

---

# NEPHROLOGY MTAC

## PROTOCOL

SECOND EDITION (2019)

---

PHARMACEUTICAL  
SERVICES PROGRAM  
MINISTRY OF HEALTH MALAYSIA

April 2019

© All Rights Reserved

This is a publication of the Pharmaceutical Services Programme, Ministry of Health Malaysia. Enquiries are to be directed to the address below. Permission is hereby granted to reproduce information contained herein provided that such reproduction be given due acknowledgement and shall not modify the text.

Pharmaceutical Services Programme

Ministry of Health Malaysia

Lot 36, Jalan Universiti,

46200 Petaling Jaya, Selangor, Malaysia

Tel: 603 – 7841 3200 Fax: 603 – 7968 2222

Website: [www.pharmacy.gov.my](http://www.pharmacy.gov.my)

## **FOREWORD**

It gives me immense pleasure to release the 2<sup>nd</sup> edition of the Nephrology Medication Therapy Adherence Clinic (MTAC) Protocol. This protocol encompasses the modules for Chronic Kidney Disease MTAC (CKD-MTAC), Dialysis MTAC and Renal Transplant MTAC (RTX-MTAC). The RTX-MTAC, which started in year 2004 in Hospital Selayang, is also the first MTAC service in the Ministry of Health (MOH) facility. Dialysis MTAC was first initiated in Hospital Tuanku Ampuan Rahimah, Klang in year 2008 and subsequently a year later, the Chronic Kidney Disease MTAC (CKD-MTAC) in Hospital Serdang, Selangor. The benefits of MTAC services have shown to improve the quality, safety and cost effectiveness of patient care. Today, a total of 40 major hospitals are providing at least one Nephrology MTAC services.

This protocol outlines the procedure and documentations during all Nephrology MTAC sessions. It is intended as the key reference for pharmacists in the course of managing renal patients at the ambulatory care settings. The availability of this protocol would sustain the standardization of practice across MOH facilities.

I would like to applaud the Clinical Pharmacy Working Committee (Renal Pharmacy Subspecialty) of Pharmacy Practice and Development Division for their boundless commitment to the progress of renal pharmacy services in general and to the publication of this protocol.

Thank you.

DIRECTOR  
PHARMACY PRACTICE & DEVELOPMENT DIVISION  
PHARMACEUTICAL SERVICES PROGRAMME  
MINISTRY OF HEALTH MALAYSIA

**ADVISORS**

DR. ROSHAYATI BT MOHAMAD SANI

Director

Pharmacy Practice and Development Division

Pharmaceutical Services Programme, MOH

**EDITORIAL**

NORAINI BT MOHAMAD

Deputy Director

Pharmacy Practice and Development Division

Pharmaceutical Services Programme, MOH

NOR HASNI BT HARON

Senior Principal Assistant Director

Pharmacy Practice and Development Division

Pharmaceutical Services Programme, MOH

ANGELINE TAN MENG WAH

Senior Principal Assistant Director

Pharmacy Practice and Development Division

Pharmaceutical Services Programme, MOH

**EXTERNAL REVIEWER**

PROF DATIN DR ROSNANI HASHIM

Professor of Clinical Pharmacy

Faculty of Pharmacy

Cyberjaya University College of Medical Sciences (CUCMS)

DR BEE BOON CHEAK

Consultant Nephrologist

Department of Nephrology

Hospital Selayang

## CONTRIBUTORS

### CLINICAL PHARMACY WORKING COMMITTEE (RENAL PHARMACY SUBSPECIALTY)

**Adeline Tay Hui Yin**  
Hospital Tengku Ampuan Rahimah

**Choong Chiau Ling**  
Hospital Selayang

**Chai Chung Wei**  
Hospital Raja Permaisuri Bainun

**Fadhleena bt Yusoff**  
Hospital Raja Perempuan Zainab II

**Jaime Chan Yoke May**  
Hospital Umum Sarawak

**Lau Chia Ying**  
Hospital Sultanah Bahiyah

**Lau Yee Sian**  
Hospital Pakar Sultanah Fatimah

**Lee Soo Wen**  
Hospital Queen Elizabeth I

**Nadia Shahirah Mohamed Azri**  
Hospital Tengku Ampuan Afzan

**Dr. Norkasih Ibrahim**  
Hospital Kuala Lumpur

**Norlaila Kartina Malini Mamat**  
Hospital Sultanah Nur Zahirah

**Nurul Hidayah Mizan**  
Hospital Tuanku Ja'afar

**Ong Peng Seng**  
Hospital Pulau Pinang

**Ong Zee Yun**  
Hospital Melaka

**Ooi Chah Chah**  
Hospital Tuanku Fauziah

**Ruwaida Nur Zainol Abidin**  
Hospital Serdang

**Siti Shahida Mohd Sharifuddin**  
Hospital Kuala Lumpur

## **Table of Contents**

FOREWORD .....	ii
ADVISORS .....	iii
EDITORIAL .....	iii
EXTERNAL REVIEWER .....	iii
CONTRIBUTORS .....	iv
1.0 INTRODUCTION TO NEPHROLOGY MTAC .....	6
2.0 OBJECTIVES .....	6
3.0 SCOPE OF SERVICE .....	6
4.0 MANPOWER RECRUITMENT .....	7
5.0 GENERAL PROCEDURE .....	7
5.1 WORK FLOW .....	7
5.2 PATIENT SELECTION .....	8
5.3 REGISTRATION .....	8
5.4 APPOINTMENTS & MISSED VISITS .....	8
5.5 INITIAL ASSESSMENT .....	8
5.6 SECOND AND SUBSEQUENT VISITS .....	9
5.7 DOCUMENTATION .....	9
5.8 REFFERAL AND DISCHARGE .....	10
6.0 OUTCOME MEASURES .....	10
7.0 MTAC MODULES .....	10
8.0 APPENDIXES .....	11
9.0 REFERENCES .....	38

## **1.0 INTRODUCTION TO NEPHROLOGY MTAC**

Chronic Kidney Disease (CKD) is one of the most common chronic illnesses, and patients with end stage kidney failure (ESKF) require either lifelong dialysis or renal transplantation. Kidney disease is silent in the early stages and expensive in terms of clinical management, medications and care. It is estimated that 2 to 3 million of our population are living with CKD but only 4% are aware of the diagnosis and with time, progress to ESKF<sup>1</sup>. Our incidence and prevalence of ESKF is 234 per million population (pmp) and 1155 per million population (pmp) respectively<sup>2</sup>. There are no less than 8000 new dialysis patients each year and the number grows progressively<sup>2</sup>. Nevertheless, the prevalence of new dialysis is increasing with the dismally low kidney transplantation rate.

Patients with failing kidney including those who have had a successful renal transplantation are often prescribed with complex pharmacotherapy<sup>3</sup>. This situation exposes them to higher chances of medication-related problems as compared to the general medical population<sup>4</sup>. The goal of pharmacotherapy changes with severity of the disease. Treatment goal in pre-dialysis CKD is to retard disease progression; meanwhile in dialysis it is to minimize disease complications. In post renal transplantation, the goal is to prolong graft and patient survival. Nephrology MTAC service complements the strategies in achieving these treatment goals.

## **2.0 OBJECTIVES**

- a) To empower patients with knowledge on medications and disease.
- b) To improve and sustain adherence towards medications.
- c) To optimize pharmacotherapy in terms of quality, safety and cost-effectiveness.

## **3.0 SCOPE OF SERVICE**

- a) The Nephrology MTAC service will operate in the clinic area during designated clinic day. Subsequent visits can be carried out in either the pharmacy or clinic area whichever deemed suitable.
- b) The pharmacist will be responsible to evaluate, assess and manage patients pharmaceutical care issues following the activities in the respective MTAC modules.

