Medication management in the older adult (in the ER)

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Overview

1. PPT Presentation (this) with MCQ
2. Cases (breakout rooms)

Objectives

Review **physiology** of aging

Develop an understanding on **ED polypharmacy** and **prescribing cascade**

Review **high-risk medications** and **high-risk med combinations**

Treatment of common issues in the ER - pain and procedural sedation

Case 1: Ms Rose

88 yo F; cc: rash

Went to walk-in clinic 3 days ago, Dx contact dermatitis and started on diphenhydramine 50 PO q6h PRN and prednisone 25mo PO daily x 7 d

Since then, rash improved but is now socially withdrawing, confused. Denies infectious sx or trauma

Does not participate in the history with you

Physical exam

PMHx: Osteoporosis, MCI, CAD, COPD

MEDs: Risendronate, Vit D, Ca, Pulmicort, Donepezil

HR 75, RR 16, SpO2 96%, BP 142/78.

- CV, Resp, abdo unremarkable
- Skin: Diffuse maculopapular rash covering neck, torso and buttocks with excoriations. No palm and mouth involvement
- Neuro: slightly drowsy. Oriented to place, month and year. Normal speech. CN and power normal. Finger-nose and heel-shin normal.

Investigations

ECG - sinus

CBC, electrolytes, Cr all within normal limits

Troponin negative

Urinalysis – no leukocytes, no blood, no nitrates, no ketones

Questions

1. How could the patient's medications be contributing to their problem?

2. What, if any, changes to the patient's medications would you make?

1. What are some of the risks of polypharmacy?

