



Pharmaceutical Services Division
Ministry of Health Malaysia

PROTOCOL
Medication Therapy
Adherence Clinic:
GERIATRIC

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Pharmaceutical Services Division
Ministry of Health, Malaysia

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PREFACE



The development of new roles for pharmacists has expanded to the geriatric care settings. Pharmaceutical care, which is comprehensive and patient focused is vital in ensuring that patients receive rational, safe and effective treatment. It aims to promote health by preventing and treating disease and disabilities in older adults.

Geriatrics is focused on the clinical, preventive, remedial and social aspects of illness in the elderly. Challenges in this field are of frailty, complex comorbidity, different pattern of disease presentation and slower response to treatment requires special attention. In the elderly, presentations of illness are often non-specific and focused more on falls, immobility, incontinence, confusion and adverse drug reactions.

Elderly people require specific attention to medications and they are often subject to polypharmacy. Some of them have multiple medical disorders, some have self-prescribed herbal remedies and OTC products. This scenario may increase the risk of drug interactions and adverse drug reactions. Therefore, pharmacist involve in geriatric care could play a role as a member of a multidisciplinary healthcare team to provide rational, safe and cost effective drug therapy to geriatric patients.

This protocol is meant for pharmacists in Ministry of Health in providing their expertise in Geriatric Medication Therapy Adherence Clinics. This protocol will ensure the standardisation of practice and also enable the pharmacists to fully contribute as part of the healthcare team throughout MOH facilities.

I would like to thank the Clinical Pharmacy Working Committee (Geriatric Subspecialty), Pharmaceutical Services Division, MOH for their contribution and commitment to the publication of this protocol.

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▲ A. INTRODUCTION

Population ageing is a phenomenon that occurs worldwide, where it is most advanced in highly developed nations. This phenomenon is highly affected by the increment in longevity as the result of improvement in healthcare system and technology in addition to the extensive health consciousness among public. In Malaysia, the aging process of population has become apparent over the recent decades. In 1990, the proportion of the population aged 60 and above was 5.9 percent. The figure rose to 6.2 percent in 2000 and is estimated to reach 9.5 percent by 2020¹.

Looking at the trend of aging, the elderly population will stand as one of the largest healthcare consumers and, more specifically, pharmaceutical care services. This group of people is more vulnerable to the unwanted effects of medication treatment. This may be due to the fact that elderly are more prone to have multiple diseases which will necessitate treatment that utilize multiple medications. Hence, the elderly will need more focused care in medical therapy as well as medication management.

Pharmacists have a major role to play in improving and ensuring the quality of drug use in the elderly. A more intensive and patient-focused approach is needed in assisting elderly patients and caregivers to achieve the desired therapeutic goals. A good collaboration between pharmacists, physicians and other healthcare personnel will bring the quality of patient care to greater heights. In view of this, involvement of pharmacists in Medication Therapy Adherence Clinic (MTAC) for geriatric patients would be a good platform to extend the provision of pharmaceutical care to the target group.

¹Department of Statistics, Malaysia

OBJECTIVE

1. To improve patient's **adherence and compliance** towards medication therapy.
2. To provide pharmaceutical care in elderly patients aiming at **maximising the therapeutic outcomes with minimisation of adverse drug events**.
3. To **educate** patients and care-givers regarding the medication management.
4. To **collaborate with physicians and other healthcare providers** in the provision of optimum patient care.
5. To improve patient's **quality of life**.

SCOPE OF SERVICE

GMTAC is conducted in **collaboration with the Geriatric Physician Clinic**. The job scopes of the pharmacists are to conduct patient's medication review, identify pharmaceutical care issues, educate and counsel patients/care givers and monitor relevant therapeutic outcomes. The patients who are selected for GMTAC program will have a regular follow up at the clinic. Patient recruitment and follow-up of cases will be based on mutual agreement between the physician, pharmacist, patient and caregiver.

MANPOWER REQUIREMENT

At least one pharmacist should be placed in the clinic.

APPOINTMENT

1. Appointment

Selected patients enrolled in GMTAC program will be given appointments that are scheduled by the pharmacist according to geriatric clinic appointment.

2. Missed Appointment

Patients who missed their appointment would be rescheduled according to their next visit to geriatric clinic.

PROCEDURES

Refer **Appendix 1** for Geriatric MTAC (GMTAC) Process Flow Chart.

1. Location

- i. Geriatric clinic
- ii. A conducive place for pharmacist-patient interaction during the GMTAC program, with minimal interruptions to ensure patient's privacy and confidentiality.

2. Operation Hours

GMTAC operates on the same day as geriatric clinic.

3. Patient Selection

Inclusion of patients into GMTAC will be based on the following criteria:

- a. Geriatric patients who received treatment in geriatric Clinic (≥ 60 years).
- b. Patients on multiple medications, preferably more than 5.
- c. Patients who are suspected to have **5I's Geriatric Giant Syndrome**.
 - i. Iatrogenic – drug related
 - ii. Instability
 - iii. Immobility
 - iv. Incontinence
 - v. Impaired cognitive function
- d. Patients referred by doctors

4. Activities

a. Patient Screening

Retrieve patient's case notes.

Review patient's clinical condition and medication therapy.

