

# Uključivanje ljekarnika u klinički tim



**X. savjetovanje farmaceuta**

**Hrvatska farmacija pred ulaskom u EU**

**Šibenik 24-26.5.2012.**

**Dina Ljubas Kelečić, mr.pharm.**

**KBC Zagreb, Centar za kliničku prehranu**

# Zrnca povijesti

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- ▶ 1752. Jonathan Roberts
- ▶ John Morgan



- ▶ 1960. USA,UK - **klinička farmacija**
- ▶ **Drug.com** - 24 000 USA, 40 000 ostali (185)
- ▶ **Hrvatska** – cca. 3940

# Nuspojave lijekova

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- ▶ 1971. - **ADRs (Adverse drug reactions)** – 140 000 umrlih i 1 000 000 hospitaliziranih bolesnika

Talley and Laventurier. JAMA. 1974.

- ▶ USA - 3 do 7% hospitalizacija zbog ADRs
- ▶ 10 do 20% ADRs tijekom hospitalizacije
- ▶ Incidencija smrti zbog ADRs - 0.5 to 0.9%

[http://www.merckmanuals.com/professional/clinical\\_pharmacology/adverse\\_drug\\_reactions/adversedrug\\_reactions.html](http://www.merckmanuals.com/professional/clinical_pharmacology/adverse_drug_reactions/adversedrug_reactions.html)