#### 4.0 MANPOWER RECRUITMENT

- a) Nephrology MTAC service shall be provided by trained pharmacist(s).
- b) A minimum of one pharmacist stationed during MTAC session. However, the number of pharmacists shall depend on the number of patients scheduled per day.
- c) A coordinator is recommended to facilitate the continuity of the service.

#### 5.0 GENERAL PROCEDURE

##### 5.1 WORK FLOW

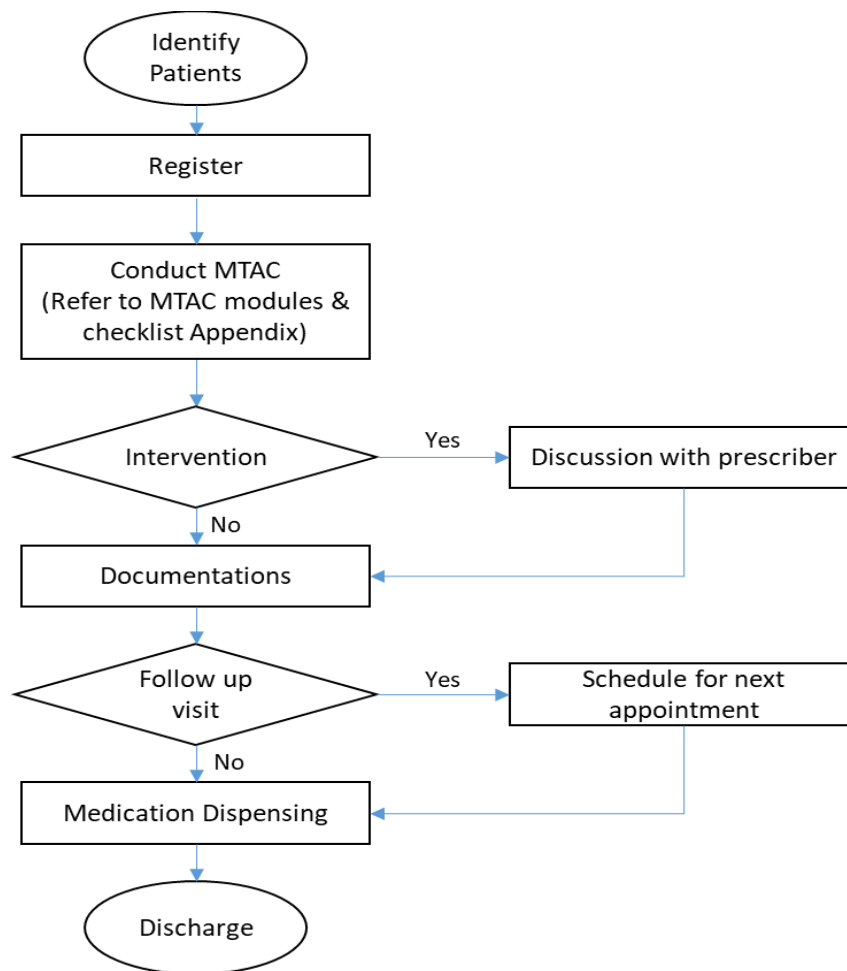


Figure 1: Nephrology MTAC Workflow



## **5.2 PATIENT SELECTION**

- a) Patients not adhering to medications
- b) Patients with drug-related problem, e.g sub-optimal drug therapy, medication overdose, inappropriate drug therapy (more information can be referred at Appendix 1)

## **5.3 REGISTRATION**

A registry of all MTAC patients must be maintained.

## **5.4 APPOINTMENTS & MISSED VISITS**

- a) Appointments  
All MTAC appointments will be scheduled by MTAC pharmacist into a suitable record, e.g. calendar, planner, PHIS system etc.
- b) Missed visits  
Patients will be contacted by pharmacist or clinic staff to reschedule the appointment.

## **5.5 INITIAL ASSESSMENT**

(Activities of first visit are summarized in Appendix 2.)

During the first visit, the following will be reviewed and discussed together with patients:

- ✓ Introduction to Nephrology MTAC & its objectives
- ✓ Anticipated benefits to the patients or care givers
- ✓ Goals for patient
- ✓ Patient's specific drug therapy related needs
- ✓ Patient's rights and responsibilities in the program

The pharmacist will also perform an initial assessment of the patients. These baseline assessments involve:

- ✓ Demographic data
- ✓ Medical / medication history
- ✓ Social/family history

- ✓ Medication knowledge
- ✓ Patients understanding on medication & adherence

The pharmacist will then proceed with counseling and education following the topics listed in the respective MTAC modules (Appendix 3-5). The topics should be delivered based on patients' understanding and disease progression.

## 5.6 SECOND AND SUBSEQUENT VISITS

(Activities of subsequent visits are summarized in Appendix 2)

Activities in subsequent visits include managing pharmaceutical care issues and providing patient education. Subsequent visits shall be scheduled based on patients' needs, current health status, other clinic visits and medication refill appointments.

## 5.7 DOCUMENTATION

- a) All relevant MTAC Forms will be updated during the MTAC session.
- b) A copy of relevant forms will then be placed together with patient's case notes.
- c) MTAC forms are as follows (Appendix 3):
  - ✓ Form RP1 – Patient's Profile
  - ✓ Form RP2 – Pharmacist Notes
  - ✓ Form RP3 – Medication Knowledge Assessment
  - ✓ Form RP4 – *Profil Pengobatan Pesakit*
  - ✓ Form RP5a(1) – Drug Knowledge Assessment Form (CKD MTAC)
  - ✓ Form RP5a(2) – *Borang Penilaian Pengetahuan Ubat- ubatan (MTAC CKD)*
  - ✓ Form RP5b(1) – Drug Knowledge Assessment Form (Dialysis MTAC)
  - ✓ Form RP5b(2) – *Borang Penilaian Pengetahuan Ubat- ubatan (MTAC Dialisis)*
  - ✓ Form RP5c(1) – Drug Knowledge Assessment Form (Renal Transplant MTAC)
  - ✓ Form RP5c(2) – *Borang Penilaian Pengetahuan Ubat- ubatan (MTAC Transplan Buah Pinggang)*

## **5.8 REFERRAL AND DISCHARGE CRITERIA**

### a) Referral

- ✓ Referral between pharmacists will use CP4 form.
- ✓ Referral from other healthcare care providers will use the standard referral form in the facility.

### b) Discharge criteria

Patients who fulfilled one (1) of the following criteria can be discharged from MTAC service:

- ✓ Medication knowledge evaluation is satisfactory AND completed the MTAC modules
- ✓ Discharged or transferred to other facilities
- ✓ Requested to exit MTAC services

## **6.0 OUTCOME MEASURES**

The following indicators shall be monitored:

- a) Medications adherence status
- b) Medication knowledge
- c) Relevant laboratory investigations

## **7.0 MTAC MODULES**

There are 3 nephrology MTAC Modules;

- a) Chronic Kidney Disease MTAC Module (Appendix 4),
- b) Dialysis MTAC Module (Hemodialysis MTAC and Peritoneal Dialysis MTAC) (Appendix 5), and
- c) Renal Transplant MTAC Module (Appendix 6).

Each module comprises a series of topics and counselling points for patients. It is important to note that the selection of topics and the number of MTAC sessions should be tailored to individual patient's needs.

