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# Exhibiting Health: Museums as a Venue for Public Health Intervention

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Public health interventions are as broad as the field itself. Through this paper, I will highlight the missed opportunity that museums present as an intervention site for public health. I will then discuss the design, content, challenges, successes, and directions for growth of a specific exhibition (Big Food: Health, Culture, and the Evolution of Eating), as an example of successfully translating public health into the museum context, which could be used as a starting point for further interventions in this underutilized venue.

### Museums: Public Learning Spaces

The practice of public health can be undertaken in a huge range of venues, but one area that is often overlooked is museums. In America, public museums belong to a vast network of more than 17,500 spaces that are used to educate, inspire, and entertain children and adults.<sup>1</sup> These include science museums, natural history museums, children's museums, cultural centers, state and local history museums, art galleries, zoos and aquariums, parks, gardens, and countless other specialized museums (for example, railway museums, maritime museums, and fire-fighting museums).<sup>2</sup> The American Association of Museums (AAM) estimates that about 850 million visitors attend museums each year, with a preference for science museums, living collections, and children's museums. These factors make museums uniquely suited to partnership with health workers: they have a large, interested audience, are placed all over the country, and are well established within communities. Though many museums are already targeted to health and science education, this venue could be utilized more often and more effectively.

Several museums nationwide have addressed various health topics, with specific exhibitions like the Newark Museum's Generation Fit: Steps to a Healthier Lifestyle and the Children's Museum of Manhattan's Eat Sleep Play, and more broadly Houston's Health Museum. One noteworthy example is the Yale Peabody Museum's Big Food: Health, Culture, and the Evolution of Eating. Beyond simply exposing a large audience to accurate information, there is a precedent for using museum exhibitions to educate the public, especially in children. Even better, research has shown that good exhibitions (long running exhibitions that are interactive, graphic, and include a historical context) can also influence intent to change, which is especially relevant for public health.<sup>3</sup> Intent to change was also more likely for younger children and female viewers.<sup>4</sup>

Many of the factors that contribute to a successful exhibition are difficult to quantify despite their importance. For example, interactive museum experiences are important because they help the viewer engage directly with the material. Large blocks of text can be hard to read because of the viewer's age or ability, and can tax the attention span and focus of viewers, particularly children. An interactive section may be more enjoyable than the alternative, encouraging more interest in the section, and thus a higher level of attention and retention. Similarly, graphic depictions, be they images, models, or videos, appear to facilitate recall due to the more memorable nature of the content. Historical content appears to be a valuable addition partly because it provides a contrast to modernity, and partly because it accesses a shared communal experience. Finally, long running exhibitions are successful not only because they allow a larger audience to experience the exhibition, but also because they provide an opportunity for the viewer to return to the museum.

### Obesity Matters:

Obesity, defined by a BMI of 30 or greater, has, in conjunction with other chronic conditions (many of which are comorbidities of obesity) surpassed infectious disease as a cause of illness and death over the last three decades. Since 1985, American obesity rates have skyrocketed from under 15% in every state to over 20% in every state in 2010, with 36 states weighing in with 25% and 12 states with 30% or more.<sup>5</sup> Overweight and obesity are linked to heart disease, diabetes, high blood pressure, liver disease, sleep apnea, asthma, joint damage, fertility issues, and a variety of cancers due to increased weight, bulk, and fat percentage.<sup>6</sup> Reducing obesity is the most direct way to combat this range of health problems, and can have a drastic impact on our nation's health. Globally, countries that used to be known for malnutrition are now doubly burdened with growing obesity rates.<sup>7</sup>

Public health and health care have both diversified to face these challenges, and yet intervening to prevent or reverse obesity is challenging; perhaps even more so than ameliorating infectious diseases. Despite a wide variety of targeted interventions, Americans have continued to gain weight: more than one third of US adults are obese, and almost 20% of US children and adolescents are obese.<sup>8</sup> Museums can provide an ideal environment to undertake education on this topic. By providing information on the prevalence of obesity and the overwhelming factors contributing to its growth to a primarily young audience, public health education can reach a wider and younger intervention group more efficiently than through traditional methods. Further, the space and time afforded in a museum allow a more holistic discussion of contributing factors and solutions than can be addressed in other venues.

### The Exhibition:

Big Food: Health, Culture, and the Evolution of Eating, makes these challenges more accessible for Peabody visitors through education and action, providing a skill-building interactive experience that remains applicable outside the museum. This critically acclaimed collaboration began when Jeannette Ickovics, Yale Public Health professor, researcher, and community activist, suggested that the Peabody museum create an exhibition addressing obesity rather than infectious diseases, which are less relevant in the local New Haven community and the country as a whole, yet are the frequent subject of exhibitions at the Peabody and elsewhere. The final exhibition was designed by a broad multi-disciplinary team, including experts on food policy, anthropology, public health intervention, and exhibition creation to create a rich, multifaceted educational experience for visitors with the expectation that utilizing a community museum space to address obesity related issues would reach, and inspire change in, a broad audience.