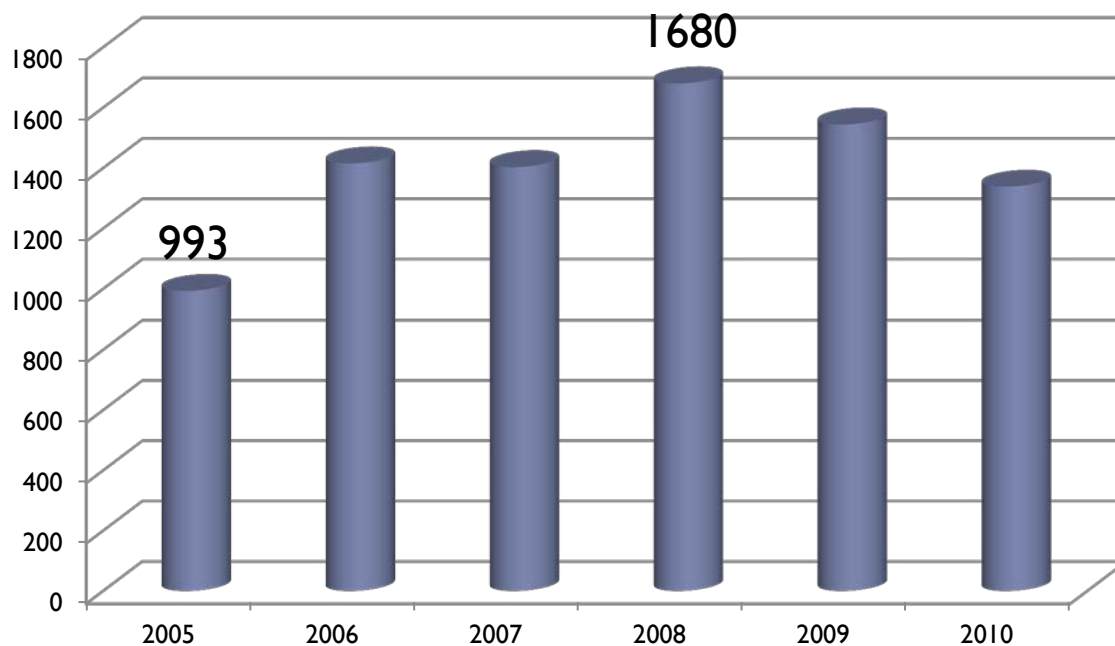


# Farmakovigilancija u Hrvatskoj

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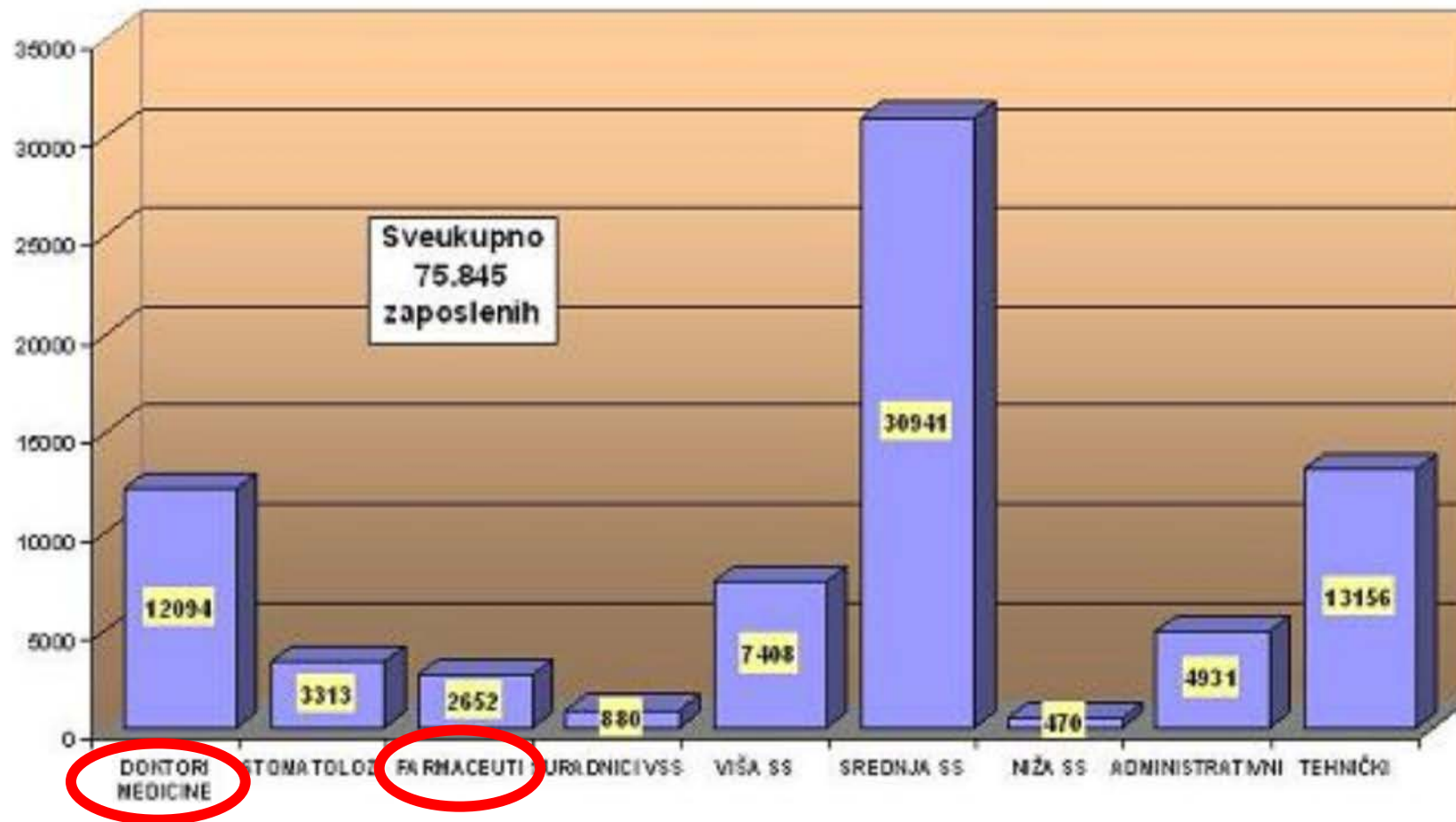


**Broj prijavljenih nuspojava**



## Broj djelatnika sa zaposlenjem u zdravstvu u Hrvatskoj

- stanje na dan 31.12.2005.



# Prevention of Pediatric Medication Errors by Hospital Pharmacists and the Potential Benefit of Computerized Physician Order Entry

Jerome K. Wang, Nicole S. Herzog, Rainu Kaushal, Christine Park, Carol Mochizuki and Scott R. Weingarten

*Pediatrics* 2007;119:e77

DOI: 10.1542/peds.2006-0034

© 2008 Nordic Pharmacological Society. *Basic & Clinical Pharmacology & Toxicology*

**The Impact of Clinical Pharmacists on Drug Clinical Outcomes**  
Kirsten K. Vikriti<sup>1,3</sup> and Hege Salte<sup>1,2</sup>  
<sup>1</sup> Lovisenberg Diakonale Hospital, and <sup>2</sup> University of Oslo, Oslo, Norway  
Received September 13, 2007; Accepted October 1, 2007



