


 HUG Conference, 31 January 2007 Berlin - Germany  
**Unit-Dose-Project KAV Vienna**

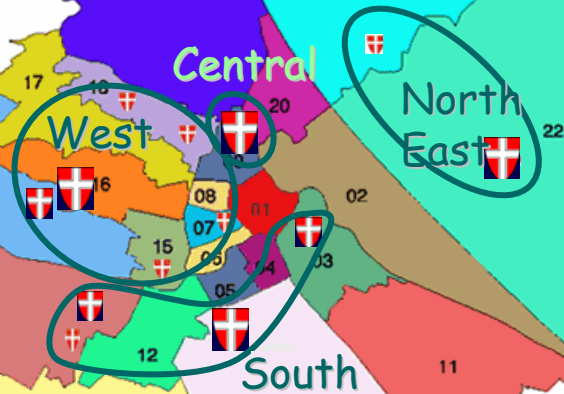

 Vienna Hospital Association (KAV)  
 Head of medical economics and pharmacy  
 wolfgang.gerold@wienkav.at


# Unit-Dose-Project KAV Vienna


## W. Gerold

### Berlin, 31. 1. 2007






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 wolfgang.gerold@wienkav.at

## KAV 2005

**13 Hospitals**

**14.336 Beds**

9.132 H + 5.357 G

**383.979 Patients**

**4.607.113 Days**



**12 Geriatrics**

**Expenditure 2,4 Mrd. €**

**Receipts 1,4 Mrd. €**

Hospital: Duration of hospitalisation **7,7 days**

**28.514 + 2.800 Employees**

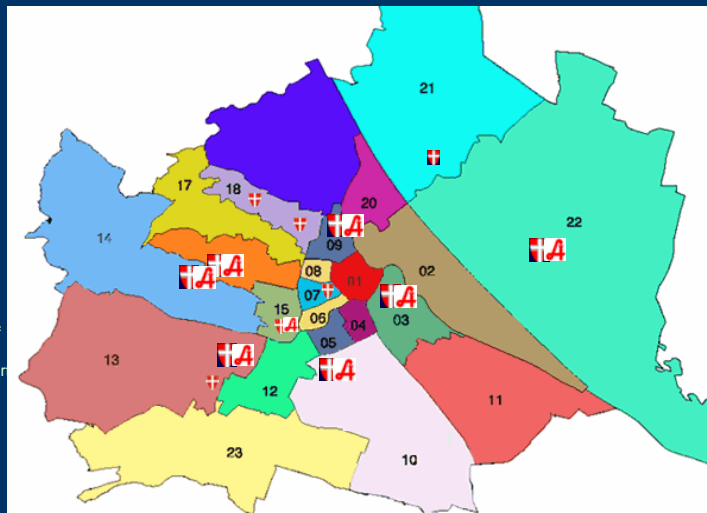



## Costs

annual account 2006	~ 2.380.000.000 €	
funds of medical care	~ 316.000.000 €	13 %
therefrom pharmacies	~ 194.000.000 €	8 %
therefrom drugs	~ 119.000.000 €	5 %

## Location of Vienna Municipal Hospitals

- District
- 3. Rudolf Hospital
- 7. Social Medical Center
- Sophien Hospital
- 9. General Hospital
- 10. Kaiser-Franz-Josef-Hospital
- 13. Hietzing Hospital
- Rothschild Foundation
- Neurological
- Center Rosenhügel
- 14. Social Medical Center
- Baumgartner Höhe -
- Otto Wagner-Hospital
- 15. Kaiserin-Elisabeth-Hospital
- 16. Wilhelminen-Hospital
- 18. Orthopedic Hospital Gersthof
- Ignaz-Semmelweis-
- Gynaecological Hospital (Par-
- of Hospital Rudolf Hospital )
- 21. Social Medical Center
- Floridsdorf -Hospital
- 22. Social Medical Center
- East – Donau Hospital






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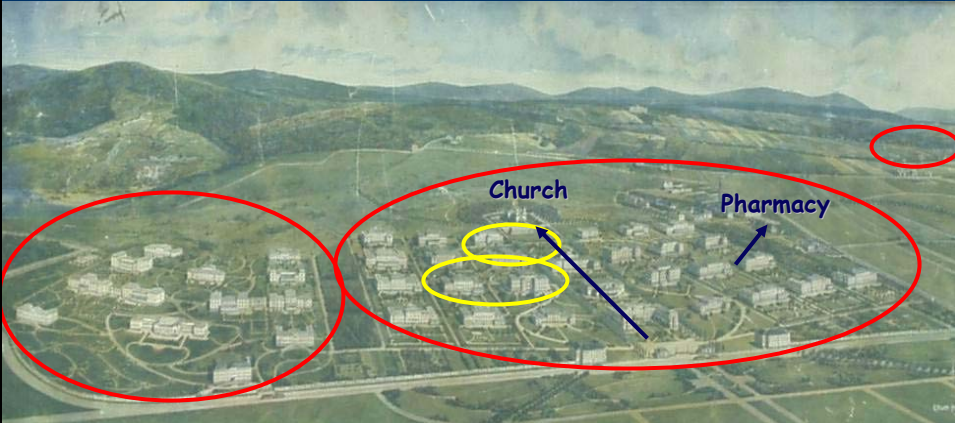
## Infra Structural Projects of the Vienna Hospital Association

- Paediatric Clinic Glanzing to Wilhelminen Hospital 1999
- „Poliklinik“ to SMC Sophien Hospital 1999
- Mautner-Markhof Paediatric Clinic to Rudolf-Hospital 1999
- Otto Wagner Hospital 2000 from
  - Psychiatric Hospital Baumgartner Höhe
  - Pulmologic Center
  - Neurologic Hospital Maria Theresien - Schlössel
  - Geriatrics Sanatoriumstraße
  - Nursing home „Förderpflegeheim“
- Semmelweis Clinic: Part of Rudolf-Hospital since 2002
- Preyers Paediatric Hospital to Kaiser Franz-Josef Hospital 2008 (Mother-Child-Center im KFJ)


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## Otto Wagner - Hospital

Association of 3 Hospitals and 2 Geriatrics since August 2000



Otto Wagner Spital

„Hospitalchurch“



## Objectives for the Future of KAV- Pharmacies Reasons for Creating Partnerships

1. To ensure quality and safety during pharmacotherapy → Unit Dose
2. To optimize logistic efficiency  
→ utilisation of synergies
3. To help pharmacies to specialize regarding human resources, administration and technical knowledge  
→ utilisation of synergies
4. To be competitive → Insourcing

## Objectives of Hospital-Pharmacy

- *right* patient
- *right* drug
- *right* quality
- *right* pharmaceutical form
- *right* dosage and
- *right* point in time and
- *right* costs.

## Pathways of Medication

Hospital Gen. Practitioner, Unit Dose

Physician

Prescription

Pharmacist

Nurse

Patient

Physician

Prescription

Pharmacist

Patient

## Medication Errors

- Prescription (Physician)
- Delegation (Nurse)
- Preparation (Nurse)
- Application

## Medication Errors Preparation

- Wrong drug
- Wrong dosage
- Wrong point in time
- Wrong kind of medicine
- Wrong application method
- Manipulation error e.g.
  - Protection against the light
  - Effervescent tablet prematurely unpackaged
  - Ampoule without protection against the light
  - Grinding of coated tablets.
  - Expired medication

## Medication Errors

American Studies prove:

- 98.000 Americans annually die as a consequence of medical blunders (medication errors are most frequent and easiest to avoid)
- Wrong application of medicine increases duration of stay, therapy and extends the need for additional test results
- 40 % of mistakes in terms of medical care happen during handing over of medicine

