IIOP – In conversation with:

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Regional Cancer Centre South East

School of Pharmacy
University College Cork

RCSI

SIOG
INTERNATIONAL SOCIETY
OF GERIATRIC ONCOLOGY

iphos
IRISH PHARMACY HAEMATOLOGY
& ONCOLOGY SOCIETY

Declarations

Speaker Honoraria: Astellas, Pfizer, Chugai, Fresenius Kabi

Travel and Conference Fees: Celltrion

Objectives

- What does becoming an "**advanced specialist**" mean for my role?
- How do I integrate into the **multidisciplinary team**?
- How can I **help patients**?
  - Avoid unplanned hospitalisation
  - Reduce length of stay
  - Improve medication management as care transitions between primary and tertiary care
- What are my responsibilities to:
  - Education and training
  - Research

What is advanced pharmacy practice?

Section 4 : Clinical Pharmacy Services

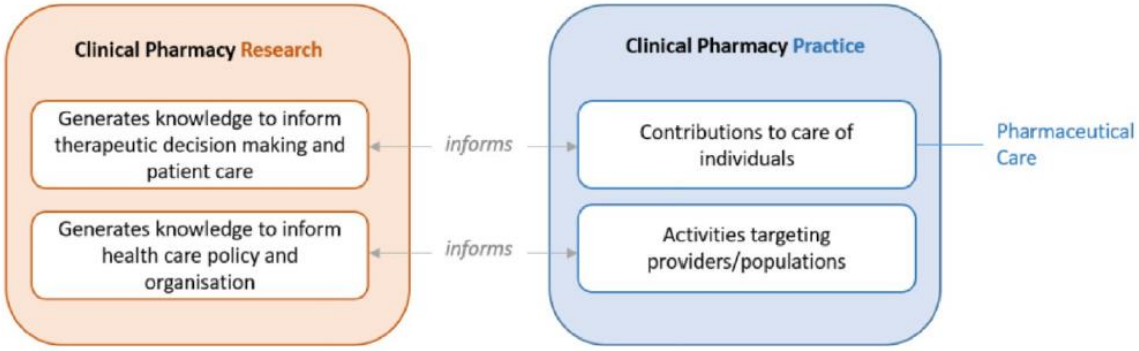
Statement 4.1

"Hospital pharmacists should be involved in all patient care settings to prospectively influence collaborative, multidisciplinary therapeutic decision-making; they should play a full part in decision making including advising, implementing and monitoring medication changes in full partnership with patients, carers and other health care professionals."

Statement 4.8

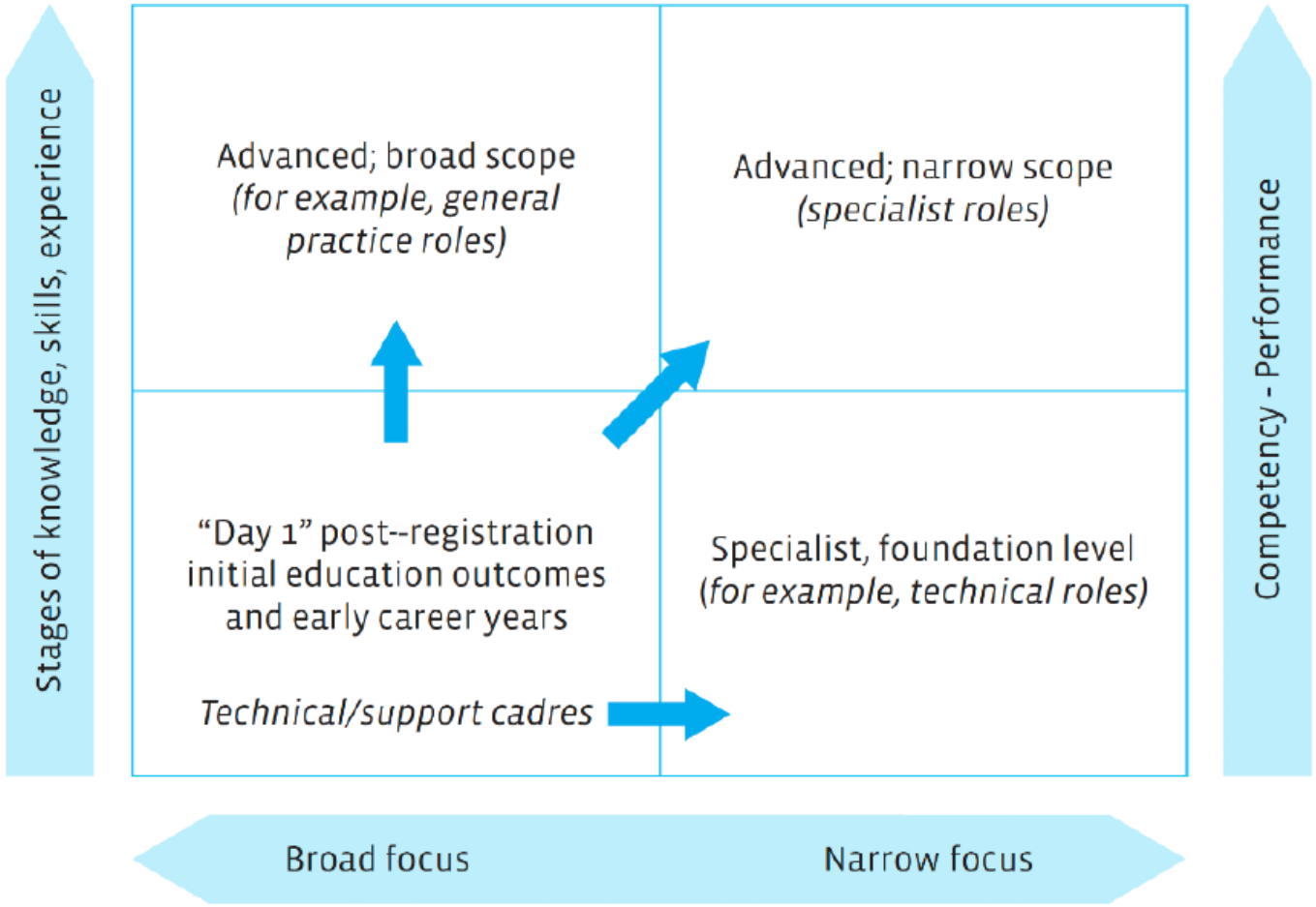
"Clinical pharmacy services should continuously evolve to optimise patients' outcomes."

ESCP
European Society of Clinical Pharmacy



The European Statements of Hospital Pharmacy European Journal of Hospital Pharmacy 2014;21:256258. Available at https://eahp.eu/hospital-pharmacy-practice/statements/from-the-president/final-statements/ (Accessed December 2024)
Dreischulte T, van den Bemt B, Steurbaut S; European Society of Clinical Pharmacy. European Society of Clinical Pharmacy definition of the term clinical pharmacy and its relationship to pharmaceutical care: a position paper. Int J Clin Pharm. 2022 Aug;44(4):837-842. doi: 10.1007/s11096-022-01422-7. Epub 2022 Jun 6. PMID: 35668277; PMCID: PMC9393137.

What is advanced pharmacy practice?



International Pharmaceutical Federation (FIP). FIP Global Advanced Development Framework: Supporting the advancement of the profession version 1. The Hague: International Pharmaceutical Federation; 2020.

What is advanced pharmacy practice?

1. Expert Professional Practice
Improves standards of pharmaceutical care

2. Working with Others
Is able to communicate, establish and maintain professionally driven working relationships and gain the co-operation of others

3. Leadership
Inspires individuals and teams to achieve high standards of performance and personal development

4. Management
Organises and delivers service objectives in a timely fashion

5. Education, Training and Development
Supports the education, training & development of self and others. Promotes a learning culture within the organisation

6. Research and Evaluation
Uses research to deliver effective practice. Identifies and undertakes research to inform practice

International Pharmaceutical Federation (FIP). FIP Global Advanced Development Framework: Supporting the advancement of the profession version 1. The Hague: International Pharmaceutical Federation; 2020.

