

SH2 Barcelona 2014

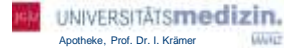
Pharmacy Practice Research



UNIVERSITÄTSmedizin.

University Medical Center
Department of Pharmacy, Prof. Dr. Irene Krämer

MAINZ

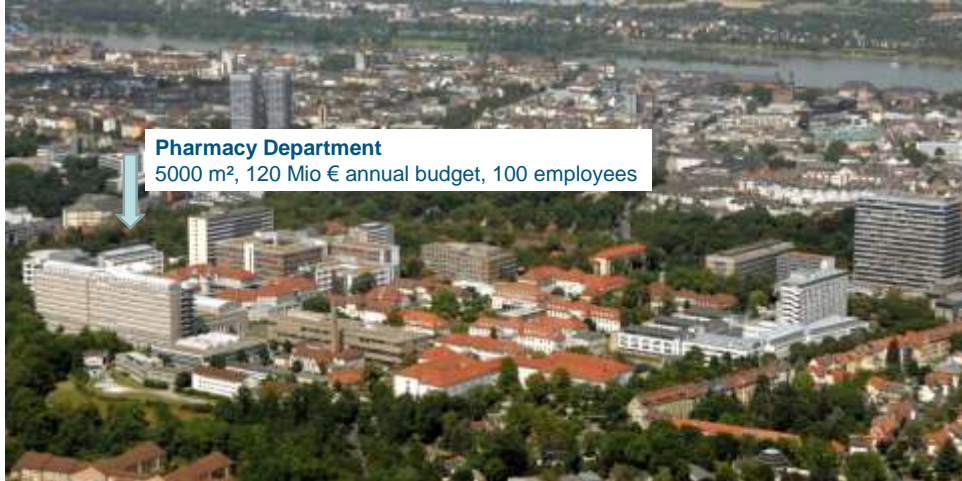


**Irene Krämer
Pharmacy Department University Medical Center**

**Nothing to disclose with regard to the Seminar
Pharmacy Practice Research**

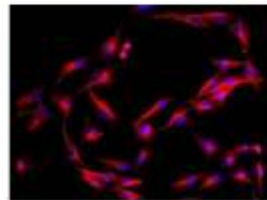
University Medical Center, Mainz Germany

1750 beds, annual budget 650 Mio €, 7000 employees



Pharmazie
Medizinische/ Pharmazeutische Chemie
Pharmazeutische Technologie und Biopharmazie
Pharmazeutische Biologie
Pharmakologie und Toxikologie
▶ Klinische Pharmazie
▶ Prof. Dr. Krämer (apl.-Prof.)
Studium
Doktorarbeiten
Publikationen
Kontakt

Institut für Pharmazie und Biochemie - Therapeutische Lebenswissenschaften



Aktuell / Veranstaltungskalender

Professor of Clinical Pharmacy

- Teacher practitioner
I teach what I do, I do what I teach

- Hybrid

Stroller between two worlds

Faculty of Medicine ↔ Faculty of Pharmacy



- Being in a hole? Living the best of two worlds!

ASHP Statement on Pharmaceutical Research in organized health-care settings

Pharmacists in organized health-care settings have a professional obligation to participate actively in and increase pharmacy-related and drug-related research efforts.

Research to be meaningful and productive in terms of pharmacy's needs and goals in organized health-care settings, must include the participation of pharmacists practicing in those settings.

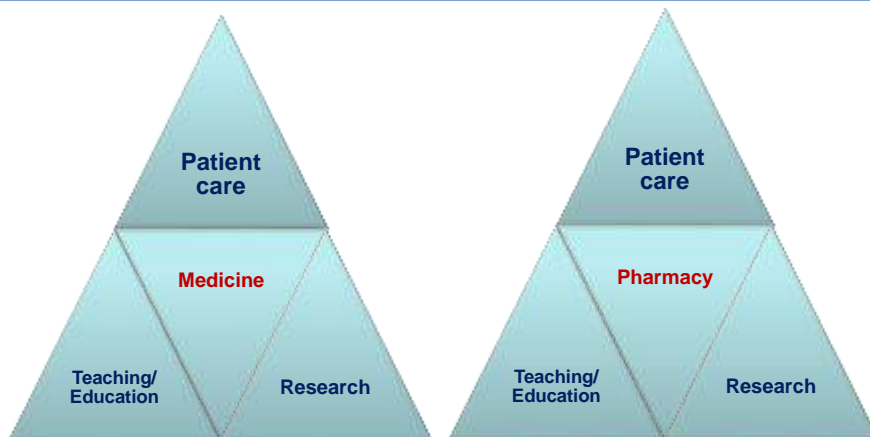
ASHP Statement on Pharmaceutical Research in organized health-care settings Am. J. Hosp- Pharm. 1991; 48:1781