## Unit Dose - System 1994 Problems

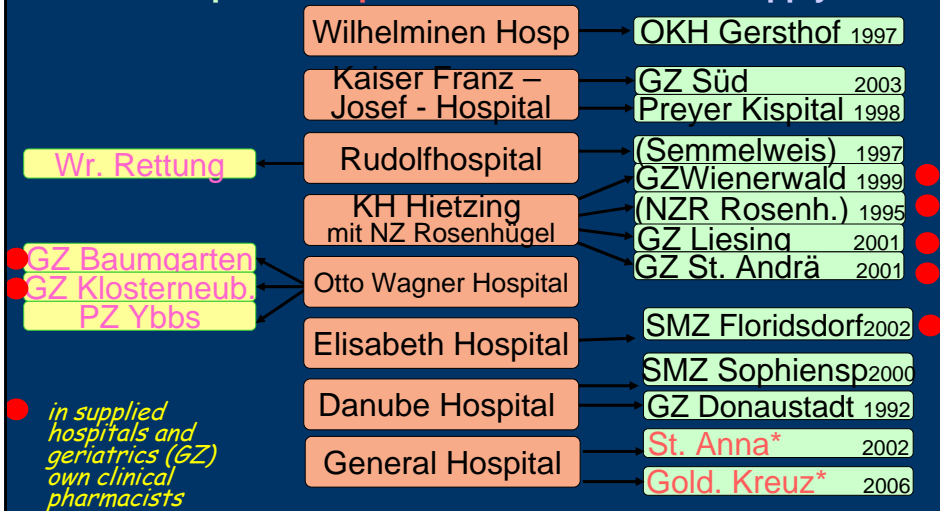
- Increase in need of staff in pharmacies (control of patient focused medication)
- Mostly hypothetical reduction of staff on wards (arrangement of medicine mainly during night shift)
- Electronic prescription = extra work for physicians
- Limitations of Unit Dose (no effervescent tablets)
- Costly distribution of all single Unit Doses for every patient
- EDP- compatibility

## KAV - Pharmacies 2006

### Medical depot

### pharmacies

### direct supply



● in supplied hospitals and geriatrics (GZ) own clinical pharmacists

\* Insourcing





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Status Quo:  
8 Pharmacies  
with 11 Supply Centers

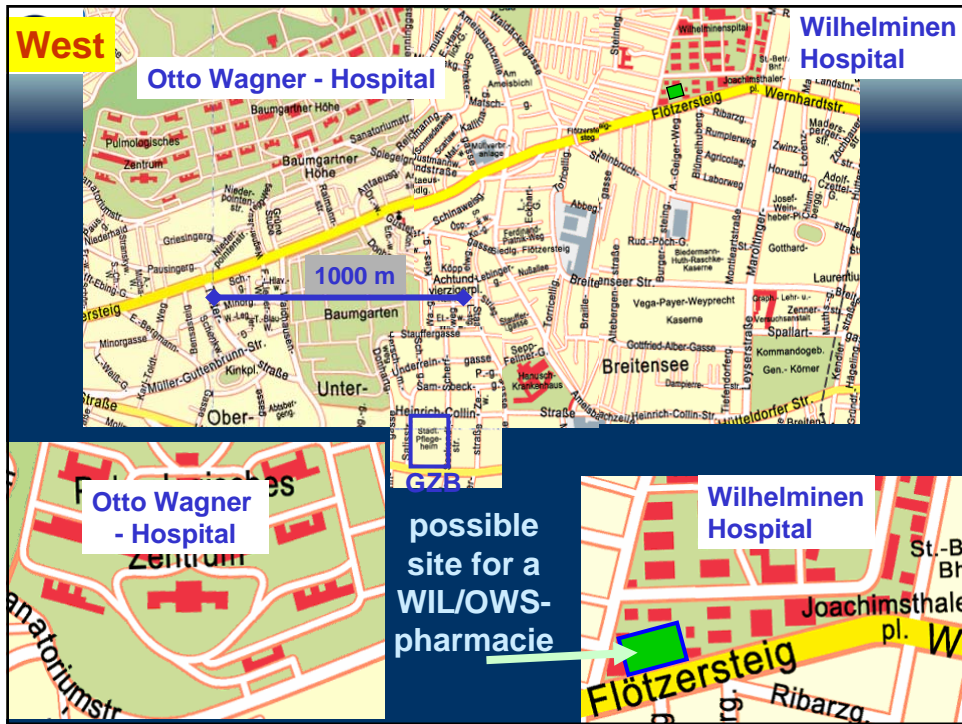
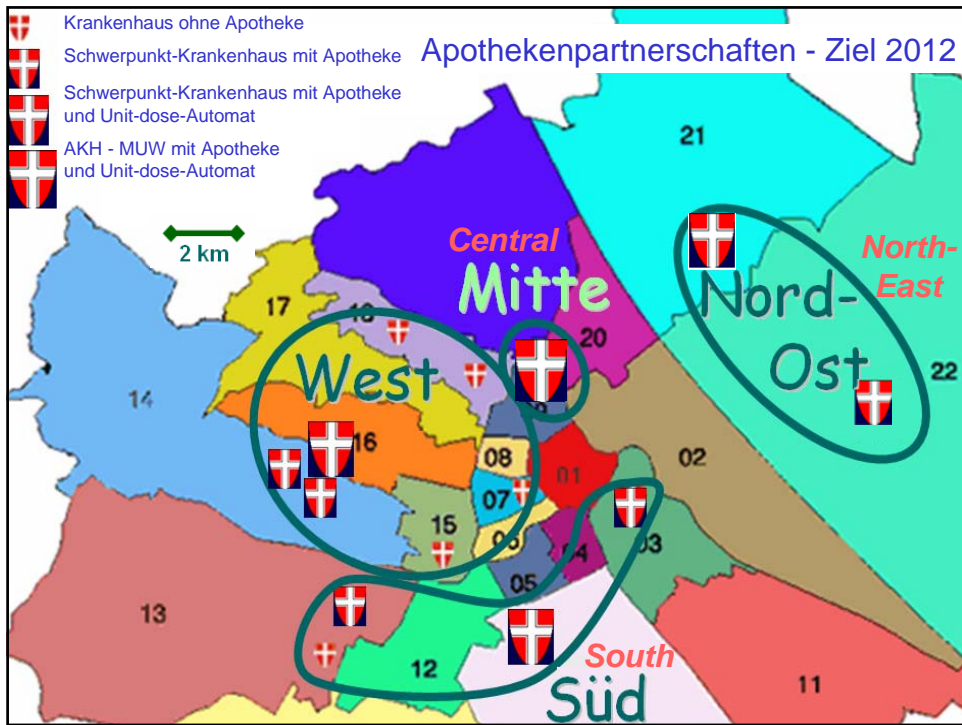


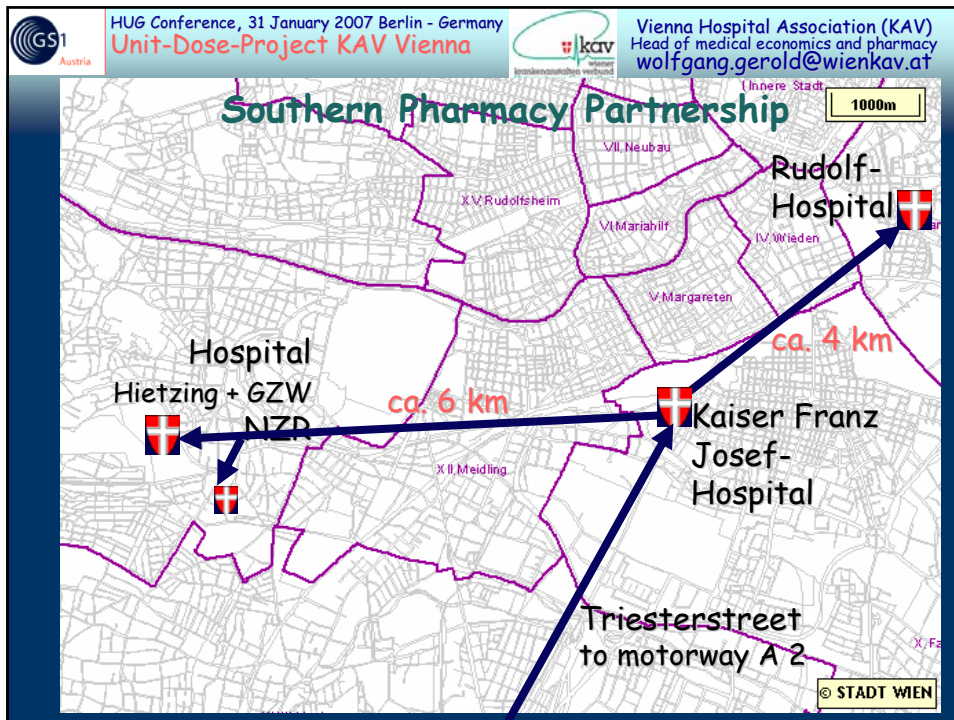
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Pharmacy- Partnership  
Objective:  
7 Pharmacies with 4  
Supply Centers  
and Demand Oriented Duties





# Arzneikosten: Sparkurs für Spitäler

**GESUNDHEIT.** Zentrale Apotheken, Pillen-Automaten und vernetzte Patientendaten sollen die Medikamentenversorgung der Wiener Spitäler verbessern und vor allem Geld sparen.

