Medication Use Evaluation
藥物使用評估

北醫臨藥所—藥物資訊

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2012.4.23

Encounters in the practice~

1. Dronedarone is recently introduced to your institution as non-formulary drug, and you would like to assess it's proper use.
2. Consider to replace the brand drug levofloxacin by generic drug.
3. Warfarin 5mg is hard to crush; may encourage the use of warfarin 1mg
4. To ensure the safety and efficacy of the new recommendation of high vancomycin trough:10-20 ug/dL (previous standard: 5-20 ug/dL)
5. Recent ADR cases of "Propofol induced propofol-infusion syndrome"
6. DOH alerts that demerol may induce neurotoxicity if long term use, may recommend to replaced by morphine.

Outlines

- Evolution of terminology
- What?
- Goal
- Classification
- Procedure of MUE
- Examples

What?

- Definition of DUE program:
  - **A structured, ongoing program that provides a rational, systematic approach for improving the quality of drug use and patient outcomes**. (*from "The Joint Commission required drug utilization Organization*")
  - A structured, ongoing organizationally authorized quality assurance process designed to ensure that drugs are used **appropriately, safely, effectively, and economically**

Evolution of terminology

1969	Task Force on Prescription Drugs (DHEW) Report- first call for develop of programs to monitor drug use
1974	HCFA, pharmacists' monthly drug regiment review (DRR) for residents of nursing facilities
1976	**Drug Utilization Reviews (DUR)** - retrospective
1978	Focus on Antibiotic Utilization Reviews (AUR)- retrospective, quantitative
1986	**Drug Use Evaluation (DUE)** replaced AUR- concurrently
1992	**Medication Use Evaluation (MUE)**- multidisciplinary
1994	MUE standards were required of all institutions

Evolution of terminology

- Drug Use Evaluation **(DUE)** named by AMCP*
  - AMCP believes that DUE is the most common designation for processes of prospective, retrospective, and concurrent medication review in the health care setting.
- Medication Use Evaluation **(MUE)** named by JCAHO#, ASHP#
  - MUE may be applied to a medication or therapeutic class, disease state or condition, or a medication-use process (ordering and transcribing, preparing and dispensing, administration, and monitoring)
- **JCAHO,** the leader in assessing and promoting quality in the health system setting, influenced MUE over years
- **MUE** is the component of a health care organization's **quality improvement program**

*Academy of Managed Care Pharmacy (AMCP)

#Joint Commission on the Accreditation of Healthcare Organizations (JCAHO)

American Society of Health-System Pharmacists (ASHP)

Evolution of terminology

- DUR & AUR
  - could be quantitative or qualitative, address **only apparent problems in patient care**
- **MUEs**
  - must be **criteria based** (qualitative)
  - routine collection of information to assess areas **where problems may not be obvious**

	Quantitative reviews:	Qualitative reviews:
Criteria based	x	o
	Measure the **amount and patterns** of drug use	Assess the **appropriateness** of drug use Data related to the **quality of patient care**; ultimately, **patient outcomes**

Why important?

- In 1995, **drug-related morbidity and mortality** resulting from **drug-related problems (DRPs)** was estimated to cost $76.6 billion annually in the ambulatory setting in the US

  (Johnson et al. Drug-related morbidity and mortality: a cost-of-illness model. *Arch Int Med.* 1995;155:1949-56)

  In 2000, the cost exceeded $177.4 billion.

  (Ernst et al. *J Am Pharm Assoc* 2001; 41: 192-199)

  - Untreated indication, improper drug selection, subtherapeutic dosage, failure to receive drugs, overdosage, ADR, drug interactions, drug use without indication

What are the objectives of an MUE program?

What are the objectives of an MUE program?

確保病人獲得安全、有效、經濟及人性化的合理藥物治療結果，並節省醫療成本避免不必要的花費

Provide all patients drug therapy

- The most rationale
- Safe
- Effective
- Cost-benefit

Medication Use Process

- A component to develop tools to assess medication use.
- Multidisciplinary.

- Prescribing
  - Assessing the need for/selecting the correct drug
  - Individualizing the therapeutic regimen
  - Designing the desired therapeutic response
- Dispensing
  - Reviewing the order for correctness of dosing and indication for use
  - Processing the order
  - Compounding/preparing the drug
  - Dispensing the drug in a timely manner

JCAHO

Medication Use Process

- Administering
  - Administering the right medication to the right patient
  - Administering the medication when indicated
  - Informing the patient about the medication
  - Including the patient in administration
- Monitoring
  - Monitoring and documenting the patient's response
  - Identifying and reporting adverse drug reactions
  - Reevaluation the drug selection, drug regimen, frequency, and duration
- Systems/Management control
  - Collaborating and communicating among caregivers
  - Reviewing and managing the patient's complete therapeutic drug regimen

Responsibility for MUE function

- P & T Committee
  - A MUE subcommittee
  - Performance/Quality Improvement Committee
- Group membership
  - Practice group: Prescribers, nurses, pharmacists
  - Respiratory therapists
  - Social workers
  - Clinical laboratory and information systems personnel
  - Discharge planners