Scientist-Practitioner in Hospital Pharmacy

- **Boulder Modell**
According to this model, a psychologist is a scientist and a competent researcher, and also a practitioner who applies knowledge and techniques to solve problems of clients
- **Core tenets**
Contributing to practice-based research and development to improve the quality and effectiveness of *pharmaceutical aspects* of health-care

Adapted from The Boulder Model: History, rationale and critique.
G Frank, Professional Psychology: Research and Practice, 1984 - psycnet.apa.org

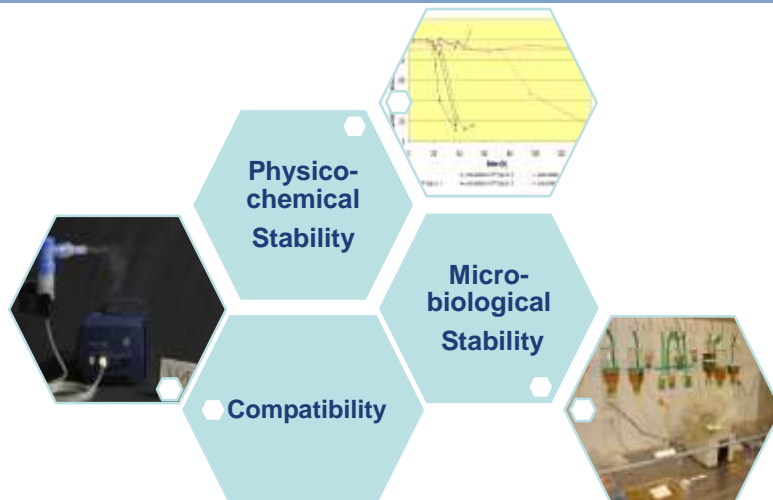
Triad in Medicine = Triad in Pharmacy



Research in the Pharmacy Department

- Research in cooperation with clinicians, pre-clinical disciplines, clinical trial center
- Research inline with the clinicians areas of interest
- Experimental research in the laboratory
- Clinical Trials, Outcome Studies

Applied Research in Drug Technology



Applied Research in Drug Technology

- Physico-chemical stability of ready-to-administer parenterals, mainly cytotoxic preparations, i.e. small molecules, monoclonal antibodies, beads
- ‚Stabilliste‘, stability database
- Viability of microorganisms in cytotoxic preparations
- Validation of Environmental monitoring in aseptic preparation (including stem cell preparation)
- Media-fills (manual, robotic system)

Applied Research in Drug Technology



- Compatibility of duplicate or triplicate admixtures
 - Physico-chemical compatibility of inhalation solutions/suspensions in nebulizer cups
 - Aerodynamic parameters of aerosols
- Performance of nebulizers
Characteristics of aerosols
- Inhalation performance of paediatric patients, eg with Respimat® Soft Mist™

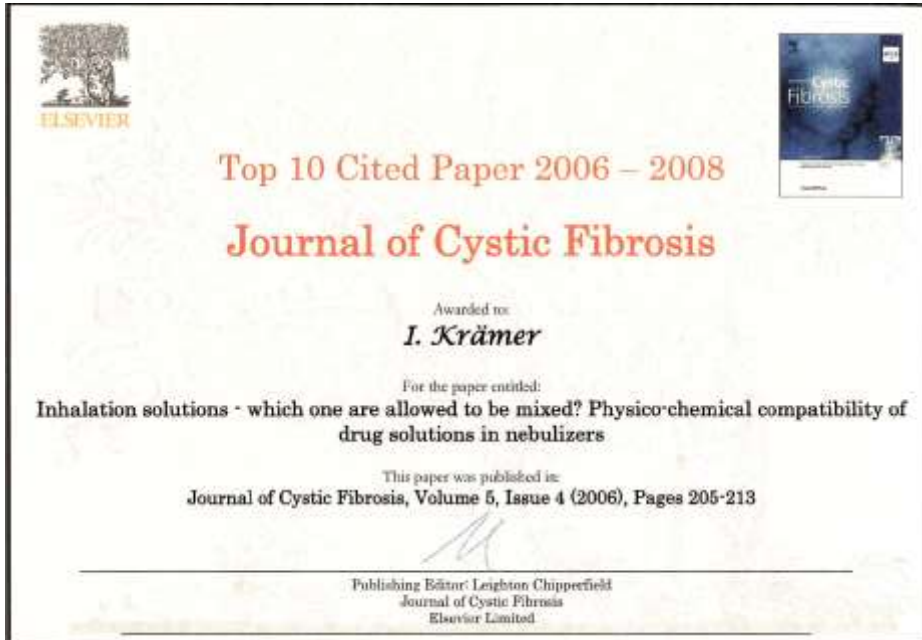
Method: Next Generation Impactor Ph.Eur.7.0, Copley Scientific

