

# Opportunities and Research Horizons in Pain Management

Knox H. Todd, MD, MPH

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*Knox H. Todd, MD, MPH, FACEP*

Director, Pain and Emergency Medicine Initiative  
Rollins School of Public Health, Emory University  
Atlanta, GA



## SWOT Analysis

- **Strengths**
  - Pain prevalence and severity
  - Momentum of efforts
- **Weaknesses**
  - Inferior education
  - Failed academic business model
- **Opportunities**
  - Novel therapies
  - National initiatives
- **Threats**
  - Resources
  - Industry marketing forces

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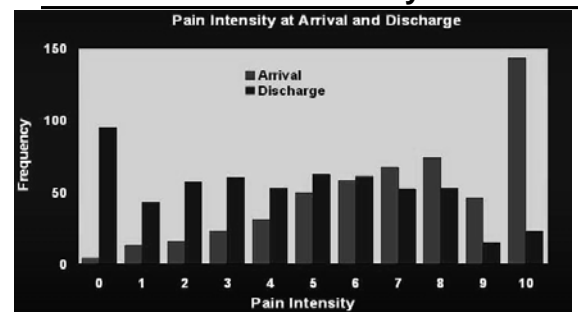
## Strengths

- High prevalence of pain
- High levels of pain intensity
- Increasing recognition of the problem
- Increasing activity & collaborators
- Systems outlook

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## Pain Intensity

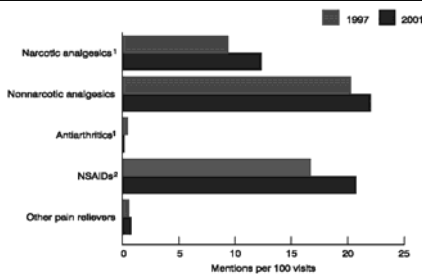


Todd KH et al. *Canadian Journal of Emergency Medicine*. 2002;4:252-256.

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## ED Analgesia Use: 1997 & 2001



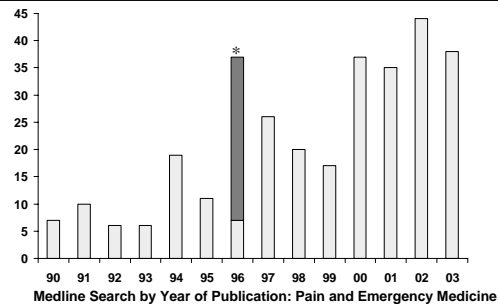
<sup>1</sup> Significant change since 1997 ( $p < 0.001$ ).  
<sup>2</sup> NSAIDs are nonsteroidal anti-inflammatory drugs.

National Hospital Ambulatory Care Survey Data – ED Summary, NCHS 2001.

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## EM Pain Literature



Medline Search by Year of Publication: Pain and Emergency Medicine

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### Weaknesses

- Lack of training
- Scarcity of mentors
- Large service demands

### Education

- From Emergency Medicine, 6th Edition (Tintinalli), page 565
  - *“Patients presenting with biliary colic and emesis are best treated with antispasmodic agents (glycopyrrolate),...”*
  - *“Meperidine is the analgesic of choice because it produces significantly less spasm of the sphincter of Oddi...”*

### EMLA and Heat

- RCT in adults of EMLA with/without heat
- VAS scoring at 20 and 60 minutes
- IV catheterization pain stimulus
- Conclusion: EMLA with heat at 20 minutes provides “intermediate” analgesia compared to EMLA without heat at 60 minutes
- Do you agree?