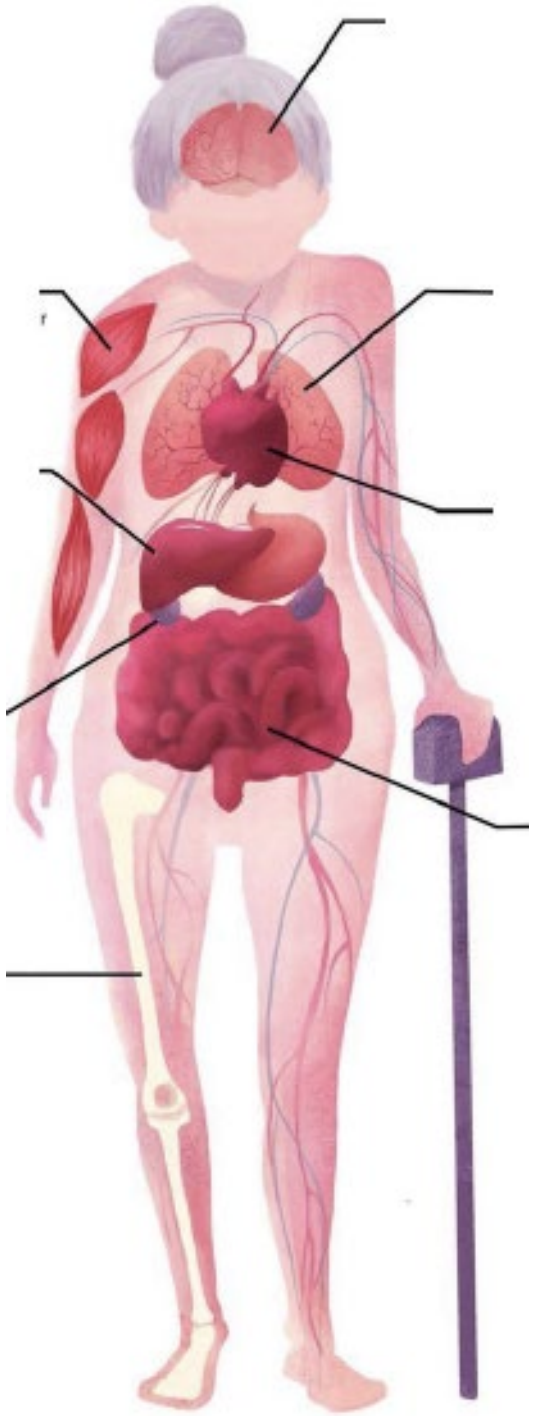
polypharmacy

1. Risks of new drug itself
2. Unexpected additive effect
3. Unintentional addition of antagonist

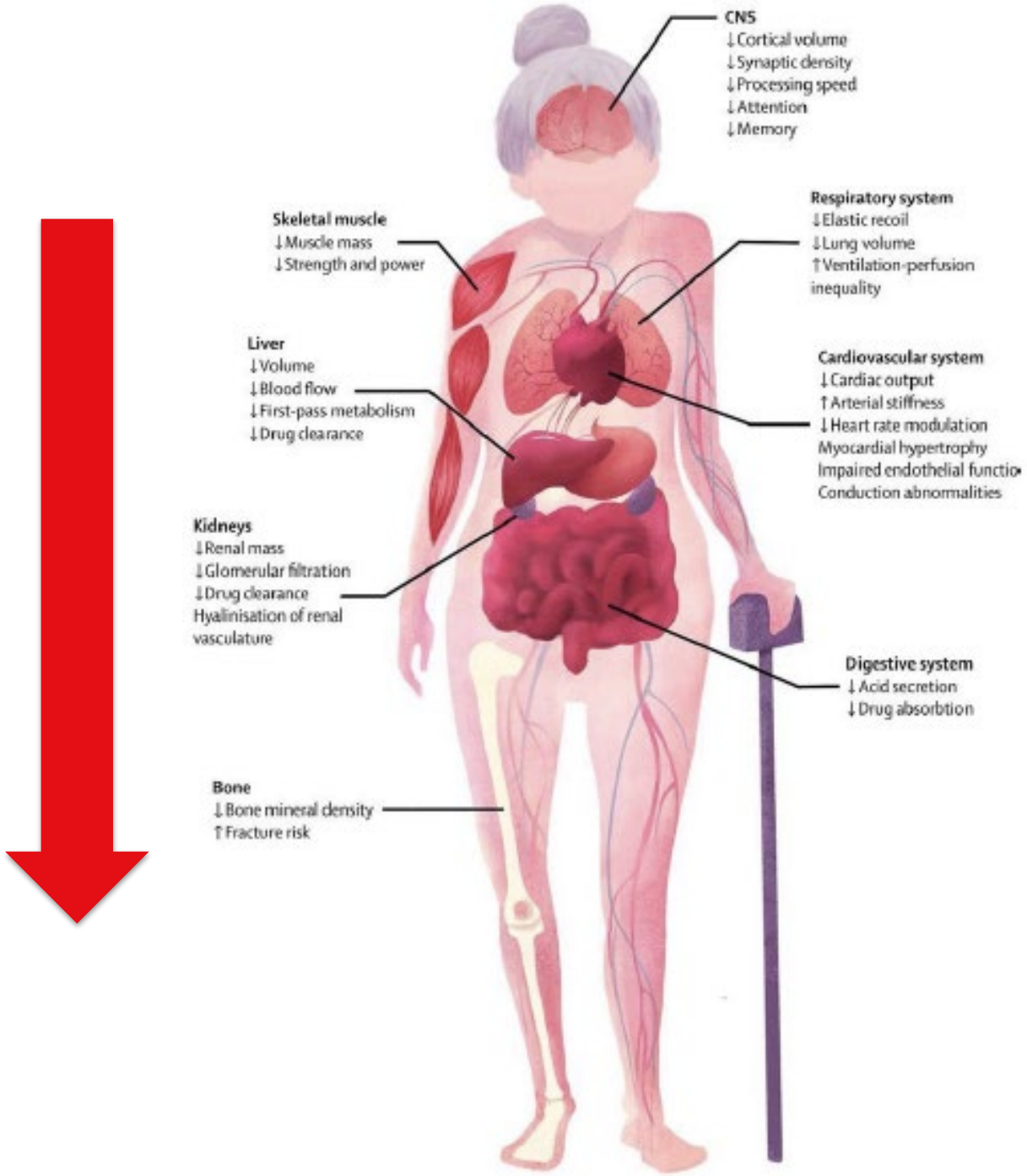
“Every new symptom in an older adult is a medication side effect until proven otherwise”

Dr Mike Steinman, geriatrician, UCSF

Physiology of aging



Physiology of aging



Q

Which statement is FALSE regarding physiological change of aging in older adults?

A. Decreased hepatic blood flow
B. Decreased lean mass
C. Decreased intestinal motility
D. Increased fat mass
E. Increased total body water

A

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B. Decreased lean mass
C. Decreased intestinal motility
D. Increased fat mass
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Q

Which statement is <u>true</u> regarding physiological changes in older adults?

A. A water-soluble drug will have an increased distribution volume and therefore a decrease effect
B. The absorption of drug by the gastro-intestinal system does not change significantly with age
C. The liver metabolism is responsible for the main elimination of drugs
D. The creatinine clearance has a direct variation with weight and is increased with women
E. The metabolism rate decrease by 50% at the age of 50 years old.

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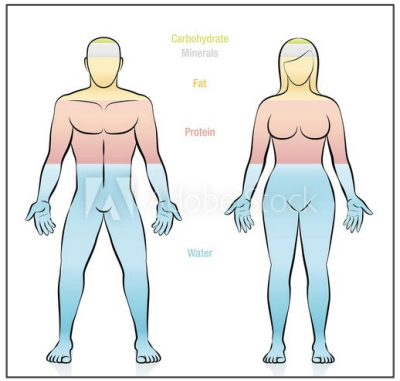
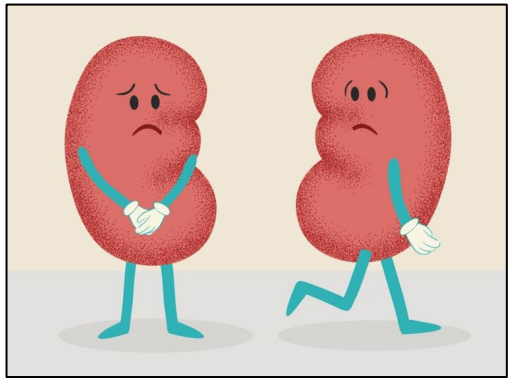
E. The metabolism rate decrease by 50% at the age of 50 years old.

