
**Evaluation of Oncology Pharmacist Therapeutic
Recommendations in the Oncology Wards and
Clinics at Princess Margaret Hospital**

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Oncology Pharmacy Service at PMH

Oncology Pharmacy Service

- **Pilot service started in year 2010**
- **Enhancement of Quality and Safety of the chemotherapy process**
- **Enhancement of Efficiency**
- **Improvement of patients' drug knowledge**



Oncology Pharmacist Clinic

- **Oncology Pharmacist Clinic**
 - **Enhanced quality and safety**
 - **Clinical Screening of Chemotherapy Prescriptions**
 - **Double checking of dosage calculations**
 - **Double checking of dosage adjustments**
 - **Prevention of drug interactions**
 - **Prevention of drug allergies**
 - **Ensure sufficient supportive medications**
 - **Review of patients' home medications**



Oncology Pharmacist Clinic

- **Oncology Pharmacist Clinic**
 - **Benefits for Patients**
 - **Improved patient knowledge**
 - **Cancer chemotherapy**
 - **Supportive medications**
 - **Handling of side effects**
 - **On-site prescription enquiries (saved time for patients)**
 - **Detailed medication history**
 - **Private medications from GPs**
 - **Medications from other HA specialties**



2. Oncology Ward Pharmacy Service

- **Patient Admission**
 - **Compilation of medication history**
 - **Medications from private doctors**
 - **Medications from other HA specialties**
 - **Medications from Oncology**
 - **Drug allergy history**
 - **Screening for drug interactions**
 - **Screening for compliance**
 - **Discrepancies between prescribed dosing instructions and patients' own administration schedule**



2. Oncology Ward Pharmacy Service

- **Dosage Adjustments for In-patients**
 - **Dosage adjustments for individual patients**
 - **According to disease indications**
 - **According to laboratory test results**
 - **Antibiotics therapy**
 - **Adjustments according to response**
 - **Adjustments according to laboratory tests results**
 - **Adjustments according to renal functions**
 - **Adjustments according to liver functions**



2. Oncology Ward Pharmacy Service

- **Screening of Prescriptions for Drug Interactions**
 - **Drug Interactions between:**
 - **Chemotherapy Medications**
 - **Meds for side effects management**
 - **Meds from Private Doctors**
 - **Meds from other HA specialties**
 - **Antibiotics**
 - **Antifungals**



2. Oncology Ward Pharmacy Service

- **Patient Counseling on Discharge**
 - **Educate patient on discharge medications**
 - **Cancer drugs**
 - **Drugs for side effects management**
 - **Antibiotics**
 - **Ensure sufficient quantity of drugs for patient**
 - **Chemotherapy medications**
 - **Anti-emetics**
 - **Analgesics**
 - **Medications for other non-cancer conditions**
 - **i.e. Hypertension, Diabetes**



Oncology Ward Pharmacy Service

- **Oncology Ward Pharmacy Service**
 - **Enhanced quality and safety**
 - **Comprehensive medication history**
 - **Chemotherapy**
 - **Meds from other specialties**
 - **Meds from private doctors**
 - **Dosage adjustments for in-patients**
 - **Dosages adjusted according to patients' laboratory tests**
 - **Avoidance of drug interactions**
 - **Avoidance of unnecessary side effects**
 - **Enhanced patients' drug knowledge on discharge**
 - **Cancer drugs + Non-cancer drugs**
 - **Ensure sufficient quantities of drugs available to patient**