WIEN (maki). Plus 20 Prozent seit 2002 – die jährlichen Medikamentenkosten der Stadt Wien steigen rasant. Nun wird reformiert und, so hofft man, gespart: Die Arzneimittelproduktion- und Auslieferung soll zentralisiert, Patientendaten elektronisch vernetzt und die Pillendosierung automatisiert werden. Der gewünschte Effekt: Eine Kostenverminderung von 20 Prozent. Hier die Eckpfeiler der Reform:

► **Zentrale Apotheken:** Statt bisher von acht sollen die Wiener Krankenhäuser nur mehr von vier Pharmazien versorgt werden. So sollen Kosten für die Produktion und Verteilung von Arzneimitteln eingespart werden. Die Medikamentenlager der einzelnen Krankenhäuser sollen stark verkleinert für Notfälle dennoch erhalten bleiben.

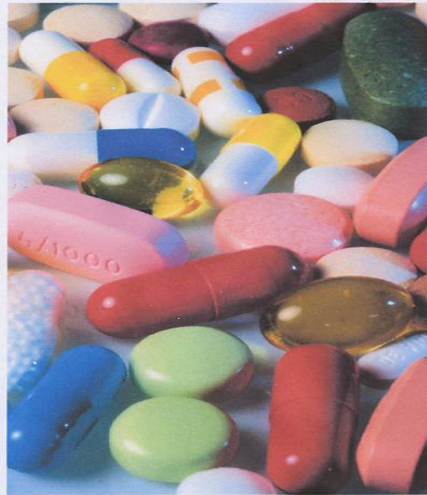
► **Kompetenzteilung:** Die einzelnen Spitalsapotheken werden nicht – wie bisher – jeden einzelnen Schritt von der Erzeugung bis zur Ausgabe von Medikamenten selbst vollziehen. Statt dessen soll sich jedes der vier Zentren auf

eine Aufgabe spezialisieren, etwa auf die Produktion von Salben oder Infusionen, die Analyse von Medikamenten oder die Logistik (Bestellung von Substanzen, Auslieferung).

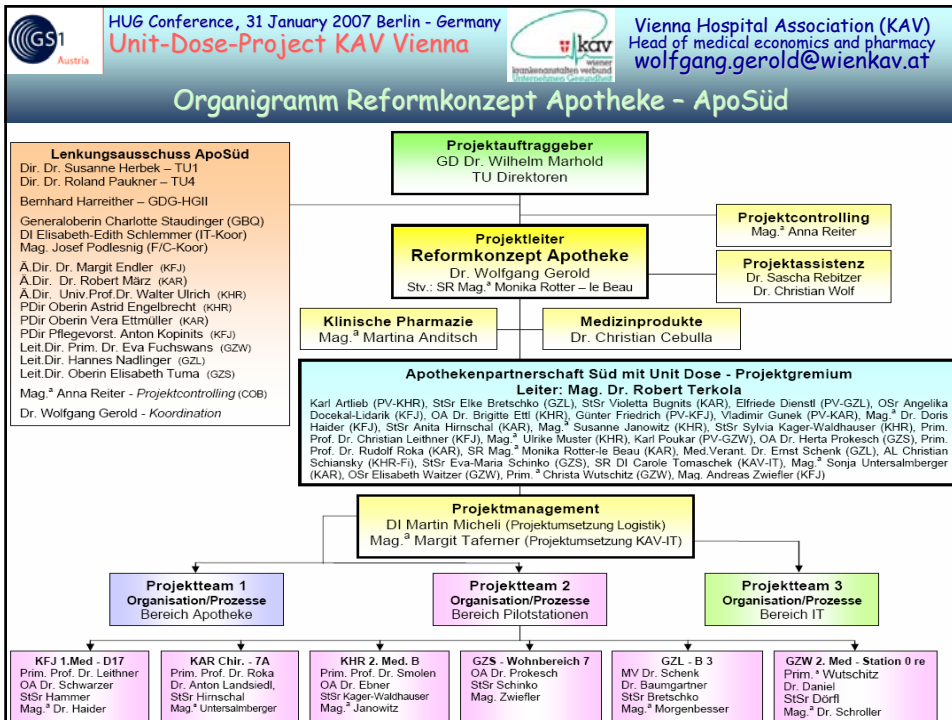
► **Pillenautomat „Unit Dose“:** Nicht die Krankenschwester, sondern eine Maschine wird in Zukunft die Medikamente für jeden einzelnen Patienten dosieren. Der Automat verpackt Tabletten, Ampullen oder Einwegspritzen in kleine Plastik-Säckchen und fädelt diese in der jeweils notwendigen Kombination auf einen Plastik-Ring (ein Ring pro Patient). So wird nur die nötige Dosis anstatt ganzer Packungen ausgegeben und so Geld für sonst ungebrauchte Reste eingespart. In Probebetrieb geht „Unit-Dose“ ab Mai 2007 im Kaiser-Franz-Josef Spital, bei Erfolg sollen mehr Apparate (Preis/Stk. ca. 800.000 Euro) angefordert werden.

► **Visite mit Laptop:** Im Idealfall sollen Ärzte und Pflegepersonal die benötigten Medikamente und den Therapieverlauf direkt vom Krankenbett aus per Laptop in eine zentrale Datenbank eingeben. Die für behandelnde Ärzte, Pflegepersonal und Pharmazeuten abrufbaren Informationen sollen verhindern, dass ein Patient etwa zu lang oder mit einer unnötig teuren Substanz therapiert wird.

► **Mehr Kooperation:** Auch die Zusammenarbeit zwischen Medizinern und Pharmazeuten soll in den Wiener Krankenhäusern angeregt werden. Durch die Kompetenzteilung bleibt – so erwartet man – mehr Zeit für Apotheker um etwa in Spitälern als Teil eines Behandlungsteams zu fungieren und Therapien ideal anzupassen.



**Bunt, teuer:** Zu viele kostspielige Pillen werden derzeit verschwendet. Der „Unit-Dose“-Automat soll durch genaue Dosierung Kosten reduzieren.












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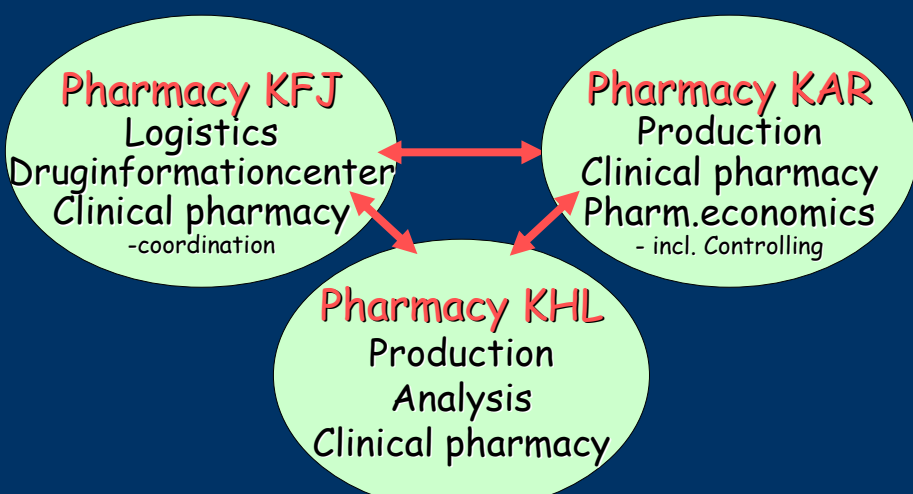
## Unit-Dose-Project Schedule

December 2005:	Prior information notice
July 2006:	Tender
at 2nd quarter 2006:	Adaption at the pharmacy KFJ
8th september 2006:	Bid opening
<b>13<sup>th</sup> september 2006</b>	<b>Political - Decision</b>
1st december 2006:	award to Swisslog and Nexus
February - April 2007:	delivery, discharging, checking
May - Dec. 2007:	Testrun: 6 Stations with Referencstations
2008/2009:	Full supply with one machine for 800 beds H und G
2008:	Planning for Unit dose in further Pharmacy-Partnerships
2011:	Full developement for Unit dose in this project





