Strategic Planning: Financial Impact of Different Types of Surgery

- This talk includes many similar slides
  - Paging through produces animation
  - Use right/ left arrow keys, → and ←
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Updated 09/03/20

Strategic Planning: Financial Impact of Different Types of Surgery

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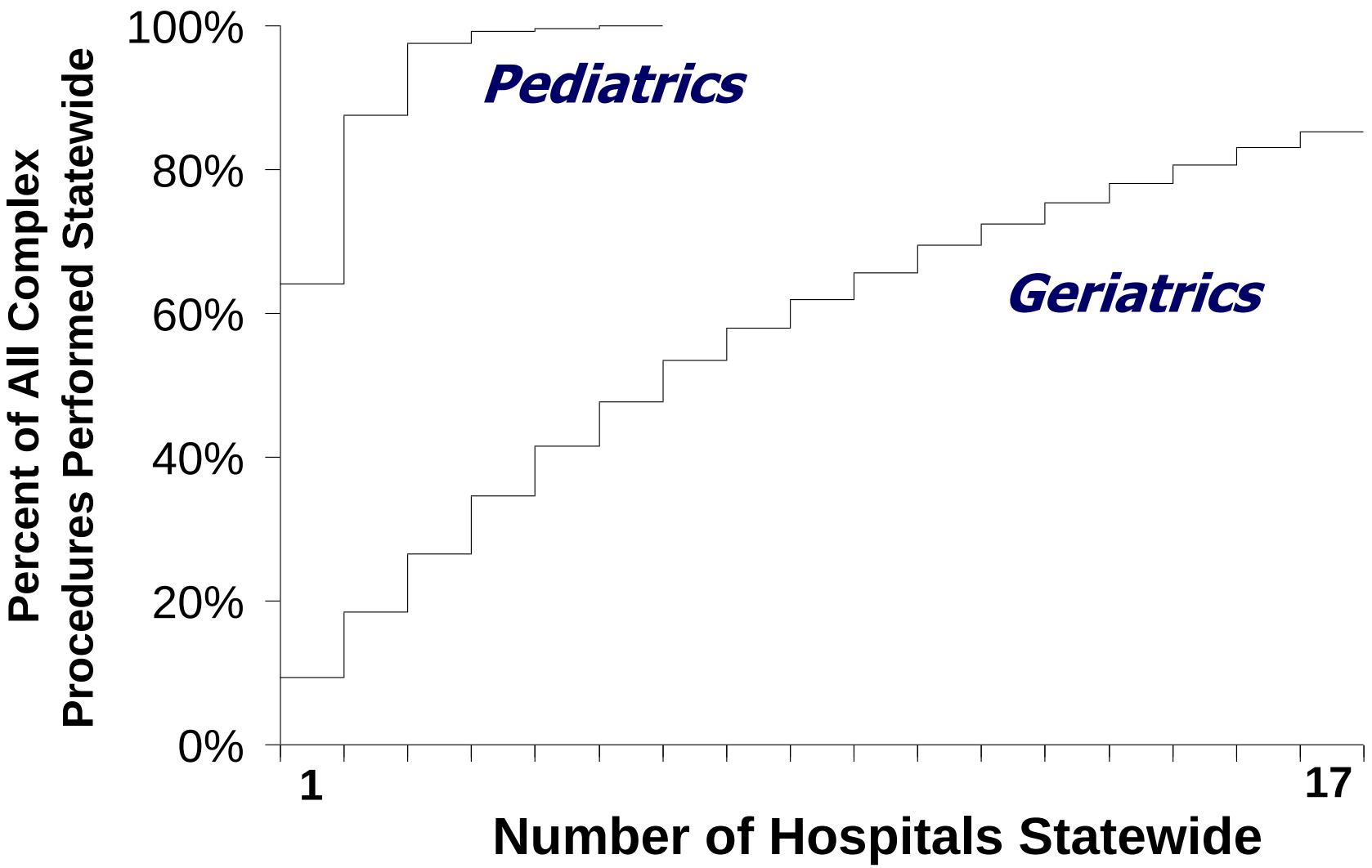
Financial Disclosure

- I am employed by the University of Iowa, in part, to consult and analyze data for hospitals, anesthesia groups, and companies
- Department of Anesthesia bills for my time, and the income is used to fund our research
  - I receive no funds personally other than my salary and allowable expense reimbursements from the University of Iowa, and have tenure with no incentive program
  - I own no healthcare stocks (other than indirectly through mutual funds)

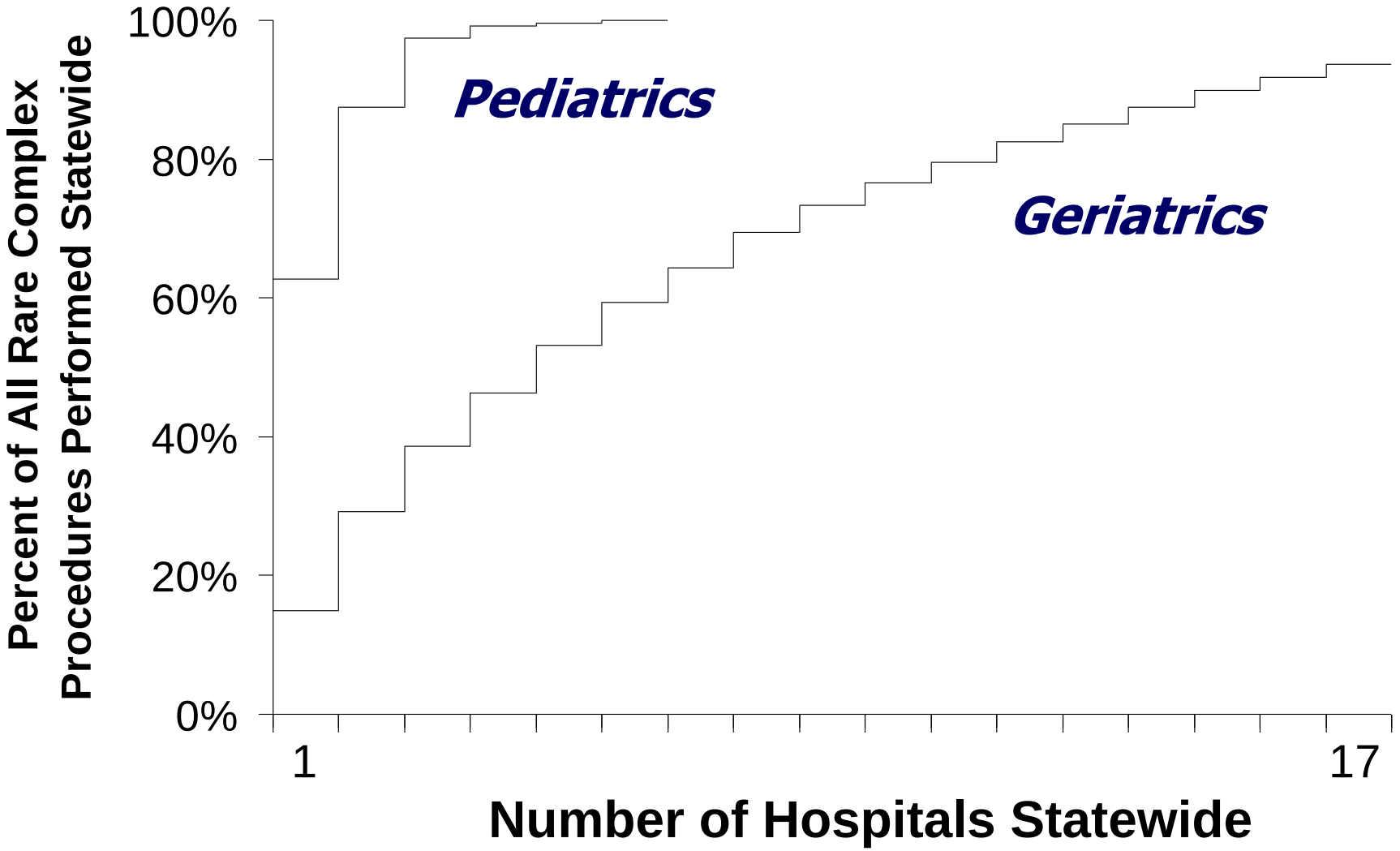
Summary of Other Talk

- "Showing Differences Among Hospitals and their Surgical Practices"
  - Useful to review the other presentation in its entirety before reviewing this talk

Physiologically Complex Procedures



Rare Types of Procedures



Summary of Other Talk

- In children, one hospital performed 64% of all physiologically complex procedures and 63% of all rare physiologically complex procedures in the entire state
- No similar dominance for geriatrics

