

INNOVATING SOLUTIONS TO PUBLIC HEALTH CHALLENGES IN WINTHROP, MA



METROBRIDGE



ABOUT THIS REPORT

This report is a set of recommendations from three teams of students in the Interdisciplinary Perspectives on Global Health course in Boston University's Kilachand Honors College led by Professor Carrie Preston.

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ABOUT BU METROBRIDGE

MetroBridge empowers students across Boston University to tackle urban issues, and at the same time, helps city leaders confront key challenges. MetroBridge connects with local governments to understand their priorities, and then collaborates with Boston University faculty to translate each city's unique needs into course projects. Students in undergraduate and graduate classes engage in city projects as class assignments while working directly with local government leaders during the semester. The goal of MetroBridge is to mutually benefit both the Boston University community and local governments by expanding access to experiential learning and by providing tailored support to under-resourced cities. MetroBridge is funded by the College of Arts and Sciences and housed at Boston University's Initiative on Cities.



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EXECUTIVE SUMMARY

The Town of Winthrop's Public Health Department collaborated with the MetroBridge program to explore three of the greatest health-related challenges facing the town. In March 2019, three groups of students in the Interdisciplinary Perspectives on Global Health course in Boston University's Kilachand Honors College addressed these challenges in a week-long, hack-a-thon style format to develop a set of recommendations for Winthrop's Public Health Director. The three public health challenges were:

CREATING A CULTURE OF CONSENT AMONG STUDENTS IN WINTHROP'S SCHOOL DISTRICT

Sexual activity, particularly forced sexual activity, is a concern in Winthrop's school district. Almost 20% (or one in five) of sexually active students report feeling pressured to engage in sexual activity at least once by their partner, which is nearly three times higher than the state average. The recommendations developed for Winthrop are tailored to address a set of issues linked to sexual assault, including educational platforms, harmful cultural and social norms, as well as reporting and accountability.

EMPOWERING SCHOOL-AGED WINTHROP RESIDENTS TO BE INFORMED HEALTH CONSUMERS

Local leadership in Winthrop believes the current opioid epidemic and rise in popularity of e-cigarettes are two examples of public health issues that are enabled, in part, by lack of public education and awareness about associated health risks. In order to help curb substance use crises in the future, Winthrop is seeking new ways to help residents, students in particular, to be informed health consumers. The recommendations developed for the town provide a more comprehensive approach to addressing substance abuse awareness.

ADDRESSING LOGAN AIRPORT'S EFFECTS ON COMMUNITY HEALTH IN WINTHROP

Given Winthrop's proximity to Boston Logan International Airport, it is a community with high exposure to air and noise pollution. There is concern among residents about negative health impacts such as asthma, chronic obstructive pulmonary disease(COPD), as well as effects on hearing, stress levels, and sleep interruption. The recommendations developed for Winthrop are designed to help mitigate these environmental concerns.

The goal of this report is to provide the Town of Winthrop with several options for policy and programmatic solutions to address three of the most pressing public health challenges. The recommendations presented here will hopefully serve as helpful, foundational information for local officials to use in developing plans of action around creating a culture of consent, expanding access to health education in schools, and reducing air and noise pollution.

CREATING A CULTURE OF CONSENT AMONG STUDENTS IN WINTHROP'S SCHOOL DISTRICT

THE CHALLENGE

Sexual activity, particularly forced sexual activity, is becoming a matter of increasing importance in Winthrop's school district. Of the youth who reported being sexually active at some time in their life, almost 20% (or one in five) also reported being pressured to engage in sexual activity at least once by their partner. According to the Massachusetts Youth Risk Behavior Survey 2017 (a similar data collection tool), 6.8% of youth throughout Massachusetts reported forced sexual activity. Therefore, the sexual assault rate at Winthrop High School is nearly three times the state average. These statistics indicate a larger trend of unhealthy sexual behavior and related problems prompting concern in Winthrop.

