

A Review of Dosing Recommendations for Overweight and Obese Patients

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Aim

- To evaluate the literature regarding medication dosage recommendations for overweight and obese patients
- To determine if these recommendations are reflected in standard reference texts
 - AMH, eTG, Micromedex, MIMs, RCHP

Method

- Extensive database searching:
 - The Cochrane Library, ACP Journal Club, Evidence Based Medicine, MEDLINE, Embase, CINAHL, BMJ Best Practice, Up-To-Date, CPG websites
- MESH search terminology:
 - obesity, overweight, dose response, drug therapy, dosing, dose

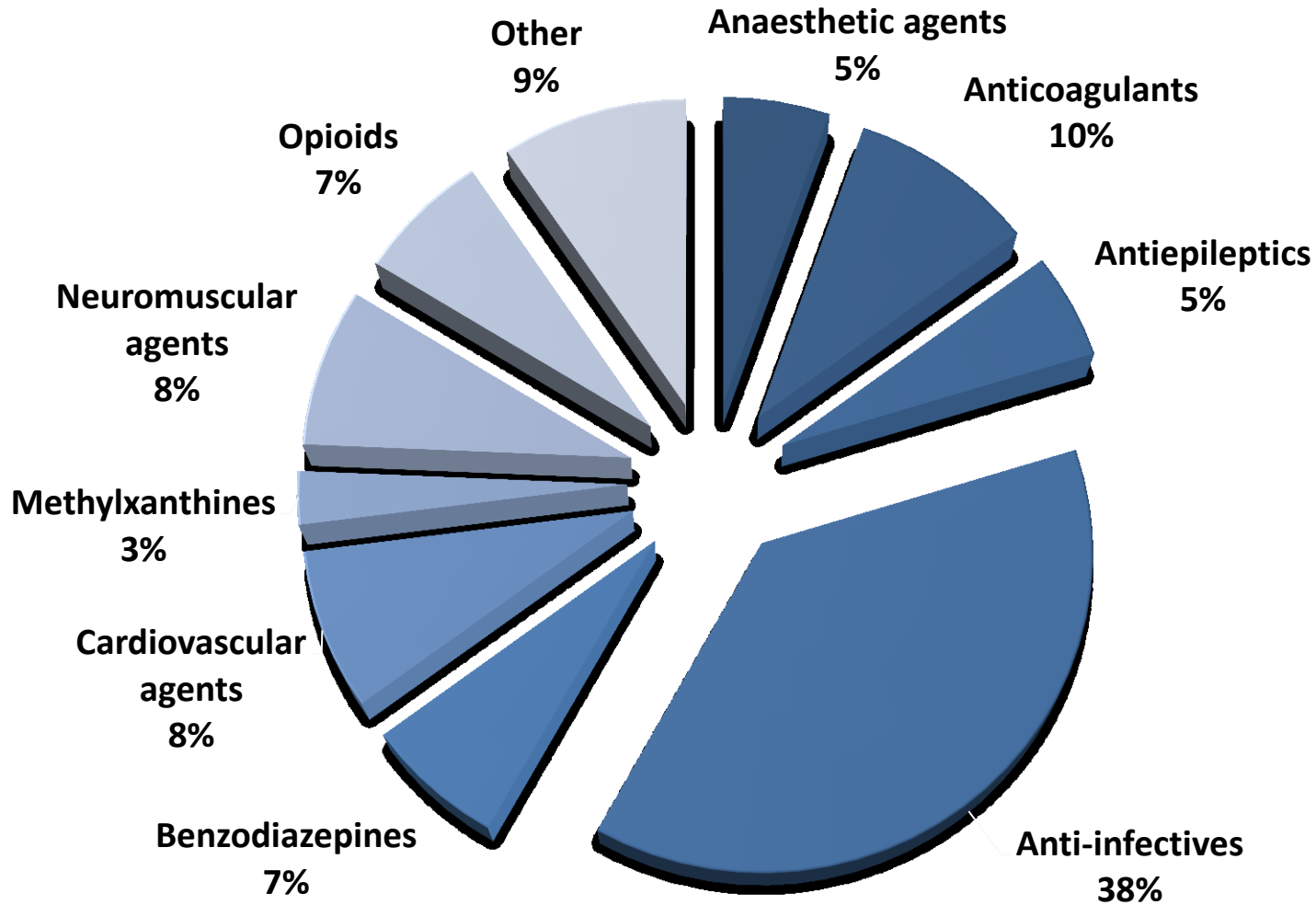
Method

- Limits: English language, full text, humans
- Citations selected based on title and abstract content
- Exclusions: anti-neoplastic agents and medications not registered in Australia

