HEALTH & SAFETY
A PRIMER FOR CROSSFIT TRAINERS

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TRAINING

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SECTION 1
INTRODUCTION TO HEALTH AND SAFETY

1—INTRODUCTION TO HEALTH AND SAFETY

What is health and safety? We often think of it as hard hats on construction sites and hazard signs on wet floors. These are health and safety issues, but the topic is much larger. The concept of health and safety encompasses all relevant governmental and organizational regulations and procedures that are intended to prevent accident or injury in a workplace or public environment. A gym is a workplace and a public environment, so it is incumbent upon trainers, managers and owners to understand and emplace relevant standards and procedures.

Gym owners are responsible for providing their employees and customers a safe workplace and training environment. The contents of this text are intended to help trainers adhere to widely adopted guidelines. While designed to be compliant with U.S. Occupational Safety and Health Administration (OSHA) standards, the contents also closely align with the UK Health & Safety at Work Act of 1974 and the proceedings of the 1985 International Labour Organization Occupational Health Services Convention. Note that cities, states and regions might have different standards, and it is up to the business to identify and comply with any additional or different regulations. If you are a gym owner, make sure you know the requirements. If you are a trainer working in a gym, make sure you understand and follow the business's operating procedures relevant to health and safety. Doing so will keep your clients safe and your job secure.

Where to Start – Find Applicable Regulations

Websites provide information relevant to small businesses in most countries. Before a gym opens, the owner should use these resources to determine what policies and regulations are applicable to the business site, the business owner, the employees and the clientele.

USA—https://www.osha.gov
U.K—http://www.hse.gov.uk
Australia—http://www.safeworkaustralia.gov.au
Canada—http://www.canoshweb.org
Ireland—http://www.hsa.ie/eng/
South Africa—http://www.labour.gov.za/DOL/legislation/acts/occupational-health-and-safety
India—http://www.labour.nic.in/industrial-safety-health
New Zealand—http://www.worksafe.govt.nz/worksafe/hswa
Malaysia—http://www.dosh.gov.my/index.php/en/
Germany—https://www.baua.de/DE/Aufgaben/Forschung/Kooperationen-und-Internationales/EU-OSHA.html
China—http://www.chinasafety.gov.cn/newpage/
Italy—https://www.inail.it/cs/internet/home.html
Austria—https://www.arbeitsinspektion.gv.at/inspektorat/Information_in_English/OSH_in_Austria/
Mexico—http://www.gob.mx/stps

Compliance begins by displaying required posters in an employee accessible area or by providing each employee with the same information.

https://www.osha.gov/Publications/osha3165.pdf

http://www.hse.gov.uk/pubns/lawleaflet.pdf

The intent of policies and regulations is to inform and assist employers in the creation of safer workplaces to reduce losses. Many thousands of workers are injured or die on the job each year. The U.S. Bureau of Labor Statistics lists 3 million non-fatal work-related injuries in 2013; 346,300 of them occurred in the leisure and hospitality category that would include gyms. A total of 4,585 fatal work injuries were reported in the same period, with 207 deaths listed under leisure and hospitality. The top four work-related causes of death across all occupations in 2013 were:

1. Transportation incidents.
2. Violence by persons or animals.
3. Contact with objects and equipment.
4. Falls, slips and trips.

The latter two categories are very important to risk management in gym-based businesses. The presence of training implements, exercise equipment, floor-level storage, varied-level floor surfaces (lifting platforms on top of a subfloor, for example) and more all contribute to the risk of injury or death. Loss of employee work time, loss of revenue from employee work, loss of clientele and even loss of finances from legal action can all be prevented through creation and implementation of a worksite health and safety policy.

What Does a Health and Safety Policy Cover?

The International Labour Organization proposes that employers are responsible for the health and safety of the employees. In general, they must attend to the following in an appropriate manner to mitigate risks:

1. Identification and assessment of the risks from health hazards in the workplace.
2. Surveillance of factors in the working environment and working practices that might affect workers' health, to include sanitary installations, canteens and housing when these facilities are provided by the employer.
3. Advice on planning and organization of work, including the design of workplaces, selection and maintenance of machinery and other equipment, and on substances used in work.
4. Participation in the development of programs for the improvement of working practices, as well as testing and evaluation of health aspects of new equipment.
5. Advice on occupational health, safety, hygiene, ergonomics, and individual and collective personal protective equipment.
6. Surveillance of workers' health in relation to work.
7. Promotion of the adaptation of work to the worker.

