

# Improving medication safety in patients with renal failure – the pharmacist's perspective

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## Background and Objective

The aim of drug therapy is to optimize clinical outcomes while minimizing drug-therapy problems (DRPs). To accomplish this, pharmacists often work in close cooperation with clinicians, with the ultimate goal of improving patients' safety.

The objective of this study was to screen eligible patients for existing DRPs and then to subset those with renal insufficiency (RI). By doing so, we were able to compare risk factors in the renal group with those with normal renal function.

## Setting and Methods

Three month study in an acute care hospital involving patients from surgical, gastrointestinal and cardiology units. All DRPs identified were discussed with the physician. Risk-related parameters were tabulated in both groups and compared using independent Student's t-test with alpha 0.025 and 0.050.

## Main outcome measures

Identification of risk factors in RI patients and creating a list of drugs most frequently involved in DRPs in RI.

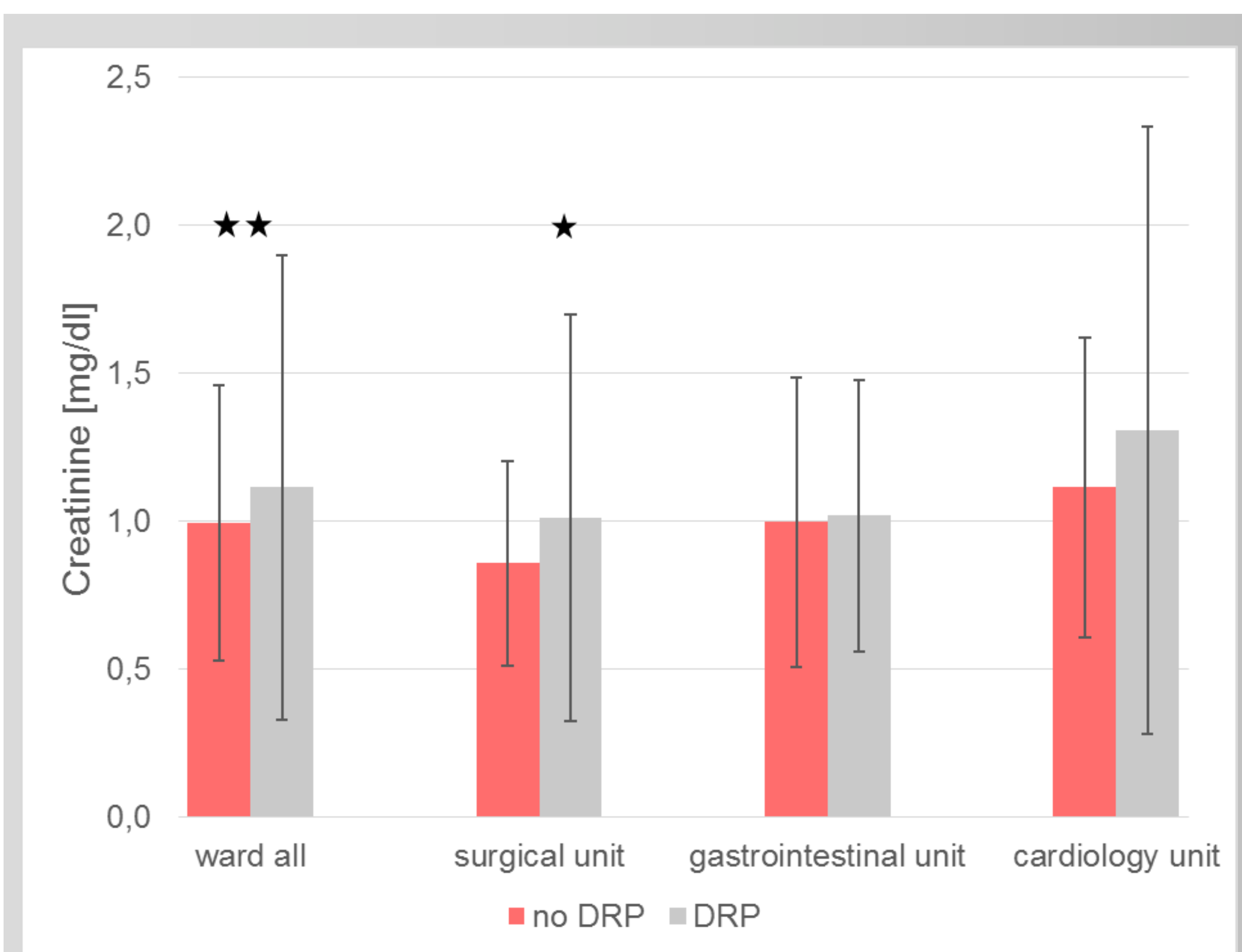


Diagram 1. Difference (mean, standard deviation) in the serum creatinine levels of patients with and without DRPs, ★ at the 0.025 and ★★ at the 0.050 level.

## Results

Of 617 patients screened (263 male, av. 71,2 years, av. number of drugs 8,5, and 28,5% on antibiotic therapy), 254 (41,1%) had 390 DRPs. 197 patients with RI were identified (GFR <60ml/min; 68 male, av. age 81, av. number of drugs 9,7, table 1). 98 RI patients (49,8%) had 173 DRPs, of which 34 were caused by antibiotic therapy. Categories of DRPs using the PI-Doc®-System [Schaefer M: Pharm World Sci 2002; 24(4): 120-127] in renal patients: 47 drug interactions, 64 dosing problems, 1 adverse drug reaction, 32 incorrect drug choices, and 29 others (diagram 2). 31 patients needed dose adjustment for renal insufficiency (DARI).