## 8.0 APPENDIXES

**EPIDEMIOLOGY DATA ON DRUG-RELATED PROBLEMS IN  
PATIENTS WITH KIDNEY FAILURE<sup>3,5-7</sup>**

Study characteristics	Population			
	CKD Children in-patient	CKD children out-patient	CKD adults on dialysis	Pre-dialysis adults
Study design	Observational prospective cohort		Literature review	Observational prospective cohort
Setting	Pediatriac teaching hospitals: Renal wards & renal outpatient clinics		NA	Dialysis units in tertiary teaching hospitals
Sample size	127	100	308	40 articles
Country	UK	UK	India	US
Study duration	24 months	24 months	9 months	Articles from year 1990 to 2010
DRP definition & classification	PCNE version 6.0	PCNE version 6.0	Hepler & Strand	Hepler & Strand
DRP incidence (95%, CI)	51.2% (43.2 - 60.6)	32% (22.9 - 41.1)	100% (all patients had at least 1 DRP)	
Significant risk factors to DRPs	Number of medications prescribed	Not reported	<ul style="list-style-type: none"> <li>• <math>\geq 3</math> comorbidities</li> <li>• <math>\geq 4</math> changes in medication regimen in a year</li> <li>• On <math>\geq 5</math> medications</li> <li>• Dependent on dialysis</li> <li>• On medications with narrow therapeutic index</li> <li>• Non-adherence</li> </ul>	Not reported
Most common DRP	Suboptimal drug therapy		Medication overdose	Inappropriate drug therapy
Severity score of DRPs	68% Minor 32% Moderate	9.4% Minor 90.4% Moderate	74% Minor 16% Moderate 10% Major	Not reported

## NEPHROLOGY MTAC ACTIVITIES CHECKLIST

		MTAC VISITS											FORMS	
		V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	Vn		
<b>MTAC ACTIVITIES</b>	Introduce MTAC Program & Register patient	√												Patient Registry
	Obtain Patient Data	√												RP 1: Patient's Profile
	Evaluate medication knowledge	√										√		RP5a-c: Drug Knowledge Assessment Form
	Assess medication knowledge and adherence	√	√	√	√	√	√	√	√	√	√	√	√	RP3: Medication Knowledge Assessment RP4: <i>Profil Pengobatan</i> (when necessary)
	Identify and manage PCI	√	√	√	√	√	√	√	√	√	√	√	√	RP2: Pharmacist Note
	Patient education	√	√	√	√	√	√	√	√	√	√	√	√	Refer: Education Module
	Introduce/assess compliance aid	When necessary												

MTAC Forms:

- ✓ Form RP1 – Patient’s Profile
- ✓ Form RP2 – Pharmacist Notes
- ✓ Form RP3 – Medication Knowledge Assessment
- ✓ Form RP4 – *Profil Pengobatan Pesakit*
- ✓ Form RP5a(1) – Drug Knowledge Assessment Form (CKD MTAC)
- ✓ Form RP5a(2) – *Borang Penilaian Pengetahuan Ubat- ubatan (MTAC CKD)*
- ✓ Form RP5b(1) – Drug Knowledge Assessment Form (Dialysis MTAC)
- ✓ Form RP5b(2) – *Borang Penilaian Pengetahuan Ubat- ubatan (MTAC Dialisis)*
- ✓ Form RP5c(1) – Drug Knowledge Assessment Form (Renal Transplant MTAC)
- ✓ Form RP5c(2) – *Borang Penilaian Pengetahuan Ubat- ubatan (MTAC Transplan Buah Pinggang)*

**PATIENT'S PROFILE**

Pharmacist: \_\_\_\_\_

Date: \_\_\_\_\_

<b>DEMOGRAPHIC BACKGROUND</b>			
Name:		Height (cm):	
IC No/MRN:		Age:	
Race:	M / C / I / O	Gender:	M / F
Marital Status:		Allergies:	
Address:			
Contact Number:	(H)	(HP)	
Educational Level:	<input type="checkbox"/> No formal education <input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Tertiary		
<b>SOCIAL HISTORY</b>			
Smoking history:	<input type="checkbox"/> Yes (Cigarette: _____sticks/day) <input type="checkbox"/> No	Alcohol history:	<input type="checkbox"/> Yes (Alcohol: _____ cans/ day) <input type="checkbox"/> No
<b>PAST MEDICAL HISTORY</b>		<b>FAMILY HISTORY</b>	
<b>PAST MEDICATION HISTORY</b>			
History of taking traditional or herbal medications?	Y / N	If YES, please state:	
Past Medication History			
<b>CKD / RRT HISTORY</b>			
Stage of CKD	1 / 2 / 3 / 4 / 5		
Type of Dialysis	HD / CAPD / APD	Date of Initiation	
Type of Transplant	Living-related / Living-unrelated / Cadaveric	Date of Transplant	
Induction Agent	Basiliximab / Thymoglobulin	Place of Transplant	Local / Overseas



PHARMACIST NOTES

MTAC \_\_\_\_\_

Date					Pharmacist						
Visit	1	2	3	4	5	6	7	8	9	10	Others:
<b>Chief Complaints</b>											
<b>Current Medications</b>											
1.						8.					
2.						9.					
3.						10.					
4.						11.					
5.						12.					
6.						13.					
7.						14.					
<b>Pharmaceutical Care Issues (PCIs)</b>											
<b>Plan</b>											

**MEDICATION KNOWLEDGE ASSESSMENT**

Indicator: Yes = 1; No = 0

Medication	Visit				Visit				Visit				Visit			
	Date:				Date:				Date:				Date:			
	D	F	I	T	D	F	I	T	D	F	I	T	D	F	I	T
Score (%) = $\frac{\text{No of "Yes"}}{\text{No of Questions}} \times 100\%$																

Key:

D= Dose    F= Frequency    I= Indication    T= Method of administration

Pharmacist's Notes:

**PROFIL PENGUBATAN PESAKIT**

<b>NAMA PESAKIT</b>		<b>NAMA PEGAWAI FARMASI BERTUGAS</b>	
<b>RN / NO. KAD PENGENALAN</b>		<b>HOSPITAL</b>	
<b>DIAGNOSIS</b>		<b>TELEFON</b>	
<b>ALAHAN</b>			

UBAT		DOS	INDIKASI	MASA PENGAMBILAN UBAT				SEBELUM MAKAN	SELEPAS MAKAN	CATATAN
NAMA GENERIK	NAMA DAGANG									

**SENARAI UBAT YANG TELAH DIHENTIKAN :**

**PERINGATAN :**

- Sila patuhi carta ini untuk rawatan yang lebih berkesan.
- Jangan berhenti mengambil ubat yang dipreskrib atau memulakan sebarang ubat (herba; ubat tradisional;suplemen dan seumpamanya) tanpa pengetahuan doktor dan pegawai farmasi untuk keselamatan anda.

## DRUG KNOWLEDGE ASSESSMENT FORM (CKD MTAC)<sup>8</sup>

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Please **CIRCLE** only **ONE (1)** correct answer for each question.

NO	QUESTIONS
<b>1</b>	<p><b>What does your kidney do?</b></p> <ul style="list-style-type: none"> <li>a. To clean my blood, remove fluids and toxin from body.</li> <li>b. To pump blood to whole body, oxygen exchange at the lungs.</li> <li>c. To defend body from infection and stop bleeding.</li> <li>d. To digest food and remove waste.</li> </ul>
<b>2</b>	<p><b>What might happen if your kidney fails?</b></p> <ul style="list-style-type: none"> <li>a. Swelling in the leg, face or hands</li> <li>b. Feel tired excessively, nausea and loss of appetite</li> <li>c. Need for dialysis or transplant</li> <li>d. All of the above</li> </ul>
<b>3</b>	<p><b>Which of the following can worsen your kidney?</b></p> <ul style="list-style-type: none"> <li>a. Uncontrolled hypertension or diabetes.</li> <li>b. Overuse of painkiller</li> <li>c. Use of traditional medicines/ herbs</li> <li>d. All of the above</li> </ul>
<b>4</b>	<p><b>Which of the following can help to delay kidney failure?</b></p> <ul style="list-style-type: none"> <li>a. Healthy diet.</li> <li>b. Regular exercise</li> <li>c. Compliant to medications</li> <li>d. All of the above</li> </ul>
<b>5</b>	<p><b>Which statement is true about proteinuria (frothy urine)?</b></p> <ul style="list-style-type: none"> <li>a. Indicates kidney impairment</li> <li>b. Treatable with traditional medicines.</li> <li>c. Not related to uncontrolled blood pressure.</li> <li>d. Self- healing without treatment.</li> </ul>

