“Smoking Cessation in Addiction Treatment” Peter Selby MD
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PI, Ontario Tobacco Research Unit
Executive Director, TEACH
PI, STOP STUDY
Disclosures

- Previous funds from Schering Canada to provide buprenorphine training (2000)
- Paid consultant and advisory board member—Pfizer consumer health care Canada, Pfizer Inc, Canada, Sanofi-Synthelabo, Canada, GSK, Canada, Genpharm and Prempharm, Canada, CTI.
- Grants: Health Canada, SFO, CIHR
- NO TOBACCO INDUSTRY FUNDS
Learning Objectives

- Educational Objectives:
  - a) to understand the association between substance use and tobacco,
  - b) to derive the implications of this association
  - c) to generate recommendations for tobacco treatment in the addicted population.
It seems beyond comprehension, but the evidence is inescapable. ... [Bill Wilson] literally smoked himself to death.

Understand tobacco dependence as a chronic disease and the need for a paradigm shift.
The Smoking Environment in Canada

- 19% of Canadians (5.4 million) 15yrs or older are current smokers
- Average cigarettes smoked per day = 15.7
- 59% of daily smokers have their 1st cigarette within 30 minutes of waking up

(CTUMS 2008)
Mortality Due to Tobacco

- 37,000 Canadians die from smoking per year
  - 100 infants/year
- 1 in 5 deaths are due to smoking
  - Five times those due to car accidents, suicides, other drug abuse, murder and HIV COMBINED!
- 1 in 2 smokers die from smoking related diseases.
  - 20% of smokers develop lung cancer
- 50% in the 44 to 50 years age group.
Some Adverse Effects of Smoking Are Reversible

- Risk of heart attack and stroke drop within 24 hours
- Breathing is easier within 3 days
- Coughing is improved within 2 weeks
- Risk of Coronary Artery Disease is reduced by 20%-50% in one year
- Risk of stroke normalizes after 5 years
- Risk of dying is equal to a non-smoker after 15 years

(Adapted from: http://www.quittobacco.org/whyquit/physicalbenefits.html)
Quitting Smoking at any Age May Increase Life Expectancy

Increased Life Expectancy

<table>
<thead>
<tr>
<th>Age stop smoking by</th>
<th>Life years gained</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30 years</td>
<td>10</td>
</tr>
<tr>
<td>&lt;40 years</td>
<td>9</td>
</tr>
<tr>
<td>&lt;50 years</td>
<td>6</td>
</tr>
<tr>
<td>&lt;60 years</td>
<td>3</td>
</tr>
</tbody>
</table>

Quitting smoking before the age of 30, normal life expectancy

Smoking as an Addiction
Conceptualizing substance use problems and their solutions

drug

vector

host

environment
What causes the harm?
Nicotine delivery devices

Most used, most harm and least regulated

Intermediate use, some harm and some regulation

least use, minimal harm and most regulation
Safety concerns related to nicotine include:
- cardiovascular disease (CVD),
- cancer
- reproductive toxicity,
- impaired wound healing,
- peptic ulcer disease,
- gastro-oesophageal reflux and
- addiction.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Dose per cigarette</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide</td>
<td>10–23 mg</td>
</tr>
<tr>
<td>Nicotine</td>
<td>1–3 mg</td>
</tr>
<tr>
<td>Hydrogen cyanide</td>
<td>400–500 mg</td>
</tr>
<tr>
<td>Aniline</td>
<td>360–655 mg</td>
</tr>
<tr>
<td>Catechol</td>
<td>200–400 mg</td>
</tr>
<tr>
<td>Nitrogen oxide</td>
<td>100–600 mg</td>
</tr>
<tr>
<td>Methanol</td>
<td>100–250 mg</td>
</tr>
<tr>
<td>Phenol</td>
<td>80–160 mg</td>
</tr>
<tr>
<td>Acrolein</td>
<td>60–140 mg</td>
</tr>
<tr>
<td>Pyridine</td>
<td>16–40 mg</td>
</tr>
<tr>
<td>Ammonia</td>
<td>10–130 mg</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>10–90 mg</td>
</tr>
<tr>
<td>Arsenic</td>
<td>40–120 mg</td>
</tr>
<tr>
<td>Hexavalent chromium</td>
<td>4–70 ng</td>
</tr>
<tr>
<td>Cadmium</td>
<td>4–70 ng</td>
</tr>
<tr>
<td>Nickel</td>
<td>0–600 ng</td>
</tr>
<tr>
<td>Lead</td>
<td>34–85 ng</td>
</tr>
</tbody>
</table>

