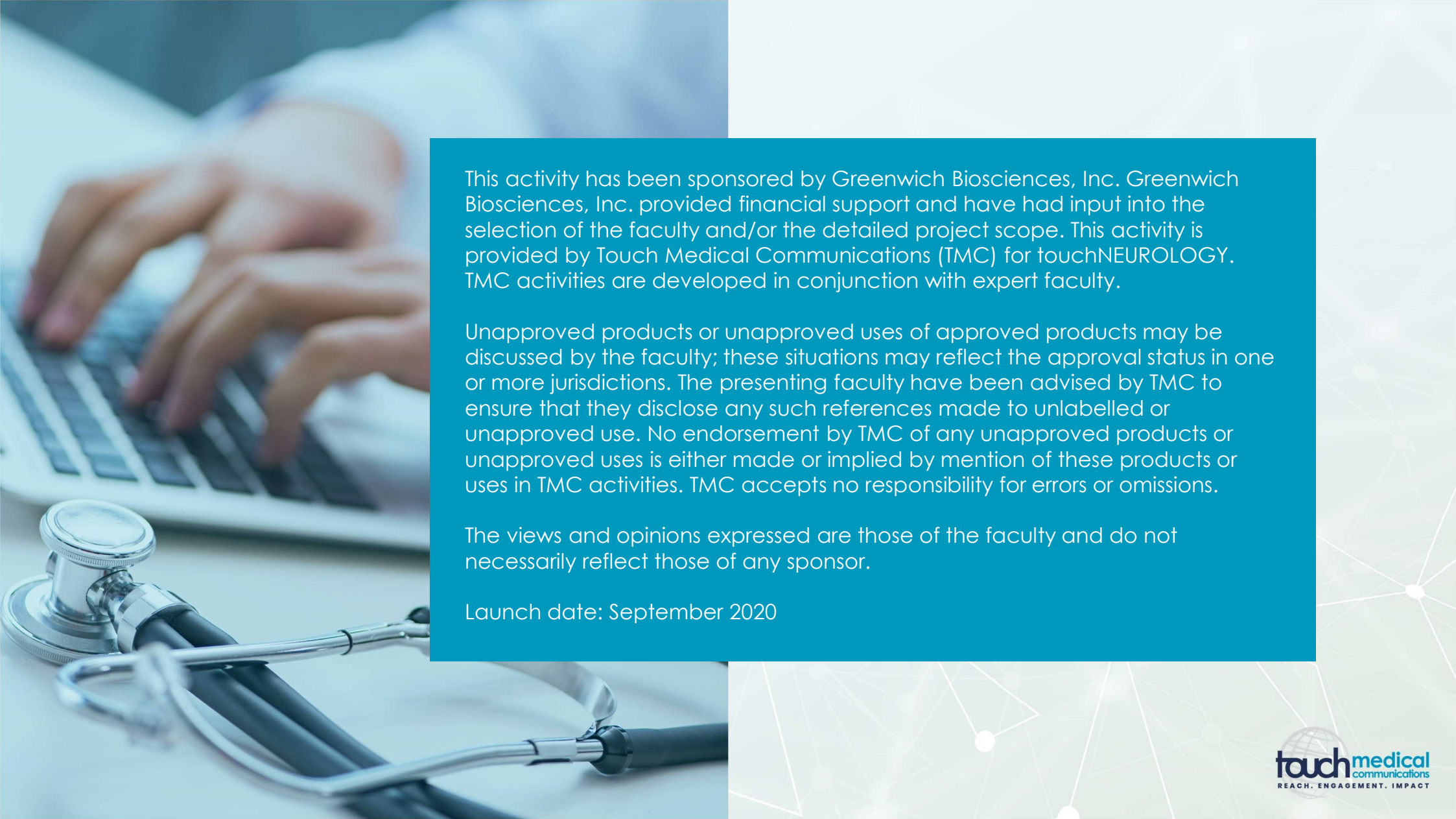


touchEXPERT BRIEFING

Differentiating MS spasticity cannabis treatment options





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Definitions

- **Regulated cannabis products** are FDA-approved or seeking FDA approval
- **Unregulated cannabis products** are NOT FDA-approved nor seeking FDA approval

