

Assessing the Efficacy of NRT and Varenicline Using the CO meter as a Clinical Tool

Renee Bittoun

Disclosure: No Conflict of Interest

Carbon Monoxide (CO)

- Gas produced by combustion
- Binds irreversibly with Hemoglobin COHb
(30% COHb is fatal—many smokers have subclinical CO poisoning)
- Validates self-reported smoking abstinence
- Used to measure smoke exposure (passive)
- Motivational tool for smoking cessation

Unrelated to numbers cigarettes/day

“Topography” of Smoking

- Numbers of puffs
- Depth of inhalation
- Breath-holding
- Puff volume
- Inter-puff velocity
- Inter-puff interval

Topographical Variations

- Deeper inhalations with “mild” or “light” cigarettes → higher CO (and COHb)
- Slow metabolisers of nicotine have lower CO levels ie don't “drag” as hard – unrelated to numbers of cigarettes/day

How Do We Take Advantage of This?

- Baseline CO levels identify levels of dependence
- Baseline CO levels can identify slow metabolisers
- Slow metabolizers do better on NRT

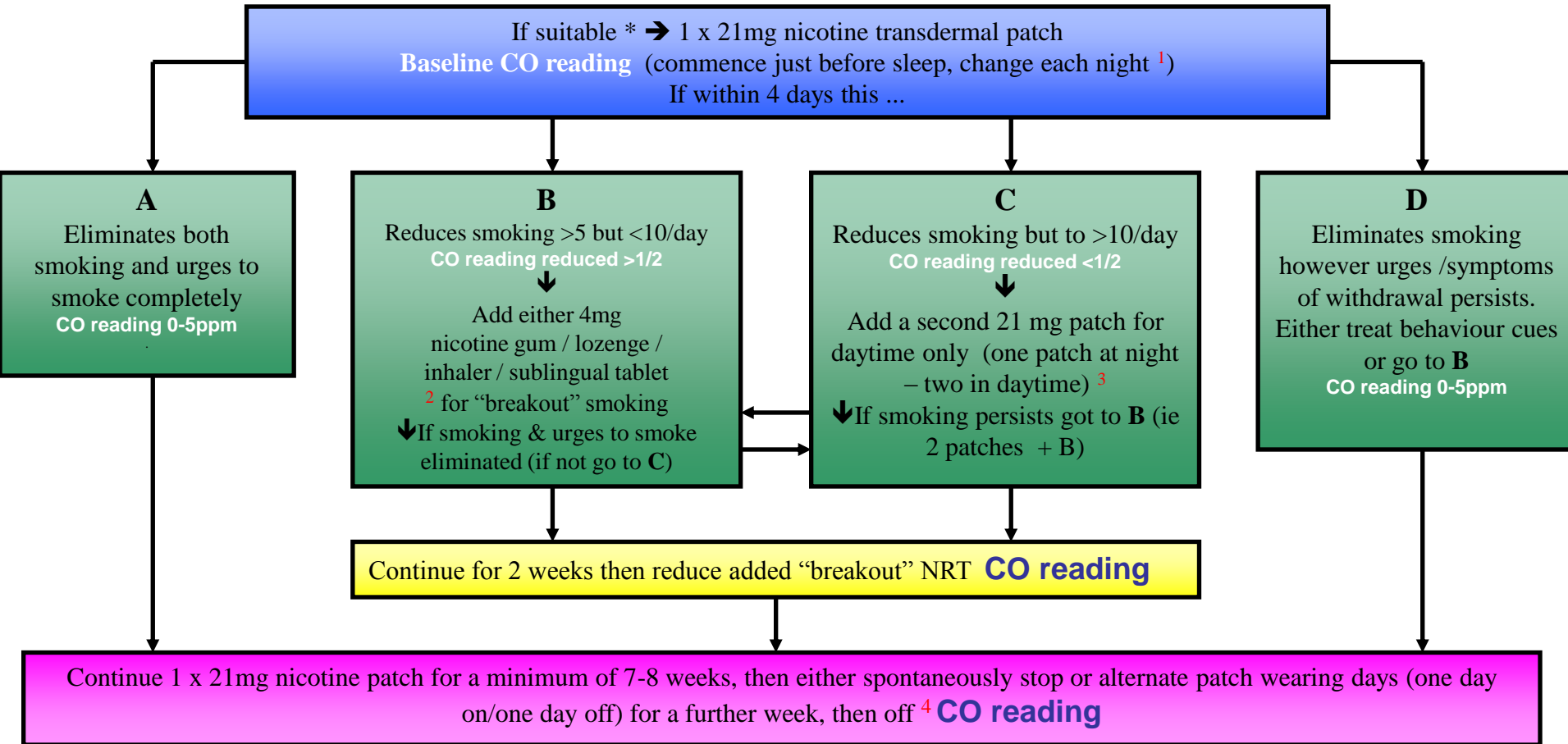
Using CO measurements with Pharmacotherapy

