



Cannabis Data Science

Saturday Morning Statistics

November 20th, 2021

Cannabis License Applications in Massachusetts



Licensing Applications | November 18, 2021

The totals below are all license applications received to date.

Type	#
Pending	259
Withdrawn	1012
Incomplete (Less than 4 packets submitted)	7,091
Denied	4
Approved: Delivery Pre-Certifications	122
Approved: Delivery Endorsements	3
Approved: Licenses	945
Total	9,436

Approved Cannabis Licenses in Massachusetts



Licensing Applications | November 18, 2021

The totals below are number of licenses approved by stage.

Type	#
Pre-Certified/Delivery Endorsed Microbusiness	124
Provisionally Approved	94
Provisional License	478
Final License	58
Commence Operations	316
Total	1,070

Provisionally approved means approved by the Commission but has not submitted license fee payment yet – provisional license has not started

Cannabis Licenses by Type in Massachusetts



Licensing Applications | November 18, 2021

The totals below are number of licenses approved by category.

Type	#
Craft Marijuana Cooperative	3
Marijuana Courier	11
Marijuana Delivery Operator	1
Independent Testing Laboratory	14
Marijuana Cultivator	285
Marijuana Microbusiness	23
Marijuana Product Manufacturer	218
Marijuana Research Facility	0
Marijuana Retailer	379
Marijuana Third Party Transporter	4
Marijuana Transporter with Other Existing ME License	7
Total	945

Cannabis Licenses Approval Stage in Massachusetts

Licensing Applications | November 18, 2021

TYPE	PENDING APPLICATION	PRE-CERTIFIED/ ENDORSEMENT	INITIAL LICENSE DENIED	PROVISIONALLY APPROVED	PROVISIONAL LICENSE	FINAL LICENSE	COMMENCE OPERATION	TOTAL
Craft Marijuana Cooperative	3	-	0	1	2	0	0	6
Marijuana Courier License	8	-	0	0	5	1	5	19
Marijuana Courier Pre-Certification	15	74	-	-	-	-	-	89
Independent Testing Laboratory	6	-	0	1	5	0	8	20
Marijuana Cultivator	67	-	2	28	164	31	62	354
Marijuana Delivery Operator License	13	-	0	0	1	0	0	14
Marijuana Delivery Operator Pre-Certification	14	48	-	-	-	-	-	62
Marijuana Microbusiness	8	-	0	4	13	2	4	31
Marijuana Product Manufacturer	48	-	1	30	120	13	55	267
Marijuana Research Facility	7	-	0	0	0	0	0	7
Marijuana Retailer	63	-	1	27	165	11	176	443
Marijuana Transporter with Other Existing ME License	0	-	0	3	2	0	3	8
Microbusiness Delivery	0	2	0	0	0	0	1	3
Third Party Transporter	7	-	0	0	1	0	2	10
Total	259	124	4	94	478	58	316	1,333

Cultivation in Massachusetts

Cultivation Applications | November 18, 2021

TYPE	PENDING APPLICATION	INITIAL LICENSE DENIED	PROVISIONALLY APPROVED	PROVISIONAL LICENSE	FINAL LICENSE	COMMENCE OPERATION	TOTAL
Cultivation Tier 1 (Up to 5,000 sq. ft.)	15	0	5	31	3	12	66
Cultivation Tier 2 (5,001-10,000 sq. ft.)	19	0	6	43	8	16	92
Cultivation Tier 3 (10,001-20,000 sq. ft.)	8	2	5	41	4	9	69
Cultivation Tier 4 (20,001-30,000 sq. ft.)	2	0	4	12	4	6	28
Cultivation Tier 5 (30,001-40,000 sq. ft.)	4	0	4	6	2	6	22
Cultivation Tier 6 (40,001-50,000 sq. ft.)	6	0	3	8	3	3	23
Cultivation Tier 7 (50,001-60,000 sq. ft.)	4	0	0	4	0	3	11
Cultivation Tier 8 (60,001-70,000 sq. ft.)	0	0	0	2	0	1	3
Cultivation Tier 9 (70,001-80,000 sq. ft.)	3	0	1	1	2	1	8
Cultivation Tier 10 (80,001-90,000 sq. ft.)	0	0	0	1	4	1	7
Cultivation Tier 11 (90,001-100,000 sq. ft.)	6	0	0	15	1	4	26
Total	67	2	28	164	31	62	354
Total Maximum Canopy (Sq. Ft.)	2,025,000	40,000	695,000	4,455,000	1,145,000	1,790,000	-

