New issues and age-old challenges: a review of young people’s relationship with tobacco
Paula Chadwick
Chief Executive
Roy Castle Lung Cancer Foundation
Prof Amanda Amos
Young people and tobacco-
the current landscape,
challenges and opportunities

Professor Amanda Amos
Usher Institute for Population Health Sciences and Informatics
University of Edinburgh
Key questions

- What are the current patterns and trends?
- What are the challenges?
  - inequalities
  - e-cigarettes
- What are the opportunities?
Prevalence of regular cigarette smoking by sex in 13 and 15 year olds: England (SDD)
Prevalence of never smoking in 15 year olds: England (SDD)
Prevalence of cigarette smoking in 16-24 year olds: Great Britain (GLS)
Smoking prevalence 16-19 and 20-24 year olds by sex, Scotland, 1998-2015 (SHeS)
E-cigarette use in young people, GB

ASH/YouGov online surveys, 11-18 year olds. Figures weighted to be nationally representative

<table>
<thead>
<tr>
<th>Year</th>
<th>Heard of e-cigs: 11-18 year olds</th>
<th>Ever tried: 11-18 year olds</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>95%</td>
<td>83%</td>
</tr>
<tr>
<td>2014</td>
<td>92%</td>
<td>90%</td>
</tr>
<tr>
<td>2015</td>
<td>87%</td>
<td>5%</td>
</tr>
<tr>
<td>2016</td>
<td>88%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Unweighted base:
All 11-18 year olds
E-cigarette use by smoking status, 2016

<table>
<thead>
<tr>
<th>Category</th>
<th>Current smoker</th>
<th>Ex-smoker</th>
<th>Never smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have never used them/ not aware of e-cigarettes</td>
<td>31%</td>
<td>67%</td>
<td>95%</td>
</tr>
<tr>
<td>I have tried them once or twice</td>
<td>38%</td>
<td>28%</td>
<td>4%</td>
</tr>
<tr>
<td>I use them sometimes (no more than once a month)</td>
<td>11%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>I use them sometimes (more than once a month)</td>
<td>5%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>I use them often (more than once a week)</td>
<td>13%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Don't want to say</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Base: All 11-18 year olds (n=2,331)
Key questions about e-cigarettes and youth smoking trajectories

- Is e-cigarette experimentation and use just confined to those young people most likely to become smokers?
  or

- Does e-cigarette experimentation and use also include young people who wouldn’t have become smokers and does this affect their risk of becoming a smoker?

- Does dual e-cigarette use affect the likelihood of a young ‘social’ smoker becoming a regular smoker?
  and/or

- Does dual e-cigarette use affect the likelihood that a young smoker may quit?
Order of use between cigarettes and e-cigarettes

Unweighted base: Tried e-cigarettes (n=318)

- I tried smoking a real cigarette before I first tried using an e-cigarette
- I have never smoked a real cigarette but have tried an e-cigarette
- I tried using an e-cigarette before I first tried smoking a real cigarette
- I don't remember
## Smoking as a cause of childhood and adult poverty in the UK

<table>
<thead>
<tr>
<th></th>
<th>Currently in poverty</th>
<th>Lifted out of poverty if smoking costs removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households with smokers</td>
<td>1,788,000</td>
<td>512,000</td>
</tr>
<tr>
<td>Children in households</td>
<td>1,244,000</td>
<td>365,000</td>
</tr>
<tr>
<td>with smokers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults in households</td>
<td>3,192,000</td>
<td>866,000</td>
</tr>
<tr>
<td>with smokers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: ASH (2015) Smoking Still Kills
Smoking by socioeconomic status

- Adolescents – less clear than adults as more limited data
- England (SDD 2014) 2 proxy measures
  - Number of books at home – more books less likely to smoke
  - Free school meals – no sig association
- Scotland (SALSUS 2015) Regular smokers (13 &15 yrs)
  - Nearly twice as likely to live in the most deprived areas
  - 15 year olds living in the most deprived areas have higher levels of consumption
Social worlds of 15 year olds (SALSUS 2015)

