RETROSPECTIVE DRUG UTILIZATION REVIEW

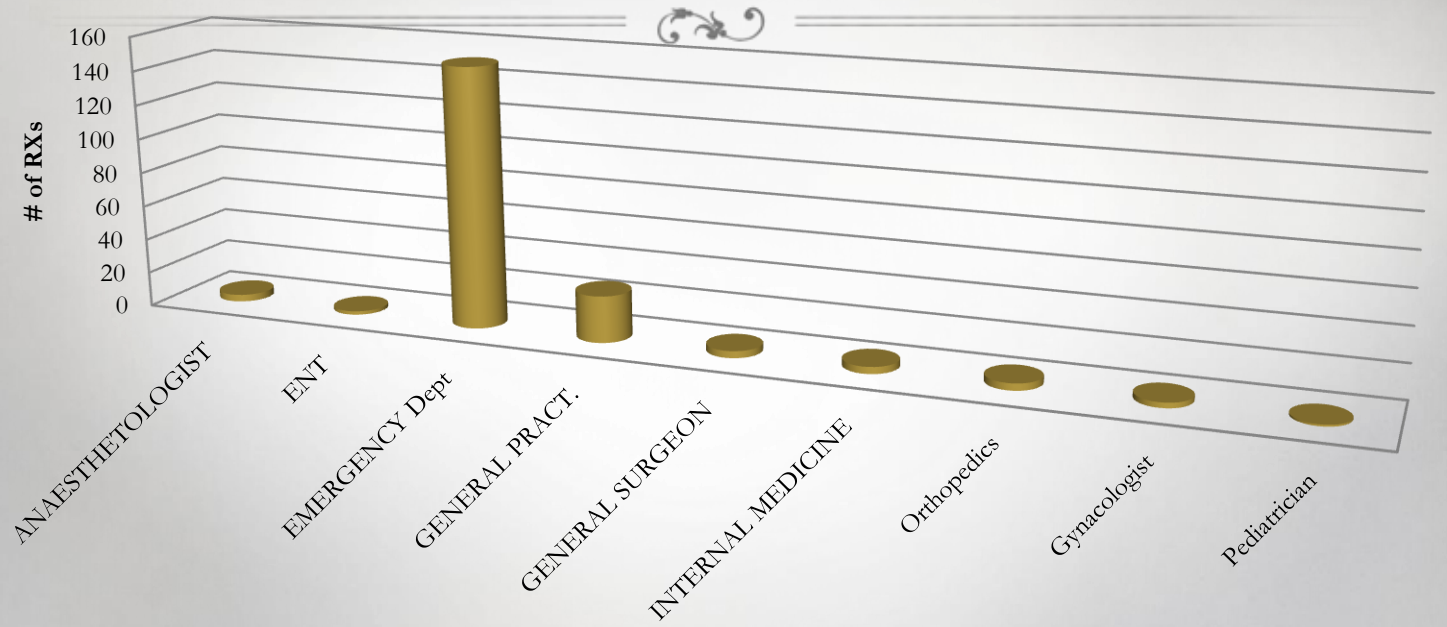
CEFTRIAXONE

April to June 2010

Yasser Mohamed, PhD, MSc, BSc

