EMERGENCY DEPARTMENT-INITIATED TOBACCO CONTROL: SYSTEMATIC REVIEW AND META-ANALYSIS

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HEALTH POLICY AND CLINICAL PRACTICE/CONCEPTS

Tobacco Control Interventions in the Emergency Department: A Joint Statement of Emergency Medicine Organizations

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For the American College of Emergency Physicians Task Force on Smoking Cessation

From the Department of Emergency Medicine, Albert Einstein College of Medicine, Bronx, NY (Bernstein, Lettman); the Department of Emergency Medicine, Montefiore Medical Center, Bronx, NY (Bernstein); the Department of Emergency Medicine, University of Medicine and Dentistry of New Jersey/Cooper Medical Center, Camden, NJ (Boudreaux); the Department of Emergency Medicine, MetroHealth Medical Center, Cleveland, OH (Cydulka); the Department of Emergency Medicine, University of Chicago, Chicago, IL (Rhodes); TeamHealth, Houston, TX (Almeida); the Department of Emergency Medicine, University of California, Los Angeles Medical Center, Los Angeles, CA (McCullough); the Department of Emergency Medicine, Eastern Virginia Medical School, Norfolk, VA (Mizouni); and the Department of Emergency Medicine, Emory University, Atlanta, GA (Kellermann).

• We call on emergency care provider to routinely assess patients’ smoking status, offer brief advice to quit, and refer to the National Smokers’ Quitline /…/

• Tobacco control fits within the traditions of other ED (Emergency Department)-based public health practices /.../

•......
Emergency-department initiated tobacco control: State of evidence in 2006

<table>
<thead>
<tr>
<th>Year / country</th>
<th>n</th>
<th>Follow-up</th>
<th>Intervention group</th>
<th>Quit rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 / USA¹</td>
<td>42</td>
<td>6 month</td>
<td>IV: Transferal to an out-side smoking cessation program</td>
<td>IV 0 / 21 = 0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CG: brief intervention</td>
<td>CG 1 / 21 = 4.8%</td>
</tr>
<tr>
<td>2000 / USA²</td>
<td>152</td>
<td>3 month</td>
<td>IV: Transferal to an out-side cessation program + brochure</td>
<td>IV 6 / 78 = 7.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CG: brochure</td>
<td>CG 5 / 74 = 6.8%</td>
</tr>
</tbody>
</table>


IV = Intervention group
CG = Control group
Prevalence of smokers in emergency departments

<table>
<thead>
<tr>
<th>Year</th>
<th>Author Setting</th>
<th>n</th>
<th>Smoking prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>Lowenstein et al., Acad Emerg Med; 5:781-87</td>
<td>923</td>
<td>48%</td>
</tr>
<tr>
<td></td>
<td>3 inner-city EDs, USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>Silverman et al., Chest; 123:1472–1479</td>
<td>1847</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>„asthmatic patients“</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>64 EDs, USA and Canada</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Neumann et al., J Trauma; 61:805–814</td>
<td>3026</td>
<td>46%</td>
</tr>
<tr>
<td></td>
<td>„minor trauma patients“</td>
<td></td>
<td>(60% in the subgroup with a positive AUDIT)</td>
</tr>
<tr>
<td></td>
<td>Inner-city ED, Berlin, Germany</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ED = emergency department  
AUDIT = Alcohol Use Disorder Identification Test, Cut-off ≥ 5 points
Young age of smokers in emergency departments

<table>
<thead>
<tr>
<th></th>
<th>Low Dependent</th>
<th>High Dependent</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 1405 smokers in</td>
<td>31.6 years</td>
<td>34.5 years</td>
</tr>
<tr>
<td>the Berlin ED-study¹</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 8490 smokers in</td>
<td>42.0 years</td>
<td>50.5 years</td>
</tr>
<tr>
<td>813 GP practices in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany²</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Neumann et al. (2006) J Trauma; 61:805–814
(2) Baum A. (2008) (dissertation). Medical Faculty of the Ludwig-Maximilians-University Munich,
GP = general practitioner
low dependent = 0-5 points in the FTND
high dependent = 5-10 points in the FTND
Are emergency department patients / smokers interested in health promotion?

