

**The Perfect Rx**

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**Objectives**

- **How to take your medications properly for:**
  - A. Oral chemotherapy
  - B. Anti-nausea medications
  - C. Anti-epileptic medications
  - D. Corticosteroids
- **Possible side effects & How to manage them**
- **Tips on Handling & Disposing Medications**
- **Complementary or Alternative Medicines**
- **Compliance Aids & MedsCheck**




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**Princess Margaret Hospital  
Outpatient Pharmacy**



1. **Specializes in CNS chemotherapy regimens and supportive medications:**
  - **Chemotherapy counseling on medications that are not commonly used in outside community pharmacies**
2. **Accessing expensive chemotherapy medications (and supportive care medications) with the knowledge of special funds to help patients**
3. **Our teamwork with other healthcare professionals in the hospital helps ensure patients receive the most effective and seamless medical care possible**

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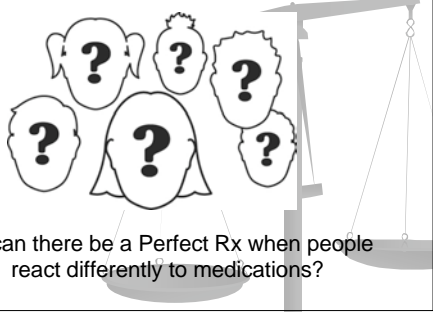
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## What is the "Perfect Rx"?



How can there be a Perfect Rx when people react differently to medications?

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## Uh oh! Maybe the Perfect Rx is just a Myth?



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## Permitting your own Rx



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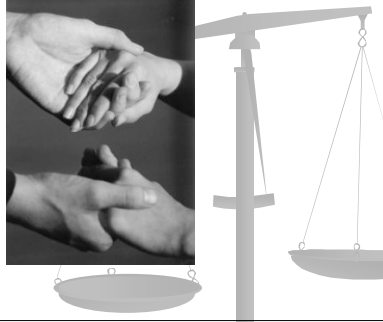
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## A. Oral Chemotherapy



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## Oral chemotherapy

Generic Name (Brand Name)	Appearance	Directions
LOMUSTINE (CCNU or CeeNu) 10MG, 40MG, 100MG		<ul style="list-style-type: none"><li>• Empty stomach (Preferably no food 2 hours before and after)</li><li>• Taken once daily</li></ul>
TEMOZOLOMIDE (TEMODAL) 5MG, 20MG, 100MG, 140MG, 180MG, 250MG		<ul style="list-style-type: none"><li>• Empty stomach</li><li>• Taken once daily</li></ul>
ETOPOSIDE (VEPESID or VP-16) 50MG		<ul style="list-style-type: none"><li>• Preferably empty stomach</li><li>• Avoid grapefruit (juice)</li><li>• Taken once daily</li></ul>

E-CPS: E-therapeutics. Canadian Pharmacists Association, 2009

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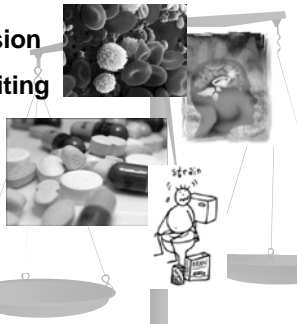
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## Side Effect/Symptom Management

- I. Myelosuppression
- II. Nausea & Vomiting
- III. Constipation



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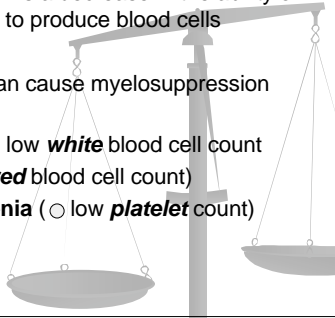
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## Myelosuppression

Myelosuppression is a decrease in the ability of the bone marrow to produce blood cells

Chemotherapy can cause myelosuppression

1. **Neutropenia** (○ low **white** blood cell count)
2. **Anemia** (● low **red** blood cell count)
3. **Thrombocytopenia** (○ low **platelet** count)



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## Neutropenia

How do I know if I have low WHITE blood count?

