



FACULTY OF PHARMACY  
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# Evaluating Renal Drug Dosing Appropriateness in Patients with Reduced Glomerular Filtration Rate

## A Consensus Across Multiple Drug Information Sources

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## Introduction

Various drug information sources provide recommendations for adjusting medication dosing in patients with reduced glomerular filtration rate.

Discrepancies in recommendations regarding dose adjustments or contraindications can contribute varying prevalence of inappropriate drug prescribing in patients with reduced glomerular filtration rate.

## Aims

This study aims to assess the prevalence of inappropriate renal drug dosing and the use of contraindicated medications in patients with reduced glomerular filtration rate, based on a consensus of SmPC and other drug information sources.

Additionally, it aimed to identify medications most frequently subject to inappropriate renal dosing adjustments and contraindication.

## Methods

**Design:** cross-sectional study

**Data source:** previous study<sup>1,2</sup> evaluating the contribution of adverse drug events to unplanned hospitalizations at University Hospital Hradec Králové (Czech Republic).

**Population:** patients admitted at University Hospital Hradec Králové with an estimated glomerular filtration rate below 60 ml/min and with at least one medications in their medication history

**Main information source:**

- Summary of product characteristics (SmPC)

**Other information sources:**

- Renal Drug Handbook
- British National Formulary
- Uptodate
- Micromedex

**Consensus definition:**

Renal drug dosing adjustment required according to the SmPC and at least two other drug information sources

## Results

Of 375 included CKD patients, 57 (15%, 95% CI 12–19) received drug dosages that were inconsistent with recommended renal dosing adjustments. Fenofibrate and metformin represented the medication most frequently dosed inappropriately. The prevalence of patients prescribed at least one contraindicated medication was 4%, with fenofibrate, metformin, dabigatran, ibandronate, and nitrofurantoin being the most common.

The most frequent medications	N	Most common prescribed daily dose	Most common required adjustment	Recommended drug dosage adjustments				
				SmPC	BNF 85	Micromedex	UpToDate	Renal Drug Handbook
fenofibrate	10	267 mg	67 mg	< 60: 67 mg	< 60: 67 mg	Initial only	< 80: 67 mg	< 60: 134 mg
metformin	9	1500 mg	1000 mg	< 45: 1000 mg	Reduce dose	Assess the benefits & risks	< 45: 1000 mg	< 45: 1000 mg
ramipril	8	10 mg	5 mg	< 60: 5mg/day	< 60: 5mg/day	< 40: 5mg/day	< 30: 5mg/day	Initial only
spironolactone	7	50 mg in HF	25 mg in HF	< 30: reduce the dose or prolong the interval	Monitor potassium	Initial only	< 50: 25 mg	< 50: 50% of normal dose
levocetirizine	4	5 mg	5 mg eod	< 50: 5 mg eod	< 50: 5 mg eod	<50: 2,5 mg eod	<50: 2,5 mg eod	< 50: 5 mg eod
tropium	4	30 mg	20 mg	< 30: 15 mg	< 30: 20 mg	< 30: 20 mg	< 30: 20 mg	< 30: 20 mg
rivaroxaban	3	20 mg	15 mg	< 50: 15 mg	< 50: 15 mg	< 50: 15 mg	< 50: 15 mg	< 50: 15 mg
sitagliptin	3	100 mg	50 mg	< 45: 50 mg	< 45: 50 mg	< 45: 50 mg	< 45: 50 mg	< 45: 50 mg
gabapentin	2	1800 mg	900 mg	< 50: 900 mg	< 50: 900 mg	< 60: 1400 mg	< 50: 900 mg	Initial only
memantine	2	20 mg	10 mg	< 30: 10 mg	< 30: 10 mg	< 30: 10 mg	< 30: 10 mg	< 30: 10 mg
solifenacin	2	10-20 mg	5 mg	< 30: 5 mg	< 30: 5 mg	< 30: 5 mg	< 30: 5 mg	< 30: 5 mg
alogliptin	1	25 mg	12,5 mg	< 50: 12,5 mg	< 50: 12,5 mg	< 50: 12,5 mg	< 50: 12,5 mg	< 50: 12,5 mg
apixaban	1	5 mg twice a day	2,5 mg twice a day	< 30: 2,5 mg twice daily + s_crea & RF	< 30: 2,5 mg twice daily + s_crea & RF	s_crea > 133 mcmol/l and ≥80 years of age or body weight ≤60 kg: 2.5 mg twice daily	< 30: 2,5 mg twice daily s_crea & RF	< 30: 2,5 mg twice daily s_crea & RF
baclofen	1	110 mg	5 – 40 mg	5 mg	5 mg	< 50: 1/2 (40 mg)	< 80: 40 mg	< 50: 5 mg 3 times a day
ciprofibrate	1	100 mg	100 mg eod	< 60:100 mg eod	< 60:100 mg eod	< 60:100 mg eod	-	< 60:100 mg eod
dabigatran etexilate	1	150 mg twice	110 mg twice	< 50: 110 –150 mg twice daily	< 50: 110 –150 mg twice daily	< 30: 75 twice daily	< 30: 75 twice daily	< 50: 110 –150 mg twice daily
metoclopramide	1	20 mg	15 mg	< 60: 15 mg	< 60: 15 mg	< 60: 15 mg	< 60: 20 mg	no adjustment
pregabalin	1	450 mg	300 mg	< 60: 300 mg	< 60: 300 mg	< 60: 300 mg	< 60: 300 mg	Initial only
rosuvastatin	1	40 mg	< 40 mg	< 60: avoid 40 mg	< 60: avoid 40 mg	< 30: 10 mg	< 30: 10 mg	< 60: 20 mg
vildagliptin	1	100 mg	50 mg	< 50: 50 mg	< 50: 50 mg	< 50: 50 mg	< 45: 50 mg	< 50: 50 mg
amoxicillin	1	3 times a day	Twice a day	< 30: twice daily	< 30: reduce	< 30: twice daily	< 30: twice daily	< 10: 250 mg – 1 g every 8 hours

eod: every other day, HF: heart failure, RF: risk factors, s\_crea: creatinine

### List of medications that were contraindicated below 30 ml/min

Contraindicated medications*	N
metformin	3
fenofibrate	3
dabigatran etexilate	2
ibandronic acid	2
nitrofurantoin	2
alendronic acid	1
epplerone	1
naproxen	1

Medications listed as contraindicated in the SmPC without concordance from other information sources:

- acetylsalicylic acid (low-dose)
- hydrochlorothiazide, chlortalidone
- rosuvastatin
- gliclazide, glimepiride
- afluzosin

\* according to the consensus of SmPC with other information sources

Medications without concordance on renal drug dosing adjustments:

- perindopril
- lisinopril
- digoxin
- trimetazidine
- cetirizine



## Conclusion

Nearly one in six patients with reduced glomerular filtration rate received medication dosages that did not align with recommended renal drug dosing. Particular attention should be given to metformin dosing in patients with reduced glomerular filtration rate.

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