Advanced Specialist Pharmacy in Clinical Oncology

Traditional Oncology/Haematology Pharmacist Activities

Community Pharmacy
- Dispensing OAM, supportive care

Aseptic compounding
- Non-patient facing

MDT attendance
- Often solely for SACT scheduling

Inpatient clinical pharmacy
- Retroactive medication management

COG membership
- Operational input in relation to SACT delivery

Advanced Specialist Pharmacist Activities

Transplant services

Oral Anticancer Medicines Management

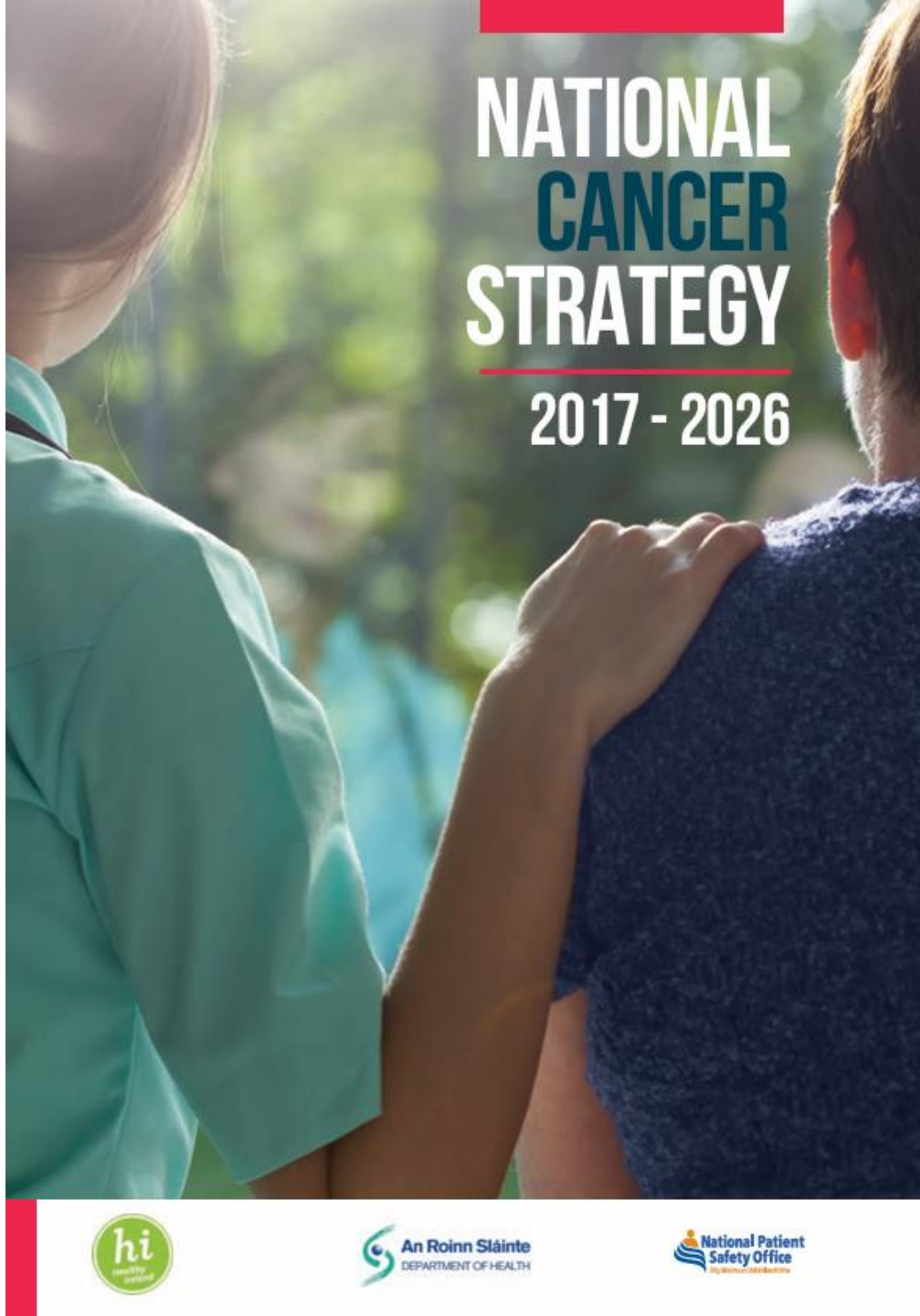
Paediatric Haem/Onc

Geriatric Oncology

IIOP
INSTITIÚID CÓGAISÍOCHTA NA hÉIREANN
IRISH INSTITUTE OF PHARMACY

IIOP Cancer Care Hub

Advanced Specialist Pharmacy in Clinical Oncology



What clinical areas do I cover?

Medical 4:

25 bed oncology/haematology cohort ward

4 isolation room, 1 cohorted 3 bed room, 3 x 6-bed bays

Oak Ward

Inpatient specialist palliative care unit

20 single bed rooms

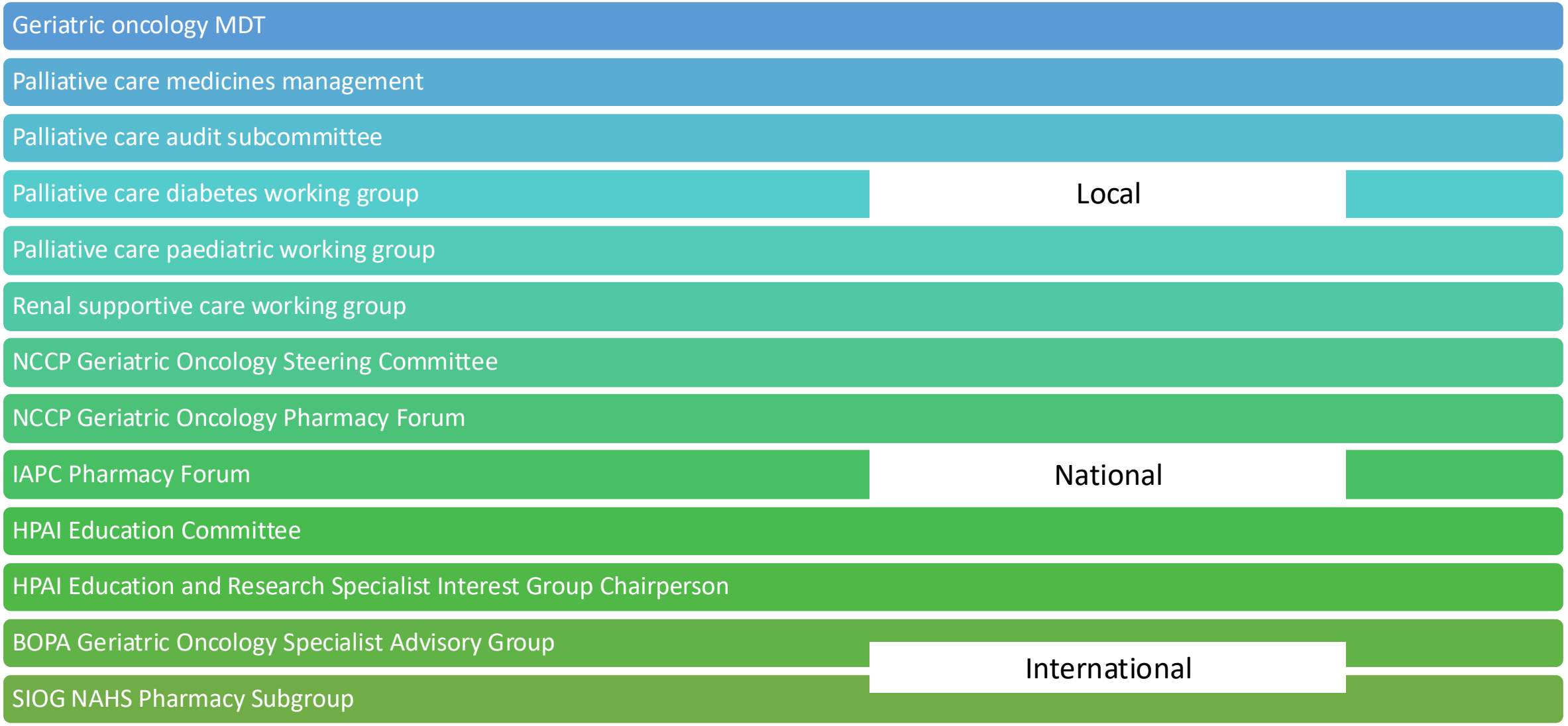
GOAL Clinic

Specialist geriatric oncology outpatient clinic

Patients with pre-identified frailty or concerns regarding ability to tolerate SACT

Specialist structured medication review

What other areas do I cover?



My working week

Monday

AM
- Ward round (palliative care)
- Ward round (acute oncology/haematology)

PM
- Education session with junior staff (1-3pm)
- Follow up on ward round

Tuesday

AM
- Ward round palliative care)
- Ward round (acute oncology/haematology

PM
- Geriatric Oncology MDT
- Outpatient letters
- TDM and Antimicrobial follow up for inpatients

Wednesday

AM
- Antimicrobial ward round for AMS
- Dispensary team meeting (9-9.30)
- Ward round (palliative care)
- Ward round (acute oncology/haematology
- 1 hour dispensary slot

PM
- Follow up on med rec and TDM issues

Thursday

AM
- Department management meeting (9am-10.30)
- Ward round (palliative care)
- Ward round (acute oncology/haematology

PM
- Ward round (palliative care)
- Ward round (acute oncology/haematology

Friday

Clinic prep (8am-9.30)

Geriatric Oncology Clinic (All day)

Answer queries (all day)

Inpatient work – MPAR Review

Weight			CrCl (Cockcroft Gault) mL/min		
Weight (Kg)	Date	Initials	Value	Date	Initials
BMI:					
Measured Height	Height	(cm) Date:		Initials:	

PATIENT CONDITIONS AFFECTING ORAL DOSES

NURSING STAFF PLEASE INDICATE

SWALLOWING PROBLEMS ☐ ENTERAL FEEDING TUBE (e.g. NG, PEG, PEJ) ☐ SPECIFY.....

STOMA/ILEOSTOMY ☐ OTHER ☐ SPECIFY.....

Signature:..... Date:.....