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## Pharmacy Partnership- Allocation of Tasks



```

graph TD
    KFJ((Pharmacy KFJ  
Logistics  
Druginformationcenter  
Clinical pharmacy  
-coordination)) <--> KAR((Pharmacy KAR  
Production  
Clinical pharmacy  
Pharm.economics  
- incl. Controlling))
    KFJ <--> KHL((Pharmacy KHL  
Production  
Analysis  
Clinical pharmacy))
    KAR <--> KHL
  
```

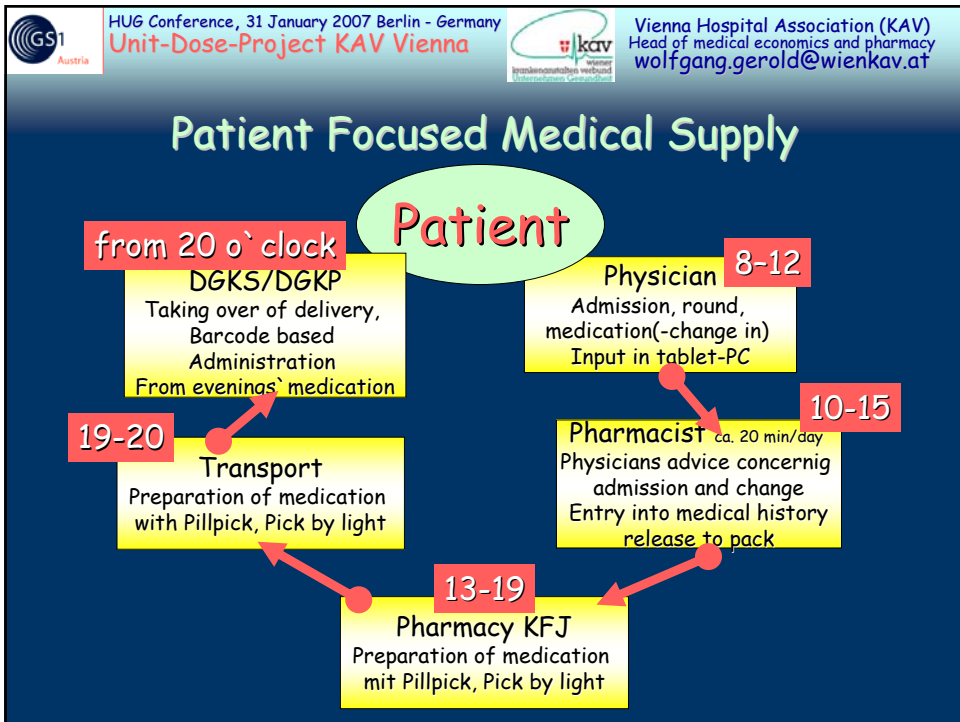





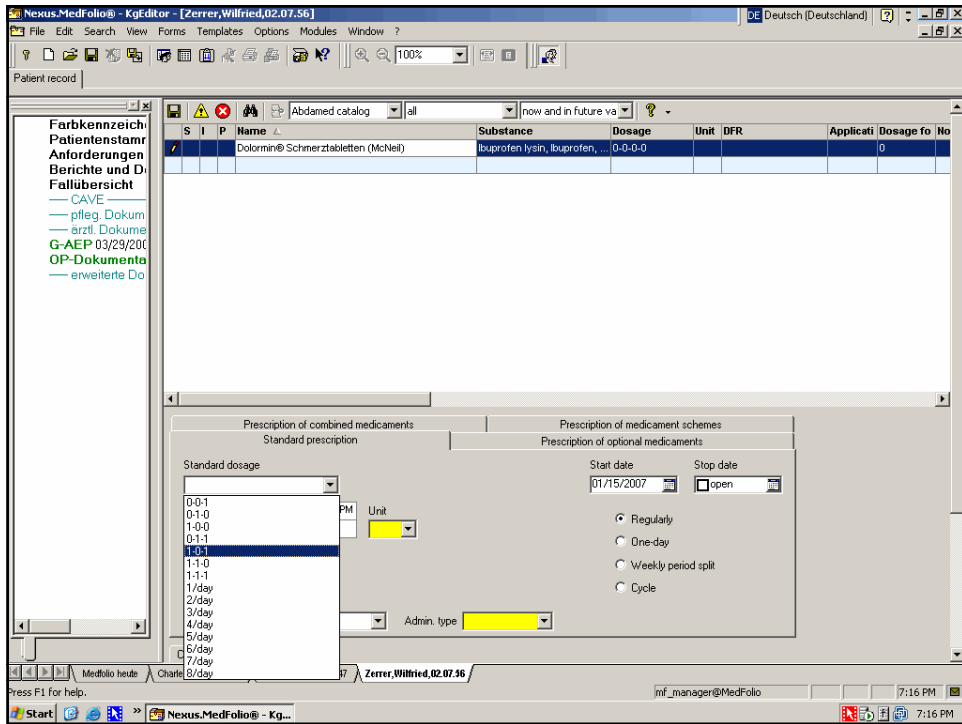
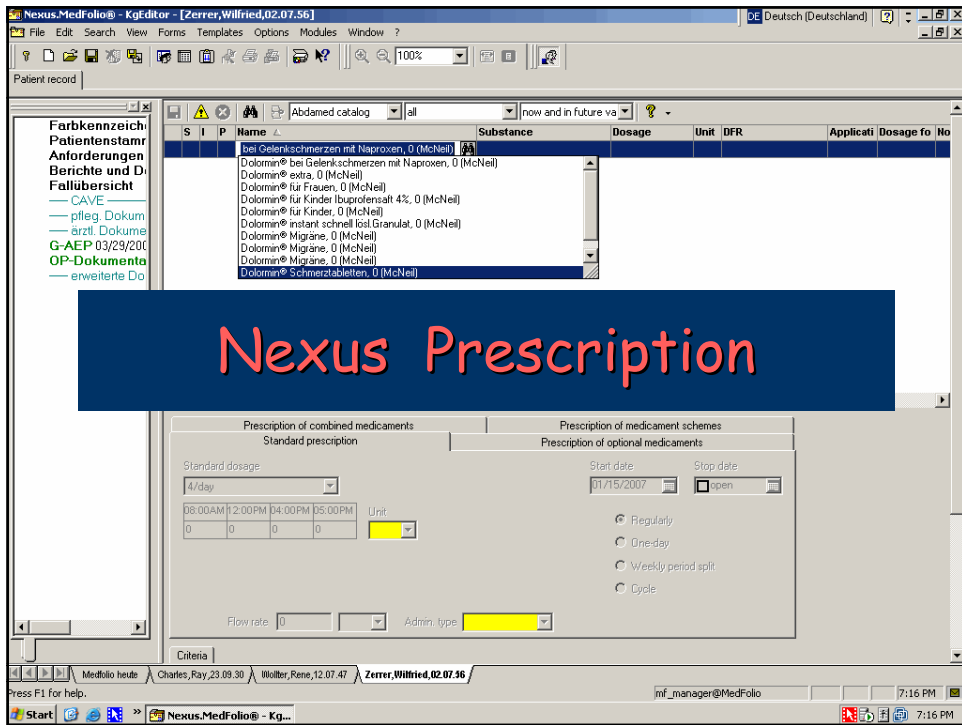
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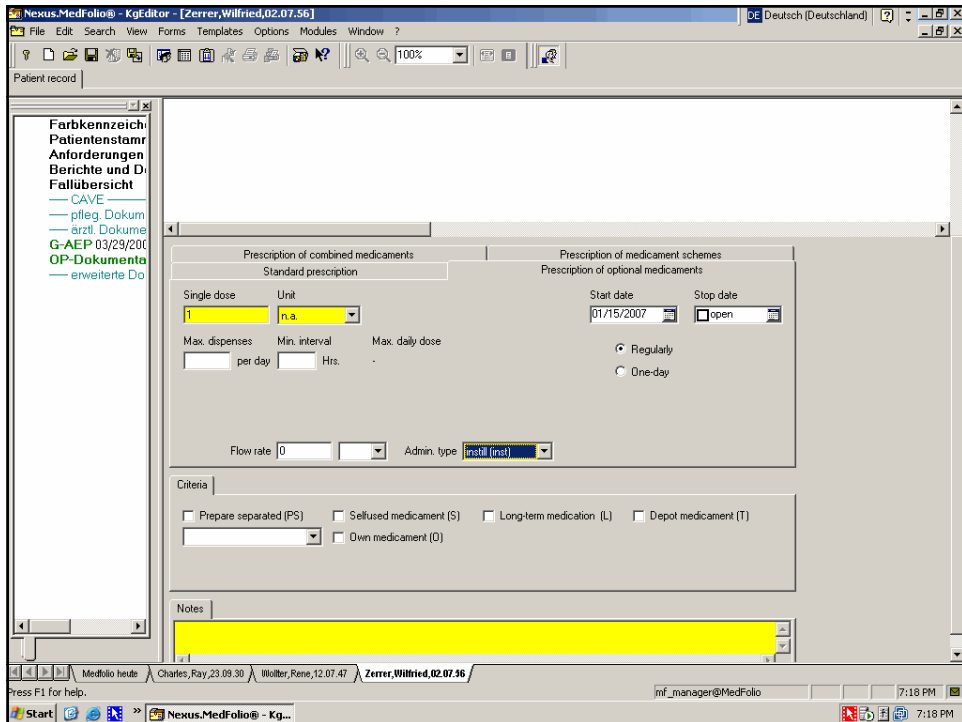
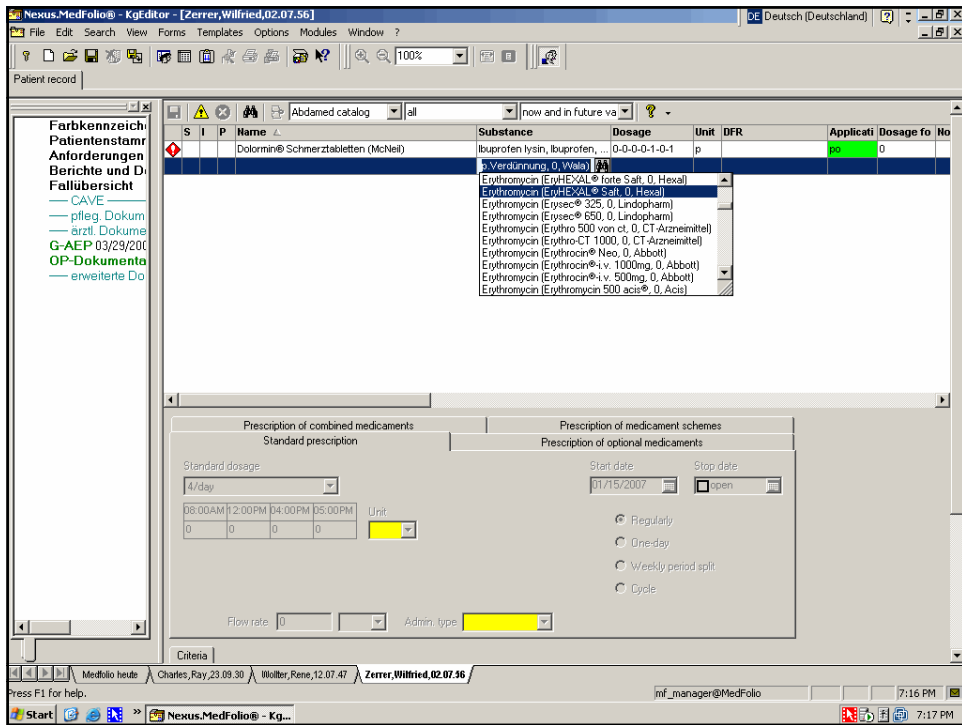
## Southern Pharmacy Partnership Aim Beds (2010)