Results

- **30 articles** retrieved
- Recommendations for dosing **75 medications** or **classes**

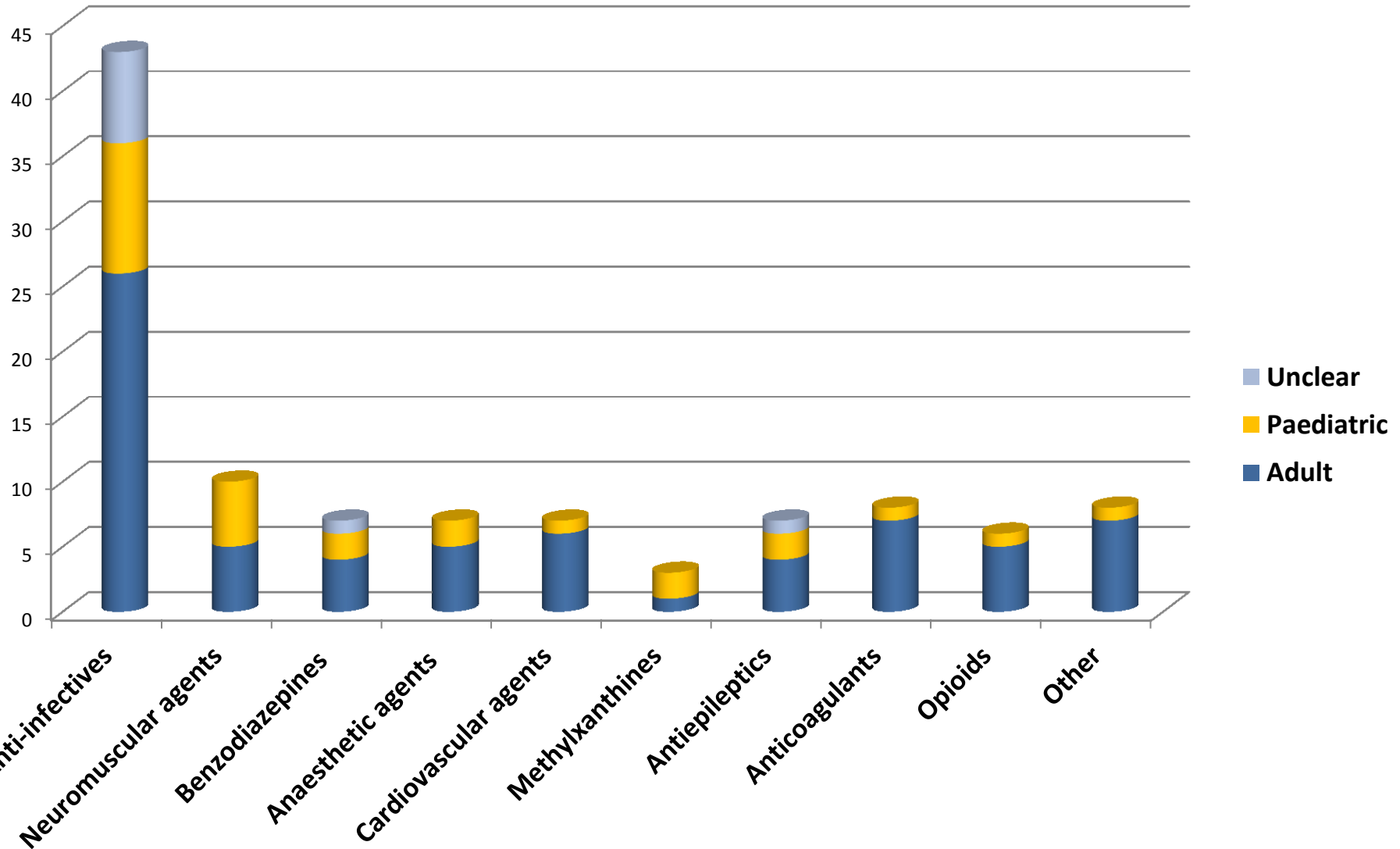
Results: Therapeutic Categories



Results: Study Population

