Quantitative & Qualitative Trauma Data Management for Analytical Optimization

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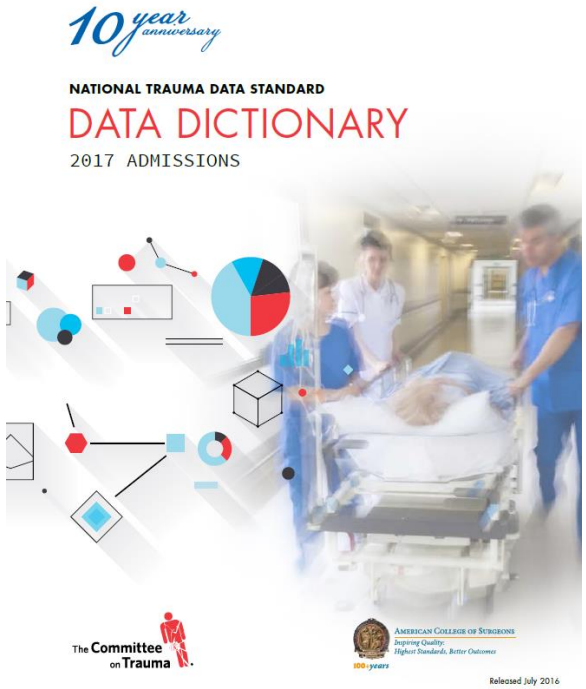
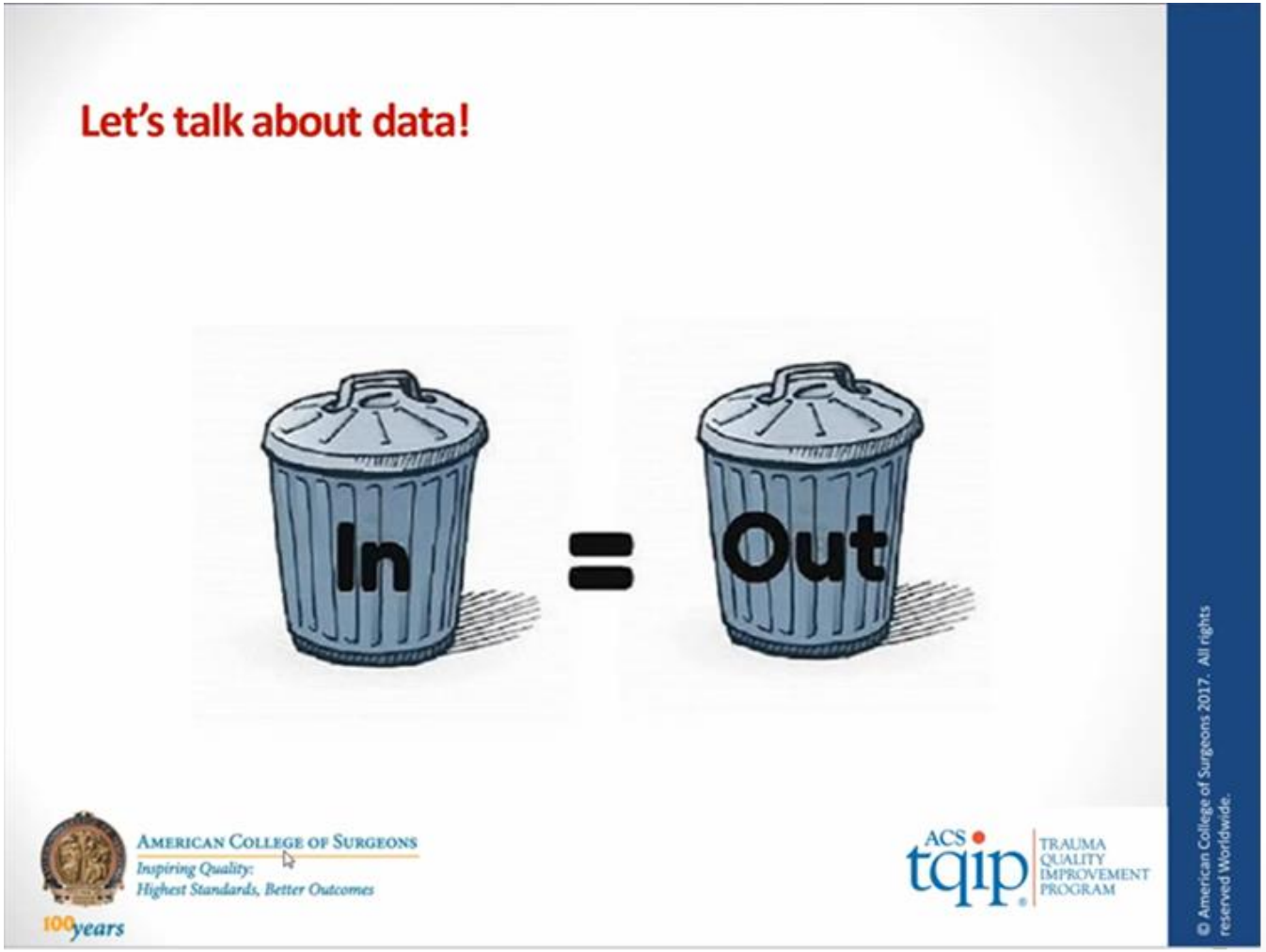
Objectives

- Quantitative Strategies
- Qualitative Strategies
- Merging Datasets
- Analytical Optimization



Importance of Data Quality



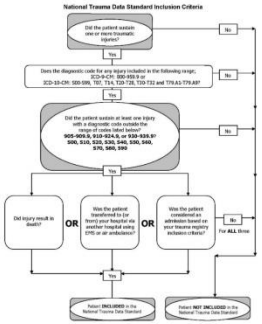
Quantitative Strategies

- Remember NTDB Inclusion Criteria
  - Injury diagnosis (other than superficial) – per ICD-10 range

  AND
  - Inter-facility transfers via EMS (even if discharged from ED)

  OR
  - Hospital admission

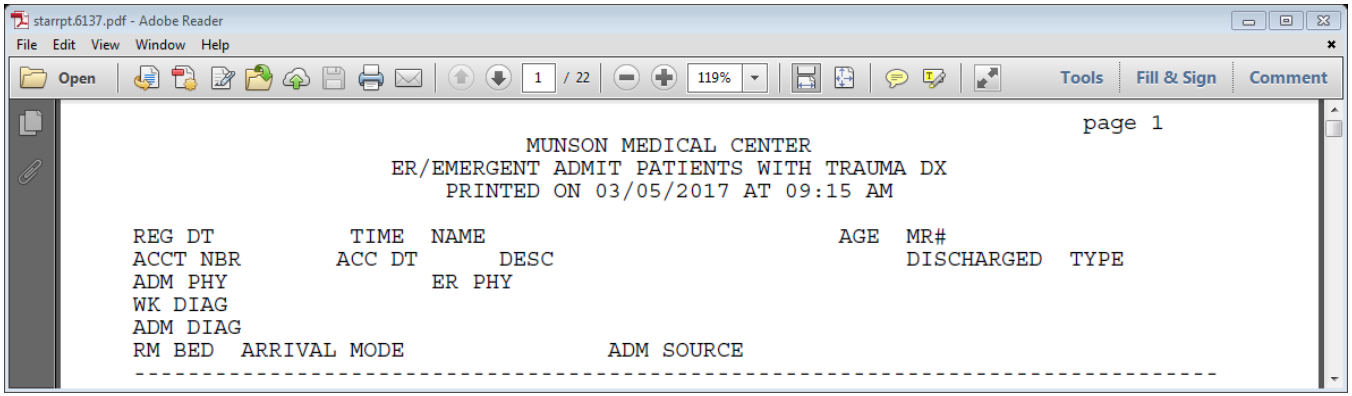
  OR
  - Death resulting from traumatic injury



- Remember Institution Specific Inclusion Criteria (as applicable)
  - All trauma activations
  - All trauma consults
  - Mechanism specific injuries

Quantitative Strategies

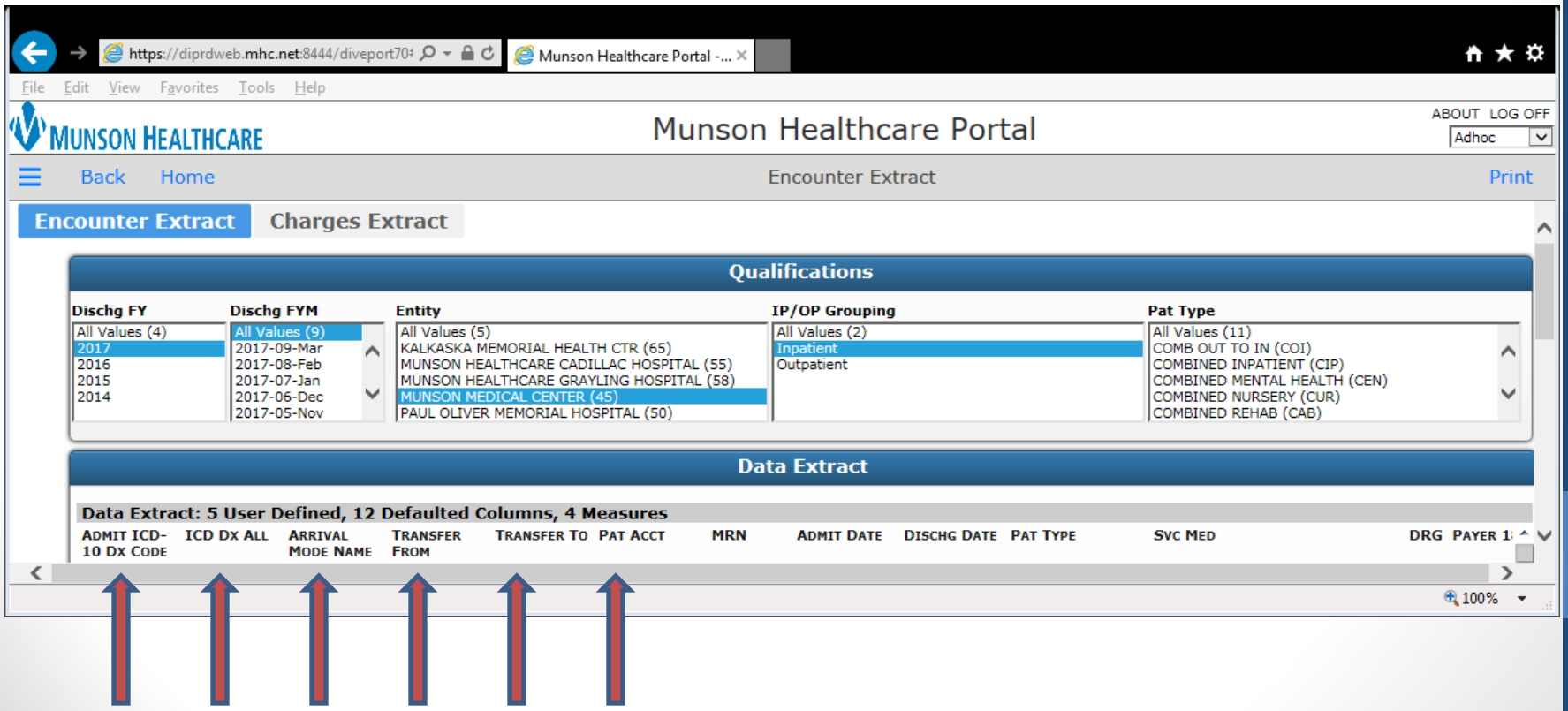
- Ensuring all Trauma Inclusion eligible patients are identified
  - ED / Trauma Logs
  - Trauma Service Patient Lists
  - Daily ED Patient Lists w/ chief complaint (Injury Related)
  - Daily ED Patient List w/ admission source (Transfer from Hospital)
  - Daily I/P Patient Lists w/ chief complaint (Injury Related)