The 2018 Prevention Needs Assessment, an anonymous survey given to students at Winthrop Middle and High Schools, measured risky behaviors and protective factors against these behaviors. Winthrop High School students were also asked additional sexual health questions. The data collected paints a picture of a tangled web, where alcohol and drug abuse, mental health, and prosocial behaviors all affect students' propensity to either perpetuate or experience nonconsensual sexual activity.

The following recommendations are tailored to address a set of issues linked to sexual assault, including educational platforms, harmful cultural and social norms, as well as reporting and accountability. They use Winthrop's schools as the primary platform for handling these points of concern.

Recommendation 1: Extending the Health Curriculum in Schools

According to Winthrop public officials, the current health curriculum at Winthrop High School is inadequate in meeting the information needs of its students. The World Health Organization, in addition to the Joint Committee on National Health Education Standards, found that the most effective health education includes a "planned, sequenced curriculum" that is "intense and begins prior to the onset of the risky behaviors" The existing curriculum in Winthrop is only a half-year course in the ninth grade, which likely cannot provide sufficient and comprehensive education that includes sexual activity, mental health, and substance abuse.

Extending this course to span the full school year gives students the chance to delve deeper into important topics and better understand the dangers of nonconsensual sexual activity and how to act when confronted with forceful behavior. Additionally, providing this course earlier in the students' education would be more effective in preventing risky behavior. Data from the Prevention Needs Assessment indicates that many students are making decisions about sex, drinking, and drugs before ninth grade. Health education that takes place before this time ensures that students understand the related consequences and can make better-informed decisions. Curriculums in classes such as physiology and psychology can also be modified to incorporate relevant topics of health.

Recommendation 2: Supporting Student-Led Programs and After-School Clubs

Outside of the health curriculum, student-led programs can engage students in a meaningful way to address issues of sexual activity. Such programs can manifest in a variety of forms, including an after-school club, peer mentorship, student run media campaigns, and community theater. These student-led programs not only tackle the issue of sexual assault directly, but also engage students in prosocial behaviors while providing a sense of community and support many students may be lacking. This community acts to normalize discussions around important issues, allowing the them to work through stigma and break down harmful cultural and social norms that too often dictate silence on the matter. Drawing on student input lets these programs tailor their work towards the exact problems and questions facing students in Winthrop, which helps them reach a larger audience more effectively through peer-to-peer awareness and targeted messaging.

Additionally, an after-school club puts students in the role of “public health ambassadors” within their school communities. Using the broader scope of public health mitigates the stigma surrounding discussions of sexual activity, while also giving students a chance to tackle issues indirectly related to sexual assault, such as dating violence, alcohol and drug use, and mental health. The formation of a club gives students an avenue for continuous input on issues of public health, expanding beyond the limitations of a yearly anonymous survey. Moreover, it can function as a space for more targeted discussions on matters specific to LGBT+ students, who lack health education specific to their needs.

Recommendation 3: Expanding Wellness Week with Year-Round Speakers and Panels

A student-led program or after-school club could be used as a platform for expanding the pre-existing Wellness Week in Winthrop's schools, although this is a solution that could be implemented independent of a club as well. Building on the idea of bringing in speakers and engaging the school in workshops, students could arrange for such panels throughout the school year. This grants them a degree of autonomy in choosing what topics are most important to them to discuss. Additionally, it lends itself to a more diverse array of educators that may reach minority students on a more personal level. Data from the Prevention Needs Assessment shows that students belonging to the LGBT+ community or racial minorities are less likely to have a trusted adult to talk to at school and are also more likely to experience harmful behavior such as dating violence and forced sexual activity. Speakers who share a background with the students may be able to bridge a gap that faculty cannot.

Recommendation 4: Promoting Dialogue Through Media Campaigns and Community Theater

Media campaigns are another way to reach the student community outside of the health curriculum. A student-led media campaign could focus its message towards parents, addressing the fear of repercussions and lack of parental engagement indicated by data from the Prevention Needs Assessment. By focusing on education rather than scare tactics, the media campaign can provide families with the information they need to facilitate better discussions with their children, rather than judgement that further stigmatizes the issue. Parents can also become more involved in these discussions through a yearly Parent Night, geared towards educating them on issues involving sex, substance abuse, and mental health.