- Spend 5 or more evenings with friends - 57% smokers vs 21% non-smokers
- Hang around streets most days - 60% smokers vs 16% non-smokers
- 6 times as likely to drink alcohol (past week) and 13 times more likely to have taken drugs (past month)
- Truanted 10+ times in past year - 31% smokers vs 4% non-smokers
- Expect to go to university - 26% smokers vs 58% non-smokers
**Worrying trends in attitudes of 15 year old regular smokers (SALSUS)**

<table>
<thead>
<tr>
<th>Benefits</th>
<th>2006</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Want to quit</td>
<td>48%</td>
<td>29%</td>
</tr>
<tr>
<td>Helps relax if feel nervous</td>
<td>89%</td>
<td>89%</td>
</tr>
<tr>
<td>Helps cope better with life</td>
<td>36%</td>
<td>59%</td>
</tr>
<tr>
<td>Helps stay slim</td>
<td>39%</td>
<td>40%</td>
</tr>
<tr>
<td>Smokers have more fun</td>
<td>20%</td>
<td>31%</td>
</tr>
</tbody>
</table>
Smoking prevalence 16-24 year olds by deprivation, Scotland 2012-15 (SHeS)
Smoking prevalence 16-24 year olds, Scotland, 2012-2015
Smoking prevalence in 15 year olds by deprivation, Scotland, 2006 and 2015 (SALSUS)
Smoking prevalence 16-24 year olds by deprivation, Scotland, 1998-2015 (SHeS)
Smoking prevalence 16-24 year olds, Scotland, 1998-2015 (SHeS)
Smoking and other forms of disadvantage

- Socio-economic status - education, income, employment
- Gender
- Ethnicity
- Lone parenthood
- Mental health problems
- Youth offenders, prisoners
- Unemployed
- Sexual orientation - lesbian, gay, bisexual
- Other excluded groups eg travellers, homeless
Prevalence of regular smoking in 15 year olds (GB) and national tobacco control

- Ad ban started
- Smokefree legislation
- Increase in age of sale
- Pictorial warnings
- Vending machine ban
- Point of sale ban
- Standard packs
- Smoking in cars ban
Dual approach to youth smoking and inequalities - opportunities

- Reduce supply
  - access/availability (eg outlet density, social sources, proxy sales, a cycle)
  - affordability (eg tax, blackmarket, cheap brands)

- Reduce demand
  - individual aspirations and desirability (eg PoS ban, standard packs, schools, youth work, media)
  - social norms (eg SHS in home and car, adult cessation support, media)
  - addiction (eg quit success, e-cigarettes?)
Evidence on equity impact of tobacco control - SILNE

- Systematic review of youth (11-25 yrs) policies and interventions, 1995-2013
- All types of interventions
- Reported differential smoking-related outcomes for at least 2 socio-economic groups
- Over 30,000 papers and reports but only 40 on equity impact
- Very little evidence but most consistent findings for reducing inequalities were on price (tax)
- ASSIST the only school programme with a positive equity effect
Conclusions (1)

- In recent years been significant declines in youth smoking due to a range of national and local tobacco control policies and action
- We know what works to reduce smoking uptake in ≤ 16 year olds, but much less in 16-24 year olds and how to reduce inequalities in youth smoking
- Challenging times but there is still political will (?) and a wealth of expertise which must not be lost
- We need to keep doing what we know works
- Also need to take bold steps- the end game
Conclusions (2)

- Need both comprehensive policies and tailored interventions for disadvantaged groups
- Need to be innovative (supply and demand) and build evidence on what works (inequalities)
- Need research and national/local data
- BUT limits to what can be achieved by tobacco control alone- also need to address social determinants of inequalities
- Involve and empower young people- CUT FILMS!
Some recommendations for action:

- standardised packaging
- ban smoking in cars
- increase age of sale to 21
- in 2031 ban sales to people born after 2013
- 50m ban smoking around schools
- novel school and media approaches
- ban e-cigs for under18s
- involve young people in co-designing interventions and cessation services
Acknowledgements

- Andy MacGregor and Stephen Hinchliffe, Scotsen
- CRUK
Questions?
Prof Marcus Munafò
YOUNG PEOPLE, TOBACCO AND MENTAL HEALTH

Marcus Munafò
Smoking and Mental Health

- Strong association between smoking and mental health
- Misattribution
- Self-medication
- Common cause
- Causality?
- Confounding?
Smoking and Mental Health

Smoking as “independent” risk factor for suicide: illustration of an artifact from observational epidemiology?

