase enforcement and reduce crash, crimes and social harms.

POP UP QUESTION 4: **True** or False:

Using data to drive strategies can help develop strategic operations that increase enforcement and reduce crash, crimes and social harms.

Summary of Part 1 “Data-Driven Strategy Basics” Objectives

1. Described a data-driven strategy.
2. Explained the benefits of *using* data-driven strategies.
3. Listed and described the 7 key principles DDACTS.
4. Described the success factors of several communities that implemented data-driven strategies.

Summary

- Describe a data-driven strategy– what national and local efforts are in place at this very moment to enhance data-driven efforts.
- Identifying the key benefits to data-driven strategies – including to identify patterns and trends, develop proactive deployment strategies (aligning enforcement with activity), reduce crash, crimes, and social harms, measure progress towards goals.
- We got clear about the 7 key Guiding Principles of data-driven processes from partners to outcomes and everything in between.
- Finally, we concluded with the stories of several police departments who have effectively implemented such strategies that hopefully got you as pumped as I am to begin this journey together!

DDACTS Project

IADLEST - <https://www.iadlest.org/training/ddacts>

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Part 2: DDACTS 2.0 in Action

Dawn Reeby
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National Highway Traffic Safety Administration (NHTSA)

International Association of Directors of Law Enforcement
Standards and Training (IADLEST)



Part 2: “DDACTS in Action” explores the 7 key areas of the Data-Driven Approaches to Crime and Traffic Safety (DDACTS) place-based operational model including partners and stakeholders, data collection, data analysis, strategic operations, information sharing and outreach, monitoring, evaluation, and adjustments, and outcomes. This segment will equip students with the tools they need to build an implementation plan, with specific emphasis on analytical processes.

Introductions: Dawn Reeby



Dawn Reeby

Objectives

1. Explain how the DDACTS 2.0 model is used for crime and crash reductions.
2. Define “Evidence-Based Policing” and determine how the DDACTS model fits into this theory.
3. Differentiate between the seven guiding principles used in the DDACTS model and the critical role *data analysis* plays in the overall scheme.



Objectives-

Upon the completion of this training segment, you will be able to:

1. Explain how the DDACTS 2.0 model is used for crime and crash reductions.
2. Define “Evidence-Based Policing” and determine how the DDACTS 2.0 model fits into this theory.
3. Differentiate between the seven guiding principles used in the DDACTS 2.0 model and the critical role *data analysis* plays in the overall scheme.

Objective 1

Explain how the DDACTS 2.0 model is used for crime and crash reductions.



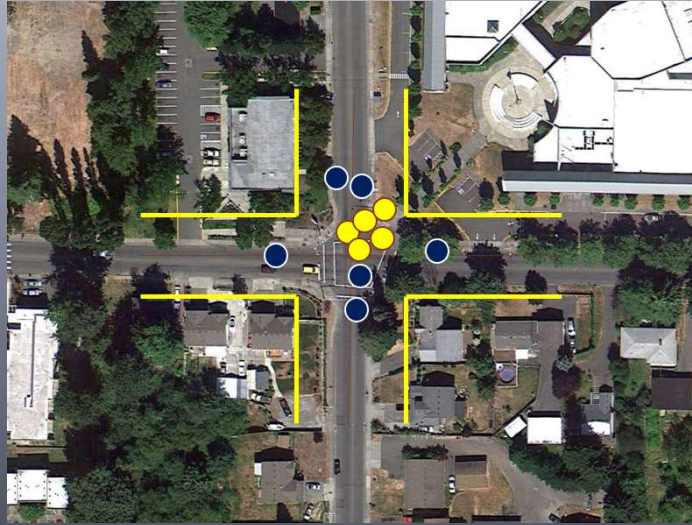
OBJECTIVE 1: Explain how the DDACTS 2.0 model is used for crime and crash reductions.

“Data-Driven Approaches to Crime and Traffic Safety (DDACTS) is a law enforcement operational model supported by a partnership among the Department of Transportation’s National Highway Traffic Safety Administration, and two agencies of the Department of Justice, the Bureau of Justice Assistance (BJA), and the National Institute of Justice (NIJ).

DDACTS integrates location-based traffic crash, crime, calls for service and enforcement data to establish effective and efficient methods for deploying law enforcement resources. By identifying areas through temporal and spatial analysis that have high incidences of crashes and crime, DDACTS employs highly visible, targeted traffic enforcement to affect these areas. This model affords communities the dual benefit of reducing traffic crashes and crime, thus reducing overall social harm.

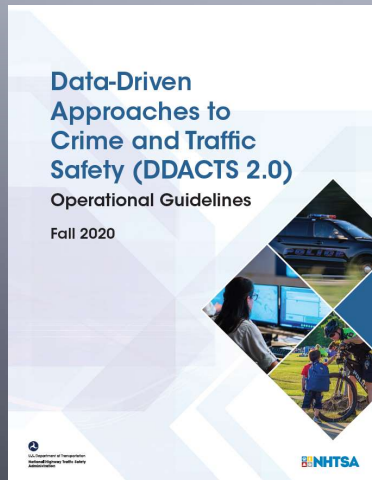
(Operational Guidelines)

In English, please...



Success in DDACTS, success in policing, means taking care of these patterns, these long-term problems, these hot spots, these groups of incidents. And to this end, DDACTS, while supporting a number of different approaches to reducing crime and increasing traffic safety, follows a very simple model.

Objective 2



Define “Evidence-Based Policing” and determine how the DDACTS 2.0 model fits into this theory.



Objective 2: Define “Evidence-Based Policing” and determine how the DDACTS 2.0 model fits into this theory.

Why DDACTS? Evidence-Based Purpose



“The relationship between traffic crashes, crime, and place-based policing has been the subject of a number of studies... over 35 years of research illustrating the residual crime control and traffic safety benefits resulting from data-driven, strategically directed traffic enforcement. One of the key elements of the DDACTS model is the nexus between the strategy and tactics of traffic enforcement and the prevention of crime. In other words, the application of highly visible traffic enforcement is a proven and effective strategy that addresses both crime and crashes whether they occur simultaneously or independently in time and/or location.” (DDACTS 2.0 Operational Guidelines, December 2020).

DDACTS is Cost-Efficient



The DDACTS model provides a cost-effective approach that employs targeted, analysis-driven highly visible patrols, engagement of partners and stakeholders, regular evaluation and adjustment of operations and emphasis on identified desired outcomes.

Overall, DDACTS has excellent return on investment.

- Cost Effective Approach – using the DDACTS deploys your agency’s resources in the most cost-effective manner. Officers aren’t just “wandering around.”
- Fewer Calls for Service – With continued use, your agency’s calls for service will start to decrease.
- Targeted Highly Visible patrols – The DDACTS model supports using officers in a strategic, but highly visible manner. The public will definitely see them working.
- Increased deterrence – when officers are deployed to your specific hot spots, the bad guy will be deterred from committing crimes in those areas.
- Increased field Contacts – Officers need to record as much information as possible from each traffic stop and contact and share this information with others in the agency.
- Reduction in Social Harm – You WILL have reductions in crashes and all types of crime when using the model.

DDACTS Partners

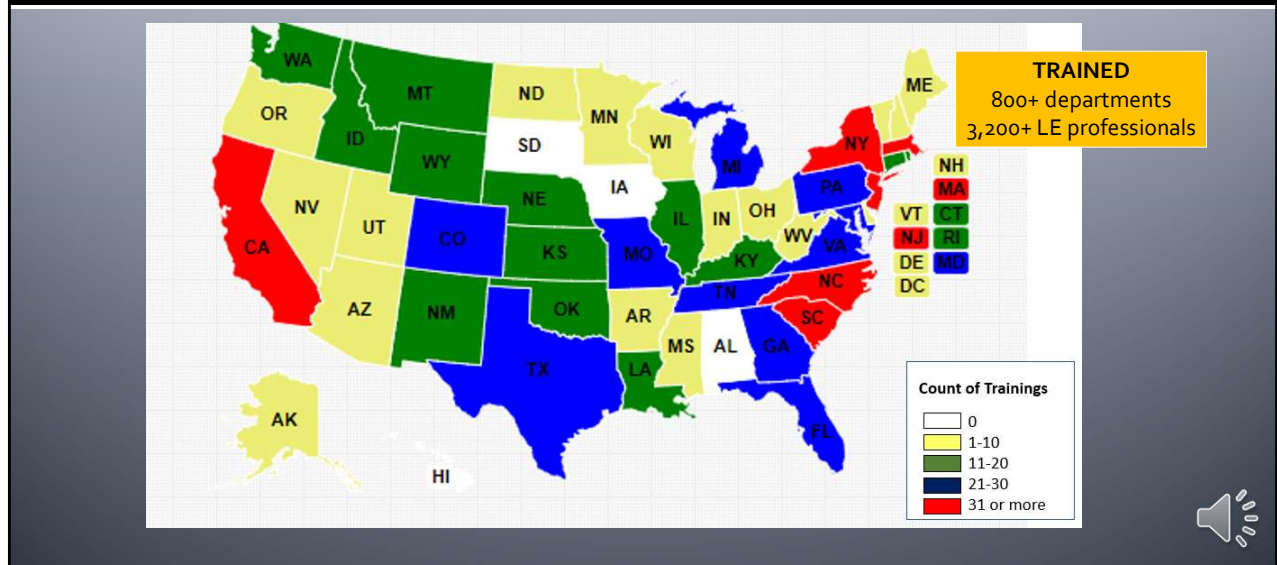


“HTSA is fortunate to have support from a number of national partners. The following organizations offer technical assistance and in-kind resources through their local affiliates to support law enforcement agencies that use DDACTS including:

- IADLEST
- IACP
- NSA
- NOBLE

(DDACTS Operational Guidelines)

Who is trained in DDACTS



From June 2010 through September 2019:

- Over 800 departments trained
- Almost 3,200 law enforcement professionals trained
- Completed over 115 workshops

POP UP QUESTION 1

True or False:

DDACTS 2.0 is a new program only in its pilot stage. There is currently no research to support that it saves costs or works.



POP UP QUESTION 1: True or **False**

DDACTS is a new program only in its pilot stage. There is currently no research to support that it saves costs or works.

Objective 3

Differentiate between the seven guiding principles used in the DDACTS 2.0 model and the critical role *data analysis* plays in the overall scheme.



Objective 3: Differentiate between the seven guiding principles used in the DDACTS 2.0 model and the critical role *data analysis* plays in the overall scheme.

DDACTS 7 Guiding Principles



DDACTS focuses on 7 basic principles:

1. Outcomes
2. Data Collection
3. Data Analysis
4. Partners and Stakeholders Participation
5. Strategic Operations
6. Information Sharing and Outreach
7. Monitoring, Evaluating, and Adjusting

1. Outcomes/Results

Category	5-Year Avg.	2019-20	Change Inside Zone	Change Outside Zone
All Collisions	106.6	84	-21%	-1%
Collisions with Injury	15.8	10	-37%	-19%
Auto Burglary	40.8	33	-21%	+16%
Auto Theft	41.2	16	-61%	-24%
Commercial Burglary	7.8	8	+3%	-50%
Residential Burglary	32.4	26	-20%	+2%
Robbery	7.2	5	-31%	-25%
Sex Crimes	2.6	7	+169%	-1%
Vandalism	39.2	33	-16%	-19%
All Target Crimes	256.8	198	-23%	-14%



“1. Outcomes — Goals and objectives that emerge during hot spot identification and strategic plan preparation are developed into outcome measures. These measures are used to assess effectiveness relating to reductions in crashes, crime, traffic violations; cost savings; the use of specific operational techniques and personnel deployment. (*Operational Guidelines*)

“Outcome measures or measures of impact that address a reduction in crashes and crime may look like the following:

- The reduction in calls for service
- Individual and collective numbers of fatal, injury, and property-damage-only crashes
- Numbers of Part I and Part II crimes
- Increasing numbers of enforcement contacts for specific driving offenses; and
- Reduction in gang violence incidents.

Administrative outcomes may include more effective and efficient utilization of work force and other resources. Additional outcomes may include:

- Increase in personnel and equipment.
- Increased cooperation and coordination among all officers, working together toward the identified desired outcomes.

2. Data Collection



Data Collection. “Accurate and timely crash, crime, calls for service and enforcement data are the building blocks of DDACTS. At a minimum, the data must include accurate and complete information on location, date, time, and incident type. If possible, it is also of great value to have access to crash and crime causation factors, enforcement activity such as citations, warnings, arrests, field interviews/contacts, citizen complaints, etc. Further information and/or data regarding violations, known offenders, probation and/or parole, census tracts, property-related information, community factors and other non-traditional data types can also be extremely valuable. Access to the data and consistency of data quality must also be considered. Ultimately, the data is only data until the analysis process turns it into actionable information.” (*Operational Guideline*)

We have an entire session in this series dedicated to data quality. Part 6 “**Data Quality and Cleaning Tips Like You’ve Never Seen Before!**” outlines the key factors relative to developing the cleanest data for quality analysis. That training will describe and explain 6 common data errors, solutions to those common errors, and 4 methods of identifying errors through querying methods.

POP UP QUESTION 2

True or False

Creating clear results desired is key to the long-term success of your strategies.



POP UP QUESTION 2

True or False

3. Data Analysis



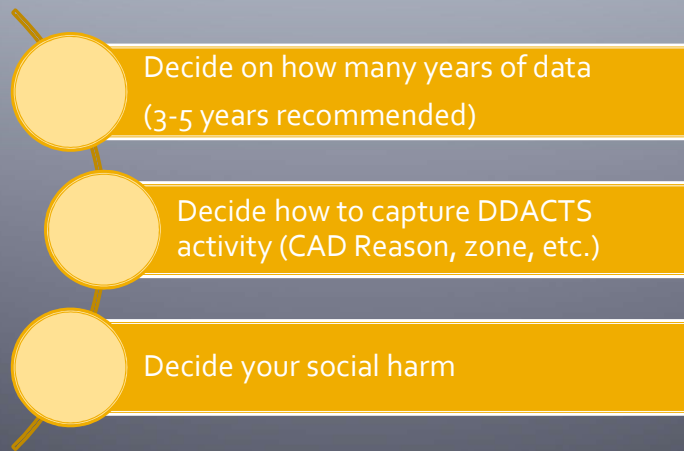
Data Analysis. “The analysis of crashes, crimes, and calls for service allows agencies to identify high-activity hot spots within the jurisdiction. Research has shown that crashes, crimes and other social harms tend to cluster in geographic space and time.

Examples may include crashes involving serious injuries at a specific intersection or curve along a stretch of roadway. Robberies may be common at convenience stores or automated teller machines or speeding along a stretch of highway may be common just after the evening rush hour period. Research has further shown us that clusters of crashes, crimes and other social harms and disorder may overlap.

The utilization of data to identify these hot spots can help agencies identify locations where highly visible traffic enforcement can impact a variety of public safety issues, ultimately achieving reductions in both crimes and crashes. The ability to graphically display these overlapping hot spots on a map can provide commanders and supervisors, as well as partners and stakeholders, with further justification and support for strategic, effective, and efficient deployment of resources.”

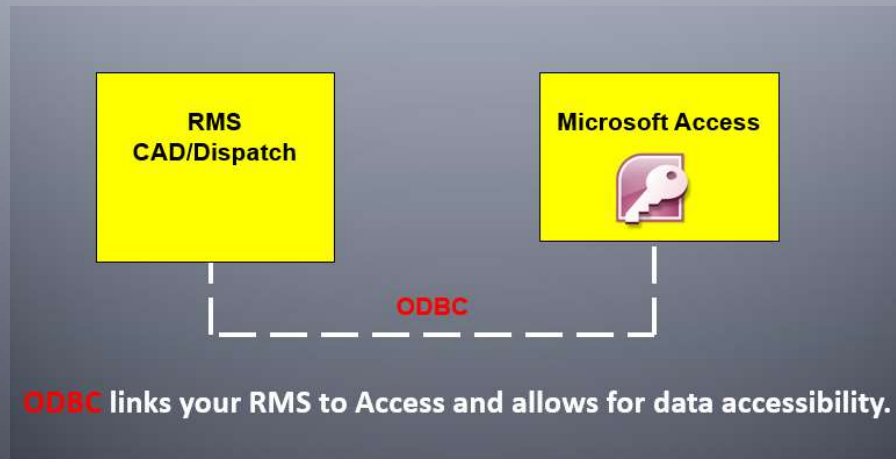
(Operational Guidelines)

Qualify Your Data



- Decide on how many years of data you're going to use to create your master files and baseline maps. (3-5 years recommended)
- Decide how you will capture your DDACTS activity. Some departments create a new CAD reason called "DDACTS". Others use spatial tools such as ArcGIS to create hotspots and continuously measure the changes within those hotspots. And others use Microsoft Access® to pull by zones identified within the hotspots. Whatever you decide to do, make a plan in the beginning so that progress can be accurately and consistently measured.
- Decide your social harm. Spend time considering the desired outcome FIRST. What do you want to effect? What are the social harms relative to your community that can be impacted through this model? Some departments choose to decrease all crime. Others omit domestic violence cases and similar that won't necessarily be impacted by visible patrol. And others simply want to address their graffiti and loitering issues only. There are lots of variations. There is no wrong answer. Take the time to work with your staff to identify what is key to your agency.

Set Up Your ODBC



USE the electronic data that we have in a CONNECTED, SIMPLISTIC, AND RESULTS-FOCUSED WAY.

Once you decide WHAT you want, you must make your move to get access to your data! ODBC, or Open Database Connection, is a function available through Microsoft Access® that pulls your data from your database management system and brings it into Microsoft Access® so that you can view and analyze any single field that is available!

We have several parts in this series that provide you with the technical tools you need to accomplish ODBC (Part 3).

POP UP QUESTION 3

The utilization of data to identify hotspots can help agencies:

- A. Identify suspect race and gender
- B. Identify suspect race and age
- C. Identify where highly visible traffic enforcement can impact a variety of public safety issues.
- D. Lead agencies to create a master utilization database for tracking victims.



POP UP QUESTION 3

The utilization of data to identify hotspots can help agencies:

- A. Identify suspect race and gender
- B. Identify suspect race and age
- C. Identify where highly visible traffic enforcement can impact a variety of public safety issues.**
- D. Lead agencies to create a master utilization database for tracking victims.

Build Your Master Database

Take care of your MASTER DATABASE



Next, you will want to spend time building your master database. This involves drawing in tables from your records management system into Microsoft Access®, such as:

- Arrests
- Incidents/Offenses
- Enforcement (CAD MV Stops)
- Crashes

The purpose here is to have a place to create baseline data, analyze current data, and measure outcomes. Parts 4 and 5 in this series detail exactly how to link your data and develop your master queries.

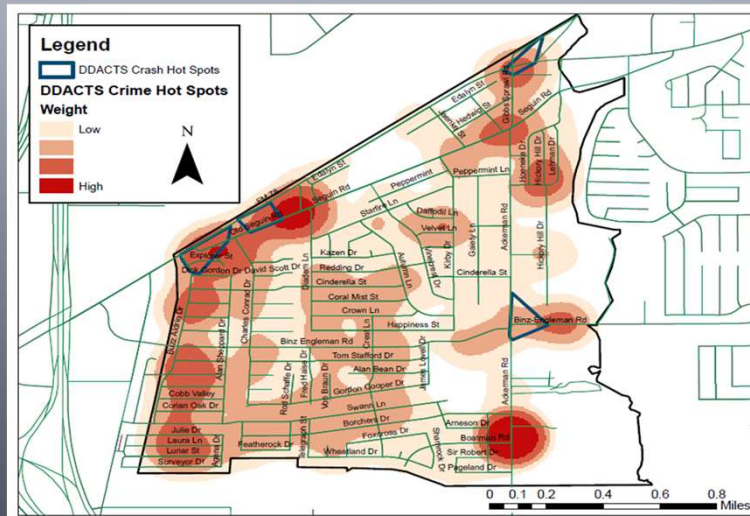
Pull Baseline Data

File	Years	Notes
Arrests/Offenses	Jan. 1, 2017 – June 30, 2020	Date, time, crime type or social harm, address of crime
Enforcement Data	Jan. 1, 2017 – June 30, 2020	Data, time, location, stop reason, action taken
Crashes	Jan. 1, 2017 – June 30, 2020	Date, time, address/intersection, conditions (possibly in state database)



Pull baseline data: arrests and offenses or social harms, your enforcement data, and your crashes for 3-5 years to create your baseline data and eventually maps. This table provides some detail on what fields you may need for creating your baseline data and maps. Part 7 on “Expressions” can facilitate your data pull processes.

Create Baseline Maps

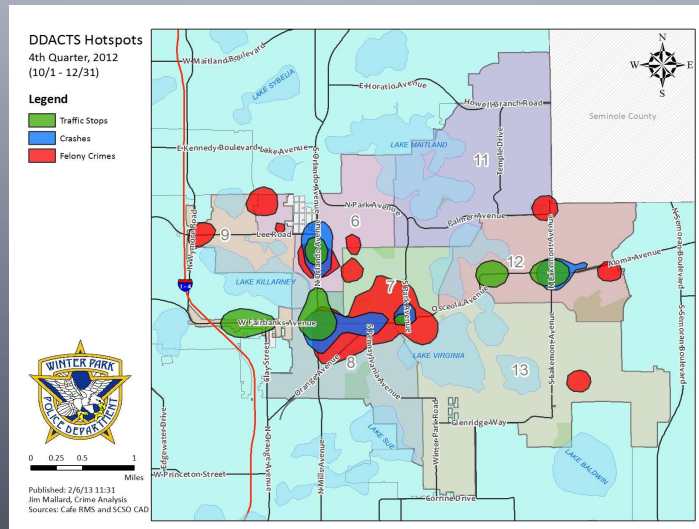


The next step is to take your baseline data for social harms, enforcement, and crashes and map them to create a visual aid in your DDACT's zone development. You will end up with 4 maps:

- Social harms map
- Enforcement map
- Crashes map
- An overlay map of social harms, enforcement, and crashes

In this map, Kirby, TX thought they knew where the crime was occurring over the previous 5 years. The stop in the bottom right corner surprised them.

Create Baseline Maps



This map shows Winter Park Florida's DDACTS efforts. Enforcement activities are more aligned with crimes and crashes, hence their subsequent reductions. The value of Guiding Principle #6 is demonstrated here. But notice there is still work to do. Management should direct resources specifically to where the blue and red overlap.

Many of the red areas without overlapping traffic enforcement efforts are not conducive to traffic enforcement due to the nature of the roadway so high visibility/felt presence would be beneficial in these areas.

You can create the maps on your own in a mapping program such as ArcGIS, or work with your City mapping folks or maybe even a local college to generate your baseline maps.

POP UP QUESTION 4

Your baseline overlap map should contain which hotspot layers?

- A. Felony crimes, crashes, and social harms
- B. Felony crimes, crashes, and traffic accidents
- C. Social harms, enforcement, and crashes
- D. Directed patrol, graffiti, and gang activity

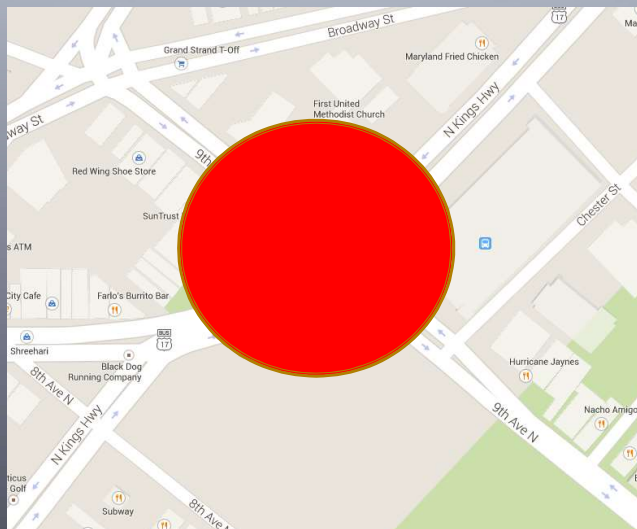


POP UP QUESTION 4

Your baseline overlap map should contain which hotspot layers?

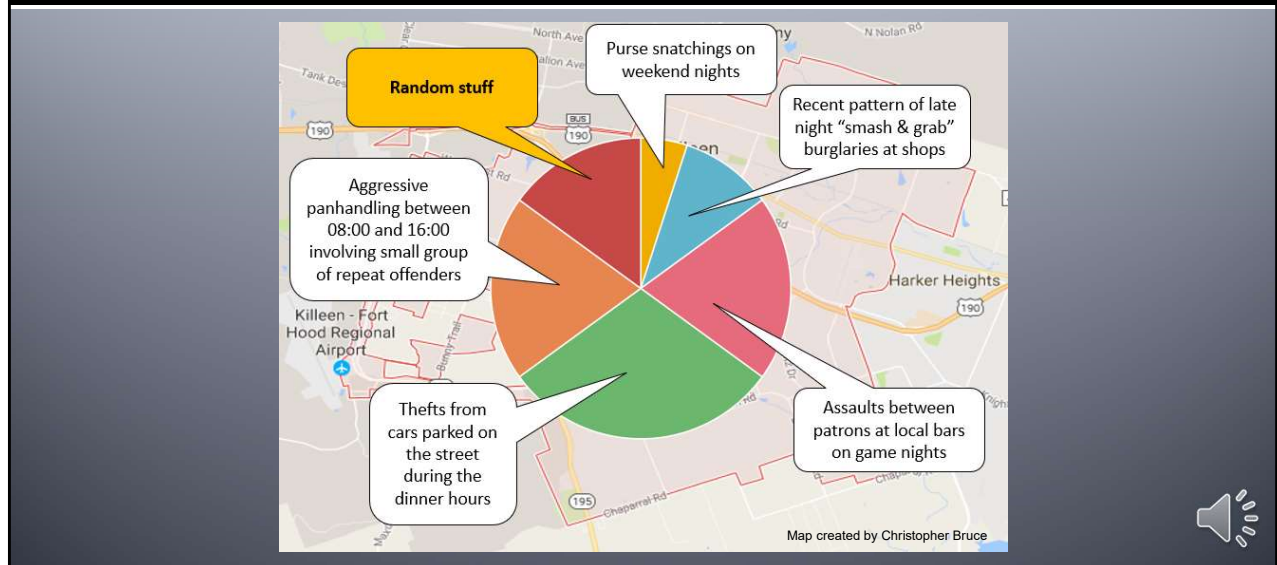
- A. Felony crimes, crashes, and social harms
- B. Felony crimes, crashes, and traffic accidents
- C. Social harms, enforcement, and crashes**
- D. Directed patrol, graffiti, and gang activity

Data Analysis



Here's what it looks like if we stop at just our baseline maps. Just a dot on the map. Should you deploy officers there all hours of the day and night? All seasons of the year? For street crime? For a problem location? We can't answer any of those questions with just a dot or just a hotspot.

Data Analysis



I encourage you to look at this a little bit more in depth. In this case we break down this hotspot by the type of activities that occur there.

- Aggressive panhandling between 08:00 and 16:00 involving small group of repeat offenders
- Thefts from cars parked on the street during the dinner hours
- Assaults between patrons at local bars on game nights
- Recent pattern of late night “smash & grab” burglaries at shops
- Purse snatchings on weekend nights
- Random stuff

By further analyzing the hotspot, we can develop strategies that are results-focused and intentional.

Dig Deep into the Data

- ✓ “Target Times” for target area
- ✓ Different target areas for each shift
- ✓ Top social harm locations
- ✓ Top crash locations
- ✓ Known offenders/Repeat offenders
- ✓ Repeat victims
- ✓ Suspicious activity
- ✓ Open warrants
- ✓ Environment
- ✓ Social Media



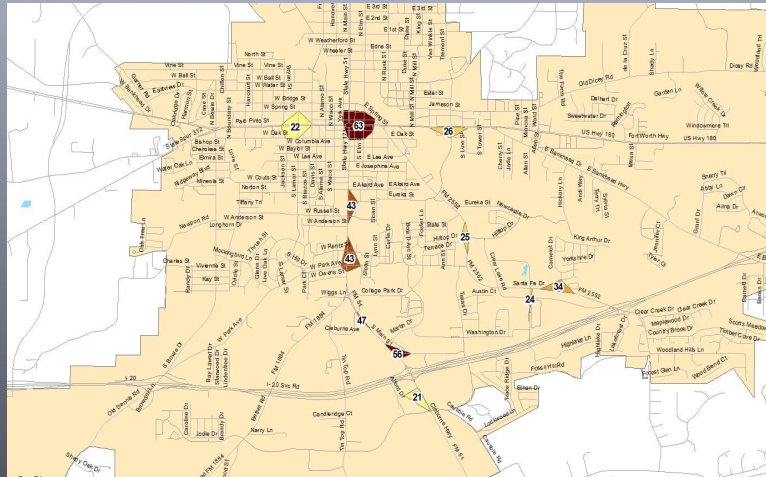
It's key to dig deeper into the data so that efforts can be clear and precise! Some items to consider for zone analysis include:

- “Target Times” for a target area
- Different target areas for each shift
- Top social harm locations
- Top crash locations
- Known offenders/Repeat offenders
- Repeat victims
- Suspicious activity
- Open warrants
- Environment
- Social Media

For details on how to analyze your data, check out Part 8 “Top Locations, Offenders, and More” and Part 9 “Reports and Automation”.

Data Analysis

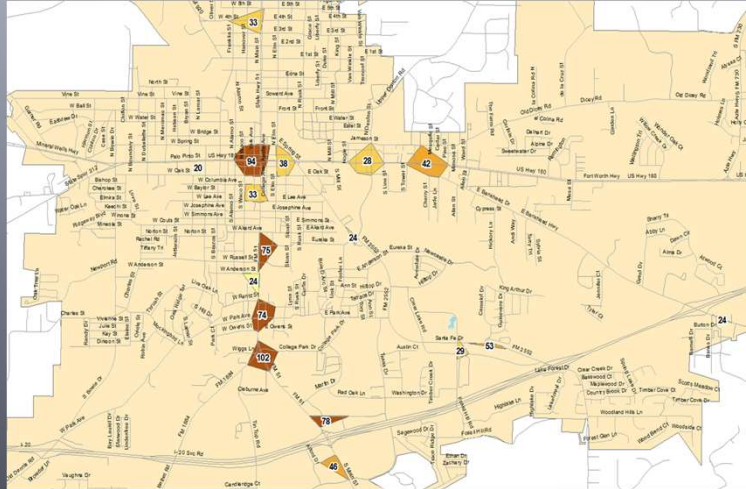
January-March hot spots, 3 years



Example of how to analyze data: seasonal hotspot analysis of years of data.

Data Analysis

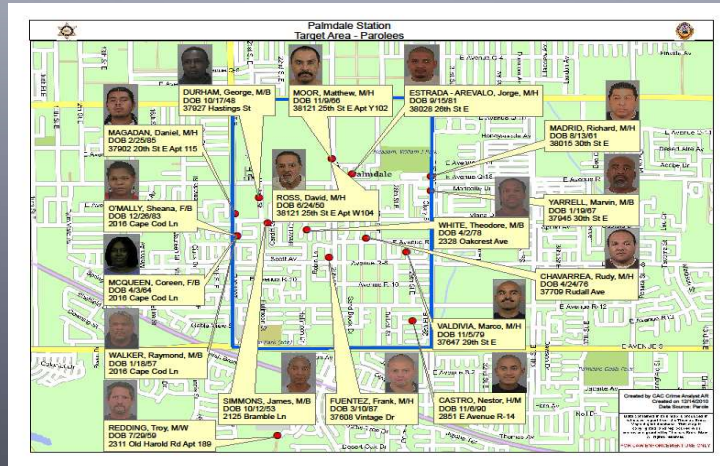
00:00 to 08:00 3-year average



Example of how to analyze data: temporal analysis of years of data.

Data Analysis

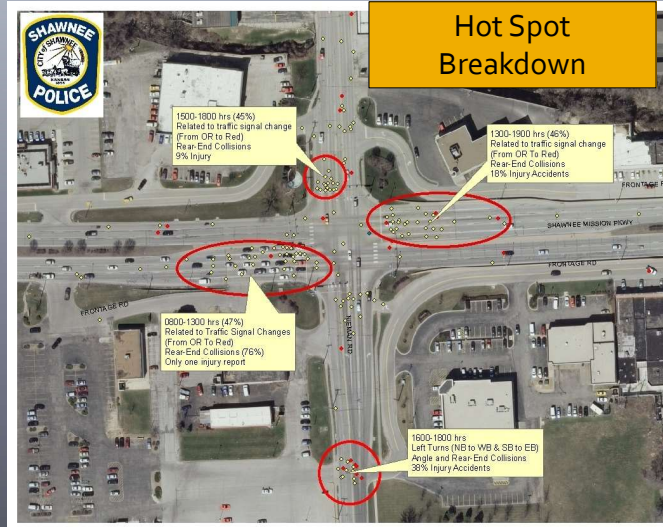
Probationers



Example of how to analyze data: probationers within hotspot DDACTS zone.

Data Analysis

Crash Breakdown



Example of how to analyze data: crash breakdown to identify key problems in the hotspot.

Data Analysis

Top Calls
For Service

Top Crash
Locations

PORT ST. LUCIE POLICE DEPARTMENT
TOP CALLS FOR SERVICE ADDRESSES

RANK	ADDRESS	COUNT	CUMULATIVE %
1	800 SW DARWIN BLVD DARWIN SQUARE	3	29 0.4% Cumulative % 0.4%
2	1449 SE MORROW ST RESIDENTIAL	2	25 0.3% Cumulative % 0.7%
3	10855 S U S HIGHWAY 1 WALMART	1	23 0.3% Cumulative % 1.1%
4	1875 NW ST LUCIE WEST BLVD WALMART	4	23 0.3% Cumulative % 1.4%
5	1850 SW GATLIN BLVD WALMART	3	22 0.3% Cumulative % 1.7%
6	1655 SE WALTON RD EMERALD HEALTHCARE	1	17 0.2% Cumulative % 1.9%
7	166 SW PEACOCK BLVD BELMONT APTS	4	14 0.2% Cumulative % 2.1%
8	973 SW DEL RIO BLVD	4	14 0.2%



Example of how to analyze data: top calls for service locations; top crash locations in DDACTS hotspot zone.

Data Analysis

Identify Potential Leads/Suspect



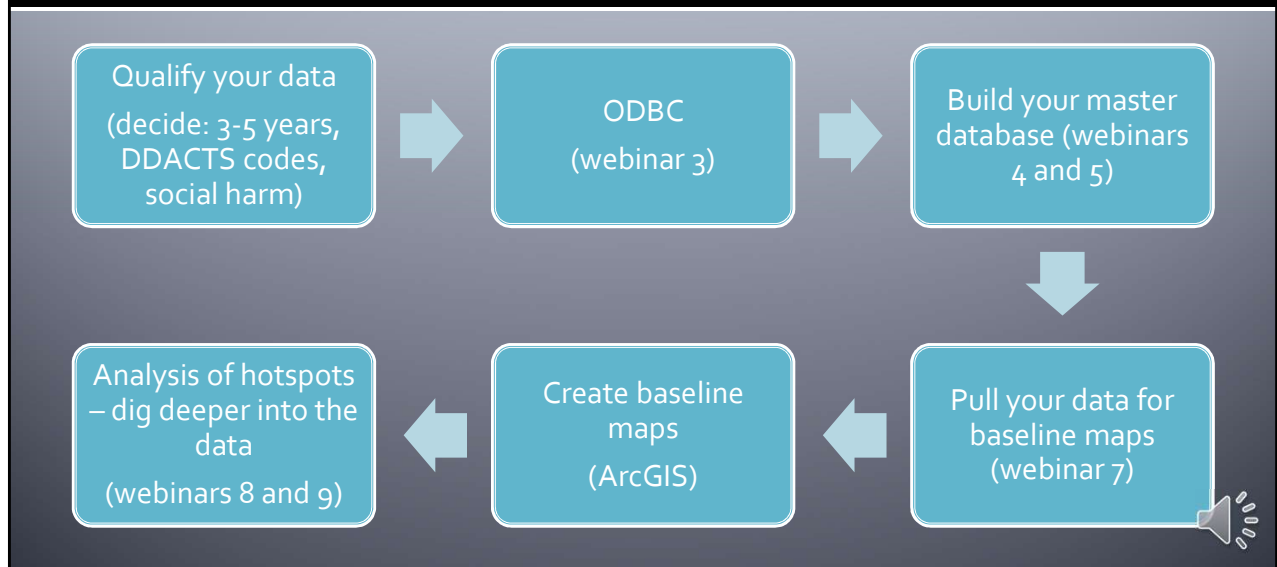
Suspect is small; climbing through very small windows.

Analyze suspects who reside within 1 standard deviation of series.



Example of how to analyze data: Identifying potential leads or suspects by pulling in offender homes (or locations frequented/work/etc.) relative to a location of a crime in a hotspot zone.

Data Analysis



- First, you must qualify your data – decide how many years of data to include in your baseline data (3-5 recommended), decide how you are going to track your DDACT’s activity (such as with a CAD reason code dedicated to DDACTS), decide what social harms your DDACTS activities will impact.
- Next, establish connectivity from your RMS system to Microsoft Access®. Check out webinar 3 on “Connectivity” for a step-by-step.
- Next, build your master database where you will analyze your data and track progress. Webinars 4 “Everything Tables and Linking” and webinar 5 “Building a Database with Make Table and Append Queries” can assist.
- Once your master database has been set up appropriately, you can now pull your data for baseline maps of 3-5 years of data. Webinar 7 “Expressions” can assist designing queries.
- Next, create your 4 baseline maps in ArcGIS – 3-5 years of social harm, crash, and enforcement data and then one map that overlays each layer. The final three webinars (11, 12, and 13) will help with the “how to” for mapping.
- Finally, and importantly, you must dig deep into the data and analyze your hotspots. Webinar 8 “Top Locations, Offenders, and More” and webinar 9 “Reports and Automation” will facilitate the analytics portion of your DDACTS model.

4. Partners and Stakeholders



“4. Partners and Stakeholders Participation — Partnerships among law enforcement agencies and with local stakeholders are essential and provide opportunities and support for decreasing social harm and improving the quality of life in a community.”

“To assist in developing a comprehensive list of partners and stakeholders, it is important to think of and list your internal and external partners or stakeholders separately so that we don’t forget that both partners and stakeholders exist inside and outside of the agency. (Internal partners can include your patrol officers, dispatch staff, and IT. External partners can include local businesses, community groups, and the media to name a few.)

You want to look for internal and external partners who have INFLUENCE! Focus on local organizations and businesses most impacted by the social harm currently prevalent in the identified hot spots.

What will you ask of your partners? What will you do for your partners?”

(Operational Guidelines)

5. Strategic Operations



“5. Strategic Operations — Based on analysis, agencies are able to identify high activity hot spots, likely to include incidents of crashes, crimes, and other calls for service. These hot spots can then be targeted with strategic, highly visible traffic and other enforcement efforts at the most appropriate places and times. Hot spot analysis guides the realignment of workflow and operational assignments to focus highly visible traffic enforcement efforts and increase the efficiency of reducing social harm.” *(Operational Guideline.)*

There is no right or wrong here, just what will work for your agency based on size, activity, staffing, etc. Some departments use a Charlie or Bike Patrol to work the DDACTS zone during the hot times; others use their school resources officers during the summer for directed efforts; others move officers from other sectors into the DDACT zones for one-hour increments daily; others require their officers to drive through the DDACTS zone every shift. The idea here is to develop location-based strategies that work for your department.

We highly recommend an analysis of available patrol hours and an objective examination of documented unobligated times so that you can develop a strategy that works best for your agency. *(Operational Guidelines)*

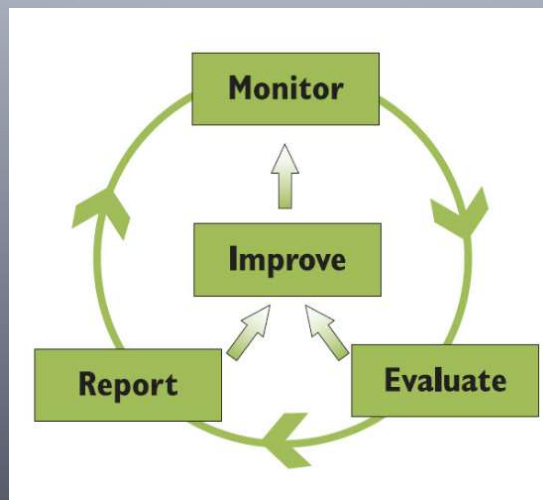
6. Information Sharing and Outreach



“6. Information Sharing and Outreach — Built into the model are opportunities to share comprehensive results and actionable information internally and externally, promote community participation, and document accomplishments. Regularly generated progress reports give management the documentation needed to keep officers informed, hold meetings with community members, and report to government administrators and elected officials. Progress reports also provide the basis for ongoing media relations.”

“Informing the public regarding traffic enforcement and crime reduction activities and the resulting impact of DDACTS is crucial to long-term success. Working with data analysts and designated staff, the agency’s public information officer or spokesperson should develop a plan for communicating (to partners and stakeholders and) through media outlets to share information about the DDACTS initiative.” (*Operational Guidelines*)

7. Monitor, Evaluate, and Adjust



7. Monitoring, Evaluation, and Adjustments — “The DDACTS model is place-based and thus needs to keep pace with ever changing data.”

“Law enforcement executives should monitor the effectiveness of traffic enforcement and the impact on crashes, crime, and social harm. The goal should be to align enforcement with incidents in order to achieve identified, desired outcomes. Strategic operations can only be evaluated, and adjusted accordingly, if data is available to monitor the impact of enforcement.

Regular evaluation of arrests, citations, citizen contacts and all other enforcement activity allows for adjustments to the mix of traffic enforcement measures and the deployment of officers. In addition, scheduled briefings keep executives aware of officers’ performance and concerns. The accountability of first line supervisors is critical. First line supervisors must be given the authority to manage, and then be held accountable for the effort displayed by patrol officers.

Law enforcement executives also will have the opportunity to assess the impact that highly visible traffic enforcement has on the performance of other law enforcement activities - nontraffic-related arrests, processing arrested individuals, filing reports, making court appearances. This information will contribute to decisions about the reallocation of resources and the deployment of officers who investigate crime.”

It is recommended that staff develop a schedule for analysis, feedback, and plan adjustment.

(Operational Guidelines)

Summary of Part 2 “DDACTS in Action” Objectives

1. Explain how the DDACTS 2.0 model is used for crime and crash reductions.
2. Define “Evidence-Based Policing” and determine how the DDACTS model fits into this theory.
3. Differentiate between the seven guiding principles used in the DDACTS model and the critical role *data analysis* plays in the overall scheme.



Summary

- **OBJECTIVE 1: Explain how the DDACTS 2.0 model is used for crime and crash reductions.** DDACTS Definition – Data Driven Approaches to Crime and Traffic Safety that integrates location-based traffic crash, crime, calls for service and enforcement data to establish effective and efficient methods for deploying law enforcement resources.
- **OBJECTIVE 2: Define “Evidence-Based Policing” and determine how the DDACTS 2.0 model fits into this theory.** Evidence-Based Model – over 35 studies linking place-based strategies to success.
- **OBJECTIVE 3: Differentiate between the seven guiding principles used in the DDACTS 2.0 model and the critical role *data analysis* plays in the overall scheme.** We discussed the 7 Key Areas of the DDACTS Model and the role of analysis:

DDACTS Project

IADLEST - <https://www.iadlest.org/training/ddacts>

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<http://www.iadlest.org/>

<http://www.nhtsa.gov/ddacts>

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Part 3: CONNECTIVITY How to Connect Your Data

Dawn Reeby
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National Highway Traffic Safety Administration (NHTSA)

International Association of Directors of Law Enforcement
Standards and Training (IADLEST)



Part 3: “How To Connect Your Data (ODBC Step By Step)” introduces participants to the concept of open database connectivity (ODBC), detailing what ODBC is, why it is necessary to have to analyze patterns and trends, and a step-by-step on how to get ODBC in your department (including language to send to executives, IT staff, and vendors as well as screen shots of exactly how to establish connection).

Introductions: Dawn Reeby



Dawn Reeby

Objectives

1. Discuss why ODBC was created.
2. List the benefits of direct data access and challenges.
3. Explain the process and language used to educate your Chief, vendor, and IT Support.
4. List the 7 steps to ensure an ODBC connection can occur in your analytical system.



Today we are going to explore how to get access to our data: Connectivity! We will explore why open database “Connectivity” was created, what it is and its benefits, challenges departments face when connecting, language for chiefs, IT staff, and vendors to get you started on the right foot, and a step-by-step guide on how to establish connectivity. This is open database connectivity demystified.

OBJECTIVES:

1. Discuss why ODBC was created and how this source helps the analytical community.
2. List the benefits of direct data access and expected common challenges in using it.
3. Explain the process and language used to educate your Chief, vendor, and IT Support to the value of the analyst having access to data to help solve agency and jurisdictional social harms.
4. List the seven (7) steps to ensure an ODBC connection can occur in your analytical system.

Discussion point

Methods to gain access to data:

1. Excellence RMS/CAD Export
2. Direct data access (ODBC)
3. Data Warehouse



Analysts must have access to their data. Period!

Objective 1

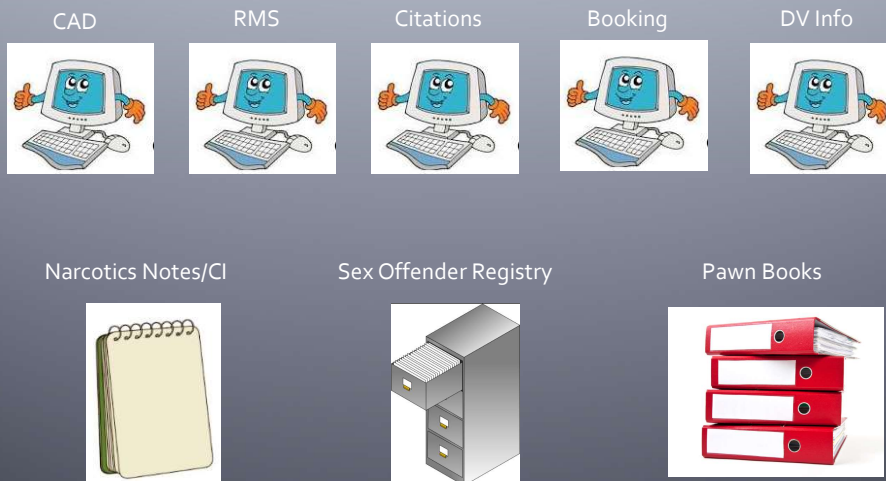
Discuss why ODBC was created and how this source helps the analytical community.



Objective 1: Discuss why ODBC was created and how this source helps the analytical community.

For more on big data, see Ferguson, A. G. (2017, November). Beyond data-driven policing. *American Scientist*, 105(6), 378-380.

Why was Connectivity Created?



USE the electronic data that you have in a **CONNECTED, SIMPLISTIC, AND RESULTS-FOCUSED WAY**. What we are looking to accomplish today is to get you started with actually *looking at* all that hard-earned data, whether it exists in a citations database, a booking file, a domestic violence or Narcotics database, sex offender/probation/parole registry, a separate CAD/RMS system, or even a pawn database.

What is Connectivity?

ODBC –
MY
HERO!



(image: Unsplash <https://unsplash.com/s/photos/super-hero>)

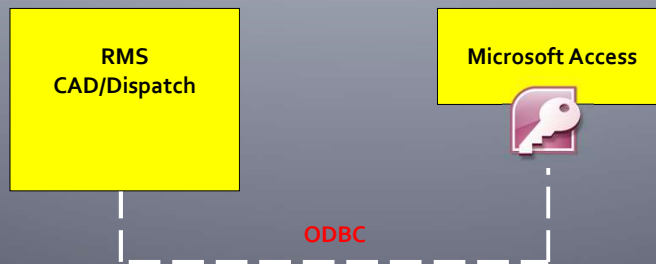


ODBC allows you to design maximum interoperability. Another words, you can set up your system to have the ability to access multiple data sources at once.

(image: Unsplash <https://unsplash.com/s/photos/super-hero>)

What is Connectivity?

Open Database Connection (ODBC) is a library containing data access routines



ODBC links your RMS to Access and allows for data accessibility.



ODBC, or Open Database Connection, is a function available through Microsoft Access® that pulls your data from your database management system and brings it into Microsoft Access® so that you can view and analyze any single field that is available! It is a library containing data access routines. ODBC is an Application Program Interface (API) and uses structure query language (SQL) as its database language. This means you can share it with others!

What is Connectivity?

The screenshot shows a software interface titled 'Records Analysis'. At the top, there are menu options: Records, Analyze, Traffic, Property, Reports/Queries, Analysis, Status, PA, Submissions/IBR, CE, Exit. Below the menu is a toolbar with icons for file operations. The main area contains several input fields and buttons:

- From date: [text box]
- Thru date: [text box]
- Time Each Day:
- From Time: 0000
- To Time: 2359
- Incident & Arrest Filters (Skip To Include All Information)
- Offense Jurisdiction: [text box]
- Offense Location Name: [text box]
- Offense Streets: [text box]
- Zones: [text box]
- Zone Groupings: [text box]
- Days Of Week: [text box]
- Crimes Against (VPS):
- At least one victim aged: [text box] to [text box]
- At least one offender aged: [text box] to [text box]
- Follow-Up/Division Codes: [text box]
- Offense Type: [text box]
- Bias Against: [text box]
- Drugs: [text box]
- Suspected of Using: [text box]
- IBR Codes: [text box]
- Laws: [text box]
- Event Codes: [text box]
- Select Reports To Process: [text box]
- Select Graphs To Process: [text box]
- Add Selection Criteria To Report:
- Use State IBR Tables for Statistics:
- Screen or Printer: S
- Which Printer: WPOLICE06IDET HP LASERJET 4050

A speech bubble points to the filters section with the text: "A typical canned query in Records-Limited & do you know how the data is collected?"

This may look familiar. It is a typical canned query as it allows you to select certain data parameters. It's limited as you really don't know how the data is being drawn from your system.

What is Connectivity?

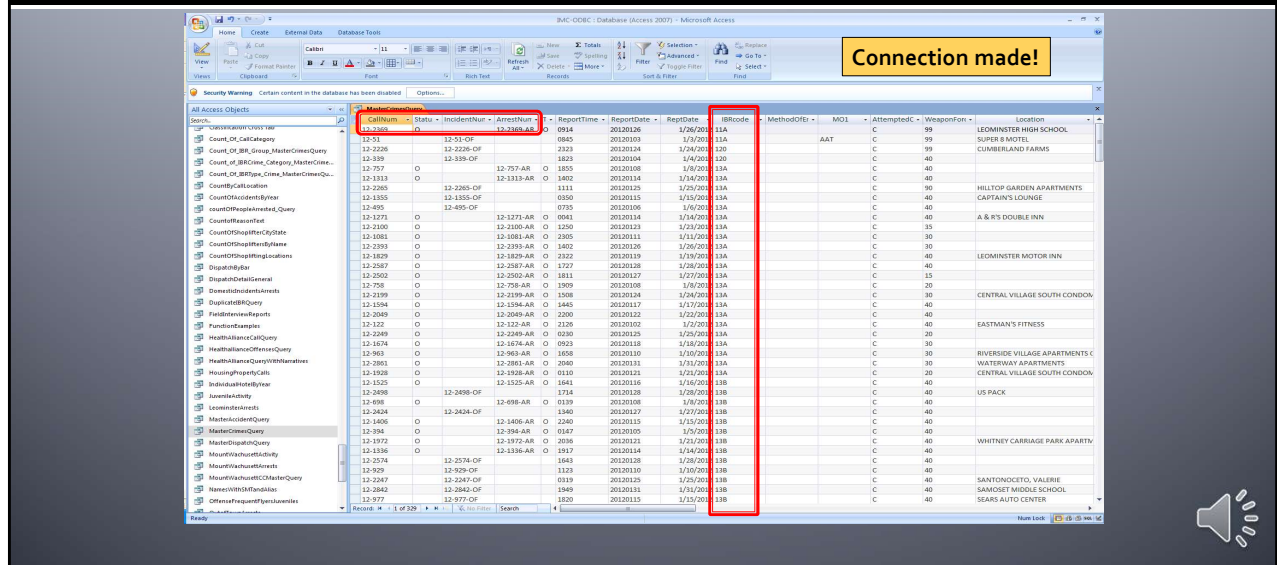
Leominster Police Department Page: 1 of 5
 Crime Comparison Report For the period ending 12/31/2013

Group A Crimes Against Persons

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2013								1					1
2012													
Pct								n/a					n/a
2013		2		2			1	2		1			8
2012	1						1	1	1				4
Pct	n/a	n/a		n/a			0%	n/a	n/a	n/a	n/a		+100%
2013	1			1	5	2	3						17
2012	2	2	1	3					4	2	2		17
Pct	-50%	n/a	n/a	n/a	n/a	0%	n/a	n/a	n/a	n/a	-50%		0%
2013						1	4	1	2	2	1		10
2012						1							3
Pct	n/a					n/a	n/a	n/a	+100%	n/a	n/a		+233%
2013				1									1
2012				1									1
Pct	n/a			n/a									0%
2013	13	10	22	27	15	20	19	20	24	31	18	19	238
2012	27	21	27	14	23	21	22	14	20	24	20	28	261
Pct	-52%	-52%	-19%	+93%	-35%	-5%	-14%	+43%	+20%	+29%	-10%	-32%	-9%
2013	31	33	45	43	52	52	49	43	54	45	42	39	528
2012	33	39	51	40	48	47	45	40	45	51	43	42	524
Pct	-6%	-15%	-12%	+8%	+8%	+11%	+9%	+8%	+20%	-12%	-2%	-7%	+1%
2013	23	34	14	22	26	19	13	15	24	26	18	18	252
2012	11	13	19	20	30	23	30	17	16	21	19	21	240
Pct	+109%	+162%	-26%	+10%	-13%	-17%	-57%	+50%	+50%	+24%	-5%	-14%	+5%
2013				3	1	1	1	1	1	2	5	1	17
2012				2	1								1
Pct	n/a	-50%	n/a	n/a	-50%	0%	n/a	-80%	-50%	+100%	n/a	0%	-8%
2013	68	78	87	96	97	89	86	105	106	86	77	77	1072
2012	76	80	98	77	103	93	100	76	89	100	84	92	1068
Pct	-11%	-3%	-11%	+25%	-6%	+4%	-11%	+13%	+18%	+6%	+2%	-16%	+0%

Here is an example of a typical canned report. You get a bunch of numbers but can't extract any understanding as to what the numbers represent. For all you know, this report could be counting by offenses instead of by incidents. So, if an offender was charged with 30 counts of rape to a single victim, it could appear that you have a rapist running wild.

