

# The Adherence of Heart Health Advice for Adolescents by Exercise Facilities in the Greater Sacramento Area

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## ABSTRACT

Heart health is one of the most focused fields in all of medicine. One of the reasons why it is the most focused is because of the emphasis placed by organizations like the American Heart Association. The creation of these organizations is evidence for the health sector's concern about the overall trend of diagnoses of heart disease in patients. Heart disease is an umbrella term for a number of heart defects that are developed through a lifetime. The umbrella term covers diseases like cardiovascular disease (CVD), coronary heart disease, high blood pressure, arrhythmia, congestive heart failure, cardiac arrest, and many others. Something that is notable about heart disease is how variable the term truly is. To help combat this variability, many health organizations, notably the American Heart Association and the Stanford Children's Hospital, have released ways to prevent the development of all heart diseases. It is necessary to understand the importance of keeping the heart healthy. The heart is in charge of the circulatory system in the human body. The heart pumps blood throughout the body to ensure that the cells in the body have a sufficient amount of oxygen needed in order to function. Blood flow also promotes the transfusion and circulation of oxygen rich and oxygen poor blood as the lungs manage the exchange of oxygen and carbon dioxide. Heart defects are very detrimental to a patient because of these reasons. The heart and lungs work together to transport oxygen everywhere around the body. If the heart is experiencing difficulty in functionality, chances are, the lungs are negatively affected as well (Menche N (Ed). *Biologie Anatomie Physiologie*. Munich: Urban und Fischer; 2016). It is imperative that everything that can keep the heart healthy is done by the general population to prevent failing health in their future.

## **INTRODUCTION**

If the determined goal is to keep the heart healthy, what are the steps that can be taken to execute that plan? Unfortunately, the odds are against a heart healthy future. The 20th century was the first century ever recorded where heart disease was the leading cause of death in the United States (James E. Dalen, MD, MPH, Joseph S. Alpert, MD, Robert J. Goldberg, MD, Ronald S. Weinstein, MD). According to the same authors of the study who found these results, it was concluded that the main cause for this high mortality from heart disease alone was due to a lack of foundational knowledge provided to the public that aimed at preventing heart disease in one's lifetime. More specifically, the child population of that generation who developed heart disease later in their life did not know that there were ways of preventing the condition through exercise, activity, and a healthy diet. Unfortunately, the impacts of heart disease are not constricted to the past or modern day. According to the AHA journal, the number of people with heart disease in the United States is expected to rise by 46% by 2030. Although the information necessary is more widely available these days, the rate of diagnosis for heart disease in the future is still projected to rise. Heart disease is still the leading cause of death for men and women of most racial and ethnic populations of the United States (CDC).

It is highly important that the children of this generation are aware of the numerous proven methods that exist to prevent the development of heart disease in their body through their lifetime. If the effort in providing this service

of education is non-existent within society, the consequences will be severe. Aforementioned, the heart disease diagnosis rate is projected to noticeably increase. One way of diminishing this projection is to raise the awareness of the numerous pathways towards a lifelong prevention of heart failure to children.

There are many credible lists of exercises in existence that are released by medical organizations to help provide the necessary activities for adolescents that help prevent the development of heart failure. These lists are released from organizations like the CDC, Stanford Children's Hospital, and the Cleveland Clinic. Pre-existing research indicates that aerobic exercise is the most effective in diminishing the projected rate of heart disease diagnosis (Steinberger & Daniels, 2016). Although this piece of knowledge is widely known and accepted, the exercise itself might not be practiced or reinforced. If the goal as a society is to prevent the projection that the heart disease diagnosis will increase, then it is imperative to make sure that the recommended exercise is regularly practiced in the child population.

First, it is important to review the contents of the exercise recommendations the Cleveland Clinic has released to reduce the risk of heart failure in one's life. The recommendations are released for the general population (including adolescents) to practice. This will only be beneficial to the study because it will give the necessary guidelines needed to answer the question: How effective are children's exercise groups in Sacramento in preventing Heart Failure from developing later in their lives?