| Carcinogens               |                   |
| Polynuclear aromatic hydrocarbons | 60–190 ng |
| Heterocyclic compounds    | 3–14 ng          |
| N-nitrosamines            | 200–4,900 ng      |
| Aromatic amines           | 30–670 ng         |
| N-heterocyclic amines     | 40–300 ng         |
| Aldehydes                 | 570–1,500 ng      |
| Volatile hydrocarbons     | 500–1,150 ng      |

Source: Hoffmann, Hoffmann, & Wynder (1998)
How nicotine in cigarettes is addictive?
Neuroimaging in Smokers

- Smoking affects regional cerebral blood flow
  - Areas rich in nicotinic receptors
  - Areas implicated in rewarding effects of drugs
- Cigarette craving correlated with cerebral blood flow
  - Right hippocampus – area involved with associating environmental cues with drugs
  - Left dorsal anterior cingulate – area implicated in drug craving and relapse to drug-seeking behavior

Genetic Factors

- Cytochrome P450 (CYP) metabolism\(^1,^2\)
  - CYP2B6, CYP2A6
- Dopamine receptors and transporters\(^2\)
  - DRD2 – Receptor gene
  - SLC6A3 – Transporter gene
- Serotonergic genes (5-HTT)\(^1\)
  - 5-HTT polymorphism
  - Long (L) allele
- Nicotinic acetylcholine receptors (nAChRs)\(^3,^4\)
  - Mutation in \(\alpha_4\) subunit

Inherited differences mediate susceptibility to nicotine dependence and contribute to gene/environmental interactions underlying smoking behaviors\(^1\)

Approach/avoidance

Intra-Individual factors

Biological
Molecular
Gene
Receptor
Brain region
Metabolism
Sex

Psychological
Personality
Cue reactivity
Learning
Motivation
Self efficacy

Extra-individual factors

Social
Family
Friends
Neighbours
Colleagues
Other
Cultural
Ethnic
Religion
Language

Occupational
Education
Work
Finances

Environmental
Housing
Food adequacy
Helping services
Political

Spiritual
SMOKING CESSATION TREATMENT INTEGRATION INTO ONTARIO ADDICTION AGENCIES/PROGRAMS
A final report prepared for the CAN-ADAPTT funded seed grant for a joint Addictions Ontario (AO), Centre for Addiction and Mental Health (CAMH), CONNEXOntario, and Ontario Federation of Community Mental Health and Addiction Programs (OFCMHAP) smoking cessation survey to collect pre-intervention baseline data to inform future research
Primary objective:

- To determine a baseline count and percentage of the number of programs within addiction agencies in Ontario that currently offer smoking cessation to their clients.
Secondary objectives:

- To determine the percentage of each program type (provincial service categories) that provides smoking cessation and, in the case that it is not provided, the reasons cited by each category.
- To determine the overall dominating reasons for not providing smoking cessation.
- To assess respondents’ thoughts regarding smoking cessation treatment integration into their programs.
Methods
Study Design and Population

- January 2010-May 17, 2010
- AO and the Federation distributed the survey through email + 4 REMINDERS
- 183 addiction agencies across Ontario received the survey.
Results

- The 183 addiction agencies that were surveyed hosted a total of 1,395 programs.
- Of the 1,395 programs, 1,130 responses were received from 132 addiction agencies. = 72.1% addiction agency response rate and 81.0% addiction program response rate.
23.5% of addiction agencies in Ontario, and (coincidentally) 23.5% of programs within addiction agencies, provide smoking cessation to their clients.