8. Contribution to measures of vocational rehabilitation.
9. Collaboration in providing information, training and education in the fields of occupational health, hygiene and ergonomics.
10. Organization of first aid and emergency treatment.
11. Participation in analysis of occupational accidents and occupational diseases.

As stated above, one must be familiar with local regulations, which can be variable. Use the internet to find the government website for worksite health and safety in your home country, and be sure to research state, council, county or municipal regulations.

Government regulations establish the responsibilities of employer to employee, as seen in the U.K. Health and Safety at Work Act, etc. of 1974. In Section 2 (read section 2 here)—***general duties of employers to their employees***—the very first passage states:

> "It shall be the duty of every employer to ensure, so far as reasonably practicable, the health, safety and welfare at work of all his employees."

Section 2 also lays out specific duties that are included:

- "The provision and maintenance of plant and systems of work that are, so far as is reasonably practicable, safe and without risks to health;
- "Arrangements for ensuring, so far as is reasonably practicable, safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;
- "The provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the Health & Safety at work of his employees;
- "So far as is reasonably practicable as regards any place of work under the employer's control, the maintenance of it in a condition that is safe and without risks to health and the provision and maintenance of means of access to and egress from it that are safe and without such risks;
- "The provision and maintenance of a working environment for his employees that is, so far as is reasonably practicable, safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work."

Note the word "practicable." The regulation considers that all risk cannot be eliminated, but employers should endeavor to make the workplace as safe as possible. We also endeavor to make our gym safe for customers. Section 3 of the act outlines general duties of employers and self-employed persons (trainers and coaches) to persons who are not employees:

- "It shall be the duty of every employer to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that persons not in his employment who may be affected thereby are not thereby exposed to risks to their health or safety.
- "It shall be the duty of every self-employed person to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that he and other

persons (not being his employees) who may be affected thereby are not thereby exposed to risks to their health or safety."

- "In such cases as may be prescribed, it shall be the duty of every employer and every self-employed person, in the prescribed circumstances and in the prescribed manner, to give to persons (not being his employees) who may be affected by the way in which he conducts his undertaking the prescribed information about such aspects of the way in which he conducts his undertaking as might affect their health or safety."

SECTION 2
HEALTH AND SAFETY PROGRAM ELEMENTS

2—HEALTH AND SAFETY PROGRAM ELEMENTS

A health and safety program and its related documentation doesn't have to be a huge mass of paperwork. Government guidance and operational aids for small business can help keep the workload and documentation requirements relatively low. In the U.S., OSHA identifies four elements of any plan for any business:

1. Owners or management, with appropriate levels of employee involvement, set policy and assign and support responsibility.
2. A responsible party conducts worksite analysis for identification of all existing and potential hazards (an ongoing process).
3. Based on the worksite analysis, hazard prevention and control methods are identified and implemented to prevent or control existing or potential hazards.
4. The business ensures supervisors and employees are trained to understand and effectively act when faced with worksite hazards.

Setting Policy and Assigning Responsibility and Support

A proactive approach to health and safety is required. Retrospective creation of policies after an accident brings areas of risk to the forefront but does not protect the injured or the business. Further, if no attention is given to health and safety by ownership or management, it is unlikely employees will feel compelled to follow or even be cognizant of regulations.

While it is the owner's or manager's responsibility to ensure regulations are followed, the creation or execution of a plan can be delegated—authority can be delegated but responsibility cannot. In smaller gym operations, it is wise to involve employees in planning and carrying out compliance efforts. This distributes labor and provides more input on creating documentation and finding solutions. Inclusion has also been seen to improve attention to and compliance with plans, which benefits the business, employees and customers.

Trainers are often independent contractors, and they must also be cognizant of and follow the same guidelines as employers and managers.

Below are a few considerations to initiate the process of planning and documentation:

1. Identify the regulations and resources needed for your business and location (see Chapter 1).
2. Post the policy poster on worksite health and safety required by your regulating organization or government office.
3. Make a list of regulations to be implemented and documents to be completed and filed.
4. Meet with management and employees to establish responsibility, authority, and division of labor for preparing documents, completing documents, and maintaining documents.
5. Once standard policies are in place, ensure everyone understands and follows them.

It might be appropriate to include "engage with health and safety policies" in all job descriptions.

6. If anyone does not have the appropriate knowledge, provide him or her with training. If equipment is needed, such as first aid kits or an AED, invest in it.
7. Make sure compliance tasks are completed on time. It is the business owner's or manager's responsibility to ensure policies are followed, so if a task is not completed by an assigned employee, its accomplishment falls back on the manager or owner.
8. Review the health and safety plan annually to determine if updates are required.