NO	QUESTIONS
6	<p><b>What is the complications of non- compliant to medications?</b></p> <ul style="list-style-type: none"> <li>a. Fasten the need for dialysis or kidney transplant.</li> <li>b. Reduce the kidney burden from medications.</li> <li>c. Save the cost of medications.</li> <li>d. No serious complications.</li> </ul>
7	<p><b>What do you do if you MISSED a dose?</b></p> <ul style="list-style-type: none"> <li>a. Take it as soon as remember. But, if it's time for the next dose, omit the missed dose and continue with the next scheduled dose.</li> <li>b. Double the dose.</li> <li>c. Take half of the dose.</li> <li>d. Not sure.</li> </ul>
8	<p><b>What should you do if you experience any side effects from medications?</b></p> <ul style="list-style-type: none"> <li>a. Reduce the dose.</li> <li>b. Consult the doctor/ pharmacist immediately.</li> <li>c. Take the medicine less frequently.</li> <li>d. Not sure.</li> </ul>
9	<p><b>What should you do if you want to take traditional medicines or supplements?</b></p> <ul style="list-style-type: none"> <li>a. Discuss with doctor/ pharmacist before start taking.</li> <li>b. It is safe to take traditional medicines or supplements together with medications from hospital/ clinic</li> <li>c. Stop the medications from hospital/ clinic.</li> <li>d. Take traditional medicines or supplements 1-2 hours gap with medications from hospital/ clinic.</li> </ul>
10	<p><b>Where should I store my tablets?</b></p> <ul style="list-style-type: none"> <li>a. In the fridge</li> <li>b. In the freezer</li> <li>c. In airtight container and away from sunlight</li> <li>d. In the car</li> </ul>
	<p><b>Total: / 10</b></p>

## BORANG PENILAIAN PENGETAHUAN UBAT-UBATAN (MTAC CKD)<sup>8</sup>

Nama: \_\_\_\_\_

Tarikh: \_\_\_\_\_

Sila **BULATKAN** pada **SATU (1)** jawapan betul sahaja bagi setiap soalan.

BIL	SOALAN
<b>1</b>	<p><b>Apakah fungsi buah pinggang?</b></p> <ul style="list-style-type: none"> <li>a. Membersihkan darah, menyingkirkan air berlebihan dan sisa toksik.</li> <li>b. Mengepam darah ke seluruh badan dan pertukaran oksigen di peparu.</li> <li>c. Melindungi badan daripada jangkitan dan berhentikan pendarahan.</li> <li>d. Menghadamkan makanan dan menyingkirkan sisa toksik.</li> </ul>
<b>2</b>	<p><b>Apa yang akan berlaku sekiranya buah pinggang rosak?</b></p> <ul style="list-style-type: none"> <li>a. Kaki, muka atau tangan menjadi bengkak</li> <li>b. Keletihan yang berlebihan, loya dan kehilangan selera makan</li> <li>c. Keperluan untuk menjalani dialisis atau pemindahan buah pinggang.</li> <li>d. Semua di atas.</li> </ul>
<b>3</b>	<p><b>Apakah punca- punca yang merosotkan buah pinggang?</b></p> <ul style="list-style-type: none"> <li>a. Penyakit darah tinggi atau kencing manis yang tidak terkawal.</li> <li>b. Penggunaan ubat tahan sakit secara berlebihan.</li> <li>c. Pengambilan ubat- ubatan traditional atau herba</li> <li>d. Semua di atas.</li> </ul>
<b>4</b>	<p><b>Kegagalan fungsi buah pinggang boleh dilambatkan dengan:</b></p> <ul style="list-style-type: none"> <li>a. Pemakanan yang sihat.</li> <li>b. Mengamalkan senaman</li> <li>c. Patuh kepada pengambilan ubat.</li> <li>d. Semua di atas.</li> </ul>
<b>5</b>	<p><b>Pernyataan yang manakah benar tentang protein dalam kencing (kencing berbuih)?</b></p> <ul style="list-style-type: none"> <li>a. Menunjukkan tanda- tanda kerosakkan buah pinggang.</li> <li>b. Dapat dirawati dengan ubat- ubatan traditional.</li> <li>c. Tidak berkaitan dengan tekanan darah tinggi.</li> <li>d. Boleh sembuh sendiri tanpa rawatan.</li> </ul>

BIL	SOALAN
6	<p><b>Apakah komplikasi jika tidak patuh kepada arahan pengambilan ubat?</b></p> <ul style="list-style-type: none"> <li>a. Mempercepatkan keperluan untuk menjalani dialisis atau pembedahan buah pinggang.</li> <li>b. Mengurangkan beban buah pinggang daripada kesan ubat.</li> <li>c. Menjimatkan kos perubatan.</li> <li>d. Tiada komplikasi yang serius.</li> </ul>
7	<p><b>Apakah yang akan anda lakukan sekiranya TERLUPA mengambil ubat?</b></p> <ul style="list-style-type: none"> <li>a. Mengambil ubat sebaik sahaja teringat</li> <li>b. Mengambil separuh dos</li> <li>c. Menggandakan dos</li> <li>d. Tidak pasti</li> </ul>
8	<p><b>Apakah yang perlu dilakukan jika anda mengalami kesan-kesan sampingan ubat?</b></p> <ul style="list-style-type: none"> <li>a. Menurunkan dos ubat</li> <li>b. Merujuk kepada Doktor/Pegawai Farmasi dengan segera</li> <li>c. Mengurangkan kekerapan pengambilan ubat</li> <li>d. Tidak pasti</li> </ul>
9	<p><b>Apakah yang perlu dilakukan jika anda mahu mencuba ubat tradisional atau ubat suplemen?</b></p> <ul style="list-style-type: none"> <li>a. Berbincang dengan Doktor/ Pegawai farmasi sebelum mengambil ubat tersebut</li> <li>b. Ubat suplemen/tradisional selamat diambil bersama ubat- ubatan daripada hospital/ clinic.</li> <li>c. Berhenti mengambil ubat- ubatan daripada hospital/ clinic.</li> <li>d. Jarakkan pengambilan ubat suplemen/tradisional 1-2 jam daripada masa pengambilan ubat- ubatan daripada hospital/clinic.</li> </ul>
10	<p><b>Bagaimanakah cara penyimpanan ubat tablet yang betul?</b></p> <ul style="list-style-type: none"> <li>a. Simpan di dalam peti sejuk</li> <li>b. Simpan di dalam ruangan sejuk beku</li> <li>c. Diletakkan di dalam bekas tertutup dan jauh dari cahaya matahari</li> <li>d. Simpan di dalam kereta</li> </ul>
	<p><b>Jumlah Markah: / 10</b></p>

**DRUG KNOWLEDGE ASSESSMENT FORM  
(DIALYSIS MTAC)<sup>8</sup>**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Please **CIRCLE** only **ONE (1)** correct answer for each question.