74



Open Access

Participation of a hospital pharmacist in intensive care unit reduces prescribing errors and patient harm: an intervention study

van Kan<sup>1</sup>, Hendrikus J van Kan<sup>1</sup>, Anne-Cornelie de Pont<sup>2</sup>, Marcel G Dijkgraaf<sup>3</sup>, Vroom<sup>2</sup>, Susanne M Smorenburg<sup>4</sup>

ORIGINAL INVESTIGATION

**Pharmacist Participation on Physician Rounds and Adverse Drug Events in the Intensive Care Unit**

**Pharmacists on Rounding Teams Reduce Preventable Adverse Drug Events in Hospital General Medicine Units**

Suzan N. Kucukarslan, PhD; Michael Peters, RPh, BCPS; Mark Mlynarek, RPh, BCPS; Daniel A. Nafziger, MD, MS

# Klinička farmacija

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## ▶ Definicija

“area of pharmacy concerned with the science and practice of rational medication use”

American College of Clinical Pharmacy. ACCP defines clinical pharmacy. ACCP Rep 2005;24(8):1–2.

## ▶ Klinički farmaceut

### ▶ Na odjelu

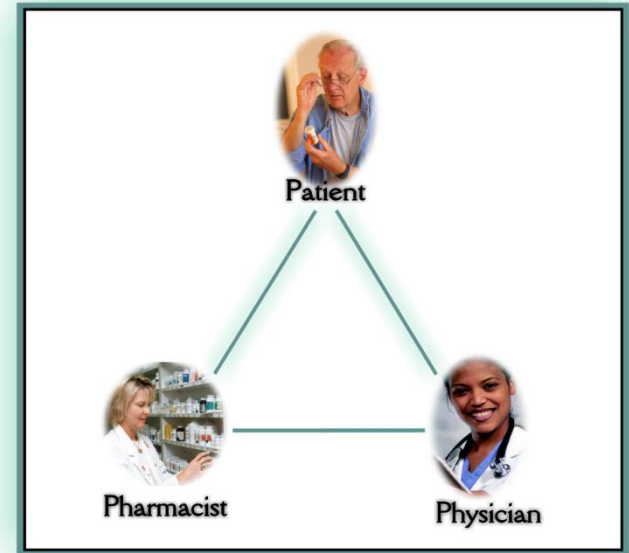
### ▶ Orijehtiran prema pacijentima

- ▶ Nabava, priprema i izdavanje lijekova, kontrola kvalitete, analiza supstanci i gotovih lijekova, parenteralna prehrana, citostatici

# Collaborative Drug Therapy Management (CDTM)

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- ▶ USA – 43 države
- ▶ **Timski rad:**
- ▶ informiranje i edukacija bolesnika
- ▶ bolji “compliance”
- ▶ ↑ učinkovitost terapije
- ▶ ↓ ARDs
- ▶ ↓ komplikacije
- ▶ ↓ troškovi



**Cilj uspješne  
farmakoterapije**

# Znanje

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- ▶ Farmakoterapija
- ▶ Patofiziologija
- ▶ Medicinsko laboratorijska dijagnostika
- ▶ Komunikacijske vještine
- ▶ Monitoring
- ▶ Informiranje o lijekovima
- ▶ Planiranje terapije



- ▶ Znanje o lijekovima integrirano sa osnovnim razumijevanjem biomedicinskih, farmaceutskih, sociobehavioralnih i kliničkih znanosti

# Osnovne aktivnosti kliničkog farmaceuta

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- ▶ **FARMAKOTERAPIJA**
- ▶ Odabir, primjena i monitoring terapije
- ▶ Procjena odgovora na terapiju
- ▶ Savjetovanje i edukacija bolesnika
- ▶ Medikacijska povijest
- ▶ Vizite i konziliji
- ▶ Farmakovigilancija
- ▶ Farmakokinetika / praćenje terapijskog učinka lijeka
- ▶ Kliničke studije
- ▶ Farmakoekonomika
- ▶ Edukacija
  
- ▶ **Kontrola lijeka prije, tijekom i nakon preskripcije!**

# Centar za kliničku prehranu

- ▶ 2007. KBC Zagreb
- ▶ sastavni dio Klinike za internu medicinu
- ▶ Klinička jedinica za kliničku prehranu
  
- ▶ **Nutritivni tim**
- ▶ Liječnik - internist
- ▶ **Farmaceut**
- ▶ Dijetetičar/nutricionist
- ▶ VMS



Nutritivni tim KBC Zagreb: Dr.sc. Darija Vranešić Bender (nutricionist), prof. Željko Krznarić (specijalist gastroenterolog i pročelnik Centra za kliničku prehranu), Dina Ljubas Kelečić, mr.pharm.