Dexter F et al. Anesthesiology 2003
Wachtel RE, Dexter F. Anesthesiology 2004

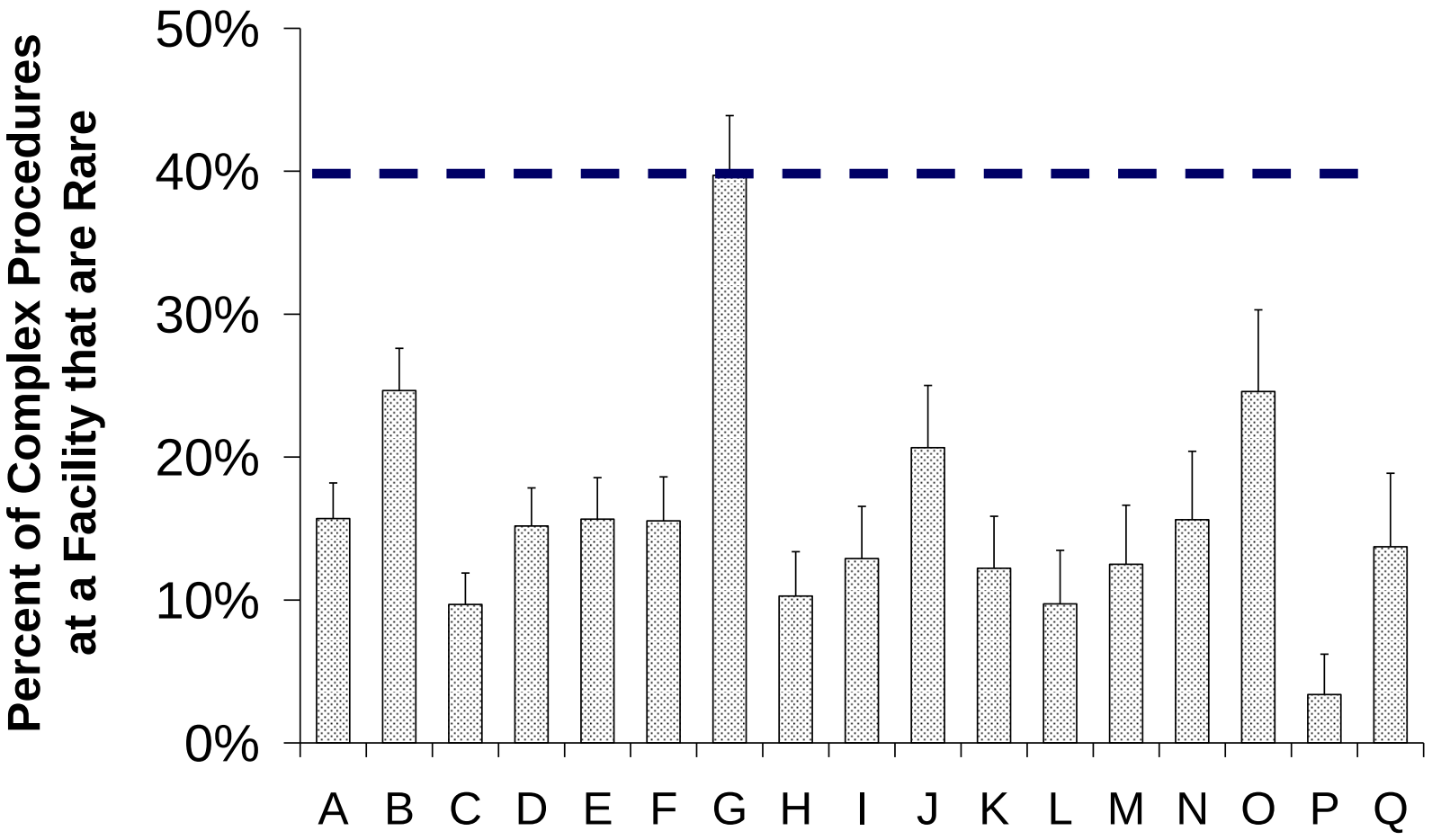
Is the Dominance Good or Bad Financially for the Hospital?

- Maybe most hospitals don't do physiologically complex pediatric cases because the hospitals would lose money on them
- Does that one hospital lose money on them? Does it know? How would it know?

Is the Dominance Good or Bad Financially for the Hospital?

- From a financial perspective, should hospital:
  - Encourage dominance in pediatric surgery and promote itself as a "center of excellence?"
  - Hope patients go elsewhere?

Rare Procedures in Geriatric Patients



Rare Procedures

- At the hospital, 40% of all physiologically complex procedures in the elderly were rare
- Much higher proportion than at other hospitals
- “We specialize in rare procedures.”

Is the Specialization Good or Bad Financially for the Hospital?

- From a financial perspective, should hospital:
  - Encourage growth in geriatric surgery, because the number of elderly needing sophisticated medical care is increasing?
  - Discourage growth in geriatric surgery, because Medicare payments are low?
  - Educate benefactors and third-party payers that increased funding is needed for rare and complex procedures, because they are more expensive to perform?

Predictions

- Test 3 predictions regarding the financial implications of the types of procedures performed by this hospital

Wachtel RE et al. Anesthesiology 2005

Predictions

- Test 3 predictions regarding the financial implications of the types of procedures performed by this hospital
  1) Pediatric surgery is more lucrative than geriatric surgery
  2) Rare physiologically complex procedures are financially disadvantageous
  3) Procedures with high implant charges are associated with poor financial performance

How to Measure Profitability

- Revenues
  - Hospital
  - Professional
- Costs
  - Fixed
  - Variable

Fixed Costs

- Building and grounds
  - Maintenance and utilities
- Administration
  - Billing office, VPs, information system
- OR expenses
  - Equipment and instruments

Variable Costs

- Supplies
  - Drugs
  - Linens
  - Implants
- Labor
  - ICU, OR, PACU, ward nursing

Contribution Margin

- Marginal cost of manufacturing another widget
- Contribution margin associated with selling another widget
  - Incremental revenue minus marginal cost
  - Incremental revenue minus variable costs

Profit

- Profit
  - Revenue
    Minus variable costs
    Minus fixed costs

Contribution Margin

- Contribution margin associated with doing a surgical case
  - Incremental Revenue minus variable costs
- For comparison, must account for differences in resource use: OR time
- CM/OR hour

Macario A et al. Anesth Analg 2001
Dexter F et al. Anesth Analg 2002
Dexter F et al. Anesth Analg 2005

Contribution Margin

- Calculate CM/OR hour
  - Groups of patients
  - Types of surgical procedures
- Determine whether differences are financially important
  - $250 or more
  - Variable costs per hour of OR time that can be influenced by strategic planning

Study Only Patients Undergoing Elective Surgery

- Outpatient surgery
- Inpatient surgery
  - admitted day of elective surgery
    - not anesthesiologists' physical status "E"
    - not on weekend or holiday
    - no ambulance or ER charges

Why Study Only Patients Undergoing Elective Surgery?

- Elective case
  - All subsequent costs of hospitalization and additional surgeries arising from complications can be attributed to initial decision to perform surgery

Why Not Urgent Cases?

- Emergent or urgent cases
  - Can be victims of trauma who with numerous charges unrelated to original surgical procedure
  - Hospitals do not have the same ability to alter the numbers and types of procedures performed through strategic decision-making

Analysis Methodology

- Combine patient-specific information obtained from several sources within the hospital

Data Linked Together Based on Medical Record Number

- Hospital and professional practice database of patient information
- OR information system
- Anesthesia billing data
- Hospital accounting data

Accounting Data

- Hospital may have bottom-up activity based cost accounting system
- If not available, simply sum costs of
  - OR hours
  - Implant costs
  - ICU days
  - Bed days on floor

Dexter F et al. Anesthesiology 2002
Dexter F et al. Anesth Analg 2005

Hospital Database

- Hospital and professional practice database(s) of patient information
  - List of inpatient admissions
  - List of outpatient admissions
  - Dates of surgery
  - Diagnosis and procedure codes

What Else is Needed?

- Must determine if surgery was elective
  - Date of admission
  - Date of surgery
  - Ambulance charges from billing system
  - American Society of Anesthesiologists' status E from anesthesia billing data

What Else is Needed?

- Physiological complexity of case
  - ≥ 8 ASA Relative Value Guide (RVG) base units
  - Determine directly from CPT codes using ASA crosswalk
  - Determine by converting ICD-9/10 procedure codes to CPT codes

Dexter F et al. Anesth Analg 2002
Dexter F, Thompson E. AANA J 2001

What Else is Needed?

- Physiological complexity of case
  - CPT code of primary procedure from anesthesia billing data
  - CPT codes or ICD-9/10 codes of secondary procedures from hospital database

What Else is Needed?

- OR times from OR information system

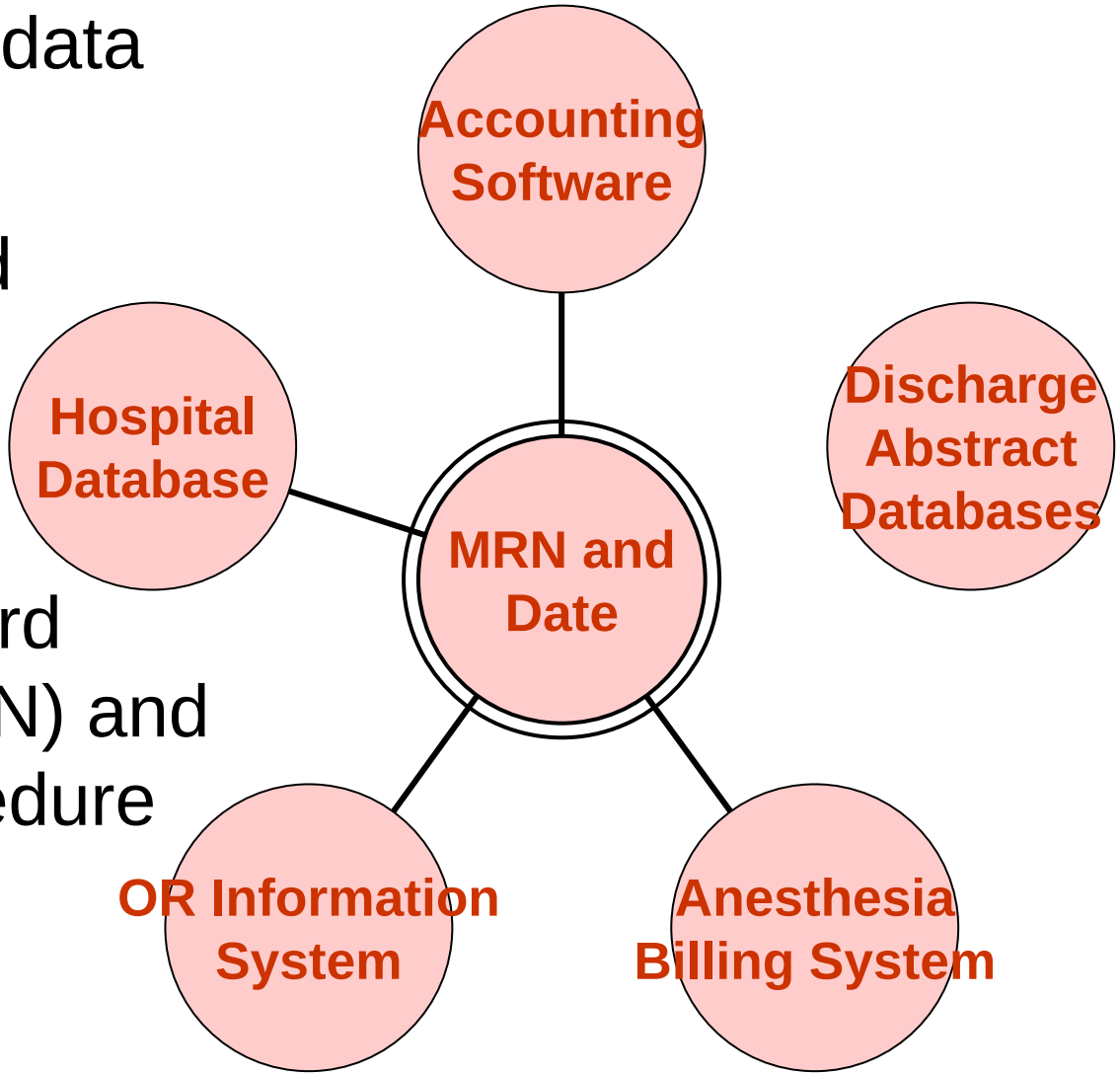
What Else is Needed?