## Heart Failure: Exercise Recommendations from the Cleveland Clinic

The Cleveland Clinic outlines that there are three basic types of training in the scope of exercise: flexibility, cardiovascular (also known as aerobic), and strength training. Flexibility exercise is more well known as yoga or tai chi. It consists of stretching to fulfill the purpose of preventing injury or strain. Usually this exercise is carried out at a slower pace to focus on stretching and calibrating the muscles instead of building them. On the other hand, strength training is a type of exercise where muscles are repetitively pushed against weights until they are tired. This sort of exercise increases muscle mass and strength in the body but it still does not have the same impacts on the heart that cardiovascular exercise does. Cardiovascular training is defined by the Cleveland Clinic as a form of exercise that "improves the way your body uses oxygen and has the most impact on your heart health". This form of exercise is known as the most effective when it comes to combating heart failure because cardiovascular activity promotes the circulation of blood and increases the rate at which oxygen is brought into the circulatory system. Due to a more active heart and lung relationship, the chances of a heart failure diagnosis diminishes drastically simply because of a more active heart. The Cleveland Clinic provides examples of aerobic exercise that are not only practical for the general population, but are also easily accessible for children/adolescents. Jumping rope, jogging, and riding a bike are all forms of aerobic activity but more importantly, they are activities that children believe are *fun* and something that they would do as a leisurely activity. Aerobic activity is designed to lower an individual's blood pressure while increasing the body's oxygen intake (*The role of exercise testing in the evaluation and management of heart failure*). What this does is increase the proportion or ratio of oxygen absorbed by the body to blood pressure. A generally lower blood pressure - as long as it stays above the unhealthy level of 90 mm Hg systolic or 60 mm Hg diastolic (Mayo Clinic, 2020) - can fight off the risk of cardiovascular disease.

Most importantly, the Cleveland Clinic makes it clear that among preventing a potential diagnosis for heart disease, aerobic exercise holds many more benefits. In a way, aerobic exercise is a double forked spear; it can attack the probability of the development of heart disease all the while giving an individual more energy, improves self-esteem, and gets rid of body fat. This only helps the purpose of a study run on how well these parameters set are met by groups who specialize in children's exercise. If children in general are adhering to the given guidelines, not only are they working towards a lower probability of heart failure, but they are also fighting off the obesity epidemic and are also ensuring that their mental health is in the right place in order to live a long and happy life (Uyen T. Truong, M.D.,<sup>1</sup> David M. Maahs, M.D., Ph.D.,<sup>1,2</sup> and Stephen R. Daniels, M.D., Ph.D.<sup>1</sup>). As seen in the study by Prof.

Emeline M. Van Craenenbroeck, aerobic activity is being recommended to people diagnosed with heart disease already. If this habit of aerobic exercise is learned early, adherence will increase and the chances of heart disease decrease (Exercise Training as Therapy for Chronic Heart Failure).

## American Heart Association: Finding the Gap in Research

The American Heart Association is the country's leader in promoting heart health and sending the message across to all population groups of the United States emphasizing the importance of exercise and its impacts on heart health. The AHA is doing everything possible to send the benefits of exercise to children and its effects on heart health. Some of their methods of reaching out to adolescents are sending pamphlets and organizing school wide events to educate them about the beneficial effects of exercise. Although the AHA makes all of these efforts in promoting the effect of exercise on the heart, they still have an identifiable gap in research. "Developing strategies toward achieving the AHA Strategic Impact Goal in youth populations depends largely on estimating the current prevalence of cardiovascular health behaviors and factors and identifying the target behaviors and factors and the populations in need of improvement" (Lloyd-Jones DM, Hong Y, Labarthe D, Mozaffarian D, Appel LJ, Van Horn L, 2010). If the AHA's only way of measuring whether or not their efforts are ineffective, then there is no way of knowing if the children of the country are adhering to the exercise recommendations provided. The purpose of this study is to determine whether or not children who are participating in exercise programs within the Sacramento area are adhering and are also being provided the necessary exercise recommendations to prevent heart disease in their lifetime. The way this study will help to fill this gap will be done by reaching out to children's exercise programs within the Sacramento area and observing whether or not the exercises that these programs provide to the children adhere to the aerobic activity recommendations provided by the Cleveland Clinic. The impact of this study will be significant as it can find important conclusions when it comes to preventing the increase in the rate of diagnosis in the future.