No	QUESTIONS
1	<p><b>What is the function of these medicines : Ferrous Fumarate / Zincofer® / Iberet® ?</b></p> <p>a. As a calcium supplement  b. As iron supplement  c. To strengthen the bone  d. Not Sure</p>
2	<p><b>What is the BEST way to take Ferrous Fumarate / Zincofer® / Iberet®?</b></p> <p>a. Take on empty stomach (half an hour before meal or 2 hours after food); and if I have gastric or stomach discomfort when taken on empty stomach, I can take it after meal.  b. It is not necessary to be separated from calcium carbonate for 1 – 2 hours.  c. Take together with food.  d. Not sure</p>
3	<p><b>What is the function of calcium carbonate?</b></p> <p>a. To control potassium level  b. As iron supplement  c. To control phosphate level  d. Not sure</p>
4	<p><b>How to reduce phosphate level in the blood?</b></p> <p>a. Take high fibre diet  b. Take calcium carbonate with meals and maintain a low phosphate diet.  c. To consume high protein diet  d. Not sure</p>
5	<p><b>What is the best way to take calcium carbonate?</b></p> <p>a. Take calcium carbonate on empty stomach  b. Take calcium carbonate with food (Chew / Sprinkle / Swallow)  c. Can be taken before or after meal  d. Not sure</p>



<b>No</b>	<b>QUESTIONS</b>
<b>6</b>	<p><b>Which of the following statement <u>is</u> FALSE regarding complication of imbalance calcium and phosphate level in our body?</b></p> <ul style="list-style-type: none"> <li>a. Bone become brittle and easily fractured</li> <li>b. Dry skin and itchiness</li> <li>c. Heart disease</li> <li>d. No complications at all</li> </ul>
<b>7</b>	<p><b>What is the target of blood phosphate level for dialysis patient?</b></p> <ul style="list-style-type: none"> <li>a. Less than 0.6 mmol/L</li> <li>b. Less than 1.6 mmol/L</li> <li>c. Less than 2.6 mmol /L</li> <li>d. Not sure</li> </ul>
<b>8</b>	<p><b>What is the function of Erythropoietin Stimulating Agent for example Binocrit®, Recormon®, Mircera®, NESP®?</b></p> <ul style="list-style-type: none"> <li>a. To produce red blood cell</li> <li>b. To produce vitamin D</li> <li>c. To reduce phosphate level</li> <li>d. Not sure</li> </ul>
<b>9</b>	<p><b>What is the target of optimum haemoglobin for dialysis patients on Erythropoetin Stimulating Agent for example Binocrit®, Recormon®, Mircera®, NESP®?</b></p> <ul style="list-style-type: none"> <li>a. 9 – 10.5g/dL</li> <li>b. 10 – 12.0 g/dL</li> <li>c. 13 – 15.0g/dL</li> <li>d. Not sure</li> </ul>
<b>10</b>	<p><b>What do you do IF you missed a dose?</b></p> <ul style="list-style-type: none"> <li>a. I will take it as soon as I remember. But, if it's time for the next dose, I will omit the missed dose and continue with the next scheduled dose</li> <li>b. Double the dose</li> <li>c. Take half of the dose</li> <li>d. Not sure</li> </ul>
	<b>Total: / 10</b>

## BORANG PENILAIAN PENGETAHUAN UBAT- UBATAN (MTAC DIALISIS)<sup>8</sup>

Nama: \_\_\_\_\_

Tarikh: \_\_\_\_\_

Sila **BULATKAN** pada **SATU (1)** jawapan betul sahaja bagi setiap soalan.

BIL	SOALAN
1	<p><b>Apakah fungsi ubat berikut: <i>Ferrous Fumarate</i>, Zincofer<sup>®</sup>, Iberet<sup>®</sup>?</b></p> <p>a. Sebagai suplemen kalsium  b. Sebagai suplemen zat besi  c. Untuk menguatkan tulang  d. Tidak pasti</p>
2	<p><b>Apakah cara TERBAIK untuk mengambil ubat <i>Ferrous Fumarate</i>/ Zincofer<sup>®</sup>/ Iberet<sup>®</sup>?</b></p> <p>a. Diambil dengan perut kosong (setengah jam sebelum atau 2 jam selepas makan) dan jika ada gastrik, boleh diambil selepas makan  b. Ubat zat besi tidak perlu dijarakkan 1-2 jam daripada <i>calcium carbonate</i>  c. Ambil bersama makanan  d. Tidak pasti</p>
3	<p><b>Apakah fungsi <i>calcium carbonate</i>?</b></p> <p>a. Untuk mengawal paras potassium  b. Sebagai suplemen zat besi  c. Untuk mengawal paras fosfat  d. Tidak pasti</p>
4	<p><b>Bagaimanakah cara untuk mengurangkan paras fosfat dalam darah?</b></p> <p>a. Mengambil makanan yang tinggi serat  b. Mengambil <i>calcium carbonate</i> dengan makanan dan amalkan diet fosfat rendah  c. Mengambil makanan yang tinggi protein  d. Tidak pasti</p>
5	<p><b>Apakah cara TERBAIK pengambilan <i>calcium carbonate</i>?</b></p> <p>a. Mengambil <i>calcium carbonate</i> dengan perut kosong  b. Mengambil bersama makanan ( Kunyah / Tabur atas makanan / Telan )  c. Boleh diambil sebelum atau selepas makan  d. Tidak pasti</p>

BIL	SOALAN
6	<p><b>Berikut adalah kesan buruk ketidakseimbangan paras fosfat dan kalsium KECUALI:</b></p> <ul style="list-style-type: none"> <li>a. Tulang menjadi lemah dan rapuh</li> <li>b. Kulit kering dan gatal</li> <li>c. Penyakit jantung</li> <li>d. Tiada apa – apa kesan buruk</li> </ul>
7	<p><b>Apakah sasaran paras fosfat untuk pesakit dialisis ?</b></p> <ul style="list-style-type: none"> <li>a. Kurang daripada 0.6mmol/L</li> <li>b. Kurang daripada 1.6 mmol/ L</li> <li>c. Kurang daripada 2.6 mmol/ L</li> <li>d. Tidak pasti</li> </ul>
8	<p><b>Apakah fungsi suntikan Erythropoetin Stimulating Agent contohnya: Binocrit®, Recormon®, Mircera®, NESP®?</b></p> <ul style="list-style-type: none"> <li>a. Menghasilkan sel darah merah</li> <li>b. Menghasilkan vitamin D</li> <li>c. Mengurangkan paras fosfat</li> <li>d. Tidak pasti</li> </ul>
9	<p><b>Apakah sasaran hemoglobin yang optima untuk pesakit dialisis yang mengambil suntikan Erythropoetin Stimulating Agent contohnya Binocrit®, Recormon®, Mircera®, NESP®?</b></p> <ul style="list-style-type: none"> <li>a. 9 - 10.5g/dL</li> <li>b. 10 - 12.0 g/dL</li> <li>c. 13 – 15.0 g/dL</li> <li>d. Tidak pasti</li> </ul>
10	<p><b>Apakah yang akan anda lakukan sekiranya anda TERLUPA untuk mengambil ubat?</b></p> <ul style="list-style-type: none"> <li>a. Mengambilnya sebaik sahaja teringat. Tetapi, jika masanya lebih hampir dengan masa dos seterusnya, saya akan tinggalkan dos tersebut dan ambil ubat pada dos yang seterusnya.</li> <li>b. Menggandakan dos</li> <li>c. MengaMembiarkan sahaja dan mengambilnya pada waktu dos seterusnya</li> <li>d. Tidak pasti</li> </ul>
	<p><b>Jumlah Markah: / 10</b></p>

## DRUG KNOWLEDGE ASSESSMENT FORM (RENAL TRANSPLANT MTAC)<sup>8</sup>

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Please **CIRCLE** only **ONE (1)** correct answer for each question.