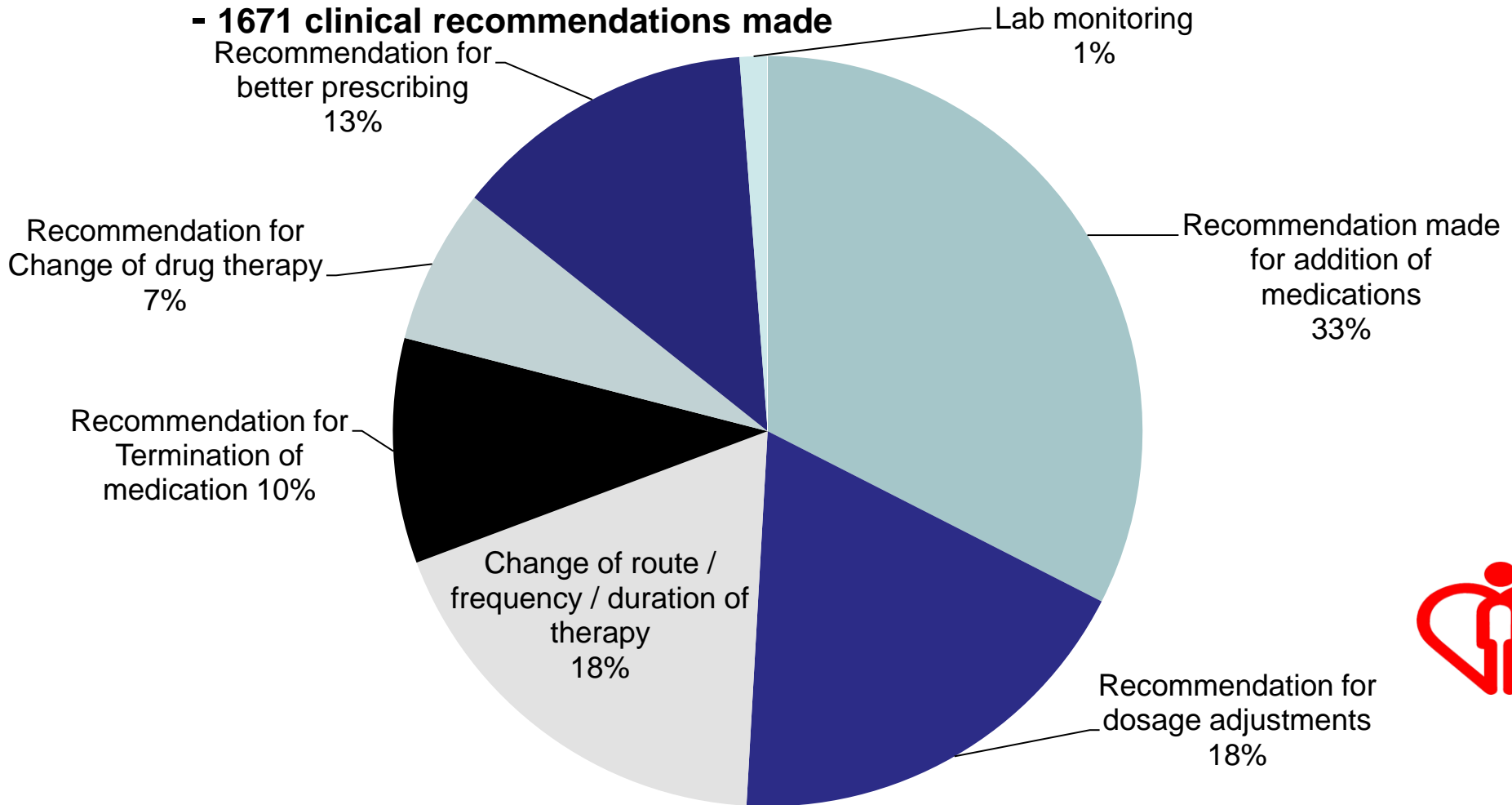


Oncology Pharmacy Service

➤ Clinical screening of prescriptions

➤ Recommendations made by Oncology Pharmacists

- 1671 clinical recommendations made



Oncology Pharmacy Service

Categorization of severity levels

Severity Level	Examples
Serious	Drug could exacerbate patient's condition (related to contraindications). High dosage of drug with low therapeutic index.
Significant	Drug dosage too low for patient's condition. Errant dual drug therapy. Inappropriate dosing interval
Minor	Unavailable or inappropriate dosage form. Non-compliance with standard formulations and hospital policies
Others	Clarifications made with the administration date of chemotherapy, proceeding with chemotherapy for low blood counts