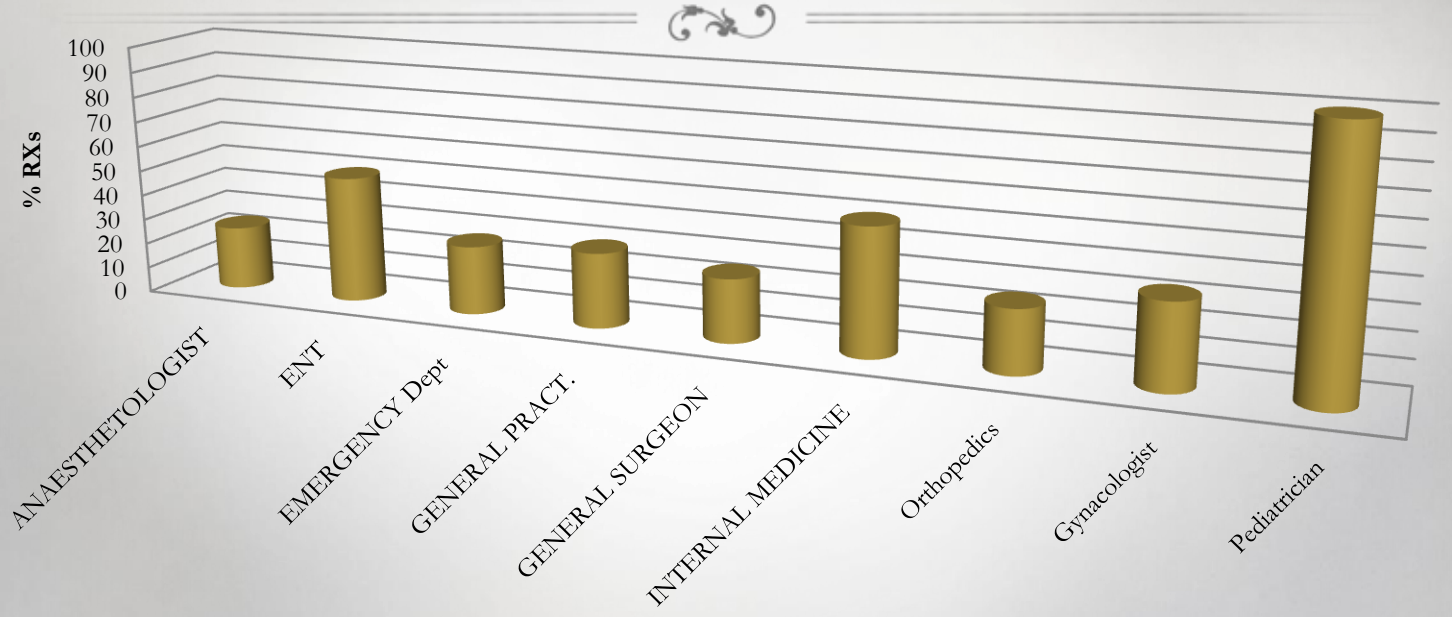
North Bay Regional Health centre

Frequency of ceftriaxone Prescribing by Specialty

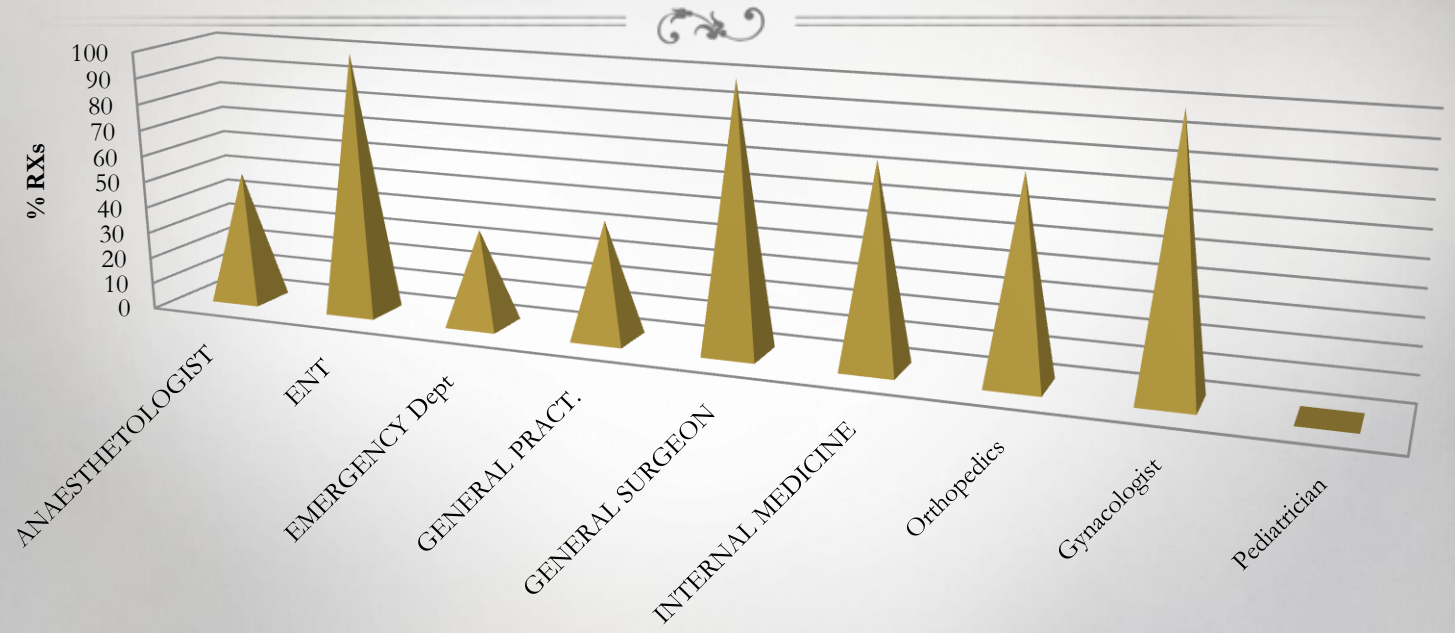