- ***Sufficient*** NRT or Varenicline will act as receptor agonists and reduce the need to “drag” on a cigarette.
- Titrating the drug → increase the agonistic effect → reduced CO
- NRT can be increased but
- Varenicline needs to have a clinically effective level—this may take weeks or be partial

Protocol

- Baseline CO reading
- Commence pharmacotherapy
- Review weekly CO reading (ideally at same time of day each time)
- Titrate treatment accordingly

Bittoun Combination Nicotine Replacement Therapy Algorithm[#]



* **KEEP IN MIND CONTRAINDICATIONS:** 1) **PREGNANCY OR LIKELIHOOD** (all NRT OK but not Patch)
2) **RECENT CARDIOVASCULAR EVENT** (48hrs)

¹ Applying patch last thing before sleep allows the slow rise of nicotine overnight - the likelihood of 1st cigarette of the day “urge” is strongly diminished.

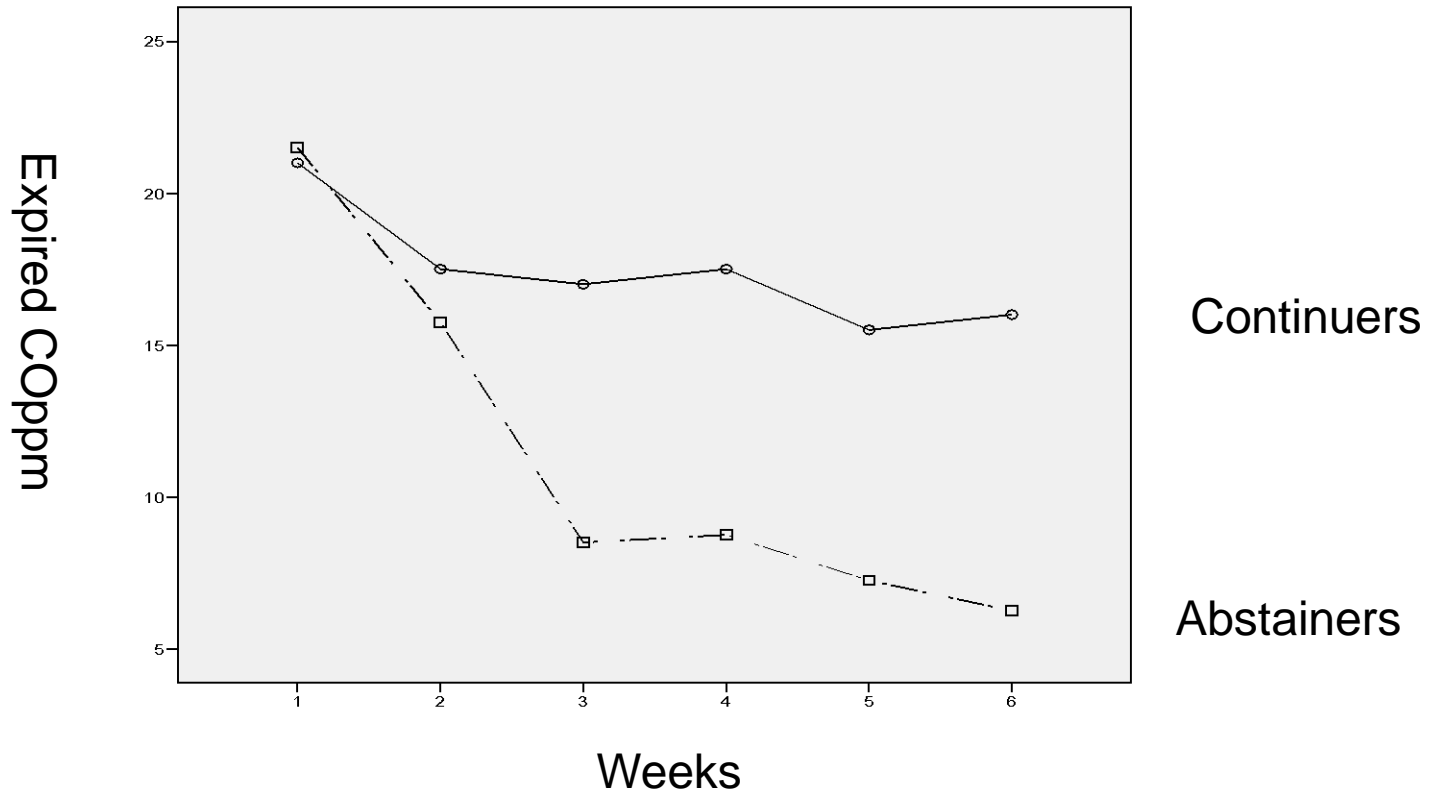
² Either 4mg nicotine gum or lozenge depending on patient choice. Inhaler or sublingual tablet recommended over the others if patient needs faster reinforcement.