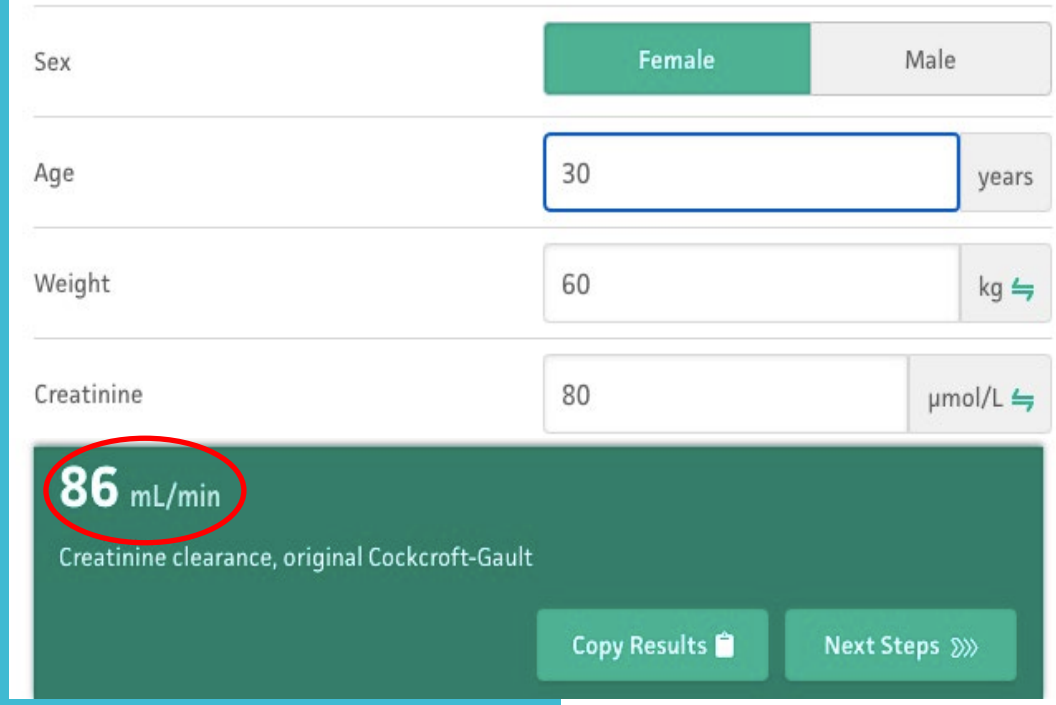
Pharmaco-kinetics

aka .....what the body does to the drug

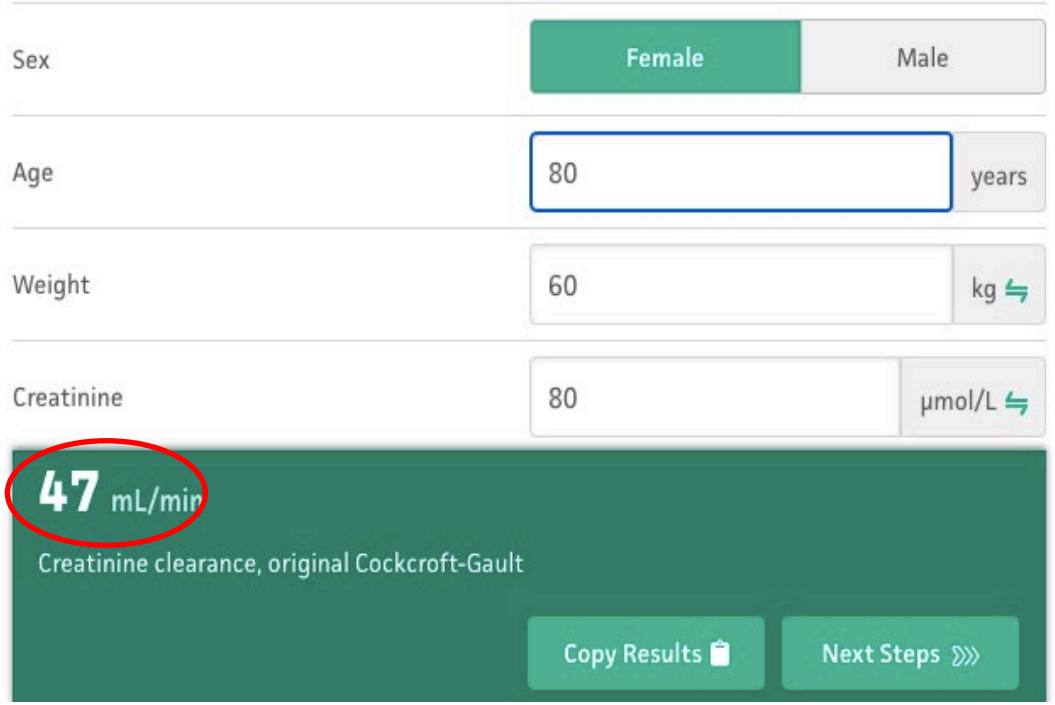
Pharmaco-kinetics

ABSORPTION 	DISTRIBUTION 
METABOLISM 	ELIMINATION 

30 year old

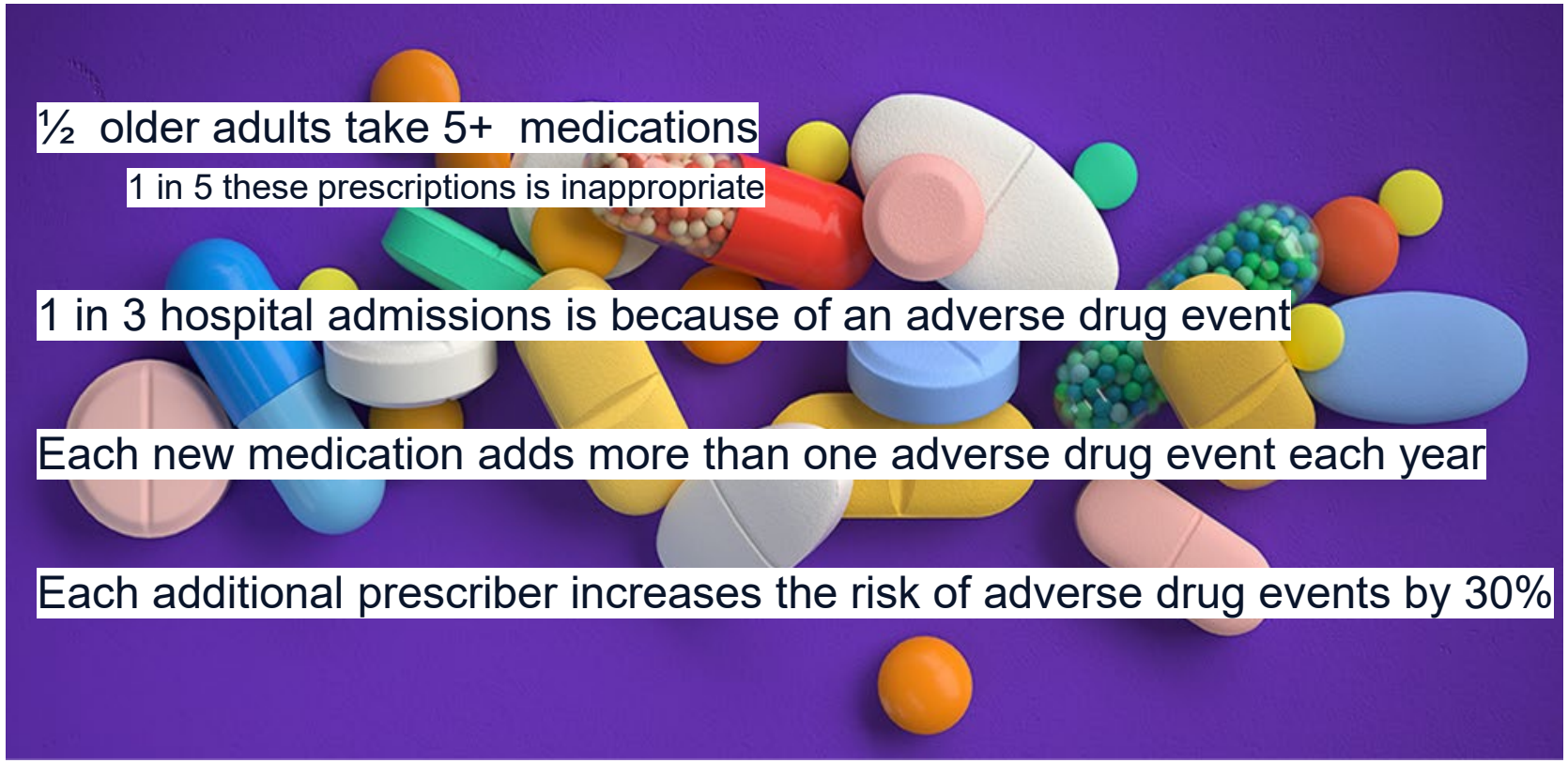


80 year old



Polypharmacy

polypharmacy



Q

Polypharmacy increases risks for all the following except for one, which one?

A. Worsening outcomes in disease management
B. Medication interactions
C. Prescribing cascade
