Needham Board of Health

AGENDA

Wednesday, December 16, 2015
7:00 p.m. – 8:30 p.m.

Charles River Room – Public Services Administration Building
500 Dedham Avenue, Needham MA 02492

- **7:00 to 7:05 - Welcome & Review of Minutes**
- **7:05 to 7:20 - Director and Staff Reports**

Board of Health Public Hearing

- **7:20 to 7:40 - Public Hearing about Draft Tanning Regulations**
- **7:40 to 8:00 - Public Hearing on Draft Medical Marijuana Regulations**

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- **8:00 to 8:10 - Discussion of MetroWest Adolescent Health Survey**
- **8:10 to 8:20 - Discussion of Board of Health Goals & Objectives**
- **Other Items**
  - **Environmental Monitoring and Testing of Synthetic Turf Fields**
  - **MA Cancer Registry: Town Report**
  - **E-Cigarettes**
  - **Public Health Department Articles**
- **Next Meeting Scheduled for January 8, 2016**
- **Adjournment**

(Please note that all times are approximate)

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NEEDHAM BOARD OF HEALTH
November 20, 2015
MINUTES

PRESENT:	**Stephen Epstein, M.D., Chair, Edward V. Cosgrove, Ph.D. Vice-Chair, and Jane Fogg, M.D.**
STAFF:	**Timothy McDonald, Director, Donna Carmichael, Tara Gurge, Rachel Massar, Carol Read,**
Guest:	**Henry Parnell, Laurie Trotta, Bill Curran, Christopher Brosco, William Tophan, Sarah Hood, Emma Murphy, Jabor Sassim, David Harringhton, John Duffy, John McCarthy, Mark Wilkins, Charles Polochsonis, Alice Fernandes**
CONVENE:	**7:00 a.m. – Public Services Administration Building (PSAB), 500 Dedham Avenue, Needham MA 02492**

DISCUSSION:

Call To Order – 7:06 a.m. – Dr. Cosgrove

Approve Minutes:
Upon motion duly made and seconded, the minutes of the BOH meeting of October 9, 2015 were approved as submitted. The motion carried. Unanimous vote.

Director's Report – Timothy McDonald
Mr. McDonald shared an update on Traveling Meals Coordinator, Maryanne Dinell. On behalf of Ms. Dinall Mr. McDonald submitted her monthly report.

Mr. McDonald reported on activities involving presentations to the Mass Health Officers Association Annual Meeting and the Exchange Club. Mr. McDonald stated that he and his staff have been involved in a great deal of work on supporting Needham's emergency management activities. Mr. McDonald reported that the town would engage in a Table Talk exercise to explore an E. coli water contamination scenario. Mr. McDonald noted that this is a continuation of a situation that occurred over the summer in which there was an alert of a possible E. Coli water contamination in town. Mr. McDonald explained that because there are false positives and that the state requires a second test be conducted. The town did a huge amount of work to prepare for the second test and was notified that the first test was a false positive. Mr. McDonald spoke about what was learned from this experience and plans to facilitate the Table Talk exercise, which will be conducted with town departments and state agencies

to look at scenarios on how the town would respond in the event of emergency.

Mr. McDonald reported that Elaine Tenaglia, School Nurse, at the Newman Elementary School has been appointed as the Interim School Health Director. Mr. McDonald stated that the school department revised the job description for this position and asked him to sit on the Interview Committee for applicants.s

Staff Reports

- **Environmental Health Agents Report - Tara Gurge**

  Ms. Gurge reported that the Bodyworks applications have been mailed to all establishments and practitioners in town along with a copy of the approved Board of Health Bodyworks Regulations. Ms. Gurge stated that she has had to educate some therapists on the scope of the Bodyworks regulations.

  Ms. Gurge provided a food service update. Ms. Gurge stated that the Little Lamb Caterer has decided not to move forward with permitting, as did Huttenhouse Home Kitchen. Ms. Gurge also shared an update on Acapulco's on 1st Ave in Needham. Ms. Gurge stated there is an ongoing issue around pest control. Ms. Gurge stated that an Administrative Hearing has been scheduled with the owner of this establishment to work on pest control and cleaning protocols.

  Mr. Gurge reported that the Farmers Market is winding down. Inspections were conducted on October 4th and 18th to ensure that food safety protocols and food-sampling protocols are followed. The Farmers Market will end on Sunday, November 22nd.

  Ms. Gurge reported that annual food service permits have been issued to New Garden Restaurant and Temple Beth Shalom Daycare.

  Ms. Gurge provided a brief update on an ongoing housing complaint at 321 Hillside Road. Ms. Gurge stated she has been working with the Building Commissioner on this matter. An inspection has been scheduled for November 30th. Ms. Gurge also provided an update on the Doane Avenue housing complaint. Ms. Gurge stated that she and Ms. Carmichael have scheduled a follow up inspection to monitor this situation.

  Ms. Gurge provided an update on permit renewals, a septic abandonment on Wellesley Avenue, and tobacco compliance checks.

- **Traveling Meals Coordinator Report - Maryanne Dinell**
  Mr. McDonald reported that the recipients of Traveling Meals have gone up substantially. Mr. McDonald stated that although it is great to be able to reach more people it has also presented a challenge. Springwell has been enrolling persons into the Traveling Meals program who don't meet the Needham Public Health Department's definition of being infirmed or homebound. The Springwell population of Traveling Meals recipients doesn't always communicate when they are not going to be at home, which poses a challenge to the Traveling Meals volunteers in terms of meal delivery. Mr. McDonald noted that the ratio of recipient meal delivery is approximately 1/3 private pay and 2/3 Springwell clients. Ms. Dinell is working with Springwell on this.

- **Substance Abuse Prevention Coordinator – Carol Read**
  Ms. Read reported on the SAPC regional stakeholder inaugural meeting took place on October 29th. Stakeholders from Needham, Dedham, Norwood and Westwood attended this event. Attendees received comparative data from each town on substance abuse rates. Ms. Read reported that there were two breakout sessions on contributing factors around underage alcohol use. Ms. Read noted that Mr. McDonald and Ms. Massar did a great job. Ms. Read stated that the SAPC grant is in the data collection process, which involves interviews from community leaders and residents and focus groups with youth, parents, school nurses, and Faith based leaders. Ms. Read stated that SAMHSA wants this to be a comprehensive assessment to identify common risk factors across the four towns relating to access to underage alcohol use.

  Ms. Read stated that Needham is in a great position in having the DFC Grant and the Regional grant. We are a point were we can do great work over the next five years. Ms. Read pointed out that there is a lot going, Needham now has the structure and funding to support the work of breaking down the stigma of addiction and abuse/dependence, the stigma often is a barrier for people in terms of reaching out for help.

  Ms. Read stated that Saturday, November 21 is the Pollard Middle School Parenting Conference. The Needham High School Parenting Conference will take place in January.

  A brief discussion followed on efforts to increase the frequency of alcohol compliance checks. Ms. Read noted that the MetroWest survey show a decrease in underage alcohol

use yet the numbers are still concerning. 7 Ways to Protect Your Teen From Alcohol and Other Drugs: a Parent's Guide A longitudinal study that shows a correlation between 7th grade drinking and hard drugs. Towns have this data to validate the importance of preventing underage drinking.

- **Public Health Nurses Report – Donna Carmichael**
  Ms. Carmichael reported that the Health Department has given out approximately 650 doses of flu vaccine. The Health Department also continues to administer flu vaccine by appointment in the Health Office.

  Ms. Carmichael presented a brief review on communicable diseases. Ms. Carmichael presented an update on fuel assistance for families needing support with utility bills.

  Ms. Carmichael reported on an anonymous call she received regarding an elderly adult who might need intervention from protective services. Ms. Carmichael stated that she and LaTanya Steele, Council on Aging Assistant Director/Social Worker Supervisor, made a home visit and found that the individual needed medical attention. Ms. Carmichael stated she would follow-up with protective services for additional support for the individual. Ms. Carmichael reported briefly on the collaborative partnership with Ms. Steele.

- **Evaluation and Communications Coordinator Report – Rachel Massar**
  Ms. Massar reported that she has conducted weekly inspections of the Needham Farmers Market inspections. Ms. Massar also reported that she has worked with Ms. Gurge on the Environmental Health Write-up, which shows the vast amount of complex work Ms. Gurge is engaged in. She is also working on a similar Write-up with Traveling Meals. Ms. Massar stated she has worked with Ms. Read to compile adolescent health and police data from Needham, Westwood, Norwood, and Dedham to create graphs in preparation of the SAPC Kick-Off Meeting.

Update on Bodyworks Implementation
Mr. McDonald noted that there were a few technical corrections that must be applied to the recent adopted Bodyworks Regulation. A general discussion followed on section 16.0, paragraph (f). Dr. Fogg stated that the focus should be on the health factors and cleanliness of an establishment and not the practice.

Vote
Upon motion duly made by Jane Fogg and seconded by Edward Cosgrove to approve the Bodyworks Regulations with an amendment

to section 16.0, paragraph (f), which removes the wording "…at the request of a physician…"
The motion carried. Unanimous vote.

Human Services and Community Support
Mr. McDonald stated that the Health and Human Services group presented a request to the Town Manager and the Finance Committee to use unobligated salary line funding to hire a Social Worker who would provide services to adults of all ages and would be based at The Center for The Heights. A general discussion followed.

FY2017 Public Health Department Budget Submission
Mr. McDonald stated that the Public Health Department submitted its budget request in October. Mr. McDonald outlined the Departmental Expenditures (DSR2), Departmental Personnel Supplement (DSR3), Performance Improvement Funding Request (DSR4), and Special Warrant Article Request (DSR5). A general discussion then followed on the FY17 Public Health Department Budget submission.

Other Items
Mr. McDonald provided a brief update on the Greendale Mews Development. Mr. McDonald stated that the PPBC articulated one of the considerations for the Pool House Building would be an additional floor to house the Health Department. Mr. McDonald stated that the space is not much bigger than the current Health Department space.

Mr. McDonald stated he sent a letter to the Zoning Board of Appeals (ZBA). Public meeting has been rescheduled to take place in December. A brief discussion followed on the significant health concerns of micro particles from highway emissions.

BOARD OF HEALTH PUBLIC HEARING (Opened at 8:00 a.m.)

Administration Hearing about Tobacco Regulations (Article #1) Violations – Sale to Underage Persons

Ms. Gurge opened the discussion on the Administration Hearing about Tobacco Regulations (Article #1) Violations – sale to underage person. Ms. Gurge stated that Great Plain Avenue Gas, Tedeschi Food Shops, Sudbury Farms and Dunkin Donuts Mini Mart are vendors who sold tobacco products to an underage person.

Bill Curran, Owner of Tedeschi Food Shop, 168 Garden Street addressed the Board regarding the Tobacco Regulations violation. Mr. Curran stated an employee failed to check ID of an underage person purchasing cigarettes. Mr. Curran

noted the store's very strict card policy as well as the strict online training program for employees. Mr. Curran, as a sole proprietor, appealed to the Board for leniency. A general discussion followed. The Board asked about the carding process, asking for identification from regular customers, and the percentage of tobacco products sold to persons under 30 years old.

Alice Fernandes, David Harrington, and John Duffy of Dunkin Donuts Mini Mart addressed the Board regarding the Tobacco Regulations violation. Mr. Harrington stated that Dunkin Donuts Mini Mart has a new systems that verifies identification, however the clerk did not ask for identification of an underage person purchasing cigarettes. A discussion followed on new system and how it works as well as training for employee and signs requesting customers show an ID when purchasing tobacco products.

John McCarthy, Sudbury Farms Store Manager addressed the Board regarding the Tobacco Regulations violation. Mr. McCarthy stated that an employee of Sudbury Farms sold tobacco products to an underage person purchasing cigarettes. Mr. McCarthy stated that it is the store policy to terminate an employee on their second offense of not asking for appropriate ID. Mr. McCarthy added that signs have been posted to alert customers that they must show an ID if purchasing tobacco products. Mr. McCarthy noted that tobacco products are sold at the courtesy counter only.

Jabor Sassime, Manager, Great Plain Avenue Gas addressed the Board regarding the Tobacco Regulations violation. Mr. Sassime stated that the Great Plain Avenue Gas apologizes for not being incompliance Tobacco Regulations. Mr. Sassime stated that the employee made a terrible mistake by not asking for identification of an underage person purchasing tobacco. Mr. Sassime stated that the employee involved was suspended for two days, and that all employees have undergone training. Ms. Sassime also stated that signs have been posted alerting customers that they must show ID when purchasing tobacco products. Mr. Sassime stated that Great Plain Avenue is doing everything it can to improve their process of ensuring that tobacco products are not sold to underage persons.

Public Comments

Bill Topham, 140 Meadowbrook Road. Mr. Topham stated that the BOH meets too early in the morning, no other Board in town meets at 7am, and it doesn't give the taxpayer an opportunity to come in and voice an opinion. Mr. Topham

also stated that he doesn't agree with the Tobacco Regulations and BOH oversight.

Sarah Hood, 26 Glendeon Road. Ms. Hood stated she does not agree with the sale of tobacco, and is glad that Needham implemented a rise in the smoking age to 21. Ms. Hood stated she is here in support of Tedeschi Food Shops. Ms. Hood stated that what she hears from the four vendors resoundingly is that they have been in Needham for a long time and she is hoping that the BOH would give leniency to their first time offence.

Dr. Cosgrove stated that the purpose of today's exercise is to make sure vendors are aware that the BOH views the sale to underage person in town very seriously. Dr. Cosgrove stated that he proposes that the BOH not invoke the suspension and perhaps impose the $100 fine or nothing at all.

Dr. Fogg stated that the intention is to make sure that as as a community we are doing everything we can and that it is a collaborative effort. Dr. Fogg noted that one of the challenges of waiving any penalties is consistency. A discussion followed on options to ensure compliance of tobacco regulations. One option would be to hold a meeting with vendors to discuss protocols. Dr. Cosgrove stated he would be willing to facilitate that meeting along with Ms. Gurge. Dr. Epstein noted that there seems to be some confusion among the state regulations and the BOH regulations. Dr. Fogg stated that with the upcoming changes in the flavored tobacco products, there is an opportunity here for education and collaboration, to reset the bar and not to waiver from it.

Vote

Upon motion duly made by Edward Cosgrove and seconded by Jane Fogg to fine tobacco regulation violations, but waive $100.00 fine and the week-long license suspension, and convene a meeting with vendors.

The motion carried. Unanimous vote.

Christopher Brosco addressed the Board. Mr. Brosco stated that he is happy with todays ruling, however a year ago four vendors came before the Board with the same violations and received a ruling of a seven-day suspension. Mr. Brosco stated his stores lost a lot of money from that ruling. Mr. Brosco stated that the Boards decision to change its policy mid-stream is grossly unfair.

Public Hearing on Draft Medical Marijuana Regulations

Mr. McDonald presented draft regulations for the Board's consideration: Regulations to ensure the Sanitary and Safe Operations of Registered Marijuana Dispensaries (RMD) and the sale of marijuana to persons with documented medical needs. Mr. McDonald also stated the Board would consider home cultivation sites that would require registration and inspection.

Mr. McDonald stated that four vendors expressed an interest in opening a marijuana dispensary in Needham. Three have applied to the Mass Public Health Office for a license. Mr. McDonald stated he and Ms. Read worked with other public health directors and substance abuse prevention coordinators to develop the draft medical marijuana regulation. A general discussion followed.

Ms. Read stated two items are pending from the state, food and fire inspection permits for RMD's. Mr. McDonald stated that the initial applicants for a Needham RMD would require retail only. A discussion followed on the budgetary impact to the Public Health Department operating budget.

Public Hearing on Draft Tanning Regulations

Ms. Carmichael stated that Needham does not have any tanning salons and because of this she thought it would be an opportunity to review the regulations. Ms. Carmichael stated that Ms. Massar has provided her with some excellent assistance in doing research on what other towns are doing. Ms. Carmichael stated that an age requirement does not exist for persons operating Tanning Salons and users. Ms. Massar spoke about her research and what other towns have adopted. Ms. Massar stated that Needham's draft regulations are similar to the state but with the change that person under 21 cannot operate or use the tanning device. A general discussion followed.

Next Meeting Discussion
By a general consensus of the Board, the next meeting is scheduled for December 16, 2015. This will be an evening meeting beginning at 7:00 p.m.

Adjournment –

Upon motion duly made and seconded, that the November 20, 2015 BOH meeting adjourn at 9:45 a.m. The motion carried. Unanimous vote.

NEEDHAM PUBLIC HEALTH

Needham Public Health
Prevent. Promote. Protect.

Director's Report

To: Needham Board of Health
From: Timothy Muir McDonald, Public Health Director
Date: December 3, 2015
Re: Monthly Report for November 2015

November was a month full of presentations, from testimony on Beacon Hill in front of the legislature's Joint Committee on Mental Health and Substance Abuse and the Joint Committee on Public Health to a community panel at Christ Episcopal Church.

New Staff Additions

Two new staff members have joined the Public Health Department on temporary basis. Karen Shannon, a resident of Needham, and Monica DeWinter, a resident of Dedham, will be working in a part-time capacity to support the department's substance use prevention and education initiatives.

Karen and Monica will assist in the implementation of community prevention initiatives to support the mission of the Needham Coalition for Youth Substance Abuse Prevention (NCYSAP), and will assist Carol Read with all coalition activities: communications, data collection, relevant research, program implementation and distribution of materials to the community through online, print and cable access media outlets in accordance with the coalition Action Plan. Karen and Monica will work with coalition members, youth leaders and community volunteers to mobilize community leaders, key stakeholders and residents to build coalition capacity and increase the protective factors indicated in reducing underage substance use.

Emergency Planning

On November 23rd, the Town of Needham held a TableTop Exercise based upon a possible *E.Coli* Water Contamination Scenario. The event was well-attended; there were 12 key players including representatives from all the key town departments as well as the Massachusetts Water Resources Authority and the Massachusetts Emergency Management Agency. Observers included partners in the non-Needham public schools (the Walker School, St. Sebastian's, St. Joseph's, and Olin College) and from Town of Wellesley department heads, as well as representatives from other town departments that might be less directly involved in emergency response scenarios (Human Resources, Public Library, etc). I served as the moderator/facilitator for the exercise; all the materials of which were developed by Donna and I and contracted staff members (Neia and Kerry). A post-exercise evaluation was conducted from all the players and the observers, and my staff and I are incorporating that feedback into a formal, HSEEP-compliant After-Action Report which is due by no later than January 23rd (60 days from the date of event).

Substance Use Prevention Testimony

I joined a pair of local public health directors in a presentation in front of a pair of Joint legislative committees about the Commonwealth's opioid epidemic. Public Health was that last group of presenters from a larger segment that includes law enforcement, corrections, medicine, and recovery programs. In

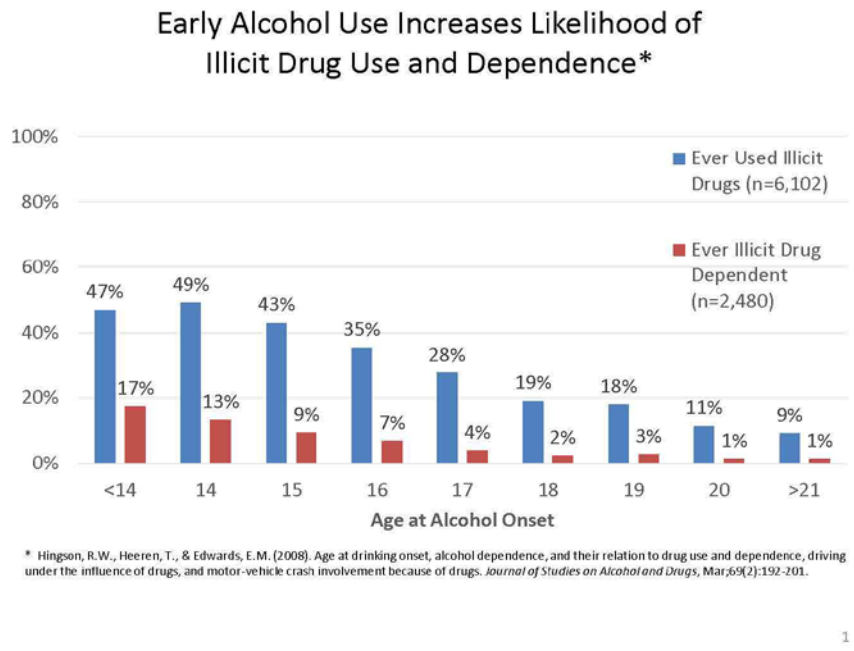
my (very brief) remarks, I highlighted the importance of prevention as an equal partner alongside treatment in addressing the opioid epidemic.

"I want to speak to you about the importance of prevention as an equal partner alongside treatment and recovery programs. Benjamin Franklin famously said that "an ounce of prevention is worth a pound of cure." And a number of studies have confirmed that investments in substance abuse prevention producing savings significantly higher than their cost.[1]

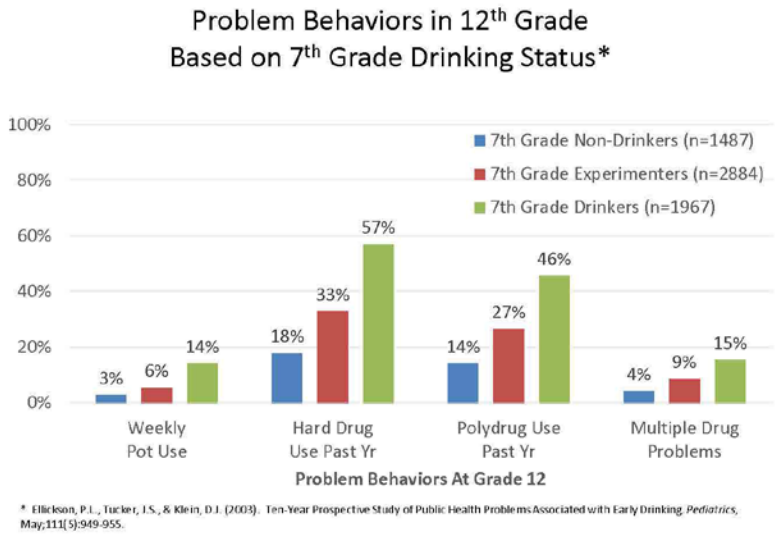
The effect of evidence-based prevention efforts is amplified when applied to youths; SAMHSA has confirmed that almost 90% of substance use disorders have their onset between the ages of 12 – 20. Needham was fortunate to receive an Underage Drinking Prevention grant from MA DPH as part of a cluster with Dedham, Norwood, and Westwood. And while efforts to address the use of opioid prescription drugs and heroin are important, data from a pair of longitudinal studies shows the importance of preventing early substance use as both a benefit unto itself and as method to reduce the likelihood to "hard" drug use and dependence. (see attached slides)

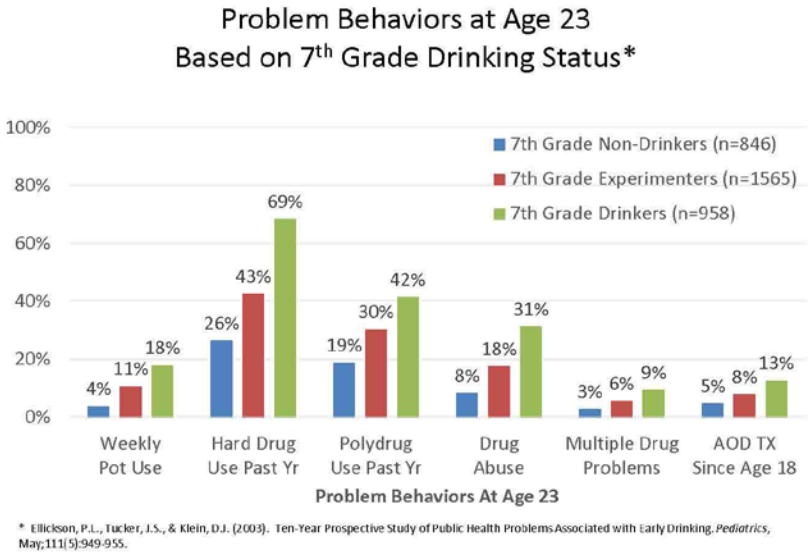
That is why I am here today, to urge you to remember that a comprehensive prevention is critically important, employing evidence- based strategies targeting: youth, families, schools and communities. Working collaboratively at the community level with multiple stakeholders we can reduce the risk factors known to increase youth substance use and increase the protective factors which prevention science and public health research validate. Those protective factors enhance youth resilience and shift youth away from using substances ultimately creating safe and healthier communities.

Prevention should be an equal partner alongside treatment and recovery programs.



[1] 2004 study in the Journal of Primary Prevention on the Costs-Benefits of Prevention found that that every $1 invested in prevention returns between $2 and $20 dollars in savings.





Sincerely,

Timothy Muir McDonald

Timothy Muir McDonald
Director of Public Health, Town of Needham

Needham Public Health Department
November 2015
Health Agents - Tara Gurge and Brian Flynn

Activities

Activity	*Notes*
Bodywork Application Review	**In process of reaching out to all potential Bodywork establishments and reviewing bodywork establishment and practitioner permit applications.**
Demo review/approval	**11 - Demolition sign-offs :** • **#18 Morley St.** • **#50 Winfield St.** • **#381 Hillside Ave. (home, garage, barn)** • **#252 Manning St. (home/garage)** • **#1058 Highland Ave. (garage)** • **#147 Tower Ave.** • **#20 Elmwood Rd. (home, garage, septic)** • **#38 Gary Rd.** • **#155 Whitman Rd. (home/garage)** • **#109 Brookside Rd.** • **#12 Dell Ave.**
Drill – Town of Needham	**Participated in a Water Boil Tabletop Exercise/Drill put on by Tim on Nov. 23rd.**
Food – Complaints	**0 – New Food Complaints received**
Farmers Market inspections	**Rachel conducted inspections on Nov. 1, Nov.8, Nov. 15, and Nov.22nd, to ensure that food safety protocols and food sampling protocols are being followed by permitted vendors. (Market is now closed for the season.)**
Food – Temporary Food Permits	**15 – Temp. food permits issued to:** - **Needham Women's Club –Holiday House Tour** - **Community Center of Needham, Inc. – Needham Lights** - **Temple Beth Shalom – Temple Blood Drive** - **Parent Talk - Winter Market @ Powers Hall** - **Needham Community Theatre, Inc. – Miracle on 34th Street** - **St. Joseph's School – Santa Breakfast** - **Eliot/Hillside School PTCs – Basketball Game** - **High Rock/Pollard Schools PTC – High Rock School Conf.** - **Deborah's Kitchen - The Village Fair and Marketplace** - **FUNdamentally Nuts - The Village Fair and Marketplace** - **Congregational Church of Needham - The Village Fair and Marketplace** - **Hillside School PTC - Hillside Family Fun Night** - **Knights of Columbus – Trivia Night** - **Beth Shalom Garden Club – Antique Show** - **Great Hall Performance Foundation – Great Hall Concert Series**
Food – Pre-operation Inspection	**1 – Pre-operation inspection conducted at:** **- #199 Maple St. (Ruth's Bakery) Home Kitchen**
Food – Annual Permit	**1 – Annual food service permit issued to:** - **#199 Maple St. (Ruth's Bakery) Home Kitchen**
Hotel Inspection	**1 – Hotel inspection conducted at:** - **Residence Inn**

Housing – Complaints/ Follow-ups	**4 – Housing Complaints/Follow-ups:** - **#321 Hillside Rd. (On-going.) – Updated letter mailed. Follow-up inspection set for Nov. 12th with Building Commissioner. UPDATE: Follow-up site visit conducted. Letter sent. (Final follow-up inspection pending.)** - **#235 Gould St., Unit 115 (Residences at Wingate) – Report of bedbugs on site. Spoke with director about report. Requested copies of routine pest control reports. No additional activity observed. Will continue to monitor.** - **#18 Doane Ave. – Follow-up site visit scheduled for week of Nov. 16th. UPDATE: Follow-up site visit conducted with Donna. No additional follow-up site visits required at this time.** - **#83 Pickering St., Unit 3-B (Stephen Palmer Apts.) – Follow-up inspection conducted to check heat. Met with landlord and maintenance manager on site. (In process)**
Nuisance – Complaints/ Follow-ups	**3 – Nuisance Complaints/Follow-ups:** - **#22 Seabeds Way, Apt. #2 (Needham Housing) – Report of dumpsters not being serviced. Spoke to NHA about concern. Dumpsters serviced.** - **#25 Lakin St. – Report of a lot of junk/debris being stored on property. Site visits (x2) conducted. Letter sent . (Also notified Selectmen's Office.) Owner's son is working with us to clean up the property. (On-going).** - **#36 Chestnut St. (Master Shoe Repair) – Report of bad air quality, from shop owner next door, due to shoe chemicals (i.e. polishes, cleaners, etc.) used on site. Site visit conducted. Spoke to owner of shop and landlord about complaint. Will install an exhaust fan (In process.)**
Permit Renewal s	**In process of collecting and reviewing annual permit renewal applications/setting up inspections, etc. (i.e. indoor pools, disp. of sharps.) Collecting fees for annual permits.**
Pool Inspections	**2 – Indoor Pool inspections conducted for:** - **Residence Inn** - **YMCA**
Septic – Abandonment Form	**1 – Septic Abandonment Form received for:** - **#20 Elmwood Rd.**
Septic Installer Exam	**2 – Septic Installer Exam administered to:** - **Edward Hart from Podgurski Corp. (Passed.)** - **Antonio Musto from J & L Musto Construction, Inc. (Passed)**
Septic Installer Permits	**2 –- Septic Installer permits issued to:** - **Edward Hart with Podgurski Corp. (New)** - **Antonio Musto from J & L Musto Construction, Inc.**

Septic – Plan Review	**1 – Septic Plan Review conducted for:** - **#12 Brookside Rd. – Reviewed revised plan. Issued plan approval. Letter sent.**
Septic – Soil/Perc Tests	**3 – Soil/Perc Tests conducted at:** - **Town Recycling and Transfer Station (RTS) for new employee trailer. (If suitable soils are not found on site, may look into installing a tight tank.)** - **#1689 Central Ave. – For septic system upgrade.** - **#102 Pine St. – For septic system upgrade.**
Tobacco Compliance Check Training/ Regulation Updates (On Dec. 16th from 6-7 PM @ PSAB)	**Tobacco Training conducted to all 12 permitted vendors.**
Tobacco – Letters	**Mailed out violation letters to all four establishments that recently sold.** - **Great Plain Ave. Gas (Mobil Station)** - **Tedeschi Food Shops** - **Sudbury Farms** - **Dunkin Donuts Mini Mart**
Wells	**2 – Perm. To Drill Letters sent for:** - **#64 Helen Rd. (Geothermal)** - **#755-757 Highland Ave. (Monitoring)**

Yearly

Category	*Jul*	*Au*	*S*	*O*	*N*	*D*	*J*	*F*	*M*	*A*	*Ma*	*Ju*	***Yly Tot***	***FY' 15***	***FY' 14***	*Notes/Follow-Up*
Biotech	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	Biotech permits
Bottling	0	1	0	0	0	0	0	0	0	0	0	0	1	1	3	Bottling Permit insp.
Demo	13	13	16	7	11	0	0	0	0	0	0	0	60	100	117	Demo reviews
Domestic Animal	1	0	0	1	0	0	0	0	0	0	0	0	2	15	14	Animal permits
Food Service	9	10	16	14	13	0	0	0	0	0	0	0	62	220	198	Routine insp.
Food Service	5	2	5	5	1	0	0	0	0	0	0	0	18	26	43	Pre-oper. Insp.
Retail	4	5	7	10	3	0	0	0	0	0	0	0	29	71	69	Routine insp.
Resid. kitchen	0	0	3	0	2	0	0	0	0	0	0	0	5	8	11	Routine insp.
Mobile	1	1	1	0	0	0	0	0	0	0	0	0	3	10	13	Routine insp.
Food Service	2	5	1	8	7	0	0	0	0	0	0	0	23	52	36	Re-insp.

Food Service/ Retail	3	1	3	2	1	0	0	0	0	0	0	0	10	170	166	Annual permits
Food Service	5/4	3/0	17/0	9/2	15/ 0	0/0	0/0	0/0	0/0	0/0	0/0	0/ 0	49/6	96/ 44	90/ 52	Temp. food permits/ Temp. food insp.
Food Service	1/3	0/2	0/3	1/2	0/0	0/0	0/0	0/0	0/0	0/0	0/ 0	0/ 0	2/10	18/ 45	12/ 18	Farmers Market permits/ Market insp.
Food Service	1/1	2/2	0/0	4/4	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/ 0	7/7	17/ 21	15/ 16	New Compl/ Follow-ups
Food Service	4	3	1	1	0	0	0	0	0	0	0	0	9	35	28	Plan Reviews
Food Service	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	Admin. Hearings
Grease/ Septage Haulers	0	0	0	0	0	0	0	0	0	0	0	0	0	25	26	Grease/ Septage Hauler permits
Housing (Chap II Housing)	0/0	0/0	7/0	0/4	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/ 0	7/4	7/4	7/0	Annual routine insp./ Follow-up insp.
Housing	2/3	1/1	0/1	4/5	1/3	0/0	0/0	0/0	0/0	0/0	0/0	0/ 0	4/13	8/1 0	3/5	New Compl./ Follow-ups
Hotel	0/0	0/0	0/0	0/0	1/0	0/0	0/0	0/0	0/0	0/0	0/0	0/ 0	1/0	2/0	12/ 0	Annual insp./Follow-ups
Nuisance	6/6	7/7	2/1	5/4	3/4	0/0	0/0	0/0	0/0	0/0	0/0	0/ 0	23/ 22	43/ 47	42/ 44	New Compl./ Follow-ups
Pools	0/0	0/0	0/0	0/0	2/0	0/0	0/0	0/0	0/0	0/0	0/0	0/ 0	2/0	10/ 7	10/ 2	Pool insp./follow-ups
Pools	0	0	0	0	0	0	0	0	0	0	0	0	0	10	9	Pool permits
Pools	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	Pool plan reviews
Pools	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	Pool variances
Septic	2	0	0	1	1	0	0	0	0	0	0	0	4	9	8	Septic Abandon Forms
Septic	0	0	0	1	0	0	0	0	0	0	0	0	1	10	1	Addition to a home on a septic plan rev/approval
Septic	0	5	0	2	0	0	0	0	0	0	0	0	7	14	23	Install. Insp.
Septic	0	0	0	2	0	0	0	0	0	0	0	0	2	2	0	COC for repairs
Septic	1	0	0	1	0	0	0	0	0	0	0	0	2	0	6	COC for complete septic system
Septic	4	5	4	5	4	0	0	0	0	0	0	0	22	61	63	Info. requests.

Septic	0	0	1	0	3	0	0	0	0	0	0	0	4	3	2	Soil/Perc Test.
Septic	1	0	0	3	0	0	0	0	0	0	0	0	4	4	5	Const. permits
Septic	2	0	0	0	2	0	0	0	0	0	0	0	4	10	9	Installer permits
Septic	2	0	0	1	2	0	0	0	0	0	0	0	5	6	5	Installer Tests
Septic	1	0	0	0	0	0	0	0	0	0	0	0	1	3	4	Deed Restrict.
Septic	2	0	0	1	1	0	0	0	0	0	0	0	4	8	14	Plan reviews
Sharps insp.	0	0	0	0	0	0	0	0	0	0	0	0	0	10	8	Disposal of Sharps insp.
Sharps permits	0	0	0	0	0	0	0	0	0	0	0	0	0	10	8	Disposal of Sharps permits
Subdivision	0/0	1/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/0	7/1	6/2	Plan review-Insp. of lots /Bond Releases
Special Permit/ Zoning memos	0	3	1	1	0	0	0	0	0	0	0	0	5	12		Special Permit/ Zoning
Tobacco	0	0	1	0	0	0	0	0	0	0	0	0	1	12	12	Tobacco permits
Tobacco	0/0	2/0	2/0	2/0	5/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	11/0	21/2	20/21	Routine insp./ Follow-up insp.
Tobacco	0	0	0	12	0	0	0	0	0	0	0	0	12	36	33	Compliance checks
Tobacco	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/3	2/2	New compl./ Compl. follow-ups
Trash Haulers/ Medical Waste Haulers	0/0	1/0	0/0	1/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	2/0	29/2	24/2	Trash Hauler permits/ Medical Waste Hauler permits
Well	1/0	0/0	0/0	0/0	2/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/0	14/1	5/8	Permission to drill letters/ Well permits

Meetings, Events, and Trainings

Title	*Type*	*Description/Highlights/Votes/Etc.*	*Attendance*
Meet with Tim (x2)	Meeting	Met with Tim to review on-going projects	**2**
BOH Meeting	Meeting	Meeting with BOH to review monthly activities.	**10**
Tobacco	Meeting	Tim and I met with Needham Times to review recent tobacco sales to minors.	**3**
Food Grading	Meeting	I met with Tim and Rachel about the current Food Grading protocols in other cities/towns. We will continue to research this.	**3**
Boil Water Drill	Meeting	Met with Tim to review drill.	**2**
Boil Water Drill	Drill	Participated in Town of Needham Boil Water Drill put on by Tim.	**70**
Food Trucks	Meeting	Met with Tim and Town Dept. Directors on Food Truck Protocols	**15**

FY 16 Critical Violations Chart (By Date)

Restaurant	Insp. Date	Critical Violation	Description
Restaurant Depot	8/10/15	- Food Contact surfaces cleaning and sanitizing; - Hand washing – Operation and Maintenance	- Need to provide sufficient hot water at Seafood Dept. 3-Bay sink; - Need to provide sufficient hot water at Seafood Dept. hand washing sink.
Pronti Bistro	8/10/15	- Hand washing – Operation and Maintenance	- Provide working soap dispenser; - Re-fill empty paper towel dispenser at kitchen hand washing sink.
Fuji Steakhouse	8/24/15	- Hand washing – Operation and Maintenance - Conformance with Approved Procedures/HACCP Plan (for Acidified Sushi Rice) - Food Contact surfaces cleaning and sanitizing	- Repair hot water faucet handle at kitchen hand washing sink; - Need to ensure that Sushi pH Log is maintained and entries are made when rice is prepared (Log was not up to date); - Ensure that dish machine reaches a min. temperature of 180 deg F or greater for final hot water sanitizing rinse.
The Center Café	9/15/15	- Separation/Segregation/Protection	- Observed Flies in establishment. Got copies of recent pest control reports. Will monitor.
Gari	10/20/15	- Hand washing – Operation and Maintenance	- Need to provide sufficient hot water at hand washing sinks. Only 99-103 deg F observed. Repaired. Ensure that sushi hand wash sink is easily accessible and used for hand washing only (some items stored in sink.)

Needham Public Health Department

November, 2015

Maryanne Dinell- Traveling Meals Program Coordinator

Monthly

Description	*Reason*	*Notes/Follow-Up (ongoing, completed, etc.)*
Month of November – 50 Clients	Clients on the Program	33 Springwell clients 17 Private pay
33 Springwell Clients and 17 private pay	Number of Meals Delivered for the month of October	445 meals delivered Springwell Clients 227 meal Private Pay - Total # meals 672 @ 5.50 per meal =cost of $3696.00
3 Clients off Program	private pay moved out of town or into nursing home or living on their own	3 Client- 3 into Rehab
2 additional clients		1 Client- New to Program 1 Client- Previously on Program

Category		*Jul*	*Au*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*FY '15 Total*	*FY '16*	
Meal Delivery		855	791	794	800	672								8014	3912	
General Telephone Calls-received		10	82	80	91	125								598	388	
Assistance Calls-to Springwell		0	0	0	4	5								58	9	
Not at home at delivery		6	12	9	4	12									43	
911		0	0	0	0									2	0	

Category		*Jul*	*Au*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*FY '15 Total*	*FY '16*	

Meetings, Events, and Trainings

BI	*Type*	*Description/Highlights/Votes/Etc.*	*Attendance*
Volunteer Training		2 trainees- 1 for delivery of meals 1 for packing- Outcome- 2 interested in volunteering	2

Donations, Grants, and Other Funding [List any donations received, grants funded, etc. over the past month.]

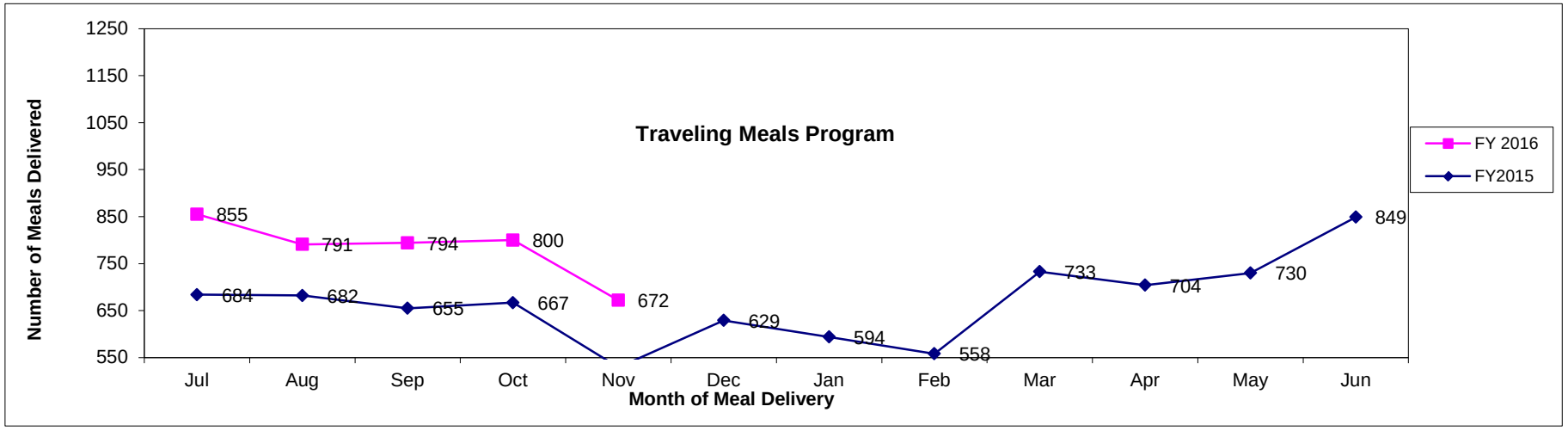
Description	*Type (D,G,O)*	*Amount Given*	*Source*	*Notes*

Traveling Meals Program

November, 2015

Month	# Meals FY2015	# Meals FY2016	FY16 Cost	% Change # Meals
Jul	684	855	$4,702.50	25%
Aug	682	791	$4,350.50	16%
Sep	655	794	$4,367.00	21%
Oct	667	800	$4,400.00	20%
Nov	529	672	$3,696.00	27%
Dec	629			
Jan	594			
Feb	558			
Mar	733			
Apr	704			
May	730			
Jun	849			
Totals:	8,014	3,912	21,516.00	

Projected-12 Mo.	
$	51,638.40
#	9,389



Needham Public Health Department – Nurses Report

Donna Carmichael RN & Alison Paquette RN

COMMUNICABLE DISEASES and Animal Bites
NEEDHAM HEALTH DEPARTMENT
FISCAL YEAR 2016

DISEASES:	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	Apr	MAY	JUN	T16	T15	T14
BABESIOSIS													0	3	1
Borrelia Miyamota				1									1	na	na
CAMPYLOBACTER	1	3	2	2									8	12	13
CHICKENPOX	3				2								5	6	6
CRYPTOSPORIDIUM													0	0	0
E-Coli													0	0	0
EHRLICHIOSIS/ HGA	1												1	2	2
Enterovirus			2	1									3	2	1
GIARDIASIS													0	5	2
HEPATITIS B													0	8	6
HEPATITIS C		2		1	1								4	13	13
Influenza													0	77	54
Legionellosis													0	2	0
Listeriosis													0	0	1
LYME	12	13	8	5	3								41	57	80
MEASLES													0	0	0
MENINGITIS													0	0	0
Meningitis(Aseptic)													0	0	0
Mumps													0	0	2
Noro Virus		1											1	0	0
PERTUSSIS													0	1	0
SALMONELLA		1			1								2	1	3
SHIGELLOSIS		1											1	2	1
STREP Group B		1	1										2	2	1
STREP (GAS)													0	2	0
STREP PNEUMONIAE													0	1	1
TUBERCULOSIS													0	1	0
Vibrio		1											1	1	2
West Nile virus													0	0	1
													1		
TOTAL DISEASES	17	23	13	10	7								70	197	190
Revoked Diseases Investigated				1									1	7	NA
Contact Investigation													0		
Animal/Human Bites															
DOG			1	1	1								3	10	15
CAT													0	0	
BAT	1	4											5	5	9
SKUNK													0	0	
RACOON													0	0	1
Fox													0	0	
TOTAL BITES	1	4	1	1	1								8	18	25

Immunizations	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	FY16	FY15	FY14
B12	2	2	2	3	0								9	22	26
Flu (Seasonal)	0	0	0	661	147								808	723	1137
IPV	0	0	0	0	0								0	0	0
Meningococcal	0	0	0	0	0								0	0	0
MMR	0	0	0	0	0								0	0	2
Pneumo	0	0	0	0	0								0	0	0
Zoster	0	0	0	0	0								0	2	25
Td	0	0	0	0	0								0	0	1
Tdap	0	0	0	0	0								0	2	4
varicella	0	0	0	0	0								0	0	2
Consult	18	24	39	50	75								212	390	301
Fire/Police	2	4	1	2	3								12	49	36
Schools	0	2	22	10	12								46	59	40
Town Agencies	12	8	14	26	32								92	125	84
Community Agencies	4	10	8	12	28								62	157	141

ASSISTANCE PROGRAMS													FY16	FY15	FY 14
Food Pantry	1	3	2	2	4								12	35	42
Food Stamps	0	0	0	1	1								2	4	10
Friends	0	0	0	0	0								0	1- YTD $25.00	4-YTD $400.00
Gift of Warmth	0	2	2	2	1								YTD 7 $1649.00	22- YTD $6133.00	38 – YTD $11,480
Good Neighbor	0	0	0	0	0								0	6 -$1650 $275/Fam	12- $250./Fam
Park & Rec	0	2	0	0	0								2	3	5
RTS	0	0	0	0	0								0	1	15
Salvation Army	0	0	0	0	0								0	0	YTD-4 $293.00
Self Help	0	1	2	4	7								14	51	50
Water Abatement	0	0	0	0	0								0	2	4

Gift of Warmth – Donation - Total - $1,800.00
Christ Episcopal Church - $300.00
Needham Women's Club - $1000.00
First Baptist Church - $500.00

Gift Card Donation - 0
Gift Card given - 0

WELLNESS Programs													FY16	FY15	FY14
Office Visits	22	35	34	19	39								149	287	528
Safte Visits	0	2	2	0	2								6	33	17
Clinics	3	5	0	0	1								9	34	17
Housing Visit	0	1	1	1	2								5	27	11
Housing Call	0	8	12	16	18								54	186	57
Camps-summer	15	5	20	0	0								40	63	29
Tanning Insp	0	0	0	0	0								0	2	5
Articles	1	0	1	0	0								2	8	3
Presentations	1	0	0	1	0								2	2	4
Cable	1	0	0	0	0								1	4	6

EMPLOYEE WELLNESS	July	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	FY16	FY15	FY14
BP/WELLNESS - DPW/RTS	9	0	12	12	15								48	137	147
BP/WELLNESS -TOWN HALL	0	0	0	0	3								3	4	53
FLU VACCINE	0	0	0	73	12								85	52	52
CPR/AED INSTRUCTION	0	0	10	7	0								17	29	23
SMOKING Education	1	0	0	1	2								4	8	9
HEALTH ED LYME DISEASE	20	20	0	10	7								57	102	94
HEALTH ED WEST NILE	20	20	0	0	0								40	90	29
HEALTH ED EEE	20	20	0	0	0								40	45	29
HEALTH ED FLU	0	0	50	200	32								282	221	132
FIRST AIDE	5	3	4	6	5								23	29	66
GENERAL HEALTH EDUCATION	10	12	20	25	50								117	230	157
Police weights	0	0	0	0	10								10	34	31
TOTAL EMPLOYEE CONTACTS	85	75	96	334	136								726	981	825

EMERGENCY PLANNING

EP Planning with Tim and Kerry Dinell, and Neia Illingworth x2
EP planning with Fire and Building with Temple Beth Shalom Day Care and Construction at Temple
Nc7 Meeting
Region 4B meeting

Meetings, Events, and Trainings

Title	*Description/Highlights/Votes/Etc.*
Flu Clinics	Town Hall, North Hill
DVAC Meeting	Monthly meeting and Minutes
MAPHN	Public Health Nurses Meeting in Braintree- Maven updates and training

Needham Public Health Department

November 2015

Substance Abuse Prevention & Education
Needham Coalition for Youth Substance Abuse Prevention ~ NCYSAP
Carol Read, Senior Program Coordinator
Karen Mullen, Project Coordinator/Capacity Building

Section 1: Activities

Activity	*Notes*
NPHD Monthly Report- November 2015	Compile information, prepare and write NCYSAP November monthly report.
Drug Free Communities (DFC) - ONDCP new grantee meeting. Washington, D.C. December 6th- December 8th. NCYSAP – Needham Public Health presentation. Coalition success through community level policy change: *Impacting Underage Alcohol Access: Licensee Regulation Initiative.*	Coordination with Marc Mandel, Director of The Needham Channel for media conversion of Needham Alcohol licensee training program to web. Off site and On site training programs to transfer for online viewing for SAMHSA grantees.
SAPC – Dedham, Needham, Norwood and Westwood.	Grant compliance review, timeline adjustment BSAS. Structure of financial and programmatic compliance. Review Virtual Gateway platform for reimbursement. Dawn Stiller NPHD
SAPC – Dedham, Needham Norwood and Westwood Inaugural Meeting *October 29th* follow-up.	Review and compilation of notes from meeting breakout sessions by town. Sort and share with cohort leaders as focus group content. Process notes on meeting agenda related to successes and improvements for January meeting.
Middle School Parent Conference- ***Power of Parenting*** workshops.	Update PPT presentation. Compile 2014 MWAHS data for presentation, alcohol, marijuana, prescription drugs grades 7-12 including trends. Parent communication strategies, Refusal Skills role play, overview of brain development and adolescent behavioral expectations.
Middle School Parent Conference- Prepare 100 resource packets.	Contents: Program overview sheet, PPT slides, *Power of Parenting*, 4 booklets (3) NIDA Marijuana Facts for Teens, Drugs Shatter the Myth, Marijuana Facts for Parents. (1) BSAS Parenting to Prevent Alcohol Abuse
SAPC Regional cohort – Strategic Planning	Draft communication templates: Key informant interview (KII) introduction, KII questions, Focus Group introduction and FG questions. Strategy for all town outreach, scheduling with SAPC regional stakeholder Leadership Team.
NCYSAP – Needham coalition strategic planning and communication	NCYSAP November 3rd meeting planning. Agenda outline, prevention initiative updates and compilation of meeting packets. Coalition meeting announcement emails, education and support resource list.
SALSA- *Students Advocating Life Without Substance Abuse* –	Students Advocating Life Without Substance Abuse (**SALSA)** Peer leadership mentoring- Pollard Presentations November 19th and 20th KM

Section 2: Summary Statistics

Monthly*

Description	*Type*	*Reason*	*Notes/Follow-Up (ongoing, completed, etc.)*
CON-Grief	School request	Loss young adult	Resources provided for individual and group grief support
CON- SW services	AP-83yrs (family call)	Health - Financial Disability sight	Resources reviewed, RCC SW, Community Council, Traveling meals. Referral to CATH Barbara Falo
CON- MH	YP- 17yrs	Grief- parent loss	Review of options RCC- SW – NHS Guidance
CON- SA	AIP- 16yrs	Alcohol	Review of educational resources- Assessment options Children's ASAP – MA General ARMS

Yearly

Category	*Type*	*Jul*	*Au*	*S*	*O*	*N*	*D*	*Ja*	*F*	*Mar*	*Ap*	*May*	*Jun*	*Yearly Total*	*FY '15*	*Notes/Follow-Up (ongoing, completed, etc.)*
CON	AP-SA-Y	1			1									2		Referral complete-future support resources available
CON	AP-SA-A															Referral complete-future support resources available
CON	AP-MH A	2	5	2	1	1								11		Referral complete-future support resources
CON	AP-MH Y															Referral complete-future support resources
CON	AIP-SA-Y					1								1		Referral complete-future support resources available
CON	AIP-SA-A															Referral complete-future support resources available
CON	AIP-MH-Y															Referral complete-future support resources available
CON	AIP-MH-A		2	1										3		Referral complete-future support resources available
CON	YIP-SA A															Referral complete-future support resources available
CON	AIP-Health-A															Referral complete-future support resources available
CON	YP-MH					1								1		Referral complete-
CON	YIP-MH															Referral complete-

Section 3: Meetings, Events, and Trainings

Title	*Type*	*Description/Highlights/Votes/Etc.*	*Attendance*
Board of Health	MTG	Meeting-Overview of staff work: community Public Health programs and prevention initiatives. Dr. Jane Fogg, Chair, Dr. Stephen Epstein and, Ed Cosgrove, PhD-NPHD Staff. Public Hearing Bodywork regulations. Tobacco licensee appeal. BOH review and discussion of compliance check violations	8
BIDN Community Health Needs Assessment	MTG	Meeting- *John Snow, Inc. (JSI) Community Health Needs Assessment 2015 to identify, examine and address the health needs of the surrounding community. JSI is conducting a series of key informant interviews with community, regional, and statewide stakeholders to learn more about what people perceive to be the major health issues, the leading determinants of health, and the most challenging barriers to care for residents in BID-Needham's service area*. Interviewed by Madison Maclean with Tim McDonald. Stakeholder perceptions of the services provided by BIDN, existing collaborations and opportunities for enhanced community engagement.	3
Emily Bhargava Connections Lab	2-MTG	2 Meetings- Conference calls. (1) Review of Needham SAPC scope of work, compilation and assessment of data from Dedham, Needham, Norwood and Westwood for strategic planning and evaluation report. (2) Review of MassTAPP TA options, SAPC structure and timeline for deliverables.	40
Westwood Cares	MTG	Meeting- Westwood Cares prevention coalition. Danielle Sutton, MSW, LICSW Director Westwood Youth and Family Services, coalition chair. Review of WWC parent event featuring Joanie Geltman, SAPC grant, SPF process, key informant interview list and focus group plan. Options discussed for Westwood students grades 6-12 youth risk behavior survey.	12
Metro West Health Foundation	MTG	Meeting- Interview: Public Health perspective of utilization of MWAHS data for MetroWest Health Foundation (MWHF) 2015 stakeholder report. Review NPHD and NCYSAP utilization of data points and reports of youth health indicators including: exercise, nutrition, mental health, school attachment, bullying, substance use and sexual activity since 2007. Rebecca Donham, Senior Program Officer Rebecca Gallo, Program Officer. Marty Cohen, President CEO	3
NPHD Capacity	MTG	Meeting- SAPC strategic planning data collection and assessment SPF. Review grant timeline with Tim McDonald and Rachel Massar. Focus Group plan, SAPC Parent Survey.	2
NCYSAP November meeting	MTG	Meeting- Prevention initiative updates. Review of Needham prevention funding: DFC grant program- SAPC regional grant missions and compliance with data collection and assessment to identify Needham risk and protective factors. Strategic Prevention Framework (SPF) process, Needham stakeholder outreach for key informant interviews (KII) and focus groups (FG). Member volunteer for KII and FG outreach timeline for completion. Final report February 2016	18
Parent Liaison Needham	MTG	Meeting- ***Needham Parents Care.*** NPS liaisons, 2 parents per school. Extension of NCYSAP community prevention work	8

Title	*Type*	*Description/Highlights/Votes/Etc.*	*Attendance*
Parents Care		to all Needham schools. Review of substance use educational resources. Overview of Needham prevention funding: DFC grant program- SAPC regional grant missions and compliance with data collection and assessment to identify risk and protective factors. Strategic Prevention Framework (SPF) process, Needham stakeholder outreach for key informant interviews (KII) and focus groups (FG). Member volunteer for KII and FG outreach to support assessment process.	
Middle School Parent Conference	EVT	Event- High Rock –Pollard 6th annual Middle School Parent Conference featuring Dr. Robert Brooks keynote speaker: *Building Adolescent Resilience and motivation.* 2 session presentation: Power of Parenting. Review of NPHD resources and services, educational information and resources for assessment, counseling and treatment encompassing mental health conditions, substance use disorders. 2014 MWAHS data sharing grades 7-12. Saturday, November 21st 7:30am-1:00pm workshops. Karen Dacey Janet Lucey Co- Chairs	130
Drug Free Communities (DFC)	MTG	Meeting- Webinar DFC Me launch. Newly created communication platform for grantees encompassing financial and programmatic reporting. System launch (Part 1), navigation instruction review and platform content highlights.	Web- 500
Drug Free Communities (DFC)	MTG	Meeting- Conference Call. MA- Central grantee call: prevention updates, progress sharing with SAMHSA Project Officer Greg Grass. Participants: Ashland, Natick, Needham, Waltham and Arlington, Wayland and Charlestown.	16
SAPC Norwood Meeting	MTG	Meeting- Sigalle Reiss, Director PH. Karen Reagan, Norwood PH nurse. SAPC SAMHSA's Strategic Prevention Framework (SPF) data by town youth use, DUI, possession and substance related arrests. Discussion on data collection and assessment process, key informant interviews, focus groups stakeholder involvement. Rachel Massar, MPH- Project Coordinator and Monica DeWinter, MPH.	5
MassTAPP	MTG	Meeting- Conference call. Tracy Desovich, MPH MassTAPP technical assistance provider SAPC grant. Review of Needham SAPC cohort data collection and assessment process, goals and objectives for assessment process: key informant interviews (KII) and focus groups (FG) question content, structure and individual town goals.	2
John Scheft, Esq. Marijuana RMD	MTG	Conference Call- DRAFT health regulations for RMD operations, K2 Spice and drug paraphernalia. Drafted by John Scheft, JD, Law Enforcement Dimension, Arlington. To prevent diversion of marijuana, MIP's and oils and to mitigate collateral adverse health and safety consequences of RMD operations in communities. Collaboration with Stoughton, Weymouth and Avon NPHD Tim McDonald.	2
SAPC Dedham-Westwood Meeting	MTG	Meeting- Dedham, Cathy Cardinale, Linda Shea Westwood. Review SAMHSA's Strategic Prevention Framework (SPF). Discussion on data collection and assessment process, key informant interviews, focus groups stakeholder involvement. Rachel Massar, Project Coordinator. Monica DeWinter	4

Title	*Type*	*Description/Highlights/Votes/Etc.*	*Attendance*
NPHD Planning	2-MTG	2 Meetings- Tim McDonald, NCYSAP capacity discussion including DFC grant staffing. Review of current NCYSAP prevention initiatives, NPHD health regulation initiative (marijuana- RMD operations), SAPC grant data collection and assessment process and reporting compliance, Rachel Massar Project Coordinator.	(1) 2 (2) 2
NCYSAP Leadership Team Meeting	MTG	Meeting- NCYSAP Strategic planning discussion. DFC grant staffing, prevention initiatives and synthesis with the SAPC data collection process. Dr. Kathy Pinkham, recent Leadership Team member. Coalition initiative review Lt Chris Baker, Bob Timmerman, Karen Mullen, Kathy Pinkham and Tim McDonald, Director NPHD.	6
SALSA Presenters Meeting	MTG	Meeting – Rehearsal with NHS SALSA students to prepare for afternoon presentations at Pollard MS Gr. 8 Health classes- 11-19 at NHS. KM	10
SALSA Presenters Meeting	MTG	Meeting – Rehearsal with NHS SALSA students to prepare for afternoon presentations at Pollard MS Gr. 8 Health classes- 11-20 at NHS. KM	9
SALSA Presentations	MTG	Meeting- Presentations to 3 Pollard Gr. 8 Health Classes Health Classes. 11-19 (2 classes) KM, MD, RM and CR 11-20 (1 class) KM	60

Out of office: 1- Town of Needham holiday ~ 6 Vacation days

Needham Health Department
Rachel Massar, Program Evaluation & Communications Coordinator
November 2015 Monthly Report

Section 1: Summary

During the month of November I worked on projects including the Needham Farmer's Market food safety inspections, creating a write-up of the Traveling Meals program in Needham, writing an article about avian flu, reviewing Bodyworks applications with Tara, and assisting Carol with organizing SAPC assessment data.