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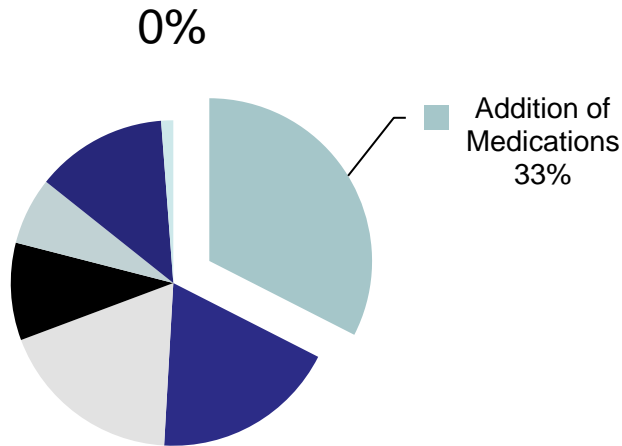
Severity levels of Recommendations Made

Severity Level	Percentage
Serious	7.42 %
Significant	48.29 %
Minor	22.02 %
Others	22.26 %



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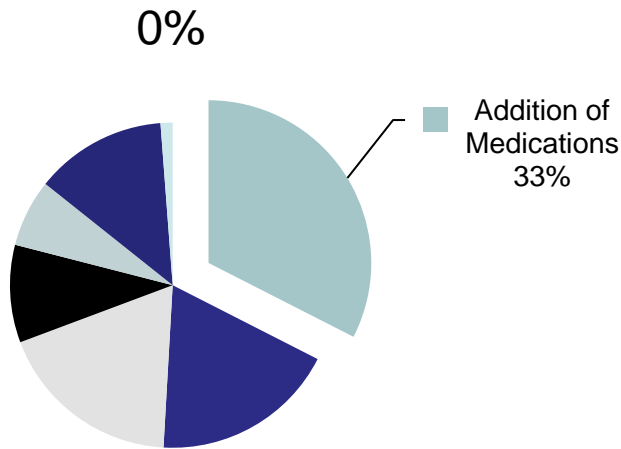
- **Clinical screening of chemotherapy orders**
 - **Recommendations made by Oncology Pharmacists**
 - **Addition of Medications(I)**



Interventions	Patient Harm Prevented
<i>Amlodipine added</i>	<i>Uncontrolled High BP</i>
Atenolol added	Uncontrolled High BP
Emend added	Severe vomiting
Lamivudine added	Hep B aggravation
<i>Entecavir added</i>	<i>Hep B aggravation</i>
Zofran added	Severe vomiting
Folic acid	Marrow suppression

Oncology Pharmacy Service

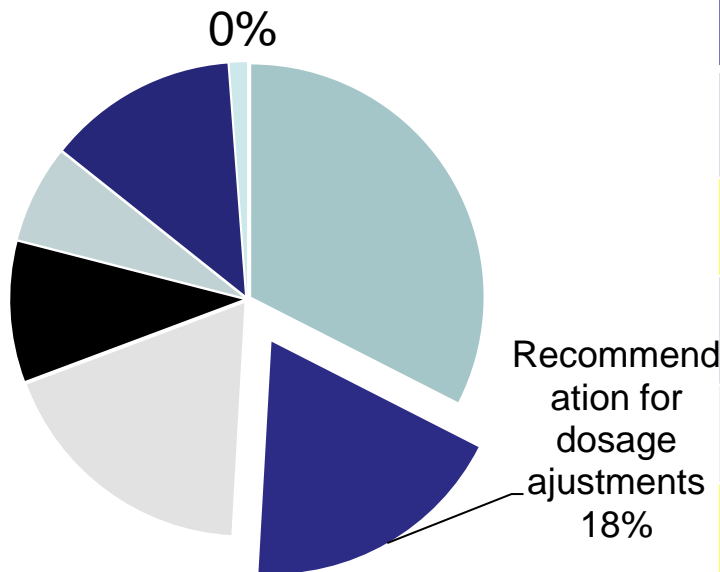
- **Clinical screening of chemotherapy orders**
 - **Recommendations made by Oncology Pharmacists**
 - **Addition of Medications (II)**