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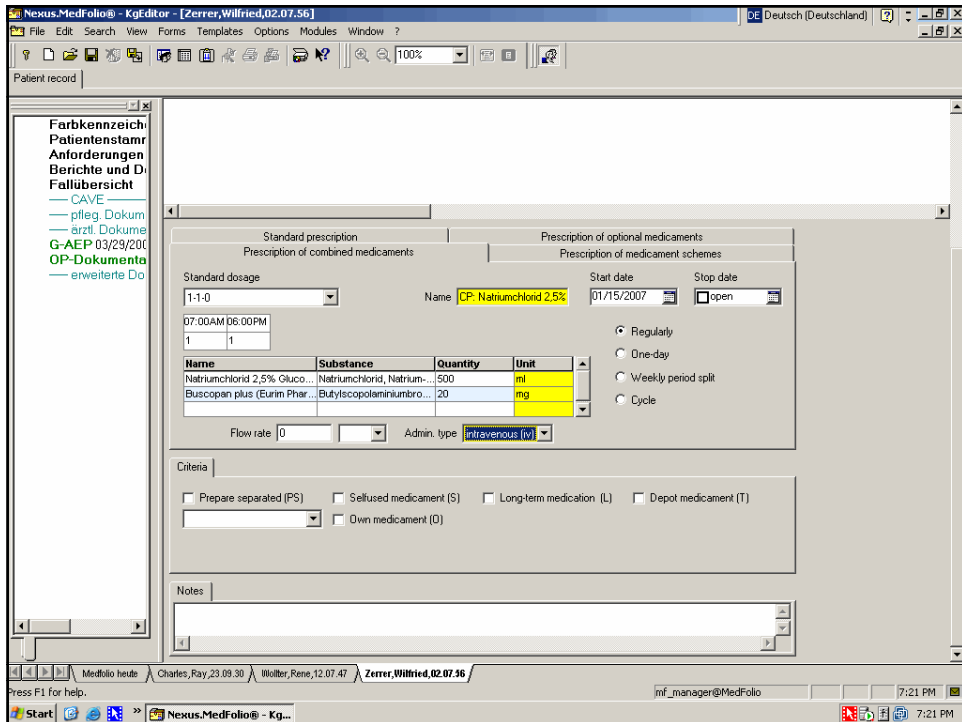
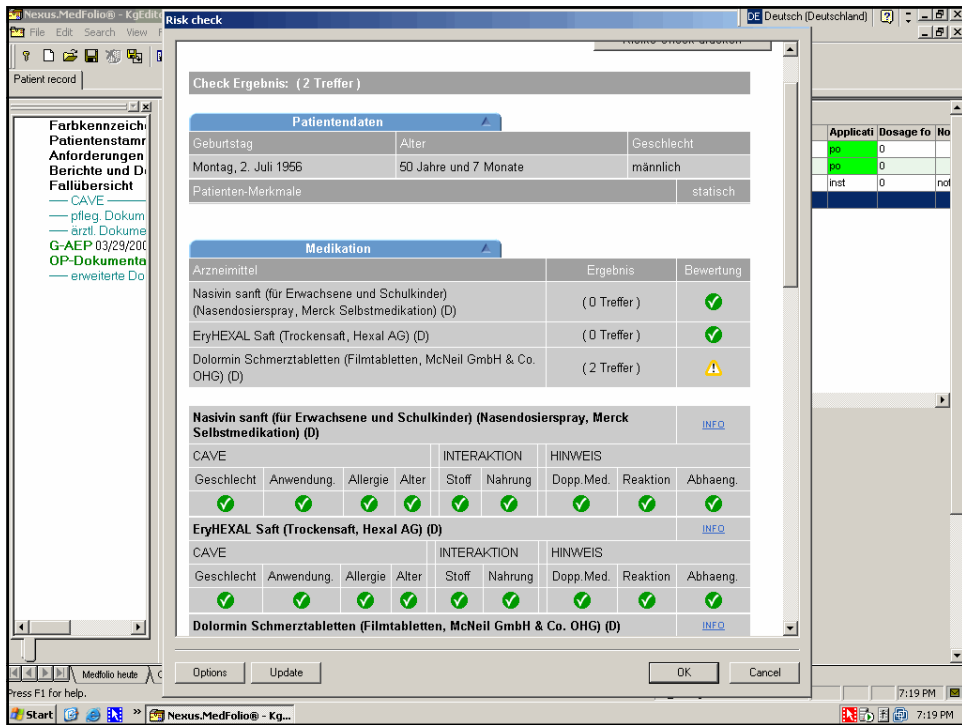
		<b>Hospital Geriatrics</b>	
Kaiser-Franz-Josef Hospital	758		
Rudolf Hospital	813		
Hietzing Hospital	841		
Geriatrics			1600
<b>Overall</b>		<b>2412</b>	<b>1600</b>
		<b>4012</b>	











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File View Options Modules Window ?