Select patients who fulfill the inclusion criteria for GMTAC enrolment.

b. Enrollment into GMTAC (First Visit)

i. Registration

Register new recruitment into GMTAC program according to general policies and procedures.

ii. Introduction to GMTAC

Explain to patients and caregivers regarding the objectives, operation and activities of GMTAC, their rights and commitment in the program, and expected benefits to be gained from the participation.

For enrolment into GMTAC program, patients should grant their consent to allow their information to be reviewed for the sole purpose of patient care (Refer **Appendix 2**).

c. Initial Assessment by Pharmacist

Conduct a baseline assessment on patient's past medical/medication history, social/family history, allergies (drug/food), laboratory investigations and activities of daily living [Pharmacotherapy Form–First visit (MTAC/GR/F1), Refer **Appendix 3**].

d. Medication Adherence Evaluation

i. Review patient's current medications and conduct medication adherence assessment.

ii. Document summary of the medication adherence evaluation into patient's case notes.

e. Activities of Daily Living (ADL)

- i. Interview patient on his/her daily activities and document it into ADL Scale Form (Refer **Appendix 4**).
- ii. Important points of ADL (if applicable) to be included in the chart are:
 - Bathing
 - Dressing
 - Toileting
 - Transferring
 - Continence
 - Feeding

f. Pharmacotherapy Review

- i. Identify Pharmaceutical Care Issues from patient's health screening findings, medication history, and medication adherence evaluation.
- ii. Formulate a pharmaceutical care plan to address the identified issue.
- iii. Discuss with the physicians (if relevant) and implement the care plan.
- iv. Review medication using START, STOP and Beer's Criteria to evaluate the appropriateness of medication use.
- v. Monitor patient's progress on the subsequent visit to ensure achievement of desired outcome. Modify the existing care plan if necessary.

g. Medication Dispensing and Counseling

- i. Receive and screen patient's prescription on current visit.
- ii. Reconcile patient's medication and dispense new prescription.
- iii. Counter-check on the medication supplied.

- iv. Dispense medications to patient or caregiver.
- v. Counsel and educate patient or caregiver on medication therapy.
- vi. Remind patient to bring the balance of the medications (if any) during the next visit.

Table 1: Summary of Activities During Initial and Subsequent GMTAC visits

INITIAL VISIT	SUBSEQUENT VISITS
<ol style="list-style-type: none"> 1. Introduction to GMTAC. 2. Obtain patient's demographic details. 3. Obtain current patient ADL status using KETZ Basic Activities of Daily Living (ADL) Scale (refer Appendix 4). 4. Medication knowledge assessment (DFIT). 5. Medication adherence evaluation 6. Pharmacotherapy review: <ol style="list-style-type: none"> i. *START (refer Appendix 5) ii. *STOP (refer Appendix 6) iii. List of Medications with Increased Risk of Adverse Drug Events in Patients Over 65 (*Beer's Criteria refer Appendix 7) 7. Medication dispensing and counseling. 	<ol style="list-style-type: none"> 1. Reassess KETZ Basic Activities of Daily Living (ADL) Scale (refer Appendix 4). 2. Reassess knowledge using DFIT and any suitable adherence tools. 3. Pharmacotherapy review: <ol style="list-style-type: none"> i. *START (refer Appendix 5) ii. *STOP (refer Appendix 6) iii. List of Medications with Increased Risk of Adverse Drug Events in Patients Over 65 (*Beer's Criteria refer Appendix 7) 4. Other relevant test that may be used: <ol style="list-style-type: none"> i. Mini Mental State Examination (MMSE refer Appendix 8) ii. Yesavage Geriatric Depression Scale (GDS refer Appendix 9)

**May use START/STOP/BEER's criteria as a guide to detect any drug related problem during pharmacotherapy review.*

5. Discharge Criteria

- a. Default follow up for 1 year.
- b. Deceased patient.
- c. Patient's refusal to continue the GMTAC program.
- d. Less than 5 types of medications.
- e. Transferred out to other facility.

6. Documentation

- a. Document all relevant information into patient case notes.
- b. Complete following forms as required:
 - i. Pharmacotherapy Form – First visit (MTAC/GR/F1), **Appendix 3**
 - ii. Activity Daily Life (ADL), **Appendix 4**
 - iii. Mini-Mental State Examination (MMSE), **Appendix 8**
 - iv. Geriatric Depression Scale (GDS), **Appendix 9**

REFERENCES

Geriatric Depression Scale. Accessed on February 11, 2010 from http://consultgerirn.org/uploads/File/trythis/try_this_4.pdf

PJ Barry, P Gallagher, C RYAN, DO Mahony. Start (Screening Tool to Alert Doctors to the Right Treatment)-an Evidence-Based Screening Tool to Detect Prescribing Omissions in Elderly Patients. *Age and Ageing* 2007; 36: 632–638.