Integrating public health into aspects of Winthrop education allows administrators to draw on the strengths of already-established programs to address sexual assault. Winthrop's High School in particular has a strong theater program that could be used to foster conversation. It draws together many different forces: those involved in the theater program, the rest of the student body, teachers, administrators, and parents. Collaboration between these groups builds connections and equips the community with the tools needed to discuss and prevent forced sexual activity. Additionally, information can be shared with parents at school events such as open houses, science fairs, and sports nights when parents are more easily engaged in information being distributed by the school district.

Recommendation 5: Improve Reporting Mechanisms and Support Services for Sexual Assault Victims (*Mobile App, Law Enforcement Training, and School District Services*)

There are several ways in which Winthrop can improve reporting mechanisms and support services for sexual assault victims. First, technology can be used to improve standards of reporting and accountability more directly. Winthrop students likely use digital devices for just about everything, and with a simple app, that could include reporting assault. Functions could include notifying selected friends and/or authorities with the user's location and providing a list of resources such as suicide and sexual assault hotlines. Discretion and anonymity are key to implementing this solution effectively, so it may be prudent to integrate this into a broader school-oriented or otherwise disguisable app.

Second, equipping law enforcement officials with the training necessary to respond to a sexual assault case can also help improve reporting. The You Have Options Training for law enforcement has been an effective tool in enhancing responses to sexual assault and has also been proven to increase reporting rates by supporting victims through the process. The focus on "victim-centered and offender-focused response" encourages survivors to speak up and, in that process, works against the stigma surrounding sexual assault.

Lastly, Winthrop Public Schools can focus inwards on administration and services to combat sexual assault and provide resources for survivors. Professional development can be a useful tool in training teachers to act as a resource for students who seek a trusted adult to turn to after experiencing, witness, or hearing about an assault. Some adjustments are simpler. Providing free condoms in the nurse's office, for example, is an easy and cost-effective option that open up conversations around sexual activity, establish the nurse as a resource, and provide students with important materials. As a longer-term strategy, diversifying administrative staff can further engage students who previously felt alienated by a staff that did not reflect the diverse demographics of the student body.

It should also be noted here that while teachers can be a great resource, ultimately the people best prepared to guide students through these circumstances are those professionally trained in mental health services. Increasing access to such services is another vital part of combatting tangential issues to sexual assault, such as intimate partner abuse. Currently, adjustment counselors at Winthrop's schools are largely overworked, and there are no town-based mental health services.

EMPOWERING SCHOOL-AGED WINTHROP RESIDENTS TO BE INFORMED HEALTH

THE CHALLENGE

The current opioid epidemic has swept across the United States, affecting a diverse catalog of communities across the nation. One such community is Winthrop, where nine residents died from an opioid overdose in 2017. The rate of occurrences of fatal overdoses in Winthrop has risen in recent years -- between 2008-2010, 12 fatal opioid overdoses were reported, equating to approximately four deaths per year. In response to the drastically increasing magnitude of this issue, the Town of Winthrop mobilized, training all first responders in naloxone administration and employing a Peer Recovery Coach to assist members of the community. Despite these efforts, however, the epidemic continues.

The recent rise in the popularity of e-cigarettes, such as the JUUL, in the U.S. occurred very quickly, with some striking parallels to the opioid epidemic. This allegedly-safe alternative to cigarettes, designed to help people who smoke avoid doing so, soon spread to non-smokers and to young people, aided by the development of flavor pods. In Winthrop, 50% percent of students in grades 7-12 report using e-cigarettes, which is dramatically higher than the Massachusetts average of 33.8% amongst this population. The spread of this problem was catalyzed by a combination of factors, including a lack of regulation, limited public knowledge of these devices, and marketing by the product developers.

