

The gateway theory

- **Pr Jean-François ETTER**
PhD (political science)
- E-cigarette Summit
- London, November 17, 2016
- Competing interests: none

Enormous political influence

- Since 1970s: used to support the idea that marijuana *causes* heroin use
- EU Tobacco Products Directive states that:
“Electronic cigarettes can develop into a gateway to nicotine addiction and ultimately traditional tobacco consumption [...]. For this reason, it is appropriate to adopt a restrictive approach”

Establishing causality: Austin Bradford Hill, 1965

1. Strength of the association
2. Consistency (across trials, investigators, persons)
3. Specificity (can other things cause it?)
4. Temporal precedence (do we know if cause precedes effect)
5. Dose-responsivity
6. Plausibility (biological and psychological)
7. Coherence (consistent with other lines of evidence)
8. Experiment
9. Analogy (do similar agents act similarly)

Strength of the association

- A few cases are not sufficient
- What is the minimal effect ?
- Proponents of the theory never specify it
- Effects are unlikely to be much $>10\%$ (RR = 1.1)
- Doubt that effects below $+10\%$ can ever be detected

Specificity (exclude that other things cause smoking)

- Propensity to use nicotine (in any form)
- Common susceptibility to both vaping and smoking
- Social influences, family and friends who smoke
- Personality (risk taking, novelty seeking)
- Psychiatric problems
- Genetic factors
- Proximity of the 2 behaviors: use of any nicotine device is inevitably associated with use of other nicotine devices
- Statistical adjustments do not eliminate the variability in propensity to smoke captured by the variable 'e-cig use'
- Vaping will still predict smoking in the best multivariate models

Specificity : the common liability theory

The common liability theory:

- Is supported by a large body of scientific evidence
- Also accounts for the dose-response effects
- Provides a better foundation for research and policy

Temporality

- Cause must precede effect
- Very hard to establish antecedence when product use co-occur
- Many studies of gateway effect show only:
 - antecedence and
 - increased relative risk of smoking
- This is not sufficient, because it does not eliminate :
 - confounding by other factors (even after statistical adjustment)
 - doubts about the plausibility of the theory

Plausibility

- The gateway theory is circular
- The stage is identical to the drug / device
- Nicotine use (in e-cigs) is seen as the cause of nicotine use (in cigs)
- The theory does not specify a cause for progression between 'stages'

- In fact smoking usually precedes vaping: this is a solid fact against the gateway theory

- Cigarettes are omnipresent, there is no need for a gateway

Plausibility

- Why would people who chose to vape rather than smoke change their mind and start smoking ?
- Addiction:
 - most e-cig models are not very addictive
 - if nicotine supply is not sufficient, vapers can switch to newer e-cig models that provide more nicotine
- Reverse gateway: people vape because they look for alternatives to smoking that are safer, cheaper, more socially acceptable

Coherence : consistent with other lines of evidence ?

- Is the theory coherent with historical trends in vaping and smoking ?
- Decrease in youth smoking in countries where vaping is frequent (US, UK)
- This is reassuring, but smoking prevalence data are no proof for or against this theory

Analogy : do similar agents act similarly ?

- Nicotine medications are not very addictive
- No reported case of non-users of tobacco who got addicted to nicotine medications and then switched to smoking to satisfy this addiction
- Smokeless tobacco delivers large amounts of nicotine and is addictive
- Smokeless does not appear to be a gateway to smoking
- Low rates of smoking prevalence in countries where smokeless is legal

Not a comprehensive model

- We need comprehensive models that explain movement in all directions, not just from vaping to smoking
- E-cig most probably help smokers quit, even though the quality of the evidence is low
- Gateway effects would need to be very large to counteract the effects of e-cigs on quitting

Conclusions

- Most criteria for causality are not met
- Gateway theory is circular, has little heuristic value
- Not yet proven
- It will be difficult to obtain evidence
- Common liability model is more plausible, is a better base for policy
- Gateway theory has enormous political influence
- Its success is perhaps due to its simplicity
- Policies based on this theory will not have the intended effects, if the common liability theory applies
- These policies may have adverse effects, if vapers switch back to smoking