# Organizacija nutritivne skrbi i terapije



## Djelovanje nutritivnog tima

- ▶ **Klinička praksa**
- ▶ Propisivanje i nadzor kliničke prehrane
- ▶ Implementacija nutritivnog probira
- ▶ Implementacija protokola za EN i PN
- ▶ Poliklinika

# Edukacija (KBC, MEF Zagreb i Rijeka, PBF, RH, Europa)

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## Prehrambeno – biotehnološki fakultet

- ▶ Preddiplomski studij: “Enteralna i parenteralna prehrana”
- ▶ Diplomski studij: “Dijetoterapija”

## Medicinski fakultet Zagreb

- ▶ izborni predmet “Prehrana i dijetoterapija u kliničkoj praksi”
- ▶ poslijediplomski tečaj trajnog usavršavanja “Klinička prehrana”

# Klinička prehrana

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## ► Nutritivne intervencije



Dijetni savjeti



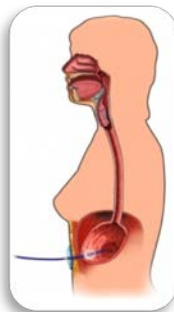
Međubroci



Obogaćivanje  
obroka



ONS



Enteralna  
prehrana



Parenteralna  
prehrana

# Klinički nutritivni tim (uloga farmaceuta)



- odlazi na vizite i konzilijarne preglede
- procjena nutritivnog statusa
- propisuje parenteralnu prehranu
- propisuje enteralnu prehranu
- motri uspješnost kliničke prehrane
- ukazuje na potencijalne interakcije iv. lijekova i hrane
- vrši balansiranje elektrolita i pazi na hidraciju bolesnika
- kreira planove nutritivne potpore za hospitalizirane i polikliničke bolesnike

# Farmako-ekonomski aspekti



Nutrition 21 (2005) 1127–1133

NUTRITION

[www.elsevier.com/locate/nut](http://www.elsevier.com/locate/nut)

Applied nutritional investigation

## Cost savings of an adult hospital nutrition support team

John F. Kennedy, R.G.N., D.P.S.N., and Jeremy M.D. Nightingale, M.D., F.R.C.P.\*

*Leicester Royal Infirmary, Leicester, United Kingdom*

Manuscript received February 26, 2005; accepted June 21, 2005.

### Abstract

**Objectives:** A hospital-based nutrition support team (NST) may need to demonstrate cost savings and quality benefits. The primary aim of this study was to determine whether an NST could show tangible cost savings (equipment, investigations, and medication costs) from managing patients considered for parenteral nutrition (PN). Secondary aims related to the quality issues of placement of PN catheters, catheter-related sepsis (CRS), duration of parenteral nutrition, and mortality.

**Methods:** An NST was formed in 1999 and worked in all adult areas of a university hospital (Leicester Royal Infirmary). Comparative data about all patients given PN were collected for 2 consecutive years (a retrospective pre-NST year and a prospective NST year).

**Results:** In the pre-NST year there were 82 PN episodes (54 patients), 665 PN days, and a CRS rate of 71% (seven infections/100 PN days). In the NST year, there were 133 referrals for PN but only 78 PN episodes (75 patients, 59% of referrals), 752 PN days, and a decreased overall CRS rate of 29% (three infections/100 PN days,  $P < 0.05$ ) but a rate of 7% (0.6 infection/100 PN days) in the final 3 mo of the NST year. Tangible cost savings for the NST year were derived from 55 avoided PN episodes (£42 741) and 35 avoided CRS episodes (£7974). Thirty-nine percent of PN catheters were inserted by the NST with no insertion-related complications. Competency-based training of ward nursing staff decreased the CRS rate. Mean duration of PN increased from 8 to 10 d ( $P$  not significant). In-hospital mortality for patients who had PN was 23 of 54 (43%) in the pre-NST year compared with 18 of 75 (24%) in the NST year ( $P < 0.05$ ).