Section 2: Activities

Activity	*Notes*
Needham Farmer's Market	Conducted weekly inspections of Needham Farmers Market food vendors on 11/1, 11/8 11/15 and 11/22.
Avian flu article	Worked with Donna and Tara to write an article about Avian flu
Bodyworks applications	Worked with Tara to review bodyworks practitioner and establishment applications
Traveling Meals Write-up	Research and drafting write-ups of the program with the help of Maryanne.
SAPC data coordination	Working with Carol and the Health Directors in Norwood, Westwood, and Dedham to organize and facilitate focus groups and analyze assessment data

Section 3: Meetings & Conferences

Title	*Description*	*Attendance*
Serv Safe Class	Serv Safe Certification course & exam	
Food Grading Meeting	Met with Tim and Tara about the food grading program in Newton and the future program in Boston	3
SALSA Presentation	Attended SALSA presentation at Pollard Middle school on 11/19 in an 8th grade classroom.	
BOH Meeting	Meeting with BOH to review monthly activities.	
Norwood SAPC meeting	Meeting to discuss next steps in SAPC assessment process	5
SAPC meeting with Dedham and Westwood	Meeting to discuss next steps in the SAPC assessment process	4

Needham Health Department
Monica De Winter, Program Support Assistant
November 2015 Monthly Report

Section 1: Summary

During the month of November I worked on November 17, 18, 19 and November 23, 24, 25 for five hours each day. I read through the DFC budget narrative and Coalition History documents, the MetroWest Adolescent Health Survey data, CADCA pamphlets and DFC grantee handbook. I participated in a DFC webinar, attended a SALSA presentation and a SAPC meeting in Norwood. Finally, I researched DESE school incident and discipline data for SAPC participants. I started to prepare a report for how the four communities can access and utilize this data for community assessment purposes.

Section 2: Activities

Activity	*Notes*
Reading and reviewing	DFC budget and coalition history, MWAHS data for Needham High and Pollard Middle Schools, CADCA pamphlets, DFC grantee handbook and the Strategic Prevention Framework
SAPC community assessment tool	Research and begin to prepare report on DESE school incident and discipline data

Section 3: Meetings & Conferences

Title	*Description*	*Attendance*
DFC Webinar	Instruction on DCFMe, a new online dashboard for all grantees to share data and information. It is to replace COMET.	Online webinar
SALSA Presentation	Attended SALSA presentation at Pollard Middle school on 11/19 in an 8th grade classroom. It was peer-to-peer substance abuse role-playing and learning refusal skills	4 Needham Public Health staff and approx. 18 students x 2 classes
Norwood SAPC meeting	Meeting 11/23 to discuss next steps in SAPC assessment. What substance abuse risk factors are in Norwood – use youth data, survey data, key informant interviews, Norwood Hospital data, DESE data. Discussed the need to form focus groups which should be 10-12 per group at least 5 groups	5

NEEDHAM PUBLIC HEALTH

Needham Public Health
Prevent. Promote. Protect.

Memorandum

To: Needham Board of Health
From: Donna Carmichael, R.N., Public Health Nurse
Rachel Massar, Program Evaluation & Communications Coordinator
CC: Timothy Muir McDonald, Public Health Director
Date: November 6, 2015
Re: Proposed Indoor Tanning Regulation

Scientific research demonstrates that indoor tanning poses a serious health threat to the public by enhancing the risk for developing skin cancer, including melanoma, by up to 75%[1]. The World Health Organization (WHO) and the U.S. Department of Health and Human Services agree that tanning devices are a human carcinogen comparable to tobacco. Teenagers are especially vulnerable to the effects of ultraviolet radiation since their skin cells are dividing and changing more rapidly than adults. Statistics show that skin cancer rates are rising, both nationally[2] and in the Town of Needham. From 2006-2010 there were significantly more melanoma cases than expected in Needham, with 36 male cases (SIR=167, 95% CI 116.9-231.2) and 19 female cases (SIR=104.9, 95% CI 63.1-163.8).[3]

Limiting access to tanning facilities for minors will substantially reduce the long-term health consequences of indoor tanning. The Massachusetts tanning facility regulations (105 CMR 123.000), however, are not sufficient in reducing the long-term health consequences of indoor tanning. Those state regulations allow young people to both access and operate indoor tanning facilities freely; there is no age requirement for operators of tanning devices under the state regulations. Additionally, under the existing state regulations:

- persons 14 years of age to 17 years of age may use a tanning device with prior written consent of a parent or legal guardian;
- persons under 14 years of age may use a tanning device if they are accompanied by a parent or legal guardian; and
- there is no restriction for persons 18 years and older for using a tanning.

It is critical to reduce access to indoor tanning for teenagers, whose developing skin cells are more vulnerable to the effects of harmful radiation from indoor tanning devices. Furthermore, tanning is most popular among teenagers, meaning that the most at-risk group is also the highest user group of indoor

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1. 2006 IARC, World Health Organization, International Agency for Research on Cancer, Exposure to Artificial UV Radiation and Skin Cancer
2. Cancer Institute. SEER Stat Fact Sheets: Melanoma of the Skin. Available from: 2006 IARC, World Health Organization, International Agency for Research on Cancer, Exposure to Artificial UV Radiation and Skin Cancer
3. MDPH Mass Cancer Registry Cancer Incidence Report, City & Town Series 2006-2010. Available from: http://www.mass.gov/eohhs/docs/dph/cancer/city/2006-2010/registry-city-06-10-leverett-new-salem.pdf
4. Skin Cancer Foundation. Quick Facts about Teen Tanning. Available from: http://www.skincancer.org/prevention/tanning/quick-facts-about-teen-tanning

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tanning. According to the Skin Cancer Foundation, 37% of white female adolescents and over 11% of white male adolescents between 13 and 19 years of age in the U.S. have used tanning booths.[4] Without regulations to restrict access to indoor tanning, teenagers will use tanning booths, leading to potentially devastating health outcomes.

There is an opportunity to strengthen the regulatory framework governing tanning facilities, as there are currently no operating tanning facilities in the Town of Needham. Specifically, restricting the minimum age for the operation and use of tanning devices to 21 years is proposed to remain consistent with the Town's legal age for purchase of alcohol and tobacco products. Attached is the proposed Needham Board of Health Regulation of Indoor Tanning Facilities which includes revisions to 105 CMR 123.003 Sections C and D.

Sincerely,

Donna Carmichael, R.N.
Public Health Nurse
Public Health Department

Rachel Massar
Program Evaluation and Communications Coordinator
Public Health Department

Attachments: *Draft Needham Board of Health Tanning Regulations*
Massachusetts Tanning Regulation (105 CMR 123.000) with Needham Edits

Board of Health

Timothy McDonald, MPA
Director of Public Health

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ARTICLE 21 REGULATION OF INDOOR TANNING FACILITIES

SECTION 21.1 AUTHORITY

This regulation is promulgated under the authority granted to the Needham Board of Health under Massachusetts General Law Chapter 111, Section 31, which states that "boards of health may make reasonable health regulations."

SECTION 21.2 RATIONALE/PURPOSE

The purpose of this Regulation is to complement the Massachusetts Radiation Control Program regulation entitled "Tanning Facilities", 105 CMR 123.000, to allow for local oversight and inspection of indoor tanning facilities to ensure the facilities are closely monitored to meet the requirements set forth by the Town of Needham's Board of Health.

The Needham Board of Health finds that sound and reasonable scientific evidence exists, evidence which demonstrates the dangers of tanning. Further, the Needham Board of Health has concluded that limiting access to tanning facilities for individuals under 21 years of age is necessary to protect public health.

SECTION 21.3 ADOPTION OF 105 CMR 123

The Massachusetts Radiation Control Program regulation entitled "Tanning Facilities" (105 CMR 123.000) is hereby adopted.

SECTION 21.4 OPERATORS

Section 105 CMR 123.003 (C) is hereby amended by adding the following sentence:

No tanning facility shall employ a person under 21 years of age as an operator or permit an employee under 21 years of age to operate a tanning device.

SECTION 21.5 PROHIBITION OF YOUTH TANNING

Section 105 CMR 123.003(D) (2) and (3) is stricken and replaced (as Section 2) with the following sentence:

No person under the age of 21 shall use a tanning device.

SECTION 21.6 NOTICE

The Operator of a tanning facility must post notice of such prohibition and such notice shall be provided by the Board of Health and shall be posted conspicuously by the operator.

SECTION 21.7 VIOLATIONS

It shall be the responsibility of the operator to ensure compliance with all sections of this regulation. Violations shall be enforced in accordance with the provisions of 105 CMR 123 and the Town of Needham By-Laws entitled Non-Criminal Disposition of Certain Violations.

SECTION 21.8 EFFECTIVE DATE

Upon approval by the Board of Health, a copy shall be filed with the Massachusetts DEP and with the Needham Town Clerk. The regulation shall also be published in a newspaper in circulation with the Town of Needham. The Regulation shall become effective on January 1, 2016.

105 CMR 123.000: TANNING FACILITIES

Section

123.001: Purpose and Scope

(A) The purpose of 105 CMR 123.000 is to set forth the licensure procedures and the requirements for the maintenance and operation of tanning facilities.

(B) 105 CMR 123.000 applies to all tanning facilities, except for those facilities having a phototherapy device used by or under the supervision of a licensed physician who is trained in the use of such phototherapy device in which patients are intentionally exposed to ultraviolet radiation for the purpose of treatment of disease by licensed health care professionals.

123.002: Definitions

Applicant means any person who applies to the Board of Health for a license to maintain and operate a tanning facility.

Board of Health or Board means the Board of Health which has jurisdiction in the community in which a tanning facility is located including the Board or officer having like powers and duties in towns where there is no Board of Health.

Customer means any member of the public who is provided access to a tanning facility in exchange for a fee or other compensation, or any individual who is afforded use of a tanning facility as a condition or benefit of membership or access.

Department means the Radiation Control Program of the Massachusetts Department

of Public Health.

Facility means tanning facility.

Injury means bodily harm resulting from the use of a tanning device which requires medical attention.

Inspection means an official examination or observation by the Department or Board, which includes but is not limited to tests, surveys, and monitoring to determine compliance with rules, regulations, orders, requirements and conditions of the Board or Department.

Jeopardy means a situation or condition which the Board has determined presents an imminent threat to the health or safety of a customer.

123.002: continued

License means a license to operate a tanning facility issued by the Board in accordance with 105 CMR 123.000.

Licensee means any person who is licensed by the Board in accordance with 105 CMR 123.000.

Operator means an individual designated by the licensee to control the operation of a tanning facility and to instruct and assist the customer in the proper operation of tanning devices.

Person means any natural person, corporation, partnership, firm, association, society, trust, estate, public or private institution, group, agency, political subdivision of this Commonwealth, any other State or political subdivision or agency thereof, and any legal successor, representative, agent, or agency of the foregoing.

Phototherapy device means equipment that emits ultraviolet radiation and is used by health care professionals in the treatment of disease.

Radiation means ultraviolet radiation.

Radiation machine means any device capable of producing radiation.

Tanning device means any equipment used for tanning the skin that emits ultraviolet radiation, including, but not limited to, a tanning booth, tanning bed or sunlamp which includes high pressure tanning lamps. Tanning devices also include any accompanying equipment, including, but not limited to, protective eyewear, timers and handrails.

Tanning facility means any location, place, area, structure or business which provides access to tanning devices.

Ultraviolet radiation means electromagnetic radiation with wavelengths in the air between 200 nanometers and 400 nanometers.

123.003: Operation of Tanning Facilities

Unless otherwise ordered or approved by the Board or Department, each tanning facility shall be constructed, operated, and maintained to meet the following minimum requirements:

(A) Physical plant:

(1) Warning sign

(a) A warning sign shall be posted within three feet of each tanning device;

(b) The warning sign shall be readily legible, clearly visible, and not obstructed by any barrier, equipment, or other item so that the user of the tanning device can easily view the warning sign before energizing the ultraviolet light generating device;

(c) The warning sign shall be printed in white on a red background;

(d) The lettering on each warning sign shall be at least _ inch high for all words shown in capital letters and at least 3/16 inch high for all lower case letters;

(e) The warning sign shall be at least 8½ inches wide by 11 inches long;

(f) The warning sign shall contain the following information:

DANGER - ULTRAVIOLET RADIATION

1. Follow instructions.

2. Avoid too frequent or lengthy exposure. As with natural sunlight, exposure to a sunlamp may cause eye and skin injury and allergic reaction. Repeated exposure may cause chronic damage characterized by wrinkling, dryness, fragility, bruising of the skin and skin cancer.

3. Wear protective eyewear. FAILURE TO USE PROTECTIVE EYEWEAR MAY RESULT IN SEVERE BURNS OR LONG TERM INJURY TO THE EYES.

123.003: continued

4. Ultraviolet radiation from sunlamps aggravates the effects of sun. Do not sunbathe before or after exposure to ultraviolet radiation.

5. Abnormal or increased skin sensitivity or burning may be caused by certain foods, cosmetics or medications, including but not limited to, tranquilizers, diuretics, antibiotics, high blood pressure medication, birth control pills and skin creams. Consult a physician before using a sunlamp if you are using medication, have a history of skin problems, or believe you are especially sensitive to sunlight. Pregnant women or women on birth control pills who use a tanning device may develop discolored skin.

6. IF YOU DO NOT TAN IN THE SUN YOU WILL NOT TAN FROM USE OF THIS DEVICE. Use of a tanning device does not provide a substantial protective base against the effects of the sun.

(2) Requirements for Tanning Devices

(a) Only tanning devices manufactured and certified to comply with the Code of Federal Regulations (CFR) 21 CFR 1040.20, "Sunlamp products and ultraviolet lamps intended for use in sunlamp products," as amended from time to time, shall be used in tanning facilities. Compliance shall be based on the standard in effect at the time of manufacture as shown on the device identification label required by 21 CFR 1010.3, as amended from time to time.

(b) Each tanning device shall have a timer which complies with the requirements of 21 CFR 1040.20(c)(2), as amended from time to time. The maximum timer interval shall not exceed the manufacturer's maximum recommended exposure time. No timer interval shall have an error greater than plus or minus 10% of the maximum time interval for the product.

(c) Tanning devices shall meet the requirements of the relevant sections of the National Fire Protection Association's National Electrical Code and shall have been inspected and have satisfied all the local electrical code requirements.

(d) There shall be physical barriers in tanning facilities to protect customers from injury induced by touching or breaking the lamps.

(e) Additional requirements for stand-up booths:

1. There shall be physical barriers or other methods, such as handrails or floor markings, to indicate the proper exposure distance between ultraviolet lamps and the customer's skin.

2. The construction of the booth shall be such that it will withstand the stress of use and the impact of a falling person.

3. Access to the booth shall be of rigid construction; doors shall open outwardly. Handrails or non-slip floors shall be provided.

(f) Defective or burned-out lamps or filters shall be replaced with a type intended for use in that tanning device which is specified on the product label or with lamps or filters that are "equivalent" under the U.S.F.D.A. regulations and policies applicable at the time of lamp manufacture.

(g) The licensee shall maintain records of the recommended exposure time established by the manufacturer of the tanning device. Such records shall be available to each operator. The operator shall follow the recommended exposure times and limit each customer to the maximum exposure established by such records.

(h) The interior temperature of the tanning device shall not exceed 100°F.

(B) Protective Eyewear.

(1) Protective eyewear which meets the requirements of 21 CFR 1040.20(c)(4), as amended from time to time, shall be made available to the customer before each tanning session with instructions for its mandatory use.

(2) The licensee shall maintain in the facility manufacturer's eyewear literature

which documents compliance with 21 CFR 1040.20(c)(4), as amended from time to time.

(3) Protective eyewear, other than eyewear designed for one-time use only, shall be properly sanitized before each use, using a sanitizing agent which is registered by the United States Environmental Protection Agency (U.S.E.P.A.) and which is specifically manufactured for use with protective eyewear. Exposure to the ultraviolet radiation produced by the tanning device itself is not considered a sanitizing agent.

123.003: continued

(C) Operators.

(1) No tanning facility shall employ a person under 21 years of age as an operator or permit an employee under 21 years of age to operate a tanning device.

(2~~1~~) Each operator must be trained and sufficiently knowledgeable in the correct operation of tanning devices used at a facility. That knowledge shall include:

(a) the requirements of 105 CMR 123.000 and of 21 CFR 1040.20, as amended from time to time;

(b) proper use of U.S.F.D.A. Recommended Exposure Schedule;

(c) photosensitizing agents such as: foods, cosmetics, and medications that may produce an abnormal or increased skin sensitivity;

(d) skin type determination;

(e) recognition of injuries from overexposure to ultraviolet radiation;

(f) manufacturer's procedures for the correct operation and maintenance of the tanning device;

(g) use of protective eyewear;

(h) emergency procedures in case of injury;

(i) effects of ultraviolet radiation, acute and chronic exposure, biological effects, and health risks;

(j) electromagnetic spectrum with emphasis on the photobiology and physics within the 200-400 nanometer range;

(3~~2~~) A list of the facility's operators who have been trained in accordance with 105 CMR 123.003(C)(1) shall be maintained and available at the facility.

(4~~3~~) A trained operator must be present at a tanning facility at all times during operating hours.

(D) Records.

(1) Each time a customer uses a tanning facility, or each time a customer executes or renews a contract to use a tanning facility, such customer shall be given a written statement of warning as described in 105 CMR 123.003(A)(1) and sign a written statement acknowledging that he/she has read and has understood the warning statement. For illiterate or visually handicapped persons, the warning statement shall be read by the operator to the customer in the presence of a witness. Both the witness and the operator shall sign the statement indicating it has been read to the customer.

(2) No person under 21 years of age shall use a tanning device.

~~(2) No person 14 years of age to 17 years of age, inclusive, shall use a tanning device without the prior written consent of a parent or legal guardian who shall indicate therein that such parent or guardian has read and understood the warnings required under the provisions of 105 CMR 123.003(A)(1). The operator must sign the consent form as a witness to the signing by the parent or legal guardian.~~

~~(3) No person under 14 years of age shall use a tanning device unless accompanied by a parent or legal guardian. The parent or legal guardian accompanying the person under 14 years of age shall sign a consent form indicating to the operator that such parent or guardian has read and understood the warnings required under 105 CMR 123.003(A)(1).~~

(3) A record shall be kept by the facility operator of each customer's total number of tanning visits and tanning times. Such records shall be maintained for at least 12 months from the date of that customer's last tanning session.

(4) Copies of all applications and the license information outlined in 105 CMR 123.005(C)(1) through (7), must be maintained at the tanning facility and be available for review by inspectors and tanning facility customers upon request.

(E) Injury Reports.

(1) A written report of any tanning injury to a customer or complaint of injury shall be forwarded by the facility's operator or licensee to the Board which issued the license and to the Department with a copy to the complainant or injured person within five working days of its occurrence or knowledge thereof. The report shall include:

(a) the name of the affected individual;

(b) the name and location of the tanning facility involved;

(c) the nature of the injury;

(d) the name and address of the affected individual's health care provider, if any;

(e) any other information considered relevant to the situation.

(F) Sanitation.

(1) The operator shall provide to customers of the tanning facility access to toilet and hand washing facilities. Such facilities shall meet the following requirements:

(a) they shall be cleaned and disinfected at least once every 24 hours, and

(b) they shall contain liquid soap, paper towels, and a receptacle for used paper towels.

(2) Each customer shall have access at all times to a safe and sanitary supply of drinking water.

(3) Each facility shall provide to its customers paper or cloth towels which may not be shared. Cloth towels must be washed and sanitized after each use.

(4) All surfaces with which customers have contact within tanning devices shall be disinfected after each customer's use. Disinfection shall be carried out using

an U.S.E.P.A. registered disinfectant.

(5) Each tanning device shall be capable of being ventilated so that there is a minimum of 20 cubic feet per minute (cfm) of fresh air per occupant.

(6) If showers are provided:

(a) hot water shall be at a temperature between 110 - 130°F;

(b) shower floors shall be constructed of non-absorbent, non-slippery materials, and sloped toward a properly installed floor drain. The use of duckboards or rubber mats in the shower is not permitted; and

(c) shower floors and walls shall be cleaned and disinfected at least once every 24 hours.

(7) The interior of the facility shall be maintained in good repair and in a safe, clean, sanitary condition, free from all accumulation of dirt and rubbish.

(8) All equipment and fixtures in the facility, if appropriate, shall be installed in accordance with accepted plumbing, gas fitting, and electrical wiring standards.

(G) No tanning facility shall claim, or distribute promotional material that claims, that the use of a tanning device is safe and free from risk.

123.004: Inspections

(A) The Board of Health shall inspect each tanning facility within 30 days of licensure, every six months thereafter, and upon receipt of any written complaint.

(B) The Board of Health, local health agent, or Department shall have access at all reasonable times to any tanning facility for the purpose of inspecting said facility.

123.005: Application for a License

(A) No person shall maintain or operate a tanning facility unless he/she is the holder of a valid license granted by the Board of Health.

(B) Applications for licensure shall be made on forms prescribed by and available from the Board. Each applicant shall submit all the information required by the form and the accompanying instructions. The term "application" as used herein shall include original and renewal applications.

(C) The Board shall require that the applicant provide at least the following information in order to be issued a license to operate a tanning facility:

(1) Name, address and telephone number of the following:

(a) The tanning facility;

(b) The owner(s) of the tanning facility;

(2) The manufacturer, model number, model year, serial number (if available) and type of each ultraviolet lamp or tanning device located within the facility;

123.005: continued

(3) The geographic areas within the Board's jurisdiction to be covered, if the

facility is mobile;

(4) The name and address of the tanning device supplier, installer, date of installation of each tanning device, and service agent;

(5) A signed and dated certification that the applicant has received, read and understood the requirements of 105 CMR 123.000;

(6) A copy of the consent form to be used by the facility in fulfilling the requirements of 105 CMR 123.003(D)(2) and (3);

(7) A copy of the operating and safety procedures to be followed in the operation of the facility and tanning devices.

(D) Each applicant shall provide such additional information as the Board may reasonably require.

(E) Each applicant shall submit the appropriate license fee. The fee for a license and annual renewal thereof shall be determined by each Board.

123.006: Issuance of a License

(A) Upon a determination by the Board that an applicant meets the requirements of 105 CMR 123.005, the Board shall issue a license to maintain and operate a tanning facility.

(B) The Board may incorporate in the license at the time of issuance or thereafter by appropriate rule, regulation or order, such additional requirements and conditions with respect to the licensee's receipt, possession and use of the license to operate tanning facilities as it deems appropriate or necessary.

(C) A license shall expire no later than one year from the date of its issue.

(D) Each tanning facility's license must be displayed in a conspicuous place in the facility.

123.007: Renewal of a License

(A) An application to renew a license shall be filed in accordance with the requirements of the Board.

(B) In order to renew a license, a licensee shall file an application with the Board in proper form for renewal not less than 30 days prior to the expiration of his/her license, whereupon the licensee's existing license shall not expire until the renewal application status has been finally determined by the Board.

123.008: Report of Changes

All information required by 105 CMR 123.005 and otherwise required by the Board shall be kept current by each licensee. The licensee shall notify the Board in

writing before making any change which would render the information reported pursuant to 105 CMR 123.005 and contained in the application for license no longer accurate. This requirement shall not apply to changes involving replacement of the original lamp types which have been certified with the United States Food and Drug Administration (U.S.F.D.A.) as "equivalent" lamps under the U.S.F.D.A. regulations and policies applicable at the time of replacement of the lamps. The facility owner shall maintain at the facility manufacturer's literature demonstrating the equivalency of any replacement lamp.

123.009: Non-Transferability of License

No license shall be transferable from one person to another or from one tanning facility to another.

123.010: Grounds for Suspension of a License

The Board or its authorized agent may summarily suspend a license pending a hearing whenever the Board finds that there is a situation causing jeopardy to customers at a tanning facility. A facility may not operate during the period of a suspension of its license.

123.011: Grounds for Denial, Revocation or Refusal to Renew a License

(A) The Board may deny, revoke or refuse to renew a license sought or issued pursuant to 105 CMR 123.000 for any one of the following reasons:

(1) The applicant or licensee has failed to submit the information required under 105 CMR 123.005 which demonstrates that the facility will be operated and maintained in accordance with the requirements of 105 CMR 123.000;

(2) The applicant or licensee has submitted incorrect, false or misleading information in the documents required under 105 CMR 123.005;

(3) The applicant or licensee has failed to operate or maintain the tanning facility in accordance with the specifications approved by the Board except as such maintenance may involve the replacement of lamps by "equivalent" lamps which have been defined in 105 CMR 123.008;

(4) The tanning facility is operated in a way that causes or creates a nuisance or hazard to the public health or safety;

(5) The applicant or licensee has violated any condition upon which the license was issued by the Board;

(6) The applicant or licensee has failed to allow duly authorized agents of the Board or Department to conduct inspections of the facility at reasonable hours and in a reasonable manner;

(7) The applicant or licensee has failed to pay license fees;

(8) The tanning facility has been found to be in violation of M.G.L. c. 111, §§ 207 through 214 or 105 CMR 123.000, or any additional requirements adopted by the Board and has not complied within seven days of written notice of said violations by the Board.

(9) The applicant or licensee has failed to pay fines or penalties imposed for

violations of M.G.L. c. 111, §§ 207 through 214 or 105 CMR 123.000 or local rules, regulations, or orders respecting tanning facilities.

(B) The Board shall notify an applicant or licensee in writing of any violation of 105 CMR 123.000 for which the Board intends to deny, revoke or refuse to renew a license. The applicant or licensee shall have seven days after receipt of such written notice in which to comply with 105 CMR 123.000. The Board may deny, revoke or refuse to renew a license of a tanning facility which fails to comply after said seven days.

123.012: Procedure for Hearings

(A) Suspension of a License.

(1) Upon written request to the Board, the licensee shall be afforded an opportunity to be heard concerning the suspension of a license by the Board.

(2) Such a hearing shall be initiated pursuant to 801 CMR 1.00 *et seq*. no later than 21 calendar days after the effective date of the suspension.

(3) In cases of suspension of a license, the hearing officer shall determine whether the Board has proved by a preponderance of the evidence that there existed immediately prior to or at the time of the suspension a jeopardy situation at a tanning facility. The hearing officer shall issue a written decision which contains a summary of the testimony and evidence considered and the reasons for the decision.

(B) Denial, Revocation, or Refusal to Renew a License.

(1) A license may be denied, revoked or refused renewal only after a hearing conducted by the Board of Health;

(2) If the Board determines that a license shall be denied, revoked or not renewed pursuant to 105 CMR 123.011, the Board shall initiate a hearing in accordance with 801 CMR 1.00 *et seq*.

123.012: continued

(3) Following the hearing, the hearing officer shall issue a written decision which contains a summary of the testimony and evidence considered and the reasons for the decision.

123.013: Procedure for Appeal

Following a hearing by the Board, any applicant or licensee aggrieved by a determination of the Board pursuant to 105 CMR 123.012 may appeal in writing to the Department within 20 days of said determination. Any applicant or licensee or the Board, if aggrieved by a determination of the Department, may appeal said decision pursuant to the provisions of M.G.L. c. 30A § 14.

123.014: Penalties

Whoever violates any provision of M.G.L. c. 111, §§ 207 to 213 inclusive or any rule or regulation promulgated thereunder shall be punished by a fine of not less than $200 nor more than $2,000. Each violation shall be considered a separate offense.

123.015: Exemptions

(A) The Board and/or the Department may, upon application therefor or upon its own initiative, grant such exemptions or exceptions from the requirements of 105 CMR 123.000 as it determines are authorized by law and will not result in undue hazard to public health and safety.

(B) Devices intended for purposes other than the deliberate exposure of parts of the living human body to ultraviolet radiation, and which produce or emit ultraviolet radiation incidental to its proper operation are exempt from the provisions of 105 CMR 123.000.

(C) Tanning devices while in transit or storage incidental thereto are exempt from the provisions of 105 CMR 123.000.

(D) Phototherapy devices used by or under the supervision of a licensed physician who is trained in the use of such phototherapy devices are exempt from the provisions of 105 CMR 123.000.

123.016: Severability

If any provision, clause, section, sentence or paragraph of 105 CMR 123.000 or the application thereof to any person shall be held to be invalid, such invalidity shall not affect the remaining provisions or applications of 105 CMR 123.000. The valid part of any provision, clause, section, sentence or paragraph shall be given independence from the invalid provisions or applications, and to this end 105 CMR 123.000 are hereby declared to be severable.

REGULATORY AUTHORITY

105 CMR 123.000: M.G.L. c 111, §§ 207 through 214, inclusive.

-----Original Message-----
From: Amelia [mailto:burke.amelia@gmail.com]
Sent: Sunday, November 22, 2015 9:52 AM
To: Health Department
Subject: In support of the proposed indoor tanning regulation

To whom it may concern at the Board of Health,

Yes!! I wholeheartedly support the regulation on tanning facilities. I myself spent way too much time tanning indoors and out in the sun in my teenage years and I deeply regret it. I loved having a nice tan year round but for several years now have had to worry about an increased skin cancer risk as a result. I have had 7 suspicious spots removed over the past several years at the direction of my dermatologist. These excisions are not always easy and pain free. I have had to have some performed by a surgeon. They required stitches and an immense amount of pain during the removal. I say that not to scare anyone who is facing a similar removal. I would encourage anyone to your skin checked and listen to your dermatologist. Be vigilant about skin changes and unusual looking spots. Learn the warning signs and protect yourself now. The nice tan is not worth the fear for your health and your life for the rest of one's life. I have two children and a husband and friends and family whom I love dearly. So far I've been lucky but I do worry that indoor tanning will lead to a cancer diagnosis one day. This should be prevented. As an educated society and town, we should do everything we can to protect our residents and young teens who may not be thinking about the possible long term and potentially disastrous effects from indoor tanning.

I am happy to speak at a town meeting if that would be helpful. I think with my past experience tanning and present experience living with the consequences (multiple mole removals, multiple dermatologist visits per year, fear of cancer) I could be a powerful (yet regular citizen) spokesperson for this important bill.

Good luck with this and thanks for this important step!

Amelia Burke

Feel free to email me if I may be helpful in your process with this legislation.

Sent from my iPhone

Board of Health

Timothy McDonald, MPA
Director of Public Health

1471 Highland Avenue
Needham, MA 02492
www.needhamma.gov/health

Phone: 781-455-7500 ext 511
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ARTICLE 20 REGULATION TO ENSURE THE SANITARY AND SAFE OPERATIONS OF REGISTERED MARIJUANA DISPENSARIES AND THE SALE OF MARIJUANA TO PERSONS WITH DOCUMENTED MEDICAL NEEDS

SECTION 20.1 AUTHORITY

This regulation is promulgated under the authority granted to the Needham Board of Health under Massachusetts General Laws Chapter 111, Section 31 which states that "boards of health may make reasonable health regulations," and pursuant to Chapter 369 of the Acts of 2012 An Act for the Humanitarian Medical Use of Marijuana ("The Act") and Massachusetts Department of Public Health Regulations 105 CMR 725.000.

SECTION 20.2 PURPOSE

The primary purpose of this regulation is to provide for local oversight and inspection of Registered Marijuana Dispensaries (RMDs) and hardship cultivation sites within the town by Needham's Board of Health and its agents to ensure the safe and sanitary operation of any such RMD or hardship cultivation site consistent with public health and safety. The regulation is intended to ensure that only people with a documented need will acquire medical marijuana or marijuana-infused products pursuant to the Act. Since the existence of an RMD or hardship cultivation site present a risk of improper diversion and other collateral consequences within the community, it is necessary to regulate this activity at the local level.

SECTION 20.3 ADOPTION OF 105 CMR 590

The State Sanitary Code regulation, which outlines the minimum standards for food establishments, is the 105 CMR 590, which is hereby adopted.

SECTION 20.4 DEFINITIONS

Unless otherwise indicated, terms used throughout this regulation shall be defined in the same way as they are in 105 CMR 725.004.

For ease of reference, 105 CMR 725.000 in its entirety may be downloaded or printed from the Massachusetts Department of Public Health (DPH) website at http://www.mass.gov/dph/. These DPH regulations and any relevant amendments, directives, memorandums or notifications from DPH are incorporated fully into this local regulation. These provisions must be read in conjunction with and as part of this regulation.

Board of Health: Town of Needham Board of Health and its designated agents. Those agents include the Director of Public Health and his/her staff, as well as other municipal officials designated by the Director or the Board including, but not limited to, law enforcement officers, fire officials, code enforcement officials, and other public and private consultants.

Board of Health Agent: The Director of Public Health and any town employee designated in writing by the Board of Health or the Director, which may include Health department staff, law enforcement officers, fire officials, and code enforcement officials

Business Agent: A Dispensary Agent who has been designated by the RMD Permit Holder to be a manager in charge of the RMD facility and its operations.

Director: The Director of Public Health, acting on behalf of the Needham Board of Health.

Home Permit: Issued by the Board of Health, to be renewed annually, to the holder of a hardship cultivation registration issued by the Massachusetts Department of Public Health (DPH) in 105 CMR 725.000, which registration is for a specific location within the town.

Non-Residential Roll-Your-Own (RYO) Machine: A mechanical device made available for use (including to an individual who produces rolled marijuana products solely for the individual's own personal consumption or use) that is capable of making rolled marijuana products. RYO machines located in private homes used for solely personal consumption are not Non-Residential RYO machines.

RMD Permit: A Registered Marijuana Dispensary Permit, to be renewed annually, which may be issued by the Board of Health to a non-profit corporation holding a Certificate of Registration issued by the Massachusetts Department of Public Health (DPH) pursuant to 105 CMR 725.000, which permits a RMD to operate within the town.

Self-Service Display: Any display from which customers may select marijuana or a marijuana-infused product without assistance from a Dispensary Agent or store

personnel.

Town: The Town of Needham, Massachusetts.

Vending Machine: Any automated or mechanical self-service device, which upon insertion of money, tokens or any other form of payment, dispenses or makes marijuana products.

SECTION 20.5 PERMIT TO OPERATE A REGISTERED MARIJUANA DISPENSARY

20.5.1 – Permits

A) No person shall sell or otherwise distribute marijuana or marijuana-infused products within the Town of Needham without first obtaining a RMD Permit. A RMD Permit may only be issued to a nonprofit corporation which:

(i) has a current Certificate of Registration issued by the Massachusetts Department of Public Health (DPH) pursuant to 105 CMR 725.000; and

(ii) has a permanent, non-mobile location in Needham approved by the DPH for use as an RMD; and

(iii) is in compliance with all applicable zoning requirements.

And which provides satisfactory documentation of compliance with those requirements to the Board of Health.

B) The applicant shall also submit to the Board of Health a copy of the operating policies and procedures for the RMD which was submitted to DPH pursuant to 105 CMR 725.000 and any other relevant DPH directives, memorandums or notifications.

C) The applicant shall sign a statement declaring that the applicant understands that, under this local regulation:

(i) all Dispensary Agents are responsible for complying with all local and state regulations pertaining to the operation of the RMD. Specifically, a violation of any provision of 105 CMR 725.000 or other applicable state regulations constitutes a violation of this regulation, which may be enforced by the Board of Health; and

(ii) the applicant is responsible for providing instruction and training in all applicable local and state regulations; and

(iii) the fact that a Dispensary Agent, vendor, or other person

associated with the RMD is unaware of a regulation or lacks understanding of its content, shall not be a defense to any violation; and

(iv) the Board of Health and its designated agents may conduct periodic, unannounced inspections of the RMD premises.

D) The fee for a RMD Permit shall be two thousand five hundred dollars ($2,500.00) annually or at the level determined in the Needham Board of Health's Fee Schedule. All RMD Permits expire on July 1 annually, regardless of the year or day and month on which they were issued.

E) The initial plan review for marijuana-infused product facilities (see section 20.6.1) shall result in a fee of one thousand dollars ($1,000.00) or at the level determined in the Needham Board of Health's Fee Schedule. The initial plan review for the safe and sanitary storage of marijuana-infused products in a RMD (see section 20.6.2) shall result in a fee of one thousand dollars ($1,000.00) or at the level determined in the Needham Board of Health's Fee Schedule. The initial plan review for trash collection and the safe and sanitary disposal of waste (see section 20.6.3) shall result in a fee of one thousand dollars ($1,000.00) or at the level determined in the Needham Board of Health's Fee Schedule.

F) Following suspension, revocation or modification, a RMD permit may be renewed or re-issued, at the Board of Health's discretion, only upon the filing of a new application and fee. If necessary, the plan reviews mentioned in section (D) above may also be required along with their requisite fees. If renewed or re-issued, the RMD Permit shall be renewed in the usual course with the usual fee mentioned in sections (D) and (E) above.

G) A separate RMD Permit is required for each RMD retail establishment selling marijuana or marijuana-infused products within the Town.

H) Each RMD Permit shall be displayed at the RMD retail establishment in a conspicuous place.

I) A RMD Permit is non-transferable.

J) A RMD Permit will not be renewed if the RMD Permit Holder has failed to pay any outstanding fines or failed to satisfy any other penalties or conditions lawfully imposed by the Town.

K) A RMD may not open for business before 9:00 A.M. and shall close no later than 7:00 P.M., on each day the RMD is open. The hours and days when the RMD is open must be posted conspicuously on the front entrance door.

L) Acceptance of a RMD Permit constitutes an agreement by the RMD that it will

adhere to the practices, policies, and procedures described or submitted with its application, as well as the relevant laws, state and local regulations, and conditions imposed by the Board of Health as part of the permit process.

20.5.2 – Inspections and Compliance

A) Dispensary Agents must present their Registration Card on request by any Board of Health agent.

B) Issuance and maintaining a RMD Permit shall be conditioned on the RMD Permit Holder's ongoing consent to periodic, unannounced inspections of the RMD premises by the Board of Health and its designated agents. The applicant also consents to abide by the provisions relating to inspections found in 105 CMR 725.300 and related sections including, but not limited to, "deficiency statements" and "plans of correction."

C) There must be a designated Business Agent on the premises at all times that the RMD is open for business.

D) The Board of Health and its designated agents, as well as the Needham Police Department, shall be provided with an updated phone list through which a Business Agent may be reached on a 24 hour basis.

E) Issuance and maintaining a RMD Permit shall be conditioned on the RMD Permit Holder's ongoing consent to provide the Board of Health with copies of the Registration Cards for all Dispensary Agents working at the RMD, and the names of all Business Agents of the RMD, and to submit any changes in staffing and registration information within five (5) business days. The notification and information about changes in staffing and registration shall be submitted in both paper copy via courier or certified mail and electronically in PDF format.

F) No RMD Permit Holder shall permit any disorder, disturbance, or illegality of any kind to take place in or on the licensed premises. The term "illegality" includes, but is not limited to, any violation of 105 CMR 725.000 and related directives, memoranda or notifications; and any violation of these regulations promulgated by the Board of Health. The Permit Holder shall be responsible for any disorder, disturbance or illegality of any kind whether present or not.

G) Failure or refusal of an RMD or Home Permit holder to cooperate with the Board of Health or its agent shall be a violation of these regulations.

20.5.3 – Records Retention

A) A RMD Permit Holder shall notify the Needham Public Health Department and the Board of Health orally and in writing within 24 hours of a visit to the premises

or request for information by any representative of DPH acting in an official capacity. The RMD Permit Holder has a duty to provide the Board with any reports, correspondence, emails or other information from DPH on demand or, in any case, no later than five (5) business days after receipt by the RMD.

B) Video surveillance shall conform to the requirements of 105 CMR 725.110(D) and any other related regulations, directives, memorandums or notifications from DPH. In addition, as conditions of issuing or maintaining its RMD Permit, the Board of Health may require other, reasonable surveillance operations and security (e.g., an off-site backup system). Furthermore, the RMD must allow for immediate viewing of video surveillance by the Board of Health or its designated agents, upon request. A copy of a requested recording shall be provided as soon as practicable to these officials. All video recordings shall be retained for a minimum of 180 days. Furthermore, as soon as the RMD is aware of any recording that might relate to a criminal, civil or administrative investigation or legal proceeding of any kind, the RMD shall not alter or destroy the recording without the written permission of the Board of Health or its designated agent.

C) Issuance and maintaining a RMD Permit is conditioned on maintaining all records outlined in 105 CMR 725.105(I) and other DPH regulations, directives, memorandum and notifications, along with any other documents reasonably required by the Board of Health in writing. Following closure of an RMD, all records must be kept for at least two (2) years at the expense of the RMD and in a form and location acceptable to the Board of Health. Moreover, as a condition of issuing and maintaining a RMD Permit, the Board of Health may reasonably require that the new owner of a RMD retain records generated by the previous RMD at the expense of the new RMD.

20.5.4 – Other Restrictions

A) For RMDs that cultivate marijuana, the cultivation and processing facility shall not adversely affect the health or safety of the nearby residents or businesses by creating dust, glare, heat, noise, noxious gases, materials, processes, products or wastes. Growing areas shall be within a self-contained, locked structure, with a 1-hour firewall assembly made of green board, well ventilated with odor control, and shall not create humidity or mold issues within the establishment.

B) No RMD is permitted to sell or distribute alcoholic beverages or tobacco products and must not be in possession of either a tobacco sales permit or a liquor license.

C) No RMD is permitted to hold a Common Victualler license issued by the Town for on-premises food consumption.

D) No RMD is permitted to be a Massachusetts lottery dealer or to engage in any

other legal or illegal gaming activities.

E) Failure or refusal of an RMD or Home Permit holder to cooperate with the Board of Health or its agent shall be a violation of these regulations.

SECTION 20.6 PLAN REVIEW OF MARIJUANA-INFUSED PRODUCTS (PRODUCTION AND SAFE STORAGE) & PLAN REVIEW OF TRASH COLLECTION & WASTE DISPOSAL

20.6.1 – An applicant who wishes to sell or produce edible marijuana-infused products (MIPs) at a RMD must, prior to beginning operations, undergo a plan review of any food processing and preparation facilities, regardless of their location, for any MIP that will, at some point, be sold, stored, or produced within the Town. The Board of Health and its designated agents will conduct the plan review, which may include a facilities inspection, to ensure sanitary handling and processing conditions and practices.

20.6.2 – An applicant who wishes to sell edible marijuana-infused products (MIPs) at a RMD must, prior to beginning operations, undergo a plan review of all MIP storage and handling locations within the RMD. The Board of Health and its designated agents will conduct the plan review, which may include a facilities inspection, to ensure sanitary handling and storage conditions and practices in line with the requirements outlined in the 105 CMR 590, the State Sanitary Code which outlines the minimum standards for food establishments.

The requirements of 105 CMR 590 include specific actions to prevent the growth of bacteria. *Clostridium botulinum* is a bacterium whose spores are present on plant material and in soil. Spores are present in many plant material extractions and can survive cooking/pasteurization temperatures. These spores can spontaneously germinate (grow into bacteria) given the right conditions/substrate. The bacteria can produce a powerful toxin which can cause severe illness or death. Specific actions required of a RMD selling MIP are:

A) Except during preparation, cooking, or cooling, time/temperature control for safety food (TCS) items shall be maintained at 5°C (41°F) or less to prevent the growth of bacteria. This shall apply, unless specifically permitted by the Board of Health or its agents, to all:
   a. marijuana extractions and concentrates intended for non-smoking oral consumption (i.e. eating, drinking);
   b. infusions made from those extractions, such as infused oils, butters, honey, etc.; and
   c. foods that have such infusions/extractions as an ingredient.

B) If a marijuana extraction, concentrate, or infusion has been continuously refrigerated and is then added as an ingredient into baked goods that have a low water activity, such as most cookies and brownies, these baked products may be

considered shelf-stable if explicitly reviewed and permitted by the Board of Health or its agents.

C) If the extracted marijuana concentrate is immediately infused into a 190/200 proof alcohol with no additional ingredients (including flavorings or other additives) and the tincture is homogenous, then the growth of *C. botulinum* spores may have been prevented. Homogenous 190/200 proof alcohol tinctures may be safe to store outside of refrigerated temperatures if explicitly reviewed and permitted by the Board of Health or its agents.

D) Approvals for any variance from the safe and sanitary storage requirements outlined above will be based upon:
   a. a review of written procedures that are followed to make the product;
   b. the use of control measures described above; and
   c. any other scientific evidence submitted by the manufacturer from a certified laboratory or process authority that demonstrates the safety of the product in question.
      i. pH and/or water activity testing must be conducted by an accredited laboratory;
      ii. three samples from separate batches must be tested; and
      iii. all samples must meet the criteria for a non-potentially hazardous food as described in Tables A and B of the 2013 *FDA Food Code*.

E) At any time, the Board of Health or its agents may require a Hazard Analysis and Critical Control Points (HACCP) plan before approving the distribution of MIPs.

F) Photos or images of food are not allowed on MIP product labels.

G) All MIP must be contained in an opaque package.

H) If the MIP is identified on the label using a common food name (i.e. Brownie, Honey, Chocolate, Chocolate Chip Cookie, or Green Tea), the phrase "MEDICAL MARIJUANA" must be written before the common food name. This phrase must be as easy to read as the common food name (i.e. same font size).

I) Only generic food names may be used to describe the MIP. As an example, using "Snickerdoodle" to describe a cinnamon cookie is prohibited.

J) All MIP must state the following:

   a. Manufacture date;
   b. The statement "Keep Out Of Reach Of Children";
   c. The statement "For Medical Use Only"; and
   d. Net weight of Medical Marijuana in the MIP.

20.6.3 – An applicant for a RMD Permit shall develop a plan for the safe and secure storage

and disposal of any waste, refuse, or damaged marijuana products. Such a plan will be subject to review and approval by the Board of Health and its designated agents prior to the RMD beginning operations.

SECTION 20.7 MARIJUANA SALES BY REGISTERED MARIJUANA DISPENSARY

20.7.1 – No person shall sell marijuana or marijuana-infused products from any location other than at a RMD that possesses a valid RMD Permit.

20.7.2 – A sign shall be conspicuously posted at all entrances to the RMD, indicating that the entry to persons who do not possess a valid Registration Card is prohibited. The Board of Health shall provide the sign, which shall be posted conspicuously on the exterior of the establishment so that it may be readily seen by any person approaching the entrance to the RMD. The sign shall remain unobstructed, secured to the building at a height of no less than four (4) feet or greater than seven (7) feet from the ground, and maintained in good condition.

20.7.3 – Dispensary Agents shall verify the Registration Card of the Card Holder in accordance with the procedures outlined in 105 CMR 725.000 and any other directives, memorandums or notifications from DPH. In addition, the Registration Card shall be verified for each and every Card Holder, on each and every occasion that he/she enters the RMD, without exception. The failure to verify, regardless of the prior history of the Card Holder at the RMD, constitutes a violation of this regulation.

20.7.4 – All retail sales of marijuana and marijuana-infused products must be face-to-face between the Dispensary Agent and the Card Holder on the premises of the RMD, unless the Card Holder is the proper recipient of home delivery in accordance with all applicable DPH regulations.

20.7.5 – No person shall:

A) Distribute, or cause to be distributed, any free samples of marijuana or marijuana-infused products; or

B) Accept or redeem, offer to accept or redeem, or cause or hire any person to accept or redeem, or offer to accept or redeem, through any coupon or other method, any marijuana or marijuana-infused product for less than the listed or non-discounted price; or

C) Sell marijuana or a marijuana-infused product through any discounts (e.g., "buy-two-get-one-free") or otherwise provide any marijuana or marijuana-infused product for less than the listed or non-discounted price in exchange for the purchase of any other product.

D) This provision of 20.7.5 shall not prohibit dispensing of free or discounted marijuana or marijuana-infused products to card holders whose ability to pay for a product deemed medically necessary is limited by demonstrable financial hardship.

20.7.6 – RMDs are prohibited from using self-service displays.

20.7.7 – RMDs are prohibited from using vending machines.

20.7.8 – RMDs are prohibited from using Non-Residential Roll-Your-Own machines.

20.7.9 – Dispensary agents or any other personnel associated with an RMD are prohibited from making any statement that:

(i) encourages the use of marijuana for any purpose other than to treat a debilitating medical condition or related symptoms. This includes, but is not limited to, statements encouraging the recreational use of marijuana; or

(ii) is false or misleading in any material way about the products for sale, their medical or scientific properties, or the manner in which the RMD conducts business.

SECTION 20.8 HOME CULTIVATION

20.8.1 – All marijuana cultivation or processing of any kind is illegal in the town without a RMD Permit or Home Permit issued by the Needham Board of Health. There are no exceptions.

20.8.2 – Prior to any home cultivation taking place within the town, even by a qualifying patient or caregiver under 105 CMR 725.000, the respective individual must obtain a Home Permit.

20.8.3 – A Home Permit shall not be granted if it is determined by the Board of Health that: (1) the applicant has access to free or low cost medical marijuana from a RMD; and (2) the RMD will deliver this low cost or free marijuana to the applicant, or the applicant has a method of transportation to reasonably access the RMD.

Applicants who meet this standard will not receive a Home Permit and will be informed, in a written statement, which any marijuana cultivation within the town is outside the coverage of the medical marijuana program and is subject to prosecution as a crime under Massachusetts General Laws, Chapter 94C.

20.8.4 – In the event that section 20.8.3 is inapplicable to the applicant, the Board of Health may issue a Home Permit authorizing cultivation activities at a specified address within the town, provided that the applicant:

A) Submits to a pre-approval inspection by the Board of Health or its designated

agents, which may include law enforcement officers and fire officials, to ensure that the location specified in the application meets all of the requirements of this regulation; and

B) Meets all the requirements for home cultivation contained in 105 CMR 725.000 and any related directives, memorandums or notifications. These include, but are not limited to, an enclosed, locked space, not viewable from a public location, in which cultivation and storage takes place in accordance with "industry best practices"; and

C) Meets all applicable local regulations within the town including, but not limited, fire safety and building code provisions; and

D) Has informed, if applicable, the registered public or private property owner of the specified address, and obtained from that owner consent to alter the property's fixtures or structure, and/or arrived at a cost-sharing agreement concerning any increased utility costs likely to result from cultivation activities; and

E) Grows only enough marijuana to maintain a sixty (60) day supply, which has been determined to be ten (10) ounces by DPH. The Board of Health or the Director may specifically designate the number and type of plants that may be possessed at any time by the applicant in order to meet this standard; and

F) Submits to reasonable inspections by the Board of Health or its designated agents, which may include law enforcement officers, to ensure compliance with all of the requirements in this regulation; and

G) Agrees that a Home Permit only allows for the cultivation and processing of marijuana <u>without</u> the use of any fire, heat source, or gas, except for cooking on a conventional stove originally supplied with the dwelling; and

H) In any case, agrees that a Home Permit does not allow any method for processing marijuana that presents a risk of explosion or other property damage by any means; and

I) Renews his/her Permit on an annual basis prior to July 1 but, in no case, shall a Home Permit applicant be charged a fee to obtain a permit.

SECTION 20.9 <u>VIOLATIONS</u>

20.9.1 – Based on a determination by the Board of Health, after a duly noticed hearing at which the RMD or Home Permit holder has had an opportunity to be heard, of a violation of these regulations by the RMD or Home Permit holder, the Board may, by written decision, fine the RMD or Home Permit Holder up to $300 per violation, and may suspend, modify, or

revoke the RMD Permit or Home Permit. The minimum suspension schedule shall be as follows:

A) In the case of a first violation, the RMD Permit or Home Permit shall be suspended for seven (7) consecutive business days.

B) In the case of a second violation, the RMD Permit or Home Permit shall be suspended for six (6) months.

C) In the case of three or more violations, the RMD Permit or Home Permit shall be suspended for twelve (12) months and may, at the Board of Health's discretion, be permanently revoked.

D) Refusal to cooperate with the Board of Health or its designated agents is considered a violation of these regulations and shall result in the suspension of the RMD Permit or Home Permit for ninety (90) consecutive business days. This shall be in addition to any other penalty imposed for other violations observed.

E) Any RMD Permit Holder or Home Permit Holder who engages in or allows the sale, distribution or cultivation of marijuana or marijuana-infused products while his or her permit is suspended shall be subject to permanent revocation.

20.9.2 - The penalties mentioned in 20.9.1 represent the minimum guidelines for action to be taken by the Board of Health for violations, and do not preclude the licensing authority from taking additional action after a duly noticed hearing at which the RMD Permit or Home Permit holder has had an opportunity to be heard.

20.9.3 – If an RMD permit is suspended, the permit holder shall cease sale and distribution of marijuana or marijuana-infused products, and close and secure the RMD premises to the satisfaction of the Director or his agents for the period of the suspension. Additionally, notice of the suspension must be publicly posted on the RMD to the satisfaction of the Director or his agents.

20.9.4 – If an RMD permit is revoked, the permit holder shall cease all sale, distribution or cultivation of marijuana or marijuana-infused products, and shall close and secure the RMD premises to the satisfaction of the Director or his agents, and the RMD shall submit subject to the approval of the Board or its designated agents, or the Board may order, implementation of a plan for the removal of marijuana and marijuana-infused products and related implements and equipment from the RMD retail establishment. Additionally, notice of the revocation must be publicly posted on the RMD to the satisfaction of the Director or his agents.

20.9.5 – In the case of a suspension or revocation of a Home Permit, the Board may order that marijuana or marijuana-infused products and related implements and equipment be removed from the specified Home Permit location. The method for removal and storage, and the deadline for compliance, may be specified in the Board's order. In the case of a

Home Permit, the Board may authorize immediate confiscation of all the items previously mentioned prior to the hearing, provided that any removed items are not damaged or destroyed prior to the conclusion of all administrative actions and appeals.

20.9.6 - All fines must be paid within twenty-one (21) days of assessment. The failure to do so may be the subject of a separate criminal proceeding.

20.9.7 - In the event that a RMD or Home permit is suspended or modified, the Permit Holder may be ordered to submit a remediation plan addressing all causes for the suspension or modification and all appropriate changes to business practices and operations. That remediation plan is subject to review and approval by the Board of Health prior to reinstating the Permit.

SECTION 20.10 ENFORCEMENT

20.10.1 - Enforcement of this Regulation shall be by the Board of Health and its designated agents.

20.10.2 - Whoever violates any provision of this regulation may be penalized by the non-criminal method of disposition as provided in General Laws, Chapter 40, Section 21D and Town of Needham By Laws, or by filing a criminal complaint.

20.10.3 - Each day any violation exists shall be deemed to be a separate offense.

20.10.4 - Any resident who desires to register a complaint pursuant to this Regulation may do so by contacting the Board of Health, the Public Health Department, or the Needham Police Department.

SECTION 20.11 SEVERABILITY

If any provision of these regulations is declared invalid or unenforceable, the other provisions shall not be affected thereby but shall continue in full force and effect.

SECTION 20.12 EFFECTIVE DATE

This regulation shall take effect upon December 31, 2015. Public meetings regarding this regulation were conducted on November 20, 2015, December 16, 2015, and January 8, 2016. This regulation was voted by a majority of the Board of Health on XYZ, 2016.

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To: **Timothy McDonald, Director, and the Needham Board of Health**

From: **John Sofis Scheft, Esq.**

Date: **October 12, 2015**

Re: **In Areas Where RMDs Deliver Low Cost or Free Marijuana, DPH Must Reject All Medical Marijuana Cultivation Registrations**

Summary of argument. The intent of the medical marijuana law was to allow a patient or his caregiver to grow marijuana only in cases where the patient is indigent[1] *or* lacks access to a registered marijuana dispensary (RMD). Once an RMD delivers low cost or free marijuana, the patient lacks a legal jurisdiction for home cultivation.

Homegrows are risky. Of all the provisions of the medical marijuana law, home cultivation presents the greatest risk to public health and safety. [2, 3] The security requirements for homegrows are not nearly as extensive as those mandated for RMDs, which creates great potential for the diversion of marijuana plants or products away from patients and caregivers.[4]

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[1] A "verified financial hardship" means that an individual is a recipient of MassHealth, or Supplemental Security Income, or the individual's income does not exceed 300% of the federal poverty level, adjusted for family size. 105 CMR 725.004.

[2] Current regulations require that homegrowers "adhere to industry best practices in the cultivation of marijuana plants and storage of the finished product." 105 CMR 725.035(I). Ironically, these same regulations do not make homegrowers responsible for the detailed testing and cultivation requirements applied to RMDs, even though this activity occurs inside inhabited residences — often housing children!

[3] While homegrowers may only cultivate up to a 60 day supply of marijuana [105 CMR 725.035(G)], DPH has not specified how many plants constitute a 60 day supply. This has left a gaping, regulatory hole allowing homegrowers to grow more than they need.

[4] Existing regulations only require that home cultivation occur indoors, out of public view, in an enclosed and locked area. 105 CMR 725.035(H) and 725.650.

Moreover, when not conducted properly with appropriate equipment, home cultivation creates a risk of mold growth and fire due to marijuana extraction methods and overtaxed utilities. Communities in other states have experienced increased electrical fires, explosions, water damage, overall property damage, infestation, and collateral crime and disorder (e.g., home invasions; drug dealing; etc.) Massachusetts is starting to experience these issues too.[5]

Because of these obvious risks, DPH regulators intended to radically reduce homegrows. To properly implement the Medical Marijuana Act[6], former DPH Commissioner Lauren Smith and the Members of the Public Health Council created the Medical Marijuana Working Group to promulgate regulations. Their work resulted in the current version of 105 CMR 725.000.

In a memorandum dated May 8, 2013, this 14-member group of experts declared:

> "In order to avoid the diversion and security complications associated with widespread home cultivation, DPH intends to minimize hardship cultivation by optimizing access through a variety of approaches, including: 1) mandating the provision of low-income subsidies at all [RMDs], 2) allowing secure home delivery where necessary, and 3) encouraging personal caregivers to pick up product in lieu of cultivation."[7]

For these reasons, the final version of the regulations drafted by these experts permit home cultivation *only if* a patient has:

1. **A verified financial hardship**;[8] *or*

2. **An inability to access an RMD** because he cannot use public transportation or drive, *or* lacks a caregiver with transportation, *or* lacks an RMD that delivers to his or his caregiver's primary address. 105 CMR 725.035(A).

In short, home cultivation is not an option once an applicant has financial and physical access to marijuana.

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[5] "Medfield Man Arraigned on Marijuana Charges" (Rebecca Fiore, Boston Globe, May 20, 2015) (article explains how police and fire responded to an explosion at 6 a.m. due to marijuana extraction in a home).
[6] Chapter 369 of the Acts of 2012.
[7] Medical Marijuana Working Group Memorandum (May 8, 2013; re: "Request for Approval for Promulgation of Regulations at 105 CMR 725.000"), at page 7. See Attachment A for pages 6-8 of this memorandum.
[8] See note 1 for a definition of "verified financial hardship."

Financial hardship evaporates as soon as an indigent patient has an RMD willing to provide free or low cost marijuana. At present, all RMDs *must* provide reduced cost or free marijuana to patients with a documented financial hardship. 105 CMR 725.100(A)(6).

Similarly, the lack-of-access justification goes away as soon as a patient confirms that he or his caregiver has transport to an RMD, or has an RMD that will deliver marijuana. DPH regulations permit RMDs to engage in home delivery after receiving orders by telephone or the internet. 105 CMR 725.105(N)(5) and (6).

