



Cotinine Testing

by Dr. Adele Visser

Introduction

The 31st of May is World No Tobacco Day. Tobacco kills more than 8 million people worldwide of which 7 million is due to direct use and an estimated 1,2 million due to second-hand smoke.

Of the estimated 1,3 billion smokers, more than 80% reside in low- and middle-income countries.

It is therefore essential that it should be seen as a health priority and all measures should be taken to reduce its impact¹.

Impact and Implications of Smoking Tobacco

Smoking is the cause for 70% of all cases of lung cancer in the world.

Over and above this, it is also association with various other malignancies including mouth, throat, larynx, oesophagus, bladder, bower, cervic, kidney, liver, stomach and pancreas cancer.

In addition to this, it greatly increases the risk of coronary artery disease, strokes and peripheral vascular disease.

With regards to the respiratory system, it is associated with chronic obstructive pulmonary disease (COPD) and pneumonia.

It is therefore evident that it places a great burden on our limited resources in the health care sector².

WHO efforts to reduce smoking

The World Health Organization rolled out the MPOWER initiative in 2007 to provide various strategies to reduce the ease of obtaining tobacco products (figure 1)¹.

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| M | Monitor tobacco use and prevention policies |
| P | Protect people from tobacco use |
| O | Offer help to quit tobacco use |
| W | Warn about the dangers of tobacco |
| E | Enforce bans on tobacco advertising, promotion and sponsorship |
| R | Raise taxes on tobacco |

Figure 1. The WHO's MPOWER initiative steps in reducing worldwide tobacco use.





The role of the Laboratory

Serum cotinine is a metabolite of nicotine and is a laboratory based test which is used to detect evidence of nicotine use, assuming tobacco use.

It is typically used in the setting of:

1. Smoking cessation programmes.
2. Insurance medical examinations.
3. Employment testing.
4. Medical testing (may be used in screening prior to organ transplant or determine cause for poor wound healing)³.

The test can be performed on serum, urine and saliva with preference on saliva and blood.

Reference ranges differ according to sample type and test platform used, however various guides as to interpretation of results exist.

Tables 1 and 2 represent various interpretation tools currently implemented in international institutions.

Table 1. CDC's biomonitoring protocol for the interpretation of cotinine results⁴.

	Urine levels	Serum levels
Non-smoker	<10ng/mL	<1ng/mL
Light smoker or second-hand smoke	11 - 30ng/mL	1 - 10ng/mL
Heavy smoker	>500ng/mL	>500ng/mL

Table 2. Meta-analysis data showing statistically relevant cut offs for various sample types⁵.

	Level that correlates with self-reported smoking studies
Saliva	10 - 25ng/mL
Urine	50 - 200ng/mL
Serum	10 - 20ng/mL

References

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3. https://www.urmc.rochester.edu/encyclopedia/content.aspx?contentid=nitotine_cotinine&contenttypeid=167
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5. Sungroul, K. 2016. Overview of Cotinine Cutoff Values for Smoking Status Classification. Int J Environ Res Public Health. 13(12):1236



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