- List of procedures that are rare from state or provincial discharge abstract database
- Rare procedure
  - Performed < 250 times statewide
  - Performed, on average, less than once per workday

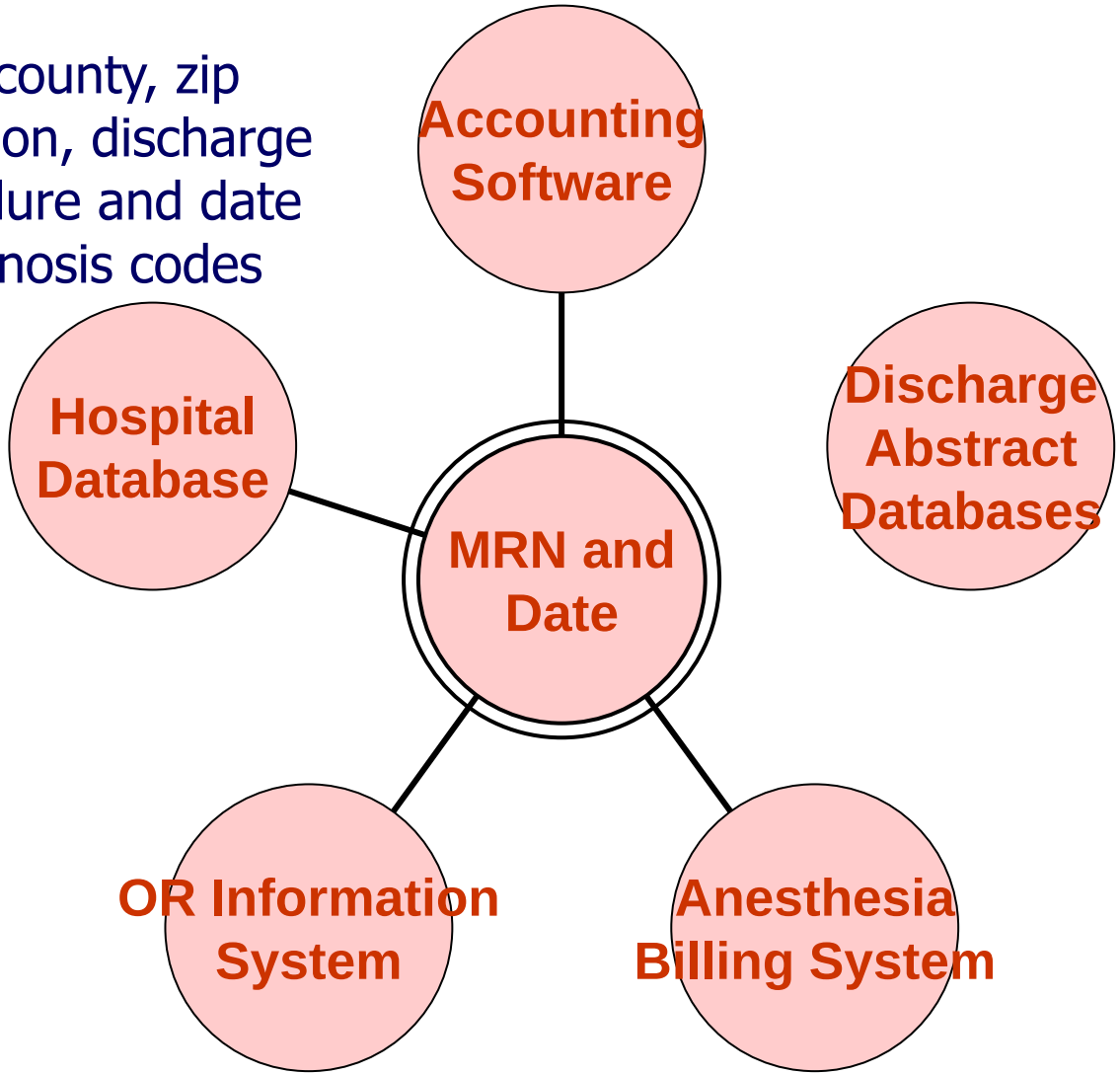
5 sources of data

data in each file are linked

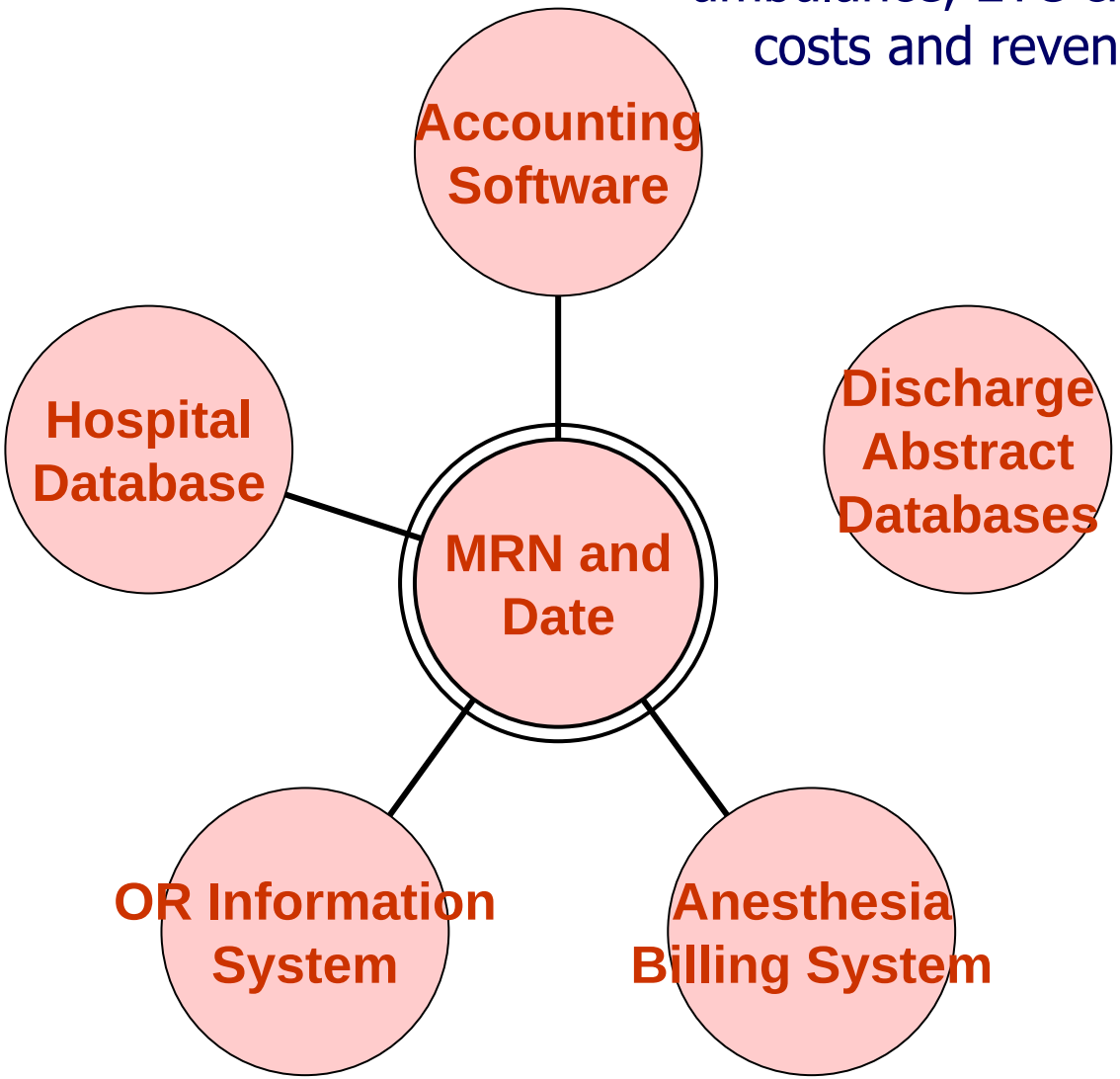
medical record number (MRN) and date of procedure