When considering the progression of both the opioid and the vaping epidemics in Winthrop, it is clear that these challenges were enabled in part by a lack of public education and accessible information. In order to help curb substance use crises in the future, it is crucial that communities place an emphasis on developing strong health consumers amongst themselves. By focusing on prevention rather than retroactive treatment, future substance abuse trends may abate. In addition to this, however, it is imperative that current e-cigarette use amongst Winthrop students is addressed. While Winthrop Public Schools has a substance use awareness program in place for students, more must be done to curb the impact of this issue.

Recommendation 1: Expanding the Health Curriculum in Winthrop Public Schools to Include Healthy Decision-Making and Stress-Management Approaches

As referenced in the previous section, an integrated Winthrop Middle school and High School curriculum that focuses on student health in everyday settings would serve to normalize the discussion of one's well-being. Synthesizing existing mandatory topics with discussions of mental and physical health would maintain the necessary educational aspect while providing students with the health resources they need. In middle school years, the discussion would be focused on basic education about healthy decision-making and problem solving (sixth grade), defining addiction and substance abuse and what to do to seek help (seventh grade), and discussing mood disorders and healthy coping mechanisms (eighth grade). In high school, the curriculum will delve deeper into wellness as well as practical education on substances and peer pressure. Ninth graders will focus on self-care techniques, peer pressure, and the physical, emotional, and social impacts of various classes of drugs. These discussions will continue into tenth grade, with a greater emphasis on peer pressure and how to resist it. In eleventh grade, students will discuss stress relief in a manner that is tailored to the upcoming college application process. Finally, twelfth graders will examine what has worked for them personally, while further exploring the impact of positive affirmations and what each individual can do to adjust to life after high school.

The integrated curriculum will promote an overall culture of healthy stress management, which, in turn, will direct young people to stable coping mechanisms for stress rather than turning to substance use, thus prompting the development of strong health consumers. Furthermore, such a curriculum will remain relevant in the face of new challenges -- regardless of what the next popular substance may be.

Recommendation 2: Adjust School Hours to Promote Mental Health and Well-Being of Students

In addition to this curriculum, it is recommended that Winthrop Public Schools implement programs and services to promote the mental health and well-being of students. Changes to the structure of the school day, such as beginning class at later times and building in break times throughout the day, would aid student mental health. The current start time of 7:55 a.m. in high school is not compatible with the typical natural sleep cycle of school-aged students, and allowing for healthy sleep patterns will reduce student stress and fatigue. Breaks throughout the day would serve as general

stress relief for all students, enabling them to rest and reset.

Recommendation 3: Promoting Accountability with Student-Athlete Contracts

Another option to help promote individual accountability and responsibility for avoiding drugs and alcohol is a student-athlete handbook: a contract that those participating in school sports must sign at the beginning of each season holding themselves to standards of behavior that include not using substances, and acknowledging related consequences for violations. This contract approach provides stronger incentives for safe behavior and reinforces accountability among students. Such contracts could also be used for all students, not just student-athletes.

Recommendation 4: Creating a Peer Mentorship Program

The creation of a peer mentorship program is an example of larger-scale, long-term institutional support. This program would connect Winthrop High School upperclassmen and alumni with underclassmen, and these mentors would meet with mentees to discuss mental health and social pressures on a personal basis once every two weeks. These mentors would be selected based on their involvement in and impact on their school, extracurricular activities, and community. They would be required to abstain from drug and alcohol use, and they would be provided with resources and training from mental health and substance abuse experts within the community. It is important to note, however, that this is not an adequate substitute for trained staff and guidance counselors available to students at Winthrop High School.

The peer mentorship program for Winthrop High School's approximately 600 students would require between 30-50 volunteer mentors, to be compensated with \$600-\$700 each, depending on their hourly contribution and number of mentees. Factoring in additional costs, such as materials and training, the estimated cost range for this program is \$23,000-\$45,000.