Interventions	Patient Harm Prevented
Dexamethasone added	Nausea and vomiting
Maxolon	Nausea and vomiting
Kytril pre-med	Nausea and vomiting
NS for post hydration	Renal toxicity
<i>Metformin added</i>	<i>Hyperglycemia</i>
Gliclazide added	Hyperglycemia
Seretide inhaler added	COAD aggravation

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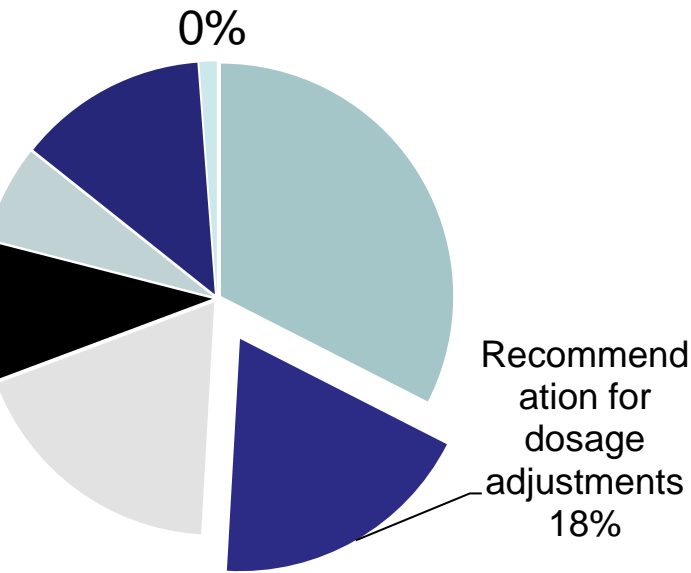
- **Clinical screening of chemotherapy orders**
 - **Recommendations made by Oncology Pharmacists**
 - **Recommendation for dosage adjustments (I)**



Interventions	Patient Harm Prevented
5Fu dose too low	Sub therapeutic for cancer therapy
<i>Carboplatin dose too high</i>	<i>Severe myelosuppression</i>
Sulperazone dose too low	Untreated infections / resistance
Nexavar dose too high	Toxicities
<i>Ampicillin dose too low</i>	<i>Untreated infections / resistance</i>
Nystatin dose too low	Untreated infections / poor quality of life
Cisplatin dose too high	Renal toxicity

Oncology Pharmacy Service

- **Clinical screening of chemotherapy orders**
 - **Recommendations made by Oncology Pharmacists**
 - **Recommendation for dosage adjustments (II)**