APPROPRIATENESS OF CEFTRIAXONE USE

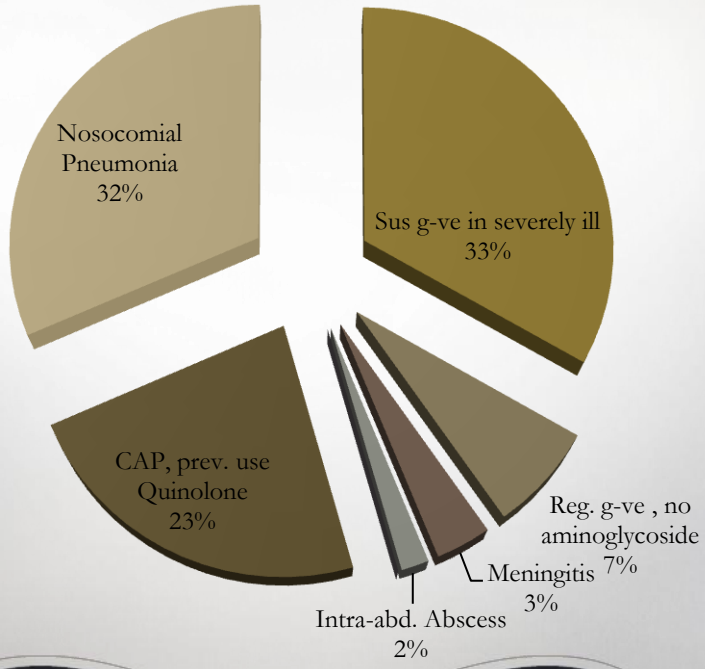
Adherence to guidelines for Empirical Use of Ceftriaxone