- Eliminate single points of failure…“Redundancy ensures competency”

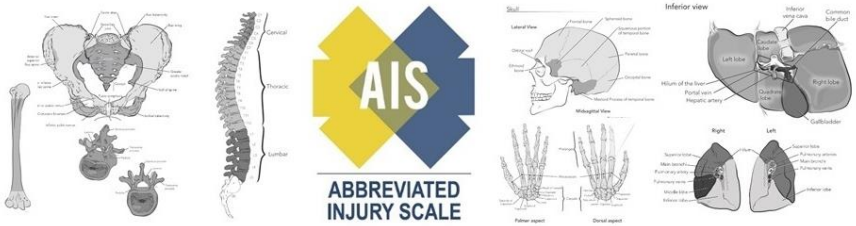
Quantitative Strategies

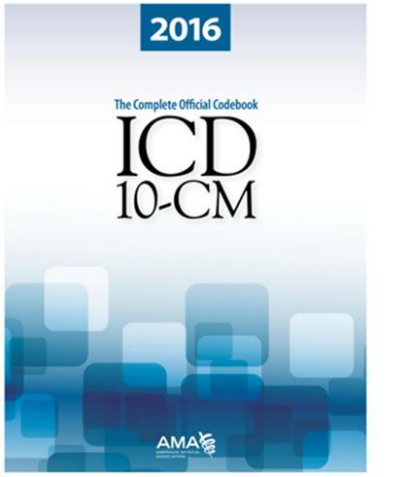
- Ad hoc audit tools…ensuring no eligible patients are missed
  - Medical billing coding records
  - Clinical intelligence data warehouse queries



Qualitative Strategies

- Ensuring all required & essential data elements are completed
  - Consult ACS NTDB National Trauma Data Standard: Data Dictionary for specific elements
  - Consult MTQIP Data Dictionary as appropriate
  - ALWAYS follow established hierarchies when choosing best source of data for entry into the trauma registry
  - ALWAYS follow Abbreviated Injury Scale coding & ICD-10 coding guidelines & rules

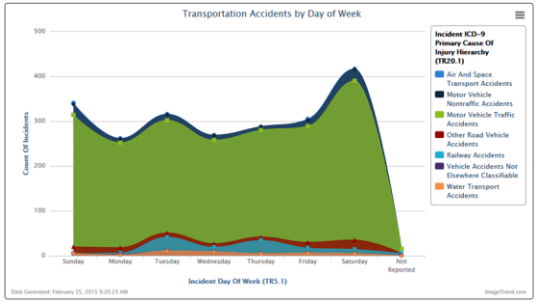


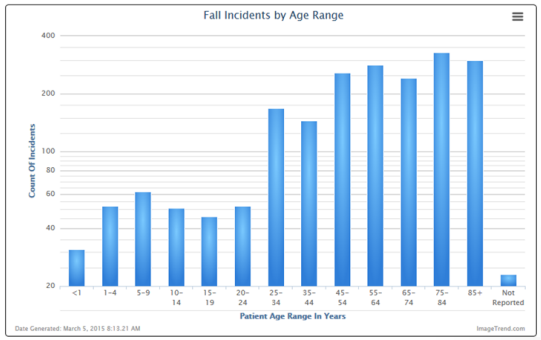


Qualitative Strategies

- Reduce human error in data collection wherever possible
  - Audit records / re-abstract to ensure quality – multiple levels of review:

  - Automate data entry, if possible, to reduce data entry errors
  - Use data analysis tools to verify consistent / accurate data entry





Qualitative Strategies

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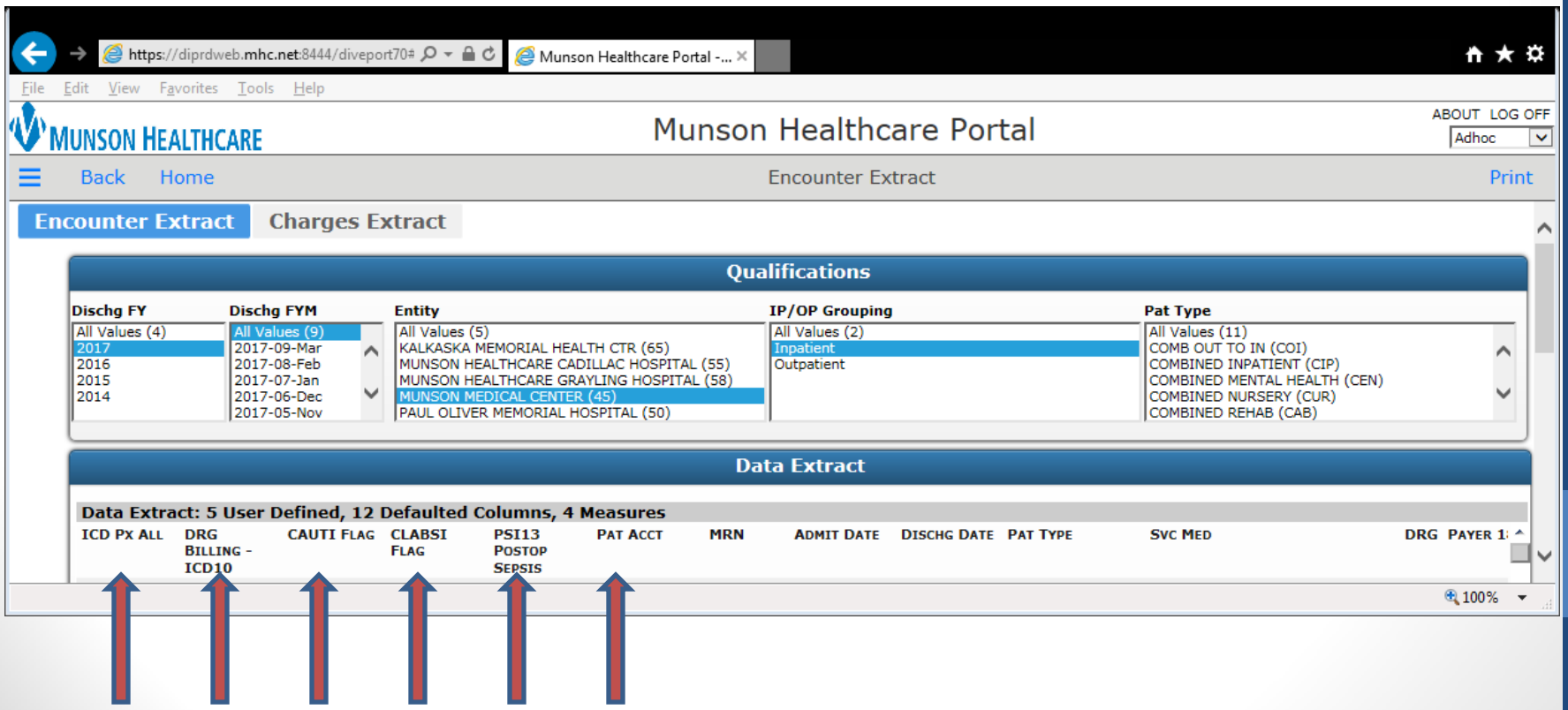
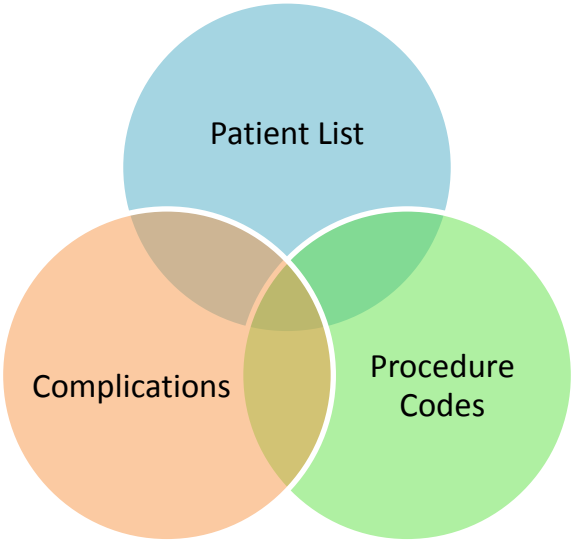


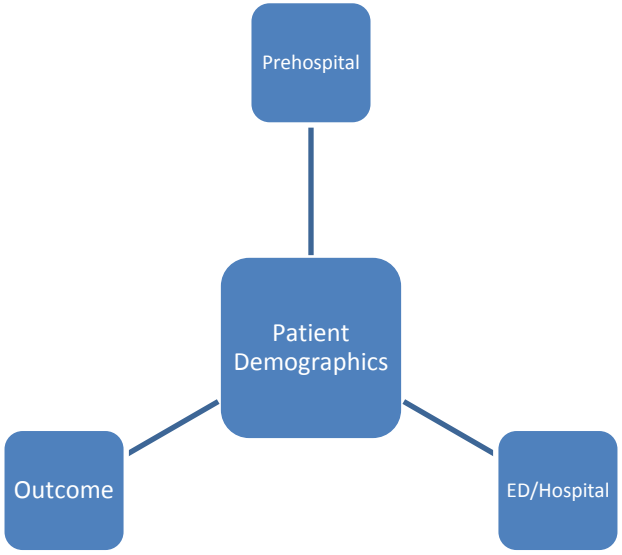
Merging Datasets

- Identify methods to work “smarter not harder”
- Utilize software solutions to merge datasets for entry into the trauma registry or to expand on the trauma registry
  - Spreadsheet type tools (e.g. Excel, csv, XML)
  - Data linkage & query tools (e.g. Access, SAS)