MUE in UIHC Pharmacy Practice

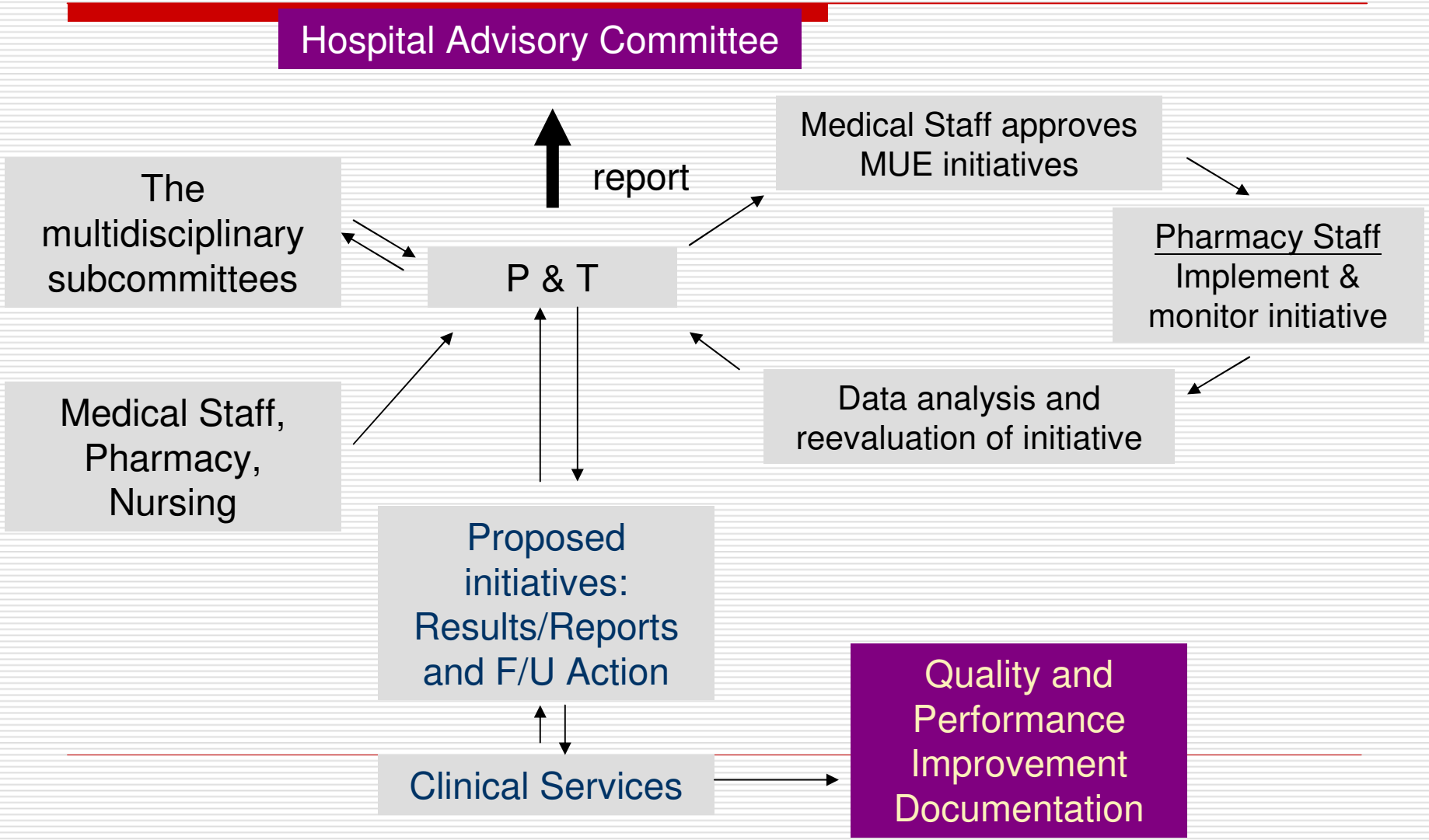
- **JCAHO MUE requirement**:
  - retrospective, individual, prescriber-based medication review in 1970s

    →prospective or concurrent, patient outcomes-focused tool.
- **Cost-effectiveness**: provide high-quality health care at a reasonable price.
- Reviewed by:
  - Quality and Performance Improvement Program
  - MUE program
  - P& T subcommittee
    - Abx Advisory, **MUE**, Biotech. Drug Advisory, Amb. Care Med Use, Adverse Drug Event, Pain Management Advisory, Parenteral Infusion Device, Parenteral Nutrition

UIHC, University of Iowa Hospitals and Clinics

Pharm Pract Manage Q 2000;20(2):1-5

MUE in UIHC Pharmacy Practice



What are the materials for MUE?

A specific drug	alteplase
A class of drugs	thrombolytics
drug used in the management of a specific disease state or clinical setting	thrombolytics in AMI
drugs related to a clinical event	drug therapy within the first 24 hrs for pt admitted w/ AMI including aspirin, ß-blockers, thrombolytics, etc
A specific component of the drug use process	time from admission to administration of thrombolytic
Evaluate investigated drug (new drug) before marketing	
→ **Individual patient DUE gathered to be "a component of EBM"**	

Classification

- **Retrospective MUEs**
  - Most common, simplest to perform
  - Drug therapy is reviewed ***after*** the patient has received the medication**.**
  - Data source: chart review, past computerized record
  - Determine whether the drug therapy met approved criteria. Detect patterns in prescribing, dispensing, or administering drugs to **prevent recurrence of inappropriate use**
  - No opportunity to improve in that patient's drug therapy, but provide evidence for **future decision making**.

Classification

- **Concurrent MUEs**
  - performed ***during*** treatment and involves the ongoing monitoring of drug therapy to ensure positive patient outcomes.
  - Data source: staff or patient interviews
  - **Alert providers to potential problems** and to intervene in areas such as drug-drug interactions, duplicate therapy, over or underutilization, and excessive or insufficient dosing.
  - Correct specific problems in an **individual patient**.