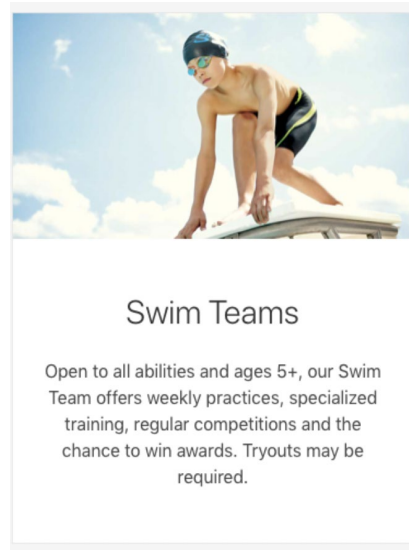
## RESEARCH DESIGN AND METHODOLOGY

### Study Design

As discussed before, this study explores and identifies whether or not children's exercise organizations are indeed following the recommendations of the Cleveland Clinic and the AHA on how to keep the heart of an adolescent healthy. The goal of this study is that once completed, the data found and the steps it took to receive the data on the subject can be used elsewhere to identify if other organizations abroad are also following the heart healthy recommendations. Again, this is important because the heart disease diagnosis rate is projected to rise (AHA). It is already proven that exercise done at a young age will create habits that translate to a healthier lifestyle which will inevitably lead to a healthier heart. If health organizations can ensure the adherence of a healthy lifestyle for our younger generation, then this projection of a higher diagnosis rate of heart disease could become a statistic of the past.

This study is formulated in a way where qualitative and quantitative analysis can be derived from the subjects. This study is an analysis of the existing children's exercise groups that are located in the greater Sacramento area in California. This process consists of examining these organizations' business plans/goals and examining brochures that have the potential of listing exercises that are heart healthy. The places that I am looking at to fill the gap of the existing research in this field are Life Time, California Family Fitness, and My Gym . All of these establishments have programs that are focused at promoting adolescent physical exercise. These three gyms were specifically chosen over others in the area because they are the three predominant gyms in terms of membership. These three gyms also display a proficiency in corporate infrastructure, specifically LifeTime and California Family Fitness. Choosing gyms with a far outreach to its members like the ones presented is crucial to the study because it provides the study with the best possible sample size. Because of the high volume of membership, most children enrolled in gyms will be engaging

in activity similar to the gyms that are subject for evaluation. As stated before, the actual subjects that are subject to analysis are specific exercise routines that are taken from the gyms' websites. Every individual exercise routine that the gym has to offer is evaluated for its adherence to the AHA and CDC guidelines for aerobic activity. Each exercise must meet the criteria of aerobic exercise for it to be considered as a part of the gym's ability to promote adherence to heart healthy exercise among adolescents. Some of these keywords include: conditioning, cardio, stamina, or anything that alludes to the promotion of the circulation of oxygen throughout the body with the increase of cardiovascular activity. Once the individual exercise is determined to include aerobic activity, the exercise is marked as a sufficient activity that adheres to the guidelines presented for adolescents. A sample on which analysis was conducted is shown in figure 1.