What is Connectivity?



Your goal in data management is to do an “end-run” around the canned screens and reports that your vendor has given to you, and to access your data directly so you can use modern data querying and data mining tools like Microsoft Access® to ask whatever questions you want of your data.

What is Connectivity?

Field	StreetName	StreetSuf	IntersectStreetName	IntersectStreetSuf	RealDate: Date/val, RealTime: Time/val, Month Format/De	AccidentDate
Table	Master_Accident_T	Master_Accident_T	Master_Accident_T	Master_Accident_T		Master_Accident_T
Show	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria		"COMMERCIAL"	"RD"	"COMMERCIAL"	"RD"	>= 2010/06/01 <= 2010/06/01

Microsoft Access® allows YOU to ask your own questions and you can easily see how the data looks. Here we have a query that brings in two datasets to ask questions.

Have you ever wanted to know which “Shots Fired” calls resulted in actual reports involving guns? Or which offenders were linked in some way to another individual? By linking data sets on a common field, you can do just that and much more!

POP UP QUESTION 1

TRUE OR FALSE:

Connectivity allows you to set up your system to have the ability to access multiple data sources at once and create the queries of your dreams!



POP UP QUESTION 1: **TRUE OR FALSE:**

Connectivity allows you to set up your system to have the ability to access multiple data sources at once and create the queries of your dreams!

Objective 2

List the benefits of direct data access and expected common challenges to using it.



Objective 2: List the benefits of direct data access and expected common challenges to using it.

Benefits of Direct Data Access

- Identify patterns and trends as they emerge
- Identify investigative leads
- Develop deployment strategies
- Identify and repair data quality issues
- Increase deterrence
- Reduce crime, social harm, and crashes
- Recover uncommitted patrol time
- Increase arrests
- Transparency
- Recover budget funding



Part 1 shared the many benefits of having direct access to your data and is worth touching upon here again today.

- Identify patterns and trends as they emerge – with your data all in one spot, you can search for increases or decreases or trends relatively easily.
- Identify investigative leads – you can identify past MOs relatively easily and link past offenders to current crime series.
- Develop deployment strategies – For instance, you can take the last 3 years of summer nightshift crashes, identify hotspots, and determine deployment strategies that align with those hot spots. An increase in police presence at the “smartest” locations may increase deterrence in that area as well.
- Identify and repair data quality issues – with data at your fingertips, you can identify dirty data and make quick corrections to mass amounts of errors (check out Part 5 of this series for dirty data tips and tricks)
- Reduce crime, social harm, and crashes – this is a big one...hang on, we will get into this in a moment.
- Recover uncommitted patrol time – you can determine when there is uncommitted officer time, implementing a more proactive and less reactive approach.
- Increase arrests – I’ll prove in a second with a cost analysis of how data-driven strategies can increase arrests!
- Transparency – having easy access to your data can make reporting to the community much easier and much more efficient. Imagine an automated arrest report that redacts juveniles, domestics, and current narcotic cases. No more printing daily and bolding out info with black magic marker!

POP UP QUESTION 2

Data-driven policing can help reduce crashes, crimes, social harms and can help police departments save time and **MONEY?**



POP UP Question 2.

Data-driven policing can help reduce crashes, crimes, social harms and can help police departments save time and **money!**

Objective 3

Explain the process and language used to educate your Chief, vendor, and IT Support to the value of the analyst having access to data to help solve agency and jurisdictional social harms.



Objective 3: Explain the process and language used to educate your Chief, vendor, and IT Support to the value of the analyst having access to data to help solve agency and jurisdictional social harms.

What do I say to my Chief? IT?

CHIEF

- I'm here to do a job, and I need your support!
- Share the benefits of data-driven strategies

IT Staff

- Let's work together
- I won't break stuff



What do I say to my Chief? What do I say to IT staff?

Share that with access to data there are so many benefits, or wins, for your Chief and your department:

- Identify patterns and trends as they emerge
- Identify investigative leads
- Develop deployment strategies
- Identify and repair data quality issues
- Increase deterrence
- Reduce crime, social harm, and crashes
- Recover uncommitted patrol time
- Increase arrests
- Transparency
- Recover budget funding

Access to your data will also help your chief LOOK REALLY GOOD! With Chiefs, they get what they need, and you get what you need – WIN-WIN!

(To learn more about the “7 Habits of Highly Effective People”, visit <https://www.stephencovey.com/7habits/7habits-habit5.php>).

What do I say to my Vendor?

1. Explain to them that you are embarking on a **new effort to analyze** crime and traffic hot spots, and thus you want to **establish a direct connection** to the RMS for the purposes of data querying and mapping.
2. Ask them to send you the information necessary to set up an ODBC connection:
 - The server name
 - The name of the database (or "catalog") on the server
 - A login and password that will have read-only access to the data
3. Ask them if a **DATA DICTIONARY** is available for the system. It probably isn't, but it doesn't hurt to ask.



What do I say to my vendor? You want to:

1. Explain to them that you are embarking on a **new effort to analyze** crime and traffic hot spots, and thus you want to **establish a direct connection** to the RMS for the purposes of data querying and mapping.
2. Ask them to send you the information necessary to set up an ODBC connection:
 - The server name
 - The name of the database (or "catalog") on the server
 - A login and password that will have read-only access to the data
3. You need these things for the servers/databases that have CRIME, CALLS FOR SERVICE, and CRASHES.
4. Ask them if a DATA DICTIONARY is available for the system. A **data dictionary** is a centralized repository of information about data such as meaning, relationships to other data, format, etc. Basically, it's how your data is connected.

POP UP QUESTION 3

TRUE OR FALSE:

It's best to just try to access your data without investing the partnerships of your chief, IT staff, or vendor.



POP UP QUESTION 3: TRUE OR **FALSE**:

It's best to just try to access your data without investing the partnerships of your chief, IT staff, or vendor.

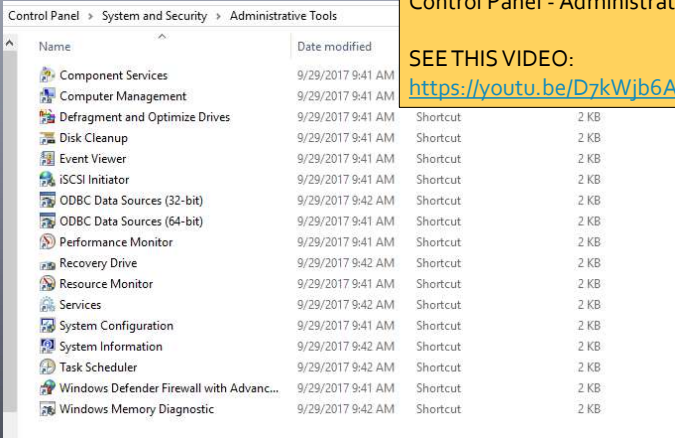
Objective 4

List the 7 steps to ensure an ODBC connection can occur in your analytical system.



OBJECTIVE 4: List the seven steps to ensure an ODBC connection can occur in your analytical system.

Connection Steps: FOR IT Staff



IT staff set up your ability for ODBC connection. They will do this through the Control Panel - Administrative Tools.

SEE THIS VIDEO:
<https://youtu.be/D7kWjb6AmKo>

Name	Date modified	Size
Component Services	9/29/2017 9:41 AM	Shortcut 2 KB
Computer Management	9/29/2017 9:41 AM	Shortcut 2 KB
Defragment and Optimize Drives	9/29/2017 9:41 AM	Shortcut 2 KB
Disk Cleanup	9/29/2017 9:41 AM	Shortcut 2 KB
Event Viewer	9/29/2017 9:41 AM	Shortcut 2 KB
iSCSI Initiator	9/29/2017 9:41 AM	Shortcut 2 KB
ODBC Data Sources (32-bit)	9/29/2017 9:42 AM	Shortcut 2 KB
ODBC Data Sources (64-bit)	9/29/2017 9:41 AM	Shortcut 2 KB
Performance Monitor	9/29/2017 9:41 AM	Shortcut 2 KB
Recovery Drive	9/29/2017 9:42 AM	Shortcut 2 KB
Resource Monitor	9/29/2017 9:41 AM	Shortcut 2 KB
Services	9/29/2017 9:42 AM	Shortcut 2 KB
System Configuration	9/29/2017 9:41 AM	Shortcut 2 KB
System Information	9/29/2017 9:42 AM	Shortcut 2 KB
Task Scheduler	9/29/2017 9:42 AM	Shortcut 2 KB
Windows Defender Firewall with Advanc...	9/29/2017 9:41 AM	Shortcut 2 KB
Windows Memory Diagnostic	9/29/2017 9:42 AM	Shortcut 2 KB

Setting up your connectivity.

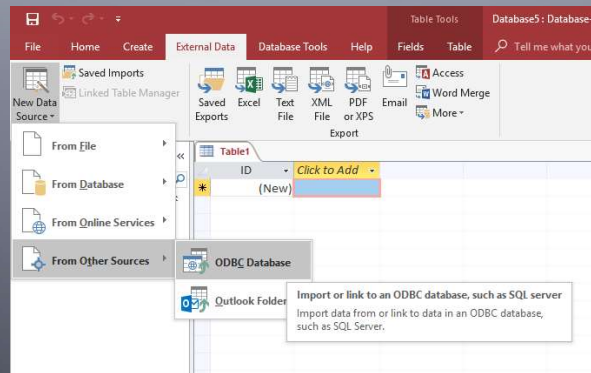
IT staff set up your ability for ODBC connection. They will do this through the Administrative Tools located in the control panel.

Here's are two great videos for your IT staff should they need assistance creating an ODBC connection to SQL Server:

- "Advanced Programming in Access 2013. Creating an ODBC Connection To SQL Server" December 2014. <https://youtu.be/D7kWjb6AmK0>
- "How to Configure ODBC to Access a Microsoft SQL Server" November 2011. Retrieved December 2020. <https://www.youtube.com/watch?v=tUiaK5fRH7k>

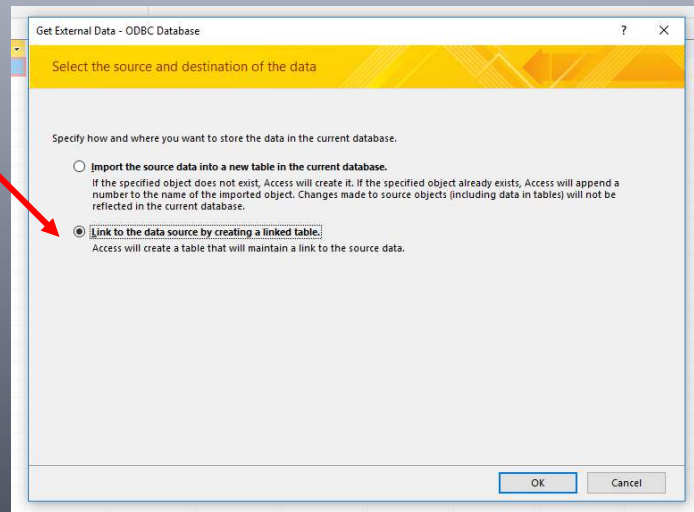
Connection Steps: Step 1

External Data
New Data Source
From Other Sources
ODBC Database



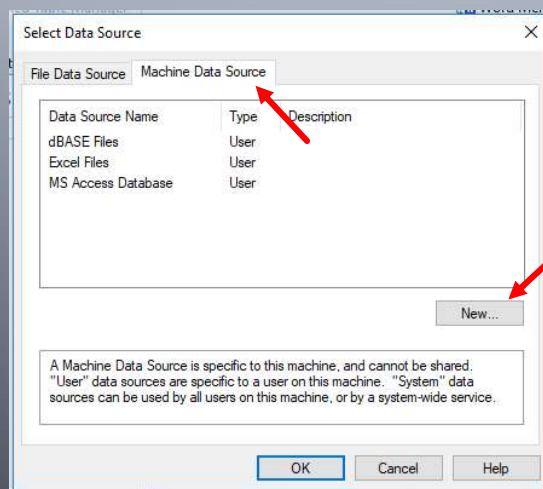
Step 1: set up the ODBC connection.

Connection Steps: Step 2



Step 2: Directly link to your data source.

Connection Steps: Step 3

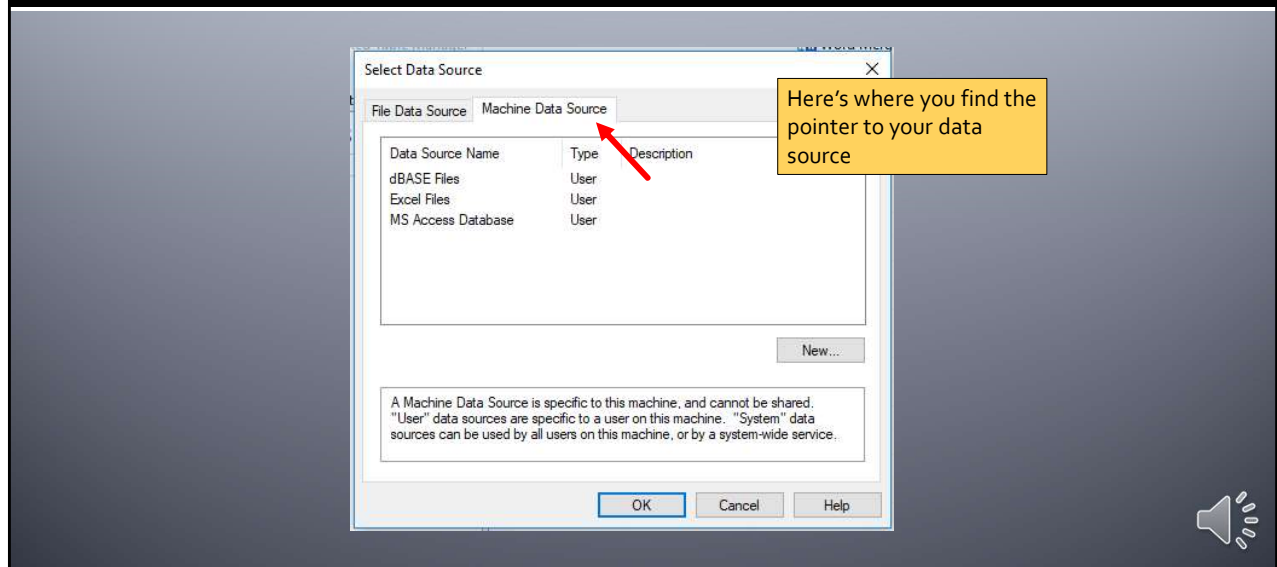


For IT staff.

Recommended to start in CONTROL PANEL, ADMINISTRATIVE TOOLS, ODBC.

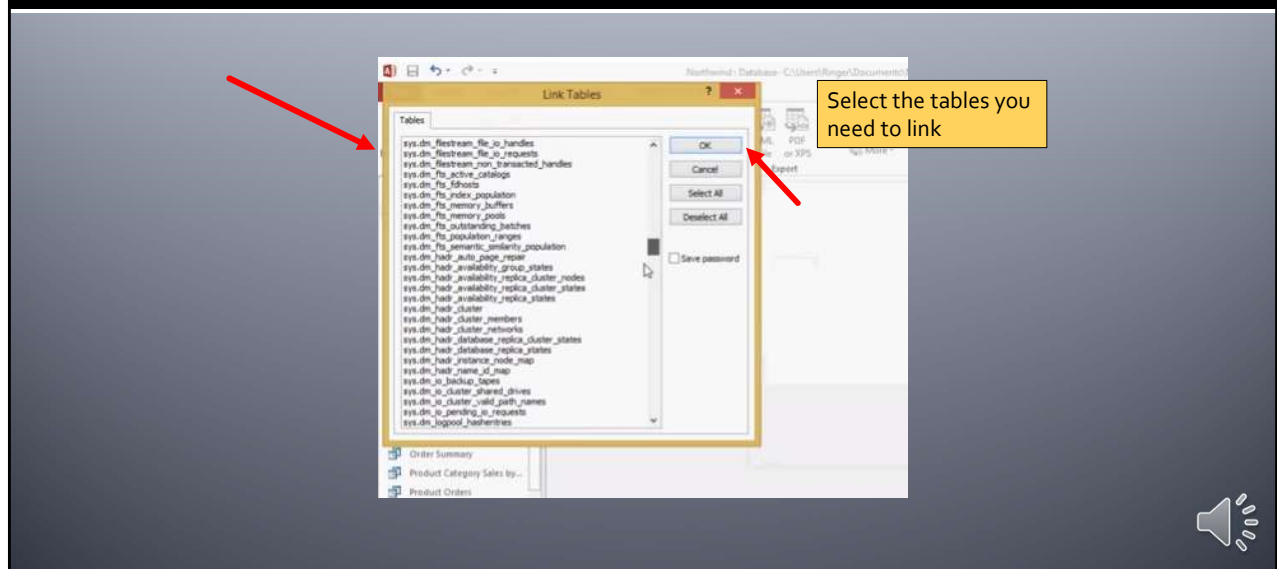
Step 3: Identify the location of the data you desire to be linked.

Connection Steps: Step 4



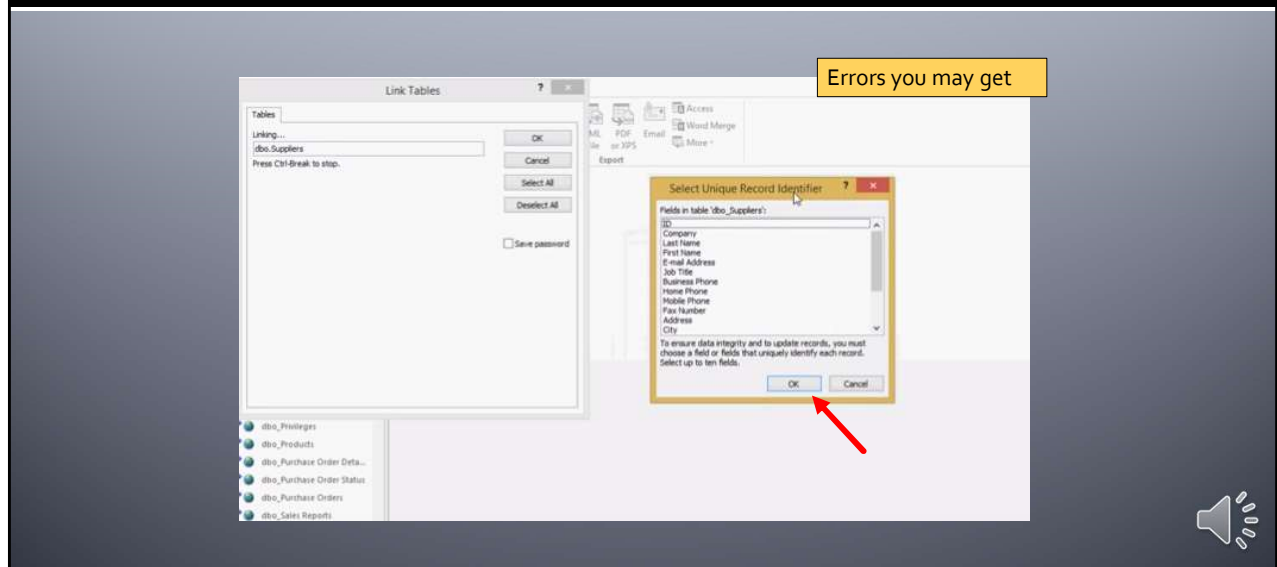
Step 4: Find the pointer to your data source.

Connection Steps: Step 5



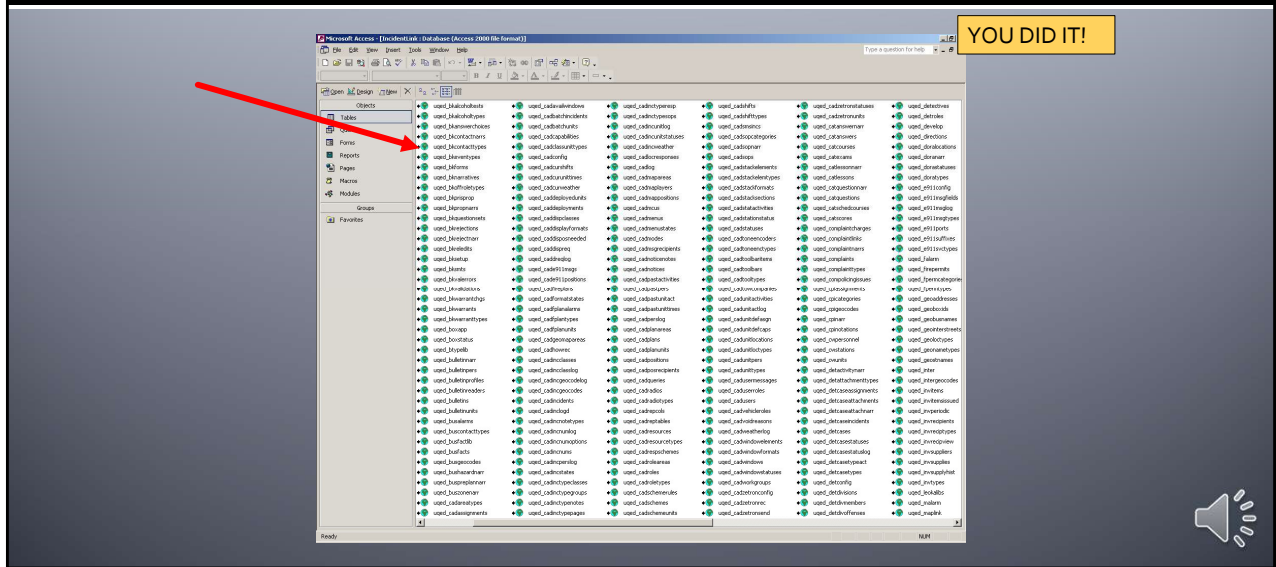
Step 5: Select the tables you want to bring in.

Connection Steps: Step 6



Step 6: Deal with linking errors.

Connection Steps: Step 7



Step 7: Play with your new data!

POP UP QUESTION 4

TRUE or FALSE:

You need to work hand in hand with IT staff to set up your data connection.



POP UP QUESTIONS 4: **TRUE** or FALSE:

You need to work hand in hand with IT staff to set up your data connection.

Summary of Part 3 “Connectivity” Objectives

1. Discuss why ODBC was created.
2. List the benefits of direct data access and challenges.
3. Explain the process and language used to educate your Chief, Vendor, and IT Support.
4. List the 7 steps to ensure an ODBC connection can occur in your analytical system.



Summary:

The Objectives for this course were for students to be able to define and explain open database connectivity (ODBC) and its usability. Specifically,

1. Discuss why ODBC was created and how this source helps the analytical community.
2. List the benefits of direct data access and expected common challenges in using it.
3. Describe the process and language used to educate your Chief, vendor, and IT Support to the value of the analyst having access to data to help solve agency and jurisdictional social harms.
4. List the seven steps to ensure an ODBC connection can occur in your analytical system.

DDACTS Project

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Part 4: Everything Tables and Linking

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Part 4: “Everything Tables and Linking” outlines the key factors relative to table structure and linking tables in Microsoft Access®. These instructions are pivotal in designing a properly functioning database with all its automated processes.

For more on linking tables, go to:

1. [Bruce, C.W. \(Jan. 2016\) *Microsoft Access for Crime Analysis*. Unpublished Work, PDF.](#)
2. Bruce, C.W. *Advanced Microsoft Access for Crime Analysis*. Unpublished Work, PDF.
3. “Import or link to data in another Access database” Retrieved December 2020. <https://support.microsoft.com/en-us/office/import-or-link-to-data-in-another-access-database-095ab408-89c7-45b3-aac2-58036e45fcf6>
4. “How to Set Table Relationships in Microsoft Access 2016” Retrieved December 2020. <https://www.dummies.com/software/microsoft-office/access/how-to-set-table-relationships-in-access-2016/>

Introductions: Dawn Reeby



Dawn Reeby

Objectives

1. Define table structures.
2. Identify the utility of the primary key.
3. Determine the difference between flat files and relational files.
4. Import data from outside sources into Microsoft Access®.
5. Determine the utility of Cartesian join, inner join, left outer join, and right outer join.

Objectives

1. Define table structures.
2. Determine the utility of the primary key.
3. Identify the difference between flat files and relational files.
4. Import data from outside sources into Microsoft Access®.
5. Determine the utility of Cartesian join, inner join, left outer join, and right outer join.

Objective 1

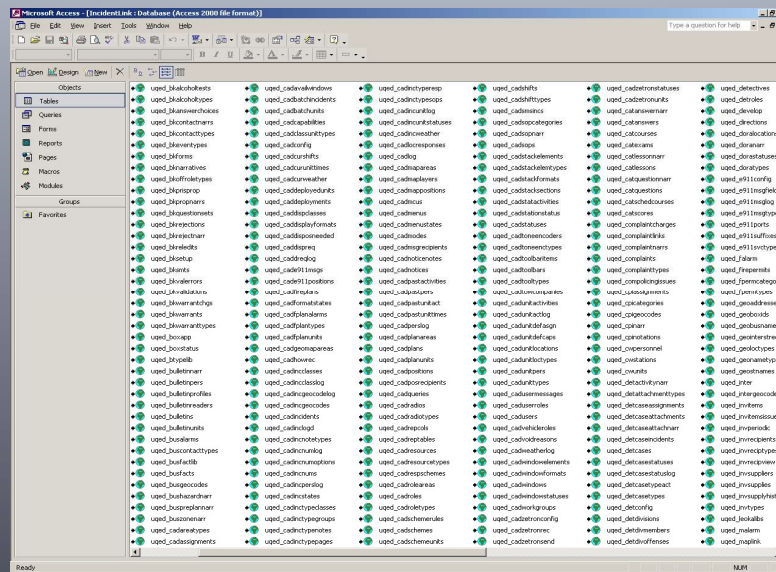
Define table structures.

Objective 1: Define table structures.

Now that you have your data, the next step is to focus on:

- Table structures
 - Primary Key
 - Flat Files versus Relational Databases
- Importing Data
- Linking tables
 - Cartesian Joins (no join)
 - Inner Joins
 - Left Outer Joins
 - Right Outer Joins

Table Structures



The globes represent the live connection to your RMS/CAD or other database. If you have imported the data, rather than linked the data source, instead of globes you will see mini excel-like looking sheets. These are static data and does not change or update.

However, the linked files, noted by the globes here, are LIVE data, and are automatically updated in your Microsoft Access® database when updated in your RMS system. Another words, when the officer submits a new report on Sunday, and on Monday you look at the data, the Sunday report with automatically be there.

You will probably be confronted by hundreds of data tables. If you're lucky, you'll either get a data dictionary from your vendor or the tables will be named sensibly enough that you can understand them. It's best that you identify which tables contain the data you desire. Mostly, you should be looking for a file or files with your CAD, crashes, crimes, arrests, and citations data. See if you can get your DDF files from your vendor to make this process easier.

Table Structures

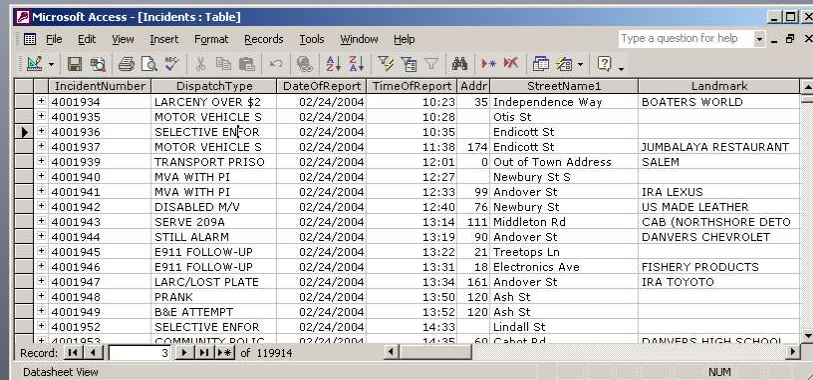
- **Core Data Tables**
 - Store substantive information about incidents, people, vehicles, property, etc.
- **Library Tables**
 - Store “lookup” values for drop-down lists and other forced-choice selections
- **System Tables**
 - Store values (temporary or permanent) needed by the system to perform various tasks
- **Link/Activity Tables**
 - Serve as bridges between two tables with no common fields

You will find that the many tables in your database break down into one of four types:

- CORE DATA TABLES: which store data about incidents, people, vehicles, property, etc.
- LIBRARY TABLES: which store "look up" values for drop down menus.
- SYSTEM TABLES: that store values needed by the system to perform various tasks.
- LINK/ACTIVITY TABLES: that serve as a bridge between two tables with no common fields.

Table Structures: Core Tables

- Incident
- Offense and *modus operandi*
- Person
- Property
- Vehicles
- Citations



The screenshot shows a Microsoft Access window titled "Microsoft Access - [Incidents : Table]". The window displays a table with the following columns: IncidentNumber, DispatchType, DateOfReport, TimeOfReport, Addr, StreetName1, and Landmark. The table contains 14 records, all dated 02/24/2004. The records are as follows:

IncidentNumber	DispatchType	DateOfReport	TimeOfReport	Addr	StreetName1	Landmark
4001934	LARCENY OVER \$2	02/24/2004	10:23	35	Independence Way	BOATERS WORLD
4001935	MOTOR VEHICLE S	02/24/2004	10:28		Otis St	
4001936	SELECTIVE ENFOR	02/24/2004	10:35		Endicott St	
4001937	MOTOR VEHICLE S	02/24/2004	11:38	174	Endicott St	JUMBALAYA RESTAURANT
4001939	TRANSPORT PRISO	02/24/2004	12:01	0	Out of Town Address	SALEM
4001940	MVA WITH PI	02/24/2004	12:27		Newbury St S	
4001941	MVA WITH PI	02/24/2004	12:33	99	Andover St	IRA LEXUS
4001942	DISABLED M/V	02/24/2004	12:40	76	Newbury St	US MADE LEATHER
4001943	SERVE 209A	02/24/2004	13:14	111	Middleton Rd	CAB (NORTHSHORE DETO
4001944	STILL ALARM	02/24/2004	13:19	90	Andover St	DANVERS CHEVROLET
4001945	E911 FOLLOW-UP	02/24/2004	13:22	21	Treetops Ln	
4001946	E911 FOLLOW-UP	02/24/2004	13:31	18	Electronics Ave	FISHERY PRODUCTS
4001947	LARC/LOST PLATE	02/24/2004	13:34	161	Andover St	IRA TOYOTO
4001948	PRANK	02/24/2004	13:50	120	Ash St	
4001949	B&E ATTEMPT	02/24/2004	13:52	120	Ash St	
4001952	SELECTIVE ENFOR	02/24/2004	14:33		Lindall St	
4001953	COMMUNITY POLIC	02/24/2004	14:35	60	Cashot Rd	DANVERS HIGH SCHOOL

Examples of CORE TABLES are incident tables, offenses and MO tables, master name files, property tables, vehicle tables, and citation tables.

Table Structures: Library Tables

- Incident or Offense Types
- Person "Roles"
- IBR Descriptions
- Colors
- Vehicle Makes & Models

sernum	chocode	chdesc	chgtype	nbroffcode	nbroffdesc	chgdatabar	chgnic	nbrgroup	ucroffensecod
1	209A/7/B	ABUSE PREVENTION ORDER VIOL, RETALIATORY	M+	90F	FAMILY OFFEN: 1013000	3209	B		
2	208/34C	ABUSE PREVENTION ORDER, VIOL PROBATE CT c208 534C	M+	90F	FAMILY OFFEN: 19910103	3209	B		
3	209A/7	ABUSE PREVENTION ORDER, VIOLATE c209A 57	M+	90F	FAMILY OFFEN: 19940701	3209	B		
4	274/4	ACCESSORY AFTER THE FACT c274 54	F	90Z	ALL OTHER OFI 0	9200	B		
5	274/2	ACCESSORY BEFORE THE FACT c274 52	F	90Z	ALL OTHER OFI 0	9100	B		
7	274/6	ATTEMPT TO COMMIT CRIME c274 56	M+	90Z	ALL OTHER OFI 0	9300	B		
9	274/7	CONSPIRACY c274 57	M+	90Z	ALL OTHER OFI 19681019	9400	B		
12	265/43/B	STALKING IN VIOL OF RESTRAINING ORDER c265 543	F	90Z	ALL OTHER OFI 19920518	3209	B		
13	265/43/C	STALKING IN VIOL OF RESTRAINING ORDER, 2D c265 543	F	90Z	ALL OTHER OFI 19920518	3209	B		
20	272/53/D	ACCOST/ANNOY PERSON OF OPPOSITE SEX c272 553	M+	90C	DISORDERLY C 0	7099	B		
21	269/10D	BODY ARMOR, USE IN FELONY c269 510D	F	520	WEAPON LAW 19830827	7099	A		
27	102/1A	BOAT, TRESPASS ON c102 51	M-	90J	TRESSPASS OF 0	7199	B		
29	98/56D/A	CHECKOUT SYSTEM DECEPTION, AUTOMATIC, 2D c98 556D	M-	23C	SHOPLIFTING 19760415	7199	A		
30	98/56D/B	CHECKOUT SYSTEM DECEPTION, AUTOMATIC, 2D c98 556D	M-	23C	SHOPLIFTING 19760415	7199	A		
31	98/56D/C	CHECKOUT SYSTEM DECEPTION, AUTOMATIC, 3D c98 556D	M-	23C	SHOPLIFTING 19760415	7199	A		
32	95/16/A	NAME/ADDRESS, MV OP REFUSE GIVE AT NIGHT c95 516	CM	90Z	ALL OTHER OFI 0	7199	B		
38	266/120	TRESPASS c266 5120	M-	90I	TRESSPASS OF 19840322	7199	B		
39	266/117/A	TRESPASS FOR TREE/PLANT/FRUIT c266 5117	M+	90I	TRESSPASS OF 0	7199	B		
40	266/117/B	TRESPASS FOR TREE/PLANT/FRUIT SUN/NIGHT c266 5117	M+	90I	TRESSPASS OF 0	7199	B		
41	266/123	TRESPASS ON STATE/COUNTY PROPERTY c266 5123	M-	90I	TRESSPASS OF 19940322	7199	B		
42	266/121	TRESPASS WITH FIREARM c266 5121	M-	90I	TRESSPASS OF 0	7199	B		
43	266/121A	TRESPASS WITH MOTOR VEHICLE c266 5121A	CM	90I	TRESSPASS OF 19740802	7199	B		

Examples of LIBRARY TABLES are incident or offense type, IBR codes, roles of persons (i.e. victim, offender, witness), colors, vehicle makes and models. Library tables can be helpful as one can select or link to the category rather than free-typing each field.

Table Structures

Field Name	Data Type	Description
IncNum	Text	The police incident number
DispatchType	Text	The dispatch code as determined by the related CAD incident
DateOfReport	Date/Time	The date that the incident was reported
TimeOfReport	Date/Time	The time that the incident was reported
DateFrom	Date/Time	The earliest date that the incident could have occurred
TimeFrom	Date/Time	The earliest time that the incident could have occurred
DateTo	Date/Time	The latest date the incident could have occurred
TimeTo	Date/Time	The latest time the incident could have occurred
MidTime	Date/Time	The halfway point between the earliest time and the latest time
StNo	Number	The address number
Street1	Text	The main street
Street2	Text	The intersecting street (if any)

Figure 8: A table's design view

Field data types available in Access

Data Type	Description	Uses in Policing/CA
Text (Short text in 2013)	Alphanumeric combinations, up to 255 characters	Crime type, <i>modus operandi</i> factor, street name, last name, serial number
Memo (long text in 2013)	Text up to 63,999 characters	Narratives, stories, lengthy comments and notes
Number	Real numbers, including decimal numbers	Est. number of members in a gang, number of lanes on a street, number of months of a sentence.
Date/Time	Dates, times, or both	Date and time of report, date of birth, release date for parolees

Once the table is opened in the design view, you can see that there are different field structures for different types of data. For instance, a field that you want to write a short description in may be structured as a TEXT field. Or a date field, such as date of birth, date of incident, etc. might be structured to represent time in a specific format, such as 1/1/2021.

Table Structures

Data Type	Description	Uses in Policing/CA
Currency	Specially-formatted number field with four decimal places, up to eight integers, and the country's currency symbol	Value of property stolen, bail amount
AutoNumber	Sequential or random number, always unique for each record	A primary key when the table lacks another option for one
Yes/No	One of two values, designated by yes/no, true/false, on/off, etc.	"Include this incident in weekly report," other flags
OLE Object	A file linked or embedded	Person photographs, fingerprints
Hyperlink	Hyperlink to computer, network, or web location	Link to record in the official RMS; link to property record in online assessor's database
Attachment	Like OLE objects, but allows multiple file attachments in a single record	Multiple photographs for an offender, multiple crime scene photographs for a crime, victim and witness statements, related crime bulletins
Calculated	Calculates a value based on another field	Calculate an "Address" field based on multiple discrete fields: <u>StNo</u> , Street, etc.
Lookup Wizard	Not a separate field type. This is a text field that auto-populates lookup properties. Best to set to "Text" and do it yourself.	

There are many data structures to choose from depending on the type of field you have. Here are a few more taken from Bruce's *Microsoft Access for Crime Analysis*.

Table Structures



	IncidentNumber	DispatchType	DateOfReport	TimeOfReport	DateFrom	TimeFrom	DateTo	T
*	19800001	UNWANTED GUEST	01/01/1998	00:09	01/01/1998	00:09	01/01/1998	
*	19800002	FIGHT	01/01/1998	00:32	01/01/1998	00:32	01/01/1998	
*	19800003	UNWANTED GUEST	01/01/1998	01:07	01/01/1998	01:07	01/01/1998	
*	19800004	FIGHT	01/01/1998	01:09	01/01/1998	01:09	01/01/1998	
*	19800005	FIGHT	01/01/1998	01:12	01/01/1998	01:12	01/01/1998	
*	19800006	FIGHT	01/01/1998	01:24	01/01/1998	01:24	01/01/1998	
*	19800007	SUSPICIOUS PERS	01/01/1998	01:27	01/01/1998	01:27	01/01/1998	
*	19800008	ASSIST OTHER	01/01/1998	01:43	01/01/1998	01:43	01/01/1998	
*	19800009	ALARM BUSINESS	01/01/1998	01:49	01/01/1998	01:49	01/01/1998	
*	19800010	SUSPICIOUS PERS	01/01/1998	02:01	01/01/1998	02:01	01/01/1998	
*	19800011	SUSPICIOUS PERS	01/01/1998	02:18	01/01/1998	02:18	01/01/1998	
*	19800012	MEDICAL AID	01/01/1998	02:47	01/01/1998	02:47	01/01/1998	
*	19800013	NON DOM DISPUTE	01/01/1998	03:40	01/01/1998	03:40	01/01/1998	
*	19800014	ALARM BUSINESS	01/01/1998	05:32	01/01/1998	05:32	01/01/1998	
*	19800015	SUSPICIOUS ACTI	01/01/1998	07:08	01/01/1998	07:08	01/01/1998	
*	19800016	FIREARM OFFENSE	01/01/1998	07:45	01/01/1998	07:45	01/01/1998	
*	19800017	ALARM BUSINESS	01/01/1998	07:50	01/01/1998	07:50	01/01/1998	
*	19800018	ALARM BUSINESS	01/01/1998	08:29	01/01/1998	08:29	01/01/1998	
*	19800019	MEDICAL AID	01/01/1998	11:07	01/01/1998	11:07	01/01/1998	
*	19800020	NON DOM DISPUTE	01/01/1998	14:06	01/01/1998	14:06	01/01/1998	
*	19800021	ASSIST FIRE DEP	01/01/1998	14:26	01/01/1998	14:26	01/01/1998	
*	19800022	ALARM BUSINESS	01/01/1998	14:28	01/01/1998	14:28	01/01/1998	
*	19800023	ANIMAL/DOG CALL	01/01/1998	15:12	01/01/1998	15:12	01/01/1998	
*	19800024	MAL DAM RESIDEN	01/01/1998	16:08	12/31/1997	13:00	12/31/1997	
*	19800025	ALARM BUSINESS	01/01/1998	16:27	01/01/1998	16:27	01/01/1998	
*	19800026	ALARM BUSINESS	01/01/1998	18:33	01/01/1998	18:33	01/01/1998	
*	19800027	CANCELED INCID	01/01/1998	18:39	01/01/1998	18:39	01/01/1998	
*	19800028	DOMESTIC DISPUT	01/01/1998	18:56	01/01/1998	18:56	01/01/1998	
*	19800029	DOMESTIC DISPUT	01/01/1998	19:16	01/01/1998	19:16	01/01/1998	
*	19800031	TRANSP PRISONER	01/01/1998	21:17	01/01/1998	21:17	01/01/1998	
*	19800032	CHECK IN/OUT	01/01/1998	21:30	01/01/1998	21:30	01/01/1998	

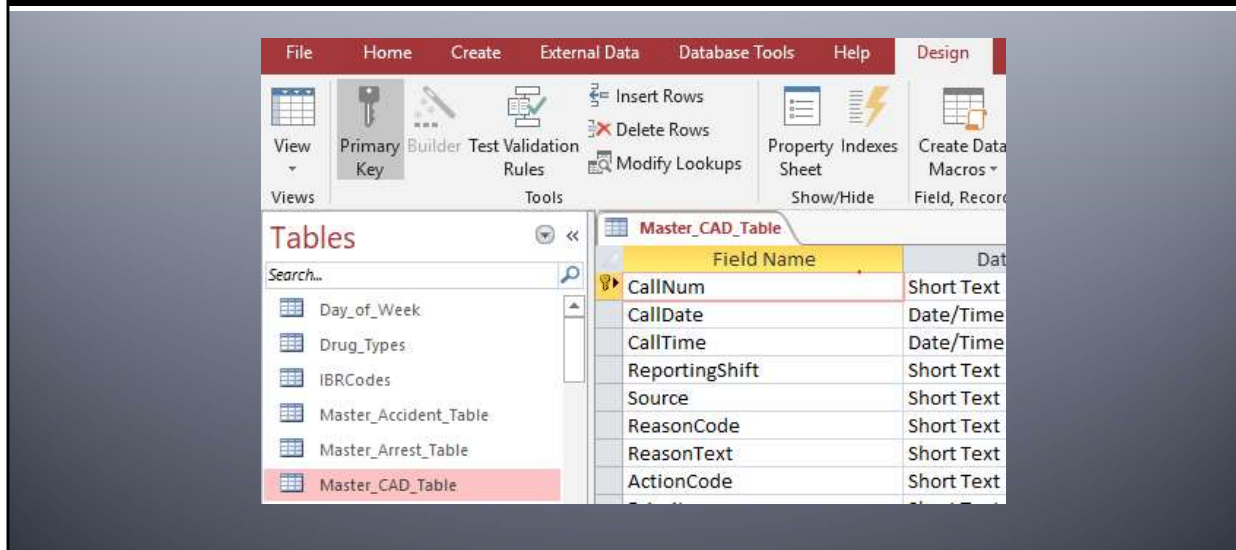
When you double click on any of the globes, you'll see the data that is currently live. It's important to spend time looking at the field names in your tables, what data is included in which tables, etc. A notebook with this info scribbled down will come in handy when moving on to linking your tables.

Objective 2

Identify the utility of the primary key.

OBJECTIVE 2: Identify the utility of primary key.

Table Structures: Primary Key



PRIMARY KEY is a special column (or combination of columns) designated to uniquely identify all table records. Each record has a different value for the key. The main purpose of a primary key is to implement a relationship between two tables in a relational database.

Objective 3

Identify the difference between flat files and relational files.

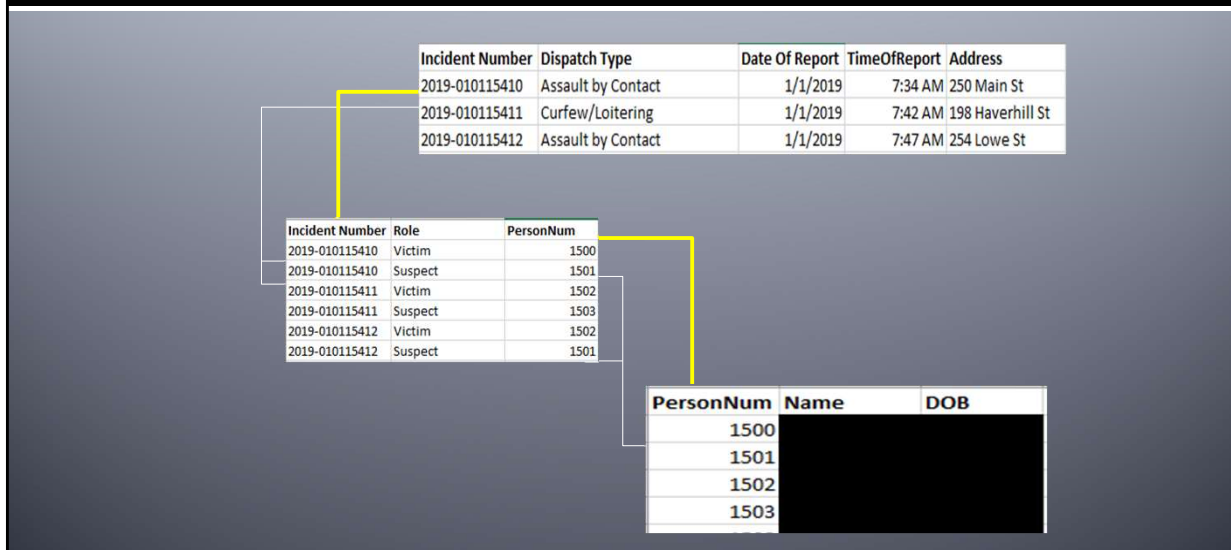
OBJECTIVE 3: Identify the difference between flat files and relational files.

Table Structures: "Flat File" Systems

Incident Number	Dispatch Type	Date Of Report	TimeOfReport	Address
2019-010115410	Assault by Contact	1/1/2019	7:34 AM	250 Main St
2019-010115411	Curfew/Loitering	1/1/2019	7:42 AM	198 Haverhill St
2019-010115412	Assault by Contact	1/1/2019	7:47 AM	254 Lowe St

A "flat file" tracks data in a single table. This is an example of a simple Excel sheet that stores a set of data in a single table.

Table Structures: Relational Databases



In a relational database, every data type appears in its own table, and the tables are related through common fields such as CAD number. This minimizes duplication of entry and ensures accurate results when querying.

For instance, some crimes have multiple incident types - a burglar is charged with burglary, damage to property, and assault. Or a robbery involves multiple victims. In these cases, relational databases are much more helpful. A relational database is a database structured to recognize relations among stored items of information.

These tables communicate and share information, which facilitates data search ability, organization and reporting. In English, relational databases bring data sets together by a common factor (such as CAD number) so that searches can be much more comprehensive.

POP UP QUESTION 1

True or False

You should spend time getting to know your files prior to linking them?

POP UP QUESTION 1:

True or False: You should spend time getting to know your files prior to linking them?

Objective 4

Import data from outside sources into Microsoft Access®.

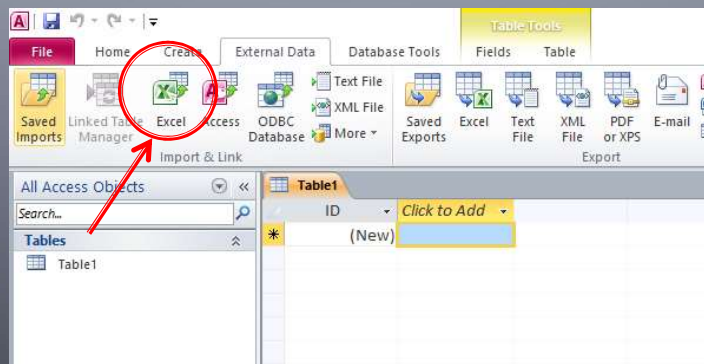
OBJECTIVE 4: Import data from outside sources into Microsoft Access®.

Your turn!

**OPEN MICROSOFT
ACCESS blank
database
Import Data**

Importing Data

Click: -External Data
-Import
-Excel



Click on External Data, Import, and then Excel to import our data.

Importing Data

Select: Import. Click Browse.

Get External Data - Excel Spreadsheet

Select the source and destination of the data

Specify the source of the data.

File name: C:\Users\Dawn\Documents\ **Browse...**

Specify how and where you want to store the data in the current database.

Import the source data into a new table in the current database.
If the specified table does not exist, Access will create it. If the specified table already exists, Access might overwrite its contents with the imported data. Changes made to the source data will not be reflected in the database.

Append a copy of the records to the table: Table1
If the specified table exists, Access will add the records to the table. If the table does not exist, Access will create it. Changes made to the source data will not be reflected in the database.

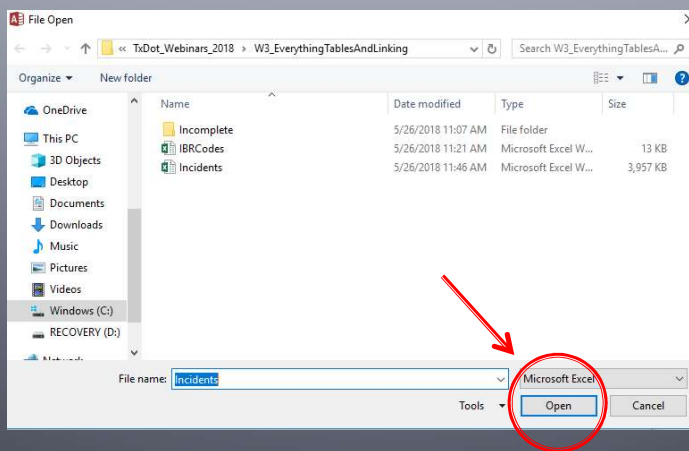
Link to the data source by creating a linked table.
Access will create a table that will maintain a link to the source data in Excel. Changes made to the source data in Excel will be reflected in the linked table. However, the source data cannot be changed from within Access.

OK Cancel

Browse your desktop to find where you stored the files/materials for this project.

Importing Data

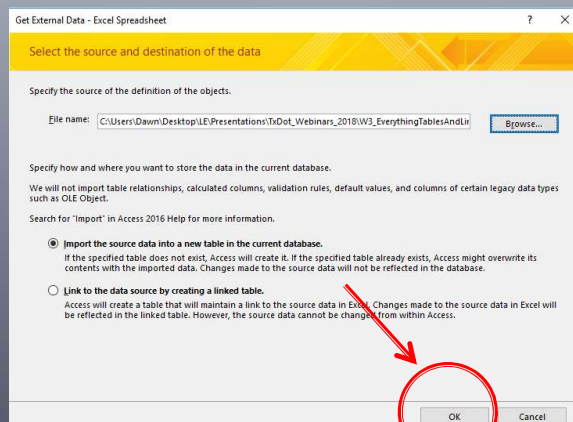
Find the Excel sheet. Click Open.



Open.