Classification

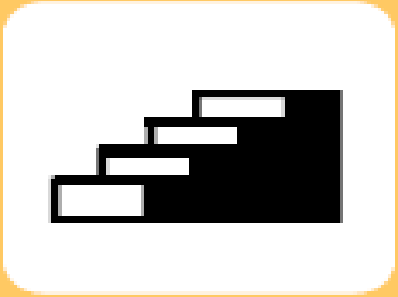
- **Prospective MUEs**
  - Evaluating a patient's planned drug therapy ***before*** a medication is dispensed and allows for identification of problems ***before*** the patient has received the medication.
  - **Pharmacists perform prospective reviews in daily practice** by **assessing a prescription** medication's dosage and directions and reviewing patient information for possible drug interactions or duplicate therapy.
  - Computerized physician order entry (**CPOE**) system: **alarming!**
  - Correct problems occurs prior to drug use, offer **greatest interaction and education**
  - But also increases the **risk for negative interaction & therapy delays.**

(B)

醫師開例處方，遇到重複用藥，電腦跳出警訊系統以評估此用藥適當性，是屬於以下何種藥物使用評估方式 (MUE)？

A. Retrospective MUEs
B. Prospective MUEs
C. Concurrent MUEs

Steps in MUE Planning



Steps in MUE Planning

- Establish Organization Authority
- Select Medications and Medication - Use Processes for Evaluation
- Examine Potential Indicators
- Establish Criteria or Protocol
- Collaborate with Key Stakeholders
- Educate on Criteria or Protocol

General Anticipated Time Commitments

- Design and development: 2 – 4 weeks
- IRB review and approval (if necessary): 6 – 10 weeks
- Data collection: 4 – 6 weeks
- Analysis and presentation: 2 – 4 weeks

Steps in MUE Planning

1990 JCAHO, DUE program are required to include the following

Assign responsibility (e.g., P&T)

Step 1. Selecting drugs

- Assess overall drug use patterns
- Identify specific drugs or drug classes to be evaluated

Step 2. Develop criteria

Step 3. Data Collection

Step 4. Monitoring and Evaluating

- compare with criteria

Step 5. Take actions

- Solve problem or improve drug use

Step 6. Follow up

- Assess the effectiveness of the action

Step 7. Documenting and Reporting

- Communicate information to appropriate individuals and departments

Step 1. Selecting Drugs

- **Focus on:**

  High volume, high risk, problem-prone medication-related processes

- **Set priorities, base on the scope of care of the institution**
  - For **formulary evaluation** (e.g., **deletion, addition**)
  - For study by hospital **infection control** or quality assurance activities
  - **Frequently prescribed** drug
  - **Expensive**
  - Potentially **toxic**
  - Potentially serious **ADR** or **interactions** w/ drugs, foods, or diagnostic procedures
  - Used in patient population at **high risk for adverse reactions**
  - Most efficacious when used in a **specific manner**
  - Discomfort when used at therapeutic **dosages**

Step 1. Selecting Drugs

- **Information sources:**
  - Medication error reports
  - Adverse drug reactions
  - Advances in patient care modalities that involve changes in optimal pharmacotherapy
  - Diagnosis related groups length of stay or cost
  - Purchasing reports
  - Specific medication, antibiotics, etc.

(D)

在選擇作Medication Use Evaluation的藥物特性或時機，以下何者較不適當？

A. Expensive drug
B. New drug for formulary addition
C. Drug used in patient population at high risk for adverse reactions
D. Seldom prescribed drug

Examples of MUE-

手術預防性抗生素之臨床路徑修改成效分析

- Step 1. Selecting Drugs
  - Surgical Prophylaxis Antibiotics
    - Cefazolin
  - Rationale: updated prophylaxis in the clinical pathway
  - 評鑑條文 3.7.3.3 正確使用抗生素
    - 在手術劃刀前且在一小時內，應給第一劑預防性抗生素
    - 應符合國內外抗生素使用指引。
    - 劑量應與體重相符。
    - 手術中視必要追加。
    - 一般清淨手術後，於術後不再繼續使用抗生素，重大手術不超過24 小時後使用抗生素

臺北醫學大學萬芳醫院

泌尿科 **前列腺肥大切除術** 臨床路徑表 (DRG 0337A)

主治醫師：

住院日期：____年____月____日

預估住院日：6 日　實際住院日：____日　基本醫療：(無此限制)