### Does Heat Improve on EMLA?

	Heat	No Heat
Placebo (20 minutes)	46.6	46.1
EMLA (20 minutes)	31.9	35.7
EMLA (60 minutes)	13.1	16.6

### Opportunities

- New therapeutic modalities
- Health services research
- National initiatives
- Collaboration with others
- Marketing forces

### Femoral Nerve Blockade

- 14 children with mid-shaft femur fractures
- 23 G needle inserted one finger breadth lateral to femoral artery at the inguinal ligament
- 2 mg/kg 0.5% bupivacaine without epi
- Analgesic onset: 8 minutes
- One block failure
- No pain with Xray (60 min. post block) or traction (124 min. post block)

### 3-in-1 Femoral Nerve Block

- UK RCT of 3-in-1 FNB in 50 patients with femoral neck fractures
- 24 IV MS, 26 FNB
- 30 minutes instruction
- FNB: 20 mL 0.5% bupivacaine, no stimulator
- Mean pain score/24 hrs (0-3 scale): 0.6 vs. 1.3
- Time to lowest pain score: 2.9 vs. 5.8 hrs
- MS requirements 0.5 vs. 1.2 mg/hr

Fletcher AK, et al. Ann Emerg Med 2003;41:227-233.

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### Intranasal PCA

- RCT of IN vs. IV PCA fentanyl
- 48 post-op patients, 4-hour study
- Fentanyl 25 mcg IN vs. 17.5 mcg IV (double load)
- 6-minute lockout
- Analgesia onset– 22 min IN vs. 22 min IV
- VS stable, SE's comparable
- PI 55 mm to 11 mm IN vs 52 mm to 11 mm IV
- Txmt “excellent or good” for 22/23 IN vs. 24/25 IV

Toussaint S, et al. Can J Anaesthesia 2000;47:299-302.

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### Intranasal PCA

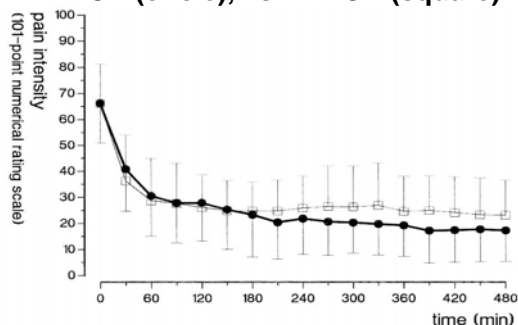
- RCT of IN vs. IV PCA fentanyl
- 50 post-op ortho patients, 8-hour study
- Fentanyl 25 mcg IN vs. IV (no load)
- 6-minute lockout
- Total dose: 0.66 mg IN vs. 0.5 mg IV (1.3 X)
- # demands hour 1: 6.9 IN vs. 5.5 IV
- # demands hour 2: 2.6 IN vs. 2.2 IV
- No discontinuation due to insufficient analgesia
- VS similar
- No differences in pain intensity

Striebel HW, et al. Anesth Analg 1996;83:548-551.

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### IN PCA (circle), vs. IV PCA (square)

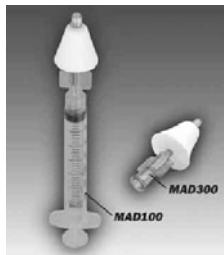


Postoperative pain intensity, evaluated by a 101-point numerical rating scale every 30 min. From: Striebel: Anesth Analg, 1996;83(3):548-551

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### MAD Nasal® (Mucosal Atomization Device)



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### EMLA and Ultrasound

- RCT of EMLA vs. placebo with or without brief (10 seconds) skin pretreatment with low-frequency (55Hz) ultrasound
- 20 g needle prick pain stimulus
- Pain scores and patient preferences recorded
- EMLA/ultrasound at 5, 10 & 15 minutes similar to EMLA at 60 minutes

Katz NP, et al. Anesthesia & Analgesia 2004;98:371-376.

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### Acute Pain – Nursing Protocol

- Prospective study of 349 patients
- Titrated IV morphine protocol
- Median initial pain 85 mm; to 40 mm at 1 h
- Median time to opioid administration: 18 min
- Median time to MD exam: 52 min
- 15 adverse events:
  - 10 hypotension
  - 5 O<sub>2</sub> desaturation
- No intervention other than supplemental O<sub>2</sub>
- No bradycardia, bradypnea or reduced level of consciousness

Fry M et al. *Emerg Med (Fremantle)*. 2002;14:249-254.

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### Acute Fractures – Nursing Protocol

- Nurse-managed, titrated IV opioid policy
- Acute long-bone fractures
- Before and after chart review (1993 vs. 1997)
- Patients receiving IM opioid: 53% to 5%
- Patients receiving IV opioid : 6% to 54%

Kelly AM. *J Accid Emerg Med*. 2000;17:185-187.