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Patient record

01/15/2007

current + required

A	S	Name	Dosage	Unit	Application typ	Dosa	VA	IG	VM	08:00 AM	12:00 PM	04:00 PM	05:00 PM	Or	Re	Pr	Ch	Gi	P	Remark
		Bauer, M, 12/12/1978	Nasivin® 0,05% (für Erwach...)	1 max.6/1h																only by sne
		Wolter, Rene, M, 07/12/1947	Nasivin® 0,05% (für Erwach...)	1	n.a.	inst	0	B												notes are n.
		Zerrer, Wilfried, M, 07/02/1956	Nasivin® sanft (für Erwach...)	1	n.a.	inst	0	B												notes are n.
			Dolormin® Schmerztabletten...	0-0-0-0-1-0-1	p	so	0			1		1								

Nexus Distribution

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		Bauer, M, 12/12/1978	Nasivin® 0,05% (für Erwach...)	1 max.6/1h	n.a.	inst	0	B												only by sne...
			Dolormin® Schmerztabletten...	1-0-1	p	so	0			1		1								
			Erythrocin® Neo (Abbott)	3-3	p	so	0			3		3								
		Charles, Ray, M, 09/23/1930	Dolormin® Migräne (McNeil)	1-0-1	p	so	0			1		1								
			Dolormin® Schmerztabletten...	1-0-1-1-0-1	p	so	0			1		1								
			Propra retard-ratiopharm®1...	1-0-1-1-1-0-0-1...	p	so	0			1		1								
										1		1								
		Wolter, Rene, M, 07/12/1947	Nasivin® 0,05% (für Erwach...)	1	n.a.	inst	0	B												notes are n...
			Dolormin® Schmerztabletten...	1-0-1	p	so	0			1		1								
			EryHEXAL® forte Saft (Hexal)	5-5-5	ml	so	0			5		5								
			Pantoloc 40mg (Eurin Pharm)	1-0-0	p	so	0			1										
		Zerrer, Wilfried, M, 07/02/1956	Nasivin® sanft (für Erwach...)	1	n.a.	inst	0	B												notes are n...
			EryHEXAL® Saft (Hexal)	5-5-5-5	ml	so	0			5		5		5		5				

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Bauer, M, 12/12/1978																			
		Nasivin® 0,05% (für Erwach...	1,max.6/1h	n.a.	inst	0	B												only by sne...
		Dolormin® Schmerztabletten...	1-0-1	p	po	0		1	1										
		Erythrocin® Neo (Abbott)	3-3	p	po	0		3	3										
Charles, Ray, M, 09/23/1930																			
		Dolormin® Migräne (McNeil)	1-0-1	p	po	0		1	1										
		Dolormin® Schmerztabletten...	1-0-1-1-0-1	p	po	0		4	1										
		Propra retard-ratiopharm® 1...	1-0-1-1-1-0-0-1	p	po	0		1	1										
Wolter, Rene, M, 07/12/1947																			
		Nasivin® 0,05% (für Erwach...	1	n.a.	inst	0	B												notes are n...
		Dolormin® Schmerztabletten...	1-0-1	p	po	0		1	1										
		EryHEXAL® forte Saft (Hexal)	5-5-5	ml	po	0		5	5		5								
		Pantoloc 40mg (Eurin Pharm)	1-0-0	p	po	0		1	1										
Zerrer, Wilfried, M, 07/02/1956																			
		Nasivin® sanit (für Erwach...	1	n.a.	inst	0	B												notes are n...
		EryHEXAL® Saft (Hexal)	5-5-5-5	ml	po	0		5	5		5		5						

**Differing dosage of dispensary**

Propra retard-ratiopharm® 160 Hartkapseln (ratiopharm), 16.00, 1p

Different amount:

Remark:  
more needed . |

OK Cancel

MedFolio heute Charles\_Ray,23.09.30 Wolter\_Rene,12.07.47 Zerrer,Wilfried,02.07.56 Prepare and dispense medicaments

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Bauer, M, 12/12/1978																				
		Nasivin® 0,05% (für Erwach...	1,max.6/1h	n.a.	inst	0	B													only by sne...
		Dolormin® Schmerztabletten...	1-0-1	p	po	0		1	1											
		Erythrocin® Neo (Abbott)	3-3	p	po	0		3	3											
Charles, Ray, M, 09/23/1930																				
		Dolormin® Migräne (McNeil)	1-0-1	p	po	0		1	1											
		Dolormin® Schmerztabletten...	1-1-0-0-1-1	p	po	0		4	1											
		Propra retard-ratiopharm® 1...	1-0-1-1-1-0-0-1	p	po	0		1	1											
											3									
												1								
													1							
Wolter, Rene, M, 07/12/1947																				
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		EryHEXAL® forte Saft (Hexal)	5-5-5	ml	po	0		5	5		5									
		Pantoloc 40mg (Eurin Pharm)	1-0-0	p	po	0		1	1											
Zerrer, Wilfried, M, 07/02/1956																				
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MedFolio heute Charles\_Ray,23.09.30 Wolter\_Rene,12.07.47 Zerrer,Wilfried,02.07.56 Prepare and dispense medicaments

mf\_manager@MedFolio 7:46 PM

## Electronically Supported Prescription, Commission and Administration

- **Easier Consideration of**
  - Interactions
  - Contraindications
  - Change i.v.-admin. to oral admin.
  - Department specific guidelines
- **Commission on Location Through Pharmacist**
  - Interdisciplinary Coordination
- **Garantee of Suitable Administration**
  - Through application of barcode based registration

## Further Training for Clinical Pharmacists

- From 1.10.2004
- Duration: 3 years
- 240 Teaching Units in terms of clin. pharmacy, production and analysis as well as management
- Concluding project thesis
- Exam
- Designation: approved Hospital Pharmacist („aHPh“)

# Unit Dose - Devices

- **ATC 212** - Baxter for 212 Drug Units
  - since 1988, 200.000 €
  - At present: 150 devices in use
  - 18 Bags/Minute = 270 Patients/hour
- **FDS 330** - Baxter for 330 Drug units
  - since 1996, 225.000 €
- **FDS 520** - Baxter for 520 Drug units
  - since 1996, 325.000 €
- **FDS 330 and 520**
  - At present: 16 devices in use
  - 45 Bags/Minute
- **Swisslog** ca. 900.000 €
  - Pillpicksystem: pills, capsules, dragées, ampoules, small bottles, tubes, filled syringes, suppositories (bulkware or parted blister-packed drugs)



Multi dose medication device ATC 212

Foto: W. Gerold





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 Vienna Hospital Association (KAV)  
 Head of medical economics and pharmacy  
[wolfgang.gerold@wienkav.at](mailto:wolfgang.gerold@wienkav.at)



Monitoring multi dose medicine photo: W. Gerold





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 Vienna Hospital Association (KAV)  
 Head of medical economics and pharmacy  
[wolfgang.gerold@wienkav.at](mailto:wolfgang.gerold@wienkav.at)



Storage of Unit Dose drugs on the ward photo: W. Gerold

## Swisslog Pillpick-Device

Pillpick is the first all - in - one solution on the market, which is suitable for the administration of Unit Doses in hospitals because it enables the implementation of either a central a decentral or a hybrid form of medicine distribution

Pillpick is able to

- administrate all medicine from pharmacies
- package oral solid matter, small bottles,
- ampoules and blister-packed drugs
- process medicine via Unit Dose
- distribute medicine patient focused
- Controls medicine entirely
- collects data concerning medicine flow



## Packaging - Device

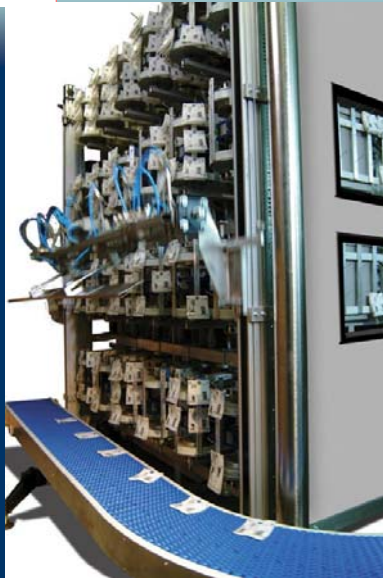
### Pillbox

Medicine packaged by the Pillpicker is arranged in the Pillbox.

