National Medication Utilization Evaluation Program in Saudi Arabia

Yousef Ahmed Alomi, The Former General Manager of General Administration of Pharmaceutical Care and Head, National Clinical pharmacy, and Pharmacy Practice and Pharmacy R & D Administration, MOH, Riyadh, Saudi Arabia.

Abeer Hussin Almasoudi, Director, Administration of Research and Studies, Ministry of Health, Tabuk, Saudi Arabia.

Correspondence: Dr. Yousef Ahmed Alomi, The Former General Manager of General Administration of Pharmaceutical Care, The Past Head, National Clinical pharmacy and pharmacy practice, The Past Head, Pharmacy R and D Administration, Ministry of Health, Riyadh, SAUDI ARABIA.

Phone no: +966 504417712
E-mail: yalomi@gmail.com

Received: 03-03-2019;
Accepted: 04-05-2019

Copyright: © the author(s), publisher and licensee International Journal of Pharmacology and Clinical Sciences. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

This is an open access article distributed under the terms of the Creative Commons Attribution-Non-Commercial-ShareAlike 4.0 License

ABSTRACT
The national Medication Utilization Evaluation Program at the Ministry of health in Saudi Arabia with complimentary of physician order techniques is new system found in the Kingdom of Saudi Arabia. The programming part of pharmacy strategic planning and national pharmacy practice at health care services at the Ministry of health. The Medication Utilization Evaluation program started with evidence-based medicine guidelines. The new project of Medication Utilization Evaluation physician order was one the outcome of the program. The program steps development through central committee by Pharmacy department at the most prominent hospital crossover regions in Saudi Arabia. The project is complementary of pharmaceutical concept and alerting system of misuse of medications and subsequences medication-related problems and avoids the unnecessary economic burden on the healthcare system. The new national Medication Utilization Evaluation project is new in Saudi Arabia, Gulf, and Middle East counties.

Keywords: Medication, Utilization, Evaluation, Ministry of health in Saudi Arabia, Ministry of Health, Saudi Arabia.

INTRODUCTION
The medication use evaluation program is very beneficial system of awareness of misuse of medications and economic burden of healthcare services in Saudi Arabia. The American of Health System Pharmacist (ASHP) and the Society of Hospital Pharmacists of Australia (HPA) released the standard of medications use evaluation program. The General Administration of Pharmaceutical care implementation, the national medication use evaluation program stated in 2014 among several national pharmacy practice program at Ministry of Health institutions. The program followed the previous both international hospital societies. Several studies showed the percentage of implementation of medications use evaluation at Saudi Arabia. The program found at 60 % of hospitals, 41.4 % of clinical pharmacist activities, and only 36 % hospital had clinical pharmacist specialized in Medications use Evaluation. In addition, the DUE committee founded at 43.2 % hospital only, and 52.6 % of implementation of DUE standard. The new updating national medication use evaluation program with physician order techniques is seldom find in the Saudi Arabia, Gulf and Middle East countries. The program steps development through central committee by Pharmacy department at the most prominent hospital crossover regions in Saudi Arabia. The project is complementary of pharmaceutical concept and alerting system of misuse of medications and subsequences medication-related problems and avoids the unnecessary economic burden on the healthcare system. The new national Medication Utilization Evaluation project is new in Saudi Arabia, Gulf, and Middle East counties.

Medication Use Evaluation order in Saudi Arabia
The Medication Use Evaluation physician order form consisted of patient demographic data, the diagnosis, criteria’s for indications, Critical (Process) Indicators, the general dosing for each indications, the adjusting dose if, the monitoring parameters, the duration of therapy, time of administration of medications, and prescriber name and clinical pharmacist for follow up. The form may quickly convert to the electronic format in the computer pharmacy system as explored in appendix 1, appendix 2, appendix 3, and appendix 4. The forms missed the Complications standards, Critical Preventative/Responsive Management, and Outcome Measures. All missing points should cover through clinical pharmacist follow up drug therapy. Another method of physician order consisted of treatment of diseases as clinical pathway as explored in other references.