Natural history museums, like the Yale Peabody museum in New Haven, Connecticut, use artifacts and models to teach visitors about nature by superimposing historical data with modern life. A typical visit could expose a viewer to models of dinosaurs, rocks and minerals native to Connecticut, and a variety of rotating exhibitions. The museum is host to more than 150,000 visitors annually, including school groups from around the region, students from Yale University, and families. The Peabody also runs a wide range of classes and camp experiences for local children and adults, and is well known and respected within the New Haven community and beyond.

In creating this exhibition, the curatorial team chose to address obesity through food, which accentuated the major issues associated with the obesity epidemic: the mismatch between the evolution of our bodies and our surroundings, the forces of advertisement, societal changes that have made fresh foods scarce and other environmental factors, policy challenges, and the health risks associated with obesity. The exhibition uses food to discuss the causes of obesity in America with the expectation that understanding these causes can help viewers to avoid or mitigate them. The way we eat is of historical and cultural importance: food has a special place in our collective consciousness, and can be employed in a way that addressing the obesity epidemic cannot. By tackling obesity through the lens of food, the topic becomes more approachable, more appealing, and less overwhelming for the viewer.

Big Food provides a model for a successful exhibition based on collaboration between public health workers and museum personnel. Rather than describe the entire exhibition in detail, the following will outline Big Food in broad strokes, with a more detailed description of some of the content that best fits the characteristics of a successful exhibit outlined above.

### *Corridor of Food:*

As patrons enter the exhibition, they walk through a corridor with food models that replicate what the average American consumes in a year based on data from the US Census Bureau.<sup>9</sup> The contrast between 45 gallons of soda, 9 boxes of pizza, 5 gallons of ice cream, and several large gallon-sized bins of sugar shown next to only 21 gallons of milk and a few bushels of veggies and fruits help highlight how truly unbalanced the average American's diet has become. The opening also features a short film created by local Emmy award winner Ann Prum. This film serves as a succinct introduction to the content of the exhibition.

### *What is Food?*

Many Americans do not put enough thought into what they eat, but neuroscience can show how our brains process hunger and taste, and how these influences can contribute to weight gain. Our environment, including breastfeeding and solid foods consumed throughout childhood, influences food preferences. This section features two interactive displays: one computer-based, and one physical interactive. In the first, a kiosk display of the web application Smash Your Food created by Food N' Me, viewers enter information about their age, activity level, and size, and then try to guess the components of unhealthy ingredients in a variety of foods, including burgers and sugary drinks. The video then smashes the food, showing the actual percentages of sugar, salt, and oil, and comparing these numbers to the daily values for the user based on the information he or she entered earlier. The other display asks viewers to "pick a snack" from a vending machine model based only on the listed nutrition information of the "snack." After reading the label, the viewer can open a door to reveal the item. This exercise shows how to effectively read and process a food label, and helps illustrate the conceptual difference between real foods and "food-like substances."

### *Evolution and Food Biology*

Real foods have fewer than five ingredients, and each component can be easy to recognize and pronounce.

Humans have evolved over time to store sugars and fats in order to survive, and though our surroundings have made finding food much more simple, our bodies have not evolved as quickly. From an understanding of history and anthropology, we can learn what our ancestors really ate and why: this portion of the exhibition addresses these issues, including a look at the varying efficiency of food products, the differences between hunters and gatherers, and why these factors impact our health today. This section utilizes research conducted with the Ache, a group of modern-day hunters and gatherers, as well as artifacts from the Peabody museum's collections to help draw conclusions about our historical interactions with food on social, cultural, and biological levels.

### *Food R[E]volution*

Large-scale shifts in society contribute to changes in how we interact with the food environment. This segment traces food consumption from agrarian societies to the transition to industrialization and accompanying urbanization, and finally to globalization. These sections touch on the ways these shifts have contributed to poor health and environmental problems, including an explanation of food swamps and a look at the negative impact of factory farming on the environment (and us). This section utilized data and maps compiled by the CDC and the WHO to display national and global overweight and obesity trends in video displays. Nationally, the CDC maps illustrating the increased percentage of obese Americans between 1985 and 2010, along with hard numerical data. The global trends display uses comparisons between the number of overweight children under five in wealthy countries like the US and UK (8 million), and the number of such children in countries like Mexico, Egypt, China and India (35 million). The video displays simplify data for ease of comprehension and timeliness.

Food Swamps: areas where fast food restaurants outnumber supermarkets five to one.