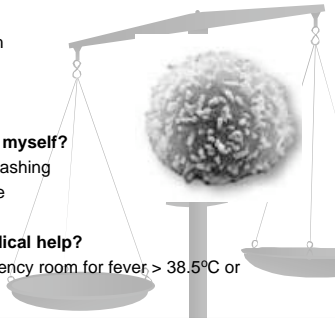
- Fever
- Productive cough
- Sore throat
- Chills

What can I do to protect myself?

- Frequent hand washing
- Avoid sick people

When should I seek medical help?

- Go to the Emergency room for fever > 38.5°C or 101°F



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## Anemia

How do I know if I have low RED blood count?

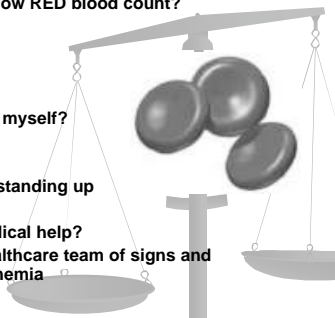
- Fatigue
- Skin paleness
- Dizziness

What can I do to protect myself?

- Rest
- Pace activities
- Take care with standing up

When should I seek medical help?

- Notify your healthcare team of signs and symptoms of anemia



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## Thrombocytopenia

**How do I know if I have low PLATELETS?**

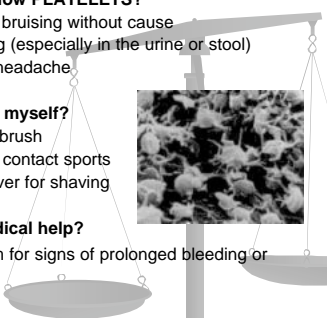
- Easy bruising or bruising without cause
- Signs of bleeding (especially in the urine or stool)
- Sudden severe headache

**What can I do to protect myself?**

- Use a soft tooth brush
- Avoid injections, contact sports
- Use electric shaver for shaving

**When should I seek medical help?**

- Emergency room for signs of prolonged bleeding or headache




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## What can you do about Myelosuppression?

Blood element & function	Signs of deficiency	Tips if a deficiency exists	When to seek medical help
White Blood Cells – fight infection	<ul style="list-style-type: none"> <li>■ Fever</li> <li>■ Productive cough, sore throat, chills</li> </ul>	<ul style="list-style-type: none"> <li>■ Frequent hand washing</li> <li>■ Avoid sick people</li> </ul>	Emergency room for fever > 38.5°C or 101°F
Red Blood Cells (hemoglobin) – oxygen transport	<ul style="list-style-type: none"> <li>■ Fatigue</li> <li>■ Skin paleness</li> <li>■ Headache</li> <li>■ Dizziness</li> </ul>	<ul style="list-style-type: none"> <li>■ Rest</li> <li>■ Pace activities</li> <li>■ Take care with standing up</li> </ul>	Notify health care team of signs/symptoms
Platelets – clot blood	<ul style="list-style-type: none"> <li>■ Red spots, bruising</li> <li>■ Signs of bleeding</li> <li>■ Sudden severe headache</li> </ul>	<ul style="list-style-type: none"> <li>■ Soft tooth brush</li> <li>■ Avoid injections, contact sports</li> <li>■ Use electric razor</li> </ul>	Emergency room for signs of prolonged bleeding or headache

Chart is adapted from: Daniels, M, Cashman, R. Brain tumor nursing working group. Winnipeg, Manitoba, May 2006




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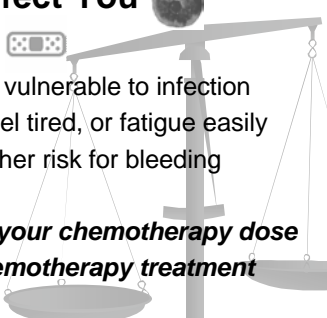
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## How Myelosuppression Can Affect You

- Make you more vulnerable to infection
- Cause you to feel tired, or fatigue easily
- Put you at a higher risk for bleeding

- **Limit or lower your chemotherapy dose**
- **Delay your chemotherapy treatment**




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## How to properly handle chemotherapy agents?