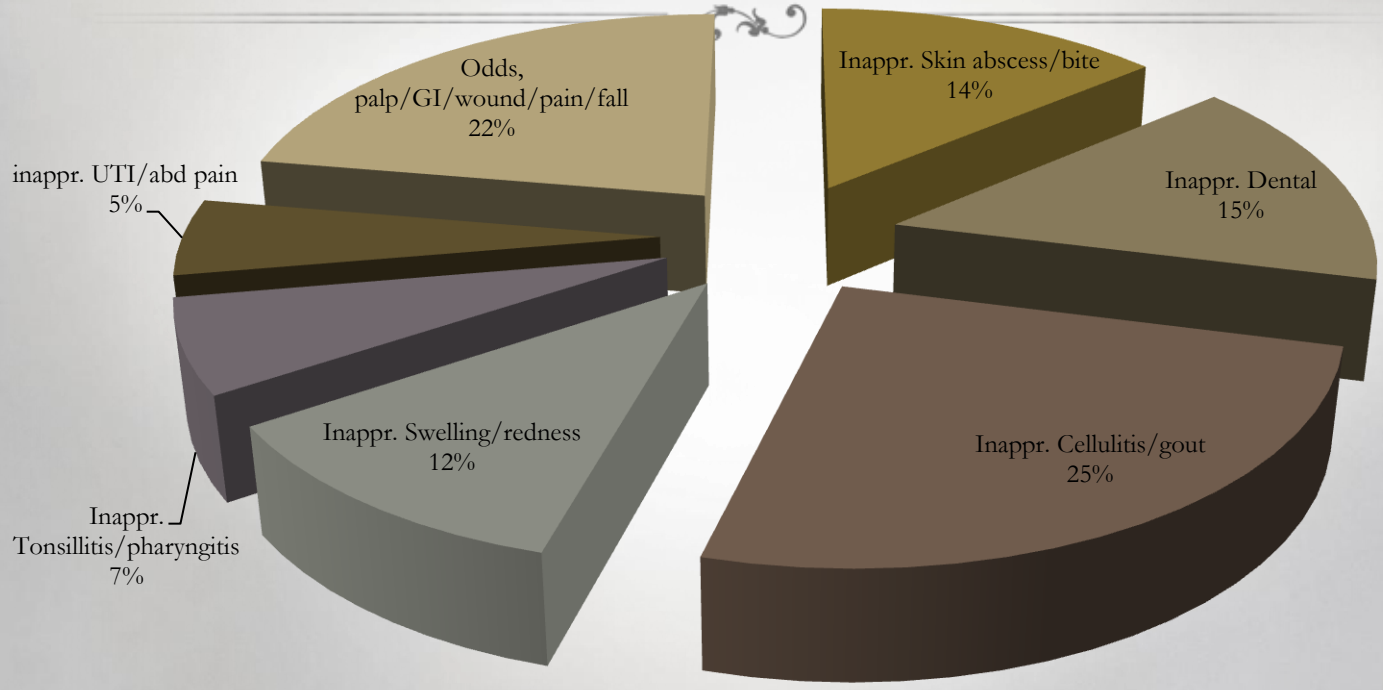
% Culture & Sensitivity ordered either pre or post Initiation of Empirical Therapy



Distribution of Ceftriaxone RXs per approved Empirical Guidelines



Distribution of Inappropriate Ceftriaxone use



TRENDS OF LOCAL BACTERIAL RESISTANCE

- MSSA is becoming multidrug resistant bug at NBGH
- About 55 % of MSSA isolates were resistant to clindamycin
- 90 to 100 % of all studied isolates of both Gram +ve and Gram –ve bacteria were sensitive to Co-Trimethoxazole
- E. coli (catheter related UTI) isolates were 40% resistant to ciprofloxacin

Table 3: Local NBGH Antibiogram for Isolates Collected in 3-Month Period (% Sensitive Isolates)

Antibiotic	Citrobacter	E. cloaceae	E. faecalis	Strept. Gp C	Strept. lundunensi	Strept. pneum.	Strept. Agalact.	Strept. Epid.	Strept. Gp A	Staph. aureus	Serratia Mar.	K. pneum	Morg. Morg.	P. Aeru.	E. coli
Penicillin	10	10	100	100	10	85	100	10	100	30	10	10	10	10	10
Oxacillin	10	40	100	100	100	100	100	100	100	100	10	10	10		100
Pipracillin		100									100		100		100
Cephalosporin 1st,2nd gen.	10					100						93	10		100
Cephalosporin 3rd gen.						100							50	100	
Carbapenem		100									100	100	50	100	
Amino-glycoside	100	100			100							100	100	100	100
Quinolone	10	100	75			100		100		82	100	100	100	10	100
Vancomycin				100	100	100	100		100				100		
Macrolide				100	100	60	100	10	50	64					
Sulfatrim	10	100			100	100		100	100	91	100	100	93		100
Clindamycin				100			100	100	100	55					

