
NEW MATH:

DOSE CALCULATIONS FOR CANNABINOIDS, NICOTINE AND ALCOHOL

Lisa Graves, MD, CCFP, FCFP Professor Family and Community Medicine WMed

Launette Rieb, MD, MSc, CCFP(AM), FCFP, CCSAM, DABAM, FASAM, Clinical Associate Professor, Dept. of Family Practice, UBC



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FACULTY/PRESENTER DISCLOSURE

Faculty: Dr. Launette Rieb

Relationships with financial sponsors:

- No interests in nor money received from a pharmaceutical, medical device or communications company, nor from an alcohol, cannabis, or tobacco producer or distributor
- Dr. Rieb has received honoraria for accredited talks for WorkSafeBC, BCCSU, CPSBC, TFME, WCAF, SPH-CME, UBC-CPD, among others, and unaccredited talks to the govt. of Alberta and the public

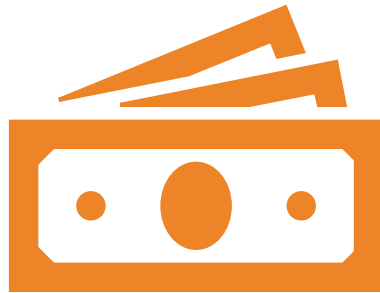
FACULTY/PRESENTER DISCLOSURE

Faculty: Dr. Lisa Graves

Relationships with financial sponsors:

- No interests in nor money received from a pharmaceutical, medical device or communications company, nor from an alcohol, cannabis, or tobacco producer or distributor
- Dr. Graves' grants include STFM, AAFP, SUAP (Health Canada), AAMC as well as honoraria from CFPC and SOGC

DISCLOSURE OF FINANCIAL SUPPORT



**The speakers have not received
financial support for this talk**



**Potential for conflict(s) of interest:
None**



Mitigation of Bias

Dr. Graves and Dr. Rieb will not mention organizations that they have worked for or given talks for

OBJECTIVES

BY THE END OF THE SESSION PARTICIPANTS WILL BE ABLE TO...

1. Identify available formulations and delivery modes for cannabis/cannabinoids, nicotine, and alcohol
2. Determine amounts of active ingredients per unit and calculate daily dosages for the substances identified
3. Plan clinical shared decision-making for various product forms, integrating low risk dosing recommendations



ALCOHOL

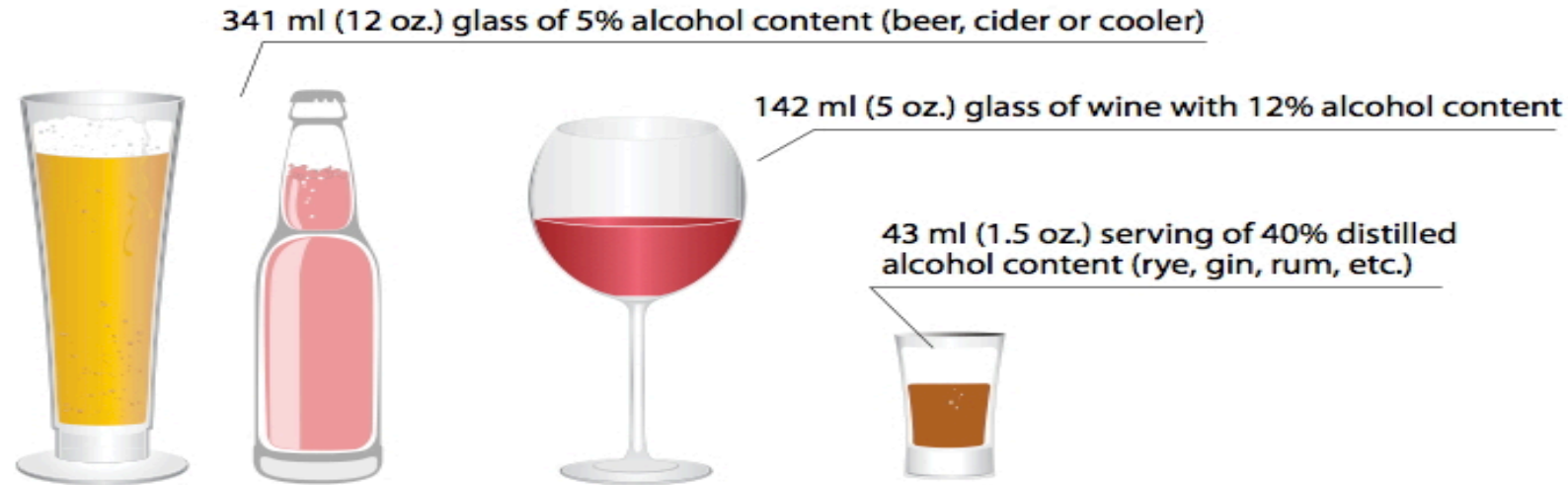
What does your patient mean by ...