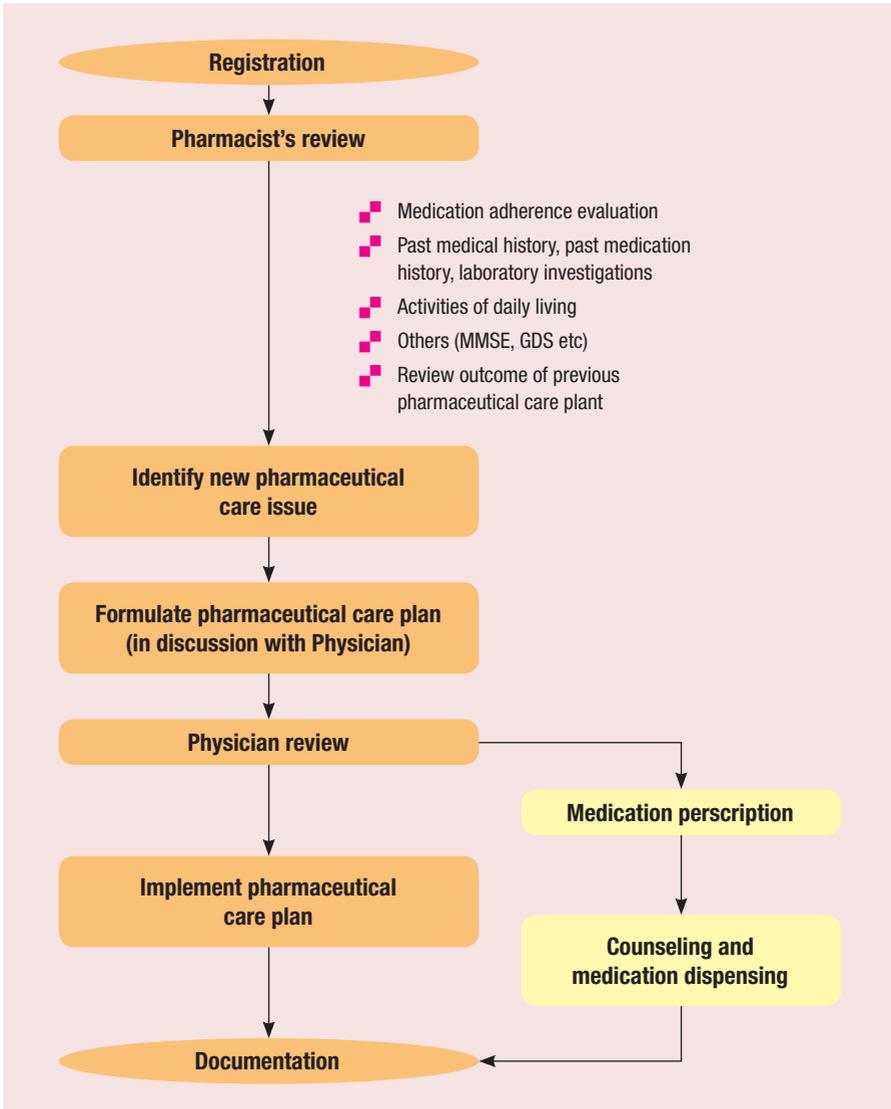
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STOPP: Screening Tool of Older People's potentially inappropriate Prescriptions. Accessed on February 10, 2010 from https://www.aacp.com.au/FourpointRoot/portal/shared/Assets/mmr_manual_09/Linked_documents/STOPP-data.pdf

Yesavage, J.A. Geriatric Depression Scale. *Psychopharmacology Bulletin*.1988. 24(4):709-711.

APPENDICES

APPENDIX 1: GMTAC Process Flow Chart



APPENDIX 2: Participant's/Caregiver Consent Form



Geriatric Medication Therapy Adherence Clinic (GMTAC)

I am with I/C No agree to participate in the Geriatric Medication Therapy Adherence Clinic (GMTAC) program offered by Pharmacy Department, Hospital/Klinik Kesihatan The program will be conducted by the Pharmacist and I will give my full cooperation. Full explanation about the program has already been explained by the Pharmacist In-charge and I understand it well. I agree and allow the GMTAC Pharmacist to do the needful.

.....
Name: Name of Caregiver:
I/C No: I/C No:
Date: Date:

Pharmacist In-charge

.....
Name:
Stamp:
Date:

▶ Borang Kebenaran Menjadi Peserta



Geriatric Medication Therapy Adherence Clinic (GMTAC)

Saya No. K/P bersetuju untuk mengikuti program Geriatric Medication Therapy Adherence Clinic (GMTAC) anjuran Jabatan Farmasi, Hospital/Klinik Kesihatan Program ini akan dijalankan oleh Pegawai Farmasi dan saya akan memberi kerjasama sepenuhnya. Saya telah diberi penerangan berkaitan program ini dan faham penjelasan yang telah diberikan. Saya juga membenarkan Pegawai Farmasi yang terlibat menjalankan aktiviti berkaitan sekiranya perlu.

.....
Nama: Nama Penjaga:
No K/P: No K/P:
Tarikh: Tarikh:

Pegawai Farmasi yang bertanggungjawab

.....
Nama:
Cop Jawatan:
Tarikh:

Appendix 3



**PHARMACOTHERAPY FORM-FIRST VISIT
GERIATRIC MEDICATION THERAPY
ADHERENCE CLINIC (GMTAC)**

JABATAN FARMASI,

(MTAC/GR/F1)

Reference no.