Refer to Speech & Language Therapy guidance and Enteral Tube Drug Administration resources

ALLERGIES/ADVERSE DRUG REACTIONS: Complete below before medication is administered.

or Tick if No Known Drug Allergy ☐ Signature: Date:

Medication / Other	Nature of Reaction	Signature	Date

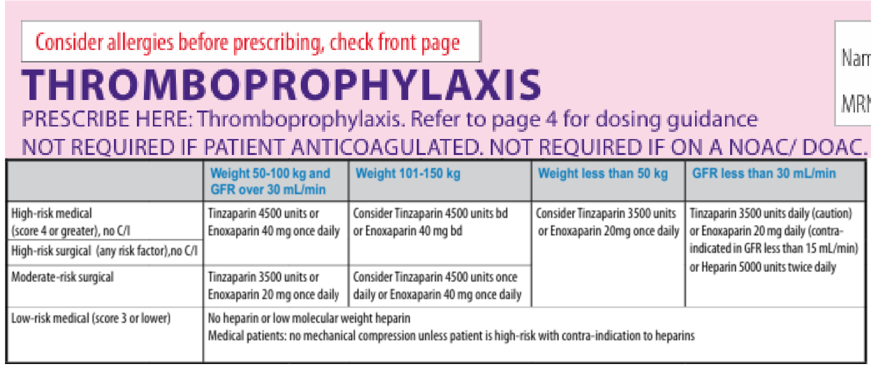
Consider allergies before prescribing, check front page

MEDICATION RECONCILIATION:

Pre-Admission Medication List

	GENERIC NAME & FORM	DOSE	FREQUENCY	✓ Dr's plan on admission				Rationale/Further Comment(s)/Route of Administration	RECONCILED ✓
				CONTINUE	HOLD	STOP	CHANGE		
1									

Inpatient work – MPAR Review



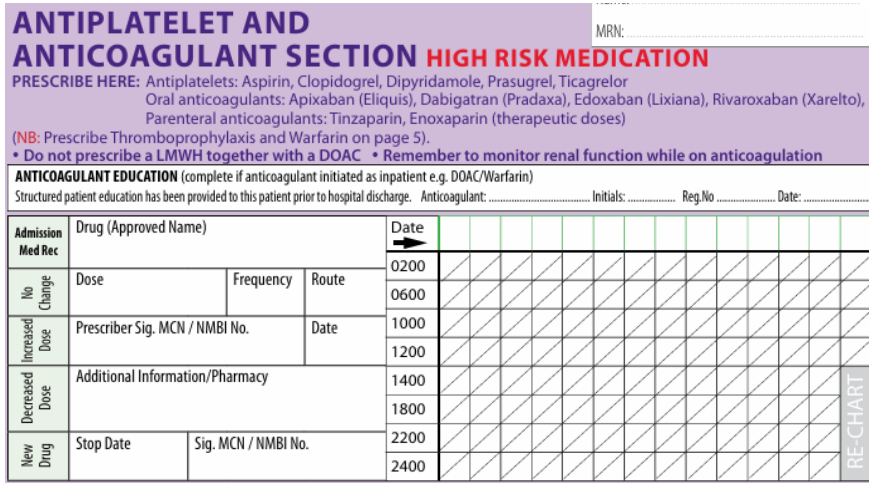
Consider allergies before prescribing, check front page

THROMBOPROPHYLAXIS

PRESCRIBE HERE: Thromboprophylaxis. Refer to page 4 for dosing guidance

NOT REQUIRED IF PATIENT ANTICOAGULATED. NOT REQUIRED IF ON A NOAC/ DOAC.

	Weight 50-100 kg and GFR over 30 mL/min	Weight 101-150 kg	Weight less than 50 kg	GFR less than 30 mL/min
High-risk medical (score 4 or greater), no C/I High-risk surgical (any risk factor),no C/I	Tinzaparin 4500 units or Enoxaparin 40 mg once daily	Consider Tinzaparin 4500 units bd or Enoxaparin 40 mg bd	Consider Tinzaparin 3500 units or Enoxaparin 20mg once daily	Tinzaparin 3500 units daily (caution) or Enoxaparin 20 mg daily (contra-indicated in GFR less than 15 mL/min) or Heparin 5000 units twice daily
Moderate-risk surgical	Tinzaparin 3500 units or Enoxaparin 20 mg once daily	Consider Tinzaparin 4500 units once daily or Enoxaparin 40 mg once daily		
Low-risk medical (score 3 or lower)	No heparin or low molecular weight heparin Medical patients: no mechanical compression unless patient is high-risk with contra-indication to heparins			



ANTIPLATELET AND ANTICOAGULANT SECTION HIGH RISK MEDICATION

PRESCRIBE HERE: Antiplatelets: Aspirin, Clopidogrel, Dipyridamole, Prasugrel, Ticagrelor
Oral anticoagulants: Apixaban (Eliquis), Dabigatran (Pradaxa), Edoxaban (Lixiana), Rivaroxaban (Xarelto),
Parenteral anticoagulants: Tinzaparin, Enoxaparin (therapeutic doses)
(NB: Prescribe Thromboprophylaxis and Warfarin on page 5).
• Do not prescribe a LMWH together with a DOAC • Remember to monitor renal function while on anticoagulation

ANTICOAGULANT EDUCATION (complete if anticoagulant initiated as inpatient e.g. DOAC/Warfarin)
Structured patient education has been provided to this patient prior to hospital discharge. Anticoagulant: .... Initials: .... Reg.No .... Date: ....

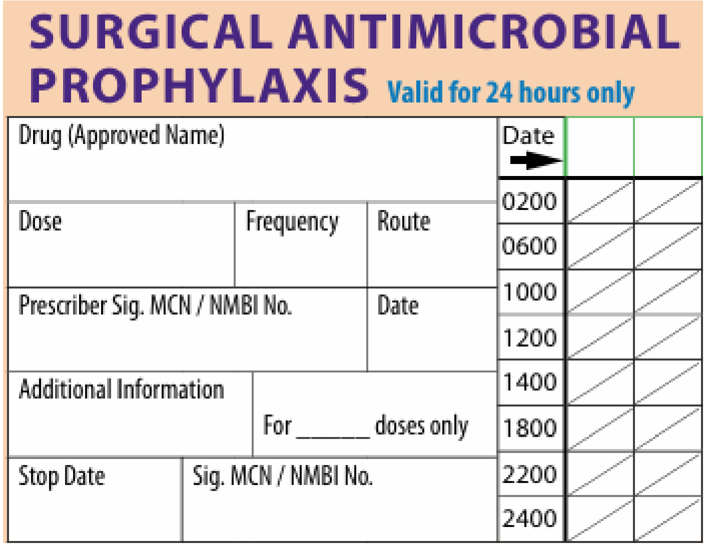
MRN:

Admission Med Rec | No Change | Increased Dose | Decreased Dose | New Drug

Drug (Approved Name) | Dose | Frequency | Route | Prescriber Sig. MCN / NMBI No. | Date | Additional Information/Pharmacy | Stop Date | Sig. MCN / NMBI No.

Date → 0200 0600 1000 1200 1400 1800 2200 2400

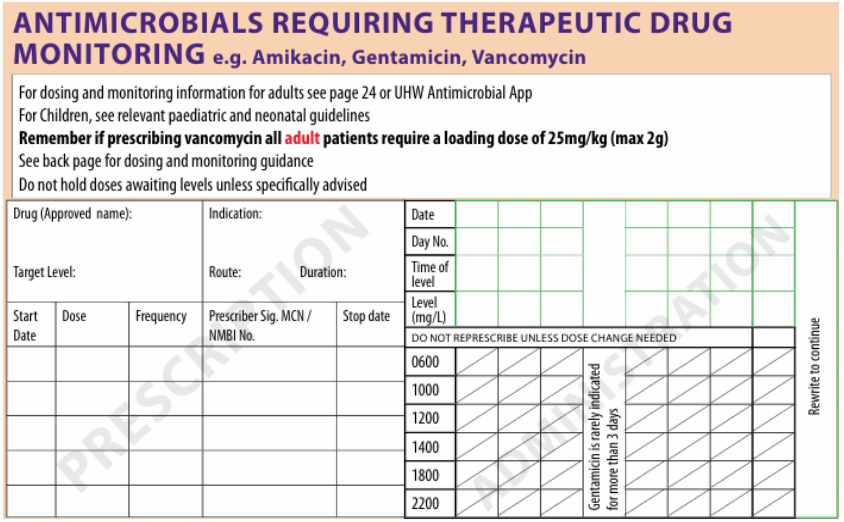
RE-CHART



SURGICAL ANTIMICROBIAL PROPHYLAXIS Valid for 24 hours only

Drug (Approved Name) | Dose | Frequency | Route | Prescriber Sig. MCN / NMBI No. | Date | Additional Information | For ______ doses only | Stop Date | Sig. MCN / NMBI No.

Date → 0200 0600 1000 1200 1400 1800 2200 2400



ANTIMICROBIALS REQUIRING THERAPEUTIC DRUG MONITORING e.g. Amikacin, Gentamicin, Vancomycin

For dosing and monitoring information for adults see page 24 or UHW Antimicrobial App
For Children, see relevant paediatric and neonatal guidelines
Remember if prescribing vancomycin all adult patients require a loading dose of 25mg/kg (max 2g)
See back page for dosing and monitoring guidance
Do not hold doses awaiting levels unless specifically advised

Drug (Approved name): | Indication: | Target Level: | Route: | Duration: | Start Date | Dose | Frequency | Prescriber Sig. MCN / NMBI No. | Stop date

Date | Day No. | Time of level | Level (mg/L)

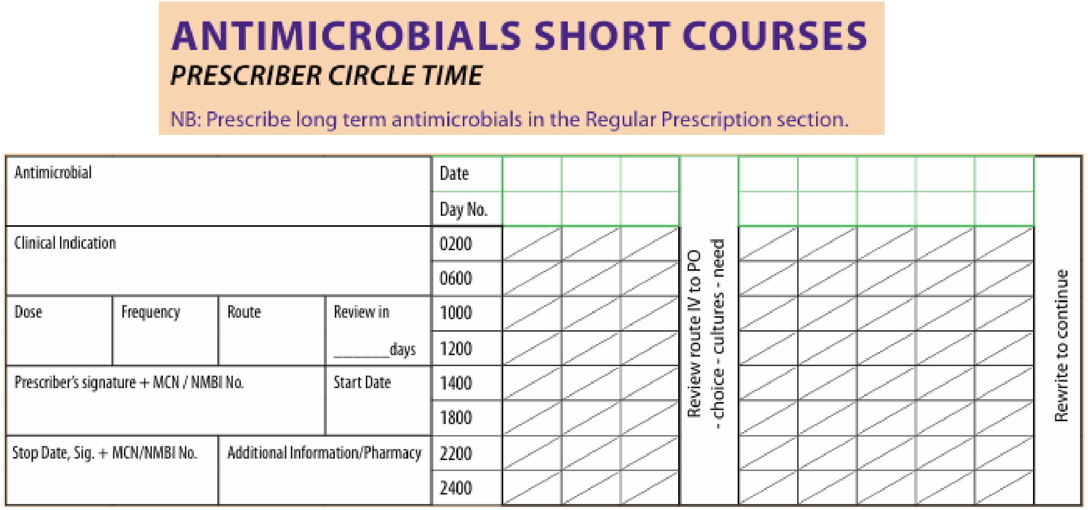
DO NOT REPRESCRIBE UNLESS DOSE CHANGE NEEDED

0600 1000 1200 1400 1800 2200

Gentamicin is rarely indicated for more than 3 days

Rewrite to continue

PRESCRIPTION ADMINISTRATION



ANTIMICROBIALS SHORT COURSES

PRESCRIBER CIRCLE TIME

NB: Prescribe long term antimicrobials in the Regular Prescription section.