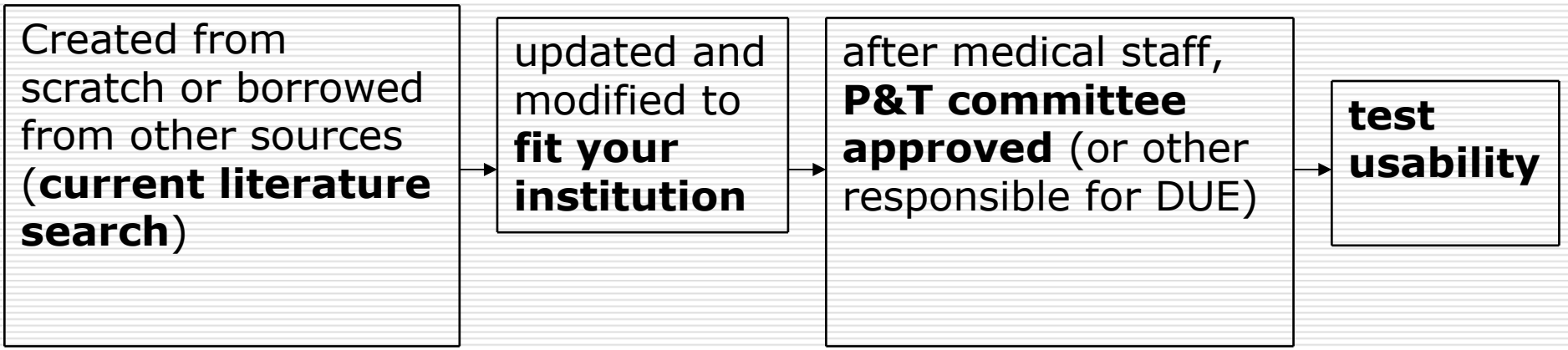
床號：

姓名：

住院日數	住院日(術前準備日)	第二天/手術日	第三天/術後第一天
日期			
臨床評估	□病史詢問 □理學檢查—肛診	□Vital signs □傷口檢視	□Vital signs □傷口檢視
檢驗	□CBC □Blood type □PT □APTT □ALT □Alb □AST □BUN □Cr □Na □Glu/Ac □K □U/A □S/A □EKG □KUB □CXR □備血 PRBC 2U	**※□前列腺切片 st (OR) (5gm)** **※□前列腺切除 st**	□傷口換藥 (小) Suprapubic wound3D □Foley care st
處置及手術	□麻醉前評估 □皮膚準備 □灌腸 □Bisacodyl 1#supp hs □GB 1#enema hs	**※□麻醉 st** □SA □GA □其他_____ □Pulse oximeter st □麻醉恢復照護 st □Dn foley st □N/S irrigation for 24hrs st	
活動	無限制	□術後平躺 6-8 小時至_____點 □平躺結束後只可床上活動	□術後可下床活動
飲食	□正常飲食□糖尿病飲食 □其他_____ □午夜後禁食	□手術後腸水順利即恢復正常飲食 □其他_____	□正常飲食□糖尿病飲食 □其他_____
藥物治療		術前 st □IV DSS run 80ml/hr □其他 IV_____ □抗生素_____ 術後 st □IV fluid □Gentamicin 80mg iv drip 30 min st □Cefazolin 1gm iv q8h □Sennoside 1# hs □其他_____	□IV DSS run 60ml/hr st □其他 IV_____ □Cefazolin 1g iv q8h to next day □Sennoside 1# hs
	□告知住院流程 □感控環境介紹	□傷口護理評估 □尿管檢視確許尿管通暢	□告知預估出院日 □傷口護理評估

Step 2. Developing Criteria, Standard, and Indicators

- Most difficult!
- Develop **explicit criteria** (expectations of findings if drug use is optimum.)



- Should represent acceptable drug use within your health-care facility

Step 2. Developing Criteria, Standard, and Indicators

- **Implicit criteria** (subjective) Implied or unwritten
  - Vary greatly between reviewers
  - Likely inconsistent and unreliable with time
- **Explicit criteria** (objective) Predetermined, written statements that define an acceptable quality of drug use
  - Specific parameters, every person using would arrive at the same conclusions

Examples of implicit and explicit criteria statements

Implicit criteria statements	**Explicit criteria statements**
Blood work ordered	Pretreatment WBC differential ordered and completed within 48 hours prior to the initiation of therapy
Renal function assessed routinely	Serum creatinine evaluated every 3 days
Neutropenic patients	Patients with WBC < 1000/mm^3

Step 2. Developing Criteria, Standard, and Indicators

Good criteria can be expected to ensure improvement in patient care and outcomes

- **Usable criteria**:
  - readily retrievable data
  - clear, complete, and concise with specific measurable numerical decision points
  - all terms are defined (avoid "usually, high, frequently…etc")
- **Reliable criteria**:
  - no judgment or interpretation by the user (all users arrive at the same decision about whether the criterion was met)
- **Relevant criteria**:
  - supported by current references from the medical literature, clinical knowledge, and experience
- **Reasonable criteria**:
  - not with low expectations that they encourage poor performance or with high expectations that they are unrealistic
  - reflect consideration for local practitioners and unique characteristics of the hospital

Criteria

- Prescribing / Indication
- Administering / Dosage
- Monitoring / Adverse effects
- Outcome measures

Examples of **Indicators**: suggesting a need for MUE analysis
Patients > 65years old in whom CrCl has been estimated
Patients undergoing surgery who receive prophylactic antibiotics > 2h before the first incision
Frequency of pharmacy stock outages
Frequency of discrepancies in automatic dispensing units
Patients with a diagnosis of acute myocardial infarction that are prescribed daily aspirin therapy at discharge
Patients with a diagnosis of congestive heart failure receiving an ACEI
Patients discharge on > x number of prescription medications

Examples of MUE-

手術預防性抗生素之臨床路徑修改成效分析

- Step 2. Developing criteria
  - 泌尿科前列腺肥大切除術Prostatectomy

萬芳醫院 臨床路徑表				原始版本			藥劑部修改版本			參考文獻
科別	編號	手術名稱	乾淨度分類	術前抗生素	術中抗生素	術後抗生素	術前抗生素	術中抗生素	術後抗生素	見表格後註記
泌尿科	6-2	結石輸尿管鏡碎石術	clean-contaminated	Cefazolin 1g before OR	無	Cefazolin 1g q6h至CM	* Cefazolin 1g iv 帶至OR(劃刀前1hr.內給予)	無	無	B, D
	6-1	精索靜脈曲張修補術	clean-contaminated	Cefazolin 1g iv st	無	IV to cm (next day) 抗生素	無	無	無	G
	6-3	前列線切除術	clean-contaminated	Antibiotics	無	Gentamicin 60mg iv drip 30min st, Cefazolin 1gm iv q6h x 2d Cephalexin(500) po 1# qid x 2d	Cefazolin 1g iv 帶至OR(劃刀前1hr.內給予)	無	無	A
	6-4	腹股溝疝氣修補術	clean-contaminated	Cefazolin 1gm q6h iv st	無	無	無	無	無	G

* 視病人情況選擇性勾

參考文獻:

A. Taiwan IDST guidelines
B. ASHP guidelines
C. University of Pennsylvania Medical Center
D. University of Kansas Hospital
E. ACOG guidelines for prophylactic antibiotic use in labor and delivery
F. University of Iowa Health Care Virtual Hospital
G. 健保局_清淨手術使用抗生素監測計畫

Step 3. Data Collection

- Patient selection process
- Sample size and method
  - All consecutive patients
  - Intermittent sampling
  - Random sampling
- Evaluation time frame
- Data collection method
  - Retrospective DUEs
  - Concurrently DUEs
  - Prospectively DUEs
- Standards of performance

Examples of MUE-

泌尿科前列腺肥大切除術之手術預防性抗生素修改成效分析

Step 3. Data Collection

- Study Design: Retrospective chart review
- Patients selected：Transurethral resection of prostate(TURP) according to ICD-9(60.29)
- Screening period: 96/7~96/12

