Safe handling of oral anticancer agents

Jude Lees
Senior Pharmacist
Royal Adelaide Hospital Cancer Centre
Adelaide, South Australia

What do we mean by safe handling?

Exposure with IV chemo

Many Oral Agents in Clinical Use

Chemotherapy	
Busulfan	Lomustine
Capecitabine	Melphalan
Chlorambucil	Mercaptopurine
Cyclophosphamide	Methotrexate
Etoposide	Procarbazine
Fludarabine	Temozolomide
Hydroxyurea	Thioguanine
Idarubicin	Vinorelbine

Targeted agents
Dasatinib
Erlotinib
Gefitinib
Imatinib
Lapatinib
Sorafenib
Sunitinib
Immunomodulatory agents
Thalidomide
Lenalidomide

Patients prefer oral administration

- Avoids invasive procedures required for IV access (may cause discomfort & anxiety for patients)
- given in the patient's home - avoids hospital admission or waiting in busy day centres for IV chemotherapy administration
- offers patient a sense of control over treatment & interferes less with their daily lives

Payne SA. A study of QOL in cancer patients receiving palliative chemo. Soc Sci Med 1992; 35: 1505-9.
Bardelmeijer HA et al. The oral route for the administration of cytotoxic drugs: Invest New Drugs 2000; 18; 231-41

Medication Errors Involving Oral Chemotherapy

Saul N. Weingart, MD, PhD[1,2]; Julio Toro, RN, BSN[1,3,4]; Sylvia Bartel, RPh, MHP[1]; Jeremy Miransky, Maureen Connor, RN, MPH[1]

BACKGROUND: Given the expanding use of o... scribing, dispensing, administration, and monit... otherapy-associated medication errors from a... Medication Errors Reporting Program and ME... cancer centers, and also collected incident repo... own center. They classified the type of... error. They examined the... errors. **RESULTS:** ... of harm. Of the 99 adverse d... The most common medication errors inv... plied (11.0%), and missed dose (10.0%). The ... involving the wrong number of days supplied ... search and hospital incident reporting system ... respectively) compared with other sources. **CONCLUSIONS:** ... ments in the way these drugs are ordered, dispensed, administered, and monitored. *Cancer* 2010;000:000–000.

99 adverse drug events: 20 serious or life-threatening, 52 significant, 25 minor

Most common medication errors involved: wrong dose (38.8%), wrong drug (13.6%), wrong number of days supplied (11.0%), and missed dose (10.0%).

Majority of errors (322) resulted in a near miss

39.3% of reports involving the wrong number of days supplied resulted in adverse drug events.

Prescribing errors - temozolamide

- physician order writing - 59.4% of errors
- death of a patient on a research protocol whose physician accidentally wrote a 10-fold overdose
- a covering physician misinterpreted the daily dose of temozolomide as the dose per square meter
  - overdose resulted in bone marrow suppression requiring blood product and factor support

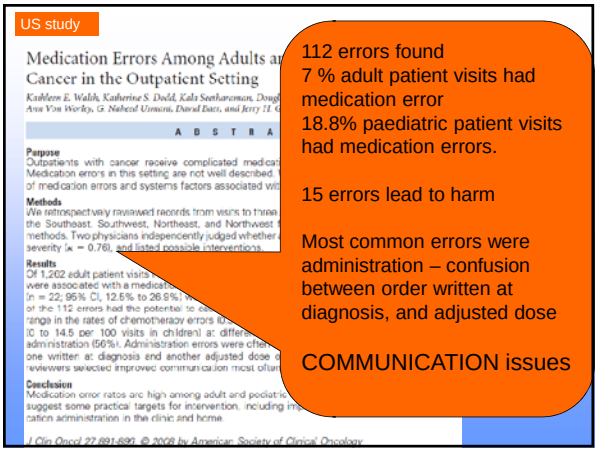
Dispensing errors -underdose

- Capecitabine errors common -various pill sizes and dosing algorithms
- prescription for 500 mg tablets, take ‘‘4 tablets twice daily for Days 1-14’’ was dispensed as 150 mg tablets, take 4 twice a day
- order for 1800 mg twice a day was dispensed as 800 mg twice a day
- Temozolomide - patient given 3 separate prescriptions & instructions to take every day 1x 100mg capsule, 2x 20mg capsules, and 3x 5mg capsules (total daily dose 155 mg)
  - pharmacist filled only the 5mg script (daily dose15mg)

