


**MEDICAL AND PHARMACY STUDENTS' KNOWLEDGE AND SKILLS ON PHARMACOLOGY AND PHARMACOTHERAPY**

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Patiëntenzorg  
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 Onderzoek



## INTRODUCTION

- Collaboration of pharmacists and physicians for medication reviews has increased interest over the years.<sup>1</sup>
- Better results on level of patient care.<sup>2</sup>
- Both professionals have own specialists' knowledge and skills.<sup>3</sup>


1. Geurts MM, Br J Clin Pharmacol 2012; Jul 74(1): 16-33.  
 2. Sorensen L, Br J Clin Pharmacol 2004; Dec: 58(6): 648-64.  
 3. Gallagher RM, Adv Health Sci Educ Theory Pract 2012; May; 17(2):247-57.



## INTRODUCTION


- Only few studies on actual differences
  - professionals: -
  - students: pharmacy > medical students on knowledge on interactions and on recognizing prescription errors.<sup>4,5</sup>

4. Watholak TL, Am J Pharm Educ 2011; Mar 10; 75(2):24.  
 5. Harrington AR, Am J Pharm Educ 2011; Dec 15; 75(10):199.



## AIM

to study if pharmacy and medical students differ on pharmacology and pharmacotherapy (P&P) knowledge and skills.



**Sphor** expertgroep farmacotherapie bij ouder personen

## METHODS

**Design** cross-sectional design

**Population** pharmacy and medical students  
after graduating bachelors degree

**Instrument** formative assesment on knowledge and skills  
level bachelors degree  
50 questions (60 min)

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## METHODS

**Design assessment**

- Based on core

What is the first pass effect?

**Domain (3)**

Basic knowledge (25 multiple choice)	a 80 year old women with renal failure and a complicated urinary tract infection is presented to the family doctor. What is the best treatment for the UTI in this woman?	interactions/side effects
Case based knowledge (24 multiple choice)	prescribing	interactions/side effects
Skill (open questions)	You've just visited mr de Jong, suffering end-stage lung carcinoma. The dyspnoea has increased and you decide to start morphine. Write the recipe for him.	interactions

6. Maxwell S. Br. J Clin Pharmacol 2003; Jun;55(6):496-503.  
7. Nierenberg DW. J Clin Pharmacol 1991; Apr;31(4):307-11.

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**Validity assessment**

- construct: based on literature, expert group
- concurrent: compared to expert group, 91% vs 71%, (p<0.001)

**Reliability assessment**

- item-rest correlation ( $r_{it}$ ) no questions excluded
- internal consistence: Guttman labda: 0,5-0,7 (ideally > 0.7)<sup>8</sup>


8. Sijtsma K. Psychometrika 2009; Mar;74(1):107-20.

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## METHODS

**Data collection**

- All students in a mandatory course on pharmacology and pharmacotherapy
  - pharmacy students
  - medical students
- Voluntary participation
- Debriefing with interactive lecture afterwards



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**Analyses**

- T test on mean score in percentages
- ANCOVA, covariates age, sex, previous study, study duration, inclusion year
- Effect size calculations (Cohens  $\delta$ )<sup>8</sup>
  - > 0,2 small
  - > 0,5 medium
  - > 0,8 large

8. Cohen J. Psychol Bull 1992; Jul;112(1):155-9

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## RESULTS

		Medical students (n=451)	Pharmacy students (n=151)	P-value*
age	median (range)	22 (19-45)	23 (20-40)	0.000
gender	female (%)	75	72	0.355
year of inclusion	2010-2011 (n)	222	41	0.000
	2011-2012 (n)	229	110	
start study	median (range)	2007 (2005-2009)	2006 (1998-2008)	0.000
duration study (incl date-start study)	median (range)	3 yr 8 m (1 y 11 m- 6 yr 9 m)	4 yr 10 m (3 yr 2 m - 12 yr 7 m)	0.000
previous relevant study	not or not relevant (n)	411	142	0.166
	relevant (n)	40	8	

\*chi square and Mann-Whitney U

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## RESULTS

Category	Medical (%)	Pharmacy (%)	Effect Size ( $\delta$ )
basic knowledge	68.2	77.0	0.88
case based knowledge	72.2	73.8	0.15
skill/recipe	68.6	50.7	0.57


\* t-test: p<0.05  
 † ANCOVA: p<0.05

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## RESULTS



Skill	Medical (%)	Pharmacy (%)
1. pharmadynamics	69	74
2. pharmacokinetics	70	79
3. interaction/side effects	72	77
4. ATC groups	64	78
5. prescribing	65	66
6. prescribing special groups	73	75
7. regulations	79	83
8. recipe writing	72	77

\* p < 0.05 in ANCOVA  
 †  $\delta$  > 0.5 (medium effect)

 **DISCUSSION**

- First study to show differences between both health professional students on different domains of knowledge
- Both students appear to have reciprocal knowledge
- Collaborations can be useful, at least at the level of education
- However,
  - mono-center
  - students are not the same as professionals
  - rather low reliability assessment <sup>8</sup>

8. Schmitt N. Psychological Assessment 1996;8(4):350-3.

 **CONCLUSION** 

- Pharmacy students have better basic knowledge
- Medical students have better skills
- On case base knowledge differences are too small to be relevant
- Therefore, they can complement each other
- Interdisciplinary collaborations can be useful on the level on education

 **Aknowledgements**

JRBJ Brouwers, PharmD, PhD  
 DJ de Wildt, PharmD, PhD  
 EJFM Custers, PhD  
 ThJ ten Cate, PhD  
 PAF Jansen, MD, PhD  
 A CM Hanzen, PharmD  
 CAM Pouw, BSc

  
 Universitair Medisch Centrum  
 Utrecht

 **ZonMw**