**Figure 1**

This exercise set receives the following analysis: Swimming is undoubtedly an aerobic sport (Dr. Tyler Wheeler, MD), who is a primary care sports medicine physician at Family Practice Center Atlanta. It proficiently increases cardiovascular activity and prioritizes the circulation of oxygen throughout the body to keep the swimmer's speed constant when swimming competitively. Therefore, LifeTime's swim team passes the analysis for whether or not the activity adheres to the guideline of remaining in the scope of aerobic fitness for adolescents. This is largely due to the competitive nature of the swim team.

By utilizing this process of gathering data and analyzation, this study accommodates the existing field of research with new information and important data that proves to be beneficial towards the goal of this study. Through the method established, it is possible to compare and contrast the findings of this study with the pre-existing recommendations and research done on the ways heart failure can be prevented. It is also possible to conclude whether or not the exercises set by the children's health programs and organizations adhere to the guidelines produced by the AHA and the Cleveland Clinic. The pre-existing research presented by the American Heart Association openly admits that there is no reliable set of data points to prove the adherence of American children to their heart health recommendations. This study aims to fill that gap with the observatory and quantitative results that this study is capable of providing.

This study was designed to be employed throughout various regions of the United States and abroad. This is a significant part of the research design method because if this study cannot be replicated to any sort of degree, it will lose all of its value. Replicability is key and this study must ensure it. The reason why this study is replicable is because the various items that are necessary for examination and analysis can be easily acquired from any sort of exercise

facility that has a program for adolescents. Another reason why this study is deemed to be replicable is because the guidelines for preventing heart disease are very closely tied with aerobic exercise. Aerobic exercise can be used as the basis of analysis anywhere this study is conducted and that is essential to this study's replicability. The goal of the research conducted and produced by this study is to provide the scientific community with a method that can fill the gap identified by the AHA. This study turns an estimate of the adherence rate among adolescents into a number the academic community can use to determine what additional steps must be done in order to subdue the effects of the projected 46% increase of the amount of people suffering from heart disease by 2030 (American Heart Association).

## Subjects

The subjects of this study are the three children's health and exercise organizations that have been mentioned earlier in the paper. These organizations are based in the greater Sacramento area. The three gyms that are under the observation of this study are Life Time, Sweet and Smiles Fitness Studio, and My Gym. The reason why these three gyms have been specifically chosen is because they provide a children's exercise facility/service where being physically fit is encouraged. These subjects were gathered through a selection of gyms that indicated they provided an exercise service for children on their webpage. These facilities also have a substantially higher number of people enrolled into their membership program than any of the other gyms within the Folsom area in California. What is also important to note is that California Family Fitness, LifeTime, and My Gym are all facilities that are not locally based but are rather chains that can be found in other regions of the United States as well (with the exception of California Family Fitness). This project was limited to pulling information from the Folsom locations but it still gives a general idea of what the gym company has to offer as a corporate entity.

Business infrastructure was a factor that was carefully taken into account when deciding which exercise facilities in the greater Sacramento area will be subject to analysis. Business infrastructure is a term coined to refer to a company's level of sophistication and operation. Aforementioned, the companies selected are all chains. There are multiple locations of each gym/exercise facility of every company. It is beneficial to the study to select a single location of a large exercise entity because what the company chooses to employ in a single area would reflect the choices they make and the exercises they offer in other locations too. In a way, not only does it provide the local adherence rate to heart health, but it also gives a good estimate of the emphasis a given company puts on promoting aerobic exercise among adolescents.

## Procedures

The initial step of the study was of course finding the gyms that would be subject to evaluation. The gyms that were chosen for this study are all located in Folsom, California and also indicate that they do have a program for adolescents to participate in exercise curriculums. The selection process was determined by three key factors: range of exercise, proximity, and accessibility. Range of exercise means that there must be an emphasis put on the wide array of exercise the gym can offer. Proximity is essential because the gyms must be located within the Folsom area and accessibility is key because a larger number of people must have access to the gym for it to be considered effective. Once the gyms go through this process and are selected for evaluation, the next step is to understand what types of exercises the children are participating in. It is important to keep these questions in mind during the evaluation because it will make the evaluation process much more coherent.