Examples of MUE-

泌尿科前列腺肥大切除術之手術預防性抗生素修改成效分析

- Step 3. Data Collection
  - **Inclusion Criteria**
    - Patients undergoing TURP who do not have preoperative clinically significant bacteriuria (i.e. their preoperative urine is reported as sterile or $<10^5$ bacteria/mL urine)
  - **Exclusion Criteria**

    Patients will be excluded if they had the following：

    (1)Symptoms of bacteriuria (e.g. a pre- or post-operative body temperature(T) of >38 Celsius, $>10^5$ bacteria/ml urine or Leukocyte esterase and Nitrite-positive in urine)

    (2)Tumor

    (3)Hypersensitivity to antibiotics (cefazolin)

    (4)Underline diseases and need to preoperative stay

    (5)Coexisting infection (e.g. urinary tract infection)

Step 4. Monitoring and Evaluating

- Analysis of collective data

  Screening review → In-depth review
- Screening review:
  - indicates high potential problems: indication, correct dosage
  - Screening criteria
    - represent those few “critical” elements (if not met, indicate the need for a more detailed or **indepth review**)
    - Explicit (use by computers or nonprofessional personnel)
- In-depth review
  - Identify patterns
  - Trend indicative of problems

Step 4. Monitoring and Evaluating

- Data Analysis
  - Thresholds / Control limits
    - Compare actual performance with expectations defined by the standards
  - Standard %
  - Exceptions

Examples of MUE-

泌尿科前列腺肥大切除術之手術預防性抗生素修改成效分析

- Step 4. Monitoring and Evaluating
  - Comparing the compliance rate (%) to the updated clinical pathway before and after pharmacist intervention

9/24 INTERVENTION

Compliance rate:

	*After intervention, compliance rate A(30)	B(41)
Timing **Within an 1 hr prior to incision**	28(93%)	41(100%)
Choice of drug **Cefazolin**	28(100 %)	41(100 %)
Duration **Second dose** **Postop antibiotics** **(except for high risk p'ts)** →	13(46%)	31(76 %)
Dose **1g, weight>80 kg 2g**	10(37%)	26(63%)
Overall	10(33%)	26(63%)

Examples of MUE-

泌尿科前列腺肥大切除術之手術預防性抗生素修改成效分析

Step 4. Monitoring and Evaluating

- From this study, the most serious problem is prolonged use postoperatively
  - within 1 hr before incision ⇨55.7 %
  - discontinued within 24 hrs ⇨40.7 %
- The other problem is inappropriate dose on the basis of patient body weight.
  - > 80kg did not obtain 2g cefazolin
- According to this study and recent researches, reducing the duration of use of prophylaxis does not increase postoperative complications, but decrease the medical cost. In the long run, it can decrease the chance of resistance.

Step 5. Taking Action-
Intervention & Corrective Actions

- After identifying the problems
  →determine **probable causes**
  - E.g., outdated or cumbersome procedures, inadequate quantity or quality of resources, gasp in knowledge or misinformation, people problem
- Develop simple plan!
  - Regulatory measures should be avoided initially (e.g., prescribing restrictions), used as last resort

Step 5. Taking Action- **Intervention**

- Educational interventions
  - Knowledge deficits
  - Outside the criteria
  - Discussion of results, letters, newsletters
  - Computerized order entry educational screens
  - Protocols, guidelines, presentation

- Restrictive interventions
  - Special ordering procedures
  - Compliance with guidelines for use
  - Consultation with a specialty service
  - Formulary restrictions

Step 5. Taking Action- **Corrective Actions**

- Process changes
  - Policy / procedures
  - Implementation of new services
  - Acquisition of new equipment
  - Changes in staffing
  - Generation of regular notifications