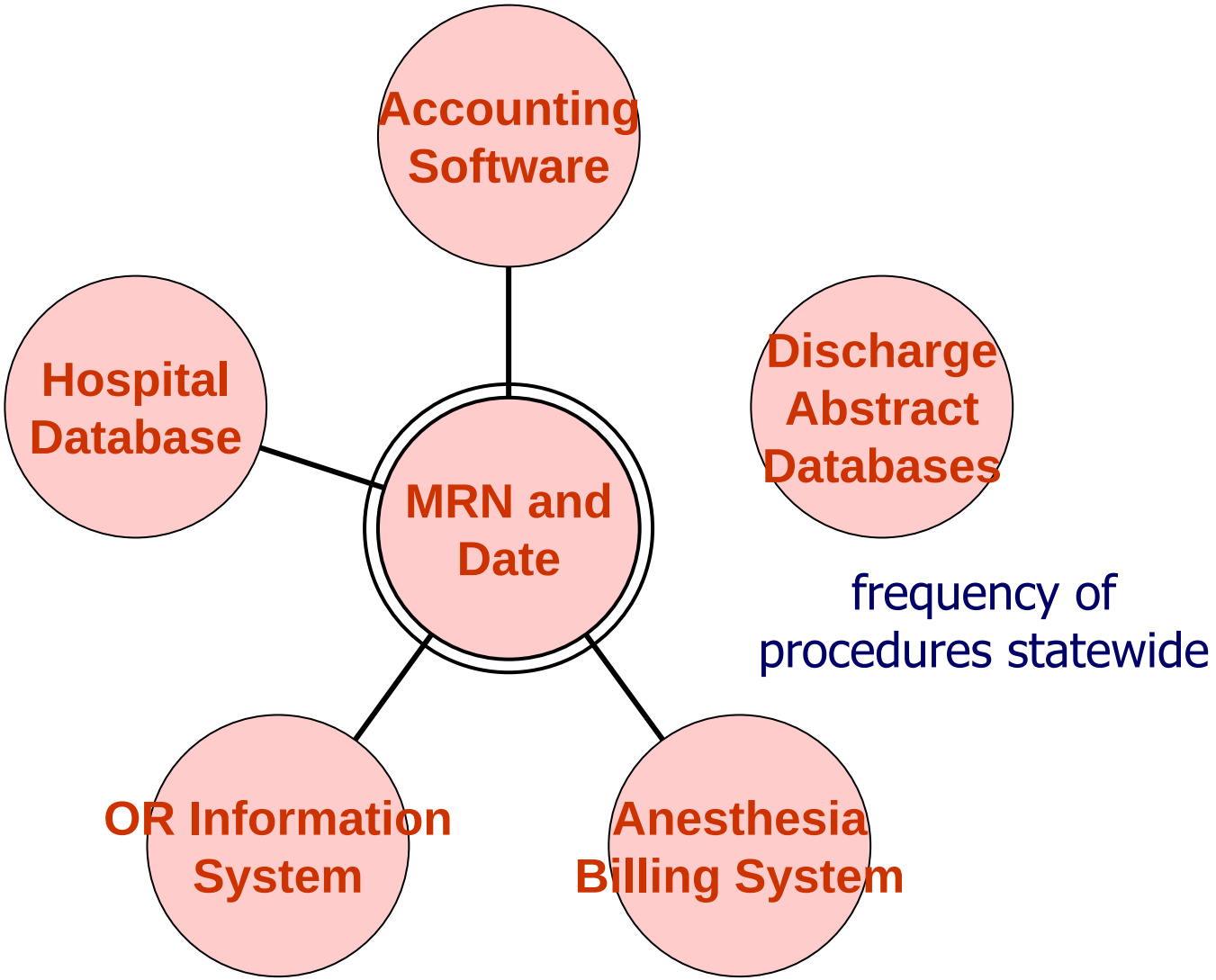
patient age, county, zip
dates of admission, discharge
principal procedure and date
DRG and diagnosis codes