Recommendation 5: Fostering an Unbiased, Supportive Environment in Schools

A crucial part of addressing substance use problems in this community is working to bust the stigma surrounding substance abuse treatment, as those struggling with such issues often feel ashamed of admitting that they need help. The protocol for teachers, staff, or law enforcement responding to an individual experiencing a substance use

crisis shall strongly emphasize the importance of supporting the individual, promoting compassion over punishment. Additionally, it is recommended that Winthrop Public Schools enable anonymous, unbiased support teams that students are able to contact in the case of a crisis. Existing data of Substance Use Outreach in Winthrop shows that most individuals experiencing a crisis are receptive to outreach teams. (These support teams could be implemented in conjunction with the proposed support teams for victims of sexual assault, as referenced in the previous section.)

Furthermore, it is important that school staff and teachers are trauma-informed, so as to foster a healthy environment for all students. Teachers may also promote peer-to-peer learning in the classroom rather than clinical definitions in a lecture-style setting so as to convey empathy towards students who may connect with such issues. Public service announcements may also be displayed to promote healthier coping mechanisms than substance use, and normalizing the decision to ask for help. Finally, parental engagement and education may be encouraged so that the families of student are informed of each grade level curriculum and involved in discussion, bringing this education further into the community.

ADDRESSING LOGAN AIRPORT'S EFFECTS ON COMMUNITY HEALTH IN WINTHROP

THE CHALLENGE

Given Winthrop's proximity to Boston Logan International Airport, it is a community with high exposure to air and noise pollution generated by the airport. A 2014 study by the Massachusetts General Court and the state's Department of Public Health found that chronic obstructive pulmonary disease (or COPD) is statistically significantly higher for residents in high exposure areas and children in these high exposure areas are three to four times more likely to report symptoms of asthma compared to children in low exposure areas. These conclusions are of concern because the amount of air traffic is going to continue to increase, especially with the ongoing expansion of Terminal E.

Noise pollution is also a concern for the residents of Winthrop given possible effects on health, hearing, and sleep interruption. Day Night Level (DNL) is a standard for measuring noise pollution over a 24-hour period. The current DNL "threshold of significance" is 65 decibels, however recent measurements from Winthrop are much higher. On March 2, 2018 DNL = 80 dbl from the 1,152 flights that day and April 5, 2018 DNL = 83 dbl from flights. The airplanes passing over head are not only loud, they are also close to homes. Airplane departures from Point Shirley (the closest runway to Winthrop) average 700 feet above homes, according to the Noise Abatement Office, and some are as low as 300 feet. Arrivals in the same area of Winthrop travel approximately only 275 feet over homes.

The negative effects of noise pollution include decreased sleep quality, increased stress and distraction, and temporary changes in hearing in the short term, as well as contributing to long term risks and chronic effects of hypertension, reduced learning and productivity, endocrine disruptions, and permanent hearing loss.

Recommendation 1: Reducing Inbound and Outbound Airplane Speeds

An extensive 2018 study by MIT outlined several recommendations for decreasing harmful health effects on surrounding areas of Boston Logan International Airport. One key recommendation from the study is to reduce aircraft speeds for departing and arriving jets. Aircraft noise is dependent on aircraft speed in terms of airflow around flaps and landing gear, and therefore higher speeds lead to higher noise levels. As the report describes, aircraft typically accelerate to 250 knots after takeoff, but reducing take-off speeds to 220 knots will decrease airframe noise to a volume similar to engine noise.

Additionally, adjustments to flight paths can also improve the MIT report suggests that airplane noise can be mitigated if aircraft accelerated at higher elevations. Currently, aircraft accelerate as low as 6,000 feet, but increasing this minimum to 10,000 feet could reduce exposure to jet departure noise. -Another strategy proposed by the MIT study is changing landing patterns for feasible flights to the path shown above, which goes around Winthrop airspace and would reduce noise.

The potential barriers to these proposed recommendations are: fuel burning and increases in flight time, possible runway throughput reduction, and more limited aerodynamic maneuvering margins at lower speeds. However, the report also outlines how to adapt to these issues and why these are not unmanageable barriers. A resident petition, along with liaising with neighboring communities and Massport, would be necessary to successfully argue for the changes in flight paths and aircraft speed.