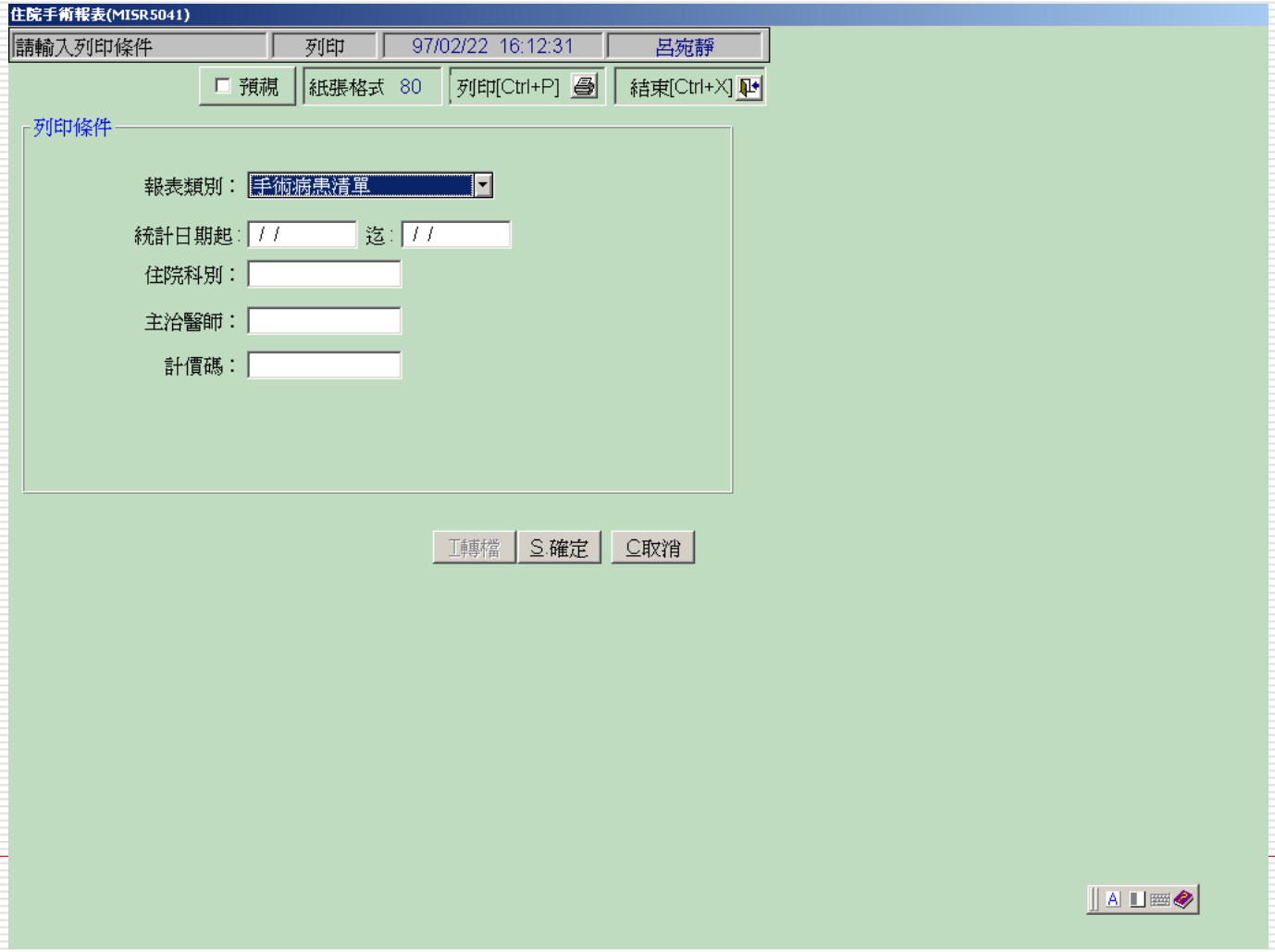
Examples of MUE-

泌尿科前列腺肥大切除術之手術預防性抗生素修改成效分析

- Step 4. Taking action
  - 感控會議及當科宣導
  - 資訊室報表功能更新
  - 定期監測預防性抗生素使用正確性

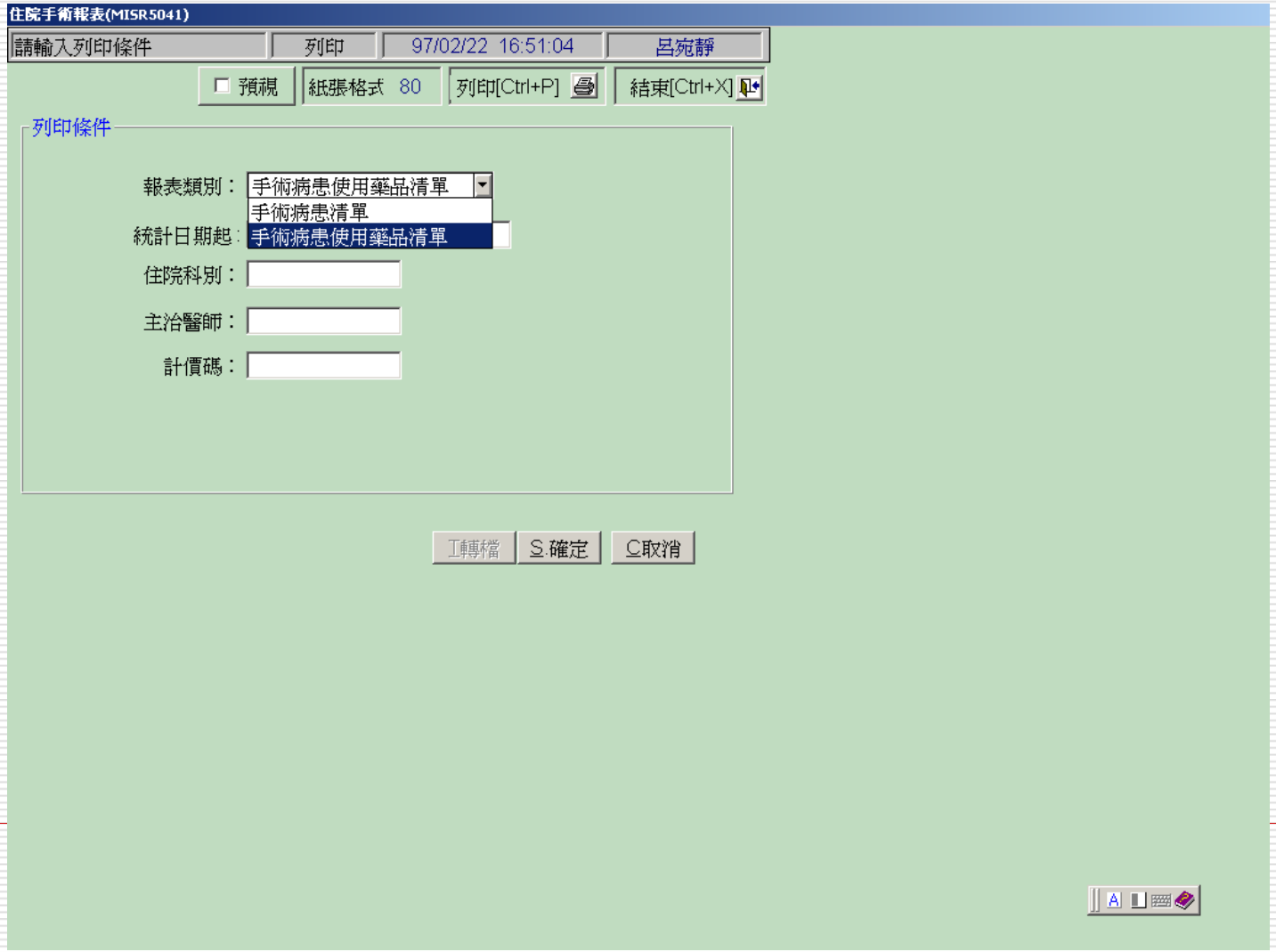
手術病患清單_

術前預防性抗生素給藥時間點



手術病患使用藥品清單_

術後六天內預防性抗生素品項



Step 6. Follow-up

- **Follow up evaluation:**

  Problems have been corrected? patient care has improved?
- Effectiveness of the interventions
- Same
  - Criteria
  - Standards
  - Sample