Merging Datasets: background

- Relational database = a database structured to recognize relations among stored items of information
- SQL (Structured Query Language) = the language for querying and maintaining the database
- Bottom line: data management relies on relational databases



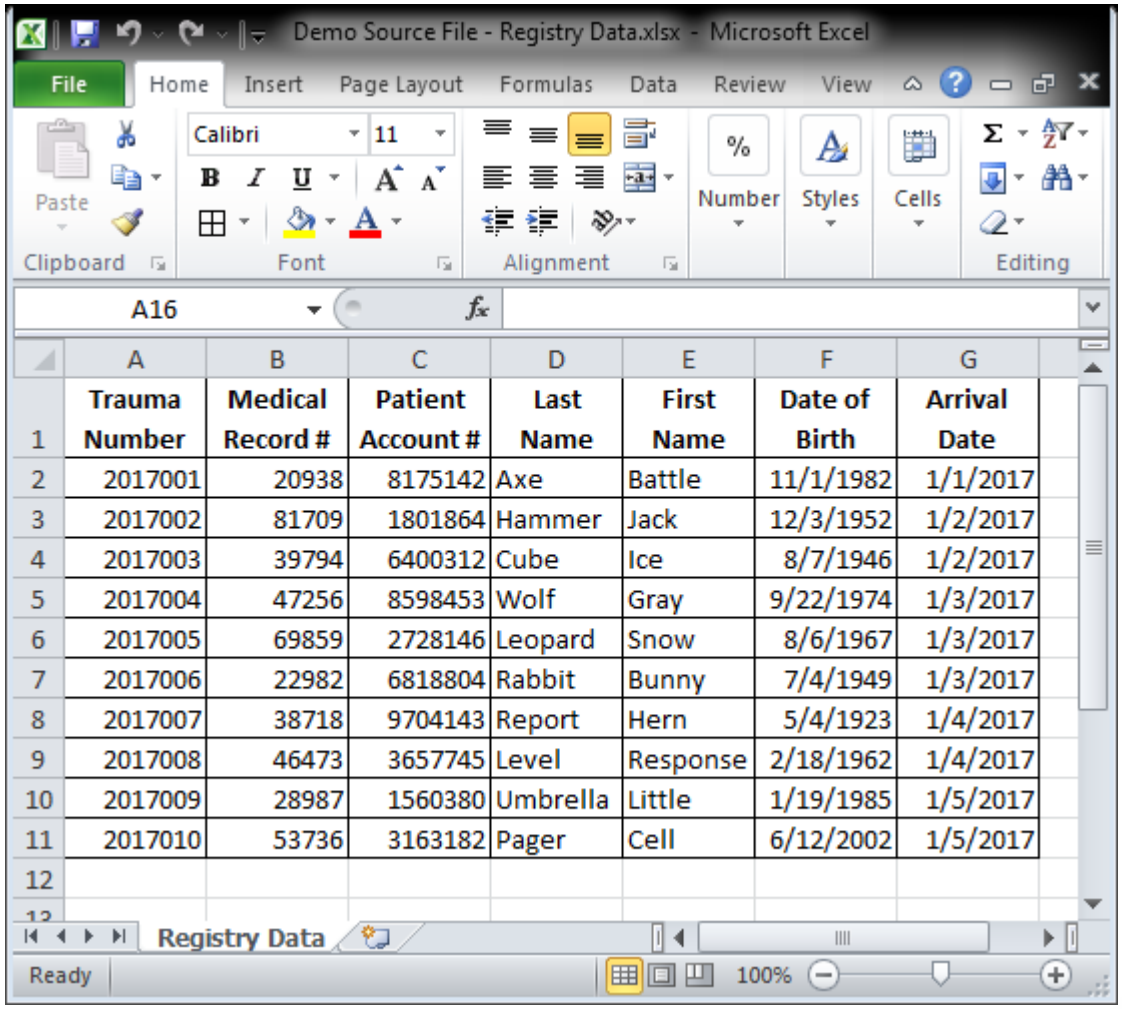
Merging Datasets: basic steps

- Prepare source files
- Import source files
- Write query to link files
- Generate calculations as needed
- Export desired data elements

Merging Datasets: prepare files

- Prepare source files
  - Identify linkage variable(s)
    - Patient Account # for unique encounters (e.g. for procedures)
    - Medical Record # to look across encounters (e.g. for readmissions)
    - Name & DOB to look across institutions (e.g. for patient transfers)
  - Ensure column headers are in the first row and properly labeled
    - Use column headers that are readily identifiable
    - Delete extraneous rows & columns (e.g. where no data exists)
  - Verify that source files are inclusive given desired criteria
    - Appropriate date ranges (e.g. CY 2016 vs. FY 2016)
    - Defined population (e.g. all I/P vs. all I/P & O/P)

Merging Datasets: prepare files



	A	B	C	D	E	F	G
1	Trauma Number	Medical Record #	Patient Account #	Last Name	First Name	Date of Birth	Arrival Date
2	2017001	20938	8175142	Axe	Battle	11/1/1982	1/1/2017
3	2017002	81709	1801864	Hammer	Jack	12/3/1952	1/2/2017
4	2017003	39794	6400312	Cube	Ice	8/7/1946	1/2/2017
5	2017004	47256	8598453	Wolf	Gray	9/22/1974	1/3/2017
6	2017005	69859	2728146	Leopard	Snow	8/6/1967	1/3/2017
7	2017006	22982	6818804	Rabbit	Bunny	7/4/1949	1/3/2017
8	2017007	38718	9704143	Report	Hern	5/4/1923	1/4/2017
9	2017008	46473	3657745	Level	Response	2/18/1962	1/4/2017
10	2017009	28987	1560380	Umbrella	Little	1/19/1985	1/5/2017
11	2017010	53736	3163182	Pager	Cell	6/12/2002	1/5/2017
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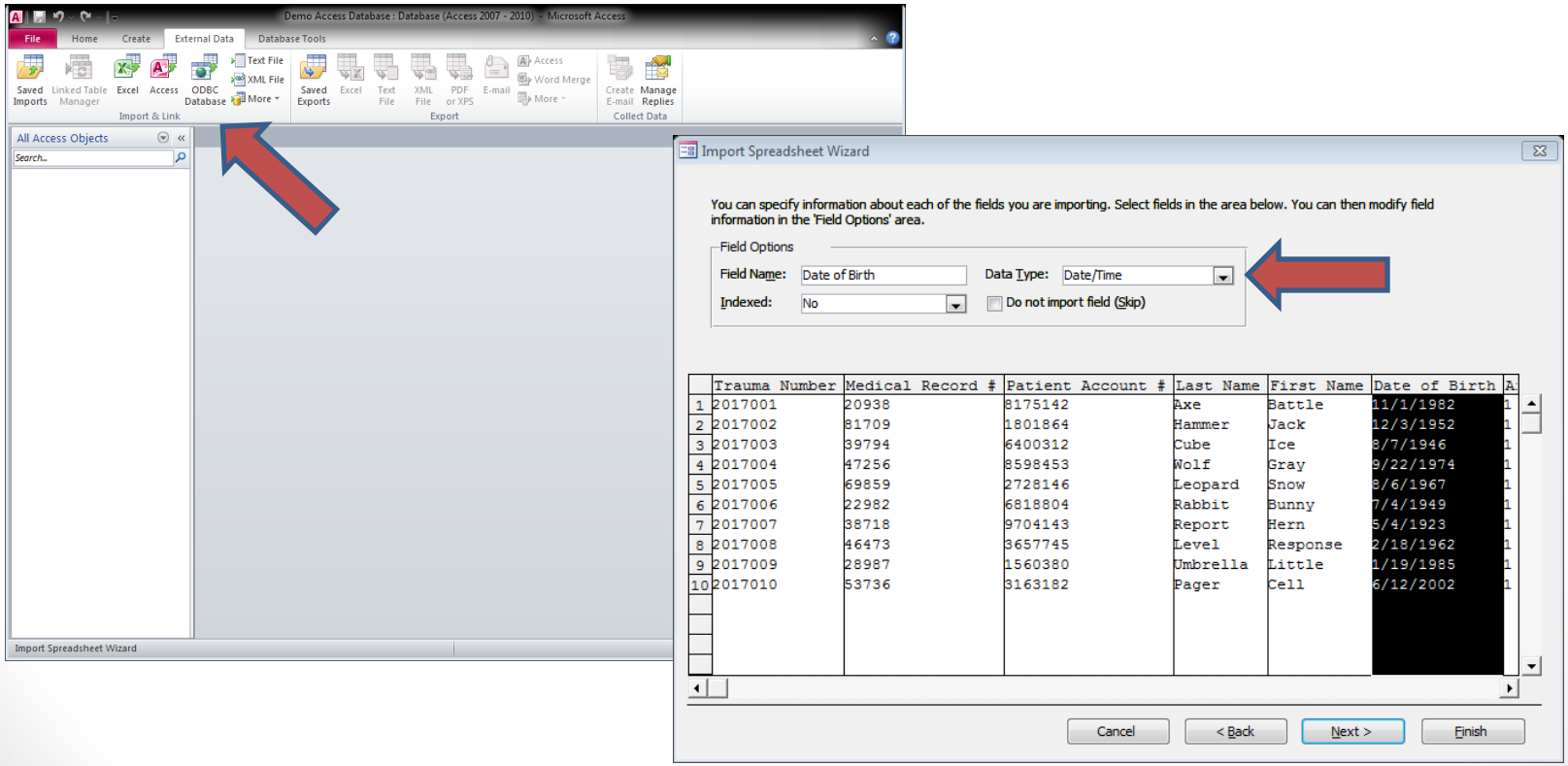
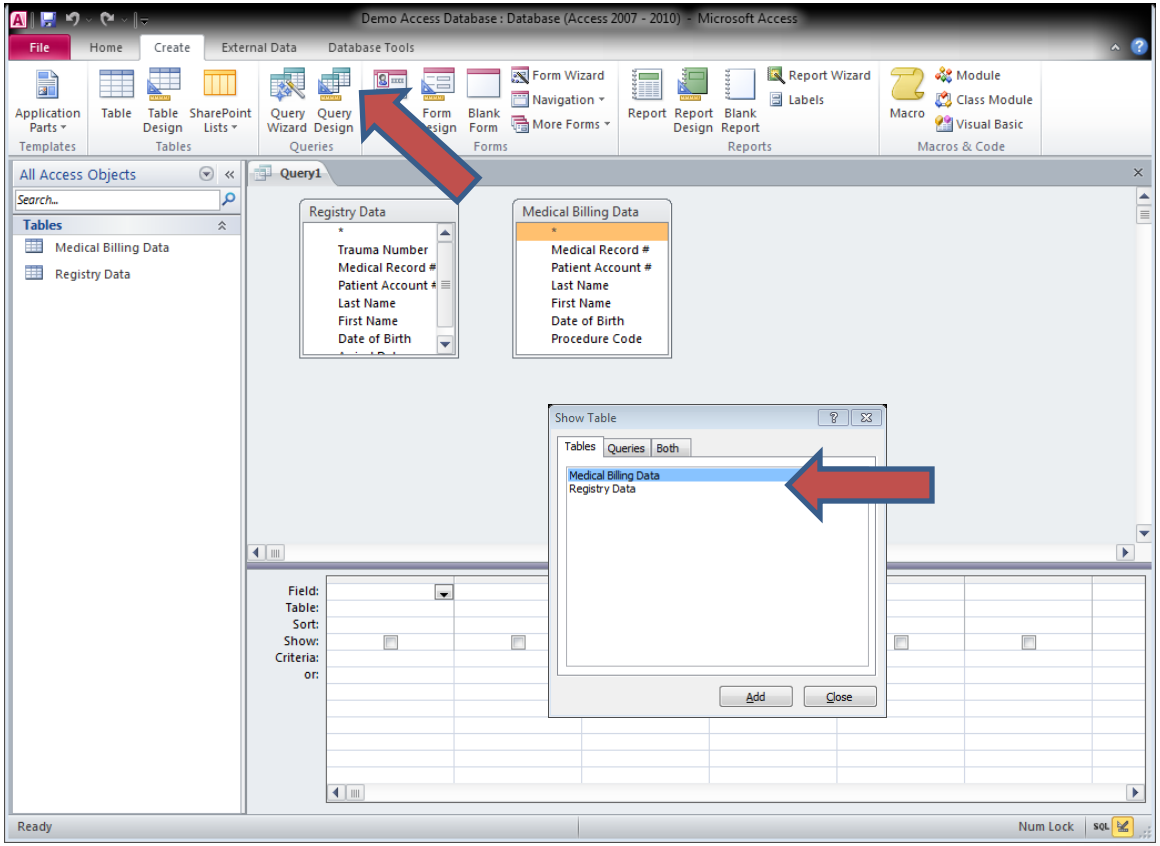
Merging Datasets: import files