- Do these sets of exercises fall under the category of being aerobic or anaerobic?  
(If there is a sport on the list)
- Are there drills in the sport that can fall under the category of being heart healthy?
- Which organization's sets of exercises adhere to the guidelines the best?

The reason why these are the sets of questions that are most important to ask while observing a set of exercises is because some exercises work better than others when it comes to developing and maintaining heart health as discussed in the literature review of the study. Using aerobic activity as a requirement for the exercise routines to determine whether or not the activity is heart healthy is a baseline for this experiment. Without the baseline of aerobic activity, it would be impossible to determine whether or not a set of requirements are being met to promote a heart healthy lifestyle for the adolescents.

The next step of the process is the creation of a spreadsheet that files the gym under analysis, the exercise activities they offer for adolescents, and the results of the analysis of every exercise. This spreadsheet keeps everything in order and indicates which exercises adhere to the aerobic activity recommendations made by the CDC and which ones do not. The example seen in figure 2 is the spreadsheet created for California Family Fitness' swim program that is offered at the Folsom location.

California Family Fitness	Exercises	Analysis	Points	
Swim Lessons	This class gives parents the opportunity to learn safe and fun swimming skills that will orient their children to water activities. Parent Skills: Holding positions, touching cues, and safety skills. Child Skills: Safe entry and exit, water adjustment, kicking front and back.	Does not qualify as aerobic activity. Although the skills are important, it does not satisfy the scope the study is centered in.	2	2/6
Parent/Child				
Turtle I	Skills: Entry and exit, water adjustment, buoyancy or floating, locomotion with walking and kicking, arm strokes	Does not qualify as aerobic activity. Although the skills are important, it does not satisfy the scope the study is centered in.		
Turtle II	Skills: Entry and exit, water adjustment, buoyancy or floating, locomotion with walking and kicking, arm strokes	Does not qualify as aerobic activity. Although the skills are important, it does not satisfy the scope the study is centered in.		
Seahorse I	Skills: Unassisted floats, glides, entry into deep water, combined arm and leg skills on the front and back, introduction to crawl, elementary backstroke and back crawl, sculling and treading.	Does not qualify as aerobic activity. Although the skills are important, it does not satisfy the scope the study is centered in.		
Seahorse II	Skills: Unassisted floats, glides, entry into deep water, combined arm and leg skills on the front and back, introduction to crawl, elementary backstroke and back crawl, sculling and treading.	Does not qualify as aerobic activity. Although the skills are important, it does not satisfy the scope the study is centered in.		
Dolphin	Skills: Side breathing, continuing elementary backstroke, crawl, and back crawl	Qualifies as aerobic activity because heart and lungs are trained to pump blood efficiently in conditioning exercises.		
Shark	Skills: Perfection of crawl, back, breast, side and butterfly strokes, turns (both recreational and competitive), water rescue skills, application of skills for endurance and survival	Qualifies as aerobic activity because heart and lungs are trained to pump blood efficiently in conditioning exercises.		

Figure 2



Figure 2 shows the analysis sheet produced for the swim program of California Family Fitness. This spreadsheet was created because the Folsom location of California Family Fitness does not have a swim team but rather offers swim lessons. All parts of the swim lesson program had to be subject to analysis because the form of swimming that best fits into the category of aerobic activity is competitive swimming. Swimming lessons have a larger emphasis placed on technique rather than conditioning and speed. This spreadsheet was created to analyze and identify what parts of the swim lesson are fast paced enough to amount to the aerobic level of lap swim (Healthline). Lap swimming is considered to be aerobic activity because it's all about distance and endurance. Swim lessons are about technique and in swimming, technique is what comes before endurance. The only two lesson formats that qualified for promoting aerobic activity are the Dolphin and Shark swim lessons. The Dolphin lessons teach the swimmer how to breathe correctly when swimming, a very important skill when building endurance. The Shark lessons are a deeper dive into how the swimmer can build endurance and is also a perfection of the technique. Perfection of the technique means that the swimmer will now be introduced to lap swimming and the endurance/conditioning building part of swimming. In short, the Dolphin lessons encourage aerobic activity and teach the swimmer how to maximize oxygen circulation while the Shark lessons put it into action. Therefore Dolphin lessons promote aerobic activity and Shark lessons make the swimmer engage in aerobic activity. This is why both qualify as exercise programs that promote aerobic activity.