³ No evidence in our experience of toxicity. Consider reducing concentrations if nausea occurs.

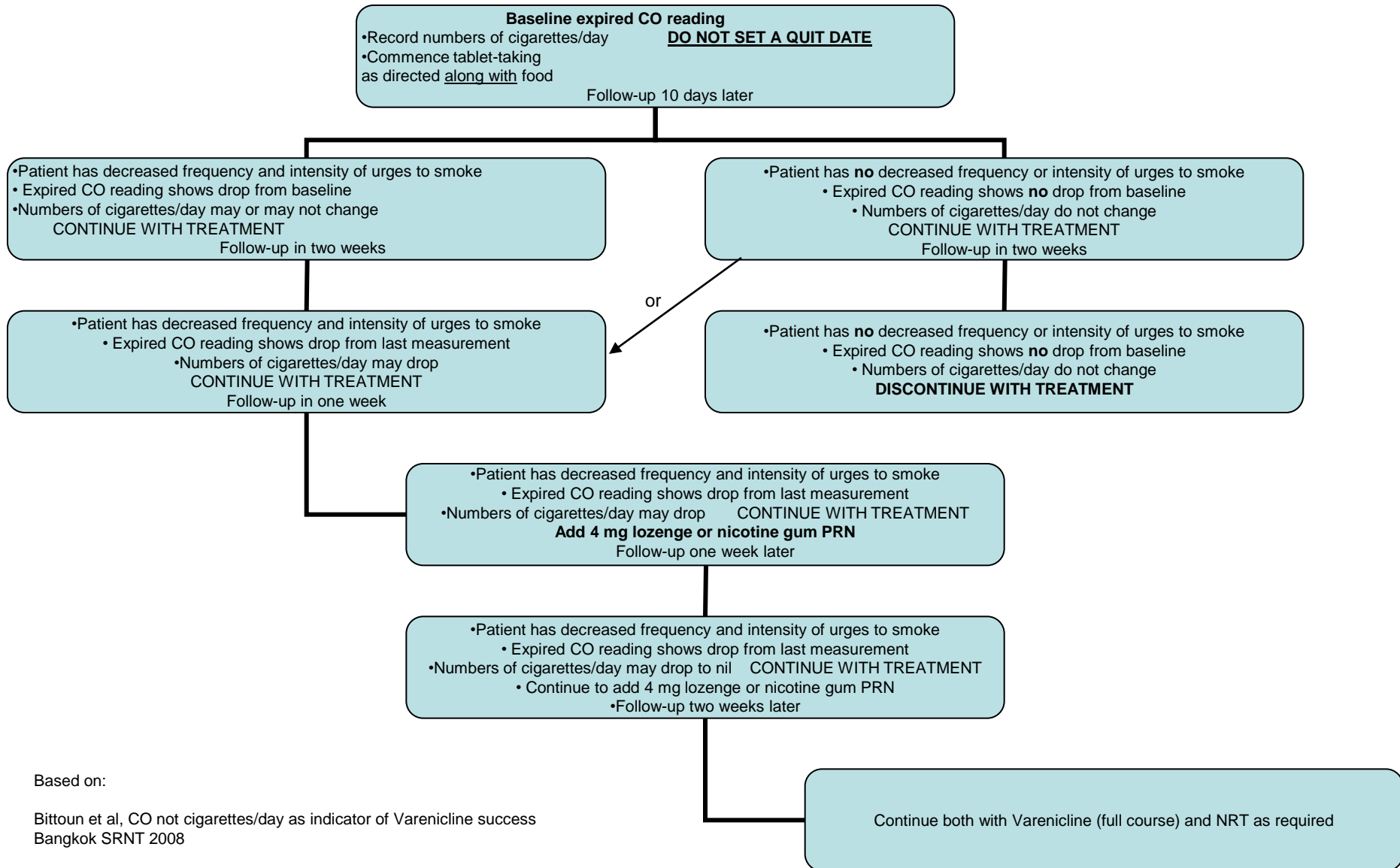
⁴ There is no evidence for weaning (or reduction) of patch strengths

Mean Expired Carbon Monoxide Levels in Smokers Commenced on Varenicline

Unrelated to numbers cigarettes/day



Flow Chart for Varenicline (Champix and NRT)



Based on:

Bittoun et al, CO not cigarettes/day as indicator of Varenicline success
Bangkok SRNT 2008

Bittoun et al, Combination Varenicline and NRT Dublin SRNT 2009

Outcomes

- > 50% confirmed > 6 months abstinence
- Harm reduction as an endpoint

Conclusion

Use the CO meter as a clinical tool

- To identify slow metabolisers
- To gauge treatment effects
- To demonstrate effect to patient
- To demonstrate *immediate* reduced harm