Recommendation 2: Creating a Biomass Barrier

This recommendation proposes the construction of a strategically located stand of trees and/or other greenery in Winthrop near the airport. Plants remove many of the common air pollutants exuded from flying aircraft. This reduction of pollutants has direct effects in preventing the onset of COPD and asthma.

In a report by the U.S. Department of Agriculture Forest Service, trees in urban areas are shown to absorb atmospheric pollutants. An urban area with 100% tree cover, within only an hour, remove as much as 13% of particulate matter, 8% of nitrogen dioxide, and 0.05% of carbon monoxide. Young trees absorb around 15lbs of carbon and carbon dioxide (CO₂) per year and this rate increases as the trees age. Pollution removal is proportional to leaf surface areas of trees, and therefore the most advantageous trees

for the biomass barrier would be plants with high leave coverage year-round. Additionally, for every ton of CO₂ absorbed, it saves \$870 in terms of externality value (the cost to prevent the pollutant from entering the atmosphere).

A biomass barrier also reduces noise and could therefore be effective in addressing noise disruption from Boston Logan Airport. Tree barriers have been shown to reduce noise by 5-10 decibels and a 10-decibel reduction equates to halving perceived loudness. A biomass barrier consisting of arborvitaes or evergreens, which maintain dense coverage all year round, would be most effective for reducing noise and pollutants regardless of season, and they are inexpensive and fast-growing trees.

The proposed budget for the biomass barrier is \$21,000 total. Trees (1,200) can be purchased for \$15,500, additional bushes and vines for \$2,500, and supplies for \$3,000. In order to undertake this project, a volunteer-based community effort must be put forth. Community volunteers can be recruited through promotional materials and their role would include recruiting for and participating in weekend events centered around planting for the biomass barrier. It is proposed that the entire project be overseen by an urban planning summer intern, paid a \$5,000 stipend, who is qualified and able to identify the best location and organization for the biomass barrier. Additionally, the biomass barrier should be maintained in the long-term by municipal workers, but given the denseness of the greenery, the trees will not require much upkeep and will not impose a significant cost.

Recommendation 3: Developing Independent Air Quality Monitors and Offering Respiratory Screenings

This recommendation focuses particularly on gathering and sharing more information pertaining to respiratory issues and air pollution. Installing PurpleAir sensors, which track air quality and upload the information every 80 seconds to a map, would give the town more independent data from which to understand the magnitude of air quality issues. Currently all air quality data collection is performed by Massport, the authority that owns and operates Logan Airport, so the potential for a conflict of interest has led some residents to call the validity of the air quality data into question.

The PurpleAir air quality sensors could be placed at each school and one at town hall. Additionally, in order to transparently communicate this data to the public, as well as ensure the wellbeing of the residents in the case of dangerous air quality levels, an app publishing daily airport activity, air quality levels, and information about health effects

can be introduced in combination with a text alert system and live data-monitoring tab on the Winthrop town website.

The associated cost for building this app would be \$500 and no domain cost or subscription would be needed for the website link if created through the Winthrop town website. Texts alerts with air quality index of above 50, which is considered moderate, costs approximately \$2,000 for 5 years given monthly business rates for automated texts. Text alerts can help the members of the community stay informed about the environment they're living in and take appropriate precautions if necessary.

Additionally, to find out if the increases in asthma in children is correlated with ventilation systems in schools, another intervention to be considered is measuring air quality in two elementary schools in order to determine if the HVAC (heating, ventilation, air conditioning) needs maintenance. Furthermore, in order to help diagnosis respiratory issues amongst the population, hosting respiratory awareness clinic days at schools and using a spirometer device at free clinic days where Winthrop residents can be tested for respiratory problems should be considered. This may help ease any anxieties about air pollution having devastating unknown effects on the population, and help the residents stay informed.

Overall, the estimated budget comes out to under \$20,000. Four PurpleAir monitors for \$876, air quality alerts costing around \$2,500, three spirometers for diagnosing respiratory issues for \$6,000, and around \$4,000 for clinic costs, all adding up to \$19,376.

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