- Import source files {**using Microsoft Access as an example**}
  - Choose appropriate file type to import (e.g. Excel, XML, Text)
  - Ensure data elements are imported in correct format (e.g. dates)



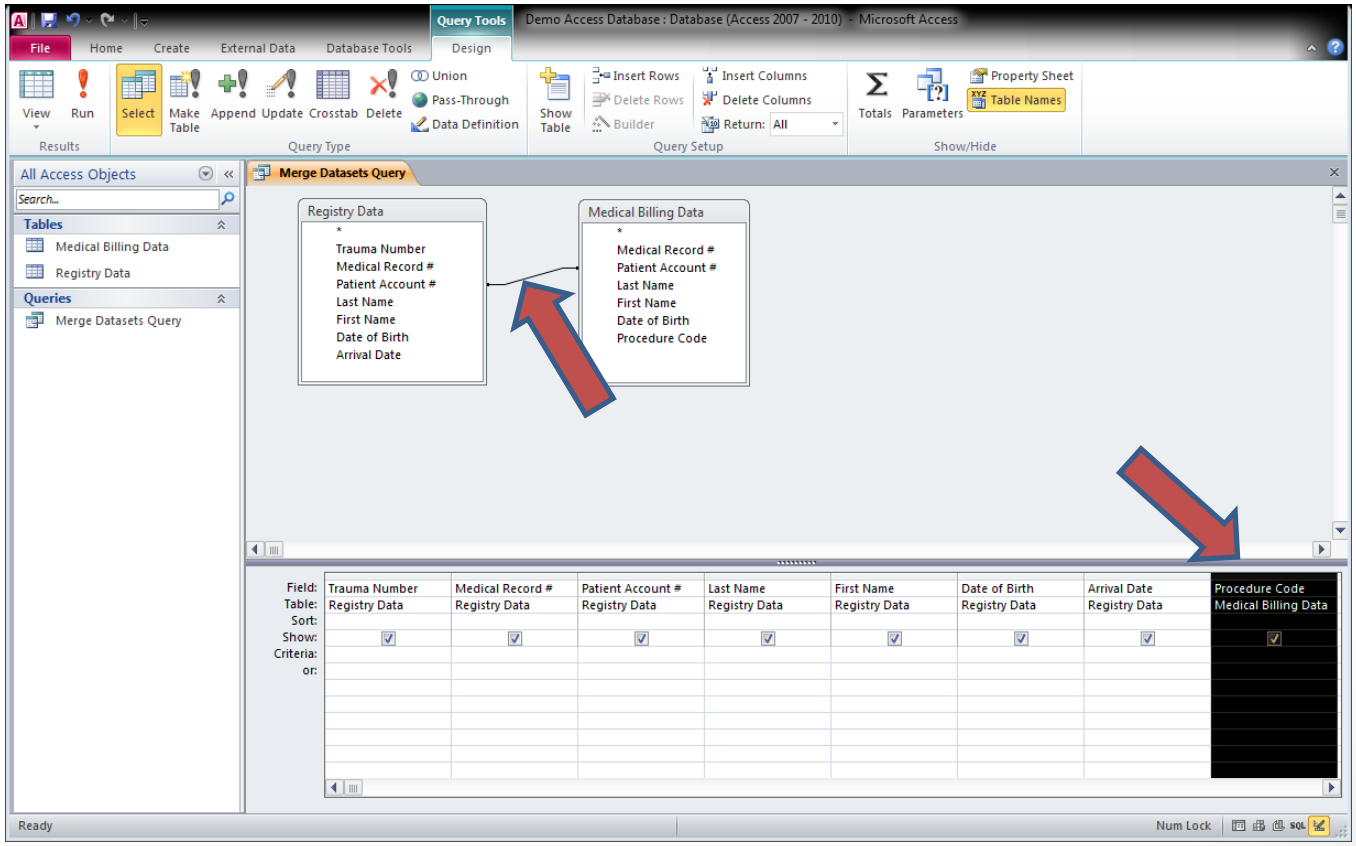
Merging Datasets: write query

- Write query to link files
  - Select type of query
  - Select files “tables” to merge / query



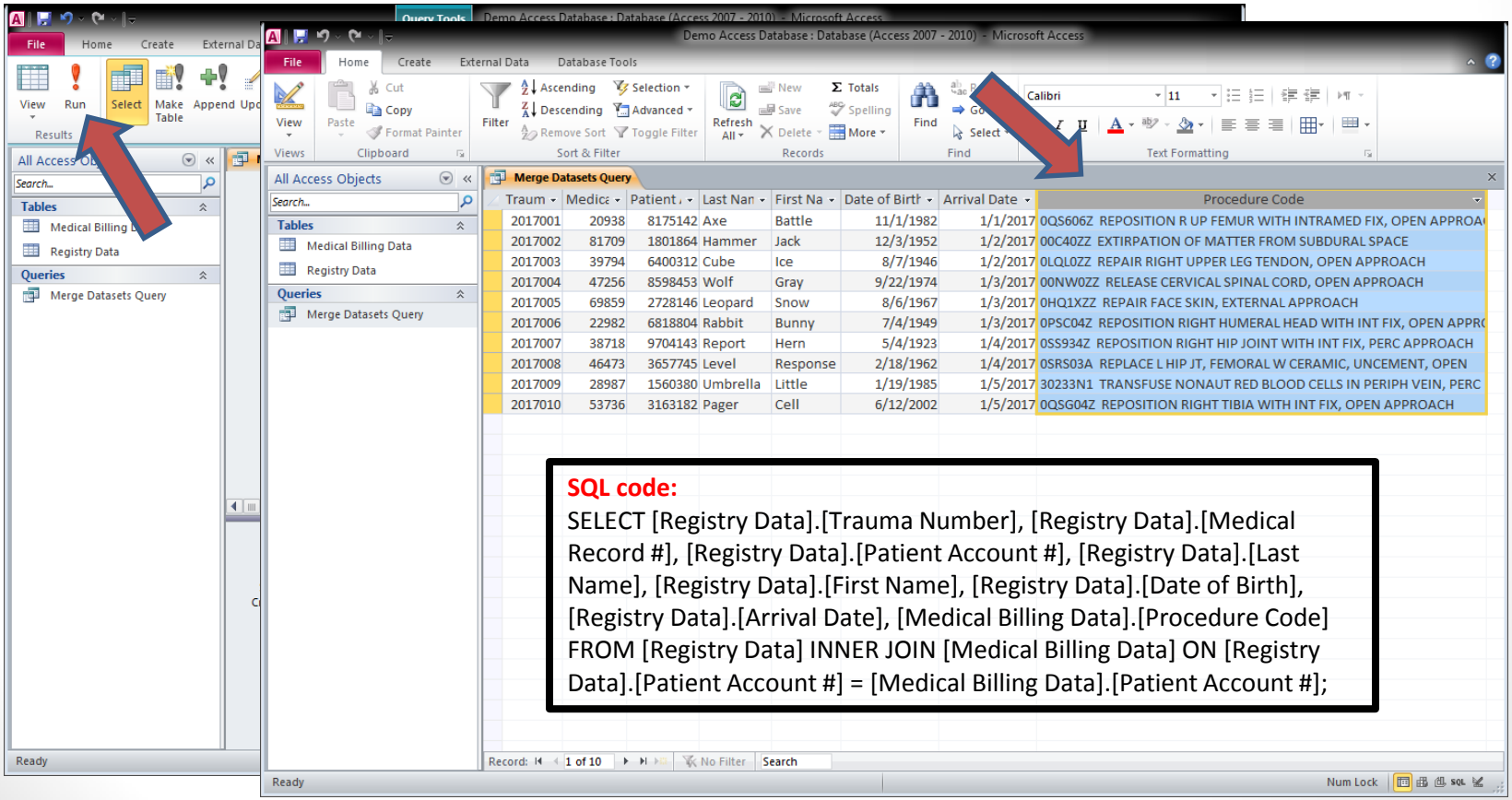
Merging Datasets: write query

- Write query to link files
  - "Relate" datasets by connecting key linkage variable(s)
  - Select data elements to display in the query