“I just had a couple of drinks!”

You need to know the volume and percent alcohol of the drink consumed



CANADA'S GUIDANCE ON ALCOHOL AND HEALTH 2022/3



- 0 if contraindicated
- 1 to 2 per week = low risk (still risk of CA and CVD)
- 3 to 6 per week = moderate risk (17.7 YLL/100-1000 lifetimes)
- 7+ per week = dose dependent risk escalation, including death

WHAT IS A DRINK? AS PER CANADA'S GUIDANCE ON ALCOHOL AND HEALTH

Notes on a Standard Drink

In Canada, a standard drink is 17.05 millilitres or 13.45 grams of pure alcohol, which is the equivalent of:

- A bottle of beer (12 oz., 341 ml, 5% alcohol)
- A bottle of cider (12 oz., 341 ml, 5% alcohol)
- A glass of wine (5 oz., 142 ml, 12% alcohol)
- A shot glass of spirits (1.5 oz., 43 ml, 40% alcohol)

A standard drink means:



Beer

341 ml (12 oz) of beer
5% alcohol

or



Cooler, cider, ready-to-drink

341 ml (12 oz) of drinks
5% alcohol

or



Wine

142 ml (5 oz) of wine
12% alcohol

or



Spirits

(whisky, vodka, gin, etc.)
43 ml (1.5 oz) of spirits
40% alcohol

BEER – 5% ETOH

DIVIDE ML BY 341



Standard **can**
= 355 mL \div 341 mL/SD
= **1.0 Standard drink (SD)**



“Flight”
= 4 - 6 each 4 - 5 oz pours
In this example 4 X 118 mL (4 oz)
= 472 mL \div 341 mL/SD
= **1.4 SD**



Imperial Pint
= 568 mL \div 341 mL/SD
= **1.7 SD**
US Pint
= 473 mL \div 341 mL/SD
= **1.4 SD**

BEER

SIZE AND POTENCY DIFFERENCE

FIRST DIVIDE THE #
ML IN THE CAN BY
341 ML

NEXT DIVIDE THE %
ETOH OF THE
PRODUCT BY 5%

MULTIPLY THESE 2
NUMBERS TO GET THE
STANDARD DRINK
(SD) PER CAN
(CONTAINER)

4%

5%

8%



$$\begin{aligned} & (355 \text{ mL} \div 341 \text{ mL/SD}) \\ & \times \\ & (4\% \div 5\%) = 1 \times 0.8 \\ & = \mathbf{0.8 \text{ SD}} \end{aligned}$$

$$\begin{aligned} & (473 \div 341) \times \\ & (5 \div 5) = 1.4 \times 1 \\ & = \mathbf{1.4 \text{ SD}} \end{aligned}$$

$$\begin{aligned} & (473 \div 341) \times \\ & (8 \div 5) = 1.4 \times 1.6 \\ & = \mathbf{2.2 \text{ SD}} \end{aligned}$$