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### Trauma Protocols

- Trauma protocol (Israel)
- Before and after survey
- Baseline:
  - 80% of staff unaware of trauma pain guidelines
  - Main reason for withholding analgesia: belief that pain assists diagnosis (78.6%)
  - Analgesic administration delayed
  - IM meperidine used most commonly
- After protocol:
  - Analgesics administered earlier, more often (mostly IV morphine)
  - Patients appreciated timely analgesia (38% vs. 14%)
  - Analgesia rated beneficial by more patients (70% vs. 23%)
  - Increased patient satisfaction with pain relief

Zohar Z et al. *J Trauma*. 2001;51:767-772.

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### JCAHO Standards

- Patients have the right to appropriate assessment and management of pain
- Patients can expect:
  - that reports of pain will be believed
  - information about pain and pain relief measures
  - that staff will be concerned
  - that health professionals will respond quickly
  - to receive effective pain management

Comprehensive Accreditation Manual for Hospitals. JCAHO. 1999.

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### PEMI-1

- Describe the clinical epidemiology of pain for patients treated and discharged from the ED
- ED phase and 3-month telephone follow-up
- 20-30 sites in U.S. and Canada

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### PEMI-1 Study

- Broad representation of US and Canadian ED's
- Six 8-hour enrollment periods per site
- ED patient interviews
- ED chart reviews
- Central phone follow-up for up to three months

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**Measures**

- Pain intensity
- Satisfaction
- Time to resolution
- Pain histories
- Analgesic treatment
- Side effects
- Non-pharmacologic interventions
- Patient demographics
- ED interactions
- Pain-related interference with function
- Health care utilization
- Clarity of instructions
- Patient-related barriers to treatment
- Physician demographics

**PEMI-1 Site Investigators**

Tim Mader	Baystate MC	Robert Cox	Spalding Regional
Jim Ducharme	Atlantic HS	Jacques Lee	S & W -Toronto
Wayne Triner	Albany MC	Dave Fosnocht	U. Utah
Cameron Crandall	U. New Mexico	Christian Vaillancourt	Ottawa
Basmah Safdar	Yale	Paula Tanabe	Northwestern
Martha Neighbor	UCSF	Les Zun	Mt. Sinai
Bradford Walters	Wm. Beaumont	Barbara Lock	Columbia
Ed Panacek	UC Davis	Grant Innes	St. Paul's
Robert O'Conner	Christiana	Ed Sloan	UIC
Don Yealy	U. Pittsburgh	Marco Sivilotti	Kingston
Brian Rowe	U. Alberta	Ken Iserson	U. Arizona

**Associated Projects**

- UC Davis – study of “problem” patients with pain in ED
- St. Louis School of Law – October 2004 conference on EM pain, future issue of *The Journal of Law, Medicine, and Ethics* on EM pain topics
- EM Painline – web-based EM pain bibliographic resource on-line in 2004

**APS EM Scholars**

- |                     |                   |
|---------------------|-------------------|
| <b>2003</b>         | <b>2004</b>       |
| Cameron S. Crandall | Mary Ann Cooper   |
| David Fosnocht      | Matt Lewin        |
| Sam McLean          | Barbara Lock      |
| Martha Neighbor     | John McManus      |
| Basmah Safdar       | Gerard Rebegliati |
|                     | Scott Rohrbeck    |
|                     | Sachin Shah       |
|                     | Leslie Zun        |

**EM Painline**

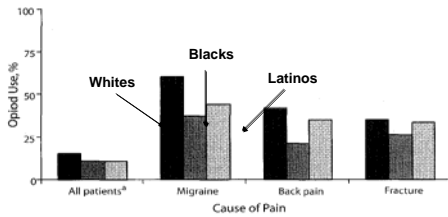
- *EM Painline* is intended to assist emergency physicians and nurses in developing their pain-related knowledge and skills as well as enhance the quality of emergency medicine pain management and research
- Critically-reviewed bibliography of pain literature pertinent to EM
- Discussion forums
- Conference schedule
- Web links
- ACEP supported
- [www.empainline.org](http://www.empainline.org)