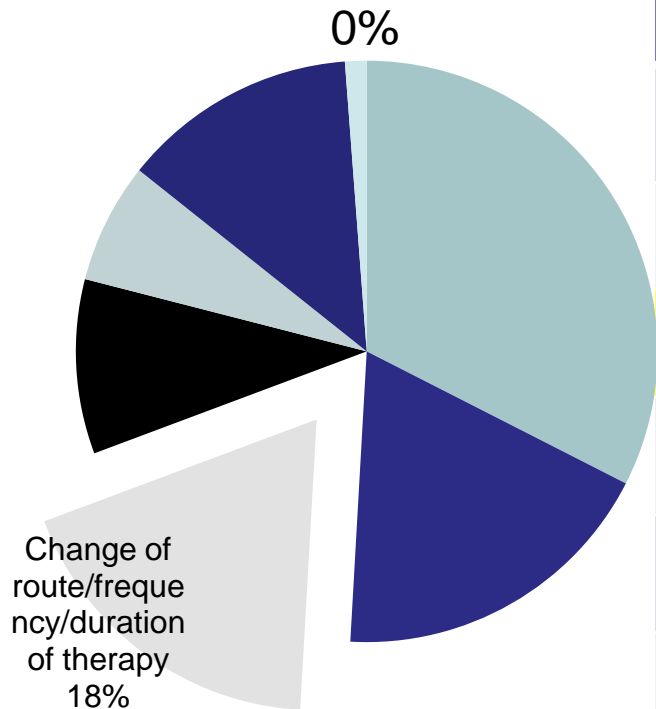


Interventions	Patient Harm Prevented
Vancomycin dose too low	Untreated infections / resistance
Warfarin dose too high	Bleeding risks
Metformin dose too low	Hyperglycemia
Tarceva dose too high	Toxicities develop
Cetuximab dose too low	Cancer disease progression
Xeloda dose too high (renal function compromised)	Myelosuppression
Carboplatin dose too high (creatinine clearance miscalculated)	Myelosuppression

Oncology Pharmacy Service

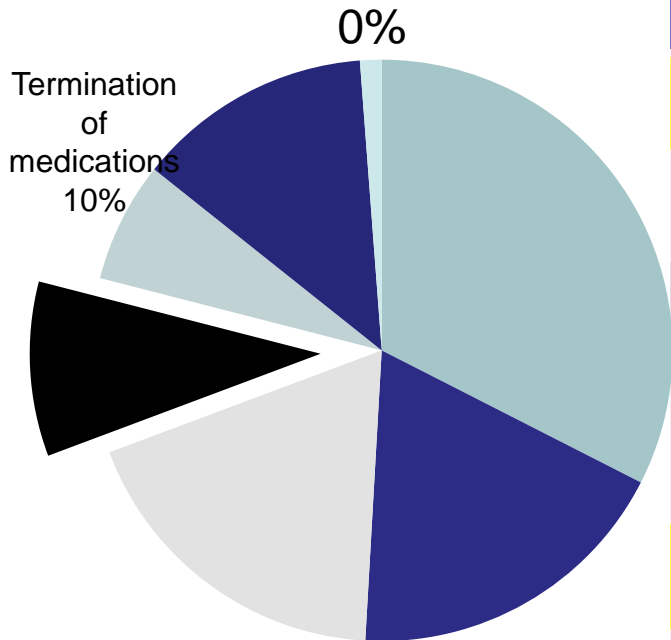
- **Clinical screening of chemotherapy orders**
 - **Recommendations made by Oncology Pharmacists**
 - **Change of route/frequency/duration of therapy**

Interventions	Patient Harm Prevented
Etoposide concentration too high	Precipitated drug injected into blood stream
Tarceva frequency too high	Toxicities
<i>Taxol concentration too low</i>	<i>Drug instable for patient use</i>
Piperacillin frequency too low	Untreated infection / resistance
Ventolin inhaler changed to syrup (poor technique)	COAD aggravation
5Fu duration too long	Myelosuppression



Oncology Pharmacy Service

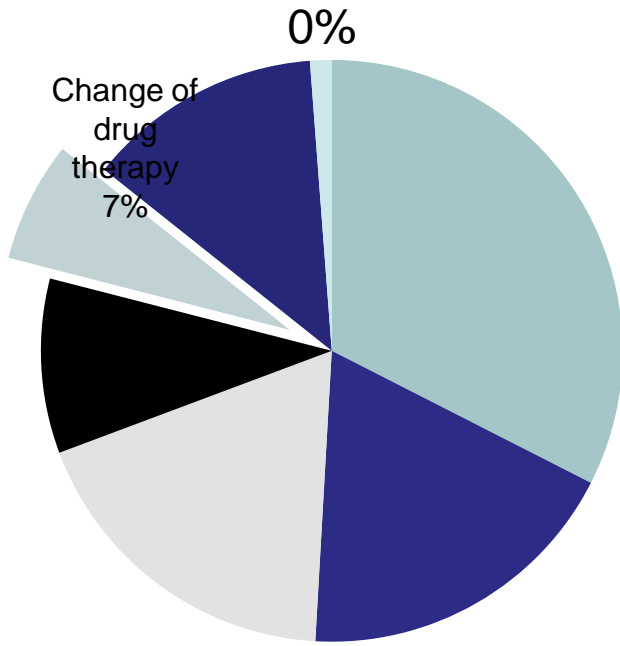
- **Clinical screening of chemotherapy orders**
 - **Recommendations made by Oncology Pharmacists**
 - Recommendation for termination of medications