- Measured Parameters
 - MMAD = Median mass aerodynamic diameter
 - RDDR Respirable Drug Delivery Rate $\leq 5 \mu\text{m}$ =
DDR x % rate particle $\leq 5 \mu\text{m}$ (fine particle fraction)

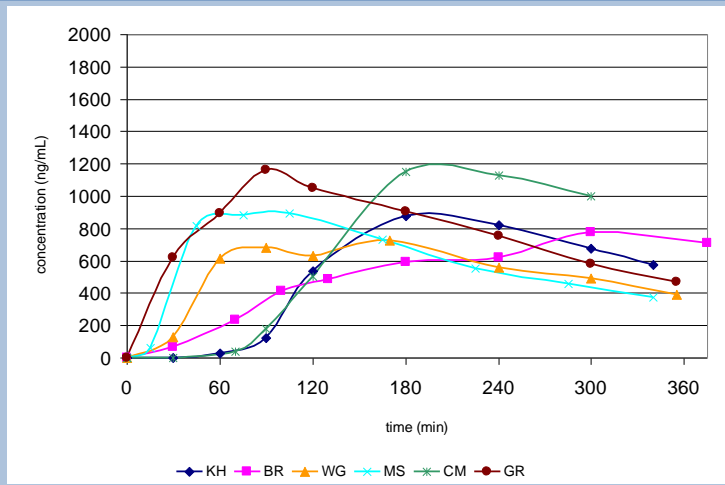


Physico-chemical compatibility of inhalation solution/suspensions

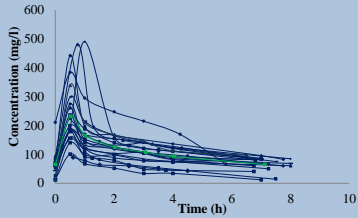
	Dornasealfa	Tobramycin	Tobramycin	Colisti- methate	Ipratropium	Albuterol	Budesonide	Fluticasone- 17- propionate	Cromolyn	Hypertonic saline
	Pulmozyme®	Bramitob® TOBI®,	Gernebcin®	Colistin CP®	Atrovent®, Atrovent®unit dose 2 ml	Sultanol®, Sultanol®unit dose 2.5 ml	Pulmicort®	Flutide®	Intal®	5.85% NaCl solution
Dornasealfa		Mixable ^a	Do not mix	Do not mix	Do not mix	Do not mix	Mixable	Do not mix	Do not mix	Do not mix
Tobramycin Bramitob®, TOBI®	Mixable ^a			Mixable	Mixable	Mixable	Mixable	Mixable	Do not mix	Do not mix
Tobramycin Gernebcin®	Do not mix			Mixable	Mixable	Mixable	Mixable	Mixable	Do not mix	Do not mix
Colistimethate	Do not mix	Mixable	Mixable		Mixable**	Mixable**	Mixable	Mixable	Do not mix	Mixable
Ipratropium	Do not mix	Mixable	Mixable	Mixable**		Mixable ^a	Mixable	Mixable ^a	Mixable**	Do not mix
Albuterol	Do not mix	Mixable	Mixable	Mixable**	Mixable ^a		Mixable	Mixable ^a	Mixable**	Do not mix
Budesonide	Mixable	Mixable	Mixable	Mixable	Mixable	Mixable		*	Mixable	Mixable
Fluticasone-17- propionate	Do not mix	Mixable	Mixable	Mixable	Mixable ^a	Mixable ^a	*		Do not mix	Do not mix
Cromolyn	Do not mix	Do not mix	Do not mix	Do not mix	Mixable**	Mixable**	Mixable	Do not mix		Do not mix
Hypertonic saline	Do not mix	Do not mix	Do not mix	Mixable	Do not mix	Do not mix	Mixable	Do not mix	Do not mix	



Busulfan serum concentrations after the first oral dose 1 mg/kg in patients no 1-6, documenting high inter-patient variability in drug absorption