1. *Score 10 represents Resistant strain*
2. *At least 3 isolates or more were used to calculate % sensitivity*
3. *For Cephalosporins 1st&2nd generations, cefazolin was used*
4. *For 3rd generation Cephalosporins, ceftazidime/ceftriaxone were used*
5. *Amino glycoside used was gentamycin*
6. *Macrolide used was erythromycin*
7. *Foe quinolones, ciprofloxacin/ levofloxacin were utilized*
8. *serious findings are highlighted in color*

Table 1. Criteria elements for the drug utilization evaluation of ceftriaxone (ASHP)

No	Criteria	Threshold, %	Exceptions
****	**Justification for use**		
1	Culture &sensitivity (C&S) documented serious gram –ve pulmonary infection (not Pseudomonas) sensitive to ceftriaxone	100	Organism need not be resistant to ampicillin, and Sulfatrim if patient has documented allergy to beta-lactam antibiotics or sulfonamides
2	C&S documented acute or chronic gram negative osteomyelitis	100	
3	C&S documented meningitis due to enteric bacteria or *Hemophilus influenzae*	100	
4	C&S documented gonorrhea, gonococcal infection	100	
5	C&S documented pelvic inflammatory disease	100	
6	C&S documented chancroid	100	
7	C&S documented serious infection due to multidrug resistant gram negative microorganism(not *pseudomonas*)	100	
8	Empiric treatment of suspected gram negative bacteremia/septicemiain non-neutropenic patient or severe pneumonia	90	
9	Empiric treatment of suspected gram-negative non-Pseudomonal meningitis	100	
10	Empiric treatment of sexually acquired epididymitis	90	
****	**Critical process indicators**		
1	Appropriate C&S obtained within 48 hr before initial ceftriaxone dose	100	Ceftriaxone ordered in response to positive culture
2	Complete blood count (CBC) with differential obtained within 48 hr before initial ceftriaxone dose	90	
3	Serum creatinine (SCr) concentration or urinary creatinine clearance (CrCl) obtained if severe hepatic and renal impairment occurs	100	If severe hepatic and renal impairment, total daily dose lower than or equal to 2 g
4	Liver function tests [total serum bilirubin, alkaline phosphatase (ALP), aspartate aminotransferase (AST), and alanine aminotransferase (ALT) obtained within 7 days before initial ceftriaxone dose	100	
5	Vital signs monitored at least three times daily (*i.e.*, once each nursing shift) until patient becomes afebrile and at least one daily thereafter during ceftriaxone therapy	80	
6	Previous hypersensitivity reaction to beta-lactam antibiotics noted in patient's chart	100	
7	White blood cell (WBC) count obtained at least once weekly during Ceftriaxone therapy		
8	SCr or urinary CrCl obtained at least once weekly during ceftriaxone therapy	80	

****	**Appropriate ceftriaxone dosage**	
1	Uncomplicated gonorrhea/gonococcal infection: 250 mg IM single dose	100
2	Disseminated gonorrhea/gonococcal infection:1 g IV q 24 hr for 7 days	100
3	Pelvic inflammatory disease: 250 mg IM as a single dose followed by doxycycline	100
4	Sexually acquired epididymitis: 250 mg IM as a single dose followed by doxycycline	100
5	Chancroid : 250 mg IM as a single dose	100
6	Moderate infection: 1-2 g IV/IM q 24 hr for 7- 14 days	100
7	Severe infection: 1 g IV/IM q 12 hr or 2g IV/IM q 24 hr for 7-14 days	100
8	Meningitis: 2g q 12 hr for 7-14 days	100
****	**Post Culture De-escalation**	
1	D/C if no clinical/ microbiological proof of infection	80
2	IV to po conversion if patient is afebrile, symptoms resolving	80
3	Switch to other earlier classes if organism sensitive	80

American Society of Hospital Pharmacist. Criteria for Drug use Evaluation. Vol. 4. Bethesda: American Society of Hospital Pharmacist, 1993.