The last step of the analysis is the point counter. If the exercise listed on the analysis spreadsheet qualifies as aerobic activity, a point is awarded to the exercise to keep track of how many points total the exercise facility accumulates. The point system also keeps track of the fraction of exercises offered by the gym that are aerobic from the total.

LifeTime	Exercises	Analysis	Points
Yoga Academy	Proper alignment posture and skill	Does not qualify as aerobic activity posture and skill breathing exercise important, it does not satisfy the scope the study is looking for (aerobic)	4
Gymnastics	Builds coordination flexibility and strength	Does not qualify as aerobic activity although the skills taught are important, it does not satisfy the scope safety, spotting a the study is looking for (aerobic) drills	
Climb Activity	Top-rope climbing knot tying, essential rock climbing skill to pump blood efficiently in rock climbing exercises	Qualifies as aerobic activity because heart and lungs are trained to pump blood efficiently in rock climbing exercises	
Dance Academy	core foundations of dance; proper warm up, flexibility technique, stretching	Qualifies as aerobic activity because heart and lungs are trained to pump blood efficiently in dancing. The more upbeat the dance style the higher the heart rate.	
Fit Academy	Conditioning, fitness based education, high energy cardio weekly.	Qualifies as aerobic activity because heart and lungs are trained to pump blood efficiently in conditioning exercises	
Swim Teams all ages 5yrs+	Competitive, lap swimming, helps with conditioning	Qualifies as aerobic activity because heart and lungs are trained to pump blood efficiently in conditioning exercises	

Figure 3

Figure 3 depicts the same process of using a spreadsheet to analyze the adherence of the CDC and AHA guidelines for adolescent heart disease prevention at the Folsom LifeTime gym location. As seen on Figure 3, the same process outlined before is employed to determine which exercises the LifeTime gym offers that promotes aerobic fitness and activity among adolescents. This spreadsheet outlines a wider array of exercises than seen in the California Family Fitness example because the exercises did not have separate sections like seen in the California Family Fitness

example. For example, the swim team LifeTime offers does not have different programs but rather separates the participants by age group. The reason why the swim team LifeTime offers is determined to be completely aerobic is because all participants are swimming competitively rather than engaging in 1-on-1 or group lessons.

The final step for the process was converting the information obtained from the aerobic test spreadsheets into an adherence percentage that gives a good estimate of how many exercise programs are in place for adolescents that aim to benefit their heart health. This percentage number is generated by tallying the number of all exercises that promote aerobic activity and dividing it by the number of total exercises for adolescents that the facility has to offer. Multiply this number by 100 and the adherence percentage is calculated.

Calculation: Number of Aerobic exercises programs for adolescents/total number of exercises for adolescents X 100  
= Adherence percentage

## Results

The results of the study were generated through the process of analysis of the multiple gyms found in the greater Sacramento area. The gyms that were put under consideration for their abilities of adhering to the heart health guidelines were the California Family Fitness Gym, LifeTime Gym, and My Gym, all of which are located in Folsom California. Every gym had all of the categories of fitness offered for adolescents separated and analyzed individually for their adherence to heart health guidelines. These categories of fitness consisted of all of the programs the gym had to offer. For example, some of the gyms provide a rock climbing program while others don't. The ones that do provide the rock climbing program were scored on the ways that their program adhered to the heart health standards set by the CDC.