CIDER, COOLERS AND MUDDLERS

CALCULATED LIKE BEER

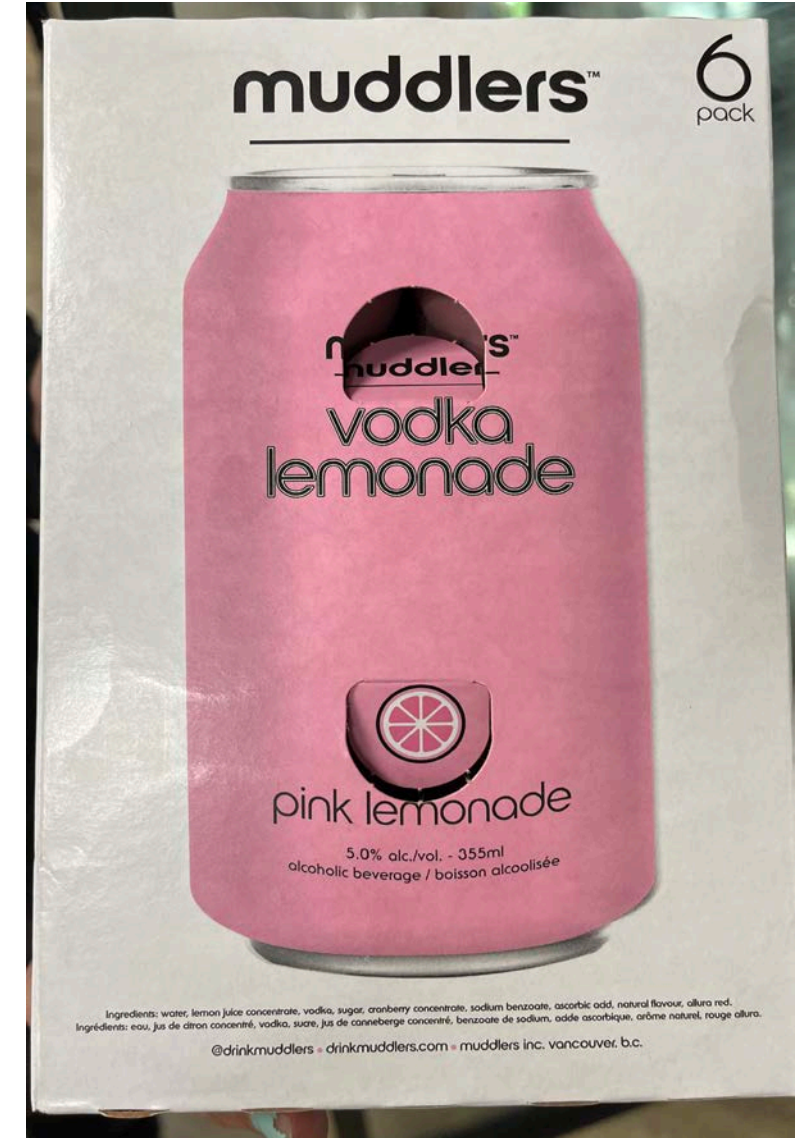
$$\begin{aligned} & (\text{PRODUCT ML} \div 341 \text{ ML}) \times \\ & (\text{PRODUCT \%} \div 5\%) \\ & = \# \text{ SD PER CONTAINER} \end{aligned}$$



1.0 SD per can in a 12 pack



1.4 SD



1.0 SD

BEER/CIDER/COOLER - STANDARD DRINKS PER CONTAINER

% Alcohol	Can 355 mL	Tall can 473 mL	Growler 1.9 L	mL for 1 SD
4%	0.8 SD	1.1 SD	4.5 SD	426 mL
5%	1.0 SD	1.4 SD	5.6 SD	341 mL
7%	1.4 SD	2.0 SD	7.8 SD	265 mL
8%	1.6 SD	2.2 SD	9.0 SD	213 mL

Calculation based on a standard drink (SD) being 341 mL of beer with 5% alcohol

WINE – 12 % ETOH

DIVIDE ML BY 142

“We split a bottle of wine”

If a different % alcohol...

First divide the # mL in the bottle
by 142 mL

Next divide the % ETOH in the
product by 12%

Multiply these 2 numbers to get the
SD per bottle

12%



$$750 \text{ mL} \div 142 = \mathbf{5.3 \text{ SD}}$$

$$1500 \text{ mL} \div 142 = \mathbf{10.6 \text{ SD}}$$

14.7%



$$(750 \text{ mL} \div 142 \text{ mL/SD}) \times (14.7\% \div 12\%) = 5.3 \times 1.2 = \mathbf{6.5 \text{ SD}}$$

WINE - STANDARD DRINKS PER CONTAINER

% alcohol	750 ml	1,500 mL	4 L	mL for 1 SD
10%	4.4 SD	8.8 SD	23.5 SD	170 mL
12%	5.3 SD	10.6 SD	28.2 SD	142 mL
15%	6.6 SD	13.0 SD	35.3 SD	116 mL
20%*	8.8 SD	17.6 SD	46.8 SD	85 mL

Calculation based on a standard drink (SD) being 142 mL of wine with 12% alcohol

*Fortified wine like port or sherry

WHAT ABOUT HARD LIQUOR (SPIRITS)?