PATIENT INFORMATION								
Name:				I/C Number:				
Age:		Gender: M/F		Race: M/C/I/Others				
Home Address:				Tel No.				
Visit	1	2	3	4	5	6	7	8
Date								
Pharmacist Interview (I)								
Dispense (D)								
Medical Problem								
Past Medication History (Before enrollment)				Hospital Admission History				
				Date		Reason		
Social/Family History						Stay alone		
						Stay with family		
						Smoking		
						Alcohol		
Allergy								

GERIATRIC MEDICATION THERAPY ADHERENCE CLINIC–LAB VALUES

Physical Parameters									
	Normal Value	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7	Visit 8
Date									
Blood Pressure	<130/80 mmHg								
Pulse	60-100 p/min								
Weight (kg)									
Laboratory Parameters									
Date									
Blood Profile									
TWBC	4-11 X 10 ⁹ /L								
Hb	11.5-16.5 d/dL								
RBC	4.5-6.3 X 10 ⁶ /L								
HCT	0.4-0.5 (male) 0.37-048 (female)								
Platelet	150-400 x 10 ⁹ /L								
Renal Profile									
Urea	1.7-8.3 mmol/L								
Sodium	135-145 mmol/L								
Potassium	3.5-5.0 mmol/L								
Chloride	96-106 mmol/L								
Calcium	2.1-2.6 mmol/L								
Phosphate	0.8-1.45 mmol/L								
Magnesium	0.1-1.3 mmol/L								
SCr	64-122 umol/L								
CrCl	105-150 ml/hour								
Liver Profile									
Albumin	35-50 g/dL								
ALP	53-141 u/L								
ALT	<32 u/L								
AST	5-35 u/L								
Lipid Profile									
T.Cholesterol	3.5-5.7 mmol/L								
TG	0.6-1.6 mmol/L								
LDL	<2.5 mmol/L								
HDL	>1.5 mmol/L								
Glycemic control									
FBG	4.4-6.0 mmol/L								
RBG	<10 mmol/L								
HbA1c%	<6.5%								
Others									

GERIATRIC MEDICATION THERAPY ADHERENCE CLINIC

Name:

GMTAC No:

Date/Time:

Visit No.

MEDICATION PRESCRIBED	MEDICATION TAKEN BY PATIENT (√ if same with medication prescribed)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	

Pharmaceutical Care Issues	Suggestion/Plan
Compliance:	

Pharmacist's Signature and Stamp

GERIATRIC MEDICATION THERAPY ADHERENCE CLINIC *(copy for pharmacy)*

Name:

GMTAC No:

Date/Time:

Visit No.

MEDICATION PRESCRIBED	MEDICATION TAKEN BY PATIENT (✓ if same with medication prescribed)	Knowledge assessment				DC
		D	I	F	T	
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						

D Dose, **I** Indication, **F** Frequency, **T** Method of Administration, **C** Continue, **DC** Discontinue **score =**

Pharmaceutical Care Issues	Suggestion/Plan
Compliance:	

Pharmacist's Signature and Stamp

Appendix 4: Activities of Daily Living (ADL)

Katz Index of Independence in Activities of Daily Living.

ACTIVITIES POINTS (1 OR 0)	INDEPENDENCE: (1 POINT) NO supervision, direction or personal assistance	DEPENDENCE: (0 POINTS) WITH supervision, direction, personal assistance or total care
BATHING POINTS: _____	(1 POINT) Bathes self completely or needs help in bathing only a single part of the body such as the back, genital area or disabled extremity.	(0 POINTS) Needs help with bathing more than one part of the body, getting in or out of the tub or shower. Requires total bathing.
DRESSING POINTS: _____	(1 POINT) Gets clothes from closets and drawers and puts on clothes and outer garments complete with fasteners. May have help tying shoes.	(0 POINTS) Needs help with dressing self or needs to be completely dressed.
TOILETING POINTS: _____	(1 POINT) Goes to toilet, gets on and off, arranges clothes, cleans genital area without help.	(0 POINTS) Needs help transferring to the toilet, cleaning self or uses bedpan or commode.
TRANSFERRING POINTS: _____	(1 POINT) Moves in and out of bed or chair unassisted. Mechanical transferring aides are acceptable.	(0 POINTS) Needs help in moving from bed to chair or requires a complete transfer.
CONTINENCE POINTS: _____	(1 POINT) Exercises complete self control over urination and defecation.	(0 POINTS) Is partially or totally incontinent of bowel or bladder.
FEEDING POINTS: _____	(1 POINT) Gets food from plate into mouth without help. Preparation of food may be done by another person.	(0 POINTS) Needs partial or total help with feeding or requires parenteral feeding.
TOTAL POINTS = _____ 6 = High (patient independent) 0 = Low (patient very dependent)		

Slightly adapted from Katz, S., Down, T.D., Cash, H.R., & Grotz, R.C. (1970) Progress in the development of the index of ADL. *The Gerontologist*, 10(1), 20-30.

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Appendix 5: Screening Tool to Alert Doctors to the Right Treatment (START)

During the process of pharmacotherapy screening, START tool is used as a guide to identify pharmaceutical care issues. START tool addresses issues related to inappropriate prescribing that encompasses acts of commission and omission of the medication therapy.