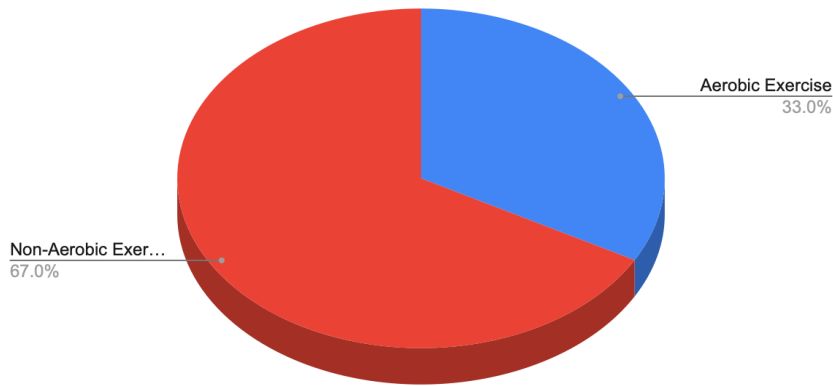
The programs the gyms had to offer were scored on their ability to follow the heart health standards. This meant that the factors on what makes a program adhere to the guidelines must be concretely defined. Whether the heart health guidelines came from the American Heart Association, The Cleveland Clinic, or the CDC, they all had one thing in common. The pre-existing research shows that aerobic activity is the clearest pathway towards a healthy heart. Therefore, the programs of the gyms were scored on their ability to activate and have adolescents engage in aerobic activities rather than anaerobic activities. If the given exercise program was identified to promote aerobic fitness, the program would help to move the gym up in their rankings within the group they were being analyzed in. Each gym was analyzed individually initially before they were compared with the other subjects to determine which gym had the best adherence to the guidelines. This was determined after all of the analyses were completed because completing it prematurely could leave space for bias in the process.

### The Adherence Rates

At this point of the study, all of the subjects have been analyzed, the exercise programs available to adolescents have been compiled, and the adherence rates of each gym have been generated. The purpose of this study is to determine whether or not a concrete rate of adherence to the guidelines for preventing heart disease in the future can be accurately derived. Therefore, the answer to this question lies in the adherence rates generated by the results of this study.

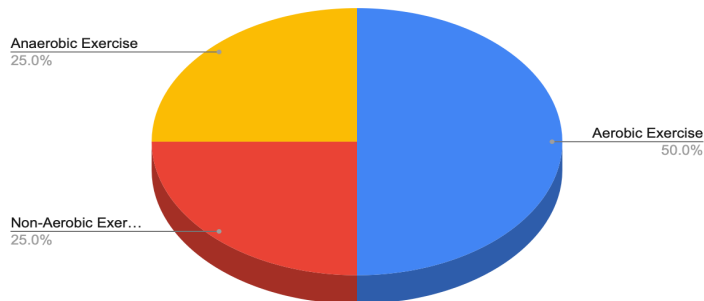
After calculating the adherence rate of My Gym, the results show that My Gym has an adherence rate of 33% aerobic activity. The rest My Gym has to offer is non-aerobic exercise. This is partly because the target age group of My Gym is much younger than for LifeTime and for California Family Fitness. It is difficult to have a young child, especially one who is a toddler to build conditioning and endurance. Figure 4 shows the distribution of the adherence rate versus the parts of My Gym that don't partake in aerobic activity.