GEORGE DAVEY SMITH    ANDREW N. PHILLIPS    JAMES D. NEATON

It may be argued that smoking is a plausible causal factor for suicide. The risk of being murdered has therefore also been analysed according to smoking status. As there are only 222 deaths due to homicide, smoking has been classified into three groups—no cigarettes, 1–39, and 40+. The relative rates (and 95% CI) of being murdered, adjusted for income and race which are both associated with risk of murder, are: 1.00, 1.71 (1.29–2.28), and 2.04 (1.32–3.15), respectively.

“Unless the provisional wing of the health education lobby has moved on to a direct action phase, during which they shoot smokers, this association is very unlikely to be causal”.

University of BRISTOL

MRC Integrative Epidemiology Unit
Smoking and Mental Health

Cigarette smoking → Confounders → Mental Health

?
Strengthening Causal Inference

Cross-Context Comparisons

Positive and Negative Controls

Instrumental Variables

Causal Inference in Developmental Origins of Health and Disease (DOHaD) Research

Suzanne H. Gage,1,2 Marcus R. Munafò,1,2 and George Davey Smith1

1MRC Integrative Epidemiology Unit (IEU) at the University of Bristol, Bristol BS8 2BN, United Kingdom; email: kz.davey-smith@bristol.ac.uk
2UK Center for Tobacco and Alcohol Studies, School of Experimental Psychology, University of Bristol, Bristol BS8 1TU, United Kingdom

## Strengthening Causal Inference


<table>
<thead>
<tr>
<th>Technique</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative control</td>
<td>Exposures or outcomes with similar confounding but no plausible biological connection are identified to ascertain whether associations are likely to be causal or due to confounding.</td>
</tr>
<tr>
<td>Cross-contextual</td>
<td>Two populations with differing confounding structures are sampled and associations are compared between them.</td>
</tr>
<tr>
<td>Instrumental variable</td>
<td>Unconfounded proxies are found for exposures of interest (e.g., genetic variants in Mendelian randomization).</td>
</tr>
<tr>
<td>analysis</td>
<td></td>
</tr>
<tr>
<td>Family studies</td>
<td>Assumptions are made about shared genetic and environmental factors in comparisons of related pairs of individuals.</td>
</tr>
</tbody>
</table>
Strengthening Causal Inference

Strengthening Causal Inference

Strengthening Causal Inference

Positive and Negative Controls

Partner smoking and maternal cotinine during pregnancy: Implications for negative control methods

Amy E. Taylor, George Davey Smith, Cristina B. Bares, Alexis C. Edwards, Marcus R. Munafo

Maternal smoking during pregnancy and offspring smoking initiation: assessing the role of intrauterine exposure

Amy E. Taylor, Laura D. Howe, Jon E. Heron, Jennifer J. Ware, Matthew Hickman & Marcus R. Munafo

Positive and Negative Controls

Intrauterine tobacco exposure  Little / no intrauterine tobacco exposure
## Smoking in Pregnancy

### Study
- **ALSPAC**
- **HUNT**
- **1982 Pelotas Birth Cohort**

### Population
- Longitudinal birth cohort from, UK
- Population based cohort, Norway
- Longitudinal birth cohort, Brazil