**Conclusions:** Although the number of PN days increased with an NST, tangible cost savings of £50 715 were demonstrated within the NST year by avoided PN episodes and a decreased incidence of CRS. These savings justify the salaries of a nutrition nurse specialist and a senior dietitian. © 2005 Elsevier Inc. All rights reserved.

**Keywords:**

Nutrition support team; Parenteral nutrition; Enteral nutrition; Cost savings

SVEUČILIŠTE U ZAGREBU - MEDICINSKI FAKULTET

Centar za kliničku prehranu  
Klinika za unutarnje bolesti  
Kliničkog bolničkog centra Zagreb

organiziraju

poslijediplomski tečaj stalnog medicinskog usavršavanja  
I. kategorije

## KLINIČKA PREHRANA

Voditelji tečaja:

Prof. dr. sc. Željko Krznarić

dr. sc. Darija Vranešić Bender

ISTE U ZAGREB

**ESTSPEN**  
Estonian Society for Parenteral and Enteral Nutrition

Baltic Club of Clinical Nutrition ( BCCN ) and  
The European Society for Clinical Nutrition and Metabolism (ESPEN)  
present

## III Baltic Course in Clinical Nutrition and Metabolism 19 – 21 March 2010, Tallinn, Estonia

10:30 – 11:00	Nutritional support and obesity ( incl. ICU)	Andrius Klimasauskas, Lithuania
11:00 – 11:30	Nutritional support in IBD	Zeljko Krznaric, Croatia
11:30 – 12:00	Nutritional support in Liver diseases	Ingrida Lisauskiene, Lithuania
12:00 – 12:30	Complications in Nutritional support	Simon P. Allison, UK
12:30 – 13:00	Refeeding syndrome	Dina Ljubas Kelečić, Croatia

# 19<sup>TH</sup> ESPEN COURSE OF Clinical Nutrition and Metabolic Care

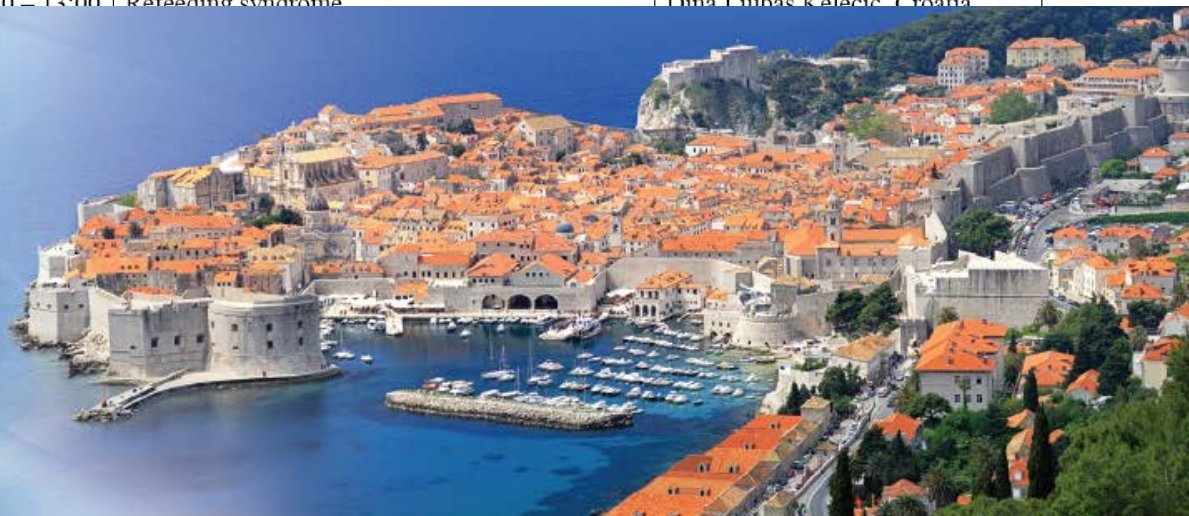
October 28. - November 03. 2012  
Dubrovnik, Croatia



European Society  
of Clinical Nutrition  
and Metabolism



Croatian Society of  
Clinical Nutrition  
Croatian Medical  
Association



Urednici:

Željko Krznarić  
Darija Vranešić Bender  
Dina Ljubas Kelečić

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### Kontakti

Hrvatsko društvo za  
parenteralnu i enteralnu  
prehranu Hrvatskog  
liječničkog zborni-  
ca  
Prof. dr. sc. Željko Krznarić  
KBC Zagreb - Rebro  
Kispatičeva 12  
10 000 Zagreb, Hrvatska  
Tel. +385 1 2367730