Cardiovascular System

- i. Warfarin in the presence of chronic atrial fibrillation, where there is no contraindication to warfarin.
- ii. Aspirin in the presence of chronic atrial fibrillation, where there is no contraindication to warfarin.
- iii. Aspirin or Clopidogrel with a documented history of coronary, cerebral or peripheral vascular disease in patients in sinus rhythm, where therapy is not contraindicated.
- iv. Antihypertensive therapy where systolic BP consistently >160 mmHg, where antihypertensive therapy is not contraindicated.
- v. Statin therapy in patients with documented history of coronary, cerebral or peripheral vascular disease, where the patients' functional status remains independent for activity of daily living and life expectancy is more than 5 years.
- vi. ACE inhibitor in chronic heart failure, where no contraindication exists.
- vii. ACE inhibitor following acute myocardial infarction.
- viii. Beta blocker in chronic stable angina, where no contraindication exists.

Central Nervous System

- i. L-DOPA in idiopathic Parkinson's disease with definite functional impairment and resultant disability.
- ii. Antidepressant in the presence of clearcut depressive symptoms, lasting at least 3 months.

Gastrointestinal System

- i. Proton pump inhibitor in the presence of chronic severe gastro-oesophageal acid reflux or peptic stricture requiring dilatation.
- ii. Fibre supplement for chronic symptomatic diverticular disease with constipation.

Locomotor System

- i. Disease-modifying anti-rheumatic drug (DMARD) with known, moderate-severe rheumatoid disease lasting more than 12 weeks.
- ii. Bisphosphonate in patients taking glucocorticoids for more than 1 month (i.e. chronic corticosteroid therapy).
- iii. Calcium and vitamin D supplement in patients with known osteoporosis (previous fragility fracture, acquired dorsal kyphosis).

Respiratory System

- i. Regular inhaled β_2 -agonist or anti-cholinergic agent for mild to moderate asthma or COPD.
- ii. Inhaled steroid in moderate-severe asthma or COPD, where reversibility of airflow obstruction has been shown.
- iii. Home continuous oxygen where chronic type 1 respiratory failure ($pO_2 < 8.0$ kPa, $pCO_2 < 6.5$ kPa or type 2 respiratory failure ($pO_2 < 8.0$ kPa, $pCO_2 > 6.5$ kPa) has been well documented and where there is no contraindication to continuous oxygen therapy.

Endocrine System

- i. Metformin with type 2 diabetes +/- Metabolic Syndrome (in the absence of renal impairment present i.e. blood urea > 12.0 mmol/L \pm serum creatinine > 200 mmol/L)
- ii. ACE inhibitor or Angiotension Receptor Blocker in diabetes with nephropathy i.e. overt dipstick proteinuria or microalbuminuria (> 30 mg/24 h) \pm serum biochemical renal impairment (blood urea > 8.0 mmol/L or serum creatinine > 130 μ mol/L)
- iii. Aspirin therapy in diabetes mellitus with well controlled blood pressure.
- iv. Statin therapy in diabetes mellitus if fasting serum cholesterol > 5.0 mmol/L or additional cardiovascular risk factor(s) present.

Reference: START (Screening Tool to Alert Doctors to the Right Treatment) - an Evidence-Based Screening Tool to Detect Prescribing Omissions in Elderly Patients. PJ Barry et al.

APPENDIX 6: Screening Tool of Older People's Potentially Inappropriate Prescriptions (STOP)

During the process of pharmacotherapy screening, this tool is used as a guide to identify pharmaceutical care issues. In STOP tool, it addresses issues related to commonly use drug in treating chronic disease but may be contraindicated in certain patient condition or may worsen the patient's condition.

No.	System	Drug Prescriptions
A.	Cardiovascular System	<ol style="list-style-type: none"> Digoxin at a long-term dose >125µg/day with impaired renal function* (<i>increased risk of toxicity</i>). Loop diuretic for dependent ankle oedema only i.e. no clinical signs of heart failure (<i>no evidence of efficacy, compression hosiery usually more appropriate</i>). Loop diuretic as first-line monotherapy for hypertension (<i>safer, more effective alternatives available</i>). Thiazide diuretic with a history of gout (<i>may exacerbate gout</i>). Beta-blocker with Chronic Obstructive Pulmonary Disease (COPD) (<i>risk of increased bronchospasm</i>). Beta-blocker in combination with verapamil (<i>risk of symptomatic heart block</i>). Use of diltiazem or verapamil with NYHA Class III or IV heart failure (<i>may worsen heart failure</i>). Calcium channel blockers with chronic constipation (<i>may exacerbate constipation</i>). Use of aspirin and warfarin in combination without histamine H2 receptor antagonist (except cimetidine because of interaction with warfarin) or proton pump inhibitor (<i>high risk of gastrointestinal bleeding</i>). Dipyridamole as monotherapy for cardiovascular secondary prevention (<i>no evidence for efficacy</i>). Aspirin with a past history of peptic ulcer disease without histamine H2 receptor antagonist or Proton Pump Inhibitor (<i>risk of bleeding</i>). Aspirin at dose >150mg day (<i>increased bleeding risk, no evidence for increased efficacy</i>). Aspirin with no history of coronary, cerebral or peripheral vascular symptoms or occlusive event (<i>not indicated</i>).