- Do not handle directly with bare hands
- Use gloves or tweezers
- Avoid splitting or crushing tablets to prevent powder in air
- Leftover chemotherapy medicine - bring back to Pharmacy for proper disposal (do not throw in garbage or flush down toilet)

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## B. Nausea & Vomiting




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## Anti-Nausea Drugs (1)

Generic name (Brand name)	Appearance	Directions	Possible Side Effects
GRANISETRON (KYTRIL) 1MG TAB		<ul style="list-style-type: none"> <li>• With or without food</li> <li>• Taken 1-2 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• headache</li> <li>• constipation</li> </ul>
ONDANSETRON (ZOFRAN) 4MG, 8MG TAB, 8MG ODT*, 4MG/5ML		<ul style="list-style-type: none"> <li>• With or without food</li> <li>• Taken 1-3 times daily</li> </ul>	

\*ODT - Oral Disintegrating Tablet

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Anti-Nausea Drugs (2)			
Generic name (Brand name)	Appearance	Directions	Possible Side Effects
METOCLOPRAMIDE (MAXERAN) 10MG TAB, 1MG/ML		<ul style="list-style-type: none"> <li>• 30 minutes before meals preferably</li> <li>• taken every 4-6 hours if required</li> </ul>	<ul style="list-style-type: none"> <li>• sedation</li> <li>• tremor</li> <li>• restlessness</li> </ul>
DOMPERIDONE (MOTILIUM) 10MG TAB		<ul style="list-style-type: none"> <li>• 30 minutes before meals preferably</li> <li>• taken every 4-6 hours if required</li> </ul>	<ul style="list-style-type: none"> <li>• dystonia (muscle tightens/spasms)</li> <li>• diarrhea</li> </ul>
PROCHLORPERAZINE (STEMETIL) 5MG,10MG TAB,10MG SUPP*		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• taken every 4-6 hours if required</li> </ul>	<ul style="list-style-type: none"> <li>• sedation</li> <li>• tremor</li> <li>• restlessness</li> <li>• dystonia (muscle tightens/spasms)</li> </ul>
NABILONE (CESAMET) 0.5MG,1MG CAP		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• usually 2-3 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• drowsiness</li> <li>• euphoria/ dysphoria</li> </ul>
TETRAHYDRO-CANNABINOL (MARINOL) 2.5MG,5MG CAP		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• usually 2-3 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• hallucinations</li> <li>• dizziness</li> </ul>

\*SUPP - Suppository

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### C. Dealing with Epilepsy




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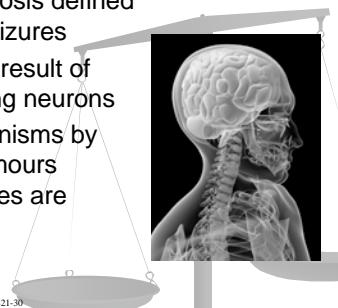
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### What is Epilepsy?

- A clinical diagnosis defined by recurrent seizures
- Seizures are a result of abnormally firing neurons
- Precise mechanisms by which brain tumours produce seizures are unclear



S M Van Breeven, et al. Lancet Neurol 2007; 6: 421-30

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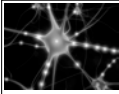
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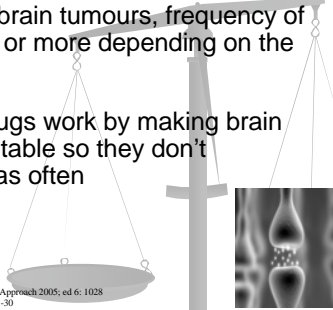
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## Epilepsy

- In patients with brain tumours, frequency of epilepsy is 30% or more depending on the type of tumour
- Anti-epileptic drugs work by making brain nerves less excitable so they don't abnormally fire as often

DiPiro, et al. Pharmacotherapy: A Pathophysiologic Approach 2005, ed 6: 1028  
S M Van Breenen, et al. *Lancet Neurol* 2007; 6: 421-30




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## Anti-epileptic Drugs (1)

Generic name (Brand name)	Picture	Directions	Comments
Carbamazepine (Tegretol, Tegretol CR)		<ul style="list-style-type: none"> <li>• with food</li> <li>• 2-4 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• visual disturbance</li> <li>• avoid grapefruit</li> </ul>
Oxcarbazepine (Trileptal)		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• 2-3 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• related to Tegretol &amp; better tolerated</li> </ul>
Phenytoin (Dilantin)		<ul style="list-style-type: none"> <li>• with or without food (be consistent)</li> <li>• 1-2 daily</li> </ul>	<ul style="list-style-type: none"> <li>• gum enlargement</li> </ul>
Phenobarbital		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• once daily (at bedtime)</li> </ul>	<ul style="list-style-type: none"> <li>• hyperactivity in children</li> <li>• not commonly used</li> </ul>
Primidone (Mysoline)		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• 3-4 daily</li> </ul>	<ul style="list-style-type: none"> <li>• metabolizes to phenobarbital</li> <li>• not commonly used</li> </ul>