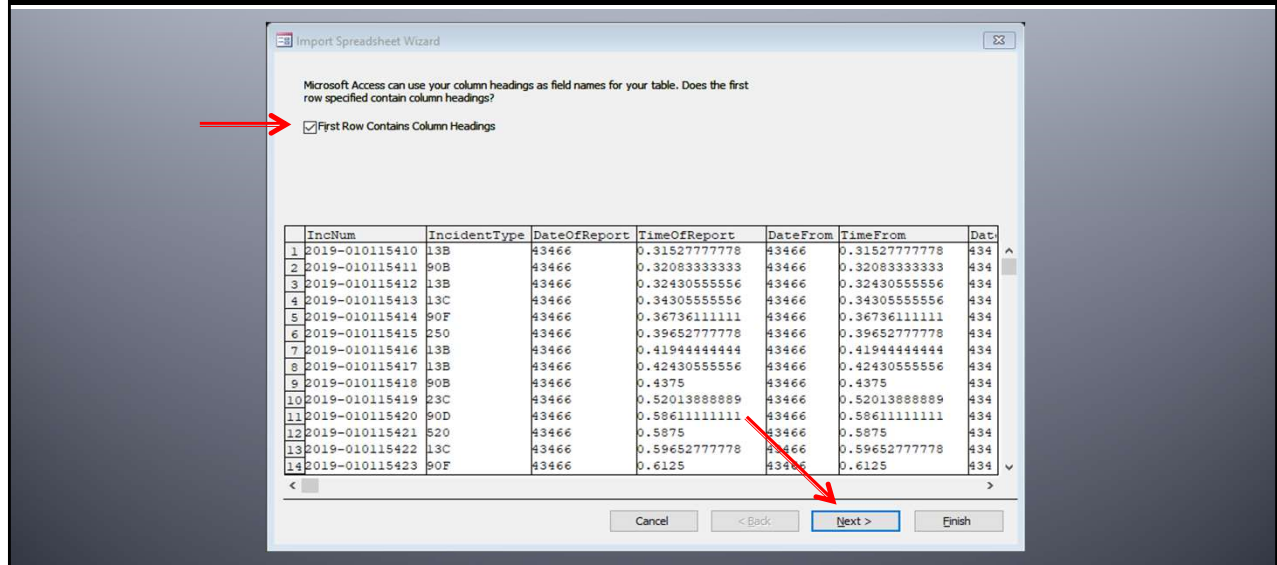
Importing Data

Click: Ok



Import the source data into a new table in the current database. Click Ok.

Importing Data



Your first row contains data. Access will use these headings to name the fields.

Importing Data

Click: Next

You can specify information about each of the fields you are importing. Select fields in the area below. You can then modify field information in the 'Field Options' area.

Field Options

Field Name: Data Type:

Indexed: Yes (Duplicates OK) Do not import field (Skip)

	IncNum	IncidentType	DateOfReport	TimeOfReport	DateFrom	TimeFrom	Date
1	2019-010115410	13B	43466	0.315277777778	43466	0.315277777778	434
2	2019-010115411	90B	43466	0.320833333333	43466	0.320833333333	434
3	2019-010115412	13B	43466	0.324305555556	43466	0.324305555556	434
4	2019-010115413	13C	43466	0.343055555556	43466	0.343055555556	434
5	2019-010115414	90F	43466	0.367361111111	43466	0.367361111111	434
6	2019-010115415	250	43466	0.396527777778	43466	0.396527777778	434
7	2019-010115416	13B	43466	0.419444444444	43466	0.419444444444	434
8	2019-010115417	13B	43466	0.424305555556	43466	0.424305555556	434
9	2019-010115418	90B	43466	0.4375	43466	0.4375	434
10	2019-010115419	23C	43466	0.520138888889	43466	0.520138888889	434
11	2019-010115420	90D	43466	0.586111111111	43466	0.586111111111	434
12	2019-010115421	520	43466	0.5875	43466	0.5875	434
13	2019-010115422	13C	43466	0.596527777778	43466	0.596527777778	434
14	2019-010115423	90F	43466	0.6125	43466	0.6125	434

Buttons: Cancel < Back Next > Finish

You can specify information about each of the fields you are importing by selecting the fields and modifying their “Field Options”.

Importing Data

Primary Key. Click: Next

Import Spreadsheet Wizard

Microsoft Access recommends that you define a primary key for your new table. A primary key is used to uniquely identify each record in your table. It allows you to retrieve data more quickly.

Let Access add primary key.

Choose my own primary key.

No primary key.

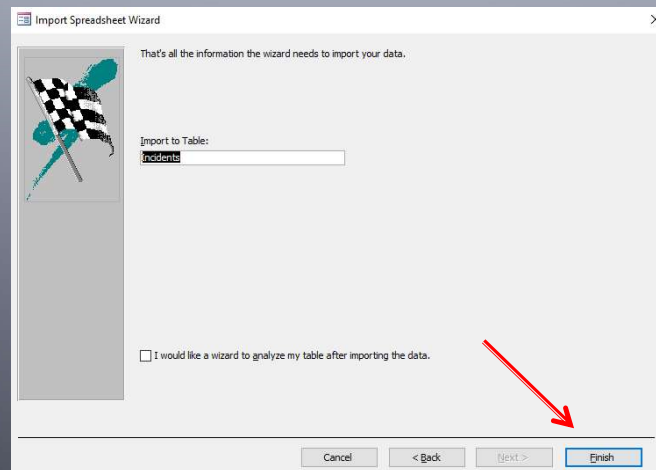
ID	InclNum	IncidentType	DateOfReport	TimeOfReport	DateFrom	TimeFrom
1	2019-010115410	13B	43466	0.315277777778	43466	0.315277777778
2	2019-010115411	90B	43466	0.320833333333	43466	0.320833333333
3	2019-010115412	13B	43466	0.324305555556	43466	0.324305555556
4	2019-010115413	13C	43466	0.343055555556	43466	0.343055555556
5	2019-010115414	90F	43466	0.367361111111	43466	0.367361111111
6	2019-010115415	250	43466	0.396527777778	43466	0.396527777778
7	2019-010115416	13B	43466	0.419444444444	43466	0.419444444444
8	2019-010115417	13B	43466	0.424305555556	43466	0.424305555556
9	2019-010115418	90B	43466	0.4375	43466	0.4375
10	2019-010115419	23C	43466	0.520138888889	43466	0.520138888889
11	2019-010115420	90D	43466	0.586111111111	43466	0.586111111111
12	2019-010115421	520	43466	0.5875	43466	0.5875
13	2019-010115422	13C	43466	0.596527777778	43466	0.596527777778
14	2019-010115423	90F	43466	0.6125	43466	0.6125

Cancel < Back Next > Finish

Primary key selection.

Importing Data

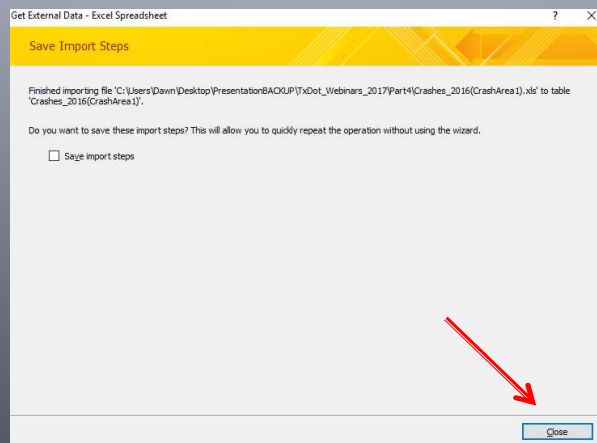
Import to Table. Click: Finish



Finish the import.

Importing Data

Click: Close



Close.

Importing Data

Double click on your new table to open

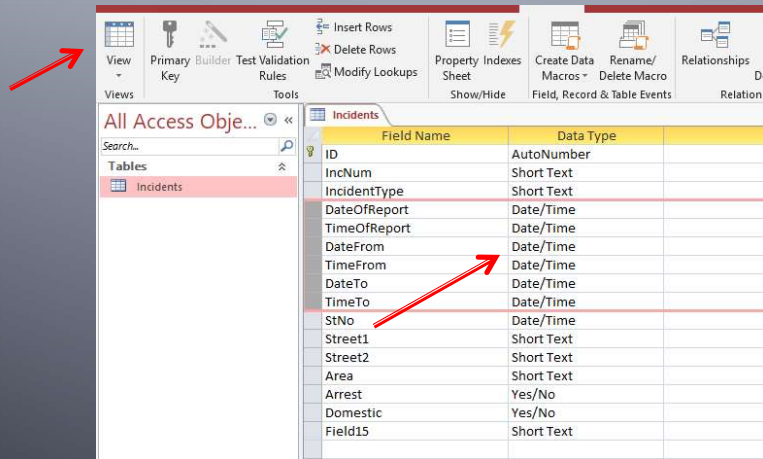
The screenshot shows the Microsoft Access interface. On the left, the 'All Access Objects' pane is open, showing a list of tables. The table 'Incidents' is highlighted in red, and a red arrow points to it. The main window displays the 'Incidents' table in Datasheet View. The table has the following columns: ID, IncNum, IncidentType, DateOfRepo, TimeOfReport, DateFrom, TimeFrom, DateTo, TimeTo, and STNo. The data is as follows:

ID	IncNum	IncidentType	DateOfRepo	TimeOfReport	DateFrom	TimeFrom	DateTo	TimeTo	STNo
1	2019-010115410	13B	43466	0.315277777777778	43466	0.315277777777778	43466	0.315277777777778	250 N
2	2019-010115411	90B	43466	0.320833333333333	43466	0.320833333333333	43466	0.320833333333333	198 H
3	2019-010115412	11B	43466	0.324305555555556	43466	0.324305555555556	43466	0.324305555555556	254 L
4	2019-010115413	13C	43466	0.343055555555556	43466	0.343055555555556	43466	0.343055555555556	182 N
5	2019-010115414	90F	43466	0.367361111111111	43466	0.367361111111111	43466	0.367361111111111	140 H
6	2019-010115415	250	43466	0.396527777777778	43466	0.396527777777778	43466	0.396527777777778	200 T
7	2019-010115416	13B	43466	0.419444444444444	43466	0.419444444444444	43466	0.419444444444444	496 E
8	2019-010115417	13B	43466	0.424305555555556	43466	0.424305555555556	43466	0.424305555555556	184 A
9	2019-010115418	90B	43466	0.4375	43466	0.4375	43466	0.4375	182 V
10	2019-010115419	23C	43466	0.520138888888889	43466	0.520138888888889	43466	0.520138888888889	640 N
11	2019-010115420	90D	43466	0.586111111111111	43466	0.586111111111111	43466	0.586111111111111	218 C
12	2019-010115421	520	43466	0.5875	43466	0.5875	43466	0.5875	184 L
13	2019-010115422	13C	43466	0.596527777777778	43466	0.596527777777778	43466	0.596527777777778	186 H
14	2019-010115423	90F	43466	0.6125	43466	0.6125	43466	0.6125	420 N
15	2019-010115424	90B	43466	0.666666666666667	43466	0.666666666666667	43466	0.666666666666667	280 H
16	2019-010115425	90B	43466	0.672916666666667	43466	0.672916666666667	43466	0.672916666666667	446 A
17	2019-010115426	90B	43466	4.86111111111111E-03	43466	4.86111111111111E-03	43466	4.86111111111111E-03	730 N
18	2019-010115427	90B	43466	2.70833333333333E-02	43466	2.70833333333333E-02	43466	2.70833333333333E-02	580 V
19	2019-010115428	220	43466	4.65277777777778E-02	43466	4.65277777777778E-02	43466	4.65277777777778E-02	384 E
20	2019-010115429	220	43466	5.13888888888889E-02	43466	5.13888888888889E-02	43466	5.13888888888889E-02	214 S
21	2019-010115430	90E	43466	5.97222222222222E-02	43466	5.97222222222222E-02	43466	5.97222222222222E-02	630 E
22	2019-010115431	90B	43466	7.22222222222222E-02	43466	7.22222222222222E-02	43466	7.22222222222222E-02	244 F
23	2019-010115432	90B	43466	7.36111111111111E-02	43466	7.36111111111111E-02	43466	7.36111111111111E-02	218 F
24	2019-010115433	220	43466	0.134027777777778	43466	0.134027777777778	43466	0.134027777777778	62 C

Double click on your new table to open and view. If you didn't change your data field types during the wizard, then the fields are not formatted correctly. You can go into the design view of the table to adjust.

Importing Data

Format Data in Home, Design View. Save.



Use the Data Type to select the best options for your data. For instance, for Date of Report, select “Date/Time” since the data in this field represents the date that the crime/crash occurred.

Importing Data

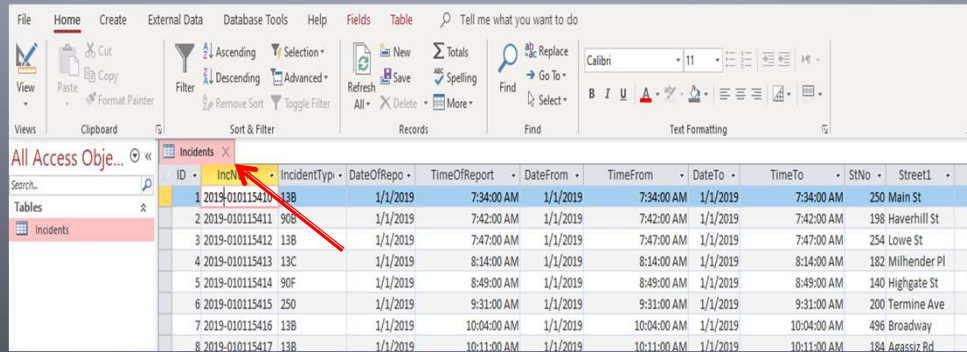
New dates and times

ID	IncNum	IncidentTyp	DateOfRepo	TimeOfReport	DateFrom	TimeFrom	DateTo	TimeTo	StNo	Street1
1	2019-010115410	13B	1/1/2019	7:34:00 AM	1/1/2019	7:34:00 AM	1/1/2019	7:34:00 AM	250	Main St
2	2019-010115411	90B	1/1/2019	7:42:00 AM	1/1/2019	7:42:00 AM	1/1/2019	7:42:00 AM	198	Haverhill St
3	2019-010115412	13B	1/1/2019	7:47:00 AM	1/1/2019	7:47:00 AM	1/1/2019	7:47:00 AM	254	Lowe St
4	2019-010115413	13C	1/1/2019	8:14:00 AM	1/1/2019	8:14:00 AM	1/1/2019	8:14:00 AM	182	Milhender Pl
5	2019-010115414	90F	1/1/2019	8:49:00 AM	1/1/2019	8:49:00 AM	1/1/2019	8:49:00 AM	140	Hilgate St
6	2019-010115415	250	1/1/2019	9:31:00 AM	1/1/2019	9:31:00 AM	1/1/2019	9:31:00 AM	200	Termin Ave
7	2019-010115416	13B	1/1/2019	10:04:00 AM	1/1/2019	10:04:00 AM	1/1/2019	10:04:00 AM	496	Broadway
8	2019-010115417	13B	1/1/2019	10:11:00 AM	1/1/2019	10:11:00 AM	1/1/2019	10:11:00 AM	184	Agassiz Rd
9	2019-010115418	90B	1/1/2019	10:30:00 AM	1/1/2019	10:30:00 AM	1/1/2019	10:30:00 AM	182	Willers St
10	2019-010115419	23C	1/1/2019	12:29:00 PM	1/1/2019	12:29:00 PM	1/1/2019	12:29:00 PM	640	Main St
11	2019-010115420	90D	1/1/2019	2:04:00 PM	1/1/2019	2:04:00 PM	1/1/2019	2:04:00 PM	218	Charles St
12	2019-010115421	520	1/1/2019	2:06:00 PM	1/1/2019	2:06:00 PM	1/1/2019	2:06:00 PM	184	Lorraine Ter
13	2019-010115422	13C	1/1/2019	2:19:00 PM	1/1/2019	2:19:00 PM	1/1/2019	2:19:00 PM	186	India Wharf
14	2019-010115423	90F	1/1/2019	2:42:00 PM	1/1/2019	2:42:00 PM	1/1/2019	2:42:00 PM	420	Mallon Rd
15	2019-010115424	90B	1/1/2019	4:00:00 PM	1/1/2019	4:00:00 PM	1/1/2019	4:00:00 PM	280	Hillsboro Rd
16	2019-010115425	90B	1/1/2019	4:09:00 PM	1/1/2019	4:09:00 PM	1/1/2019	4:09:00 PM	446	Addison St
17	2019-010115426	90B	1/1/2019	12:07:00 AM	1/1/2019	12:07:00 AM	1/1/2019	12:07:00 AM	730	Main St
18	2019-010115427	90B	1/1/2019	13:38:00 AM	1/1/2019	13:38:00 AM	1/1/2019	13:38:00 AM	500	Worcott St

View your new data.

Importing Data

Click on the X to close



The screenshot shows the Microsoft Access interface. The 'Incidents' table is open, and a red arrow points to the 'X' close button on the table's tab. The table contains the following data:

ID	IncNo	IncidentTyp	DateOfRepo	TimeOfReport	DateFrom	TimeFrom	DateTo	TimeTo	StNo	Street1
1	2019-010115410	13B	1/1/2019	7:34:00 AM	1/1/2019	7:34:00 AM	1/1/2019	7:34:00 AM	250	Main St
2	2019-010115411	90B	1/1/2019	7:42:00 AM	1/1/2019	7:42:00 AM	1/1/2019	7:42:00 AM	198	Haverhill St
3	2019-010115412	13B	1/1/2019	7:47:00 AM	1/1/2019	7:47:00 AM	1/1/2019	7:47:00 AM	254	Lowe St
4	2019-010115413	13C	1/1/2019	8:14:00 AM	1/1/2019	8:14:00 AM	1/1/2019	8:14:00 AM	182	Milhender Pl
5	2019-010115414	90F	1/1/2019	8:49:00 AM	1/1/2019	8:49:00 AM	1/1/2019	8:49:00 AM	140	Highgate St
6	2019-010115415	250	1/1/2019	9:31:00 AM	1/1/2019	9:31:00 AM	1/1/2019	9:31:00 AM	200	Terminie Ave
7	2019-010115416	13B	1/1/2019	10:04:00 AM	1/1/2019	10:04:00 AM	1/1/2019	10:04:00 AM	496	Broadway
8	2019-010115417	13B	1/1/2019	10:11:00 AM	1/1/2019	10:11:00 AM	1/1/2019	10:11:00 AM	184	Apassiz Rd

Click "X" to close.

Importing Data

DO THE SAME THING FOR IBR TABLE.

POP UP QUESTION 2

Can you import data into Microsoft Access®, or do you have to manually type it in?

POP UP QUESTION 2:

Can you import data into Microsoft Access®, or do you have to manually type it in?

YES, I can import!

Objective 5

Determine the utility of Cartesian join, inner join, left outer join, and right outer join.

OBJECTIVE 5: Determine the utility of Cartesian join, inner join, left outer join, and right outer join..

Joining/Linking Tables

ID	IncNum	IncidentTyp	DateOfRepo	TimeOfReport	DateFrom	TimeFrom	DateTo
1	2019-010115410	13B	1/1/2019	7:34:00 AM	1/1/2019	7:34:00 AM	1/1/2019
2	2019-010115411	90B	1/1/2019	7:42:00 AM	1/1/2019	7:42:00 AM	1/1/2019
3	2019-010115412	13B	1/1/2019	7:47:00 AM	1/1/2019	7:47:00 AM	1/1/2019
4	2019-010115413	13C	1/1/2019	8:14:00 AM	1/1/2019	8:14:00 AM	1/1/2019
5	2019-010115414	90F	1/1/2019	8:49:00 AM	1/1/2019	8:49:00 AM	1/1/2019
6	2019-010115415	250	1/1/2019	9:31:00 AM	1/1/2019	9:31:00 AM	1/1/2019
7	2019-010115416	13B	1/1/2019	10:04:00 AM	1/1/2019	10:04:00 AM	1/1/2019
8	2019-010115417	13B	1/1/2019	10:11:00 AM	1/1/2019	10:11:00 AM	1/1/2019
9	2019-010115418	90B	1/1/2019	10:30:00 AM	1/1/2019	10:30:00 AM	1/1/2019
10	2019-010115419	23C	1/1/2019	12:29:00 PM	1/1/2019	12:29:00 PM	1/1/2019
11	2019-010115420	90D	1/1/2019	2:04:00 PM	1/1/2019	2:04:00 PM	1/1/2019
12	2019-010115421	520	1/1/2019	2:06:00 PM	1/1/2019	2:06:00 PM	1/1/2019
13	2019-010115422	13C	1/1/2019	2:19:00 PM	1/1/2019	2:19:00 PM	1/1/2019
14	2019-010115423	90F	1/1/2019	2:42:00 PM	1/1/2019	2:42:00 PM	1/1/2019
15	2019-010115424	90B	1/1/2019	4:00:00 PM	1/1/2019	4:00:00 PM	1/1/2019
16	2019-010115425	90B	1/1/2019	4:09:00 PM	1/1/2019	4:09:00 PM	1/1/2019
17	2019-010115426	90B	1/1/2019	12:07:00 AM	1/1/2019	12:07:00 AM	1/1/2019
18	2019-010115427	90B	1/1/2019	12:39:00 AM	1/1/2019	12:39:00 AM	1/1/2019
19	2019-010115428	220	1/1/2019	1:07:00 AM	1/1/2019	1:07:00 AM	1/1/2019
20	2019-010115429	220	1/1/2019	1:14:00 AM	1/1/2019	1:14:00 AM	1/1/2019
21	2019-010115430	90E	1/1/2019	1:26:00 AM	1/1/2019	1:26:00 AM	1/1/2019
22	2019-010115431	90B	1/1/2019	1:44:00 AM	1/1/2019	1:44:00 AM	1/1/2019
23	2019-010115432	90B	1/1/2019	1:46:00 AM	1/1/2019	1:46:00 AM	1/1/2019
24	2019-010115433	220	1/1/2019	3:13:00 AM	1/1/2019	3:13:00 AM	1/1/2019

54,777 Crimes in dataset

It's important to understand what is in your dataset. If you open the "Incidents" table, you will notice that there are 54,777 crimes in dataset. The data includes "incident number", "incident type" – which looks like the IBR code, "date", "time", "location", etc.

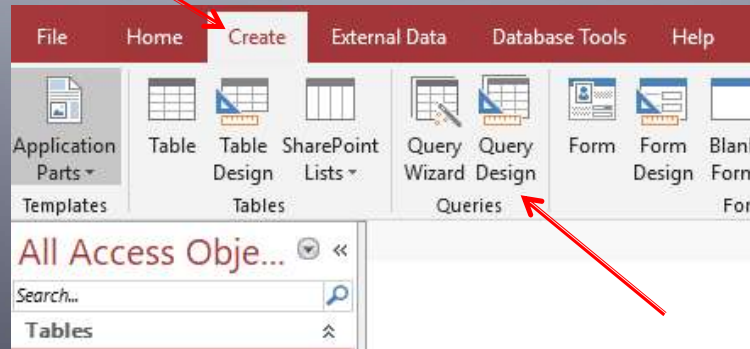
Joining/Linking Tables

ID1	ID	IBRCode	IBRDescripti	Category Co	Crime Categ	TypeCrime	Group	Part
1	2	09A	Murder and Nc	2	HOMICIDE OFF	Person	A	P1
2	3	09B	Negligent Man	2	HOMICIDE OFF	Person	A	P1
3	4	09C	Justifiable Hon	2	HOMICIDE OFF	Person	A	
4	5	100	Kidnapping / A	3	KIDNAPPING /	Person	A	
5	6	11A	Forcible Rape	5	SEX OFFENSES,	Person	A	P1
6	7	11B	Forcible Sodon	5	SEX OFFENSES,	Person	A	P1
7	8	11C	Sexual Assault	5	SEX OFFENSES,	Person	A	P1
8	9	11D	Forcible Fondli	5	SEX OFFENSES,	Person	A	P1
9	10	120	Robbery	4	ROBBERY	Person	A	P1
10	11	13A	Aggravated Ass	1	ASSAULT OFFEI	Person	A	P1
11	12	13B	Simple Assault	1	ASSAULT OFFEI	Person	A	P2
12	13	13C	Intimidation	1	ASSAULT OFFEI	Person	A	
13	14	200	Arson	7	ARSON	Property	A	P1
14	15	210	Extortion / Blat	14	EXTORTION / B	Property	A	
15	16	220	Burglary / Brea	9	BURGLARY / BR	Property	A	P1
16	17	23A	Pocket-picking	16	LARCENY/THEF	Property	A	P1
17	18	23B	Purse-snatchin	16	LARCENY/THEF	Property	A	P1
18	19	23C	Shoplifting	16	LARCENY/THEF	Property	A	P1
19	20	23D	Theft from a Bl	16	LARCENY/THEF	Property	A	P1
20	21	23E	Theft from a Cc	16	LARCENY/THEF	Property	A	P1
21	22	23F	Theft from a M	16	LARCENY/THEF	Property	A	P1
22	23	23G	Theft of Motor	16	LARCENY/THEF	Property	A	P1
23	24	23H	All Other Larce	16	LARCENY/THEF	Property	A	P1
24	25	240	Motor Vehicle	17	MOTOR VEHICL	Property	A	P1
25	26	250	Counterfeiting	11	COUNTERFEITH	Property	A	P2
26	27	26A	False Pretense	15	FRAUD OFFENS	Property	A	P2
27	28	26B	Credit Card / A	15	FRAUD OFFENS	Property	A	P2
28	29	26C	Impersonation	15	FRAUD OFFENS	Property	A	P2
29	30	26D	Welfare Fraud	15	FRAUD OFFENS	Property	A	P2
30	31	26E	Wire Fraud	15	FRAUD OFFENS	Property	A	P2
31	32	270	Embezzlement	13	EMBEZZLEMEN	Property	A	P2

Similarly, when you open the IBR table, our library table of IBR codes and their respective descriptions, you see “IBR Code”, “IBR Description”, and so on. It’s important to note that the “IBR Code” in this table reflects the “incident type” field in the “Incidents” table.

3 Linking/Joining Options

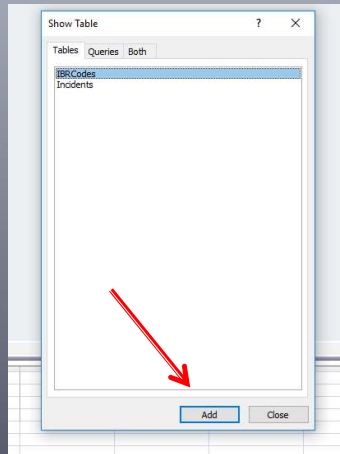
Create. Query Design.



Create a new query in Query Design.

3 Linking/Joining Options

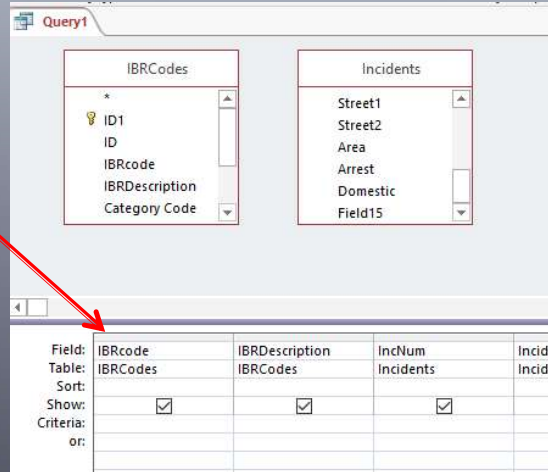
Add "IBRCodes" and "Incidents" tables



Add the desired tables.

3 Linking/Joining Options

Add fields from tables to query



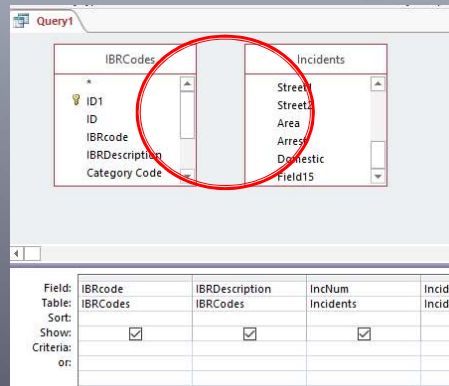
Add the desired fields from each table to the query.

4 Types of Joins

1. Cartesian
2. Inner
3. Left Outer
4. Right Outer

Linking/Joining Options

No Join, or Cartesian Join



There are 4 basic types of joins: a no join (or Cartesian join), an Inner Join, a Left Outer Join, and a Right Outer Join. Here we have the no-join, or Cartesian join. This means that the two files are not linked. Most of the time we would NEVER use a Cartesian product because it will duplicate all the records.

Click Run in the top left-hand corner to see the results.

Linking/Joining Options

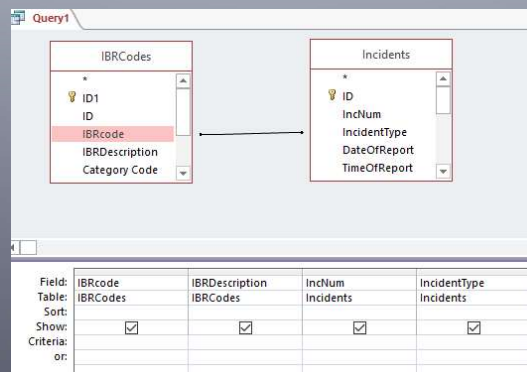
No Join or Cartesian Join

IBRcode	IBRDescripti	IncNum	IncidentTyp	DateOfRepo
36A	Incest	2020-000002121	220	8/6/2020
36B	Statutory Rape	2020-000002121	220	8/6/2020
370	Pornography /	2020-000002121	220	8/6/2020
39A	Betting / Wage	2020-000002121	220	8/6/2020
39B	Operating / Pri	2020-000002121	220	8/6/2020
39C	Gambling Equi	2020-000002121	220	8/6/2020
39D	Sports Tamper	2020-000002121	220	8/6/2020
40A	Prostitution	2020-000002121	220	8/6/2020
40B	Assisting or Pri	2020-000002121	220	8/6/2020
510	Bribery	2020-000002121	220	8/6/2020
520	Weapon Law V	2020-000002121	220	8/6/2020
90A	Bad Checks	2020-000002121	220	8/6/2020
90B	Loitering / Vag	2020-000002121	220	8/6/2020
90C	Disorderly Con	2020-000002121	220	8/6/2020
90D	Driving Under 1	2020-000002121	220	8/6/2020
90E	Drunkenness	2020-000002121	220	8/6/2020
90F	Family Offense	2020-000002121	220	8/6/2020
90G	Liquor Law Vio	2020-000002121	220	8/6/2020
90H	Peeping Tom	2020-000002121	220	8/6/2020
90I	Runaway	2020-000002121	220	8/6/2020
90J	Trespass of Res	2020-000002121	220	8/6/2020
90Z	All Other Offer	2020-000002121	220	8/6/2020
99	Traffic Town B	2020-000002121	220	8/6/2020
	No Crime Invol	2020-000002121	220	8/6/2020

The result of a Cartesian join produces a ton of duplicates. Basically, every incident is being matched to every possible combination of IBR codes – we now have 3,231,840 records/duplicates in our file. Not very valuable.

Linking Options

Inner Join

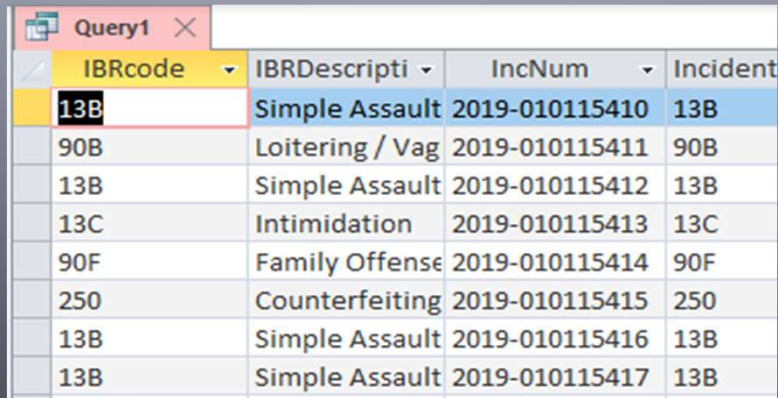


Now let's link these two tables by selecting the field called "IBRCODE" from the "IBRCodes" table and dragging it over to the field called "IncidentType" from the "Incidents" table. Remember, these were the two fields that had the same data – IBR Code. This is called an "Inner Join".

Click Run in the top left-hand corner to see the results.

Linking Options

Inner Join – returns records from the 2 tables where it finds a match. Some items can be left out.

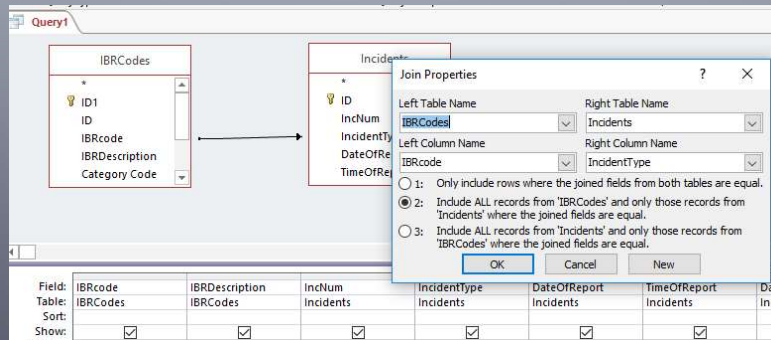


IBRcode	IBRDescripti	IncNum	Incident
13B	Simple Assault	2019-010115410	13B
90B	Loitering / Vag	2019-010115411	90B
13B	Simple Assault	2019-010115412	13B
13C	Intimidation	2019-010115413	13C
90F	Family Offense	2019-010115414	90F
250	Counterfeiting	2019-010115415	250
13B	Simple Assault	2019-010115416	13B
13B	Simple Assault	2019-010115417	13B

An Inner join will return records from the 2 tables where it finds a MATCH on the linked fields. Some things could be left out. For instance, if your “Incident” file contained “Police Information” or “Field Interrogation” reports, they would not be included here as those reports don’t have IBR codes. Conversely, if the “IBRCodes” table had a code for “murder” and the “Incident” file didn’t have any murders, then those records won’t be included in this output either.

Linking Options

Left Outer Join



Double click on the line linking the two tables and select option 2: Include all records from 'IBRCodes' and only those from 'Incidents' where the fields are equal. This is called a Left Outer Join – simply, you will return ALL of the records from the left side/left table even if no matches were found in the second table.

Click Run in the top left-hand corner to see the results.

Linking Options

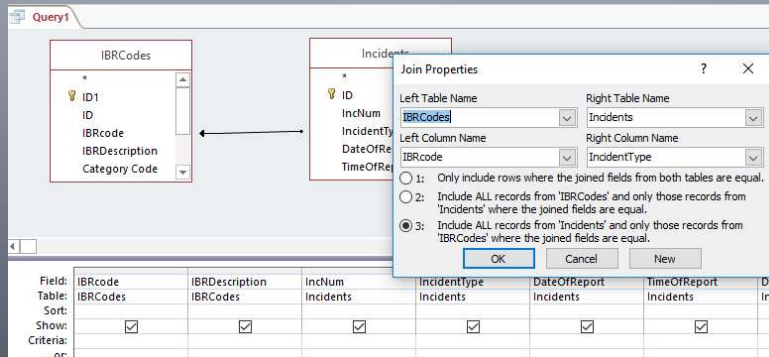
Left Outer Join - returns ALL of the records from the left side/left table even if no matches were found in the second table.

IBRCode	IBRDescription	IncNum	IncidentType	DateOfReport	TimeOfReport
09A	Murder and Non-negligent Manslaughter	2019-040619760	09A	4/6/2019	4:54:00 PM
09A	Murder and Non-negligent Manslaughter	2019-042639442	09A	4/26/2019	9:58:00 PM
09A	Murder and Non-negligent Manslaughter	2019-042620658	09A	4/26/2019	3:38:00 PM
09A	Murder and Non-negligent Manslaughter	2019-061742036	09A	6/17/2019	4:19:00 PM
09B	Negligent Manslaughter				
09C	Justifiable Homicide				
100	Kidnapping / Abduction	2019-101611719	100	10/16/2019	12:11:00 PM
100	Kidnapping / Abduction	2019-111550168	100	11/15/2019	5:51:00 AM
100	Kidnapping / Abduction	2019-102649114	100	10/26/2019	3:18:00 AM
100	Kidnapping / Abduction	2019-030300372	100	3/3/2019	2:12:00 AM
11A	Forcible Rape	2019-071243520	11A	7/12/2019	7:49:00 AM
11A	Forcible Rape	2019-071743798	11A	7/17/2019	11:37:00 AM
11A	Forcible Rape	2019-071743790	11A	7/17/2019	1:29:00 AM

Left Outer Join returns ALL of the records from the IBR table. The “IBRCodes” table has a “Negligent Manslaughter” code and a “Justifiable Homicide” code, but there were no “Negligent Manslaughters” or “Justifiable Homicides” in the “Incidents” dataset. Once you click “Run” you can see that Access returns all of the data codes from the “IBRCodes” file and inserts blanks where there is no data in the “Incidents” table. This can be useful if you wanted a complete list of your crime, including the zeros.

Linking Options

Right Outer Join



Right Outer Join is just the opposite.

Double click on the line and select option 3: Include all records from 'Incidents' and only those from 'IBRCodes' where the fields are equal. This is called a Right Outer Join – simply, you will return ALL of the records from the right side/right table even if no matches were found in the second table.

Click Run in the top left-hand corner to see the results.

Linking Options

Right Outer Join - return ALL of the records from the right side/right table even if no matches were found.

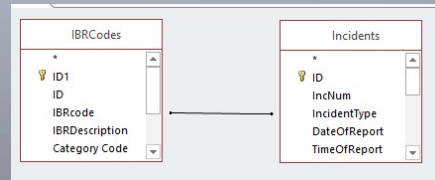
IBRCode	IBRDescription	IncNum	IncidentType	DateOfReport
13B	Simple Assault	2019-010115410	13B	1/1/2019
90B	Loitering / Vagrancy / Curfew Violations	2019-010115411	90B	1/1/2019
13B	Simple Assault	2019-010115412	13B	1/1/2019
13C	Intimidation	2019-010115413	13C	1/1/2019
90F	Family Offenses, Nonviolent	2019-010115414	90F	1/1/2019
250	Counterfeiting / Forgery	2019-010115415	250	1/1/2019
13B	Simple Assault	2019-010115416	13B	1/1/2019
13B	Simple Assault	2019-010115417	13B	1/1/2019
90B	Loitering / Vagrancy / Curfew Violations	2019-010115418	90B	1/1/2019
23C	Shoplifting	2019-010115419	23C	1/1/2019
90D	Driving Under the Influence	2019-010115420	90D	1/1/2019
520	Weapon Law Violations	2019-010115421	520	1/1/2019
13C	Intimidation	2019-010115422	13C	1/1/2019
90F	Family Offenses, Nonviolent	2019-010115423	90F	1/1/2019
90B	Loitering / Vagrancy / Curfew Violations	2019-010115424	90B	1/1/2019
90B	Loitering / Vagrancy / Curfew Violations	2019-010115425	90B	1/1/2019
90B	Loitering / Vagrancy / Curfew Violations	2019-010115426	90B	1/1/2019
90B	Loitering / Vagrancy / Curfew Violations	2019-010115427	90B	1/1/2019
220	Burglary / Breaking and Entering	2019-010115428	220	1/1/2019
220	Burglary / Breaking and Entering	2019-010115429	220	1/1/2019
90E	Drunkenness	2019-010115430	90E	1/1/2019

Access returns ALL of the records from the “Incidents” table and only those records from the “IBRCodes” table that match. So, if the “Incident” file contained “Police Information” or “Field Interrogation” records and the “IBRCodes” table did not, then the output would include the “Police Information” and “Field Interrogation” reports and blanks in the in the “IBRCodes” table where there are no matches.

You really want to spend time thinking about what you want your output to be prior to setting up your links.

POP UP QUESTION 3

True or False:



An Inner Join returns only those records where the joined fields are equal.

POP UP QUESTION 3:

True or False:

An Inner Join returns only those records where the joined fields are equal.

Summary of Part 4 “Everything Tables and Linking” Objectives

1. Define table structures.
2. Determine the utility of the primary key.
3. Identify the difference between flat files and relational files.
4. Import data from outside sources into Microsoft Access®.
5. Determine the utility of Cartesian join, inner join, left outer join, and right outer join.

Summary:

The Objectives for this course were for students to be able to define and explain table structure details and the four methods of linking tables for querying in Microsoft Access®. Specifically:

1. Define table structures.
2. Determine the utility of the primary key.
3. Identify the difference between flat files and relational files.
4. Import data from outside sources into Microsoft Access®.
5. Determine the utility of Cartesian join, inner join, left outer join, and right outer join.

DDACTS Project

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Part 5: Creating Master Tables Using 'Make Table' and 'Append' Queries

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Part 5: “Creating Master Tables Using ‘Make Table’ and ‘Append’ Queries” outlines the key factors relative to creating and appending to master tables in Microsoft Access®. These instructions are pivotal in designing a properly functioning database with all its automated processes.

Introductions: Dawn Reeby



Dawn Reeby

Objectives

1. List the benefits of static master tables.
2. Create a master crash table skeleton using a 'Make Table' query.
3. Design an 'Append' Query to add live crash data to that master crash table.
4. Combine multiple years of static data into one master file.

Today we are going to create a comprehensive master dataset using a combination of three helpful data structure techniques in Microsoft Access®.

Specifically, we will:

1. List the benefits of a static master tables.
2. Create a master "Crash" table skeleton using a "Make Table" query.
3. Design an "Append" query to add live crash data to that master "Crash" table.
4. Combine multiple years of static data into one master file.

Objective 1

List the benefits of a static master table.

Objective 1: List the benefits of a static master table.

Benefits of Master Static Tables

- Can store fields from multiple data sources all in one place
- Can have manually added data (MO, Story, Notes)
- Can be used in various queries

There are numerous benefits of having master static tables:

- Can store fields from multiple data sources all in one place
- Can manually add data (MO, Story, Notes)
- Can be used in various queries

Benefits of Master Static Tables

Can store fields from multiple data sources all in one place

The screenshot displays a Microsoft Access interface for a 'Make Table' query. The query is named '1_Accident_Make_Table_Query'. It shows three tables: 'AccidentConditionsNH', 'AccidentControl', and 'AccidentInvolved'. Arrows indicate relationships between these tables. Below the tables is a preview of the query results, showing columns for AccidentNum, CallNum, AccidentDate, AccidentTime, ReportDate, OfficerID, OUIInvolved, and Intersecti.

Field:	AccidentNum	CallNum	AccidentDate	AccidentTime	ReportDate	OfficerID	OUIInvolved	Intersecti
Table:	AccidentControl	AccidentControl	AccidentControl	AccidentControl	AccidentControl	AccidentControl	AccidentControl	AccidentControl
Sort:								
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Criteria:			"20090908"					
or:								

Here's an example of how queries can store fields from multiple data sources all in one place.

In this case, once we linked our tables from our RMS system into Microsoft Access®. We found that 3 files contained the entirety of the crash data that we wanted: one file had the crash location and time, another file had injury, and the third file had road conditions. To make querying easy and accurate, we wanted to combine all these tables into one table. The output of the "Make Table" query gave us all the data in one accessible and editable location.

Benefits of Master Static Tables

Can store fields from multiple data sources all in one place

CallNum	AccidentDat	AccidentTim	ReportDate	OUIInvolve	Intersection	LightCond	WeatherCor
18-278	20180105	0849	20180105	N		1	1
18-2529	20180207	1151	20180207		Y	1	4
18-2520	20180207	0910	20180207			1	2
18-2493	20180206	1919	20180206			5	2
18-2403	20180205	1612	20180205	N		1	1
18-2400	20180205	1516	20180205		Y	1	1
18-2355	20180205	0720	20180205	N	N	1	1
18-2354	20180205	0716	20180205	N		1	1
18-2358	20180205	0745	20180205	N	N	1	1
18-2349	20180205	0636	20180205		Y	1	1
18-2351	20180205	0704	20180205	N	N	1	1
18-276	20180105	0745	20180105			1	1
18-2345	20180204	2318	20180205	N	N	4	3
18-2319	20180204	1053	20180204			1	2
18-2239	20180202	2226	20180203	N	Y	4	1
18-2220	20180202	1623	20180202			1	1

Here is the output of our query.

Benefits of Master Static Tables

Can have manually added data (MO, Story, Notes)

INum	IBRcode	Desc	Story	Crime Bulletin	Narcotics Bull	Gang Bulletin
0488	0	POLICE INFORMATION	REPORT NOT COMPLETED.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0487	0	Police Information	Father Mick (8/28/79) slapped his son	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0483	0	POLICE INFORMATION	REPORT NOT COMPLETED.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0396	0	Disturbance	Carol Mickey assaulted Meghan Sou	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
0352	0	Police Information	Laura kicked table in anger; husband	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0232	0	Lost Property	Lost Property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0401	11A	AGGRAVATED FELONIOUS SEXUAL ASSAULT FORCIB	WILLIAM Reeby (9/22/93) was admi	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Here's an example of how a table can play a role when we want to add additional data to our table such as MO, Story, Notes. Let's say we want automated crime bulletins every Friday or narcotics reports every morning. By adding a check box to the master table, we are later able to create automated reporting based off the new check box.

Benefits of Master Static Tables

Can be used in various queries

IBRDescription	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Aggravated Assault	39	52	49	45	38	35	48	43	45	36	46	20
All Other Larceny	126	153	144	171	145	146	116	169	171	89	60	216
All Other Offenses	224	227	186	206	240	268	342	316	280	255	205	114
Arson	24	18	10	9	6	14	4	20	7	6	1	2
Assisting or Promoting Prostitution	0	0	0	0	0	0	0	1	0	0	0	0
Bad Checks	5	3	7	6	7	8	3	4	0	2	5	2
Burglary / Breaking and Entering	133	179	185	162	177	164	144	198	133	127	69	31
Counterfeiting / Forgery	43	26	22	21	22	39	36	31	54	26	33	16
Credit Card / ATM Fraud	33	19	26	35	21	31	17	28	28	31	24	26
Destruction / Damage / Vandalism of Property	438	472	451	417	396	386	291	376	317	265	178	82
Disobeying an Officer	0	0	0	0	0	0	1	0	0	0	0	0
Disorderly Conduct	57	143	85	103	78	65	71	77	82	56	43	35
Driving Under the Influence	122	106	81	94	104	126	118	140	111	100	92	42
Drug / Narcotic Violations	104	142	118	110	100	107	157	191	192	193	199	141
Drug Equipment Violations	0	1	0	0	0	0	0	0	0	0	0	0
Drunkenness	6	1	6	26	37	37	37	33	43	59	47	7
Embezzlement	11	17	13	24	21	9	15	17	17	13	16	0
Extortion / Blackmail	0	0	0	1	1	0	0	1	0	0	2	0
False Pretenses / Swindle / Confidence Game	171	70	69	52	58	34	84	48	85	85	64	14

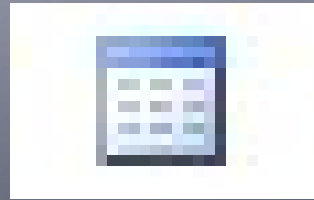
Creating static master tables will also facilitate the execution of other queries. For instance, since we needed 6 tables to set up our master crimes data, the query results would have been way too complicated to run summary stats by year by crime type. By developing a master crimes table through a “Make Table” query, we simplified the results and were able to use them in this “click of a button” query.

Discussion Point: Linking vs. Importing

Link and Append Live Tables

- Ac_MAEnty
- AccidentConditions
- AccidentConditionsMA
- AccidentConditionsMA1
- AccidentConditionsMT
- AccidentConditionsNH
- AccidentConditionsRI

Import and Append Static files



In the end...

Master Crash Table

Provides an unduplicated count of crashes with details

Master Crimes Table

Provides an unduplicated count of crimes with details and provides FI and events data.

Master CAD Table

Provides an unduplicated count of calls for service

Master Arrest Table

Provides all arrests reports and bases the IBR Description on hierarchy (duplicated in more than one person was arrested during one incident)

Master Enforcement Table

Provides all enforcement activities

Master Drug Arrest Table

Provides all Drug Arrests regardless of other crime committed

POP UP QUESTION 1

Whether linking to live data or appending static data, the analyst wants to end up with:

MASTER STATIC TABLES

Objective 2

Create a master “Crash” table using a “Make Table” query.



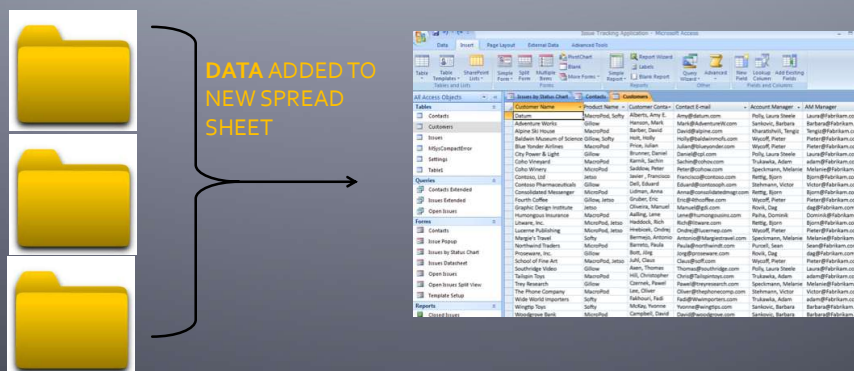
Objective 2: Create a master “Crash” table using a “Make Table” query.

For more information Make Table Queries, visit:

1. Bruce, C.W. (Jan. 2016) *Microsoft Access for Crime Analysis*. Unpublished Work, PDF.
2. “Make Table Query”. Retrieved on September 28, 2018 from <https://support.office.com/en-us/article/Create-a-make-table-query-96424F9E-82FD-411E-ACA4-E21AD0A94F1B>

'Make Table' Query Details

You use a make table query when you want to retrieve data from one or more tables, and then loads the result set into a new table.



- You want to start with existing data, but you want to edit and change it.
- You want to create a library table using the grouped values in an existing table.
- You want to extract a set of data to give to someone else without giving him the entire original table.
- You have an extremely complex query on which you want to base further analysis, but the query takes a long time to run. A temporary extract into a permanent "make table" query runs a lot faster.

Keep in mind that once created, the table no longer references the original data, so any changes will not be reflected in the new table. Running the query again overwrites the new table, so the query cannot be used to update data; you would have to switch it to an "append query" for that.

Several other important points:

- Access will designate a primary key for the new table, even if one exists in the original data.
- Access only makes one table per "Make Table" query. If you join multiple tables in the "Make Table" query, the result will have all the duplications and restrictions inherent with multiple tables.
- You can use expressions, functions, and calculations in "Make Table" queries, and the results will be stored in a permanent field.
- Fields in the new table will have the data types of the original fields. In the case of expressions, Access will choose a data type that seems sensible based on the expression output.

POP UP QUESTION 2

Which query do you use when you need make a new table by using data from other sources?

POP UP QUESTION 2 - Which query do you use when you need to add new records to an existing table by using data from other sources? (Answer: **"Make Table" Query**)

Objective 3

Design an “Append” query to add live data to the master table.

Objective 3: Design an “Append” query to add live data to the master table.

For more information on the topics discussed, visit:

1. “Append Query”. Retrieved on September 28, 2018 from <https://support.office.com/en-us/article/Add-records-to-a-table-by-using-an-append-query-98a5bd66-2190-4243-9638-8ef649cf3596?ui=en-US&rs=en-US&ad=US>
2. “Microsoft Access 2016 Append Query: Append Query” (2018). Retrieved from https://www.youtube.com/watch?v=nx_-z-uuw5Y

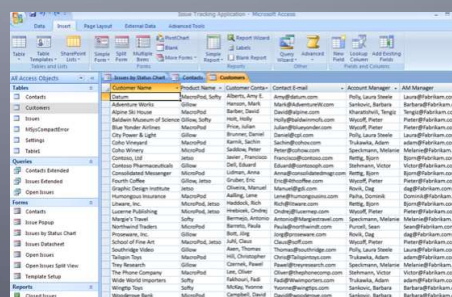
Append Query

- You use an append query when you need to add new records to an existing table by using data from other sources.

Adds current data to tables.



NEW DATA
ADDED TO SAME
SPREADSHEET



“Append” queries take data from one table and append, or add, it to another. They are particularly useful to:

- Combine values from many tables into a single table.
- Frequently refresh data from one table into another table.
- You can convert data through expressions, functions, and calculations during the append process, appending the result. This is particularly helpful if you require multiple expressions, functions, and calculations, and still want your queries to run quickly.

Analysts often use them to periodically copy CAD or RMS data into permanent tables, stored, edited, and maintained by the analyst, in a “shadow RMS” configuration. Refer to Chapter 10 of *Microsoft Access® for Crime Analysis*. (Bruce, 2016).