Logically, if an RMD makes free or low cost marijuana available to patients who cannot afford it, those patients no longer have a financial hardship requiring them to cultivate at home. And if an RMD is willing and able to deliver to a patient, lack of physical access to an RMD cannot constitute a hardship requiring the patient or caregiver to engage in home cultivation.

DPH must reject all applications that fall into these two categories.

It then follows that municipalities, through their own Boards of Health, may also reject "hardship cultivation" permits for these same reasons. See G.L. c. 111, § 31.

Board of Health regulations that do so will not conflict with the regulatory scheme established by DPH in 105 CMR 725.000.[9] This means that the Town of Needham, and other like-minded municipalities, could and should adopt this approach to reduce the collateral damage to public health and safety caused by unwarranted homegrows.

[9] A local regulation will not be invalidated unless the court finds a "sharp conflict" between the local and State provisions. *Doe v. City of Lynn,* 472 Mass. 521, 526 (2015) citing *Easthampton Savings Bank v. Springfield,* 470 Mass. 284, 289 (2014).

Attachment

A

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TO: Interim Commissioner Lauren Smith and Members of the Public Health Council

FROM: DPH Medical Marijuana Work Group[1]

DATE: May 8, 2013

RE: Request for Approval for Promulgation of Regulations at 105 CMR 725.000: *Implementation of An Act for Humanitarian Medical Use of Marijuana (Chapter* 369 of the Acts of 2012)

INTRODUCTION

The purpose of this memorandum is to request approval for promulgation of 105 CMR 725.000, *Implementation of An Act for Humanitarian Medical Use of Marijuana*. The proposed regulation implements requirements enacted in Chapter 369 of the Acts of 2012.

BACKGROUND

On November 6, 2012, Ballot Question 3, *"An Initiative Petition for a Law for Humanitarian Medical Use of Marijuana"* passed with a 63.3% vote (and with a majority in 349 of 351 communities), making Massachusetts the 18th state in the nation in addition to the District of Columbia to approve the use of marijuana for medical purposes.

This measure, now Chapter 369 of the Acts of 2012 (the Act), became law on January 1, 2013 and allows qualifying patients with certain defined medical conditions or debilitating symptoms to obtain and use marijuana for medicinal use. Additionally, the law requires the Department of Public Health (Department or DPH) to issue regulations providing critical implementation and policy framework by May 2013. The Act eliminates state criminal and civil penalties for the medical use of marijuana by qualifying patients. In order to qualify, a patient must have been diagnosed with a "debilitating medical condition" as defined in the statute[2] and have obtained a written certification from a physician with whom the patient has a *bona fide* physician-patient

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[1] DPH Medical Marijuana Work Group: Cheryl Bartlett, Alice Byrd, Dr. Madeleine Biondolillo, Julian Cyr, Dr. Alfred DeMaria, Andy Epstein, Priscilla Fox, Donna Levin, Alison Mehlman, Kara Murray, Jenny Nathans, Lydie Ultimo, Iyah Romm, Dr. Lauren Smith, and Jay Youmans.

[2] "...[C]ancer, glaucoma, AIDS or HIV, Hepatitis C, ALS, Crohn's disease, Parkinson's disease, Multiple Sclerosis, and other conditions as determined in writing by a qualifying patient's physician."

- **Initial Draft Regulation:** DPH recommended allowing up to 10 ounces of finished product in leaf form (or equivalent) as a 60-day supply for the purposes of defining a maximum amount of medical marijuana that can legally be possessed at a given time. This amount of supply was based on a review and comparison of dispensing across states as well as stakeholder feedback. DPH proposed describing only a cap so that the certifying physician can use his or her best judgment in describing the needs of his/her individual patient. DPH further recommended that a physician's certification for a debilitating condition must indicate the time period for which such certification is valid; however, this physician determination may not exceed one year. The amount of medical marijuana that a patient may be dispensed would be in direct proportion to the period of time indicated in the certification; up to 10 ounces for a 60-day supply (e.g. certification for 15 days would allow dispensing of up to 2.5 ounces).
- **Comment Received and Response:** DPH received extensive comment on the 60-day supply, including many who testified that the supply was insufficient, and many others who indicated that 10 ounces is too much for this period of time. Many of the former indicated support for the provision allowing physicians to override the 10 ounce cap where extenuating circumstances indicate additional supply is necessary. Recognizing the balance struck by the initial proposed regulation between the perspectives of many stakeholders, and between the legitimate needs of patients and concerns for safety and security of our communities, DPH recommends no revision to this provision.

4. Defining a Bona-Fide Physician-Patient Relationship

- **Initial Draft Regulation:** Based upon the framework provided by BORiM, DPH recommended the following definition: "*Bona Fide Patient Relationship* means a relationship between a physician, acting in the usual course of his or her professional practice, and a patient in which the physician has conducted a clinical visit, completed and documented a full assessment of the patient's medical history and current medical condition, has explained the potential benefits and risks of marijuana use, and has a role in the ongoing care and treatment of the patient."
- **Comment Received and Response:** Comments indicated widespread support for the definition of bona-fide physician-patient relationship. Comment was provided by several professional associations and by patient advocates that mid-level practitioners should be allowed to diagnose patients with debilitating medical conditions and provide written certifications accordingly. DPH recognizes M.G.L. c. 112, s. 80I, and has added a stipulation that nothing in this reguation shall be construed to limit the scope of practice of nurse practitioners.

  Additionally, subsequent to a request by a professional association, DPH has adopted a prohibition on allowing physicians to certify immediate family members. The association recommended that DPH align this requirement with the prescribing guidelines and regulation of BORiM for Schedule II medications, in which such a prescription can only be written in an emergency situation. DPH does not contemplate such emergencies being applicable to marijuana and therefore has prohibited this practice entirely. Where renewal certifications may occur remotely, DPH believes that any urgent need for accessing marijuana for medical use will be accounted for by the current model.

5. Hardship Cultivation

- **Initial Draft Regulation:** Those states that allow home cultivation permit patients to select this approach without additional administrative process. A patient's ability to cultivate at home is not dependent on financial, physical, or geographic hardship in those states. Pursuant to the Act, Massachusetts would be the first state to develop such criteria. In order to avoid the diversion and security complications associated with widespread home cultivation, DPH intends to minimize hardship cultivation by optimizing access through a variety of approaches, including: 1) mandating the provision of low-income subsidies at all MMTCs, 2) allowing secure home delivery where necessary, and 3) encouraging personal caregivers to pick up product in lieu of cultivation. DPH therefore previously recommended the following criteria and definitions:

  Physical incapacity to access reasonable transportation:
  An inability to use public transportation or drive oneself; and
  Does not have a personal caregiver with a reliable source of transportation; and
  Does not have a MMTC that will deliver medical marijuana to the patient's or personal caregiver's primary address.

  Verified financial hardship:
  A patient who submits satisfactory evidence of being a recipient of MassHealth, Supplemental Security Income, or the applicant's income does not exceed 133% of the federal poverty line, adjusted for family size.

  Lack of treatment center within a reasonable distance of the qualifying patient's residence:
  Lacks a treatment center within a reasonable distance from the qualifying patient's residence; and
  Does not have a MMTC that will deliver medical marijuana to the patient's or personal caregiver's primary address.

- **Comment Received and Response:** Extensive comment was received on various elements of hardship cultivation.
  - Many proposed that DPH should not limit home cultivation to cases of hardship and that each registered qualifying patient should accordingly be allowed to cultivate at-will. The statute clearly stipulates that home cultivation can only occur pursuant to a hardship cultivation registration granted by the Department, based upon the factors of geographic, financial, or physical hardship.
  - Another comment challenged the proposed requirement that only one personal caregiver be allowed to cultivate on behalf of his or her registered qualifying patient. DPH has clarified this requirement to stipulate that hardship cultivation may occur at only one location, either at the primary residence of the patient or of one of the allowable personal caregivers. This revision allows a second personal caregiver, if any, to participate in cultivation, facilitating ongoing support of patients during times such as vacation, work-related travel, etc.
  - Further comment questioned the requirement that cultivation only occur at the registered qualifying patient's or personal caregiver's primary place of residence. DPH recognizes the challenge posed to individuals with a hardship cultivation registration who rent property and are unable to use that place of primary residence to cultivate. However, recognizing the limitations on hardship cultivation in and of itself imposed by the Act, the availability of personal caregivers, delivery models offered by MMTCs, and the significant concerns for security presented by cultivation at alternate locations, we believe that the

provision should remain as written. The waiver provision in the regulation would allow for modification on a case-by-case basis should no other means of accessing marijuana be available to a given patient.

- DPH received comment that Department staff should not have the right to enter the home of registered qualifying patients and their personal caregiver(s), if any. DPH believes that a request for and acceptance of a hardship cultivation registration constitutes permission for the Department to conduct such inspections, as is consistent with MMTCs or health care facilities.
- DPH received comment from patients and patient advocates that the proposed definition of verified financial hardship, 133% of federal poverty level (FPL), adjusted for family size, was too low, presenting access barriers to low income patients. As Massachusetts Health Care Reform provides for partial health insurance subsidization for people with income of up to 300% of FPL, DPH has amended this provision and adopted the standard of 300% of FPL adjusted for family size.
- DPH also received comment that a patient's enrollment in Social Security Disability Insurance (SSDI) should be accepted as a demonstration of financial hardship. DPH agrees that many patient's enrolled in SSDI may qualify for verifiable financial hardship under these regulations, however, SSDI is not a means-tested benefit. Therefore, in and of itself, SSDI is not an indication of financial hardship. Patients enrolled in SSDI may apply for consideration of a verifiable financial hardship, for which a variety of factors would be considered.
- DPH received questions as to whether a registered qualifying patient with a hardship cultivation registration could purchase marijuana from a MMTC as well. As the demonstration of hardship for a cultivation registration explicitly includes factors that would preclude acquiring marijuana from an MMTC, DPH has included provisions stipulating that patients with hardship cultivation registrations may not purchase products, other than seeds, from MMTCs.
- Further comment was received suggesting that hardship cultivation be banned entirely. The Act explicitly protects individual cultivation within the defined parameters of financial, physical, or geographic hardship and cannot be banned by the Department.
- DPH received comment that municipal governments and law enforcement agencies should be notified of the location of any registered qualifying patient who receives a hardship cultivation registration, or their personal caregiver, if any. DPH intends for law enforcement to have easy, real-time access to appropriate information in the Department's interoperable database. However, the generation of such lists would pose privacy and security concerns and would not be appropriate.

6. Laboratory Testing

- **Initial Draft Regulation:** While a clear need has been articulated, because there are as yet no established, widely accepted, and available tests for medical marijuana, DPH recommended requiring a quality assurance and periodic testing plan in the application for approval as a treatment center, and DPH would use responses in evaluating applications. DPH further recommended specifying a requirement that the MMTC must test for contaminants as specified by the Department, including at least pests, mold, mildew, heavy metals and the presence of pesticides, while including provisions such that the Department may require additional testing without regulatory change.

Developing Public Health Regulations for Marijuana: Lessons From Alcohol and Tobacco

Rosalie Liccardo Pacula, PhD, Beau Kilmer, PhD, Alexander C. Wagenaar, PhD, Frank J. Chaloupka, PhD, and Jonathan P. Caulkins, PhD

Until November 2012, no modern jurisdiction had removed the prohibition on the commercial production, distribution, and sale of marijuana for nonmedical purposes—not even the Netherlands. Government agencies in Colorado and Washington are now charged with granting production and processing licenses and developing regulations for legal marijuana, and other states and countries may follow. Our goal is not to address whether marijuana legalization is a good or bad idea but, rather, to help policymakers understand the decisions they face and some lessons learned from research on public health approaches to regulating alcohol and tobacco over the past century. (*Am J Public Health.* 2014;104: 1021–1028. doi:10.2105/AJPH.2013.301766)

Marijuana legalization is no longer an abstract notion. In November 2012, voters in Colorado and Washington passed initiatives that not only made it legal to possess up to an ounce of marijuana for nonmedical purposes but also allow for-profit firms to supply the market. Colorado's initiative additionally allows home production. Although marijuana remains illegal under federal law, policymakers in these states are now developing regulatory regimes that will allow licensees to produce and sell marijuana and other cannabis products, including infused candies and other edibles, to anyone who is aged 21 years or older. ("Marijuana" is an American term, customarily applied to the dried leaves and flowers of the cannabis plant. There are other cannabis plant products, including resin, which is referred to in the United States as "hashish." The majority of cannabis consumed in the United States is in the form of marijuana, which is probably why initial state legalization statutes that have passed are specifically about "marijuana" although even these laws do not mean to be restrictive in their terms. For example, Washington speaks of "marijuana-infused" drinks and edibles, and Colorado's Amendment 64 defines "marijuana" to be all possible products of the plant except industrial hemp.) Bills to legalize marijuana are being introduced in other states, and we will likely see more ballot initiatives in future elections.

Although many jurisdictions have experimented with alternatives to strict marijuana prohibition, including decriminalization, medical marijuana, and the Dutch "coffee shops," no industrialized nation has legalized the cultivation, processing, distribution, and supply of marijuana for recreational purposes in the modern era—not even the Netherlands. In the Netherlands, de facto legalization extends only to retail sales of up to 5 grams; wholesale distribution of marijuana to coffee shops remains illegal and is actively enforced. That is not to say that it has never been legal; in fact, marijuana was a legal commodity in the United States until the early 1900s. But regulatory policy on the cultivation, processing, distribution, and sale of marijuana and its derivative products is unprecedented in the modern era.

Because there are no modern examples of marijuana regulation, policymakers are confronting many new questions about how to manage a marijuana market. Should the number of licensees be restricted, and, if so, how should those scarce licenses be allocated? Should vertical integration be allowed, or should there be separate licenses for growing, processing, and selling marijuana? What product safety requirements should be considered (in terms of specific ingredients allowed or disallowed), and who will be responsible for testing the product? How restrictive should licenses be in terms of permitted quantity and potency? Should taxes be assessed per unit weight, as a percentage of value (ad valorem), or on some other basis, such as Δ-9-tetrahydrocannabinol (THC) content? Should marijuana be sold in conventional stores alongside other products or only in specialized venues? What about within-state Internet sales? Although the questions are new for marijuana, policymakers have grappled with similar questions pertaining to alcohol and tobacco, raising the question of what lessons can be learned from these 2 substances and applied to marijuana policy.

We have summarized insights and ideas that grew out of a meeting of alcohol, tobacco, and illicit drug policy experts hosted by the RAND Drug Policy Research Center on February 11, 2013, to foster discussions about how one might regulate marijuana to promote public health objectives assuming a decision to legalize has already been made. The arguments here do not necessarily reflect the opinions of every coauthor but, instead, reflect a general consensus of ideas that grew out of those discussions. The conference was filmed by C-SPAN.[1]

WHY PUBLIC HEALTH REGULATIONS ARE NEEDED

Marijuana has been used for thousands of years. Similar to alcohol, most adults who use marijuana continue to perform their expected social roles and do not exhibit serious problems. Millions of people have derived pleasure from the plant, and there is evidence that some cannabinoids have important medical benefits.[2,3] It is for these and other reasons interested parties have pursued legalization.

Legalization does not imply a lack of regulation, however. Essentially all markets in modern societies are subject to at least some regulation. Although different perspectives and philosophies favor more or less regulation, we have presented the public health perspective

favoring certain types of regulations in light of documented harms associated with marijuana use, particularly for youths.[4,5] Although the magnitude of the various health harms is debated, there are certain acute effects and consequences of chronic use for which the evidence of adverse effects is fairly strong, including panic attacks and increased anxiety, impaired judgment and reaction time, increased probability of experiencing psychotic symptoms, and risk of dependence.[4,6–11] Moreover, the correlation between frequent marijuana use among adolescents and a wide range of adverse outcomes, such as poor educational attainment, is strong although it is difficult to disentangle the effects of use versus other unobservable third factors.[12–14]

Discussions of policy alternatives to prohibition either implicitly or explicitly involve both public health and other objectives, many of which conflict. For example, minimizing consumption by dependent users conflicts with the goal of maximizing tax revenue because the minority of very heavy users account for the majority of consumption and, hence, tax revenues. Thus, it is important to start any discussion of possible regulatory approaches with agreement on common objectives. We have assumed the following objectives, because they are frequently raised in legalization debates as areas of common ground among reformers and those opposed to legalization:

1. minimizing access, availability, and use by youths,
2. minimizing drugged driving,
3. minimizing dependence and addiction,
4. minimizing consumption of marijuana products with unwanted contaminants and uncertain potency, and
5. minimizing concurrent use of marijuana and alcohol, particularly in public settings.

The last objective is motivated by epidemiological and health services research suggesting that concurrent use of alcohol and marijuana may increase the risk of traffic crashes, acute health effects, and other harms relative to using either substance alone.[15–18] However, for some individuals concurrent use could also reduce alcohol consumption and possibly some of the consequences associated with heavy drinking (e.g., aggression). It is impossible to predict how concurrent use will influence social welfare under legalization, and we urge researchers to pay close attention to this relationship. But because of the existing evidence, it seems appropriate, at least initially, to minimize the concurrent use of marijuana and alcohol in public.

Of course, these are not the only public health or policy objectives that one could consider. Some people may want to reduce overall smoking of marijuana (out of concern about adverse effects on the respiratory system) or overall consumption of THC (to reduce impairment). Similarly, some might consider minimizing use in public to reduce perceived normative acceptance and to prevent secondhand smoke exposure, as for tobacco. However, those in favor of legalization may want to allow use in public places and not have restrictions on use or products consumed, should be on the grounds that consumption makes users feel good and such, this consumption makes them feel good, and such policies increase personal liberties. Because of the obvious contention in trying to find common ground on restrictions or limitations on adult use, we have chosen not to include it as an explicit objective, although we recognize there are public health arguments for making reduction in overall use a main goal.

This is not the first time the public health community has struggled to balance competing objectives concerning dependence-inducing products or activities. Obvious analogies include drinking and gambling.[19–23] Lessons can be learned from the repeal of alcohol prohibition. Importantly, the Twenty-First Amendment did not specify a particular form of a regulated market but, rather, left it to the states to experiment with different models, including the option to retain the prohibition. Although no US state today retains a strict prohibition, it is also true that no single regulatory model has emerged, suggesting that there may not be 1 perfect model. Although examples from numerous US states, Russia, Finland, and Sweden demonstrate that state-run monopolies with control of wholesale or retail off-premise sales, prices, locations of outlets, hours of operation, and advertising help control problems associated with excessive drinking,[24–28] such state monopoly controls have gradually decreased within the United States since Prohibition, with most alcoholic beverages in most states now distributed via licensing systems. As noted by Fosdick and Scott, a fundamental characteristic of licensing systems is that they retain the profit motive and, hence, the incentive to increase sales.[20] Evidence from privatization experiments in the United States and abroad has shown that such transitions lead to more outlets, longer hours of operation, increased promotions, and, importantly, increased sales and use.[29–33] Other regulatory strategies have emerged to try to counter the harms created by the licensing system. We have reviewed some approaches that the literature suggests can minimize the threats posed to public health by alcohol and tobacco.

INSIGHTS FROM ALCOHOL AND TOBACCO

What can be done if policymakers are interested in developing regulations that help reduce (1) access, availability, and use by youths; (2) drugged driving; (3) the risk of dependency and addiction; (4) consumption of marijuana products with unwanted contaminants and uncertain potency; and (5) concurrent use of marijuana and alcohol, particularly in public settings? Below are some key insights that can be gleaned from the alcohol and tobacco literature.

Keep Prices Artificially High

Hundreds of studies on tobacco and alcohol show that raising prices reduces consumption and a long list of related health and social harms. Many studies show that raising excise taxes on cigarettes is one of the most effective strategies for reducing early initiation and use, discouraging the transition to being a pack-a-day smoker, and increasing quit attempts even among youths.[34–37] Similarly, higher alcohol taxes and prices have been shown to reduce initiation, binge drinking, drunk driving, and traffic crash rates even among youths.[38–40] Higher alcohol prices are also associated with lower violence and deaths from chronic diseases such as cirrhosis and certain cancers.[39,41,42]

Legalization of marijuana would reduce production costs, perhaps substantially, and that would be expected to lead to lower prices to consumers.[43,44] Although one could try to raise the price of regulated marijuana all the way back to its illegal underground market

price through taxation or fees, such a strategy encourages current illegal producers and sellers to remain in the market or for gray market arbitrage between low- and high-tax jurisdictions. Underground markets have emerged across states, and even across nations, in response to much smaller economic gains per unit weight or volume when smuggling tobacco,[35,45,46] and "home growing" marijuana is easier than home growing tobacco.

Any strategy that involves keeping the price of regulated marijuana high will need to include mechanisms that reduce the incentive for tax-evading underground markets. That can be done in at least 2 ways: (1) designing the regulatory structure around tax collection (e.g., by banning home production and issuing few production licenses), and (2) having strong enforcement and sanctions for those operating outside the regulatory structure. The potential and limitations of such strategies might be inferred from the cases of tobacco and alcohol, in which the underground markets account for variable sizes of the total market in different countries despite designated agencies explicitly charged with providing oversight over, monitoring of, and enforcement in the industry. Thus, there is no guarantee that an underground market in marijuana will not continue to exist, particularly if the legal market imposes significant taxes or restricts the types of marijuana goods that can be sold.

Adopt a State Monopoly

One way to keep price artificially high and reduce underground market competition is a state-run monopoly on production, distribution, and sale. (Note that this model could still allow privatized production and, in the case of marijuana, cultivation and processing if the state monopoly focused entirely on distribution and retail sales.) Research on state alcohol monopolies, and monopolies more generally, have shown that monopolies help keep the price of a good higher through reduced competition, reduce access to alcohol by youths, and reduce overall levels of use.[19,28–30,47,48] State monopolies would be impossible to implement currently in the United States because of continuing federal prohibition. However, it is worth discussing the public health advantages of a tightly controlled state monopoly in case the federal legal landscape changes, either through repeal or amendment of the Controlled Substances Act or with some sort of waivers system.[49]

State stores often sell only the commodity in question—marijuana in this case. That is not unique to a state store model; private stores could also be similarly restricted. And it is not without drawbacks, notably a smaller number of outlets reducing customer convenience. Inconvenience is a cost that helps constrain consumption, and single-purpose stores discourage using the intoxicating substance as a loss leader, effectively cross-subsidizing its consumption with profits from the sale of other substances. The problem of using intoxicants as loss leaders is evident in the case of alcohol, generating considerable policy debate in the United Kingdom and elsewhere, with some movement toward imposing minimum per dose pricing in addition to conventional product taxes to maintain higher prices.[50,51]

As the sole distributor and retailer of marijuana, the state government could more aggressively pursue violators who pretend to be legitimate distributors or retailers because they could be more easily identified as nongovernment employees. With aggressive deterrence against underground market suppliers, the government can set prices at levels higher than otherwise possible. Competition would not push prices lower, as there would be a single supplier. Moreover, having monopoly control of marijuana distribution would facilitate messaging concerning the quality and content of the marijuana product sold, warnings about risks of use, and adherence to point-of-sale advertising restrictions. If the government store sold only unbranded "generic" forms, it would eliminate altogether the incentive for producers to promote their product. Finally, considerable evidence from both the alcohol and tobacco literature suggests that monitoring and frequent enforcement checks of sellers can reduce sales to minors.[52–54] This is easier to accomplish with state-owned stores.

Restrict and Carefully Monitor Licenses and Licensees

If a government monopoly is not possible, the next most preferred option is a strong licensing system in which licenses are required to participate in any part of the supply chain: grower, producer or processor, wholesaler or distributor, and retailer. (One could also require that individual users receive a license to consume.[55–57]) Setting up licensing systems is justified mainly because it allows the government to trace all products and ensure that they meet some minimum quality standards required by law and because the sale of the products can be monitored in terms of excess or insufficient supply. (It is important to note that licensing is necessary but not sufficient for supply to be effectively monitored.) In the case of intoxicating or addictive substances like alcohol and tobacco, however, it can also limit competition (which can keep prices high), enable effective tax collection, limit the density of retail outlets, and reduce the potential for diversion, particularly if licenses are restricted.

Currently, there is no strong evidence about the impact of licensing tobacco retailers on tobacco use, partly because tobacco outlets are so pervasive and policies in this area are just beginning to take shape. The density of tobacco outlets is positively associated with smoking rates, particularly among youths,[58–60] but causality has yet to be definitively ascertained. There is clearer evidence in the tobacco literature that strong licensing provisions that are actively enforced (through regular random compliance checks and imposition of penalties) are effective at limiting sales to minors because of the potential for license revocations or suspensions for violators.[61–63] Moreover, fees collected through the licensing systems provide steady revenues to support active oversight and enforcement by regulatory agencies.[62]

The alcohol literature demonstrates the benefits of outlet licensing more clearly; studies from various disciplines converge in showing a strong positive relationship between alcohol outlet density and alcohol misuse as well as unintentional injuries and crime.[28,64–66] The evidence is so strong that several national and regional health organizations, including the European Commission,[67] the World Health Organization,[68] and the US Department of Health and Human Services,[69] have included recommendations related to licensing restrictions in prevention plans.

Keeping the number of licenses small also helps control the cost of regulating these new businesses and enforcing compliance (because there are fewer entities to oversee). Fewer

licenses make it easier for the government to keep close records on each licensee, making it easier to discover anomalies in their books that could indicate diversion to underground markets.

Rules—even arbitrary, meddlesome, and pointless rules—can also create inefficiency in the industry, keeping costs and hence prices higher. Although normally this is viewed as a cost, not a benefit, of regulation, the welfare effects of higher prices are ambiguous when consumption of that good creates externalities. One could view the 3-tier alcohol supply system, which restricts those with a specific form of license (production, distribution, retail sale) from engaging in the business activities of the other licensees, in this light. This allows states to impose fees (or taxes) at different points in the supply chain and keep the industry from realizing efficiencies that would otherwise emerge from vertical integration.

Licensing retailers who engage in direct to consumer sales can be restricted in a variety of ways, as evidenced by existing alcohol and tobacco restrictions. For example, in the case of tobacco, licensing restricts the type of businesses that can sell tobacco, location of retailers (e.g., distance from schools, parks, and other youth venues), density of retailers (on the basis of, e.g., population and geography), and modes of sales (e.g., bans on vending machines and self-service). Similarly there are many restrictions on retailers of alcohol, including restrictions on locations, modes and hours of sale, and goods that can be sold.

Limit the Types of Products Sold

Although limiting the types of products sold are tied to licensing, regulators can easily overlook its value. An important lesson comes from tobacco policy, however. Although public health warnings have been posted on cigarette cartons since the 1960s, the government was unable to pass legislation allowing the US Federal Drug Administration to regulate the constituents of tobacco products until 2009. It has literally taken decades of scientific evidence for there to be enough political will for the government to step in, and just how the US Federal Drug Administration will use that power remains unclear.[70]

The lesson for marijuana may be to establish authorities' rights to impose regulations from the outset because of how difficult it can be to expand regulatory scope ex post. Subjects for regulation might include what is allowed to be in the product (e.g., additives, flavorings), methods of production (e.g., to reduce pesticides, mold, or other contaminants), "bundling" of marijuana with other inputs (e.g., edibles, nicotine), and limits on THC content. It might also be useful to consider whether high levels of THC can and should be allowed if accompanied by high levels of cannabinoids that are believed to offset some of the effects of THC, like cannabidiol. If governments wait to try to impose such product restrictions or leave the industry to regulate this itself, the outcome could be problematic, as profit motive will likely dominate decisions rather than consumer safety.

Both the alcohol and tobacco industry have developed products that are particularly appealing to youths. Examples include candy and gum cigarettes, alcohol pops, and wine coolers. It seems valuable to impose restrictions on marijuana products targeting youths similar to those imposed on the alcohol and tobacco industry. Although it may be impossible to think in advance of every possible product that could appeal to youths, examining current products would be a useful place to start. The medical marijuana industry already sells THC-infused chocolate bars, peanut butter cups, Rice Krispies treats, hard candies, and lollipops.

Attempt to Limit Marketing

The US doctrine of commercial free speech makes it difficult to limit advertising. However, bans on advertising, promotion, and sponsorship have been achieved in some areas (and in other countries) at times when significant harms were identified (e.g., tobacco and, to a lesser extent, hard liquor and sugary drinks). If the goal is to maintain antismoking norms and keep risk perceptions high to reduce youths' initiation and use of marijuana, comprehensive marketing restrictions can be justified. Moreover, if the federal ban on marijuana legalization remains, market restrictions may in fact be possible because of threat of sanctions from the federal government. (An August 29, 2013, memorandum from the US Department of Justice listed 8 enforcement priorities for federal prosecutors making decisions about marijuana cases in states that have legalized marijuana. One of the priorities is to target firms that not only sell marijuana to children but also market in a manner that is appealing to youths.) The alcohol and tobacco literature have demonstrated positive relationships between tobacco and alcohol advertising, promotion and sponsorship, and youths' use, including product placements in movies and on television and radio.[48,71–74] There is no reason to believe that marijuana marketing would not be equally appealing.

In light of evidence showing that partial restrictions on marketing are largely ineffective at reducing tobacco use because they just lead to a shift of expenditures to other forms of nonbanned marketing,[73] a comprehensive ban on all forms of marijuana marketing might be the ideal. Such an approach would encompass all forms of advertising (e.g., print, television, radio, transit, billboards, point-of-sale, Internet, and social media outlets), promotion (e.g., price discounting, coupons, free sample distribution), sponsorships, and other indirect forms of marketing (e.g., brand stretching, branded merchandise). Approaches for doing this are described in the World Health Organization Framework Convention on Tobacco Control Article 13 guidelines.[75] Additional restrictions recently placed on tobacco in other countries that might be considered for marijuana include complete bans on the retail display (as done in all Canadian provinces and territories, all Australian states and territories, Norway, the United Kingdom, and Iceland) and plain packaging policies (as done in Australia, effectively eliminating the use of the pack as a marketing tool). Such steps, which would arguably appear very restrictive for a relatively harmless product that had already been freely traded in the marketplace, would be minimal for a new product because of its first chance to be legally traded. Opinions differ on whether such marketing restrictions would withstand legal challenges in the United States, but it is clear that efforts to restrict marijuana marketing should be initiated before or at the time marijuana is legalized. Options may exist at that point that will no longer be possible after marijuana sales have become well established.

Restrict Public Consumption

Limiting consumption in public serves 2 purposes: it reduces secondhand exposure to smoked marijuana, and it reduces the extent to which marijuana use is seen by youths as

socially acceptable or normative. The value of reducing secondhand exposure to marijuana smoking is not something that science has clearly established in the way that reducing exposure to secondhand smoke from tobacco has been shown.[76] Nonetheless, nonusers are exposed through secondhand smoke and heavy passive exposure to marijuana can result in measurable THC concentrations in the nonusers' blood serum and urine.[77,78] However, the passive exposure is unlikely to lead to a failed urine test.[79] But for some, exposure to marijuana smoke is as offensive as exposure to tobacco smoke—regardless of the health implications of that exposure.

The second justification for limiting marijuana consumption in public places is the beneficial effect on youths' initiation. The tobacco literature shows that clean indoor air laws targeting public places that youths tend to congregate (e.g., concerts, sporting events, malls, and public transportation) are associated with reduced initiation and self-reported use of cigarettes among children and adolescents.[72,80] Even broad workplace clean indoor air laws (affecting restaurants and the like) have been shown to influence the smoking behavior of youths by influencing antismoking norms.[36] By limiting where marijuana can be consumed, regulators can reduce the exposure youths have to marijuana, perhaps making it less normative and more likely that youths delay initiation or never start at all.

Restrictions on where marijuana can be consumed could also reduce the probability that marijuana and alcohol be used concurrently. Because of the evidence on how concurrent use increases the risk of a traffic crash, restricting place of consumption could have important implications for impaired driving. For example, use could be restricted to establishments that do not allow alcohol to be consumed or to private residences. However, if concurrent use leads to a decrease in alcohol consumption for some individuals, this could also produce some benefits (e.g., reduction in aggression). We cannot predict how concurrent use will influence social welfare under legalization; researchers should pay close attention to this relationship.

Measure and Prevent Impaired Driving

Driving under the influence of marijuana can be dangerous. Even the National Organization for the Reform of Marijuana Laws includes "no driving" in its *Principles of Responsible Cannabis Use*.[81] In their review of research, Room et al. argue that the

> better controlled epidemiological studies have recently provided credible evidence that cannabis users who drive while intoxicated are at increased risk of motor-vehicle crashes.[82(p18)]

More recent literature reviews and meta-analyses reached the same conclusion.[10,83]

Although driving under the influence of marijuana can adversely affect psychomotor performance, the effect is much greater for those driving under the influence of alcohol.[16,84] Research has found that those under the influence of both marijuana and alcohol are at a much greater risk of a crash than are those under the influence of either by itself.[85] Some have argued that THC-impaired drivers compensate by driving more cautiously, but it is also true that it is very difficult to ascertain true impairment because impairment can be affected by a number of individual specific factors, including tolerance, amount of THC consumed, and mode of consumption.[11,86]

Part of the problem of measuring impairment relates to the substance itself and how it is metabolized in the body. The main psychoactive constituent in marijuana is THC, and although its acute psychoactive effects often last only a few hours, it remains detectable in blood for several hours and, for some chronic users, up to 7 days after use.[87] Furthermore, metabolites typically included in specific tests of urine are detectable for even longer.[85,87] Therefore, detection of use can occur well outside the window of impairment.

Although measurement of THC in blood concentration is broadly viewed as the gold standard because it correlates more closely with impairment,[87–89] obtaining blood is invasive and requires transporting the individual to a place where blood can be safely drawn. Urine samples are easier to collect but also a bit invasive, and they correlate less well with true impairment, particularly for cannabis. Oral fluid testing is the least invasive, but until recently these tests have not generated estimates that are as reliable when done in the field as when done in the lab.[90] Tool development continues, but it is a developing field.[88–89]

There is also the problem of determining what level of THC concentration in the blood is a reasonable level at which to say that someone is likely to be impaired. In the only study of its kind, an international team of scientists conducted a meta-analysis of the experimental and epidemiological research to develop a per se limit for THC in blood that would indicate comparable impairment to a blood alcohol concentration of 0.05%.[11] They concluded that a THC concentration in blood serum of 7 to 10 nanograms per milliliter (equivalent to a range of 3.5–5.0 ng/ml in whole blood) is comparable. Both Washington and Colorado set legal limits of THC for driving impairment to 5 nanograms per milliliter as measured in whole blood. Some toxicologists argue attempting to set legal limits for THC that approximate alcohol limits is a mistake.[11] The policy question is whether the allowable level should permit significant impairment for drivers (as the current case for alcohol, allowing driving at modest impairment levels below 0.08) or whether the legally allowable level for THC should be set at a very low level approximating zero impairment (currently in place for alcohol in the United States for drivers younger than 21 years).

If a serious campaign to reduce marijuana-impaired driving is to be undertaken, lessons can be learned from the alcohol literature, in which a variety of strategies have been tried, evaluated, and modified on the basis of prior experience, including alcohol-specific controls (e.g., per se laws, higher prices, higher minimum legal drinking age), enforcement (mandatory fines and jail times for offenders, sobriety check points), transportation (graduated licensing and safety belt laws), and media campaigns. Reviews have been conducted identifying successful and cost-effective strategies, such as raising beer prices and driving under the influence per se laws.[91–92] Reviews have also identified core elements of specific approaches that increase the likelihood of success, such as the meta-analysis by Elder et al.[93] that identified the following: careful planning, solid execution, significant audience exposure, concurrent ongoing prevention activities, and active and visible enforcement of drunk driving laws.

KEY INSIGHTS AND AREAS FOR FUTURE RESEARCH

Reasonable people can disagree about the merits of legalizing marijuana. There is

tremendous uncertainty about its consequences, and individuals hold different beliefs about the value of tangible outcomes (e.g., dependence and psychotic symptoms) and other outcomes such as greater intoxication and personal freedom. We have not taken a position about whether marijuana legalization is a good or bad idea or whether a particular perspective is more or less relevant. Rather, we have provided a starting point for the public health community to start thinking about how specific public and safety goals might be approached under a legal regime and the range of policy options that could be considered in light of them. We have focused on 5 objectives that we hear frequently discussed in legalization debates, and we discussed various regulatory approaches that have been shown to contribute to achieving similar objectives for tobacco and alcohol.

Table 1 summarizes the discussion in "Insights From Alcohol and Tobacco," linking specific regulatory approaches (in terms of evidence of effectiveness) to each of the 5 public health goals. The approaches are not necessarily mutually exclusive. Furthermore, not all of these approaches influence specific goals in the same way or to the same magnitude. Some regulations target a particular behavior directly (e.g., higher prices to decrease youths' use and dependence and impaired driving regulations to reduce drugged driving), whereas others do so indirectly (limits on products sold to reduce the appeal of products to children and, hence, youths' use and future dependence). It is expected that larger effects will be observed when the links are direct or coupled with strong monitoring of compliance and enforcement.

The alcohol and tobacco literature are germane to other issues raised by legalization, such as the design of an overall prevention strategy and strategies for minimizing the criminalization of youths. In some cases, lessons may translate easily because of similarities in the nature of the behaviors or substances (e.g., the continuum of lower risk to higher risk behavior with alcohol consumption or specific alcohol products). However, in other cases the parallels are imperfect. For example, the strategy of reaching a cooperative agreement with the industry self-restricting advertising is greatly complicated because the marijuana industry is highly fragmented, with many small firms instead of a few dominant players. So, although it is valuable to look to the tobacco and alcohol control models, one must be mindful of how the substances' markets differ in terms of the behavior of users and the behavior of suppliers. Society has cycled through different policy approaches with alcohol and tobacco, with times of unregulated free markets, prohibition on production and sales (in the case of alcohol), and proactive regulation; so much can be learned from the experiences of regulating these substances.

However, researchers and agencies must exert greater effort to help evaluate alternative strategies. In particular, more research is needed—and soon—on the relationship between alcohol and marijuana. Notably, one can find studies that support the conclusion that the goods are economic substitutes or that they are complements; the fact is that scientists are still grappling with this question and have not reached a consensus. Furthermore, past research simply does not address the current circumstance, as legalization of commercial marijuana production is unprecedented and could bring many changes (e.g., a substantial decline in marijuana price) that has not been part of the equation when evaluating previous policy changes.

Greater effort needs to be given to data collection in states adopting legalization to assess the impact of regulations and how they are enforced on the use of intoxicating substances. Data tracking marijuana prices, marijuana potency, other cannabinoid constituents, methods of consumption (e.g., smoking a marijuana cigarette vs using e-cigarette–like devices with hash oil), youths' exposure to advertising, commerce among youths, and the like, can provide valuable information for understanding the effects of these policies. Nevertheless, another lesson from the tobacco and alcohol experience is that the full implications of policy changes may not manifest within the first 10 years—let alone the first few years. There can be important consequences that accumulate slowly over time, through generational replacement and industry adaptation.

Finally, even though the current science does not suggest marijuana is as harmful as alcohol or tobacco, there is general agreement among us that if a jurisdiction is going to experiment with something other than prohibition, a restrictive regulatory approach is preferred. (Note that it is possible to regulate while only allowing nonprofit producers and sellers. Jurisdictions have a choice about whether they want to allow for-profit companies to supply the market.) On the basis of the US experience with alcohol and tobacco, in which products were directly marketed and promoted to children, new products were developed to entice young users, and high outlet density led to normalized beliefs and increased use, it seems more prudent from a public health perspective to open up the marijuana market slowly, with tight controls to test the waters and prevent

TABLE 1—Linking Regulatory Approaches to Public Health Objectives

	Public Health Objective to Minimize				
Regulatory Choices	Youths' Access and Use	Drugged Driving	Dependence and Addiction	Unwanted Contaminants and Uncertain Potency	Concurrent Use of Marijuana and Alcohol[a]
Increase prices	X	X	X		?
Create state monopoly	X	X	X	X	X
Restrict and monitor licenses and licensees	X	X	X	X	X
Limit products sold	X	X	X	X	
Limit marketing	X	X	X		X
Restrict public consumption	X	X	X		X
Measure and prevent impaired driving		X			X

[a]It is impossible to predict how concurrent use will influence social welfare under legalization, but because of the existing evidence it seems appropriate, at least initially, to minimize the concurrent use of marijuana and alcohol in public.

gross commercialization of the good too soon. If history is any guide, a laissez-faire approach could generate a large increase in misuse and consequent health and social problems. ■

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NEEDHAM PUBLIC HEALTH

Memorandum

To: Needham Board of Health
From: Rachel Massar, Emily Pasco-Anderson, Public Health Interns
Needham Public Health Department Staff
Re: Overview and Analysis of 2014 MetroWest Adolescent Health Survey Results

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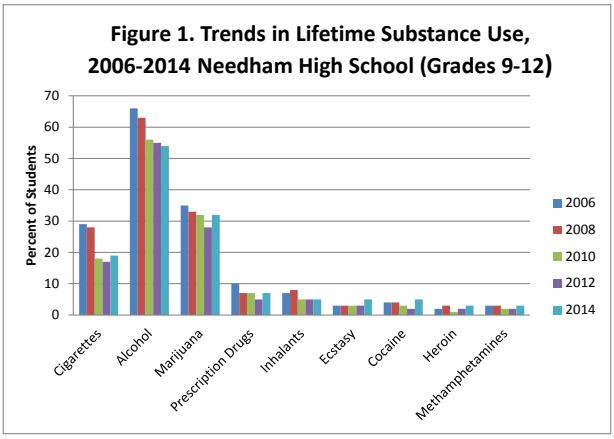
The MetroWest Health Foundation has sponsored a detailed biennial survey of middle and high school students in the 25 cities and towns which comprise the MetroWest region.[1] This survey, first administered in fall 2006, collects information from students about their mental health, nutrition, safety, sexual activities, sleep, and substance use, among other topics. The survey results present a rich trove of data on youth activities and perceptions, and help to inform the Town's efforts across many municipal departments to educate, protect, and support its young residents.

Substance Use

Substance use rates among Needham High School students reported in the MetroWest Adolescent Health Survey (MWAHS) followed a steady downward trend from 2006 to 2012, but the data from 2014 revealed an across-the-board increase in substance use among Needham High School students as seen in Figure 1. In particular, the lifetime substance use rates reported by high school students for cigarettes (19%), marijuana (32%), and prescription drug misuse (7%) were all slightly higher than previously reported in 2012.



[1] The MetroWest Health Foundation's service area includes the communities of Ashland, Bellingham, Dover, Framingham, Franklin, Holliston, Hopedale, Hopkinton, Hudson, Marlborough, Medfield, Medway, Mendon, Milford, Millis, Natick, **Needham**, Norfolk, Northborough, Sherborn, Southborough, Sudbury, Wayland, Wellesley, and Westborough.

Needham High School substance use rates were slightly higher than the MetroWest area rates for cigarette smoking, binge drinking, and marijuana use. This is notable since rates of substance use in Needham were slightly lower than those of the MetroWest region in the past. In addition, there are also significant differences in substance use by sex and age. In general, males tend to have higher rates of substance use than females, and substance use increases substantially by grade level.

The abuse of prescription drugs and opioids is a pressing public health concern across the state of Massachusetts and within the Needham community. The 2014 MWAHS revealed a 50% increase in lifetime misuse of both prescription drugs and use of heroin among Needham High School students. Specifically, lifetime misuse of prescription drugs increased from 70 students in 2012 to 104 students in 2014 and lifetime heroin use increased from 29 students in 2012 to 45 students in 2014. This is an important trend to watch closely as the Commonwealth of Massachusetts declared an opioid epidemic in late spring 2015.

The 2014 iteration of the MWAHS is the first year in which youths were posed questions about usage of e-cigarettes. These questions revealed a new area of concern for school and public health officials; 29% of high school students reported that they have smoked e-cigarettes in their lifetime, and 17% currently smoke e-cigarettes. Additionally, e-cigarettes (6% usage rate) are twice as popular with 7th and 8th grade students as traditional nicotine cigarettes (3% usage rate).

Alcohol continues to be the most popular substance among high school students; the report shows that 54% Needham High School students have drank alcohol in their lifetime. Furthermore, 35% of high school students reported drinking alcohol recently, and 20% reported recent binge drinking.

Mental Health

Mental health rates, similar to substance use rates, increased in many categories in 2014, undercutting gains over the previous eight years. Reports of mental health issues including stress and depressive symptoms returned to previous levels after showing improvement from 2006 to 2012. In general, females are more likely to report mental health issues than males, and there is a substantial increase in mental health issues by grade level, a trend which mirrors substance use.

High school students who reported that their life was very stressful in the past 30 days decreased from 2006 (32%) to 2010 (25%), but have returned to higher levels in 2014 (32%). Females were more likely to report stress than males (45% vs. 18%). The most common source of stress reported by high school students was "worrying about school" (63%).

Reports of depressive symptoms among high school students had also decreased from 2006 (19%) to 2012 (14%), but have since increased in 2014 (19%). While

12% of high school students reported self-injury in the past 12 months, 42% reported concern that a peer would hurt themselves. Similarly, although only 5% of 7th and 8th grade students reported self-injury, 23% reported concern that a peer would hurt themselves and 21% reported concern that a peer would hurt someone else. Reports of self-injury and suicidality have remained similar among high school students since 2006 at 11-13% and 9-11% respectively.

Sexual Behavior

18% of Needham High School teens are currently sexually active, while 22% have ever been sexually active. Although these numbers have not changed significantly, the rate of students ever having STDs has continued to increase, from 1% in 2006, to 1.9% in 2014. The 2014 data showed a concerning trend of higher rates of forced sexual contact since 2012, from 3.6% to 4.9%. This is above the rate for the MetroWest region, which is at 4.6%. In addition, more students are feeling pressured to send "sexts;" 5.9% to 9.8% between 2012 and 2014. These changes are reflected across the United States, and could be considered as bullying, cyberbullying, or even sexual harassment.

Cyberbullying

Cyberbullying is an increasingly important issue for Needham High School students, rising slightly from 15% in 2006 to 18% in 2014. Females are more likely to be report being victims of cyberbullying than males (21% vs. 14%), with reports of cyberbullying being the highest among 9th grade students. This is an area of public health that should be closely monitored as technology and social media become more popular and heavily used. Cyberbullying creates a new platform for harassment- perpetrators are able to hide behind anonymity, which encourages them to say hurtful things that they wouldn't have otherwise said.

Body Perception

According to the 2014 data, 25% of students overall (29% females and 20% males) have described themselves as slightly/very overweight, while 38% of students (54% females and 22% males) are trying to lose weight. However, only 12% of students (11% females and 14% males) are actually overweight, and 5% (3% of females and 8% of males) are obese. The weight perception versus actual weight of these students is skewed, especially within the female population. This issue is important to address as pop culture becomes more obsessed with weight loss, dieting, and having "the perfect body," which is not accurately representative of the average human physique. The social pressure that this imposes on the young female population generates an entirely new spectrum of stress and dissatisfaction that may lead to mental disorders such as anorexia and bulimia, which are occurring with higher frequencies than in previous generations due the sensationalized media surrounding the "ideal" body.

Distracted Driving

Despite having state laws that ban anyone under the age of 18 from using any cellular device while driving, this data shows that a significant percent of the

Needham High School student body has either admitted to driving distracted (using their cellphones) or has driven with someone who was using their cellphone. 35% of 11th and 12th grade drivers reported that they have texted while driving, and 31% rode in a car with a high school driver who was texting while driving. More 12th graders reported texting while driving compared to 11th graders (45% vs. 24%). Reports of riding with a driver who was texting while driving has increased steadily from 2010 (22%) to 2012 (29%) to 2014 (31%). As Needham and the surrounding MetroWest area becomes more populated, it is important to keep drivers, especially younger drivers, focused on their surroundings to avoid hurting not only themselves, but those around them as well.

Conclusion

The MWAHS results are a valuable tool for the Town of Needham to assess the status of adolescent health related behaviors, evaluate current efforts, and inform future initiatives. The 2014 results illuminated several areas of adolescent health that deserve attention. In particular, rates of substance use and overall mental health issues (including both stress and body perception) among high school students are on the rise after several years of improvement. These results suggest the need to evaluate of Needham's current substance use and mental health prevention methods and identify possible areas of improvement. Considering the strict regulations that exist in Needham to prevent youths' access to substances including tobacco products, the increase in substance use among Needham youth points to factors besides availability. Furthermore, adolescent issues of mental health are not to be ignored, as high levels of stress may lead to unhealthy and possibly dangerous coping mechanisms for students. Public Health efforts will not only require the inclusion of school staff and counselors for education and prevention, but also from town law enforcement and local government- students must understand and abide by the policies that prevent distracted driving. This collaborative approach across the Town's many municipal departments and schools is necessary to consider reevaluate current efforts in place. By working together, the Town of Needham can address these issues, and ensure that Needham's youth is healthy and vibrant.

NEEDHAM MIDDLE SCHOOL 2014 MWAHS

SUBSTANCE USE X MENTAL HEALTH CROSSTABS - 6/26/15

	% of youth substace users reporting mental health problems	% of youth **non**substance users reporting mental health problems	p-value from Chi-Squared test
STRESS (life " very stressful" in past 30 days)			
Cigarette use (lifetime)	8.7	8.4	n/a
Alcohol use (lifetime)	15.4	7.7	0.032
Marijuana use (lifetime)	15.4	8.3	n/a
Prescription drug misuse (lifetime)	16.7	8.4	n/a
Inhalant use (lifetime)	11.1	8.4	n/a
DEPRESSIVE SYMPTOMS (past 12 months)			
Cigarette use (lifetime)	17.4	8.9	n/a
Alcohol use (lifetime)	24.6	7.7	<0.001
Marijuana use (lifetime)	15.4	9.1	n/a
Prescription drug misuse (lifetime)	50.0	8.9	n/a
Inhalant use (lifetime)	33.3	9.0	n/a
SELF-INJURY (past 12 months)			
Cigarette use (lifetime)	8.7	4.7	n/a
Alcohol use (lifetime)	9.2	4.4	n/a
Marijuana use (lifetime)	15.4	4.7	n/a
Prescription drug misuse (lifetime)	16.7	4.8	n/a
Inhalant use (lifetime)	22.2	4.7	n/a
SERIOUSLY CONSIDERED SUICIDE (lifetime)			
Cigarette use (lifetime)	17.4	7.7	n/a
Alcohol use (lifetime)	20.6	6.8	<0.001
Marijuana use (lifetime)	38.5	7.4	n/a
Prescription drug misuse (lifetime)	50.0	7.6	n/a
Inhalant use (lifetime)	22.2	7.8	n/a
ATTEMPTED SUICIDE (lifetime)			
Cigarette use (lifetime)	4.3	1.4	n/a
Alcohol use (lifetime)	3.1	1.4	n/a
Marijuana use (lifetime)	7.7	1.4	n/a
Prescription drug misuse (lifetime)	16.7	1.4	n/a
Inhalant use (lifetime)	0.0	1.5	n/a

if p<.05, then the difference in mental health between users and nonusers is statistically significant.
n/a means that the number of youth reporting the behaviors is too small to compute a p value.

NEEDHAM MIDDLE SCHOOL 2014 MWAHS

SUBSTANCE USE X MENTAL HEALTH CROSSTABS - 6/25/15

	% of youth **with** mental health problems reporting substance use	% of youth **without** mental health problems reporting substance use	p-value from Chi-Squared test
CIGARETTE SMOKING (lifetime)			
Stress (past 30 days)	3.0	2.9	n/a
Depressive symptoms (past 12 months)	5.6	2.7	n/a
Self-injury (past 12 months)	5.3	2.8	n/a
Seriously considered suicide (past 12 months)	6.5	2.6	n/a
Attempted suicide (past 12 months)	8.3	2.8	n/a
ALCOHOL USE (lifetime)			
Stress (past 30 days)	15.2	7.6	0.032
Depressive symptoms (past 12 months)	22.2	6.8	<0.001
Self-injury (past 12 months)	15.8	7.9	n/a
Seriously considered suicide (past 12 months)	21.0	7.0	<0.001
Attempted suicide (past 12 months)	16.7	8.0	n/a
MARIJUANA USE (lifetime)			
Stress (past 30 days)	3.0	1.5	n/a
Depressive symptoms (past 12 months)	2.7	1.5	n/a
Self-injury (past 12 months)	5.1	1.5	n/a
Seriously considered suicide (past 12 months)	8.1	1.1	n/a
Attempted suicide (past 12 months)	8.3	1.5	n/a
PRESCRIPTION DRUG MISUSE (lifetime)			
Stress (past 30 days)	1.5	0.7	n/a
Depressive symptoms (past 12 months)	4.1	0.0	n/a
Self-injury (past 12 months)	2.6	0.7	n/a
Seriously considered suicide (past 12 months)	4.8	0.4	n/a
Attempted suicide (past 12 months)	8.3	0.6	n/a
Inhalant USE (lifetime)			
Stress (past 30 days)	1.5	1.1	n/a
Depressive symptoms (past 12 months)	4.1	0.8	n/a
Self-injury (past 12 months)	5.1	0.9	n/a
Seriously considered suicide (past 12 months)	3.2	1.0	n/a
Attempted suicide (past 12 months)	0.0	1.2	n/a

if p<.05, then the difference in mental health between users and nonusers is statistically significant.
n/a means that the number of youth reporting the behaviors is too small to compute a p value.

NEEDHAM HIGH SCHOOL 2014 MWAHS

SUBSTANCE USE X MENTAL HEALTH CROSSTABS - 6/24/15

	% of users	% of nonusers	p-value from Chi-Squared test
STRESS (life " very stressful" in past 30 days)			
Cigarette use (past 30 days)	45.0	30.8	0.002
Alcohol use (past 30 days)	40.0	27.6	<0.001
Marijuana use (past 30 days)	39.3	29.9	0.002
Prescription drug misuse (past 30 days)	47.5	31.3	0.008
Heroin use (lifetime)	40.0	31.7	0.266, ns
Methamphetamine use (lifetime)	46.7	31.5	0.032
DEPRESSIVE SYMPTOMS (past 12 months)			
Cigarette use (past 30 days)	43.4	16.8	<0.001
Alcohol use (past 30 days)	22.9	16.8	0.004
Marijuana use (past 30 days)	28.4	16.3	<0.001
Prescription drug misuse (past 30 days)	55.6	17.1	<0.001
Heroin use (lifetime)	40.9	18.1	<0.001
Methamphetamine use (lifetime)	36.2	18.3	0.002
SELF-INJURY (past 12 months)			
Cigarette use (past 30 days)	33.0	10.5	<0.001
Alcohol use (past 30 days)	13.1	11.9	0.491, ns
Marijuana use (past 30 days)	19.0	10.5	<0.001
Prescription drug misuse (past 30 days)	36.5	11.2	<0.001
Heroin use (lifetime)	34.1	11.7	<0.001
Methamphetamine use (lifetime)	31.9	11.7	<0.001
SERIOUSLY CONSIDERED SUICIDE (past 12 months)			
Cigarette use (past 30 days)	31.3	9.2	<0.001
Alcohol use (past 30 days)	12.4	10.2	0.209, ns
Marijuana use (past 30 days)	16.8	9.4	<0.001
Prescription drug misuse (past 30 days)	27.0	10.1	<0.001
Heroin use (lifetime)	34.1	10.1	n/a
Methamphetamine use (lifetime)	27.7	10.4	<0.001
ATTEMPTED SUICIDE (past 12 months)			
Cigarette use (past 30 days)	11.6	2.6	n/a
Alcohol use (past 30 days)	5.1	2.4	0.007
Marijuana use (past 30 days)	7.7	2.2	<0.001
Prescription drug misuse (past 30 days)	24.2	2.5	n/a
Heroin use (lifetime)	27.3	2.6	n/a
Methamphetamine use (lifetime)	25.5	2.6	n/a

if p<.05, then the difference in mental health between users and nonusers is statistically significant.
n/a means that the number of youth reporting the behaviors is too small to compute a p value.

NEEDHAM HIGH SCHOOL 2014 MWAHS

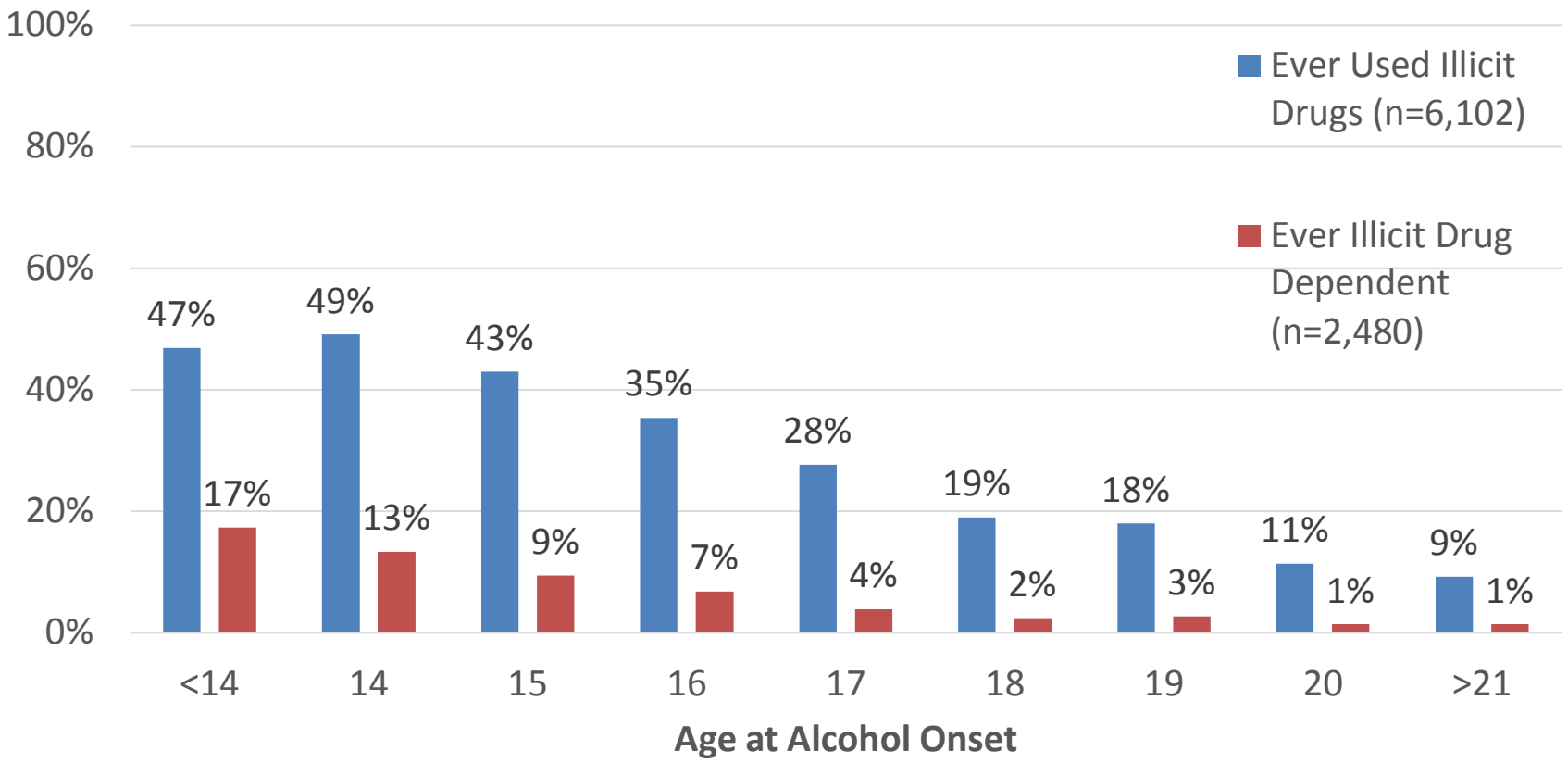
SUBSTANCE USE X MENTAL HEALTH CROSSTABS - 6/24/15

	% of youth **with** mental health problem reporting substance use	% of youth **without** mental health problem reporting substance use	p-value from Chi-Squared test
CIGARETTE SMOKING (past 30 days)			
Stress (past 30 days)	10.6	6.1	0.002
Depressive symptoms (past 12 months)	17.8	5.4	<0.001
Self-injury (past 12 months)	20.7	5.8	<0.001
Seriously considered suicide (past 12 months)	22.0	5.9	<0.001
Attempted suicide (past 12 months)	27.1	7.1	n/a
ALCOHOL USE (past 30 days)			
Stress (past 30 days)	43.8	30.7	<0.001
Depressive symptoms (past 12 months)	42.2	33.2	0.004
Self-injury (past 12 months)	37.2	34.6	0.491, ns
Seriously considered suicide (past 12 months)	39.4	34.4	0.209, ns
Attempted suicide (past 12 months)	53.1	34.4	0.007
MARIJUANA USE (past 30 days)			
Stress (past 30 days)	26.5	19.2	0.002
Depressive symptoms (past 12 months)	32.5	19.2	<0.001
Self-injury (past 12 months)	33.3	20.0	<0.001
Seriously considered suicide (past 12 months)	33.1	20.2	<0.001
Attempted suicide (past 12 months)	49.0	20.6	<0.001
PRESCRIPTION DRUG MISUSE (past 30 days)			
Stress (past 30 days)	6.2	3.2	0.008
Depressive symptoms (past 12 months)	12.8	2.4	<0.001
Self-injury (past 12 months)	12.8	3.1	<0.001
Seriously considered suicide (past 12 months)	10.8	3.6	<0.001
Attempted suicide (past 12 months)	30.6	3.4	n/a
HEROIN USE (lifetime)			
Stress (past 30 days)	3.4	2.4	0.266, ns
Depressive symptoms (past 12 months)	6.5	2.2	<0.001
Self-injury (past 12 months)	8.3	2.3	<0.001
Seriously considered suicide (past 12 months)	9.5	2.2	n/a
Attempted suicide (past 12 months)	24.5	2.3	n/a
METHAMPHETAMINE USE (lifetime)			
Stress (past 30 days)	4.5	2.4	0.032
Depressive symptoms (past 12 months)	6.2	2.5	0.002
Self-injury (past 12 months)	8.3	2.5	<0.001
Seriously considered suicide (past 12 months)	8.2	2.6	<0.001
Attempted suicide (past 12 months)	24.5	2.5	n/a

if p<.05, then the difference in mental health between users and nonusers is statistically significant.
n/a means that the number of youth reporting the behaviors is too small to compute a p value.