SWOT Analysis
The Strength, Weakness, Opportunities, and Threats (SWOT) analysis used for the project. The strong points of the project were, easy way to implement Medication Use Evaluation program, it is easy way to collect the data of Medication Use Evaluation, it is a clinical pathway of Medication Use Evaluation, educational tool for new staff; it fit the accreditation and requirements of national organizations of accreditation health care institutions, it is control of hospital formulary and prevents miss-use if medications. The forms not covered all medications, and it was not an electronic format, and not covered Complications standards, Critical Preventative/Responsive Management, and Outcome Measures. The opportunities points were part of accreditation requirements, and threats points were it not followed by healthcare staff, the new updating of the Medication Use Evaluation.
Implementations steps of Medication Use Evaluation Program at Ministry of Health Institutions

The central committee of medication use evaluation implemented the program through the following steps: Identification of drug use process of evaluation. Target areas for evaluation may include individual drugs, drug classes, or Therapeutic indication which includes: Drugs known to be associated with adverse event or poor patient outcome, Drug used in high risk patient, Drug with high-unit or high volume cost, Drugs or processes where its suboptimal use is likely to have negative effect on patient outcomes or system cost, and Adverse medication event as a sign of treatment. Assembling the medication use team, Approval of the study from director of pharmacy, Development of criteria and measurement instruments, Data collection (retrospective / concurrent / prospective), Evaluation with pre-determined criteria and analysis of the results, Reporting and having a feedback from those concerned, Designing and implementation of intervention strategies, and Reassessment and revision of problem. The general administration of pharmaceutical care at MOH sent a memo in early May 2014 to each region to started and implement the program.

Implementations steps of Medication Use Evaluation physician Order

It is evidence-based medication use evaluations at cross over of hospital at Ministry of Health in Kingdom of Saudi Arabia. The Medication Use Evaluation physician Order based on evidence based on current and update literatures and American Food and Drug Administration (FDA), and Saudi Food and Drug Authority (SFDA) (3)(4). It designed through Medication Use Evaluation committee and headed by the author. The committee consisted of head of national drug information center, drug information pharmacist or Medication Use Evaluation from each regions overall kingdom of Saudi Arabia. The first draft finished by the committee members and revised by the first author and other members. The committee made several discussion and final agreement. Each of the head of hospital pharmacy submit to the pharmacy and therapeutic for revision and final approval. The Medication Use Evaluation physician order implemented through several education session with hospital staff. The manual physician order sent to information technology to convert as electronic physicians order entry for each institution.

CONCLUSION

The National Medication Utilization Evaluation Program at Ministry of health in Saudi Arabia with new system of physician order is new Saudi Arabia and first services in Gulf and Middle East counties. It had several advantages for clinical and economic patients and healthcare services outcomes in Kingdom of Saudi Arabia.

ACKNOWLEDGMENT

None.

CONFLICT OF INTEREST

None.

ABBREVIATIONS

ASHP: American of Health System Pharmacists; SHPA: Society of Hospital Pharmacists of Australia; SWOT: Strength, Weakness, Opportunities, and Threats; KSA: Kingdom of Saudi Arabia; MOH: Ministry of Health.

REFERENCES

## COLISTIN ORDER FORM (1)(2)(3)

*(Drug Utilization Evaluation Program)*

**Patient's Name_________________ File No__________ Age:_______ Gender □ Male □ Female Wt.:___________kg.**

**Allergy:___________________**

**Colistin Indication:** Treatment of acute or chronic infections due to sensitive strains of certain gram-negative bacilli (particularly *Pseudomonas aeruginosa*) which are resistant to other antibacterials or in patients allergic to other antibacterials

- Review patient allergies prior to prescribing/administering medications.
- Select appropriate antibiotic as determined by Antibiotic Guidelines, after collecting specimen for Gram stain and C/S

<table>
<thead>
<tr>
<th>Diagnosis</th>
</tr>
</thead>
</table>

**Site of Infection**

- □ Blood
- □ CNS
- □ Heart
- □ Respiratory Tract
- □ Intra-abdominal/GI
- □ Urinary Tract
- □ Skin/Soft Tissue
- □ Bone/Joint
- □ Other

**Type of Infection**

- □ Community Associated
- □ Hospital care Associated

**Type of Therapy:**

- □ Empirical
- □ Specific

**C/S □ Organism_______________________**

**Sensitivity: Resistant to_______________________**

**Sensitivity: Susceptible to_______________________**

**CrCl:________________ml/min.**

### Colistin

1) Colistin Base
   - a) Colistin base 1 mg = colistimethate sodium 2.4 mg
   - b) Colistin base 1 mg = 30,000 International Units potency
2) Colistimethate Sodium (CMS)
   - a) Colistimethate sodium 1 mg = 12,500 International Units potency
   - 1 MU = 80mg CMS = 33mg colistin base

### Dose

**Dosing adjustment in renal impairment:**

- □ CrCl 50-79 mL/minute: 2.5-3.8 mg/kg Colistin base in two divided doses daily.
- □ CrCl 30 to 49 mL/minute: 2.5 mg/kg Colistin base once or in two divided doses daily.
- □ CrCl 10-29 mL/minute: 2.5 mg/kg Colistin base every 36 hours.