Special considerations for unregulated products – contaminants



- Up to 72% are contaminated with **solvents** used for cannabinoid extraction.¹



- Up to 85% of products contain **pesticides** from all pesticide classes, including 3 bad actor carcinogens.²



- May be contaminated with pathogenic **bacteria** like *E. coli* and fungi like *Aspergillus* and *Penicillium* from the marijuana plant microbiome.^{2,3}

Regulated cannabis products – FDA-approved or seeking FDA approval; Unregulated cannabis products - NOT FDA-approved nor seeking FDA approval; nabiximols is an investigational product and is not approved for any indication in the US;

1. Raber et al, *J Toxicol Sci.* 2015;40(6):797-803; 2. Russo EB. *Front Pharmacol.* 2016;7:309; 3. McKernan K F1000Res. 2016;5:2471.

Special considerations for unregulated products – contaminants



- Can be contaminated with **heavy metals** from soil (cadmium and copper) and other metals such as lead used to increase crop weight.^{1,2}



- **Adulterants** like tobacco to increase effectiveness or decrease adverse events can be included.³



- Harmful compounds including formaldehyde and ammonia have been found in **vapor and smoke**.¹

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1. Russo EB. *Front Pharmacol.* 2016;7:309; 2. Busse F, et al. *N Engl J Med* 2008;358:1641–2; 3. McPartland JM. *Cannabinoids* 2008;3:16-20

Special considerations for unregulated products – storage, labelling and staff



- Are frequently **inadequately stored** – some cannabinoid-containing products may require refrigeration in the absence of light.¹

- **Fail to meet basic label accuracy standards** – 83% of 75 products analyzed were inaccurately labelled for THC content.²



- 80% of **dispensary staff have no medical or scientific training** - 94% make recommendations and up to 78% of recommendations are for ineffective products or ones which could exacerbate a condition.³

Regulated cannabis products – FDA-approved or seeking FDA approval; Unregulated cannabis products - NOT FDA-approved nor seeking FDA approval; nabiximols is an investigational product and is not approved for any indication in the US; THC, tetrahydrocannabinol; 1. Thomas BF and ElSohly M. Waltham:Elsevier;2016; 37-65; 2. Vandrey R, et al. JAMA 2015;313:2491-2493. 3. Haug NA, et al. Cannabis Cannabinoid Res 2016;1.1:244-251.

Comparison of regulated versus unregulated products



Vs



- Rigorously tested for effectiveness and safety¹
 - Manufactured under strict conditions – the exact composition is known; no contaminants¹
 - Stored under controlled conditions¹
 - Accurately labelled¹
 - Prescribed by physicians¹
- Generally untested for effectiveness and safety¹
 - Variable processing – composition uncertain; contamination likely¹⁻⁴
 - Stored under variable conditions⁵
 - Labelling mostly inaccurate⁶
 - Recommended only; non-prescribed⁷

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1. Russo EB. *Front Pharmacol.* 2016;7:309; 2. Raber et al, *J Toxicol Sci.* 2015;40(6):797-803; 3. McKernan K F1000Res. 2016;5:2471;

4. Busse F, et al. *N Engl J Med* 2008;358:1641–2; 5. Thomas BF and ElSohly M. Waltham:Elsevier;2016; 6. Vandrey R, et al. *JAMA* 2015;313:2491-2493.

7. Haug NA, et al. *Cannabis Cannabinoid Res* 2016;1.1:244-251.

Real world impact of unregulated products

- Without FDA approved formulations there is uncertainty about product effectiveness and safety
 - For example, patients with epilepsy receiving a regulated pharmaceutical product experienced a 39% reduction from baseline in seizure frequency vs a 70% increase in patients receiving dispensary products.¹
 - Unknown risk of adverse events



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1. Cohen N, et al. AAN website. 2020. Available at: https://n.neurology.org/content/94/15_Supplement/710 (Accessed April 2020)

Key take-home messages

1

There are many uncertainties regarding the effectiveness and safety of unregulated medical marijuana

2

Regulated cannabinoid products are rigorously tested and the exact composition known

3

Uncertainties around unregulated marijuana make it difficult to determine the risk vs. benefit for patients