E-CPS. E-therapeutics. *Canadian Pharmacists Association, 2009*  
DiPiro, et al. Pharmacotherapy: A Pathophysiologic Approach 2005, ed 6: 1028

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## Anti-epileptic Drugs (2)

Generic Name (Brand name)	Appearance	Directions	Comments
Valproic acid / Divalproex (Depakene, Epival)		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• 2- 3 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• possible weight gain</li> <li>• divalproex maybe better tolerated than valproic acid</li> </ul>
Gabapentin (Neurontin)		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• 3-4 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• well tolerated</li> <li>• no significant drug interactions</li> </ul>
Lamotrigine (Lamictal)		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• 2 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• rash</li> </ul>
Topiramate (Topamax)		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• 2 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• weight loss, ↓ concentration, memory difficulties</li> </ul>
Levetiracetam (Keppra)		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• 1-2 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• no significant drug interactions</li> </ul>
Clobazam (Frisium)		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• 1-2 times daily</li> </ul>	
Pregabalin (Lyrica)		<ul style="list-style-type: none"> <li>• with or without food</li> <li>• 2-3 times daily</li> </ul>	<ul style="list-style-type: none"> <li>• no significant drug interactions</li> </ul>

DiPiro, et al. Pharmacotherapy: A Pathophysiologic Approach 2005, ed 6: 1028

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## Anti-epileptic Drug Side Effects



- Common: dizziness, drowsiness, headache, nausea, rash, fatigue
- patients with brain tumours have greater risk of experiencing side effects than other patients with epilepsy
  - ie. rash, cognitive changes, bone marrow suppression

S M Van Breeem, et al. *Lancet Neurol* 2007; 6: 421-30

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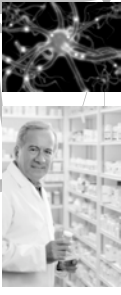
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## Anti-Epileptic drugs in patients with brain tumour

- Whether drug interactions affect you or not depends on your seizure control, side effects, drug levels, blood work...etc.
- Less data on drug interactions with newer seizure medications and chemotherapy agents
  - Your physician and pharmacist can help answer your questions
- Never discontinue drug without consulting your doctor



Vecht, et al. *Lancet Neurol* 2003; 2: 404-09  
Vecht, et al. *Neurology* 2006; Suppl 4: S10-S13

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## D. Cortico(Steroids)



Steroids play a big part in treating brain cancers.

They are used to:

- Treat edema (brain swelling)
- Reduce pain
- Reduce inflammation
- Help with nausea & vomiting
- Improve appetite

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## Corticosteroids

Generic Name (Brand Name)	Drug Appearance	Directions
PREDNISONE (DELTASON) 1MG, 5MG, 50MG		<ul style="list-style-type: none"> <li>• Take with food</li> <li>• Taken according to your doctor's instruction</li> </ul>
DEXAMETHASONE (DECADRON) 0.5MG, 2MG, 4MG		<ul style="list-style-type: none"> <li>• Take with food</li> <li>• Taken according to your doctor's instruction</li> </ul>

E-CPS: E-therapeutics. Canadian Pharmacists Association, 2009

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## Steroids

Despite their usefulness, steroids can cause a number of side effects:

- i. Stomach upset (heartburn)
- ii. Muscle weakening or loss
- iii. Weaken your immune system (making you more vulnerable to infection)

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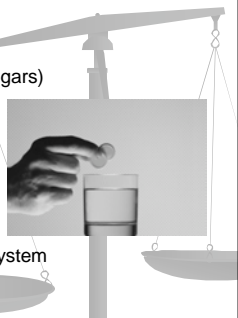
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## Timeline of Steroid Side Effects

- Short term use:
  - Euphoria/psychosis/insomnia
  - Hyperglycemia (high blood sugars)
  - Stomach upset (heartburn)
- Chronic/Long-term use:
  - Weakening of bones
  - Muscle weakening & loss
  - "Moon face" appearance
  - Weakening of your immune system