**Figure 4**

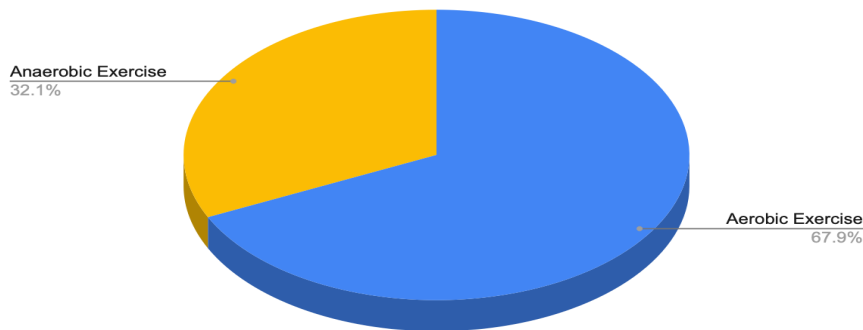
The adherence rate for the Folsom location of the LifeTime facility is different from what My Gym had to offer. This is because LifeTime has a better business infrastructure and also has a wider array of exercises because of their appeals to older adolescents as well. The adherence rate for LifeTime is 50% as seen in Figure 5.



**Figure 5**

LifeTime also offers classes that can strictly be quantified as anaerobic exercise. LifeTime has a better infrastructure and more resources to have a wide array of exercises and adherence to the CDC guidelines for aerobic activity than My Gym.

California Family Fitness was the last gym that was evaluated from the study. This gym has the largest outreach to members because it doesn't have such a narrow target population like My Gym and it isn't advertised as a luxury gym like LifeTime is. California Family Fitness is the most accessible and therefore has the most proficient business infrastructure than any of the other gyms. The adherence rate for California Family Fitness of Folsom is 67.9% as seen in figure 6.



**Figure 6**

California Family Fitness performs the best out of all of the subjects when it comes to adherence of the recommended guidelines. The outreach and accessibility that California Family Fitness has is unmatched when compared to My Gym and LifeTime because of its accessibility.

The last important calculation that must be considered is the adherence rate between the three gyms as an average. This will give a good indication of how the Folsom performs as a town at heart health adherence since these three gyms have such a high number of enrollment. The adherence rate between these three gyms is 50%.

## Discussion and Conclusion

To reiterate, the purpose of this study is to provide the scientific community with a feasible and replicable method to attain a concrete quantitative result that represents the adherence rate of heart health advice among adolescent exercise programs within a region. The study is able to successfully fulfill its purpose. This study fills the gap that was previously identified as the fact that health officials can only provide a reasonable guess as to how well our exercise facilities are able to adhere to the guidelines they set out. This study provides a method that can result in our health officials and organization knowing exactly what is being done in a concentrated region of the United States as it pertains to the adherence of the heart health guidelines for adolescents. With this method of figuring out the adherence rates of towns and even larger land areas like states, health organizations and gym companies will understand what further steps should be taken to increase and optimize adherence among adolescents.

When trying to make sense of the 50% adherence rate calculated for Folsom California, it can be concluded that this number is not necessarily all bad. Considering that there are many types of exercise for adolescents and aerobic activity happens to already make up half of them all within a region is a good sign for the future and a good starting point. It would be most beneficial to conduct the study in different areas to determine the adherence rates abroad. If this study were to continue, that would be the next step: generating adherence rates in other regions and comparing them among each other to see what one region can learn from another.

This study wouldn't be complete without talking about the limitations that were run into. The first limitation is that at this level of research, it is nearly impossible to get a warrant. The method was designed in a way where even if a research warrant were somehow to be attained to have access to more specific information about the creation of the exercise programs, the study would still have been possible to conduct. The most apparent pool of information at this level are resources like brochures and websites that describe the exercise programs. Essentially, this study had non-specific samples to derive its analyses from. Another limitation that had some effect in impeding the study was the sample size. Pulling information from 3 gyms might not be enough. Although it may be sufficient in a small town,

more specific and accurate adherence ratings could be derived from a region if as many exercise facilities that offer programs to adolescents are taken into consideration.

Despite these limitations, this study still produces major implications on how adherence is seen. Further research can determine how to raise the overall adherence rate of various regions across the country. Larger gym corporations like California Family Fitness dominate local markets. Further research can determine what changes these larger organizations can make to optimize adherence among adolescents. At the end of the day, adherence of the company's programs to the guidelines might not be enough. Perhaps changes to the way children participate in the programs can help to increase general adherence.

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