泌尿科

科別	編號	各科臨床路徑表	計價代碼	術前預防性抗生素		沒給藥或沒記錄給藥時間	%	劃刀1hr.內給藥	%	劃刀>1hr.前給藥	%	劃刀後才給藥	%	手術總件數
泌尿科	6-2	結石輸尿管鏡碎石術	F50023B, F50024B	cefazolin	7-9月									0
					10-12月									0
	6-1	精索靜脈曲張修補術	F79202B, F79204C	不需要	7-9月	9	75.0%	3	25.0%					12
					10-12月	17	68.0%	8	32.0%					25
	6-3	前列線切除術	F79404B, F79405B, F79406B, F79411B, F79412B	cefazolin	7-9月	9	15.3%	48	81.4%			2	3.4%	59
					10-12月	12	18.5%	52	80.0%			1	1.5%	65
	6-4	腹股溝疝氣修補術	F75606B, F75607C, F75613C, F75614C, F75615C	不需要	7-9月									0
					10-12月									0

Step 7. Documenting and Reporting

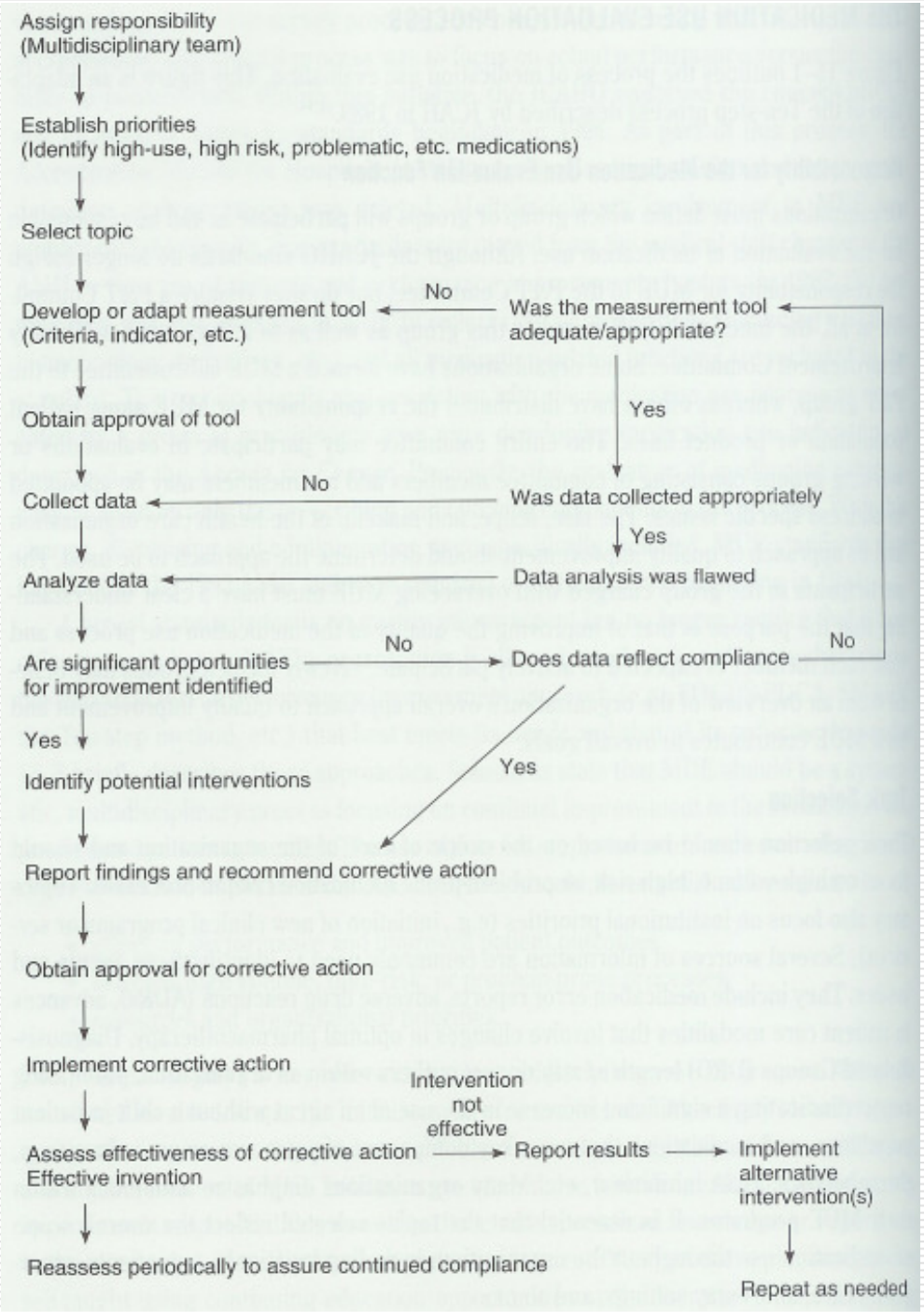
- Written reports of findings, recommendations, and actions
  - Written plan for the DUE program, criteria sets, and forms
  - Memo informing staff of DUE activities
  - Committee meeting minutes
  - Correspondence form individuals or committees regarding DUE activities
- Provides the basis for a comprehensive program evaluation (e.g., MUE)
- Results should be communicated to appropriate individuals, departments, and the overall hospital quality assurance program

Examples of MUE-

泌尿科前列腺肥大切除術之手術預防性抗生素修改成效分析

- Step 4. Reporting
  - 臨床路徑委員會
  - 感控會議
  - 大外科會議
  - 麻醉科 及 開刀房宣導
  - 資訊室會議

- Responsibility for MUE function
- Establish priorities (Identify high-use, high risk, problematic)
- Select topic
- Criteria
- Data collection
- Interventions
- Report finding and recommend corrective action
- Correct action
- Follow up