Dispensing errors - overdose

- prescription written for lomustine single dose every 6 weeks
  - misread by pharmacist who dispensed 190 mg lomustine daily
  - patient died of complications of bone marrow suppression
- pharmacist dispensed a pack of 20 x 40mg lomustine capsules
  - instructions to take a single 160mg dose (ie only 4 capsules)
  - patient misunderstood instructions and took 4 capsules daily for 5 days

US study


Medication Errors Among Adults ... Cancer in the Outpatient Setting

Kathleen E. Walsh, Katherine S. Dodd, Kala Seetharaman, Doug... Ann Von Worley, G. Naheed Usmani, David Buss, and Jerry H. ...

ABSTRACT

Purpose
Outpatients with cancer receive complicated medicat... Medication errors in this setting are not well described. ... of medication errors and systems factors associated wit...

Methods
We retrospectively reviewed records from visits to three ... the Southeast, Southwest, Northeast, and Northwest ... methods. Two physicians independently judged whether ... severity (κ = 0.76), and listed possible interventions.

Results
Of 1,262 adult patient visits ... were associated with a medicat... (n = 22; 95% CI, 12.5% to 26.9%) ... of the 112 errors had the potential to ca... ranges in the rates of chemotherapy errors (0.... (0 to 14.5 per 100 visits in children) at differ... administration (56%). Administration errors were ofte... one written at diagnosis and another adjusted dose ... reviewers selected improved communication most ofte...

Conclusion
Medication error rates are high among adult and pediatric ... suggest some practical targets for intervention, including ... cation administration in the clinic and home.

J Clin Oncol 27:891-899. © 2008 by American Society of Clinical Oncology

112 errors found
7 % adult patient visits had medication error
18.8% paediatric patient visits had medication errors.

15 errors lead to harm

Most common errors were administration – confusion between order written at diagnosis, and adjusted dose

COMMUNICATION issues

Risk

- oral chemotherapy is an expanding area of risk in oncology practice
- Need to develop safer practices for:
  - ordering
  - dispensing
  - administering
  - monitoring

Program to Support Safe Administration of Oral Chemotherapy

By Ann M. Birner, PharmD, BCOP, Marilyn K. Bedell, MS, RN, OCN, Jean T. Avery, MBA, BSN, RN, and Marc S. Ernstoff, MD
Dartmouth-Hitchcock Medical Center, Lebanon, NH

- 2001 multidisciplinary group set up to evaluate use of oral chemo in all settings
- RN led telephone contact program for all adult oncol & haem pts on oral CT
- Reviewed progress, dosing comprehension, ADR, supply issues etc

JOURNAL OF ONCOLOGY PRACTICE • VOL. 2, ISSUE 1
JANUARY 2006 • www.jopasco.org

Problems documented	
Pharmacy did not dispense drug in daily dose packs if indicated	13
Incomplete/incorrect instructions on label of vial/bottle	12
Problems with insurance including co-payment	8
Pharmacy dispensed incorrect amount of drug	6
Patient misread/misinterpreted instructions on label	6
Patient noncompliant	6
Patient/family confused and need additional help to understand instructions	5
Clarified expected adverse effects and treatment plan	5
Patient still myelosuppressed, requiring chemotherapy to be held	2
Discrepancy between prescription and planned regimen per office note	1
Total No. of problems	64

2007 – practice standards for oral chemotherapy hits the headlines

BMJ

RESEARCH

Oral chemotherapy safety practices at US cancer centres: questionnaire survey

Saul N Weingart, vice president for patient safety[1], Jonathan Flug, medical student[2], Daniela

WHAT IS ALREADY KNOWN ON THIS TOPIC

Although oncologists prescribe oral chemotherapy for many indications, little is known about associated safety practices

WHAT THIS STUDY ADDS

Few of the safeguards in routine use for infusion chemotherapy have been adopted for oral chemotherapy

UK alert

NHS
National Patient Safety Agency

Rapid Response Report

NPSA/2008/RRR001

From reporting to learning — 22 January 2008

Risks of incorrect dosing of oral anti-cancer medicines

The National Patient Safety Agency (NPSA) is alerting all healthcare staff involved in the use of oral anti-cancer medicines of potentially fatal outcomes if incorrect doses of these medicines are used. These oral anti-cancer medicines are increasingly being used in hospitals and in the community. Those who prescribe, dispense or administer these oral medicines and bypass the normal safeguards used for injectable anti-cancer medicines.