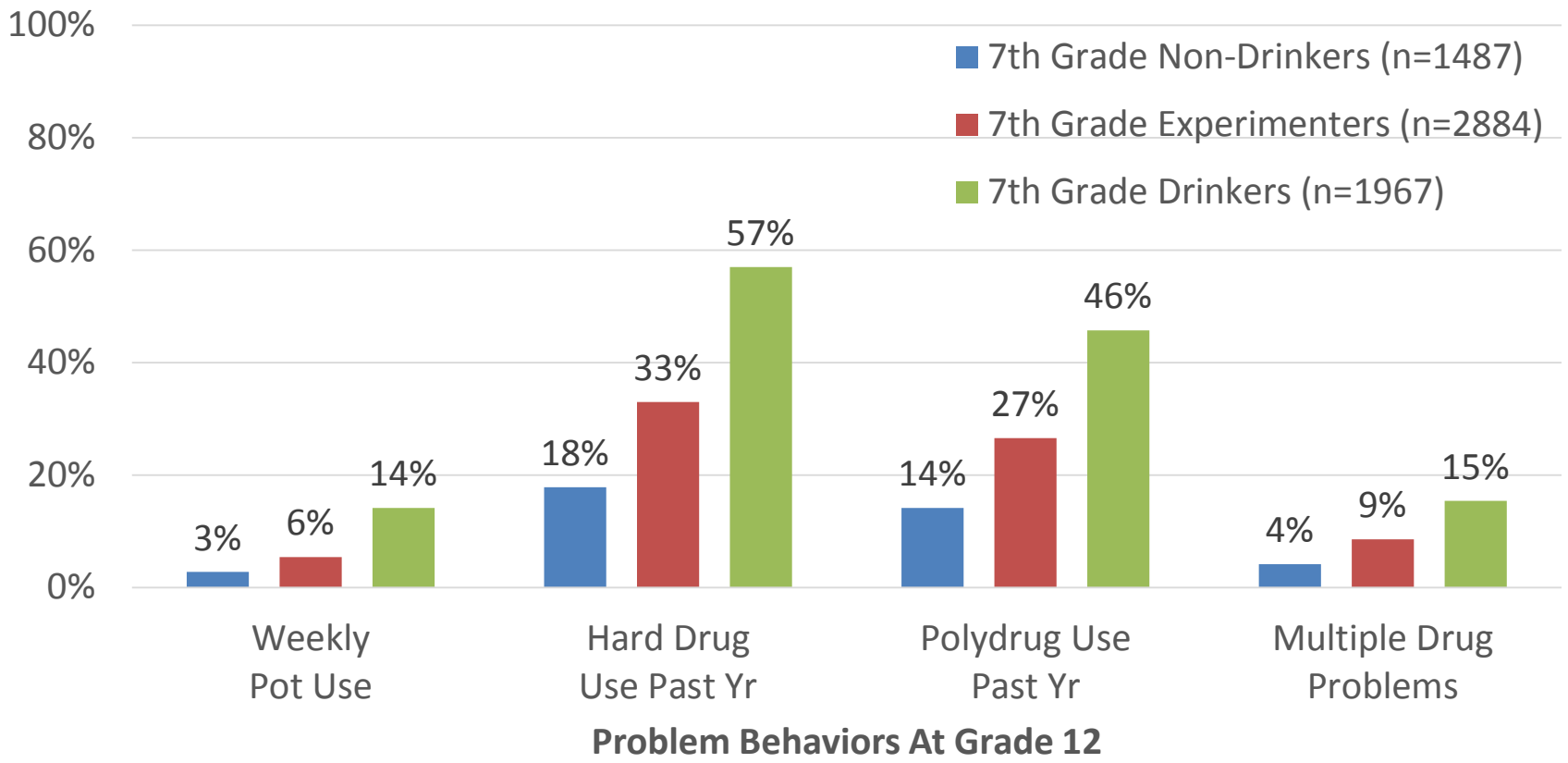
Key National Data on Youth Alcohol Use

Early Alcohol Use Increases Likelihood of Illicit Drug Use and Dependence*



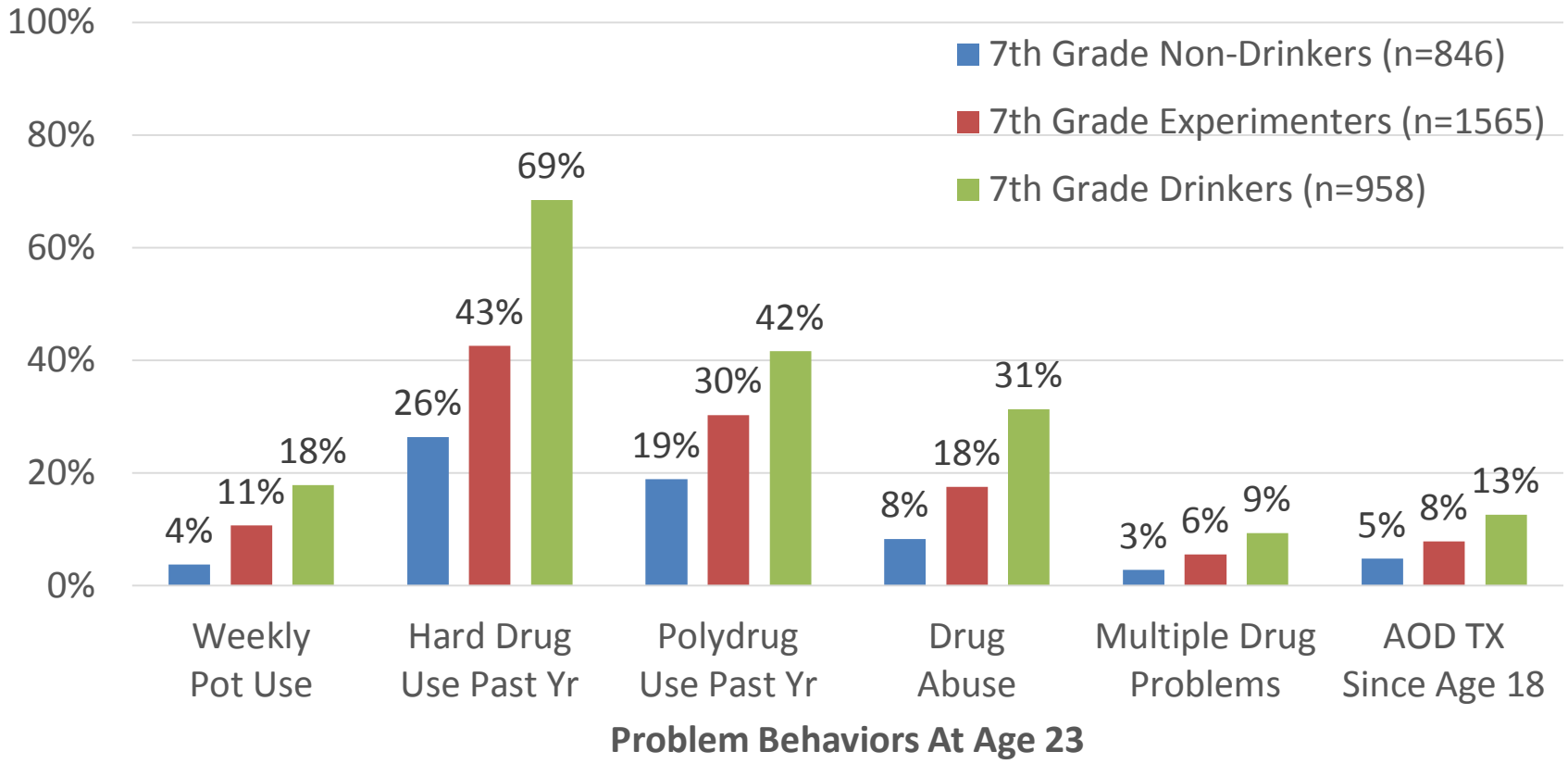
* Hingson, R.W., Heeren, T., & Edwards, E.M. (2008). Age at drinking onset, alcohol dependence, and their relation to drug use and dependence, driving under the influence of drugs, and motor-vehicle crash involvement because of drugs. *Journal of Studies on Alcohol and Drugs*, Mar;69(2):192-201.

Problem Behaviors in 12th Grade Based on 7th Grade Drinking Status*



* Ellickson, P.L., Tucker, J.S., & Klein, D.J. (2003). Ten-Year Prospective Study of Public Health Problems Associated with Early Drinking. *Pediatrics*, May;111(5):949-955.

Problem Behaviors at Age 23
Based on 7th Grade Drinking Status*



* Ellickson, P.L., Tucker, J.S., & Klein, D.J. (2003). Ten-Year Prospective Study of Public Health Problems Associated with Early Drinking. *Pediatrics*, May;111(5):949-955.

2014 MWAHS
Pollard Middle School Key Indicators

Pollard Middle School, Needham (Grades 7-8)
2006-2014 Trends in Key Indicators*

	Year of Survey (%)				
	2006 *(654)*	2008 *(653)*	2010 *(772)*	2012 *(787)*	2014 *(804)*
SUBSTANCE USE					
Lifetime cigarette smoking	6.9	6.6	5.7	5.5	2.9
Current cigarette smoking (past 30 days)	3.4	2.0	2.0	1.6	0.4
Lifetime alcohol use	19.7	19.8	14.8	13.6	8.3
Current alcohol use (past 30 days)	8.1	6.3	6.4	6.2	1.9
Binge drinking (past 30 days)†	2.3	2.0	2.0	0.9	0.4
Rode with driver who had been drinking (lifetime)	14.9	15.8	15.5	12.5	15.3
Lifetime marijuana use	3.5	3.3	4.3	3.5	1.6
Current marijuana use (past 30 days)	2.6	2.0	3.0	1.9	0.8
Lifetime inhalant use	13.4	6.8	7.1	3.3	1.1
VIOLENCE					
Physical fighting (lifetime)	45.4	42.3	36.9	39.3	31.7
Physical fighting on school property (lifetime)	20.3	14.9	12.3	9.5	7.1
Carried a weapon (lifetime)	12.6	10.9	8.8	10.8	9.8
Carried weapon on school property (lifetime)	2.8	2.5	1.2	1.3	0.7
BULLYING VICTIMIZATION					
Bullying victim (past 12 months)	46.1	46.4	30.4	22.2	19.2
Bullying victim on school property (past 12 months)	41.0	41.6	24.1	16.5	12.5
Cyberbullying victim (past 12 months)	17.3	14.9	11.5	14.6	14.1
MENTAL HEALTH					
Life "very" stressful (past 30 days)	12.4	10.2	10.6	10.2	8.5
Depressive symptoms (past 12 months)	12.8	9.4	8.5	8.6	9.2
Self-injury (past 12 months)	4.5	5.6	4.4	4.9	4.9
Considered suicide (lifetime)	8.0	7.6	8.1	8.1	7.9
Attempted suicide (lifetime)	2.5	1.7	1.7	1.3	1.5
PHYSICAL ACTIVITY AND BODY WEIGHT					
Exercised for ≥20 minutes on 3 or more days/week	81.3	83.3	81.7	83.7	89.1
Overweight or obese‡	16.3	12.8	14.8	16.8	13.0

* *Source: MetroWest Adolescent Health Survey*

† *Consumed 5 or more drinks in a row on one or more occasions*

‡ *Students who were ≥85th percentile for body mass index by age and gender, based on reference data*

Pollard Middle School, Needham (Grades 7-8)
2014 Gender Patterns for Key Indicators*

	Gender (%)		Total (%)
	Female	Male	
	(400)	*(403)*	*(804)*
SUBSTANCE USE			
Lifetime cigarette smoking	2.3	3.5	2.9
Current cigarette smoking (past 30 days)	0.0	0.8	0.4
Lifetime alcohol use	5.8	10.8	8.3
Current alcohol use (past 30 days)	0.8	3.0	1.9
Binge drinking (past 30 days)†	0.3	0.5	0.4
Rode with driver who had been drinking (lifetime)	14.6	16.0	15.3
Lifetime marijuana use	0.8	2.5	1.6
Current marijuana use (past 30 days)	0.3	1.3	0.8
Lifetime inhalant use	1.5	0.8	1.1
VIOLENCE			
Physical fighting (lifetime)	15.7	47.4	31.7
Physical fighting on school property (lifetime)	2.8	11.5	7.1
Carried a weapon (lifetime)	4.3	15.3	9.8
Carried weapon on school property (lifetime)	0.0	1.5	0.7
BULLYING VICTIMIZATION			
Bullying victim (past 12 months)	21.3	17.3	19.2
Bullying victim on school property (past 12 months)	14.2	10.8	12.5
Cyberbullying victim (past 12 months)	18.5	9.7	14.1
MENTAL HEALTH			
Life "very" stressful (past 30 days)	10.8	6.3	8.5
Depressive symptoms (past 12 months)	11.6	6.8	9.2
Self-injury (past 12 months)	6.5	3.3	4.9
Considered suicide (lifetime)	9.9	5.8	7.9
Attempted suicide (lifetime)	1.8	1.3	1.5
PHYSICAL ACTIVITY AND BODY WEIGHT			
Exercised for ≥20 minutes on 3 or more days/week	86.5	91.7	89.1
Overweight or obese‡	10.4	15.4	13.0

* *Source: MetroWest Adolescent Health Survey*

† *Consumed 5 or more drinks in a row on one or more occasions*

‡ *Students who were ≥85th percentile for body mass index by age and gender, based on reference data*

Pollard Middle School, Needham (Grades 7-8)
2014 Grade Patterns for Key Indicators*

	Grade (%)		Total (%)
	7th (373)	8th (431)	(804)
SUBSTANCE USE			
Lifetime cigarette smoking	2.7	3.0	2.9
Current cigarette smoking (past 30 days)	0.5	0.2	0.4
Lifetime alcohol use	6.2	10.1	8.3
Current alcohol use (past 30 days)	1.9	1.9	1.9
Binge drinking (past 30 days)†	0.3	0.5	0.4
Rode with driver who had been drinking (lifetime)	10.9	19.2	15.3
Lifetime marijuana use	1.3	1.9	1.6
Current marijuana use (past 30 days)	0.5	0.9	0.8
Lifetime inhalant use	1.1	1.2	1.1
VIOLENCE			
Physical fighting (lifetime)	28.1	34.8	31.7
Physical fighting on school property (lifetime)	7.8	6.5	7.1
Carried a weapon (lifetime)	9.2	10.3	9.8
Carried weapon on school property (lifetime)	0.0	1.4	0.7
BULLYING VICTIMIZATION			
Bullying victim (past 12 months)	19.2	19.2	19.2
Bullying victim on school property (past 12 months)	13.0	12.0	12.5
Cyberbullying victim (past 12 months)	13.7	14.4	14.1
MENTAL HEALTH			
Life "very" stressful (past 30 days)	4.8	11.8	8.5
Depressive symptoms (past 12 months)	6.2	11.8	9.2
Self-injury (past 12 months)	4.8	5.0	4.9
Considered suicide (lifetime)	6.5	9.0	7.9
Attempted suicide (lifetime)	1.6	1.4	1.5
PHYSICAL ACTIVITY AND BODY WEIGHT			
Exercised for ≥20 minutes on 3 or more days/week	90.4	88.0	89.1
Overweight or obese‡	11.1	14.5	13.0

* *Source: MetroWest Adolescent Health Survey*

† *Consumed 5 or more drinks in a row on one or more occasions*

‡ *Students who were ≥85th percentile for body mass index by age and gender, based on reference data*

2014 MWAHS
Needham High School Key Indicators

Needham High School (Grades 9-12)
2006-2014 Trends in Key Indicators*

	Year of Survey (%)				
	2006 *(1,281)*	2008 *(1,285)*	2010 *(1,326)*	2012 *(1,403)*	2014 *(1,490)*
SUBSTANCE USE					
Lifetime cigarette smoking	29.1	28.3	17.9	16.8	19.3
Current cigarette smoking (past 30 days)	12.9	10.3	6.7	5.5	7.7
Lifetime alcohol use	66.1	63.5	55.8	55.1	54.0
Current alcohol use (past 30 days)	45.2	43.5	36.4	34.9	35.0
Binge drinking (past 30 days)†	27.7	25.0	23.0	21.3	19.7
Rode with driver who had been drinking (past 30 days)	23.5	21.1	17.7	15.1	16.3
Lifetime marijuana use	35.2	33.3	32.4	28.0	32.1
Current marijuana use (past 30 days)	24.8	23.7	22.9	19.4	21.8
Lifetime prescription drug misuse‡	10.5	7.4	6.5	4.6	6.7
VIOLENCE					
Physical fighting (past 12 months)	20.3	20.6	17.0	12.8	14.0
Physical fighting on school property (past 12 months)	6.9	6.3	5.0	4.1	4.2
Carried a weapon (past 30 days)	4.7	5.2	3.9	4.7	5.6
Carried a weapon on school property (past 30 days)	2.4	2.9	2.3	2.5	2.7
BULLYING VICTIMIZATION					
Bullying victim (past 12 months)	29.0	31.7	28.4	20.1	18.0
Bullying victim on school property (past 12 months)	25.1	27.3	24.2	15.7	13.9
Cyberbullying victim (past 12 months)	15.1	17.9	18.2	15.9	18.0
MENTAL HEALTH					
Life "very" stressful (past 30 days)	32.4	25.4	25.2	26.8	31.9
Depressive symptoms (past 12 months)	19.5	18.0	16.6	14.1	18.9
Self-injury (past 12 months)	11.4	12.2	12.0	12.5	12.3
Considered suicide (past 12 months)	11.2	9.5	10.2	10.3	11.0
Attempted suicide (past 12 months)	3.2	3.5	2.2	3.3	3.4
SEXUAL BEHAVIOR					
Lifetime sexual intercourse	21.3	21.1	20.3	18.8	22.5
Currently sexually active (past 3 months)	15.9	17.4	16.2	15.0	18.1
Condom use at last intercourse (among sexually active youth)	64.8	72.2	75.2	66.5	68.7
PHYSICAL ACTIVITY AND BODY WEIGHT					
Exercised for ≥60 minutes on 5 or more days/week	33.8	36.4	45.3	57.5	56.5
Overweight or obese§	16.8	16.8	14.9	15.7	17.5

* *Source: MetroWest Adolescent Health Survey*

† *Consumed 5 or more drinks in a row on one or more occasions*

‡ *Without a doctor's prescription*

§ *Students who were ≥85th percentile for body mass index by age and gender, based on reference data*

Needham High School (Grades 9-12)
2014 Gender Patterns for Key Indicators*

	Gender (%)		Total (%)
	Female	Male	
	(769)	*(706)*	*(1,490)*
SUBSTANCE USE			
Lifetime cigarette smoking	17.1	21.4	19.3
Current cigarette smoking (past 30 days)	6.4	8.9	7.7
Lifetime alcohol use	54.5	53.1	54.0
Current alcohol use (past 30 days)	35.6	34.3	35.0
Binge drinking (past 30 days)†	17.5	22.1	19.7
Rode with driver who had been drinking (past 30 days)	17.0	15.3	16.3
Lifetime marijuana use	28.7	35.5	32.1
Current marijuana use (past 30 days)	17.2	26.7	21.8
Lifetime prescription drug misuse‡	5.4	8.0	6.7
VIOLENCE			
Physical fighting (past 12 months)	8.6	19.6	14.0
Physical fighting on school property (past 12 months)	2.1	6.4	4.2
Carried a weapon (past 30 days)	2.7	8.7	5.6
Carried a weapon on school property (past 30 days)	2.0	3.4	2.7
BULLYING VICTIMIZATION			
Bullying victim (past 12 months)	21.2	14.3	18.0
Bullying victim on school property (past 12 months)	15.7	11.9	13.9
Cyberbullying victim (past 12 months)	21.4	14.0	18.0
MENTAL HEALTH			
Life "very" stressful (past 30 days)	45.0	17.8	31.9
Depressive symptoms (past 12 months)	25.8	11.3	18.9
Self-injury (past 12 months)	18.2	5.9	12.3
Considered suicide (past 12 months)	13.1	8.4	11.0
Attempted suicide (past 12 months)	3.9	2.7	3.4
SEXUAL BEHAVIOR			
Lifetime sexual intercourse	21.2	23.4	22.5
Currently sexually active (past 3 months)	17.0	19.1	18.1
Condom use at last intercourse (among sexually active youth)	67.4	70.5	68.7
PHYSICAL ACTIVITY AND BODY WEIGHT			
Exercised for ≥60 minutes on 5 or more days/week	53.6	59.9	56.5
Overweight or obese§	14.1	21.2	17.5

* *Source: MetroWest Adolescent Health Survey*

† *Consumed 5 or more drinks in a row on one or more occasions*

‡ *Without a doctor's prescription*

§ *Students who were ≥85th percentile for body mass index by age and gender, based on reference data*

Needham High School (Grades 9-12)
2014 Grade Patterns for Key Indicators*

	Grade (%)				Total (%)
	9th (382)	10th (385)	11th (365)	12th (344)	(1,490)
SUBSTANCE USE					
Lifetime cigarette smoking	9.3	16.8	22.4	29.9	19.3
Current cigarette smoking (past 30 days)	2.1	4.2	11.3	13.2	7.7
Lifetime alcohol use	34.7	49.1	62.4	71.6	54.0
Current alcohol use (past 30 days)	17.1	32.1	39.8	52.6	35.0
Binge drinking (past 30 days)†	5.5	17.4	25.0	31.9	19.7
Rode with driver who had been drinking (past 30 days)	10.3	16.4	22.3	15.2	16.3
Lifetime marijuana use	8.4	27.9	39.9	54.1	32.1
Current marijuana use (past 30 days)	6.3	19.7	24.5	38.1	21.8
Lifetime prescription drug misuse‡	2.9	4.5	10.5	9.1	6.7
VIOLENCE					
Physical fighting (past 12 months)	18.4	10.4	15.7	10.6	14.0
Physical fighting on school property (past 12 months)	5.2	2.1	6.3	2.3	4.2
Carried a weapon (past 30 days)	3.9	5.2	7.4	5.6	5.6
Carried a weapon on school property (past 30 days)	1.3	2.1	4.4	2.6	2.7
BULLYING VICTIMIZATION					
Bullying victim (past 12 months)	23.0	14.9	21.0	11.7	18.0
Bullying victim on school property (past 12 months)	17.2	11.8	17.3	8.5	13.9
Cyberbullying victim (past 12 months)	21.7	17.3	18.0	14.4	18.0
MENTAL HEALTH					
Life "very" stressful (past 30 days)	21.6	30.4	35.1	42.6	31.9
Depressive symptoms (past 12 months)	18.9	18.3	19.3	19.4	18.9
Self-injury (past 12 months)	12.9	12.6	13.3	10.0	12.3
Considered suicide (past 12 months)	8.9	10.8	13.4	10.9	11.0
Attempted suicide (past 12 months)	2.7	3.3	4.5	2.7	3.4
SEXUAL BEHAVIOR					
Lifetime sexual intercourse	6.4	12.2	30.0	43.3	22.5
Currently sexually active (past 3 months)	3.5	9.1	23.2	38.9	18.1
Condom use at last intercourse (among sexually active youth)	69.2	70.6	65.9	71.5	68.7
PHYSICAL ACTIVITY AND BODY WEIGHT					
Exercised for ≥60 minutes on 5 or more days/week	65.9	59.5	47.1	53.0	56.5
Overweight or obese§	16.8	18.1	20.1	14.2	17.5

* *Source: MetroWest Adolescent Health Survey*

† *Consumed 5 or more drinks in a row on one or more occasions*

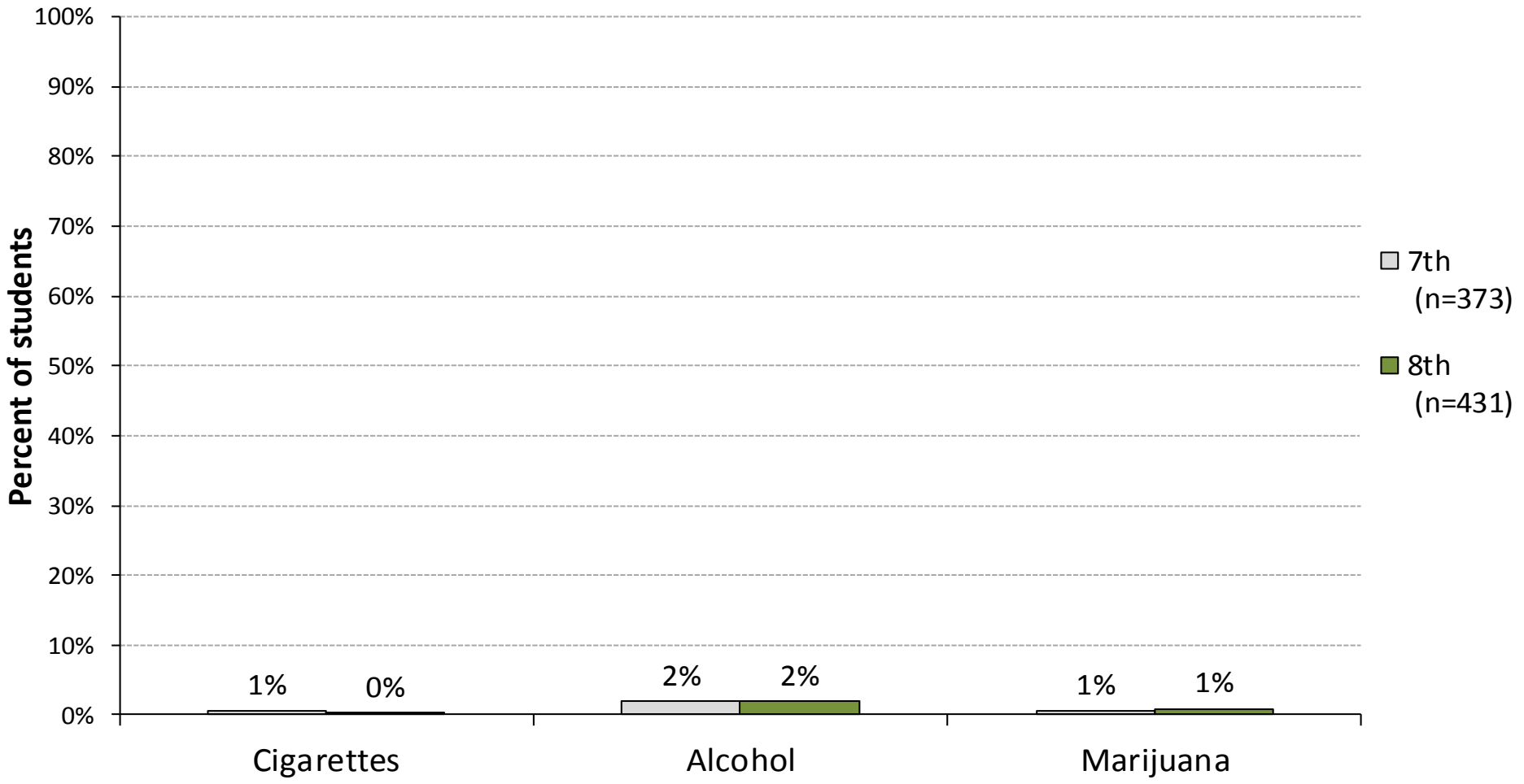
‡ *Without a doctor's prescription*

§ *Students who were ≥85th percentile for body mass index by age and gender, based on reference data*

2014 MWAHS
Pollard Middle School Grades 7&8

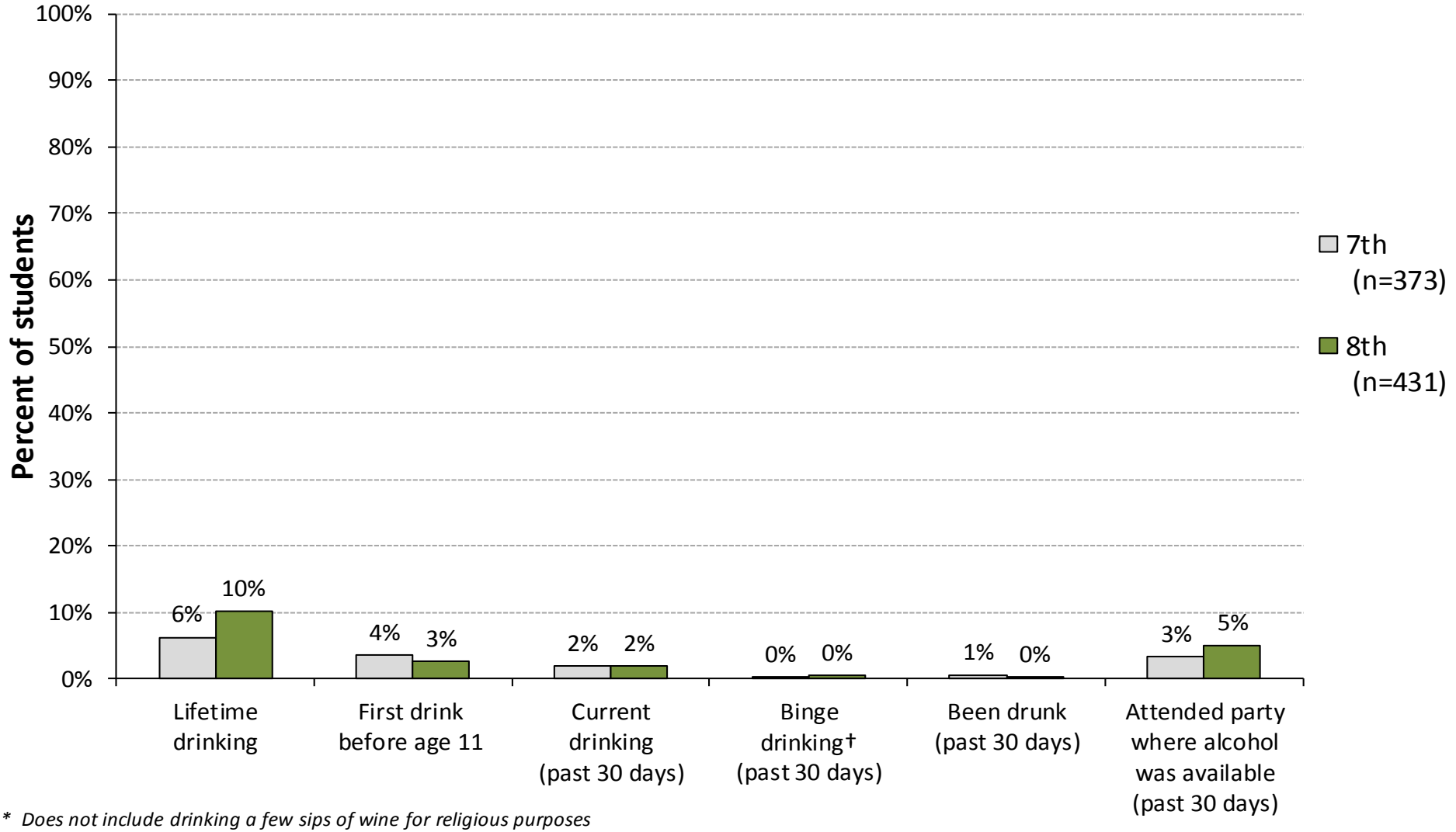
Selected Slides

Figure 2-2B. Current Substance Use* by Grade, 2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey



* *Used one or more times in the past 30 days*

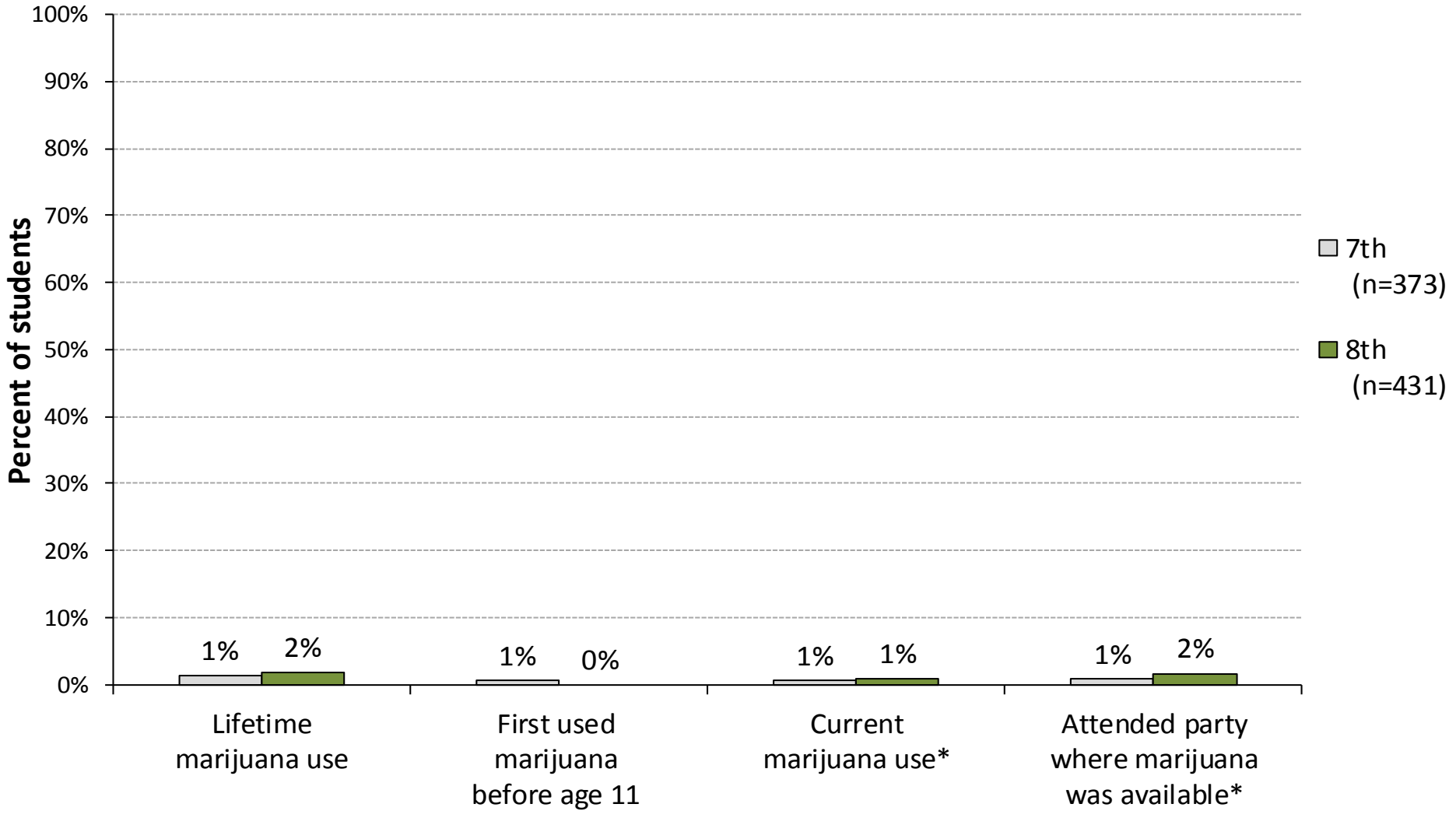
Figure 2-5B. Alcohol Use* by Grade, 2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey



* *Does not include drinking a few sips of wine for religious purposes*

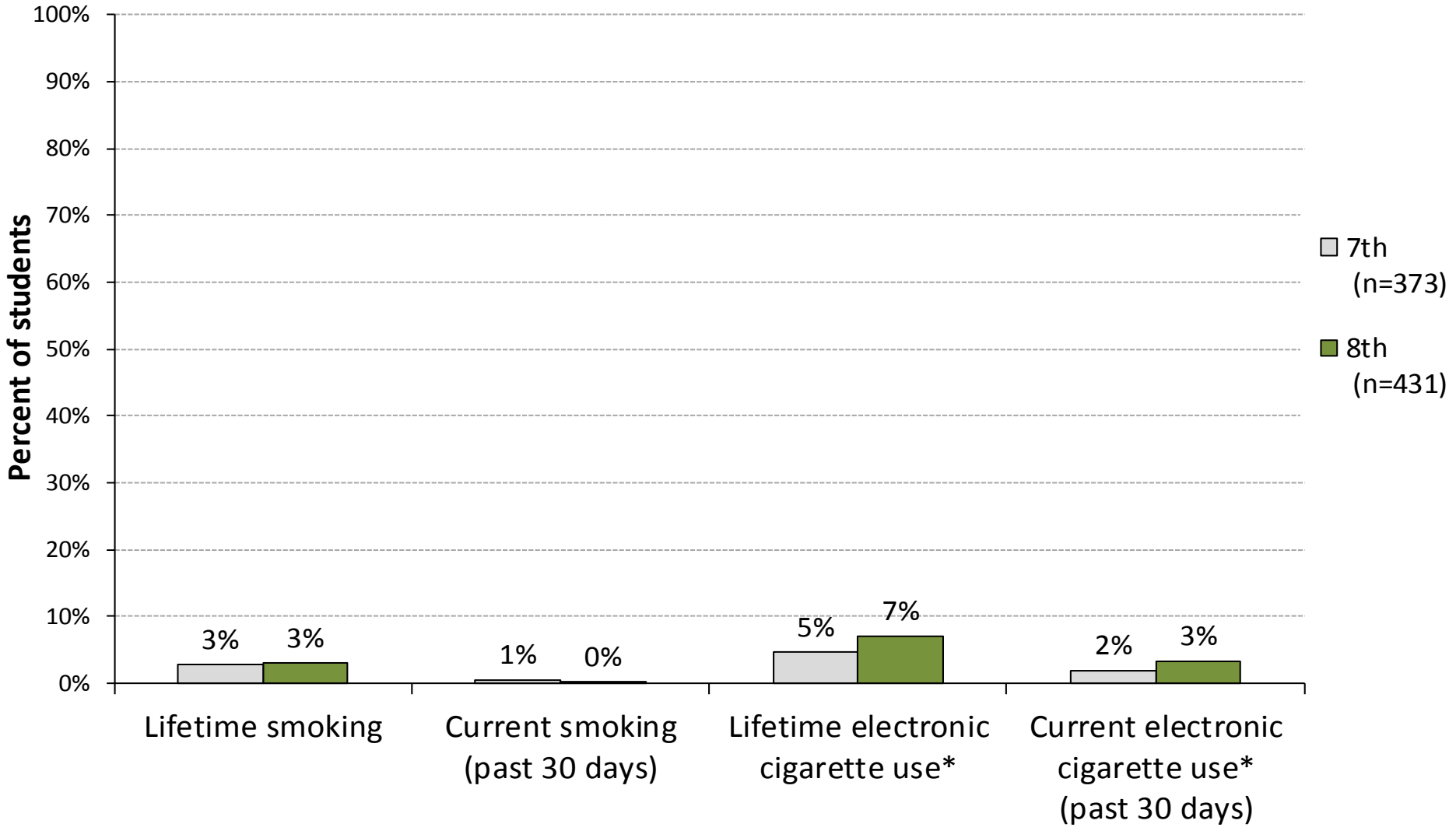
† *Had 5 or more drinks in a row (within a couple of hours)*

Figure 2-7B. Marijuana Use by Grade, 2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey



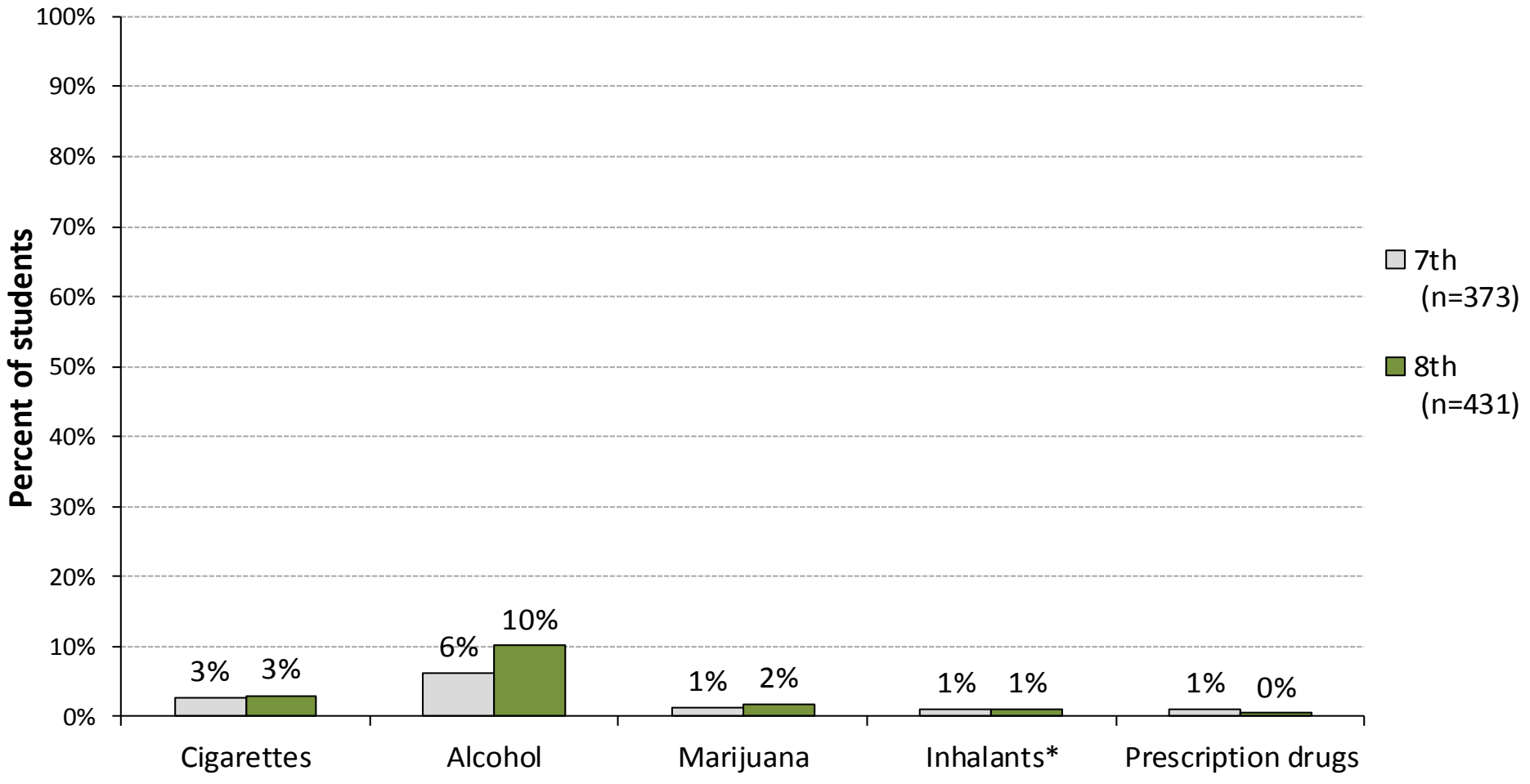
* *In the past 30 days*

Figure 2-3B. Cigarette and Electronic Cigarette Smoking by Grade, 2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey



* *Includes electronic cigarettes, or e-cigarettes, and other electronic vapor products. E-cigarettes create a mist or vapor that you breathe in like smoke.*

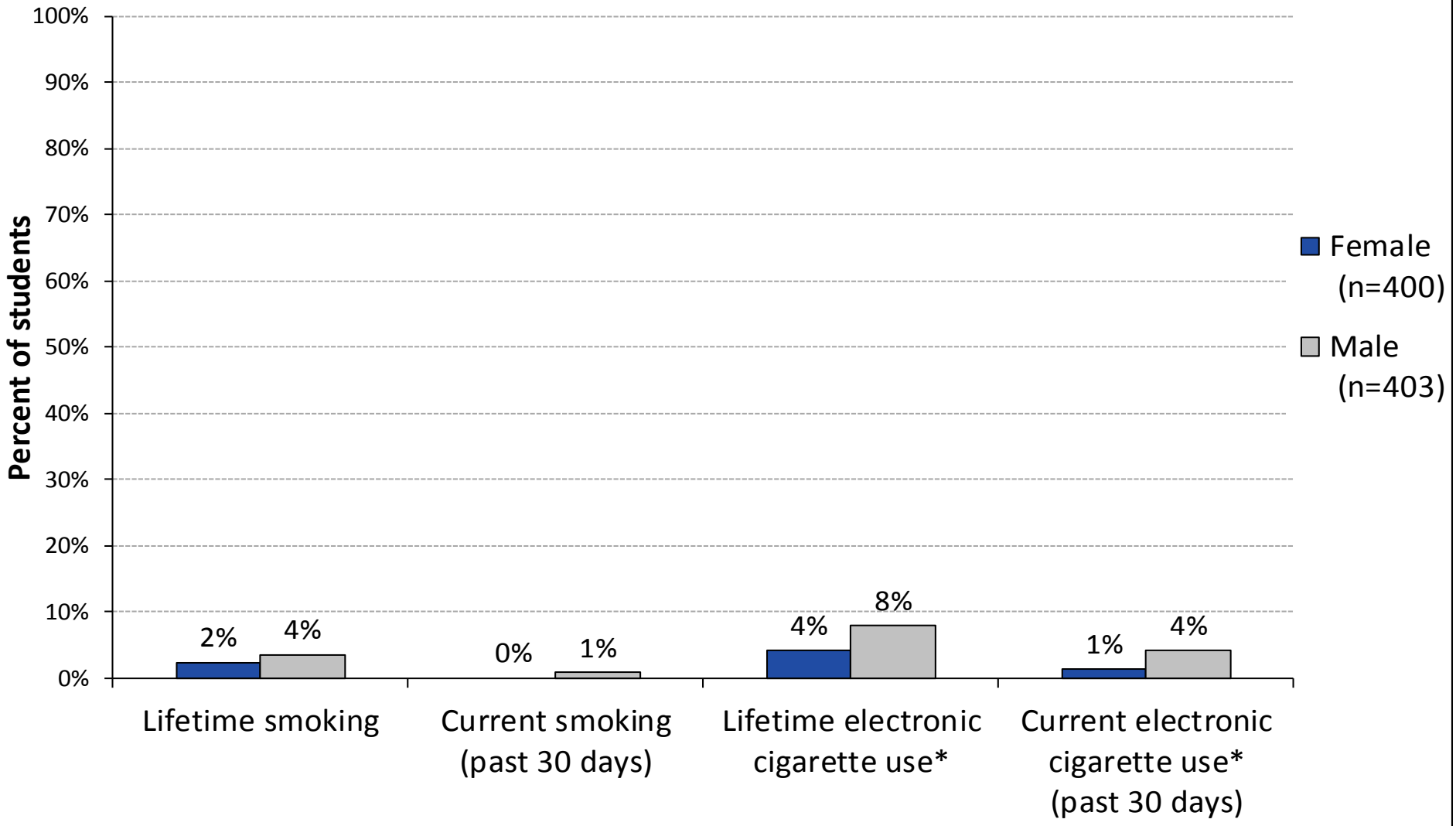
Figure 2-1B. Lifetime Substance Use by Grade, 2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey



* *Includes sniffing glue, breathing the contents of aerosol spray cans, or inhaling any paints or sprays to get high*

Figure 2-3A. Cigarette and Electronic Cigarette Smoking by Gender, 2014
Pollard Middle School, Needham (Grades 7-8)

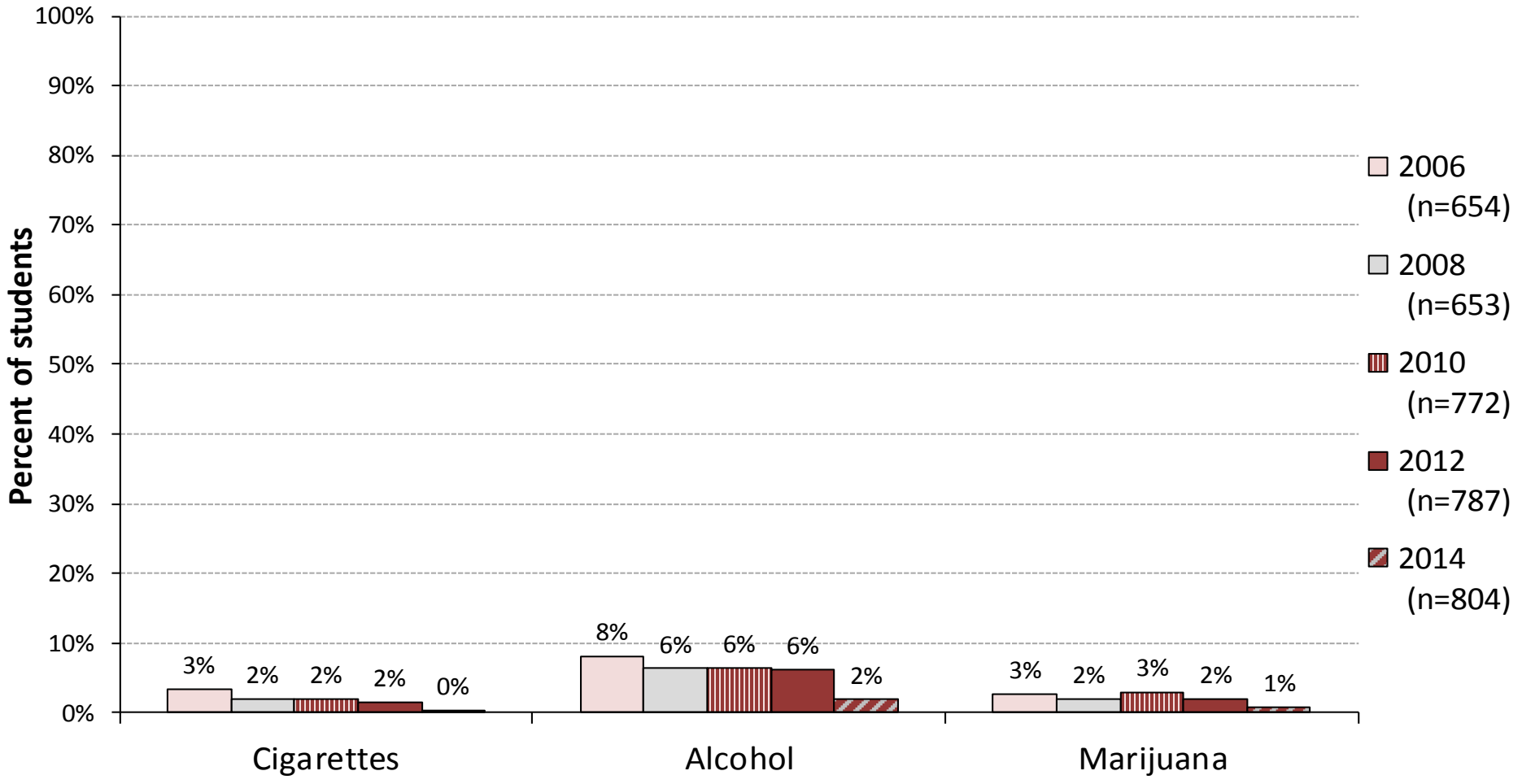
MetroWest Adolescent Health Survey



* *Includes electronic cigarettes, or e-cigarettes, and other electronic vapor products. E-cigarettes create a mist or vapor that you breathe in like smoke.*

Figure 2-2C. Trends in Current Substance Use,* 2006-2014
Pollard Middle School, Needham (Grades 7-8)

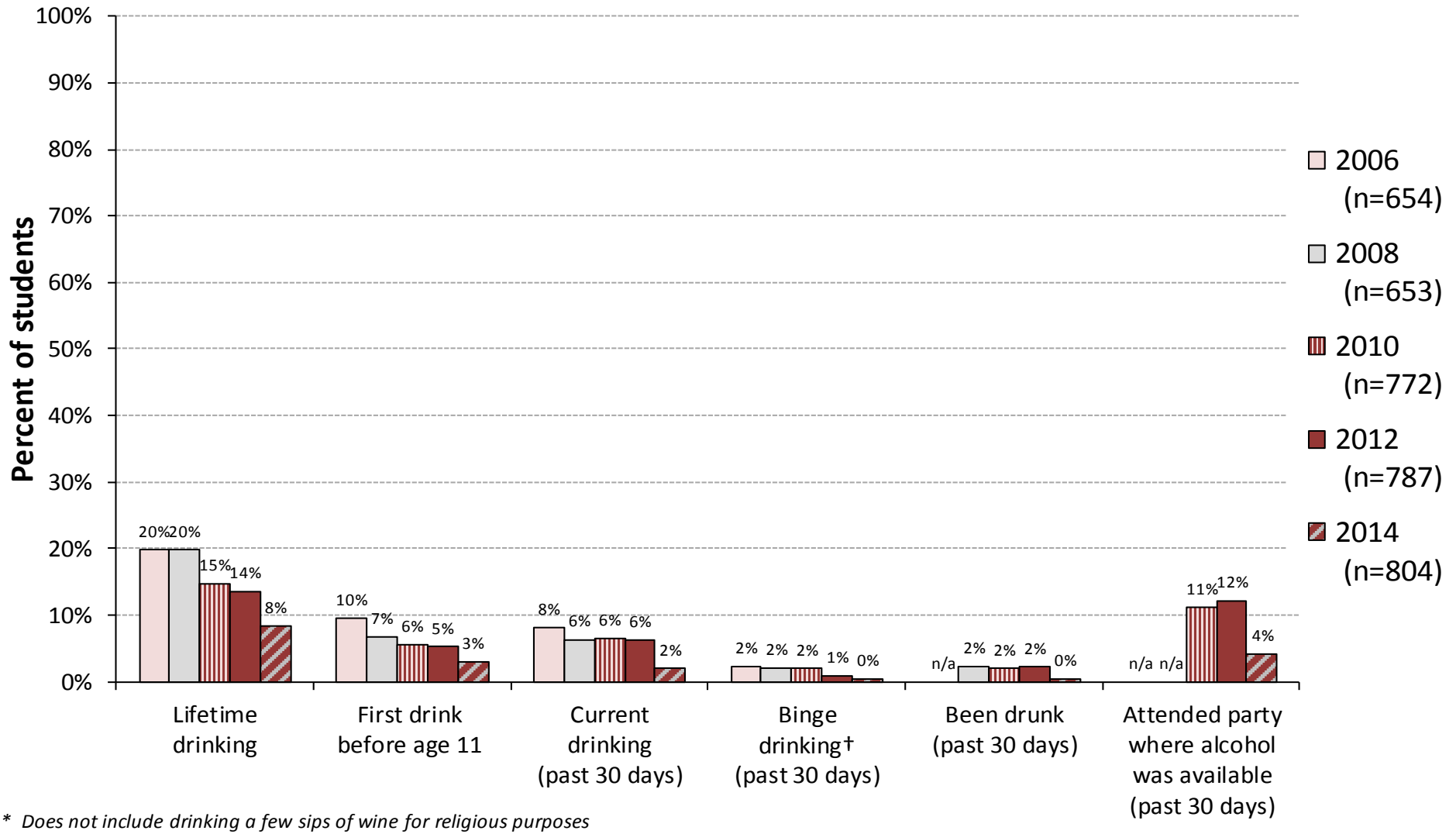
MetroWest Adolescent Health Survey



* *Used one or more times in the past 30 days*

Figure 2-5C. Trends in Alcohol Use,* 2006-2014
Pollard Middle School, Needham (Grades 7-8)