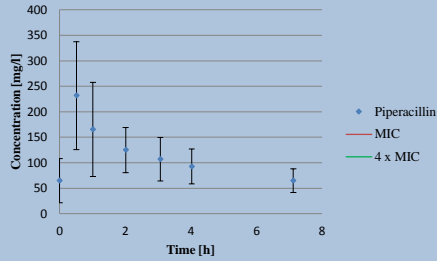


Pharmacokinetics of piperacillin and ciprofloxacin in critically ill patients undergoing continuous venovenous haemodialysis or haemodiafiltration



Individual (blue) and mean (green) plasma concentration curves of patients treated with piperacillin

Concentration time curve of mean \pm SD piperacillin conc. in 21 patients. Optimum exposure to piperacillin is expected when serum conc. are maintained 4-5 times higher than the minimum inhibitory conc. MIC i.e. above 64 mg/l

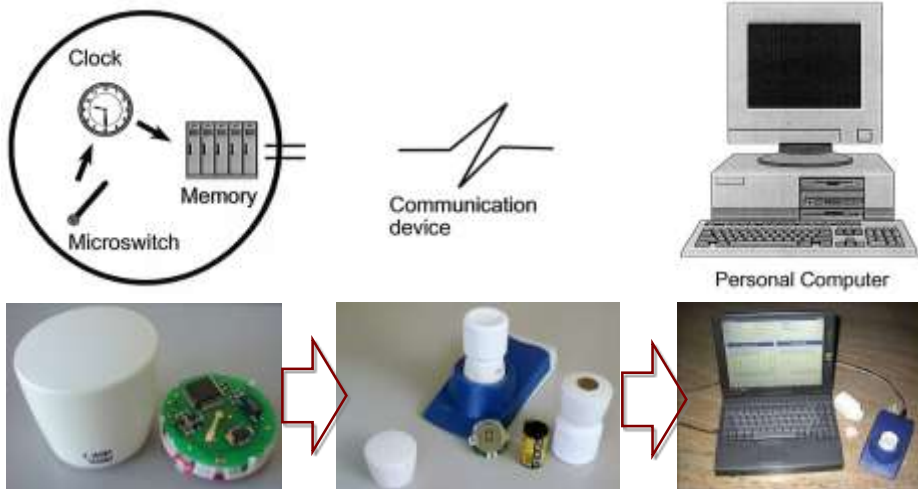


Outcome of Pharmaceutical Interventions



Introducing Advanced Technology on Monitoring Adherence

Medication Event Monitoring System®
 from AARDEX (Advanced Analytical Research on Drug Exposure)



UNIVERSITÄTsmEDIZIN.
 Apotheke, Prof. Dr. I. Krämer

OtCM - Real Time Telemonitoring

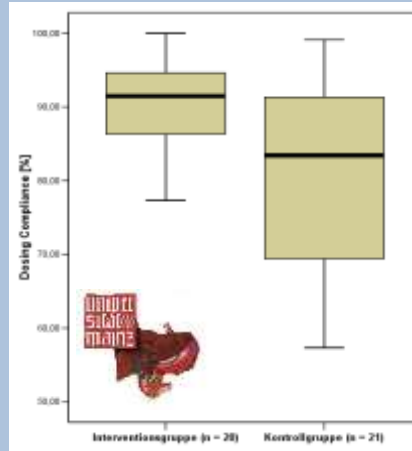


Anticoagulant patients

- Increased number of patients in target INR range
- Increased time in therapeutic range
- Increased dosing compliance

Impact of Pharmaceutical Care on medication compliance of liver transplant patients

- Significant increase of dosing compliance with immunosuppressive medication in the first year post LTx $p = 0.015$
- Intervention group
 $\bar{X} = 90\%$ (77-100%)
- Control group
 $\bar{X} = 81\%$ (57-99%)



Health Services Research

- Impact of Pharmaceutical Care services on
 - Clinical outcome
 - Social outcome (compliance, quality of life, health-related satisfaction)
 - Economic outcome
- Liver transplant patients
- Oral anticoagulant patients
- Diabetes patients with foot ulcers
- Patients undergoing cardiosurgery

Medikationsplan

Bitte beachten! Dieser Plan ist eine **Personenbezogene Gesundheitsinformation** (Art. 6 DSGVO).
 Dieser Medikationsplan zeigt Ihre derzeitige Arzneimitteltherapie im Krankenhaus.
 Es können sich noch bis zu drei Fortsetzung Anmerkungen angedeutet.
 Bitte nehmen Sie die Arzneimittel wie angegeben ein.