Think of “Append” queries like this: You’re at that buffet and you add a HUGE piece of chocolate cake to your plate. Upon ingesting, you’ve added, or appended, 340 calories, 60 grams of unwanted sugar, and a ginormous belly ache! This ADDITION didn’t change the current calories in your body – it only ADDED more.

'Append' Query Benefits

- Append multiple records in one pass
- Append new data without losing previously recorded/cleaned data
- Review your selection before you copy it
- Use criteria to refine your selection (only specific crimes; crash types)
- Append records when some of the fields in the data sources don't exist in the destination table

Benefits of "Append" queries:

- Append multiple records in one pass
- Append new data without losing previously recorded/cleaned data
- Review your selection before you copy it
- Use criteria to refine your selection (only specific crimes; crash types)
- Append records when some of the fields in the data sources don't exist in the destination table

'Append' Query Benefits

Append multiple records in one pass without losing previously recorded/cleaned data; use criteria/expressions

Field:	CallNum	IncidentNum	Status	IncidentNum	ReportDate	Year: Left([ReportDate],4)	Month: Format([ReptDate], 'mmm')
Table:	IncidentControlRec	IncidentControlRec	IncidentControlRec	IncidentControlRec	IncidentControlRec	IncidentControlRec	IncidentControlRec
Sort:							
Append To:	CallNum	Number	Status	IncidentNum	ReportDate	Year	Month
Criteria:					>= 20151001		
or:							

This particular “append” query takes data from a couple of related RMS tables, and copies it to a permanent table, noting that you can apply criteria and expressions during the append process (year, month, etc.).

'Append' Query Benefits

Append records when some of the fields in the data sources don't exist in the destination table

Num	IBRcode	Desc	Story	Crime Bulletin	Narcotics Bull	Gang Bulletin
0488	0	POLICE INFORMATION	REPORT NOT COMPLETED.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0487	0	Police Information	Father Mick (8/28/79) slapped his s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0483	0	POLICE INFORMATION	REPORT NOT COMPLETED.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0396	0	Disturbance	Carol Mickey assaulted Meghan Sou	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
0352	0	Police Information	Laura kicked table in anger; husban	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0232	0	Lost Property	Lost Property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0401	11A	AGGRAVATED FELONIOUS SEXUAL ASSAULT FORCIE	WILLIAM Reeby (9/22/93) was admi	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

→ New records added here



In this example, the "Append" query adds the new records, ones that don't currently exist in the destination table. It does this without disturbing what is already in the table.

POP UP QUESTION 3

Which query do you use when you need to add new records to an existing table by using data from other sources?

POP UP QUESTION 3:

Which query do you use when you need to add new records to an existing table by using data from other sources? **(Answer: "Append" query)**

Application

Creating master tables using live data
and appending the live data each day

Creating Master Tables with Live Data – 4 Steps

1. Make Table Query
2. Set up new table to de-duplicate
3. Make append query
4. Make final queries

STEP 1: "Make Table" Query

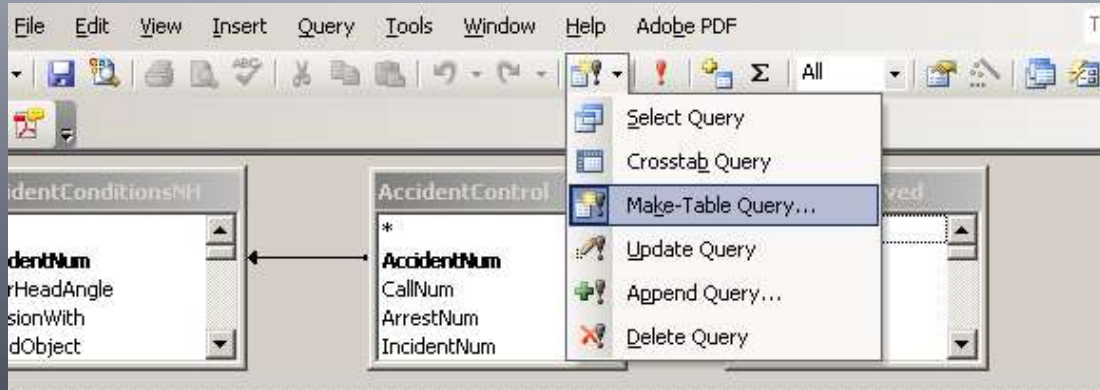
1. MAKE A TABLE QUERY

- Open a new select query
- Bring in the tables you want
- Link them appropriately
- Select the fields you want
- Select a date
- Add any formulas
- Change to "Make Table Query"

STEP 1: "Make Table" Query

Field:	AccidentNum	CallNum	AccidentDate	AccidentTime	Report
Table:	AccidentControl	AccidentControl	AccidentControl	AccidentControl	AccidentControl
Sort:					
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Criteria:			"20090908"		


STEP 1: "Make Table" Query



STEP 2: Set Up New Table To De-Duplicate

Field Name	Data Type	
▶ AccidentNum	Text	
CallNum	Text	
AccidentDate	Text	
AccidentTime	Text	
ReportDate	Text	
OfficerID	Text	
OUIInvolved	Text	
Intersection	Text	
City	Text	
Location	Text	
StreetNum	Text	
StreetName	Text	

General	Lookup
Field Size	20
Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes
Indexed	Yes (No Duplicates)
Unindexed Compression	No

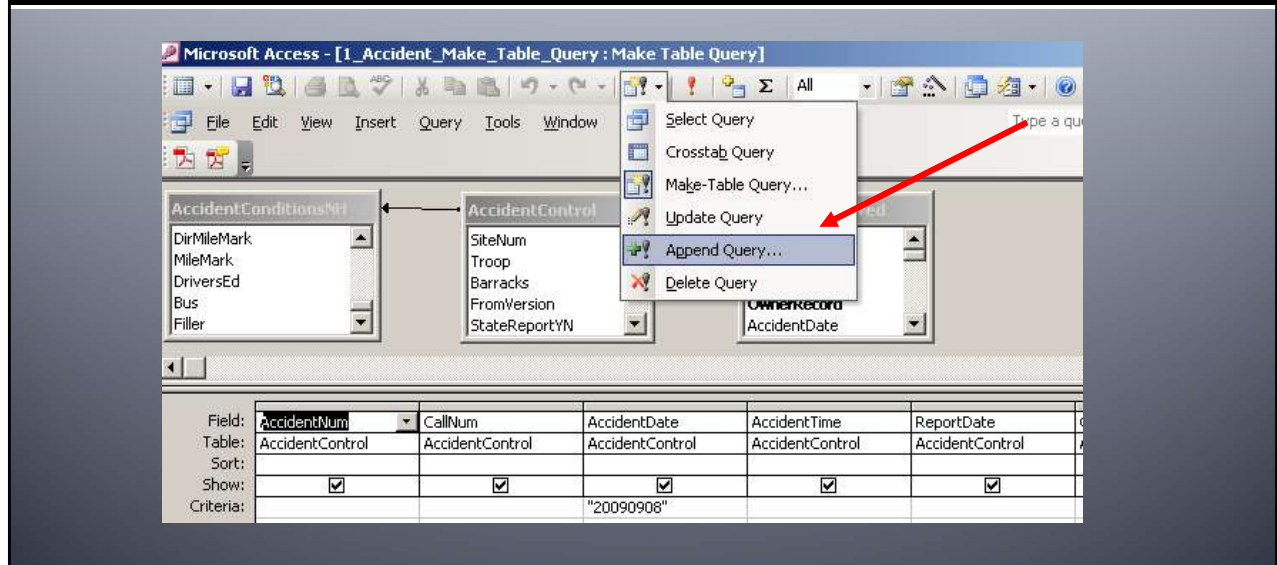


Allow no duplicates in table (field = “IncNum”). Change Indexed to “Yes (No Duplicates)”. Save. Close.

STEP 3: "Append" Query

- Go back to your Table Query
- Change to Append Query
- Line up fields with append fields
- Change date to ">=" your date
- Run and Save

STEP 3: "Append" Query



Click the arrow to find "Queries". Right click on new append query and click "Design View".

Then...

STEP 3: "Append" Query

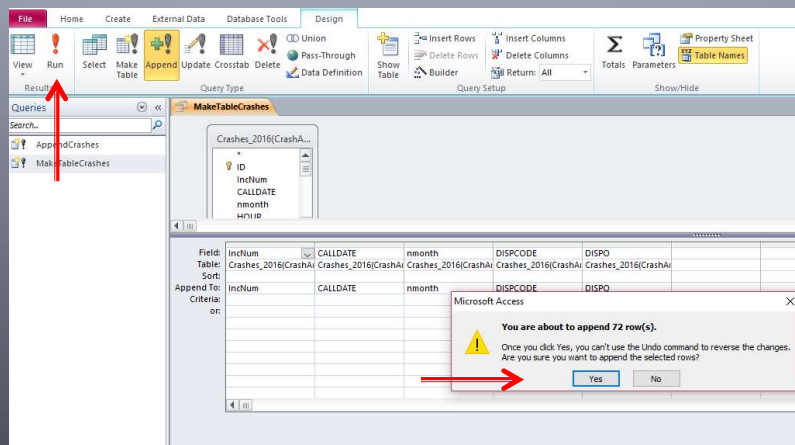
The screenshot shows the Microsoft Access interface for an Append Query. The design grid at the top lists three tables: AccidentConditions, AccidentControl, and AccidentInvo... with arrows indicating relationships. Below the design grid is a table with columns: Field, Table, Sort, Append To, Criteria, and or. The 'Append To' row is highlighted.

Field:	Table:	Sort:	Append To:	Criteria:	or:
AccidentNum	AccidentControl		AccidentNum		
CallNum	AccidentControl		CallNum		
AccidentDate	AccidentControl		AccidentDate	>="20090909"	
AccidentTime	AccidentControl		AccidentTime		
ReportDate	AccidentControl		ReportDate		

Notice "Append To" row appears.

STEP 3: "Append" Query

Click Run.  Click Yes. Additional Errors.



Click Run. Click Yes to accepting additional errors – basically that you are agreeing to append your new rows to the current table. Because we set up the table to not accept duplicates, you will get another error saying that not all of your records could be appended. This is what you want – to only add the new data.

View Your New Data

View your new data

The screenshot shows the Microsoft Access interface. The 'Tables' pane on the left lists 'crashes' and 'Crashes_2016(CrashArea1)'. A red arrow points to the 'crashes' table. The main window displays the 'crashes' table with the following data:

IncNum	CALLDATE	nmonth	DISPCODE
16007866	1/6/2016	1	8
16021773	1/15/2016	1	8
16028503	1/19/2016	1	8
16033232	1/22/2016	1	13
16037602	1/25/2016	1	8
16053858	2/4/2016	2	14
16066340	2/12/2016	2	8
16074640	2/17/2016	2	8
16092702	2/29/2016	2	8
16101556	3/5/2016	3	2
16102172	3/6/2016	3	8
16104606	3/7/2016	3	1

View your new data. If you set up a process to append your data once a day/week/month/year, then you can rest assured that the new data will be populated.

STEP 4: Make Master Queries

Simply create a new query and add all the data available in the table.

Objective 4

Combine multiple years of static data into one master file.

OBJECTIVE 4: Combine multiple years of static data into one master file.

Combining Static Data Benefits

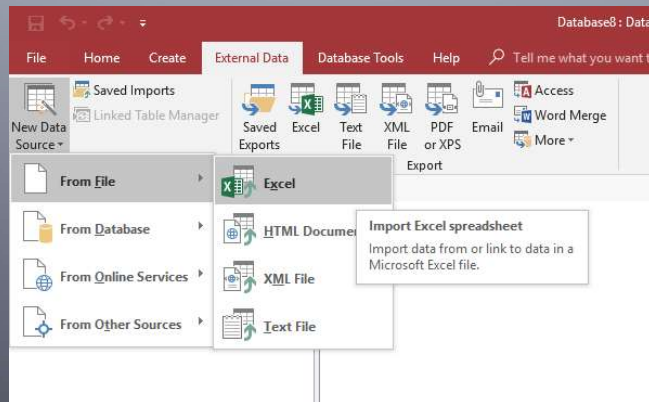
- Combine multiple records in one pass
- Append new data without losing previously recorded/cleaned data
- Combine multiple years of data for analysis and mapping/hot spots

Combining static data has many benefits. In addition to gaining the trust and comradery of your narcotics staff, appending static data helps as it:

- Can combine multiple records in one pass
- Can append new data without losing previously recorded/cleaned data
- Can combine multiple years of data for analysis or mapping/hot spots

Combining Static Data - Exercise

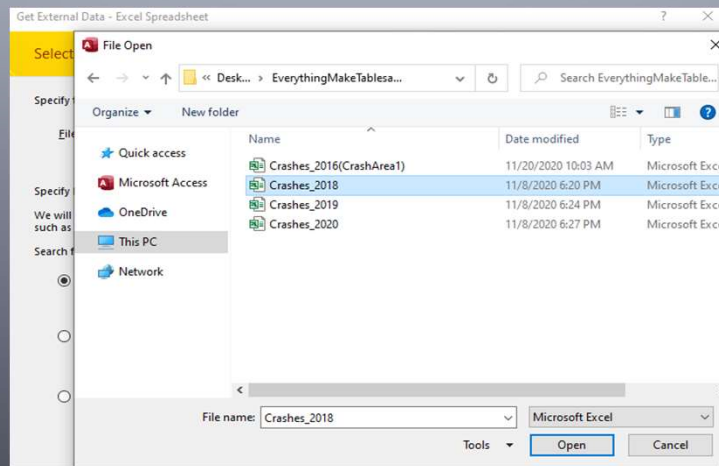
Import "Crashes_2018" file



Import the files/materials available for this training.

Combining Static Data

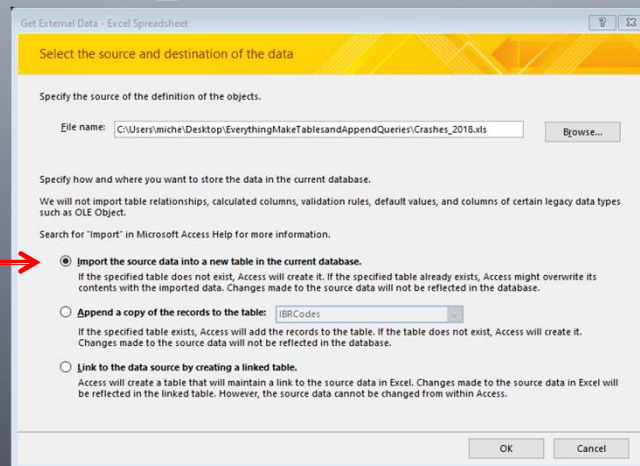
Import "Crashes_2018" file



Find the "Crash_2018" file stored on your desktop.

Combining Static Data

Import "Crashes_2018" file. Save as "Crashes_2018"



To begin, we will simply import through the import wizard.

Combining Static Data

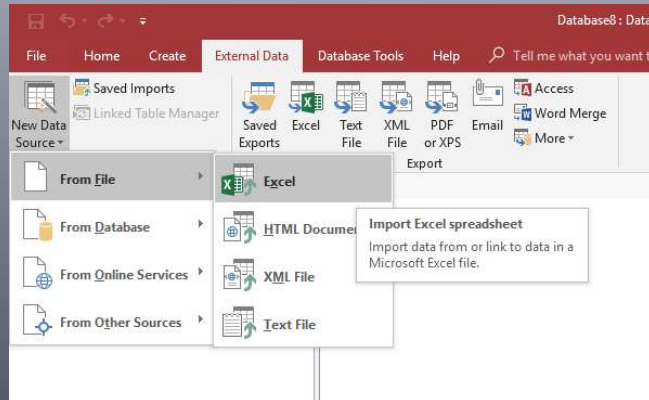
View "Crashes_2018" file. Close.

ID	IncNum	CALLDATE	nmonth	HOUR	TM_RCV	TM_DISP	TM_ARVD	TM_CLRD	TOT_TM	CALLTYPE	ARC_Street
1	18007866	1/6/2018	1	9	9:04:00	9:08:00	9:12:00	9:53:00	0:48:27	8	BRANDYWINE
2	18021773	1/15/2018	1	7	7:50:00	8:01:00	8:11:00	8:52:00	1:02:30	9	BRANDYWINE
3	18028503	1/19/2018	1	16	16:12:00	16:27:00	16:29:00	16:39:00	0:27:32	9	1108 STATE ST
4	18033232	1/22/2018	1	15	15:32:00	15:44:00	15:46:00	16:52:00	1:19:53	9	BRANDYWINE
5	18037602	1/25/2018	1	14	14:16:00	16:09:00	16:22:00	16:46:00	2:29:51	9	100 S BRANDYV
6	18053858	2/4/2018	2	16	16:28:00		16:28:00	16:30:00	0:01:15	9	1129 STATE ST
7	18066340	2/12/2018	2	8	8:27:00	8:35:00	8:45:00	9:38:00	1:11:05	9	BRANDYWINE
8	18074640	2/17/2018	2	16	16:17:00		16:17:00	16:48:00	0:30:35	9	1121 STATE ST
9	18092702		2	9	9:10:00	9:21:00	9:34:00	10:20:00	1:10:07	9	1129 STATE ST
10	18101556	3/5/2018	3	22	22:38:00	22:42:00	22:51:00	23:07:00	0:29:03	9	BRANDYWINE
11	18102172	3/6/2018	3	9	9:32:00	10:43:00	10:43:00	11:33:00	2:01:14	9	1129 STATE ST
12	18104606	3/7/2018	3	21	21:32:00	22:04:00	22:10:00	22:11:00	0:38:37	9	BRANDYWINE
13	18105302	3/8/2018	3	10	10:56:00	11:01:00	11:13:00	13:18:00	2:22:01	9	BRANDYWINE
14	18125257	3/20/2018	3	15	15:11:00		0:00:00	0:00:00	0:00:00	9	100 S BRANDYV
15	18128787	3/22/2018	3	20	20:01:00	20:04:00	20:10:00	21:34:00	1:32:15	7	1129 STATE ST
16	18135703	3/26/2018	3	22	22:26:00	22:28:00	22:42:00	23:40:00	1:13:55	9	BRANDYWINE

View your file. Close.

Combining Static Data

Add "Crashes_2019" file to "Crashes_2018" table



Now to add your 2019 crashes into the same file as your 2018 crashes. Select "Append a copy of the records to the table" "Crashes_2018".

Combining Static Data

Append the static data "Crashes_2019"

Get External Data - Excel Spreadsheet

Select the source and destination of the data

Specify the source of the definition of the objects.

File name: C:\Users\miche\Desktop\EverythingMakeTablesandAppendQueries\Crashes_2019.xls Browse...

Specify how and where you want to store the data in the current database.

We will not import table relationships, calculated columns, validation rules, default values, and columns of certain legacy data types such as OLE Object.

Search for "Import" in Microsoft Access Help for more information.

Import the source data into a new table in the current database.
If the specified table does not exist, Access will create it. If the specified table already exists, Access might overwrite its contents with the imported data. Changes made to the source data will not be reflected in the database.

Append a copy of the records to the table: Crashes_2018
If the specified table exists, Access will add the records to the table. If the table does not exist, Access will create it. Changes made to the source data will not be reflected in the database.

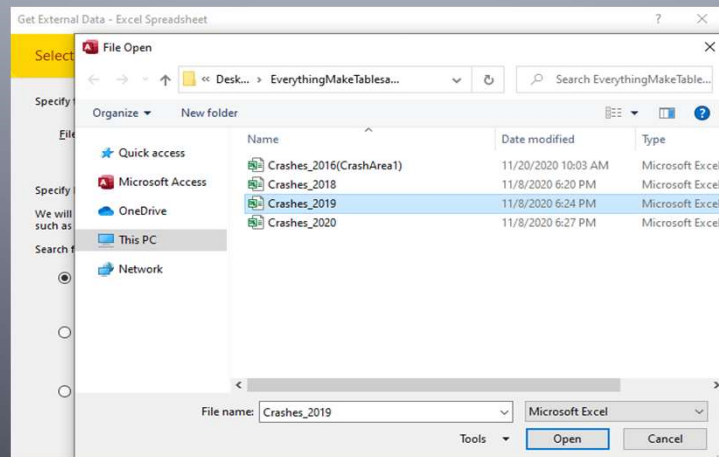
Link to the data source by creating a linked table.
Access will create a table that will maintain a link to the source data in Excel. Changes made to the source data in Excel will be reflected in the linked table. However, the source data cannot be changed from within Access.

OK Cancel

Use the wizard to import your 2019 data.

Combining Static Data

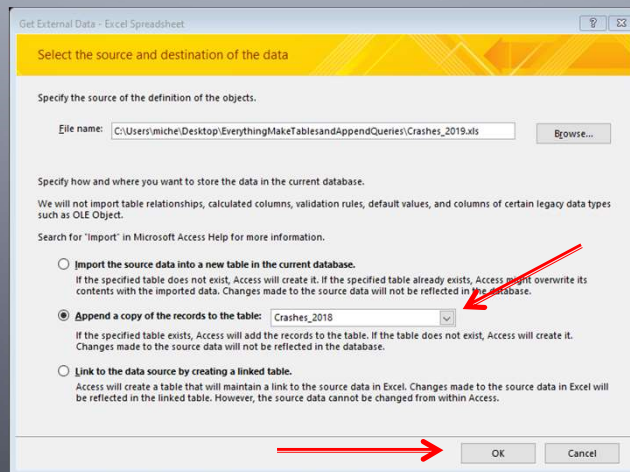
Append the static data "Crash_2019" to "Crash_2018"



Append the static data "Crash_2019" to "Crash_2018".

Combining Static Data

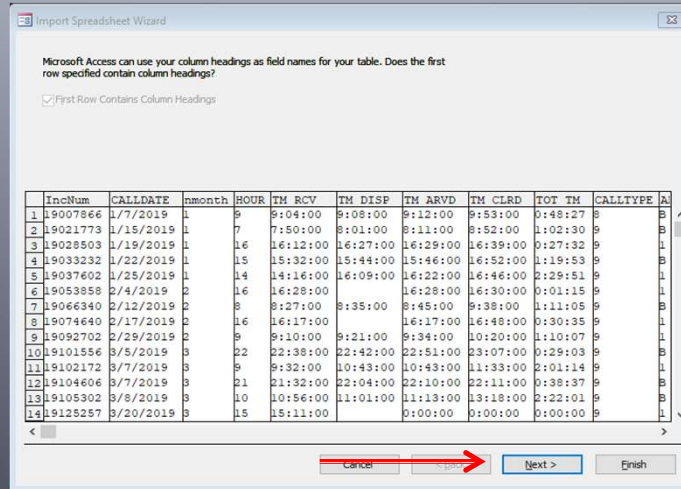
Append the static data "Crash_2019" to "Crash_2018"



Append the static data "Crash_2019" to "Crash_2018".

Combining Static Data

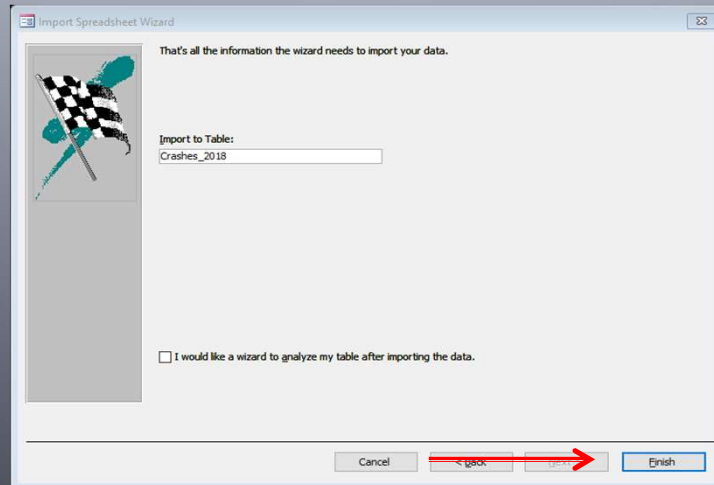
Append the static data "Crash_2019" to "Crash_2018"



Use the wizard.

Combining Static Data

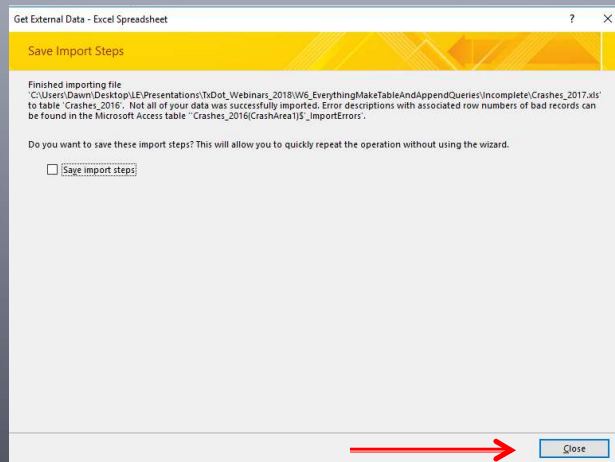
Append the static data "Crash_2019" to "Crash_2018"



Finish.

Combining Static Data

Append the static data "Crash_2019" to "Crash_2018"



Close.

Combining Static Data

Now both 2018 and 2019 data are in the same table

ID	IncNum	CALLDATE	nmonth	HOUR	TM_RCV	TM_DISP	TM_ARVD
67	18550492	12/1/2018	12	5	5:47:00	5:49:00	5:54:00
68	18554343	12/3/2018	12	13	13:52:00	14:09:00	14:09:00
69	18565604	12/10/2018	12	23	23:51:00	0:39:00	0:41:00
70	18571873	12/15/2018	12	8	8:57:00	8:58:00	8:59:00
71	18586687	12/25/2018	12	7	7:36:00	8:26:00	8:29:00
72	18588417	12/26/2018	12	19	19:04:00	19:05:00	19:11:00
73	19007866	1/7/2019	1	9	9:04:00	9:08:00	9:12:00
74	19021773	1/15/2019	1	7	7:50:00	8:01:00	8:11:00
75	19028503	1/19/2019	1	16	16:12:00	16:27:00	16:29:00
76	19033232	1/22/2019	1	15	15:32:00	15:44:00	15:46:00
77	19037602	1/25/2019	1	14	14:16:00	16:09:00	16:22:00
78	19053858	2/4/2019	2	16	16:28:00		16:28:00

Now both 2018 and 2019 data are in the same table. Note that the field names have to be EXACTLY the same in order to correctly append.

Combining Static Data

Let's Practice

Import "Crashes_2020" file

Now it's your turn...again. Go through the process for adding "Crashes_2020" data file to your now 2018 and 2019 data. Feel free to change the table name to something like "crashes_2018-2020" after you save and close.

POP UP QUESTION 4

True or False:

Combining static data to a master table is helpful if you want to analyze or map multiple years of data that currently is located in separate files.

POP UP QUESTION 4:

True or False:

Combining static data into a master table is helpful if you want to analyze or map multiple years of data that currently is in separate files.

Summary of Objectives

1. List the benefits of static master tables.
2. Create a master “Crash” table skeleton using a “Make Table” query.
3. Design an “Append” query to add live crash data to that master “Crash” table.
4. Combine multiple years of static data into one master file.

Summary:

The Objectives for this course are for students to be able to create a comprehensive master dataset using a combination of three helpful data structure queries/techniques in Microsoft Access®. Specifically,

1. List the benefits of static master tables.
2. Create a master “Crash” table skeleton using a “Make Table” query.
3. Design an “Append” query to add live crash data to that master “Crash” table.
4. Combine multiple years of static data into one master file.

Overall, the way you create your master tables – using live or static data – does not matter. What matters most is that you have multiple years of comprehensive, timely, and accurate data at your fingertips so that you can perform the analysis you desire quickly and efficiently.

DDACTS Project

IADLEST - <https://www.iadlest.org/training/ddacts>

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Part 6: Data Quality and Cleaning Tips Like You've Never Seen Before!

Dawn Reeby
Analytical Specialist

National Highway Traffic Safety Administration (NHTSA)

International Association of Directors of Law Enforcement
Standards and Training (IADLEST)



Part 6: “Data Quality and Cleaning Tips Like You’ve Never Seen Before!” outlines the key factors relative to developing the cleanest data for quality analysis. These instructions are pivotal in designing a properly functioning database and processes for data-driven strategies.

Introductions: Dawn Reeby



Dawn Reeby

Objectives

1. Describe the benefits of direct data access.
2. Describe the 6 common data errors.
3. Describe solutions to those common errors.
4. Describe 4 methods of identifying errors through querying methods.

Objectives:

1. Describe the benefits of direct data access.
2. Describe the 6 common data errors.
3. Describe solutions to those common errors.
4. Describe 4 methods of identifying errors through querying methods.

More on Data Quality Guidelines:

1. Bureau of Justice Statistics Data Quality Guidelines. Accessed December 2020. <https://www.bjs.gov/content/dataquality/dataquality.cfm>
2. "Ethical Guidelines for Statistical Practice" American Statistical Association. (April 2018) Accessed. 2018. <https://www.amstat.org/ASA/Your-Career/Ethical-Guidelines-for-Statistical-Practice.aspx>
3. "Information Quality Guidelines for Statistics" published by the Federal Bureau of Investigation in its Administration of the Uniform Crime Reporting (UCR) Program. Accessed December 2020. <https://ucr.fbi.gov/data-quality-guidelines-new>

Objective 1

Describe the benefits of direct data access.

Objective 1: Describe the benefits of direct data access.

Benefits of Direct Data Access

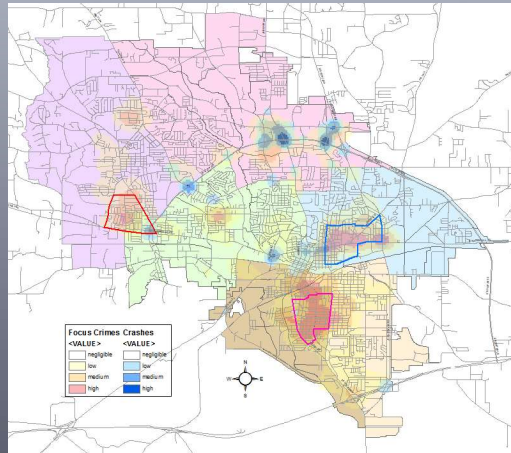
Identify Patterns and Trends

Incident Type	Average	Usual Range	2019	2020	Change from Avg.	Notes
PROPERTY CRIME						
↓ Residential Burglary	39.6	32–48	36	31	-22%	Picked up a little in the fall but not enough to overwhelm low Jan-Sep.
↓ Commercial Burglary	32.1	24–41	24	19	-41%	Dropped precipitously with copper and metal no longer hot targets.
Theft from a Vehicle	262.9	205–321	349	226	-14%	Back down after high 2008 as GPS market declined. Still lots of patterns.
↓ Theft from a Building	102.1	88–116	82	64	-37%	Decreases in health club thefts and scrap metal thefts.
Theft from a Person	26.8	20–34	24	23	-14%	One fall pattern along Endicott Street but volume otherwise normal.
↓ Theft from a Residence	57.8	51–65	61	49	-15%	Low with fewer domestic and yard thefts.
↓ Theft of a Bicycle	23.1	18–28	26	16	-31%	Plummeted. No recurrence of summer 2008 patterns.
Theft of Services	21.1	15–27	16	20	-5%	Normal level of dine-and-ditch scams and gas drive-offs.
↑ Shoplifting	266.0	225–307	273	325	+22%	Shot up particularly around holidays as retailers buffed security forces.
↓ Auto Theft	52.5	36–69	33	23	-56%	Lowest level in at least 30 years. No patterns in 2009.
Arson	2.6	0–5	1	3	+15%	Port-a-potty, car, and dumpster, all during the fall.
↑ Fraud & Forgery	119.6	98–141	109	146	+22%	Big increase with numerous incidents of credit card fraud and identity theft.
Employee Theft	22.5	16–29	22	25	+11%	Relatively normal levels. One mail kiosk reported three.

In Part 1 “Data-Driven Basics”, we explored many benefits to direct data access. This is worth touching upon again here. Direct access to data gives us the ability to identify patterns and trends as they emerge. With your data all in one spot, you can search for increases or decreases and trends relatively easily. It can assist in identify investigative leads, including surfacing past MOs relatively easily and linking past offenders to current crime series. With data at your fingertips, you can identify dirty data and make quick corrections to mass amounts of errors. Data access also gives you more transparency. Having access to your data can make reporting to the community much easier and much more efficient. Imagine an automated arrest report that redacts juveniles, domestics, and current narcotic cases. No more printing daily and bolding out info with black magic marker!

Benefits of Direct Data Access

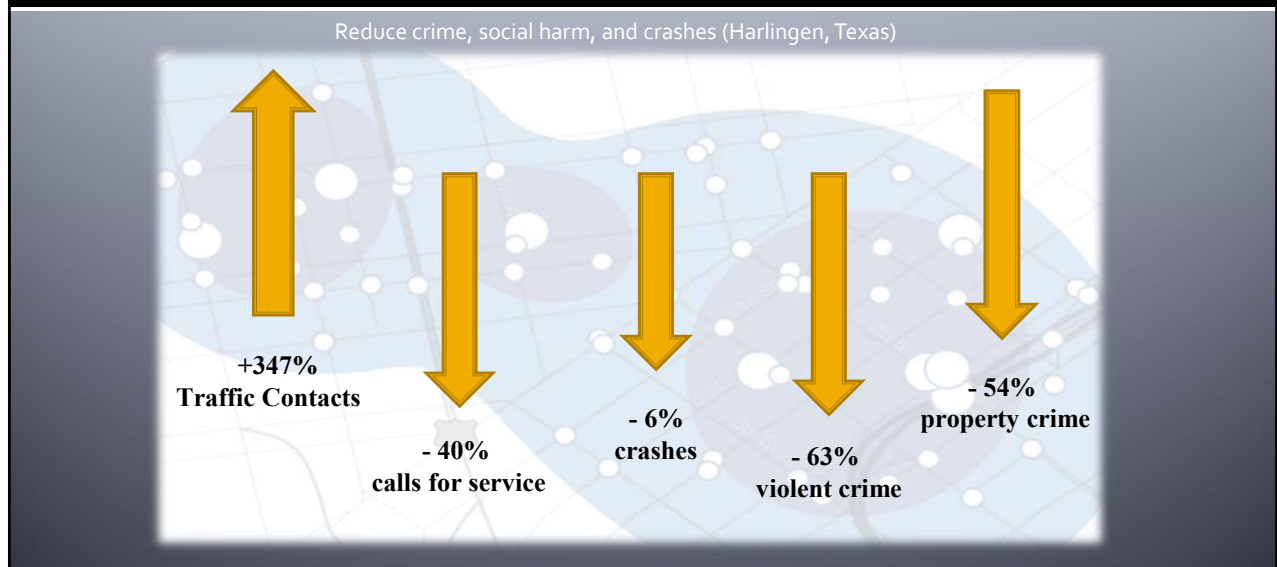
Develop Deployment Strategies



Longview, Texas identified areas where high densities of crashes and crimes.

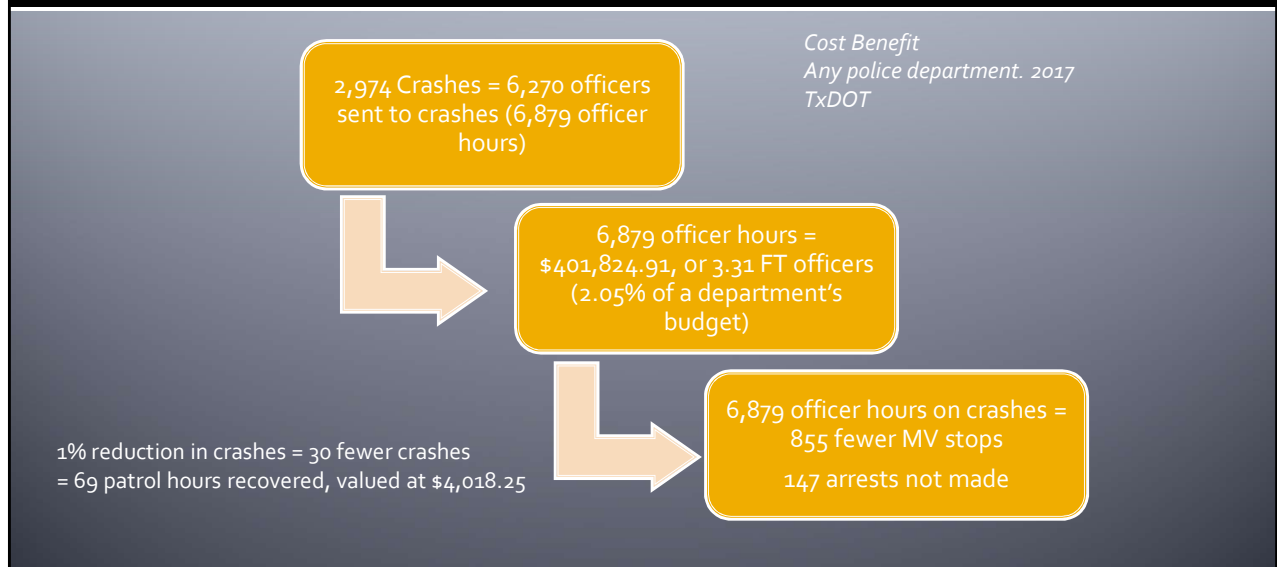
With data access, you can develop data-driven deployment strategies. For instance, you can take the last 3 years of summer nightshift crashes, identify hotspots, and determine deployment strategies that align with those hot spots. An increase in police presence at the “smartest” locations may increase deterrence in that area as well.

Benefits of Direct Data Access



Of course, access to data can give you the tools to reduce and measure reductions of crime, social harm, and crashes. Also, police can determine when there is uncommitted officer time, implementing a more proactive and less reactive approach

Benefits of Direct Data Access



Finally, direct access can help increase arrests and save MONEY! This is called policing smarter – utilizing our limited resources in a proactive and results-driven manner. A slight reduction in crashes was proven to reduce costs for police and the community.

POP UP QUESTION 1

True or False:

If your data is 50% clean, you can analyze, map, and save money.

POP UP QUESTION 1: True or **False**:

If your data is 50% clean, you can map and save money. False. Data should be as close to clean as possible!

What goes in must come out!

- **What goes in?** – tacos, tacos, tacos, martini, pan dulce. Nighttime chocolate snack.
- **Start running** – no warmup, no stretching
- 10 minutes **FRUSTRATION** sets in
- Who do I **BLAME?**
- Results in a **BAD CYCLE** of poor quality

It's a marathon, not a sprint. Start with:

Building blocks!!!

Have you ever wanted to shed a few pounds? You promise yourself that you are going to start running in the morning. You head to your families' summer BBQ with a skip in your step, knowing you are about to get rocking abs!

- **What goes in?**
- In the morning, you rise. You made a commitment to earn those abs and you're not backing down... so you **Start Running** – no warmup, no stretching
- 10 minutes in to screaming calves, **FRUSTRATION** sets in.
- Who do I **BLAME?** Primo Juan for his famous BBQ steak? Your aunt who made delicious tacos to sabotage your muscle flexing efforts? Abuela – she's always making your favorite sweets!
- Results in a **BAD CYCLE** of poor quality. You are so upset that your legs refuse to stride like they did 20 years earlier that you throw your hands up and dive into those tamales! Has this ever been you?

It is a marathon, not a sprint. Start with: Building blocks!!! Eat well, get rest, move your body.

What goes in must come out!

- **What goes in?** – data that is late, poor quality, filled with errors
- **Start running** – asked to do analyses/requests
- 10 minutes **FRUSTRATION** sets in. Too much time is spent cleaning. Or reports that don't make sense and can not be used to drive strategies.
- Who do I **BLAME**? The analyst? The officer? Records?
- Results in a **BAD CYCLE** of poor quality.

It's a marathon, not a sprint. Start with:

QUALITY DATA!!!

It is the same with data.

- **What goes in?** – data that is late, poor quality, filled with errors
- **Start running** – asked to do analyses/requests
- 10 minutes **FRUSTRATION** sets in. Too much time is spent cleaning. Or reports that don't make sense and cannot be used to drive strategies.
- Who do I **BLAME**? The analyst? The officer? Records?
- Results in a **BAD CYCLE** of poor quality.

It is a marathon, not a sprint. Start with: QUALITY DATA!!!

POP UP QUESTION 2

True or False:

Officers have enough on their plates. They shouldn't have to work hard to input clean data?

POP UP QUESTION 2: True or **False**:

Officers have enough on their plates. They shouldn't have to work hard to input clean data?

Objective 2

Describe the 6 common data errors.

OBJECTIVE 2: Describe the 6 common data errors.

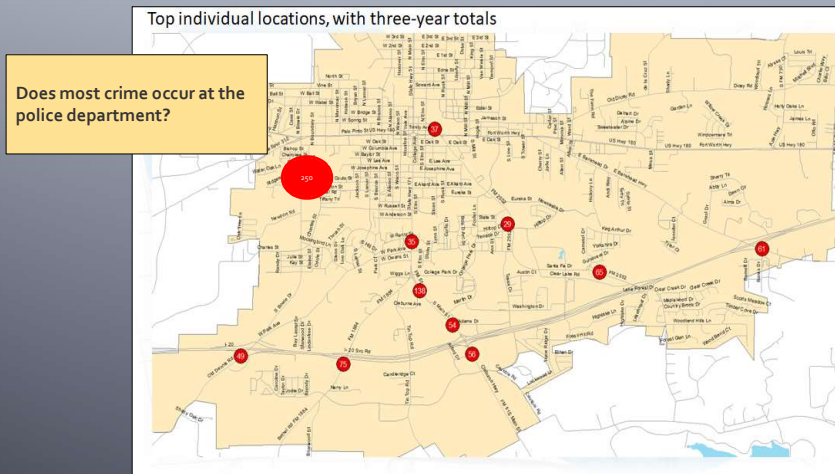
Common Data Errors

Common Data Errors
1. Most of our crime occurred at our police department
2. HWY/Major thoroughfare – officers aren't clear what address to record; or missing street #s
3. Free typing/mis-spellings
4. Missing data
5. Duplicate master data
6. Address file doesn't match mapping files

Common Data Errors

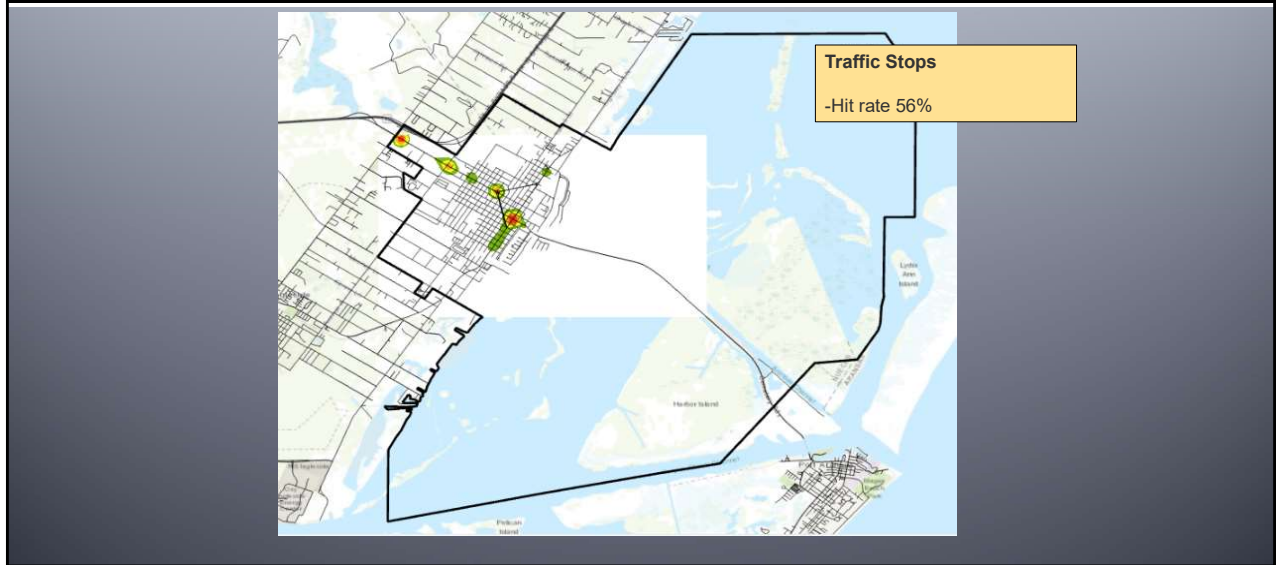
1. Most of our crime occurred at our police department
2. HWY/Major thoroughfare – officers aren't clear what address to record; or missing street #s
3. Free typing/misspellings
4. Missing data
5. Duplicate master data
6. Address file doesn't match mapping files

Common Errors #1 – Most Crime Occurs at PD



Does most of your crime occur at your police department?

Common Errors #2 – HWY/No Street



Hit rate is 56% because the data indicates “highway” as the traffic crash location, but does not determine a specific location on the highway.

Common Errors #3 – Free Typing

STREET
Wal-Mart
123 Main Street/Wal-Mart
Wally World
123 M St
South of Town Walmart
Wallmart
123 Main St

Is free typing an issue for your department? Free-typing can make data difficult to ask questions.

Common Errors #4 – Blanks

Address	FREQUENCY
(blank)	1,499
150 S Main Street	51
2607 W Daniel Webster Hwy	37
2103 Hickory LN	33
Hwy 75	24
Hwy 222	23
2702 W Daniel Webster Hwy	17
700 W Daniel Webster Hwy	14
322 MARKET ST	13

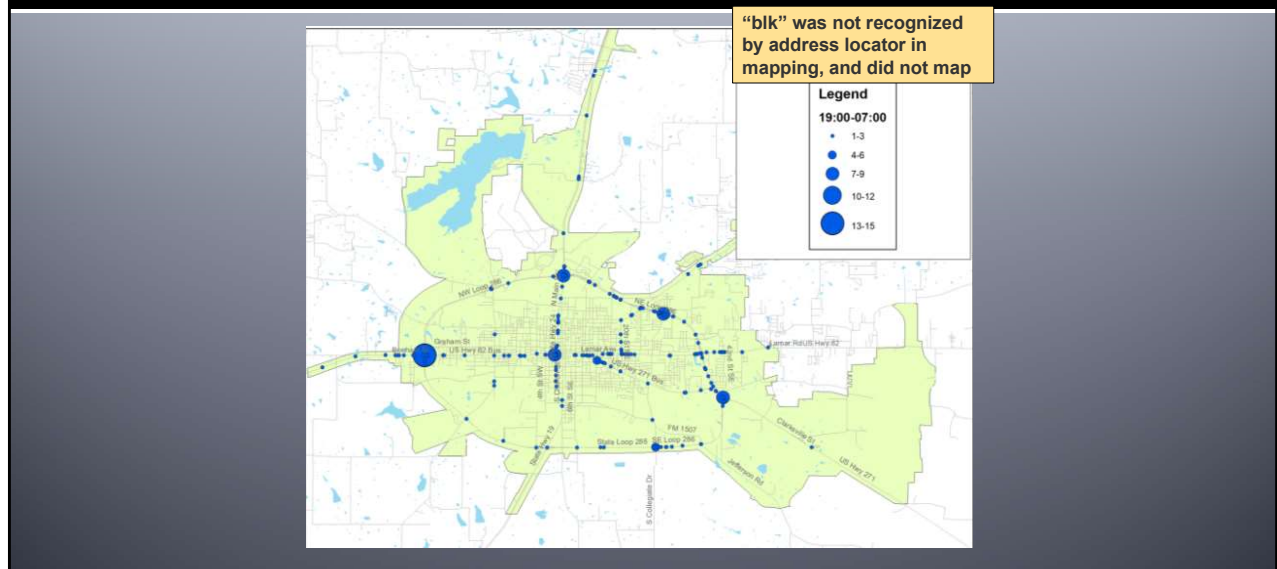
Does your department leave fields blank?

Common Errors #5 –Duplicate Master Names

FIRST NAME	LAST NAME	DOB
Dawn	Reaby	10/12/77
Dawn	Reeby	10/12/77
Dawn	Reiby	10/12/77
Don	Reeby	77/10/12
Reeby	Dawn	10/12/77
DawnN	Reeby	10/12/17
Dawna	Reaby	10/12/07

Does your department have an issue with duplicate master names?

Common Errors #6 – Unmapped HWY



Blk not recognized as an address.

POP UP QUESTION 3

True or False:

Most police departments have data quality issues, including naming the police department as the location of a crime when a report is taken from a walk-in.

POP UP QUESTION 3: **True** or False:

Most police departments have data quality issues including naming the police department as the location of a crime when a report is taken from a walk-in.

Objective 3

Describe solutions to those common errors.

Objective 3: Describe solutions to those common errors.

Solutions to Common Data Errors

Common Data Errors	Possible Solutions
1. Most of our crime occurred at our police department	Send back to officers to fix in aggregate form; train officers and supervisors
2. Duplicate master data	Identify duplicates; Train officers

Clean the Toilets



Solutions to Common Errors

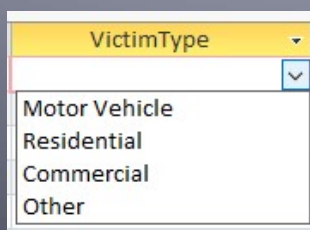
Common Problems	Possible Solutions
3. HWY/Major thoroughfare – officers aren't clear what address to record	Establish markers



Possible solution to officers not knowing what addresses to record = establish clear markers.

Solutions to Common Errors

Common Problems	Possible Solutions
4. Free typing/mis-spellings	Work with vendor to create drop down options
5. Missing data	Work with vendor to set up validation rules



A screenshot of a web form showing a dropdown menu labeled "VictimType". The menu is open, displaying four options: "Motor Vehicle", "Residential", "Commercial", and "Other". The "Residential" option is highlighted in blue.

VALIDATION RULES:

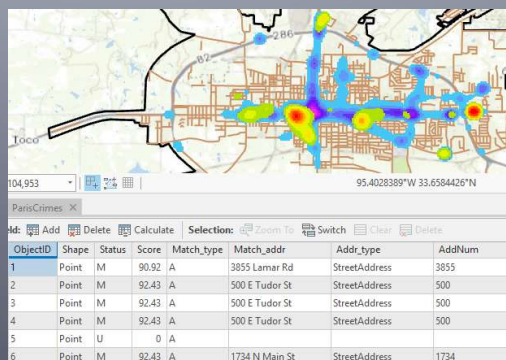
If crime is burglary, then victim type must be Residential, Commercial, or Other.

What types of validation rules would be helpful for your department?

Solutions to Common Errors

Common Problems	Possible Solutions
6. Address file doesn't match mapping files	Manually clean using Access tools

Step 1: Identify in mapping software all unmatched addresses (open the attribute table)



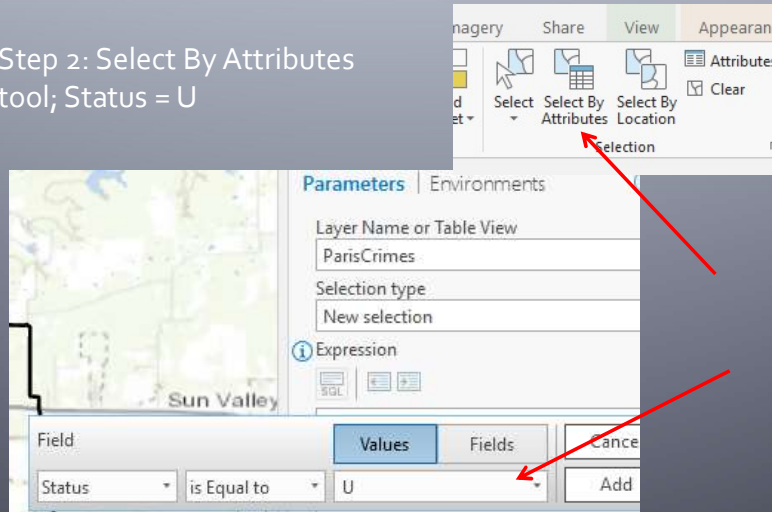
(Paris, TX)

Possible solution to address files not matching mapping files (i.e. blocks used in RMS data but not in mapping data) = Manually cleaning large amounts of data using Access tools.

Step 1: Identify in mapping software all unmatched addresses (open the attribute table).