### *The History of Modern Food*

Cultural interactions with food, food marketing, and health have evolved enormously in the last century. This timeline, contributed by the Rudd Center, illustrates the recent history of fast food, processed food, and food advertising in America. Beginning with the first American cookbook in 1796, the timeline highlights the invention of various fast foods and fast food chains (like Coca-Cola, McDonalds, and Gatorade), diet regimens (like the Stillman diet of 1960), and legislation and policy shifts that affect food access or health (such as the National School Lunch Act of 1946, and the Child Nutrition Act of 1966, and ending on the recent Let's Move Campaign).

### *Eat Me! The Role of Food Marketing*

Marketing is one of the most aggressive contributors to unhealthy interactions with food. Companies target teens and children through product placement and branding, relying on young people to influence their parent's purchases through nagging. Children are increasingly the targets of social media marketing, including "advergaming:" computer games used to advertise to children who are often too young to understand the messaging they are receiving. Soda, cereal, and fast food companies are particularly pernicious. This section offers insights into advertising to children through a display of a teenager's room, complete with computer, television, and phone all displaying advertisements for a wide

range of products. This section also encourages families to remove televisions from the bedroom to improve health and wellbeing.

### *Portion Distortion*

In the last half-century, American portion sizes have grown considerably: plates, recipes, and service sizes have all increased. Part of this section shows models of modern foods next to models from twenty years ago, illustrating the increased portion sizes. Because portion sizing guidelines can be confusing, forgettable, and unwieldy, common household items are modeled as stand-ins for foods because their sizes are easier to remember: for example, a golf ball is the appropriate serving size for hummus and nuts, while cheese should be the size of three dice. Accompanying this “portion distortion” is an increase in the sugar we consume, especially in sugar-sweetened beverages like sodas and juices. This section features a large display showing the relative amounts of sugar in a range of drinks using stacked tablespoons full of sugar, exposing unnoticed sugar consumption (9-10 teaspoons in a soft drink), and the benefits of drinking water instead.

### *Energy Balance*

The simplest way for the average person to maintain a healthy weight is to balance his or her energy, matching the calories consumed with the calories spent. Unfortunately, most people do not have a good understanding of how much energy they consume *or* expend. A popular part of this section is a working exercise bike that lights up, illustrating how much work goes into burning a small number of calories. Visitors can learn approximately how many calories they require each day, and their BMI, using chart displays. This section also addresses several of the health issues relating to obesity; a display of preserved organs highlights and explains the effects of obesity on the body, and viewers can touch a model of five pounds of fat. Additionally, an interactive kiosk displays a video game wherein the player must attempt to keep a perfect balance between calories consumed and exercise. Another displays national health data, compiled by GE, which can be compared on a state or local level via touchscreen.

### *Evidence To Action*

Effective education must be actionable. The exhibition closes with suggestions of small interventions that viewers can easily achieve, like family meals, meatless Mondays, and simple exercises, placing an emphasis on local efforts. For example, a healthy school lunch based on USDA guidelines is compared to a truly healthy lunch that might be served in New Haven, where healthy school lunches have been made a priority. On a larger scale, a soda tax counter estimates the amount of money that could have been generated by a penny per ounce tax during the exhibition’s run (an estimated \$145,799,611 per year using Rudd Center estimates).<sup>10</sup> The section also addresses cutting down on weight stigma and bias, which contribute to negative self-esteem and often make losing weight and maintaining weight loss more difficult. Finally, viewers are asked to vote for changes they would like to make for themselves, (choosing between less soda, exercising more, and less screen time) their families, (choosing between meatless Mondays, walking or biking together, and family meals) and their communities (choosing between policy change, healthier schools, and buying local). This display had gathered almost 45,000 votes as of April 2012, and provides insight into how the viewers have

interacted with the entire exhibition, as well as personal preferences, and, perhaps, positive directions for future interventions and research.

#### Challenges and Opportunities:

There are several challenges involved in using museums for public health interventions. As with most interventions, funding is a major concern. While some funding for these interventions is available through a variety of grants (the NIH Science Education Partnership Award, for instance), the application processes can be time consuming as with any grant application. In the case of Big Food, several major sponsors backed the exhibition including WellPoint Foundation, The Patrick and Catherine Weldon Donaghue Medical Research Foundation, General Electric *healthymagination*, Community Foundation for Greater New Haven, Yale-New Haven Hospital, Yale School of Medicine, The Anna Fitch Ardenghi Trust, Bank of America, N.A., Trustee, and Blue State Coffee. Many of these sponsors were attained through local connections, but several involved lengthy applications: a dedicated curator with grant-writing experience was a valuable asset. Awareness can also be an issue; many important health topics are relatively obscure, while others are extremely politically charged, and neither of these is particularly appealing to a potential museum partner.