MetroWest Adolescent Health Survey

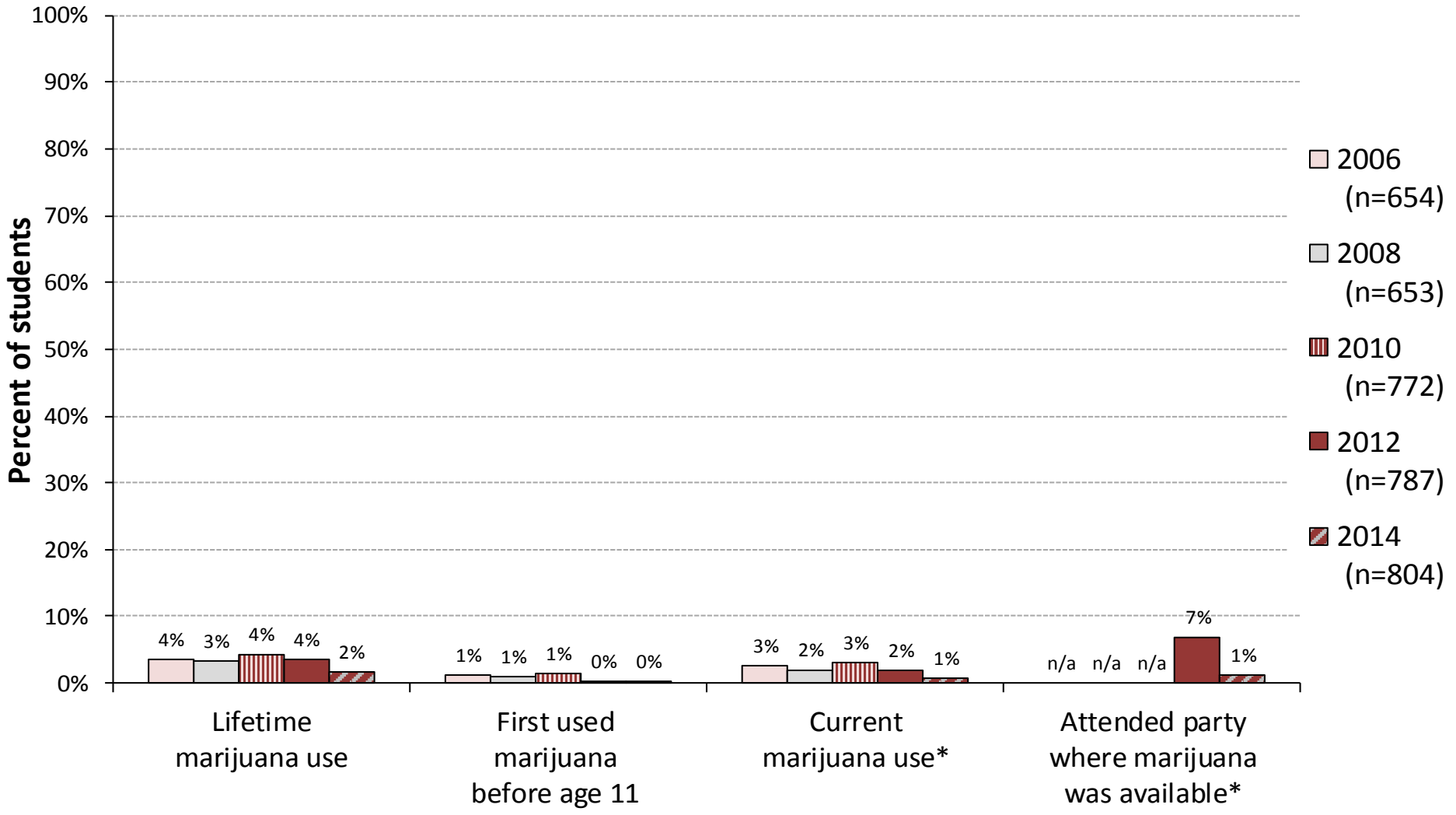


* *Does not include drinking a few sips of wine for religious purposes*

† *Had 5 or more drinks in a row (within a couple of hours)*

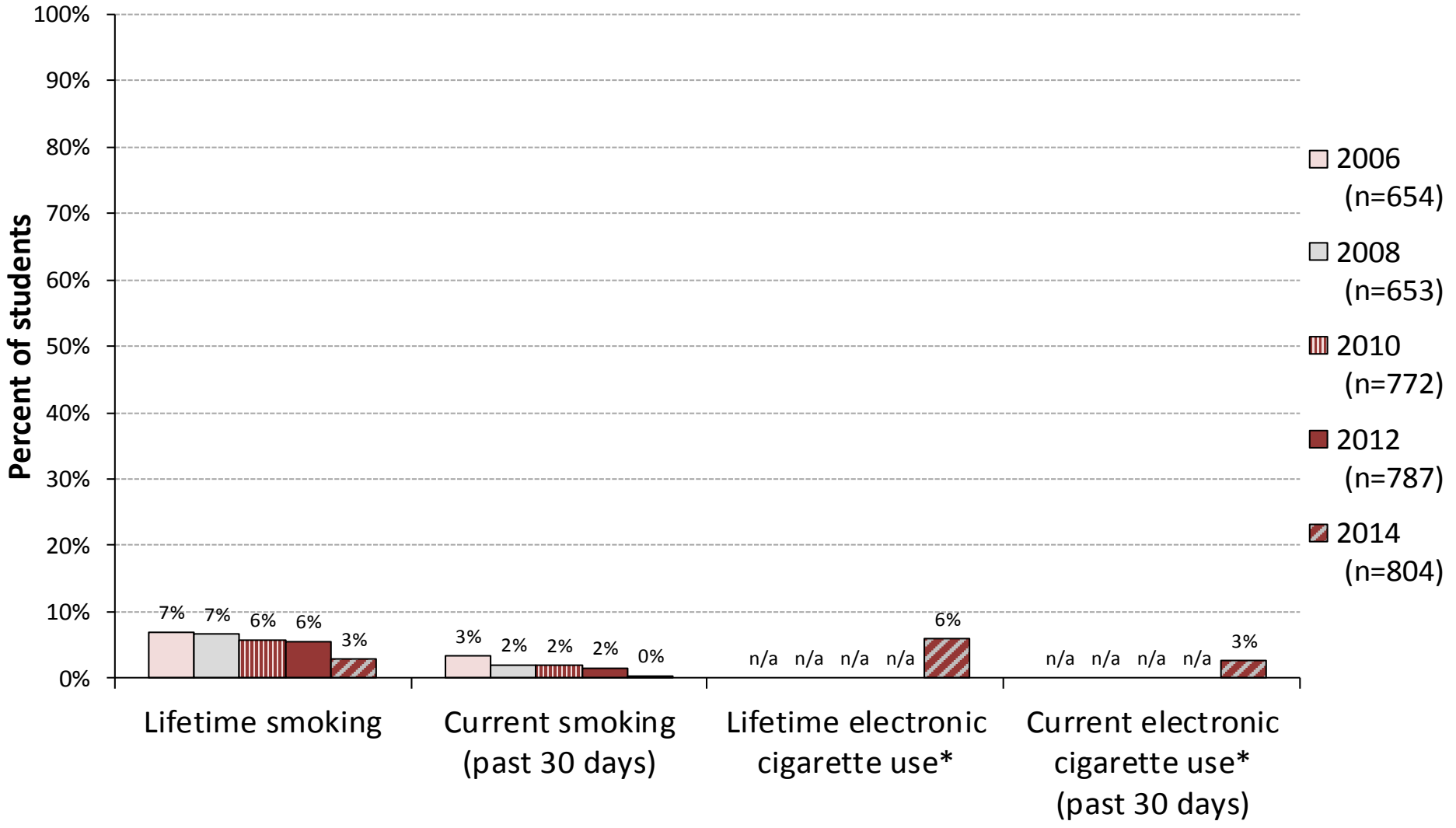
Figure 2-7C. Trends in Marijuana Use, 2006-2014
Pollard Middle School, Needham (Grades 7-8)

MetroWest Adolescent Health Survey



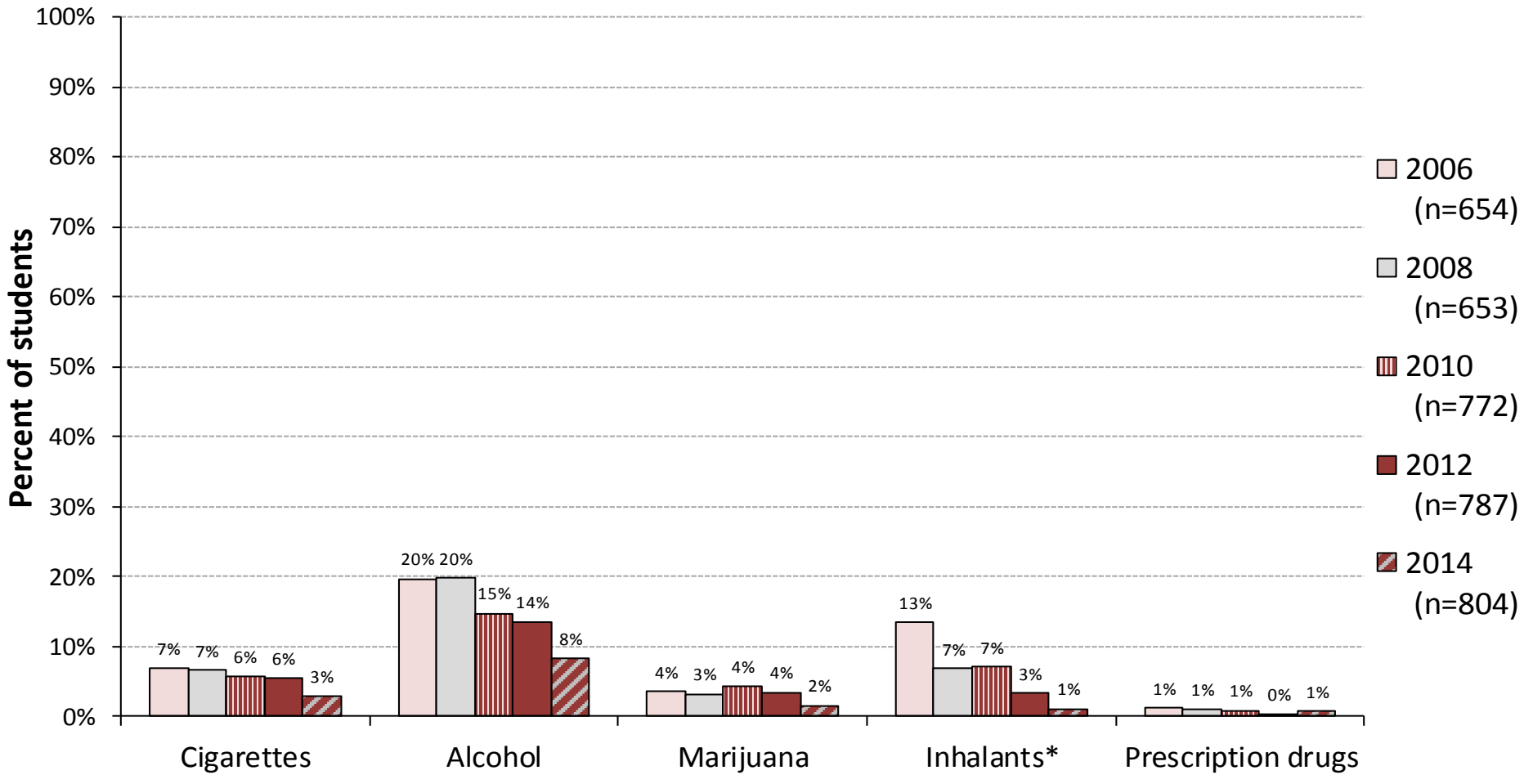
* *In the past 30 days*

Figure 2-3C. Trends in Cigarette and Electronic Cigarette Smoking, 2006-2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey



* *Includes electronic cigarettes, or e-cigarettes, and other electronic vapor products. E-cigarettes create a mist or vapor that you breathe in like smoke.*

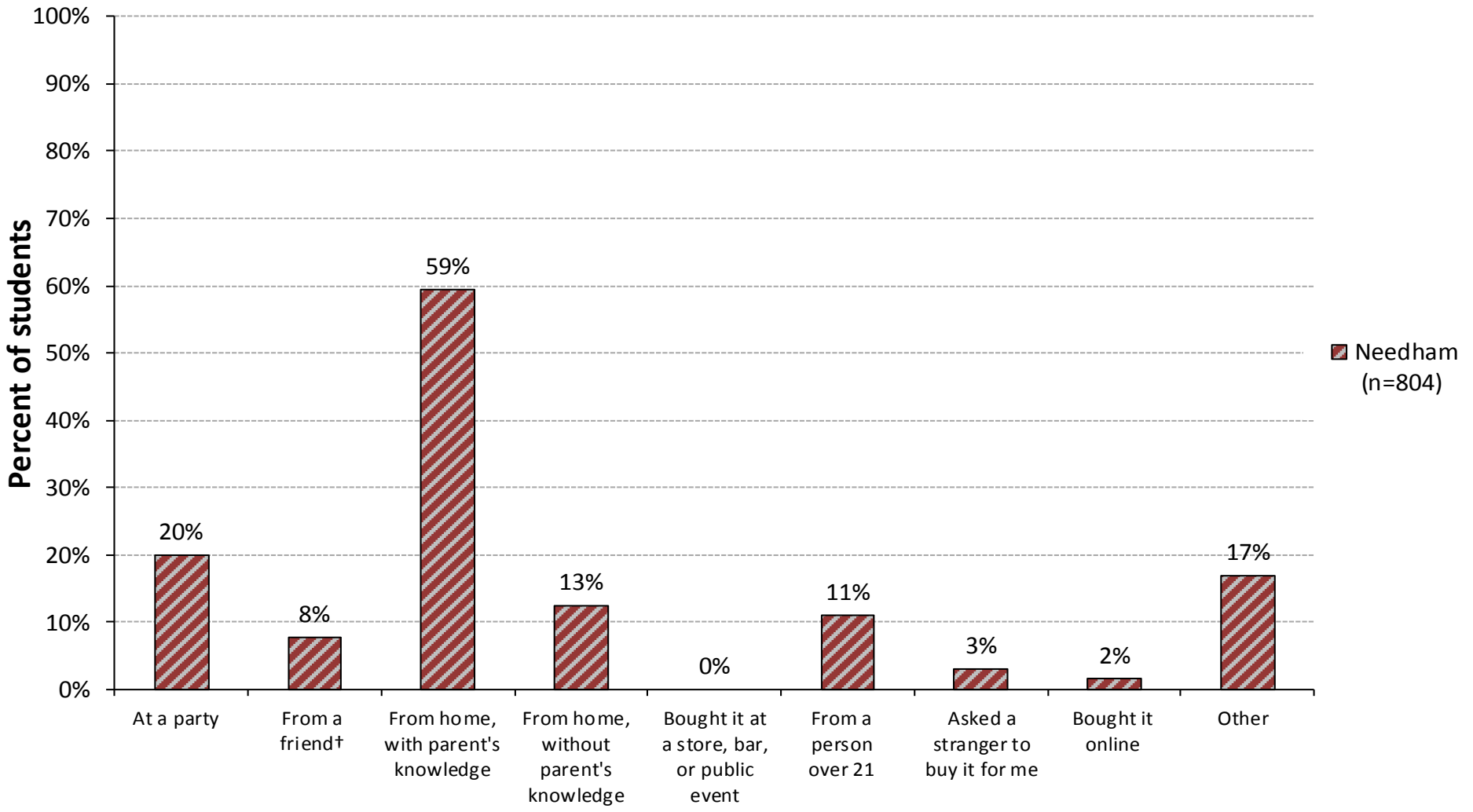
Figure 2-1C. Trends in Lifetime Substance Use, 2006-2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey



* *Includes sniffing glue, breathing the contents of aerosol spray cans, or inhaling any paints or sprays to get high*

Figure 2-6A. Access to Alcohol Among Lifetime Drinkers,* 2014
Pollard Middle School, Needham (Grades 7-8)

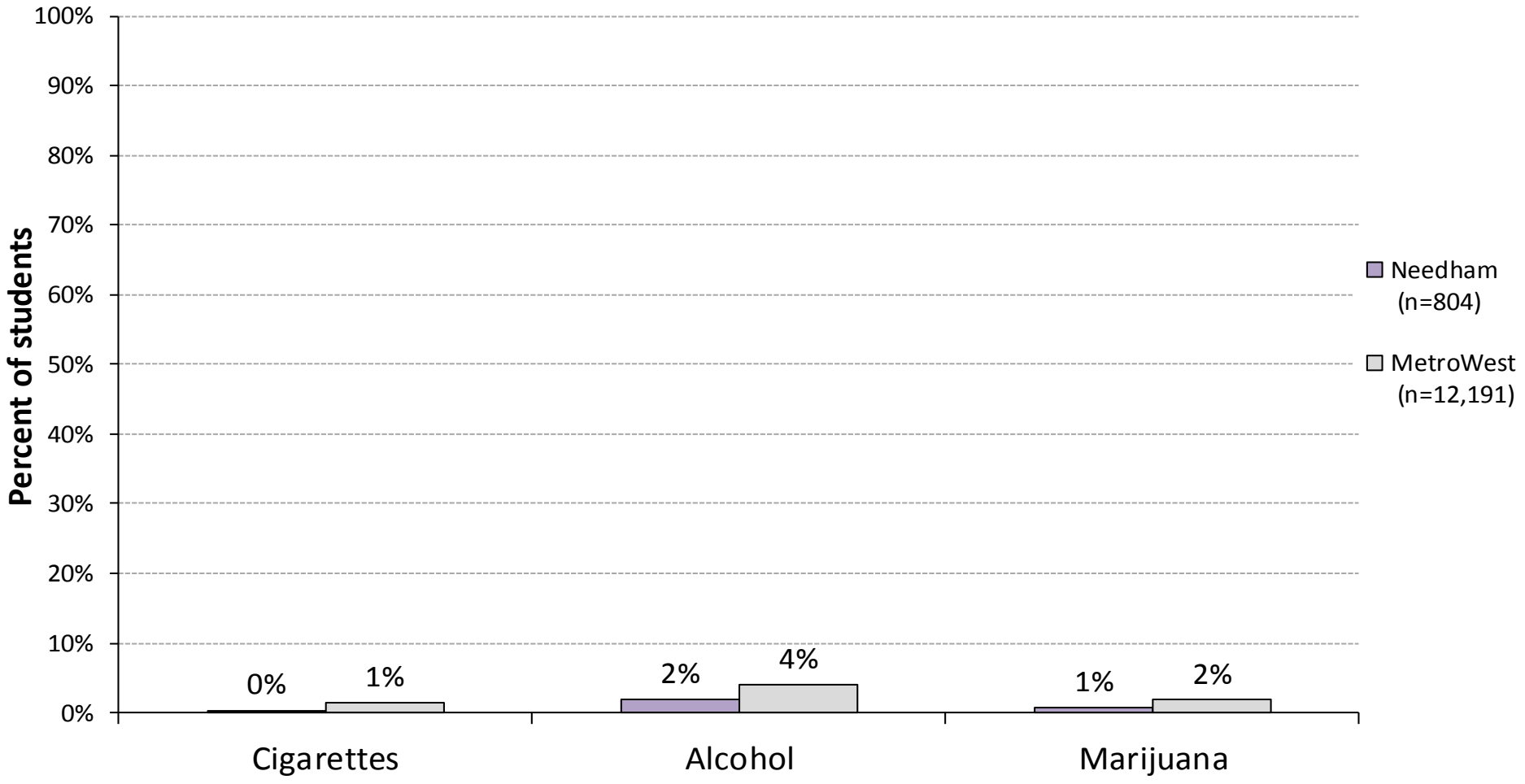
MetroWest Adolescent Health Survey



* *Among students that drank in their lifetime*

† *Does not include at a party*

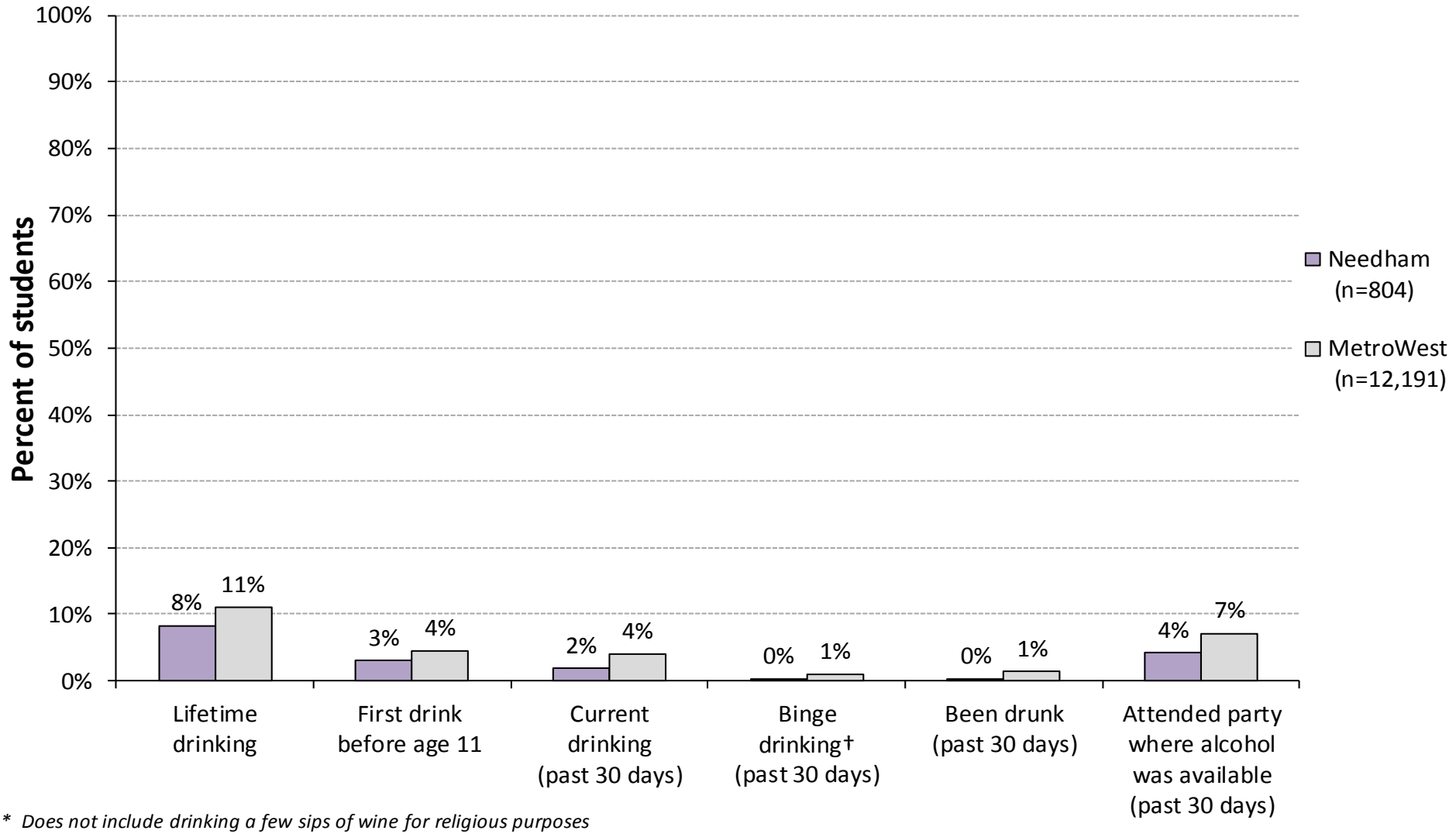
Figure 2-2D. Current Substance Use* at the District and Regional Levels, 2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey



* *Used one or more times in the past 30 days*

Figure 2-5D. Alcohol Use* at the District and Regional Levels, 2014
Pollard Middle School, Needham (Grades 7-8)

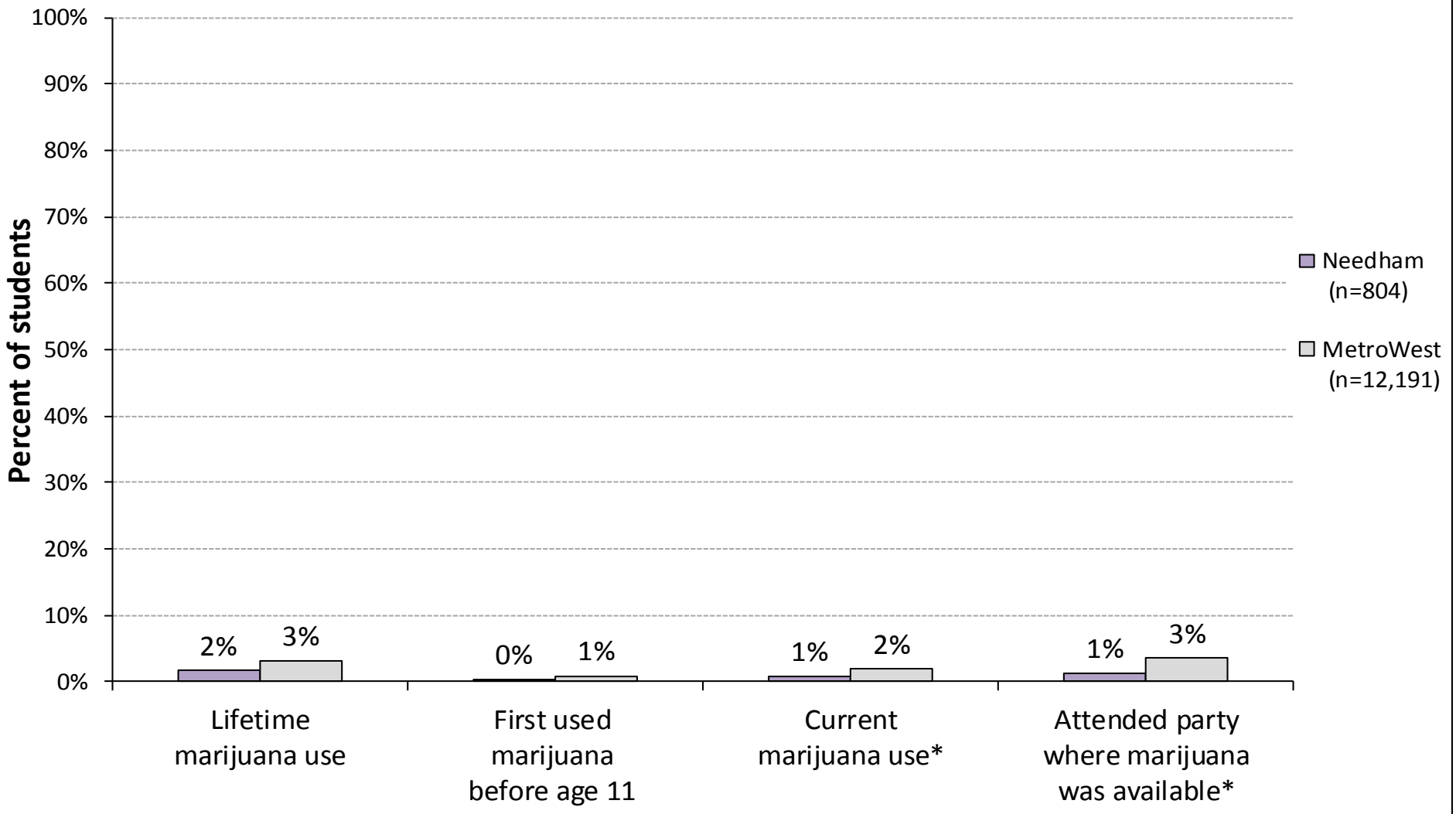
MetroWest Adolescent Health Survey



* *Does not include drinking a few sips of wine for religious purposes*

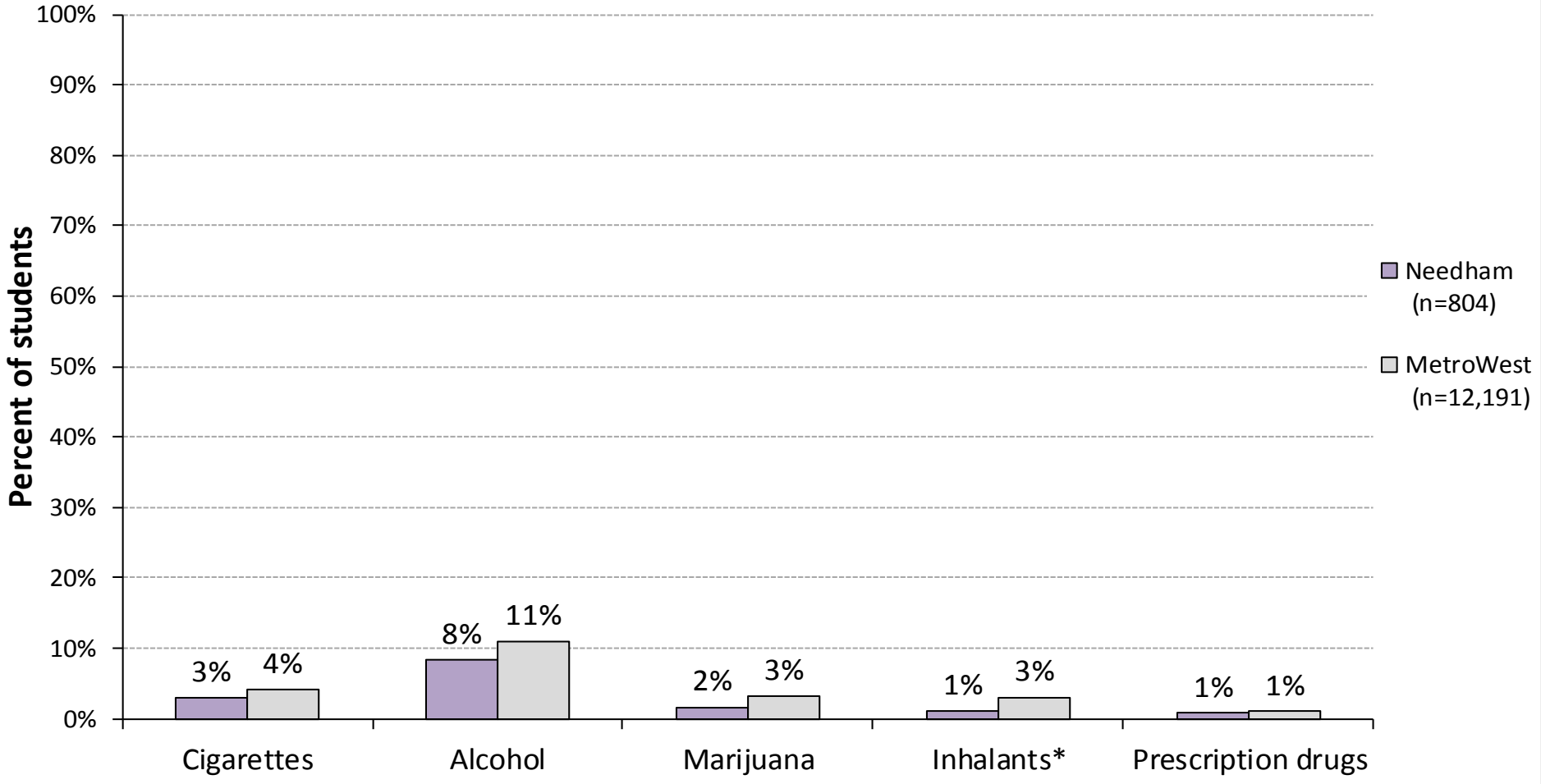
† *Had 5 or more drinks in a row (within a couple of hours)*

Figure 2-7D. Marijuana Use at the District and Regional Levels, 2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey



* *In the past 30 days*

Figure 2-1D. Lifetime Substance Use at the District and Regional Levels, 2014
Pollard Middle School, Needham (Grades 7-8)
MetroWest Adolescent Health Survey

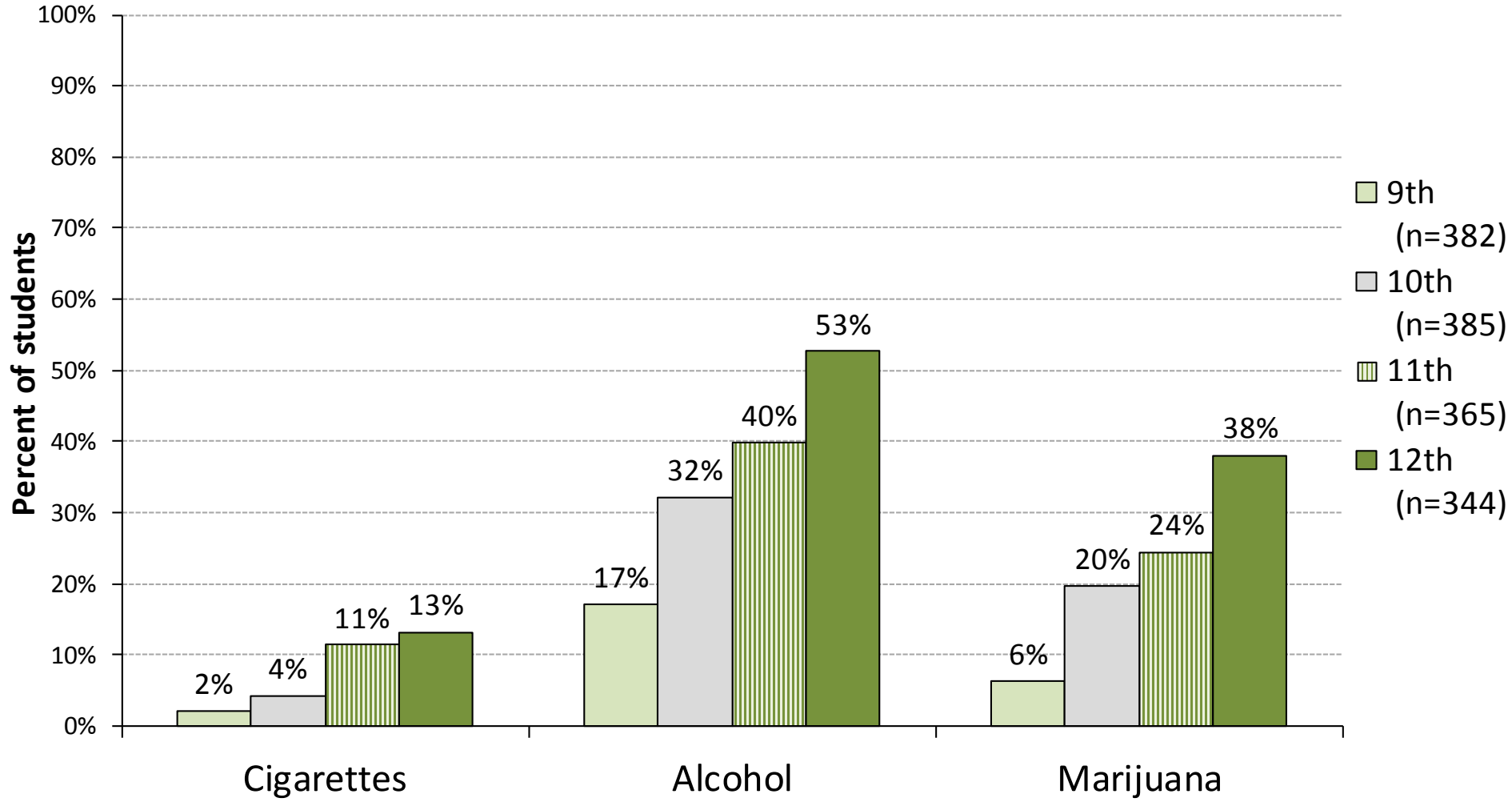


* *Includes sniffing glue, breathing the contents of aerosol spray cans, or inhaling any paints or sprays to get high*

2014 MWAHS
Needham High School Grades 9-12

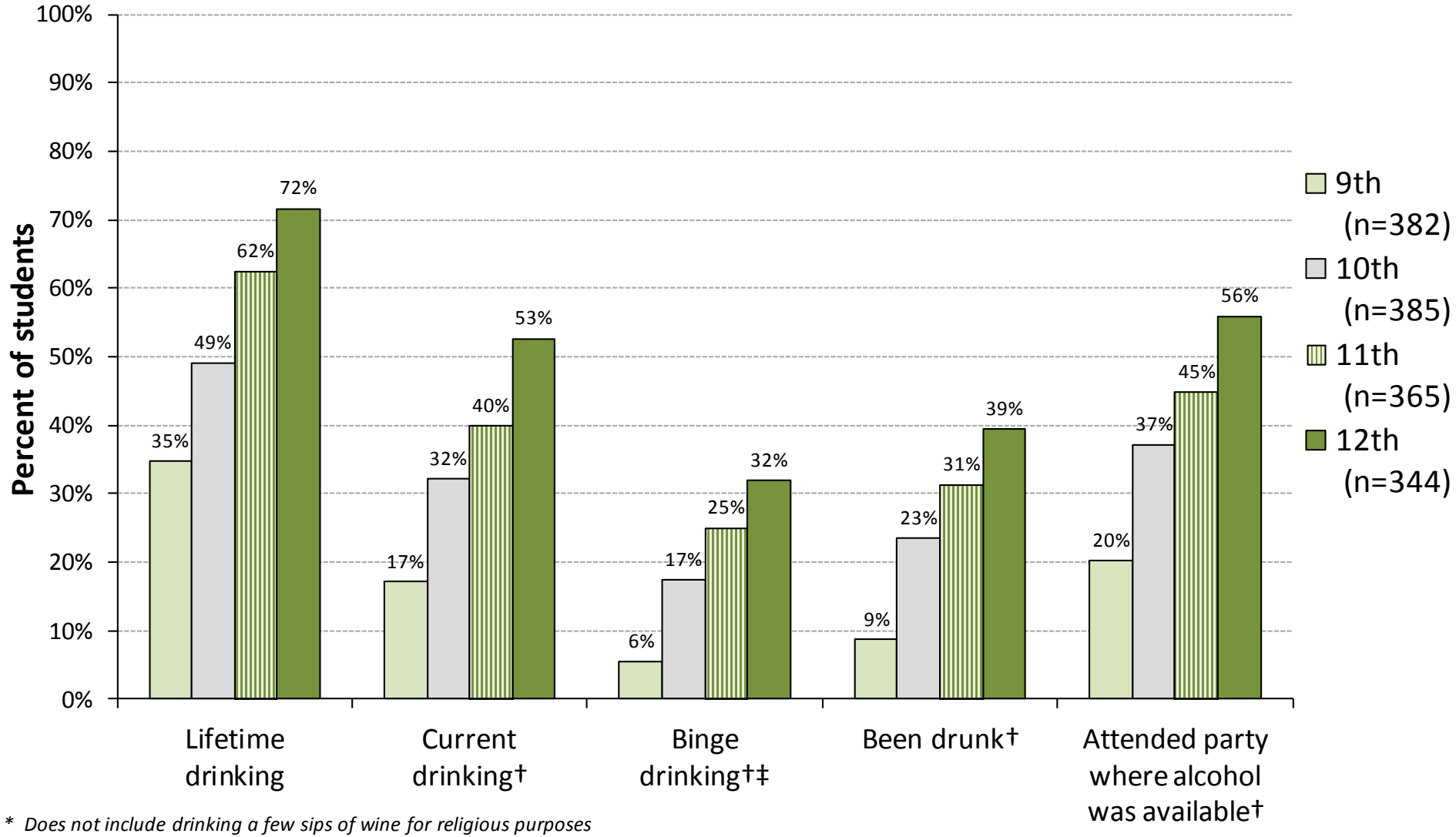
Selected Slides

Figure 2-3B. Current Substance Use* by Grade, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



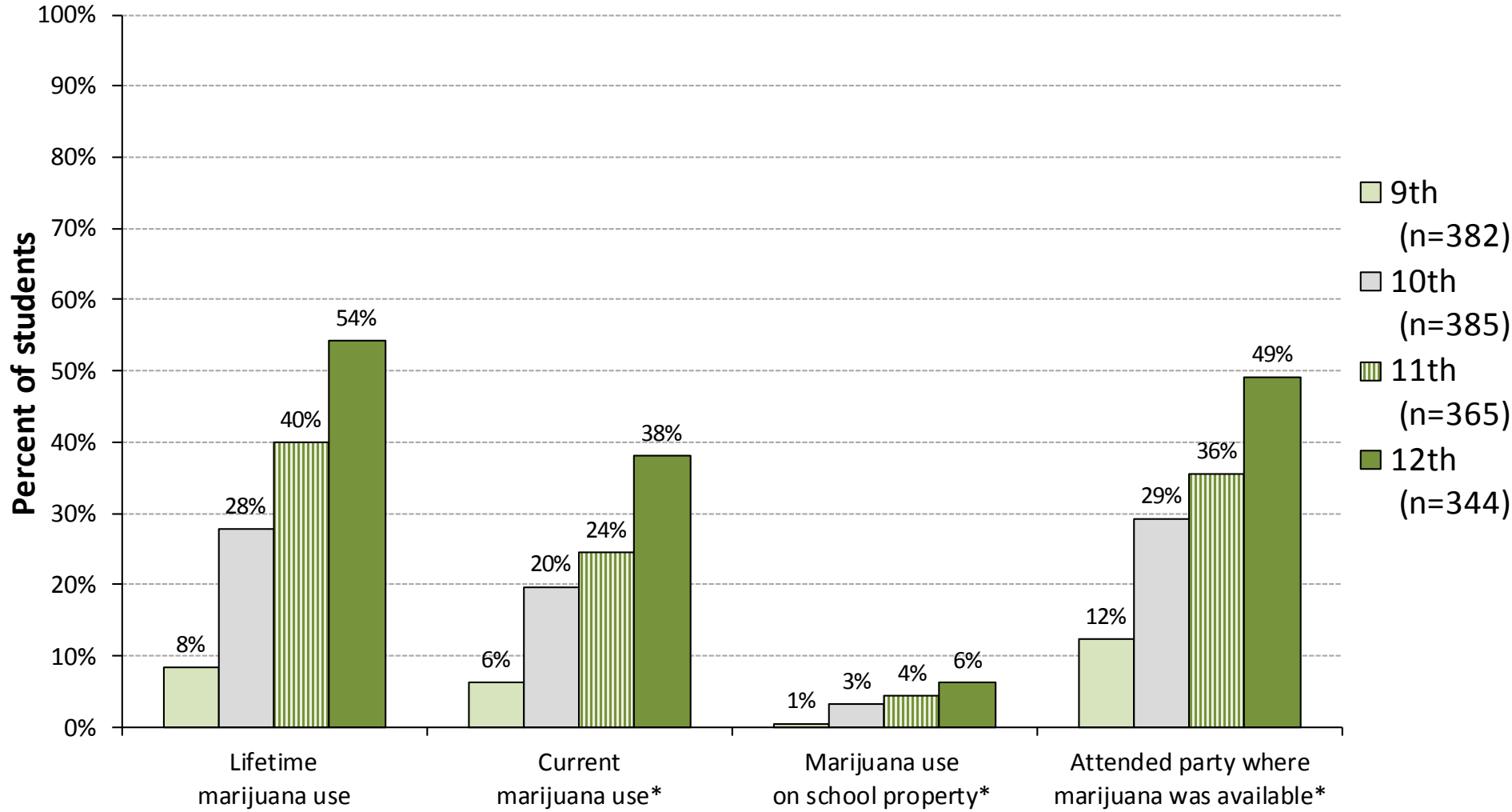
** Used one or more times in the past 30 days*

Figure 2-6B. Alcohol Use* by Grade, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



* *Does not include drinking a few sips of wine for religious purposes*
† *In the past 30 days*
‡ *Had 5 or more drinks in a row (within a couple of hours)*

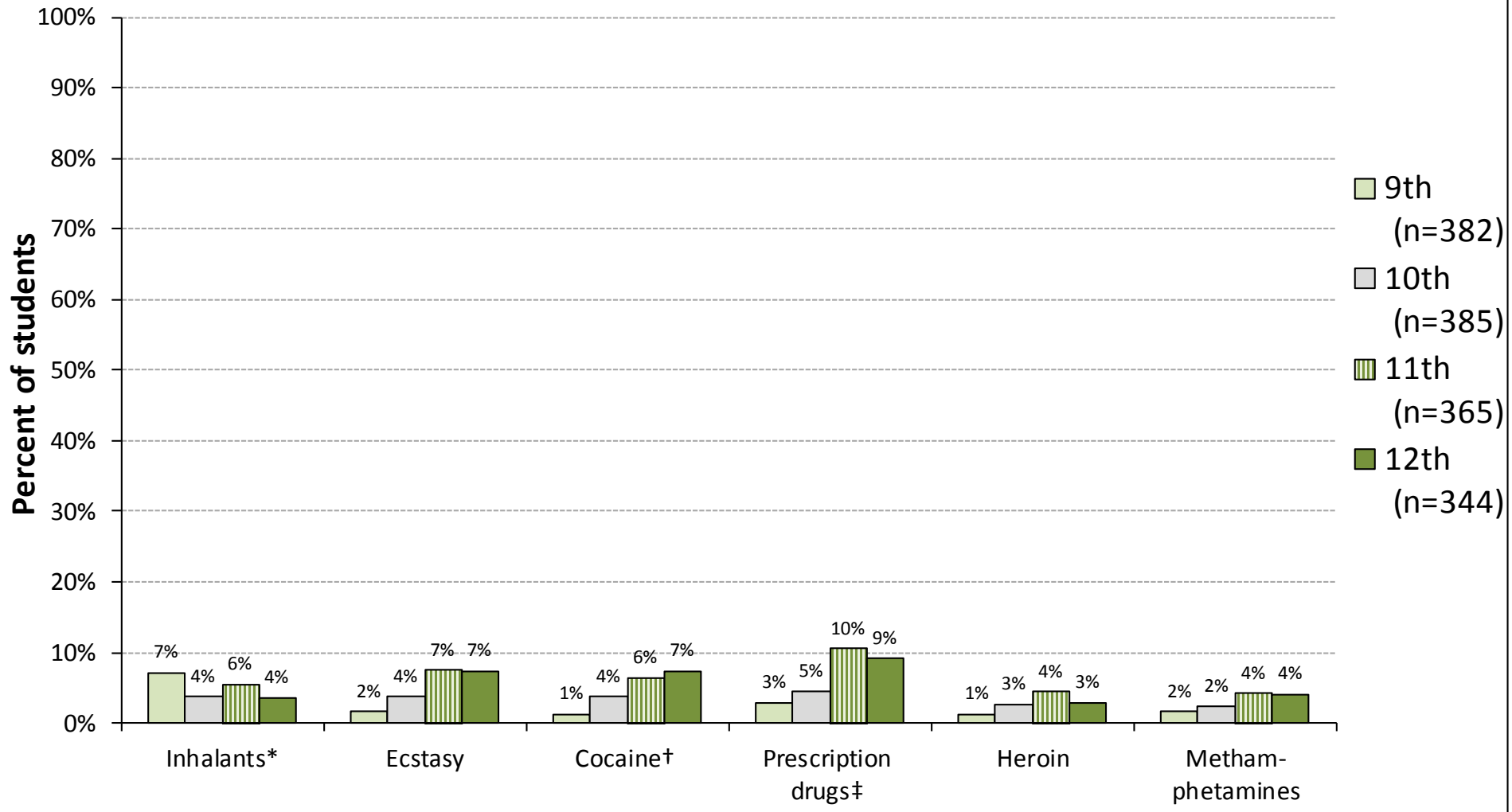
Figure 2-8B. Marijuana Use by Grade, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



* *In the past 30 days*

Figure 2-2B. Lifetime Other Substance Use by Grade, 2014
Needham High School (Grades 9-12)

MetroWest Adolescent Health Survey

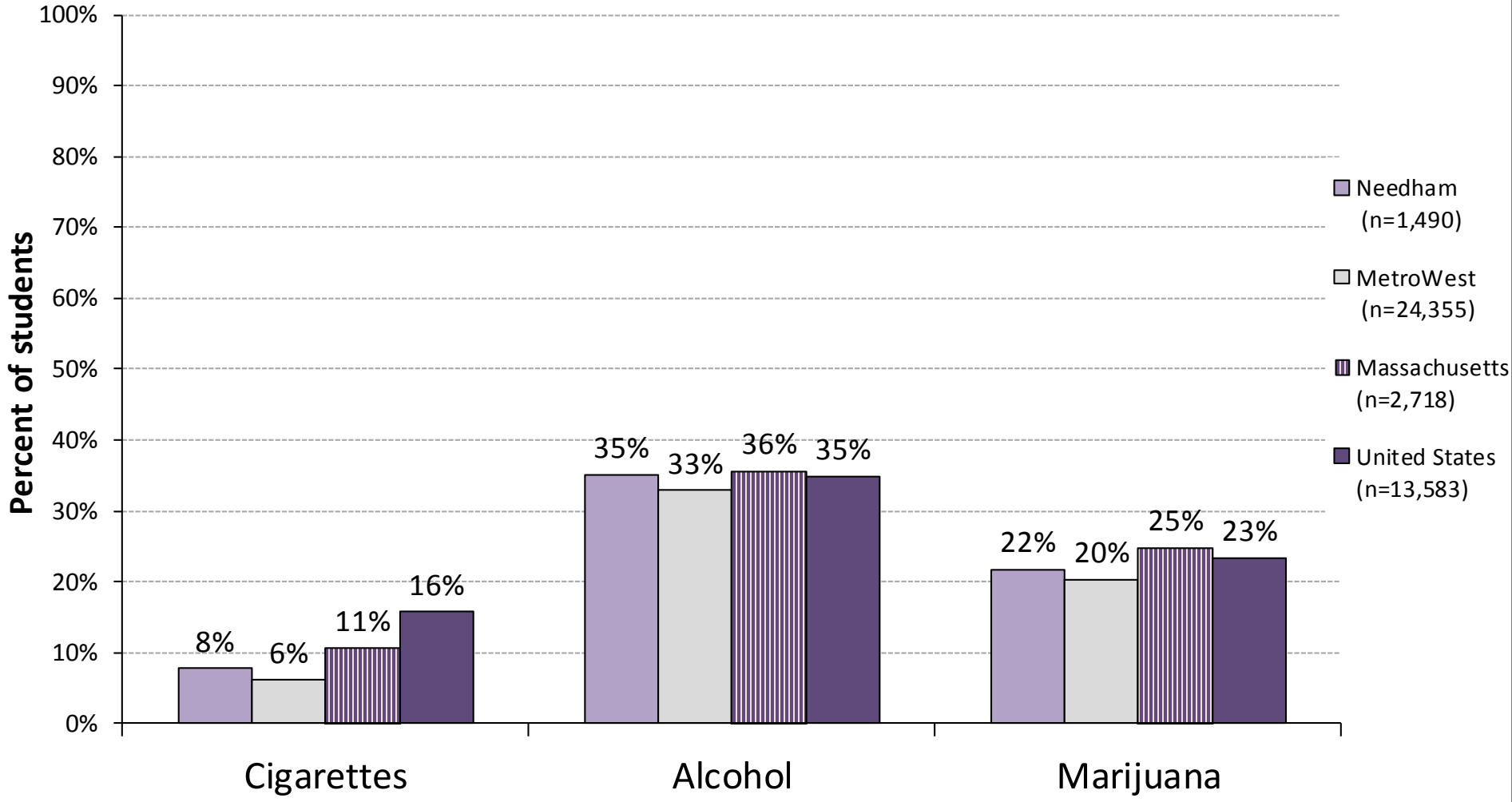


** Includes sniffing glue, breathing the contents of aerosol spray cans, or inhaling any paints or sprays to get high*

† Includes using powder, crack or freebase

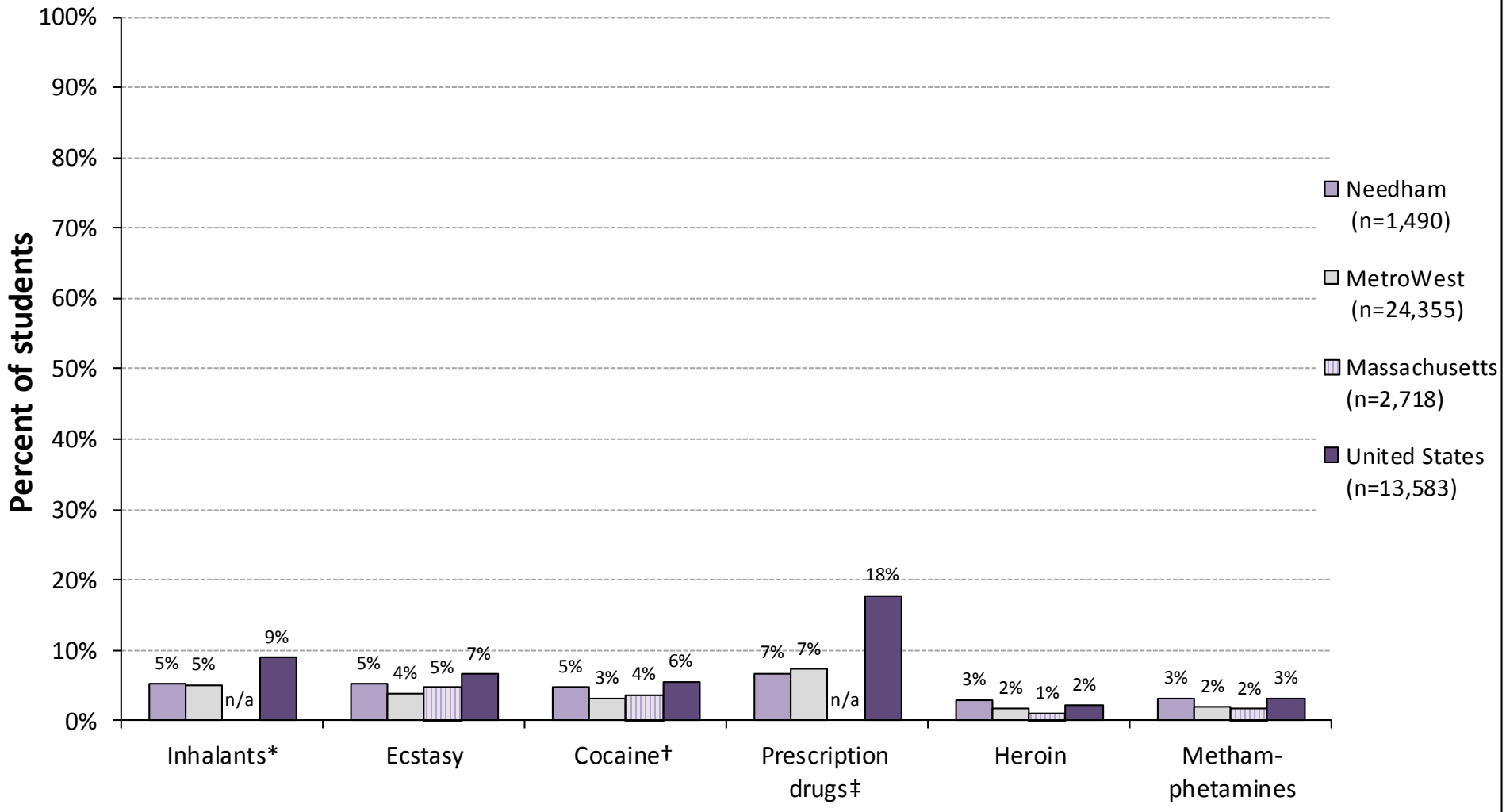
‡ Without a doctor's prescription

Figure 2-3D. Current Substance Use* at the District, Regional, State, and National Levels, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



** Used one or more times in the past 30 days*

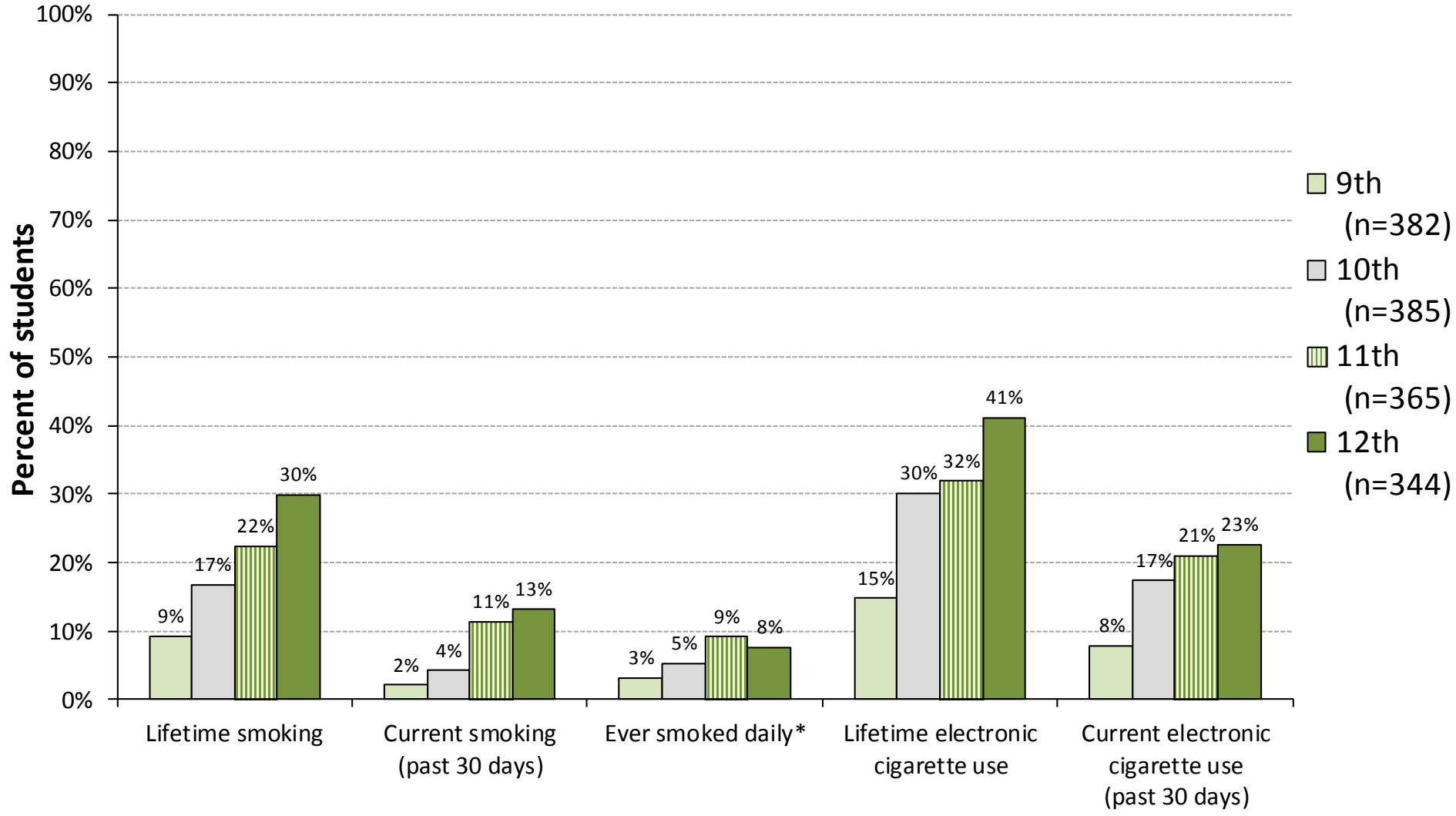
Figure 2-2D. Lifetime Other Substance Use at the District, Regional, State, and National Levels, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



** Includes sniffing glue, breathing the contents of aerosol spray cans, or inhaling any paints or sprays to get high*
† Includes using powder, crack or freebase
‡ Without a doctor's prescription

Figure 2-4B. Cigarette and Electronic Cigarette Smoking by Grade, 2014
Needham High School (Grades 9-12)

MetroWest Adolescent Health Survey



** Every day for 30 days*

Figure 2-1B. Lifetime Substance Use by Grade, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey

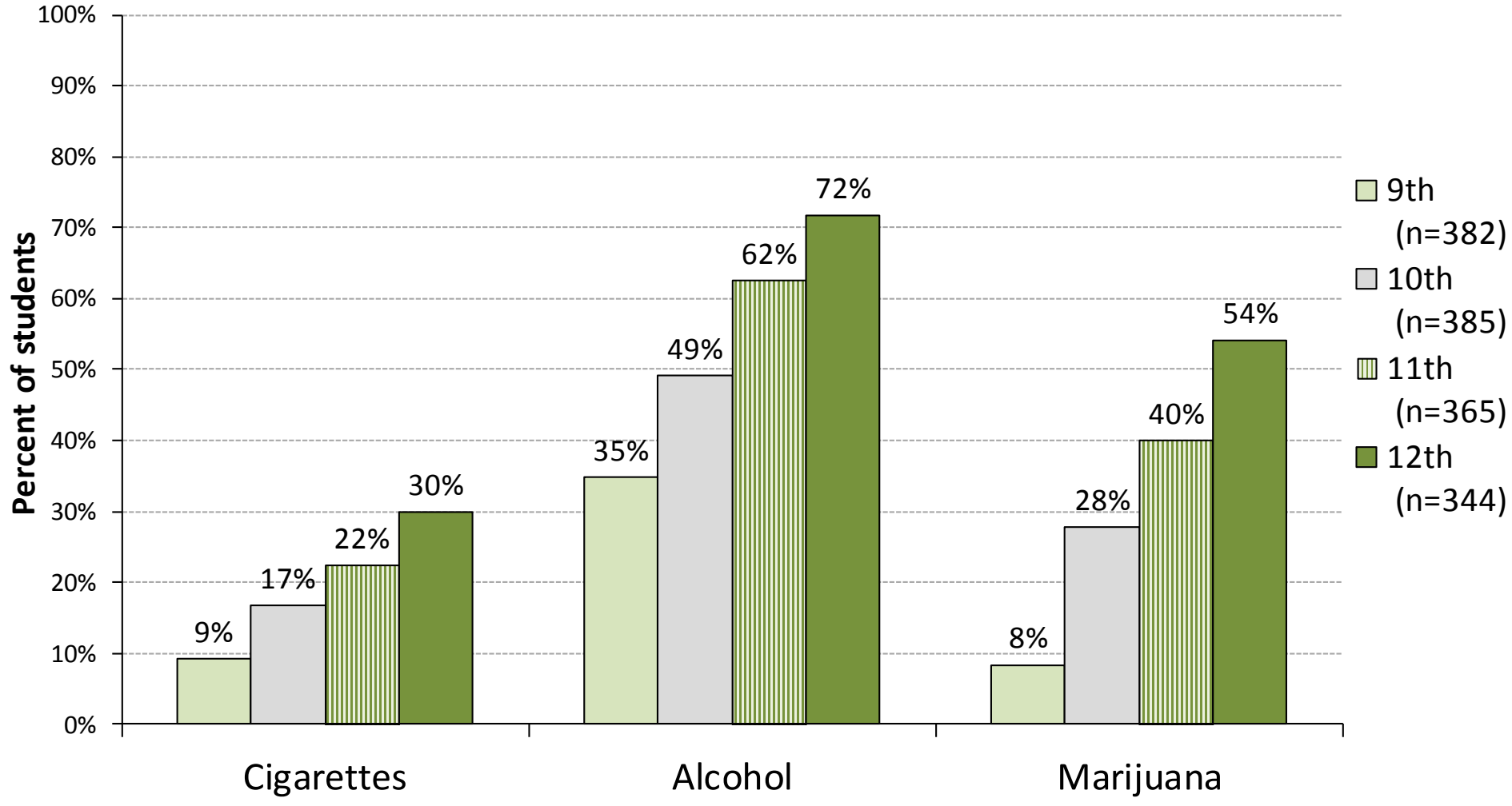


Figure 2-1C. Trends in Lifetime Substance Use, 2006-2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey

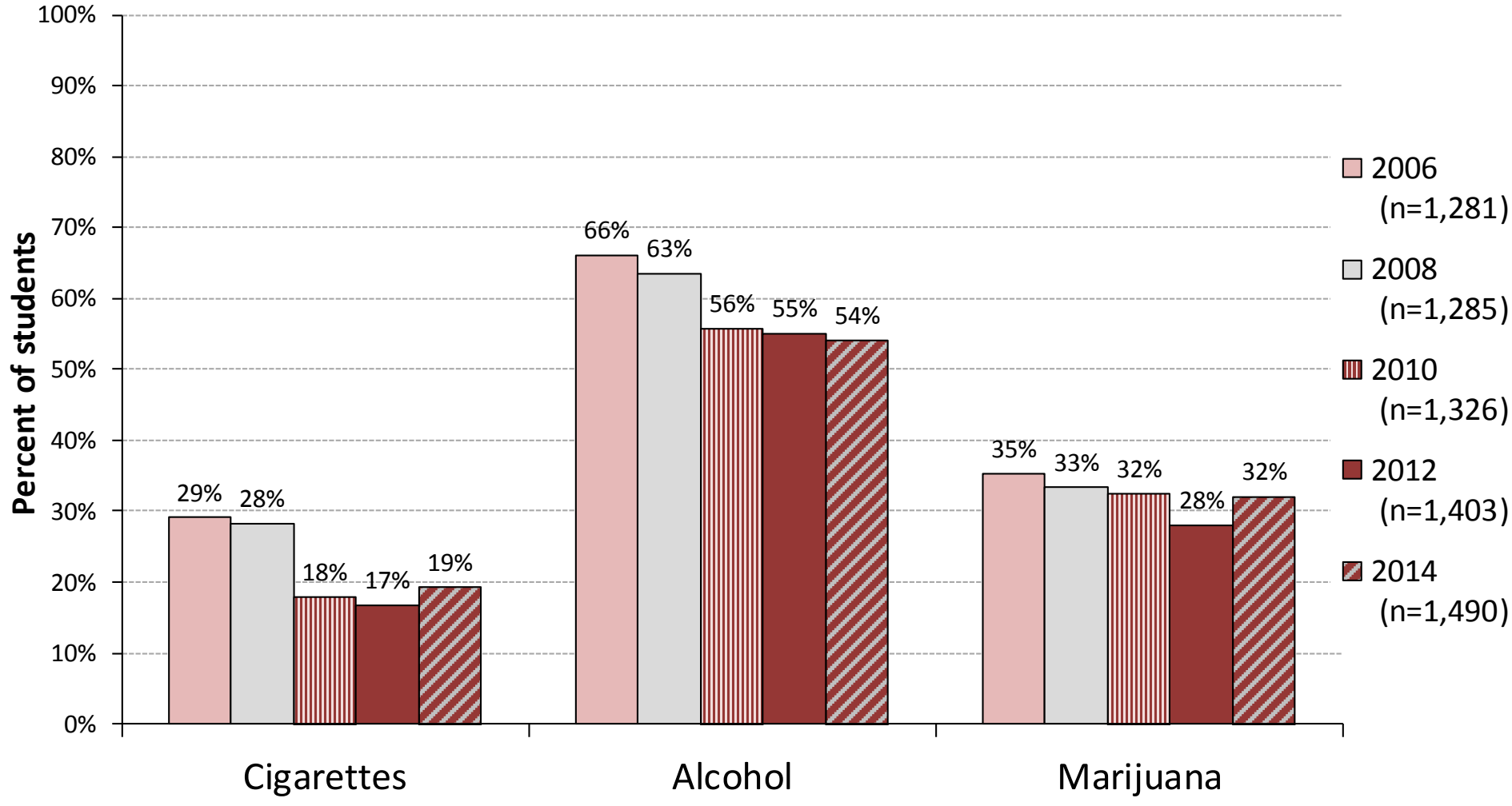


Figure 2-1D. Lifetime Substance Use at the District, Regional, State, and National Levels, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey

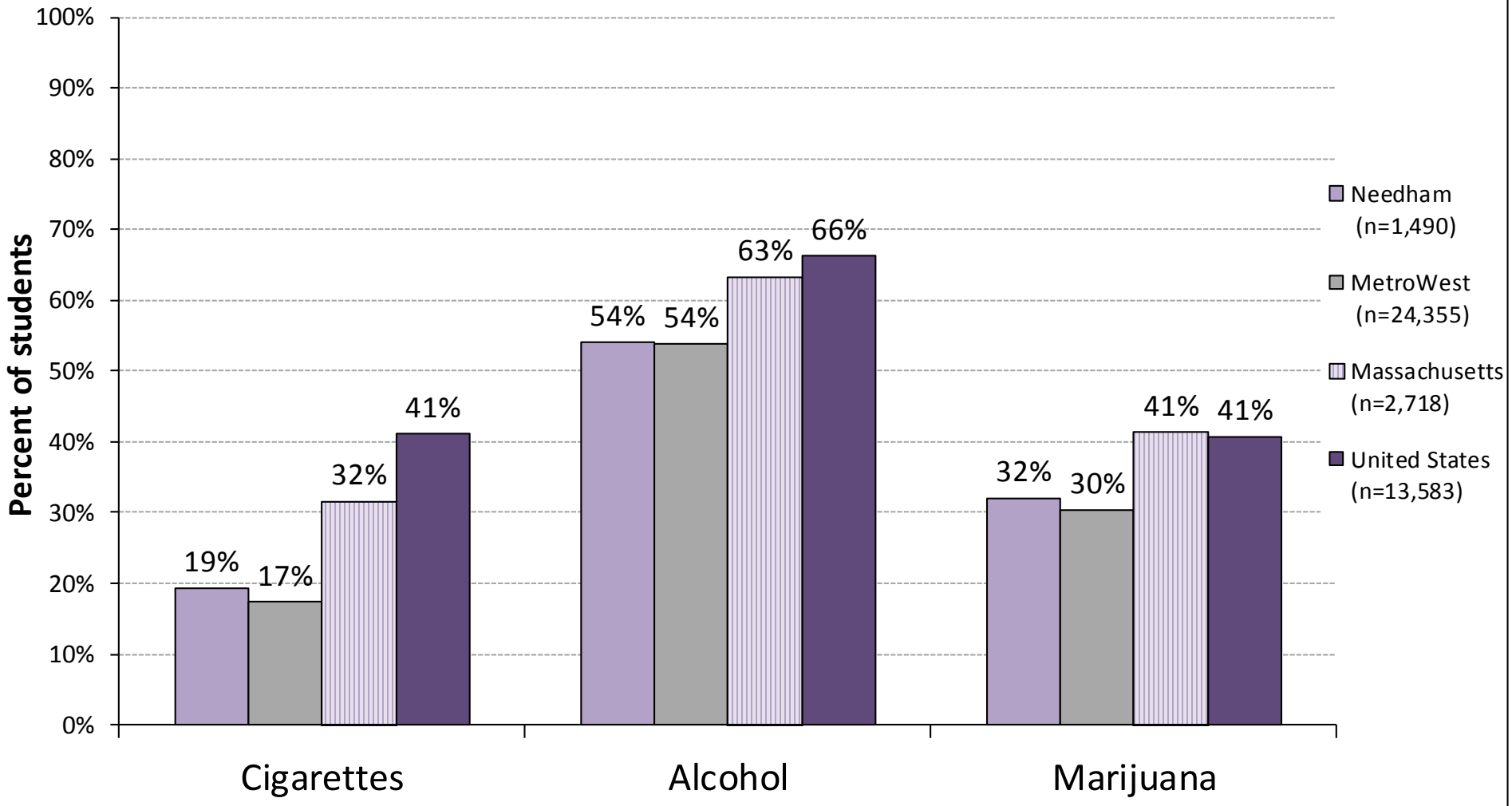
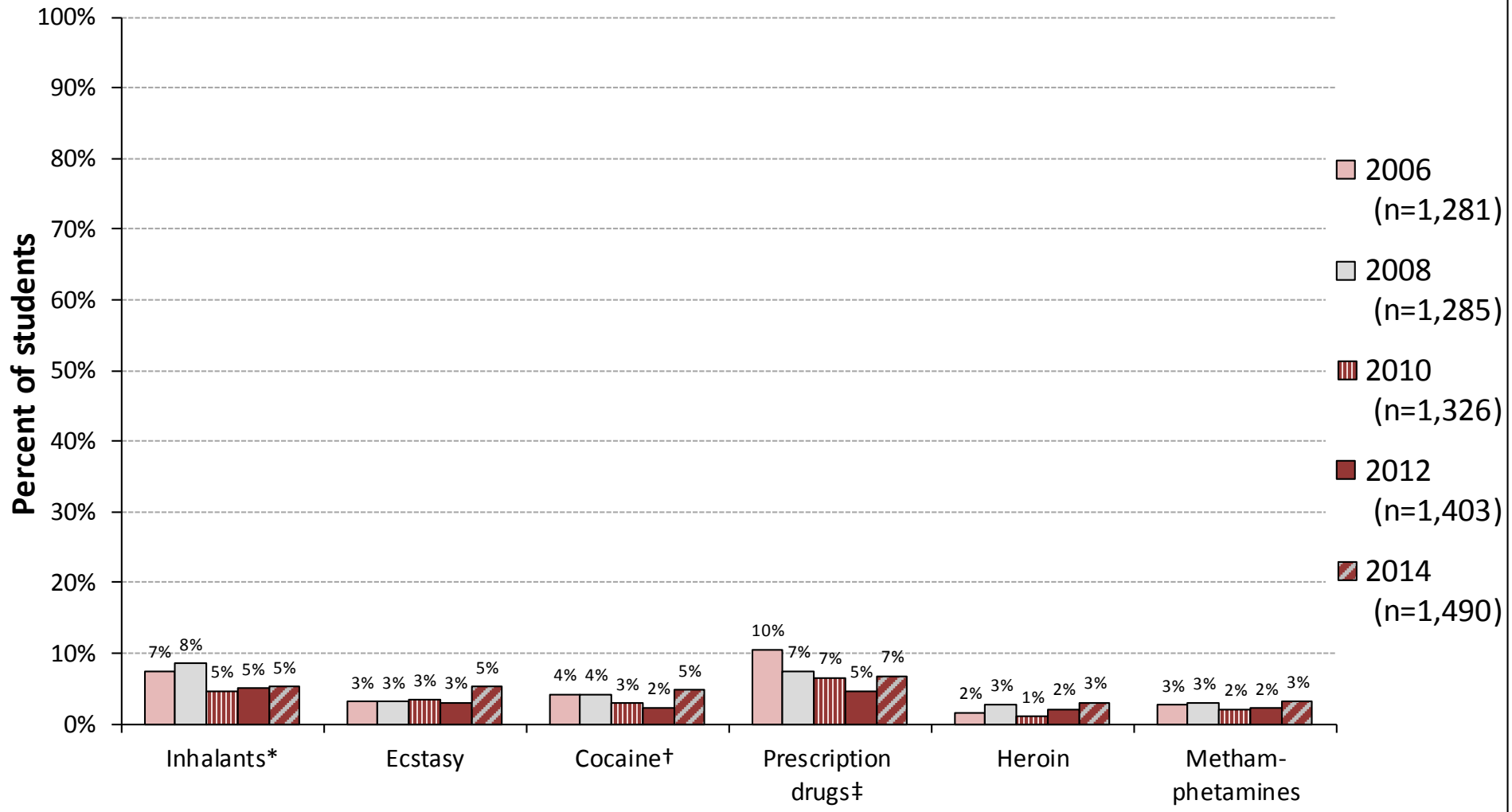


Figure 2-2C. Trends in Lifetime Other Substance Use, 2006-2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey

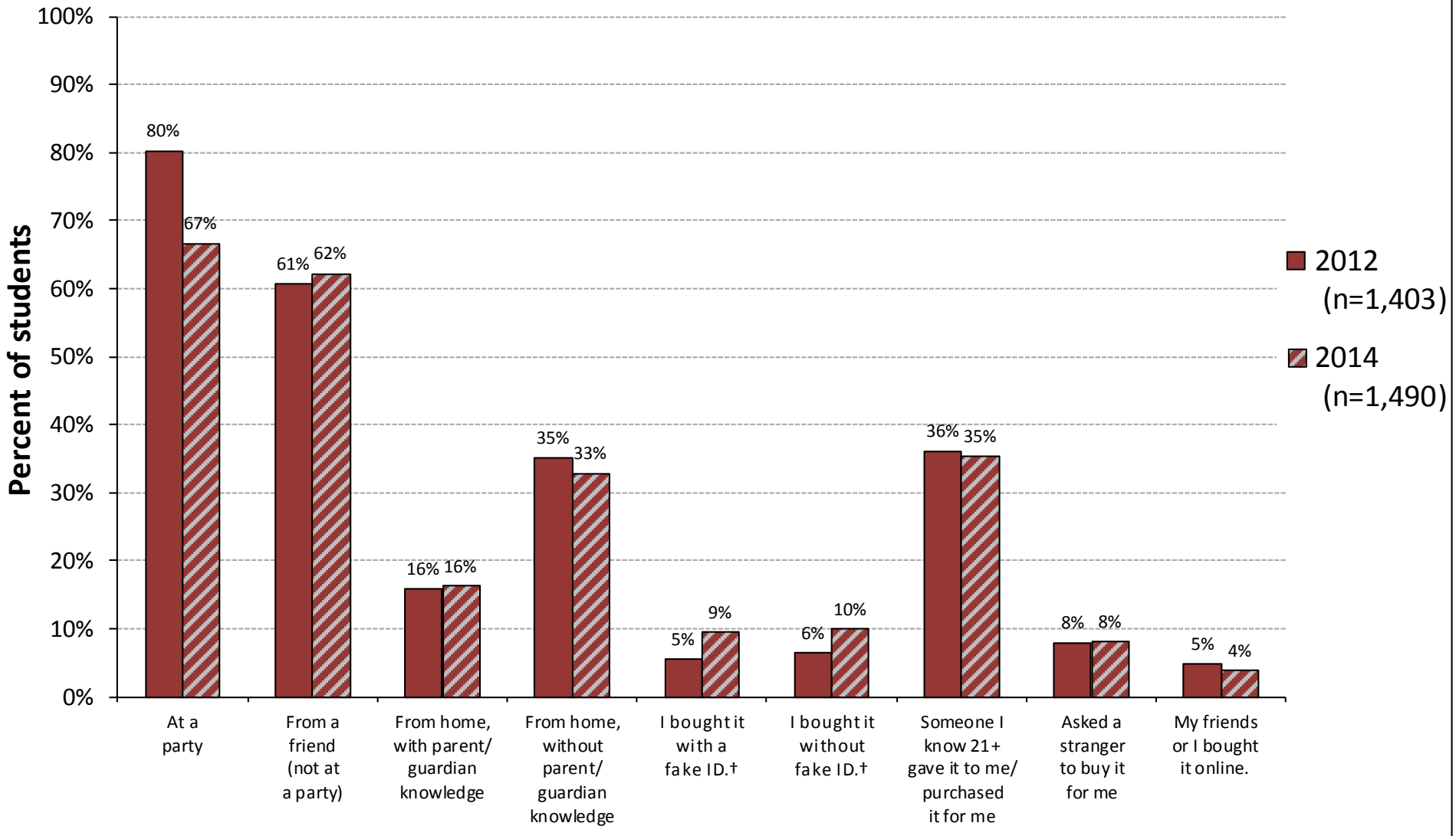


** Includes sniffing glue, breathing the contents of aerosol spray cans, or inhaling any paints or sprays to get high*

† Includes using powder, crack or freebase

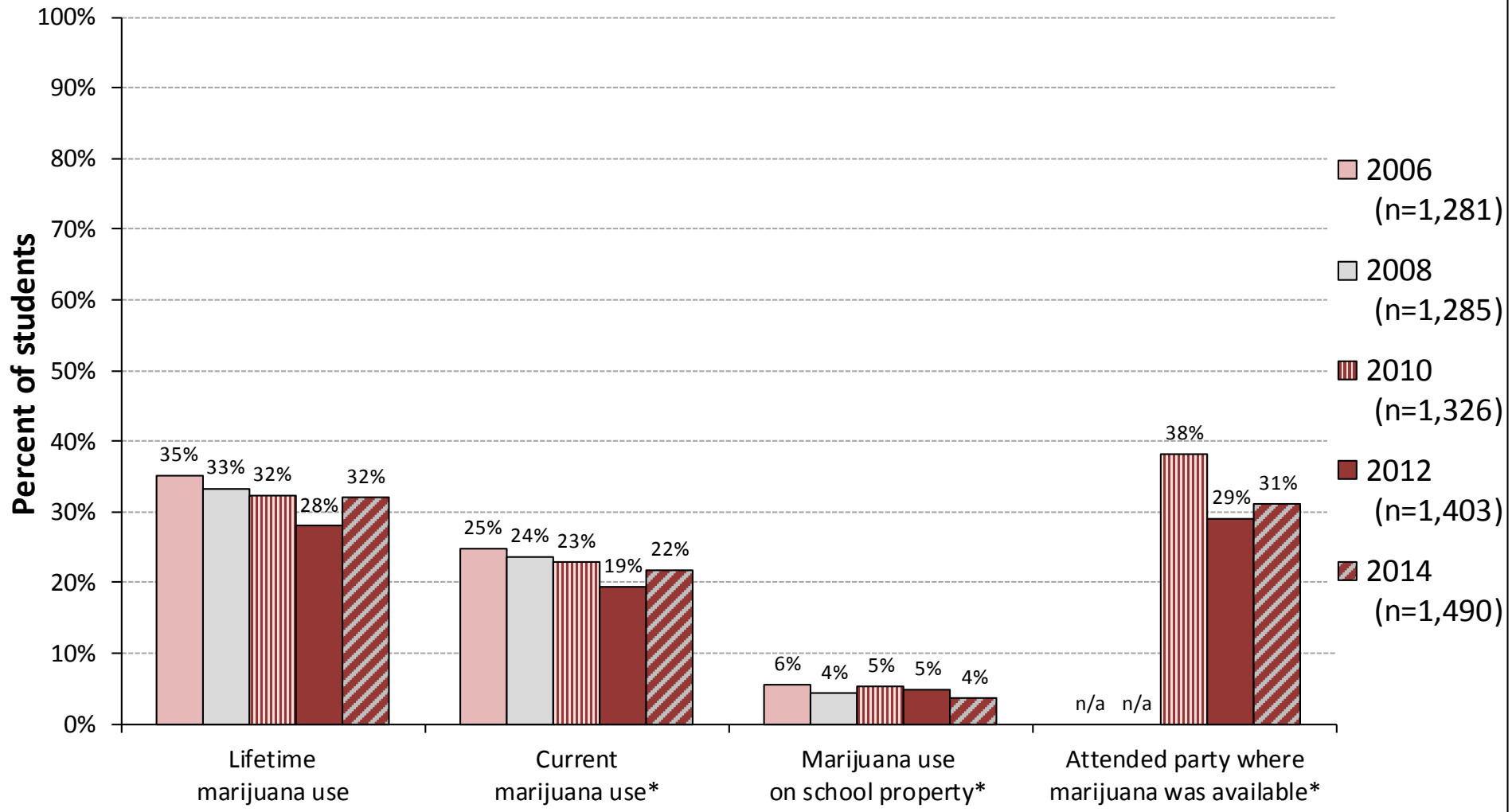
‡ Without a doctor's prescription

Figure 2-7C. Trends in Access to Alcohol Among Current Drinkers,* 2012-2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



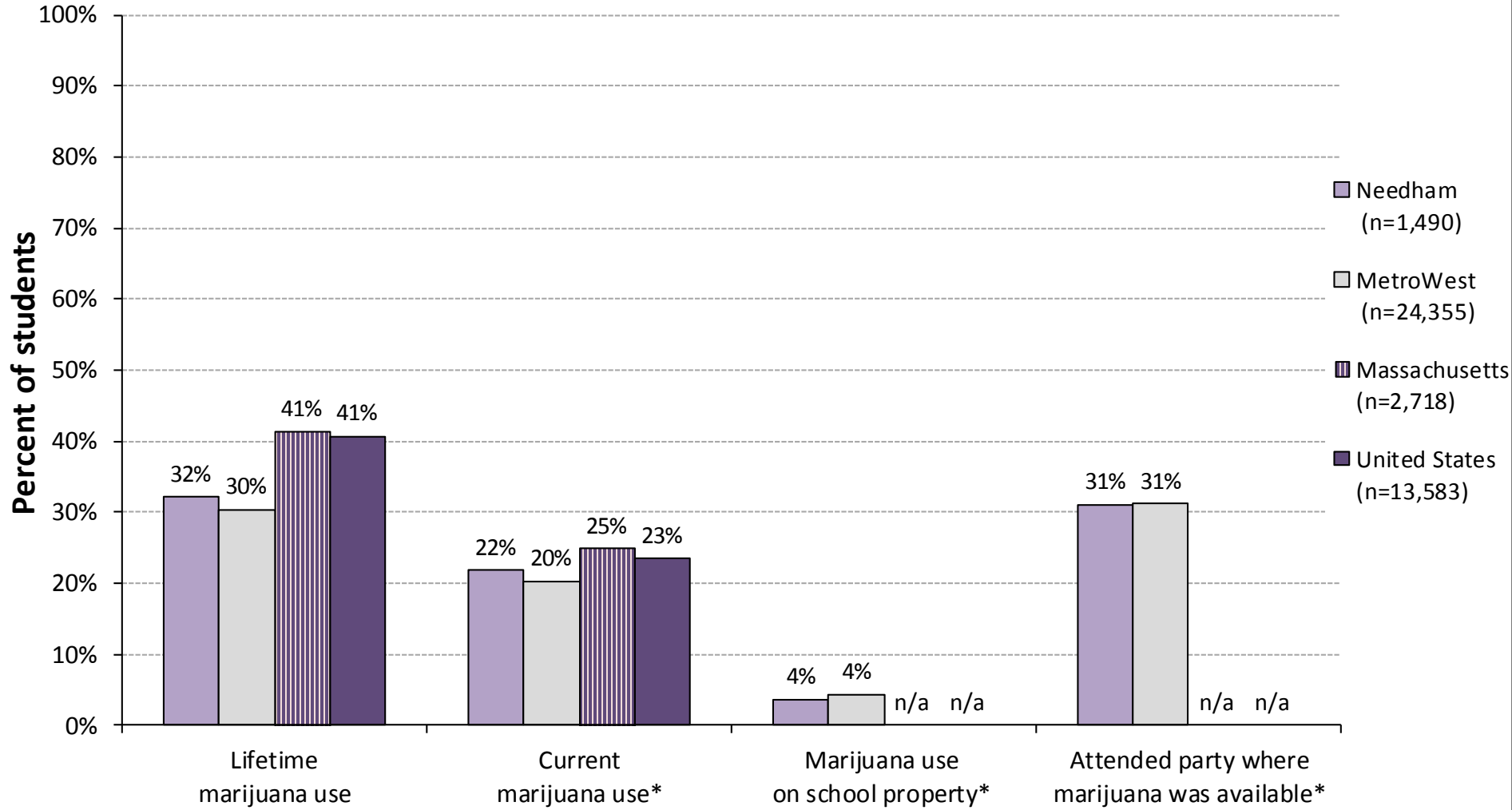
* *Among students who drank in the past 30 days*
† *At a store, tavern, bar, or public event (like a concert or sporting event)*

Figure 2-8C. Trends in Marijuana Use, 2006-2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



* *In the past 30 days*

Figure 2-8D. Marijuana Use at the District, Regional, State, and National Levels, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



* *In the past 30 days*

Figure 4-2B. Perceptions of Risk and Passenger Behaviors Related to Impaired Driving by Grade, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey

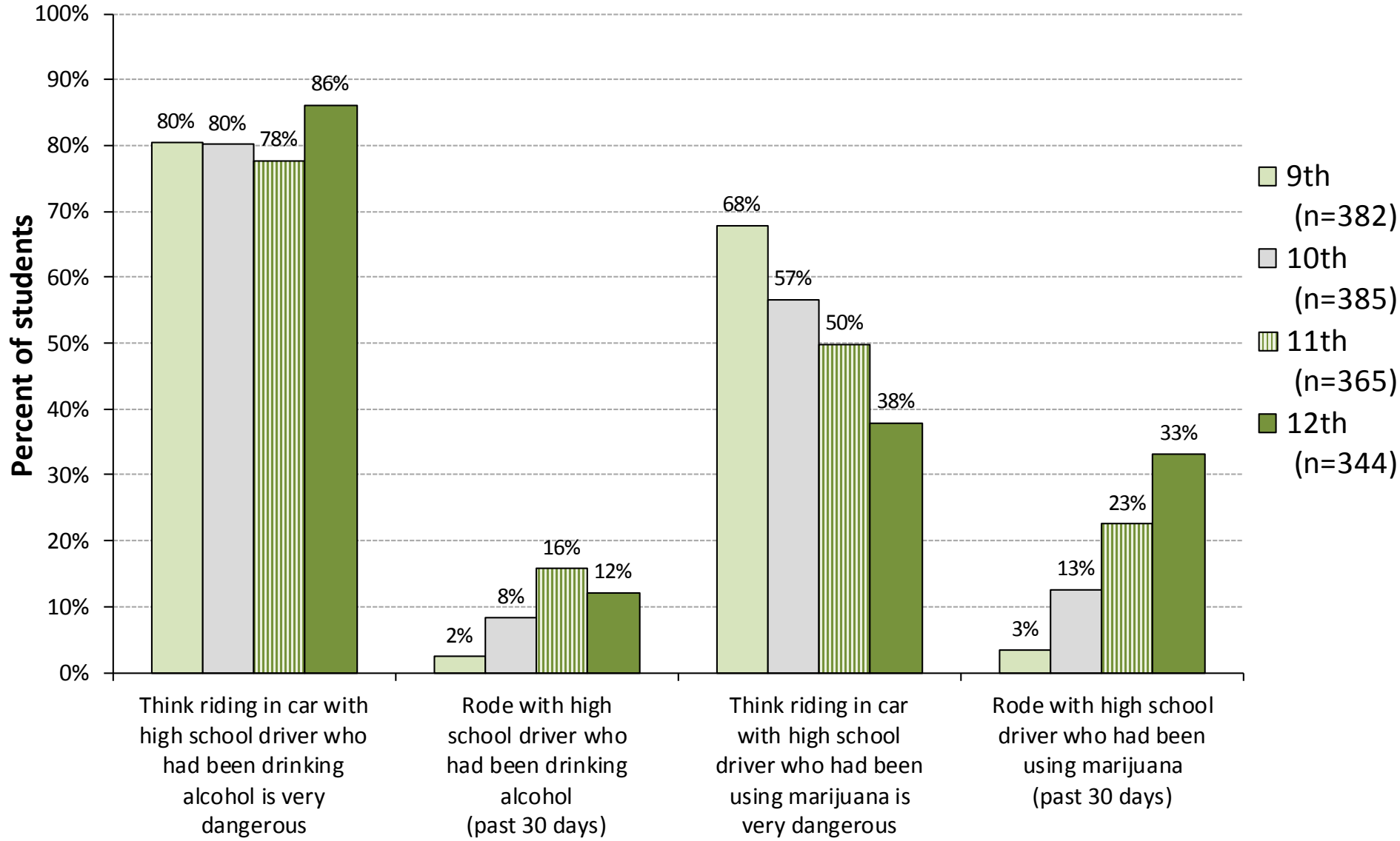
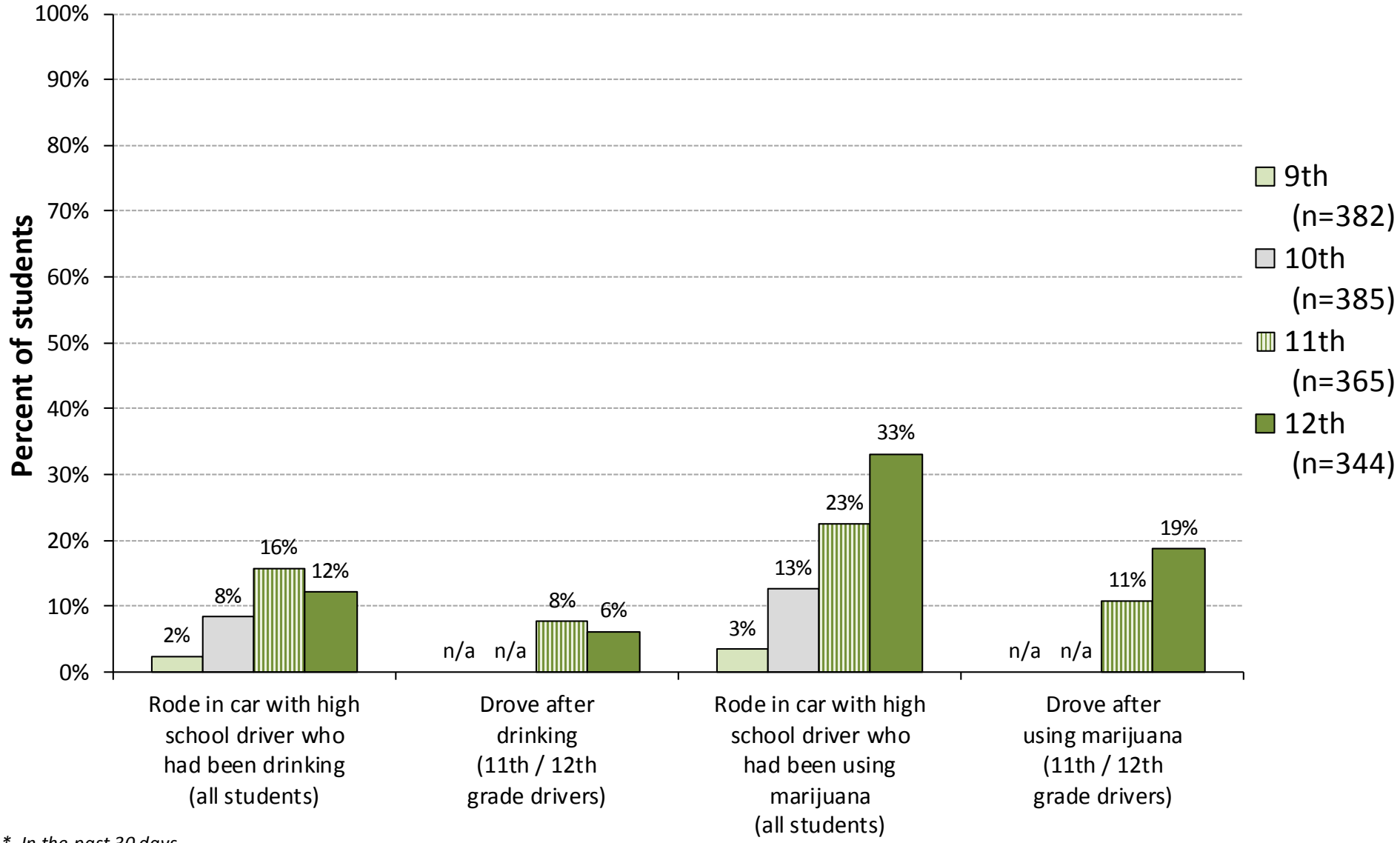
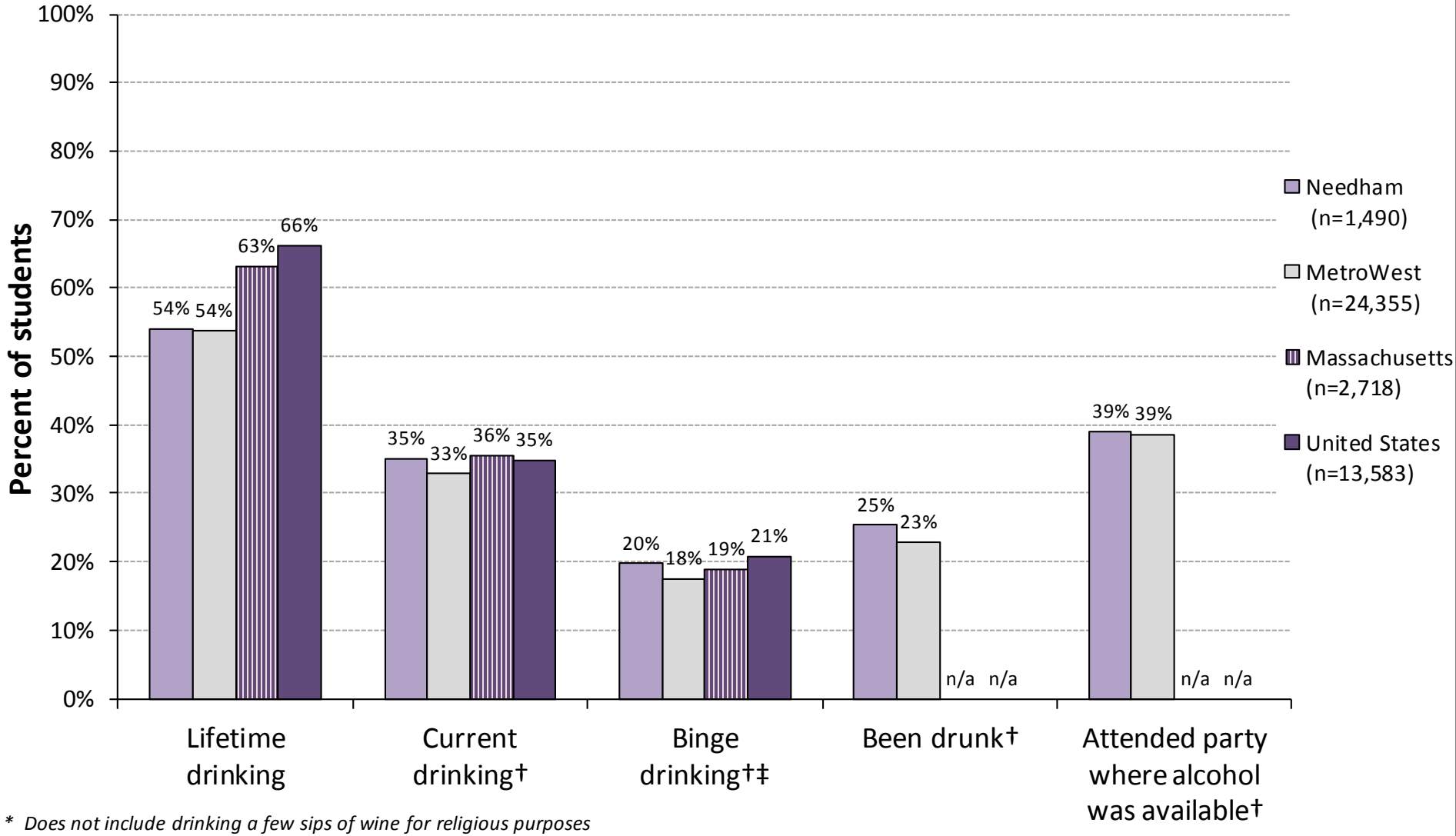


Figure 4-3B. Impaired Driving and Related Passenger Behaviors* by Grade, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



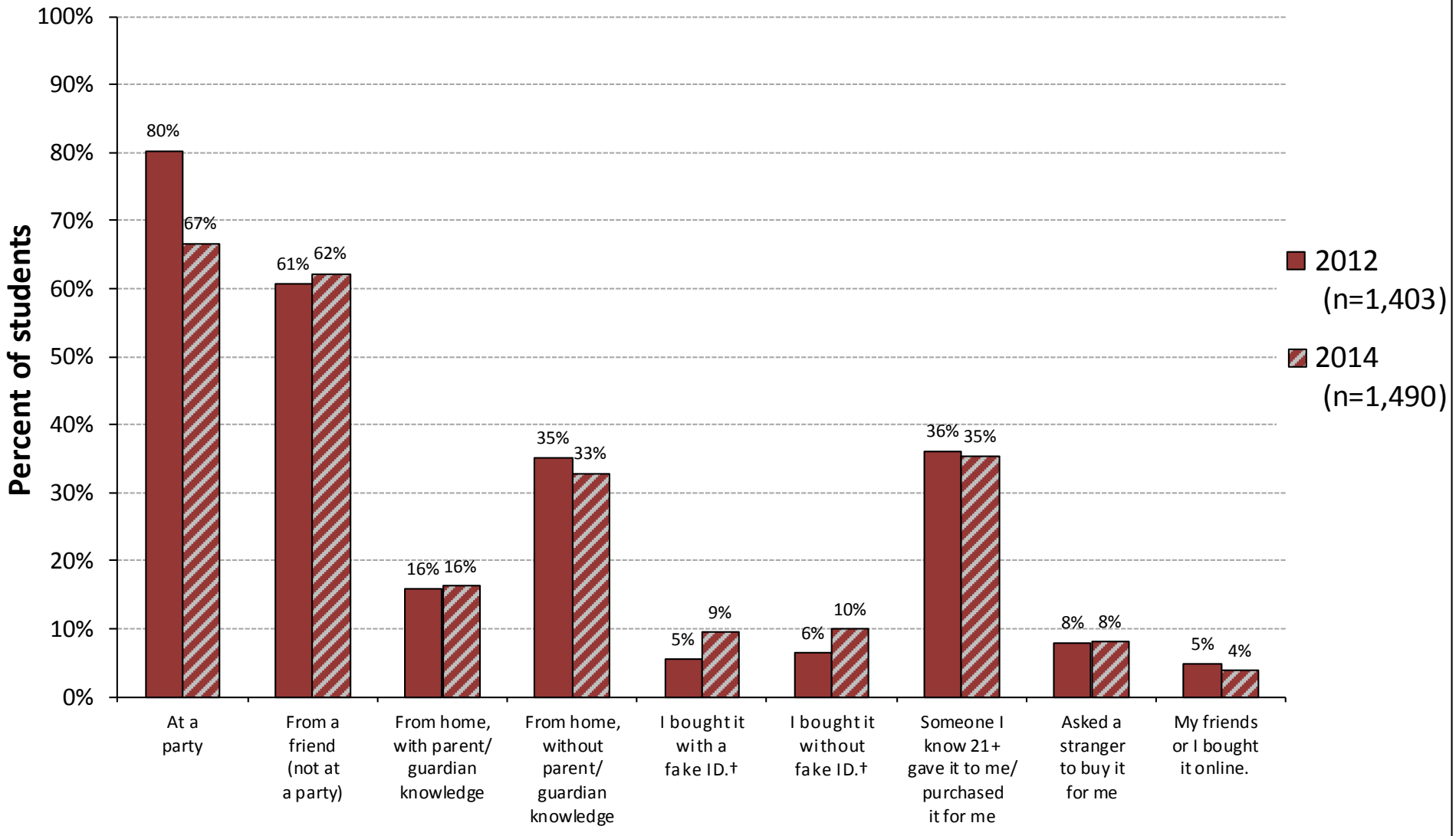
* *In the past 30 days*

Figure 2-6D. Alcohol Use* at the District, Regional, State, and National Levels, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



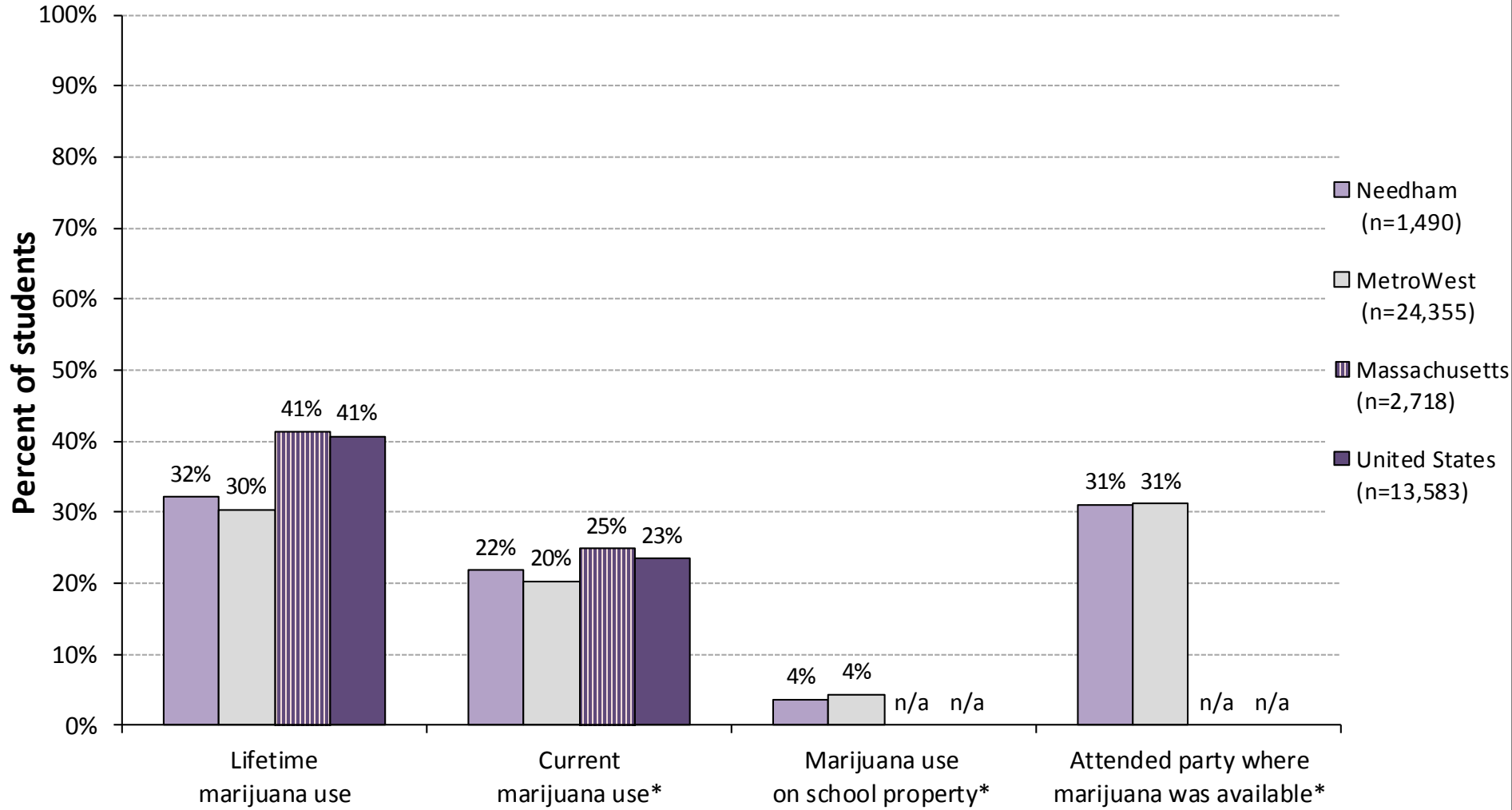
* *Does not include drinking a few sips of wine for religious purposes*
† *In the past 30 days*
‡ *Had 5 or more drinks in a row (within a couple of hours)*

Figure 2-7C. Trends in Access to Alcohol Among Current Drinkers,* 2012-2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



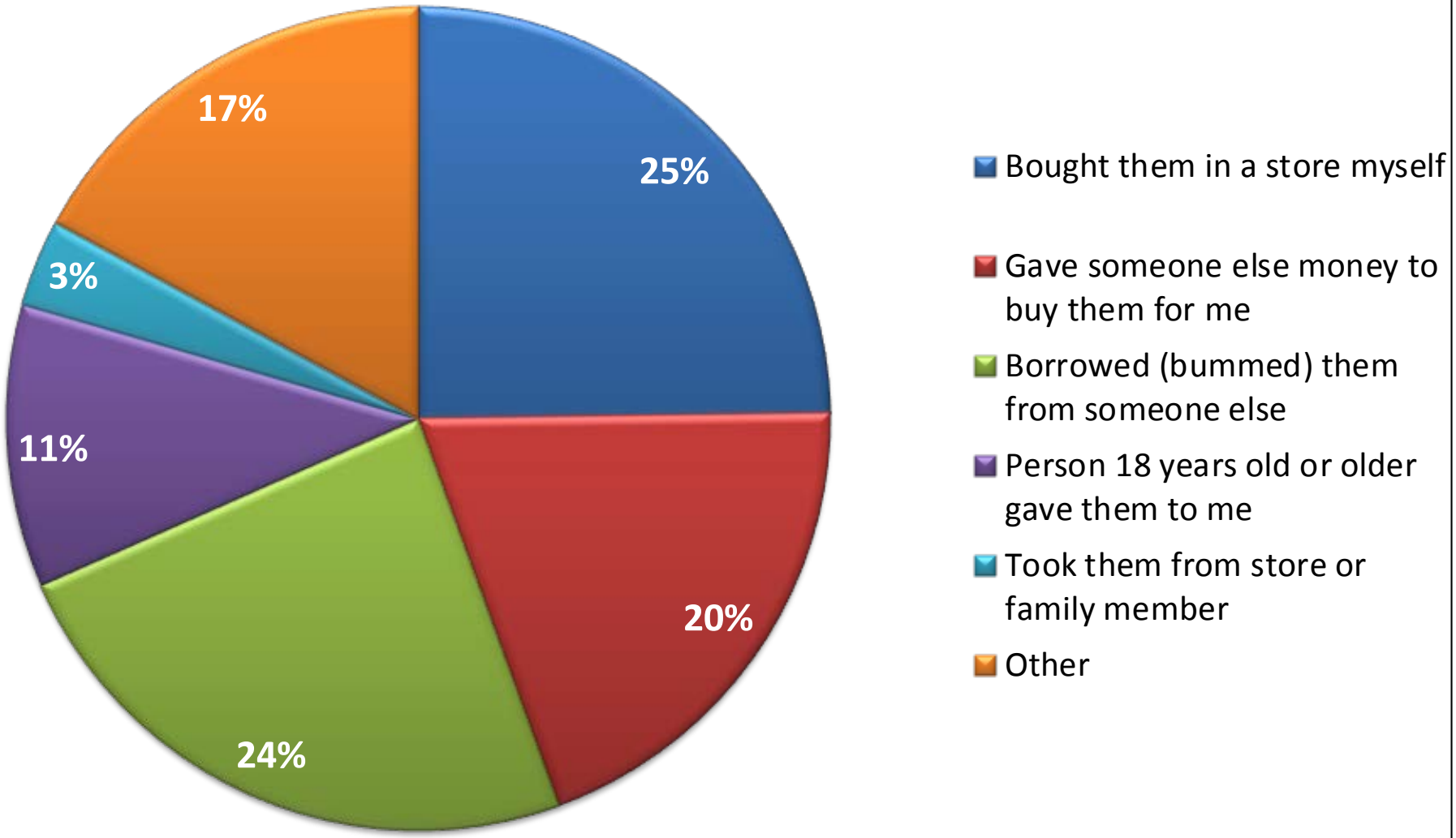
* *Among students who drank in the past 30 days*
† *At a store, tavern, bar, or public event (like a concert or sporting event)*

Figure 2-8D. Marijuana Use at the District, Regional, State, and National Levels, 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



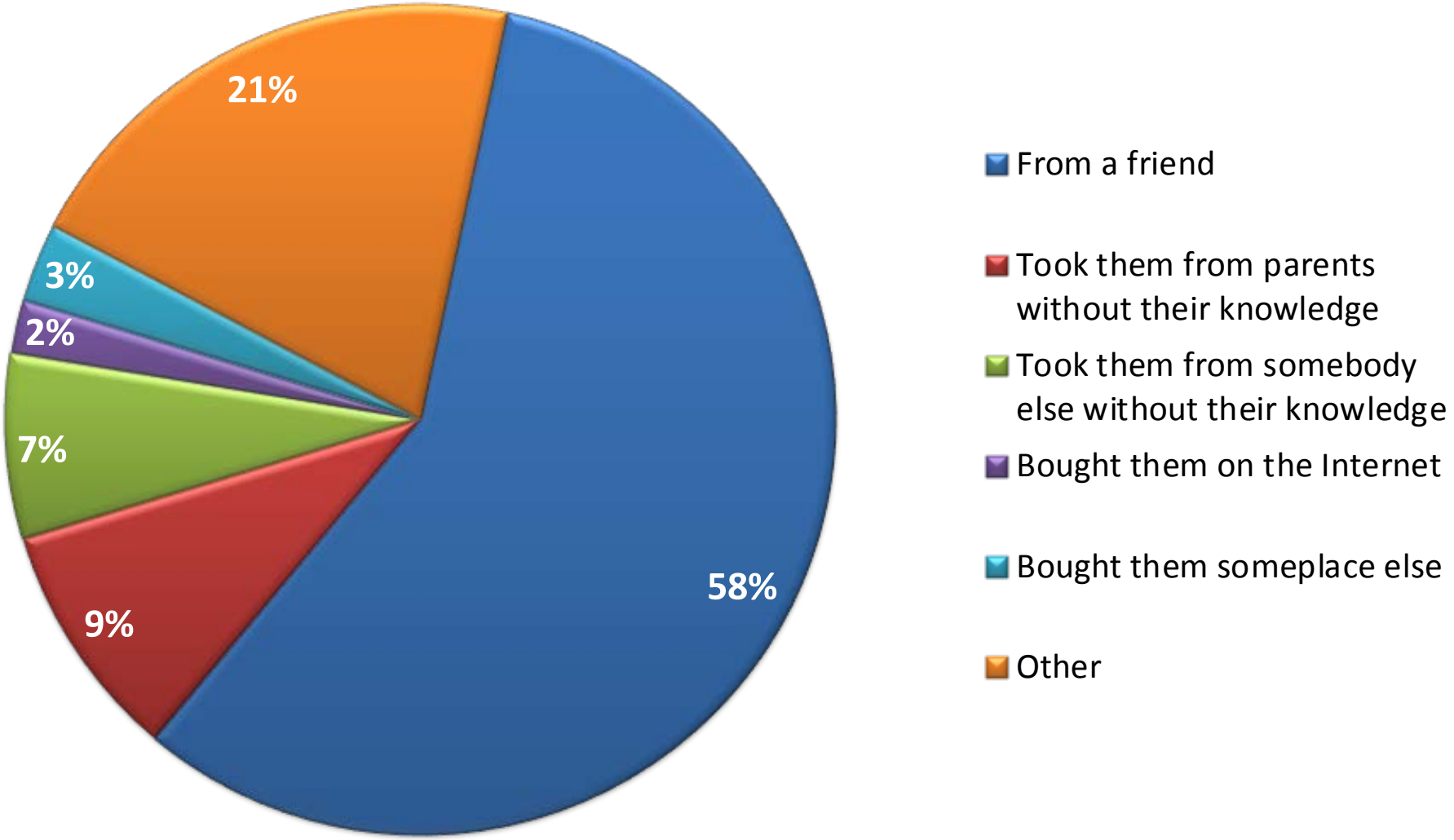
* *In the past 30 days*

Figure 2-5. Access to Cigarettes,* 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



** Among students who smoked in the past 30 days*

Figure 2-9. Access to Prescription Drugs,* 2014
Needham High School (Grades 9-12)
MetroWest Adolescent Health Survey



* *Among students who misused prescription drugs in their lifetime*

Summary of Crumb Rubber Monitoring Results - 2015

Memorial and DeFazio Parks
Needham, Massachusetts

Needham Health Department

Needham, Massachusetts

November 24, 2015

Fuss & O'Neill EnviroScience, LLC
146 Hartford Road
Manchester, CT 06040

Project No.20081266.A7E

FUSS & O'NEILL
EnviroScience, LLC

November 24, 2015

Mr. Timothy McDonald
Director of Public Health
Needham Health Department
1471 Highland Avenue
Needham, MA 02492

RE: **Summary of Crumb Rubber Monitoring Results - 2015**
Memorial and DeFazio Parks
Needham, Massachusetts
Fuss & O'Neill EnviroScience Project No. 20081266.A7E

Dear Mr. McDonald:

Enclosed is the summary report for the testing performed on the crumb rubber at your artificial turf athletic facilities at the Memorial and DeFazio Parks in Needham, Massachusetts.

If you should have any questions regarding the contents of this report please do not hesitate to contact me at (860) 646-2469 ext. 5333. Thank you for this opportunity to have served your environmental needs.

Sincerely,

Jared D. Smith, CSP
Project Manager

JDS/kr

Enclosure

146 Hartford Road
Manchester, CT
06040
t 860.646.2469
f 860.533.5143

www.fando.com

Connecticut
Massachusetts
Rhode Island

FUSS & O'NEILL
EnviroScience, LLC

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Memorial and DeFazio Parks
Needham Health Department

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2. Real-Time Measurements

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APPENDIX A - LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY FORMS

APPENDIX B - LIST OF INSTRUMENTATION

FUSS & O'NEILL
EnviroScience, LLC

1 Introduction and Background

Fuss & O'Neill EnviroScience, LLC (EnviroScience) was retained by the Needham Health Department to conduct a study on the off-gassing of crumb rubber used in the artificial turf fields at their athletic facilities in Needham, Massachusetts. The study involved the collection of crumb rubber samples for laboratory analysis from Memorial Park (Needham High School Field) located at 92 Rosemary Street and DeFazio Park (Brock Field and Founders Field) located at 380 Dedham Avenue. A review of the data was performed to identify potential health related issues.

On October 16, 2015, Mr. Jonathan Hand of EnviroScience performed the annual sampling. This sampling was performed for the Needham Health Department located in Needham, Massachusetts (the "Client") in accordance with our proposal dated May 7, 2015.

2 Methodology and Scope of Testing

One three-point composite sample of crumb rubber was collected using a comb and trowel from each of the athletic fields. The three point composite samples were collected from the two ends and the middle of each field. Samples were collected from the Needham High School Field in Memorial Park and from Brock Field and Founders Field in DeFazio Park.

To determine the concentration of chemicals present, two analyses were performed. For the first test, air was constantly flowed over a ten gram (10 g) sample of the crumb rubber that was heated to 150°F. A sample of air was collected after passing the air over the heated rubber. This test simulates a normal outdoor environment with air constantly passing over the rubber on a hot day. For the second test, a 10 g sample of the crumb rubber was sealed in a five hundred milliliter (500 mL) container and heated to 150°F for one (1) hour to determine what concentration of analytes could be found in a closed system in order to compare to the open flowed air experiments. Refer to *Appendix A* for the laboratory analytical reports and chain-of-custody forms.

Two additional analyses were performed to determine the amount of total metals present in the crumb rubber. To determine this information, samples were analyzed by inductively coupled plasma – atomic emission spectrometry (ICP-AES) to determine the presence of metals. Mercury content in the samples was determined by the Manual Cold Vapor Technique.

Real-time test parameters at each sampling location were collected during the collection of the three-point composite samples included the measurement of volatile organic compounds (VOCs) using a MiniRAE 2000 Portable Photoionization Detector (PID) as well as ambient temperature, relative humidity (RH), and carbon dioxide (CO_2), using a TSI Q-Trak Air Quality Monitor. Refer to *Appendix B* for a complete list of instrumentation used in conducting this sampling. Refer to Table 2 for the real-time measurements.

3 Results

This report identifies the available Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) for the compounds analyzed by the laboratory. All data is reported in

micrograms per cubic meter (µg/m^3) of air. See Table 1 for a comparison of laboratory analytical data compared to available OSHA PELs. For both tests, all analyzed concentrations were either very low, or below their respective OSHA PEL, where a PEL could be identified. As would be expected, the concentrations were higher in the sealed container, but even in this small enclosure, the concentrations were low and less than their respective OSHA PEL. The sealed container test confirms that tracking small amounts of the particles into an indoor setting should pose no reasonable human health risk. A previous report submitted to the Needham Health Department on October 21, 2009 entitled, "Summary of Results for Crumb Rubber Monitoring" reviews the potential health effects of crumb rubber.

4 Conclusions

Upon review of the air concentrations from off-gassing of the crumb rubber and the metal concentrations in the rubber, the rubber poses a minimal health risk from breathing the air above the rubber and from direct contact.

Report prepared by Environmental Analyst Jonathan Hand.