Solutions to Common Errors

Step 2: Select By Attributes tool; Status = U

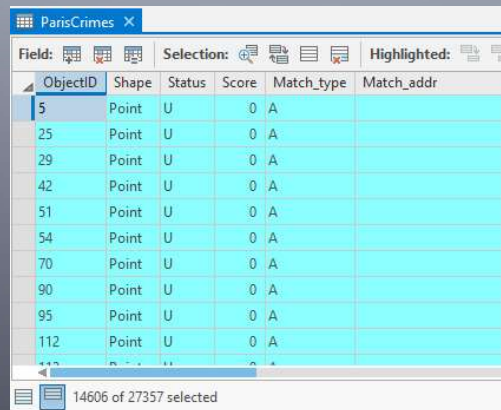


Step 2: Select By Attributes tool; Status = U

Solutions to Common Errors

Step 3: Show selected; export into CSV (convert to Excel later)

Step 4: Upload into Access (you can also just run aggregate query in Access if you don't have mapping capacities)



Field:	Shape	Status	Score	Match_type	Match_addr
5	Point	U	0	A	
25	Point	U	0	A	
29	Point	U	0	A	
42	Point	U	0	A	
51	Point	U	0	A	
54	Point	U	0	A	
70	Point	U	0	A	
90	Point	U	0	A	
95	Point	U	0	A	
112	Point	U	0	A	

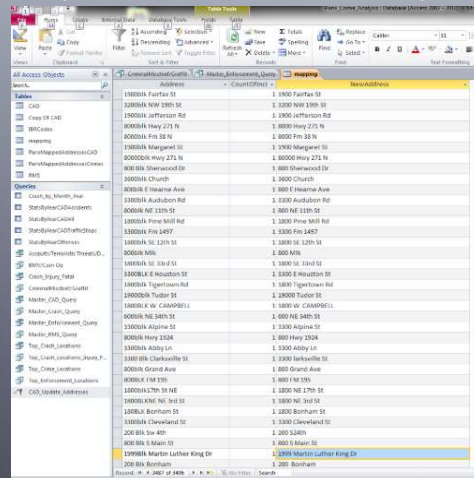
14606 of 27357 selected

Step 3: Show selected; export into CSV (convert to Excel later)

Step 4: Upload into Access (you can also just run aggregate query in Access if you don't have mapping capacities)

Solutions to Common Errors

Step 5: Create a Address Library



The screenshot shows a Microsoft Access window with a table named 'NewAddress'. The table contains a list of addresses with columns for 'Address' and 'NewAddress'. The data is as follows:

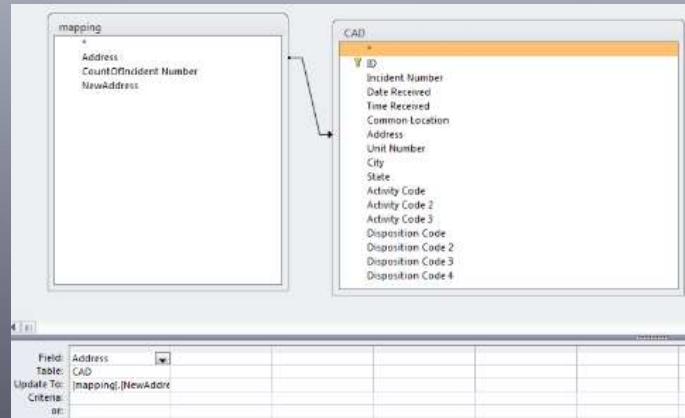
Address	NewAddress
13000A Fairfax St	1 1300 Fairfax St
13000A New 28th St	1 1300 New 28th St
13000A Jefferson Rd	1 1300 Jefferson Rd
80000A Hwy 271 N	1 8000 Hwy 271 N
80000A Fm 38 N	1 8000 Fm 38 N
13000A Margaret St	1 1300 Margaret St
80000A Hwy 271 N	1 8000 Hwy 271 N
80000A Sherwood Dr	1 8000 Sherwood Dr
80000A Church	1 8000 Church
80000A Helena Ave	1 8000 Helena Ave
13000A Audubon Rd	1 1300 Audubon Rd
8000A NE 11th St	1 800 NE 11th St
13000A Pine Hill Rd	1 1300 Pine Hill Rd
13000A Fm 2487	1 1300 Fm 2487
13000A St 12th St	1 1300 St 12th St
8000A Hwy	1 8000 Hwy
13000A St 3rd St	1 1300 St 3rd St
13000A E Houston St	1 1300 E Houston St
13000A Tigerhead Rd	1 1300 Tigerhead Rd
13000A Tudor St	1 1300 Tudor St
13000A W Caswell St	1 1300 W Caswell St
8000A NE 34th St	1 8000 NE 34th St
13000A Algona St	1 1300 Algona St
8000A Hwy 2524	1 8000 Hwy 2524
13000A Adley Ln	1 1300 Adley Ln
13000A Clarksville St	1 1300 Clarksville St
8000A Grand Ave	1 8000 Grand Ave
8000A Fm 376	1 8000 Fm 376
13000A 17th St NE	1 1300 NE 17th St
13000A NE 3rd St	1 1300 NE 3rd St
13000A Bloomington St	1 1300 Bloomington St
13000A Cleveland St	1 1300 Cleveland St
2000A Sw 4th	1 2000 Sw 4th
8000 S Main St	1 8000 S Main St
13000A Martin Luther King Dr	1 1300 Martin Luther King Dr
13000A Bonham	1 1300 Bonham

The staff in an agency in Texas went through the 3,500 address data errors that we identified with the mapping summation tool and created new addresses in Microsoft Access = mapping address library.

Step 5: Create an Address Library

Solutions to Common Errors

Step 6: Create an update query.



Created an "Update" query that updated the "CAD" table with the new addresses from the "mapping" library table in the "Address" field.

Step 6: Create an update query. Created an "Update" query that updated the "CAD" table with the new addresses from the "mapping" library table in the "Address" field.

For more on Update Queries, see: [Microsoft Online Support. "Create and Run an Update Query". Retrieved December 2020 from https://support.office.com/en-us/article/create-and-run-an-update-query-9dddc97c-f17d-43f4-a729-35e5ee1e0514](https://support.office.com/en-us/article/create-and-run-an-update-query-9dddc97c-f17d-43f4-a729-35e5ee1e0514)

Solutions to Common Errors

Results in original table were updated with new data (no more 'blk' in any of the address fields).

Date Receiv	Time Receiv	Common Loc	Address
8/10/2015	1:43:21 PM	Industrial Self	600 Graham St
8/10/2015	1:45:28 PM	Paris Police De	2910 Clarksville St
8/10/2015	1:56:20 PM	Lamar National	200 S Collegiate Dr
8/10/2015	2:25:55 PM	NULL	2500 N Main St
8/10/2015	3:06:24 PM	Paris Town Cer	3500 Lamar Ave
8/10/2015	3:19:20 PM	Wade Park	2201 E Price St
8/10/2015	3:23:46 PM	NULL	1400 NW 19th St
8/10/2015	3:33:49 PM	NULL	1400 NW 19th St
8/10/2015	3:49:05 PM	NULL	350 NE 29th St
8/10/2015	3:50:10 PM	NULL	2600 Al Male St

Result = quality data for data-driven strategies!

Results in original table were updated with new data (no more 'blk' in any of the address fields).

POP UP QUESTION 4

True or False:

It is important to spend time identifying what your top 5 or so data issues are and developing strategies to address them in past data and in the future.

POP UP QUESTION 4: **True** or False:

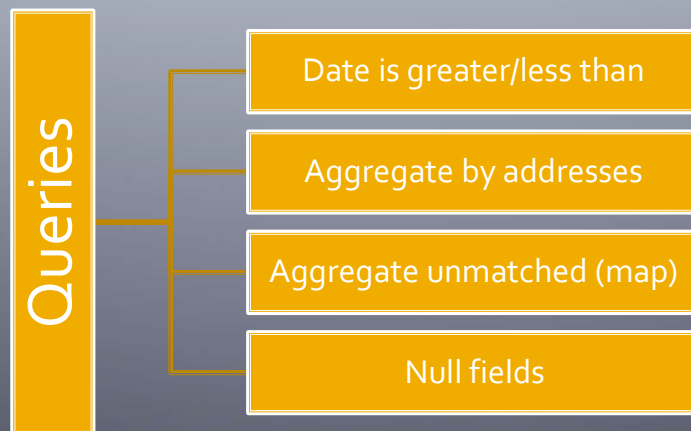
It is important to spend time identifying what your top 5 or so data issues are and developing strategies to address them in past data and in the future.

Objective 3

Describe 4 methods of identifying errors through querying methods.

Objective 4: Describe 4 methods of identifying errors through querying methods.

Tips to Identify Common Errors



You can use queries in Microsoft Access® to identify data quality issues:

- Greater than or less than (current date, DOB)
- Aggregation queries to identify top addresses and determine if they are real addresses, police department headquarters, blank addresses, free type, etc. (see Part 7 for details on how to create aggregation queries)
- Use the summation tools in GIS software to aggregate by unmatched addresses, or select by attribute (unmatched)
- Query for Null fields (addresses, IBR Codes, DOB, date to, date from, etc.)

Summary of Part 6 “Data Quality and Cleaning Tips Like You’ve Never Seen Before!” Objectives

1. Describe the benefits of direct data access.
2. Describe the 6 common data errors.
3. Describe solutions to those common errors.
4. Describe 4 methods of identifying errors through querying methods.

Objectives for this course were for the participants to be able to describe and explain data quality and cleaning solutions. Specifically:

- Describe the benefits of direct data access
 - Benefits of direct data access
 - Identify patterns and trends, develop proactive deployment strategies (align enforcement with crime/crash activity), reducing crash, crimes, and social harms, measure progress towards goals.
- Describe the 6 common data errors – Tacos and pan dulce!
 - Tacos, Tacos, Tacos...and Pan Dulce. Garbage in garbage out, frustration, blame, bad data cycle.
- Describe solutions to those common errors
 - Location issues (hotspot = police department), HWY, missing or bad data, addresses not mapping.
 - Who’s cleaning the toilets? Officer training, work with vendors, update queries.
- Describe 4 methods of identifying errors through querying methods – stop scrubbing the toilets!
 - Tips to Identify Errors. Sorting, check for null, aggregation queries.

Practical Exercises: Identify top three (3) data quality issues at your agency and identify potential solutions to implement.



Take a look at your own agency data – whether you have a direct data connection or you have to pull a year or two of data manually. Use Access or Excel or just eyeball what your biggest challenges that you see relative to data quality. Now identify one possible approach to begin to improve the quality of this data.

DDACTS Project

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Part 7: Making Analytics Easier with Expressions

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Part 7: “Making Analytics Easier with Expressions” You may have great data... but now what do you do with it?! This segment is a MUST for analysts who want dig into their data while automating as much as possible! Produce rocking analyses while saving time by executing expressions in your queries! Analysts can quickly produce a monthly or quarterly analysis by using date expressions; or create single address fields for mapping; or calculate the age at time of incident to understand what age groups are committing most offenses; or measure how long officers spend on specific calls; and so much more! This segment will share several common expressions that will facilitate the analytical flow.

Introductions: Dawn Reeby



Dawn Reeby

Objectives

1. Describe the purpose of criteria operators and expressions.
2. Identify when to utilize criteria operators including exact matches, > <, between, Like *, Or, And, Not.
3. Rename an existing field.
4. Calculate dates for analysis and reporting.
5. Concatenate fields for further analysis/mapping.



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4. Calculate dates for analysis and reporting
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For more examples of Query Expressions:

1. ["Access - Calculated Columns in Queries." Accessed December 2020.](https://codekabinett.com/rdumps.php?Lang=2&targetDoc=access-query-calculated-column-function)
<https://codekabinett.com/rdumps.php?Lang=2&targetDoc=access-query-calculated-column-function>
2. "Examples of Query Criteria." Microsoft Support Office. Accessed December 2020. <https://support.office.com/en-us/article/examples-of-query-criteria-3197228c-8684-4552-ac03-aba746fb29d8>
3. ["Use the Expression Builder." Accessed December 2020.](https://support.microsoft.com/en-us/office/use-the-expression-builder-56214db9-8b54-44f3-bc19-2a55427b5d4c)
<https://support.microsoft.com/en-us/office/use-the-expression-builder-56214db9-8b54-44f3-bc19-2a55427b5d4c>

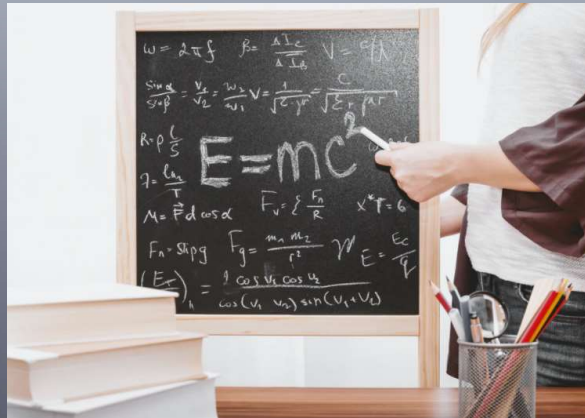
Objective 1:

Describe the purpose of criteria operators and expressions.



Objective 1: Describe the purpose of criteria operators and expressions.

What are Expressions/Criteria?



Let's start from scratch. The Microsoft Support Office details that "An expression is a combination of mathematical or logical operators, constants, functions, table fields, controls, and properties that evaluates to a single value. You can use expressions in Access® to calculate values, validate data, and set a default value."

"Examples of Query Criteria." Microsoft Support Office. Accessed December 2020.
<https://support.office.com/en-us/article/examples-of-query-criteria-3197228c-8684-4552-ac03-aba746fb29d8>

(image: Unsplash <https://unsplash.com/photos/5EKw8Z7CgE4>)

Purpose of Expressions/Criteria

- Minimize data storage and processing time
- Minimize data errors
- Validate data
- Set default values for mapping and analysis
- Analyze and count new fields
- Create keys for linking tables
- Optimize presentation
- Improve accuracy of data entry
- Create a database that has the capacity to answer many, many questions
- **Make your life EASIER!**
- **Dig deep into your data!**



What's the purpose of messing around with expressions and criteria operators?

- Minimize data storage and processing time
- Minimize data errors and validate data so that the analysis that you provide to your officers is accurate and timely
- Set default values for mapping and analysis
- Analyze and count new fields – maybe your data only has the date, but you are responsible for quarterly reports. Now you can tell your database to count those quarters for you!
- Create keys for linking tables – you can create opportunities to draw in additional data, such as pawns or probation or citations, thus generating a more comprehensive analysis
- Optimize presentation – if you're anything like me, you want to produce the most professional report in the least amount of time. Setting up expressions and criteria operators will give you the flexibility to do so
- Improve accuracy of data entry
- Create a database that has the capacity to answer many, many questions
- **Make your life EASIER!**
- **Dig deep into your data!**

We are just touching on a few today. For more exploration, challenge yourself with the expressions and functions provided on the handouts for this part.

POP UP QUESTION 1

True or False:

Expressions and Criteria are for developing quality tables.

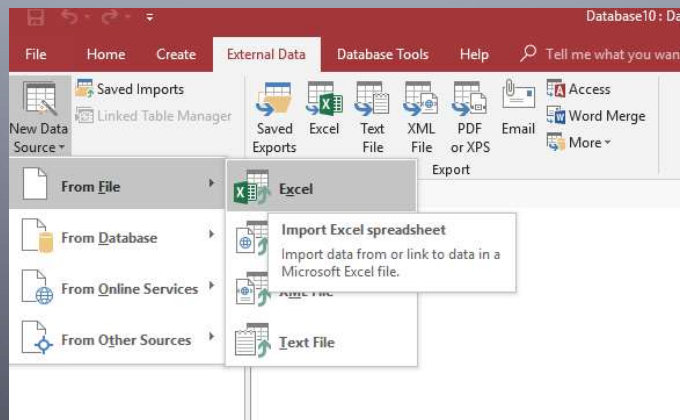


POP UP QUESTION 1: True or **False**

Expressions and Criteria are for developing quality tables. (answer: develop quality QUERIES)

Let's get started!

Import the file "Incidents"



Go ahead and import the file called "Incidents" from the training materials. If you're not quite sure how to import files, return to the earlier training segments for a step-by-step on how to import.

Take a look at your data

ID	IncNum	IncidentTyp	DateOfRepo	TimeOfRep	DateFrom	TimeFrom	DateTo	TimeTo	StNo	Street1	Street2	Area	PremisesTyp
1	2019-010115410	Alarm	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	250	Main St		2	Retail Store
2	2019-010115411	Medical	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	198	Haverhill St		3	Residence
3	2019-010115412	Alarm	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	254	Lowe St		3	Residence
4	2019-010115413	Dispute	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	182	Milhender Pl		3	Residence
5	2019-010115414	Prisoner Trans	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	140	Highgate St		5	Govt Building
6	2019-010115415	Service of Paper	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	200	Termine Ave		3	Residence
7	2019-010115416	Alarm	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	496	Broadway		4	Liquor Store
8	2019-010115417	Alarm	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	184	Agassiz Rd		1	Residence
9	2019-010115418	Medical	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	182	Willers St		4	Residence
10	2019-010115419	Larceny from P	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	640	Main St		2	Department
11	2019-010115420	Phone Calls	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	218	Charles St		2	Residence
12	2019-010115421	Traffic Complai	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	184	Lorraine Ter		3	Street
13	2019-010115422	Dispute	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	186	India Wharf		2	Residence
14	2019-010115423	Public Service	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	420	Mallon Rd		5	Govt Building
15	2019-010115424	Lost Property	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	280	Hillsboro Rd		5	Hotel/Motel
16	2019-010115425	MV Offenses	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	446	Addison St	Larose Pl	1	Street
17	2019-010115426	Medical	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	730	Main St		2	Hotel/Motel
18	2019-010115427	Noise Complai	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	580	Westcott St		5	Residence
19	2019-010115428	Assist Other Ag	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	384	Blanchard St		4	Hotel/Motel
20	2019-010115429	Directed Patro	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	214	Service Rd		2	Grocery
21	2019-010115430	Drunkenness	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	630	Blanchard St		4	Hotel/Motel
22	2019-010115431	Noise Complai	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	244	Florence Ave		2	Residence
23	2019-010115432	Medical	1/1/2019	12/30/1899	1/1/2019	12/30/1899	1/1/2019	12/30/1899	218	Potomac St		3	Residence

An excellent habit to get into is to first look at your imported data. Discover what fields are available, if you must make any format changes to the dataset... just get comfortable with your data.

In this case, we have fields for the incident number (our unduplicated field), the date of the incident, street number, street name (which are in two separate fields), area, premise type, and others. Notice that the time of report, time from, and time to fields don't look like time at all. They look like dates. In this case, we are going to have to format the times.

Go into your TABLE VIEW

Field Name	Data Type
ID	AutoNumber
IncNum	Short Text
IncidentType	Short Text
DateOfReport	Date/Time
TimeOfReport	Date/Time
DateFrom	Date/Time
TimeFrom	Date/Time
DateTo	Date/Time
TimeTo	Date/Time
StNo	Number
Street1	Short Text
Street2	Short Text
Area	Short Text
PremisesType	Short Text
Arrest	Yes/No
Domestic	Yes/No
Notes	Short Text

General Lookup	
Format	Long Time
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Indexed	No

We do this by going to the design view of the table and clicking on the time fields.

Down below you will see 'general' and 'format'. It's here that you can pull the drop-down arrow to select a different format based on your needs. In this case, we will select 'long time'. Save and view your new data.

View Data

TimeOfReport ▾
7:34:00 AM
7:42:00 AM
7:47:00 AM
8:14:00 AM
8:49:00 AM
9:31:00 AM



Now you should see the time in the correct format. You can do this for each of the time fields so that additional analysis can be performed. Setting up your table this way will allow you to determine what time most of your calls or crashes occur, the amount of time it takes to respond to a call, and so much more.

Objective 2:

Identify when to utilize criteria operators including exact matches, > <, between, Like *, Or, And, Not.



Objective 2: Identify when to utilize criteria operators including exact matches, > <, between, Like *, Or, And, Not.

Common Criteria Operators

- Exact matches – searches for specific fields
- > < -searches for fields above or below certain values
- Between – searches for fields between two values
- Like * - searches for texts with a wild card
- Or - searches for multiple values or combinations
- And - searches for more than one value
- Not - negates any of the above criteria; looks for opposite

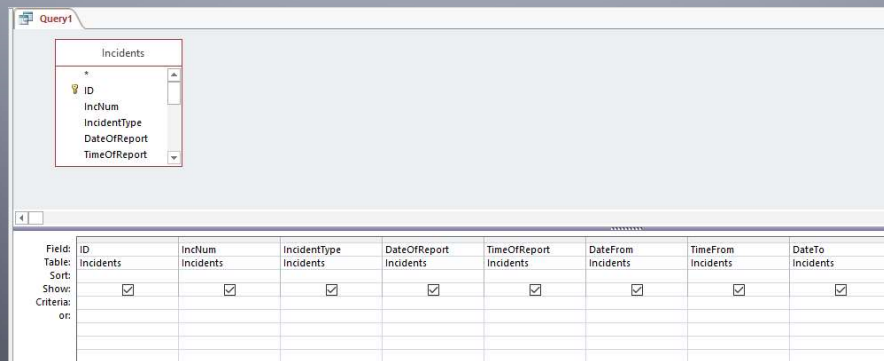


Next, we are going to go step-by-step through a series of helpful criteria. These can be used alone or in conjunction with each other to be even more sophisticated.

- Exact matches – searches for specific fields
- > < -searches for fields above or below certain values
- Between – searches for fields between two values
- Like * - searches for texts with a wild card
- Or - searches for multiple values or combinations
- And - searches for more than one value
- Not - negates any of the above criteria; looks for opposite

Common Criteria Operators

Start a new query



Go ahead and open a new query. Pull in your table called “Incidents” and draw down all the fields in the table. Again, if you are feeling hung up, be sure to go back to the earlier segments for more details on the basics.

Common Criteria Operators

Exact matches – searches for specific fields

Field:	ID	IncNum	IncidentType	DateOfReport
Table:	Incidents	Incidents	Incidents	Incidents
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:				#1/1/2019#
or:				

One criteria operator is exact matches. We use this criterion when we want to pull in a specific field. For instance, we can pull all tiger tattoos or all crime that occurred on a certain date or all burglaries. We can also use the exact match operator to pull a specific incident or crash report.

Now we have already looked at our data. We know we have a field called “DateOfReport” that contains the actual date of the report. Let’s say that we wanted to know all crimes that occurred on January 1, 2019. We simply instruct the database to return all incidents that occurred on this date by putting this date in the criteria under that exact field called “DateOfReport”. Access® is relatively intelligent. You can simply type in “1/1/19” and it will know to place the pound signs before and after – it recognizes it is a date.

Common Criteria Operators

Exact matches – searches for specific fields

IncNum	IncidentType	DateOfRepo	TimeOfReport
2019-010115410	Alarm	1/1/2019	7:34:00 AM
2019-010115411	Medical	1/1/2019	7:42:00 AM
2019-010115412	Alarm	1/1/2019	7:47:00 AM
2019-010115413	Dispute	1/1/2019	8:14:00 AM
2019-010115414	Prisoner Transp	1/1/2019	8:49:00 AM
2019-010115415	Service of Paper	1/1/2019	9:31:00 AM
2019-010115416	Alarm	1/1/2019	10:04:00 AM
2019-010115417	Alarm	1/1/2019	10:11:00 AM



Go ahead and run. Voila! Your incidents that occurred only on 1/1/19 are now in your dataset. Notice below there are now 125 records. This means that there were 125 incidents that occurred on 1/1/19 in your dataset. You can do this for one single field, or you can apply multiple exact match criterion – burglaries on 1/1/19 at residences on Main Street. The possibilities are endless!

Common Criteria Operators

> < -searches for fields above or below certain values

The screenshot shows a search interface for 'Incidents'. A list of fields is displayed in a scrollable box, including ID, IncNum, IncidentType, DateOfReport, TimeOfReport, DateFrom, TimeFrom, and DateTo. Below this, a criteria table is shown with columns for Field, Table, Sort, Show, and Criteria. The criteria table has four columns corresponding to the fields: ID, IncNum, IncidentType, and DateOfReport. The criteria for each field are: ID (checked), IncNum (checked), IncidentType ("Alarm" with a checkmark), and DateOfReport (>#1/1/2019# with a checkmark).

Field:	ID	IncNum	IncidentType	DateOfReport
Table:	Incidents	Incidents	Incidents	Incidents
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:			"Alarm"	>#1/1/2019#
or:				

On to more excitement! Next, we are going to explore greater than and less than operators. These operators search for fields above or below certain values. In this case, we are looking for alarm calls that occurred after 1/1/19.

Common Criteria Operators

> < -searches for fields above or below certain values

IncNum	IncidentType	DateOfRepo
2019-010215454	Alarm	1/2/2019
2019-010215455	Alarm	1/2/2019
2019-010215456	Alarm	1/2/2019
2019-010215459	Alarm	1/2/2019
2019-010215461	Alarm	1/2/2019
2019-010215470	Alarm	1/2/2019
2019-010233674	Alarm	1/2/2019
2019-010233675	Alarm	1/2/2019



Go ahead and run. There it is. All alarm calls that occurred after 1/1/19.

Common Criteria Operators

Between – searches for fields between two values

IncidentType	DateOfReport
Incidents	Incidents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
"Alarm"	Between #1/15/2019# And #1/31/2019#



Let's say you want to explore records that fit between multiple fields. Using the between criteria helps you find street names that begin with the letters between A through C or property value between \$251 and \$500. In this case, we want to know the alarm calls that occurred between 1/15/19 and 1/31/19. In the criteria we are going to use the "between" and the first date "and" and then the second date. Access® will add the ampersands, or if you're feeling energized you can plug them in yourself.

Common Criteria Operators

Between – searches for fields between two values

IncNum	IncidentType	DateOfRepo	TimeOfReport
2019-011515830	Alarm	1/15/2019	6:20:00 PM
2019-011534303	Alarm	1/15/2019	2:38:00 AM
2019-011553089	Alarm	1/15/2019	1:11:00 AM
2019-011553096	Alarm	1/15/2019	2:55:00 AM
2019-011553099	Alarm	1/15/2019	7:04:00 AM
2019-011553105	Alarm	1/15/2019	12:15:00 PM
2019-011553123	Alarm	1/15/2019	8:02:00 PM



Run and there it is! All alarm calls between 1/15/19 and 1/31/19. You can use this for a weekly analysis, maybe a CompStat or Commissioner meeting, or maybe to further analyze for patterns and trends.

Common Criteria Operators

Like * - searches for texts with a wild card

IncidentType	DateOfReport
Incidents	Incidents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Like "Traffic*"	Between #1/15/2019# And #1/31/2019#



This next one is a life saver! The asterisks can help you find records that contain the text. If you place the asterisks before the text (*DAWN), it will return any records that end with DAWN. If you place the asterisks after the text (DAWN*), it will return any records that begin with DAWN. Let's put this into action. Let's leave the date parameters in there and delete "alarms". Let's say we want to know all the traffic activity that also occurred within that time period. We have multiple ways of coding for traffic (traffic complaints and traffic enforcement), and we want them both. You can simply write "traffic*" in the criteria to return any records that begin with "traffic".

Common Criteria Operators

Like * - searches for texts with a wild card

IncNum	IncidentType	DateOfRepo
2019-011515801	Traffic Complaint	1/15/2019
2019-011515816	Traffic Enforcement	1/15/2019
2019-011616179	Traffic Complaint	1/16/2019
2019-011634352	Traffic Complaint	1/16/2019
2019-011634354	Traffic Complaint	1/16/2019
2019-011634358	Traffic Complaint	1/16/2019



As you can see, the return represents all traffic enforcement and all traffic complaints that occurred within the time frame provided.

Common Criteria Operators

Or - searches for multiple values or combinations

IncidentType	DateOfReport
Incidents	Incidents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
"Traffic Complaint" Or "Traffic Enforcement"	Between #1/15/2019# And #1/31/2019#



On to “or” criteria. Another way to pull all traffic enforcement and all traffic complaints is to set the criteria up to say that this field must equal "traffic enforcement or traffic complaints". This tells Access® to return records where the field equals “traffic enforcement” or the field equals “traffic complaints”. Be sure to write in the EXACT field name or use the wild card, otherwise your return will miss the information you desire.

Common Criteria Operators

Or - searches for multiple values or combinations

IncidentType ▾	DateOfRepo ▾
Traffic Complaint	1/15/2019
Traffic Enforcement	1/15/2019
Traffic Complaint	1/16/2019
Traffic Complaint	1/16/2019
Traffic Complaint	1/16/2019
Traffic Complaint	1/16/2019



Traffic Complaints and Traffic Enforcements within the selected time criteria.

Common Criteria Operators

And - searches for more than one value

IncidentType	DateOfReport
Incidents	Incidents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
"Traffic Complaint" And "Traffic Enforcement"	Between #1/15/2019# And #1/31/2019#



The “And” criteria can be very helpful – as in our date between date 1 and date 2. However, if you add an “And” criteria to Traffic Complaints and Traffic Enforcement, you’re asking Access® to return where the record is BOTH Traffic Complaints and Traffic Enforcement – as if there was one category that contained the two.

Common Criteria Operators

And - searches for more than one value

ID	IncidentType	DateOfReport
(New)		



Your return will be empty as there are no fields that contain BOTH Traffic Complaints and Traffic Enforcement. Instead, you can use the “and” for instances where both criteria exist. For example, if it were a Name field, you may ask where the Name field starts with a J (J*) and ends with “a” (*a). This way you get all of the fields that match both criteria: Juanita, Juana, Julia, Juliana, etc.

J* And *A

Common Criteria Operators

Not - negates any of the above criteria; looks for opposite

IncidentType	DateOfReport
Incidents	Incidents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Not Like `complaints`	Between #1/15/2019# And #1/31/2019#



“Not”

Let's say you want to pull up all crimes that occurred within the time period, but you didn't want a certain field included – say complaints. You can use the “Not” criteria operator. In this case, you would indicate “Not *complaint”. There were multiple complaints in the file – youth complaints, noise complaints, etc. By placing the asterisks in front of the word “complaints”, you are indicating that you do not want any fields that end with the word “complaints”. This will remove all records that have the word “complaints” at the end of the field. And remember, Access® adds the “like” so you don't have to.

Common Criteria Operators

Not - negates any of the above criteria; looks for opposite

IncNum	IncidentType	DateOfRepo
2019-011515795	Directed Patrol	1/15/2019
2019-011515796	Road Conditions	1/15/2019
2019-011515797	Directed Patrol	1/15/2019
2019-011515798	MV Accident	1/15/2019
2019-011515799	MV Accident	1/15/2019
2019-011515800	Medical	1/15/2019
2019-011515801	Traffic Complaint	1/15/2019



Your return – all incidents minus those that had the word “complaints” at the end of the field.

POP UP QUESTION 2

True or False:

```
SELECT *  
FROM [Users]  
WHERE [Clue] > 0  
No records found.
```



POP UP QUESTION 2: True or **False**

Just a little joke! Select a wild card from the “Users” field where the “Clue” field is greater than zero – yields no records found.

Objective 3:

Rename an existing field.



Objective 3: Rename an existing field.

Making Analytics Easier with Expressions

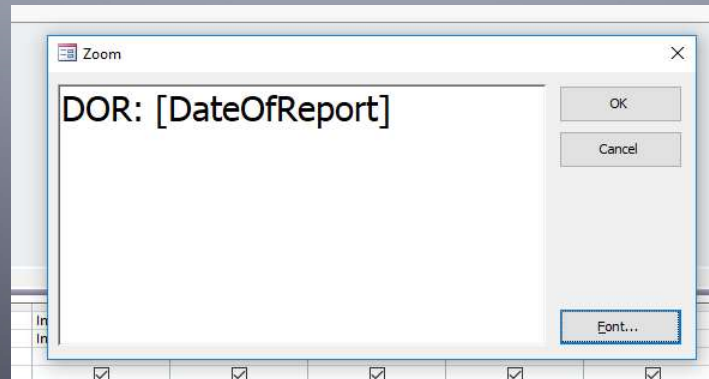
RENAMING EXISTING FIELDS



Now we are going to further explore “Making Analytics Easier with Expressions” as we switch gears from selecting out criteria to actually creating new fields using expressions.

Rename Existing Fields

Create a new field. Select
Zoom




Let's say we don't like the name of our query field "DateOfReport" and want to change it to "DOR" without changing any of the data that it stores. The easiest way to do that is to create a new field. You do so by clicking in a blank field space. Scrolling to the far right of your query in design view will open some empty fields. Then type in:

DOR: [DateOfReport]

The name of the new field we want is first "DOR". Then colon. Then we must point to the data by placing brackets around the field that we want to draw in.

Rename Existing Fields

Output



DOR ▾	DateofRepo ▾
1/15/2019	1/15/2019
1/15/2019	1/15/2019
1/15/2019	1/15/2019
1/15/2019	1/15/2019
1/15/2019	1/15/2019



The output is the new field with the same data as in the selected field. Nothing else happens to the selected field.

Objective 4:

Calculate dates for analysis and reporting.



Objective 4: Calculate dates for analysis and reporting.

Calculating Dates for Analysis

FORMAT FUNCTIONS



Moving on to FORMAT FUNCTIONS. Calculating Dates for Analysis

Calculating Dates for Analysis

FORMAT FUNCTION to calculate Year (design)



Let's start with a FORMAT FUNCTION to calculate Year. Here in the design view, click on a new empty field, zoom in, and type:

“YEAR:” = Everything before the colon represents the name of the new field. Everything after the colon represents the expression.

Next, type “Year” = this is the year function in Access®. This automatically tells Access® to draw out the year in a date field.

Next, start your parentheses. Anything within the parenthesis will be executed by the year function.

Inside the parenthesis, place the name of the field. In this case “DateOfReport”. One of the key basic tips to remember is that all field names **MUST go in brackets**. This tells Access® that it is about to be pointed to a field from which to draw the data. Brackets directly surrounding the date field, and parenthesis surrounding everything we want the Year function to execute.

***Year: Year([DateOfReport])**

Calculating Dates for Analysis

FORMAT FUNCTION to calculate YEAR (output)

DOR	DateofRepo	Year
1/1/2019	1/1/2019	2019
1/1/2019	1/1/2019	2019
1/1/2019	1/1/2019	2019
1/1/2019	1/1/2019	2019
1/1/2019	1/1/2019	2019
1/1/2019	1/1/2019	2019
1/1/2019	1/1/2019	2019
1/1/2019	1/1/2019	2019
1/1/2019	1/1/2019	2019



The output or result is the year in the form of 4 numbers – 2019.

Calculating Dates for Analysis

FORMAT FUNCTION to calculate MONTH (design)



We can do the same thing for month. Here in the design view, click on a new empty field, zoom in, and type:

“Month:” = Everything before the colon represents the name of the new field. Everything after the colon represents the expression.

Next, type “Month” = this is the year function in Access®. This automatically tells Access® to draw out the month in a date field.

Next, start your parentheses. Anything within the parenthesis will be executed by the Month function.

Inside the parenthesis, place the name of the field. In this case “DateOfReport”. Again, a key basic tip to remember is that all field names MUST go in brackets. This tells Access® that it is about to be pointed to a field. Brackets directly surrounding the date field, and parenthesis surrounding everything we want the Month function to execute.

Month: Month([DateOfReport])

Calculating Dates for Analysis

FORMAT FUNCTION to calculate MONTH (output)

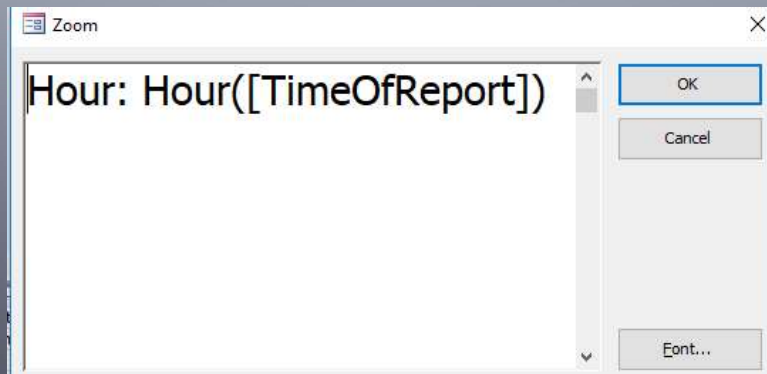
DOR	DateofRepo	Year	Month
1/1/2019	1/1/2019	2019	1
1/1/2019	1/1/2019	2019	1
1/1/2019	1/1/2019	2019	1
1/1/2019	1/1/2019	2019	1
1/1/2019	1/1/2019	2019	1
1/1/2019	1/1/2019	2019	1
1/1/2019	1/1/2019	2019	1
1/1/2019	1/1/2019	2019	1
1/1/2019	1/1/2019	2019	1
1/1/2019	1/1/2019	2019	1



The output or result is the month in numeric form.

Calculating Dates for Analysis

FORMAT FUNCTION to calculate HOUR (design)



We can do the same thing for hour. Here in the design view, click on a new empty field, zoom in, and type:

“Hour:” = Everything before the colon represents the name of the new field. Everything after the colon represents the expression.

Next, type “Hour” = this is the year function in Access®. This automatically tells Access® to draw out the hour in a date field.

Next, start your parentheses. Anything within the parenthesis will be executed by the Hour function.

Inside the parenthesis, place the name of the field. In this case “TimeOfReport”. Again, a key basic tip to remember is that all field names MUST go in brackets. This tells Access® that it is about to be pointed to a field. Brackets directly surrounding the date field, and parenthesis surrounding everything we want the Hour function to execute.

Hour: Hour([TimeOfReport])

Calculating Dates for Analysis

FORMAT FUNCTION to calculate HOUR (output)

Year	Month	TimeOfReport	Hour
2019	1	7:34:00 AM	7
2019	1	7:42:00 AM	7
2019	1	7:47:00 AM	7
2019	1	8:14:00 AM	8
2019	1	8:49:00 AM	8
2019	1	9:31:00 AM	9
2019	1	10:04:00 AM	10
2019	1	10:11:00 AM	10
2019	1	10:30:00 AM	10
2019	1	12:29:00 PM	12
2019	1	2:04:00 PM	14
2019	1	2:06:00 PM	14



The output or result is the hour that the call occurred. Now you can analyze the days of week crimes or crashes are occurring by hour – on specific days, what times are most active?

Calculating Dates for Analysis

STRING FUNCTIONS



There's another way to calculate dates in Access® using STRING FUNCTIONS.

Calculating Dates for Analysis

String Functions to calculate YEAR (design)

"yy"

```
*YEAR:  
Format([DateOfReport],"yy")
```

"yyyy"

```
**YEAR:  
Format([DateOfReport],"yyyy")
```



This is a string function to calculate year.

First, name your new field. Since we already have a field named “Year”, let’s call this one “*Year:”. It really doesn’t matter – this part is up to you!

Now to use the string format. Type in “Format” to the right of the colon. This is telling Access® that we are about to put something in parenthesis that we want it to execute using the format function.

Now for what’s in parenthesis. We start with the field name “DateOfReport”. Of course, we already learned that all field names go in brackets, so go ahead and plug in your brackets around your “DateOfReprt”. The Format function needs to know what we want to draw out from that field in brackets. In this case we want the year. There are several was to draw out year, depending on what you need. Play around here – try “yy” and then try “yyyy” and see the results.

The “yy” format will give you a two-digit year. So 2004 will be formatted to “04”. If you prefer a four-digit return, the “yyyy” will do just that.

***Year: Format([DateOfReport], “yy”)**
****Year: Format([DateOfReport], “yyyy”)**

Calculating Dates for Analysis

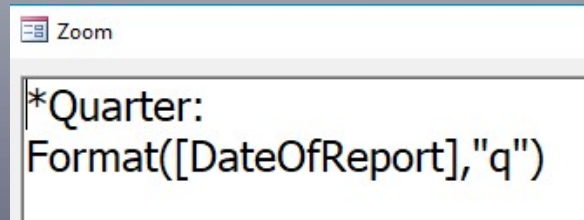
String Functions to calculate YEAR (output)

"yy"		"yyyy"	
DateofRepo	*Year	DateofRepo	**Year
1/1/2019	19	1/1/2019	2019
1/1/2019	19	1/1/2019	2019
1/1/2019	19	1/1/2019	2019
1/1/2019	19	1/1/2019	2019
1/1/2019	19	1/1/2019	2019
1/1/2019	19	1/1/2019	2019
1/1/2019	19	1/1/2019	2019
1/1/2019	19	1/1/2019	2019
1/1/2019	19	1/1/2019	2019



Calculating Dates for Analysis

String Functions to calculate QUARTER (design)



```
*Quarter:  
Format([DateOfReport], "q")
```



You can use the string function to create a “quarter” field. This can be very helpful later on when you want to aggregate your data by quarter or analyze data from year to year by quarter.

***Quarter: Format([DateOfReport], “q”)**

Calculating Dates for Analysis

String Functions to calculate QUARTER (output)

DateofRepo ▾	*Quarter ▾
1/1/2019	1
1/1/2019	1
1/1/2019	1
1/1/2019	1
1/1/2019	1
1/1/2019	1



The output will be the quarter noted in single digits.

Calculating Dates for Analysis

String Functions to calculate MONTH (design)

"MMM"

```
Zoom  
*Month:  
Format([DateOfReport], "mmm")
```

"MMMM"

```
Zoom  
*Month:  
Format([DateOfReport], "mmm")
```



Let's try using the string function to calculate month.

***Month: Format([DateOfReport], "mm")**

***Month: Format([DateOfReport], "mmm")**

Calculating Dates for Analysis

String Functions to calculate MONTH (output)

"MMM"		"MMMM"	
DateofRepo	*Month	DateofRepo	**Month
1/1/2019	Jan	1/1/2019	January
1/1/2019	Jan	1/1/2019	January
1/1/2019	Jan	1/1/2019	January
1/1/2019	Jan	1/1/2019	January
1/1/2019	Jan	1/1/2019	January
1/1/2019	Jan	1/1/2019	January
1/1/2019	Jan	1/1/2019	January



The "mmm" will result in an abbreviated month and "MMMM" will result in the complete month name spelled out. This is all about personal preference.

Calculating Dates for Analysis

String Functions to calculate DAY OF WEEK (design)

"ddd"

```
Zoom
*DOW:
Format([DateOfReport],"ddd")
```

"dddd"

```
Zoom
*DOW:
Format([DateOfReport],"dddd")
```



We can do this for day of week as well.

***DOW: Format([DateOfReport], "ddd")**

***DOW: Format([DateOfReport], "dddd")**

Calculating Dates for Analysis

String Functions to calculate DAY OF WEEK (output)

"ddd"

DateofRepo	*DOW
1/1/2019	Tue
1/1/2019	Tue
1/1/2019	Tue
1/1/2019	Tue
1/1/2019	Tue
1/1/2019	Tue
1/1/2019	Tue
1/1/2019	Tue

"dddd"

DateofRepo	**DOW
1/1/2019	Tuesday
1/1/2019	Tuesday
1/1/2019	Tuesday
1/1/2019	Tuesday
1/1/2019	Tuesday
1/1/2019	Tuesday
1/1/2019	Tuesday
1/1/2019	Tuesday



Similar to month, "ddd" will result in an abbreviated day of week and "dddd" will result in the complete day of week spelled out. You can then use these new fields to set up crosstabs (to be discussed more in Part 8).

POP UP QUESTION 3

True or False:

There are multiple ways to write expressions with similar output.



POP UP QUESTION 3: **True** or False:

There are multiple ways to write expressions with similar output.

Objective 5:

Concatenate fields for further analysis/mapping.



Objective 5: Concatenate fields for further analysis/mapping.

Concatenate (aka smush together)

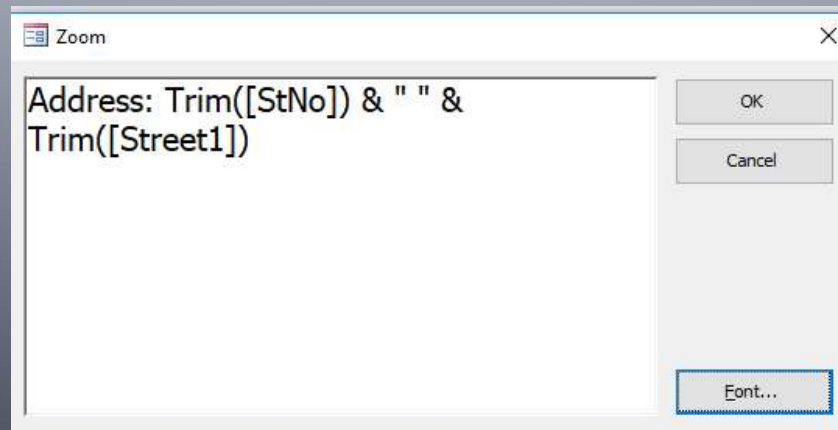
Address

StNo	Street1
214	Service Rd
182	Wilcutt Rd
300	Milhender Pl
680	Westcott St
89	Pearl Pl
226	Tuckerman St
360	Parker Hill Ave
378	Matchett St
300	Milhender Pl
300	Milhender Pl



Concatenate basically means to squish fields together into one field. For instance, let's say you want to map all of your crimes. Your mapping software will only put the dots on the map if it has the address in one field, but your street number and street name are in two different fields. You can use this tool to combine the two fields.

Concatenate (aka smush together)



Just like before, we name our new field and add a colon. Then we use "Trim".

Address: Trim([StNo]) & " " & Trim([Street1])

Concatenate (aka smush together)

StNo	Street1	Address
214	Service Rd	214 Service Rd
182	Wilcutt Rd	182 Wilcutt Rd
300	Milhender Pl	300 Milhender Pl
680	Westcott St	680 Westcott St
89	Pearl Pl	89 Pearl Pl
226	Tuckerman St	226 Tuckerman St
360	Parker Hill Ave	360 Parker Hill Ave



The result is a completed address. See the space between street number and street name? Looks a lot better than with no space (TRIM function).

POP UP QUESTION 4

True or False:

Concatenate means to
abbreviate street names



POP UP QUESTION 4: True or **False**

Concatenate means to abbreviate street names. (*False. Concatenate means to combine two or more fields into one.*)

Summary of Part 7 “Making Analytics Easier with Expressions” Objectives

1. Describe the purpose of criteria operators and expressions.
2. Identify when to utilize criteria operators including exact matches, > <, between, Like *, Or, And, Not.
3. Rename an existing field.
4. Calculate dates for analysis and reporting.
5. Concatenate fields for further analysis/mapping.



Summary

Objectives for this course were that the participant would be able execute a minimum of 10 common expressions/criteria functions. Specifically:

1. Describe the purpose of criteria operators and expressions.
2. Identify when to utilize criteria operators including exact matches, > <, between, Like *, Or, And, Not.
3. Rename an existing field.
4. Calculate dates for analysis and reporting.
5. Concatenate fields for further analysis/mapping.

DDACTS Project

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Part 8: How to Identify “Top” Locations, Offenders, and More with Queries

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Part 8: How to Identify “Top” Locations, Offenders, and More (Select Queries, Complex Queries, Aggregation Queries; Crosstab Queries) - Every analyst wants a quick and efficient way to identify the top crash or crime locations during a specific season, to identify the "heavy hitters" taking up the most police time, to create yearly comparisons and monthly reports, and to identify deployment strategies in the hot spot zones that send officers where they need to go exactly when they need to be there (day of week and time of that day). This webinar focuses on smarter policing that maximizes our resources through "top" analytics.

Introductions: Dawn Reeby



Dawn Reeby

Objectives

1. Build simple select queries.
2. Build complex queries.
3. Build aggregation queries.
4. Build crosstab queries.

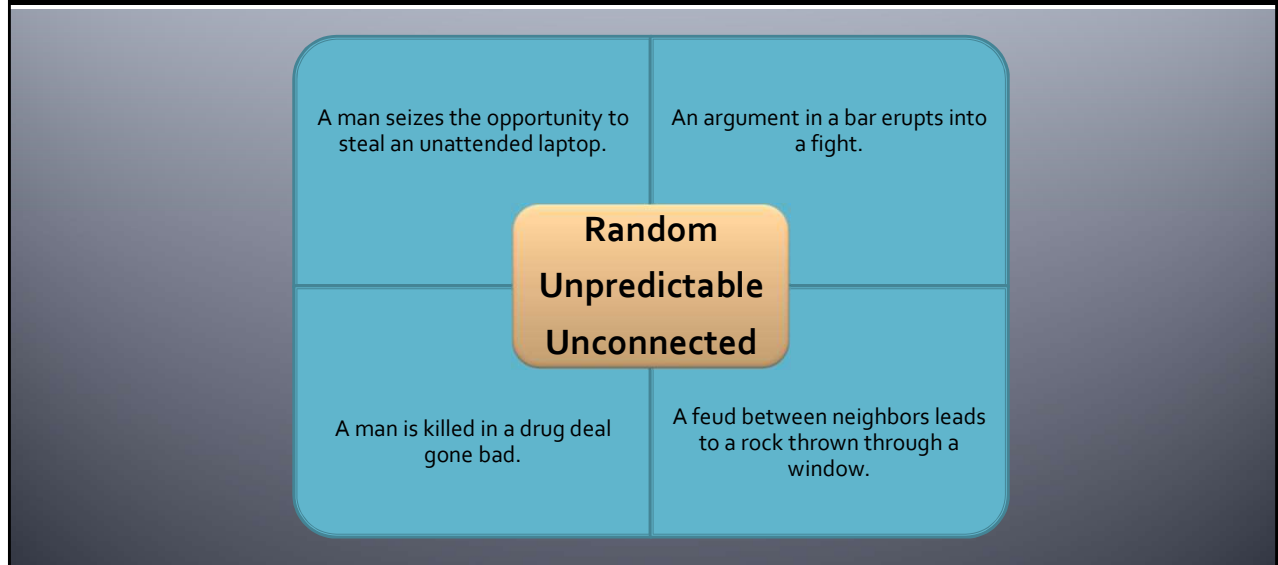
Objectives

Use the sample data provided, the participant to demonstrate three methods of querying data in Microsoft Access.

Specifically, students will:

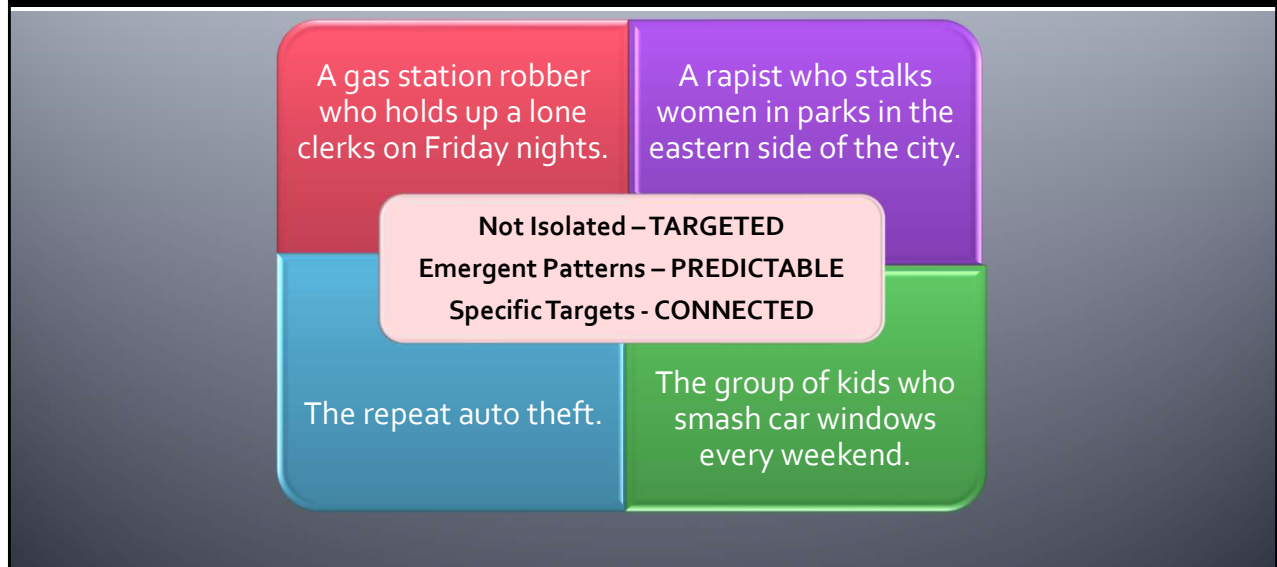
1. Build simple select queries in Microsoft Access®.
2. Build complex queries in Microsoft Access®.
3. Build aggregation queries in Microsoft Access®.
4. Build crosstab queries in Microsoft Access®.

Most Crime Is...



Most crime is random, unpredictable, and unconnected. For example, a man seizes the opportunity to steal an unattended laptop. Or an argument erupts into a fight at a bar. Maybe a man is killed during a bad drug deal. These types of crimes can be addressed using traditional police response.

But SOME Crime is...



However, some crime is targeted, predictable, and connected. For instance, a group of kids smash car windows every single weekend. Or the repeat auto thief strikes again. Maybe a string of gas stations manned by a lone clerk are held up on Friday nights regularly. These are not isolated crimes. They are emergent patterns. They have specific targets. THESE are the types of crimes that crime analysis can play a very large role in suspect identification and strategy response.

What does this really say?

Calls for Service by Year



How can we use this information to drive strategies?

- What are the Call trends? What are officers spending their time on?
- Are proactive CAD #s up or down?
- Is the department more reactive? Going from call to call?
- Are there repeat people? Repeat locations? Any hotspots? Predictions?
- Does enforcement align with the hotspots?