553 patients (238 ♂, av. 72,0±15,6 a, av. number of drugs 8,8±4,1, av. crea 1,0±0,6 mg/dl und 30% on antibiotic therapy) with complete lab data were included in the risk-related parameters analysis. As expected, there was a significant difference in patients with vs. patients without DRPs in the following parameters: age and serum creatinine levels (diagram 1). There was no significant difference in the average number of prescribed drugs.

The 10 most frequently involved drugs in RI patients covered 73% of the dose adjustments. Medication included esp. antihypertensive and antidiabetic drugs. Ranking list: Ramipril, Hydrochlorothiazide, Simvastatin, Metformin, Glimepiride, Cefuroxime, Sitagliptin, Enalapril, Spironolactone, Olmesartan. Three security-relevant DRPs were detected in the RI patients: no dose adjustment with Certoparin, Pregabalin and Digoxin – three drugs with a narrow therapeutic range.

Tab. 1. RI population.

ward	patients	female	male	years	GFR < 15	GFR 15-29	GFR 30-44	GFR 45-59	number of drugs	number of drugs/patient
1	59	43	16	82,76	1	7	28	23	638	10,81
2	54	38	16	78,54	0	11	19	24	484	8,96
3	84	48	36	81,89	6	19	23	36	782	9,31
	197	129	68	81,06	7	37	70	83	1904	9,70

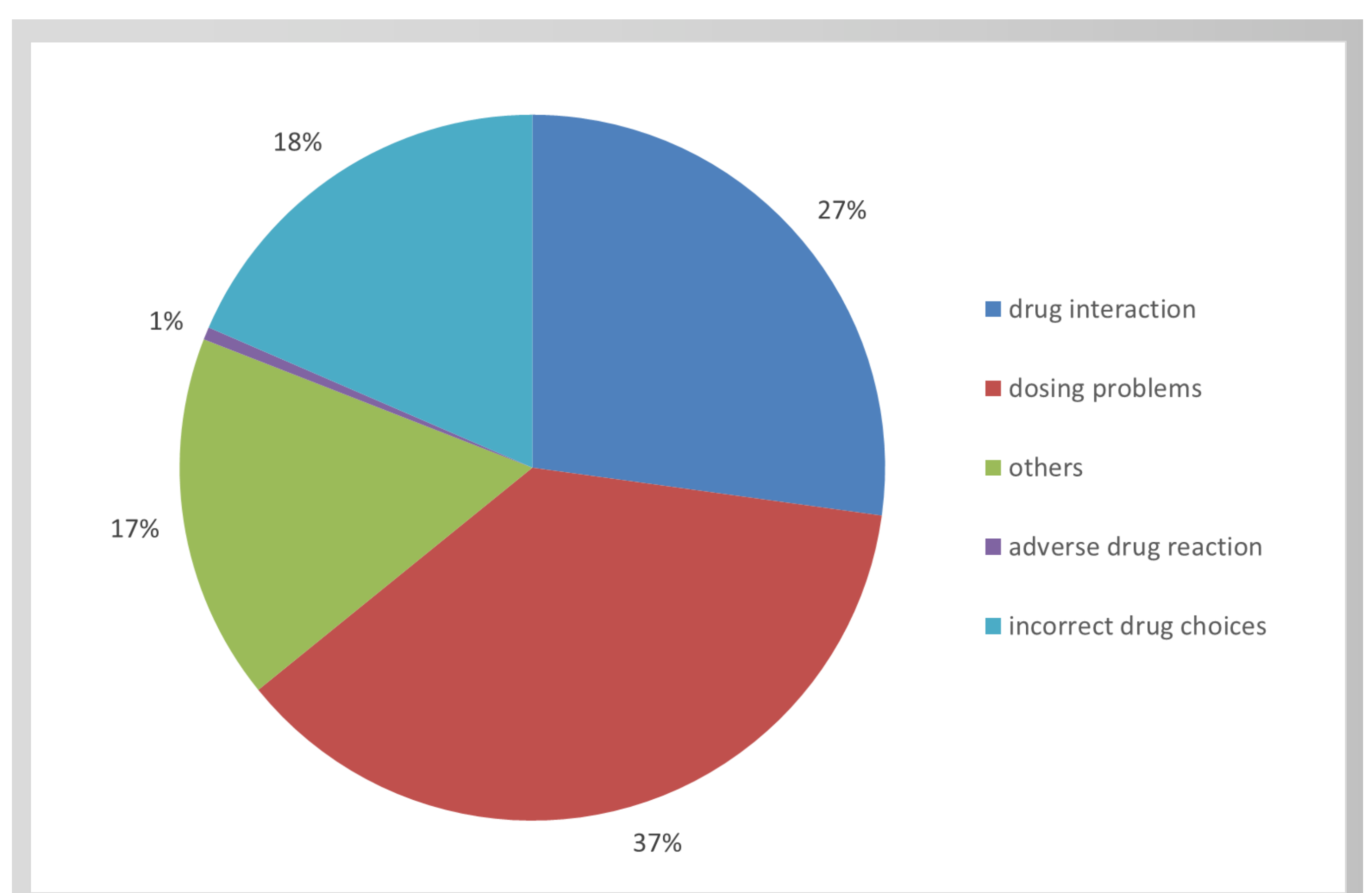


Diagram 2. Categories of DRPs in RI patients.

## Conclusion

Renal patients have an urgent need for medication review. Pharmacists are not always at the hospital, but knowing just ten critical drugs for DARI covers 3/4 of their DRPs. Data gathered here can serve as a working and learning tool for physicians in various settings.