D. Adverse effects
E. Decreased compliance

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polypharmacy

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Q

Which combination of drugs is NOT an antagonist choice?

A. Ondansetron + Dimenhydrinate
B. Amoxicillin-clavulanic acid + probiotic
C. Donepezil + Diphenhydramine
D. Salbutamol + Propranolol
E. Levodopa + Haloperidol

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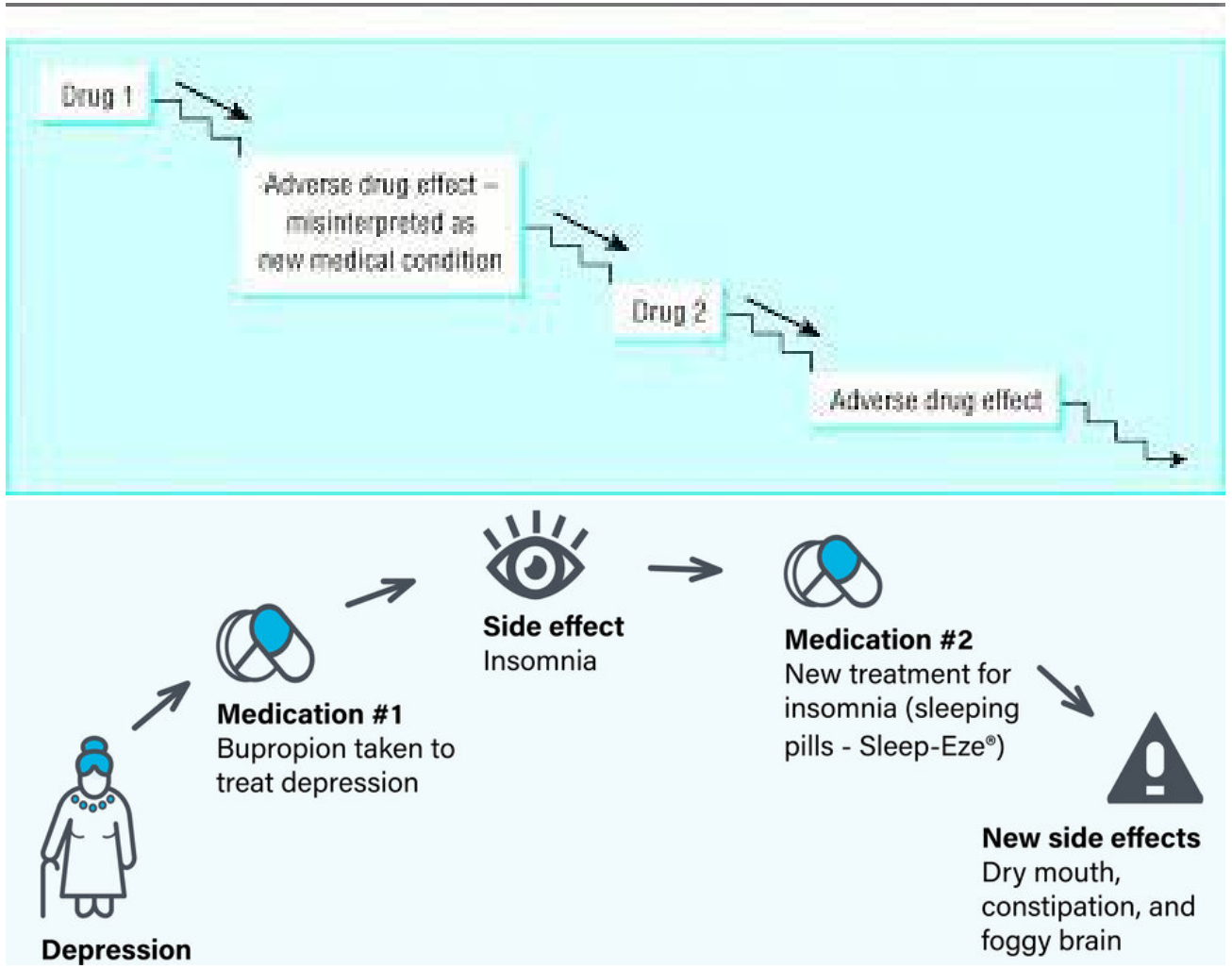
Rx Cascade