Far too often we see analysts just kick out a bunch of numbers. But what is this really saying?

- What are the Call trends? What are officers spending their time on?
- Are proactive CAD #s up or down?
- Is the department more reactive? Going from call to call?
- Are there repeat people? Repeat locations? Any hotspots? Predictions?
- Does enforcement align with the hotspots?

Numbers are just not enough! We need to dig deeper.

Just numbers



Many departments just look at numbers. They set a goal based off the total – such as this chart. They may see that collisions are around 275 and make an arbitrary goal to reduce collisions to 160.

I encourage you to look at this differently. For instance, take this chart. Analysis breaks down the collision count into chunks: Drivers texting and emailing during the commute; there's a hotspot at an entrance to a major shopping center; there's a pattern of illegal U-turns at a new construction site; repeat offender Brett runs an illegal drag racing club; there's a chronic problem of teenagers speeding upon leaving high school; there's a poorly configured freeway causing problems... and then we are left with the random collisions.

Now we can develop individual strategies that make the most sense for each of the problems identified. We can be more strategic and more efficient with our officer time, which translates into maximized resources and properly set goals.

Objective 1

Build simple select queries.

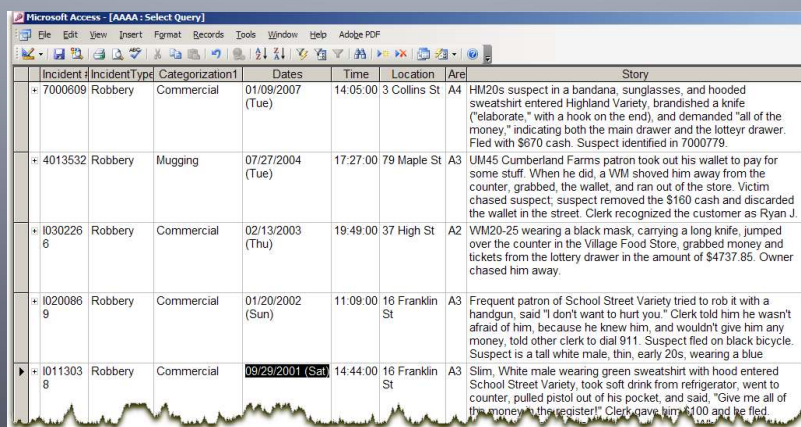
OBJECTIVE 1: Build simple select queries in Microsoft Access®. Simple select queries gives the ability to gain insight about data using simple questions.

Simple Select Queries



For instance, a map like this that details the locations of all the bank robberies in a series is generated by using simple select queries. We may use Microsoft Access to return all the bank robberies within a given time period along with their addresses. Then add the data to a GIS tool for mapping.

Simple Select Queries



The screenshot shows a Microsoft Access window titled "Microsoft Access - [AAAA: Select Query]". The window displays a table with the following columns: Incident, IncidentType, Categorization1, Dates, Time, Location, Area, and Story. The table contains five rows of robbery incidents.

Incident	IncidentType	Categorization1	Dates	Time	Location	Area	Story
+ 7000609	Robbery	Commercial	01/09/2007 (Tue)	14:05:00	3 Collins St	A4	HM20s suspect in a bandana, sunglasses, and hooded sweatshirt entered Highland Variety, brandished a knife ("elaborate," with a hook on the end), and demanded "all of the money," indicating both the main drawer and the lottery drawer. Fled with \$670 cash. Suspect identified in 7000779.
+ 4013532	Robbery	Mugging	07/27/2004 (Tue)	17:27:00	79 Maple St	A3	UM45 Cumberland Farms patron took out his wallet to pay for some stuff. When he did, a WM shoved him away from the counter, grabbed the wallet, and ran out of the store. Victim chased suspect; suspect removed the \$160 cash and discarded the wallet in the street. Clerk recognized the customer as Ryan J.
+ 10302266	Robbery	Commercial	02/13/2003 (Thu)	19:49:00	37 High St	A2	WM20-25 wearing a black mask, carrying a long knife, jumped over the counter in the Village Food Store, grabbed money and tickets from the lottery drawer in the amount of \$4737.85. Owner chased him away.
+ 10200869	Robbery	Commercial	01/20/2002 (Sun)	11:09:00	16 Franklin St	A3	Frequent patron of School Street Variety tried to rob it with a handgun, said "I don't want to hurt you." Clerk told him he wasn't afraid of him, because he knew him, and wouldn't give him any money, told other clerk to dial 911. Suspect fled on black bicycle. Suspect is a tall white male, thin, early 20s, wearing a blue
+ 10113038	Robbery	Commercial	09/29/2001 (Sat)	14:44:00	16 Franklin St	A3	Slim, White male wearing green sweatshirt with hood entered School Street Variety, took soft drink from refrigerator, went to counter, pulled pistol out of his pocket, and said, "Give me all of the money in the register!" Clerk gave him \$100 and he fled.

Or you can use a simple select query to easily draw out data from a database. In this case, we can easily extract all robberies (displayed in our map a moment earlier) for easy dissemination of the details to patrol, detectives, or even other agencies.

Your turn!

**OPEN
MICROSOFT
ACCESS FOR
Simple Querying**

We are going to dive into SIMPLE QUERIES which allow us to ask simple questions. Go ahead and open a blank database in Microsoft Access®. Import the “Incidents” file that is included in the class material. Head on over to the QUERY section.

For more on Simple Select Querying, see:

“Simple Select Querying.” Microsoft Office Online Support. Accessed December 2020.
<https://support.office.com/en-us/article/create-a-simple-select-query-de8b1c8d-14e9-4b25-8e22-70888d54de59>

Simple Select Queries

Design

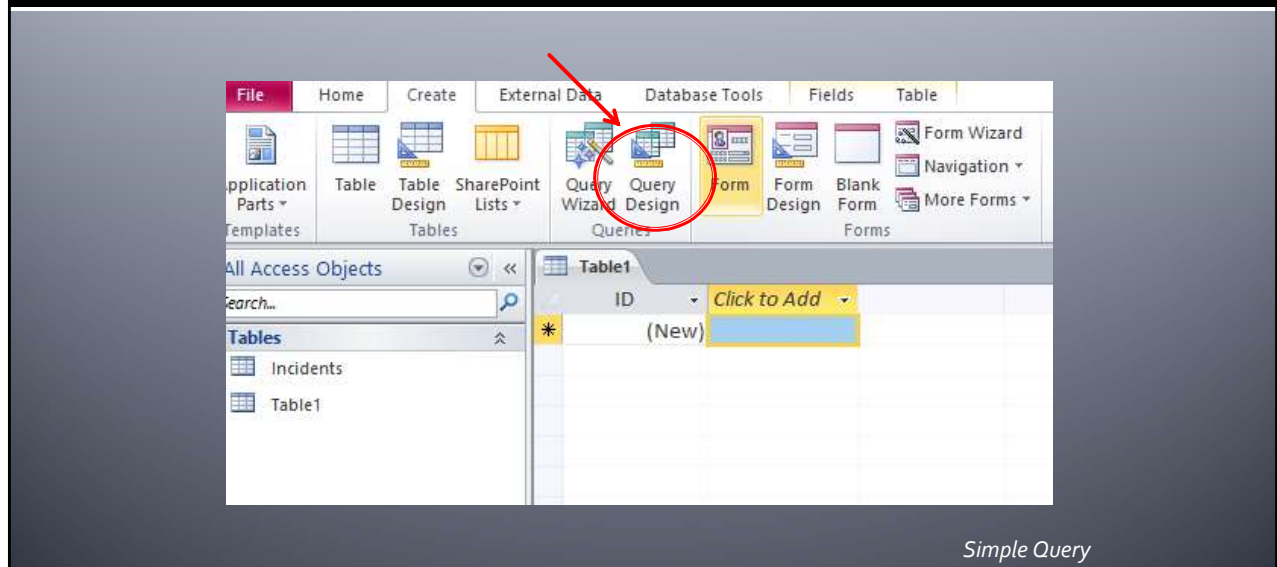
Field:	DispatchType	IncNum	LocationType
Table:	Incidents	Incidents	Incidents
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:			"HOTEL/MOTEL"
or:			

Output

DispatchType	IncNum
Lost Property	2019-010115424
Medical	2019-010115426
Assist Other Agency	2019-010115428
Drunkenness	2019-010115430
Noise Complaints	2019-010115435
Dispute	2019-010133632
Drugs	2019-010133644
Traffic Complaint	2019-010215485
Check Well Being	2019-010233712

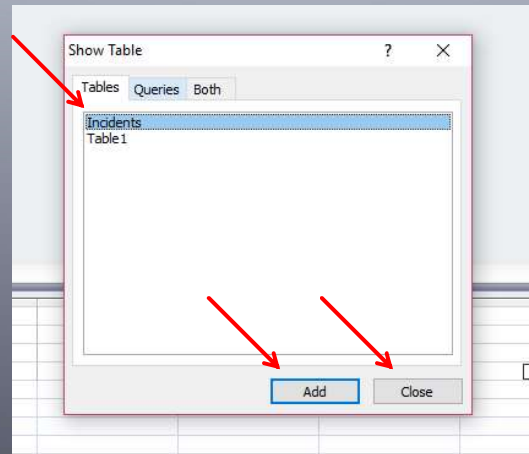
All queries have a design view and an output view. The design view is where you ask questions of the data. The output view is where you see the results of the questions.

Simple Select Queries: Example



We are now going to create a simple select query. Under “create”, find “query design”. You could use the wizard here. But honestly, it’s easy enough to just do it manually.

Simple Select Queries: Example



Simple Query

Next, you will choose the table or query (or combination of multiple tables or queries) to use to design your query. In this case, select “Incidents”, “add”, and then “Close”. You have successfully added the table “Incidents” to your query.

Simple Select Queries: Example

The screenshot shows the Microsoft Access interface in Design view for a query named 'Query1'. The ribbon is set to 'Design', and the 'Run' button is highlighted with a red arrow. The 'All Access Objects' pane on the left shows the 'Incidents' table selected. The design grid below shows the 'Incidents' table selected for all fields. The 'Criteria' section is empty.

Field:	InclNum	DispatchType	DateOfReport	StNo	Street1	LocationType	Area
Table:	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents
Sort:							
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:							
or:							

Simple Query

Draw in the fields for which you want your records to display simply but grabbing and dragging to the criteria section. Click “View” to view your results.

Simple Select Queries: Example

The screenshot shows the Microsoft Access interface with a simple select query named 'Query1' displayed in Datasheet View. A red arrow points to the 'View' button in the ribbon. The query results table is as follows:

IncNum	DispatchType	DateOfReport	StNo	Street1	LocationType	Area
2019-030100296	Lost Property	3/1/2019	380	Main St	Retail Store	2
2019-030100297	MV Offenses	3/1/2019	36	New Haven St	Street	3
2019-030100298	Directed Patrol	3/1/2019	300	Milhender Pl	School	5
2019-030100299	Traffic Complaint	3/1/2019		Hooten Ct	Street	2
2019-030100300	Disabled MV	3/1/2019	146	Douglas St	Street	4
2019-030100301	Shoplifting	3/1/2019	364	Blanchard St	Department Store	4
2019-030100302	Traffic Enforcement	3/1/2019	458	Rutledge St	Street	5
2019-030100303	Directed Patrol	3/1/2019	380	Main St	Retail Store	2
2019-030100304	Suspicious Activity	3/1/2019	208	Charles St	Residence	2
2019-030100305	Phone Calls	3/1/2019	186	St Brendan Rd	Residence	3
2019-030100306	Dispute	3/1/2019	258	Ruskin Rd	Residence	4
2019-030100307	Prisoner Transport	3/1/2019	9	Highgate St	Govt Building	5
2019-030100308	Alarm	3/1/2019	550	Douglas St	Office	4
2019-030100309	Shoplifting	3/1/2019	420	Broadway	Retail Store	4

Simple Query

In this case, you are looking at all records in your “Incident” file. It’s important to understand exactly what is in your data set as perfect spelling is key! Now you can click back into the design view so that we can begin to ask questions.

Simple Select Queries: Example

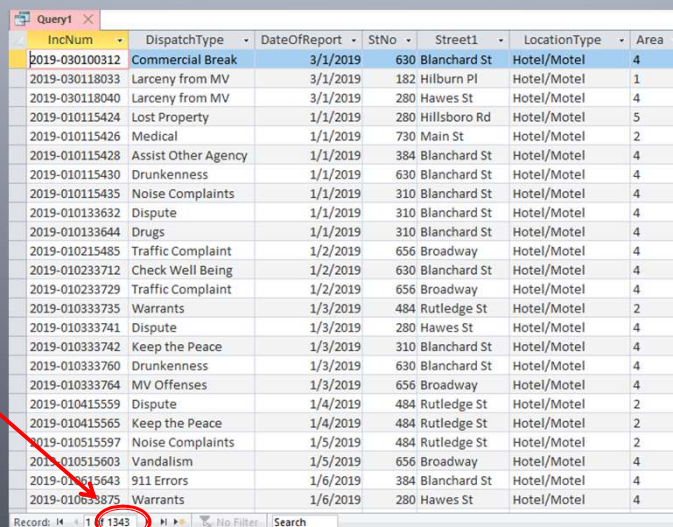
The screenshot shows the Microsoft Access interface. The ribbon is set to 'Design'. The 'View' button in the 'Results' group is highlighted with a red arrow. The 'All Access Objects' pane on the left shows the 'Incidents' table selected. The 'Query1' design grid is visible, showing the 'LocationType' field with the criteria 'Hotel/Motel' entered. The 'View' button in the ribbon is also highlighted with a red arrow.

Field	InchNum	DispatchType	DateOfReport	StNo	Street1	LocationType	Area
Table:	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents
Sort:							
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:						"Hotel/Motel"	
on:							

Simple Query

Here is an example. Let us say we want to know all incidents that occurred at a hotel/motel. First, we find the field that will store that data: "LocationType". Again, it is important to understand what fields store which types of data. You can toggle back and forth between the design view and the output view to remind yourself what fields exist in your dataset. Under "LocationType", plug in "Hotel/Motel". Now click "View" to view your data.

Simple Select Queries Example: 1,343



IncNum	DispatchType	DateOfReport	StNo	Street1	LocationType	Area
2019-030100312	Commercial Break	3/1/2019	630	Blanchard St	Hotel/Motel	4
2019-030118033	Larceny from MV	3/1/2019	182	Hilburn Pl	Hotel/Motel	1
2019-030118040	Larceny from MV	3/1/2019	280	Hawes St	Hotel/Motel	4
2019-010115424	Lost Property	1/1/2019	280	Hillsboro Rd	Hotel/Motel	5
2019-010115426	Medical	1/1/2019	730	Main St	Hotel/Motel	2
2019-010115428	Assist Other Agency	1/1/2019	384	Blanchard St	Hotel/Motel	4
2019-010115430	Drunkenness	1/1/2019	630	Blanchard St	Hotel/Motel	4
2019-010115435	Noise Complaints	1/1/2019	310	Blanchard St	Hotel/Motel	4
2019-010133632	Dispute	1/1/2019	310	Blanchard St	Hotel/Motel	4
2019-010133644	Drugs	1/1/2019	310	Blanchard St	Hotel/Motel	4
2019-010215485	Traffic Complaint	1/2/2019	656	Broadway	Hotel/Motel	4
2019-010233712	Check Well Being	1/2/2019	630	Blanchard St	Hotel/Motel	4
2019-010233729	Traffic Complaint	1/2/2019	656	Broadway	Hotel/Motel	4
2019-010333735	Warrants	1/3/2019	484	Rutledge St	Hotel/Motel	2
2019-010333741	Dispute	1/3/2019	280	Hawes St	Hotel/Motel	4
2019-010333742	Keep the Peace	1/3/2019	310	Blanchard St	Hotel/Motel	4
2019-010333760	Drunkenness	1/3/2019	630	Blanchard St	Hotel/Motel	4
2019-010333764	MV Offenses	1/3/2019	656	Broadway	Hotel/Motel	4
2019-010415559	Dispute	1/4/2019	484	Rutledge St	Hotel/Motel	2
2019-010415565	Keep the Peace	1/4/2019	484	Rutledge St	Hotel/Motel	2
2019-010515597	Noise Complaints	1/5/2019	484	Rutledge St	Hotel/Motel	2
2019-010515603	Vandalism	1/5/2019	656	Broadway	Hotel/Motel	4
2019-010615643	911 Errors	1/6/2019	384	Blanchard St	Hotel/Motel	4
2019-010633875	Warrants	1/6/2019	280	Hawes St	Hotel/Motel	4

Record: 1343

Simple Query

This simple select query returns all your incidents at hotels/motels. The arrow with the line to the right of it will bring you to your last record. Click on that and you will find that there were 1343 incidents at hotels/motels in this dataset. Easy peasy!

POP UP QUESTION 1

True or False:

Numbers will give your directors all that they need to know.

POP UP QUESTION 1

True or **False**

Numbers will give your directors all that they need to know.

(False – numbers are just not enough! The analyst needs to dig deeper into the data to discover patterns and trends.)

Objective 2

Build complex queries.

OBJECTIVE 2: Build complex queries in Microsoft Access®. Complex queries allow us to dig deeper into the data.

For more on complex queries, see:

“Complex Queries.” Accessed December 2020.

<https://www.youtube.com/watch?v=sxnaujD3wOQ>

Complex Queries

Design

Field:	DispatchType	Month: Format(Date)	DateOfReport	SflNo	Street1	LocationType	Area
Table:	Incidents		Incidents	Incidents	Incidents	Incidents	Incidents
Sort:							
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		'Jan' Or 'Feb' Or 'Ma				'Hotel/Motel'	
or:							

Output

IncNum	DispatchType	Month
2019-030100312	Commercial Break	Mar
2019-030118033	Larceny from MV	Mar
2019-030118040	Larceny from MV	Mar
2019-010115424	Lost Property	Jan
2019-010115426	Medical	Jan
2019-010115428	Assist Other Agency	Jan
2019-010115430	Drunkenness	Jan
2019-010115435	Noise Complaints	Jan
2019-010133632	Dispute	Jan
2019-010133644	Drugs	Jan
2019-010215485	Traffic Complaint	Jan
2019-010233712	Check Well Being	Jan

The same as simple select queries, complex queries have a design view and an output view. Here is when we use multiple querying fields and maybe even some expressions!

Complex Queries: Example

How many calls were reported at hotels/motels during the summer of 2019?

Complex Query. Use "Between" function for date

Let's work on answering this question together: "How many calls were reported at hotels/motels during the summer of 2019?"

Complex Queries Example

The screenshot shows a query editor window titled 'Query1'. A dropdown menu for the 'Incidents' table is open, showing fields: ID, IncNum, DispatchType, DateOfReport, and TimeOfReport. Below the dropdown is a query grid with the following structure:

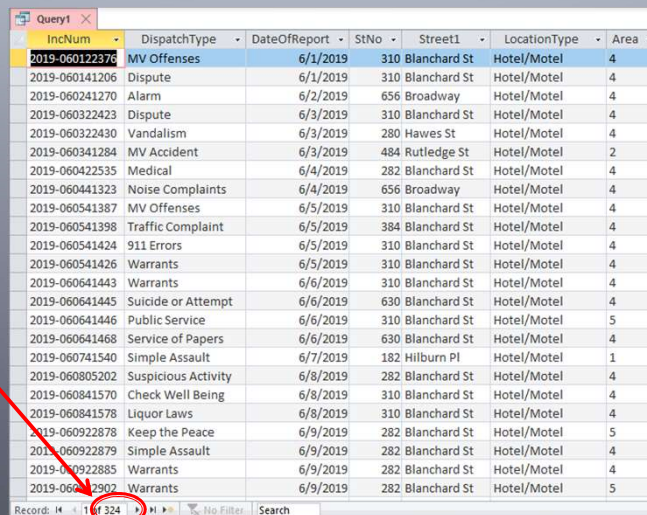
Field:	IncNum	DispatchType	DateOfReport	STNo	Street1	LocationType	Area
Table:	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents
Sort:							
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:			Between #6/1/2019# And #8/30/2019#			'Hotel/Motel'	
or:							

Red arrows point from the 'DateOfReport' and 'LocationType' fields in the grid to their respective dropdown menus in the 'Incidents' table dropdown.

Complex Query. Use "Between" function for date

We are going to just add on to our simple select query. We will keep where "LocationType" equals "**hotel/motel**". But now we want to know those hotel/motel incidents that occurred during the summer of 2019. We can use our "between" function to ask this very question. Go ahead and plug in "**between #6/1/2019# and #8/30/2019**" under the "DateOfReport" field. Why this field? Because when we looked at our data in the output view, we noticed that the dates of the reports were in date format in this field.

Complex Queries Example: 324



IncNum	DispatchType	DateOfReport	StNo	Street1	LocationType	Area
2019-060122376	MV Offenses	6/1/2019	310	Blanchard St	Hotel/Motel	4
2019-060141206	Dispute	6/1/2019	310	Blanchard St	Hotel/Motel	4
2019-060241270	Alarm	6/2/2019	656	Broadway	Hotel/Motel	4
2019-060322423	Dispute	6/3/2019	310	Blanchard St	Hotel/Motel	4
2019-060322430	Vandalism	6/3/2019	280	Hawes St	Hotel/Motel	4
2019-060341284	MV Accident	6/3/2019	484	Rutledge St	Hotel/Motel	2
2019-060422535	Medical	6/4/2019	282	Blanchard St	Hotel/Motel	4
2019-060441323	Noise Complaints	6/4/2019	656	Broadway	Hotel/Motel	4
2019-060541387	MV Offenses	6/5/2019	310	Blanchard St	Hotel/Motel	4
2019-060541398	Traffic Complaint	6/5/2019	384	Blanchard St	Hotel/Motel	4
2019-060541424	911 Errors	6/5/2019	310	Blanchard St	Hotel/Motel	4
2019-060541426	Warrants	6/5/2019	310	Blanchard St	Hotel/Motel	4
2019-060641443	Warrants	6/6/2019	310	Blanchard St	Hotel/Motel	4
2019-060641445	Suicide or Attempt	6/6/2019	630	Blanchard St	Hotel/Motel	4
2019-060641446	Public Service	6/6/2019	310	Blanchard St	Hotel/Motel	5
2019-060641468	Service of Papers	6/6/2019	630	Blanchard St	Hotel/Motel	4
2019-060741540	Simple Assault	6/7/2019	182	Hilburn Pl	Hotel/Motel	1
2019-060805202	Suspicious Activity	6/8/2019	282	Blanchard St	Hotel/Motel	4
2019-060841570	Check Well Being	6/8/2019	310	Blanchard St	Hotel/Motel	4
2019-060841578	Liquor Laws	6/8/2019	310	Blanchard St	Hotel/Motel	4
2019-060922878	Keep the Peace	6/9/2019	282	Blanchard St	Hotel/Motel	5
2019-060922879	Simple Assault	6/9/2019	282	Blanchard St	Hotel/Motel	4
2019-060922885	Warrants	6/9/2019	282	Blanchard St	Hotel/Motel	4
2019-06092902	Warrants	6/9/2019	282	Blanchard St	Hotel/Motel	5

Complex Query. Use "Between" function for date

When you view the output, you'll notice that there were 324 incidents at hotels/motels that occurred between June. 1, 2019 and August 30, 2003.

POP UP QUESTION 2

True or False:

Simple Select Queries and Complex Queries rely on the data within the tables.

POP UP QUESTION 2: **True** or False

Simple Select Queries and Complex Queries rely on the data within the tables.

Objective 3

Build aggregation queries.

OBJECTIVE 3: Build aggregation queries in Microsoft Access®.

Now on to Aggregate queries. Aggregate queries provide total counts of variables. They count frequencies. Aggregate queries can be used to answer many questions - How many auto thefts do we have? Is the count going up or down? When are cars most likely to be stolen? What types of locations are they stolen from? What time of day, day of week, and month of year hold the most auto thefts? What types of cars are being stolen? Make? Model? Year? Style? What do we know about auto theft offenders? Their ages, towns of residence, gender? In what cities and towns are cars being recovered? You are going to see hand-on how to do this in a moment.

For more on “Aggregation Query”, see:

“Aggregation Query.” Accessed December 2020. <https://support.office.com/en-us/article/sum-data-by-using-a-query-430a669b-e7fd-4c4b-b154-8c8dbbe41c8a>

Aggregate Queries

In what month are cars most likely to be stolen?

The screenshot displays the Microsoft Access interface. On the left, the 'Query Design View' shows two tables, 'Offenses' and 'Incidents', connected by a line representing a relationship on the 'InclNum' field. The 'Offenses' table has fields: InclNum, Offense, Categorizator. The 'Incidents' table has fields: InclNum, DispatchType, DateOfReport, TimeOfReport. Below the design view, the 'Field List' pane shows the following configuration:

Field:	Offense	Month: Month([DateOfReport])	Total: InclNum
Table:	Offenses		Incidents
Total:	Where	Group By	Count
Sort:			
Show:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:	'Auto Theft'		
or:			

On the right, the 'Query Results View' shows a table with two columns: 'Month' and 'Total'. The data is as follows:

Month	Total
1	23
2	26
3	25
4	31
5	24
6	22
7	24
8	32
9	28
10	26
11	21
12	20

Aggregate queries add up the counts of data, such as in this example that gives counts by month. There is a design view where you can ask questions of the data and an output view where you can see your results.

Aggregation Queries Example

Using “Where” criteria, what top 3 types of calls (dispatch type) occurred at hotels/motels in the months of June, July, and August of 2019?

Aggregate query using criteria operators and expressions

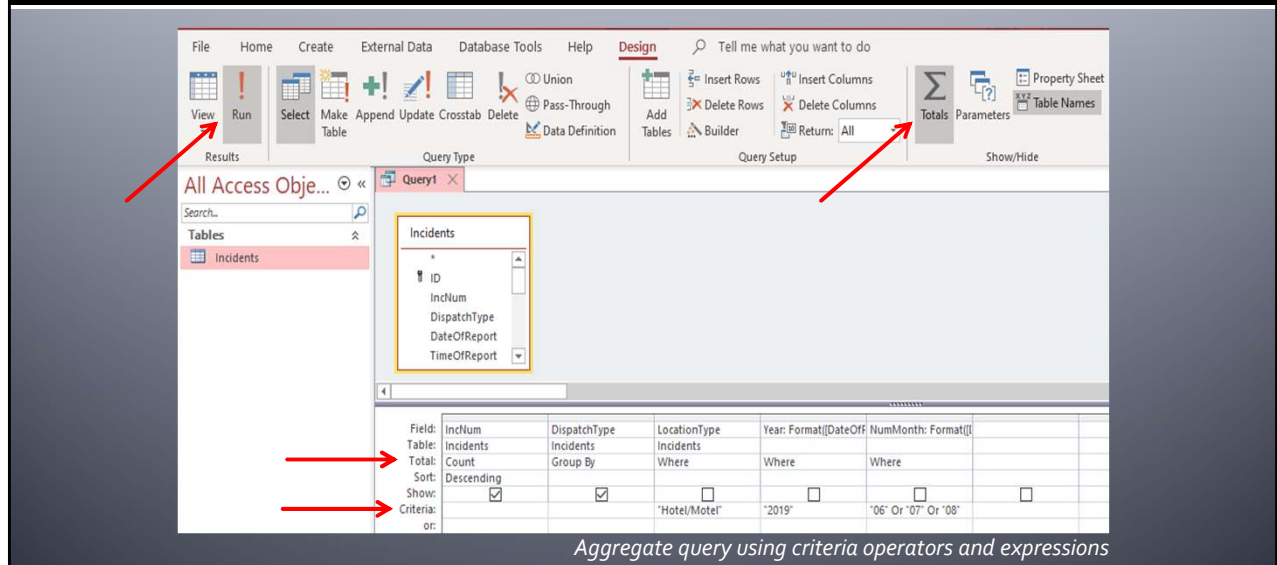
Let’s work together to answer this question: “Using “Where” criteria, what top 3 types of calls (dispatch type) occurred at hotels/motels in the months of June, July, and August of 2019?”

Aggregation Queries

OPEN MICROSOFT
ACCESS

Go ahead and create a new query in Microsoft Access based off the “Incident” table.

Aggregation Queries Example



Bring in the fields named “IncNum”, “DispatchType”, and “LocationType”. We are bringing in the “IncNum” as we are going to use this field to count our records. We are bringing in our “DispatchType” so that we can answer the question of what types of calls we see. We are bringing in the “LocationType” because we want to only select out “hotel/motel”.

Next, let us add some expressions!

Year: Format([DateOfReport], “yyyy”)

NumMonth: Format([DateofReport], “mm”)

You can “Run” or view in the output view. The major difference between the output view and run is that the output view just reviews the results. The “Run” option runs any commands from the query. In this query, we do not have any command operations, therefore it does not matter which button you use.

Aggregation Queries: Medical, Dispute, Warrants

What top 3 types of calls occurred at hotels/motels in the months of June, July, and August of 2019?

CountOfIncNu	DispatchType
33	Medical
29	Dispute
24	Warrants
24	MV Offenses
23	Suspicious Activity
16	Public Service
14	Keep the Peace
14	Service of Papers
11	Check Well Being

Aggregate query using criteria operators and expressions

What top 3 types of calls occurred at hotels/motels in the months of June, July, and August of 2019?

- Medical, dispute, warrants

POP UP QUESTION 3

True or False:

Aggregation queries give you the top criteria selected.

POP UP QUESTION 3:

True or False

Aggregation queries give you the top criteria selected.

Objective 4

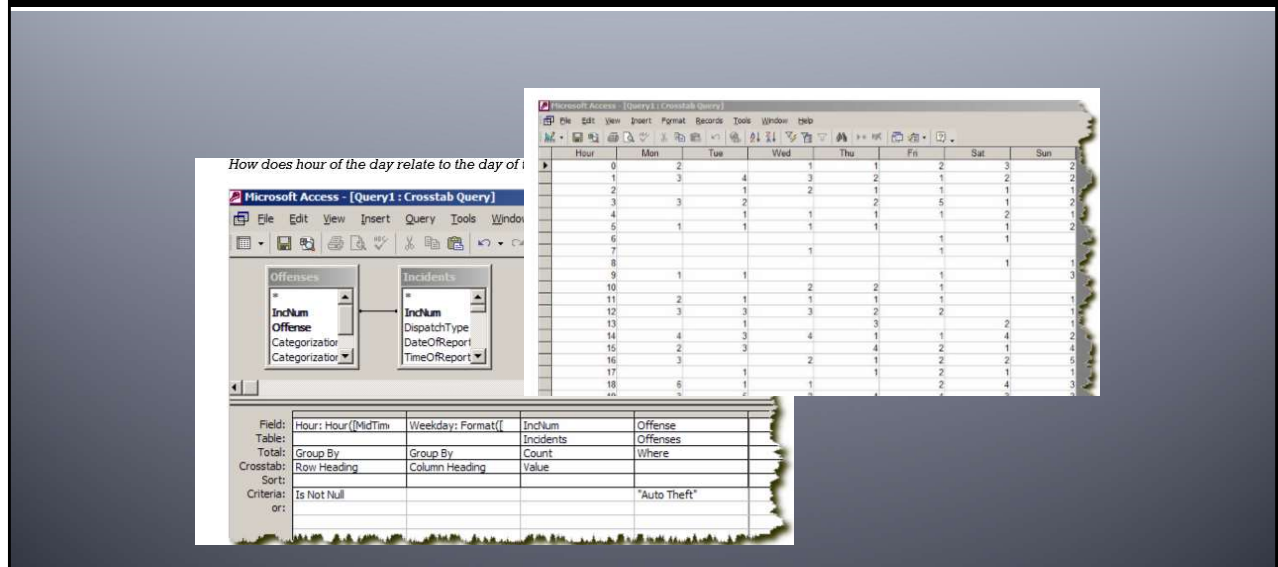
Build crosstab queries.

OBJECTIVE 4: Build crosstab queries in Microsoft Access®. Crosstab queries define the counts in those groups. A cross tab query is a transformation of rows of data to columns. It usually involves aggregation of data, (e.g., totals broken down by months, products etc.,) where the months are represented by columns. For example, crimes count by year or crash counts by month.

For more on “Crosstab Query”, see:

“Crosstab Query.” Accessed December 2020. <https://support.office.com/en-us/article/make-summary-data-easier-to-read-by-using-a-crosstab-query-8465b89c-2ff2-4cc8-ba60-2cd8484667e8>

Crosstab Queries



Crosstab queries define the characteristics within the group. In this example, we are asking Access to tell us the counts of auto theft by time and by day combined. We want to know more than just what time the auto thefts occur...we want to know on specific days (such as weekends), what time do the thefts occur. Using this information, we can determine the most often hit days and times within those days.

We can use crosstab queries for a variety of analyses - to answer questions such as do we have enough officers on each shift? Are the shift changes in alignment with the activity? When are most traffic crashes occurring on weekends? On weekdays? Are there any relationships among these categories? For instance, are cars stolen at different times of the day on different days of the week? Are the ages of offender's dependent upon the towns they come from? Are certain styles of car stolen from certain locations?

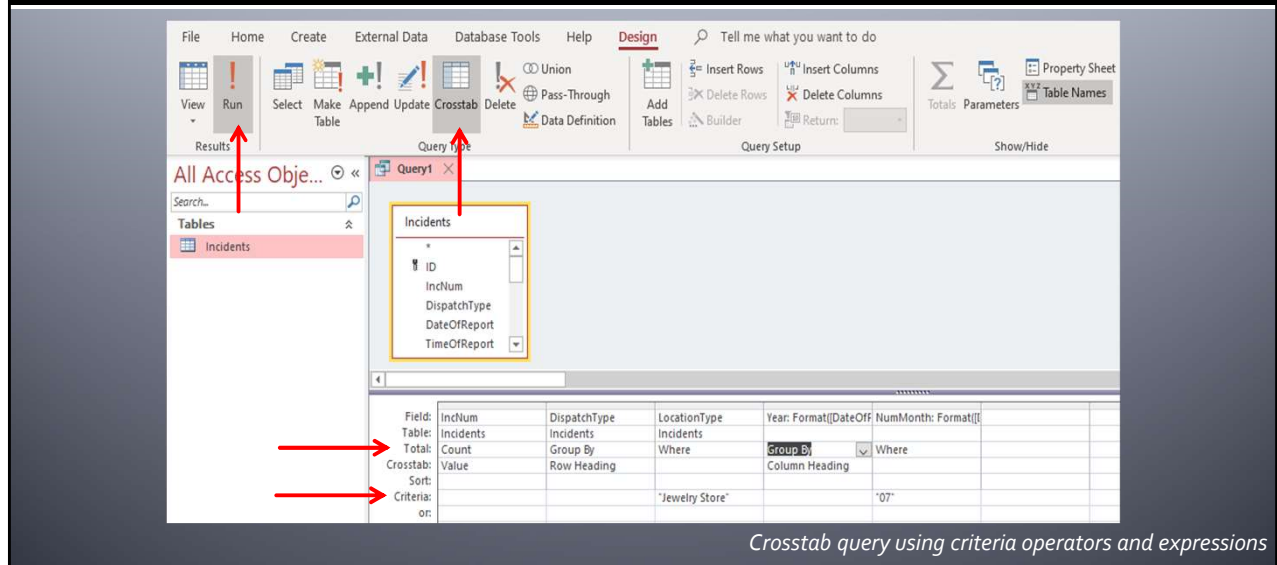
Crosstab Queries Example

How does the top activity at jewelry store locations during July of 2019 compare to the top activity at jewelry store locations during July of 2020?

Crosstab query using criteria operators and expressions

We are going to build off our aggregation query to answer the question, “How does the top activity jewelry store locations during July of 2019 compare to the top activity at jewelry store locations during July of 2020?”

Crosstab Queries Example



Build off of the aggregation query. Notice that all the criteria for each field is listed on the same row. This tells Access to return only the records that meet ALL the criteria listed.

Let's turn this into a **Crosstab query**. Under the "Design" tab at the top, select "Crosstab". When you select "Crosstab", a new row will appear within your criteria called "Crosstab". Every crosstab will require 3 options to be completed: **"Value", "Row Heading", and "Column Heading"**. Another words, which field data do you want populating the chart? Which field do you want on the left-hand side, labeling each row? And which field do you want across the top in each column. Those are the required fields. Everything else is optional. The end result is a pivot chart. Let's get to designing our crosstab query.

- For the "IncNumber" field, you can tell Access that you want to see the "value".
- For the "DispatchType" field, tell Access to view this field in the "Row Heading" – this means that the dispatch types will be listed on the left-hand side.
- For the "Year", tell Access to label each column across the top with the year.
- Keep the other fields using the "where" criteria operator so that Access will only pull records where the "LocationType" is a Jewelry Store and the month is July.

Click Run.

Crosstab Queries Example

How does July of 2019 compare to July of 2020 by call type at jewelry stores?

DispatchType	2019	2020
Alarm	2	11
Commercial Break		1
Investigation		1
Larceny from Buildi		1
Shoplifting		1

Crosstab query using criteria operators and expressions

How does July of 2019 compare to July of 2020 by call type at jewelry stores?

Now you can begin to see which dispatch reasons had increases or decreases in July for the years provided.

POP UP QUESTION 4

True or False:

Crosstabs are a great way to display data in a pivot chart.

POP UP QUESTION 4

True or False:

Crosstabs are a great way to display data in a pivot chart.

Summary of Part 8 “How to Identify “Top” Locations, Offenders, and More with Queries” Objectives

In Microsoft Access® ...

1. Built simple select queries.
2. Built complex queries.
3. Built aggregation queries.
4. Built crosstab queries.

Summary

Objectives for this course were for participants to be able to demonstrate four methods of querying data in Microsoft Access® including:

1. Built simple select queries – asking simple and quick questions of the dataset.
2. Built complex queries – which allows the analyst to dig a little further into the data.
3. Built aggregation queries – which answer questions such as who my top offenders are, top calls for service, etc.
4. Built crosstab queries – helped identify how data intersected. For instance, what time of day on specific days of week do most alarm calls occur.

DDACTS Project

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Part 9: How to Create Rocking Reports and Automation Processes

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National Highway Traffic Safety Administration (NHTSA)

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Part 9: “How to Create Rocking Reports and Automation Processes”. Ever wish you could press the "Easy" button, grab a coffee or tea, and then return to your desk to find your reports are completed? It's possible! This section focuses on refining and automating processes so that your database can work for you! We will explore how to generate automated reports for print and how to automate other processes in Microsoft Access®.

Introductions: Dawn Reeby



Dawn Reeby

OBJECTIVES

1. Build report using Report Wizard.
2. Edit reports in design view.
3. Display selected data in automated reports.
4. Automate certain tasks by programming macros (such as a print a report, append a series of queries, run a Compstat report).

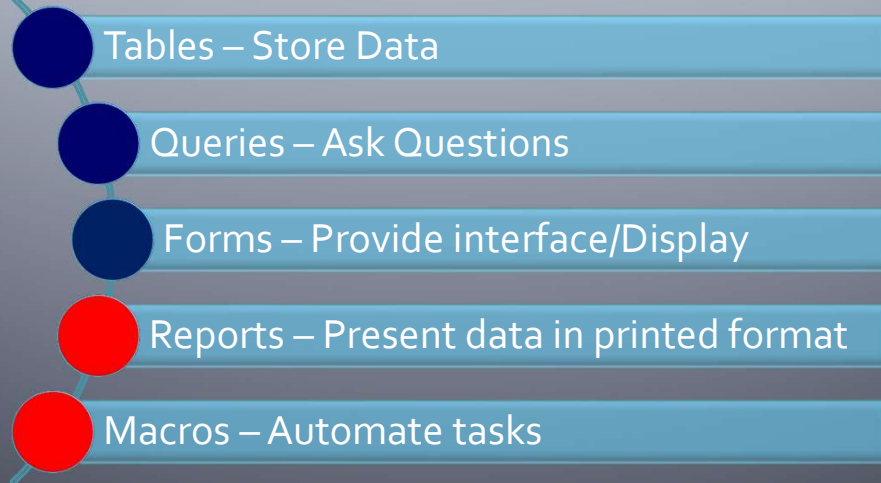
Objectives

For today, our objective is to learn how to build reports and macros in Microsoft Access®.

Specifically, we will:

1. Build report using Report Wizard.
2. Edit reports in design view.
3. Display selected data in automated reports.
4. Automate certain tasks by programming macros (such as a print a report, append a series of queries, run a Compstat report).

Overview of Microsoft Access®



Overview of Microsoft Access® Reports.

- Tables store data
- Queries is where you ask questions of the data
- Forms provides an interface or display
- Reports present data in printed format
- Macros automates tasks

Objective 1

Build report using Report Wizard.

Objective 1: Build report using Report Wizard.

REPORTS (automated)



Reports – Present data in printed format

Reports offer you an effective way to present data in a printed format, with text formatting, images, and charts. Data that is displayed in a report comes from an underlying table or query.

“Reports offer you an effective way to present data in a printed format, with text formatting, images, and charts. Data that is displayed in a report comes from an underlying table or query. In design view, we lay out the report; in report view, we see and print the results.” *(Microsoft)*

For more on Reports, see:

1. “Microsoft Access 2016 Tutorial: Creating and Modifying Reports. 2017.” Accessed December 2020. https://www.youtube.com/watch?v=ve_opOuLNil
2. “Microsoft Office Online Support - Reports.” Accessed 2020. <https://support.office.com/en-us/article/Introduction-to-reports-in-Access-E0869F59-7536-4D19-8E05-7158DCD3681C>

REPORTS (automated)

Reports – Present data in printed format

Robbery Report

<u>Date</u>	<u>IncNum</u>	<u>Offense</u>	<u>Address/Location</u>	<u>Story</u>
2/19/2020	2003-02192593	ROBBERY	108 HAYES ST BANK	33-year-old white male, bald, 5'6", 200 lbs., entered Fleet Bank. He sauntered up to the counter and flashed a smile at the young female clerk behind it. She gave him a demure grin in return. The suspect clasped his hands. "I'm terribly sorry to bother you," he said. "But I fear I must ask you to relinquish the contents of your cash drawer. Otherwise, I shall be impelled to commit acts of horrific violence." The clerk nodded sagely, then began unbuckling... (see full report for further details.)
4/10/2020	2003-04105080	ROBBERY	282 NW EASTMAN PKWY BANK	18-year-old white male entered the Bank of America wearing a heavy coat. He went up to a clerk and made a motion in his coat as if he had a gun, then said, "All the money!" An off-duty police officer tackled him and he was arrested. Suspect had no gun.
6/24/2020	2005-06241706	ROBBERY	110 E PIONEER AVE BANK	Black male in his 20s wearing a jean jacket and baseball cap entered the bank, showed a handgun, and demanded cash. Manager gave him \$5000 from a deposit bag and suspect fled in a beat-up Dodge Durango.
8/1/2020	2005-08014461	ROBBERY	320 INTERURBAN AVE S BANK	White male in his 40s gave a clerk a handwritten note that said "I have a bomb. Give me all the money." Clerk screamed and ducked down behind the counter and suspect fled on foot.

Here's an example of an automated report. This analyst drafts a short story in the table, which we will be doing in just a bit. The analyst runs a query into this report, which spits out a pretty picture of the activity at hand. This could be very helpful for a detective who is conducting an investigation and has a suspect in the interrogation room. Information on hand will assist in questioning. This can also be helpful during a meeting with staff regarding a series. Folks could easily access and understand the details of the series at hand. A quick review of the available data may present opportunities for additional data collection and/or analysis.

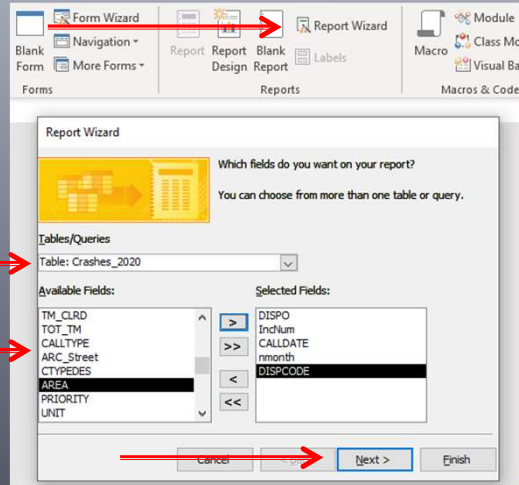
REPORTS

Import your table: Crashes_2020

Let's get started with designing our own reports. We are going to use the Report Wizard first, and then tailor our report to our liking. We will take it step-by-step, so be sure to bring up your second screen and let's work on this together. Begin by importing the table called "Crimes". Take a moment to go through the import wizard to get your table set up. If you're struggling, go back to the earlier parts of this series for a step-by-step on uploading data.

REPORTS

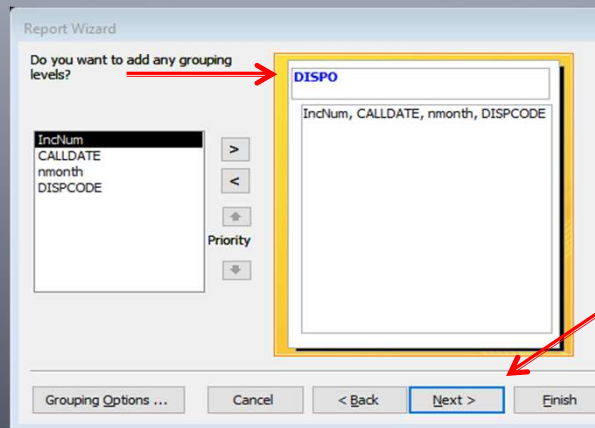
Click Report Wizard. Select Fields. Click Next.



Screen shot report wizard.

REPORTS

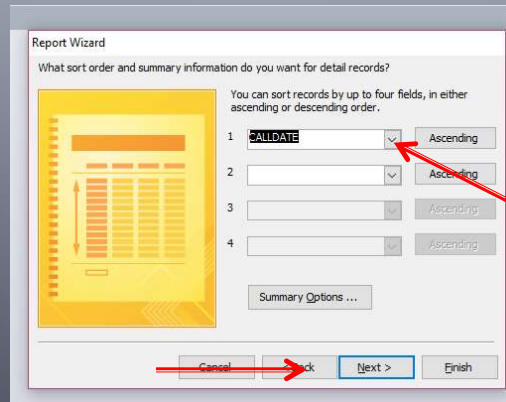
Double click on "DISPO" to group by that category.
Click Next.



Screen shot report wizard. Grouping.

REPORTS

Can sort by fields if desired. Select "CALLDATE".
Click Next.



The screenshot shows a 'Report Wizard' dialog box with the following elements:

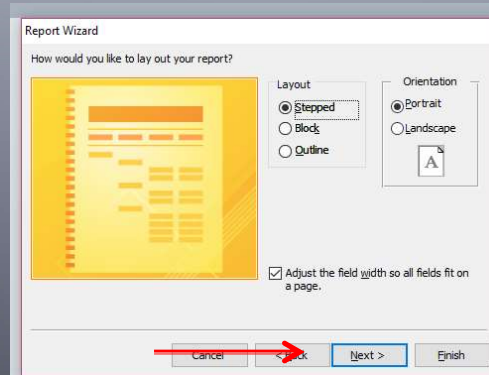
- Title: Report Wizard
- Question: What sort order and summary information do you want for detail records?
- Instruction: You can sort records by up to four fields, in either ascending or descending order.
- Field 1: A dropdown menu containing 'CALLDATE' and a 'v' icon, with an 'Ascending' button to its right.
- Field 2: An empty dropdown menu and a 'v' icon, with an 'Ascending' button to its right.
- Field 3: An empty dropdown menu and a 'v' icon, with an 'Ascending' button to its right.
- Field 4: An empty dropdown menu and a 'v' icon, with an 'Ascending' button to its right.
- Summary Options: A button labeled 'Summary Options ...'.
- Navigation: A row of buttons at the bottom: 'Cancel', 'Back', 'Next >', and 'Finish'. The 'Next >' button is highlighted with a blue border.

Two red arrows are present: one pointing to the 'CALLDATE' dropdown and another pointing to the 'Next >' button.

Screen shot report wizard. Sorting.

REPORTS

Can change the layout. Click Next.



Screen shot report wizard. Layout.

REPORTS

Can rename the report (CrashReport). Click Finish.

Report Wizard

What title do you want for your report?

CrashReport

That's all the information the wizard needs to create your report.

Do you want to preview the report or modify the report's design?

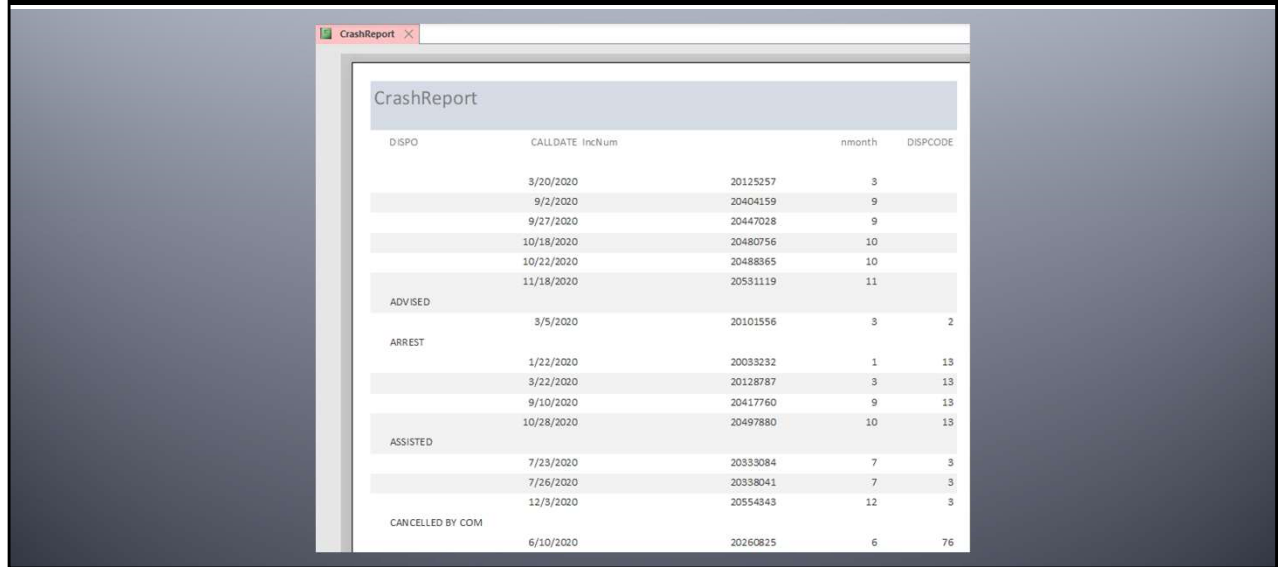
Preview the report.

Modify the report's design.

Cancel Back Finish

Screen shot report wizard. Name report.

REPORTS

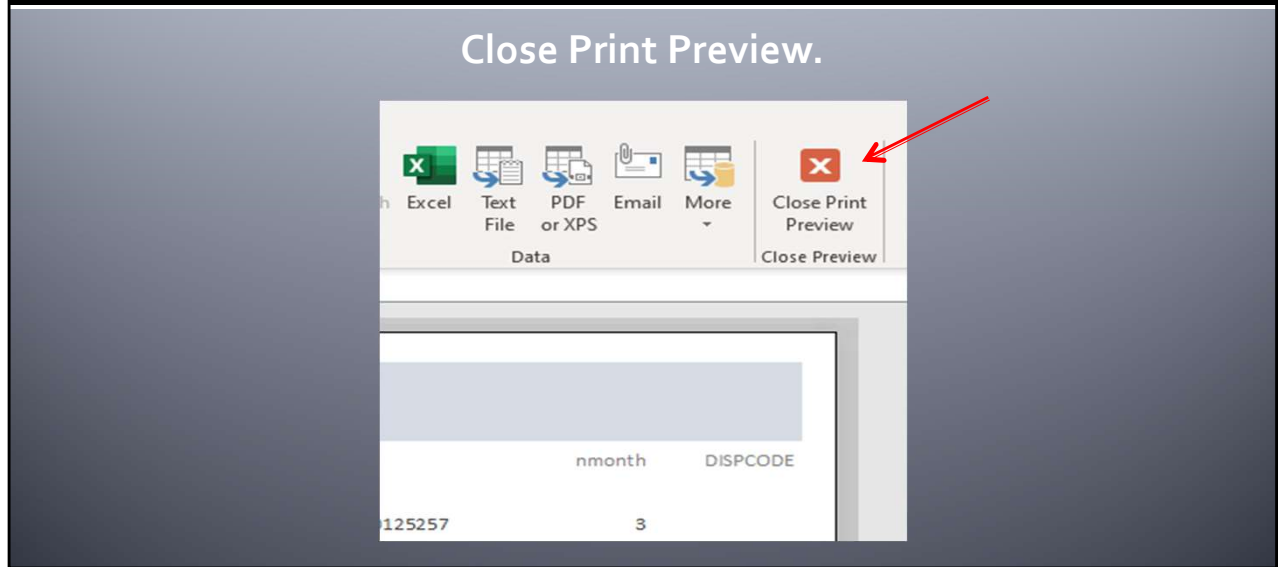


The screenshot shows a window titled 'CrashReport' with a table of incident data. The table has five columns: DISPO, CALLDATE, IncNum, nmonth, and DISPCODE. The data is grouped by incident status: DISPO, ADVISED, ARREST, ASSISTED, and CANCELLED BY COM.