No	QUESTIONS
1	<p><b>Which medicines listed below are immunosuppressants?</b></p> <ul style="list-style-type: none"> <li>a. Tacrolimus, mycophenolate, prednisolone</li> <li>b. Bactrim, nystatin, valganciclovir</li> <li>c. Amlodipine, diltiazem, metoprolol</li> <li>d. Not sure</li> </ul>
2	<p><b>Why do you need to take immunosuppressants?</b></p> <ul style="list-style-type: none"> <li>a. To prevent rejection of my newly transplanted organ</li> <li>b. To prevent infection</li> <li>c. To control my high blood pressure</li> <li>d. Not sure</li> </ul>
3	<p><b>How should I take my immunosuppressants?</b></p> <ul style="list-style-type: none"> <li>a. Same time everyday</li> <li>b. Only when necessary</li> <li>c. Only at night</li> <li>d. Not sure</li> </ul>
4	<p><b>Where should I store my tablets?</b></p> <ul style="list-style-type: none"> <li>a. In the fridge</li> <li>b. In the freezer</li> <li>c. In airtight container and away from sunlight</li> <li>d. In the car</li> </ul>
5	<p><b>Why is it important to have regular blood test while on immunosuppressant treatment?</b></p> <ul style="list-style-type: none"> <li>a. To check if there is any infection</li> <li>b. To check the condition of the new kidney</li> <li>c. To check the concentration of immunosuppressant in the blood</li> <li>d. All of the above</li> </ul>

No	QUESTIONS
6	<p><b>What do you usually do when you MISSED a dose of your medicine?</b></p> <ul style="list-style-type: none"> <li>a) I will take it as soon as I remember. But, if it's time for the next dose, I will omit</li> <li>b) Take half of the dose</li> <li>c) Double the dose</li> <li>d) Not sure</li> </ul>
7	<p><b>What should you do if you experience any side effects from your medicines?</b></p> <ul style="list-style-type: none"> <li>a) Take half of the dose</li> <li>b) Consult the doctor/pharmacist immediately</li> <li>c) Take the medicine less frequently</li> <li>d) Not sure</li> </ul>
8	<p><b>What to do if you want to take supplement and traditional medication while taking immunosuppressant?</b></p> <ul style="list-style-type: none"> <li>a. Consult doctor/pharmacist before taking it</li> <li>b. Supplement/traditional medication are safe to be taken together with immunosuppressant</li> <li>c. Stop the immunosuppressants</li> <li>d. Supplement/traditional medication can be taken 1-2 hours apart from immunosuppressants</li> </ul>
9	<p><b>What is the consequences if you do not take the medicine correctly?</b></p> <ul style="list-style-type: none"> <li>a. May cause impairment to the new kidney</li> <li>b. May experience adverse effects of the medicine</li> <li>c. May result in rejection</li> <li>d. All of the above</li> </ul>
10	<p><b>Why is it important to have good sugar and blood pressure control while you are taking immunosuppressants?</b></p> <ul style="list-style-type: none"> <li>a. Blood sugar and blood pressure will be normal after renal transplantation</li> <li>b. Immunosuppressants can increase sugar level and blood pressure</li> <li>c. It delays wound healing after surgery</li> <li>d. Not sure</li> </ul>
	<p><b>Total: / 10</b></p>

## BORANG PENILAIAN PENGETAHUAN UBAT- UBATAN (MTAC TRANSPLAN BUAH PINGGANG)<sup>8</sup>

Nama: \_\_\_\_\_

Tarikh: \_\_\_\_\_

Sila **BULATKAN** pada **SATU (1)** jawapan betul sahaja bagi setiap soalan.

BIL	SOALAN
1	<p><b>Berikut yang manakah merupakan ubat immunosupresi?</b></p> <ul style="list-style-type: none"> <li>a. Tacrolimus, Mycophenolate, Prednisolone</li> <li>b. Bactrim, Nystatin, Valganciclovir</li> <li>c. Amlodipine, Diltiazem, Metoprolol</li> <li>d. Tidak pasti</li> </ul>
2	<p><b>Kenapa anda perlu mengambil ubat immunosupresi?</b></p> <ul style="list-style-type: none"> <li>a. Membersihkan darah, menyingkirkan air berlebihan dan sisa toksik.</li> <li>b. Untuk mencegah jangkitan kuman</li> <li>c. Untuk mengawal tekanan darah tinggi</li> <li>d. Tidak pasti</li> </ul>
3	<p><b>Bagaimana saya harus mengambil ubat immunosupresi?</b></p> <ul style="list-style-type: none"> <li>a. Mengambil ubat pada waktu yang sama setiap hari</li> <li>b. Mengambil ubat apabila perlu sahaja</li> <li>c. Mengambil ubat pada waktu malam sahaja</li> <li>d. Tidak pasti</li> </ul>
4	<p><b>Bagaimanakah cara penyimpanan ubat tablet yang betul?</b></p> <ul style="list-style-type: none"> <li>e. Simpan di dalam peti sejuk</li> <li>f. Simpan di dalam ruangan sejuk beku</li> <li>g. Diletakkan di dalam bekas tertutup dan jauh dari cahaya matahari</li> <li>h. Simpan di dalam kereta</li> </ul>
5	<p><b>Mengapa anda perlu menjalani ujian darah secara berkala semasa menerima rawatan immunosupresi?</b></p> <ul style="list-style-type: none"> <li>a. Untuk mengesan jangkitan kuman sekiranya ada</li> <li>b. Untuk memeriksa fungsi organ transplan</li> <li>c. Untuk memeriksa kepekatan ubat immunosupresi dalam darah</li> <li>d. Semua pilihan di atas</li> </ul>

BIL	SOALAN
6	<p><b>Apakah yang akan anda lakukan sekiranya TERLUPA mengambil ubat?</b></p> <ul style="list-style-type: none"> <li>e. Mengambil ubat sebaik sahaja teringat</li> <li>f. Mengambil separuh dos</li> <li>g. Menggandakan dos</li> <li>h. Tidak pasti</li> </ul>
7	<p><b>Apakah yang perlu dilakukan jika anda mengalami kesan-kesan sampingan ubat?</b></p> <ul style="list-style-type: none"> <li>e. Menurunkan dos ubat</li> <li>f. Merujuk kepada Doktor/Pegawai Farmasi dengan segera</li> <li>g. Mengurangkan kekerapan pengambilan ubat</li> <li>h. Tidak pasti</li> </ul>
8	<p><b>Apakah yang perlu dilakukan jika anda mahu mencuba ubat tradisional atau ubat suplemen?</b></p> <ul style="list-style-type: none"> <li>e. Berbincang dengan Doktor/ Pegawai farmasi sebelum mengambil ubat tersebut</li> <li>f. Ubat suplemen/tradisional selamat diambil bersama ubat immunosupresi</li> <li>g. Berhenti mengambil ubat immunosupresi</li> <li>h. Jarakkan pengambilan ubat suplemen/tradisional 1-2 jam daripada masa pengambilan ubat immunosupresi</li> </ul>
9	<p><b>Apakah komplikasi sekiranya anda tidak mengambil ubat secara betul?</b></p> <ul style="list-style-type: none"> <li>a. Boleh menyebabkan kerosakan pada buah pinggang baru</li> <li>b. Boleh mendedahkan pesakit kepada kesan sampingan ubat tersebut</li> <li>c. Boleh menyebabkan penolakan (rejection) buah pinggang baru</li> <li>d. Semua pilihan di atas</li> </ul>
10	<p><b>Apakah kepentingan mengawal paras gula dan tekanan darah semasa rawatan immunosupresi?</b></p> <ul style="list-style-type: none"> <li>a. Tahap gula dan tekanan darah semestinya kembali normal selepas transplan</li> <li>b. Ubat immunosupresi boleh meningkatkan tahap gula dalam darah dan tekanan darah</li> <li>c. Ia boleh melambatkan kesembuhan luka selepas pembedahan</li> <li>d. Tidak pasti</li> </ul>
	<p><b>Jumlah Markah: / 10</b></p>

**EXAMPLE**

**MEDICATION ASSESSMENT**

Indicator: Yes = 1; No = 0

Medication	Visit 1				Visit				Visit				Visit			
	Date: 2.1.2018				Date:				Date:				Date:			
	D	F	I	T	D	F	I	T	D	F	I	T	D	F	I	T
ATENOLOL 50MG OD	√	√		√												
PERINDOPRIL 4MG OD		√	√													
GLICLAZIDE 80MG BD	√		√	√												
Score (%) = $\frac{\text{No of "Yes"}}{\text{No of Questions}} \times 100\%$	8/12 X 100% = 66.67%															