Note: CrCl calculated using the Cockcroft-Gault equation

### New Order □ Renew Order

**Date:**

**Time of Antibiotic order:**

**Time of Administration**

**Physician’s Requesting:**

- □ Consultants
- □ Registrar
- □ Senior Registrar
- □ Specialist
- □ Resident
- □ Intern

**Clinical Pharmacist Follow up and Comment:**

### References

<table>
<thead>
<tr>
<th>Patient’s Name: ____________________</th>
<th>File No: __________</th>
<th>Age: _______</th>
<th>Gender: □ Male □ Female</th>
<th>Wt.: ________ kg.</th>
</tr>
</thead>
</table>

**Tigecycline Indication:**
- □ Intra-abdominal infections, complicated
- □ Skin/skin structure infections, complicated AND infected by ESBL-producing strains or polymicrobial MDR infections (excluding Pseudomonas spp)

- Review patient allergies prior to prescribing/administering medications.
- Select appropriate antibiotic as determined Antibiotic Guidelines, after collecting specimen for Gram stain and C/S

**Diagnosis:**

**Site of Infection:**
- □ Blood
- □ Respiratory Tract
- □ Intra-abdominal/GI
- □ Skin/Soft Tissue
- □ Other: ________________

**Type of Infection:**
- □ Community Associated
- □ Hospital care Associated

**Type of Therapy:**
- □ Empirical
- □ Specific

**C/S Organism:**

**Sensitivity:** Resistant to

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Routes</th>
<th>Frequency</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>Initial: 100 mg as a single dose; Maintenance dose: 50 mg</td>
<td>□ IV</td>
<td>□ every 12 hours</td>
<td>□ 7 days</td>
</tr>
<tr>
<td>Pediatric</td>
<td>□ Children 8 to 11 years: 1.2 mg/kg/dose; max. dose: 50 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Children 12-18 years: 50 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Renal impairment: No adjustment necessary. Severe hepatic impairment (Child-Pugh class C): Initial: 100 mg single dose; Maintenance: 25 mg every 12 hours

**New Order**  □ Renew Order

**Date:** __________  **Time of Antibiotic order:** __________  **Time of Administration:** __________

**Physician’s Requesting:** ____________________

- □ Consultants
- □ Registrar
- □ Senior Registrar
- □ Specialist
- □ Resident
- □ Intern

**Clinical Pharmacist Follow up and Comment:**

**References**
Patient’s Name___________________ File No___________ Age:_______ Gender □ Male □ Female Wt.:___________kg.

Allergy:_______________

Indication:
- C. difficile-associated diarrhea, pseudomembranous colitis, and staphylococcal enterocolitis
- Endocarditis:
  - Diphtheroid endocarditis, or in early-onset prosthetic valve endocarditis
  - Endocarditis caused by enterococci (eg, Enterococcus faecalis)
  - Endocarditis caused by Staphylococcal
  - Endocarditis due to Streptococcus viridans or Streptococcus bovis
- Staphylococcal infections: Serious or severe infections (eg, septicemia, bone infections, lower respiratory tract infections, skin and skin structure infections) caused by susceptible strains of methicillin-resistant (beta-lactam-resistant) staphylococci; empiric therapy of infections when methicillin-resistant staphylococci are suspected
- Other(______________________________________)

► Review patient allergies prior to prescribing/administering medications.
► Select appropriate antibiotic as determined Antibiotic Guidelines, after collecting specimen for Gram stain and C/S

Site of Infection □ Blood □ CNS □ Heart □ Respiratory Tract □ Intra-abdominal/GI □ Urinary Tract
  □ Skin/Soft Tissue □ Bone/Joint □ Other___________