DISPO	CALLDATE	IncNum	nmonth	DISPCODE
	3/20/2020	20125257	3	
	9/2/2020	20404159	9	
	9/27/2020	20447028	9	
	10/18/2020	20480756	10	
	10/22/2020	20488365	10	
	11/18/2020	20551119	11	
ADVISED	3/5/2020	20101556	3	2
ARREST	1/22/2020	20033232	1	13
	3/22/2020	20128787	3	13
	9/10/2020	20417760	9	13
	10/28/2020	20497880	10	13
ASSISTED	7/23/2020	20333084	7	3
	7/26/2020	20338041	7	3
	12/3/2020	20554343	12	3
CANCELLED BY COM	6/10/2020	20260825	6	76

Screen shot report wizard. Output/Print Preview View.

REPORTS



Screen shot report wizard. Close report.

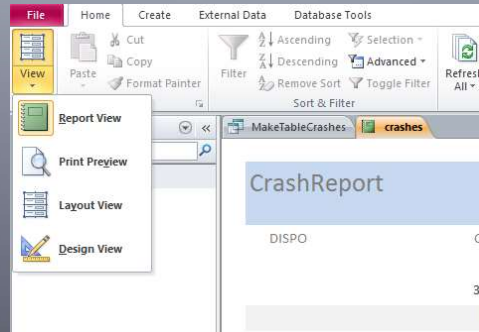
Objective 2

Edit reports in design view.

Objective 2: Edit reports in design view.

REPORTS

Go to Design View to make changes.



Screen shot report. Make changes in Design View.

REPORTS

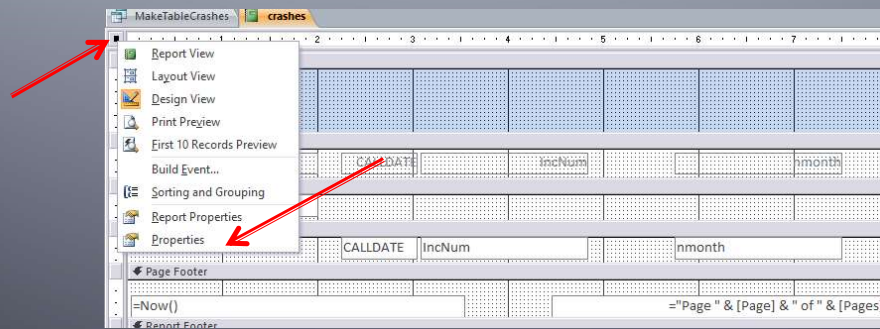
Select field "DISPCODE" in both the Header and Details, and click delete (keyboard), change Report Header, bold text, etc.

Report Header					
CrashReport					
Page Header					
DISPO	CALLDATE	IncNum	nmonth	DISPCODE	
DISPO Header					
DISPO					
Detail					
	CALLDATE	IncNum	nmonth	DISPCODE	
Page Footer					
=Now()			="Page " & [Page] & " of " & [Pages]		
Report Footer					

Screen shot report. Change font.

REPORTS

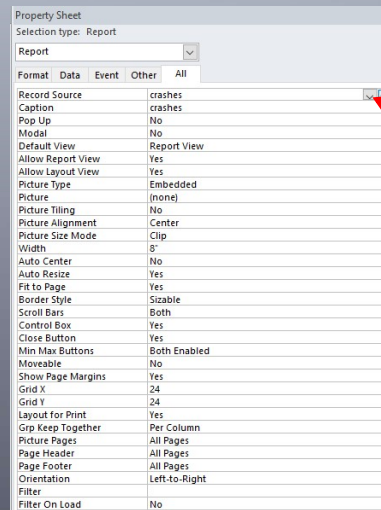
To find where data is coming from, right click on box in far left. Click Properties.



Screen shot report. Discover data source.

REPORTS

A Property Sheet appears.
-See Record Source.
-Click on any field and see/change source.
-Make changes to report.



Screen shot report. Change property/data sources.


REPORTS

Return to the Print Preview to see changes.
Change the Report Header to "Cool Town Police
Department Crash Report". Save. Print Preview.



Screen shot report. Preview changes.

REPORTS



DISPO	CALLDATE	IncNum	nmonth
	3/20/2020	20125257	3
	9/2/2020	20404159	9
	9/27/2020	20447028	9
	10/18/2020	20480756	10
	10/22/2020	20488365	10
	11/18/2020	20531119	11
ADVISED			
	3/5/2020	20101556	3
ARREST			
	1/22/2020	20033232	1

Screen shot report. View changes.

POP UP QUESTION 1

TRUE OR FALSE?

In design view, we lay out the report; in report view, we see and print the results.

POP UP QUESTION 1

TRUE OR FALSE?

In design view, we lay out the report; in report view, we see and print the results.

Objective 3

Display selected data in automated reports.

Objective 3: Display selected data in automated reports.

Set Up Automated Reports

1. Medical Report
2. Directed Patrol Report
3. Drunkenness Report

Next, we are going to set up 3 automated reports:

1. Medical Report
2. Directed Patrol Report
3. Drunkenness Report

What we will be exploring here is an easy way to maximize time and minimize effort.

Set Up Automated Reports

1. Medical Report

Let's start with the Medical Report. How can this be helpful? Does your Chief want to know how many heroin overdoses there are and you find yourself manually counting them up each week? Or does your Narcotics Division want to see all field interrogation reports taken, and you spend hours copying and pasting? Or maybe your Captain wants a shift report once a month that details the crimes on her shift. The requests are endless! But your time spent on them doesn't have to be!

Imagine the possibilities here... you can automate a heroin overdose report, a narcotics report, a domestic violence report, a juvenile report, all of your Cleary reports for colleges/schools, a CompStat report, a field interrogation report, a part 1 crimes report, a weekly summary report, and so on and so on! What would you want to automate at your department?

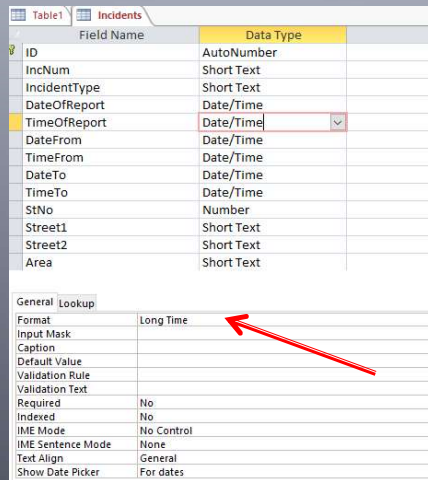
REPORTS

Import your table:
Crimes

Import desired table.

Set Up Automated Reports

Change time format in Design View




Field Name	Data Type
ID	AutoNumber
IncNum	Short Text
IncidentType	Short Text
DateOfReport	Date/Time
TimeOfReport	Date/Time
DateFrom	Date/Time
TimeFrom	Date/Time
DateTo	Date/Time
TimeTo	Date/Time
StNo	Number
Street1	Short Text
Street2	Short Text
Area	Short Text

Property	Value
Format	Long Time
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Indexed	No
IME Mode	No Control
IME Sentence Mode	None
Text Align	General
Show Date Picker	For dates

Change format in Design View of table.

Set Up Automated Reports

Create new fields



Field Name	Data Type
TimeTo	Date/Time
StNo	Number
Street1	Short Text
Street2	Short Text
Area	Short Text
PremisesType	Short Text
Arrest	Yes/No
Domestic	Yes/No
Notes	Short Text
Story	Short Text
MedicalReport	Yes/No
DirPatReport	Yes/No
DrunkReport	Yes/No

Create new desired fields, and set up proper Data Type.

Set Up Automated Reports

Add stories. Check related boxes.

Story	Medical Rep	DirPatRepor	DrunkRepor	ID	IncNum	IncidentType
Victim overdosed on heroin	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18	2019-010233700	Medical
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	19	2019-010233701	Medical
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20	2019-010233702	MV Offenses
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	21	2019-010233703	Larceny from MV
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	22	2019-010233704	MV Accident
Victim overdosed on alcohol	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	23	2019-010233705	Medical
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24	2019-010233706	Shoplifting
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25	2019-010233707	Youth Complaints
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26	2019-010233708	Disabled MV
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27	2019-010233709	Youth Complaints
Child drank cleaner	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	28	2019-010233710	Medical
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	29	2019-010233711	Service of Papers
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30	2019-010233712	Check Well Being
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	31	2019-010233713	Alarm
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	32	2019-010233714	Road Conditions
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	33	2019-010233715	Psychiatric
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	34	2019-010233716	Check Well Being
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35	2019-010233717	Check Well Being
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	36	2019-010233718	Directed Patrol
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37	2019-010233719	MV Accident
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	38	2019-010233720	Directed Patrol

Add story to a few medical calls, directed patrols, and drunkenness. Check the boxes where you want to see the reports. Save.

Set Up Automated Reports

Set up Medical Report query.

Field:	IncNum	IncidentType	DateOfReport	STNo	Street1	Story	MedicalReport
Table:	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents
Sort:							
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:							Yes
or:							

Add "yes" for medical report as you want this to populate your medical report.

Set Up Automated Reports

View Results

IncNum	IncidentType	DateOfRepo	StNo	Street1	Story	Medical Rep
2019-010233700	Medical	1/2/2019	264	Bosworth St	Victim overdosed on heroin	<input checked="" type="checkbox"/>
2019-010233701	Medical	1/2/2019	482	Rutledge St		<input checked="" type="checkbox"/>
2019-010233705	Medical	1/2/2019	914	Oriole St	Victim overdosed on alcoho	<input checked="" type="checkbox"/>
2019-010233710	Medical	1/2/2019	402	Leniston St	Child drank cleaner	<input checked="" type="checkbox"/>
*						<input type="checkbox"/>

View results.

POP UP QUESTION 2

TRUE OR FALSE?

You can add your own fields in the table to capture additional data and/or to set up for automated reports.

POP UP QUESTION 2

TRUE OR FALSE?

You can add your own fields in the table to capture additional data and/or to set up for automated reports.

Set Up Automated Reports

Create Report in Report Wizard

Report Wizard

Which fields do you want on your report?
You can choose from more than one table or query.

Tables/Queries
Query: MedicalReportQuery

Available Fields: MedicalReport

Selected Fields:
IncNum
IncidentType
DateOfReport
StNo
Street1
Story

Cancel < Back Next > Finish

Create a report in Report Wizard.

Set Up Automated Reports

Group by Month

Report Wizard

Do you want to add any grouping levels?

IncNum
IncidentType
DateOfReport
StNo
Street1
Story

>
<
Priority
↓

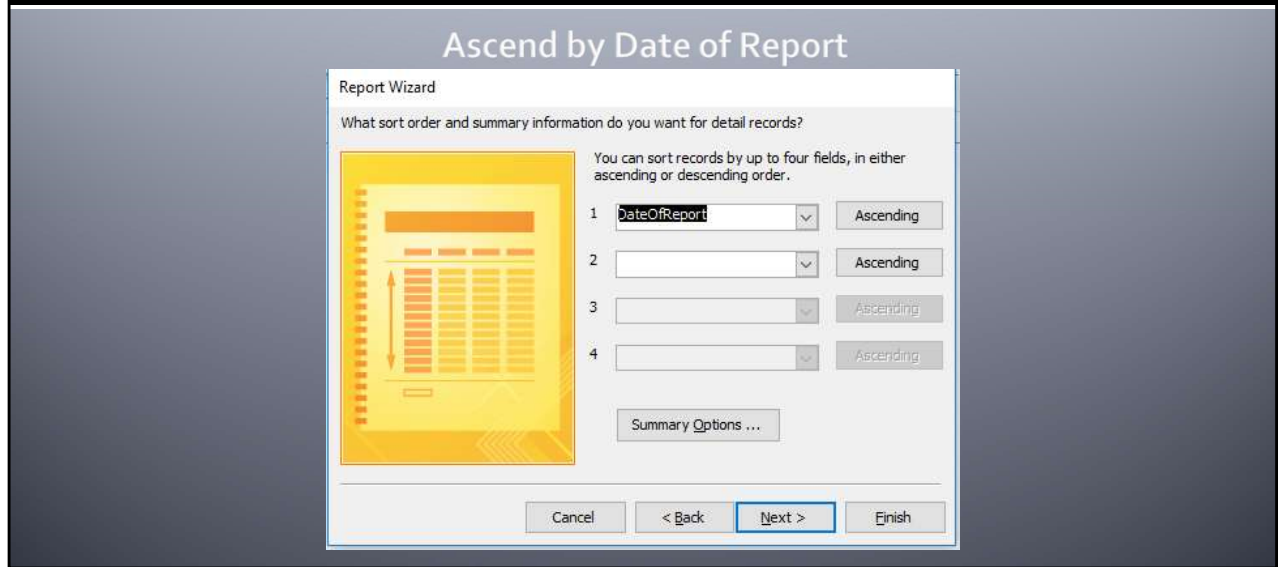
DateOfReport by Month

IncNum, IncidentType, DateOfReport,
StNo, Street1, Story

Grouping Options ... Cancel < Back Next > Finish

Report Wizard screen shot. Grouping.

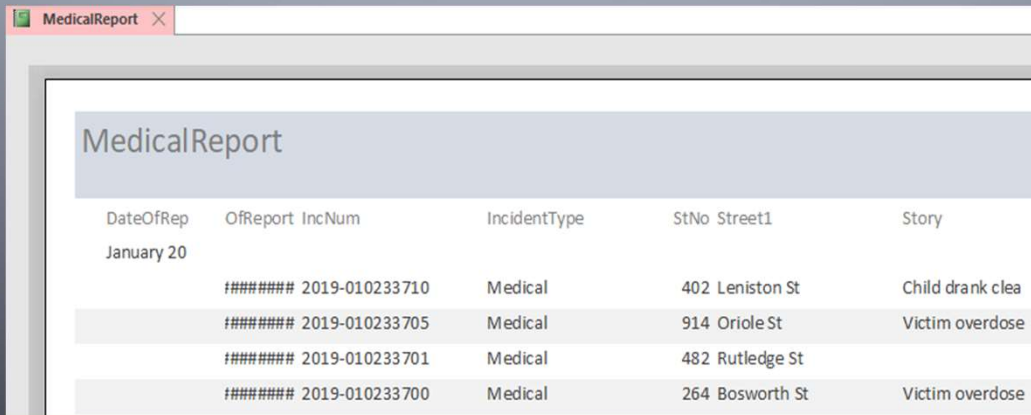
Set Up Automated Reports



Go through wizard and change name to MedicalReport.

Set Up Automated Reports

View Report

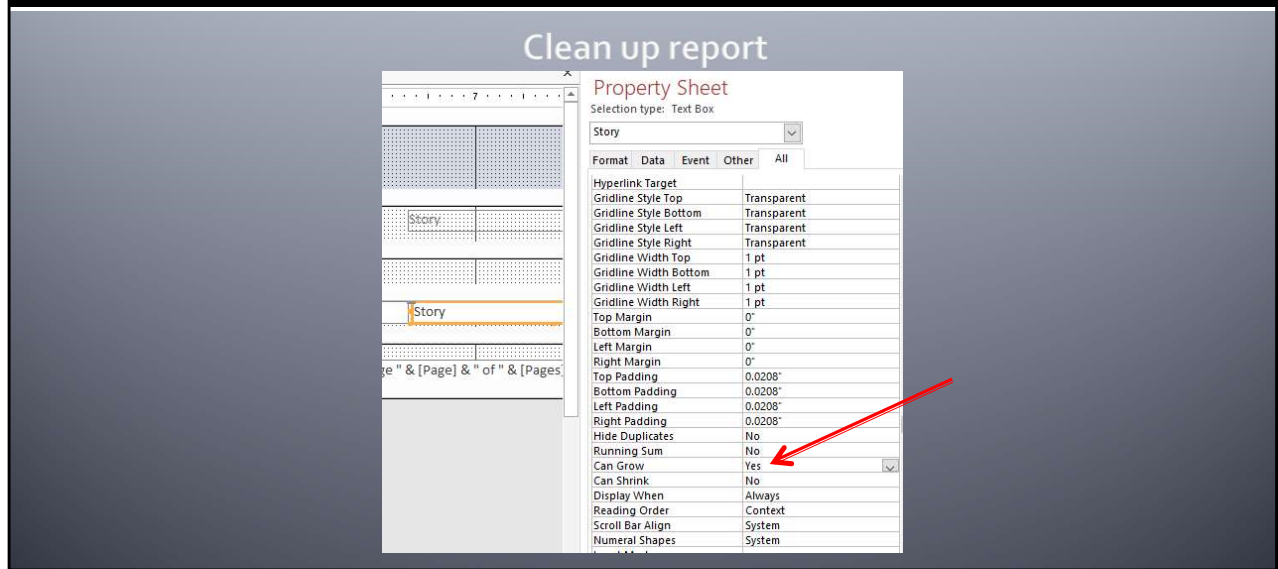


The screenshot shows a web browser window with a single tab titled "MedicalReport". The page content is titled "MedicalReport" and displays a table with the following columns: DateOfRep, OfReport, IncNum, IncidentType, StNo, Street1, and Story. The data is filtered for "January 20".

DateOfRep	OfReport	IncNum	IncidentType	StNo	Street1	Story
January 20						
	#####	2019-010233710	Medical	402	Leniston St	Child drank clea
	#####	2019-010233705	Medical	914	Oriole St	Victim overdose
	#####	2019-010233701	Medical	482	Rutledge St	
	#####	2019-010233700	Medical	264	Bosworth St	Victim overdose

View report. Notice formatting.

Set Up Automated Reports



Clean up your report: move stuff around; change titles. Right click on "Story". Change "CAN GROW" to "YES".

Set Up Automated Reports

View Report



The screenshot shows a window titled 'MedicalReport' with a close button. The window content includes a header 'MedicalReport' and a table with the following columns: DateOfReport, IncNum, IncidentType, StNo, Street1, and Story. The table lists four medical reports from January 2019. At the bottom left of the window, it says 'Sunday, November 29, 2020' and at the bottom right, 'Page 1 of 1'.

DateOfReport	IncNum	IncidentType	StNo	Street1	Story
January 2019					
1/2/2019	2019-010233710	Medical	402	Leniston St	Child drank cleaner
1/2/2019	2019-010233705	Medical	914	Oriole St	Victim overdosed on alcohol at 914 Oriole St.
1/2/2019	2019-010233701	Medical	482	Rutledge St	
1/2/2019	2019-010233700	Medical	264	Bosworth St	Victim overdosed on heroin

View new report with property changes.

POP UP QUESTION 3

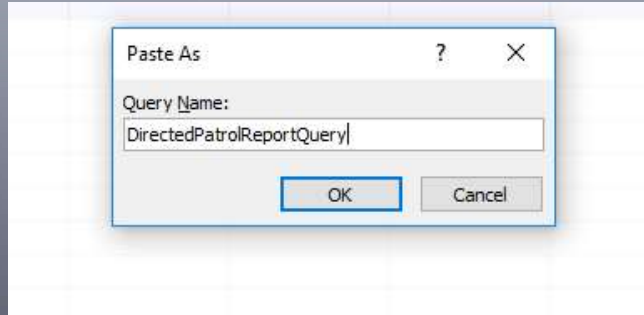
Where do you go in reports to make a field be able to expand/grow?

POP UP QUESTION 3:

Where do you go in reports to make a field be able to expand/grow? **Property Sheet.**
Can Grow.

Set Up Automated Reports

Directed Patrol Report Query

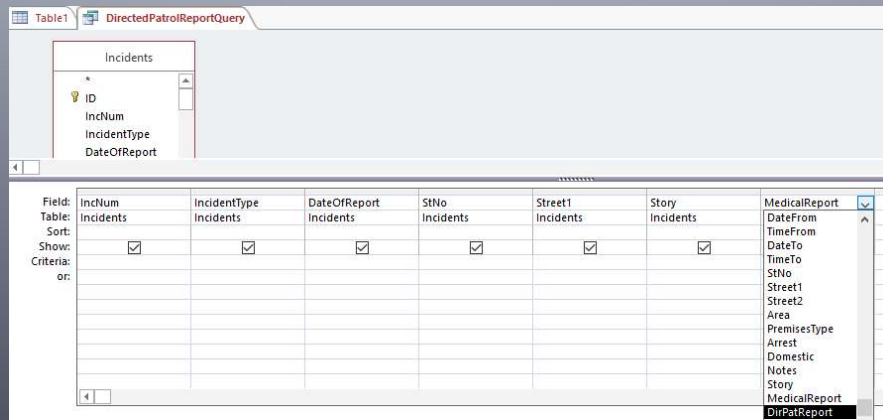


Copy and paste query. Change name to Directed Patrol Report Query.

Copy and paste query. Change name to Directed Patrol Report Query (instead of reinventing an entirely new query).

Set Up Automated Reports

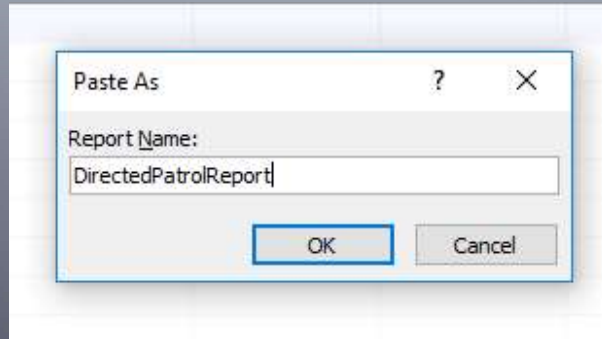
Change Medical Report to Directed Patrol. Save.



Change data fields in query by using the drop-down option.

Set Up Automated Reports

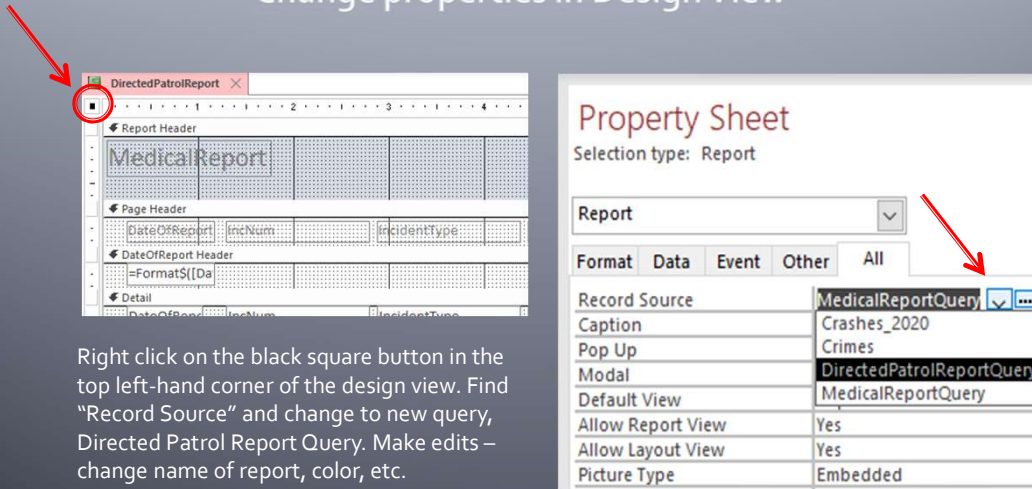
Copy and Paste Medical Report. Save as Directed Patrol Report.



Instead of starting from scratch, you can use a report that you really like, and just change the data source. Copy and paste the Medical Report into a new report called Directed Patrol Report.

Set Up Automated Reports

Change properties in Design View



Right click on the black square button in the top left-hand corner of the design view. Find "Record Source" and change to new query, Directed Patrol Report Query. Make edits – change name of report, color, etc.

Property	Value
Record Source	MedicalReportQuery
Caption	Crashes_2020
Pop Up	Crimes
Modal	DirectedPatrolReportQuery
Default View	MedicalReportQuery
Allow Report View	Yes
Allow Layout View	Yes
Picture Type	Embedded

Right click on the black square button in the top left-hand corner of the design view. Find "Record Source" and change to new query, Directed Patrol Report Query. Make edits – change name of report, color, etc.

Set Up Automated Reports

View new Directed Patrol Report

DateOfReport	IncNum	IncidentType	StNo	Street1	Story
January 2019					
1/2/2019	2019-010233687	Directed Patrol	300	Milhender Pl	Ofcr covered DDACTs Zone: 2 arrests

Sunday, November 29, 2020 Page 1 of 1

See your changes by looking at the Print Preview.

Set Up Automated Reports

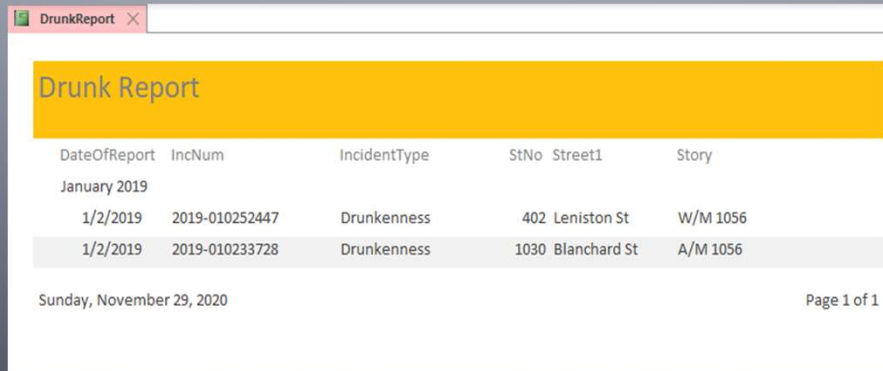
Copy and paste query for Drunkenness Report

Field:	IncNum	IncidentType	DateOfReport	StNo	Street1	Story	DrunkReport
Table:	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents	Incidents
Sort:							
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:							Yes
or:							

Let's make another one. Remember, using a favorite report and changing the data source in properties will save you a ton of time! Change your colors and data source and view.

Set Up Automated Reports

Copy and paste report. Make changes in property.



DateOfReport	IncNum	IncidentType	StNo	Street1	Story
January 2019					
1/2/2019	2019-010252447	Drunkenness	402	Leniston St	W/M 1056
1/2/2019	2019-010233728	Drunkenness	1030	Blanchard St	A/M 1056

Sunday, November 29, 2020 Page 1 of 1

New report.

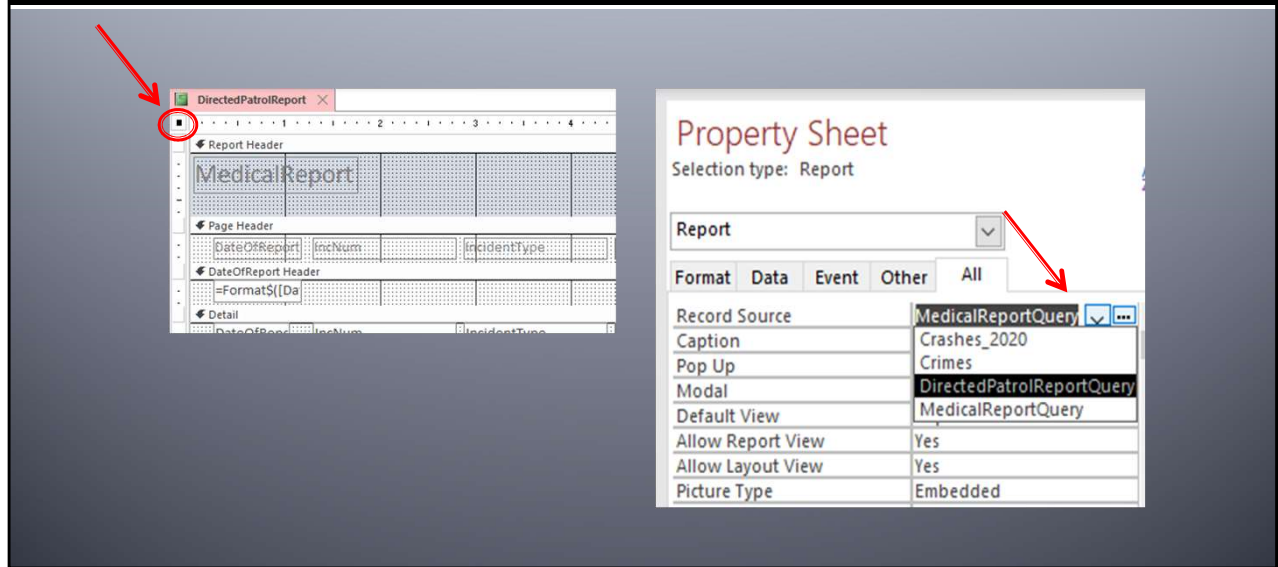
POP UP QUESTION 4

How do you determine where your report data is coming from?

POP UP QUESTION 4

How do you determine where your report data is coming from?

POP UP QUESTION 4 Answer



POP UP QUESTION 4 ANSWER:

The little button in the top left-hand quarter of the query. Then go to Properties. Then go to Record Source. Record Source is just that – it tells you what the data source for that particular report is. You can simply change the data source and any related fields by using the Properties, Record Source. This comes in really handy when you develop your favorite design don't have to duplicate your efforts ever again!

Objective 4

Automate certain tasks by programming macros.

Objective 4: Automate certain tasks by programming macros (such as a print a report, append a series of queries, run a Compstat report).

MICROSOFT ACCESS®

MACROS

Moving on to MACROS! Get ready to be super excited! Macros will blow your socks off!!! I remember when I first started using macros. I was so intimidated by them. Afraid that I was going to screw something up, or that it would take too long to learn. I mean, I didn't know how to write SQL nor did I have time to learn another language! Is this you? Are you wondering the same thing? Feeling intimidated or overwhelmed?

For more on Macros, see:

1. [“Microsoft Access 2016 Macros. 2019.” Accessed December 2020.](#)
<https://www.youtube.com/watch?v=89tN58urld0>
2. “Microsoft Office Online Support - Macros.” Accessed December 2020.
https://support.office.com/en-us/article/Introduction-to-macros-A39C2A26-E745-4957-8D06-89E0B435AAC3#_toc280773426

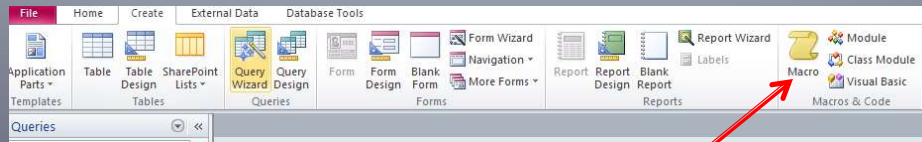
Macros – Automate!

- Macros allow you to automate certain tasks by programming a set of one or more actions that produce a certain result.
 - Print Report
 - Append a series of queries
 - Run series of queries (Compstat)

“Macros allow you to automate certain tasks by programming a set of one or more actions that produce a certain result. For instance, a button marked ‘Print Report’ on a form might run a macro that prints a report to the default printer. Though we specify the steps in design view, we generally run macros from form buttons or events.” *(Microsoft)*

Macros

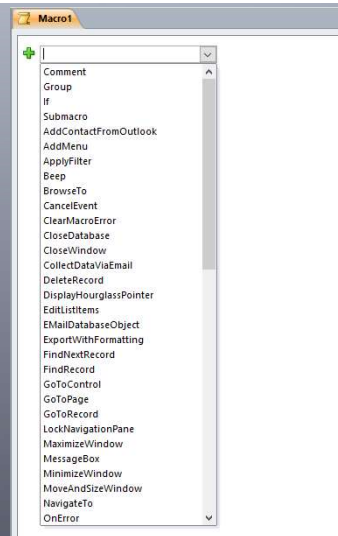
Click on Macros



Find the Macro command on your ribbon and select.

Macros

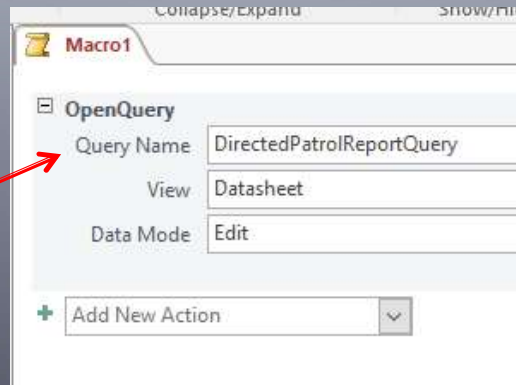
Click on "OpenQuery"



Design your macro to perform tasks and processes automatically. Click "Open Query". This will tell Access to open the selected query whenever you run this macro. This is helpful when adding 2, 3, or even 10 or more processes into one macro.

Macros

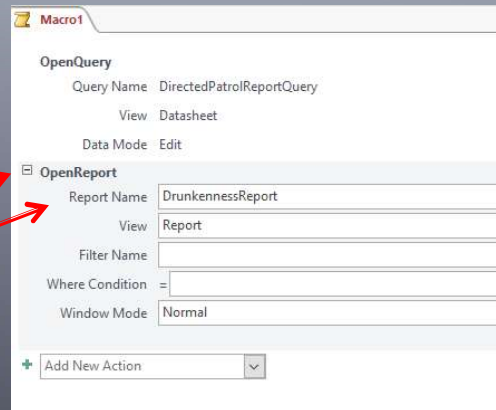
Select the query "Directed Patrol Query"



Find the query you want to open.

Macros

Add a second macro command (Open Report) and select "Drunkenness Report".



The screenshot shows a macro editor window titled "Macro1". It contains two actions:

- OpenQuery**
 - Query Name: DirectedPatrolReportQuery
 - View: Datasheet
 - Data Mode: Edit
- OpenReport** (highlighted with a blue background)
 - Report Name: DrunkennessReport
 - View: Report
 - Filter Name: (empty)
 - Where Condition: =
 - Window Mode: Normal

At the bottom, there is a button labeled "+ Add New Action" with a dropdown arrow.

Two red arrows point to the "OpenReport" section: one points to the "OpenReport" header, and the other points to the "Report Name" field.

Add additional desired commands.

Macros

Add a third macro command (MessageBox). Add your message.

The screenshot shows the Microsoft Access Macro Editor window titled "Macro1". It contains three actions in a sequence:

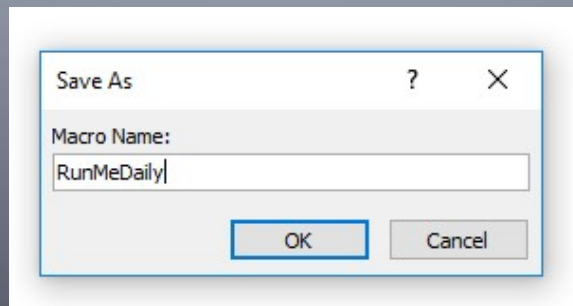
- OpenQuery**: Query Name: DirectedPatrolReportQuery, View: Datasheet, Data Mode: Edit.
- OpenReport**: Report Name: DrunkennessReport, View: Report, Filter Name: (empty), Where Condition: (empty), Window Mode: Normal.
- MessageBox**: Message: Done, You Crazy Fool!, Beep: Yes, Type: None, Title: (empty).

At the bottom, there is a button labeled "Add New Action" with a dropdown arrow. Two red arrows point to the "MessageBox" action and its "Message" field.

Select Message Box as your final command so that Access can notify you when it completes the designated processes.

Macros

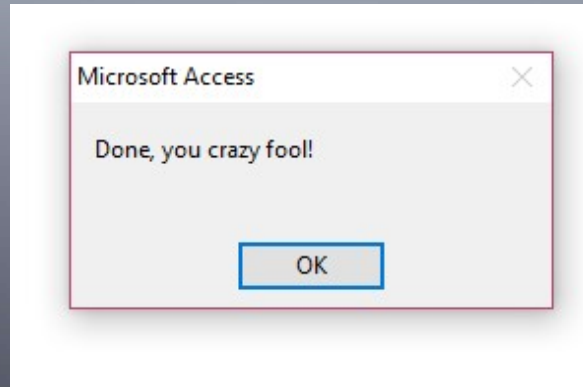
Click Save and name macro "RunMeDaily". Click Run.  Click OK.



Save and name your macro.

MACROS

Some (good) errors may occur. Set Warnings to No.



If your queries have warnings, set them to “no”.

You can set up macros to execute a series of tasks – maybe you want to run all of your append queries, or your 10 Compstat reports, or your sector or shift summaries, or... well I am just way too excited! You get the idea! Your life is about to get simplified!

POP UP QUESTION 5

What is a simplified programming language that you write by building a list of actions to perform? For instance, you can automatically open or print a set of queries with the touch of one button!

POP UP QUESTION 5:

What is a simplified programming language that you write by building a list of actions to perform? For instance, you can automatically open or print a set of queries with the touch of one button!

Macro

IACA Report Contest

- International Association of Crime Analysts (IACA) Rewards and Recognition Committee
- Awards presented at the annual conference

If you are looking for some inspiration, the International Association of Crime Analysts (IACA) Rewards and Recognition Committee has a bulletin contest every year when they select the best bulletins from each category – tactical, intelligence, mapping, and others – from agencies all over the world! Awards presented at the annual conference. Take a look at the IACA website (have to be a member) for some inspiration!

Summary of Part 9 “How to Create Rocking Reports and Automation Processes” Objectives

1. Build report using Report Wizard.
2. Edit reports in design view.
3. Display selected data in automated reports.
4. Automate certain tasks by programming macros (such as a print a report, append a series of queries, run a Compstat report).

Summary

Objectives for this course were for participants to be able to build reports and macros in Microsoft Access®.

Specifically, we:

- Explored building report using Report Wizard
- Built queries and reports in design view
- Displayed selected data in automated reports
- Automated certain tasks by programming macros (such as a print a report, append a series of queries, run a Compstat report)

DDACTS Project

IADLEST - <https://www.iadlest.org/training/ddacts>

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<http://www.nhtsa.gov/ddacts>

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Part 10: Z-Score and Statistical Significance Made Easy (Excel)

Dawn Reeby
Analytical Specialist

National Highway Traffic Safety Administration (NHTSA)

International Association of Directors of Law Enforcement
Standards and Training (IADLEST)



Part 10: “Z-Score and Statistical Significance Made Easy (Excel)” Do you find yourself looking at statistics from year to year, trying to determine if their increases or decreases are actually meaningful? What do the numbers actually mean? Part 10 provides a solid understanding (and Excel worksheet tool!) for analysts to put structure to their analysis. We will explore what statistical significance means, what model to use to determine that a threshold has been met (warranting further analysis), and how to make it all look simple and pretty for presentation.

Introductions: Dawn Reeby



Dawn Reeby

Objectives

1. Apply threshold analysis.
2. Import Master Crimes, create crosstabs, and export queries.
3. Create normal range, average, statistically significant/z-scores, percent changes.
4. Apply conditional-formatting.

Objectives

Part 10: “Z-Score and Statistical Significance Made Easy (Excel)” details what statistical significance means, practicing the model to use to determine that a threshold has been met (warranting further analysis), apply tips to make it all look simple and pretty for presentation. Specifically, we are going to:

1. Apply threshold analysis.
2. Import Master Crimes, create crosstabs, and export queries.
3. Create normal range, average, statistically significant/z-scores, percent changes.
4. Apply conditional-formatting.

Why Threshold?

Provide actionable reporting to officers and detectives so that they have opportunities to succeed!

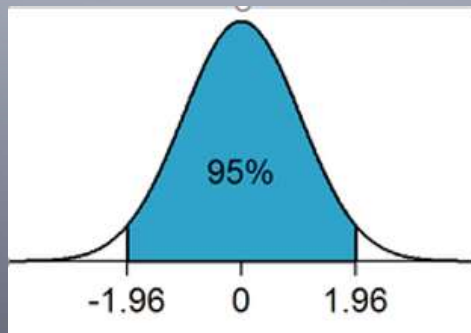
Why threshold analysis? Our role as analysts is to provide actionable reporting to our officers and detectives so that they may have opportunities to succeed – arrest the criminals, deter a traffic crash, impact crime, etc. Threshold is a tool that allows analysts to measure crime patterns and trends. Analysts can run multiple thresholds several times a week to determine if there may be a potential pattern. Then the analyst knows exactly what to dig into further to provide actionable reporting for officer/detective strategy development and impact.

Objective 1

Apply threshold analysis.

Objective 1: Apply threshold analysis.

What is Statistical Significance?



Courtesy of Wikipedia

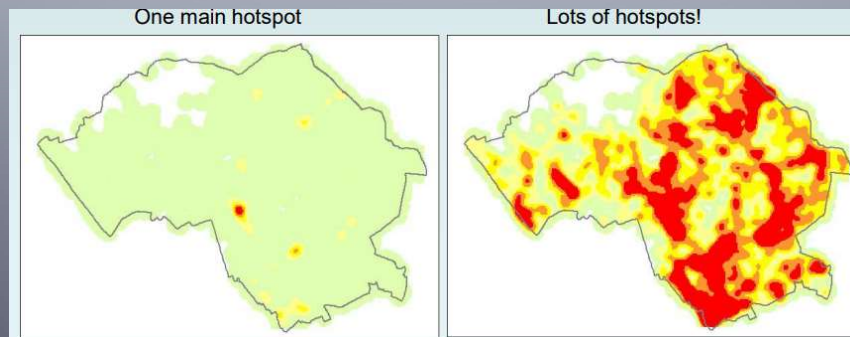
Simply put, a category is statistically significant if it is unlikely that the output is within a normal range of what is typical to occur. So, let's say that it's "not unusual" for your department to see between 20-25 car crimes per month. 65 car breaks in one month would raise a red flag. Get it? It's kind of like identifying what counts will RING THE BELL for you to dive in deeper.

*"The term **significance** does not imply importance here, and the term **statistical significance** is not the same as research, theoretical, or practical significance."*
(Wikipedia)

Here's a simple bell curve. Basically, what's in the 95% range is considered 'normal'. Going back to the example early, car breaks between 20-25 per month is relatively normal. But 65 car breaks fall outside of the normal range on the plus side of the bell curve. You could just as easily have a count that falls outside the normal range on the other end, such as only car breaks occurring. The fact that it occurs outside of the normal range – either way, less or more – simply says that as an analyst, you must analyze further as something might be worth further investigation.

Wikipedia: https://en.wikipedia.org/wiki/Statistical_significance

Significance in Criminal Justice



Courtesy of Spencer Chainey

In Spencer Chainey's "Spatial significance hotspot mapping using the G_i^* statistic", he applies statistical significance to criminal justice as he talks about the value of testing for spatial significance and using the G_i^* statistic to identify patterns of spatial significance. He shares that a measure for statistical significance is the Z-score test statistic.

Chainey focuses on spatial statistical significance. But his threshold concepts apply here, too. More relative to our work today, he details that "Z scores indicate the place of a particular value in a dataset relative to the mean, standardized with respect to the standard deviation." Basically, this means that the Z score helps determine HOW MUCH above or how below a value is relative to what is normal.

Chainey, Spencer. "Spatial Significance Hot Spot Mapping Using the G_i^* Statistic"
Retrieved December 2020.

<https://popcenter.asu.edu/sites/default/files/conference/conferencepapers/2010/Chainey-Gi-hotSpots.pdf>

What is Threshold Analysis?

Incident Type	Average	Usual Range	2019	2020	Change from Avg.	Notes
PROPERTY CRIME						
↓ Residential Burglary	39.6	32–48	36	31	-22%	Picked up a little in the fall but not enough to overwhelm low Jan-Sep.
↓ Commercial Burglary	32.1	24–41	24	19	-41%	Dropped precipitously with copper and metal no longer hot targets.
Theft from a Vehicle	262.9	205–321	349	226	-14%	Back down after high 2008 as GPS market declined. Still lots of patterns.
↓ Theft from a Building	102.1	88–116	82	64	-37%	Decreases in health club thefts and scrap metal thefts.
Theft from a Person	26.8	20–34	24	23	-14%	One fall pattern along Endicott Street but volume otherwise normal.
↓ Theft from a Residence	57.8	51–65	61	49	-15%	Low with fewer domestic and yard thefts.
↓ Theft of a Bicycle	23.1	18–28	26	16	-31%	Plummeted. No recurrence of summer 2008 patterns.
Theft of Services	21.1	15–27	16	20	-5%	Normal level of dine-and-ditch scams and gas drive-offs.
↑ Shoplifting	266.0	225–307	273	325	+22%	Shot up particularly around holidays as retailers buffed security forces.
↓ Auto Theft	52.5	36–69	33	23	-56%	Lowest level in at least 30 years. No patterns in 2009.
Arson	2.6	0–5	1	3	+15%	Port-a-potty, car, and dumpster, all during the fall.
↑ Fraud & Forgery	119.6	98–141	109	146	+22%	Big increase with numerous incidents of credit card fraud and identity theft.
Employee Theft	22.5	16–29	22	25	+11%	Relatively normal levels. One mail kiosk reported three.

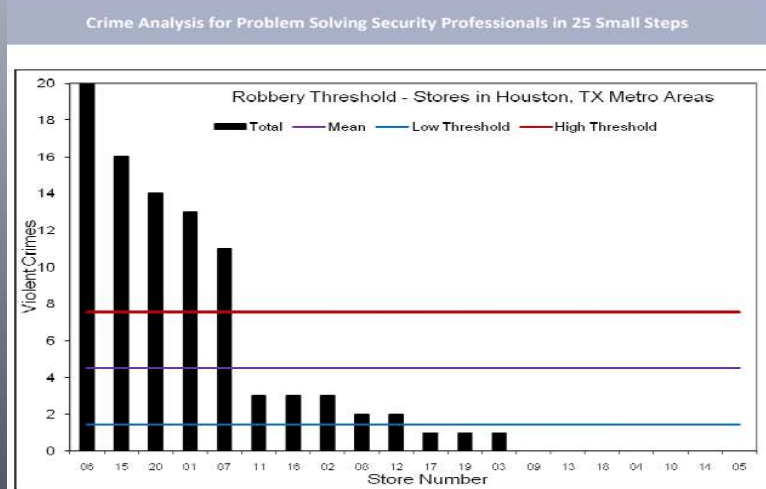
One of the most brilliant minds in law enforcement pattern analysis is Christopher Bruce. Bruce shares the key ways that analysts identify crime patterns in his paper “Identifying Crime Patterns”. He reports that analysts can determine the possibility of patterns through 3 methodologies:

- Modus Operandi Commonalities found through a careful review of incident reports and their narratives - daily
- Exceptional Volume, found through some brand of threshold analysis, either deliberate or unconscious
- Geographic Proximity found through crime mapping.

“Threshold analysis describes the process by which the analyst identifies potential patterns through exceptional volume. The theory behind threshold analysis is that when crime in a particular geographic area reaches a level that is significantly higher than usual, some type of crime pattern is probably to blame. The analyst can use a statistical method to determine when crime has reached a level that is “significantly higher than usual”—in other words, when crime crosses the threshold from average volume to exceptional volume.”

Bruce, Christopher. (Undated) Identifying Crime Patterns. Unpublished Work, PDF.

What is Threshold Analysis?



Here's another way to look at threshold analysis – determining if fluctuations in crime are statistically significant. In “Crime Analysis for Problem Solving Security Professionals in 25 Small Steps”, Karim Vellani looks to understand how to measure the effectiveness of a site-specific security program via crime analysis.

“In this example, the black columns represent the total violent crimes per store during the three years. The purple line represents the average number of robberies. The red line represents the high threshold. The blue line represents the low threshold. Relative to its peers, any store that rises above the red line is mathematically high crime, while any store that drops below the blue line is low crime. Stores which fall between the blue and red lines are considered average (Gottlieb, 1998). The heavy concentration of crime on the left side of the graph, referred to as Power Law or more commonly as the 80/20 rule, shows that applying countermeasures to the “high crime” stores will yield the most benefit.”

Vellani, Karim “Crime Analysis for Problem Solving Security Professionals in 25 Small Steps”. Retrieved December 2020 from <https://www.threatanalysis.com/2010/09/01/crime-analysis-for-problem-solving-security-professionals-in-25-small-steps/>

POP UP QUESTION 1

TRUE OR FALSE?
Threshold analysis is an indicator that crime is up or down, and requires further analysis?

POP UP QUESTION 1:

TRUE or False

Threshold analysis is an indicator that crime is up or down, and requires further analysis?

Example of Statistical Significance

Reason Code	2017	2018	2019	Average	St Dev	Normal Range	2020	Z Score	% Change Average- 2020	% Change 2019-2020
Arrest	277	253	162	430	201.0	229-631	9	-2.10	-98%	-94%
Bad Check	27	22	15	34	19.0	15-53	10	-1.27	-71%	-33%
Box Alarm	570	521	325	538	77.7	460-616	11	-6.78	-98%	-97%
Burglary	792	772	397	546	190.6	356-737	12	-2.80	-98%	-97%
Criminal Mischief	933	227	776	912	362.0	550-1274	13	-2.48	-99%	-98%

Now it's time to dig into what statistical significance models look like, how to use them efficiently, and how to automate the entire process!!!

Here's an example of a threshold analysis using call types.


- Here we have data by **year** from 2017, 2018, and 2019. There were 277 arrests in 2017; 253 arrests in 2018; and 162 arrests in 2019.
- The next column represents the **average**. Here, Excel has calculated what the average count of arrests were for years 2017 through 2019: 430 arrests.
- Now, you'll see a "scary" column called **standard deviation**. This is the best way to show how far the data range is above or below the average.
- The next column is the **Normal Range**, which is a calculation that measures what is normal for a category.
- Then you have the **current year's data**: 2020.
- The next column is the **Z-score**. Now remember, the z-score shows us how many standard deviations from the average the current year is.
- Next, we have the **percent change from the average**. It's always important to run percent changes from the average instead of just the previous year as the average considers anomalies in data sets.
- Since some departments also want to see **current to past year comparisons**, we included that column here.

We are going to go into each of these fields and calculations step-by-step.

Average/Mean

What is the Mean?

Your report card has an average on it.




- The **Mean** is the average.
- 2 simple steps will give you the mean of a set of numbers.

Step 1: Add the numbers.

Step 2: Divide by the # of items in the dataset.

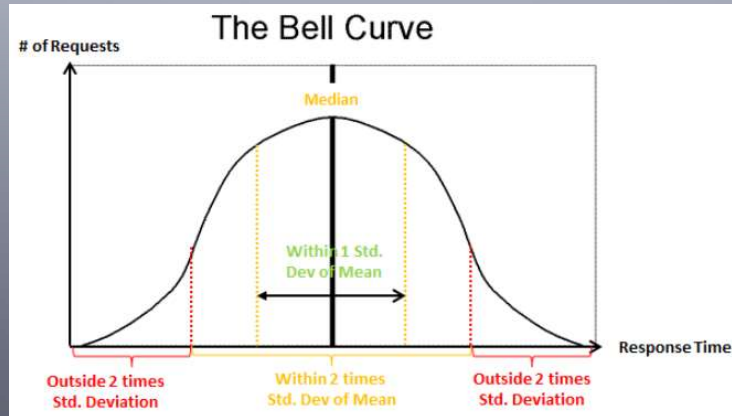
Mean = Average



Google image

Average – the mean is the average. Basically, you add up all of the counts in your category and then divide it by the total number of categories. This will give you your average.

Standard Deviation

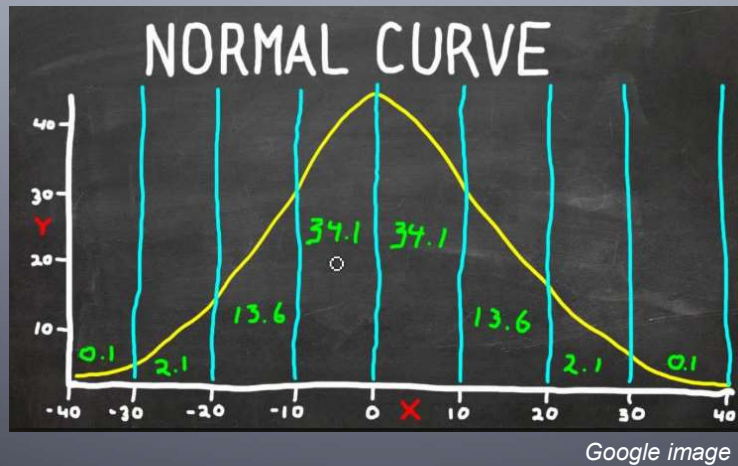


Google image

Standard Deviation – tells us how measurements of a group are spread out from the average. Here the average is signified by “x”. The Standard Deviation markers indicate how far away from the average, or x , a variable is.