Prescribing Cascade



Source: google images

Rx Cascade

pain → opioids → itch → Benadryl ©

Pain → opioids → nausea → Gravol ©

HTN → ACEi → cough → codeine

DeRx-ing

- ED is not the safest location to start BUT…
  - *Identify concerning medications*
- Encourage GP/pharmacy to review medications
  - Gerimedrisk.com
- Consider de-prescribing standing NSAIDs
- Consider benzo tapering (EMPOWER trial)

Q

79y0M, presents with a fall after getting out of bed. He complains of dizziness while standing up. His vitals signs are 140/90 lying and 110/70 standing, with a steady HR around 55. Blood work and xrays are unremarkable. He passed a walk test. He has stable CAD, HTN, and atrial fibrillation. You decide to evaluate his medication:

- **ASA 80mg daily**
- **Amlodipine 10mg daily**
- **Ramipril 10mg daily**
- **Metoprolol 50mg daily**
- **Atorvastatin 40mg daily**
- **Warfarin 4mg daily**
- **Vitamin D 1000 UI daily**

Which approach is the most appropriate for this patient?

A. D/C amlodipine, and decrease dose of metoprolol and ramipril

B. Decrease dose of ramipril

C. Decrease dose of metoprolol, leave a message to his family doctor to ensure a follow-up to re-evaluate current medication

D. Decrease dose of metoprolol, decrease dose of ramipril and order a bone density scan and a vitamin D level to evaluate the appropriate dose of vitamin D and indication of bisphosphonate

E. No change for the moment, the patient will see his family doctor tomorrow morning

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Harmful / high risk medications

Top 4 Rx associated with adverse events?

1) warfarin

2) insulin

3) oral antiplatelets

4) oral hypoglycemics

BEERS CRITERIA

Medications:

- to **avoid**
- use with **caution/avoid**
- that have **interactions**
- that are **dosed differently**

Benzos

Codeine

NSAIDS

Opioids

Insulin

Glyburide

Anticoagulants

Anticholinergics

Q

Which treatment option is a good balance between efficacy and safety for nausea in the older adult population?

A. Metoclopramide
B. Ondansetron
C. Dimenhydrinate
D. Ginger pill
E. Haloperidol

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Dangerous Medication combinations

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Hypoglycemics + B –blockers → unrecognized hypoglycemia

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ACEi /ARBs + NSAIDs

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SSRI/SNRI + NSAIDS/ASA

Steroids + NSAIDS

Dangerous Medication Combinations

Hypoglycemics + B –blockers → unrecognized hypoglycemia

ACEi /ARBs + NSAIDs → htn

SSRI/SNRI + NSAIDS/ASA/warfarin → bleeding

Steroids + NSAIDS → bleeding

Dangerous Medication Combinations

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warfarin + abx

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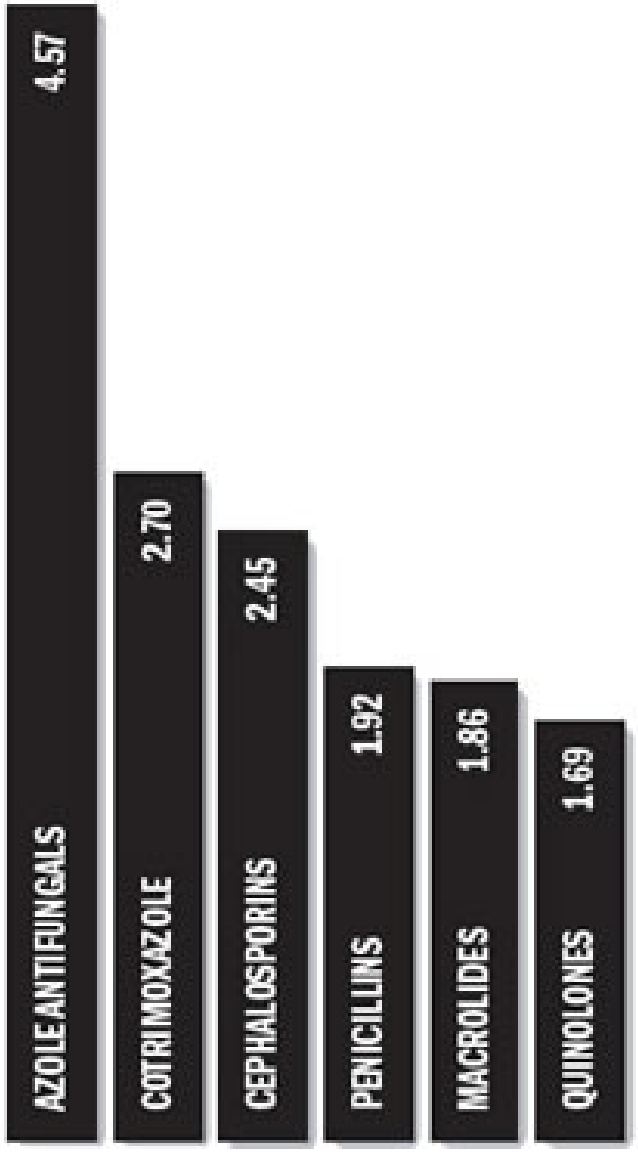
SSRI/SNRI + NSAIDS/ASA/warfarin → bleeding