The NPSA has received reports of three recent deaths and a further 400 patient safety incidents concerning oral anti-cancer medicines between November 2003 and July 2007. Half of these reports concern the wrong dosage, frequency, quantity or duration of oral anti-cancer medicines. It is also likely that there are substantial numbers of unreported incidents.

The "ideal" oral chemo patient

- good communications skills (or have responsible, committed family member who can communicate on behalf of the patient)
- willingness & ability to adhere to instructions
- intellectual discipline & emotional wherewithal to commit fully to the program

Keeping pace with oral chemotherapy. Barefoot et al Oncology Issues May/June 2009

Patients should be assessed

- understanding the importance of the therapy to their disease
- potential treatment side effects
- how they will fit therapy into their schedule
- can they swallow pills and/or liquids
- do they normally miss doses of other meds
- where they obtain their meds, & how they pay

Patients' perspectives & safe handling of oral anticancer drugs at an Asian cancer center

Alexandre Chan, Yumei Cynthia Leow , Mui Hian Sim, Singapore

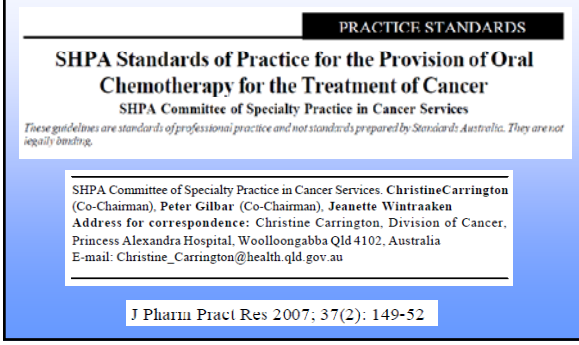
- interviewer-administered survey at outpt pharmacy NCC Singapore 2008
- studied cancer patients' perspectives of oral anticancer drugs & behaviour re storage, handling & administration
- 126 patients had received at least one cycle of oral cancer tx or been taking oral anticancer agents continuously for 3 months
- median age 58 (range 31—85 yrs)

Patients' perspectives & safe handling of oral anticancer drugs at an Asian cancer center

Alexandre Chan, Yumei Cynthia Leow , Mui Hian Sim, Singapore

- capecitabine (~40%), tamoxifen (23%), aromatase inhibitors (18%), gefitinib (9%), imatinib (3%)
- > 90% pts self-administered
- 94% reported no difficulties in adherence
- 48% habitually washed hands after taking their anticancer drugs but only 2 patients on capecitabine habitually used gloves
- need to improve patients' understanding of storage, handling & safe administration of oral anticancer drugs

Australian Standards



PRACTICE STANDARDS

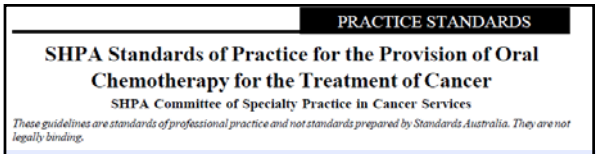
SHPA Standards of Practice for the Provision of Oral Chemotherapy for the Treatment of Cancer

SHPA Committee of Specialty Practice in Cancer Services

These guidelines are standards of professional practice and not standards prepared by Standards Australia. They are not legally binding.