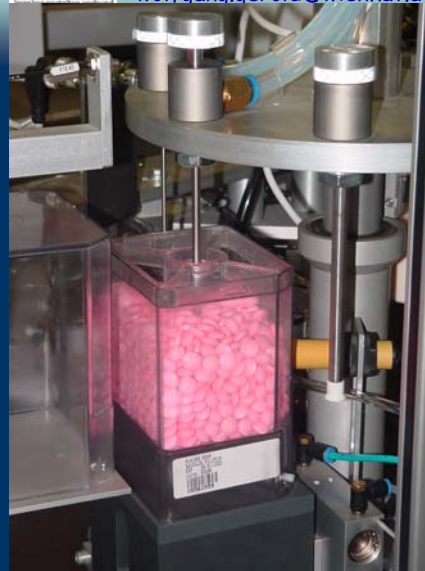
Every container is equipped with a chip which collects certain data about the products:

- Trade name of the product
- Active substances
- ID number of medicine
- application form
- batch number
- expiry date





**Drugnest:**  
 Automatic store for Unit-Doses



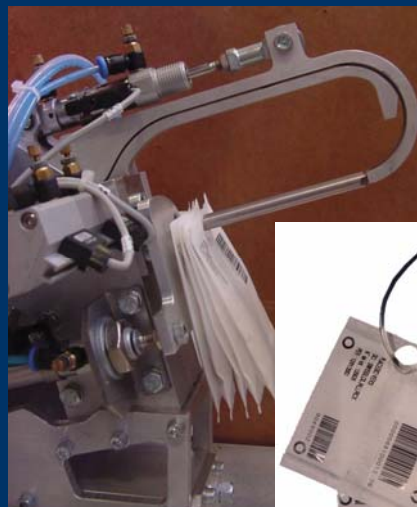
The Pillpicker always takes only one kind of drug out of the Pillbox.

## Store - and Distribution Device



### Pickring

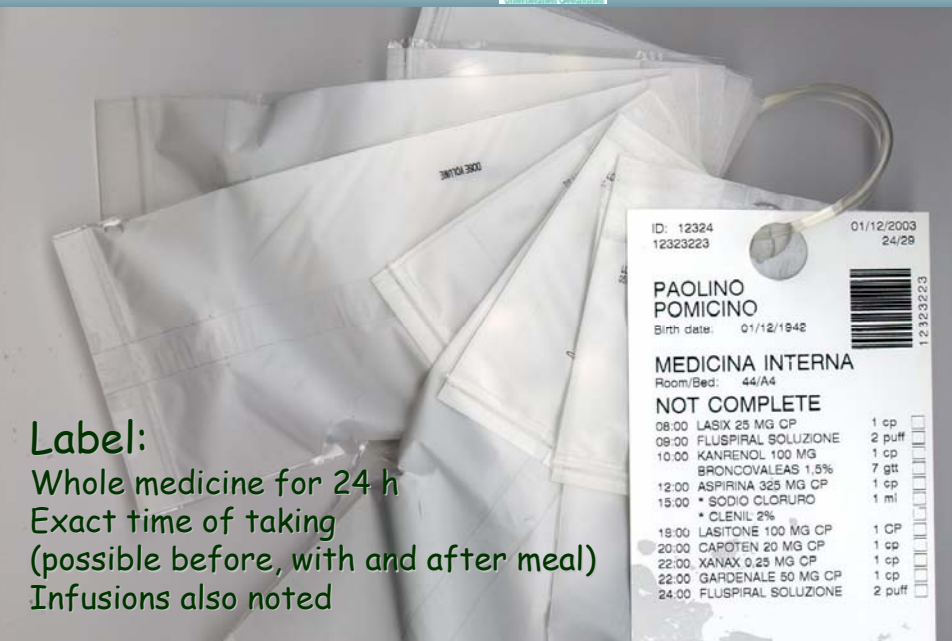
"Pickring" is a plastics ring and a special application patented by swisslog, which holds the small bags, containing Unit Doses, together.

It facilitates the distribution of medicine and increases the safety of the administration of medication as a consequence of the function of the "Pickring", which avoids mixing up of prescribed drugs with medicine originally not intended for the certain patient







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 Head of medical economics and pharmacy  
 wolfgang.gerold@wienkav.at



**Label:**  
 Whole medicine for 24 h  
 Exact time of taking  
 (possible before, with and after meal)  
 Infusions also noted

ID: 12324	01/12/2003
12323223	24/29
<b>PAOLINO POMICINO</b>	
Birth date: 01/12/1942	
<b>MEDICINA INTERNA</b>	
Room/Bed: 44/A4	
<b>NOT COMPLETE</b>	
08:00 LASIX 25 MG CP	1 cp
09:00 FLUSPIRAL SOLUZIONE	2 puff
10:00 KANFRENOL 100 MG	1 cp
BRONCOVALEAS 1,5%	7 gtt
12:00 ASPIRINA 325 MG CP	1 cp
15:00 * SODIO CLORURO	1 ml
* CLENIL 2%	
18:00 LASITONE 100 MG CP	1 CP
20:00 CAPOTEN 20 MG CP	1 cp
22:00 XANAX 0,25 MG CP	1 cp
22:00 GARDENALE 50 MG CP	1 cp
24:00 FLUSPIRAL SOLUZIONE	2 puff



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**Patient Barcode**





**Unit Dose**







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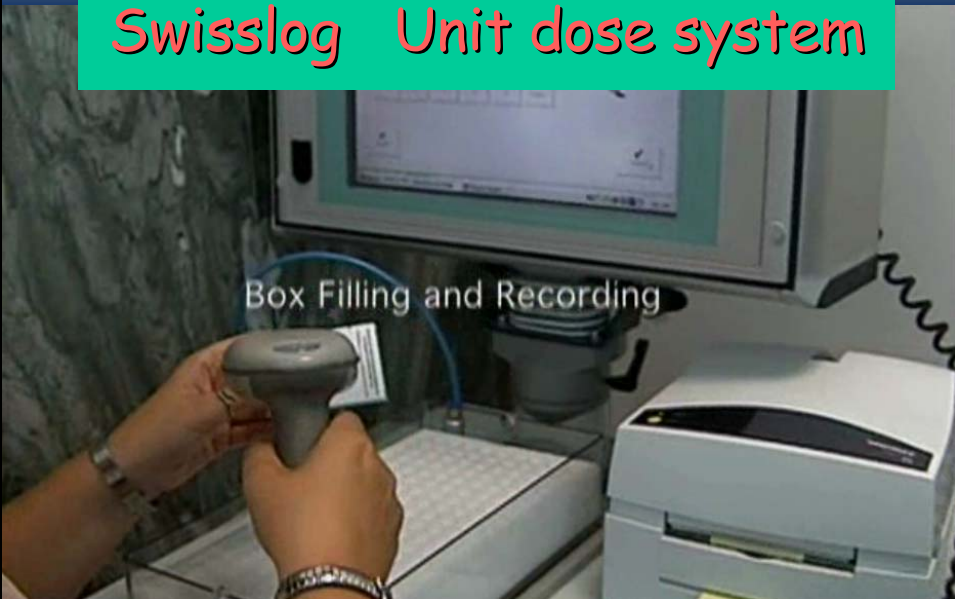
 Vienna Hospital Association (KAV)  
 Head of medical economics and pharmacy  
[wolfgang.gerold@wienkav.at](mailto:wolfgang.gerold@wienkav.at)



Computerized Physician Order Entry


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**Unit-Dose-Project KAV Vienna**

 Vienna Hospital Association (KAV)  
 Head of medical economics and pharmacy  
[wolfgang.gerold@wienkav.at](mailto:wolfgang.gerold@wienkav.at)