Antimicrobial | Clinical Indication | Dose | Frequency | Route | Review in ______ days | Prescriber's signature + MCN / NMBI No. | Start Date | Stop Date, Sig. + MCN/NMBI No. | Additional Information/Pharmacy

Date | Day No. | 0200 0600 1000 1200 1400 1800 2200 2400

Review route IV to PO - choice - cultures - need

Rewrite to continue

Inpatient work – MPAR Review

REGULAR PRESCRIPTIONS

Admission Med Rec	Drug (Approved Name)			Date →
No Change	Dose	Frequency	Route	0200
Increased Dose	Prescriber Sig. MCN / NMBI No.		Date	0600 / 1000 / 1200
Decreased Dose	Additional Information/Pharmacy			1400 / 1800
New Drug	Stop Date	Sig. MCN / NMBI No.		2200 / 2400

RE-CHART

AS REQUIRED (PRN) PRESCRIPTIONS

Drug (Approved Name)				Date →
Dose	Max Frequency	Route	Start Date	Time
Indication				Dose
Prescribed by		MCN/NMBI		Route
Pharmacy		Review Date		Given by

DRUG INFUSIONS (ALL ROUTES)

Prescription								Date	Time	Results	Administration Rate	Prep./ Given By	Checked By	Amount Discarded
Drug (Approved Name)						Date								
Route		Dose		Frequency										
Diluent & Volume														
Prescribed Rate	Start Date	Stop Date	Prescriber Sig			Reg No								
Special Instructions			Reviewed by: Date:											

INTRAVENOUS FLUIDS

Date	Fluid	Volume	Additive and Dose	Route	Rate	Prescriber's Signature MCN / NMBI	Start Time	Prepared/ Given by	Checked by

SLIDING SCALE INSULIN CHART
HIGH RISK MEDICATION

Medication		
Frequency	Route	
Start date	End date	
Prescribed by		
If blood glucose is between		
	give	Units
	give	Units
	give	Units
	give	Units
	give	Units
	give	Units

Inpatient work –Acute Haematology/Oncology

nccp National Cancer Control Programme

ASCO AMERICAN SOCIETY OF CLINICAL ONCOLOGY

NCCN National Comprehensive Cancer Network®

HSE RECOGNISE SEPSIS ENHANCE SURVIVAL

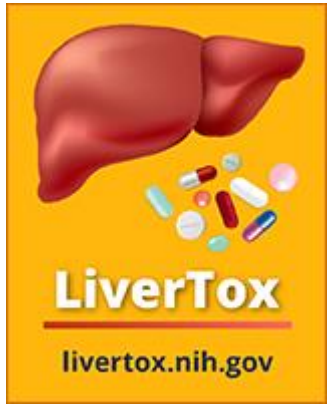
ACUTE HOSPITALS ONLY
(NON MATERNITY) ≥16 YRS

SEPSIS SCREENING TOOL FOR ADULTS

THIS FORM DOES NOT REPLACE CLINICAL JUDGEMENT

BMJ Best Practice

ESMO Clinical Practice Guidelines: Supportive and Palliative Care



The Renal Drug Database

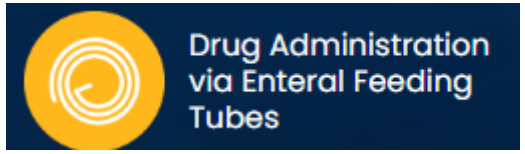


Table 8 Risk factors for drug-induced QT prolongation and torsade de pointes

Correctable	Non-correctable
QT-prolonging drugs[a] • Antiarrhythmics • Antibiotics • Antidepressants • Antifungals • Antiemetics • Antihistamines • Antipsychotics • Loop diuretics • Opioids (methadone) Bradyarrhythmia Electrolyte imbalance/ abnormalities • Hypokalaemia (≤3.5 mEq/L) • Hypomagnesaemia (≤1.6 mEq/L) • Hypocalcaemia (≤8.5 mEq/L) Inadequate dose adjustment of renal or hepatic cleared QT-prolonging drugs	Acute myocardial ischaemia Age > 65 years Baseline QTc interval prolongation[b] Family history of sudden death (congenital LQTS or genetic polymorphism) Female sex Impaired renal function (for renally excreted drugs) Liver disease (for hepatically excreted drugs) Personal history of syncope or drug-induced TdP Pre-existing CVD (CAD, HF, LV hypertrophy)

CAD, coronary artery disease; CVD, cardiovascular disease; HF, heart failure; LQTS, long QT syndrome; LV, left ventricular; QTc, corrected QT interval; TdP, torsade de pointes.
[a]See https://www.crediblemeds.org.
[b]QTc using Fridericia correction (QTcF = QT/$\sqrt[3]{RR}$) is recommended in patients with cancer.

Inpatient work – Palliative care

Our Lady's Hospice & Care Services

Harold's Cross Blackrock Wicklow

Respite Rehabilitation Reassurance

Palliative Meds Info

Scottish Palliative Care Guidelines

Palliative Care Formulary

Drug Administration via Enteral Feeding Tubes

BMJ Best Practice

NCCN National Comprehensive Cancer Network®

ESMO Clinical Practice Guidelines: Supportive and Palliative Care

Table 8 Risk factors for drug-induced QT prolongation and torsade de pointes

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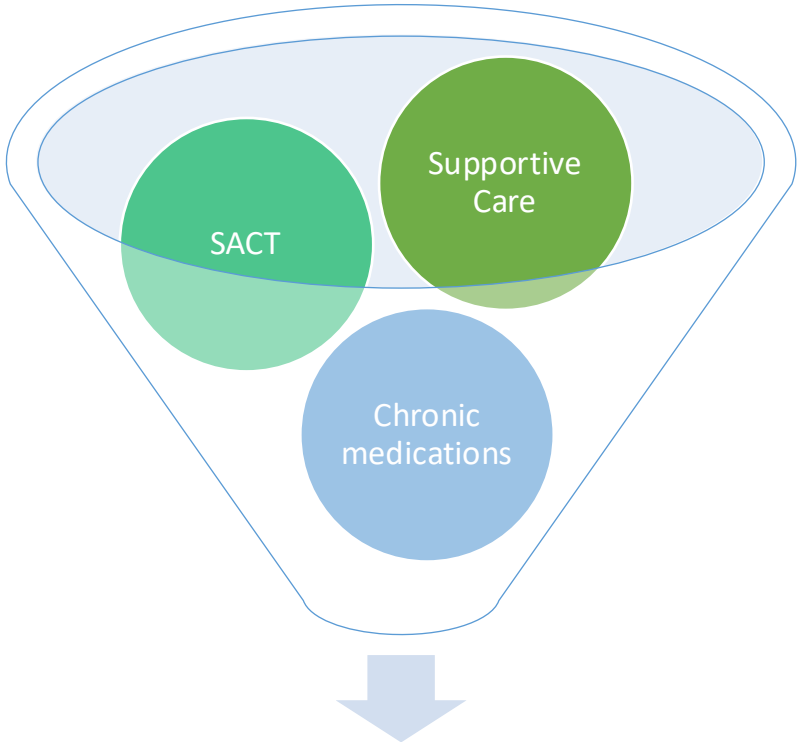
[a]See https://www.crediblemeds.org.

[b]QTc using Fridericia correction ($QTcF = QT/\sqrt[3]{RR}$) is recommended in patients with cancer.

Outpatient work -Medication optimisation in Geriatric Oncology



Medication management

Adverse drug events in Geriatric Oncology

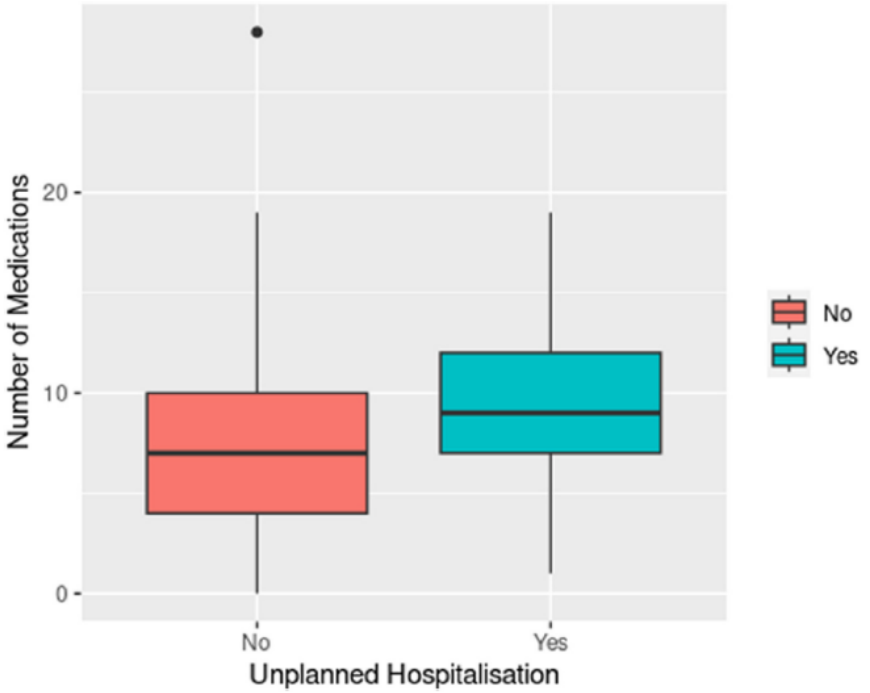


Fig. 1. Boxplot distribution of patients according to hospitalization status and number of medications.
*note – intended for color reproduction.