Type of Infection □ Community Associated □ Hospital care Associated

Type of Therapy: □ Empirical □ Specific

C/S □ Organism________________________

Sensitivity: Resistant to_______________________________________

CrCl:_______________ml/min.
eGFR:_______________mL/minute per 1.73 m2

Vancomycin

<table>
<thead>
<tr>
<th>Dose</th>
<th>Routes</th>
<th>Frequency</th>
<th>duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-15mg/kg actual body weight every 8-12 hours</td>
<td>IV infusion over at least 2 hours</td>
<td>every 6 hours</td>
<td>7 days</td>
</tr>
<tr>
<td>10 mg/kg/dose every 6 hrs. (max:2,000 mg/dose)</td>
<td>every 8 hours</td>
<td>every 12 hours</td>
<td>14 days</td>
</tr>
</tbody>
</table>

Dosing adjesment in renal Impairment: see the attached table

New Order □ Renew Order

Date: ____________ Time of Antibiotic order : ____________ Time of Administration ____________

Physician’s Requesting : _____________________

Consultants □ Registrar □ Senior Registrar □ Specialist □ Resident □ Intern

Clinical Pharmacist Follow up and Comment:

References
Note: Vancomycin levels should be monitored in patients with any renal impairment:

**Vancomycin Initial Dosage Regimens for Adults Patients With Impaired Renal Function (Golightly 2013)**

<table>
<thead>
<tr>
<th>eGFR (mL/minute per 1.73 m²)</th>
<th>Actual Body Weight</th>
<th>&gt;100 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;60 kg</td>
<td>60 to 80 kg</td>
</tr>
<tr>
<td>&gt;90</td>
<td>750 mg every 8 hours</td>
<td>1,000 mg every 8 hours</td>
</tr>
<tr>
<td>50 to 90</td>
<td>750 mg every 12 hours</td>
<td>1,000 mg every 12 hours</td>
</tr>
<tr>
<td>15 to 49</td>
<td>750 mg every 24 hours</td>
<td>1,000 mg every 24 hours</td>
</tr>
<tr>
<td>&lt;15a</td>
<td>750 mg</td>
<td>1,000 mg</td>
</tr>
</tbody>
</table>

**Reference:**
**Rationale Indication for using Human Albumin**

- Shock (decrease in systolic BP > 30mm Hg, mean arterial BP < 60mm Hg at > 3 months of age, or diastolic BP < 40mm Hg at > 3 months of age) if inability to tolerate crystalloid or nonprotein colloid due to one of the following:
  - Blood loss unresponsive to at least 40ml/kg of IV fluid.
  - Thermal injury involving > 10% body surface area unresponsive to crystalloids.
  - Septic shock unresponsive to at least 40ml/kg of IV fluid.
  - Peritonitis unresponsive to crystalloids.
  - Newborn (gestational age < 44 weeks).
- Cirrhosis and ascites with removal of more than 4 liters of fluid
- Dialysis patients with hypotension, hypoalbuminemia and inability to tolerate crystalloid
- Major intra-abdominal surgery or liver resection in a patient with a serum albumin < 2.5g/dL.
- Cardiothoracic surgery if inability to tolerate crystalloid or nonprotein colloid
- Severe, necrotizing pancreatitis.
- Protein losing nephropathy/enteropathy or acute/chronic liver failure for any of the following purposes:
  - To raise blood pressure if acutely hypotensive.
  - To induce diuresis in fluid overload with albumin 25% in combination with a diuretic
- Other: ____________________________________________

**Diagnosis**

- Total Serum Protein: ________________________________
- Serum Albumin level: ________________________________

May be considered after *inadequate response to crystalloid therapy and when nonprotein colloids are contraindicated*. The volume administered and the speed of infusion should be adapted to individual response

<table>
<thead>
<tr>
<th>Albumin to use</th>
<th>Albumin 5%..........ml; Give IV every .............hrs x .......... Doses.</th>
<th>5% should be used in hypovolemic patients or intravascularly-depleted patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Note: Albumin 5% is dosed in milliliters.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Albumin 25%..........gram(s); infuse over ............hrs.</td>
<td>25% should be used in patients in whom fluid and sodium intake must be minimized.</td>
</tr>
<tr>
<td></td>
<td>Note: Albumin 25% is dosed in grams.</td>
<td></td>
</tr>
</tbody>
</table>

**Clinical Pharmacist Follow up and Comment:**

**References:**