Divide mL in product by 43 mL/SD

Next divide the % ETOH in the product by 40% (For 40% this will be 1.0)

Then multiply together to get the number of SD per bottle

In the first example:

“Micky”
 $375 \text{ mL} \div 43$
mL/SD
 $= 8.7 \text{ SD}$

40% = 80 Proof



“26er”
 $750 \text{ mL} \div 43 \text{ mL/SD}$
 $= 17.4 \text{ SD}$

750 mL

47% = 94 Proof



$17.4 \times (47 \div 40)$
 $= 17.4 \times 1.2$
 $= 20.9 \text{ SD}$

50% = 100 Proof



$17.4 \times (50 \div 40)$
 $= 17.4 \times 1.25$
 $= 21.8 \text{ SD}$

75.5% = 151 Proof



$17.4 \times (75.5 \div 40)$
 $= 17.4 \times 1.9$
 $= 33.1 \text{ SD}$

THE PINKING OF THE ALCOHOL INDUSTRY

Colours that may appeal to women:

Pink, white and baby blue

Spirits mixed with familiar child-like or fun drinks - juice or lemonade

Labeling and lower alcohol content to decrease threat of hard liquor

Container shape to appeal to women



Pink lemonade flavoured
30% ETOH = **13.1 SD**

Slim cans, white and baby blue

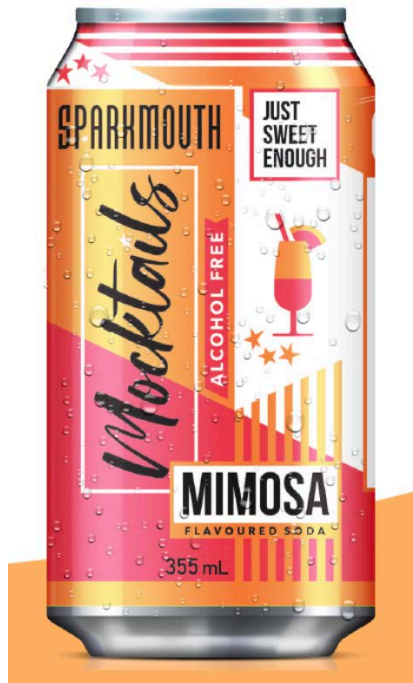
SPIRITS - STANDARD DRINKS PER CONTAINER

% alcohol	375 mL	750 mL	1 L	mL for 1 SD
30%* (60 proof)	6.5 SD	13.1 SD	17.5 SD	57 mL
40% (80 proof)	8.7 SD	17.4 SD	23.3 SD	43 mL
50% (100 proof)	10.9 SD	21.8 SD	29.1 SD	34 mL
75.5% (150 proof)	16.4 SD	32.8 SD	44.0 SD	23 mL

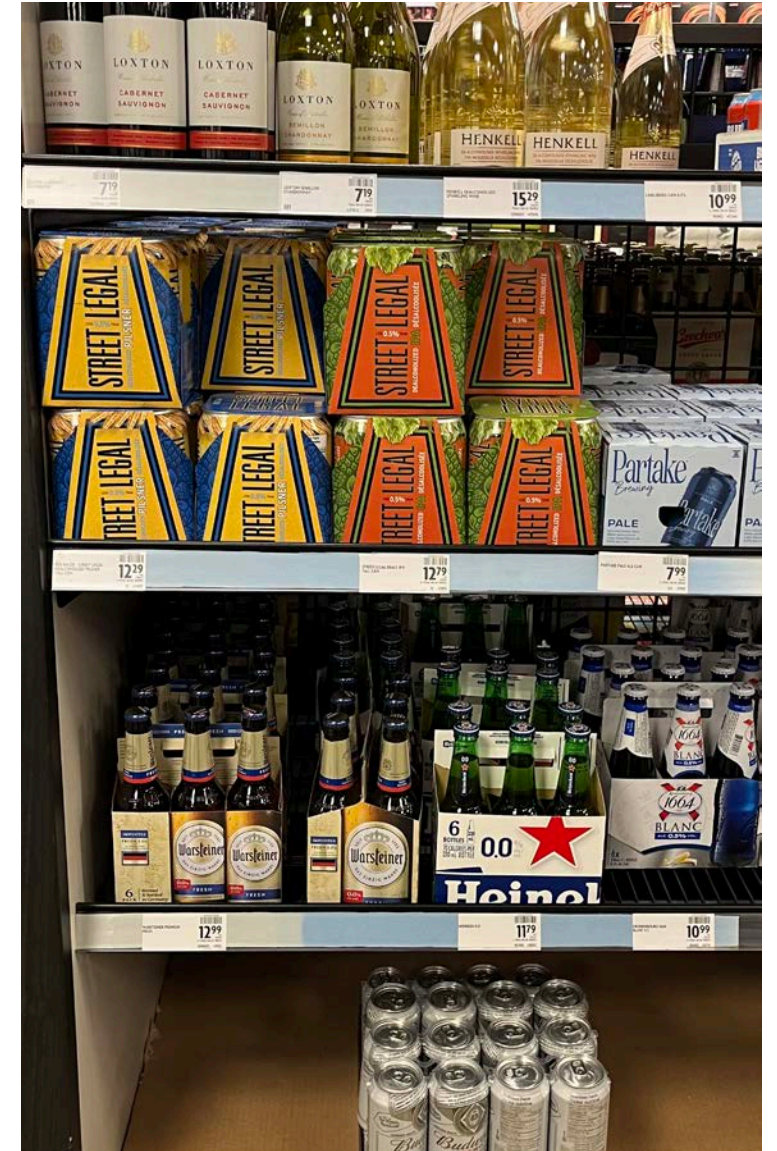
Calculation based on a standard drink (SD) being 43 mL of spirits with 40% alcohol