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+385 -1 - 4930 683  
E-mail: ivana.resetar@o-  
tours.hr  
hr.hrpworldwide.com  
www.otours.hr

### 10:40-11:00 Coffee Break

11:00-11:20 Dina Ljubas Kelečić: Nutritivna potpora kod Anoreksije nervose  
11:25-11:45 Antonio Juretić: Tumorska kaheksija  
11:50-12:10 Stjepko Pleština: Nutritivna potpora bolesnika s tumorima probavnog sustava  
12:15-12:35 Davor Štimac: Endoskopske tehnike u liječenju debljine

### 13:00-15:00 Ručak

### Simpozij: Prehrana u jedinici intenzivnog liječenja – u suradnji s Fresenius Kabi

15:00-15:30 Renata Dobriša Dintinjara: Prikaz primjene enteralne prehrane u onkologiji  
15:30-16:00 Mladen Perić: Glutamin u JIL-u  
16:00-16:30 Željko Krznarić: Novosti u parenteralnoj primjeni lipida

### 16:30-16:45 Coffee Break

16:45-17:05 Lea Poljak: Hrana za posebne medicinske potrebe - regulativa, podjela  
17:10-17:30 Eva Pavčić: Uvođenje i vrđnovanje HACCP sustava u bolničkim kuhinjama  
17:35-17:55 Sanja Kolaček: Prehrana trećeg milenija – epigenetika, nutrigenomika

### Završna rasprava: Perspektive kliničke prehrane

18:00-18:30 Davor Štimac, Željko Krznarić, Sanja Kolaček, Darija Vranešić Bender

### Organizacijski odbor

Prof. dr. sc. Željko Krznarić  
Dr. sc. Darija Vranešić Bender  
Prof. dr. sc. Sanja Kolaček  
Prof. dr. sc. Davor Štimac

9:00 Dina Ljubas Kelečić, Darija Vranešić Bender: Prehrana i hidracija palijativnog

bolesnika

9:20 Željko Krznarić: Mučnina, povraćanje, konstipacija i maligna opstrukcija; Sindrom anoreksije, kaheksije i dehidracije



## LIJEČNIČKI VJESNIK

GLASILO HRVATSKOGA LIJEČNIČKOG ZBORA

HRVATSKE SMJERNICE ZA PREHRANU OSOBA STARIJE DOBI, DIO I\*

CROATIAN GUIDELINES FOR NUTRITION IN THE ELDERLY, PART I\*

## HRVATSKE SMJERNICE ZA PREHRANU OSOBA STARIJE DOBI, DIO II – KLINIČKA PREHRANA\*

CROATIAN GUIDELINES FOR NUTRITION IN THE ELDERLY,  
PART II – CLINICAL NUTRITION\*

ŽELJKO KRZNARIĆ, DARIIJA VRANEŠIĆ BENDER, DINA LJUBAS KELEČIĆ,  
ŽELJKO REINER, SPOMENKA TOMEK ROKSANDIĆ, DOMINA KEKEZ, TAJANA PAVIĆ\*\*

**Autori:** DARIIJA VRANEŠIĆ BENDER<sup>1</sup>, ŽELJKO KRZNARIĆ<sup>1</sup>, ŽELJKO REINER<sup>2</sup>, SPOMENKA TOMEK

ROKSANDIĆ<sup>3</sup>,

BOŠNIR<sup>3</sup>

<sup>1</sup> Hrvatsko dr

Željko Krznar

<sup>2</sup> Hrvatsko dr

<sup>3</sup> Hrvatsko dr

Tomek Roks

## HRVATSKE SMJERNICE ZA PRIMJENU ENTERALNE PREHRANE U CROHNOVOJ BOLESTI\*

CROATIAN GUIDELINES FOR USE OF ENTERAL NUTRITION IN CROHN'S DISEASE\*

ŽELJKO KRZNARIĆ, SANJA KOLAČEK, DARIIJA VRANEŠIĆ BENDER, DINA LJUBAS KELEČIĆ,  
SILVIJA ČUKOVIĆ-ČAVKA, BRANKICA MIJANDRUŠIĆ SINČIĆ, MARKO BANIĆ, VLADIMIR BORZAN,  
MIROSLAV ŠIMUNIĆ, MLADEN PERŠIĆ, DAVOR ŠTIMAC, BORIS VUCELIĆ\*\*