SHPA Committee of Specialty Practice in Cancer Services. **ChristineCarrington** (Co-Chairman), **Peter Gilbar** (Co-Chairman), **Jeanette Wintraaken**
Address for correspondence: Christine Carrington, Division of Cancer, Princess Alexandra Hospital, Woolloongabba Qld 4102, Australia
E-mail: Christine_Carrington@health.qld.gov.au

J Pharm Pract Res 2007; 37(2): 149-52



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- prescription verification, dispensing and patient education
- by a pharmacist with **appropriate training & skills** in cancer chemotherapy as defined by SHPA Stds
- label with the total dose required
  - If patient to take 2 different strengths to make up the dose (e.g. capecitabine 150 mg and 500 mg) must be labelled with the number of each tablet to take and the total dose
- highlight different strengths aid patient understanding
- all boxes/bottles must contain a label
  - never taped together with a label on one box

SHPA -Prescription Verification

- chemotherapy must be prescribed in the context of a referenced protocol, ideally on a specifically designed chemotherapy prescription form
- prescriptions must state clearly for each course
  - the drug
  - dose
  - route & frequency
  - intended start date, duration of treatment, and where relevant, the intended stop date
- pharmacists must have access to a documented treatment plan and to full copies of the relevant protocol

Clinical check

- ensure prescribed doses, treatment intervals & administration details are appropriate to the patient's demographics, tumour type, haematological & biochemical profile, organ function & treatment protocol;
- verify maximum & cumulative doses of all chemotherapy prescribed are not exceeded;
- check that all chemotherapy drugs listed in the protocol have been prescribed including those to be administered by other routes;

Clinical check

- check relevant supportive drugs are prescribed and are appropriate for the protocol, the length of the course and the patient e.g. antiemetics, GCSF etc
- be aware of the toxic and therapeutic effects of the medicine and identify interactions with other drugs;
- ensure supplied in timely manner according to the patient's treatment plan;
- verify with original prescriber any anomalies identified during this checking process. Incorrect or missing details must be corrected by the prescriber prior to dispensing

Second check

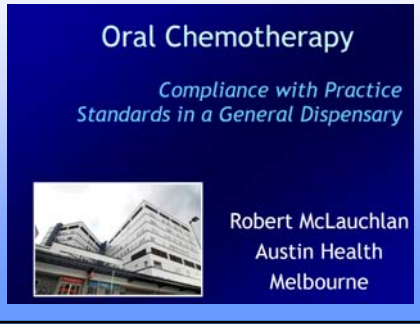
- a second independent check to verify all prescribing & dispensing details
- second check must include a clinical check, label check, contents check and a check to ensure the correct number of tablets has been supplied

The pharmacist

- Use a specialist pharmacist with 'appropriate' skills in cancer chemotherapy to supply and counsel the patient
- The pharmacist must be COMPETENT for the job
  - demonstrated knowledge, training and skills in cancer chemotherapy appropriate to the task
- Staff with insufficient knowledge or experience in cancer treatment must NOT be delegated to manage the supply of oral chemotherapy
- Restrict supply to 'accredited' hospitals

Do you meet these Standards?
Many Australian hospitals do not.

Australian public hospital study



Australian public hospital study

- In Australia large public hospitals have general pharmacist staff in dispensaries
- survey to assess attitudes of dispensary staff to supply of oral chemotherapy
- confidence and behaviour patterns
- awareness of resources
- education

R. McLauchlan. Austin Health, Australia

Survey results

- Lack of Confidence Among Staff
- Significant Proportion of Staff Seek Advice/Reassurance from Specialist Pharmacist
- Handling of New vs Repeat Prescription Very Different
- 14% of Staff Would Not Dispense on Weekend
- Demand for Education

R. McLauchlan. Austin Health, Australia

Strategy

- Educate Staff on Use of Resources
- Incorporate Checklist for Each Episode
- Documentation of Dispensing
- Assess Compliance and Refine Strategy

R. McLauchlan. Austin Health, Australia

Policy

- Drugs Included
- Restrict Staff
- Inpatient / Outpatient Supply
- Mandatory Checks
- Quantities Supplied
- Labelling
- Checking Procedures
- Counselling
- Documentation


Austin Health Pharmacy Department
Checklist for Supply of Oral Chemotherapy

Purpose

Oral Chemotherapy Medications List

R. McLauchlan. Austin Health, Australia

Australian public hospital study

- Completed 100 dispensings
- Significant improvement
- Further resources and ongoing project planned

- What happens in other large public hospitals or private hospital clinics?
- What happens in Asia?