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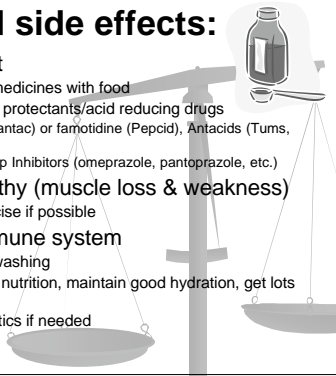
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## Management of Steroid-related side effects:

- I. Stomach upset
  - o Take steroid medicines with food
  - o Take stomach protectants/acid reducing drugs
    - o ranitidine (Zantac) or famotidine (Pepcid), Antacids (Tums, Rolaids)
    - o Protein Pump Inhibitors (omeprazole, pantoprazole, etc.)
- II. Steroid myopathy (muscle loss & weakness)
  - o Physical exercise if possible
- III. Weakened immune system
  - o Hand washing
  - o Proper nutrition, maintain good hydration, get lots of rest
  - o Antibiotics if needed



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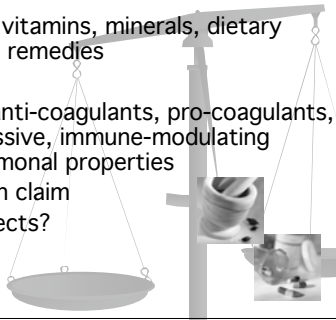
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## Complementary/Alternative Therapies

- Includes: herbals, vitamins, minerals, dietary supplements, folk remedies
- Safety Concerns:
  - anti-oxidants, anti-coagulants, pro-coagulants, immunosuppressive, immune-modulating properties, hormonal properties
- Evidence of health claim
- Potential side effects?



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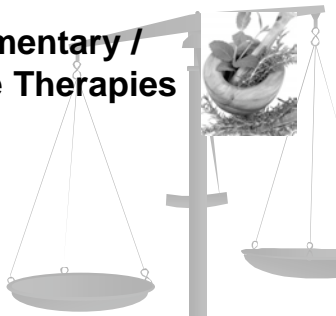
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## Complementary / Alternative Therapies



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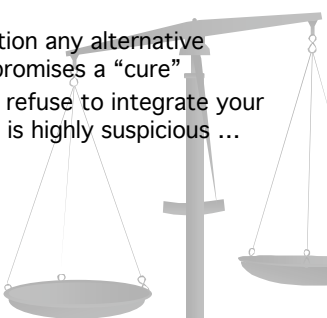
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- You should question any alternative treatment that promises a “cure”
- Treatments that refuse to integrate your medical program is highly suspicious ...



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**Talk to your pharmacist,  
physician, nurse**



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**How do we keep track of our  
medicines?**



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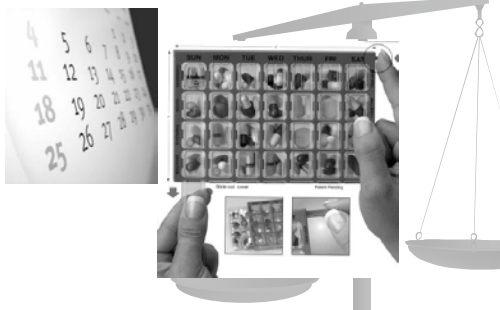
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## Tools to help you with taking your medication



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## MedsCheck



What is it?  
Who is eligible?  
Why does it benefit you?

MedsCheck INFOline 1-866-255-6701  
<http://www.health.gov.on.ca/cs/medscheck>

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## MedsCheck

What is it?

- Program allowing a yearly appointment with a pharmacist for up to 30 minutes
- Comprehensive medication review
- Free! (compliments from the government!)

Who is eligible?

- Ontario resident
- Taking at least three prescription medications for a long-term condition(s)
- OHIP card

Why does it benefit you?

- Discuss how your prescriptions, over-the-counter and alternative medicines may be affecting each other
- Obtain an accurate medication list to carry with you!



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## The Core Four

1. Deal with only one pharmacy so that your pharmacist can keep track of your medications

3. Inform your health care professionals about any side effects you are having

2. Keep all your health care professionals informed of changes in your dosages, allergies or medications

4. Always carry a complete list of your medications and directions with you



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Thank you  
Questions?



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CONTACT INFORMATION

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