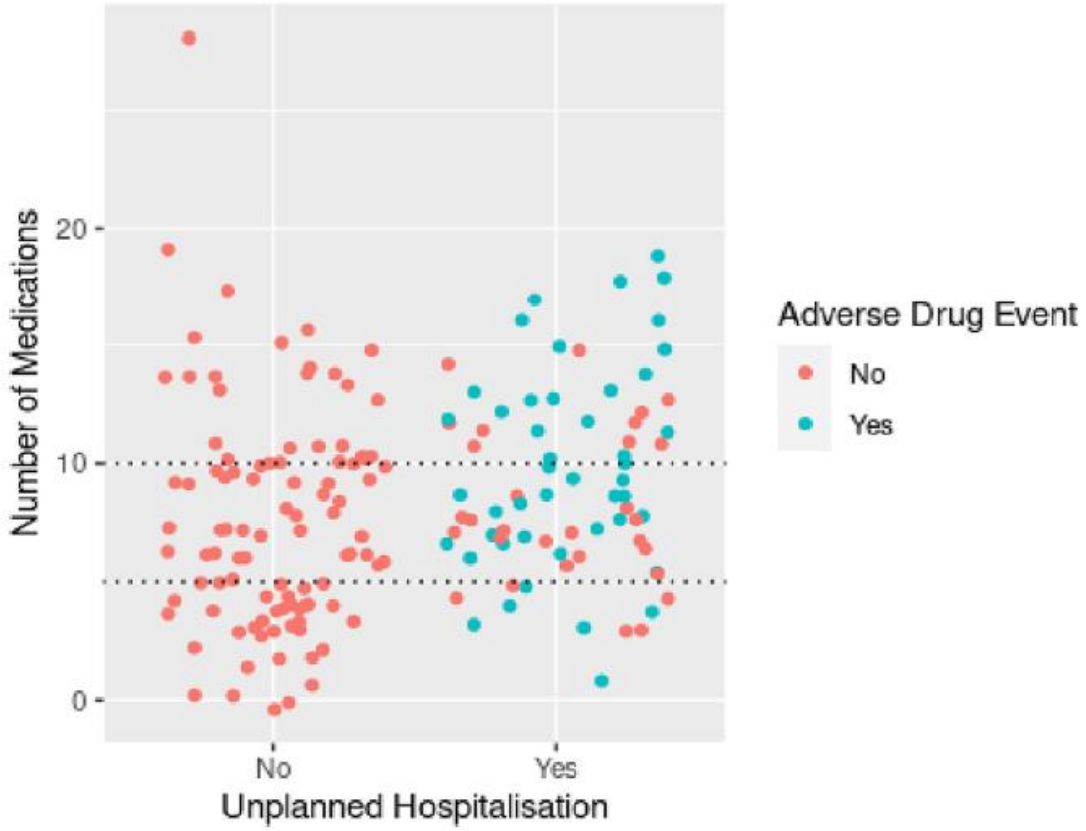
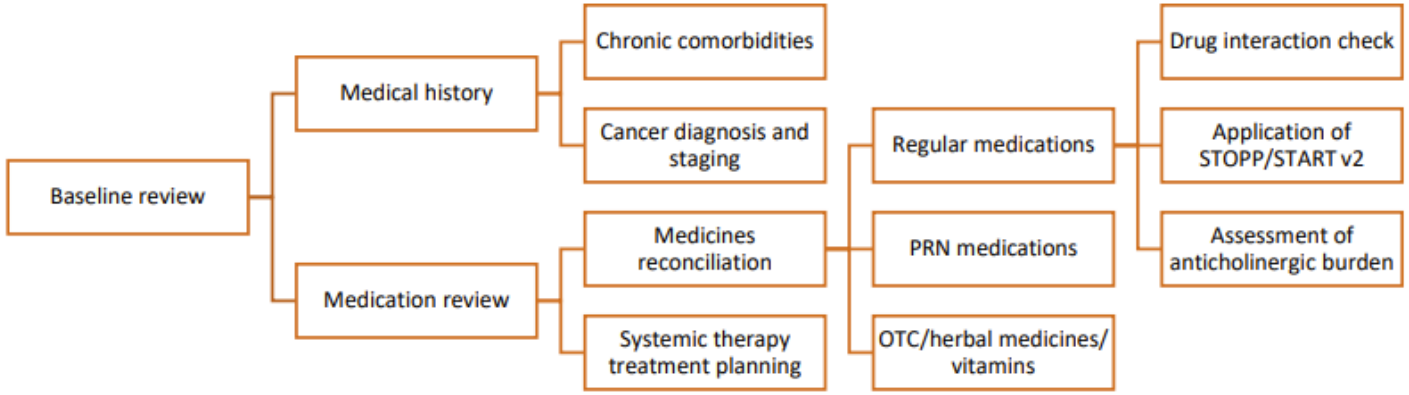


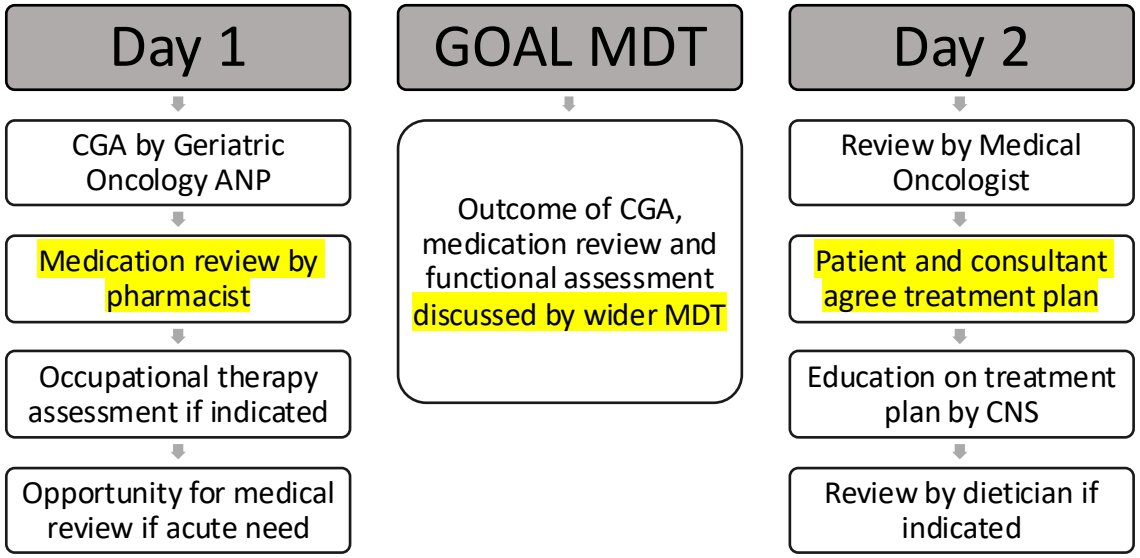
Fig. 2. Jitter plot of patients who were hospitalized with an adverse drug event. The dashed lines represent polypharmacy and hyperpolypharmacy on the y-axis.

Walsh DJ, Sahm LJ, O'Driscoll M, Bolger B, Ameen H, Hannan M, Goggin C, Horgan AM. Hospitalisation due to adverse drug events in older adults with cancer: A retrospective analysis. Journal of Geriatric Oncology, Volume 16, Issue 6, 102283. doi: https://doi.org/10.1016/j.jgo.2025.102283.