Key:

D= Dose    F= Frequency    I= Indication    T= Method of administration

Pharmacist's Notes:



**APPENDIX 4 CHRONIC KIDNEY DISEASE (CKD-MTAC) MODULE**

1) CKD-MTAC: TOPICS FOR PATIENT EDUCATION

	EDUCATION TOPICS					
<b><u>RECRUITMENT</u></b>	<b>Know Your Drugs</b>	<b>Disease Management</b>	<b>Know Your Numbers</b>	<b>Side Effects Of Drug</b>	<b>Self Management</b>	<b><u>DISCHARGE</u></b>
<ul style="list-style-type: none"> <li>✓ Introduce the importance of MTAC and roles of pharmacist</li> <li>✓ Demographic profile</li> <li>✓ Pre-test-drug evaluation assessment</li> </ul>	<ul style="list-style-type: none"> <li>✓ Generic and Trade name of drugs</li> <li>✓ Indications</li> <li>✓ Administration ways – before/after food</li> <li>✓ Provide individualised medication list</li> <li>✓ Provide patients' education materials</li> <li>✓ Adherence &amp; compliance enhancement</li> </ul>	<ul style="list-style-type: none"> <li>✓ CKD</li> <li>✓ Proteinuria</li> <li>✓ DM</li> <li>✓ Hypertension</li> <li>✓ Hyperlipidemia</li> <li>✓ Anaemia</li> <li>✓ Renal bone disease</li> <li>✓ Others</li> </ul>	<ul style="list-style-type: none"> <li>✓ Serum creatinine</li> <li>✓ FBG/RBS/HbA1C</li> <li>✓ BP</li> <li>✓ Lipid profile (total cholesterol, HDL, LDL, TG)</li> <li>✓ Urine protein</li> <li>✓ Hb</li> <li>✓ PO4, Ca, albumin, iPTH</li> <li>✓ Body mass index</li> </ul>	<ul style="list-style-type: none"> <li>✓ Recognize, prevent, minimize and manage</li> <li>✓ Report ADR when necessary</li> </ul>	<ul style="list-style-type: none"> <li>✓ What to do if missed dose?</li> <li>✓ Healthy Lifestyle</li> <li>✓ Compliance Aids (pill box, diaries keeping, organiser, alarm clock etc )</li> <li>✓ Medication storage at home</li> </ul>	<ul style="list-style-type: none"> <li>✓ Drug knowledge and adherence evaluation</li> <li>✓ Clinical outcome parameters</li> </ul>

## 2) CKD MTAC COUNSELLING POINTS

TOPIC	COUNSELLING POINTS
<b>CKD</b>	<ul style="list-style-type: none"> <li>- Stages of CKD</li> <li>- Treatment goal - to retard progression of CKD</li> <li>- Complications of CKD – may progress to ESKF (dialysis/transplant)</li> <li>- Proteinuria</li> </ul>
<b>Diabetes mellitus</b>	<ul style="list-style-type: none"> <li>- Medications (oral antidiabetic/insulin)</li> <li>- Type 1 or 2 DM</li> <li>- Target HbA1c, fasting glucose level and post prandial glucose</li> <li>- Complications of uncontrolled DM (macrovascular: stroke, CVS) or microvascular: nephropathy, retinopathy, neuropathy)</li> <li>- Insulin injection technique and storage</li> <li>- Symptoms of hypoglycaemia &amp; management</li> </ul>
<b>Cardiovascular</b>	<ul style="list-style-type: none"> <li>- Medications (antihypertensive/ cardiovascular agent)</li> <li>- Target BP</li> <li>- Complications of high BP</li> <li>- Salt and fluid restrictions</li> </ul>
<b>Anemia</b>	<ul style="list-style-type: none"> <li>- Medications (oral iron, folic acid, B complex, EPO, IV iron)</li> <li>- Target haemoglobin</li> <li>- Oral iron – take on empty stomach</li> <li>- EPO: adherence, storage, injection technique, BP monitoring</li> <li>- Symptoms and complications of anaemia</li> </ul>
<b>Hyperlipidaemia</b>	<ul style="list-style-type: none"> <li>- Medications (statin, fibrates)</li> <li>- Target: total cholesterol, HDL, LDL, TG</li> <li>- Complication</li> </ul>
<b>Healthy Lifestyle</b>	<ul style="list-style-type: none"> <li>- Low salt diet (for HPT)</li> <li>- Low sugar diet (for DM )</li> <li>- Low protein diet (CKD )</li> <li>- Low phosphate diet</li> <li>- Low fat diet (hyperlipidaemia)</li> <li>- Low potassium diet</li> <li>- Exercise and achieving normal BMI</li> <li>- Smoking cessation</li> </ul>
<b>Others</b>	<ul style="list-style-type: none"> <li>- Avoid nephrotoxic drugs such as NSAIDs, unregistered traditional medicines/herbs, herbal drugs known to be nephrotoxic etc.</li> <li>- Inform health care providers if plan to take supplements/over-the-counter products.</li> </ul>

**APPENDIX 5 DIALYSIS MTAC MODULE (Applicable for Hemodialysis and Peritoneal Dialysis MTAC)**

1) DIALYSIS MTAC: TOPICS FOR PATIENT EDUCATION

EDUCATION TOPICS						
<b><u>RECRUITMENT</u></b>	<b>Know Your Drugs</b>	<b>Disease Management</b>	<b>Know Your Numbers</b>	<b>Side Effects Of Drug</b>	<b>Self Management</b>	<b><u>DISCHARGE</u></b>
<ul style="list-style-type: none"> <li>✓ Introduce the importance of MTAC and roles of pharmacist</li> <li>✓ Demographic profile – RP 1</li> <li>✓ Pre-test</li> </ul>	<ul style="list-style-type: none"> <li>✓ Generic and Trade name of drugs</li> <li>✓ Indications</li> <li>✓ Administration ways – before/after food</li> <li>✓ Provide individualised medication list</li> <li>✓ Provide patients’ education materials</li> <li>✓ Adherence &amp; compliance enhancement</li> </ul>	<ul style="list-style-type: none"> <li>✓ DM</li> <li>✓ Cardiovascular</li> <li>✓ Renal Anaemia</li> <li>✓ Mineral bone disease</li> <li>✓ Hyperlipidemia</li> <li>✓ Others</li> </ul>	<ul style="list-style-type: none"> <li>✓ FBS /HbA1C</li> <li>✓ BP &amp; dry weight</li> <li>✓ Hb, TSAT, Ferritin</li> <li>✓ Ca, PO4, albumin, ALP, iPTH</li> <li>✓ Lipid profile (total cholesterol, HDL, LDL, TG)</li> </ul>	<ul style="list-style-type: none"> <li>✓ Recognize, prevent, minimize and manage</li> <li>✓ Report ADR when necessary</li> </ul>	<ul style="list-style-type: none"> <li>✓ What to do if missed dose?</li> <li>✓ Healthy Lifestyle</li> <li>✓ Compliance Aids (pill box, diaries keeping, organiser, alarm clock etc )</li> <li>✓ Medication storage at home</li> </ul>	<ul style="list-style-type: none"> <li>✓ Drug knowledge and adherence assessment</li> <li>✓ Clinical outcome parameters</li> </ul>