**Ethnic Disparities in Analgesic Prescribing**

- Analysis of 1997-1999 NHAMCS data
- National sample of ED patients
- Examined ethnic disparities in prescriptions
- Opioids less likely for Blacks than Whites with migraines and back pain
- Disparities not seen for long bone fractures
- Conclusion: Disparities greatest for conditions with fewer objective findings (e.g., migraine)

Tamayo-Sarver JH, et al. *Racial and ethnic disparities in emergency department analgesic prescription.* American Journal of Public Health. 2003;93(12):2067-73.

**Ethnic Disparities in Analgesic Prescribing**



Adjusted proportions of patients receiving opioids, for all patients combined and for those presenting with migraine, back pain, and long bone fractures

Tamayo-Sarver JH, et al. *Racial and ethnic disparities in emergency department analgesic prescribing.* American Journal of Public Health. 2003;93(12):2067-73.



**Variations in Headache Therapies**

- Isolated benign headache
- 3 nonaffiliated ED's
- 20 different medications used
- Wide variations in use of medications
  - Opioids: 16% to 72%
  - DHE: 5% to 16%
  - Prochlorperazine: 32% to 59%
  - Adjunctive diphenhydramine: 42% to 88%

Vinson DR, et al. Ann Emerg Med 2003;41:90-97.

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**Treatment Patterns of Isolated Benign Headache**

- 1998 NHAMCS database
- 36 different medications used
- Most commonly used meds:
  - Meperidine 30%
  - Ketorolac 21%
  - Prochlorperazine 17%
- Adjunctive antiemetics used with 90% of parenteral opioids
- Antiemetics without anti-headache effects (promethazine, hydroxyzine) used six times more commonly than those with such effects (prochlorperazine, metoclopramide, droperidol) 78% vs 12%

Vinson DR. Ann Emerg Med 2002;39:215-222.

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**Threats**

- Lack of creative research
- Poor science
- Inferior education
- Lack of financial support
- Lack of FDA/JCAHO involvement
- Marketing forces

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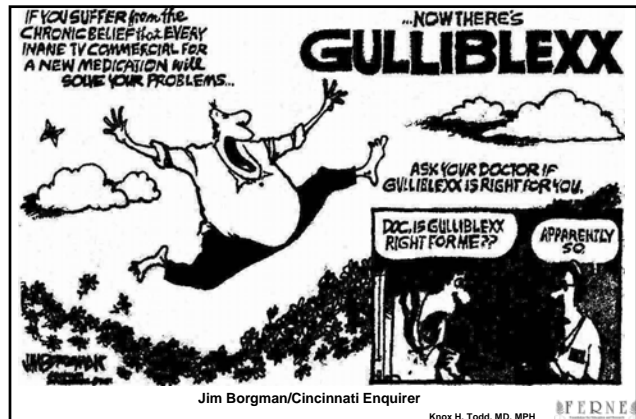


**Cyclooxygenase-2 Selective Agents**

- Efficacy equal to traditional NSAID's
- Reduce significant ulcer complications (hemorrhage or perforation) by 50%
- Absolute risk reduction less than 1%
- No evidence of reduction in overall GI-related resource utilization
- \$275,809 per QALY on average
- \$55,803 with history of bleeding ulcer
- Assumes long-term use for osteoarthritis

Brennan MRS, et al. Ann Intern Med 2003;138-795-806.

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**Lack of Federal Funding**

*“Although pain costs the United States \$79 billion annually in lost productivity and results in more than 20% of visits to all physicians and 70% of visits to EDs, only 0.6% of the current National Institutes of Health budget is devoted to basic and clinical pain research.”*

Todd KH. *Ann Emerg Med.* 2004;43:504-506.

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**The Pain and Emergency Medicine Initiative**

Supported by The Mayday Fund  
through a grant to  
The Emergency Medicine  
Foundation

Knox H. Todd, MD, MPH



**Questions?**

Knox H. Todd, MD, MPH  
ktodd@empainline.org  
Phone: 404.872.5740

ferne@ferne.org

www.ferne.org

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