A comprehensive medication review:

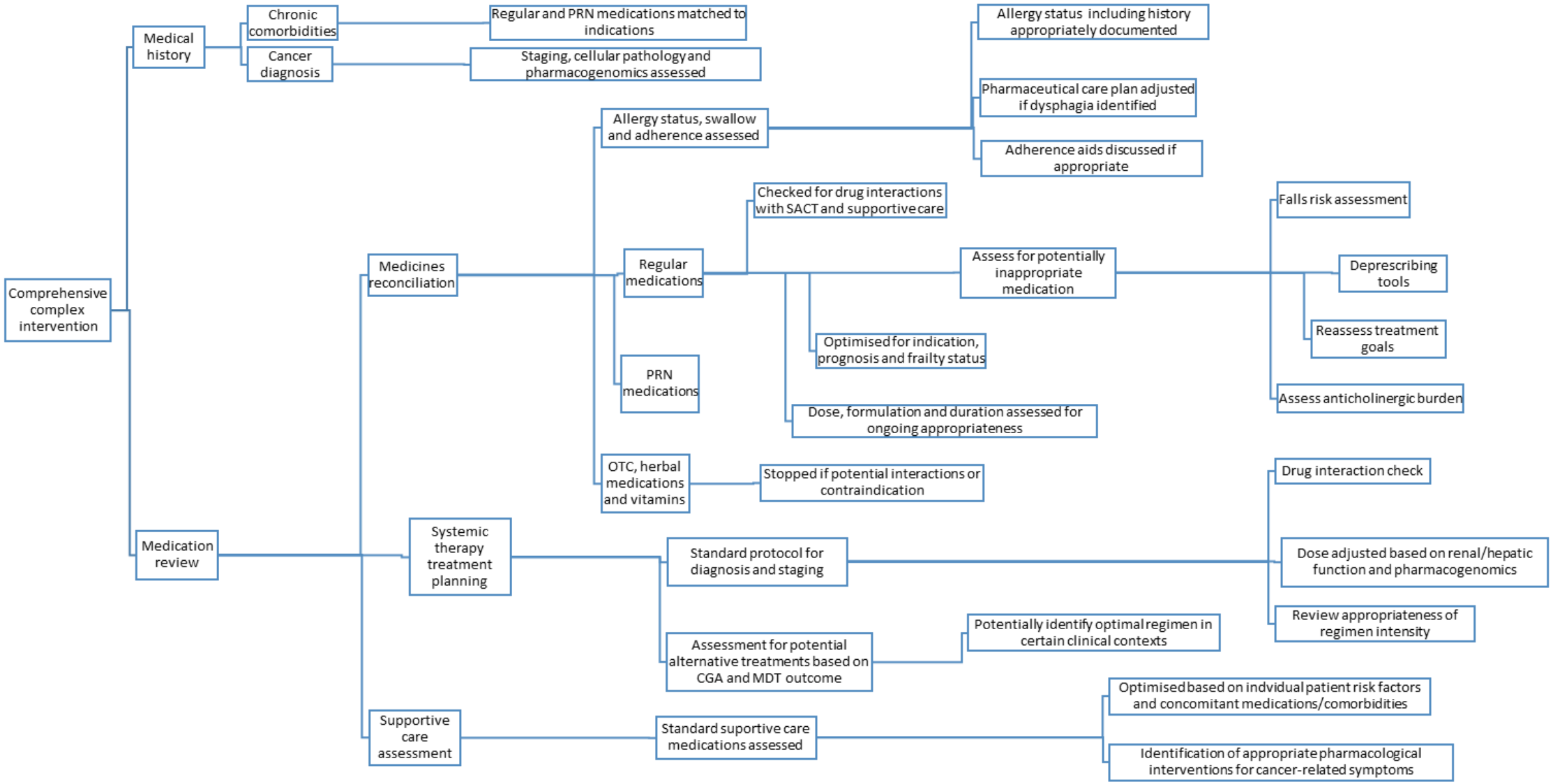


Key: OTC – Over the counter; STOPP - Screening Tool of Older Person's Prescriptions; START - Screening Tool to Alert doctors to Right Treatment



Breathnach, D. J. H. 2025. Evaluating the impact of pharmacist interventions in the geriatric oncology setting. PhD Thesis, University College Cork.

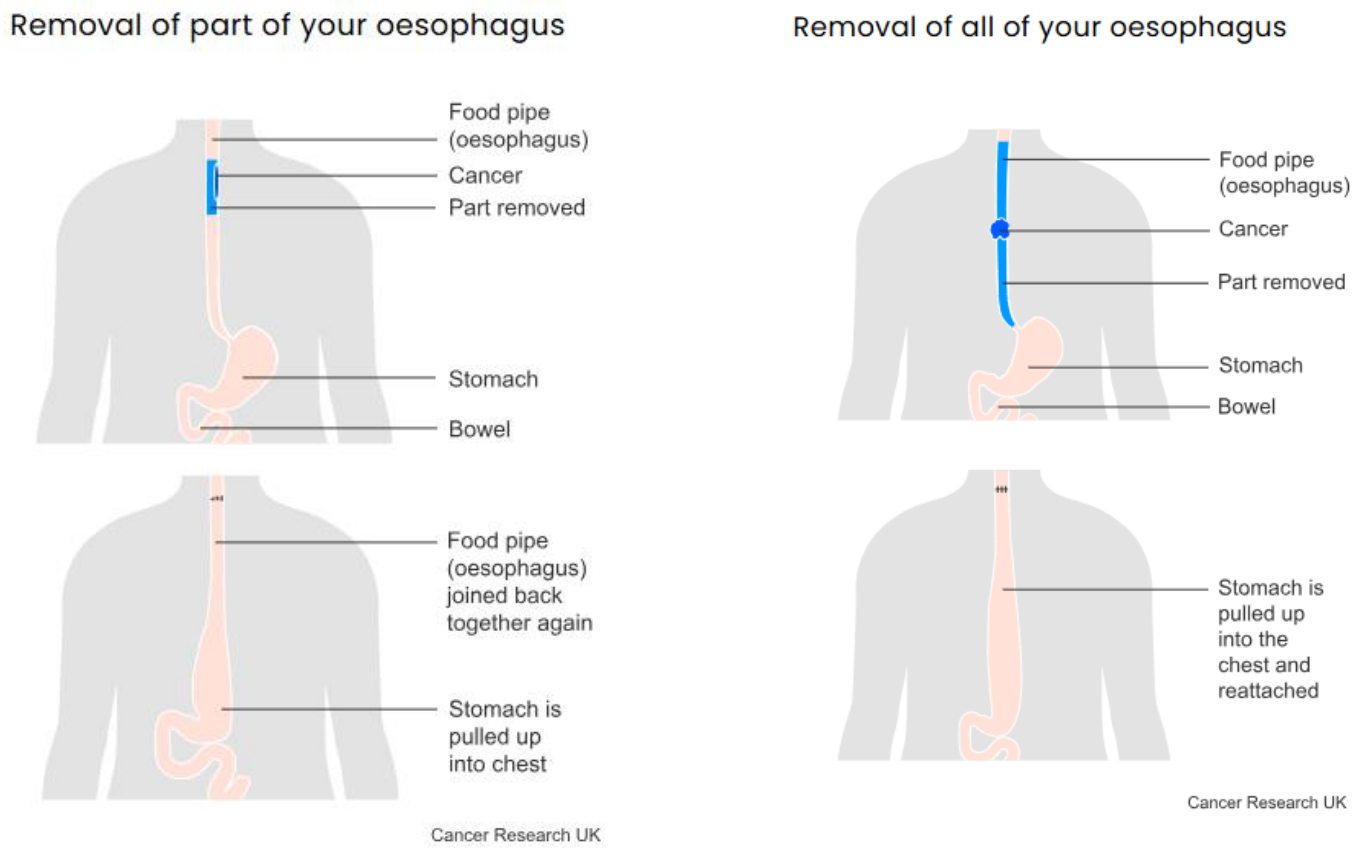
A comprehensive medication review:



Breathnach, D. J. H. 2025. Evaluating the impact of pharmacist interventions in the geriatric oncology setting. PhD Thesis, University College Cork.

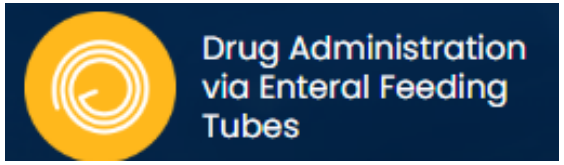
Case study 1: Discharge co-ordination

- 72 year old male is admitted with intractable hiccups and abdominal cramping for 5/7
- **Diagnosis:** Metastatic Oesophageal adenocarcinoma (liver and peritoneal mets)
- Oesophagectomy in 2023 – unable to swallow at present
- Has a radiologically inserted jejunostomy tube (16Fr)
- Symptoms controlled by CSCI
  - Levomepromazine 25mg
  - Midazolam 15mg
  - Morphine Sulphate 30mg



Case study 1: Discharge co-ordination

- Patient cannot go home on syringe driver due to inability to change driver in community at patients address
  - Staff shortages in community
- Plan – rotate one medication at a time, allow for 3 days to assess if symptoms controlled, then rotate next medication
- Morphine successfully rotated to Fentanyl patch
- Palliative care and oncology MDT looking to convert midazolam and levomepromazine to RIJ/JEJ administration



CLINICAL PEARL

Fentanyl patches have to be removed prior to a MRI as the magnetic field will heat microfilaments in the patch causing toxicity

Levomepromazine

Drug Administration via Enteral Feeding Tubes

Nozinan (Sanofi-Aventis, previously Link)	Tablet 25 mg	Levomepromazine (as maleate).[2] Tablets disperse within 2 minutes when placed in 10 mL of water to give a coarse dispersion; some of the larger particles break up when drawn into the syringe. The dispersion flushes via an 8Fr NG tube without blockage, although it is likely to block finer tubes.[3]
Nozinan (Sanofi-Aventis, previously Link)	Injection 25 mg/mL	Levomepromazine (as hydrochloride). pH 4.0–5.0. Can be administered orally if necessary.[4]

Administration - enteral tubes

1st choice - Consider giving by parenteral injection.

2nd choice - The tablets can be dispersed in water for administration if necessary.[8,102] They disperse immediately.[8,154] Click here for further information.

3rd choice - A suspension may be available in some centres.[95,169] Click here for further information.

4th choice - Use the special oral solution or the special suspension (if available). Click here for further information.

5th choice - The injection has also been used enterally.[104,164] Click here for further information.

Levomepromazine

Drug Administration via Enteral Feeding Tubes

Site of absorption (oral administration)

There is no specific information on the site of absorption of levomepromazine.[4] Peak plasma concentration occurs 1–3 hours following oral dosing.[5]

Intrajejunal administration

There is no specific information relating to jejunal administration of levomepromazine. Administer using the above method. Monitor for loss of efficacy or increased side-effects.