<table>
<thead>
<tr>
<th>High maternal education</th>
<th>Non-manual social class</th>
<th>Maternal depression</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALSPAC</strong></td>
<td><strong>ES (95% CI)</strong></td>
<td><strong>ES (95% CI)</strong></td>
</tr>
<tr>
<td>Maternal</td>
<td>0.40 (0.33, 0.47)</td>
<td>0.32 (0.26, 0.40)</td>
</tr>
<tr>
<td>Partner</td>
<td>0.58 (0.50, 0.66)</td>
<td>0.41 (0.34, 0.50)</td>
</tr>
<tr>
<td>Pelotas 82</td>
<td>0.50 (0.40, 0.63)</td>
<td>0.74 (0.60, 0.92)</td>
</tr>
<tr>
<td>Maternal</td>
<td>0.59 (0.48, 0.73)</td>
<td>0.78 (0.64, 0.96)</td>
</tr>
<tr>
<td>Partner</td>
<td></td>
<td>1.22 (1.12, 1.32)</td>
</tr>
<tr>
<td>HUNT</td>
<td>0.81 (0.72, 0.91)</td>
<td>0.98 (0.91, 1.05)</td>
</tr>
<tr>
<td>Maternal</td>
<td>0.48 (0.43, 0.53)</td>
<td></td>
</tr>
<tr>
<td>Partner</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **HUNT**                | **ES (95% CI)**         | **ES (95% CI)**     |
| Maternal                | 2.35 (1.82, 3.04)       | 1.52 (1.30, 1.92)   |
| Partner                 | 1.03 (0.92, 1.15)       | 1.29 (1.15, 1.46)   |
| HUNT                    |                          |                     |
| Maternal                |                          |                     |
| Partner                 |                          |                     |

### OR Parental smoking vs non-smoking
- **ALSPAC**
- **HUNT**
- **1982 Pelotas Birth Cohort**

### ES (95% CI)
- 0.40 (0.33, 0.47)
- 0.58 (0.50, 0.66)
- 0.50 (0.40, 0.63)
- 0.59 (0.48, 0.73)
- 0.81 (0.72, 0.91)
- 0.48 (0.43, 0.53)
- 2.35 (1.82, 3.04)
- 1.03 (0.92, 1.15)
- 0.81 (0.72, 0.91)
- 0.48 (0.43, 0.53)
- 1.52 (1.30, 1.92)
- 1.29 (1.15, 1.46)
## Smoking in Pregnancy

<table>
<thead>
<tr>
<th></th>
<th>ALSPAC</th>
<th>HUNT</th>
<th>Pelotas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maternal smoking</strong></td>
<td>Self-report during / after pregnancy</td>
<td>Derived from parental self-report</td>
<td>Self-report at birth of child</td>
</tr>
<tr>
<td><strong>Paternal smoking</strong></td>
<td>Self or maternal report during / after pregnancy</td>
<td>Derived from parental self-report</td>
<td>Self-report at 4 years</td>
</tr>
<tr>
<td><strong>Offspring depression</strong></td>
<td>Self-completed CIS-R at 18 years</td>
<td>Self-completed HADS</td>
<td>Diagnostic interview at ~30 years</td>
</tr>
</tbody>
</table>

- Logistic regression, adjusted for covariates: education, social class, maternal age, maternal depression and anxiety, other parent smoking
Smoking in Pregnancy

**Maternal**

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALSPAC</td>
<td>3401</td>
<td>1.58 (1.10, 2.27)</td>
</tr>
<tr>
<td>HUNT</td>
<td>19925</td>
<td>1.18 (1.03, 1.35)</td>
</tr>
<tr>
<td>Pelotas 82</td>
<td>2626</td>
<td>1.36 (1.01, 1.85)</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>1.24 (1.11, 1.40)</td>
</tr>
</tbody>
</table>

**Partner**

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALSPAC</td>
<td>3401</td>
<td>0.82 (0.60, 1.12)</td>
</tr>
<tr>
<td>HUNT</td>
<td>19925</td>
<td>1.08 (0.95, 1.22)</td>
</tr>
<tr>
<td>Pelotas 82</td>
<td>2626</td>
<td>1.07 (0.78, 1.45)</td>
</tr>
<tr>
<td>Pelotas 93</td>
<td>4106</td>
<td>1.04 (0.94, 1.16)</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>1.04 (0.94, 1.16)</td>
</tr>
</tbody>
</table>