**Deskriptori:** Crohnova bolest – liječenje; Er

**Sažetak.** Prehrana ima važnu višeznačnu ulogu u liječenju Crohnove bolesti. U prvom redu adekvatna terapija u obliku cijeli osteoporoze te u promicanju dobi primjerice bolesti u pedijatrijskih bolesnika enteralna je terapija. raznih pripravaka istraživanja upućuju na jeftinije i sigurnije vaka. Uporaba standardnih polimernih enteralnih pripravaka od bolesnika, manje komplikacija te značajna poboljšanja vaka. Najnovije spoznaje upućuju i na to da se može koristiti nalaze u modificiranim polimernim enteralnim pripravcima bolesti crijeva, potvrđen u nekoliko kliničkih studija. trijski gastroenterolozi, posebno upućeni u liječenje bolesti. smjernice za primjenu enteralne prehrane u Crohnovoj bolesti. medicinske literature te kliničkim iskustvima.

## CROATIAN GUIDELINES FOR USE OF EICOSAPENTANOIC ACID AND MEGESTROL ACETATE IN CANCER CACHEXIA SYNDROME

- Krznarić Z, Juretić A, Samija M, Dintinjana RD, Vrdoljak E, Samarzija M, Kolacek S, Vrbanec D, Prgommet D, Ivkić M, Zelić M;
- Croatian Society of Parenteral and Enteral Nutrition, Croatia Society of Oncology, Croatia society of Medical Oncology, Croatia Medical Association.
- **Lijec Vjesn. 2007 Dec;129(12):381-6. (Croatian).**

## Assessment of Nutritional Status of Gastroenterology Patients in Croatia

Darija Vranešić Bender<sup>1</sup>, Željko Krznarić<sup>2</sup>

<sup>1</sup> University of Zagreb, Zagreb University Nutrition, Zagreb, Croatia

<sup>2</sup> University of Zagreb, Zagreb University Croatia

<sup>3</sup> University of Zagreb, Faculty of Food Technology

### ABSTRACT

*Malnutrition is a common feature admitted to Department of Gastroenterology biochemical methods and method of Study patients admitted to the Hospital. Malnutrition moderately and 25% severely malnourished SGA were found to have statistically lower hemoglobin, vitamin A and lymphocytes as compared to hospitalized patients treated at the Department. Multiple measures would be important in this high prevalence.*

### Parenteral nutrition in oncology

Parenteral nutrition has had limited indications in oncology, since most clinical trials have been unable to demonstrate benefits such as improvements in survival rates or quality of life. However, an increased understanding of the pathogenesis of cancer cachexia suggests a new paradigm for its use in cancer patients.

**A** progressive deterioration of nutritional status is frequently found in cancer patients [1]. The clinical relevance of malnutrition is underlined by its close association with increased morbidity and mortality. Malnourished cancer patients present with a higher risk of developing severe chemotherapy-associated



wasting of muscle mass and fat tissue [7]. These molecular and biochemical events translate into the clinical syndrome of cancer cachexia, which should be considered as a specific subset of malnutrition. Indeed, cachexia has been recently defined as 'a complex metabolic syndrome associated with underlying illness and characterized by loss of muscle with or without loss of fat mass' [9].

Željko Krznarić, Dina Ljubas

## 27. Nutrition in ICU

Nutrition 27 (2011) 503–504

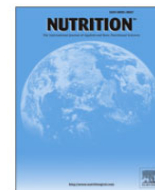


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Contents lists available at ScienceDirect

Nutrition

journal homepage: [www.nutritionjrn.com](http://www.nutritionjrn.com)



Letter to the editor

### Wernicke's encephalopathy during parenteral nutrition in a Crohn's disease patient

Dear editor,

We read with interest the article by Francini-Pesenti et al. in your issue [1]. We report seven cases of Wernicke's encephalopathy in patients on total parenteral nutrition [1]. The indications for parenteral nutrition in three cases, acute pancreatitis and Crohn's disease, were reported in two cases.