That’s means ¾ DONOT!!!
## Community treatment and assessment

<table>
<thead>
<tr>
<th>Program Type</th>
<th># of programs providing SCC</th>
<th>% of all programs providing SCC</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Treatment</td>
<td>153</td>
<td>58%</td>
<td>58%</td>
</tr>
<tr>
<td>Initial Assessment / Treatment Planning</td>
<td>61</td>
<td>23%</td>
<td>81%</td>
</tr>
<tr>
<td>Residential Treatment</td>
<td>23</td>
<td>9%</td>
<td>90%</td>
</tr>
<tr>
<td>Community Day / Evening Treatment</td>
<td>9</td>
<td>3%</td>
<td>93%</td>
</tr>
<tr>
<td>Residential Supportive Treatment Level 1</td>
<td>6</td>
<td>2%</td>
<td>95%</td>
</tr>
<tr>
<td>Residential Withdrawal Management Level 2</td>
<td>6</td>
<td>2%</td>
<td>97%</td>
</tr>
<tr>
<td>Case Management</td>
<td>3</td>
<td>1%</td>
<td>98%</td>
</tr>
<tr>
<td>Community Withdrawal Management Level 1</td>
<td>2</td>
<td>1%</td>
<td>99%</td>
</tr>
<tr>
<td>Residential Supportive Treatment Level 2</td>
<td>2</td>
<td>1%</td>
<td>100%</td>
</tr>
<tr>
<td>Community Medical / Psychiatric Treatment</td>
<td>1</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Community Withdrawal Management Level 2</td>
<td>0</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Residential Medical / Psychiatric Treatment</td>
<td>0</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Residential Withdrawal Management Level 1</td>
<td>0</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Residential Withdrawal Management Level 2</td>
<td>0</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>100%</td>
<td>-</td>
</tr>
</tbody>
</table>

### Table 1: Program Types Providing Smoking Cessation

The table above presents the number of programs providing smoking cessation (SCC) across various treatment types, along with the percentage of all programs providing SCC and the cumulative percentage. The data indicates a high level of provision across different program types, with the cumulative percentage reaching 100% for all categories.
Reasons for not providing treatment

- R8 = This agency does not have such a directive or mandate from its funder
- R9 = This agency cannot afford the necessary increase in staffing
- R11 = This agency cannot afford to purchase stop-smoking medication
- R10 = This agency cannot afford the necessary staff training

Cumulatively, these four reasons account for 81.8% of the responses.
Reason by program type

- Case Management programs
  - No staff
  - No dollar for meds.
- Community Day/Evening Treatment, Community Treatment, Initial Assessment/Treatment Planning, and Residential Treatment programs
  - No mandate.
- Community Withdrawal Management Level 1 and Community Withdrawal Management Level 2
  - No mandate
  - staffing, staff training, and stop-smoking medication.
  - demand for smoking cessation services would increase agency wait times.
Reasons contd

- Residential Supportive Treatment Level 1, Residential Supportive Treatment Level 2 and Residential Withdrawal Management Level 2 programs
  - staffing.
- Residential Supportive Treatment Level 2 and Residential Withdrawal Management Level 2 programs
  - meds
- Residential Withdrawal Management Level 1 category
  - clients’ lack of motivation to quit smoking,
  - staff training or
  - stop smoking medications.
We are a 100% non smoking both in the building and on the grounds. Our clients are not allowed to smoke during the four month treatment program. They are provided with Nicotine Replacement Therapy at no cost to them for the first two weeks. We implemented this non smoking policy two years ago and it went smoothly with no issues.

Because it is legal and your facility does not have to be licensed as would be a drinking establishment - clients (some) prefer to stop the other drugs first and work up to healthier lifestyles - smoking cessation, diet, exercise, weight gain/loss, etc. Our hospital still has a smoking area outside. If the cost savings are significant as have been indicated, increase in funding should be readily available.
Who are current smokers?
SUDS and Tobacco Use

Opioids, MMT, Alcohol, THC
Is Tobacco a gateway drug?

- Chen (2002)
- Biderman et al. (2006)
THC and Tobacco

- Some researchers regard nicotine as a particularly potent gateway drug for marijuana (Humphrey, 2004).
- Several studies have found cigarette use to precede marijuana initiation (Lai et al., 2000).
- ‘Reverse gateway’ effect may also occur for some cigarette smokers, where marijuana use may lead to nicotine dependence (Amos et al., 2004).
The Correlation Between Drinking and Smoking

- Among the general population, smoking increases with increased drinking (Dawson, 2000).
The Risks Associated with Co-occurrence

- 2-3X more than general population (80-85% vs 23%)
- ↑ nicotine related to ↑ ETOH
- More tobacco related problems
- 90% smoke >30cpd
The Impact of Smoking on Alcohol/Drug Recovery Outcomes

Findings appear to be mixed

- Smoking in recovery may cue alcohol relapse (Shiffman & Balabanis, 1995).