Reviewed by:

Jared D. Smith, CSP
Project Manager

Robert L. May, Jr.
President

Tables

FUSS & O'NEILL
EnviroScience, LLC

Table 1
Summary of Crumb Rubber Monitoring Results - October 16, 2015

Analyte	Analytical Results			OSHA PEL
	Memorial Park	DeFazio Park		
	Needham High School 1016JH-HS1 Air (µg/m³)	Brock Field 1016JH-D1 Air (µg/m³)	Founders Field 1016JH-D2 Air (µg/m³)	Air (µg/m³)
Air Flow Test Analyzed via method TO-13A				
Acenaphthene	<0.20	<0.20	<0.20	-
Acenaphthylene	<0.20	<0.20	<0.20	-
Anthracene	<0.20	<0.20	<0.20	200
Benzo(a)anthracene	<0.20	<0.20	<0.20	-
Benzo(a)pyrene	<0.20	<0.20	<0.20	200
Benzo(b)fluoranthene	<0.20	<0.20	<0.20	200
Benzo(e)pyrene	<0.20	<0.20	<0.20	200
Benzo(g,h,i)perylene	<0.20	<0.20	<0.20	-
Benzo(k)fluoranthene	<0.20	<0.20	<0.20	-
Chrysene	<0.20	<0.20	<0.20	200
Dibenz(a,h)anthracene	<0.20	<0.20	<0.20	-
Fluoranthene	<0.20	<0.20	<0.20	200
Fluorene	<0.20	<0.20	<0.20	-
Indeno(1,2,3-cd)pyrene	<0.20	<0.20	<0.20	-
1-Methylnaphthalene	<0.20	<0.20	<0.20	-
2-Methylnaphthalene	<0.20	<0.20	<0.20	-
Naphthalene	<0.50	<0.50	<0.50	50,000
Perylene	<0.20	<0.20	<0.20	-
Phenanthrene	<0.20	<0.20	<0.20	200
Pyrene	<0.20	<0.20	<0.20	200
Closed Container Test Analyzed via method TO-15				
1,4 Cyclohexadiene, 1-methyl-4-(1-(1))	ND	ND	15	-
1-Pentene, 2,4,4-trimethyl- (1)	5.2	ND	4.6	-
2-Butanone (1)	9.2	ND	ND	590,000
2-Propenal (1)	2.7	2.7	4.3	-
Butanal (1)	ND	2.7	3.3	-
Acetaldehyde (1)	ND	ND	ND	360,000
Acetone (1)	ND	ND	ND	2,400,000
Butanal (1)	6.4	ND	ND	-
Cyclopentane, methyl- (1)	2.5	11	9.4	-
Cyclopropane, ethylidenr-(1)	2.6	ND	ND	-
Ethanol (1)	ND	ND	ND	1,900,000
Furan, 2-methyl- (1)	22	17	21	-
Hexane (1)	15	ND	28	-
Isopropyl Alcohol (1)	ND	ND	ND	980,000

Analyte	Analytical Results			OSHA PEL Air (µg/m³)
	Memorial Park	DeFazio Park		
	Needham High School 1016JH-HS1 Air (µg/m³)	Brock Field 1016JH-D1 Air (µg/m³)	Founders Field 1016JH-D2 Air (µg/m³)	
Methacrolein (1)	3.0	2.9	3.6	-
Methyl Isobutyl Ketone (1)	15	15	15	410,000
Methylene Chloride (1)	27	82	71	-
Pentanal (1)	2.2	ND	ND	-
Pentane (1)	ND	ND	ND	2,950,000
Pentane, 2,2,4-trimethyl- (1)	ND	6.5	ND	-
Pentane, 3-methyl- (1)	ND	10	8.3	-
Total Metals	Solid (mg/kg)	Solid (mg/kg)	Solid (mg/kg)	
Arsenic	ND	ND	ND	
Cadmium	0.27	0.62	ND	
Chromium	0.67	0.61	0.58	
Lead	33	7.4	29	
Mercury	ND	ND	ND	
Selenium	ND	ND	ND	
Zinc	7,500	9,200	8,300	

ND = None Detected

Table 2
Real-Time Measurements, Needham Crumb Rubber Sampling - October 16, 2015

Location	Sample Number	VOC (ppm)	Temperature (°F)	RH (%)	CO_2 (ppm)
Needham High School (HS)	1	0.0	70	36	368
	2	0.0	66	41	233
	3	0.0	75	37	423
Brock Field (D1)	1	0.0	73	32	260
	2	0.0	74	31	275
	3	0.0	76	32	263
Founders Field (D2)	1	0.0	74	31	253
	2	0.0	72	34	249
	3	0.0	65	41	207

Appendix A

Laboratory Analytical Reports and Chain-of-Custody Forms

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 23, 2015

Jared Smith
Fuss & O'Neill EnviroScience, LLC - MA
50 Redfield Street, Suite 100
Boston, MA 02122

Project Location: Needham, MA
Client Job Number:
Project Number: 20081266.A7E
Laboratory Work Order Number: 15J0864

Enclosed are results of analyses for samples received by the laboratory on October 19, 2015. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Lisa A. Worthington
Project Manager

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Fuss & O'Neill EnviroScience, LLC - MA
50 Redfield Street, Suite 100
Boston, MA 02122
ATTN: Jared Smith

REPORT DATE: 10/23/2015

PURCHASE ORDER NUMBER: 20081266.A7E

PROJECT NUMBER: 20081266.A7E

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 15J0864

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Needham, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
1016JH-HS1	15J0864-01	Product/Solid		SW-846 6010C	
				SW-846 7471B	
1016JH-D1	15J0864-02	Product/Solid		SW-846 6010C	
				SW-846 7471B	
1016JH-D2	15J0864-03	Product/Solid		SW-846 6010C	
				SW-846 7471B	

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 6010C

Qualifications:

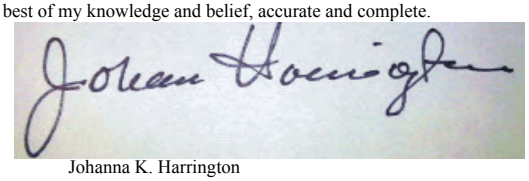
L-10

The reporting limit verification for the AIHA lead program is outside of control limits for this element. Any reported result at or near the detection limit may be bias on the high side.

Analyte & Samples(s) Qualified:

Lead
B133298-MRL1

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Johanna K. Harrington
Manager, Laboratory Reporting

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Needham, MA | Sample Description: | Work Order: 15J0864

Date Received: 10/19/2015

Field Sample #: 1016JH-HS1 | Sampled: 10/9/2015 00:00

Sample ID: 15J0864-01

Sample Matrix: Product/Solid

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	2.4	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:18	MJH
Cadmium	0.27	0.24	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:18	MJH
Chromium	0.67	0.47	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:18	MJH
Lead	33	0.71	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:18	MJH
Mercury	ND	0.025	mg/Kg	1		SW-846 7471B	10/20/15	10/21/15 12:24	SCB
Selenium	ND	4.7	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:18	MJH
Zinc	7500	0.94	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:18	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Needham, MA | Sample Description: | Work Order: 15J0864

Date Received: 10/19/2015

Field Sample #: 1016JH-D1 | Sampled: 10/9/2015 00:00

Sample ID: 15J0864-02

Sample Matrix: Product/Solid

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	2.4	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:23	MJH
Cadmium	0.62	0.24	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:23	MJH
Chromium	0.61	0.49	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:23	MJH
Lead	7.4	0.73	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:23	MJH
Mercury	ND	0.025	mg/Kg	1		SW-846 7471B	10/20/15	10/21/15 12:25	SCB
Selenium	ND	4.9	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:23	MJH
Zinc	9200	0.97	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:23	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Needham, MA | Sample Description: | Work Order: 15J0864

Date Received: 10/19/2015

Field Sample #: 1016JH-D2 | Sampled: 10/9/2015 00:00

Sample ID: 15J0864-03

Sample Matrix: Product/Solid

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	2.3	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:28	MJH
Cadmium	ND	0.23	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:28	MJH
Chromium	0.58	0.47	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:28	MJH
Lead	29	0.70	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:28	MJH
Mercury	ND	0.025	mg/Kg	1		SW-846 7471B	10/20/15	10/21/15 12:26	SCB
Selenium	ND	4.7	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:28	MJH
Zinc	8300	0.94	mg/Kg	1		SW-846 6010C	10/20/15	10/21/15 13:28	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method: SW-846 3050B-SW-846 6010C

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
15J0864-01 [1016JH-HS1]	B133298	1.06	50.0	10/20/15
15J0864-02 [1016JH-D1]	B133298	1.03	50.0	10/20/15
15J0864-03 [1016JH-D2]	B133298	1.06	50.0	10/20/15

Prep Method: SW-846 7471-SW-846 7471B

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
15J0864-01 [1016JH-HS1]	B133301	0.602	50.0	10/20/15
15J0864-02 [1016JH-D1]	B133301	0.602	50.0	10/20/15
15J0864-03 [1016JH-D2]	B133301	0.610	50.0	10/20/15

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B133298 - SW-846 3050B											
Blank (B133298-BLK1)				Prepared: 10/20/15 Analyzed: 10/21/15							
Arsenic	ND	2.5	mg/Kg								
Cadmium	ND	0.25	mg/Kg								
Chromium	ND	0.50	mg/Kg								
Lead	ND	0.75	mg/Kg								
Selenium	ND	5.0	mg/Kg								
Zinc	ND	1.0	mg/Kg								
LCS (B133298-BS1)				Prepared: 10/20/15 Analyzed: 10/21/15							
Arsenic	95.9	5.0	mg/Kg	98.5		97.4		77.8-122.1			
Cadmium	137	0.50	mg/Kg	146		93.6		81.9-118.2			
Chromium	167	1.0	mg/Kg	182		91.7		78.7-120.6			
Lead	117	1.5	mg/Kg	130		90.1		82.4-117.8			
Selenium	149	10	mg/Kg	154		96.5		77.1-122.3			
Zinc	181	2.0	mg/Kg	191		94.7		79.7-120.8			
LCS Dup (B133298-BSD1)				Prepared: 10/20/15 Analyzed: 10/21/15							
Arsenic	86.5	5.0	mg/Kg	98.5		87.8		77.8-122.1	10.3	30	
Cadmium	122	0.50	mg/Kg	146		83.6		81.9-118.2	11.3	30	
Chromium	153	1.0	mg/Kg	182		84.0		78.7-120.6	8.75	30	
Lead	107	1.5	mg/Kg	130		82.4		82.4-117.8	9.01	30	
Selenium	135	10	mg/Kg	154		87.8		77.1-122.3	9.44	30	
Zinc	165	2.0	mg/Kg	191		86.2		79.7-120.8	9.44	30	
MRL Check (B133298-MRL1)				Prepared: 10/20/15 Analyzed: 10/21/15							
Lead	1.11	0.75	mg/Kg	0.750		**148**	*	80-120			L-10
Batch B133301 - SW-846 7471											
Blank (B133301-BLK1)				Prepared & Analyzed: 10/20/15							
Mercury	ND	0.025	mg/Kg								
LCS (B133301-BS1)				Prepared & Analyzed: 10/20/15							
Mercury	6.64	0.76	mg/Kg	7.10		93.5		73.7-126.3			
LCS Dup (B133301-BSD1)				Prepared & Analyzed: 10/20/15							
Mercury	6.83	0.76	mg/Kg	7.10		96.2		73.7-126.3	2.86	30	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
L-10	The reporting limit verification for the AIHA lead program is outside of control limits for this element. Any reported result at or near the detection limit may be bias on the high side.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6010C in Product/Solid	
Arsenic	CT,NH,NY,ME,NC,VA,NJ
Cadmium	CT,NH,NY,ME,NC,VA,NJ
Chromium	CT,NH,NY,ME,NC,VA,NJ
Lead	CT,NH,NY,ME,NC,VA,NJ
Selenium	CT,NH,NY,ME,NC,VA,NJ
Zinc	CT,NH,NY,ME,NC,VA,NJ
SW-846 7471B in Product/Solid	
Mercury	CT,NH,NY,ME,NC,VA,NJ

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2016
MA	Massachusetts DEP	M-MA100	06/30/2016
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2017
NY	New York State Department of Health	10899 NELAP	04/1/2016
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2016
RI	Rhode Island Department of Health	LAO00112	12/30/2015
NC	North Carolina Div. of Water Quality	652	12/31/2015
NJ	New Jersey DEP	MA007 NELAP	10/30/2015
FL	Florida Department of Health	E871027 NELAP	06/30/2016
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2016
WA	State of Washington Department of Ecology	C2065	02/23/2016
ME	State of Maine	2011028	06/9/2017
VA	Commonwealth of Virginia	460217	12/14/2015
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2016

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- ❑ 78 Interstate Drive, West Springfield, MA 01089
- ☒ 50 Redfield Street, Suite 100, Boston, MA 02122
- ❑ 275 Promenade Street, Suite 350, Providence, RI 02908
- ❑ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0512

Turnaround

❑ 1 Day* ❑ 2 Days* ❑ 3 Days* ☒ Standard (7 days) ❑ Other ______ (days)

*Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY
Needham Crumb Rubber	Needham, MA	20081266.A7E	Con-Test

REPORT TO: Jared Smith

INVOICE TO: Jared Smith

P.O. NO.: 20081266.A7E

Sampler's Signature: Jonathan Hand Date: 10/9/15

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other Crumb Rubber

Analysis Request / Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled	VOCs by TO-15A	PAH by TO-13	Metals by 7471A	Metals by 6010c/6020A	Soil VOA Vial, [ ] methanol	Soil VOA Vial, [ ] water [ ] Na2(SO3)	Glass Soil Container (4) oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial, [ ] As is [ ] HCl	Glass Amber ( ) ml, [ ] As is [ ] H2SO4	Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - H2SO4, [ ] 250 ml [ ] 500 ml	Plastic - HNO3, 250 ml [ ] Filtered [ ] Unfiltered	Plastic - NaOH, 250 ml	Comments
01					1008JH-HS1	X	10/9/15	AM	X	X	X	X			X									
02					1008JH-D1	X	↓	↓	X	X	X	X			X									
03					1008JH-D2	X	↓	↓	X	X	X	X			X									

Transfer Number	Relinquished By	Accepted By	Date	Time
1	Jon Hand	Brav Fridge	10/9/15	
2	[signature]	Pal C [signature]	10/19/15	11:30
3	Pal C [signature]	[signature] 2.5°	10/19/15	1630
4			10/19/15	16:30

Reporting and Detection Limit Requirements:

Additional Comments: Metals of Concern = Hg, AS, CD, CR, ZN, SE, Pb

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East Longmeadow, MA. 01028
P: 413-525-2332
F: 413-525-6405
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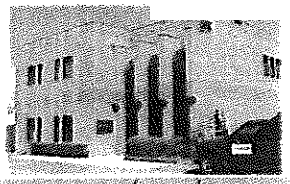

Sample Receipt Checklist

CLIENT NAME: Fuss & O'Neill **RECEIVED BY:** KB **DATE:** 10/19/15

1) **Was the chain(s) of custody relinquished and signed?** (Yes) No No CoC Included

2) **Does the chain agree with the samples?** or PAH Yes (No)
If not, explain: No VOC containers rcvd, air methods referenced but samples are P/S

3) **Are all the samples in good condition?** (Yes) No
If not, explain:

4) **How were the samples received:**
On Ice ☑ Direct from Sampling ☐ Ambient ☐ In Cooler(s) ☑

Were the samples received in Temperature Compliance of (2-6°C)? (Yes) No N/A

Temperature °C by Temp blank _____ Temperature °C by Temp gun 2.5°

5) **Are there Dissolved samples for the lab to filter?** Yes (No)
Who was notified _____ Date _____ Time _____

6) **Are there any RUSH or SHORT HOLDING TIME samples?** Yes (No)
Who was notified _____ Date _____ Time _____

7) **Location where samples are stored:**

Permission to subcontract samples? Yes No
(Walk-in clients only) if not already approved
Client Signature: _____

8) **Do all samples have the proper Acid pH:** Yes No (N/A) _____

9) **Do all samples have the proper Base pH:** Yes No (N/A) _____

10) **Was the PC notified of any discrepancies with the CoC vs the samples:** Yes No (N/A)

Containers received at Con-Test

	# of containers			# of containers
1 Liter Amber			8 oz amber/clear jar	
500 mL Amber			4 oz amber/clear jar	9
250 mL Amber (8oz amber)			2 oz amber/clear jar	
1 Liter Plastic			Plastic Bag / Ziploc	
500 mL Plastic			SOC Kit	
250 mL plastic			Non-ConTest Container	
40 mL Vial - type listed below			Perchlorate Kit	
Colisure / bacteria bottle			Flashpoint bottle	
Dissolved Oxygen bottle			Other glass jar	
Encore			Other	

Laboratory Comments:

40 mL vials: # HCl _____ # Methanol _____
Bisulfate _____ # DI Water _____
Thiosulfate _____ Unpreserved _____

Time and Date Frozen:

Login Sample Receipt Checklist

(Rejection Criteria Listing - Using Sample Acceptance Policy)

Any False statement will be brought to the attention of Client

Question	Answer (True/False) T/F/NA	Comment
1) The cooler's custody seal, if present, is intact.	NA	
2) The cooler or samples do not appear to have been compromised or tampered with.	T	
3) Samples were received on ice.	T	
4) Cooler Temperature is acceptable.	T	
5) Cooler Temperature is recorded.	T	
6) COC is filled out in ink and legible.	T	
7) COC is filled out with all pertinent information.	T	
8) Field Sampler's name present on COC.	T	
9) There are no discrepancies between the sample IDs on the container and the COC.	T	
10) Samples are received within Holding Time.	T	
11) Sample containers have legible labels.	T	
12) Containers are not broken or leaking.	T	
13) Air Cassettes are not broken/open.	NA	
14) Sample collection date/times are provided.	T	
15) Appropriate sample containers are used.	T	
16) Proper collection media used.	T	
17) No headspace sample bottles are completely filled.	T	
18) There is sufficient volume for all requsted analyses, including any requested MS/MSDs.	T	
19) Trip blanks provided if applicable.	NA	
20) VOA sample vials do not have head space or bubble is <6mm (1/4") in diameter.	NA	
21) Samples do not require splitting or compositing.	T	

Who notified of False statements?

Log-In Technician Initials: KB

Date/Time: 10/19/15

Date/Time: 16:30

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November 4, 2015

Jared Smith
Fuss & O'Neill EnviroScience, LLC - MA
50 Redfield Street, Suite 100
Boston, MA 02122

Project Location: Needham, MA
Client Job Number:
Project Number: 20081266.A7E
Laboratory Work Order Number: 15J0870

Enclosed are results of analyses for samples received by the laboratory on October 20, 2015. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Lisa A. Worthington
Project Manager

Table of Contents

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Fuss & O'Neill EnviroScience, LLC - MA
50 Redfield Street, Suite 100
Boston, MA 02122
ATTN: Jared Smith

REPORT DATE: 11/4/2015

PURCHASE ORDER NUMBER: 20081266.A7E

PROJECT NUMBER: 20081266.A7E

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 15J0870

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Needham, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
1016JH-HS1	15J0870-01	Product/Solid		EPA TO-13A	
				EPA TO-15	
1016JH-D1	15J0870-02	Product/Solid		EPA TO-13A	
				EPA TO-15	
1016JH-D2	15J0870-03	Product/Solid		EPA TO-13A	
				EPA TO-15	

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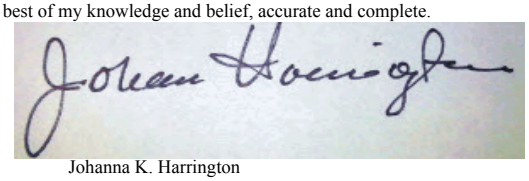
CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

EPA TO-13A

Calculations of concentrations in air are based on information regarding air volumes as reported to the laboratory.
Blank is not subtracted unless otherwise specified.

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Johanna K. Harrington
Manager, Laboratory Reporting

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ANALYTICAL RESULTS

Project Location: Needham, MA
Date Received: 10/20/2015
Field Sample #: 1016JH-HS1
Sample ID: 15J0870-01
Sample Matrix: Product/Solid
Sampled: 10/9/2015 00:00

Sample Description/Location:
Sub Description/Location:
Flow Controller ID:
Sample Type:

Work Order: 15J0870

EPA TO-13A

Analyte	Total µg Results	RL	Flag/Qual	Dilution	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.20		1	10/26/15 17:01	CJM
Acenaphthylene	ND	0.20		1	10/26/15 17:01	CJM
Anthracene	ND	0.20		1	10/26/15 17:01	CJM
Benzo(a)anthracene	ND	0.20		1	10/26/15 17:01	CJM
Benzo(a)pyrene	ND	0.20		1	10/26/15 17:01	CJM
Benzo(b)fluoranthene	ND	0.20		1	10/26/15 17:01	CJM
Benzo(e)pyrene	ND	0.20		1	10/26/15 17:01	CJM
Benzo(g,h,i)perylene	ND	0.20		1	10/26/15 17:01	CJM
Benzo(k)fluoranthene	ND	0.20		1	10/26/15 17:01	CJM
Chrysene	ND	0.20		1	10/26/15 17:01	CJM
Dibenz(a,h)anthracene	ND	0.20		1	10/26/15 17:01	CJM
Fluoranthene	ND	0.20		1	10/26/15 17:01	CJM
Fluorene	ND	0.20		1	10/26/15 17:01	CJM
Indeno(1,2,3-cd)pyrene	ND	0.20		1	10/26/15 17:01	CJM
1-Methylnaphthalene	ND	0.20		1	10/26/15 17:01	CJM
2-Methylnaphthalene	ND	0.20		1	10/26/15 17:01	CJM
Naphthalene	ND	0.50		1	10/26/15 17:01	CJM
Perylene	ND	0.20		1	10/26/15 17:01	CJM
Phenanthrene	ND	0.20		1	10/26/15 17:01	CJM
Pyrene	ND	0.20		1	10/26/15 17:01	CJM

Surrogates	% Recovery	% REC Limits	
Fluorene-d10	87.9	60-120	10/26/15 17:01
Pyrene-d10	90.0	60-120	10/26/15 17:01

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ANALYTICAL RESULTS

Project Location: Needham, MA
Date Received: 10/20/2015
Field Sample #: 1016JH-HS1
Sample ID: 15J0870-01
Sample Matrix: Product/Solid
Sampled: 10/9/2015 00:00

Sample Description/Location:
Sub Description/Location:
Canister ID:
Canister Size:
Flow Controller ID:
Sample Type:

Work Order: 15J0870
Initial Vacuum(in Hg):
Final Vacuum(in Hg):
Receipt Vacuum(in Hg):
Flow Controller Type:
Flow Controller Calibration
RPD Pre and Post-Sampling:

EPA TO-15

Analyte	ppbv Results	RL	Flag/Qual	Retention Time	Dilution	Date/Time Analyzed	Analyst

Tentatively Identified Compounds - Estimated Values Reported

	ppbv Results	Response	Retention Time	CAS #	Q#
1-Pentene, 2,4,4-trimethyl- (1)	5.2	693896	12.444	000107-39-1	
2-Butanone (1)	9.2	747145	8.527	000078-93-3	
2-Propenal (1)	2.7	222202	6.069	000107-02-8	
Butanal (1)	6.4	520953	8.396	000123-72-8	
Cyclopentane, methyl- (1)	2.5	206160	9.982	000096-37-7	
Cyclopropane, ethylidene- (1)	2.6	211861	6.807	018631-83-9	
Furan, 2-methyl- (1)	22	1739120	8.996	000534-22-5	
Hexane (1)	15	1183480	9.169	000110-54-3	
Methacrolein (1)	3.0	246219	7.884	000078-85-3	
Methyl Isobutyl Ketone (1)	15	2000240	12.719	000108-10-1	
Methylene Chloride (1)	27	2164660	7.059	000075-09-2	
Pentanal (1)	2.2	291058	11.367	000110-62-3	

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ANALYTICAL RESULTS

Project Location: Needham, MA
Date Received: 10/20/2015
Field Sample #: 1016JH-D1
Sample ID: 15J0870-02
Sample Matrix: Product/Solid
Sampled: 10/9/2015 00:00

Sample Description/Location:
Sub Description/Location:

Flow Controller ID:
Sample Type:

Work Order: 15J0870

EPA TO-13A

Analyte	Total µg Results	RL	Flag/Qual	Dilution	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.20		1	10/26/15 17:30	CJM
Acenaphthylene	ND	0.20		1	10/26/15 17:30	CJM
Anthracene	ND	0.20		1	10/26/15 17:30	CJM
Benzo(a)anthracene	ND	0.20		1	10/26/15 17:30	CJM
Benzo(a)pyrene	ND	0.20		1	10/26/15 17:30	CJM
Benzo(b)fluoranthene	ND	0.20		1	10/26/15 17:30	CJM
Benzo(e)pyrene	ND	0.20		1	10/26/15 17:30	CJM
Benzo(g,h,i)perylene	ND	0.20		1	10/26/15 17:30	CJM
Benzo(k)fluoranthene	ND	0.20		1	10/26/15 17:30	CJM
Chrysene	ND	0.20		1	10/26/15 17:30	CJM
Dibenz(a,h)anthracene	ND	0.20		1	10/26/15 17:30	CJM
Fluoranthene	ND	0.20		1	10/26/15 17:30	CJM
Fluorene	ND	0.20		1	10/26/15 17:30	CJM
Indeno(1,2,3-cd)pyrene	ND	0.20		1	10/26/15 17:30	CJM
1-Methylnaphthalene	ND	0.20		1	10/26/15 17:30	CJM
2-Methylnaphthalene	ND	0.20		1	10/26/15 17:30	CJM
Naphthalene	ND	0.50		1	10/26/15 17:30	CJM
Perylene	ND	0.20		1	10/26/15 17:30	CJM
Phenanthrene	ND	0.20		1	10/26/15 17:30	CJM
Pyrene	ND	0.20		1	10/26/15 17:30	CJM

Surrogates	% Recovery	% REC Limits	
Fluorene-d10	82.0	60-120	10/26/15 17:30
Pyrene-d10	85.4	60-120	10/26/15 17:30

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ANALYTICAL RESULTS

Project Location: Needham, MA
Date Received: 10/20/2015
Field Sample #: 1016JH-D1
Sample ID: 15J0870-02
Sample Matrix: Product/Solid
Sampled: 10/9/2015 00:00

Sample Description/Location:
Sub Description/Location:
Canister ID:
Canister Size:
Flow Controller ID:
Sample Type:

Work Order: 15J0870
Initial Vacuum(in Hg):
Final Vacuum(in Hg):
Receipt Vacuum(in Hg):
Flow Controller Type:
Flow Controller Calibration
RPD Pre and Post-Sampling:

EPA TO-15

Analyte	ppbv Results	RL	Flag/Qual	Retention Time	Dilution	Date/Time Analyzed	Analyst

Tentatively Identified Compounds - Estimated Values Reported

	ppbv Results	Response	Retention Time	CAS #	Q#
2-Propenal (1)	2.7	211771	6.069	000107-02-8	
Butanal (1)	2.7	218496	8.396	000123-72-8	
Cyclopentane, methyl- (1)	11	888915	9.982	000096-37-7	
Furan, 2-methyl- (1)	17	1333750	8.987	000534-22-5	
Methacrolein (1)	2.9	229472	7.884	000078-85-3	
Methyl Isobutyl Ketone (1)	15	1941390	12.719	000108-10-1	
Methylene Chloride (1)	82	6505070	7.059	000075-09-2	
Pentane, 2,2,4-trimethyl- (1)	6.5	867613	11.815	000540-84-1	
Pentane, 3-methyl- (1)	10	815602	8.709	000096-14-0	

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ANALYTICAL RESULTS

Project Location: Needham, MA
Date Received: 10/20/2015
Field Sample #: 1016JH-D2
Sample ID: 15J0870-03
Sample Matrix: Product/Solid
Sampled: 10/9/2015 00:00

Sample Description/Location:
Sub Description/Location:

Flow Controller ID:
Sample Type:

Work Order: 15J0870

EPA TO-13A

Analyte	Total µg Results	RL	Flag/Qual	Dilution	Date/Time Analyzed	Analyst
Acenaphthene	ND	0.20		1	10/26/15 17:59	CJM
Acenaphthylene	ND	0.20		1	10/26/15 17:59	CJM
Anthracene	ND	0.20		1	10/26/15 17:59	CJM
Benzo(a)anthracene	ND	0.20		1	10/26/15 17:59	CJM
Benzo(a)pyrene	ND	0.20		1	10/26/15 17:59	CJM
Benzo(b)fluoranthene	ND	0.20		1	10/26/15 17:59	CJM
Benzo(e)pyrene	ND	0.20		1	10/26/15 17:59	CJM
Benzo(g,h,i)perylene	ND	0.20		1	10/26/15 17:59	CJM
Benzo(k)fluoranthene	ND	0.20		1	10/26/15 17:59	CJM
Chrysene	ND	0.20		1	10/26/15 17:59	CJM
Dibenz(a,h)anthracene	ND	0.20		1	10/26/15 17:59	CJM
Fluoranthene	ND	0.20		1	10/26/15 17:59	CJM
Fluorene	ND	0.20		1	10/26/15 17:59	CJM
Indeno(1,2,3-cd)pyrene	ND	0.20		1	10/26/15 17:59	CJM
1-Methylnaphthalene	ND	0.20		1	10/26/15 17:59	CJM
2-Methylnaphthalene	ND	0.20		1	10/26/15 17:59	CJM
Naphthalene	ND	0.50		1	10/26/15 17:59	CJM
Perylene	ND	0.20		1	10/26/15 17:59	CJM
Phenanthrene	ND	0.20		1	10/26/15 17:59	CJM
Pyrene	ND	0.20		1	10/26/15 17:59	CJM

Surrogates	% Recovery	% REC Limits	
Fluorene-d10	91.0	60-120	10/26/15 17:59
Pyrene-d10	92.5	60-120	10/26/15 17:59

con-test® ANALYTICAL LABORATORY
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ANALYTICAL RESULTS

Project Location: Needham, MA
Date Received: 10/20/2015
Field Sample #: 1016JH-D2
Sample ID: 15J0870-03
Sample Matrix: Product/Solid
Sampled: 10/9/2015 00:00

Sample Description/Location:
Sub Description/Location:
Canister ID:
Canister Size:
Flow Controller ID:
Sample Type:

Work Order: 15J0870
Initial Vacuum(in Hg):
Final Vacuum(in Hg):
Receipt Vacuum(in Hg):
Flow Controller Type:
Flow Controller Calibration
RPD Pre and Post-Sampling:

EPA TO-15

Analyte	ppbv Results	RL	Flag/Qual	Retention Time	Dilution	Date/Time Analyzed	Analyst

Tentatively Identified Compounds - Estimated Values Reported

	ppbv Results	Response	Retention Time	CAS #	Q#
1,4-Cyclohexadiene, 1-methyl-4-(1- (1)	15	2422890	18.525	000099-85-4	
1-Pentene, 2,4,4-trimethyl- (1)	4.6	676444	12.444	000107-39-1	
2-Propenal (1)	4.3	352415	6.078	000107-02-8	
Butanal (1)	3.3	275067	8.405	000123-72-8	
Cyclopentane, methyl- (1)	9.4	776152	9.99	000096-37-7	
Furan, 2-methyl- (1)	21	1711330	8.995	000534-22-5	
Hexane (1)	28	2299940	9.169	000110-54-3	
Methacrolein (1)	3.6	294192	7.893	000078-85-3	
Methyl Isobutyl Ketone (1)	15	2133100	12.727	000108-10-1	
Methylene Chloride (1)	71	5841690	7.068	000075-09-2	
Pentane, 3-methyl- (1)	8.3	686478	8.709	000096-14-0	

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Sample Extraction Data

Prep Method: SW-846 3540C-EPA TO-13A

Lab Number [Field ID]	Batch	Initial [Cartridge	Final [mL]	Date
15J0870-01 [1016JH-HS1]	B133503	1.00	1.00	10/22/15
15J0870-02 [1016JH-D1]	B133503	1.00	1.00	10/22/15
15J0870-03 [1016JH-D2]	B133503	1.00	1.00	10/22/15

Prep Method: TO-15 Prep-EPA TO-15

Lab Number [Field ID]	Batch	Pressure Dilution	Pre Dilution	Pre-Dil Initial mL	Pre-Dil Final mL	Default Injection mL	Actual Injection mL	Date
15J0870-01 [1016JH-HS1]	B134516	1	1	N/A	1000	400	200	11/02/15
15J0870-02 [1016JH-D1]	B134516	1	1	N/A	1000	400	200	11/02/15
15J0870-03 [1016JH-D2]	B134516	1	1	N/A	1000	400	200	11/02/15

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	Total µg Results	Total µg RL	ug/m3 Results	ug/m3 RL	Spike Level Total µg	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag/Qual
Batch B133503 - SW-846 3540C											
Blank (B133503-BLK2)					Prepared: 10/22/15 Analyzed: 10/26/15						
Acenaphthene	ND	0.20									
Acenaphthylene	ND	0.20									
Anthracene	ND	0.20									
Benzo(a)anthracene	ND	0.20									
Benzo(a)pyrene	ND	0.20									
Benzo(b)fluoranthene	ND	0.20									
Benzo(e)pyrene	ND	0.20									
Benzo(g,h,i)perylene	ND	0.20									
Benzo(k)fluoranthene	ND	0.20									
Chrysene	ND	0.20									
Dibenz(a,h)anthracene	ND	0.20									
Fluoranthene	ND	0.20									
Fluorene	ND	0.20									
Indeno(1,2,3-cd)pyrene	ND	0.20									
1-Methylnaphthalene	ND	0.20									
2-Methylnaphthalene	ND	0.20									
Naphthalene	ND	0.50									
Perylene	ND	0.20									
Phenanthrene	ND	0.20									
Pyrene	ND	0.20									
Surrogate: Fluorene-d10	*0.867*				*1.00*		*86.7*	*60-120*			
Surrogate: Pyrene-d10	*0.963*				*1.00*		*96.3*	*60-120*			
LCS (B133503-BS1)					Prepared: 10/22/15 Analyzed: 10/26/15						
Acenaphthene	0.319	0.20	1.3		0.500		63.8	26-115			
Acenaphthylene	0.216	0.20	1.2		0.500		43.2	11.7-113			
Anthracene	0.250	0.20	1.5		0.500		50.0	22.2-103			
Benzo(a)anthracene	0.318	0.20	1.9		0.500		63.6	31.3-121			
Benzo(a)pyrene	0.266	0.20	2.1		0.500		53.2	25.2-108			
Benzo(b)fluoranthene	0.320	0.20	2.1		0.500		64.0	34-126			
Benzo(e)pyrene	0.338	0.20	2.1		0.500		67.6	33.6-126			
Benzo(g,h,i)perylene	0.311	0.20	2.3		0.500		62.2	29.7-126			
Benzo(k)fluoranthene	0.308	0.20	2.1		0.500		61.6	33.8-120			
Chrysene	0.315	0.20	1.9		0.500		63.0	35.7-126			
Dibenz(a,h)anthracene	0.304	0.20	2.3		0.500		60.8	28.3-124			
Fluoranthene	0.331	0.20	1.7		0.500		66.2	31.5-122			
Fluorene	0.334	0.20	1.4		0.500		66.8	20.7-127			
Indeno(1,2,3-cd)pyrene	0.279	0.20	2.3		0.500		55.8	25.9-117			
1-Methylnaphthalene	0.328	0.20	1.2		0.500		65.6	25.2-117			
2-Methylnaphthalene	0.307	0.20	1.2		0.500		61.4	19.1-113			
Naphthalene	0.308	0.50	2.6		0.500		61.6	13-150			
Perylene	0.278	0.20	2.1		0.500		55.6	26.6-105			
Phenanthrene	0.363	0.20	1.5		0.500		72.6	27.5-132			
Pyrene	0.330	0.20	1.7		0.500		66.0	33.1-124			
Surrogate: Fluorene-d10	*0.937*				*1.00*		*93.7*	*60-120*			
Surrogate: Pyrene-d10	*1.00*				*1.00*		*100*	*60-120*			

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QUALITY CONTROL

Air Toxics by EPA Compendium Methods - Quality Control

Analyte	Total µg Results	Total µg RL	ug/m3 Results	ug/m3 RL	Spike Level Total µg	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag/Qual
Batch B133503 - SW-846 3540C											
LCS Dup (B133503-BSD1)					Prepared: 10/22/15 Analyzed: 10/26/15						
Acenaphthene	0.399	0.20	1.3		0.500		79.8	26-115	22.3	42	
Acenaphthylene	0.278	0.20	1.2		0.500		55.6	11.7-113	25.1	56.7	
Anthracene	0.308	0.20	1.5		0.500		61.6	22.2-103	20.8	47.3	
Benzo(a)anthracene	0.371	0.20	1.9		0.500		74.2	31.3-121	15.4	43.5	
Benzo(a)pyrene	0.309	0.20	2.1		0.500		61.8	25.2-108	15.0	45.8	
Benzo(b)fluoranthene	0.368	0.20	2.1		0.500		73.6	34-126	14.0	41.4	
Benzo(e)pyrene	0.389	0.20	2.1		0.500		77.8	33.6-126	14.0	40.4	
Benzo(g,h,i)perylene	0.344	0.20	2.3		0.500		68.8	29.7-126	10.1	45	
Benzo(k)fluoranthene	0.344	0.20	2.1		0.500		68.8	33.8-120	11.0	41.5	
Chrysene	0.366	0.20	1.9		0.500		73.2	35.7-126	15.0	38.3	
Dibenz(a,h)anthracene	0.320	0.20	2.3		0.500		64.0	28.3-124	5.13	47.3	
Fluoranthene	0.387	0.20	1.7		0.500		77.4	31.5-122	15.6	37.9	
Fluorene	0.411	0.20	1.4		0.500		82.2	20.7-127	20.7	42.4	
Indeno(1,2,3-cd)pyrene	0.309	0.20	2.3		0.500		61.8	25.9-117	10.2	47.2	
1-Methylnaphthalene	0.382	0.20	1.2		0.500		76.4	25.2-117	15.2	45.2	
2-Methylnaphthalene	0.359	0.20	1.2		0.500		71.8	19.1-113	15.6	48.7	
Naphthalene	0.356	0.50	2.6		0.500		71.2	13-150	14.5	58.6	
Perylene	0.323	0.20	2.1		0.500		64.6	26.6-105	15.0	53.7	
Phenanthrene	0.461	0.20	1.5		0.500		92.2	27.5-132	23.8	40.2	
Pyrene	0.388	0.20	1.7		0.500		77.6	33.1-124	16.2	38.9	
Surrogate: Fluorene-d10	*0.924*				*1.00*		*92.4*	*60-120*			
Surrogate: Pyrene-d10	*0.964*				*1.00*		*96.4*	*60-120*			

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA TO-13A in Air	
Acenaphthene	AIHA,NJ,NY
Acenaphthylene	AIHA,NJ,NY
Anthracene	AIHA,NJ,NY
Benzo(a)anthracene	AIHA,NJ,NY
Benzo(a)pyrene	AIHA,NJ,NY,FL
Benzo(b)fluoranthene	AIHA,NJ,NY
Benzo(e)pyrene	AIHA,NJ
Benzo(g,h,i)perylene	AIHA,NJ,NY
Benzo(k)fluoranthene	AIHA,NJ,NY
Chrysene	AIHA,NJ,NY
Dibenz(a,h)anthracene	AIHA,NJ,NY
Fluoranthene	AIHA,NJ,NY
Fluorene	AIHA,NJ,NY
Indeno(1,2,3-cd)pyrene	AIHA,NJ,NY
1-Methylnaphthalene	AIHA
2-Methylnaphthalene	AIHA
Naphthalene	AIHA,NJ,NY,FL
Perylene	AIHA,NJ
Phenanthrene	AIHA,NJ,NY
Pyrene	AIHA,NJ,NY

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2016
MA	Massachusetts DEP	M-MA100	06/30/2016
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2017
NY	New York State Department of Health	10899 NELAP	04/1/2016
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2016
RI	Rhode Island Department of Health	LAO00112	12/30/2015
NC	North Carolina Div. of Water Quality	652	12/31/2015
NJ	New Jersey DEP	MA007 NELAP	06/30/2016
FL	Florida Department of Health	E871027 NELAP	06/30/2016
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2016
WA	State of Washington Department of Ecology	C2065	02/23/2016
ME	State of Maine	2011028	06/9/2017
VA	Commonwealth of Virginia	460217	12/14/2015
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2016

15J0870

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1550864 PCB

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- ☐ 78 Interstate Drive, West Springfield, MA 01089
- ☒ 50 Redfield Street, Suite 100, Boston, MA 02122
- ☐ 275 Promenade Street, Suite 350, Providence, RI 02908
- ☐ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 0512

Turnaround
☐ 1 Day* ☐ 3 Days* ☐ Other _____ (days)
☐ 2 Days* ☒ Standard (7 days) *Surcharge Applies

Project Name	Project Location	Project Number	Laboratory
Needham Crumb Rubber	Needham, MA	20081266.A7E	Con-Test

Report To: Jared Smith
Invoice To: Jared Smith
P.O. No.: 20081266.A7E
Sampler's Signature: Jonathan Hand Date: 10/9/15

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other Crumb Rubber

Analysis Request / Containers

Item No.	Transfer Check 1 2 3 4	Sample Number	Source Code	Date Sampled	Time Sampled	VOCs by TO-15A	PAH by TO-13	Metals by 7471A	Metals by 6010C/6020A	Soil VOA Vial [ ] methanol	Soil VOA Vial [ ] water [ ] NaHSO4	Glass Soil Container (4) 4 oz	Glass Soil Container ( ) oz	Other:	Water VOA Vial [ ] As is [ ] HCl	Glass Amber ( ) oz [ ] As is [ ] HCl	Plastic - As is [ ] 250 ml [ ] As is [ ] H2SO4	Plastic - H2SO4 [ ] 250 ml [ ] 500 [ ] 1000 ml	Plastic - HNO3 250 ml [ ] 500 ml	Plastic - NaOH, 250 ml [ ] Filtered [ ] Unfiltered	Comments
01		10@BJH-HS1	X	10/9/15	AM	X	X	X	X			X									
02		10@BJH-D1	X	↓	↓	X	X	X	X			X									
03		10@BJH-D2	X	↓	↓	X	X	X	X			X									

Transfer Number	Relinquished By	Accepted By	Date	Time
1	Jon Hand	Ron Fridge	10/9/15	
2	Rob C Flynn	Rob C Flynn	10/9/15	11:00
3		Kim Bro 2.5°	10/9/15	1630
4			10/9/15	16:30

Reporting and Detection Limit Requirements:

Additional Comments: Metals of Concern = Hg, AS, CD, CR, ZN, SE, Pb

Table of Contents

39 Spruce St.
East Longmeadow, MA 01028
P: 413-525-2332
F: 413-525-6405
www.contestlabs.com

con-test® ANALYTICAL LABORATORY

Sample Receipt Checklist

CLIENT NAME: Fuss & O'Neill RECEIVED BY: KB DATE: 10/19/15

1) **Was the chain(s) of custody relinquished and signed?** (Yes) No No CoC Included

2) **Does the chain agree with the samples?** Yes (No)
If not, explain: No VOC or PAH containers rcvd, air methods referenced but samples are P/S

3) **Are all the samples in good condition?** (Yes) No
If not, explain:

4) **How were the samples received:**
On Ice ☑ Direct from Sampling ☐ Ambient ☐ In Cooler(s) ☑

Were the samples received in Temperature Compliance of (2-6°C)? (Yes) No N/A

Temperature °C by Temp blank _____ Temperature °C by Temp gun 2.5°

5) **Are there Dissolved samples for the lab to filter?** Yes (No)
Who was notified _____ Date _____ Time _____

6) **Are there any RUSH or SHORT HOLDING TIME samples?** Yes (No)
Who was notified _____ Date _____ Time _____

7) **Location where samples are stored:** 

Permission to subcontract samples? Yes No
(Walk-in clients only) if not already approved
Client Signature: _____

8) **Do all samples have the proper Acid pH:** Yes No (N/A) _____

9) **Do all samples have the proper Base pH:** Yes No (N/A) _____

10) **Was the PC notified of any discrepancies with the CoC vs the samples:** Yes No (N/A)

Containers received at Con-Test

	# of containers		# of containers
1 Liter Amber		8 oz amber/clear jar	
500 mL Amber		4 oz amber/clear jar	4 PM6
250 mL Amber (8oz amber)		2 oz amber/clear jar	
1 Liter Plastic		Plastic Bag / Ziploc	
500 mL Plastic		SOC Kit	
250 mL plastic		Non-ConTest Container	
40 mL Vial - type listed below		Perchlorate Kit	
Colisure / bacteria bottle		Flashpoint bottle	
Dissolved Oxygen bottle		Other glass jar	
Encore		Other	

Laboratory Comments:

40 mL vials: # HCl _____ # Methanol _____
Bisulfate _____ # DI Water _____
Thiosulfate _____ Unpreserved _____

Time and Date Frozen:

Login Sample Receipt Checklist

(Rejection Criteria Listing - Using Sample Acceptance Policy)

Any False statement will be brought to the attention of Client

Question	Answer (True/False) T/F/NA	Comment
1) The cooler's custody seal, if present, is intact.	NA	
2) The cooler or samples do not appear to have been compromised or tampered with.	T	
3) Samples were received on ice.	T	
4) Cooler Temperature is acceptable.	T	
5) Cooler Temperature is recorded.	T	
6) COC is filled out in ink and legible.	T	
7) COC is filled out with all pertinent information.	T	
8) Field Sampler's name present on COC.	T	
9) There are no discrepancies between the sample IDs on the container and the COC.	T	
10) Samples are received within Holding Time.	T	
11) Sample containers have legible labels.	T	
12) Containers are not broken or leaking.	T	
13) Air Cassettes are not broken/open.	NA	
14) Sample collection date/times are provided.	T	
15) Appropriate sample containers are used.	T	
16) Proper collection media used.	T	
17) No headspace sample bottles are completely filled.	T	
18) There is sufficient volume for all requsted analyses, including any requested MS/MSDs.	T	
19) Trip blanks provided if applicable.	NA	
20) VOA sample vials do not have head space or bubble is <6mm (1/4") in diameter.	NA	
21) Samples do not require splitting or compositing.	T	

Who notified of False statements?

Log-In Technician Initials: KB

Date/Time: 10/19/15 16:30

Doc #277 Rev. 4 August 2013

Appendix B

List of Instrumentation

Instrumentation

Analyze	Description	Calibration
Volatile Organic Compounds (VOCs)	MiniRAE 2000 Portable VOC Monitor	Calibrated Annually Verified Prior to Use
Surface Temperature, Relative Humidity, & Carbon Dioxide	TSI Q-Trak Air Quality Monitor	Calibrated Annually Verified Prior to Use

The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health
250 Washington Street, Boston, MA 02108-4619

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MONICA BHAREL, MD, MPH
Commissioner

Tel: 617-624-6000
www.mass.gov/dph

TO: Boards of Health

FROM: Susan T. Gershman, MPH, PhD, CTR
Director
Massachusetts Cancer Registry

DATE: November 30, 2015

RE: Cancer Incidence in Massachusetts, 2007-2011, City and Town Supplement

I am writing to inform you that the Massachusetts Cancer Registry (MCR) of the Massachusetts Department of Public Health (MDPH) is releasing its report Cancer Incidence in Massachusetts, 2007-2011, City and Town Supplement. Please note that this report will be published in an electronic version only and will be posted on the Department of Public Health's web site at www.mass.gov/dph/mcr on December 7, 2015. If you are interested in further supplement data prior to the posting, please contact the registry directly at the telephone number listed below. Please note that there is no embargo on these data and they may be released prior to the web posting date.

The 2007-2011 City and Town Supplement updates the 2006-2010 City and Town Supplement. For each city and town, this report provides expected case counts, observed case counts, standardized incidence ratios, and confidence intervals for 23 types of cancer and for all cancers combined. The confidence intervals indicate if there is a statistically significant difference (excess or deficit) between the observed and expected counts.

We are providing you with the following pieces of information in advance of the report's Internet release.

1. The introduction to the report, including an explanation of standardized incidence ratios.
2. The cancer incidence data for your town (i.e. for 23 cancer types and all cancers combined).
3. Appendix II includes selected resources for information on cancer.
4. Appendix III includes MDPH Cancer Prevention and Control Initiatives.
5. For cancer risk factors, please check the following websites: American Cancer Society: www.cancer.org; National Cancer Institute: www.cancer.gov

con't other side

The complete Internet version will be available at: www.mass.gov/dph/mcr

The following reports have also been recently posted on the above website:

- *Cancer Incidence and Mortality in Massachusetts 2008-2012: Statewide Report*
- *Data Brief: Cancer Incidence in Massachusetts, 2009-2013 – Preliminary Data*
- *Data Brief: Trends in Cancer Incidence (2003-2013) and Mortality (2003-2014) for Four Major Cancers*

If you have any trouble accessing this web site, please contact the MCR at (617) 624-5662.

Lastly, enclosed is a brochure with information about the Massachusetts Environmental Public Health Tracking System.

For further information, please contact the following at MDPH:

Massachusetts Cancer Registry (617) 624-5662
Bureau of Environmental Health (617) 624-5757
Massachusetts Comprehensive Cancer Prevention and Control Program (617) 624-5484

Needham

Observed and Expected Case Counts, with Standardized Incidence Ratios, 2007-2011

	Obs	Exp	SIR	95% CI
Bladder, Urinary				
Male	40	36.8	108.6	(77.6-147.9)
Female	11	14.2	77.2	(38.5-138.1)
Brain and Other Nervous System				
Male	5	6.5	76.5	(24.6-178.4)
Female	8	5.7	140.9	(60.7-277.7)
Breast				
Male	0	1.1	nc	(nc-nc)
Female	156	137.3	113.6	(96.5-132.9)
Cervix Uteri				
Female	3	4.6	nc	(nc-nc)
Colon / Rectum				
Male	35	41	85.4	(59.4-118.7)
Female	32	45.5	70.4	(48.1-99.3)
Esophagus				
Male	5	9.5	52.8	(17-123.2)
Female	4	2.8	nc	(nc-nc)
Hodgkin Lymphoma				
Male	2	2.4	nc	(nc-nc)
Female	1	2	nc	(nc-nc)
Kidney & Renal Pelvis				
Male	11	18.3	60	(29.9-107.3)
Female	9	11.2	80.5	(36.7-152.8)
Larynx				
Male	5	5.1	97.7	(31.5-227.9)
Female	1	1.6	nc	(nc-nc)
Leukemia				
Male	7	14	50.1	(20.1-103.3)
Female	14	10.9	128.7	(70.3-216)
Liver and Intrahepatic Bile Ducts				
Male	5	10.8	46.2	(14.9-107.7)
Female	1	4	nc	(nc-nc)
Lung and Bronchus				
Male	38	65.3	58.2	(41.2-79.9)
Female	44	69.2	63.6	(46.2-85.4)
Melanoma of Skin				
Male	34	22.7	149.6	(103.6-209)
Female	23	18.2	126.6	(80.2-189.9)
Multiple Myeloma				
Male	8	6.5	124	(53.4-244.4)
Female	2	5.6	nc	(nc-nc)
Non-Hodgkin Lymphoma				
Male	29	20.3	143.1	(95.8-205.6)
Female	18	17.8	101.3	(60-160)
Oral Cavity & Pharynx				
Male	13	14.8	87.8	(46.7-150.2)
Female	5	6.9	72.5	(23.4-169.1)
Ovary				
Female	12	12.7	94.8	(49-165.7)
Pancreas				
Male	11	11.9	92.1	(45.9-164.9)
Female	18	13.9	129.1	(76.5-204)
Prostate				
Male	153	128	119.5	(101.3-140.1)
Stomach				
Male	7	8.6	81.6	(32.7-168.2)
Female	2	5.7	nc	(nc-nc)
Testis				
Male	5	3.4	145.5	(46.9-339.6)
Thyroid				
Male	12	7.6	157.2	(81.1-274.6)
Female	37	22.9	161.3	(113.6-222.4)
Uteri Corpus and Uterus, NOS				
Female	30	30.8	97.3	(65.7-139)
All Sites / Types				
Male	455	472.1	96.4	(87.7-105.7)
Female	469	484.2	96.9	(88.3-106)

- Obs = observed case count; Exp = expected case count;
- SIR = standardized incidence ratio ((Obs / Exp) X 100);
- 95% CI = 95% confidence intervals, a measure of the statistical significance of the SIR;
- Shading indicates the statistical significance of the SIR at 95% level of probability;
- nc = The SIR and 95% CI were not calculated when Obs < 5;

INTRODUCTION

Content

The purpose of this report is to provide an estimate of cancer incidence for each of the 351 cities and towns of Massachusetts for the five-year time period 2007 through 2011. For each city and town, Standardized Incidence Ratios (SIRs) are presented for twenty-three types of invasive cancer and for all invasive cancer types combined. These ratios compare the cancer incidence experience of each city or town with the cancer experience of the state as a whole. The method involves comparing the number of cases that were observed for a city or town to the number of cases that would be expected if the city or town had the same cancer rates as the state as whole. The report is organized into the following sections:

METHODS PROVIDES a detailed explanation of the data collection, data processing, and statistical techniques employed in this report.

TABLES present data for selected types of cancer by city/town and sex.

APPENDIX I provides a listing of *International Classification of Diseases for Oncology* codes used in the preparation of this report.

APPENDIX II provides selected resources for information on cancer.

APPENDIX III describes the Massachusetts Department of Public Health's current cancer control initiatives, and provides links to bureaus within the department that address some aspect of cancer. Links to resources for publications are also provided.

Comparison with Previous Reports

This report updates previous annual reports published by the Massachusetts Cancer Registry (MCR). It is available on line at http://www.mass.gov/dph/mcr. For questions about the report, contact the MCR at:

Massachusetts Cancer Registry
Office of Data Management and Outcomes Assessment
Massachusetts Department of Public Health
250 Washington Street, 6th floor
Boston, MA 02108-4619
telephone 617-624-5642; fax 617-624-5695

The preceding report, ***Cancer Incidence in Massachusetts 2006-2010: City and Town Supplement,*** included data for diagnosis years 2006 through 2010. This report contains data for the diagnosis years 2007 through 2011. There have been no changes in this report's format from the previous report.

METHODS

Data Sources

Cancer Incidence

The MCR collects reports of newly diagnosed cancer cases from health care facilities and practitioners throughout Massachusetts. Facilities that reported the 2007-2011 diagnoses that comprise this report include 69 Massachusetts acute care hospitals, 5 radiation/oncology centers, 2 endoscopy centers, 2 surgical centers, 10 independent laboratories, 3 medical practice associations, and approximately 500 private practice physicians. The MCR signed the modified National Data Exchange Agreement on March 28, 2013. This is a single agreement that allows participating states to exchange data on cases diagnosed or treated in other areas. Together with states participating in the agreement, and states with individual agreements, the MCR now has reciprocal reporting agreements with 36 states and with Puerto Rico to obtain data on Massachusetts residents diagnosed out of state. Currently the MCR collects information on *in situ* and invasive cancers and benign tumors of the brain and associated tissues. The MCR does not collect information on basal and squamous cell carcinomas of the skin.

The MCR also collects information from reporting hospitals on cases diagnosed and treated in staff physician offices when this information is available. Not all hospitals report this type of case, however, some hospitals report such cases as if the patients had been diagnosed and treated by the hospital directly. Collecting these types of data makes the MCR's overall case ascertainment more complete. Some cancer types that may be reported to the MCR in this manner are melanoma, prostate, colon/rectum, and oral cancers.

In addition, the MCR identifies previously unreported cancer cases through review of death certificate data to further improve case completeness. This process is referred to as death clearance and identifies cancers mentioned on death certificates that were not previously reported to the MCR. In some instances, the MCR obtains additional information on these cases through follow-up activities with hospitals, nursing homes, hospice residences, and physicians' offices. In other instances, a cancer-related cause of death recorded on a Massachusetts death certificate is the only source of information for a cancer case. Thus these "death certificate only" cancer diagnoses are poorly documented and have not been confirmed by review of clinical and pathological information. Such cases are included in this report, but they comprise less than 3% of all cancer cases.

All case reports that provided the basis for this report were coded following the *International Classification of Diseases for Oncology, Third Edition* (ICD-O-3), which was implemented in North America with cases diagnosed as of January 1, 2001. (1) Please see Appendix A for the classification of cancers by ICD-O3 codes.

Each year, the North American Association of Central Cancer Registries (NAACCR) reviews cancer registry data for quality, completeness, and timeliness. For 2007-2011, the MCR's annual case count was estimated by NAACCR to be more than 95% complete for each year. The MCR has achieved the gold standard for this certification element as well as for six other certification elements for each case year since 1997.

The Massachusetts cancer cases presented in this report are primary cases of cancer diagnosed among Massachusetts residents during 2007-2011 and reported to the MCR as of April 23, 2015. These data include some additional cases diagnosed in 2007-2010 that were not counted in the previous report, ***Cancer Incidence in Massachusetts 2006-2010: City and Town Supplement.*** The lag time between this report and the annual statewide report of 2008-2012 cancer cases is due to the fact that data for this city and town report needed to be cleaned for accuracy of residence within Massachusetts. The statewide report presented data at the state level and did not require such accuracy of city and town of

residence. The numbers presented in this report may change slightly in future reports, reflecting late reported cases or corrections based on subsequent details from the reporting facilities. Such changes might result in slight differences in numbers and rates in future reports of MCR data, reflecting the nature of population-based cancer registries that receive case reports on an ongoing basis.

Massachusetts cancer cases presented in this report are primary cases of cancer diagnosed among Massachusetts residents during 2007-2011. The Massachusetts data presented include invasive cancers only (except cancer of the urinary bladder, where *in situ* cancers are also included). Invasive cancers have spread beyond the layer of cells where they started and have the potential to spread to other parts of the body. *In situ* cancers are neoplasms diagnosed at the earliest stage, before they have spread, when they are limited to a small number of cells and have not invaded the organ itself. Typically, published incidence rates do not combine invasive and *in situ* cancers due to differences in the biologic significance, survival prognosis and types of treatment of the tumors. Cancer of the urinary bladder is the only exception, due to the specific nature of the diagnostic techniques and treatment patterns.

Presentation of Data

Each city and town in Massachusetts is listed alphabetically in the **TABLES** section. The observed number of cases, the expected number of cases, the standardized incidence ratios, and 95% confidence intervals are presented for twenty-three main types of cancer and for all cancer types combined. The "all cancers combined" category includes the twenty-three main types presented in this report and other malignant neoplasms. This category is meant to provide a summary of the total cancer experience in a community. As different cancers have different causes, this category does not reflect any specific risk factor that may be important for this community.

Observed and Expected Case Counts

The *observed* case count (**Obs**) for a particular type of cancer in a city/town is the actual number of newly diagnosed cases among residents of that city/town for a given time period.

A city/town's *expected* case count (**Exp**) for a certain type of cancer for this time period is a calculated number based on that city/town's population distribution[2] (by sex and among eighteen age groups) for the time period 2007-2011, and the corresponding statewide average annual age-specific incidence rates. The population data for the 2007 to 2011 period was calculated by adding 2005 city and town data with 2010 city and town data, dividing by two, and multiplying by five.

Standardized Incidence Ratios

A Standardized Incidence Ratio (SIR) is an indirect method of adjustment for age and sex that describes in numerical terms how a city/town's cancer experience in a given time period compares with that of the state as a whole.

- An SIR *of exactly 100* indicates that a city/town's incidence of a certain type of cancer is *equal to that expected* based on statewide average age-specific incidence rates.
- An SIR of *more than 100* indicates that a city/town's incidence of a certain type of cancer is *higher than expected* for that type of cancer based on statewide average annual age-specific incidence rates. For example, an SIR of 105 indicates that a city/town's cancer incidence is 5% higher than expected based on statewide average annual age-specific incidence rates.

- An SIR of *less than 100* indicates that a city/town's incidence of a certain type of cancer is *lower than expected* based on statewide average age-specific incidence rates. For example, an SIR of 85 indicates that a city/town's cancer incidence is 15% lower than expected based on statewide average annual age-specific incidence rates.

Statistical Significance and Interpretation of SIRs

The interpretation of the SIR depends on both how large it is and how stable it is. Stability in this context refers to how much the SIR changes when there are small increases or decreases in the observed or expected number of cases. Two SIRs may have the same size but not the same stability. For example, an SIR of 150 may represent 6 observed cases and 4 expected cases, or 600 observed cases and 400 expected cases. Both represent a 50 percent excess of observed cases. However, in the first instance, one or two fewer cases would change the SIR a great deal, whereas in the second instance, even if there were several fewer cases, the SIR would only change minimally. When the observed and expected numbers of cases are relatively small, their ratio is easily affected by one or two cases. Conversely, when the observed and expected numbers of cases are relatively large, the value of the SIR is stable.

A 95 percent confidence interval (CI) has been presented for each SIR in this report (when the observed number of cases is at least 5), to indicate if the observed number of cases is significantly different from the expected number, or if the difference is most likely due to chance. A confidence interval is a range of values around a measurement that indicates the precision of the measurement. In this report, the 95% confidence interval is the range of estimated SIR values that has a 95% probability of including the true SIR for a specific city or town. If the 95% confidence interval range *does not* include the value 100.0, then the number of observed cases is significantly different from the expected number of cases. "Significantly different" means there is at most a 5% chance that the difference between the number of observed and expected cancer cases is due solely to chance alone. If the confidence interval does contain the value 100, there is no significant difference between the observed and expected numbers. Statistically, the width of the interval reflects the size of the population and the number of events; smaller populations and smaller observed numbers of cases yield less precise estimates that have wider confidence intervals. Wide confidence intervals indicate instability, meaning that small changes in the observed or expected number of cases would change the SIR a great deal.

Examples:

- SIR = 137.0; 95% CI (101.6 - 180.6) – the confidence interval does not include 100.0 and the interval is above 100.0, indicating that the number of observed cases is *statistically significantly higher* than the expected number.