R. McLauchlan. Austin Health, Australia

ASCO/ONS Chemotherapy Administration Safety Standards

17. All patients who are prescribed oral chemotherapy are provided written or electronic patient education materials about the oral chemotherapy before or at the time of prescription.

A. Patient education includes the preparation, administration, and disposal of oral chemotherapy.

B. The education plan includes family, caregivers, or others based on the patient's ability to assume responsibility for managing therapy.

Patient education materials should be appropriate for the patient's reading level/literacy and patient/caregiver understanding.

J Clin Oncol 2009 27:5469-5475

Patient Counselling/Education

- patient on IV chemo has education by the ward/day chemo nurse or pharmacist
- patient on ORAL chemo needs:
  - specific, detailed instructions about what to do, what to expect, managing side-effects, who and when to call for help
  - written information - allows them (&/or carer) to re-read & absorb information later
  - adequate time to ask questions

What are the issues? Patient Education

- Even MORE essential as at home PATIENT is in charge NOT the oncology nurse
- Patients need effective, patient-focused education about their therapy
- e.g. written take-home information, diaries, guidelines for dose reduction in case of adverse events and side-effect support kits

What are the issues? Patient Education

- need to know:-
  - How many to take

    May be in 2 or more different containers, different strengths to combine to get correct dose
  - When to take

    Before/after food; Every day; twice a day; 2 weeks on 1 week off; one dose Day 8 only

What are the issues? Patient Education

- How to store
  - fridge, room temp, car glovebox
  - SAFE storage away from kids
- Is blood result required BEFORE they take dose
- Do they phone someone, or does someone phone them
- Side effects – what are they and how to manage
- Do they continue or stop if develop side effects
- WHEN and WHO to call if they run into problems

Patient Education: The patient needs to know

- When and how to obtain further supplies
- What role their GP/community nurses play in their treatment
- Possible interactions with other drugs, supplements or herbal remedies

Medication Adherence

- Patient compliance to any medication regimen is variable & not easily predicted
- a number of factors identified as leading to non-compliance
  - Complex treatment regimens
  - Side effects of medication
  - Chronic long term administration
  - Inadequate supervision

Unintentional non adherence

Patient problems

- cannot open packaging
- cannot take tablets or capsules e.g. swallowing difficulties in patients with head & neck cancer
- nausea & vomiting
- confused, or forgetful

Minimising unintentional non-adherence

- ensure **unintentional non adherers** are given minimal opportunity for misadventure
  - Use a pharmacist with 'appropriate' skills in cancer chemotherapy to supply and counsel
  - Ensure the provision of appropriate education and information with follow up
  - Provide minimal supplies

Patient information & education

- Clear unambiguous labels on containers
  - Drug name, dose, frequency, duration of treatment
  - Containers of the same strength CLEARLY annotated
  - Containers of the same drug but different strength CLEARLY annotated
- Expected adverse effects & how to manage
- What to do about missed doses
- Use of antiemetics & other therapy
- Drug interactions
- Provision of verbal AND written information

Written & verbal information

- Consider the patients needs, abilities , literacy and culture
- Are there any daily rituals that may help them remember to take the medication
- Provide written medication guides and instructions
- Labelling on the container may be insufficient space to be used alone as an instruction

Written & verbal information

- Many people identify with pictures rather then text
- Provide customised instructions such as a calendar or diary
  - eg highlighted dates to help patient remember the schedule & a diary with a symptom management log
- Many patients like a reminder system

Raehl CL, et al. Individualized drug assessment in the elderly. Pharmacotherapy 2002; 22: 1239-48

Minimise Supplies

- **DO NOT ISSUE repeats**
  - Adds to the confusion if drug is stopped or dose is changed
  - Give the patient only what is needed for that cycle and don't dispense a repeat UNLESS you are absolutely certain it is appropriate

Minimising Supplies

- **DO NOT ISSUE whole patient packs**
  - Dose & quantities vary according to BSA, the specific protocol, side effects etc
  - for patient requiring less than whole pack, supply of original container can lead to confusion & potential overdosing
  - in Australia PBS encourages original pack & repeats
  - SHPA Standards say:
  - If a whole pack is issued then the following label must be added: *You will have xxxx number of tablets remaining at the end of this course. Please return unused tablets to your pharmacist for destruction or for use for your next course of chemotherapy*