Interventions	Patient Harm Prevented
<i>Metformin discontinued</i>	<i>Hypoglycemia</i>
Alimta maintenance therapy, Carboplatin discontinued	Severe myelosuppression
Pantoloc discontinued (interaction with Iressa)	Sub therapeutic dose of Iressa, disease progression
Cetuximab discontinued, not yet due for next cycle of therapy	Overdose
<i>KCL oral solution stopped (already on IV)</i>	<i>Hyperkalaemia</i>
Aspirin discontinued	Bleeding risks (blood stained sputum)

Oncology Pharmacy Service

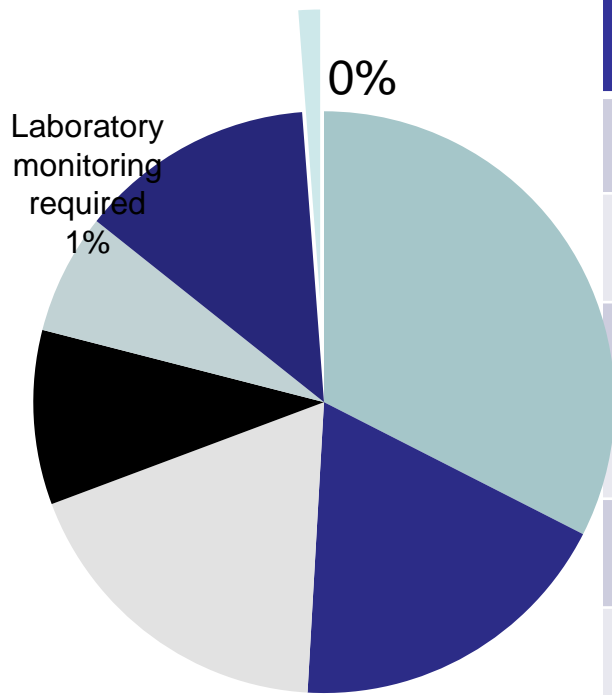
- **Clinical screening of chemotherapy orders**
 - **Recommendations made by Oncology Pharmacists**
 - Change of drug therapy, recommended by Pharmacist



Interventions	Patient Harm Prevented
Triazolam changed to Lorazepam	Toxicities due to compromised hepatic function
Piperacillin changed to Tazolcin	Untreated febrile neutropenia
IV calcium gluconate changed to oral caltrate	Hypercalcaemia
Magnesium Oral changed to IV	Insufficient supplement for severe hypo-magnesemia
Penicillin changed to ciprofloxacin	Anaphylaxis, penicillin allergy
Piperacillin changed to Sulperazone	Untreated infections (step up needed)
Levofloxacin changed to piperacillin	Resistance to Levofloxacin

Oncology Pharmacy Service

- **Clinical screening of chemotherapy orders**
 - **Recommendations made by Oncology Pharmacists**
 - Laboratory monitoring , recommended by Pharmacist



Interventions	Patient Harm Prevented
UGT1A1*28 Test for Irinotecan	Severe neutropenia
CBC (patient on GCSF for 4 days)	Increase in WBC, Drug wastage
Vancomycin level	Drug resistance
INR (patient on warfarin)	Bleeding risks
Blood culture (patient on day 6 of sulperazone)	Untreated infection / resistance
HBsAg test prior to chemotherapy	Aggravation of Hep B infections

Questions and Comments