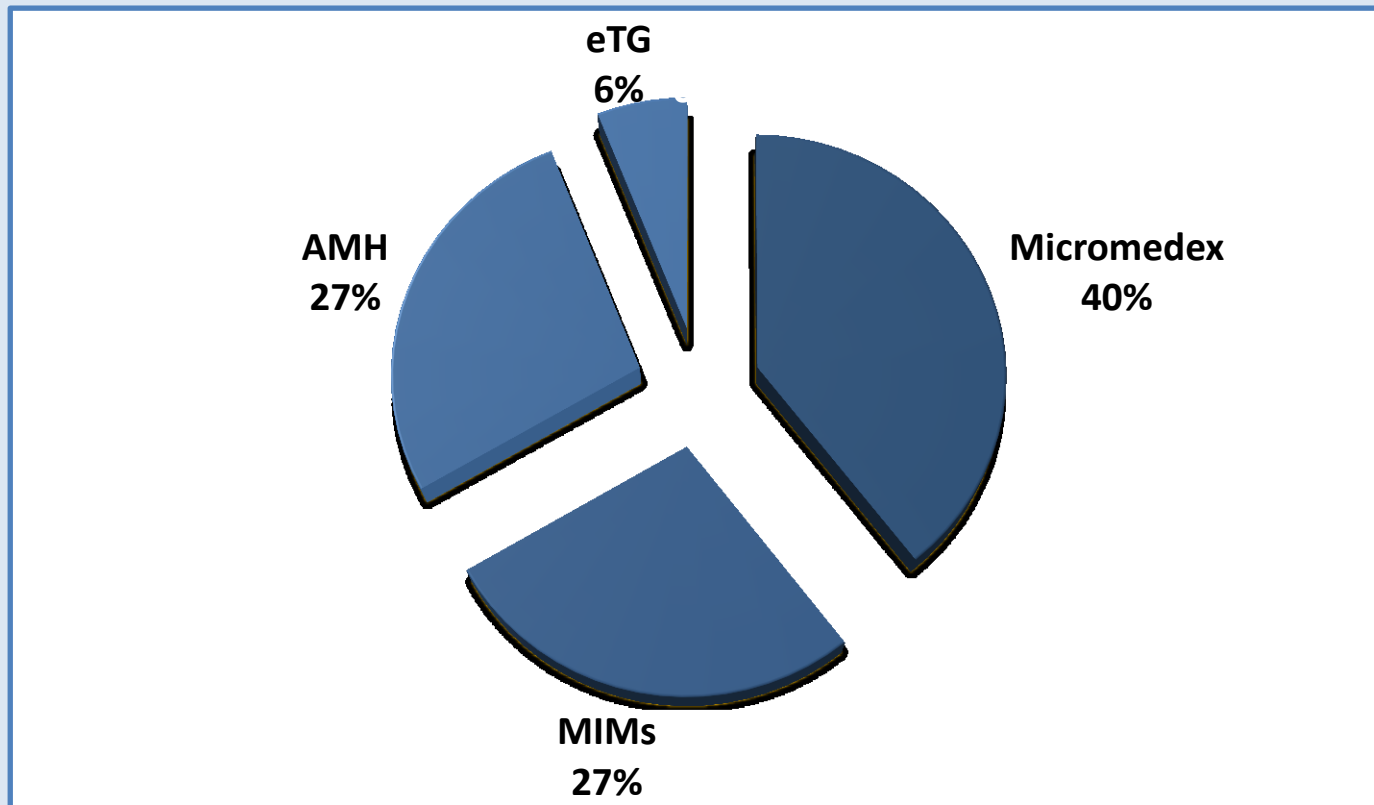
- Adults: 68 medications/classes
- Paediatrics: 28 medications/classes
 - Of which 60% were extrapolated from adult data
- Unclear: 9 medications/classes