- SIR = 71.0; 95% CI (56.2 – 88.4) – the confidence interval does not include 100.0 and the interval is below 100.0, indicating that the number of observed cases is *statistically significantly lower* than the expected number.

- SIR = 108.8 95% CI (71.0-159.4) – the confidence interval DOES include 100.0 indicating that the number of observed cases is *NOT statistically significantly different* from what is expected, and the difference is likely due to chance. When the interval includes 100.0, then the true SIR may be 100.0.

Example of Calculation of an SIR and Its Significance

$$SIR = \frac{\text{OBSERVED CASES}}{\text{EXPECTED CASES}} \times 100$$

The following example illustrates the method of calculation for a hypothetical town for one type of cancer and one sex for the years 2007-2011:

Age Group	Town X Population (A)	State Age-Specific Incidence Rate (B)	Town X Expected Cases (C)=(A) x (B)	Town X Observed Cases (D)
00-04	74,657	0.0001	7.47	11
05-09	134,957	0.0002	26.99	25
10-14	54,463	0.0005	27.23	30
15-19	25,136	0.0015	37.70	40
20-24	17,012	0.0018	30.62	30
UP TO 85+	6,337	0.0010	6.34	8
		Total:	**136.35**	**144**

$$SIR = \frac{\text{Observed Cases}}{\text{Expected Cases}} \times 100 = \frac{\text{(column D total)}}{\text{(column C total)}} \times 100 = \frac{144}{136.35} \times 100 \approx 106$$

Thus the SIR for this type of cancer in Town X is 106, indicating that the incidence of this cancer in Town X is 6% higher than the corresponding statewide average incidence for this cancer. However, the range for the 95% confidence interval (89.1-124.3) (calculation not shown) indicates that the true value may be as low as 89.1 or as high as 124.3 Also, since the range includes the value 100, it means that the observed number of cases is *not statistically significantly higher or lower* than what is expected.

Whenever the number of observed cases is less than five, the corresponding SIR is neither calculated nor tested for statistical significance. This is indicated with an (nc) ("not calculated"). However, the number of observed and expected cases is shown in these circumstances.

Notes about Data Interpretation

The SIR is a useful indication of the disease categories that have relatively high or low rates for a given community. These statistics, however, should be used with care. Such statistics provide a starting point for further research and investigation into a possible health problem, but they do not by themselves confirm or deny the existence of a particular health problem. Many factors unrelated to disease causation may contribute to an elevated SIR, including demographic factors, changes in diagnostic techniques, and changes in data collection or recording methods over time, as well as the natural variation in disease occurrence.

When reviewing the data tables, it is important to keep in mind that an SIR compares the observed cancer incidence in a particular community with the expected incidence based on statewide average annual age-specific incidence rates. This means that *valid comparisons can only be made between a community and the state as a whole. SIRs for different cities and towns* ***CANNOT*** and ***SHOULD NOT*** *be compared to each other*. (Comparisons between two communities would be valid only if there were no differences in the age and sex distributions of the two communities' populations.)

Another point to keep in mind when reviewing these data is the large number of statistical tests being performed in this report. For each of the 351 cities and towns, we evaluate 18 types of cancer that can occur in both males and females, 3 types that occur only in females and 2 types that occur only in males, resulting in 41 gender/cancer categories. This results in 14,391 possible calculations (351 cities and towns x 41 gender cancer categories). Note that gender/cancer categories with less than 5 observed cases are not evaluated for statistical significance, so the actual numbers of tests is slightly lower than 14,391. This is important for the reader because when multiple significance tests are performed, some will result in a significant finding due to chance alone. Based on the number of calculations in this report, we expect 720 significant findings to be due to chance alone. Half of these would be significant excesses (360) and half would be significant deficits (360). There are statistical techniques that can be used to reduce this number, however use of these techniques leads to the opposite problem – true significant differences that may be missed. We choose to err on the side of caution and identify more significant results, knowing that some will be due to chance alone.

Data Limitations

It should be emphasized that apparent increases or decreases in cancer incidence over time might reflect changes in diagnostic methods or case reporting rather than true changes in cancer incidence. Four other limitations must be considered when interpreting cancer incidence data for Massachusetts cities and towns: under-reporting in areas close to neighboring states; under-reporting for cancers that may not be diagnosed in hospitals; cases being assigned to incorrect cities/towns; and standardized incidence ratios based on small numbers of cases.

Border Areas and Neighboring States

Some areas of Massachusetts appear to have low cancer incidence, but this may be due to loss of Massachusetts resident cases who are diagnosed in neighboring or other states and not reported to the MCR. The MCR has reciprocal reporting agreements with 29 states and with Puerto Rico.

Cases Diagnosed in Non-Hospital Settings

During the time period covered by this report, the MCR's primary information source for most newly diagnosed cases of cancer was hospitals. In addition the MCR collected information from reporting hospitals on cases diagnosed and treated in staff physician offices, when this information was available. Other reporting sources include dermatologists and dermatopathology laboratories, urologists' offices and a general laboratory. Some types of cancer in this report may be under-reported because they are diagnosed primarily by private physicians, private laboratories, health maintenance organizations, radiotherapy centers that escape identification systems used by hospitals. The most common types of cancer diagnosed or treated outside of the hospital include melanoma and prostate cancer. The exact extent of this under-reporting has not been determined, but cases included in this report represent the great majority of cases statewide and provide an essential basis for evaluating statewide cancer incidence patterns.

City/Town Misassignment

In accordance with standard central cancer registry procedures, each case reported to the MCR ideally should be assigned to the city/town in which the patient lived at the time of diagnosis, based on the address provided by the reporting hospital. In practice, however, a patient may provide the hospital with his/her mailing address (e.g., a post office box located outside the patient's city/town of residence); a business address; a temporary address (e.g., the patient is staying with a relative while receiving treatment and reports the relative's address as his/her own); or a locality or post office name (e.g., "Chestnut Hill" rather than "Boston," "Brookline," or "Newton"). In addition, if a patient has moved since being diagnosed, the hospital may report the patient's current address. Because of the large number of cases reported to the MCR, and because data are reported to the MCR via electronic media, most city/town case assignments are performed by an automated computer process. This simplified matching process may misassign some cases based on the reported locality name. When MCR staff become aware of such misassignments, they manually correct the errors. Furthermore, in order to minimize such errors, cases from fifty geographic localities prone to city/town misassignment are reviewed manually.

Small Numbers of Cases

Standardized incidence ratios based on small numbers of cases result in estimates that are very unstable. This situation is common when the population of a city or town is small or if the particular cancer type is rare. SIRs and statistical significance are not calculated when the number of observed cases for a specific category is less than five. In these instances, the observed and expected cases are presented in the tables *for qualitative comparison only*.

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APPENDIX II: SELECTED RESOURCES FOR INFORMATION ON CANCER

This Appendix contains a listing of selected resources for additional information on cancer. Cancers are complex diseases, many of which have multiple factors that may contribute to their development.

For information on cancer risk factors or prevention, you may wish to contact the following:

Cancer Information Service (National Cancer Institute): 1-800-4-CANCER (1-800-422-6237)

Cancer Response Line (American Cancer Society): 1-800-ACS-2345 (1-800-227-2345)

In addition, the following selected Internet websites provide information on cancer. Many of these also provide links to other sites (not listed) which may be of interest.

Massachusetts Department of Public Health: http://www.mass.gov/dph

American Cancer Society: http://www.cancer.org

Centers for Disease Control and Prevention

Home Page: http://www.cdc.gov

Cancer Prevention and Control Program: http://www.cdc.gov/cancer

Fruits and Veggies More Matters™ Campaign (nutrition – formerly 5-A-Day Program): http://www.FruitsandVeggiesMatter.gov

National Cancer Institute

Information: http://www.cancer.gov

Cancer Literature in PubMed: http://www.cancer.gov/search/cancer_literature

Surveillance, Epidemiology, and End Results (SEER) Program data: http://seer.cancer.gov

Your Cancer Risk (Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine; formerly at Harvard Center for Cancer Prevention): http://www.yourdiseaserisk.wustl.edu

OncoLink (Abramson Cancer Center of the University of Pennsylvania): http://www.oncolink.upenn.edu

Cancerquest (Emory University – Winship Cancer Institute): www.cancerquest.org

Cancer News on the Net® (information on diagnosis and treatment for cancer patients and their families): http://www.cancernews.com

National Coalition for Cancer Survivorship: http://www.canceradvocacy.org

APPENDIX III: MDPH CANCER PREVENTION AND CONTROL INITIATIVES

The Massachusetts Department of Public Health is working to reduce the incidence and mortality of cancer in the Commonwealth. Partnerships between MDPH programs, researchers, healthcare providers and nonprofit organizations collect information about cancer, lead quality improvement projects, coordinate evidenced-based workshops for managing living with chronic disease (including cancer), provide education for health professionals and bring shared messages to the public. Our collaborated efforts focus on reducing cancer risk, incidence and mortality through healthy lifestyles, early diagnosis, and increased access to care. The Department's programs address the impact of tobacco, alcohol, nutrition, and physical activity on cancer prevention, along with environmental and occupational hazards for cancer. Throughout all of our efforts there is an emphasis on reducing disparate health outcomes and unequal access to cancer care.

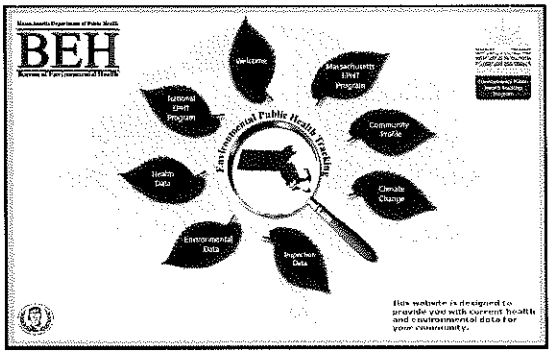
MDPH Bureaus and Programs:
Bureau of Environmental Health, www.mass.gov/dph/environmental_health
Bureau of Substance Abuse Services, www.mass.gov/dph/bsas
Comprehensive Cancer Prevention and Control Program, www.mass.gov/compcancer
Men's Health/Women's Health/Care Coordination Program
Tobacco Cessation and Prevention Program, www.mass.gov/dph/mtcp
Occupational Health Surveillance Program, www.mass.gov/dph/ohsp
Office of Healthy Aging, www.mass.gov/dph/healthyaging
Oral Health Program, www.mass.gov/dph/oralhealth
Division of Prevention and Wellness www.mass.gov/dph/healthpromotion

MDPH publications on cancer prevention and screening are available at the Massachusetts Health Promotion Clearinghouse, www.maclearinghouse.com.

Massachusetts Cancer Registry Publications are available through the Massachusetts Cancer Registry, telephone: 617-624-5642 and on the web at www.mss.gov/dph/mcr.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH | BUREAU OF ENVIRONMENTAL HEALTH

Environmental Public Health Tracking



In 2000, the Pew Environmental Health Commission identified the lack of basic information needed to link environmental hazards and chronic diseases. Chronic diseases – such as heart disease, stroke, cancer and diabetes – are among the most prevalent, costly, and preventable of all health problems. Massachusetts has one of the highest rates of chronic illness in the United States, costing the state $34 billion a year.

In response, the U.S. Centers for Disease Control and Prevention (CDC) developed the National Environmental Public Health Tracking (NEPHT) program to fund state and local health departments to build state-based environmental public health tracking networks. Environmental public health tracking is the ongoing collection, integration, analysis, and interpretation of data about environmental hazards, exposure to environmental hazards and the health effects potentially related to exposure.

Massachusetts has been part of the NEPHT Program since 2002 and launched the **Massachusetts Environmental Public Health Tracking** website (MA EPHT) in 2009.

The Massachusetts Department of Public Health/Bureau of Environmental Health (MDPH/BEH) has been in the forefront of environmental public health tracking by analyzing information from statewide disease registries and surveillance programs to determine if exposure to environmental contaminants may be contributing to the high rates of these chronic diseases in Massachusetts.

Different types of data are used to learn how the environment affects people's health. The MA EPHT website currently provides information about the following data:

Health Data:

- Asthma Hospitalization
- Birth Defects
- Cancer
- Carbon Monoxide Poisoning
- Childhood Lead Poisoning
- Heart Attack Hospitalization
- Heat Stress
- Pediatric Asthma
- Pediatric Diabetes
- Reproductive Outcomes

Environmental Data:

- Air Quality
- Climate Change
- Drinking Water Quality
- Radon

Inspection Data:

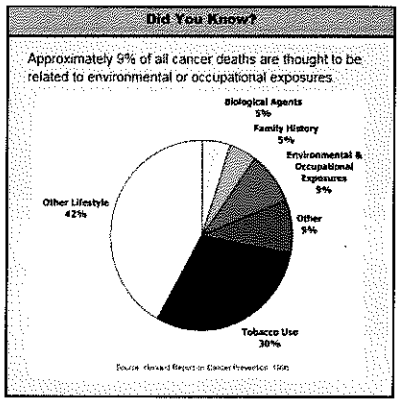
- Food Protection
- Mammography Inspection

On the MA EPHT website you can view maps, tables and charts to more closely examine the possible links between the environment and chronic diseases both statewide and locally.

You can visit the MA EPHT website at www.mass.gov/dph/matracking

MA Environmental Public Health Tracking: Cancer

Cancer is not one disease, but a group of diseases. According to the American Cancer Society, one in two men and one in three women will develop cancer during his or her lifetime. Research has shown that there are more than 100 different types of cancer, each with different causative (or risk) factors. A risk factor is anything that increases a person's chance of developing cancer and may include hereditary conditions, medical conditions or treatments, lifestyle factors, or environmental exposures. Cancer may be caused by several factors acting together over time. In general, most adult cancers have a long period of development that can range from 10 to 40 years.



Cancer data available on the MA EPHT website:

Cancer incidence rates available on the MA EPHT website are calculated using data from the Massachusetts Cancer Registry, a population-based surveillance program that has been monitoring cancer incidence in the state of MA since 1982. Cancer data are presented on the website using two different types of statistics:

Indirect Incidence Rates- *referred to as Standardized Incidence Ratios (SIRs):* An SIR is the most appropriate statistic to examine cancer incidence in a small area, such as a community or a census tract within a community. It is used to evaluate whether a community's or a census tract's cancer incidence rate differs from that of the state as a whole.

Direct Incidence Rates- A direct incidence rate is the most appropriate statistic to use for larger, more stable study populations such as a state or county. Because of the way it is calculated, it may be used to compare cancer incidence in one relatively large area to another relatively large area (such as one county to another).

For more information, visit the MA EPHT cancer webpage at: https://matracking.ehs.state.ma.us/Health-Data/Cancer/index.html

Massachusetts Department of Public Health
Bureau of Environmental Health
250 Washington Street, 7th Floor
Boston, MA 02108
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www.mass.gov/dph/environmental_health

Massachusetts Department of Public Health
Bureau of Environmental Health

November 2015

The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health
250 Washington Street, Boston, MA 02108-4619

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November 30, 2015

This is a notification to inform you that an error was very recently discovered in the web posting of last year's report *Cancer Incidence in Massachusetts 2006-2010: City and Town Supplement*. Inadvertently two sets of statistics were posted for some cities and towns, and each set had different statistics for females. The problem has been corrected and a new report has been posted at http://www.mass.gov/dph/mcr (at this page click on *Data & Statistics* and then *City & Town Series).* The corrected report will have *'run November 2015'* in the title of each city and town's statistics page.

We apologize for any inconvenience that this may have caused.

Sincerely,

The Massachusetts Cancer Registry Staff

STAT

Health Ads tout fun flavors, but many e-cigarettes contain toxic chemicals

By Sheila Kaplan

December 8, 2015

Ben Margot/AP

The growing popularity of e-cigarettes is raising concerns about health hazards they may pose.

The website sales pitches for a popular e-cigarette feature huge puffs of cotton candy, and words that conjure images of carnivals and state fairs.

But a study published Tuesday notes that these candied confections have a downside: Many of the best-selling flavorings include a toxic chemical that has long been associated with serious lung problems.

The Environmental Health Perspectives, a journal published by the National Institute of Environmental Health Sciences, says that some companies hide the presence of the flavoring chemical, known as diacetyl, as well as other potentially harmful artificial flavorings.

Read more: E-cigarettes widely seen as harmful in STAT-Harvard poll

Diacetyl was first recognized as a respiratory hazard more than 10 years ago after it appeared in workers who breathed in artificial butter flavor in microwave popcorn plants. The illness came to be known as "Popcorn Lung." It can be severe and irreversible, with some sufferers requiring lung transplants.

Both the Occupational Safety and Health Administration, which oversees workplace safety, have worked to raise awareness of the potential for harm, which is strongest when the chemical is heated.

"You have a similar pathway," said Joseph Allen, an assistant professor of exposure assessment science at the Harvard T.H. Chan School of Public Health and the lead author of the federally funded study. "You have heated, flavored chemicals that are directly inhaled. Diacetyl and other related flavoring chemicals are used in many other flavors, including fruit flavors, alcohol flavors, and, as we learned in our study, candy flavored e-cigarettes."

There are more than 7,000 flavors available for e-cigarettes. Most are mixed with nicotine and sold in cartridges. The mixture is heated, turned into a vapor, then inhaled. The emission from e-cigarettes includes a vapor and aerosol component.

Many of the flavors seem designed to appeal to children and young adults — with names like Cupcake, Fruit Squirts, Waikiki Watermelon, Tutti Frutti, Oatmeal Cookie, and Alien Blood.

Read more: Experts debate how tightly e-cigarettes should be regulated

Their popularity is growing. The Centers for Disease Control and Prevention said earlier this year that in a survey, 2 million high-school students reported using e-cigarettes at least once in the month before the survey. The World Health Organization reported that in 2013, more than $3 billion was spent on e-cigarettes in the United States alone. It predicts that sales will increase seventeenfold in 15 years.

Allen and his colleagues selected 51 flavors from a variety of manufacturers and distributors. Each e-cigarette was put in a sealed chamber and attached to a device that drew air through the e-cigarette for eight seconds at a time, with a resting period of 15 or 30 seconds between each draw. The researchers then analyzed the air stream.

They found that diacetyl was present in 39 of the 51 flavors, even those made by the companies that researchers had called before the test.

"We specifically looked at the packaging and at the website to see if any of the sellers were providing warnings," Allen said. "We asked two companies specifically, and they said 'No,' they did not have diacetyl in it. But we tested them and, in fact, they did."

Two other chemicals of concern, acetoin and 2,3-pentanedoine, were detected in some of the flavors, as well. Allen and his colleagues found that no flavor packaging came with warnings about potential dangers from diacetyl or other flavorings that OSHA has said may pose a hazard.

David Ozonoff, a professor of environmental health at Boston University's School of Public Health, said he was alarmed by the study.

"I think the discovery that there is diacetyl and a structurally similar compound in [e-cigarettes] is a giant red flag," he said. "If this is happening, then a huge exposure hazard has slipped through the cracks — and the cracks are pretty big if something like this can slip through them. I believe the [Food and Drug Administration] should take immediate action as if this were an emergency, which it is."

Read more: Experts debate: How tightly should e-cigarettes be regulated?

The FDA has proposed regulating e-cigarettes, but its proposal has been the subject of much lobbying. It is now in the hands of the White House Office of Management and Budget, which must weigh in on the matter.

A spokesman for the American Vaping Association was not available for comment. A spokesman for the Flavor and Extract Manufacturers Association of the United States referred a reporter to the group's website, which notes that "e-cigarette manufacturers and marketers should take appropriate action to assure the safety of their flavor ingredients used in e-cigarettes."

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E-cigarette use triples among middle and high school students in just one year

Hookah use doubles; no decline seen in overall tobacco use among middle or high school students

Press Release

Embargoed Until: Thursday, April 16, 2015, 1:00 PM ET

Contact: Media Relations (http://www.cdc.gov/media)
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Current e-cigarette use among middle and high school students tripled from 2013 to 2014, according to data published by the Centers for Disease Control and Prevention and the U.S. Food and Drug Administration's Center for Tobacco Products (CTP) in today's Morbidity and Mortality Weekly Report (MMWR). Findings from the 2014 National Youth Tobacco Survey show that current e-cigarette use (use on at least 1 day in the past 30 days) among high school students increased from 4.5 percent in 2013 to 13.4 percent in 2014, rising from approximately 660,000 to 2 million students. Among middle school students, current e-cigarette use more than tripled from 1.1 percent in 2013 to 3.9 percent in 2014—an increase from approximately 120,000 to 450,000 students.

This is the first time since the survey started collecting data on e-cigarettes in 2011 that current e-cigarette use has surpassed current use of every other tobacco product overall, including conventional cigarettes. E-cigarettes were the most used tobacco product for non-Hispanic whites, Hispanics, and non-Hispanic other race while cigars were the most commonly used product among non-Hispanic blacks.

"We want parents to know that nicotine is dangerous for kids at any age, whether it's an e-cigarette, hookah, cigarette or cigar," said CDC Director Tom Frieden, M.D., M.P.H. "Adolescence is a critical time for brain development. Nicotine exposure at a young age may cause lasting harm to brain development, promote addiction, and lead to sustained tobacco use."

Hookah smoking roughly doubled for middle and high school students, while cigarette use declined among high school students and remained unchanged for middle school students. Among high school students, current hookah use rose from 5.2 percent in 2013 (about 770,000 students) to 9.4 percent in 2014 (about 1.3 million students). Among middle school students, current hookah use rose from 1.1 percent in 2013 (120,000 students) to 2.5 percent in 2014 (280,000 students).

The increases in e-cigarette and hookah use offset declines in use of more traditional products such as

cigarettes and cigars. There was no decline in overall tobacco use between 2011 and 2014. Overall rates of any tobacco product use were 24.6 percent for high school students and 7.7 percent for middle school students in 2014.

In 2014, the products most commonly used by high school students were e-cigarettes (13.4 percent), hookah (9.4 percent), cigarettes (9.2 percent), cigars (8.2 percent), smokeless tobacco (5.5 percent), snus (1.9 percent) and pipes (1.5 percent). Use of multiple tobacco products was common; nearly half of all middle and high school students who were current tobacco users used two or more types of tobacco products. The products most commonly used by middle school students were e-cigarettes (3.9 percent), hookah (2.5 percent), cigarettes (2.5 percent), cigars (1.9 percent), smokeless tobacco (1.6 percent), and pipes (0.6 percent).

Cigarettes, cigarette tobacco, roll-your-own tobacco and smokeless tobacco are currently subject to FDA's tobacco control authority. The agency currently is finalizing the rule to bring additional tobacco products such as e-cigarettes, hookahs and some or all cigars under that same authority. Several states have passed laws establishing a minimum age for purchase of e-cigarettes or extending smoke-free laws to include e-cigarettes, both of which could help further prevent youth use and initiation.

"In today's rapidly evolving tobacco marketplace, the surge in youth use of novel products like e-cigarettes forces us to confront the reality that the progress we have made in reducing youth cigarette smoking rates is being threatened," said Mitch Zeller, J.D., director of FDA's Center for Tobacco Products. "These staggering increases in such a short time underscore why FDA intends to regulate these additional products to protect public health."

Today's report concludes that further reducing youth tobacco use and initiation is achievable through regulation of the manufacturing, distribution, and marketing of tobacco products coupled with proven strategies. These strategies included funding tobacco control programs at CDC-recommended levels, increasing prices of tobacco products, implementing and enforcing comprehensive smoke-free laws, and sustaining hard-hitting media campaigns. The report also concludes that because the use of e-cigarettes and hookahs is on the rise among high and middle school students, it is critical that comprehensive tobacco control and prevention strategies for youth focus on all tobacco products, and not just cigarettes.

The National Youth Tobacco Survey (NYTS) is a school-based, self-administered questionnaire given annually to middle and high-school students in both public and private schools. NYTS, which surveyed 22,000 students in 2014, is a nationally representative survey.

The 2012 Surgeon General's Report found that about 90 percent of all smokers first tried cigarettes as teens; and that about three of every four teen smokers continue into adulthood. To learn more about quitting and preventing children from using tobacco, visit www.BeTobaccoFree.gov (http://www.BeTobaccoFree.gov).

For broadcast-quality video and audio clips featuring FDA's Center for Tobacco Products Director Mitch Zeller speaking about the findings from the 2014 National Youth Tobacco Survey, visit

Letter speaking about the findings from the 2014 National Youth Tobacco Survey), visit http://dmr.homefrontdc.com/697/ctp-nyts-findings (http://dmr.homefrontdc.com/697/ctp-nyts-findings).
Please note that these clips will not be available until Thursday, April 16 at 1 p.m. ET.

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Flavoring Chemicals in E-Cigarettes: Diacetyl, 2,3-Pentanedione, and Acetoin in a Sample of 51 Products, Including Fruit-, Candy-, and Cocktail-Flavored E-Cigarettes

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Flavoring Chemicals in E-Cigarettes: Diacetyl, 2,3-Pentanedione, and Acetoin in a Sample of 51 Products, Including Fruit-, Candy-, and Cocktail-Flavored E-Cigarettes

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Running title: Flavored e-cigarettes, diacetyl and "Popcorn Lung"

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ABSTRACT

Background: There are over 7,000 e-cigarette flavors currently marketed. Flavoring chemicals gained notoriety in the early 2000's when inhalation exposure of the flavoring chemical diacetyl was found to be associated with a disease that became known as "Popcorn Lung." There has been limited research on flavoring chemicals in e-cigarettes.

Objective: To determine if the flavoring chemical diacetyl, and two other high-priority flavoring chemicals 2,3-pentanedione, and acetoin, are present in a convenience sample of flavored e-cigarettes.

Methods: We selected 51 types of flavored e-cigarettes sold by leading e-cigarette brands and flavors we deemed were appealing to youth. E-cigarette contents were fully discharged and the air stream was captured and analyzed for total mass of diacetyl, 2,3-pentanedione, and acetoin, according to OSHA Method 1012.

Results: At least one flavoring chemical was detected in 47 of 51 unique flavors tested. Diacetyl was detected above the laboratory limit of detection 39 of the 51 flavors tested, ranging from < limit of qualification (LOQ) to 239 μg/e-cigarette. 2,3-pentanedione and acetoin were detected in 23 and 46 of the 51 flavors tested at concentrations up to 64 and 529 μg/e-cigarette, respectively.

Conclusion: Due to the associations between diacetyl, bronchiolitis obliterans and other severe respiratory diseases observed in workers, urgent action is recommended to further evaluate this potentially widespread exposure via flavored e-cigarettes.

INTRODUCTION

The World Health Organization (WHO) reports that $3 billion was spent on electronic cigarettes (e-cigarettes) in 2013 in the United States alone, with sales expected to increase 17-fold in 15 years. Centers for Disease Control (CDC) estimates that 1.78 million children tried e-cigarettes as of 2012, with 160,000 of them reporting that they had not used tobacco cigarettes (WTO 2014; CDC 2013). E-cigarettes are not currently regulated; the U.S. Food and Drug Administration (FDA), which has the authority to regulate certain tobacco and nicotine-containing products under the Food, Drug, and Cosmetic Act, has issued a proposed rule to include e-cigarettes under this Act (FDA 2014). Although the popularity and use of e-cigarettes continues to increase, there is a lack of data on the exposures and potential human health effects of the use of e-cigarettes.

Concerns regarding e-cigarettes primarily focus on nicotine exposure, second-hand exposure, the potential for e-cigarettes to be a gateway to cigarette use, and renormalization/social acceptance of smoking (Trehy et al. 2011; Goniewicz et al. 2013; Long 2014; Coleman et al. 2014; Bell and Keane 2014; McMillen et al. 2014). Other recent investigations have focused on the chemical content of the e-cigarettes beyond nicotine, with researchers finding that users of e-cigarettes are exposed to carbonyl compounds, aldehydes, fine particulate matter, metals, propylene glycol, glycerol, formaldehyde, VOCs, and other additives (Bekki et al. 2014; Goniewicz et al. 2014; Pellegrino et al. 2012; Williams et al. 2013; Jensen et al. 2015; Uchiyama et al. 2013; Hutzler et al. 2014; Orr 2014; Callahan-Lyon 2014; Cheng 2014). However, despite over 7000 flavors of e-cigarettes currently marketed (Zhu et al. 2014), there have only been three published papers that focus on exposure to flavoring chemicals specifically (Farsalinos et al. 2015; Hutzler et al. 2014;

Behar et al. 2014), and one opinion piece in JAMA that highlights the potential respiratory health effects from using flavored e-cigarettes (Barrington-Trimis et al. 2015).

The use of flavorings in food products gained public attention in the early 2000s because of reports of serious lung disease in microwave popcorn workers (NYT, 2001). The flavoring chemicals involved were on the Generally Recognized As Safe (GRAS) list that applies only to ingestion, but exposures were occurring via inhalation and very little was known about potential inhalation hazards of these chemicals at that time (ECRF, 2015). In May 2000, eight persons who had previously worked at a microwave-popcorn processing plant were reported to have severe bronchiolitis obliterans (Kreiss 2002), an irreversible loss of pulmonary function that can become so severe that the only treatment option may be a lung transplant (OSHA 2007a). Researchers from the National Institute of Occupational Safety and Health (NIOSH) Division of Respiratory Disease Studies conducted an investigation at the facility where the impacted workers were employed. The NIOSH investigation included medical testing (including pulmonary function testing, medical questionnaires and work history documentation) and industrial hygiene exposure measurements (including grab samples, use of direct reading instruments and full shift samples). NIOSH determined that workers at this plant had greater than two times the expected rates of chronic cough, shortness of breath, asthma, and chronic bronchitis, and non-smokers had over 10 times the expected prevalence of airway obstruction (Kreiss 2002; CDC 2007). A strong association was found between this excess of lung disease, including bronchiolitis obliterans, and airborne exposures to butter-flavoring chemicals in the facility. Diacetyl was the most prominent chemical in the butter flavorings. Two other flavoring compounds of interest, acetoin and 2,3-pentanedione, were present in significant amounts and not sampled, respectively. Workers in the area where diacetyl-containing butter-flavoring was

added into heated mixing vats were exposed to volatilized flavor chemicals and a significant, positive dose response relationship was identified (Kreiss 2002; CDC 2007). A follow-up investigation at six other microwave popcorn manufacturing facilities found that, in five of six plants, mixers of butter flavoring and packaging-area employees working near tanks of heated oil, with exposure to diacteyl as low as 0.2 ppm, had fixed airway obstruction consistent with bronchiolitis obliterans (Kanwal 2006). Based on its occurrence in microwave popcorn manufacturing plants, bronchiolitis obliterans (and some related respiratory diseases of the small airways) became commonly known as "Popcorn Lung". The findings of adverse health effects in workers at microwave popcorn plants prompted additional investigations. The CDC identified seven additional cases of bronchiolitis obliterans in workers at a flavoring manufacturing company (CDC 2007).

Diacetyl is contained in a variety of flavors in addition to butter-flavor (Table 1; OSHA 2010), and its use is not limited to microwave popcorn facilities or food flavoring production facilities. Diacetyl, 2,3-pentanedione (a structurally related replacement for diacetyl), and acetoin are used in the manufacture of many other foods for a wide range of flavors beyond butter flavorings (e.g., caramel, butterscotch, pina colada, strawberry). Many of these same flavors are common in e-cigarette flavor cartridges, and are often sold with names that we consider to be potentially appealing to children, teenagers, and young adults: Cupcake, Fruit Squirts, Waikiki Watermelon, Cotton Candy, Tutti Frutti, Double Apple Hookah, Blue Water Punch, Oatmeal Cookie and Alien Blood. Further, e-cigarettes utilize a battery-driven nicotine delivery system in which an atomizer produces an aerosol (and vapors of evaporated liquids) through the heating of e-cigarette liquids contained in replaceable cartridges or re-fillable wells (Burstyn 2014; Jensen et al. 2015).

The heating, vaporization, and subsequent inhalation of these flavoring chemicals in e-cigarettes makes an exposure pathway for these flavorings that has significant similarities to those of the workers at the microwave popcorn facilities. In microwave popcorn manufacturing, flavorings, salt and colorants are added to heated soybean oil (57-60 °C). Kullman, et al., 2005 reported that aerosols and flavoring ingredient vapors were found in these mixing rooms. The aerosol found to have a combustible fraction that ranged from 70-85% by weight (average 79%) and a noncombustible fraction of 21%. The aerosol was identified as salt particles and oil coated salt particles, much of which was of respirable size. The mixing rooms were where the highest air concentration of flavorings was found. (Kullman et al 2005).

Based on the widespread use of these food flavors across many industries and knowledge that specific chemicals/artificial flavors were developed to mimic certain natural flavors commonly used in e-cigarettes, we hypothesized that these compounds are likely used in the manufacturing of flavored e-cigarettes. We sought to expand the state of knowledge on flavoring chemicals in e-cigarettes with a particular focus on e-cigarettes sold by the largest cigarette companies and also those flavors that we deem would be appealing to children, teenagers, and young adults.

METHODS

e-Cigarette Selection

A convenience sample of 51 e-cigarette flavors was selected for use in this study. Electronic cigarette cartridges, liquids, and their associated devices and batteries were purchased online and in retail locations. We evaluated 51 flavors, including all available flavors from three large cigarette companies (Brands A, B, and C, with 2, 2, and 7 flavors, respectively); 5 flavors from a large independent e-cigarette company (Brand D); and 24 additional flavors from three e-cigarette distributors (Brands E, F, and G, 10, 8, and 6 flavors, respectively) that we selected

based on their potential appeal to children, teenagers and young adults (Table 2). In addition, we evaluated 11 e-liquid flavors that are inserted into a cartomizer (disposable cartridge and atomizer system) (Brands H and I, 6 and 5 flavors, respectively).

The emissions from the e-cigarette are composed of an aerosol and flavor/solvent vapors. The aerosol and vapors are released after contact of the flavoring solution with the heater coil in the atomizer/cartomizer. In this study we used OSHA method 1012 for sampling of three flavoring chemicals (OSHA, 2008). The sampling media consists of a glass wool plug and glass fiber filter (GFF) in front of a dried silica bed. During the development of OSHA method 1012, the effectiveness of the silica gel tubes for capturing diacetyl and acetoin was examined. In part of that assessment, samples were taken with a PVC filter a powder on its surface which contained a known amount of the flavoring chemicals. The PVC filter was placed in series (before the silica gel tubes) and samples were taken. Both the filter and silica gel tubes were analyzed for the flavoring chemicals. OSHA reported that between 94.4% and 99.7% of the flavorings that were present in the powder were recovered from the silica gel tubes not the filter, i.e., the majority of the flavoring chemicals were stripped away and captured on the silica gel (OSHA 2008).

Sampling Protocol

The goal of the sampling protocol was to estimate the total mass of diacetyl, 2,3-pentanedione and acetoin emitted from each cartridge. Each e-cigarette was inserted into a sealed chamber attached to a lab-built device that drew air through the e-cigarette for eight seconds at a time with a resting period of 15 or 30 second between each draw (Figure 1). Eight seconds was chosen to make certain that each draw had adequate time for the entire contents to be forced out of the smoking device and through the sampling media. The draws were automated using a Pneucleus Technologies, LLC MediFlo Mass Flow Controller. Air from the chamber was split into high and

low flows to meet the lower flow sampling requirements for OSHA Method 1012 (OSHA, 2008). The low flow (target 200 ml/min) was optimized to carry the emissions of the e-cigarette through the sampling media (two SKC silica gel sorbent tubes containing 600 mg of specially washed and baked silica gel connected in series). The higher flow path was filtered and discharged. The total flow was set to the minimum needed to initiate a draw from the automatic e-cigarette and was measured at the beginning and end of each sample to determine the ratio between the high and low flows. The samples were collected until the e-cigarette cartridges or cartomizers were exhausted, determined by the lack of visible emissions in the chamber.

The samples from the lower flow portion of the sampling system were analyzed for diacetyl, 2,3-pentanedione, and acetoin using OSHA Method 1012 (OSHA, 2008). In order to determine the total concentration emitted, the reported values from the lab were adjusted using the corresponding ratio of low flow to total flow for each sample. For example, if the volume of air passing through the sampling media was 10% of total flow, the mass reported by the laboratory was multiplied by 10 to estimate the total chemical mass emitted from the e-cigarette cartridge. For the first batch of samples, the 0.12 liter volume chamber was passively purged for approximately 10 minutes between sampling different e-cigarettes by opening the chamber. For the second batch of samples, we included a 10-minute active purge of the chamber where the pumps were turned on and fresh air was drawn into the chamber. Quality assurance / quality control samples were collected for each batch.

Quality Assurance / Quality Control

Seven blank samples (>10% of total sample size) were collected using the same procedure outlined in the previous section but without an e-cigarette in the chamber. The same ratio adjustment process was conducted using the ratio of the low and high flow rates to obtain the

total chemical mass of chemical in the blanks, if any. Values for all three chemicals were <LOD in four of the seven field blanks, one had detectable levels of diacetyl and acetoin (1.2 and 10.7 μg/e-cig, respectively), one had detectable levels of 2,3-pentanedione and acetoin (0.4 and 9.2 μg/e-cig, respectively), and one had detectable acetoin only (1 μg/e-cig). Once the blanks were adjusted for flow, we performed a blank correction by batch according to the following procedure. Blank samples were averaged by batch before blank correction, and values below the laboratory limit of detection (LOD) were imputed with a value of ½ the detection limit before averaging. We calculated a limit of quantification (LOQ) for our procedure that was higher than the laboratory reported limit of detection (LOD; 0.05 ug/sample) using three times the standard deviation of the field blank samples. After blank correction, primary samples were compared to this LOQ by Batch 1 and Batch 2 (Diacetyl: 2.3 ug, 0.19 ug; 2,3-pentanedione: 0.07 ug, 0.38 ug; acetoin: 1.08 ug, 3.2 ug).If the blank-corrected mass was above the LOQ, the chemical was labeled as 'detected' and the value reported, and if the blank-corrected mass was not above the LOQ but still detected, we reported the value as "<LOQ". If the sample was reported as not-detected by the lab, we report the value as "<LOD". We re-sampled several of the same flavors from the same package (ie, testing two e-cigarette cartridges from the same pack). These replicate samples were collected for six flavors: Brand C Pina Colada (3 replicates), Brand C Cherry Crush, Brand D Pomegranate, Brand E Iced Berry, Brand F Watermelon, and Brand A Classic. The root mean square error (RMSE) for replicate samples ranged from 2.9 μg/e-cigarette to 98.4 μg/e-cigarette.

All samples were analyzed by ALS Laboratories in Salt Lake City, US, a laboratory accredited by AIHA Laboratory Accreditation Program for Industrial Hygiene. To check the integrity of the calibration curve, a separate "Initial Calibration Verification (ICV)" standard was introduced at

the mid-range level of the curve. A separate stock solution was used to generate a Liquid Calibration Standard (LCS) (89.9 % recovery) and Liquid Calibration Standard Duplicate (LSCD) (89.9 % recovery) as an overall accuracy and precision check. A reagent blank was prepared and run along with the samples to ensure that the laboratory did not introduce any contamination that would affect the analyte of interest recovery. For the three analytes in this study, the reagent blanks reported levels were all less than the laboratory reporting limit of 0.05 ug per sample.

Statistical Analysis

We grouped the samples using the product names and descriptions on the distributors' websites into the categories into the following flavoring categories based on OSHA's categories (Table 1): dairy, brown, fruit, and cocktail. Additional categories were created for tobacco flavored e-cigarettes and flavors that did fall into any other categories. Distributions of the mass of each of the three chemicals were compared according to flavor type using two sample t-tests and boxplots (R version 3.0.0, R Project for Statistical Computing, Vienna, Austria). When summarizing distributions, we substituted one half the value of the LOD as the mass for samples < LOD or < LOQ.

RESULTS

The total mass per e-cigarette (μg/e-cigarette) of the flavoring chemicals diacetyl, 2,3-pentanedione and acetoin are presented in Table 2. Diacetyl was above the level of detection in 39 of the 51 flavors tested, ranging from <LOQ to 239 μg/e-cigarette. 2,3-pentanedione and acetoin were detected in 23 and 46 of the 51 flavors tested at concentrations up to 64 and 529 μg/e-cigarette, respectively.

At least one of the flavoring chemicals was detected in 47 of the 51 unique flavors tested (92%). This includes several e-cigarette flavors that are not candy or fruit flavored, such as 'Classic' and 'Menthol'. Diacetyl and 2,3-pentanedione were detected simultaneously in 21 unique flavors, suggesting that 2,3-pentanedione may not be only a replacement for diacetyl but is often used in conjunction with diacetyl in e-cigarettes. Similarly, 2,3-pentanedione and acetoin were also detected simultaneously in 22 flavors. Diacetyl and acetoin were simultaneously detected in an even greater number of flavors (n=38).

Figure 2 depicts the distributions of the chemical masses of the e-cigarette samples, including replicates, according to flavor type. The three compounds were detected in all flavor types, with the exception of 2,3-pentanedione in dairy flavored e-cigarettes, which only had two samples. The median masses of the flavor types did not have a consistent ranking from one chemical to the next. For example, tobacco flavors had the second to lowest median mass for diacetyl compared to the fourth lowest for acetoin. The cocktail flavored e-cigarettes had the highest median masses and largest range for all three compounds, but none of the differences in the mean masses of each flavor type were statistically significant, using the bonferroni correction for multiple comparisons.

DISCUSSION

Diacetyl, a flavoring compound associated with the development of "Popcorn Lung" in workers after inhalation exposure, was detected in 39 of the 51 flavored e-cigarettes tested in this study, including flavors that have particular appeal to children, teenagers and young adults. 47 of the 51 flavors tested in our study had at least one of the three flavoring compounds detected (diacetyl, 2,3-pentandedione, acetoin). These compounds were ubiquitous among flavor types: "tobacco"

and “menthol” flavored e-cigarettes contained diacetyl despite not being listed on OSHA’s list of flavors that likely contain diacetyl (Table 1).

The health concerns related to inhaling diacetyl and other flavoring chemicals are now well recognized by OSHA and the flavoring industry. OSHA established a National Emphasis Program (NEP) in 2007 focused on respiratory disease in workers at microwave popcorn processing facilities, and a NEP in 2009 focused on “Facilities that Manufacture Food Flavorings Containing Diacetyl” (OSHA 2007b; OSHA 2009). The Flavoring and Extract Manufacturers Association of the United States released a report in April, 2012 on respiratory health and safety in the food manufacturing workplace that highlighted the potential risks associated with inhaling diacetyl and a long list of other food flavoring chemicals (FEMA 2012). They recommend the following warning for, “Any compounded flavors (liquid, dry or powdered) containing any flavoring substances listed in Table 1 in any concentrations if the compounded flavor or any of its individual flavoring substances will be heated during processing.” [The ‘Table 1’ referenced is specific to diacetyl.]

> WARNING – This flavor may pose an inhalation hazard if improperly handled. Please contact your workplace safety officer before opening and handling, and read the MSDS. Handling of this flavor that results in inhalation of fumes, especially if the flavor is heated, may cause severe adverse health effects.

Unlike these efforts by OSHA and the flavor industry to raise awareness of the hazards associated with inhaling flavoring chemicals, our review of the websites and packaging for the flavored e-cigarette brands in our study did not identify any similar notifications regarding diacetyl specifically, or flavorings generally. Two companies explicitly stated that their products

do not contain diacetyl in written communication, yet in our testing we did find diacetyl in their product.

Rules for labeling do not currently exist for e-cigarettes, because, unlike tobacco products, which are regulated by the U.S. Food and Drug Administration (FDA) under authority of the Family Smoking Prevention and Tobacco Act (Tobacco Control Act, 2009), a statute that authorizes the FDA to require warning labels on packages and advertisements and bans flavored cigarettes, e-cigarettes are not currently regulated. However, this may be changing. In 2014, the FDA issued a proposed rule that seeks to expand the legal definition of tobacco products to include e-cigarettes and other nicotine-containing products (FDA, 2014). If finalized, the rule may include minimum age and identification requirements and proposed addictiveness warnings. Specifically related to the research presented in this manuscript, and our opinion that many flavors are appealing to youth, the FDA states that, "…some tobacco products, such as e-cigarettes and certain cigars, are being marketed with characterizing flavors, and that these flavors can be especially attractive to youth." The FDA then acknowledges that the existing Family Smoking Prevention and Tobacco Act of 2009 that prohibits flavors only currently applies to cigarettes, not e-cigarettes, and they are seeking additional information regarding the effects e-cigarettes have on public health. The data presented in this manuscript on the presence of flavoring chemicals in e-cigarettes that have been previously associated with severe respiratory disease are a step toward addressing this information gap.

As a result of the toxicological and epidemiological studies by NIOSH, inhalation exposure limits for adult workers have been established for several food-flavoring compounds, including diacetyl and its structurally similar replacement, 2,3-pentanedione (Table 3). However, there are no health-based standards for diacetyl inhalation for the general public, and no standards for

children. We agree with a recent response to an article by NIOSH investigators (Hubbs et al. 2015), and an advisory released by FEMA (2015), that there are important considerations in interpreting analyses that use occupational health limits for estimating risk for e-cigarette smokers. First, these occupational health limits are set for healthy workers, not the general population, and e-cigarette users are not exclusively workers. Second, the U.S. regulatory agencies accept greater risk for workers than for the general population. For example, 'acceptable' risk for workers is generally 1 in 1,000 to 1 in 10,000 risk of an adverse event (Hubbs et al. 2015), while the U.S. EPA uses 1 in 100,000 to 1 in 1,000,000 as 'acceptable' for the general population (Castorina and Woodruff 2003). By applying occupational health limits to the general population of flavored e-cigarette smokers, we would thus be accepting a higher risk than typical. Third, the occupational limits are based on an 8-hour period, 5 days week, and come with the assumption that a worker will have 16 hours of recovery time between shifts, and 2 day recovery on the weekend, which is not applicable to e-cigarette users. Fourth, these exposure limits are for adults, not children, who on average have a smaller body weight compared to typical adult workers, resulting in a greater overall dose per e-cigarette for children and adolescents. Fifth, we do not know if the dose-response relationships observed for workers would be similar for children, who can be more susceptible to some environmental exposures. Last, the occupational exposure limits are not 'bright lines'; values below the limit should not automatically be interpreted as 'safe'. In fact, there is guidance for interpreting values below the occupational health limits. The American Industrial Hygiene Association (AIHA) first uses the upper confidence limit of the 95th percentile exposure value when comparing exposure measurements to an occupational limit, not just a point estimate or mean. They then use a 'control banding' to establish where the exposure fits within five AIHA exposure control

categories (Bullock 2006). Even when the 95th percentile exposure estimate is 10% of the occupational limit, at a minimum hazard communication is a typical control response to the exposure (Hewett et al. 2006). At 50% of the occupational limit, additional controls are also typical, including: exposure surveillance, medical surveillance, and work practice evaluation (Hewett et al. 2006).

Strengths and Limitations

One major goal of our study was to determine if diacetyl and other flavoring compounds were present in the vapors released from flavored e-cigarettes. Due to the vast number of flavored e-cigarettes currently on the market, and our convenience sample of 51 flavors, the extent to which are results are generalizable to the entire population of e-cigarette flavors is simply unknown; we did, however, detect at least one flavoring compound in 47 of the 51 flavors tested, suggesting the need to rapidly determine if this high prevalence found in our study is consistent across the many thousands of flavors being sold. Our method for determining when the e-cigarette was fully spent relied on a visual determination of emissions of the e-cigarette in the chamber. It is possible then that our samples did not fully reflect the total chemical content in the e-cigarettes if liquid remained in the e-cigarette at the time our sampler was turned off, causing an underestimate of chemical content. This method may explain the variability in replicate samples, as well as variable chemical doses in e-cigarettes of the same type. Another approach to determine total content would be to directly analyze the chemical content in the liquid contained in flavored e-cigarettes, but this does not permit analysis of the vapor. Also, our blank correction procedure used an imputed value for blank samples that were less than the limit of detection. Typically, blank correction would not be performed when blank samples do not have detectable levels of a chemical. However, to be consistent in how we handled blanks that did have

detectable levels across the different batches, we decided to uniformly blank correct, including the incorporation of non-detected blank samples (imputed, as previously described). This also would lead to an underestimate of chemical concentrations in the vapor. Lastly, our samples also showed within-flavor variability, as evidenced by the RMSE for replicate samples. This variability could be due to our method or variability in chemical content in flavored e-cigarettes; Cheng et al. (2014) reported a high degree of variability in nicotine content within e-cigarettes of the same brand. Based on these limitations, we urge caution in interpreting samples with values below the limit of quantification but above the limit of detection as being 'diacetyl-free'.

Strengths of our approach include measuring actual concentrations of these three flavoring chemicals in the vapor of e-cigarettes using repeatable and validated sampling and analytical methods, and methodological decisions that gave us confidence in reporting the presence of diacetyl in e-cigarettes. Future studies should refine these and other methods to further quantify the amount of flavoring chemicals in e-cigarettes, and the prevalence of diacetyl and alternative flavoring chemicals in a wider range of samples. Last, studies need to be performed to assess potential differences between the particulate and vapor contribution to exposure and test other environmental conditions, including variability in humidity, differences in smoker draw time/pressures, and different designs of the vaporization systems. For example, Zhang et al. showed that puffs generated smaller peak particle sizes compared to drawing at a constant rate, which has implications for where inhaled particles will penetrate in the lungs (Zhang et al. 2013). A standardized protocol for evaluating emissions (particulate and vapors) of e-cigarettes would facilitate interpretation of study results.

CONCLUSION

Our findings confirm the presence of diacetyl and other high priority flavoring chemicals in flavored e-cigarettes. Due to the associations between diacetyl, bronchiolitis obliterans and other severe respiratory diseases among workers inhaling heated vapors containing diacetyl, urgent action is recommended to further evaluate the extent of this new exposure to diacetyl and related flavoring compounds in e-cigarettes.

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Table 1. Flavors that contain diacetyl according to OSHA (OSHA, 2010).

Flavor Type	*Flavors in this Group*
Dairy Flavorings	Butter, Cheese, Cream Cheese, Cheesecake, Milk, Yogurt, Ice Cream, Egg, Ranch Dressing, Sour Cream, Buttermilk
Brown Flavorings	Butterscotch, Caramel, Vanilla Coffee, Tea, Toffee, Chocolate, Cocoa, Cocoa Butter, Maple, Brown Sugar, Marshmallow, Peanut Butter, Praline, Hazelnut, other nut flavors
Fruit Flavorings	Strawberry, Cranberry, Raspberry, Boysenberry, Other Berry Flavors, Fruit Flavors - nearly any kind (e.g., banana, apple, grape, pear), cider, tomato
Alcohol Flavorings	Brandy, Rum, Whisky, Tequila, Pina Colada
Miscellaneous Flavorings	Nutmeg, Honey, Graham Cracker, Vinegar, Meat flavors

Table 2. Estimated mass of flavoring chemicals in e-cigarettes (μg/e-cigarette)

Flavor	Brand	Flavor Type	Diacetyl (2,3-butanedione)	2,3-pentanedione	Acetoin
Classic	A	Tobacco	3.9	1.0	37.5
Classic	A	Tobacco	<LOD	<LOD	<LOD
Menthol	A	Other	<LOD	<LOD	<LOD
Menthol	B	Other	<LOD	<LOD	<LOD
Original	B	Tobacco	<LOD	<LOD	<LOD
Cherry Crush	C	Fruit	<LOQ	<LOD	9.0
Cherry Crush	C	Fruit	14.7	3.4	165.6
Classic	C	Tobacco	<LOQ	0.8	18.1
Java Jolt	C	Brown	21.5	7.4	212
Menthol	C	Other	8.3	2.7	18.3
Peach Schnapps	C	Cocktail	238.9	64.4	529.2
Pina Colada	C	Cocktail	27.0	7.1	45.5
Pina Colada	C	Cocktail	1.6	<LOD	130
Pina Colada	C	Cocktail	<LOD	<LOD	<LOD
Pina Colada	C	Cocktail	<LOD	<LOD	16.5
Vanilla	C	Brown	<LOD	0.9	<LOD
Bold	D	Tobacco	5.9	<LOD	39.8
Gold	D	Tobacco	0.6	<LOD	7.0
Menthol	D	Other	4.9	<LOQ	9.6
Pomegranate	D	Fruit	<LOD	0.2	11.9
Pomegranate	D	Fruit	6.9	<LOD	41.4
Vanilla Bean	D	Brown	6.7	<LOD	13.1
Bad Apple	E	Fruit	6.0	<LOD	<LOQ
Banana	E	Fruit	<LOD	<LOD	<LOQ
Cin	E	Other	38.4	23.4	<LOQ

Iced Berry	E	Fruit	6.6	<LOD	33.4
Iced Berry	E	Fruit	2.6	<LOD	17.3
Just Guava	E	Fruit	<LOQ	<LOD	7.3
Kick!	E	Brown	20.0	<LOD	19.1
Lime and Coconut	E	Fruit	10.3	<LOD	77.9
Peach Pit	E	Fruit	<LOD	<LOD	6.1
Snap!	E	Brown	10.9	3.4	88.2
Strawberry	E	Fruit	<LOQ	<LOD	5.2
Cherry	F	Fruit	4.2	<LOD	35.6
Double Apple Hookah	F	Fruit	21.1	2.3	193.5
Franks Lemon Lime	F	Fruit	4.2	1.1	47.3
Grape Hookah	F	Fruit	1.5	1.6	27.9
Orange Mint	F	Fruit	1.1	1.5	27.9
Peach	F	Fruit	8.3	<LOD	117.5
Pina Colada	F	Cocktail	11.6	0.7	55.8
Watermelon	F	Fruit	13.3	1.4	224.3
Watermelon	F	Fruit	7.4	<LOD	72.5
Bluewater Punch	G	Fruit	<LOD	<LOD	3.8
Cherry Lava	G	Fruit	<LOD	<LOD	5.6
CooCoo Coconut	G	Brown	1.0	<LOD	19.5
Milk Chocolate	G	Dairy	<LOD	<LOD	9.7
Pineapple Punch	G	Fruit	<LOD	<LOD	10.4
Waikiki Watermelon	G	Fruit	4.4	<LOQ	2.1
Alien Blood	H	Fruit	0.4	<LOD	19.4
Carmel Popcorn	H	Brown	0.3	<LOD	1.5
Cupcake	H	Brown	0.3	4.6	1.3
Energy Drink	H	Other	<LOD	<LOD	12.2
Fruit Squirts	H	Fruit	0.9	<LOD	114.4

Oatmeal Cookie	H	Other	2.2	4.2	26.1
Bubble Gum	I	Other	<LOD	<LOD	<LOD
Cheesecake	I	Dairy	0.9	<LOD	<LOD
Cola	I	Brown	<LOQ	0.2	3.7
Cotton Candy	I	Fruit	0.8	<LOD	8
Tutti Frutti	I	Fruit	9.3	0.8	24.7
<LOQ: Detected by the laboratory above the laboratory limit of detection (LOD) but less than the limit of quantification (LOQ); LOQ by Batch 1 and Batch 2 (Diacetyl: 2.3 ug, 0.19 ug; 2,3-pentanedione: 0.07 ug, 0.38 ug; acetoin: 1.08 ug, 3.2 ug). <LOD: Not detected above the laboratory limit of detection (LOD); 0.05 ug					

Table 3. Occupational exposure guidelines in parts per million.

Agency	Averaging Time	2,3-pentanedione	Diacetyl	Acetoin	Reference
OSHA PEL	8-hour	NA	NA	NA	OSHA 2015
	16-hour*	NA	NA	NA	
NIOSH REL	8-hour	0.0093[a]	0.005[a]	NA (10-hour)	
	16-hour*	.0023	.00125	NA	
NIOSH STEL	15-minute ceiling	0.031[a]	0.025[a]	NA	
ACGIH TLV	8-hour	NA	0.01	NA	ACGIH 2014
	16-hour*	NA	.0025	NA	
ACGIH STEL	15 minutes	NA	0.02	NA	ACGIH 2014

[a] draft occupational exposure limit (ppm)

** Adjusted OEL using Brief and Scala method*

NA Not available

PEL Permissable exposure limit

REL Recommended exposure limit

STEL Short-term exposure limit

TLV Threshold limit value

Figure Legends

Figure 1. Schematic of sampling apparatus

Figure 2. Boxplots showing the median, interquartile range, and 1.5 times the interquartile range of e-cigarette sample masses, including replicates, by flavor type for diacetyl, 2,3-pentanedione, and acetoin. Samples outside 1.5 times the interquartile range are shown as dots. The two highest concentrations for each chemical are not shown.

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Figure 1.

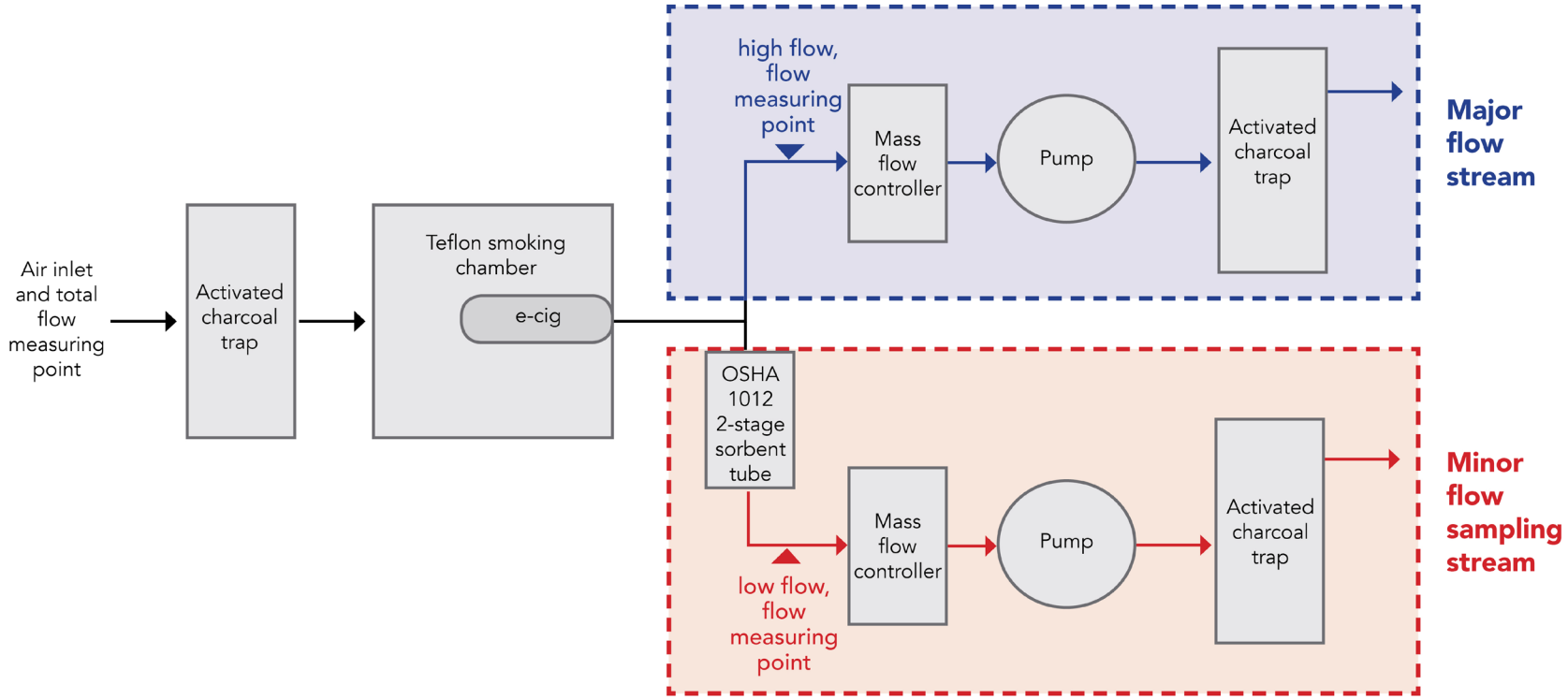

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Figure 2.