**P for heterogeneity = 0.03**
# Smoking in Pregnancy

<table>
<thead>
<tr>
<th>Smoking</th>
<th>N</th>
<th>Odds ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALSPAC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither</td>
<td>1,992</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Father yes, mother no</td>
<td>610</td>
<td>0.78</td>
<td>(0.52, 1.16)</td>
</tr>
<tr>
<td>Mother yes, father no</td>
<td>167</td>
<td>1.58</td>
<td>(0.91, 2.75)</td>
</tr>
<tr>
<td>Both</td>
<td>331</td>
<td>1.20</td>
<td>(0.76, 1.89)</td>
</tr>
<tr>
<td><strong>HUNT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither</td>
<td>6,539</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Father yes, mother no</td>
<td>6,857</td>
<td>1.06</td>
<td>(0.92, 1.23)</td>
</tr>
<tr>
<td>Mother yes, father no</td>
<td>1,774</td>
<td>1.18</td>
<td>(0.93, 1.49)</td>
</tr>
<tr>
<td>Both</td>
<td>5,027</td>
<td>1.18</td>
<td>(1.00, 1.39)</td>
</tr>
<tr>
<td><strong>Pelotas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither</td>
<td>846</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Father yes, mother no</td>
<td>898</td>
<td>1.10</td>
<td>(0.75, 1.62)</td>
</tr>
<tr>
<td>Mother yes, father no</td>
<td>238</td>
<td>1.50</td>
<td>(0.89, 2.52)</td>
</tr>
<tr>
<td>Both</td>
<td>632</td>
<td>1.35</td>
<td>(0.90, 2.02)</td>
</tr>
</tbody>
</table>
Instrumental Variable Analysis

- Genetic variant
- Exposure
- Outcome
- Confounders
Instrumental Variable Analysis

No confounding

Genetic variant → Exposure → Outcome

Confounders
Instrumental Variable Analysis

- No confounding
- No reverse causality
Mendelian Randomization

Randomized controlled trial

Randomization method

Exposed: intervention

Control: no intervention

Confounders equal between groups

Outcomes compared between groups
Mendelian Randomization

**Mendelian randomization**
- Random segregation of alleles
  - Exposed: one allele
  - Control: other allele
    - Confounders equal between groups
      - Outcomes compared between groups

**Randomized controlled trial**
- Randomization method
  - Exposed: intervention
  - Control: no intervention
    - Confounders equal between groups
      - Outcomes compared between groups
Genetics of Smoking

Genetics of Smoking

- Missense mutation in α5 subunit gene of nicotine receptor
- Definite functional significance

**Version 1.**
‘G’ allele:
Normal response to nicotine.

**Version 2.**
‘A’ allele:
Poorer response to nicotine.
This version increases risk for heavy smoking.

Genetics of Smoking

Mendelian Randomization

- Mendelian randomization
- Random segregation of alleles

- GG
- GA
- AA

Confounders equal between groups

Outcomes compared between groups
30+ studies with data on:

- rs1051730/rs16969968
- Smoking status
- Various outcomes

Restricted to samples of European ancestry

Total sample size >150,000
Smoking and Depression / Anxiety

**Depression**

<table>
<thead>
<tr>
<th>Smoke</th>
<th>ES (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>1.02 (0.97, 1.06)</td>
</tr>
<tr>
<td>Former</td>
<td>1.00 (0.95, 1.05)</td>
</tr>
<tr>
<td>Current</td>
<td>1.00 (0.95, 1.05)</td>
</tr>
<tr>
<td>Total</td>
<td>1.01 (0.98, 1.04)</td>
</tr>
</tbody>
</table>

**Anxiety**

<table>
<thead>
<tr>
<th>Smoke</th>
<th>ES (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>1.05 (1.01, 1.10)</td>
</tr>
<tr>
<td>Former</td>
<td>1.02 (0.97, 1.08)</td>
</tr>
<tr>
<td>Current</td>
<td>1.02 (0.97, 1.07)</td>
</tr>
<tr>
<td>Total</td>
<td>1.03 (1.00, 1.06)</td>
</tr>
</tbody>
</table>

Smoking and Depression / Anxiety

Change in mental health after smoking cessation: systematic review and meta-analysis

Gemma Taylor doctoral researcher, Ann McNeill professor of tobacco addiction, Alan Girling reader in medical statistics, Amanda Farley lecturer in epidemiology, Nicola Lindson-Hawley research fellow, Paul Aveyard professor of behavioural medicine