*LIQUEURS

DEALCOHOLIZED BEVERAGES (0.5%) MOCKTAILS (0.0%)



750 mL of 0.5% ETOH = **0.2 SD**



More choices all the time

YOU ARE SEEING A NEW PATIENT...NEXT WEEK YOU TAKE A DETAILED ALCOHOL HISTORY

- Your patient states they go out on Friday nights with friends for a couple of pints.....
- You calculate the SD using **Imperial Pint** = 568 mL \div 341 mL/SD = **1.7 SD x 2 pints = 3.4 SD**
- They add that at home with dinner they consume one bottle of wine per week with their partner...
 - You calculate **12% alcohol** 750 mL \div 142 mL/SD = **5.3 SD \div 2 = 2.7 SD**

TOTAL they are consuming 6.1 SD per week

CANNABIS AND CANNABINOIDS

What does your patient mean by ...

“I just take a few X
(joints, hits, drops, dabs,
gummies, pills, etc.) a
couple of times a day!”

You need to know the
volume or weight of the
product used per day &
percent THC and CBD
(or the mg/unit)



CANNABINOIDS ON PRESCRIPTION



- **Nabilone** (Cesamet) – synthetic delta 9 THC
 - 1 mg i OD to ii BID = up to **THC 4 mg/day**
- **Nabiximols** (Sativex) – plant extract of delta-9-tetrahydrocannabinol 2.7 mg and cannabidiol 2.5 mg in an oro-mucosal spray
 - 1 TID-QID, up to 12 sprays/day = **THC/CBD 32 mg/day**

CANNABIS PREPARATIONS NOT HEALTH CANADA APPROVED:

- Cannabis and extracts and THC content:
 - Dried leaves/buds 5-30+%,
 - Oils 30-60+%, waxes 40-80+%
 - “Shatter” 95+%
- Illicit synthetic cannabinoids “Spice” “K2”
 - Extremely potent - Not detected on UDS
- Hemp oil/hearts have CBD, under 0.3% THC



DOSING FOR DRIED CANNABIS – IN ADULTS 18-65



Based on *Guidance in Authorizing Cannabis Products Within Primary Care. CFPC, 2021*

**DRIED CANNABIS containing
9% THC and CBD**

up to 0.4 - 0.7 grams/day

for typical neuropathic pain relief

- For youth and older adults consider half this dose
- For extremely experienced tolerant adult patients (chronic users) do not exceed 3 g/day of DRIED product containing 9% THC
- Studies show **10 - 65 mg** of **THC & CBD/day** for neuropathic pain
- Once into the hundreds of mg THC or over 3 gm/day of dried cannabis addiction is vastly more likely (may occur at lower doses)

DOSING EXAMPLE FOR DRIED CANNABIS FOR MEDICAL PURPOSES

- Specify dose, percent THC and CBD, days, total grams of dried product
- E.g., Dried cannabis 1 puff q6h prn, 0.5 g/day maximum, 9% THC max, 9% CBD min, for 30 days, dispense 14 g. This equals THC and CBD of 45 mg/day (some lost in smoke).