Fertigarzneimittel	Wirkstoff	Bild	Dosierung				Einnahmehinweise	Einnahmegrund	sonstige Hinweise
			1	2	3	4			
Ranitidin radio 200	Ranitidin		0	0	1	0	nach dem Abendessen o. vor dem Schlafengehen	Magenchutz	
Plavix 75mg	Clopidogrel		1	0	0	0	mit oder ohne Mahlzeit	Blutgerinnungshemmung, ACE-HI	Ersatz für 6 Wochen
Aspirin Proctol 100 Tbl	Acetylsalicylsäure		0	1	0	0	unmittelbar vor der Mahlzeit	Blutgerinnungshemmung	längerfristige Einnahme, zu Hause bei Schmerzen/Paracetamol einnehmen
Lasix 40 mg Tbl	Furosemid		1	1	1	0	Einnahme nüchtern und उपरोक्त	Bluthochdruck/ Wasserklagen	Tafelkondensat wird nach und nach verringert
Kallcor retard P 800mg Kps	Kalziumchlorid		2	2	2	0	zu den Mahlzeiten, mind. ein Glas Wasser	Herzrhythmusstörungen/ Kalziummangel	Kapselanzahl wird nach und nach verringert
Sinvalocel 40 mg	Simvastatin		0	0	1	0	mit etwas Wasser abends einnehmen	Blutfettverbesserung	während der Therapie Ölgehalt vermeiden
Orlix 2.5 Plus Tbl	Remipridil Hydrochlorid		1	0	0	0	mit oder ohne Mahlzeit, morgens	Bluthochdruck	Ersatz für Enalapril comp.
L-Thyroxin 100	Levothyroxin		1	0	0	0	morgens nüchtern 30 min vor dem Frühstück	Schilddrüsenunterfunktion	
Beloc-Zok MITE	Metoprolol succinat		1	0	1	0	mit oder ohne Mahlzeit	Bluthochdruck/ Herzrhythmusstörungen	Kein plötzliches Absetzen ohne ärztlichen Rat
Sobelin 300 mg Kps	Clindamycin		2	2	2	0	mit ausreichend Wasser einnehmen	bakterielle Infektion	möglichst im 8 Stunden-Abstand einnehmen
Ciprobay 500 mg Tbl.	Ciprofloxacin		1	0	1	0	mit oder ohne Mahlzeit	bakterielle Infektion	2h Abstand zur Einnahme von Calcium, Magnesium, Eisen, Aluminium oder Zink
U.v.a.: Anwendung									
Heparin Calcium 7500 IE	Heparin-Calcium		1	0	1	0	Injektion in Hautfalte Bauch o. Oberschenkel	Blutgerinnungshemmung/ Thrombozytopenie	Spitze verabschiede die Kontrastschweizer
Huminsulin Normal Pentil 3 ml	Insulin normal		4	4	0	0	Injektion in Hautfalte Bauch o. Oberschenkel	Zuckerkrankheit	
Huminsulin Basal Penfil 3 ml	Insulin-Isophan		0	0	0	12	Injektion in Hautfalte Bauch o. Oberschenkel	Zuckerkrankheit	

Wenn Sie noch Fragen zu den vorstehenden Medikamenten bezüglich Wechselwirkungen, Nebenwirkungen etc. haben sollten, wenden Sie sich vertrauensvoll an uns.
 Wir beraten Sie gerne!
 Sie können jederzeit bei unsererhoteller Telefonnummern (Klinikern) anrufen und einen Termin für ein persönliches Gespräch vereinbaren.
 Ihre Ansprechpartnerin: Frau Apothekerin Manika Kunkel Tel.: (06131)171-4575
 Quelle der Abteilungen: Ihre GmbH

Objectives of pharmacy based research projects

- Scientific approach to solve pharmaceutical problems
- Structured approach to develop new pharmaceutical services
- Recognition as subject-matter expert in the hospital
- Improvement of cooperation in the academic world
- Gain of reputation
- Promotion of Ph.D. students
- Utilization of additional financial resources
 institutional funding (university), public funding (national, EU), pharmaceutical industry

Research in clinical pharmacy: Needs and priorities

.... To produce accurate and meaningful results, three guidelines must be borne in the minds of researchers:

- (1) select research topics that will have recognized impact on the quality of patient care and education;
- (2) design and conduct studies which can withstand the scrutiny of the established scientific community;
- (3) communicate meaningful information to all who can facilitate its utilization.

Solomon DK et al. Drug Intell Clin Pharm 1979, 13: 669-72.