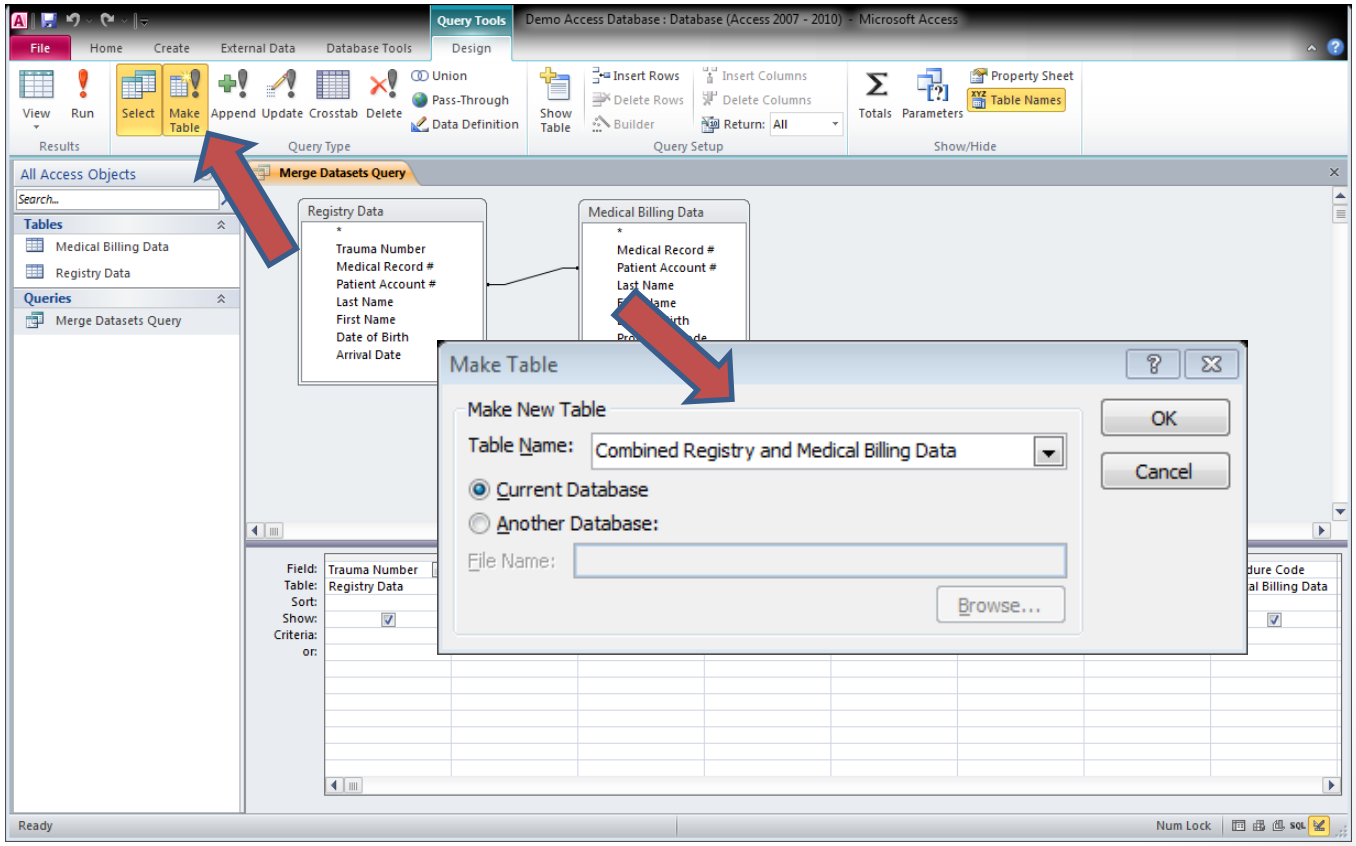
Merging Datasets: write query

- Write query to link files
  - “Run” the query to generate desired output / table
  - Verify that output is consistent with intent of the query



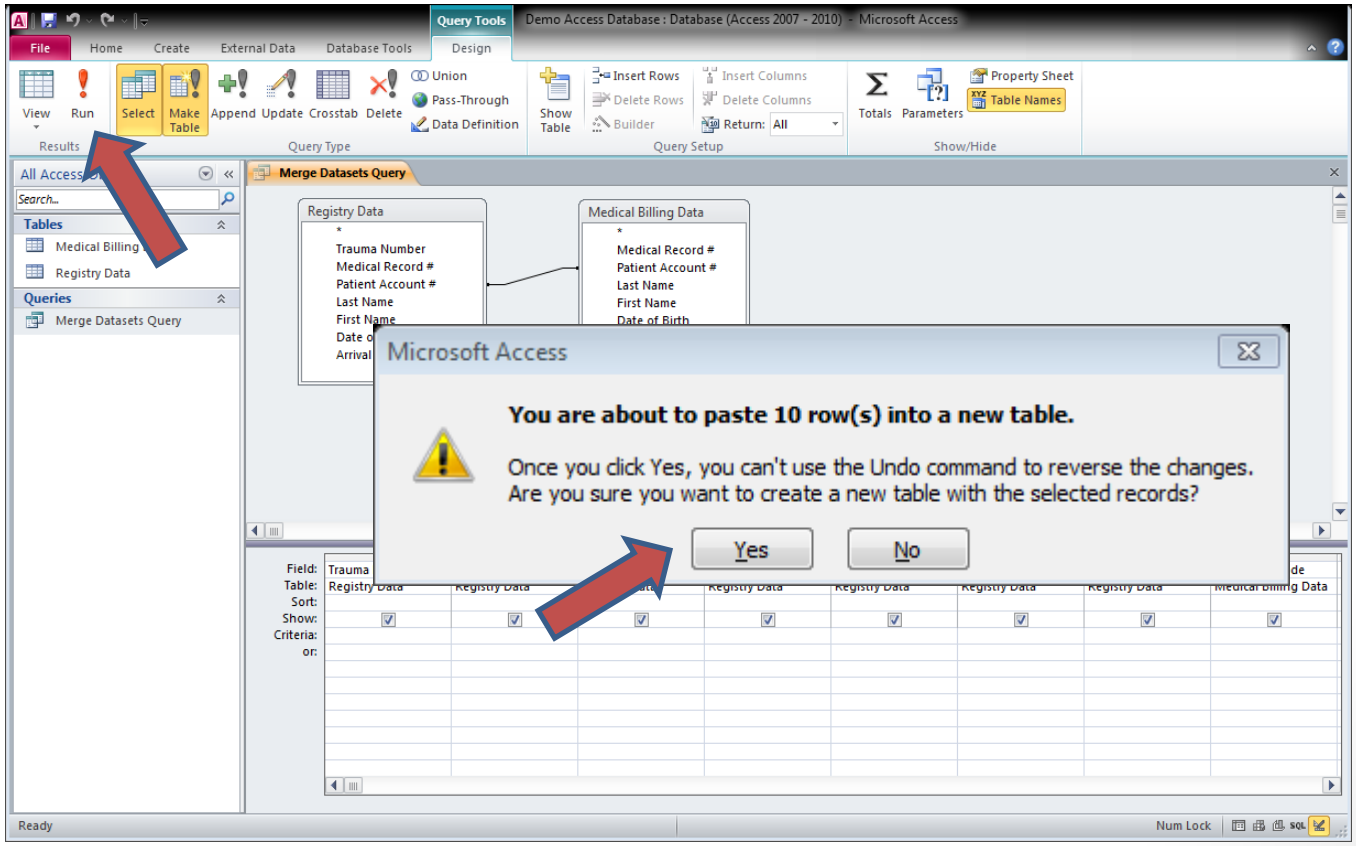
Merging Datasets: write query

- Write query to link files
  - Make a new combined table to run additional queries against
  - Select table name that can be reused in future (e.g. monthly)