Difference in depression scores from baseline to follow-up in those who stopped or continued smoking

<table>
<thead>
<tr>
<th>Study</th>
<th>Standard mean difference (95% CI)</th>
<th>Weight (%)</th>
<th>Standard mean difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solomon 2006</td>
<td>0.01 (-0.35 to 0.37)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Berlin 2010</td>
<td>-0.30 (-0.72 to 0.12)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Blaock 2008</td>
<td>-0.58 (-1.00 to -0.16)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Dawkins 2009</td>
<td>0.39 (0.88 to 0.10)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Kahler 2011</td>
<td>-0.28 (-0.69 to 0.13)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Vazquez 1999</td>
<td>-0.12 (0.44 to 0.20)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Busch 2011</td>
<td>-0.30 (-0.67 to 0.07)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Kahler 2002</td>
<td>-0.69 (1.09 to -0.29)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Munaf 2008</td>
<td>-0.09 (-0.27 to 0.09)</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Kinnunen 2006</td>
<td>-0.21 (0.42 to 0.00)</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>-0.25 (-0.37 to -0.12)</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Test for heterogeneity: $\chi^2 = 12.83, df = 9, P = 0.17, I^2 = 30$
Test for overall effect: $z = 3.89, P < 0.001$

Taylor et al. (2016). BMJ, 348, g1151.
But…

• Lung cancer (e.g., Spitz, 2008)
• COPD/emphysema (e.g., Pillai, 2009)
• Peripheral arterial disease (e.g., Thorgeirsson, 2008)

Gage et al. (2016). PLOS Genet, 12, e1005765.
But…

Rethinking the association between smoking and schizophrenia

- Variants on chromosome 15 have recently been shown to be associated with schizophrenia

- This may reflect a direct genetic effect (biological pleiotropy) or a causal effect via smoking

Smoking and Schizophrenia

- Schizophrenia risk and smoking initiation:
  - OR 1.01, 95% CI 0.98 to 1.04

- Smoking initiation and schizophrenia:
  - OR 1.73, 95% CI 1.30 to 2.25

Smoking and Schizophrenia

Does tobacco use cause psychosis? Systematic review and meta-analysis

Marie O'Reilly, Simon J. Baker, Brian M. Murray, James H. MacCulloch

Summary

Background Although the association between psychotic illness and cigarette smoking is well known, the reasons are unclear — why people with psychosis are more likely to smoke than are the general population. We aimed to test several hypotheses. First, that daily tobacco use is associated with an increased risk of psychotic illness in both case-control and prospective studies. Second, that smoking is associated with an earlier age at onset of psychotic illness. Finally, that an earlier age at initiation of smoking is associated with an increased risk of psychosis. We also aimed to derive an estimate of the prevalence of smoking in patients presenting with their first episode of psychosis.

Methods

We searched Embase, Medline, and PsycINFO, and selected observational studies in which rates of smoking were reported in people with psychotic disorders, compared with controls. We calculated the weighted mean difference for age at onset of psychosis and age at initiation of smoking. For categorical outcomes, we calculated odds ratios from cross-sectional studies and risk ratios from prospective studies.

Findings

Of 3787 citations retrieved, 61 studies reporting 37 samples met inclusion criteria. The overall sample included 14,555 tobacco users and 27,106 non-users. The prevalence of smoking in patients presenting with their first episode of psychosis was 0.57 (95% CI 0.52–0.62; p<0.001). In case-control studies, the overall odds ratio for the first episode of psychosis in smokers versus non-smokers was 3.22 (95% CI 1.43–6.40), with some evidence of publication bias (Egger's test p=0.013). For prospective studies, we calculated an overall relative risk of new psychotic disorders in daily smokers versus non-smokers of 3.18 (95% CI 1.23–8.05). Daily smokers developed psychotic illness at an earlier age than did non-smokers (weighted mean difference 1.04 years; 95% CI 0.31–1.76). Those with psychosis started smoking at a non-significantly earlier age than did healthy controls (0.44 years, 95% CI 1.23 to 0.36).