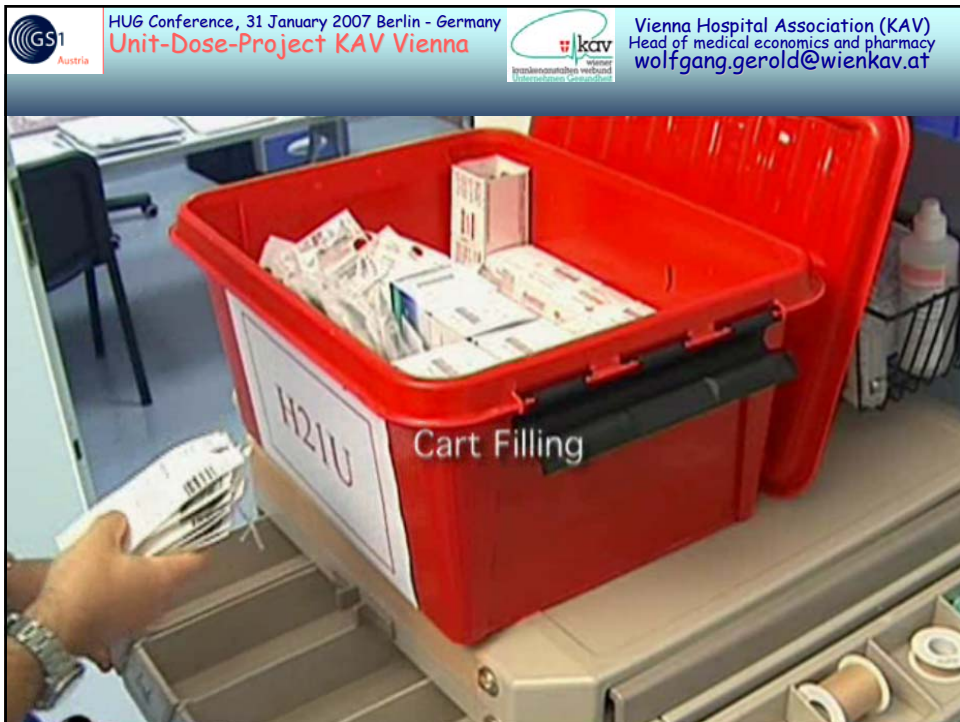
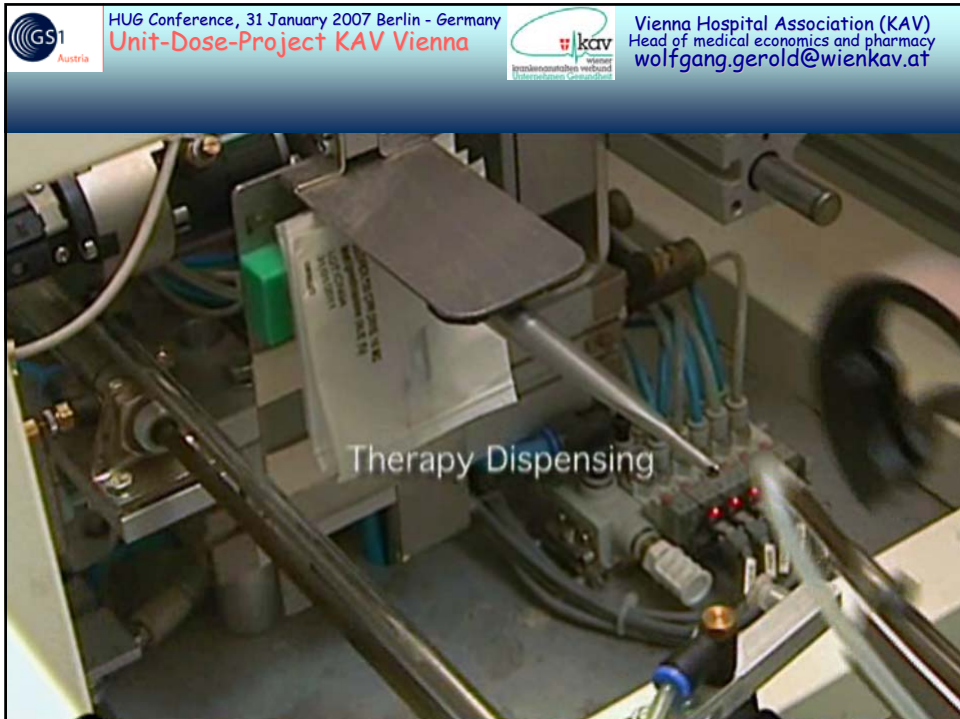
**Swisslog Unit dose system**



Box Filling and Recording









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Vienna Hospital Association (KAV)  
Head of medical economics and pharmacy  
wolfgang.gerold@wienkav.at

## Supply Center

- Operating from Sunday to Friday  
24h/day
- On Saturday Stand-by-Duty
- Stand-by-Duty (telephone): from 8  
pm to 8 am by pharmacist

## Inappropriate Products Concerning Unit Dose are:

- Products, which are not suitable for unit dose such as: heavier than 80g (120 g), larger than 20 cm, chilled goods
- Products needed at the operating room and the intensive care unit,
- Seldomly prescribed products (less than 12 packages in the whole Southern Dispensary Partnership)
- Cytostatics
- Home -made production

## Southern Dispensary Partnership Consumption 2003 in Package/Unit

Packages		4.400.000 Pk
medicine	50 %	2.200.000 Pk
UD-medicine	25 %	1.100.000 Pk
UD-suitable medicine		18.800.000 St
There of UD-Wards	92 %	17.300.000 St
Other departments	8 %	1.500.000 St

Calculation Mag. Zwiefler  
 Results rounded

## Number of Unit Doses per Day and Year

ca. 5.500 Beds x 8 UD x = ca. 40.000 UD

Hospital 85 % fill rate

Geriatrics 95 % fill rate

40.000 UD x 365 = 14.600.000 UD-units/year

2003 actually: 17.300.000 - 15 % decrease=

14.700.000 UD-units/year

## Southern Pharmacy Partnership Consumption 2003 in €

Pharmaceuticals 35.300.000 €

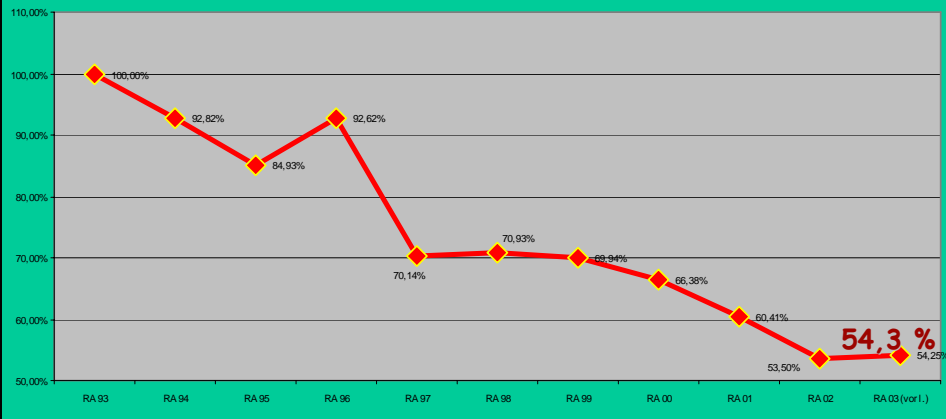
10 % Savings Assumption 3.500.000 €

Calculation Mag. Zwiefler  
 Results rounded

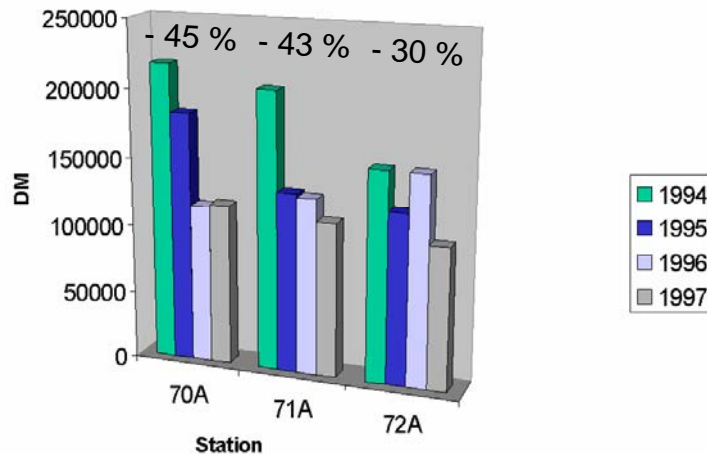


## Neurologic Hospital Rosenhügel Pharmaceuticals - Costs/Admission 1993-2003

Arzneimittelspezialitäten ohne Blutprodukte pro Aufnahme seit 1997 auf RA-Basis, Netto, bezogen auf 1993 als 100% im NZR



## Cost Development Pulmology average 40 % 110 Beds



## Pharmacy Partnership Amortisation

Assumption 10 % Reduction of costs:  
→ approx. **3,4 years**

## Economic Potential

### *Reduction of Consumption*

Wrong medication,  
Excessive medication,  
Dwindling,  
More efficient use of generics

### *Purchase Prices*

Central supply  
Bulk goods purchase

### *Costs of bound capital*

Reduction of inventory coverage

### *Reduction of legal costs*

*Higher quality and efficiency through advice and information provided by the pharmacist.*

## Unit Dose - Reference Projects

- Suhl hospital / Germany
- Bottrop/Oberhausen / Germany
- Hamburg hospitals / Germany
- Hôpital de la Ville Esch sur Alzette / Luxembourg
- Arhus Sygehus / Dänemark
- Hospital Erlanger / USA
- Ospedale San Sebastiano di Correggio/Italy

Nearly all projects were launched for  
quality reasons and not primarily because  
of reducing expenses.....

....but had the savings as a desired side  
effect.