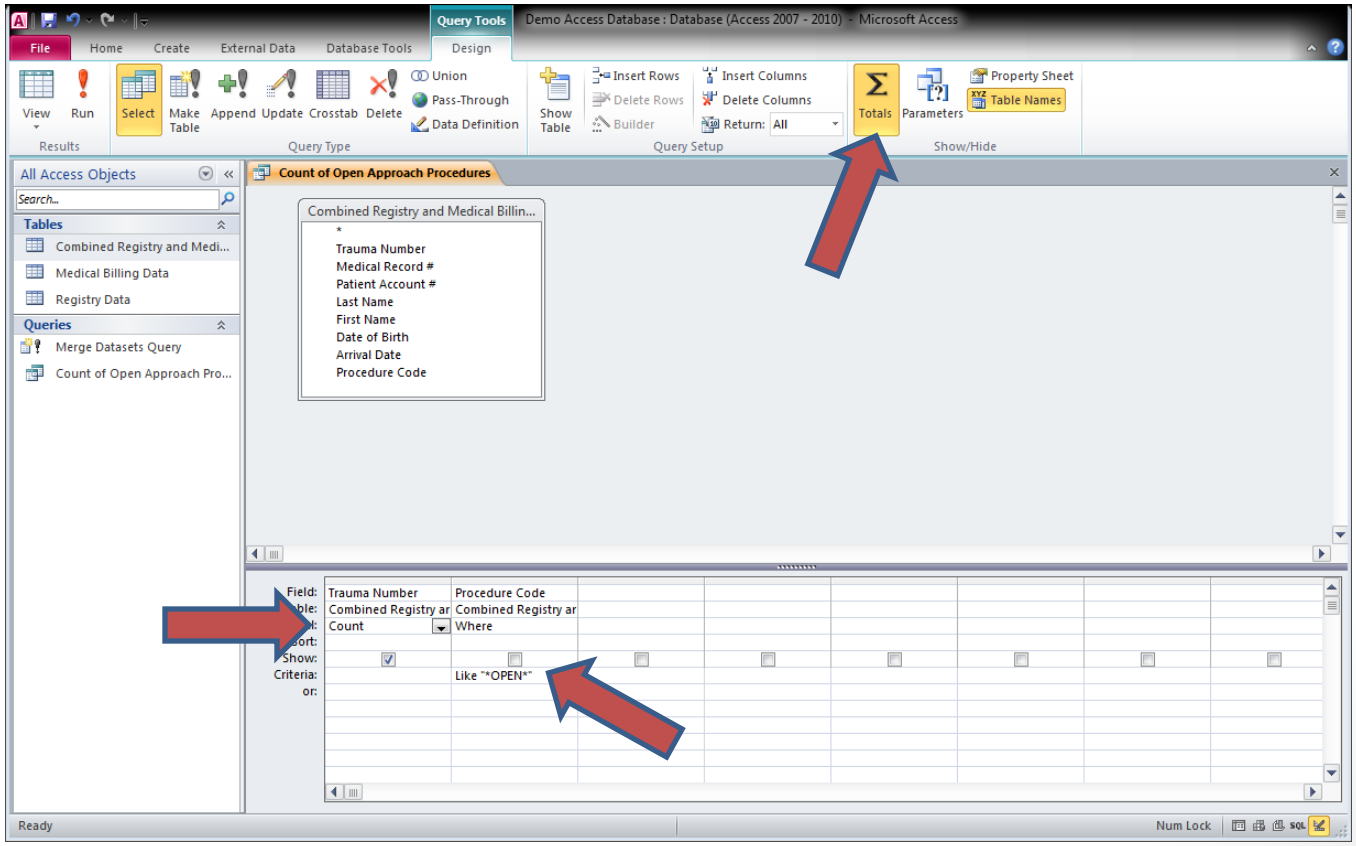
Merging Datasets: write query

- Write query to link files
  - "Run" the Make Table query to generate desired table
  - Verify record count to ensure table is generated correctly



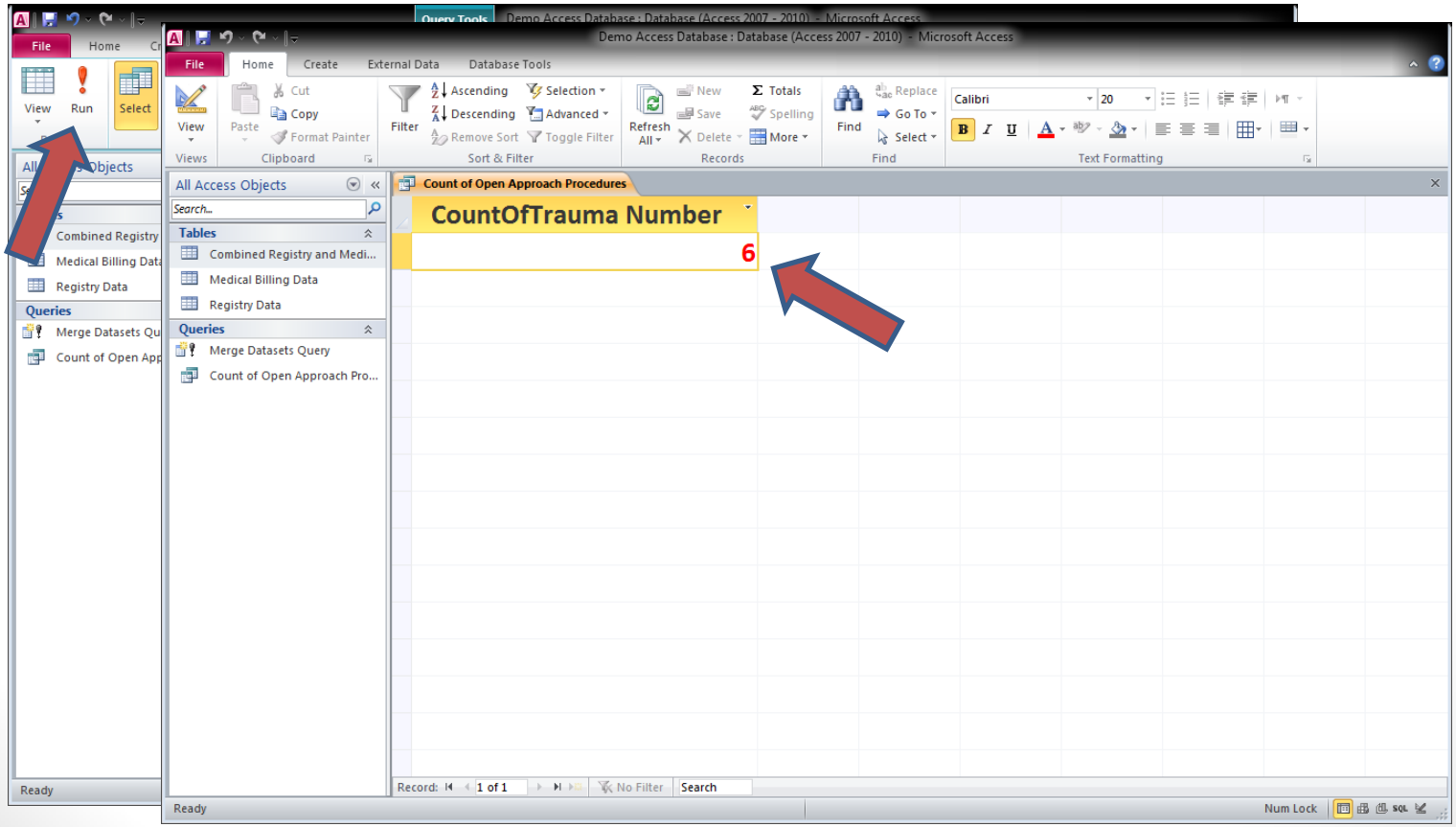
Merging Datasets: calculations

- Generate calculations as needed (**narrative search example**)
  - Start a query based on new table & select “Totals”
  - Select calculation (e.g. **Count**) & criteria (e.g. **Like "*OPEN*“**)



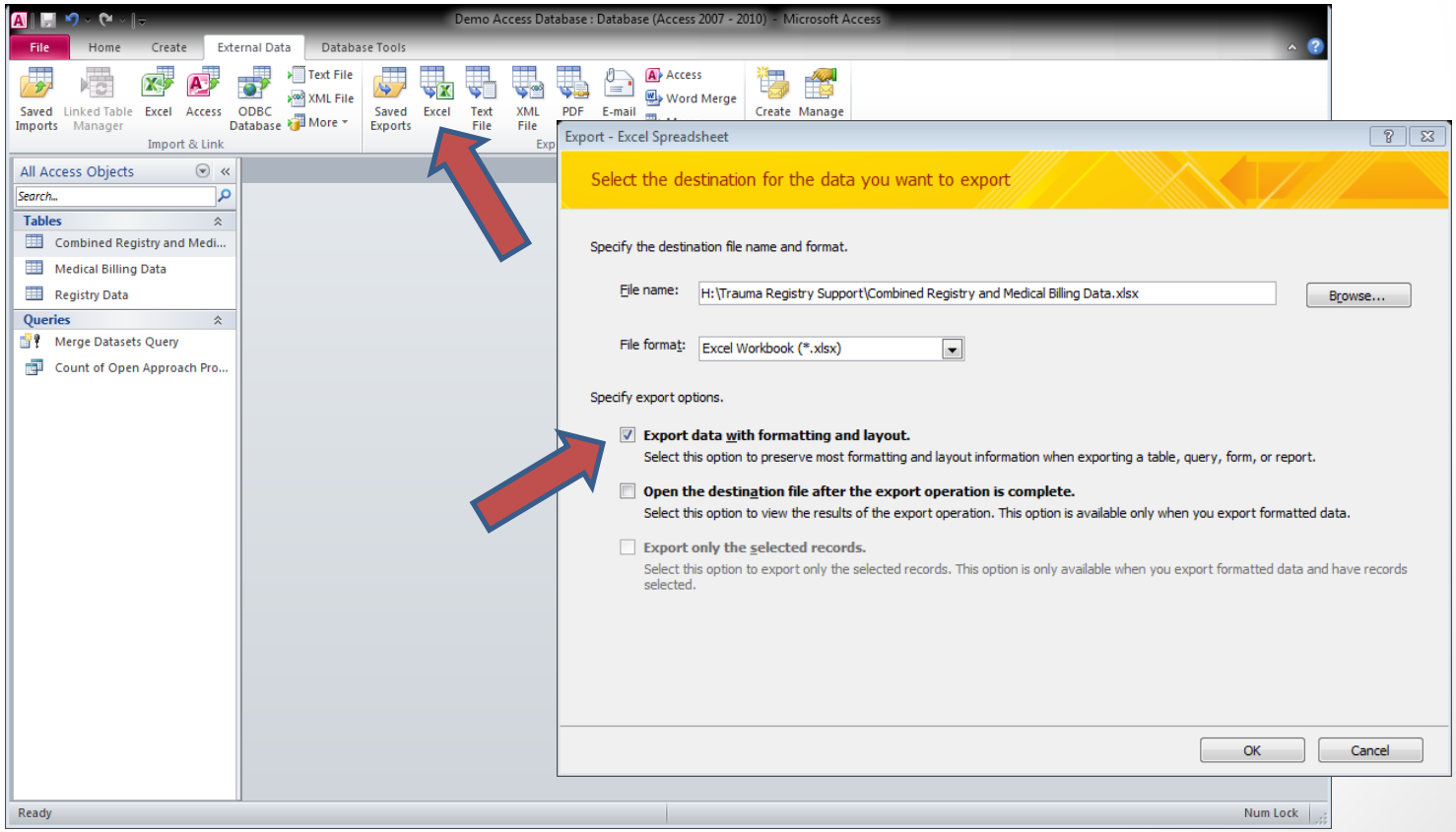
Merging Datasets: calculations

- Generate calculations as needed (**narrative search example**)
  - "Run" the query
  - Evaluate the results



