Precision inhalation in medical cannabis: dose consistency and clinical considerations for inhaled cannabinoid therapy

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Inhaled cannabinoid formulations continue to play an important role in **medical cannabis treatment**, particularly in clinical situations where **rapid onset of effect** is desirable, including **breakthrough pain**, **acute anxiety symptoms**, and **sleep initiation difficulties**.

However, one of the longstanding challenges associated with inhaled cannabinoid therapy has been **variability in dose delivery** and **patient inhalation technique**. Unlike conventional pharmaceutical delivery systems, inhaled cannabis formulations have historically shown considerable **variability in cannabinoid exposure** between patients and even between administrations.

This variability may influence both **therapeutic response** and **tolerability**, presenting challenges for clinicians attempting to **individualise treatment** in a reproducible manner.

The **QMID – Que Medical Inhalation Device** has been developed as a **standardised inhalation platform** intended to improve consistency in cannabinoid administration. The device uses a **controlled 3-second inhalation cycle**, designed to support more reproducible aerosol delivery during administration.

In addition, inhalation cartridges used with the system have undergone **analytical testing to quantify cannabinoid delivery per inhalation**. This enables clinicians to estimate **THC and CBD exposure on a per-puff basis**, potentially improving **dose predictability** during treatment initiation and titration.

The clinical importance of dose consistency

Medical cannabis prescribing remains **highly individualised**. Clinical response may vary according to multiple patient-specific and treatment-related factors, including:

- → **prior cannabis exposure**
- → **cannabinoid ratio**
- → **age and sex**
- → **concomitant medications**
- → **interindividual variability in cannabinoid receptor response**

For inhaled therapies specifically, variability in **inhalation duration** and **aerosol generation** may contribute to inconsistent cannabinoid delivery.

The use of **measured cannabinoid release profiles per puff** may therefore assist clinicians and patients in applying more structured **titration approaches**, particularly in patients who are **cannabis naïve** or **clinically sensitive to THC exposure**.

Current formulations evaluated within the prescribing guidance include:

- → **high-THC cartridges** delivering approximately **2.3 mg THC per puff**
- → **balanced THC:CBD formulations** delivering approximately **1.3 mg THC and 1.3 mg CBD per puff**

intermediate THC/CBD profiles intended to support individualised treatment approaches.

Titration and clinical practice

As with other cannabinoid therapies, **gradual dose titration** remains essential.

The prescribing guidance developed for inhaled vape liquid formulations follows the commonly accepted clinical principle of **"start low and go slow."**

The proposed **titration framework** includes:

- → initiation with **one inhalation**
- → reassessment after approximately **30 minutes**
- → gradual **dose escalation every 2–3 days** according to clinical response and tolerability

This approach may be particularly relevant in:

- → **older patients**
- → **cannabis-naïve individuals**
- → **patients with anxiety disorders**
- → **medically complex populations**

The availability of **quantified per-puff cannabinoid delivery** may support more informed **patient counselling** and facilitate clearer **dose escalation strategies**.

Real-world clinical evidence

Prospective observational data from the **UK Medical Cannabis Registry** have provided early insights into the clinical use of inhaled THC vape formulations.

In a cohort of **186 patients** prescribed an inhaled THC cartridge delivering approximately **2.45 mg THC per puff**, im-

provements were observed in patient-reported measures of **anxiety**, **sleep quality**, and **health-related quality of life**.

The reported **adverse event incidence at 6 weeks was low (1.08%)**, with **no severe adverse events** identified during the follow-up period.

As with all observational registry data, these findings should be interpreted within the limitations of **non-randomised real-world evidence**, including the absence of **placebo control** and the relatively short **follow-up duration**.

Nevertheless, the data contribute to the growing body of evidence supporting the clinical feasibility of **standardised inhaled cannabinoid delivery systems**.

Conclusion

As inhaled cannabinoid therapies continue to evolve, greater emphasis is being placed on **dose consistency**, **reproducibility**, and **structured titration strategies**.

Standardised inhalation systems capable of **quantifying cannabinoid delivery per puff** may assist clinicians in applying more precise and reproducible **prescribing approaches**, while supporting **patient safety** and **treatment individualisation**.

Further **prospective and controlled studies** will remain important in determining the **long-term clinical role** of these technologies within **cannabinoid medicine**.

Interested in this topic?

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