(1) Neumann T et al. (2006) J Trauma; 61:805-14
Motivation to stop smoking in n = 1012 emergency department smokers

<table>
<thead>
<tr>
<th></th>
<th>Unmotivated smokers</th>
<th>Ambivalent smokers</th>
<th>Motivated smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>557 (55.0%)</td>
<td>327 (32.3%)</td>
<td>128 (12.6%)</td>
</tr>
<tr>
<td>Age#</td>
<td>29 (18 – 78)</td>
<td>30 (18 – 73)</td>
<td>30.5 (19 – 78)</td>
</tr>
</tbody>
</table>

“When do you wish to stop smoking?” (unmotivated smoker = 'not within the next 6 month' / ambivalent smoker = 'within the next 6 month but not within the next 4 weeks / motivated smoker = within the next 4 weeks)

# = median (range)
Neuner B et al. (2009) Tobacco Control;18:283–293
AIM: Systematic review and meta-analysis of RCTs evaluating ED-initiated tobacco control

- Randomized controlled trials in
- an emergency department setting addressing
- patients who are actual smokers and
- who received a smoking cessation intervention on
  site, and who’s
- smoking status was evaluated at least once during
  follow-up

10-2010 (original search)
06-2012 (update >>> publication)
07-2013 (2nd update >>> APACT-2013)
Flow-chart 10-2010

Identification
- Records identified through database searching (n=4362)
  - MEDLINE (n=703)
  - The Cochrane Library (n=255)
  - EMBASE (n=975)
  - Scopus (n=632)
  - ISI Web of knowledge (n=1659)
  - PsycINFO (n=71)
  - LILACS (n=67)
- Additional records identified through other sources (n=9)
  - Conference Proceedings Citation Index (included in ISI Web of knowledge records)
  - International Trial Register (n=9)
  - Reference lists of included trials (n=9)

Records after duplicates removed (n=2743)

Screening
- Records screened (title and abstract) (n=2743)

Records excluded (n=2699)

Eligibility
- 44 full-text articles assessed for eligibility (n=44)
  - Full-text articles excluded, with reasons (n=37):
    - 3 systematic reviews
    - 5 non-controlled prospective studies
    - 6 cross-sectional studies
    - 9 RCTs but no ED patients
    - 7 RCTs not assessing smoking cessation rate as outcome measure
    - 1 duplicate study
    - 6 other

Inclusion
- Studies included in qualitative synthesis (n=7)

Studies included in quantitative synthesis (meta-analysis) (n=7)
# Characteristics of included studies

<table>
<thead>
<tr>
<th>Publication year, author</th>
<th>Country</th>
<th>n</th>
<th>ED-setting</th>
<th>Patient load</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000, Antonnaci et al.</td>
<td>USA</td>
<td>42</td>
<td>?</td>
<td>30,000</td>
</tr>
<tr>
<td>2000, Richman et al.</td>
<td>USA</td>
<td>152</td>
<td>sub-urban</td>
<td>47,000</td>
</tr>
<tr>
<td>2007, Horn et al.</td>
<td>USA</td>
<td>75</td>
<td>sub-urban</td>
<td>?</td>
</tr>
<tr>
<td>2007, Schiebel et al.</td>
<td>USA</td>
<td>39</td>
<td>inner-city</td>
<td>70,000</td>
</tr>
<tr>
<td>2008, Bock et al.</td>
<td>USA</td>
<td>543</td>
<td>inner-city</td>
<td>100,000</td>
</tr>
<tr>
<td>2008, Boudreaux et al.</td>
<td>USA</td>
<td>90</td>
<td>inner-city</td>
<td>47,000</td>
</tr>
<tr>
<td>2009, Neuner et al.</td>
<td>D</td>
<td>1044</td>
<td>inner-city</td>
<td>40,000</td>
</tr>
</tbody>
</table>
# ED-initiated tobacco control up to 2000

<table>
<thead>
<tr>
<th>Publication year, author</th>
<th>Treatment in the intervention group</th>
<th>Treatment in the control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000, Antonnaci et al.</td>
<td>Transferal to an out-side smoking cessation program</td>
<td>brief intervention</td>
</tr>
<tr>
<td>2000, Richman et al.</td>
<td>Transferal to an out-side smoking cessation program + brochure</td>
<td>brochure</td>
</tr>
</tbody>
</table>
“Interventions for smoking cessation in hospitalised patients”

“Interventions with less than a month follow-up”
  Peto Odds Ratio 1.09 (95%KI (0.91 - 1.31)), 7 studies

“Longer interventions delivered only during the hospital stay”
  Peto Odds Ratio 1.07 (95%KI (0.79 - 1.44)), 3 studies