- No empirical evidence reducing or stopping smoking has a significant impact on 12-month alcohol recovery outcomes (Toneatto, Sobell & Sobell, 1995).

- However, see Ann Joseph re: sequential versus combined treatment in VA patients
The Impact of Smoking on Alcohol/Drug Recovery Outcomes

- Smokers who abuse alcohol regularly had poorer recovery rates at 12-month follow-up, especially if their drug of choice had been a sedative such as alcohol or narcotics (Stuyt, 1997).

- Canadian National Alcohol and Other Drug Survey (Statistics Canada 1990)
  - Continued smoking in longer-term recovery (5 years) associated with increased risk of relapse (Sobell & Sobell, 1996).
Changes in smoking status among substance abusers: baseline characteristics and abstinence from alcohol and drugs at 12-month follow-up

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• N=749 treatment seeking for SUDS
• N= 649 (86.9%) 12 month follow up
• 395 smokers @ 12 month 13% quit
• 254 non-smokers 12% started/relapsed
<table>
<thead>
<tr>
<th>Smoking Status</th>
<th>Total days abstinent for AOD (Adjusted mean days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quitters</td>
<td>310</td>
</tr>
<tr>
<td>Non-smokers</td>
<td>294</td>
</tr>
<tr>
<td>Relapsers</td>
<td>246.6</td>
</tr>
<tr>
<td>Never quit</td>
<td>258</td>
</tr>
</tbody>
</table>
Conclusion

- Self initiated smoking cessation may be beneficial
- Relapse to smoking may be a marker for relapse to other drugs
The Impact of Drinking/Alcoholism on Smoking Cessation Outcomes
Impact

- Smoking cessation less frequent among those who drink more (Zimmerman, et al., 1990; Dawson, 2000).
- Lifetime history of alcohol dependence 30% less likely to stop smoking (Hughes, 1995).
- Smokers who abuse alcohol are 60% less likely to quit smoking (Breslau, et al., 1996).
- Alcohol intoxication appears strongly associated with smoking relapse (Burton & Tiffany, 1997).
Heightened Morbidity and Mortality as Risks Associated with Co-occurrence

- Risk of death for smoking and heavy drinking appears to be even greater than what would have been predicted from their additive effects.
- Patients in recovery have increased cumulative mortality due more to tobacco-related than to alcohol-related causes (Hurt, et al., 1996; MMWR, 1997).
Heightened Morbidity and Mortality as Risks Associated with Co-occurrence

- Compared to the general population, three-fold increase risk of death among former patients of an outpatient alcohol rehabilitation program (Hurt, 1999)
  - Tobacco-related diseases 50%
  - Alcohol-related 33%
Natural Remission in Smoking Associated with Alcohol/Drug Recovery

- Spontaneous, concurrent cessation rare (Sobell & Sobell, 1996).
- Rate of smoking at 6 month follow-up declined in 45% following treatment for alcohol abuse (Gulliver et al., 2000).
Client Motivation in Smoking Cessation

- Depends on the study
- Predominantly precontemplative about quitting smoking (Abrams, 1996).
- Majority are interested in quitting (Irving, 1994; Ellingstad, 1999).
- Same or more than general population (Bobo, McIlvain et al. 1996).
Client Motivation in Smoking Cessation

- Alcohol dependent smokers admitted to a residential rehabilitation program (Irving, et al. 1994).
  - 75% desire to quit smoking.
  - 80% quitting now or in the future would likely have a positive or neutral effect on their sobriety.
  - Residential treatment may be an opportune time to provide smoking interventions.
Client Motivation in Smoking Cessation

- Over 75% of alcohol outpatient treatment clients indicated that they were willing to consider smoking cessation either during or after treatment for an alcohol problem (Ellingstad, et al. 1999).

- For many of the clients who indicated a preference for concurrently working on alcohol and smoking, smoking was viewed as a stimulus for alcohol use and smoking cessation was viewed as benefiting the resolution of their substance abuse problems.
Readiness to Quit

- 80% were interested in using nicotine replacement products (Clemmey, et al. 1997).
- 58% indicated interest in participating in a smoking cessation program (Frosch, et al. 1998).
- ~50% indicated an interest in participating in a smoking cessation program (Kozlowski, et al. 1989).
Readiness to Quit

- 75% said that it would be as difficult, or more difficult, to quit smoking than to quit the drug or alcohol that brought them to the centre.