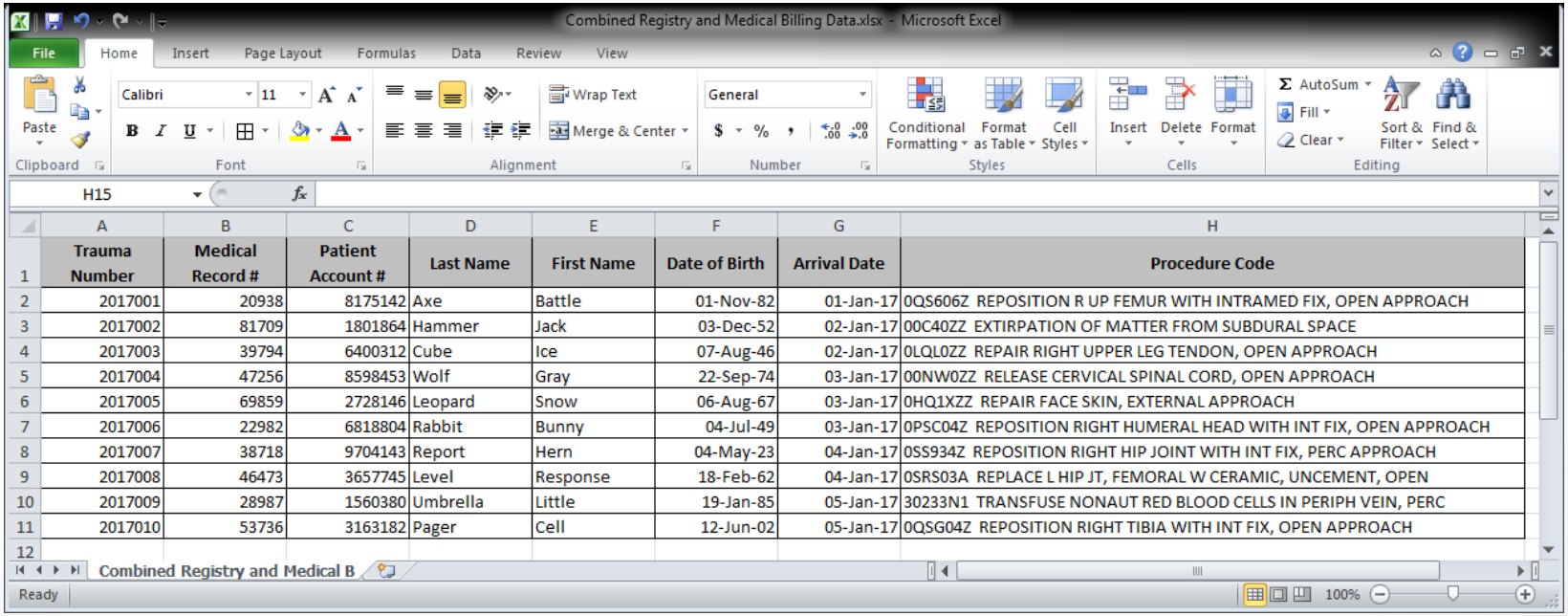
Merging Datasets: export

- Export desired data elements
  - Select table or query to export & type of export file (e.g. XML)
  - Select destination and formatting & layout for export file



Merging Datasets: export

- Export desired data elements
  - Utilize exported file for reporting purposes
  - Utilize exported file as an aid with trauma registry data entry
  - Utilize exported file as an audit tool (e.g. looking for consistency)



	A	B	C	D	E	F	G	H
1	Trauma Number	Medical Record #	Patient Account #	Last Name	First Name	Date of Birth	Arrival Date	Procedure Code
2	2017001	20938	8175142	Axe	Battle	01-Nov-82	01-Jan-17	0QS606Z REPOSITION R UP FEMUR WITH INTRAMED FIX, OPEN APPROACH
3	2017002	81709	1801864	Hammer	Jack	03-Dec-52	02-Jan-17	00C40ZZ EXTIRPATION OF MATTER FROM SUBDURAL SPACE
4	2017003	39794	6400312	Cube	Ice	07-Aug-46	02-Jan-17	0LQL0ZZ REPAIR RIGHT UPPER LEG TENDON, OPEN APPROACH
5	2017004	47256	8598453	Wolf	Gray	22-Sep-74	03-Jan-17	00NW0ZZ RELEASE CERVICAL SPINAL CORD, OPEN APPROACH
6	2017005	69859	2728146	Leopard	Snow	06-Aug-67	03-Jan-17	0HQ1XZZ REPAIR FACE SKIN, EXTERNAL APPROACH
7	2017006	22982	6818804	Rabbit	Bunny	04-Jul-49	03-Jan-17	0PSC04Z REPOSITION RIGHT HUMERAL HEAD WITH INT FIX, OPEN APPROACH
8	2017007	38718	9704143	Report	Hern	04-May-23	04-Jan-17	0SS934Z REPOSITION RIGHT HIP JOINT WITH INT FIX, PERC APPROACH
9	2017008	46473	3657745	Level	Response	18-Feb-62	04-Jan-17	0SRS03A REPLACE L HIP JT, FEMORAL W CERAMIC, UNCEMENT, OPEN
10	2017009	28987	1560380	Umbrella	Little	19-Jan-85	05-Jan-17	30233N1 TRANSFUSE NONAUT RED BLOOD CELLS IN PERIPH VEIN, PERC
11	2017010	53736	3163182	Pager	Cell	12-Jun-02	05-Jan-17	0QSG04Z REPOSITION RIGHT TIBIA WITH INT FIX, OPEN APPROACH
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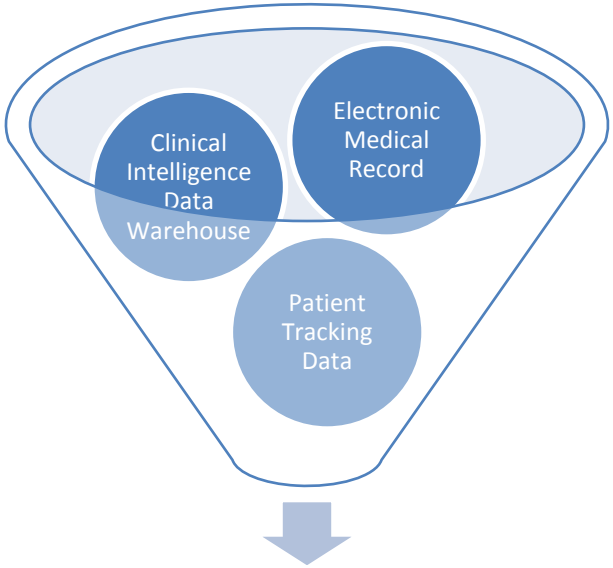
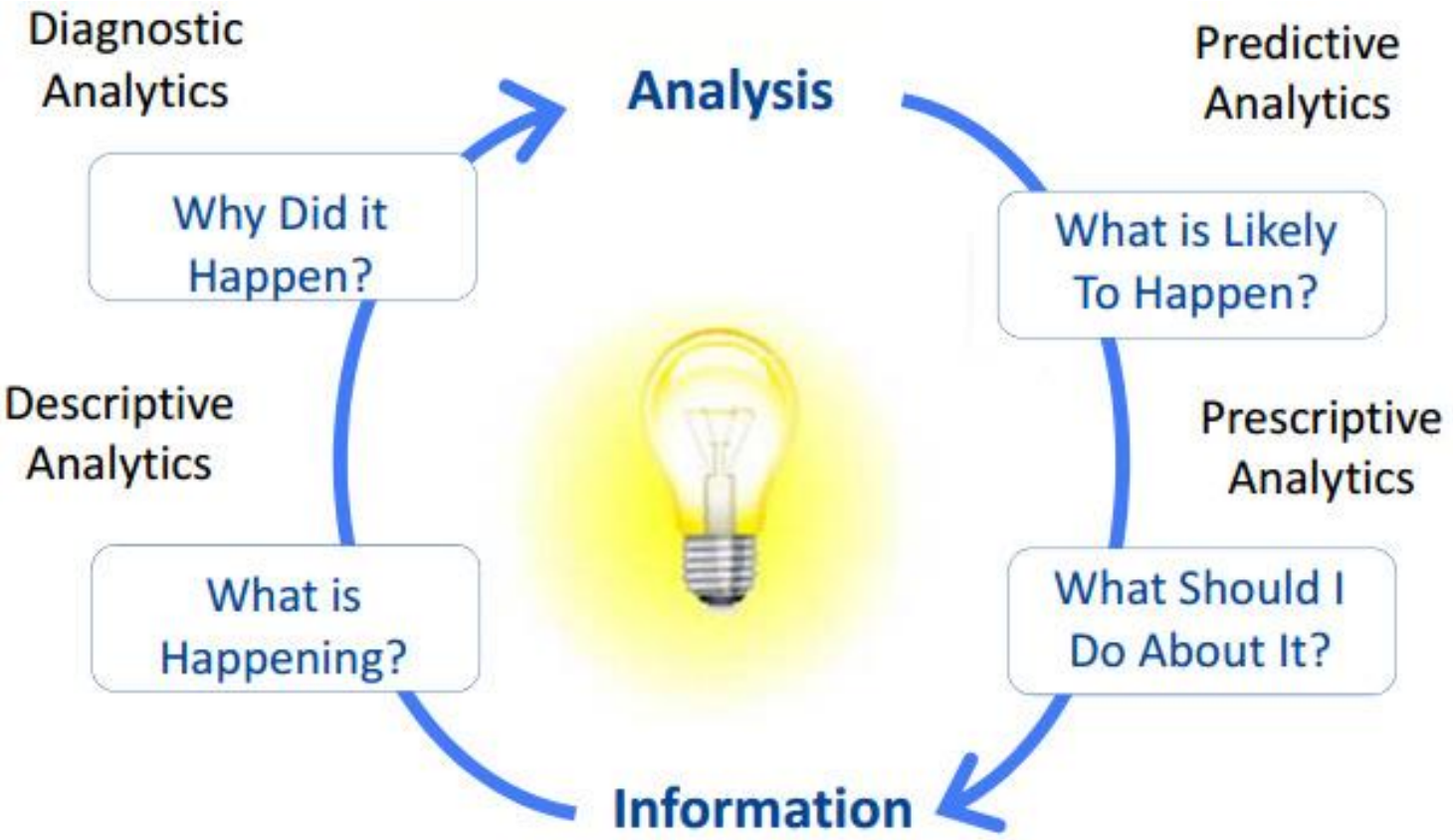
Analytical Optimization

- Quantitatively & Qualitatively robust data are essential for optimal data analysis
- Utilizing the full spectrum of data resources (**and human resources**) to support the trauma registry is key…