Adult-Use Disadvantaged Business Enterprise (DBE) Statistics

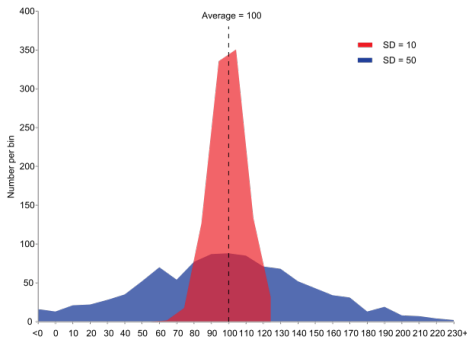
“The Cannabis Control Commission is dedicated to supporting full and robust industry participation by minorities, women, and veterans. Policies and procedures have been developed to encourage the involvement of people from communities that have previously been disproportionately harmed by marijuana prohibition and enforcement. The licensing process requires all operating marijuana establishments to positively impact those communities. Success will be measured in terms of ownership, employment, and ancillary contributions by these mandated categories of participants in the industry, as well as tangible benefits provided by licensees to disproportionately impacted communities.”

DBE Cities

Massachusetts Cannabis Control Commission Areas of Disproportionate Impact

29 Communities of Disproportionate Impact			
Abington	Amherst	Boston	Braintree
Brockton	Chelsea	Fall River	Fitchburg
Greenfield	Haverhill	Holyoke	Lowell
Lynn	Mansfield	Monson	New Bedford
North Adams	Pittsfield	Quincy	Randolph
Revere	Southbridge	Spencer	Springfield
Taunton	Walpole	Wareham	West Springfield
Worcester			

Variance



Example of samples from two populations with the same mean but different variances. The red population has mean 100 and variance 100 ($SD=10$) while the blue population has mean 100 and variance 2500 ($SD=50$).

Population correlation coefficient

$$\rho_{X,Y} = \frac{\text{cov}(X, Y)}{\sigma_X \sigma_Y} \quad (\text{Eq.1})$$

where:

cov is the covariance

σ_X is the standard deviation of X

σ_Y is the standard deviation of Y

Sample correlation coefficient

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2} \sqrt{\sum_{i=1}^n (y_i - \bar{y})^2}} \quad (\text{Eq.3})$$

where:

n is sample size

x_i, y_i are the individual sample points indexed with i

$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$ (the sample mean); and analogously for \bar{y}

Analysis of variance (ANOVA)

- A statistical test of whether two or more population means are equal.
- Generalizes the t -test beyond two means,

Hypothesis Test Type Errors

Table of error types		Null hypothesis (H_0) is	
		True	False
Decision about null hypothesis (H_0)	Don't reject	Correct inference (true negative) (probability = $1-\alpha$)	Type II error (false negative) (probability = β)
	Reject	Type I error (false positive) (probability = α)	Correct inference (true positive) (probability = $1-\beta$)

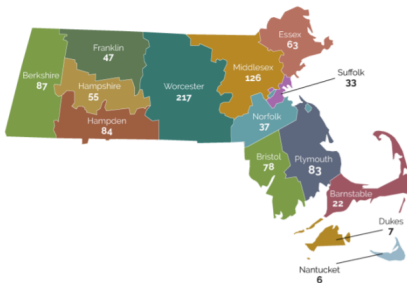
Future work: Look at geographic distribution of licensees



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The totals below are the total number of licenses by county.

COUNTY	#	+/-
BARNSTABLE	22	
BERKSHIRE	87	+2
BRISTOL	78	
DUKES	7	
ESSEX	63	+1
FRANKLIN	47	
HAMPDEN	84	+2
HAMPSHIRE	55	
MIDDLESEX	126	+5
NANTUCKET	6	
NORFOLK	37	+1
PLYMOUTH	83	+2
SUFFOLK	33	+2
WORCESTER	217	+2
TOTAL	945	+17



Thank you for coming.