## 2) DIALYSIS MTAC: COUNSELING POINTS

TOPICS	COUNSELING POINTS
<b>Diabetes mellitus</b>	<ul style="list-style-type: none"> <li>- Medications (oral antidiabetic/insulin)</li> <li>- Type 1 or 2 DM</li> <li>- Target fasting glucose level and post prandial glucose</li> <li>- Complications of uncontrolled DM (macrovascular : stroke, CVS or microvascular : nephropathy, retinopathy, neuropathy)</li> <li>- Insulin injection technique and storage</li> <li>- Symptom of hypoglycemia &amp; management</li> </ul>
<b>Cardiovascular</b>	<ul style="list-style-type: none"> <li>- Medications (antihypertensive/cardiovascular agent )</li> <li>- Target BP and dry weight</li> <li>- Complications of high BP</li> <li>- Salt and fluid restrictions</li> <li>- Precaution : you may omit antihypertensive medication if BP &lt; 90/50mmHg ; or before dialysis if experience intradialytic / postdialytic hypotension</li> </ul>
<b>Anaemia</b>	<ul style="list-style-type: none"> <li>- Medications ( oral iron, folic acid, B complex, Erythropoetin, IV iron)</li> <li>- Target of Hb : 10-11.5g/dL</li> <li>- Administration ways : oral iron – take on empty stomach</li> <li>- EPO : adherence, storage, injection technique, BP monitoring</li> <li>- Symptoms of anemia</li> <li>- Complications of low /high Hb</li> </ul>
<b>Mineral Bone Disease</b>	<ul style="list-style-type: none"> <li>- Medications (CaCO<sub>3</sub>, calcium lactate, calcitriol/alphacalcidol, lanthanum carbonate, sevelamer, cinacalcet )</li> <li>- Target calcium, phosphate, iPTH</li> <li>- Complications of hyperphosphatemia</li> <li>- Administration ways : CaCO<sub>3</sub> / Lanthanum tablet - chew tablet with food CaCO<sub>3</sub> capsule – open capsule and sprinkle on food. Sevelamer – Swallow whole with food</li> <li>- Phosphate Binders dose titration according to meal size</li> </ul>
<b>Hyperlipidemia</b>	<ul style="list-style-type: none"> <li>- Medications (statin, fibrates)</li> <li>- Target : total cholesterol, HDL, LDL, TG</li> <li>- Complications</li> </ul>
<b>Healthy Lifestyle</b>	<ul style="list-style-type: none"> <li>- Low salt diet ( for HPT)</li> <li>- Low sugar diet ( for DM )</li> <li>- High protein diet ( CKD )</li> <li>- Low phosphate diet</li> <li>- Low fat diet ( hyperlipidaemia)</li> <li>- Low potassium diet ( if HD )</li> <li>- High potassium diet ( if CAPD )</li> <li>- Exercise</li> <li>- Achieving normal BMI</li> <li>- Smoking cessation</li> </ul>

**APPENDIX 6 RENAL TRANSPLANT MTAC MODULE (RTx-MTAC)**

1) RTx-MTAC: TOPICS FOR PATIENT EDUCATION

	EDUCATION TOPICS					
<b><u>RECRUITMENT</u></b>	<b>Know Your Drugs</b>	<b>Disease Management</b>	<b>Know Your Numbers</b>	<b>Side Effects Of Drug</b>	<b>Self Management</b>	<b><u>DISCHARGE</u></b>
<ul style="list-style-type: none"> <li>✓ Introduce the importance of MTAC and roles of pharmacist</li> <li>✓ Demographic profile – RT 1</li> <li>✓ Pre-test</li> </ul>	<ul style="list-style-type: none"> <li>✓ Generic and Trade name of drugs</li> <li>✓ Indications</li> <li>✓ Administration ways – before/after food</li> <li>✓ Provide individualised medication list</li> <li>✓ Provide patients' education materials</li> <li>✓ Adherence &amp; compliance enhancement</li> </ul>	<ul style="list-style-type: none"> <li>✓ CKD</li> <li>✓ DM</li> <li>✓ Cardiovascular</li> <li>✓ Hyperlipidemia</li> <li>✓ Rejection</li> <li>✓ Opportunistic infection</li> <li>✓ Others</li> </ul>	<ul style="list-style-type: none"> <li>✓ Body mass index</li> <li>✓ FBG/RBS/HbA1C</li> <li>✓ BP</li> <li>✓ Hb</li> <li>✓ Ca, PO4, albumin</li> <li>✓ Lipid profile (total cholesterol, HDL, LDL, TG)</li> <li>✓ Serum creatinine</li> <li>✓ Immunosuppressant levels</li> </ul>	<ul style="list-style-type: none"> <li>✓ Recognize, prevent, minimize and manage</li> <li>✓ Report ADR when necessary</li> </ul>	<ul style="list-style-type: none"> <li>✓ What to do if missed dose?</li> <li>✓ Healthy Lifestyle</li> <li>✓ Compliance Aids (pill box, diaries keeping, organiser, alarm clock etc )</li> <li>✓ Medication storage at home</li> </ul>	<ul style="list-style-type: none"> <li>✓ Drug knowledge and adherence assessment</li> <li>✓ Clinical outcome parameters</li> </ul>

### 3) RTx-MTAC: COUNSELING POINTS

TOPICS	COUNSELING POINTS
<b>Graft rejection</b>	<ul style="list-style-type: none"> <li>- Types of rejection</li> <li>- Factors contributing to rejection</li> <li>- Signs and symptoms of rejection</li> </ul>
<b>Immunosuppressant agents (ISA)</b>	<ul style="list-style-type: none"> <li>- Definition and function of ISA</li> <li>- The importance of adhering to ISA in ensuring positive transplant outcome</li> <li>- Common potential side effects</li> </ul>
<b>Diabetes Mellitus</b>	<ul style="list-style-type: none"> <li>- The importance of controlling diabetes post-transplant</li> <li>- Drugs that may potentially worsen diabetes or induce NODAT</li> <li>- Treatment targets</li> <li>- Steroid induced insulin resistance</li> <li>- Home sugar monitoring</li> </ul>
<b>Hyperlipidaemia</b>	<ul style="list-style-type: none"> <li>- Medications (statin, fibrates)</li> <li>- Target : total cholesterol, HDL, LDL, TG</li> <li>- Complications</li> </ul>
<b>Cardiovascular disease</b>	<ul style="list-style-type: none"> <li>- Medications (antihypertensive/cardiovascular agent )</li> <li>- Target BP</li> <li>- Complications of high BP</li> <li>- The importance of controlling hypertension post-transplant</li> <li>- Drugs that may potentially worsen hypertension</li> </ul>
<b>Healthy lifestyle</b>	<ul style="list-style-type: none"> <li>- Exercise</li> <li>- Target weight and BMI</li> <li>- Eat more fruits and vegetables</li> <li>- Low salt diet ( for HPT)</li> <li>- Low sugar diet ( for DM )</li> <li>- Low fat diet ( hyperlipidaemia)</li> <li>- Smoking cessation</li> </ul>

## 9.0 REFERENCES

1. Lai SH, Loke MO, Ghazali A, et al. A population-based study measuring the prevalence of CKD among adults in West Malaysia. *Kidney International* 2013, 84: 1034 – 1040.
2. 22nd Report of the Malaysian Dialysis and Transplantation Registry. 2014
3. Norkasihani I, Ian CKW, Susan P, et al. Drug-related problem in children with chronic kidney disease. *Pediatric Nephrology* 2013, 28: 25-31.
4. Jeffrey CF, Jeanie B, Van Doren Hsu et al. CKD as an underrecognized threat to patient safety. *American Journal of Kidney Diseases* 2009, 53(4) (April): 681-688.
5. Rashed AA, Wong ICK, Cranswick N et al. 2012. Risk factors associated with adverse drug reactions in hospitalised children: international multicentre study. *Eur J Clin Pharmacol.* 68, 801-10
6. Cardone KE, Bacchus S, Assimon AB, et al. 2010. Medication-related problems in CKD. *Adv Chronic Kidney Dis.* 17, 404-12
7. Castelino EL, Sathvik BS, Parthasarathi G, et al. 2011. Prevalence of medication-related problems among patients with renal compromise in an Indian hospital. *J Clin Pharm Ther.* 36, 481-7.
8. Expert Opinion: Renal Pharmacy Working Committee MOH. 19-20 September 2018.