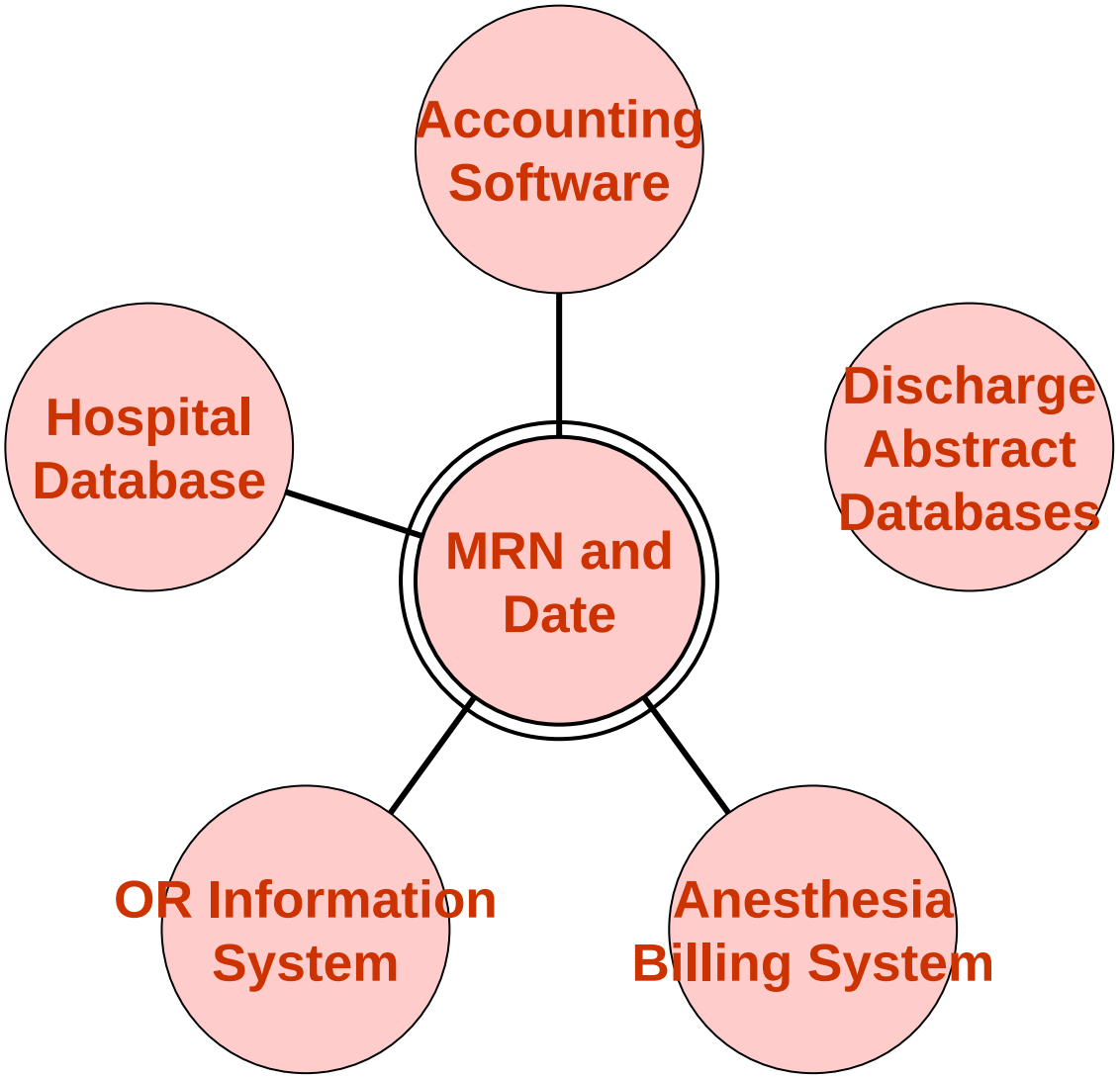


ambulance, ETC charges
costs and revenues

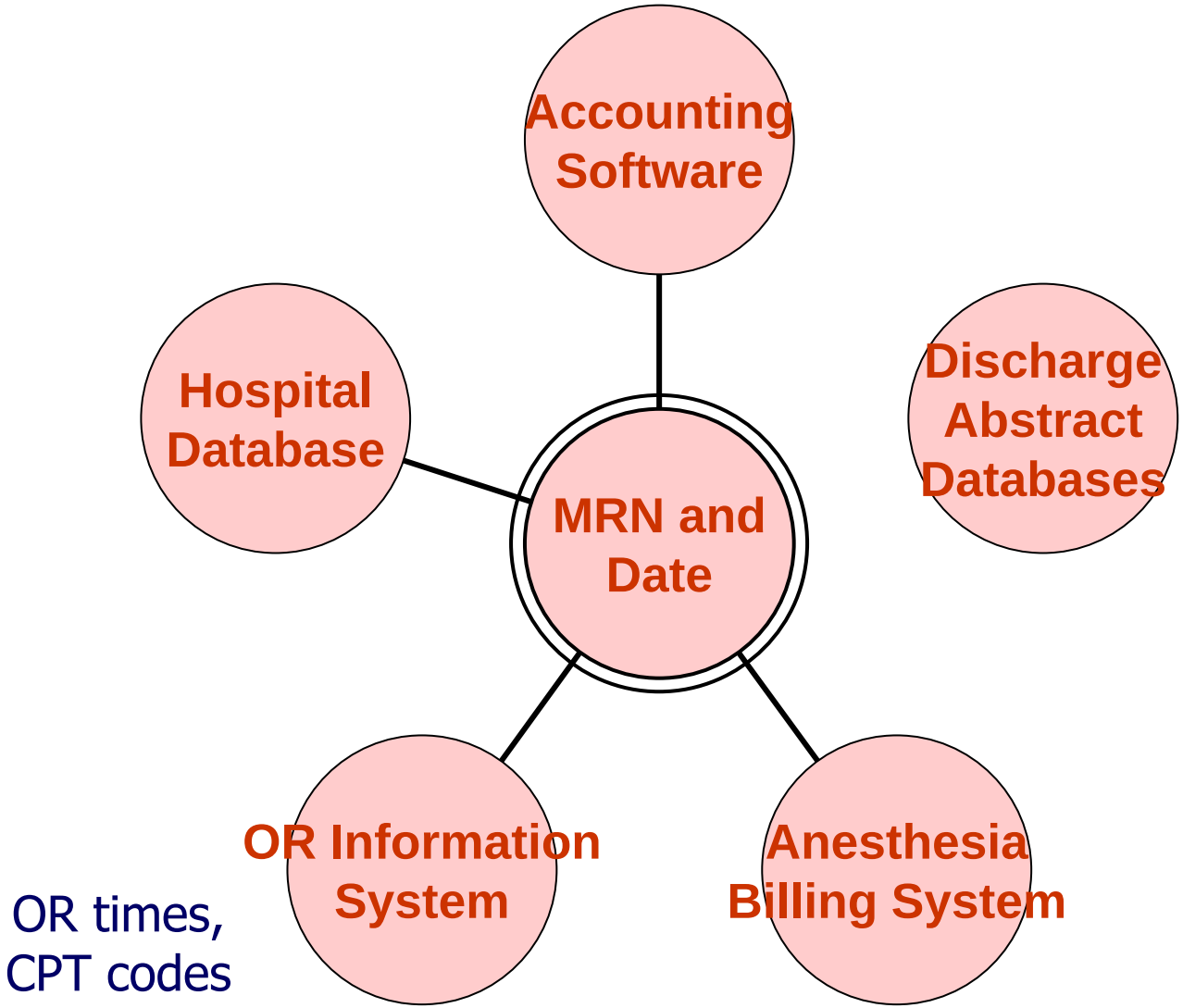


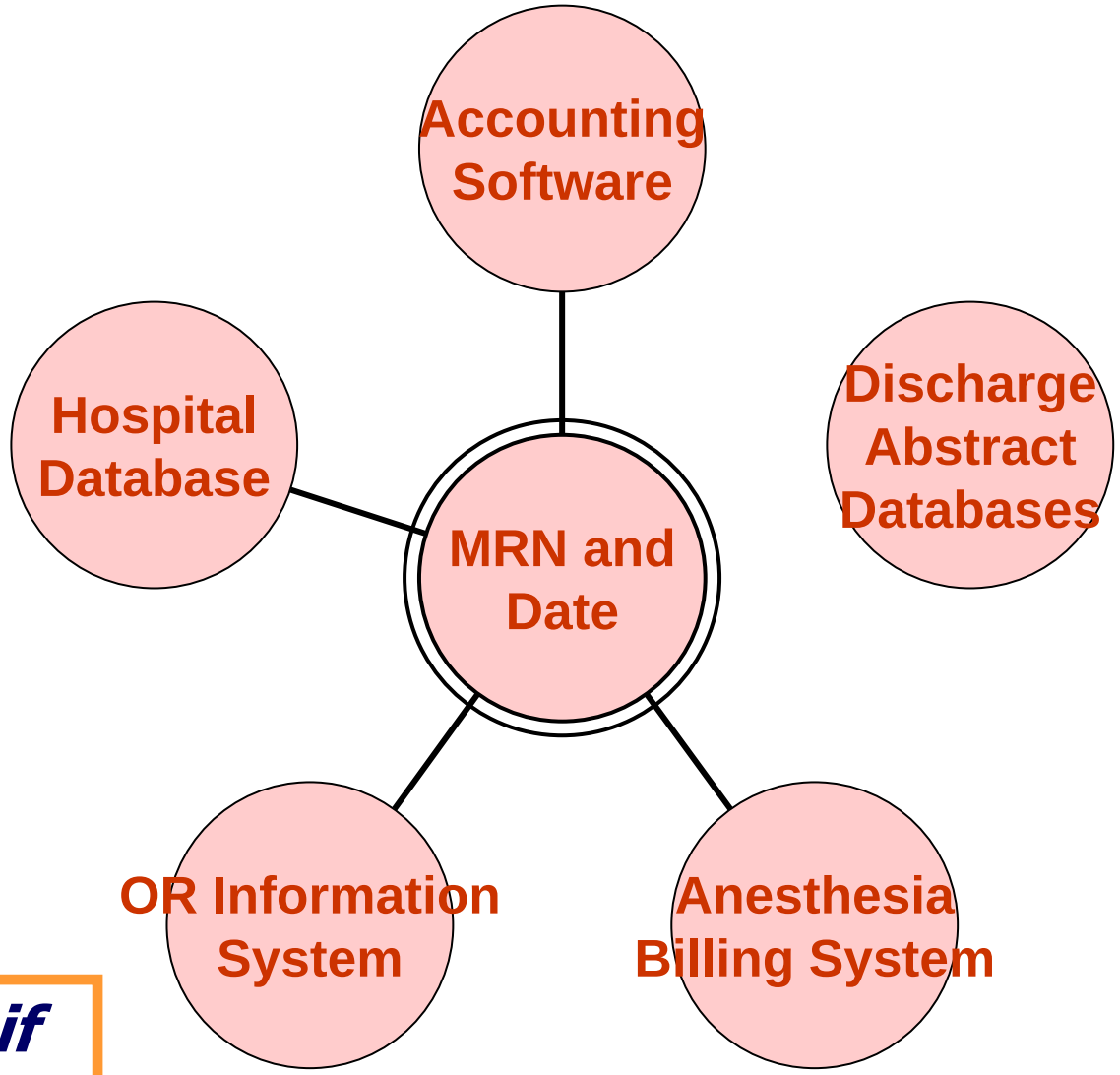
Epstein RH et al. Cureus 2020


Accounting Software
Hospital Database
MRN and Date
Discharge Abstract Databases
frequency of procedures statewide
OR Information System
Anesthesia Billing System

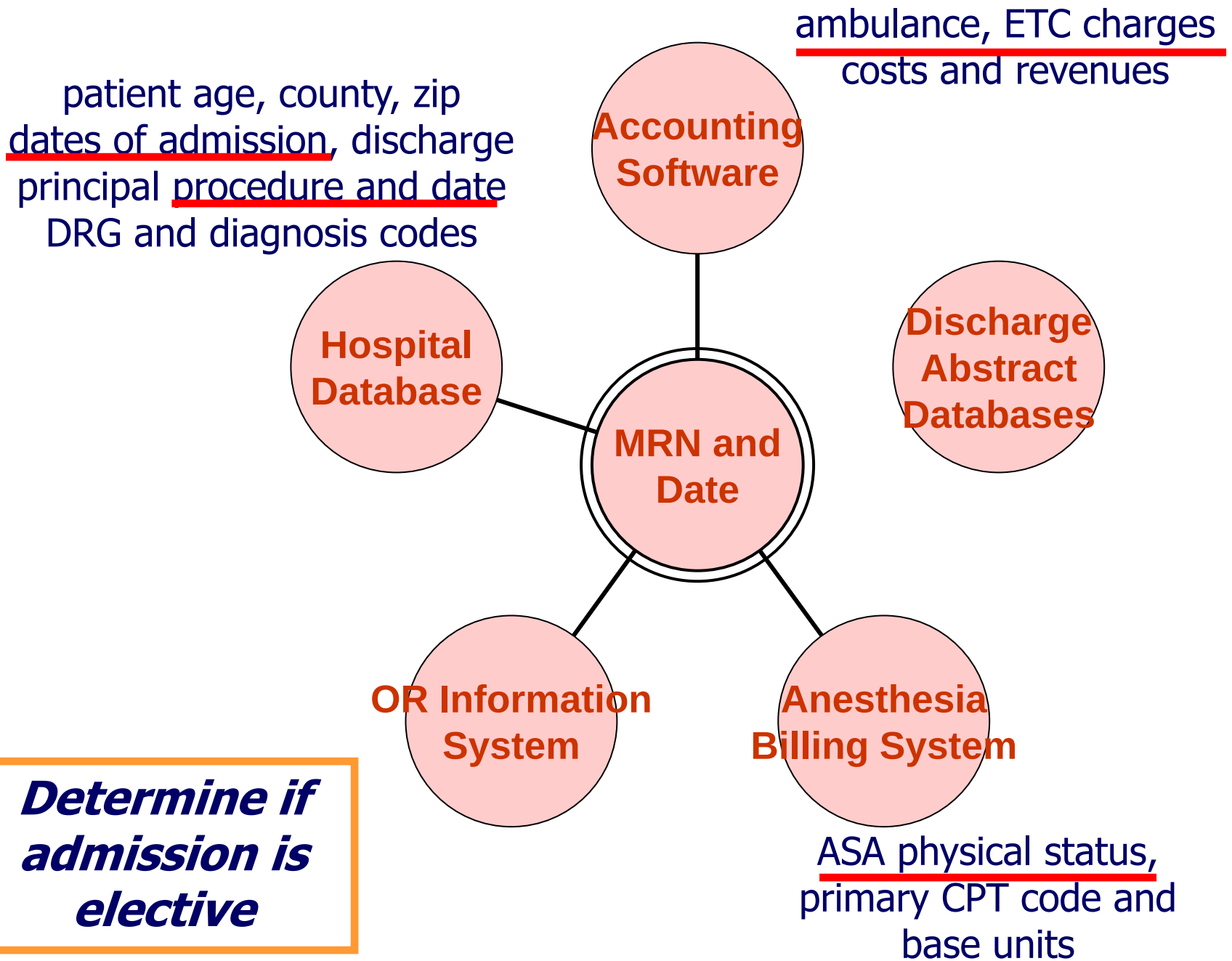


ASA physical status, primary CPT code and base units


Accounting Software
Hospital Database
Discharge Abstract Databases
MRN and Date
OR Information System
Anesthesia Billing System
OR times, CPT codes