No.	System	Drug Prescriptions
		<p>14. Aspirin to treat dizziness not clearly attributable to cerebrovascular disease (<i>not indicated</i>).</p> <p>15. Warfarin for first, uncomplicated deep venous thrombosis for longer than 6 months duration (<i>no proven added benefit</i>).</p> <p>16. Warfarin for first uncomplicated pulmonary embolus for longer than 12 months duration (<i>no proven benefit</i>).</p> <p>17. Aspirin, clopidogrel, dipyridamole or warfarin with concurrent bleeding disorder (<i>high risk of bleeding</i>). * estimated GFR <50ml/min.</p>
B.	Central Nervous System and Psychotropic Drugs	<ol style="list-style-type: none"> 1. Tricyclic Antidepressants (TCA's) with dementia (<i>risk of worsening cognitive impairment</i>). 2. TCA's with glaucoma (<i>likely to exacerbate glaucoma</i>). 3. TCA's with cardiac conductive abnormalities (<i>pro-arrhythmic effects</i>). 4. TCA's with constipation (<i>likely to worsen constipation</i>). 5. TCA's with an opiate or calcium channel blocker (<i>risk of severe constipation</i>). 6. TCA's with prostatism or prior history of urinary retention (<i>risk of urinary retention</i>). 7. Long-term (i.e. >1 month), long-acting benzodiazepines e.g. chlordiazepoxide, fluzepam, nitrazepam, chlorazepate and benzodiazepines with long-acting metabolites e.g. diazepam (<i>risk of prolonged sedation, confusion, impaired balance, falls</i>). 8. Long-term (i.e. >1 month) neuroleptics as long-term hypnotics (<i>risk of confusion, hypotension, extra-pyramidal side effects, falls</i>). 9. Long-term neuroleptics (>1 month) in those with parkinsonism (<i>likely to worsen extra-pyramidal symptoms</i>). 10. Phenothiazines in patients with epilepsy (<i>may lower seizure threshold</i>). 11. Anticholinergics to treat extra-pyramidal side-effects of neuroleptic medications (<i>risk of anticholinergic toxicity</i>). 12. Selective Serotonin Re-uptake Inhibitors (SSRI's) with a history of clinically significant hyponatraemia (<i>non-iatrogenic hyponatraemia <130mmol/l within the previous 2 months</i>).

No.	System	Drug Prescriptions
		13. Prolonged use (>1 week) of first generation antihistamines i.e. diphenhydramine, chlorpheniramine, cyclizine, promethazine (<i>risk of sedation and anti-cholinergic side effects</i>).
C.	Gastrointestinal System	<ol style="list-style-type: none"> 1. Diphenoxylate, loperamide or codeine phosphate for treatment of diarrhoea of unknown cause (<i>risk of delayed diagnosis, may exacerbate constipation with overflow diarrhoea, may precipitate toxic megacolon in inflammatory bowel disease, may delay recovery in unrecognised gastroenteritis</i>). 2. Diphenoxylate, loperamide or codeine phosphate for treatment of severe infective gastroenteritis i.e. bloody diarrhoea, high fever or severe systemic toxicity (<i>risk of exacerbation or protraction of infection</i>). 3. Prochlorperazine (Stemetil) or metoclopramide with Parkinsonism (<i>risk of exacerbating Parkinsonism</i>). 4. Proton Pump Inhibitors (PPIs) for peptic ulcer disease at full therapeutic dosage for >8 weeks (<i>dose reduction or earlier discontinuation indicated</i>). 5. Anticholinergic antispasmodic drugs with chronic constipation (<i>risk of exacerbation of constipation</i>).
D.	Respiratory System	<ol style="list-style-type: none"> 1. Theophylline as monotherapy for COPD. (<i>safer, more effective alternative; risk of adverse effects due to narrow therapeutic index</i>). 2. Systemic corticosteroids instead of inhaled corticosteroids for maintenance therapy in moderate to severe COPD (<i>unnecessary exposure to long-term side-effects of systemic steroids</i>). 3. Nebulised ipratropium with glaucoma (<i>may exacerbate glaucoma</i>).
E.	Musculoskeletal System	<ol style="list-style-type: none"> 1. Non-Steroidal Anti-Inflammatory Drug (NSAID) with history of peptic ulcer disease or gastrointestinal bleeding, unless with concurrent histamine H2 receptor antagonist, PPI or misoprostol (<i>risk of peptic ulcer relapse</i>). 2. NSAID with moderate-severe hypertension (moderate: 160/100mmHg – 179/109mmHg; severe: ≥180/110mmHg) (<i>risk of exacerbation of hypertension</i>).