“Average joint” = < 0.5 g



Not this



DRIED CANNABIS – STANDARD JOINTS PER GRAMS OF PRODUCT

%THC or CBD	0.25 gm	0.5 gm	1 gm	gm per SJ equiv.
4.5%	0.25 SJ	0.5 SJ	1.0 SJ	1.0 gm
9%	0.5 SJ	1.0 SJ	2.0 SJ	0.5 gm
18%	1.0 SJ	2.0 SJ	4.0 SJ	0.3 gm
27%	1.5 SJ	3.0 SJ	6.0 SJ	0.2 gm

Based on a standard joint (SJ) of 0.5 gm containing THC 9% (45 mg) as standard dosing for neuropathic pain

DRIED CANNABIS – THC OR CBD PER GRAMS OF PRODUCT

%THC or CBD	0.25 gm	0.5 gm	1 gm	gm per SJ equiv.
4.5%	12 mg	23 mg	45 mg	1.0 gm
9%	23 mg	45 mg	90 mg	0.5 gm
18%	45 mg	90 mg	180 mg	0.3 gm
27%	68 mg	135 mg	270 mg	0.2 gm

Based on a standard joint (SJ) of 0.5 gm containing THC 9% (45 mg) as standard dosing for neuropathic pain

THC/CBD content is rounded up to 1.0 mg, while the gm per SJ equivalent is rounded up to 0.1 gm

LIQUID CANNABINOID PRODUCT CALCULATION

(CFPC GUIDANCE DOCUMENT)

- Liquid products ideally should be labeled with cannabinoid potency in mg/mL
- Instead, many are labeled in gm/mL or % (or sometimes in a ratio like 2:1 = impossible to do a dose calculation on)
- For ease of calculation, assume: 1 mL = 1 cc = 1 gm = 1000 mg
- 1 mL of CBD 20 mg/mL = 20 mg = appropriate dose
- But... 1 mL of CBD 20% = 200 mg = inappropriate dose
 - For this product 0.2 - 0.3 mL/day max is appropriate
 - So, divide this as 0.1 mL BID – TID
 - You must look at the bottle and at their dropper!

OILS

*Guidance in Authorizing
Cannabis Products
Within Primary Care.
CFPC, 2021*



Table 3. Dosing of cannabis oils: Using the percentage of THC or CBD and volume to determine the milligrams dosage (1 millilitre = 1 gram = 1,000 milligrams of oil)

Volume in mL or cc of Oil (mg of CBD or THC)	1% THC or CBD	5% THC or CBD	10% THC or CBD	15% THC or CBD	20% THC or CBD	25% THC or CBD
0.2 (200)	2 mg	10 mg	20 mg	30 mg	40 mg	50 mg
0.3 (300)	3 mg	15 mg	30 mg	45 mg	60 mg	75 mg
0.5 (500)	5 mg	25 mg	50 mg	75 mg	100 mg	125 mg
1 (1,000)	10 mg	50 mg	100 mg	150 mg	200 mg	250 mg
10 (10,000)	100 mg	500 mg	1,000 mg	1,500 mg	2,000 mg	2,500 mg
20 (20,000)	200 mg	1,000 mg	2,000 mg	3,000 mg	4,000 mg	5,000 mg
30 (30,000)	300 mg	1,500 mg	3,000 mg	4,500 mg	6,000 mg	7,500 mg
40 (40,000)	400 mg	2,000 mg	4,000 mg	6,000 mg	8,000 mg	10,000 mg
50 (50,000)	500 mg	2,500 mg	5,000 mg	7,500 mg	10,000 mg	12,500 mg
100 (100,000)	1,000 mg	5,000 mg	10,000 mg	15,000 mg	20,000 mg	25,000 mg