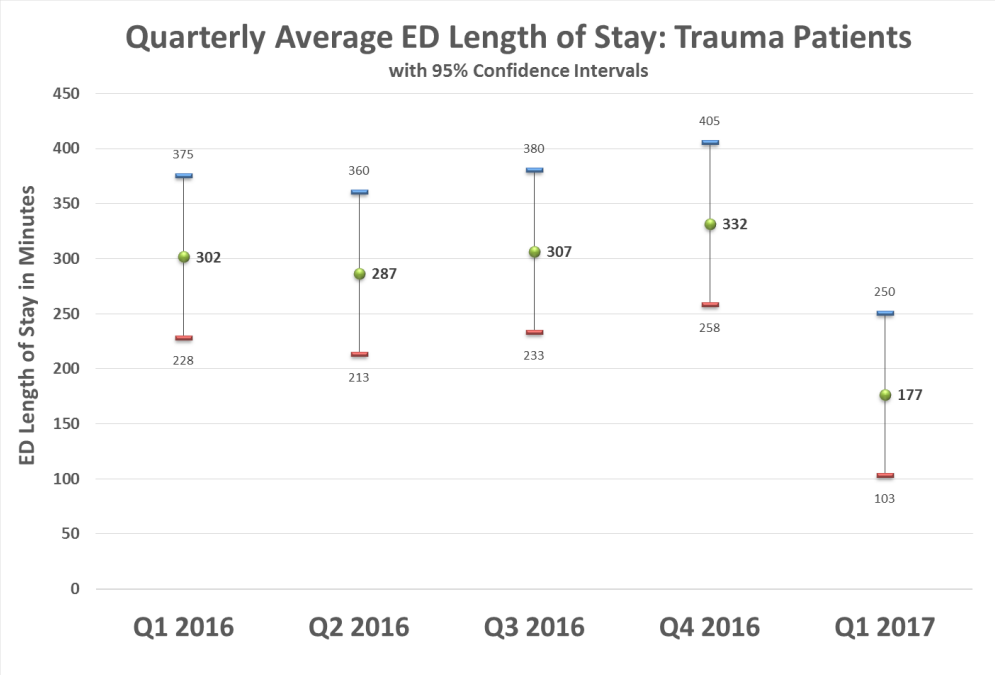
Analytical Optimization



Analytic Excellence Leads to Better Decisions

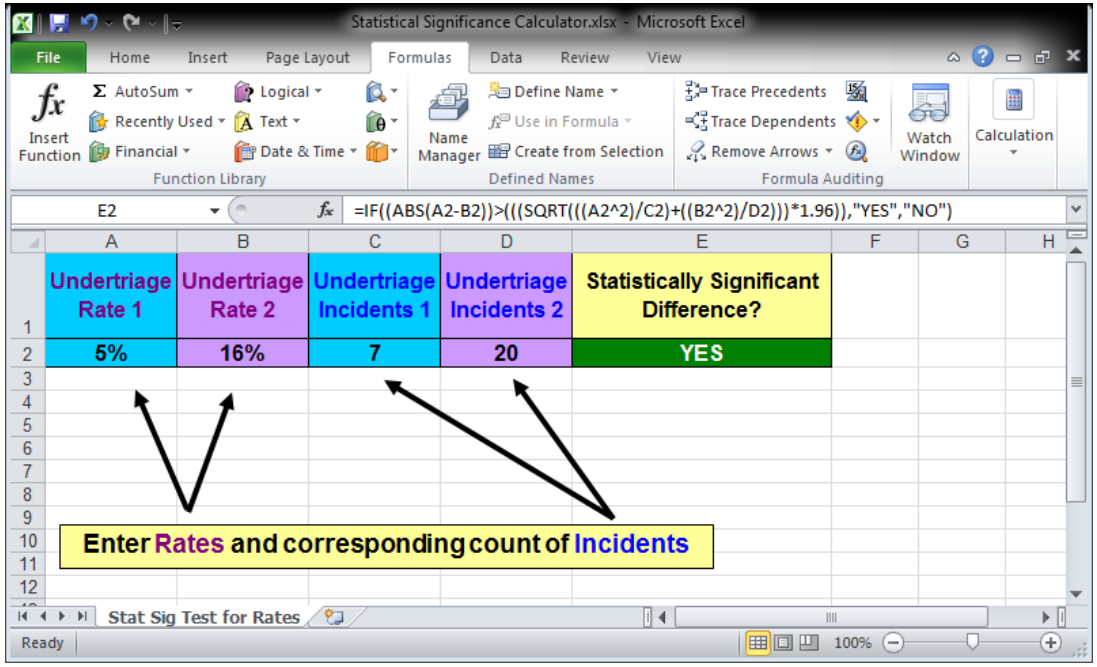
Analytical Optimization

- Keep issues in perspective…remember random variation occurs with or without external influence
- Take advantage of statistical testing to support the decision making process (e.g. TQIP / MTQIP type reports)



Analytical Optimization

- Utilize tools in Excel to analyze data (if no other software is available) – *activatate "Analysis ToolPak" in Options: Add-Ins*
- Statistical formulas can also be created in Excel to help determine if rates of change are "significant" or not (e.g. **=IF((ABS(A2-B2))>(((SQRT(((A2^2)/C2)+((B2^2)/D2)))*1.96)),"YES","NO"**)



Analytical Optimization

- Though reports are typically presented as descriptive statistics (showing what is happening NOT why it is happening), the audience will often draw their own conclusions
- These inferential conclusions are often based on presentation, explanation and understanding of the data/issue
- Be aware of possible alternative explanations for changes in the data over time…not just the more obvious

Analytical Optimization

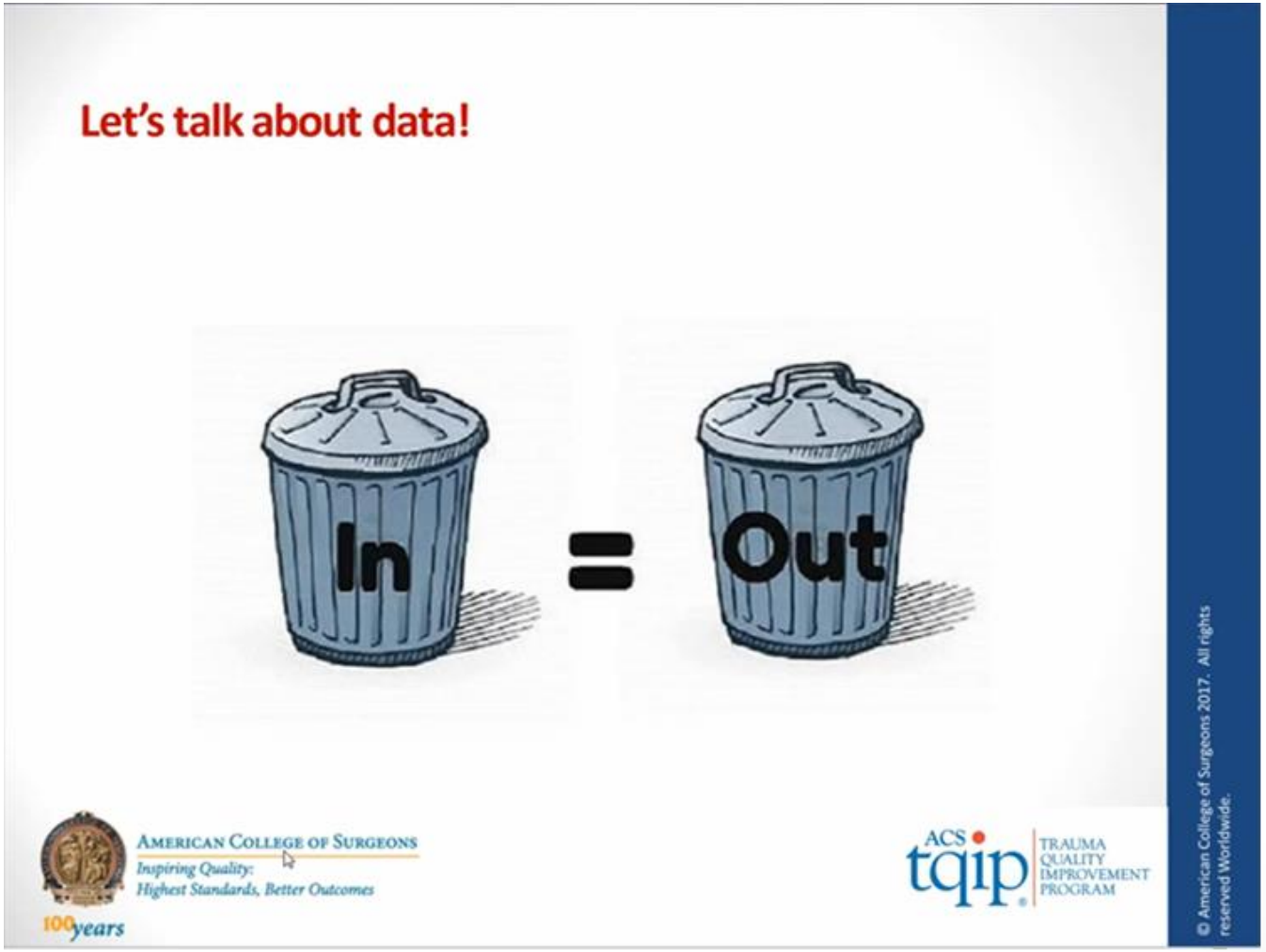
- Present data with meaningful time units (e.g. quarterly vs. monthly)
- Be aware that horizontal axis (time units) and/or vertical axis (quantitative units) can skew perceptions
- Remember that there are often cyclical/seasonal trends that can cause month-to-month variation (avoid tail-chasing)
- Data stability (e.g. rare events unstable)…reporting period/frequency should be appropriate

Analytical Optimization

- Do not present data you do not understand (data interpretation requires a well-reasoned argument and, typically, local hospital knowledge)

- Remember: whether or not a particular event results in a failure it is often a matter of chance, so it will not necessarily reflect whether or not a hazard is under control…the absence of “failures” in the trauma registry does not necessarily mean underlying issues do not still remain

Conclusion


Let's talk about data!
In
=
Out
American College of Surgeons
Inspiring Quality:
Highest Standards, Better Outcomes
100 years
ACS tqip
TRAUMA QUALITY IMPROVEMENT PROGRAM
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