Results: Study Population



Results: Reference Texts

- 21 medications with recommendations matching standard reference texts = 29%



Medication	Population	Recommendation	Micromedex	MIMs	AMH	eTG
Alprazolam	Adult	IBW	x			
Amikacin	Adult	ABW factor = 0.4	x		x	
Atracurium	Adult	IBW			x	
Cisatracurium	Adult & Paed	IBW			x	
Daptomycin	Adult	TBW		x		
Enoxaparin	Adult	Tm: TBW + anti-Xa up to 150kg	x	x	█	█
Fondaparinux	Adult	VTE prophylaxis: std dose, not higher	x	x		x
Gentamicin	Adult & Paed	ABW factor = 0.4	x		x	
Lepuridin	Adult	TBW up to 110kg		x		
Methylprednisolone	Adult	IBW	x			
Midazolam	Paediatric	IBW	x			
Phenobarbitone	Adult	TBW + TDM		x		
Phenytoin	Adult	IV load: ABW factor = 1.33	x			
Remifentanyl	Adult	IBW	x	x		
Rocuronium	Adult & Paed	IBW			x	
	Adult	1st dose TBW	x			
Sugammadex	Paed (males)	TBW		x		
Suxamethonium	Adult & Paed	TBW			x	
Theophylline	Adult & Paed	IBW			x	
Tobramycin	Adult & Paed	ABW factor = 0.4	x	x	x	
Vancomycin	Adult & Paed	TBW + TDM	x			x
Vecuronium	Adult & Paed	IBW	x	x	x	

Results: Conflicting Recommendations

- 25% within literature and between standard texts
 - 48 yo male, 160 kg, 195 cm, BMI = 42
 - Rocuronium intubation bolus: 0.6 mg/kg

Dose adjustment recommendation	Calculated dose example
Literature, Micromedex: TBW	96 mg
MIMs: LBW	54 mg
Literature, AMH: IBW	53 mg
eTG: no recommendation	?assume use TBW

Results: Dose Adjustment Methods

- IBW: Ideal Body Weight
 - ♂ = $50 \text{ kg} + 0.9 \text{ kg/each cm over } 152 \text{ cm}$
 - ♀ = $45.5 \text{ kg} + 0.9 \text{ kg/each cm over } 152 \text{ cm}$
- TBW : Total Body Weight
- ABW: Adjusted body weight
- DWCF: Dosing weight correction factor
 - = $IBW + factor \times (TBW - IBW)$

Results: Dose Adjustment Methods

- DW: Dosing weight
 $= IBW + 0.4 \times (TBW - IBW)$
- LBW: Lean Body Weight
 $= (1.10 \times TBW) - (a \times BMI \times TBW)$
(♂ $a = 0.0128$) (♀ $a = 0.0148$)
- Pharmacokinetic (PK) mass:
 $= 52 / [1 + (196.4 \times e^{-0.025TBW} - 53.66) / 100]$

Limitations

- Search strategy
- Pharmacokinetics of drugs in obesity
- Study design
 - Most were small sample size, single centre
 - < 50 patients
 - Case report based on single patient
 - Different classifications of obesity

BMI Classifications

- Overweight BMI 25 – 29.9 kg/m²
- Obesity class I BMI 30 – 34.9 kg/m²
- Obesity class II BMI 35 – 39.9 kg/m²
- Extreme obesity BMI ≥ 40 kg/m²



Conclusions

- Lack of high quality information available regarding medication dosing in obesity
- Conflicting recommendations for the same medication
- Often no recommendation is provided in standard reference texts
- Where a recommendation is made, this frequently differs to recommendations found in the literature
- Further research is needed to guide clinicians in regards to dosing of medications for overweight and obese patients

References & Complete Results

- Available on request:
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