Martindale: The Complete Drug Reference

Pharmacokinetics

(Latest modification: 24-Mar-2004)

- On average 50% of orally administered drug reaches the general circulation as unchanged levomepromazine.
- The apparent volume of distribution (Vb) was 23 to 42 L/kg, and the biologic half-life, 15 to 30 hr.
- The plasma concentration curves for levomepromazine have a deflection and become apparently linear 8 to 12 h after administration of the last maintenance dose.

Midazolam

- MDT discussion regarding appropriate benzodiazepine for administration
- Consensus agreement on diazepam
  - Ease of tapering down
  - Availability of oral suspension
  - Agreed dose of 2mg BD (relative dose reduction of ≈30%)

Drug Administration via Enteral Feeding Tubes

Diazepam (Rosemont)	Oral suspension 2.5 mg/5 mL, 10 mg/5 mL	Manufactured 'special'. Thick liquid.[4] Contains sucrose and sorbitol 0.68 g/5 mL.[3, 4]

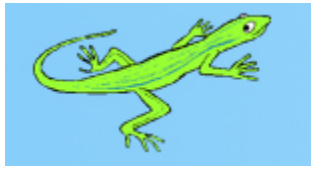
Administration - enteral tubes

1st choice - Give by intravenous or rectal route.

2nd choice – Use the oral solution, and dilute with water before administration to reduce viscosity and tube binding.[3a,4a] Click here for further information.

3rd choice – The tablets can be crushed and dispersed in water for administration.[5a] Click here for further information.

The injection has also been given enterally in some centres, however the manufacturers have no information on this, and cannot recommend it.[6a,7a]



Case 1: Outcome

Thursday

Agree plan to de-escalate between pharmacist, palliative care team and patient

- Email community pharmacy to inform them of plan, with a discharge the following Thursday

Fri. – Mon.

Trial of 12.5mg Levomepromazine BD

- No symptoms over weekend

Mon. – Wed.

Trial of 2mg BD Diazepam

- No symptoms

Wednesday

email prescriptions to community pharmacy, confirm instructions for JEJ

Thursday

AM – successful discharge

Case study 2: Discharge facilitation

62 year old female currently admitted to palliative inpatient unit

Diagnosis: Metastatic SCLC to spine

Presented with symptomatic hyponatraemia

Sodium levels hovering at 117mMol/L despite oral replacement

Serum osmolality 247mOsm/kg 26/03

Aim for discharge in 6 days

Case study 2: Discharge facilitation

- Current status – on Slow Sodium BD for 10 days, Na+ hovering at 120/121mMol/L
- Working diagnosis is SIADH
- Serum osmolality is low, no urine osmolality taken
- Advice to team:
  - Check urine osmolality
  - If normal/high, confirmed SIADH
- Refer to management of SIADH in malignancy guidelines

Case study 2: Discharge facilitation

BMJ Best Practice

persistence of chronic SIADH

1ST LINE
fluid restriction →

PLUS
treat underlying cause →

2ND LINE
tolvaptan →

3RD LINE
sodium chloride + furosemide →

4TH LINE
demeclocycline →

Syndrome of inappropriate antidiuretic hormone

- Non-compliant with fluid restriction
  - Quality of life
- Not fit for SACT, declined XRt
- Tolvaptan not available
- ? Add furosemide
  - Iatrogenic fluid restriction

Primary options

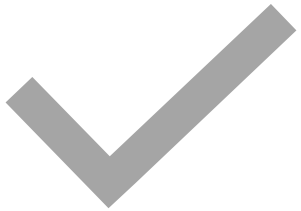
sodium chloride: 2-3 g/day orally

and

furosemide: 40 mg orally once daily

Case study 2: Outcome

Sodium >130mMol/L after 5 days of adding furosemide 20mg OD PO



Patient elected against discharge from IPU

Preferred comfort measures and aim for end-of-life care in IPU

Case study 3: Admission avoidance

84-year-old male with a diagnosis of NSCLC

- Stage: T1N1a(1/21)M0
- Not for surgery or radiotherapy

PmHx: A.fib, Hypercholesterolaemia, IPF

Current medications:

- Apixaban 2.5mg BD PO
- Rosuvastatin 5mg OD PO

SACT Tx plan:

- Carbolplatin AUC 3 (40% dose reduction) day 1 of a 21 day cycle
- Gemcitabine 600mg/m^2 (40% dose reduction) day 1 and 8 of a 21 day cycle
- Escalate dose if cycle 1 tolerated

Case study 3: Risk versus Reward

J Cancer Res Clin Oncol (2011) 137:1469–1475
DOI 10.1007/s00432-011-1013-1

ORIGINAL PAPER

Interstitial lung disease associated with gemcitabine treatment in patients with non-small-cell lung cancer and pancreatic cancer

Shigeki Umemura · Hiromichi Yamane · Toshimitsu Suwaki · Tsutomu Katoh · Takuya Yano · Yasuhiro Shiote · Nagio Takigawa · Katsuyuki Kiura · Haruhito Kamei

The results demonstrate that prior thoracic radiotherapy (odds ratio: 26.3, 95% confidence interval: 3.4–202.1,P=0.002) and pre-existing pulmonary fibrosis (odds ratio: 6.5, 95% confidenceinterval:1.1–38.1,P=0.039)were independent variables that correlated with increased risk of gemcitabine-associated ILD.

Table 4 Risk factors for the occurrence of interstitial lung disease

	No. of patients		Univariate analysis	Multivariate analysis	
	Evaluable	With ILD (%)	*P* value[a]	*P* value[a]	OR (95% CI)
Total	118	9 (7.6)			
Tumour					
NSCLC[b]	62	5 (8.1)	0.851	–	–
Pancreas[c]	56	4 (7.1)			
Age					
<70 years	63	2 (3.2)	0.07	0.09	5.191 (0.773–34.876)
≥70 years	55	7 (12.7)			
Gender					
Female	28	3 (10.7)	0.485	–	–
Male	90	6 (6.7)			
Performance status					
0–1	90	6 (6.7)	0.354	–	–
2–3	24	3 (12.5)			
No. of prior chemotherapy regimens					
0	80	5 (6.3)	0.419	–	–
≧1	38	4 (10.5)			
Prior thoracic radiotherapy					
No	110	6 (5.5)	0.005	0.002	26.322 (3.429–202.056)
Yes	8	3 (37.5)			
Pre-existing pulmonary fibrosis					
No	105	6 (5.7)	0.041	0.039	6.468 (1.098–38.106)
Yes	13	3 (23.1)			
Pulmonary emphysematous change					
No	79	5 (6.3)	0.454	–	–
Yes	39	4 (9.3)			

ILD interstitial lung disease, *OR* odds ratio, *CI* confidence interval

[a] Logistic regression model

[b] Non-small-cell lung cancer

[c] Pancreatic cancer

Case study 3: other options?

- **Taxanes:**
  - Associated with pulmonary toxicity
- **Vinca alkaloids:**
  - Can cause pulmonary toxicity
- **Etoposide:**
  - No pulmonary toxicity, but hair loss which matters to the patient
- **No treatment?**
  - He is 84, his disease burden is low, incidental finding not affecting his QOL, he wants to maintain his independence and avoid unplanned hospitalisation

Case study 3: Outcome

- Carboplatin/Etoposide

Or

- Surveillance with supportive care

Case study 4: Life or death?

- 55 year old male
- mCRC – liver and lung
- Presented to A&E with uncontrollable diarrhoea on 22/08
- Last received chemotherapy on 19/08
  - Irinotecan single agent 125mg/m^2 IV
- Working diagnosis: Late-onset irinotecan toxicity
- Spends 5 days on inpatient oncology ward
  - High dose **loperamide** on admission (**48mg/day regular and up to 32mg/day PRN**)
  - Octreotide added in CSCI
    - **Octreotide** dose reaches **1500mcg/24hrs** by 26/08
  - Transferred to IPU still having **9 loose bowel movements per day** on 27/08
  - K^+ 1.7mMol/L on 28/08

Case study 4: Life or death?

- Palliative care consultant calls to ask for advice as patient **is rapidly deteriorating**
- Quick **review of admission notes**, and **discussion with patient's wife** establishes timeline of first onset of symptoms
  - First episode of loose bowel was the **morning after chemotherapy**
  - Coincided with sweating and lacrimation
- **Early-onset toxicity** – instead of late onset toxicity – is identified

"Do not let them die, without a shot of atropine"

Diagnosis: Cholinergic syndrome

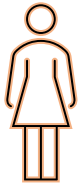
Risk factors for onset:

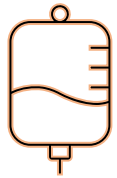
- Female sex; OR 2.18, 95% CI: 1.01-4.72; *p = 0.0471*
- Dose >175mg; OR 1.01, 95% CI: 1.01-1.02; *p = 0.0001*

Kanbayashi Y et al. Predictive factors for the development of irinotecan-related cholinergic syndrome using ordered logistic regression analysis. Med Oncol. 2018 Apr 28;35(6):82. doi: 10.1007/s12032-018-1142-3. PMID: 29705823.

- Dose >105mg/m^2; OR 10.9; 95% CI: 2.0 to 96.7; *p = 0.0121*

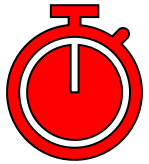
Hiroyuki Fujii et al., Risk factors and prophylaxis of irinotecan induced cholinergic syndrome in sight of supportive care.. JCO 35, 216-216(2017).DOI:10.1200/JCO.2017.35.31_suppl.216





Characterised by:

- Early onset diarrhoea (<24 hours post infusion initiation)
- Sweating
- Abdominal cramping
- Lacrimation
- Myosis
- Hypersalivation



NB – ESTABLISH A CLEAR TIMELINE!!