- Smokers in substance abuse programs typically tend to have fairly low levels of confidence in their ability to actually achieve cessation (Burling, et al., 1997).
Effects of Program

- Expressed interest in quitting smoking appears to change over the duration of program involvement.
  - increase between program intake and one-month follow-up (Monti, et al. 1995).
- Men (problem drinkers and recovering alcoholics) are more likely than women to have made multiple attempts to quit smoking (Bobo & McIlvain, et al. 1996).
- Men 50% more likely to report that they intend to try quitting within the next 6 months.
What is the Impact of Smoking Interventions on Recovery Outcomes?
Interactional Effects on Intervention Outcomes

- Smoking cessation has no detrimental effect on alcohol or other drug treatment outcomes
- Better recovery outcomes can be expected for alcoholics who quit smoking (Shiffman & Balabanis, 1995; Sobell & Sobell, 1996; and Stuyt 1997).
Smoking Cessation Outcomes

- Relatively small number successfully quit smoking during or following treatment (Kalman, 1998).
- They are much less likely to succeed (Hughes, in Shiffman & Balabanis, 1995; Hays, et al. 1999).
- Residential alcohol clients receiving some type of intervention for smoking cessation, one-year quit rates tend to range from only 0%-11% (Hurt, 1999).
Opioid Dependence and Smoking

- Prevalence 2x general population.
  - (Frosch, Shoptaw et al. 2000; Richter, Gibson et al. 2001; Richter, Choi et al. 2004)

- Responsible for mortality and morbidity
  - (Hurt, Offord et al. 1996; Hser, Hoffman et al. 2001)

- Many want to quit tobacco use. (similar to gen pop)
  - (Richter, McCool et al. 2005; Shadel, Stein et al. 2005; Nahvi, Richter et al. 2006)
MMT and Nicotine Positively Correlated.

- (Spiga, Schmitz et al. 1998; Frosch, Shoptaw et al. 2000; Frosch, Nahom et al. 2002) Smoking increased the demand for methadone but not vice versa. (Spiga, Martinetti et al. 2005)
- This may be due to the effects of methadone and other opiates on nicotinic acetyl choline receptors.
- In a qualitative study of methadone users, patients said smoking and drug use were complementary and helped mitigate the side-effects of each other.
- They were also able to recognize the similarity between tobacco smoking and drug since they shared drug cues and withdrawal symptoms.
- However, they were also aware that cigarette smoking did not have immediate negative effects as compared to drug use.
Staff attitudes at odds with readiness of patients

- Staff view smoking cessation as important,
- most do not promote smoking cessation with their patients.
  - (McCool, Richter et al. 2005)
- Staff often feel that patients are unwilling or unable to quit smoking.
  - (Richter, Choi et al. 2004; McCool, Richter et al. 2005)
- 48% of smokers in an MMT program were contemplating quitting smoking.
  - (Nahvi, Richter et al. 2006) (Frosch, Shoptaw et al. 1998)
Readiness to Quit

- MMT patients were knowledgeable on the health risks of smoking.
- 61% planned to quit in the next 6 months.
- 57% were interested in an on-site program.
Helping Patients on MMT stop smoking.

- Most patients in MMT programs are unable to stop smoking spontaneously and require assistance. (Richter, Gibson et al. 2001)
- NRT is effective in this population but is increased with contingency management added to the protocol. (Frosch, Nahom et al. 2002)
- Smokers who were able to quit smoking, also able to quit opiate and cocaine use.
- In a small open label study both NRT and bupropion together helped these patients quit smoking. (Richter, McCool et al. 2005)
- Bupropion should be used with caution especially if the patient is using cocaine because both are sympathomimetics and can cause seizures.
- Many patients who smoke crack find that cigarettes and cigarette ash act as triggers for them.
- Quitting smoking can help reduce their cravings for crack as well.
Treatment

- Patient choice re: timing
- Environmental change
- Behavioural change
- Pharmacotherapy essential
- Staff training.
Resources for smokers in Ontario

- http://www.smokershelpline.ca/
- www.stopsmokingcentre.net
- CAMH 416 535 8501 ext 6128
- Stop smoking clinic  ext 6662.