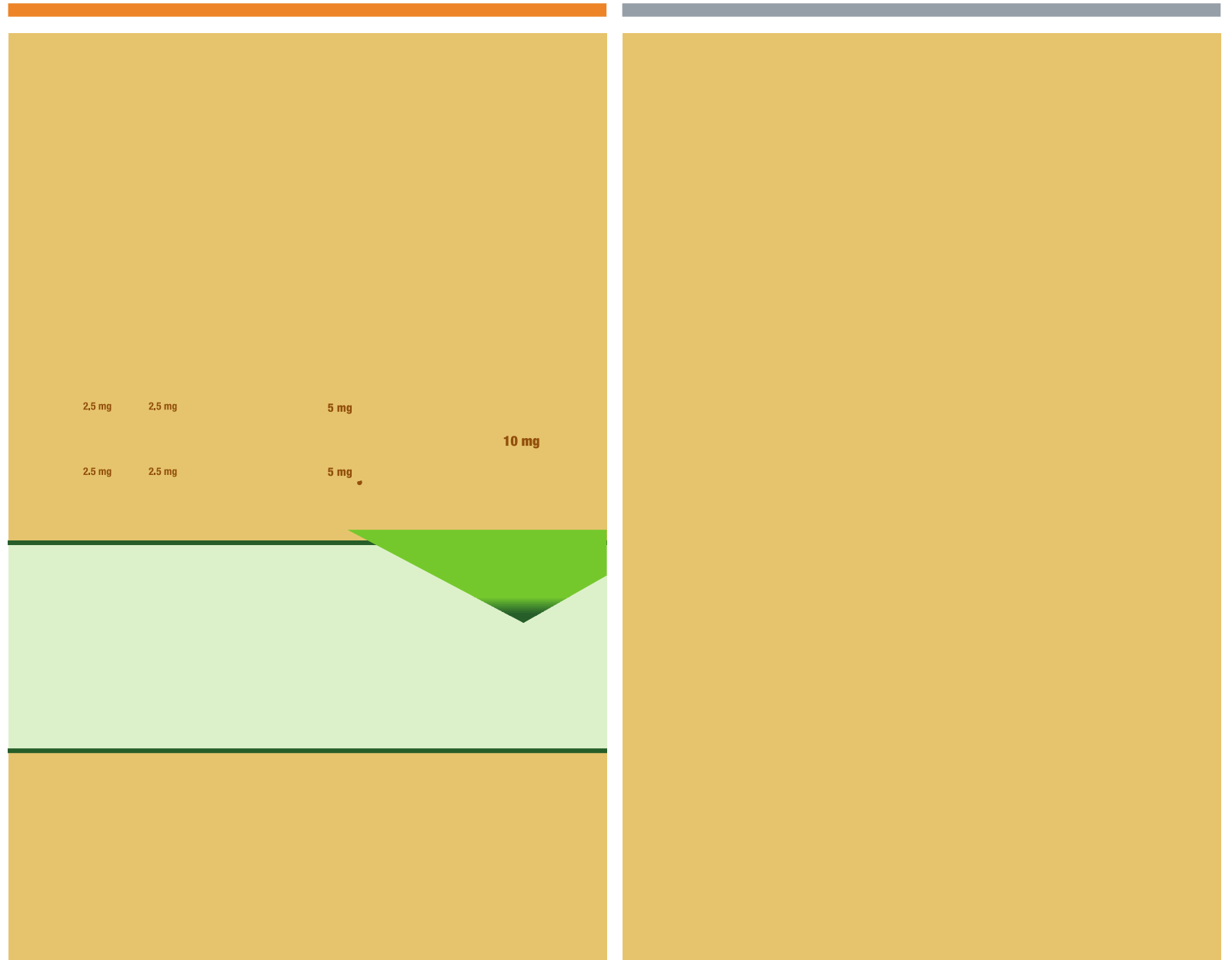
EDIBLES

Gummies, brownies, pop, cookies

In Canada by law each **PACKAGE** must contain **AT MOST** a total of **10 mg THC and/or CBD**

Thus, the individual items in the package will be less than or equal to 10 mg

First pass metabolism in the liver may decrease potency compared to smoked, but conversion to stronger metabolites may increase potency and last longer



CASE – JIM, 16 YEAR OLD CAUCASIAN MALE

Find out what he is using!

- Smoking 1-2 average sized joints per day
- Uses his cannabis vape throughout the day
- In the evening, takes 1-2 edibles of cannabis
- **So how much THC and CBD is he using on a daily basis?**

CASE – JIM, CONT'D

- Dried/Smoked cannabis 0.5 mg x 1-2 joints per day
Q: What percent THC and CBD? A: THC 18%, CBD unknown
Calculation: 1 gm/d x THC 18%/gm
- Uses his cannabis vape throughout the day
Q: THC? 45%; CBD? 0 = 450 mg/mL
Q: Size of cartridge or vile? 30 g = 30 mL vile
Q: Days to use cartridge or vile? 15 days
Calculation: (30 mL/15days) x 450 mg/mL
- In the evening, takes 1-2 edibles of cannabis 10% THC/CBD
Calculation: 2 x THC 10mg and same CBD

CASE – JIM, CONT'D

- Dried/Smoked cannabis 0.5 mg x 1-2 joints per day

Q: What percent THC and CBD? A: THC 18%, CBD unknown

Calculation: 1 gm/d x THC 18%/gm

= 180 mg/day from smoking

- Uses his cannabis vape throughout the day

Q: THC? 45%; CBD? 0 = 450 mg/mL

Q: Size of cartridge or vile? 30 g = 30 mL vile

Q: Days to use cartridge or vile? 15 days

Calculation: (30 mL/15days) x 450 mg/mL

(note: only 30- 70% of cannabinoids in dried product smoke is delivered depending on smoking method – let's average to 50% thus 90 mg in this case)