Determine if admission is elective


ambulance, ETC charges
costs and revenues
patient age, county, zip
dates of admission, discharge
principal procedure and date
DRG and diagnosis codes
Accounting Software
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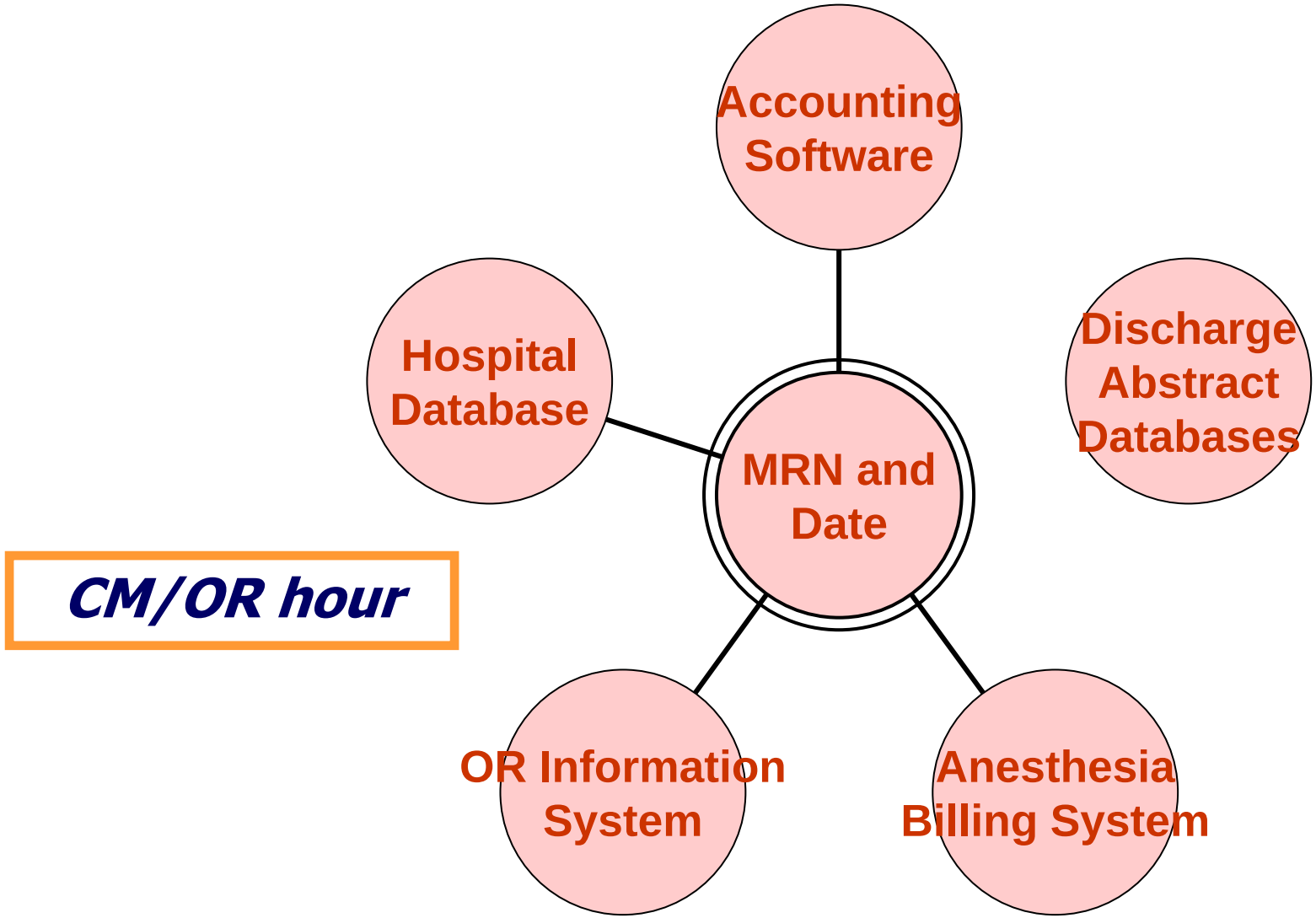
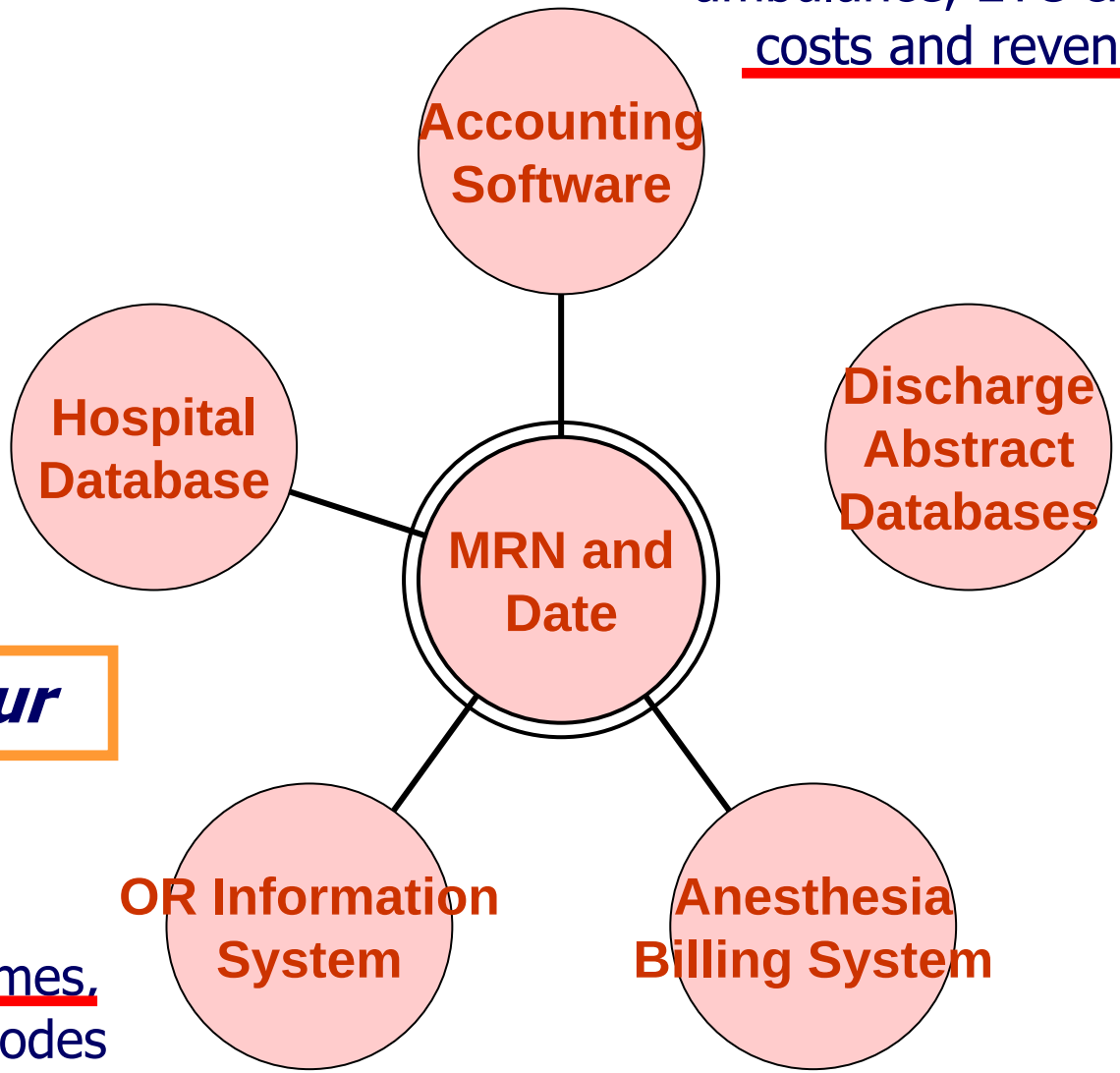

Accounting Software
Hospital Database
Discharge Abstract Databases
MRN and Date
CM/OR hour
OR Information System
Anesthesia Billing System