No.	System	Drug Prescriptions
		<ol style="list-style-type: none"> 3. NSAID with heart failure (<i>risk of exacerbation of heart failure</i>). 4. Long-term use of NSAID (>3 months) for relief of mild joint pain in osteoarthritis (<i>simple analgesics preferable and usually as effective for pain relief</i>). 5. Warfarin and NSAID together (<i>risk of gastrointestinal bleeding</i>). 6. NSAID with chronic renal failure* (<i>risk of deterioration in renal function</i>). 7. Long-term corticosteroids (>3 months) as monotherapy for rheumatoid arthritis or osterarthritis (<i>risk of major systemic corticosteroid side-effects</i>). 8. Long-term NSAID or colchicine for chronic treatment of gout where there is no contraindication to allopurinol (<i>allopurinol first choice prophylactic drug in gout</i>). <p>* estimated GFR 20-50ml/min.</p>
F.	Urogenital System	<ol style="list-style-type: none"> 1. Antimuscarinic drugs with dementia (<i>risk of increased confusion, agitation</i>). 2. Antimuscarinic drugs with chronic glaucoma (<i>risk of acute exacerbation of glaucoma</i>). 3. Antimuscarinic drugs with chronic constipation (<i>risk of exacerbation of constipation</i>). 4. Antimuscarinic drugs with chronic prostatism (<i>risk of urinary retention</i>). 5. Alpha-blockers in males with frequent incontinence i.e. one or more episodes of incontinence daily (<i>risk of urinary frequency and worsening of incontinence</i>). 6. Alpha-blockers with long-term urinary catheter in situ i.e. more than 2 months (<i>drug not indicated</i>).
G.	Endocrine System	<ol style="list-style-type: none"> 1. Glibenclamide or chlorpropamide with type 2 diabetes mellitus (<i>risk of prolonged hypoglycaemia</i>). 2. Beta-blockers in those with diabetes mellitus and frequent hypoglycaemic episodes i.e. ≥ 1 episode per month (<i>risk of masking hypoglycaemic symptoms</i>). 3. Oestrogens with a history of breast cancer or venous thromboembolism (<i>increased risk of recurrence</i>). 4. Oestrogens without progestogen in patients with intact uterus (<i>risk of endometrial cancer</i>).

No.	System	Drug Prescriptions
H.	Drugs That Adversely Affect Those Prone to Falls (≥1 fall in past three months)	<ol style="list-style-type: none"> 1. Benzodiazepines (<i>sedative, may cause reduced sensorium, impair balance</i>). 2. Neuroleptic drugs (<i>may cause gait dyspraxia, Parkinsonism</i>). 3. First generation antihistamines (<i>sedative, may impair sensorium</i>). 4. Vasodilator drugs known to cause hypotension in those with persistent postural hypotension i.e. recurrent >20mmHg drop in systolic blood pressure (<i>risk of syncope, falls</i>). 5. Long-term opiates in those with recurrent falls (<i>risk of drowsiness, postural hypotension, vertigo</i>).
I.	Analgesic Drugs	<ol style="list-style-type: none"> 1. Use of long-term powerful opiates e.g. morphine or fantanyl as first line therapy for mild-moderate pain (<i>WHO analgesic ladder not observed</i>). 2. Regular opiates for more than 2 weeks in those with chronic constipation without concurrent use of laxatives (<i>risk of severe constipation</i>). 3. Long-term opiates in those with dementia unless indicated for palliative care or management of moderate/severe chronic pain syndrome (<i>risk of exacerbation of cognitive impairment</i>).
J.	Duplicate Drug Classes	Any duplicate drug class prescription e.g. two concurrent opiates, NSAID's, SSRI's, loop diuretics, ACE inhibitors (<i>optimisation of monotherapy within a single drug class should be observed prior to considering a new class of drug</i>).

Appendix 7: Beer's Criteria

The Beer's Criteria list is used as a national guideline and reference guide for pharmacists and physicians. The Beer's Criteria is a list of medications that pose potential risks that outweigh potential benefits for elderly population. This information helps to prevent harmful side effects that could be life threatening and the emergence of other "adverse drug events" (ADEs). The Beer's Criteria is meant to serve as a guide and is not totally contraindicated since drug prescribing is based on clinical judgment.

Abbreviated Beers Criteria/Beers List of Medications with Increased Risk of Adverse Drug Events in Patients Over 65.

Medications	Reasons that Use is a Problem
Pain Relievers	
Propoxyphene and combination products	Used to control pain. Propoxyphene offers little pain-relieving advantage over acetaminophen, yet has the side effects of other narcotics.
Meperidine	Used to treat pain. Meperidine is not an effective oral pain reliever and has many disadvantages compared to other narcotics. Avoid use in older persons.
Antidepressants	
Amitriptyline Doxepin	Used to treat depression. These medications can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fracture.
Sleeping Pills and Antianxiety Medications	
Flurazepam	Used to treat insomnia. These medication produces prolonged sedation/sleepiness (often lasting for days and can worsen if taken daily) and can increase the risk of falls and fractures
Alprazolam (2mg) Lorazepam (3mg) Oxazepam (60mg) Temazepam (15mg) Triazolam (0.25mg) Zolpidem (5mg)	Used to treat insomnia and anxiety. Older people should be prescribed small doses of these medications. Total oral daily doses should rarely exceed the suggested maximum doses noted to the left.

Medications	Reasons that Use is a Problem
Chlordiazepoxide Diazepam	Used to treat insomnia and anxiety. Chlordiazepoxide and diazepam produce prolonged sedation (often lasting several days and can worsen if taken daily) and can increase the risk of falls and fractures.
Heart Medications	
Digoxin	Used to treat abnormal heart rhythms and heart failure. Because of decreased processing of digoxin by the kidney, doses in older persons should rarely exceed 0.125mg daily, except when treating certain types of abnormal heart rhythms.
Dipyridamole	Used to help stop blood from clotting in people who have experienced strokes, heart attacks and other conditions. Dipyridamole frequently causes light-headedness upon standing in older persons. Dipyridamole has been proven beneficial only in patients with artificial heart valves. Whenever possible, its use in older persons should be avoided.
Methyldopa Methyldopa/ Hydrochlorothiazide	Used to treat high blood pressure. Methyldopa may cause a slowed heart beat and worsen depression. Alternative treatments for hypertension are generally preferred.
Diabetes Medications	
Chlorpropamide	Used to control blood sugar in people with diabetes. Chlorpropamide can cause prolonged and serious low blood sugar.
Stomach and Intestinal Medications	
Dicyclomine Hyoscyamine Propantheline Belladonna Alkaloids	Used to treat stomach and intestinal cramps. These medications can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures. All of these drugs are best avoided in older persons, especially for long term use.
Trimethobenzamide	Used to control nausea. This is one of the least effective medications used to control nausea and vomiting, yet can cause severe side effects, such as stiffness, shuffling gait, difficulty swallowing, and tremor.