(C)

執行藥物使用評估(MUE)的適當順序？

1. **Monitoring and Evaluating**
2. **Follow up**
3. **Documenting and Reporting**
4. **Develop criteria**
5. **Data Collection**
6. **Take actions**
7. **Selecting drugs**

A. 7→ 4→ 5→ 6→ 1 → 3 → 2
B. 7→ 5→ 4→ 6→ 1 → 3→ 2
C. 7→ 4→ 5→ 1→ 6 → 2 → 3
D. 7→ 5→ 4→ 6→ 1 → 2 → 3

ASHP Guidelines on Medication-Use Evaluation

Am J Health-Syst Pharm. 1996; 53:1953-5.

- MUE initiated in 1992, included all medications (including vaccines, biotechnology derivatives, etc.) and all medication-related functions
- Encompasses the goals and objectives of DUE in its broadest application
- Emphasis on the need for a more multifaceted approach to improving medication use
- Pharmacist's responsibilities in MUE

ASHP guidelines on the pharmacist's role in DUE

Am J Hosp Pharm. 1988; 45:385-6

- Pharmacists should take a leadership role and work with the medical and nursing staffs, administration, and other appropriate personnel and committees (e.g., P&T, quality assurance)
  - Criteria preparation
  - Medication order review (on a routine basis)
  - Drug use data compilation
  - Data analysis and report preparation
  - Participation in educational program (presentation of inservices, preparation of newsletters and other educational materials, etc.)
  - Coordination of other activities related to the DUE program

(A)

根據ASHP guidelines，the pharmacist' role in Drug Use Evaluation (DUE)，以下何者較不適當？

A. Authority for the implementation of the DUE
B. Data analysis and report
C. Criteria preparation
D. Coordination of DUE related program

Examples of MUE

MUE of r-tPA 評估特殊使用時機藥品

- Step 1. Selecting Drugs
  - Rationale: AMI high mortality rate decrease 5-10% by r-tPA (recombinant tissue plasminogen activator).
  - the most frequently used thrombolytics, expensive, 用量突增因此進行評估
- Step 2. Developing criteria
  - 健保"藥品給付規定, r-tPA申報表literature support
  - data collection form→ evaluate “door to needle time” (pt 自AMI至注射r-tPA的延誤時間<12hr.), indication, TDM, ADR, clinical outcomes
- Step 3. Data Collection
- Step 4. Monitoring and Evaluating
  - (1)符合健保使用規定，佔 98% (2)no absolute contraindication, but 17% relative contraindication (3)monitor ADR (4)pt送醫時間過長 (5)醫院內注射r-tPA延誤時間2.75hr., 也明顯延遲施打(<20min-1hr.)
- Step 5. Taking action
  - 擬定改善或解決方案，報請何准後執行之，評估解決方案之有效性
- Step 6. Documenting and Reporting
  - 定期向醫院最高醫療品質委員會提出評估及改善結果

UIHS examples: DUE of automatic substitution cefotaxime to ceftriaxone
評估取代藥品

- Rationales:
  - An estimated $30,000 per year could be saved
  - 2 drugs provide equivalent coverage, lab sensitivity test of ceftriaxone based on cefotaxime
- Literature review discussed by the Abx Advisory and P&T subcommittee▸ 2 abx were interchangeable clinically and therapeutically.
- Sent letters to clinical services▸ feedback: biliary pseudolithiasis associated with high-dose ceftriaxone in the pediatric and neonatal
- Final approval
  - Ceftriaxone, the preferred 3rdGC in ghe adult at UIHC; cefotaxime is available only for adults through a special order request form.
- Education: satellite-specific pharmacotherapy rounds, meetings, newsletter, order alert in the computer system
- Therapeutic interchange
  - Automatic Substitution Form
  - Three-ply form that allows communication of the conversion to physicians, nurses and pharmacists.
- Outcomes

Reference

- Drug Information: a guide for pharmacists / Patrick M. Malone et al--2nd ed.
- ASHP guidelines on Medication-Use Evaluation. Am J Health-Syst Pharm 1996;53 (16):1953-5
- ASHP guidelines on the pharmacist's role in drug use evaluation. Am J Hosp Pharm 1988; 45:385-6.
- Pharm Pract Manage Q 2000;20(2):1-5

Take Home Message

- Background: Purpose or rationale/ specific research questions
- **Step 1. Selecting drugs**
  - Assess overall drug use patterns
  - Identify specific drugs or drug classes to be evaluated
- **Step 2. Develop criteria**
  - Appropriate usage, education guideline, restricted usage, Computer system support
- **Step 3. Data Collection**
  - Study design: concurrent, prospective, retrospective
  - Data collection form, sample population, study duration
- **Step 4. Monitoring and Evaluating**
  - Data Analysis, outcome measurement, problem finding
- **Step 5. Take actions**
  - Develop plan or action to solve problem or improve drug use
- **Step 6. Follow up**
  - Assess the effectiveness of the action
- **Step 7. Documenting and Reporting**
  - Communicate information to appropriate individuals and departments
- References

To Go~

How do you plan a MUE for the following scenario?

1. Dronedarone is recently introduced to your institution as non-formulary drug, and you would like to assess it's proper use.

2. Consider to replace the brand drug levofloxacin by generic drug.

3. Warfarin 5mg is hard to crush; may encourage the use of warfarin 1mg

4. To ensure the safety and efficacy of the new recommendation of high vancomycin trough:10-20 ug/dL (previous standard: 5-20 ug/dL)

5. Recent ADR cases of "Propofol induced propofol-infusion syndrome"

6. DOH alerts that demerol may induce neurotoxicity if long term use, may recommend to replaced by morphine.