Interpretation

Daily tobacco use is associated with increased risk of psychosis and an earlier age at onset of psychotic illness. The possibility of a causal link between tobacco use and psychosis merits further examination.

Funding

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Smoking and Schizophrenia

Does tobacco use cause psychosis? Systematic review and meta-analysis

Smoking and Schizophrenia in Population Cohorts of Swedish Women and Men: A Prospective Co-Relative Control Study

Kenneth S. Kendler, M.D., Sara Larsson Lönner, Ph.D., Jan Sundquist, M.D., Ph.D., Kristina Sundquist, M.D., Ph.D.

Objective: The purpose of this study was to clarify the causes of the smoking-schizophrenia association.

Method: Using Cox proportional hazard and co-relative control models, the authors predicted future risk for a diagnosis of schizophrenia or nonaffective psychosis from the smoking status of 1,413,849 women and 235,679 men from, respectively, the Swedish birth and conscript registries.

Results: Smoking was assessed in women at a mean age of 27 and in men at a mean age of 18. The mean age at end of follow-up was 46 for women and 26 for men. Hazard ratios for first-onset schizophrenia were elevated both for light smoking (2.21 [95% CI = 1.90 – 2.56] for women and 2.15 [95% CI = 1.90 – 2.44] for men) and heavy smoking (3.45 [95% CI = 2.95 – 4.03] for women and 3.80 [95% CI = 3.10 – 4.60] for men). These associations did not decline when schizophrenia onset 3–5 years after smoking assessment were censored. Higher socio-economic status and drug abuse were associated with higher risk for schizophrenia and only modestly in both samples. Women who smoked into late pregnancy had a much higher risk for schizophrenia than those who quit early. Hazard ratios predicting nonaffective psychosis in the general population, in cousins, in half siblings, and in full siblings discordant for heavy smoking were, respectively, 2.67, 2.71, 2.51, and 2.18. A model utilizing all relative pairs predicted a hazard ratio of 1.69 (95% CI = 1.17 – 2.44) for nonaffective psychosis in the heavy-smoking member of discordant monozygotic twin pairs.

Conclusions: Smoking prospectively predicts risk for schizophrenia. This association does not arise from smoking onset during a schizophrenic prodrome and demonstrates a clear dose-response relationship. While little of this association is explained by epidemiological confounders, a portion arises from common familial/genetic risk factors. However, in full siblings and especially monozygotic twins discordant for smoking, risk for nonaffective psychosis is appreciably higher in the smoking member. These results can help in evaluating the plausibility of various etiological hypotheses for the smoking-schizophrenia association.

Smoking and Schizophrenia

Does tobacco use cause psychosis? Systematic review and meta-analysis

Smoking and Schizophrenia in Population Cohorts of Swedish Women and Men: A Prospective Co-Relative Control Study

Kenneth S. Kendler, M.D., Sara Larsson Lönn, Ph.D., Jan Sundquist, M.D., Ph.D., Kristina Sundquist, M.D., Ph.D.

Objective: The purpose of this study was to determine the association between smoking and schizophrenia.

Method: We used a population-based, prospective, co-relative control study design to examine the association between smoking and schizophrenia.

Results: Smoking was associated with an increased risk of schizophrenia. The risk was highest for smokers who started smoking before the age of 18.

Conclusion: Smoking is causally associated with antipsychotic medication use and schizophrenia, but not with antidepressant medication use or depression.

Marie Kim Wium-Andersen,1,2,3 David Dynnes Ørsted2,3 and Børge Grønne Nordestgaard1,2,3,4*

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Smoking and Schizophrenia

Tobacco Use Among Individuals With Schizophrenia: What Role Has the Tobacco Industry Played?*

Judith J. Prochaska¹², Sharon M. Hall², and Lisa A. Bero³

¹Department of Psychiatry, University of California, San Francisco; ²Department of Clinical Pharmacy and Institute for Health Policy Studies, University of California, San Francisco

Imagine, the Police have just taken you in handcuffs to the Psychiatric Emergency Room of Bellevue Hospital. You have been hearing voices and your life has stopped making sense. The doctor is trying to explain something to you but everything is confusing. She tells you that you will be held against your will until you are stabilized. You are given medication for your psychosis. You are nervous and scared. You ask for a cigarette, one of your few pleasures in life. The nurse sarcastically tells you that you won't be able to smoke, the hospital is smoke free and there are no discrete smoking areas.