Monitoring adherence

- Discuss the diary record with the patient on subsequent visits
- Ask patients to return mediation containers for 'pill' counting
- Monitor for unexpected toxicities and no toxicities

Reasons for non adherence

- Side effects
- Patients wants a 'drug holiday'
- Patients does not believe in the treatment
- Patients thinks they know better- may take more or less then the prescribed dose
- Regimen doesn't fit in with lifestyle, rituals or culture
- Deliberate overdose

Deliberate non adherence

- Pay attention to the person, their perceptions, their understanding of their illness and their medicines
  - Don't just tell, discuss
  - Question the patient about themselves and family life
  - Explain the consequences of non compliance
  - Re –question patient understanding
  - Look for signs of potential non compliance

Oral Chemotherapy: Adherence Strategies

- Prescriptions
  - reviewed by clinical pharmacist
  - Medication given by clinical pharmacist to patient
    - Reduce potential for patients not collecting medication due to access barrier
  - Medications supplied in dose administration aids if needed
  - Dispensed sufficient quantities for **single** cycle only

The Alfred Hospital, Victoria, Australia

Oral Chemotherapy: Adherence Strategies

- Patient education
  - Completed by clinical pharmacist
  - Chart format with 14 languages available
  - Written protocol specific information provided
- Medication reconciliation
  - Performed by clinical pharmacist for all inpatient and outpatient oncology patients

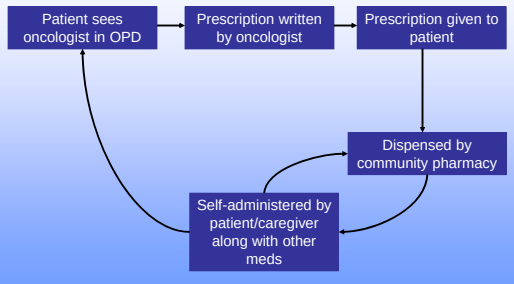
The Alfred Hospital, Victoria, Australia

Oral Chemotherapy: Adherence Strategies

- Monitoring
  - Phone reminders made to patient if needed
  - Electronic containers available
  - Pill count
  - Self-patient report
  - Dispensing report
    - Reviewed by clinical pharmacist

The Alfred Hospital, Victoria, Australia

Oral Chemotherapy



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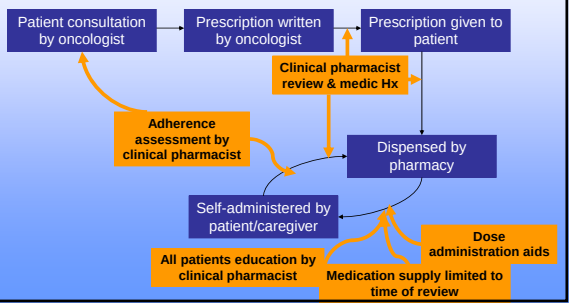
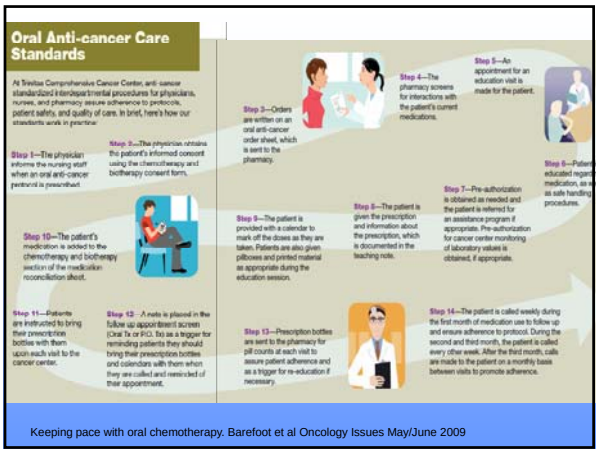
Adherence Strategies





Keeping pace with oral chemotherapy. Barefoot et al Oncology Issues May/June 2009