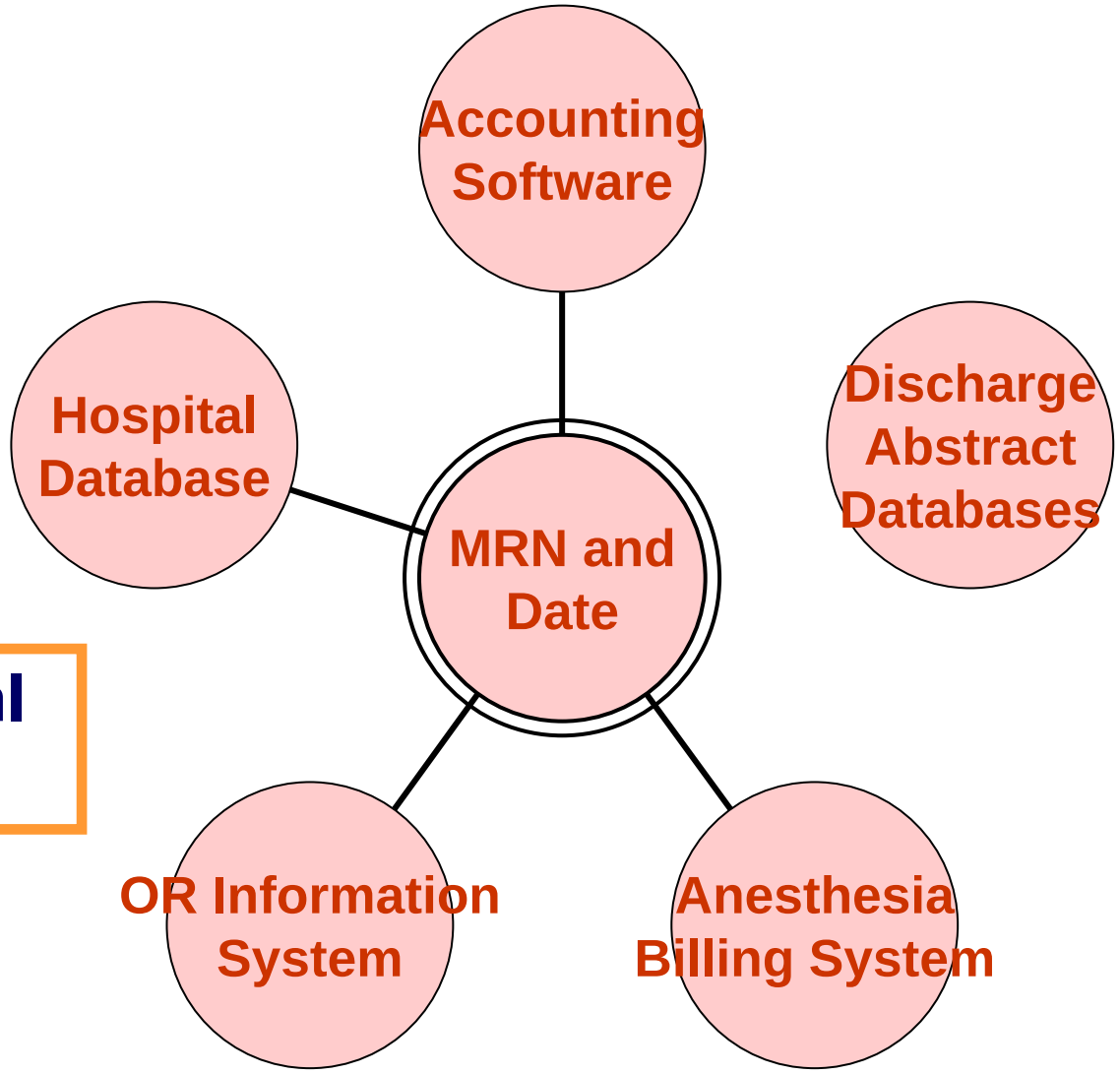
ambulance, ETC charges
costs and revenues

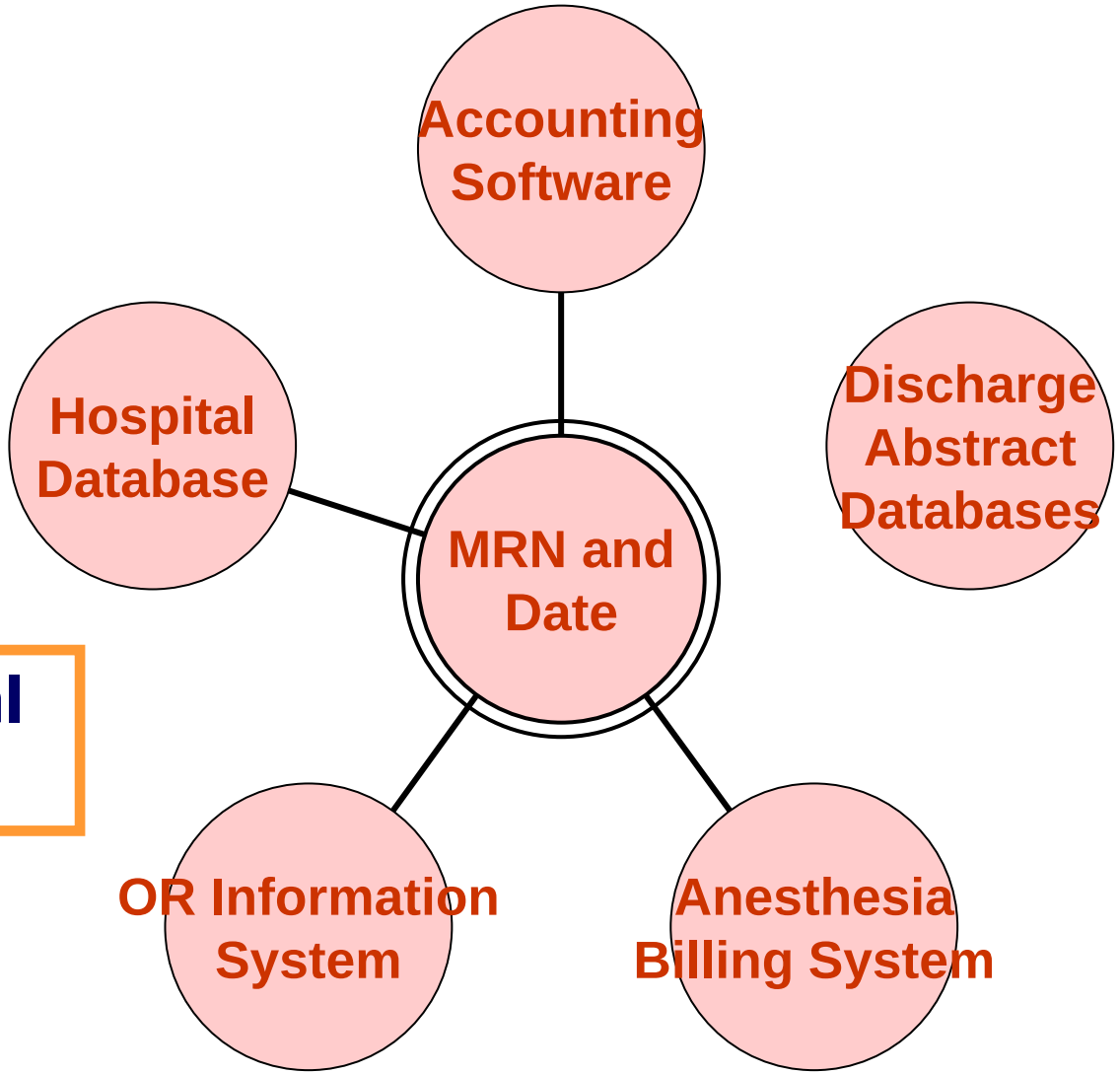


CM/OR hour

OR times,
CPT codes

physiological complexity





physiological complexity

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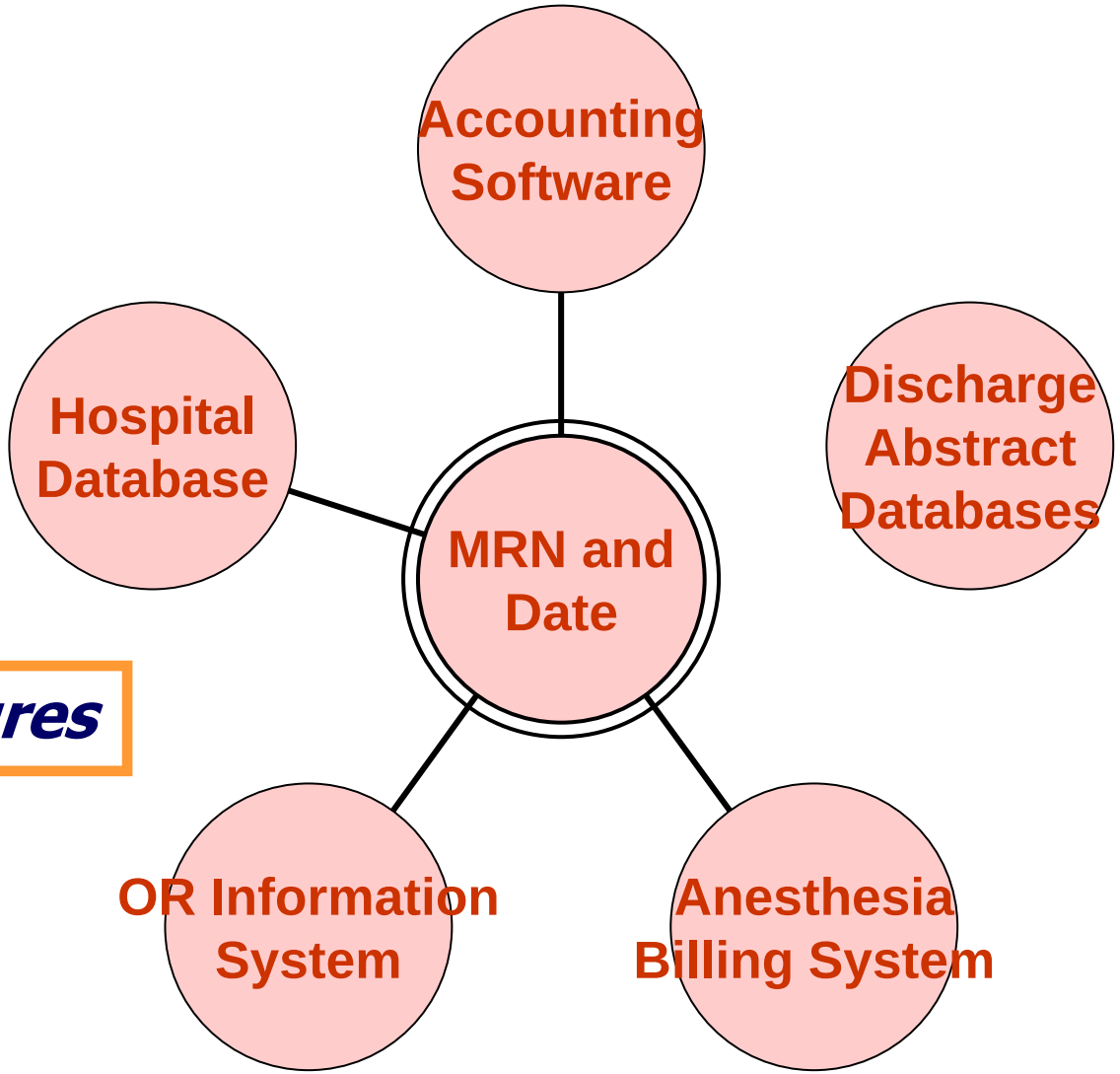
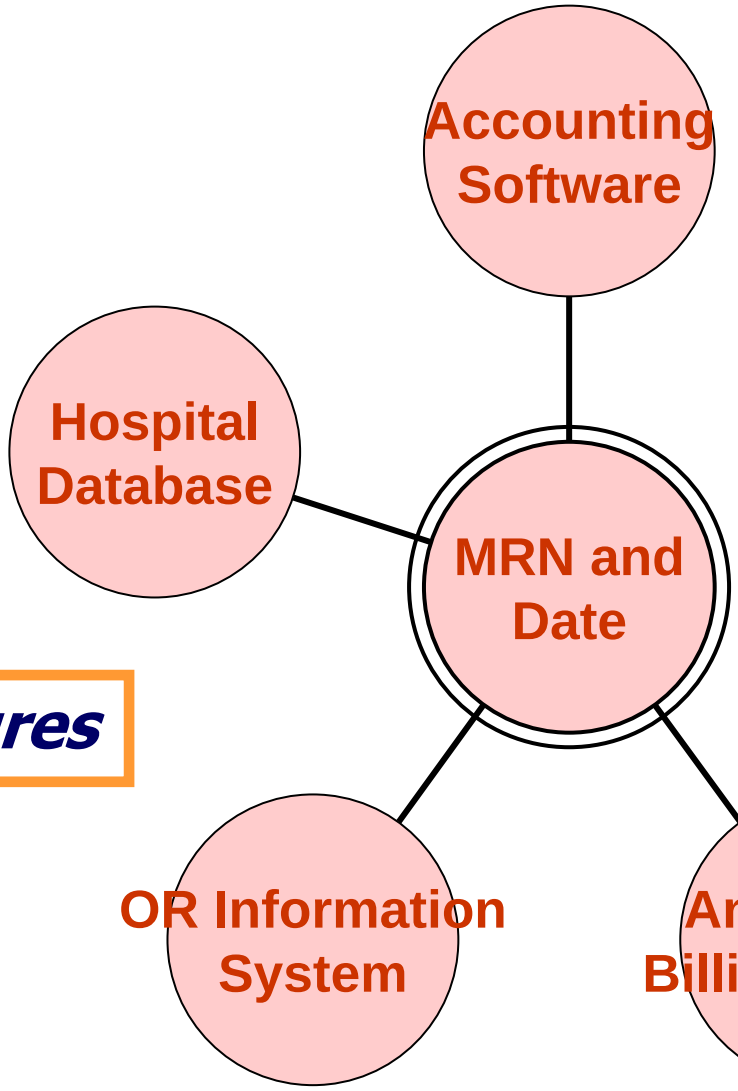