Another major challenge is translating and disseminating research for the public, especially when working with children. The language and statistics that public health research thrives upon are unapproachable for the majority of the museum-going public. However, too simplistic an approach could lead visitors to draw the wrong conclusions. For Big Food, I was able to combine research with a creative writing background to create entertaining but factual captions. Similarly, the curatorial team had to strive to translate captions and background information into an engaging display, including multimedia presentations and built objects.

As public health practitioners, one of the challenges with using museums for venue-based interventions is the difficulty of evaluating the knowledge gained by participants, or whether this knowledge lead to behavioral modifications. Exit surveys might show short-term gains, but after the participants leave the museum, measurement techniques are difficult to administer, making long-term retention and behavior change challenging to measure. For Big Food, one of the positive aspects of working with visiting school groups is that teachers can distribute and mandate the use of measurement materials.

Though museums do provide a mostly positive venue, the public, group nature of exhibition spaces can prove challenging for the viewer. The large numbers of viewers, coupled with the typical behaviors of children of all ages (crying infants, running children, and loud teens, for example) may make a positive and instructive viewing experience more challenging for other patrons. These factors are exacerbated when museum or exhibition activities are especially well liked. For example, several of the interactive games in Big Food have loud sound effects- their frequent use, combined with the noise, may make the experience of nearby sections less enjoyable and informative.

One of the greatest strengths of this exhibition is that it brings health to the public in a very visceral way; viewers can touch a fake chunk of fat, play a video game about energy balance, look at a distended liver, climb on an exercise bike, and read about how their brains process hunger all in one day. The number of people who will view the



exhibition is large, and in the amount of time that might typically be used to discuss one contributing factor of obesity, Big Food comprehensively covers the majority of these factors. Further, this exhibition reaches a diverse population: school groups of all ages from all over New Haven and the surrounding area are frequent visitors, as are local families. In a nation faced with huge health problems, an engaging and educational experience like this *could* make the difference.

Reactions to the exhibition have been overwhelmingly positive. Children enjoy the games and the interactive sections of the experience, while parents seem to gravitate towards the more policy and hard science related sections. Many of the families I have observed attending the exhibition seem to take their time going through the various segments and discussing what they learn in each, while some wander randomly. However, the enthusiasm these visitors show for the exhibition as a whole, and for voting on what contributions they would like to make, suggests that the exhibition is making an impact on viewers. This is particularly good news when it comes to a health topic like obesity, which despite its current popularity in public health circles remains an issue of national importance.

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## *Praise for Big Food*

*"In the meantime, Big Food has really changed our family's life. Our 4-year-old frequently refers to smash your food game and to the tightrope/healthy food game "If we eat junk, we'll fall and pirañas will get us. If we eat the healthy food we can balance on the tight rope."*

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*"I visited the Peabody this weekend to see the Big Food exhibit... I watched people of all ages discuss several of the displays. It was really making an impact. I'm going to talk it up here, and send my health promotion and education staff to see it."*

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*"No more Arizona Iced Tea! Never Again!!!"*

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### Future Directions:

From the successes we have observed in Big Food, it is clear that museum patrons are open to the experience of health-related museum attendance. If the lessons visitors gather from a museum can become actionable, this type of exhibition could be created to tackle nearly any pressing health need. Through education targeted to children for maximum learning, the message of public health can reach an even more substantial subset of the public, and can help create and enrich health in all of our communities. Big Food benefitted enormously from the depth of knowledge of the curatorial team and the resources we were able to gather throughout the process of creating the exhibition; the inclusion of public health professionals added a clear benefit to the museum experience. This model could easily be replicated all over the country, and one of the most exciting prospects from this exhibition's success is the potential for many such exhibitions devoted to other health topics. Even without the resources from this example, a more

targeted approach to a narrower topic could easily be completed with a smaller curatorial team and less funding.

Another opportunity to use the work done on Big Food is for the exhibition to travel. The exhibition creation process is time consuming, but construction is an entirely separate matter, allowing exhibitions to be sent all around the country (or the world), and exposing an even larger audience. Big Food is created with relatively up to date information, increasing the sustainability of the messaging involved, and though there is a section devoted to information based on the New Haven area, this would allow other museums to adapt the exhibition to fit their own regional needs.

Beyond the museum, the process of reconciling the scientific and the creative can be utilized to aid in the dissemination of research findings. Public health researchers understand the importance of dissemination as both a tool to aid in policy change and to share important findings with the public.<sup>11 12</sup> An important future direction for public health work should be toward a deeper focus on accessible dissemination: even outside of a museum, public health workers must strive to make the work of public health approachable to a wider audience. Widening the scope of research and interventions is an important step in the right direction.

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