Water-soluble vitamin absorbed in the intestine as a coenzyme for several enzymes involved in glucose metabolism. Thiamine deficiency is characterized by a classical triad of symptoms:

Krznarić Željko, M.D., Ph.D.  
Zagreb University, School of Medicine  
Department of Gastroenterology  
Center of Clinical Nutrition  
Zagreb, Croatia

Vranešić Bender Darija, B.Sc., Ph.D.,  
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Center of Clinical Nutrition, University Hospital Center Zagreb  
Zagreb, Croatia

Brinar Marko, M.D.  
Department of Gastroenterology, University Hospital Center Zagreb  
Zagreb, Croatia

# Klinička farmacija u Hrvatskoj

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## **MINISTARSTVO ZDRAVSTVA I SOCIJALNE SKRBI**

Na temelju članka 133. stavka 2. i članka 134. stavka 6. Zakona o zdravstvenoj zaštiti («Narodne novine», br. 121/03, 48/05 i 85/06) ministar zdravstva i socijalne skrbi donosi

## **PRAVILNIK O SPECIJALISTIČKOM USAVRŠAVANJU MAGISTARA FARMACIJE**

# Specijalizacije



- ▶ 1. ISPITIVANJE I KONTROLA LIJEKOVA
- 2. FARMACEUTSKA TEHNOLOGIJA
- 3. **KLINIČKA FARMACIJA** – JAVNO LJEKARNIŠTVO
- 4. **KLINIČKA FARMACIJA** – **BOLNIČKO LJEKARNIŠTVO**

**Trajanje specijalizacije:** 36 mjeseci - I. Teorijski dio: 12 mjeseci

II. Praktični rad: 24 mjeseca

Specijalizacija	*Broj odobrenih specijalizacija
Ispitivanje i kontrola lijekova	7
Farmaceutska tehnologija	2
Klinička farmacija javno ljekarništvo	2
Klinička farmacija bolničko ljekarništvo	7

# Poslijediplomski studiji

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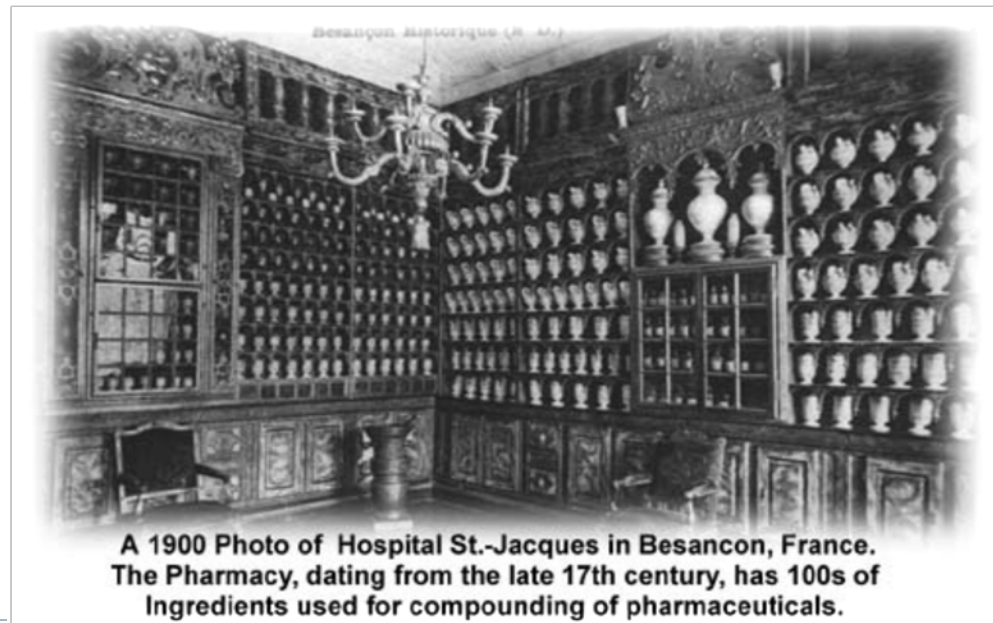
- ▶ FBF u Zagrebu - doktorski i specijalistički studiji
- ▶ **2010. g. poslijediplomski specijalistički studij Klinička farmacija** – voditeljica prof.dr.sc.Vesna Bačić Vrca
- ▶ Jednogodišnja specijalizacija – javno i bolničko ljekarništvo
- ▶ Sveučilišni magistar kliničke farmacije
- ▶ **37** polaznika 2010./2011. (prema podacima FBF u Zagrebu)

# Zaključak

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- ▶ **Bolničko ljekarništvo u HR**
- ▶ - 46 bolničkih ljekarni
- ▶ - 110 bolničkih ljekarnika

Ožujak 2012. Registar ljekarnika komore. HLJK.



# Hvala na pažnji!