Essentially, 68% of all variables fall within 1 SD of the mean. 95% of all variables fall within 2SD of the mean. And 99% of all variables fall within 3 SD of the mean. It isn't often that we use 3 SD in criminal justice as this would include the majority of all of our cases or calls for service. Instead, we play with 1-2 standard deviations.

Normal Range



Normal Range –Normal range is actually a complicated function-within-a-function that subtracts the standard deviation from the average to get the "low" threshold, adds the standard deviation to it to get the "high" threshold, then puts a dash in between. It signifies where your data normally will remain. Once you identify your standard deviation marker, the normal range represents all of those calls or variables that fit within that range.

Z-Score

What does a Z-score tell you?

- ⌘ A z-score tells you how many standard deviations the value is away from the mean and on which side of the mean it is on.
- ⌘ A positive z-score means the value is bigger than the mean (above)
- ⌘ A negative z-score means the value is smaller than the mean (below)
- ⌘ A z-score of 3 means that the number is 3 standard deviations above the mean
- ⌘ A z-score of -2.25 means that the number is 2.25 standard deviations below the mean

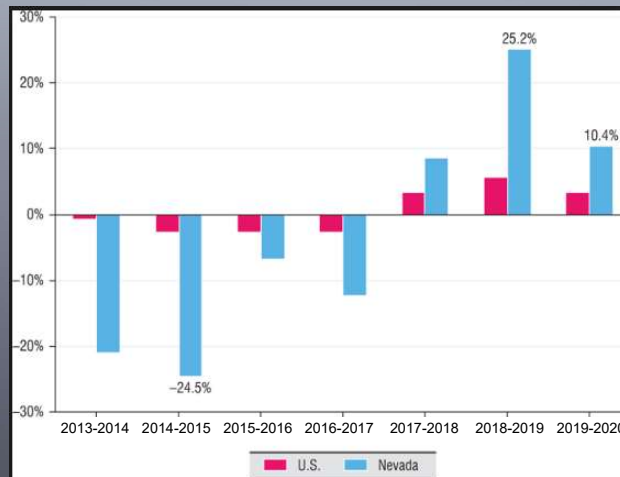
Z-Score - The z-score shows us how many standard deviations we are from the average, or mean, and on which side of the mean it is (negative or positive).

- A positive z-score means that the value is bigger than the average (above).
- A negative z-score means that the value is smaller than the average (below).
- A z-score of 3 means that the number is 3 standard deviations above the mean.
- A z-score of -2.25 means that the number is 2.25 standard deviations below the mean.

How does this translate into law enforcement? We might think of -1 to +1 as "normal," -1 to -2 as "cool," +1 to +2 as "warm," less than -2 as "cold," and more than +2 as "hot." Conditional Formatting highlights those values that are greater than 1.9 or less than -1.9

Percent Change from Average

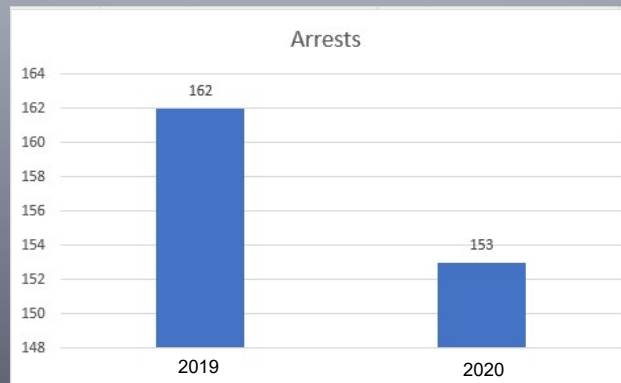
House prices changes from average



Percent change from the average – basically you are calculating the difference between the current year and the average. The calculation is new minus old, divided by old.

We always want to compare the current time period to the average of 3-5 years of the same time period. Why? Because often there may be a fluctuation from year-to-year data. Maybe there was a flood – such as with New Orleans – or perhaps a bad winter or new construction. There are so many variables that can alter year-to-year stats. As a general rule, average comparisons should be used.

Percent Change from Last Year



However, many departments still want to compare to last year. So, it's ok to add an additional column that represents **the percent change from last year**.

$(\text{New} - \text{Old}) / \text{Old} \times 100$

POP UP QUESTION 2

What is z-score?

POP UP QUESTION 2:
What is z-score?

(Simply put, a **z-score** is the number of standard deviations from the **mean** a data point is. But more technically it's a measure of how many standard deviations below or above the population **mean** a raw **score** is.

“If a **z-score** is equal to 0, it is on the mean. If a **z-score** is equal to +1, it is 1 standard deviation above the mean. If a **z-score** is equal to +2, it is 2 standard deviations above the mean.”)

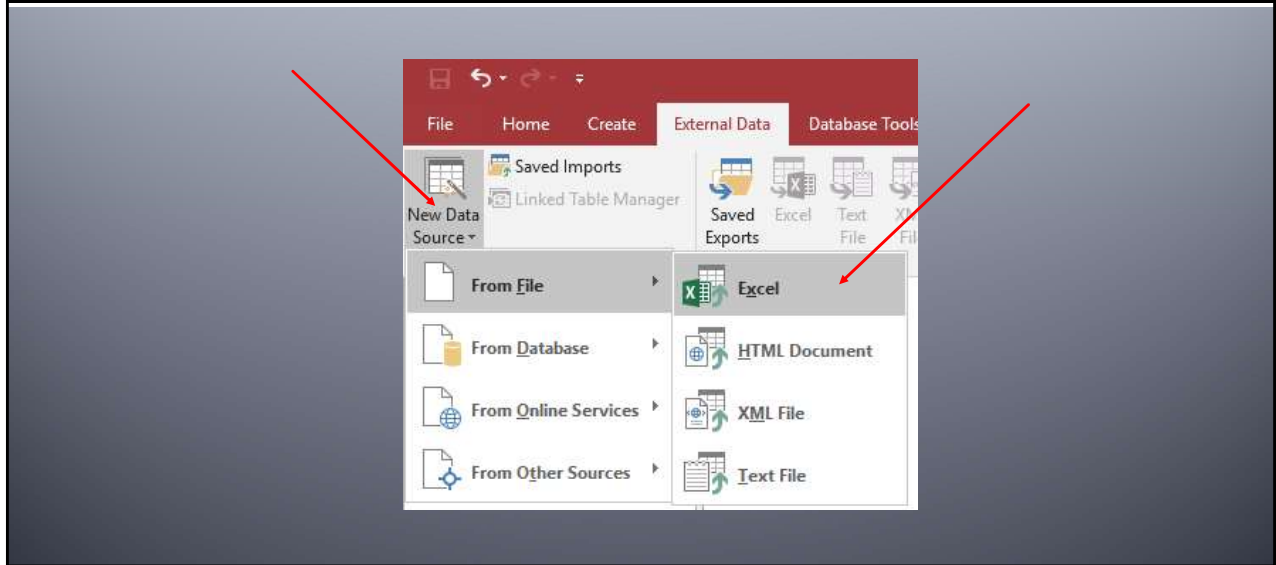
Conversely, if a z-score is -1, it is 1 standard deviation below the mean.

Objective 2

Import Master Crimes, create crosstabs,
and export queries.

Objective 2: Import Master Crimes, create crosstabs, and export queries.

Import Crime Data



Import data.

Import Crime Data

Get External Data - Excel Spreadsheet

Select the source and destination of the data

Specify the source of the definition of the objects.

File name:

Specify how and where you want to store the data in the current database.

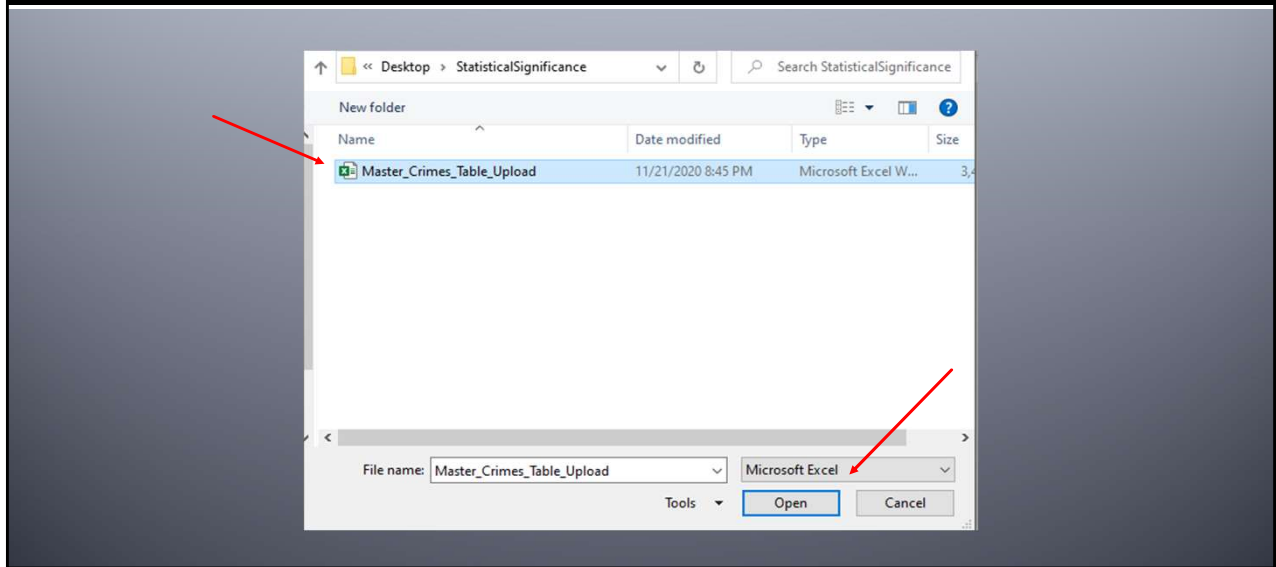
We will not import table relationships, calculated columns, validation rules, default values, and columns of certain legacy data types such as OLE Object.

Search for "import" in Microsoft Access Help for more information.

Import the source data into a new table in the current database.
If the specified table does not exist, Access will create it. If the specified table already exists, Access might overwrite its contents with the imported data. Changes made to the source data will not be reflected in the database.

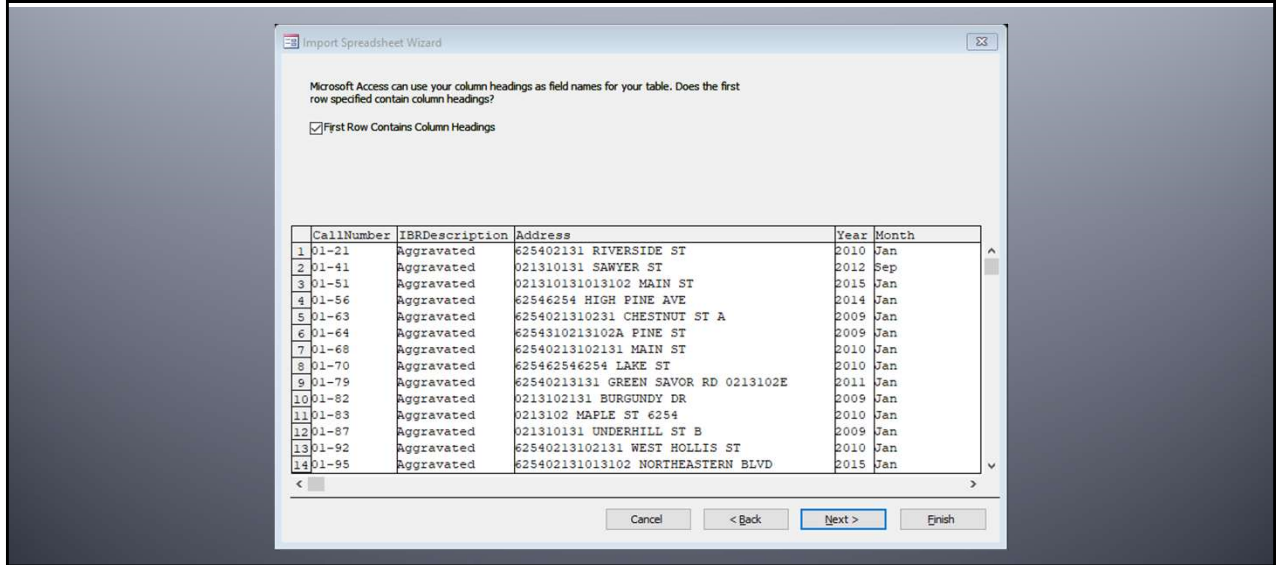
Link to the data source by creating a linked table.
Access will create a table that will maintain a link to the source data in Excel. Changes made to the source data in Excel will be reflected in the linked table. However, the source data cannot be changed from within Access.

Import Crime Data



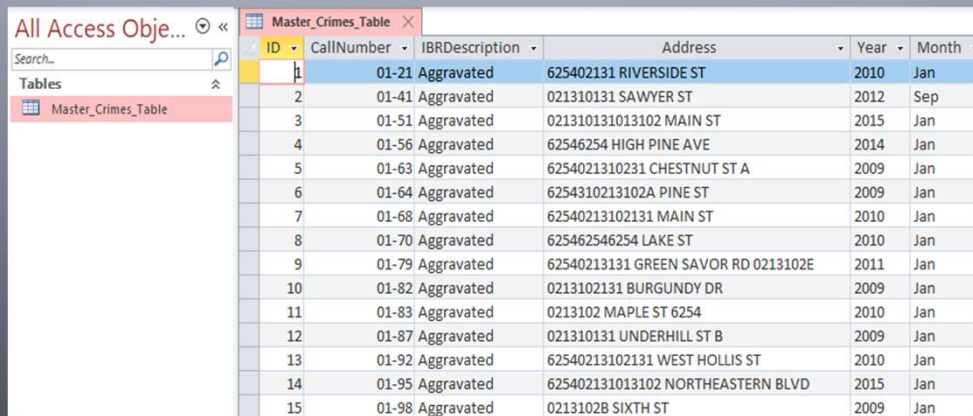
Browse and find data to import.

Import Crime Data



Import wizard; first rows are column headings.

Import Crime Data



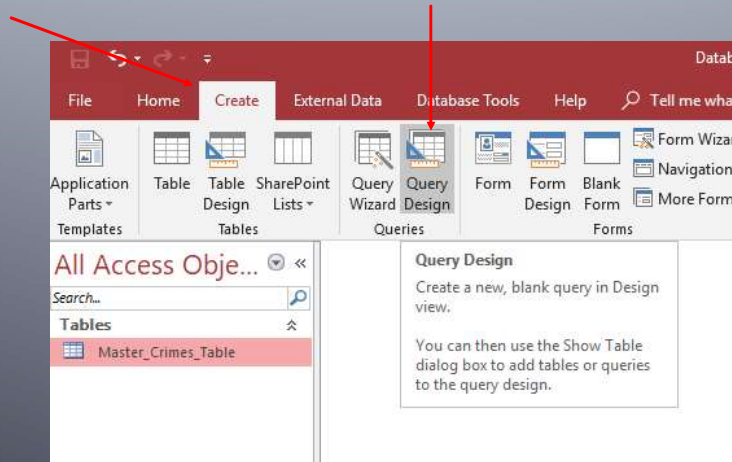
The screenshot displays the Microsoft Access interface. On the left, the 'All Access Objects' pane shows a search bar and a list of tables, with 'Master_Crimes_Table' selected. The main window shows a data table with the following columns: ID, CallNumber, IBRDescription, Address, Year, and Month. The data is as follows:

ID	CallNumber	IBRDescription	Address	Year	Month
1	01-21	Aggravated	625402131 RIVERSIDE ST	2010	Jan
2	01-41	Aggravated	021310131 SAWYER ST	2012	Sep
3	01-51	Aggravated	021310131013102 MAIN ST	2015	Jan
4	01-56	Aggravated	62546254 HIGH PINE AVE	2014	Jan
5	01-63	Aggravated	6254021310231 CHESTNUT ST A	2009	Jan
6	01-64	Aggravated	6254310213102A PINE ST	2009	Jan
7	01-68	Aggravated	62540213102131 MAIN ST	2010	Jan
8	01-70	Aggravated	625462546254 LAKE ST	2010	Jan
9	01-79	Aggravated	62540213131 GREEN SAVOR RD 0213102E	2011	Jan
10	01-82	Aggravated	0213102131 BURGUNDY DR	2009	Jan
11	01-83	Aggravated	0213102 MAPLE ST 6254	2010	Jan
12	01-87	Aggravated	021310131 UNDERHILL ST B	2009	Jan
13	01-92	Aggravated	62540213102131 WEST HOLLIS ST	2010	Jan
14	01-95	Aggravated	625402131013102 NORTHEASTERN BLVD	2015	Jan
15	01-98	Aggravated	0213102B SIXTH ST	2009	Jan

View imported data.

Create Crosstabs

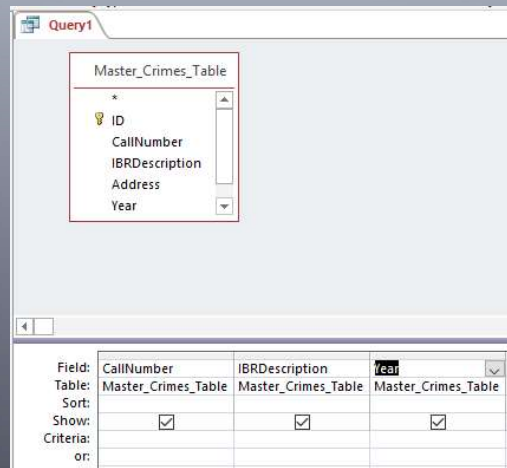
Create a basic query



Create crosstab query. See Part 8 for a refresher on how to create crosstab queries.

Create Crosstabs

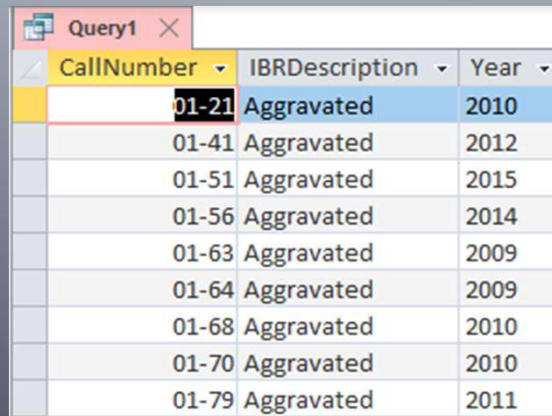
Draw in your “Master_Crimes_Table” fields: CallNumber, IBRDDescription and Year



Draw in your “Master_Crimes_Table” fields: CallNumber, IBRDDescription and Year.

Create Crosstabs

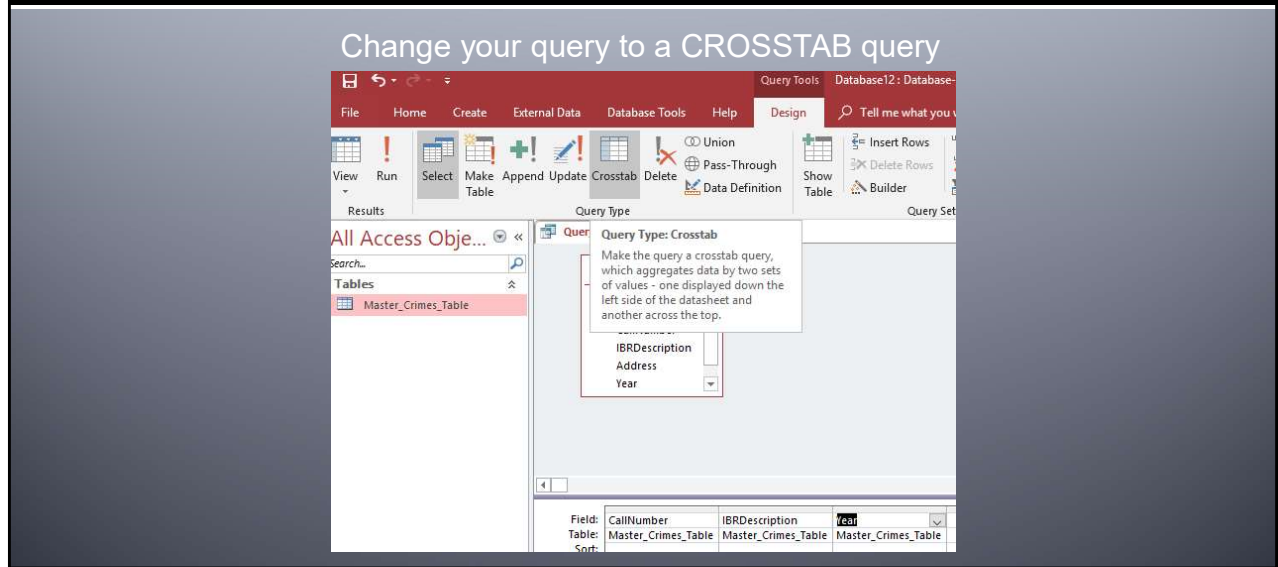
View your data



CallNumber	IBRDescription	Year
01-21	Aggravated	2010
01-41	Aggravated	2012
01-51	Aggravated	2015
01-56	Aggravated	2014
01-63	Aggravated	2009
01-64	Aggravated	2009
01-68	Aggravated	2010
01-70	Aggravated	2010
01-79	Aggravated	2011

View your data.

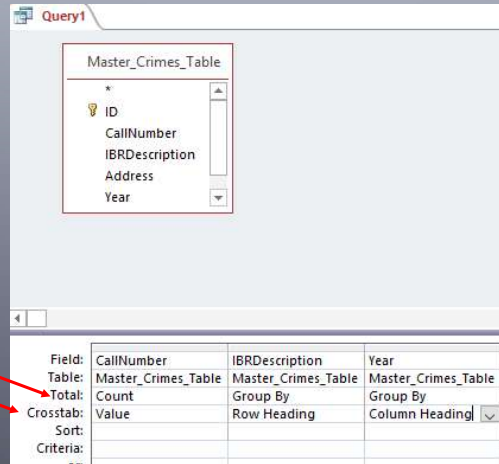
Create Crosstabs



Make your select query a crosstab query if you haven't already done so.

Create Crosstabs

Update TOTALS and CROSSTAB values



Notice the new criteria rows that appear.

Call number = Total **count**; Crosstab **value**

IBR Description = Total **Group By**; Crosstab **Row Heading**

Year = Total **Group By**; Crosstab **Column Heading**

Create Crosstabs

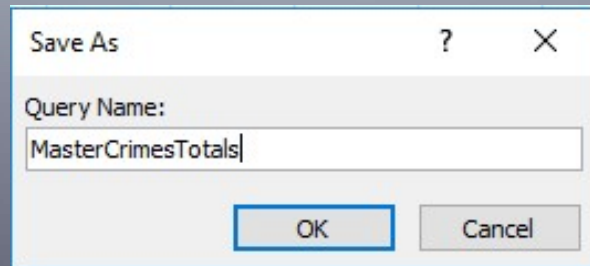
View results

IBRDescription	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Aggravated	152	675	818	828	773	790	782	876	907	750	726	721	134
All Other Larceny	40	330	372	344	342	305	331	320	360	365	214	151	216
All Other Offenses	107	455	422	372	450	495	529	668	600	545	518	477	114
Arson	8	48	33	28	16	15	29	18	31	9	15	5	2
Assisting or Promoting Prostitution									1				
Bad Checks	3	12	6	14	11	14	19	4	9	6	2	5	2
Bribery									1				
Burglary / Breaking and Entering	54	312	329	438	410	375	408	361	371	319	269	136	31
Burglary to Residence	21	94	109	97	91	86	67	115	93	78	71	88	20
Counterfeiting / Forgery	11	68	58	37	47	36	85	74	57	89	57	59	16
Credit Card / ATM Fraud	17	59	53	55	85	68	56	42	62	61	61	69	26
Destruction / Damage / Vandalism of Property	275	968	974	929	959	849	755	708	769	718	567	419	82
Disobeying an Officer								1					
Driving Under the Influence	67	261	205	161	216	223	279	241	249	215	194	192	42
Drug / Narcotic Violations	61	208	247	224	220	209	250	308	327	329	372	392	141
Drug Equipment Violations		1	1	1								1	
Embezzlement	8	28	37	35	42	48	23	29	27	33	29	41	
Extortion / Blackmail					1	2		1	1	1		2	
Family Offenses, Nonviolent	11	40	43	28	42	38	40	38	45	38	23	59	19

View results.

Create Crosstabs

Save as Master Crimes Totals



Save As

Query Name:

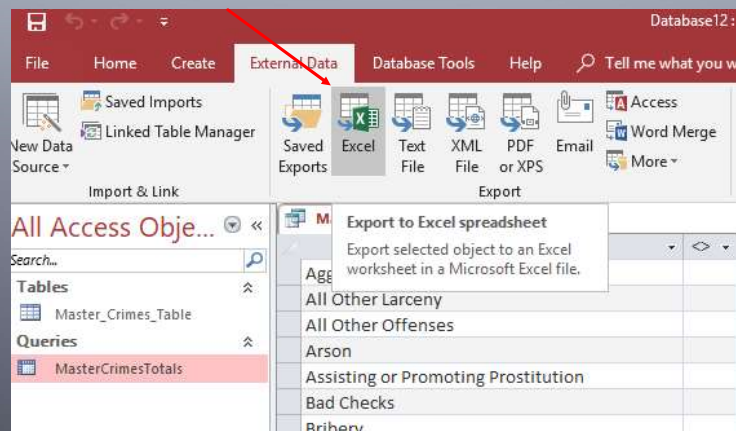
MasterCrimesTotals

OK Cancel

Save as "MasterCrimesTotals".

Export Crosstabs

Follow EXPORT WIZARD



Export your new statistics by using the Export Wizard.

External Data
Export
Excel

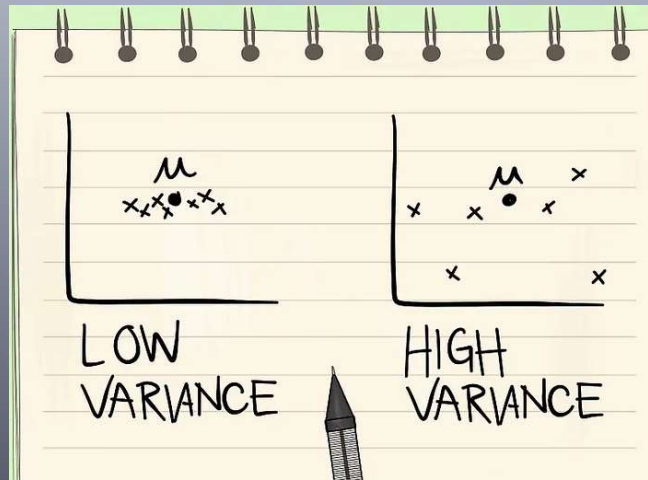
Follow wizard.

Objective 3

Create normal range, average, statistically significant/z-scores, percent changes.

Objective 3: Create normal range, average, statistically significant/z-scores, percent changes.

Populate Z-Score Formula



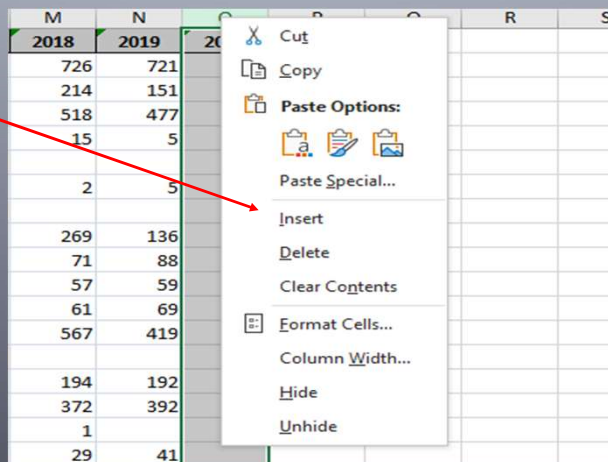
The variance is a figure that represents how far your data is clustered about the mean.

Now to Populate **Z-score formula**.

Understand: The variance is a figure that represents how far your data is clustered about the mean. The Z-score will help measure this and red flag you if something has too high of a variance to be within the normal range.

Populate Z-Score Formula

Open your exported excel sheet and insert 3 blank columns



M	N	O	P	Q	R	S
2018	2019	2020				
726	721					
214	151					
518	477					
15	5					
2	5					
269	136					
71	88					
57	59					
61	69					
567	419					
194	192					
372	392					
1						
29	41					

In the Excel sheet, insert 3 blank columns. We are going to populate these columns with the formulas that are needed to generate Z-score, which include:

- Average
- ST Deviation
- Normal Range
- Zscore
- % Change Average-2020
- % Change 2019-2020

Populate Z-Score Formula

Add new columns

- Average
- ST Deviation
- Normal Range
- Zscore
- % Change Average-2020 (current year)
- % Change 2019-2020 (past year to current year)

N	O	P	Q	R	S	T
2019	Avg	ST Deviation	Normal Range	2020	% Change Average-2020	% Change 2019-2020
721				134		
151				216		
477				114		
5				2		

Add new columns

New 3 fields between 2019 and 2020. 2020 represents the current year in this case.

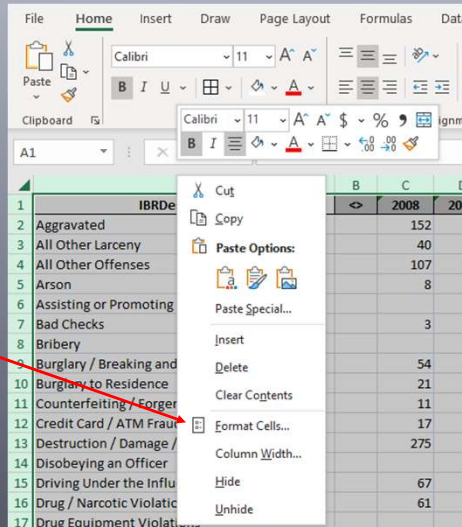
- Average
- ST Deviation
- Normal Range

Immediately after the current year, add three additional fields:

- Zscore
- % Change Average-current
- % Change past year to current year

Populate Z-Score Formula

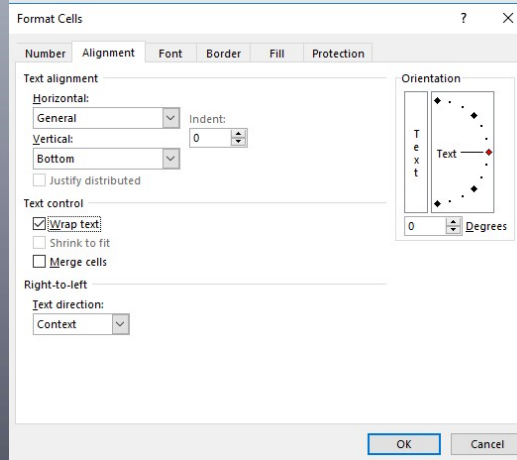
Format Cells



Format cells. Select all (top left-hand corner), right click, select "Format Cells..."

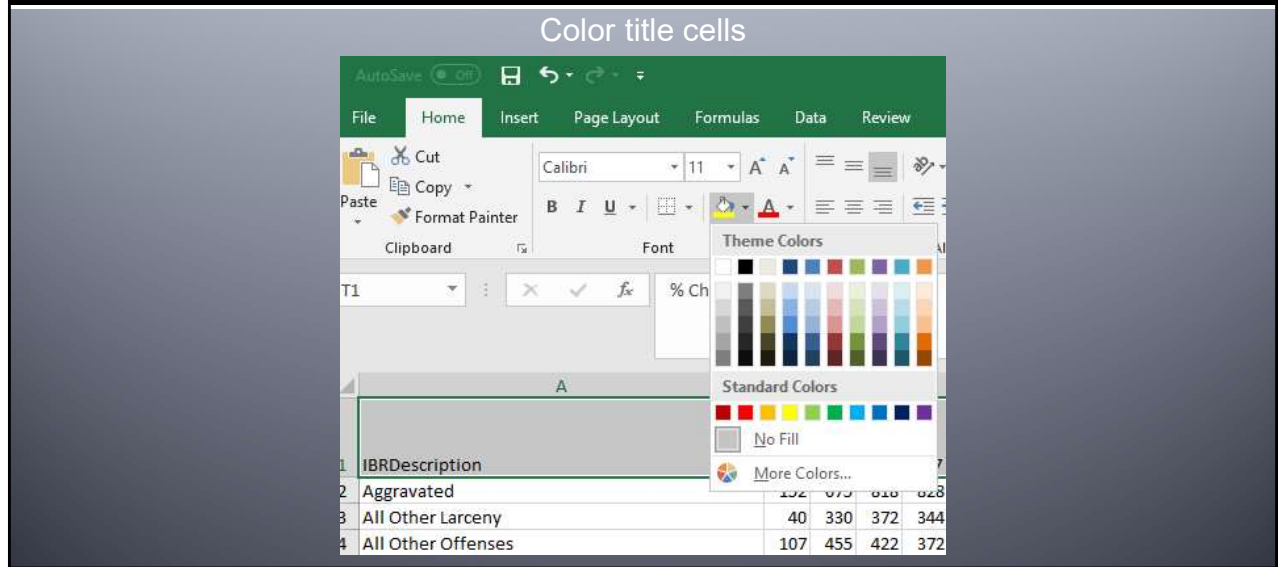
Populate Z-Score Formula

Alignment. Wrap text



Under the tab called “Alignment”, select “Wrap text”.

Populate Z-Score Formula

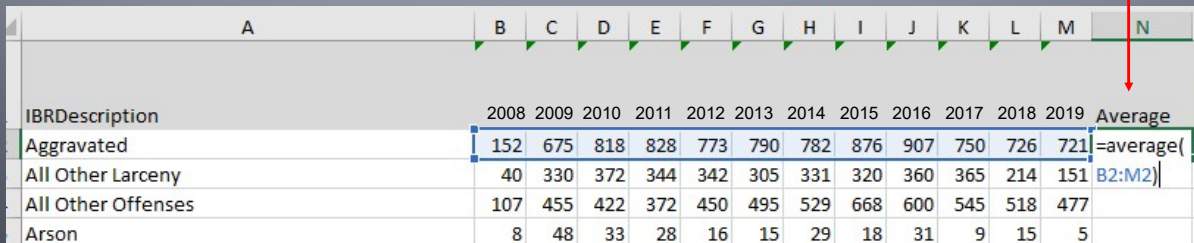


Change colors; select desired fields, right click, change background color to grey.

Populate Z-Score Formula

Delete column B

=AVERAGE(B2:M2)



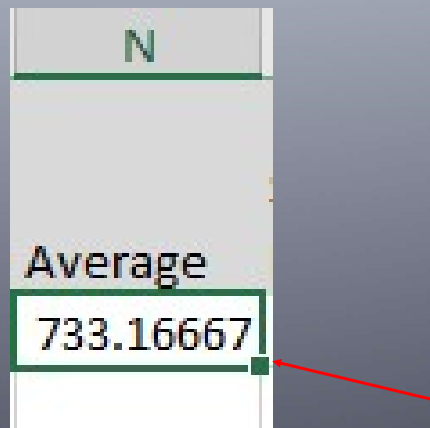
IBRDescription	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
Aggravated	152	675	818	828	773	790	782	876	907	750	726	721	=average(B2:M2)
All Other Larceny	40	330	372	344	342	305	331	320	360	365	214	151	
All Other Offenses	107	455	422	372	450	495	529	668	600	545	518	477	
Arson	8	48	33	28	16	15	29	18	31	9	15	5	

Delete Column B = blank data

Insert this formula into the first cell under "Average": =AVERAGE(B2:M2)

Populate Z-Score Formula

Drag calculation throughout data

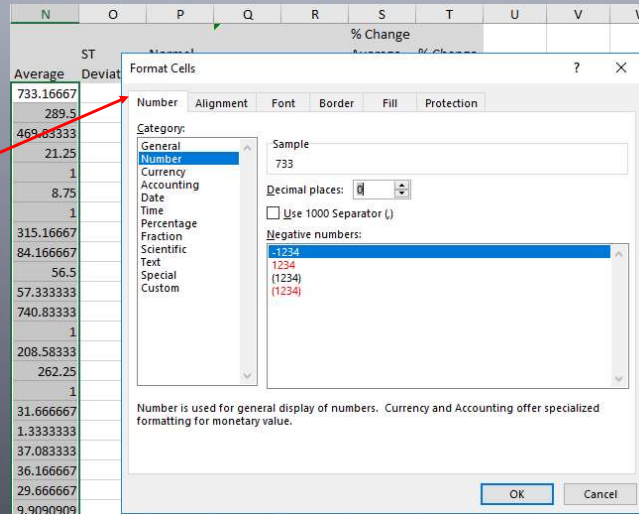


N
Average
733.16667

Drag the corner box down throughout data set to populate all cells within the column with the formula.

Populate Z-Score Formula

Format cells

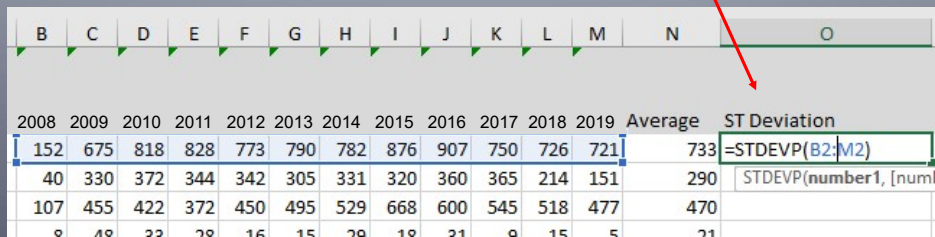


Select, right click, and format your average cells to have zero decimal places.

Populate Z-Score Formula

=STDEVP(B2:M2)

Drag formulas throughout cells in O field



	B	C	D	E	F	G	H	I	J	K	L	M	N	O
2008	152	675	818	828	773	790	782	876	907	750	726	721	733	=STDEVP(B2:M2)
2009	40	330	372	344	342	305	331	320	360	365	214	151	290	STDEVP(number1, [num
2010	107	455	422	372	450	495	529	668	600	545	518	477	470	
2011	8	48	22	28	16	15	28	18	21	8	15	5	21	

In Standard Deviation column, add this formula

=STDEVP(B2:M2)

Drag formulas throughout cells in O field

Populate Z-Score Formula

=CONCATENATE(ROUND(N2-O2,0),"-",ROUND(N2+O2,0))
 Drag formulas throughout cells in P field

N	O	P	Q
Average	StDev	Normal Range	2020
733	186	=CONCATENATE(ROUND(N2-O2,0),"-",ROUND(N2+O2,0))	134
290	98		216
470	133		114
21	12		
1	0		
9	5		2
1	0		

In Normal Range column, add this formula:

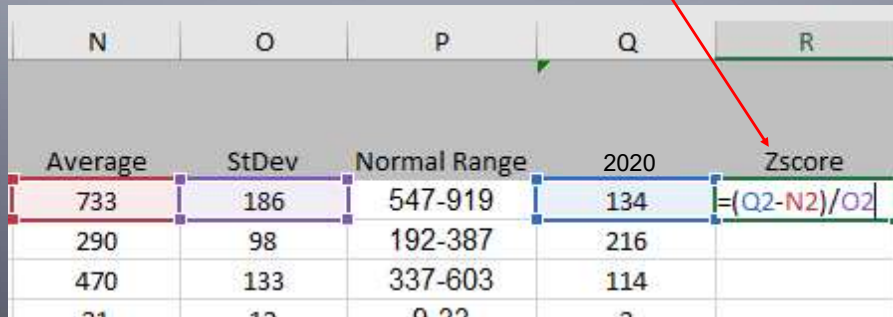
=CONCATENATE(ROUND(N2-O2,0),"-",ROUND(N2+O2,0))

Drag formulas throughout cells in P field

Populate Z-Score Formula

$$=(Q2-N2)/O2$$

Drag formulas throughout cells in R field



N	O	P	Q	R
Average	StDev	Normal Range	2020	Zscore
733	186	547-919	134	$=(Q2-N2)/O2$
290	98	192-387	216	
470	133	337-603	114	
31	12	0-22	2	

In Z-score cell, add this formula

$$=(Q2-N2)/O2$$

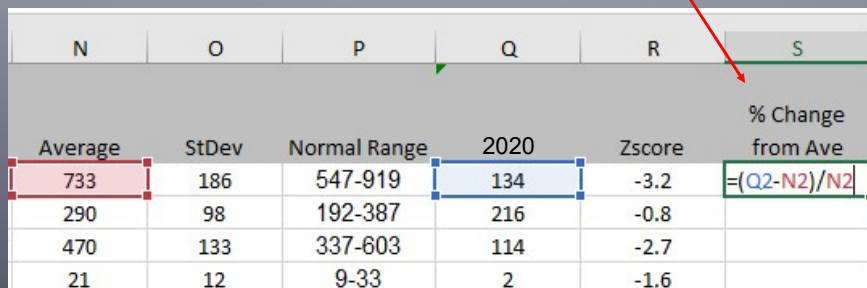
Drag formulas throughout cells in R field

Populate Z-Score Formula

$$=(Q2-N2)/N2$$

Drag formulas throughout cells in S field

Format the cells to be percentages



N	O	P	Q	R	S
Average	StDev	Normal Range	2020	Zscore	% Change from Ave
733	186	547-919	134	-3.2	$=(Q2-N2)/N2$
290	98	192-387	216	-0.8	
470	133	337-603	114	-2.7	
21	12	9-33	2	-1.6	

In percent change from the average column, add this formula (new minus old divided by the old; old equals average):

$$=(Q2-N2)/N2$$

Drag formulas throughout cells in S field

Format the cells to be percentages

Populate Z-Score Formula

$=(Q2-M2)/M2$

Drag formulas throughout cells in T field

Format the cells to be percentages

M	N	O	P	Q	R	S	T
2019	Average	StDev	Normal Range	2020	Zscore	% Change from Ave	% change from prev year
721	733	186	547-919	134	-3.2	-82%	$=(Q2-M2)/M2$
151	290	98	192-387	216	-0.8	-25%	
477	470	133	337-603	114	-2.7	-76%	
5	21	12	9-33	2	-1.6	-91%	

In the percent change from previous year column, add this formula (new minus old divided by the old):

$=(Q2-M2)/M2$

Drag formulas throughout cells in T field

Format the cells to be percentages

Populate Z-Score Formula

Clean up formatting View

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
IBRDescription	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average	StDev	Normal Range	2020	Zscore	% Change from Ave	% change from prev year	
Aggravated	152	675	818	828	773	790	782	876	907	750	726	721	733	186	547-919	134	-3.2	-82%	-81%	
All Other Larceny	40	330	372	344	342	305	331	320	360	365	214	151	290	98	192-387	216	-0.8	-25%	43%	
All Other Offenses	107	455	422	372	450	495	529	668	600	545	518	477	470	133	337-603	114	-2.7	-76%	-76%	
Arson	8	48	33	28	16	15	29	18	31	9	15	5	21	12	9-33	2	-1.6	-91%	-60%	
Assisting or Promoting Prostitution										1			1	0	1-1	#DIV/0!	-100%	#DIV/0!		

Clean up formatting. Double click on fields to resize.

POP UP QUESTION 3

True or False
The “Average” isn’t really an essential field to calculate the Z-score?

POP UP QUESTION 3:

True or **False**

The “Average” isn’t really an essential field to calculate the Z-score?

(False. The “Average” is needed to calculate the “normal range”, the “z-score”, and the “percent change from the average”.)

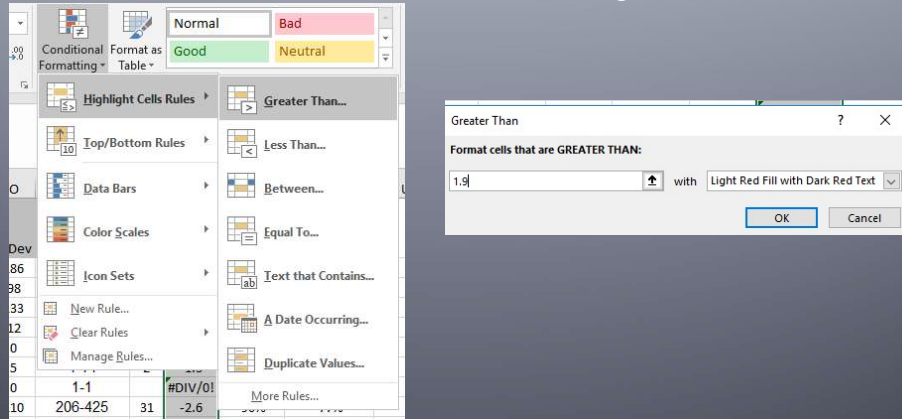
Objective 4

Apply conditional formatting.

Objective 4: Apply conditional formatting.

Conditional Formatting

Select Z-Score column. Format to number with 2 decimal places
Find Conditional Formatting
Format where cells are Great Than 1.9 as “light red filled with dark red text”



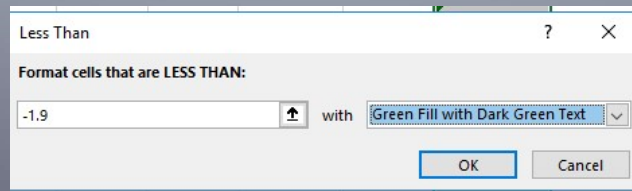
Conditional formatting helps you easily see any data that meets your desired thresholds using colors and formatting (bold, italics, etc.).

To see values that are above the threshold:

- Select Z-Score column. Format to number with 2 decimal places
- Find Conditional Formatting
- Format where cells are Great Than 1.9 as “light red filled with dark red text”

Conditional Formatting

Select Z-Score column
Find Conditional Formatting
Format where cells are Less Than -1.9 as “green filled with dark green text”



To see values that well below the threshold.

- Select Z-Score column
- Find Conditional Formatting
- Format where cells are Less Than -1.9 as “green filled with dark green text”

Conditional Formatting

What requires additional analyses?

IBRDescription	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average	StDev	Normal Range	2020	Zscore	% Change from Ave	% change from prev year	
Aggravated	152	675	818	828	773	790	782	876	907	750	726	721	733	186	547-919	134	-3.2	-82%	-81%	
All Other Larceny	40	330	372	344	342	305	331	320	360	365	214	151	290	98	192-387	216	-0.8	-25%	43%	
All Other Offenses	107	455	422	372	450	495	529	668	600	545	518	477	470	133	337-603	114	-2.7	-76%	-76%	
Arson	8	48	33	28	16	15	29	18	31	9	15	5	21	12	9-33	2	-1.6	-91%	-60%	
Assisting or Promoting Prostitution										1			1	0	1-1		#DIV/0!	-100%	#DIV/0!	
Bad Checks	3	12	6	14	11	14	19	4	9	6	2	5	9	5	4-14	2	-1.3	-77%	-60%	
Bribery										1			1	0	1-1		#DIV/0!	-100%	#DIV/0!	
Burglary / Breaking and Entering	54	312	329	438	410	375	408	361	371	319	269	136	315	110	206-425	31	-2.6	-90%	-77%	
Burglary to Residence	21	94	109	97	91	86	67	115	93	78	71	88	84	23	61-107	20	-2.8	-76%	-77%	
Counterfeiting / Forgery	11	68	58	37	47	36	85	74	57	89	57	59	57	21	36-77	16	-1.9	-72%	-73%	
Credit Card / ATM Fraud	17	59	53	55	85	68	56	42	62	61	61	69	57	16	42-73	26	-2.0	-55%	-62%	
Destruction / Damage / Vandalism o	275	968	974	929	959	849	755	708	769	718	567	419	741	215	526-956	82	-3.1	-89%	-80%	
Disobeying an Officer										1			1	0	1-1		#DIV/0!	-100%	#DIV/0!	
Driving Under the Influence	67	261	205	161	216	223	279	241	249	215	194	192	209	53	156-261	42	-3.2	-80%	-78%	
Drug / Narcotic Violations	61	208	247	224	220	209	250	308	327	329	372	392	262	86	176-349	141	-1.4	-46%	-64%	
Drug Equipment Violations		1	1	1								1	1	0	1-1		#DIV/0!	-100%	#DIV/0!	
Embezzlement	8	28	37	35	42	48	23	29	27	33	29	41	32	10	22-42		-3.2	-100%	-100%	
Extortion / Blackmail					1	2		1	1	1			2	1	0	1-2		-2.8	-100%	-100%
Family Offenses, Nonviolent	11	40	43	28	42	38	40	38	45	38	23	59	37	11	26-49	19	-1.6	-49%	-68%	
Forcible Fondling	2	23	32	40	41	32	53	35	41	41	40	54	36	13	23-49	8	-2.1	-78%	-85%	
Forcible Rape	9	23	25	20	28	24	39	25	36	26	50	51	30	12	18-41	15	-1.2	-49%	-71%	
Forcible Sodomy		9	11	12	8	15	13	6	12	6	10	7	10	3	7-13	1	-3.1	-90%	-86%	
Found Property					2								2	0	2-2		#DIV/0!	-100%	#DIV/0!	
Impersonation	3	30	33	42	43	42	32	46	56	56	56	122	47	27	20-73	26	-0.8	-44%	-79%	

There's no hard science to this method. You can fluctuate the z-scores and use your **intuition as an analyst** to see what makes the most sense. For instance, if 85% of your cells were highlighted, then perhaps your threshold suggestions are too low or too high. A slight adjustment to your conditional formatting will yield more precise results. As a general rule, scores above 1.9 or below -1.9 may represent significance. In any case, these are only **FLAGS** that ring the internal bell – prompting the analyst to further investigate a particular category.

Applying this to our example, we might need to change our conditional formatting. Or we may consider running the average of the last 3-4 years versus 10 years of averages. There may have been some changes to the community or the way we report, but the last 3-4 years represent more consistent data.

Of note, wherever you see **"DIVO"**, this just means that Excel couldn't calculate the field. For instance, if you had no crime and were dividing zero by the previous year, it would kick back as **"DIVO"**, or unable to calculate as zero doesn't divide into a number.

POP UP QUESTION 4

All z-scores must be set at 1.9?

POP UP QUESTION 4: All z-scores must be set at 1.9?

False

(As a general rule, scores above 1.9 or below -1.9 may represent significance. In any case, these are only FLAGS that ring the internal bell – prompting the analyst to further investigate a particular category.)

Critical Thinking

Incident Type	Average	Usual Range	2008	2009	Change from Avg.	Notes
PROPERTY CRIME						
↓ Residential Burglary	39.6	32–48	36	31	-22%	Picked up a little in the fall but not enough to overwhelm low Jan-Sep.
↓ Commercial Burglary	32.1	24–41	24	19	-41%	Dropped precipitously with copper and metal no longer hot targets.
Theft from a Vehicle	262.9	205–321	349	226	-14%	Back down after high 2008 as GPS market declined. Still lots of patterns.
↓ Theft from a Building	102.1	88–116	82	64	-37%	Decreases in health club thefts and scrap metal thefts.
Theft from a Person	26.8	20–34	24	23	-14%	One fall pattern along Endicott Street but volume otherwise normal.
↓ Theft from a Residence	57.8	51–65	61	49	-15%	Low with fewer domestic and yard thefts.
↓ Theft of a Bicycle	23.1	18–28	26	16	-31%	Plummeted. No recurrence of summer 2008 patterns.
Theft of Services	21.1	15–27	16	20	-5%	Normal level of dine-and-ditch scams and gas drive-offs.
↑ Shoplifting	266.0	225–307	273	325	+22%	Shot up particularly around holidays as retailers buffed security forces.
↓ Auto Theft	52.5	36–69	33	23	-56%	Lowest level in at least 30 years. No patterns in 2009.
Arson	2.6	0–5	1	3	+15%	Port-a-potty, car, and dumpster, all during the fall.
↑ Fraud & Forgery	119.6	98–141	109	146	+22%	Big increase with numerous incidents of credit card fraud and identity theft.
Employee Theft	22.5	16–29	22	25	+11%	Relatively normal levels. One mall kiosk reported three.

It is important that analysts remember their purpose: To provide actionable reporting to our officers and detectives so that they may have opportunities to succeed – arrest the criminals, deter a traffic crash, impact crime, etc.

Threshold is simply **one tool** that allows analysts to measure crime patterns and trends. Analysts can run multiple thresholds several times a week to determine if there may be a potential pattern.

This is the critical thinking part... Do not simply provide statistics. Use threshold as a tool to determine what you will dig into, where you see significant increases and decreases. **Conduct a further analysis and provide actionable reporting for officer/detective strategy development and impact.** Tell a story with your numbers that prompts results!

Summary of Part 10 "Z-Score and Statistical Significance Made Easy (Excel)" Objectives

1. Apply threshold analysis.
2. Import Master Crimes, create crosstabs, and export queries.
3. Create normal range, average, statistically significant/z-scores, percent changes.
4. Apply conditional-formatting.

Summary

Objectives:

1. Apply threshold analysis.
2. Import Master Crimes, create crosstabs, and export queries.
3. Create normal range, average, statistically significant/z-scores, percent changes.
4. Apply conditional-formatting.

DDACTS Project

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