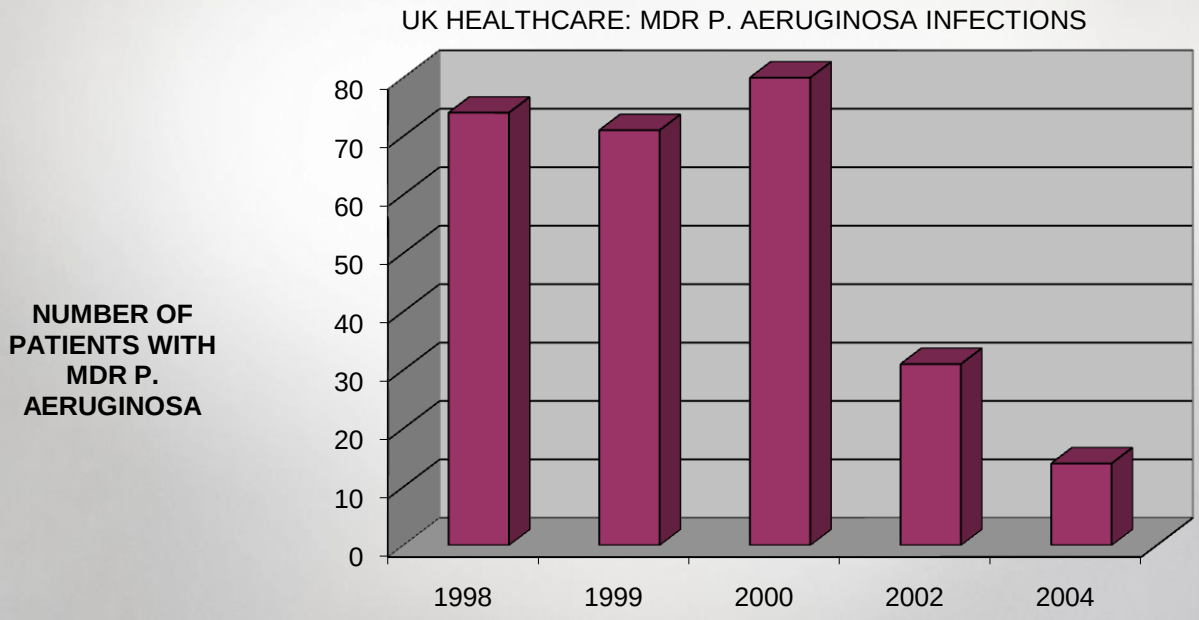
UK HealthCare: Cephalosporin intervention

Unrestricted prior to 1998	1 Intervention in 1998
❖ Ceftazidime	# Ceftazidime - Removed
❖ Cefotaxime	# Cefotaxime - Removed
❖ Ceftriaxone	# Ceftriaxone - Kept for meningitis, CAP

Cefepime-Added as the extended cephalosporin of choice

Martin C. et al, American Journal of Health-System Pharmacy, Vol. 62, Issue 7, 732-738, 2005

UK HEALTHCARE CEPHALOSPORIN INTERVENTION



Martin C. et al, American Journal of Health-System Pharmacy, Vol. 62, Issue 7, 732-738, 2005

CONCLUSION

1. By comparing actual Ceftriaxone use to predetermined standards, DUR can detect inappropriate and/or unnecessarily costly drug therapy and prevent development of resistance
2. When problems are identified, interventions are designed and implemented to improve drug use
3. Interventions can include educational programs, provision of drug information, changes in hospital policies and procedures, and changes in the drug formulary.