rare procedures



rare procedures

frequency of procedures statewide

Cautions in Analysis

- If patient underwent second surgery during same hospitalization, then OR time and variable costs must be added to original elective surgery
  - Computer programming must check for this possibility

Cautions in Analysis

- Procedures may be supplied as
  - CPT codes
  - ICD-9 procedure codes
- Not always inter-convertible
  - Each ICD-9 code maps to many CPT codes

Cautions in Analysis

- Not always possible to determine physiological complexity for each procedure or case
  - Depends on base units assigned to CPT code, not ICD-9 code

Cautions in Analysis

- Not always possible to determine frequency statewide to see if procedure is rare
- Inconsistent coding in state discharge abstract database
  - One hospital may use CPT codes
  - Other hospitals use ICD-9 codes

Prediction #1

- Pediatrics *vs.* geriatrics
  - Pediatric surgery is more lucrative than geriatric surgery

Prediction #1

- Pediatrics *vs.* geriatrics
  - Pediatric surgery is more lucrative than geriatric surgery
- ***True***

Pediatrics *vs.* Geriatrics

- CM/OR hour greater for pediatrics than geriatrics (all $P < 0.001$)
  - Inpatient surgery that was physiologically complex ($\geq$ 8 ASA RVG base units)
  - Inpatient surgery that was not physiologically complex
  - Outpatient surgery
- Differences in CM/OR hour were financially important, exceeding $250

Pediatrics *vs.* Geriatrics

- Reason why of importance
  - Professional payments per OR hour greater for pediatrics
  - Hospital payments not different
    - ***incorrectly*** predicted that hospital payments would be less for geriatrics due to low Medicare payments

Prediction #2

- Rare physiologically complex procedures are financially disadvantageous, because they have higher costs

Prediction #2

- Rare physiologically complex procedures are financially disadvantageous, because they have higher costs
  - ***Not True***

Rare Types of Procedures

- CM/OR hour greater for discharges involving at least one rare procedure
  - Higher costs, but much higher hospital payments
  - Professional payments not different between two groups

Rare Types of Procedures

- CM/OR hour greater for discharges involving at least one rare procedure
  - ➢ Higher costs, but much higher hospital payments
  - – Professional payments not different between two groups

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➢ ***No basis for negotiating with insurance companies to increase hospital payments for rare procedures***

Unexpected Identification of Potential for Conflict

- For pediatric surgeries, greater professional payment accounted for higher CM/OR hour
- For surgeries involving rare procedures, greater hospital payment accounted for higher CM/OR hour

Unexpected Identification of Potential for Conflict

- For pediatric surgeries, greater professional payment accounted for higher CM/OR hour
- For surgeries involving rare procedures, greater hospital payment accounted for higher CM/OR hour
- ***Knowledge to prevent internal conflicts***

Unexpected Identification of Potential for Conflict

- Hospital executives might want to
  - Highlight rare and unusual procedures
  - Hire surgeons with special expertise
  - Cut pediatric surgery
- Head of pediatric surgery
  - Sees it is a big money-maker
  - Wants to expand pediatric surgery

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➢ ***Why important to consider both hospital and professional components***

Prediction #3

- Procedures with high implant charges are associated with poor financial performance
  - Payment levels are not adequate to compensate for the high cost of implants

Prediction #3

- Procedures with high implant charges are associated with poor financial performance
  - Payment levels are not adequate to compensate for the high cost of implants
- ***True***

Expensive Implants

- Surgeries on lung and esophagus
  - CM/OR hour higher ($P < 0.02$) when compared to all physiologically complex surgery
  - Few implants
- Surgeries on back
  - CM/OR hour lower ($P < 10^{-4}$)
  - Often use expensive implants

Expensive Implants

- Among cases with implant charges > $10,000
  - Backs
    -$15 ± $240 (this is *negative* $15)
  - All types of procedures
    -$330 ± $220
  - Rare procedures
    -$520 ± $320

Expensive Implants

- Hospital lost money for each case
- Prediction was of poor financial return, not the previously unrecognized huge impact of expensive implants

Other Facilities

- Numbers and conclusions are specific to the hospital studied
- Cannot generalize findings to other facilities
- At least 4 reasons

Other Facilities – Reason #1

- Pediatrics *vs.* geriatrics may not be appropriate groups to compare
- Rare procedures that are physiologically complex not relevant unless they represent significant portion of caseload
- Implant contracts differ among corporations

Other Facilities – Reason #2

- Profit depends on fixed costs
  - Inconsistent fixed asset accounting
    - Many hospitals are government owned
    - "Non-profit" hospital rapidly depreciates cost of new building to "balance" excess revenues, underestimating fixed costs
      - Risks are highly political, not economic

Other Facilities – Reason #3

- Heterogeneity in which revenues are included when studying a facility *or* professional group
  - Nurse anesthetists?
  - Salaried physicians?
  - All physicians?

Other Facilities – Reason #4

- Even for similar cases, CM/OR hour highly sensitive to
  - Payer mix
  - Supply contracts for implants/ disposables

Examples of Payments

Average Medicaid Payment Per User

	Iowa	Illinois
Physician Services	$390	$370
Inpatient Hospitalization	$5,220	$9,630

Importance of Implants and Expensive Disposables

- Comparing CM/OR hr for outpatient surgery among subspecialties, patient types, etc., the only non-constant terms are

  Hospital payment/OR hr – Implant costs/OR hr

- For professional services, the only term is

  Professional payment/OR hr

Dexter F et al. Anesthesiology 2002
Toyabe S et al. Health Policy 2005
Hultman CS. Ann Plast Surg 2016
Nakata Y et al. Int J Health Care Qual Assur 2019

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Large variability among procedures

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Importance of Implants and Expensive Disposables

- Use methods appropriate for there being multiple rare procedures, patient sizes, etc.
  - Payment (price) cap model for expensive implants and disposables
    - When not applicable, use e-mail to surgeons after cases completed with relative price information

Montgomery K, Schneller ES. Milbank Q 2007

Bosco JA et al. J Arthroplasty 2014

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Review – Summarize the Facts of the Talk

Expectations for a New Perioperative Medical Director

Expectations for a New Perioperative Medical Director

1. Financial analyses developed for tactical analyses are fruitful for strategic assessments
2. Healthcare organizations can have limited financial intuition
3. Focused factory of orthopedic or spinal surgery can have high or low margin
4. Coordination between facility and anesthesia group may include sharing of results, not data
5. Understand facility *vs* professional perspectives

Additional Information on Operating Room Management

- www.FranklinDexter.net/education.htm
  - Example reports with calculations
  - Lectures on drug and supply costs, day of surgery decision making, PACU staffing, OR allocation and staffing, anesthesia staffing, and tactical (1-yr) financial analysis
- www.FranklinDexter.net
  - Comprehensive bibliography of peer reviewed articles in operating room and anesthesia group management