= 900 mg/day from vaping liquid

- In the evening, takes 1-2 edibles of cannabis 10% THC/CBD

Calculation: 2 x THC 10mg and same CBD

= 20 mg/day from edibles of THC/CBD

Total = THC 1,010 mg + CBD 20 mg

NICOTINE

Clinicians are used to discussing cutting back tobacco in terms of cigarettes or packs per day (PPD)

New realm of calculation with patches gum, oral inhaler and vaping nicotine

For comparison you must know:

Nicotine 1 mg/cigarette absorbed

Nicotine 20-24 mg/pack absorbed



NICOTINE PATCHES, GUM, AND INHALER

Patches

Step 1 = 21 mg = 20 cigs = 1 PPD

Step 2 = 14 mg = 14 cigs = 0.6 PPD

Step 3 = 7 mg = 7 cigs = 0.3 PPD

Gum - chew and park (1 cig/mg)

2 mg x 10 pieces = 20 cigs = 1 PPD

4 mg x 5 pieces = 20 cigs = 1 PPD

Oral Inhaler

A 10 mg Cartridge delivers 2 - 4 mg nicotine:

4 mg x 5 - 6 cartridges/day = 20 cigs = 1 PPD

(NB. monograph suggests 6 - 16 cartridges/d)



NICOTINE VAPING

E-Cigarette

For entry level disposable e-Cigarette with 10 mg cartridge (about 2 mg delivery per puff):

= about 1/2 PPD*

*based on nicotine 20 mg = 1 PPD



Nicotine Vaping

If product is labelled with nicotine in mg/mL then multiply by # mL/day used by patient = mg/day
= cigs/d, then divide by 20 = PPD*

OR multiply nicotine mg/mL by # mL per cartridge and divide by the days it takes to use a cartridge to get the nicotine mg used per day

If the product is only labeled in % THC or CBD per mL then multiply by 10 (or use the cannabis oil conversion table) to get the nicotine mg/mL. Then calculate based on use as above

*based on nicotine 20 mg = 1 PPD



Patient says 8 days to finish:

$$\begin{aligned} &20 \text{ mg/mL} \times 14 \text{ mL/unit} \\ &= 280 \text{ mg/unit} \div 8 \text{ days} \\ &= 35 \text{ mg/day} = 35 \text{ cigs/day} \\ &\div 20 \text{ cigs/pack} \\ &= \mathbf{1.7 \text{ PPD}^*} \end{aligned}$$



Patient used in 10 days:

$$\begin{aligned} &(12 \text{ mg/mL} \times 30 \text{ mL vial}) \div 10 \text{ days} \\ &= 36 \text{ mg/day} \\ &= \mathbf{2.8 \text{ PPD}^*} \end{aligned}$$



Advertised as 18 mL
3500 puffs sN50
Synthetic nicotine 50

5% solution = 50 mg/mL
= $\mathbf{2.5 \text{ Packs/mL}^*}$

NICOTINE VAPING

– CIGARETTE EQUIVALENT BASED ON PERCENT AND VOLUME*

% nicotine	0.1 mL	1.0 mL	2 mL	mL per PPD equiv.
1%	1 cig	10 cig	20 cig	2.0 mL
1.5%	1.5 cig	15 cig	30 cig	1.3 mL
2%	2 cig	20 cig	40 cig	1.0 mL
5%	5 cig	50 cig	100 cig	0.4 mL

*Assuming nicotine 1 mg/cigarette and 20 mg/pack. Can divide the # cigarettes/day by 20 to get PPD.

CASE – MARY, 35-YEAR-OLD MOTHER TRYING TO QUIT SMOKING TOBACCO | PPD BY VAPING

Find out what she is using!

- Vaping a nicotine 2% solution, going through 14 mL per week (i.e., 2 mL/d)
- $(2 \times 10)\text{mg/mL} \times (2 \text{ mL/d}) = ?$

CASE – MARY, 35-YEAR-OLD MOTHER TRYING TO QUIT SMOKING TOBACCO | PPD BY VAPING

Find out what she is using!

- Vaping a nicotine 2% solution, going through 14 mL per week
- $(2 \times 10)\text{mg/mL} \times (14 \text{ mL/week} \div 7 \text{ days/week}) =$
 $40 \text{ mg/day} = 40 \text{ cigarettes/day} = 2 \text{ PPD}$

PEARLS ON DOSE CALCULATIONS

- Informed consent starts with knowing what you are consuming
- Ask about the amount (volume or weight) used and the potency (% active ingredient OR unit of active ingredient per unit of product)
- Calculate the patient's dose and provide advise based on the available literature and guidance documents

May this be talk be helpful for you!