Medications	Reasons that Use is a Problem
Antihistamines	
Chlorpheniramine Diphenhydramine Hydroxyzine Cyproheptadine Promethazine	Used to treat the runny nose of the common cold and allergy symptoms. Most nonprescription and many prescription antihistamines can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures. Many cough and cold preparations are available without antihistamines and these are safer substitutes in older persons.
Diphenhydramine	Used to treat allergies and insomnia. Diphenhydramine can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures. When used to treat or prevent allergic reactions, it should be used in the smallest possible dose and with great caution.

Appendix 8: Mini Mental State Examination (MMSE)

The Mini Mental State Exam (MMSE) is the most commonly used instrument for screening cognitive function among elderly, where it includes tests of orientation, attention, memory, language and visual-spatial skills. It can help the pharmacists to gauge patient's understanding during medication counseling. It also gives an insight about the patients' understandings regarding the therapy and their level of adherence towards medication therapy during assessment. However it is important to assess the examinee's level of consciousness during examination for it might affect his or her performance on the MMSE. Although this single item does not directly contribute to the total MMSE score, it might be helpful in interpreting the score or when evaluating cognitive changes over time (e.g. in a patient recovering from delirium or experiencing side effects from medications).

Mini-Mental State Examination (MMSE)

Name :						
RN :						
Date						
Orientation (Max 10)						
Date						
Day						
Month						
Year						
Season						
Hospital						
Floor						
Town/City						
Province/County/District						
Country						

Registration (Max 3) (Please ensure all these three items below are not seen by patient)						
Mango/Apple						
Table/Chair						
Coin						
Attention and Calculation (Max 5)						
Serial 7 or Serial 3						
Recall (Max 3)						
Mango/Apple						
Table/Chair						
Coin						
Language (Max 9)						
Watch						
Pencil						
Repetition: "No if and or buts" (English), "Forty-Four Stone Lion" (Chinese) or "Tak mungkin dan cukup mustahil" (Malay)						
3 stage command: "Take this piece of paper, fold it in half and put it on the floor"						
Read and obey what is written: "Closes eyes" "Raise your hands"						
Write sentence						
Draw pentagons						
Total Score						
Score 27-30: Normal Score <27: Impaired cognitive function Education and patient condition will be considered during assessment using cut point of score above.						
Assessor						

Appendix 9: Yesavage Geriatric Depression Scale

GERIATRIC DEPRESSION SCALE

Name:
Date of Assessment:
Completed By:

Instructions: Each answer counts one point. Total score greater than five indicates probably depression.

Issues: The GDS is a screening instrument that measures the extent of depression, where it is not formulated to perform a diagnosis. Where a score of more than five is indicated, a more thorough clinical investigation should be undertaken.

A short form GDS consisted of 15-items questionnaires, where 10 of the items indicated the presence of depression when answered positively, while the rest of 5 items indicate depression when answered negatively.

Scores ranged between 0-4 are considered normal depending on age, education and complaints, 5-8 indicate mild depression, 9-11 signify moderate depression while 12-15 imply severe depression.

Feher et al. have concluded that the GDS is a generally valid measure of the mild-to-moderate depressive symptoms in Alzheimer patients with mild-to-moderate dementia.

The right hand column shows test answers which are positive for depression

No.	Questions	Answer	Test Answers
1.	Are you basically satisfied with your life?	Yes/No	No
2.	Have you dropped many of your activities or interests?	Yes/No	Yes
3.	Do you feel that your life is empty?	Yes/No	Yes
4.	Do you often get bored?	Yes/No	Yes
5.	Are you in good spirits most of the time?	Yes/No	No
6.	Are you afraid that something bad is going to happen to you?	Yes/No	Yes
7.	Do you feel happy most of the time?	Yes/No	No
8.	Do you feel helpless?	Yes/No	Yes

9.	Do you prefer to stay at home, rather than go out and do things?	Yes/No	Yes
10.	Do you feel that you have more problems with memory than most?	Yes/No	Yes
11.	Do you think it is wonderful to be alive now?	Yes/No	No
12.	Do you feel pretty worthless the way you are now?	Yes/No	Yes
13.	Do you feel full of energy?	Yes/No	No
14.	Do you feel that your situation is hopeless?	Yes/No	Yes
15.	Do you think that most people are better off than you are?	Yes/No	Yes
Total Score			

When a score more than five is indicated, a more thorough clinical investigation should be indicated (Adapted from http://consultgerirn.org/uploads/File/trythis/try_this_4.pdf)