Steroids + NSAIDS → bleeding

warfarin + abx → bleeding

Warfarin + _____ = bleeding



Dangerous Medication Combinations

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Septra + sulfonylurea

Dangerous Medication Combinations

Hypoglycemics + B –blockers → unrecognized hypoglycemia

ACEi /ARBs + NSAIDs → htn

SSRI/SNRI + NSAIDS/ASA /warfarin → bleeding

Steroids + NSAIDS → bleeding

warfarin + abx → bleeding

Septra + ACE/ARB → hyperkalemia

Septra + sulfonylurea → hypoglycemia

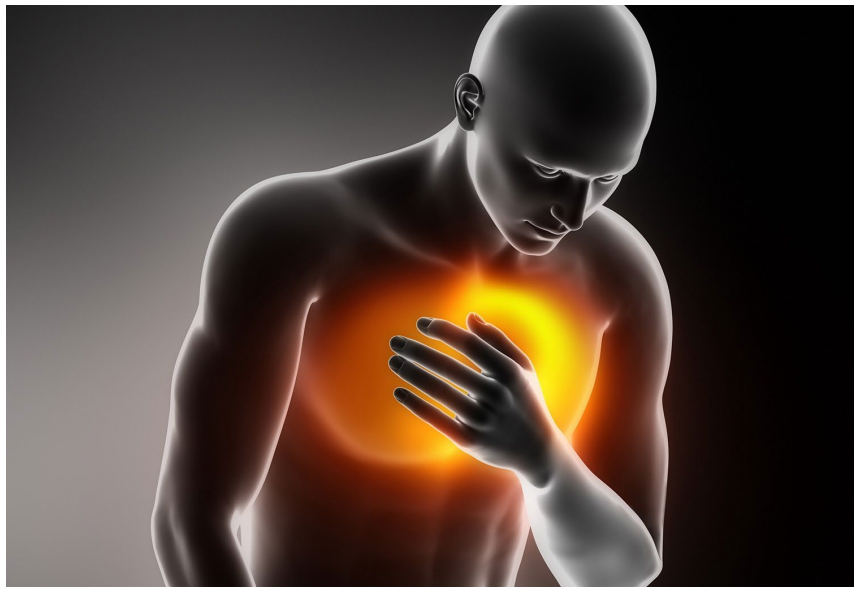
Treatment of common issues in the ER

Pain

Agitated delirium/BPSD

Procedural Sedation

PAIN



PAIN

ACETAMINOPHEN

NSAIDS

OPIOIDS

NEUROPATHIC AGENT

PAIN

ACETAMINOPHEN

- max 2500 mg in chronic users
- Hepatic dysfunction → ↓ dose by ½

PAIN

NSAIDS

- short courses and only for inflammatory condition
- topical > PO
- indomethacin highest rates of CNS issues
- caution if on steroids or renal dysfunction or anticoagulants
- Increase risk of serious bleeds (RR ~ 3)

PAIN

MORPHINE

- Caution in renal insufficiency (accumulation and sedation)
- Caution in hepatic insufficiency (increased T 1/ and bioavailability)
  - Decreased DOSE and FREQ

HYDROMORPHIINE

- ESRD will have a 4x longer half life (avoid if GFR <30mL/min)
- Caution in hepatic insufficiency
  - Decreased DOSE to 1/3 of usual

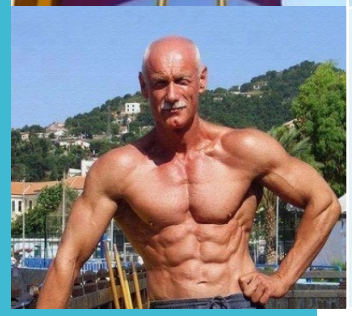
↓25 % for a 60-year-old
↓ 50 % for an 80-year-old

PAIN

Frail or robust?

Opioid naive or not?

PAIN



HYDROMORPHONE	MORPHONE
0.5-1mg PO 0.2-0.5mg IV/SC	2.5-5mg PO 1-2mg IV/SC
1-2mg PO 0.5-1mg IV/SC	5-10mg PO 2-5mg IV/SC

And codeine?

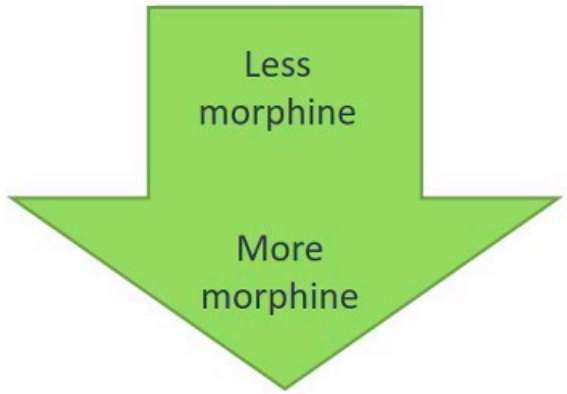
- Codeine -> morphine
- Metabolizer status varies
- Studies in Caucasian population :

Poor 5-10%

Intermediate 2-11%

Extensive 77-92%

Ultrarapid 1-2%

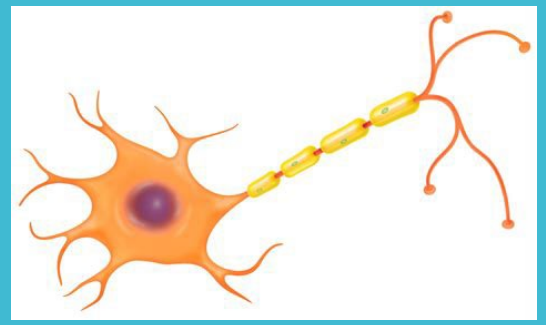


PAIN

If Rx-ing opioids, always prescribe something for →

- senna TT OD-BID
- lactulose 15-30mL OD-BID
- PEG 3350 17g OD-TID

PAIN: neuropathic pain



Gabapentin / Pregabalin

- use lowest effective dose
- caution if concurrent use with opioids
- adjusted for renal impairment

TCA

- anticholinergic

Duloxetine

- SIADH
- falls

Q

Mr. Kepner is 81 years old and has an end-stage colon cancer widely metastatic. He came in for inadequate pain management at home. He takes hydromorphone ER 6mg TID and all breakthroughs of hydromorphone 2mg q3hrs. What is the appropriate approach for pain management?