“Inpatient contact plus follow-up for at least one month”
  Peto Odds Ratio 1.82 (95%KI (1.49 - 2.22)), 6 studies
  Peto Odds Ratio 1.65 (95%KI (1.44 – 1.90)), 17 studies (2008)

# ED-initiated tobacco control after 2001/2003

<table>
<thead>
<tr>
<th>Publication year, author</th>
<th>Treatment in the intervention group</th>
<th>Treatment in the control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007, Horn et al.</td>
<td>30-min MI on site + Audio-Workbook + hand-written postcard 3 days after discharge + <strong>up to 3 booster phone calls</strong></td>
<td>Brief advice</td>
</tr>
<tr>
<td>2007, Schiebel et al.</td>
<td>45-min MI by phone within 7 days after discharge + <strong>up to 4 booster phone calls</strong></td>
<td>Self-help brochure</td>
</tr>
<tr>
<td>2008, Bock et al.</td>
<td>30-min MI on site + <strong>up to 2 booster phone calls</strong></td>
<td>Written advice</td>
</tr>
<tr>
<td>2008, Boudreaux et al.</td>
<td>30-min MI on site + <strong>up to 3 booster phone calls</strong></td>
<td>Written advice</td>
</tr>
<tr>
<td>2009, Neuner et al.</td>
<td>15-30-min MI on site + <strong>up to 4 booster phone calls</strong></td>
<td>Written advice</td>
</tr>
</tbody>
</table>
Quit rates in the intervention groups vs. control groups
Quit rates in the intervention groups vs. control groups

Bock et al. (2008), n = 543 smokers in a 24-hour "chest pain observation unit", 30 motivational interviewing + 2 booster phone calls
Method of the meta-analysis

1. Stratified by follow-up
   1. Mantel-Haenszel relative risks

2. Combined estimate at all follow-up times
   1. Generalized linear mixed models (GLMM)
      Level 1: intercept (readiness to quit smoking) + treatment effect
      Level 2: random intercepts may differ over time within each study but they are correlated
      random treatment effects are constant over time but differ between studies

Bagos PG et al. (2009) Int J Biostatistics; 5(1)Article 21
Meta-analysis stratified by follow-up

Meta-Analyses:
- 1 month: 1.47 (1.06-2.06)
- 3 months: 1.24 (0.93-1.65)
- 6 months: 1.13 (0.86-1.49)
- 12 months: 1.25 (0.91-1.72)
## Meta-Analysis, combined estimate at all follow-up times

<table>
<thead>
<tr>
<th></th>
<th>10-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>All studies (n = 7)</td>
<td>1.33 (0.96–1.83), p = 0.08</td>
</tr>
<tr>
<td>MI + booster phone calls (n = 5)</td>
<td>1.33 (0.92–1.92), p = 0.10</td>
</tr>
</tbody>
</table>
## Meta-Analysis, combined estimate at all follow-up times

<table>
<thead>
<tr>
<th></th>
<th>10-2010</th>
<th>07-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All studies</strong></td>
<td>1.33 (0.96–1.83), p = 0.08, n = 7 studies</td>
<td>1.26 (0.95–1.66), p = 0.10, n = 10 studies</td>
</tr>
<tr>
<td><strong>MI + booster phone calls</strong></td>
<td>1.33 (0.92–1.92), p = 0.10, n = 5 studies</td>
<td>1.31 (0.94–1.84), p = 0.09, n = 6 studies</td>
</tr>
</tbody>
</table>

3 additional studies: n = 338 / 221 / 33

According to the ClinicalTrials.gov database there are at least 5 registered / recruiting / completed studies (University of British Columbia / University of Iowa / Yale University / Vanderbilt University / The Miriam Hospital /
Discussion

- Good Public Health rationale (age / high reach / teachable moment / good feasibility / specific patient group)
- Recommendations from medical societies (at least for the US)

- Tradition of health promoting strategies in EDs

- EDiTC seems less effective then tobacco control in clinical settings
  1.31 (0.94–1.84) versus 1.65 (1.44–1.90)
- but.... current evidence too sparse to draw final conclusions
Thank you very much for your attention
To-do-list

• “more research is needed“
  • address multiple substance use?
  • address more accurately nicotine dependency?
  • involve family members / proxies of pediatric ED patients?
  • combination of on-site counseling with quit lines / out-side cessation programs?
  • involve GPs (if available)?
data analysis. In the formal smoking cessation group, none completed the class. Of


moderate or severe nicotine addiction. None of the patients (0%) in the intervention group contacted or attended the smoking cessation program during the study period (95% CI = 0–4%). The percentages of