What has happened to individual freedom and our respect for the human dignity of New York City's most vulnerable citizens – the seriously and chronically mentally ill? Why does Bellevue Hospital force psychiatric patients to go cold turkey? Please create a discrete smoking area for all your psychiatric patients.

Fig. 2. An Example of Campaign Materials from the Alliance for the Mentally Ill (AMI) and Friends and Advocates of the Mentally Ill (FAMI) in Opposition to the Mandate to Make all Hospitals, Including Psychiatric Units, Smoke Free.¹³
Acknowledgements

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PhD Student
PhD Student
Postdoc
Postdoc
Research Assistant
Postdoc
Research Assistant
Postdoc
Postdoc
Research Assistant
PhD Student
Questions?
Stacey Williams
Head of Cut Films
CUT FILMS
Overview of Cut Films

• Cut Films is our short film and media project which educates young people about smoking and tobacco in a creative way

• We are an evidence led peer-to-peer intervention project which follows the NICE Public Health guidelines recommendations for smoking prevention in schools and preventing the uptake of smoking in children and young people

• All our projects are externally evaluated
Cut Films – Theory of Change Impact Model
Our Projects

• Cut Films (Universal Intervention)
• Look After Your Lungs in the Northwest
• Cut Films Shisha Awareness in Barnet
• Past Project: EU Smokefree Youth Network 2016
The Workshops

• Uses the medium of film and the competitive element to educate young people
  - Research
  - Story boarding & Scripting
  - Filming (Camera techniques, composition)
  - Editing/Uploading
  - Social media promotion
  - Awards ceremonies
Cut Films Quiz

True or False. Tobacco companies use five-year old children to make cigarettes?

a. False

b. True
8. True or False. Tobacco companies use five-year old children to make cigarettes?

a. False

b. True
Celebrity Smoker Poker

Ex-Smoker

BEATING THE UK'S BIGGEST CANCER KILLER – TOGETHER
Look After Your Lungs

• Key themes covered in the workshops
  • Lung cancer (prevention, symptoms and early diagnosis)
  • Second hand smoke / passive smoking
  • Shisha and E-cigarettes
  • Financial cost of smoking
  • Environmental impact of smoking
  • Celebrity role models and impact of media
What % of adults smoke in the UK?
A. Over 90%
B. 75%
C. 52%
D. 19%
E. 10%
D
Only 19%
Cut Films Shisha Awareness

• Aim
  • Work directly with young people (13-25 year olds) in Barnet over a seven-month period across schools, educating and raising awareness of the health affects of shisha and water pipes

• Proposed Outcomes
  • Educate young people about all aspects of shisha and water pipes, raising the awareness about the dangers of using them;
  • Alter young people’s perceptions and attitudes towards shisha and water pipes, therefore enabling them to make healthier choices;
  • Contribute to a reduction in smoking prevalence through decrease in intention to use shisha and water pipes.
Shisha Awareness Activities

• Phase 1 – Creation of a short film to be shown in all of Phase 2 assemblies/workshops
Shisha Awareness Activities

• Phase 2 – Delivery of interactive workshops in schools and youth clubs
THE WATER FILTERS THE HARMFUL CHEMICALS IN SHISHA
Which film contains any reference to shisha?

Star Wars: Return of the Jedi

Guardians of the Galaxy

Pirates of the Caribbean: The Curse of the Black Pearl
Shisha Awareness Project

• Currently in evaluation
• Faculty of Public Health has accepted an abstract on the Barnet Council Shisha Campaign

• Some initial results:
  • 84% of young people have said they enjoyed the workshop
  • 90% have said they learned something new
  • 88% are more aware of the harms associated with shisha.
EU Smokefree Youth Network

• Took place between April and July 2016
• Over 24 young people from England, Sweden and Slovenia
• In London in April and in Ljubljana, Slovenia in July
Questions?
Martin Dockrell
Public Health England
Panel Questions?
Lorraine Dallas
Director of Patient & Support Services