A. Call the palliative care team and transfer care
B. Prescribe morphine 15mg IV q 15 min and re-evaluate
C. Prescribe hydromorphone 1mg IV q 15 min x 3 PRN then re-evaluate
D. Start with acetaminophen 1000mg PO, then reassess in 30 minutes
E. Refer this patient to the pain clinic

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Refractory Agitation

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NO mortality benefit

NO improvement in severity

NO improvement in time to resolution

Burry et al. *Cochrane Database Syst. Rev.* 2018

Haldol 0.25-0.5mg IM/IV/PO

Olanzapine 2.5-5mg PO/IM

Risperidone 0.25mg PO

Quetiapine 12.5-25mg PO (safest in Parkinson's/LBD)

Benzodiazepines (except with EtOH or benzo withdrawal)

Ketamine

Off label
No evidence
Measure QTc

Procedural Sedation

Procedural Sedation

Hematoma blocks

Nerve blocks

Procedural Sedation:

Propofol

- lower doses required
  - 18-40 yo = 1.4 mg/kg
  - >65 yo = 0.9 mg/kg
- Increased risk of airway complications

Patanwala 2013, Weaver 2011, Taylor 2011

Procedural Sedation:

Ketamine

- Limited studies in older adults
- Increased BP and myocardial O_2 demand

Procedural Sedation:

Etomidate

Cicero 2011

- 0.14mg/kg
- No sig dif btn complications between older and younger adults
  - Vomiting, hypoxia, htn

Homfray et al. Procedural sedation of elderly patients by emergency physicians: a safety analysis of 740 patients. 2018 Brit J of Anes.

- 740 patients, 84 years old
  - 571 patients received propofol
  - 142 morphine and midazolam
  - 27 other agents
- 19 sentinel events: 2 cases of hypoxia, 10 of apnea, 5 of hypotension, and 2 of both hypoxaemia and hypotension
- no adverse outcomes.
- adverse event rate of 2.6%
- Recommend propofol bolus of no more than 0.5 mg kg

Weaver et al.

ED procedural sedation of elderly patients: is it safe? 2011. Amer. J Emerg.

- prospective, observational study of EDPS patients at least 65 years old, as compared with patients aged 18 to 49 and 50 to 64 years
- 65 years old (50 pts) → 8% adverse event
- 50 - 64 years old (149 pts) → 5.4% adverse event
- 18 - 49 years old (665 pts) → 5.2% adverse event

Procedural Sedation

- **generally safe**
- Do **local block** if able
- **take extra precautions** – may require bagging and help with hypotension
- **lower doses**

Breakout room
Mr Holly
Ms Kringle

Mr Holly

1. List 4 things on his medication list that may be associated with his presentation?
2. It is currently Saturday of a long weekend. What, if any, changes to his medications would you make?
3. How would you counsel the patient/family upon discharge?

Ms Kringle

1. What, if any, changes to the patient's medications would you make?
   Please be specific and explain your answer/reasoning.

2. It is Saturday night - both the GEM nurse and SW are not available. How would you counsel/ what else would you do for this patient?

Key Points

GO SLOW and start LOW

Elderly people are excluded from many drug trials

Adding a medication to pt on warfarin? ….. think about decreasing dose, limiting duration and re-checking INR sooner

Calculate Creatinine Clearance before Rx new drugs

Communicate medication changes

For every elderly pt with a new symptoms, ask yourself, can this presentation be related to medication issues!!

References

Lexicomp (subscription)

ADEPT tool

American geriatric society (BEERS)- https://www.americangeriatrics.org/publications-tools

STOPP/START tool (https://docs.wixstatic.com/ugd/2a1cfa_8ee866ed1cfb4f0681a5e422c1891f1a.pdf)

http://medstopper.com/ - tool to help with the decision to stop medications

https://deprescribing.org/resources/deprescribing-information-pamphlets/ - Algorithms and guidelines for discontinuing/tapering PPIs, antihyperglycemics, antipsychotics, benzos, and cholinesterase inhibitors

http://www.acbcalc.com/ - anticholinergic properties

https://drug-interactions.medicine.iu.edu/MainTable.aspx- Flockhart Cytochrome P450 Drug Interaction Table

MedsCheck – medication review that can be completed by any community pharmacist for free annually, for patients on 3+ medications who have a chronic medical condition (http://www.health.gov.on.ca/en/pro/programs/drugs/medscheck/medscheck_original.aspx)

EMPOWER for benzo deprescribing (http://www.criugm.qc.ca/fichier/pdf/BENZOeng.pdf)

Thank you

Thank you to Drs Don Melady , Marie-Pier Lanou, Thom Ringer, Rebecca Schonnop, Christopher Skappak, Brittany Ellis and Audrey-Anne Brousseau for their previous slides

UTI

Macrobid

- Doesn't work if GFR < 40

Cipro

- Avoid if on steroids or warfarin

Septra

- Avoid if on ACE/ARB, warfarin, sulfonylurea
- Renal adjustment

Keflex

- Renal adjustment

Amox-clav

- Renal adjustment

STOPP criteria

Predictive validity of the Beers and STOPP Criteria to detect adverse drug events, hospitalizations, and emergency department visits in the United States. Joshua et al. J Am Geriatr Soc.

All three criteria were modestly prognostic for ADEs, EDs, and hospitalizations with the STOPP Criteria slightly outperforming both Beers Criteria.

With low sensitivity, low specificity, as well as low agreement between the criteria, these criteria can be used in a complementary fashion to enhance sensitivity of detecting ADEs

BEERS CRITERIA

- opioids + benzos/gabapentinoids
- Septra + ACE/ARB
- H2-receptor antagonists in patients with delirium
- Caution with ASA for primary prevention of cardiovascular disease/ colorectal cancer in patients > 70 due to increased risk of bleeding
- Avoid SNRIs in patients with a history of falls or fractures
- Avoid sliding-scale insulin due to the risk of hypoglycemia (unless patients are also on basal or long-acting insulin)

Abx & warfarin

Antibiotics in the same class have similar effects on INR:

- Cephalosporins may increase INR by inhibiting production of vitamin K-dependent clotting factors.[6,13]
- Fluoroquinolones may increase INR by inhibiting warfarin metabolism, displacing warfarin from protein-binding sites, or disturbing intestinal flora that synthesizes vitamin K.7,13
- Isoniazid may increase INR by inhibiting warfarin's metabolism.[9,13]
- Macrolides and metronidazole may increase INR by inhibiting warfarin's metabolism.[4,8,13]
- Penicillin may increase bleeding risk by inhibiting platelet function.[12,13]
- Rifampin may decrease INR by inducing warfarin's metabolism.[10,13]
- Sulfonamides may increase INR by inhibiting warfarin metabolism, displacing warfarin from protein-binding sites, or disturbing intestinal flora that synthesizes vitamin K.[5,13]
- Tetracyclines increase INR by an unknown mechanism, potentially inhibiting warfarin metabolism and plasma prothrombin activity.[11,13]

Framework for considering treatment goals for glycemia, blood pressure, and dyslipidemia in older adults with diabetes[1]

Patient characteristics/health status	Rationale	Reasonable A1C goal*	Fasting or preprandial glucose	Bedtime glucose	Blood pressure	Lipids
Healthy (few coexisting chronic illnesses, intact cognitive and functional status)	Longer remaining life expectancy	<7.5% (58 mmol/mol)	90 to 130 mg/dL (5.0 to 7.2 mmol/L)	90 to 150 mg/dL (5.0 to 8.3 mmol/L)	<140/90 mmHg	Statin unless contraindicated or not tolerated
Complex/intermediate (multiple coexisting chronic illnesses¶ or 2+ instrumental ADL impairments or mild-to-moderate cognitive impairment)	Intermediate remaining life expectancy, high treatment burden, hypoglycemia vulnerability, fall risk	<8.0% (64 mmol/mol)	90 to 150 mg/dL (5.0 to 8.3 mmol/L)	100 to 180 mg/dL (5.6 to 10 mmol/L)	<140/90 mmHg	Statin unless contraindicated or not tolerated
Very complex/poor health (LTC or end-stage chronic illnessesΔ or moderate-to-severe cognitive impairment or 2+ ADL dependencies)	Limited remaining life expectancy makes benefit uncertain	<8.5%* (69 mmol/mol)	100 to 180 mg/dL (5.6 to 10 mmol/L)	110 to 200 mg/dL (6.1 to 11.1 mmol/L)	<150/90 mmHg	Consider likelihood of benefit with statin (secondary prevention more so than primary)

Strategies to replace sliding scale insulin in patients with type 2 diabetes residing in long-term care

Current regimen	Suggested steps
SSI is the sole mode of insulin treatment	▪ Review average daily insulin requirement over prior 5 to 7 days. ▪ Give 50 to 75% of the average daily insulin requirement as basal insulin. ▪ Stop SSI. ▪ Use noninsulin agents or fixed-dose mealtime insulin for postprandial hyperglycemia. ▪ Consider giving basal insulin in the morning to impact postprandial hyperglycemia and reduce risk of early-morning hypoglycemia.
SSI is being used in addition to scheduled basal insulin	▪ Add 50 to 75% of the average insulin requirement used as SSI to the existing dose of basal insulin. ▪ Use noninsulin agents or fixed-dose mealtime insulin for postprandial hyperglycemia.
SSI is being used in addition to basal and scheduled mealtime insulin (ie, correction dose insulin)	▪ If correction dose is required frequently, add the average correction dose before a meal to the scheduled mealtime insulin dose at the **preceding** meal. For example, if glucose values are consistently elevated before lunch or dinner requiring 2 to 3 unit corrections, the scheduled breakfast or lunchtime dose of insulin could be increased by the average correction dose (2 units), respectively. Similarly, if glucose values are consistently elevated before breakfast requiring correction doses, the scheduled basal insulin dose could be increased by the average correction dose used.
SSI is used in short term due to irregular dietary intake or due to acute illness	▪ Short-term use may be needed for acute illness and irregular dietary intake. ▪ As health and glucose levels stabilize, stop SSI and return to previous regimen as tolerated.
Wide fluctuations in glucose levels in patients with cognitive decline and/or irregular dietary intake on a chronic basis	▪ Use scheduled basal and mealtime insulin based on individual needs with the goal of avoiding hypoglycemia. ▪ May use a simple scale, such as "give 4 units of mealtime insulin if glucose >300 mg/dL." ▪ Keep patients hydrated, especially when glucose levels are high (eg, >300 mg/dL).

Antihistamines	**Diphenhydramine, hydroxyzine**
Antidepressants	**Amitriptyline**, doxepin, imipramine, desimpramine, **nortriptyline, paroxetine**
Antiemetics	**Dimenhydrinate**, **prochlorperazine,** promethazine
Antipsychotics	**Olanzapine**, thiroridazine, **quetiapine**, clozpine, chlorpromazine
Cardiovascular	**Furosemide, digoxin, nifedipine, disopyramide dinitrate**
GI	Diphenoxylate, antispasmodics,cimetidine, **ranitidine**
Muscle relaxants	Dantrolene, cyclobenzaprine
Parkinsonian agents	**Amantadine, benztropine**,
Urinary incontinence	**Oxybutynin, tolterodine,** propantheline

Medication Appropriateness Index

Table 1. Medication Appropriateness Index[8]	
Question	score[(a)]
1. Is there an indication for the drug?	3
2. Is the medication effective for the condition?	3
3. Is the dosage correct?	2
4. Are the directions correct?	2
5. Are the directions practical?	2
6. Are there clinically significant drug-drug interactions?	2
7. Are there clinically significant drug-disease/condition interactions?	1
8. Is there unnecessary duplication with other drug(s)?	1
9. Is the duration of therapy acceptable?	1
10. Is this drug the least expensive alternative compared with others of equal utility?	1
Maximal score of inappropriateness	18
[a]A weight of three is given for indication and effectiveness. A weight of two is assigned to dosage, correct directions, practical directions and drug-drug interactions. A weight of one is assigned to drug-disease interactions, expense, duplication and duration.[9] These results in a total combined score of 0 to 18 (0 meaning the drug is appropriate and 18 representing maximal inappropriateness).	