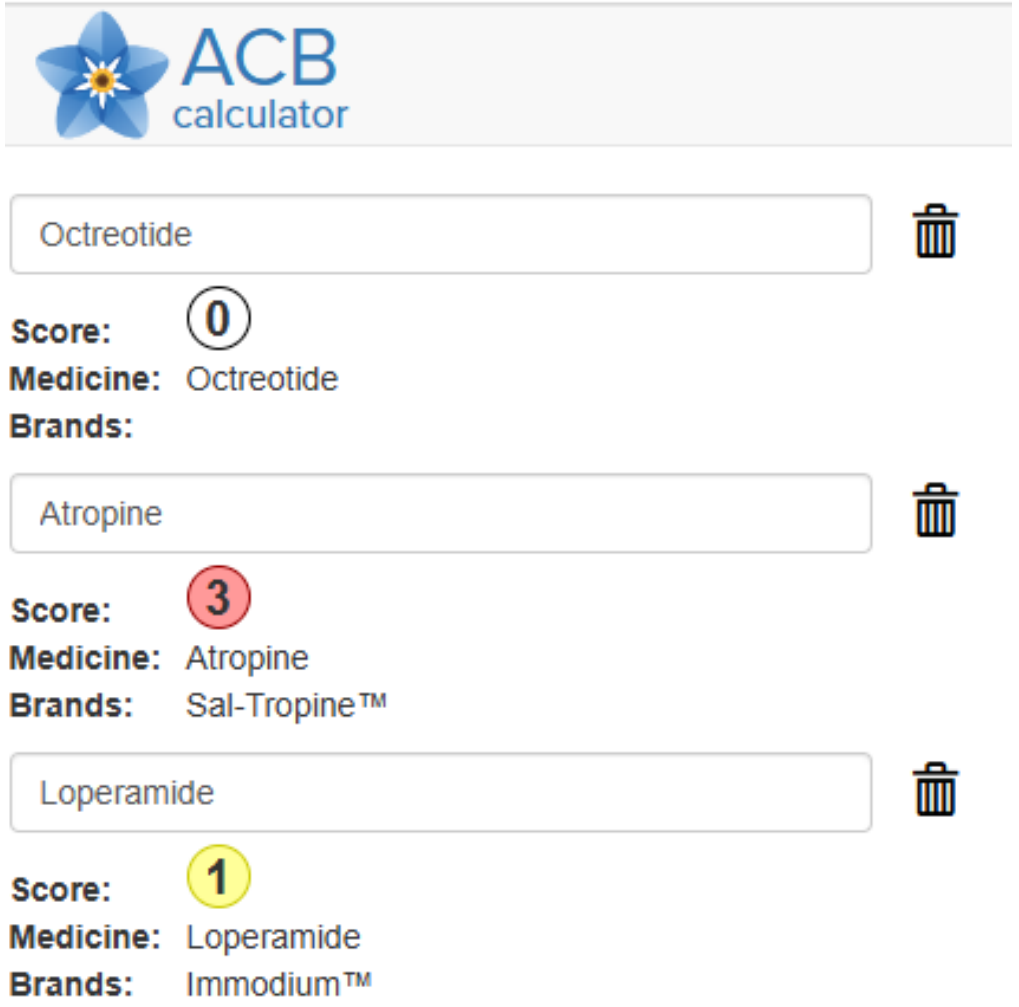
Treatment – Cholinergic syndrome

Treatment:

- SC/IV Atropine sulphate
  - Either 0.25mg or 0.3mg
- Repeated if necessary to **max 1.2mg/day**
- Have bronchodilators and corticosteroids to hand
  - Especially in asthmatic patients
- Loperamide 4mg, then 2-4mg PRN

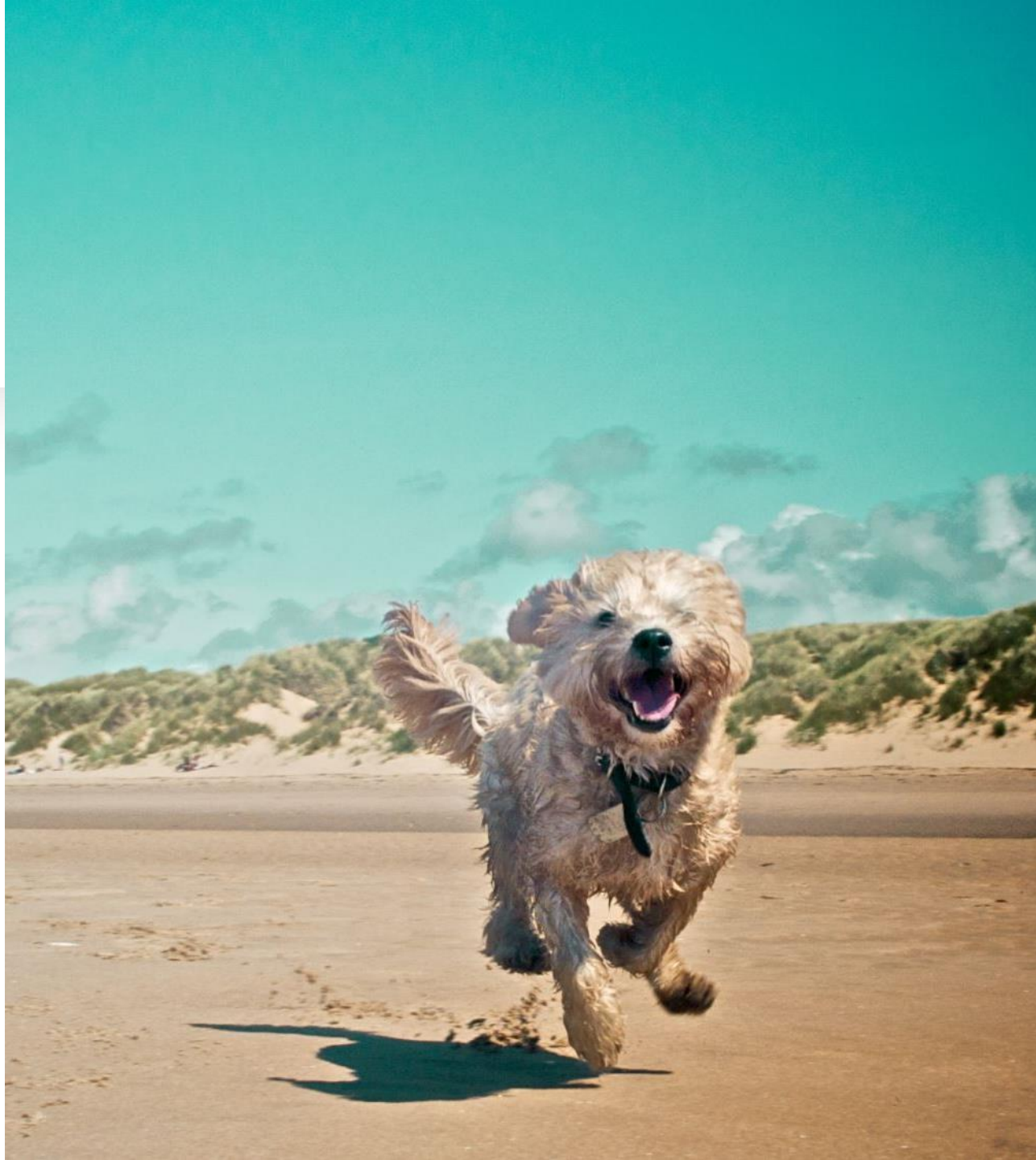
Irinotecan can cause both ***early and late onset diarrhea***. Both forms of diarrhea may be severe and appear to be mediated by different mechanisms. ***Early onset diarrhea*** occurs during or within 24 hours of administration of irinotecan. It is usually transient and only infrequently severe. Early onset diarrhea is thought to be part of a ***cholinergic syndrome*** mediated by increased anticholinesterase activity of the irinotecan parent compound. It may be accompanied by other cholinergic symptoms such as rhinitis, hypersalivation, miosis, lacrimation, diaphoresis, flushing, and abdominal cramping. The cholinergic syndrome is more likely to occur at higher irinotecan dose levels and associated with the onset of peak irinotecan plasma levels.[1] Thus, infusing irinotecan over less than 90 minutes may increase the likelihood of the cholinergic syndrome.[31] Early onset diarrhea and cholinergic symptoms are treated with atropine 0.3–0.6 mg IV or SC as needed, repeated up to a maximum dose of 1.2 mg. Blood pressure and heart rate should be monitored during atropine therapy.[21] Prophylactic atropine may be required for subsequent treatments.[24]

http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Irinotecan_monograph.pdf *(Accessed December 2024)*



Outcome – Cholinergic syndrome

- With appropriate treatment patient had 1 loose bowel movement in 24 hours post second atropine dose
- Fluid resuscitation, electrolyte repletion and cardiac stabilisation took 4 days
- The following weekend the patient shared a photo of himself walking his dog on Tramore beach
- He lived for another 8 months, saw the birth of his first grandchild, and was happy to return to the palliative unit for end-of-life care



Summary

- **Advanced specialism** means:
  - Prospectively influencing therapeutic decision making
  - Continuous evolution
  - Demostrating benefit through research

- **Multidisciplinary team** integration occurs by providing robust, evidence based interventions that are influenced by the clinical context of the patient in front of you
  - Being comfortable in the grey

- **By doing this I do help patients:**
  - Avoid unplanned hospitalisation
  - Reduce length of stay
  - Improve medication management as care transitions between primary and tertiary care

Questions?