For the U.S., if 10 or more persons are employed at the gym, a written health and safety policy must be on the premises. The U.K.'s regulation is five or more employees. This text presents information as a general policy on health and safety and shows the organization and arrangements for its conduct.

A written policy will attend to three basic elements:

1. A short statement that explains how safety will be managed.
2. A description of how and to whom responsibilities are allocated.
3. A section that describes and guides the details and tasks relevant to the policy. This can include risk assessment, fire safety, electrical safety, accident reporting, gym equipment, chemicals present and any other relevant worksite issue.

The U.K. Health and Safety Executive provides a free downloadable example policy on its website (http://www.hse.gov.uk/simple-health-safety/write.htm). Note that one of these forms would be completed for each task within the health and safety plan.

Worksite Analysis

It is the responsibility of the gym owner, manager or contractor to conduct an analysis of the business premises and operations in order to determine how to ensure the safety of employees and customers. This hazard analysis focuses on identifying physical, chemical, electrical and task-based hazards. As mentioned in Chapter 1, injuries and fatalities occur in gyms each year. A hazard analysis identifies hazards and eliminates them or reduces the risk of injury to acceptable levels. The very nature of exercise carries a risk of injury and death, and complete risk elimination is unlikely. However, owners, managers and trainers must be aware of all risks.

When a worksite analysis is done, five basic questions are addressed:

- What can go wrong?
- What happens if it does go wrong?
- What could cause the thing to go wrong?
- Do other things contribute to the thing going wrong?
- Is it very likely that the thing will go wrong?

Here are some things to consider when developing and conducting a worksite hazard analysis:

- Ensure that the owner, manager and designated personnel are cognizant of normal hazards recognized within the fitness industry.
- Review, initially and periodically, any pieces of training equipment, training methods or areas inside or outside the gym that present hidden hazards to employees or clients. This process often entails walk-throughs and step-by-step reviews of equipment and training methods.
- Create and implement a regular process of inspection.
- Ensure all personnel understand that hazard surveillance is an ongoing process and clearly outline the line of communication when a hazard is identified.
- Develop an investigation process and ensure it is followed when accidents occur.
- Review the hazard-analysis process and outcomes annually to determine if updates are required.

OSHA provides an example hazard-analysis form in one of its online documents (www.osha.gov/Publications/osha3071.pdf - see page 46).

Hazard Prevention and Control

After a hazard assessment is completed, the focus becomes risk reduction or elimination. The best outcome is elimination of risk, and minimization of risks to the lowest possible level is next best. Governing offices and relevant publications offer guidance. Issues for consideration are:

1. Develop easily, effective and understandable procedures that mitigate risk. Inherent risks cannot be eliminated, so all other risks must be eliminated or minimized.
2. Ensure procedures and rules are followed and enforcement measures are in place.
3. Gyms contain few chemical hazards, but relevant personal protective equipment should be available and maintained. Employees should know when and how to use it.
4. The space and equipment should be on a regular schedule of review and maintenance, complete with documentation of dates.
5. Although rare, fire and natural disasters should be planned for, and periodic drills will ensure employees know what actions to take if disaster strikes.
6. Ensure that the nearest medical facilities are identified and contact information is rapidly available in case of emergency. Ensure that all personnel are aware of where to go for medical advice and consultation with regard to worksite health. This does not imply that employers must provide health care; rather, they must inform employees and be prepared to deal with medical emergencies or health problems associated with the worksite.

Training for Trainers, Managers and Owners

Some form of educational program must be in place to ensure health and safety in a gym. Education is for everyone. Owners, managers and trainers must know about the equipment, facilities, and forms of exercise they deliver, and they must how to identify and control risks. Owners and managers must also ensure that all employees are trained. It is important to note that health and safety training can be part of other job training, such as training on how to use a new piece of equipment or training on how to train clients within a system of exercise.

Health and safety training does not have to be intrusive. Training doesn't have to be a group affair or provided according to some academic standard. The information can be communicated effectively from one person to another.

Employees should not be assigned or undertake a job for which they are not appropriately trained or authorized to perform. If a contractor is a yoga instructor, it is not safe to assign him or her to teach a specialty session on strongman implements. Common sense can be a guide, and no employees should be expected to engage in work activities that they cannot conduct in a safe manner for themselves and their clients. Some basic guidelines for training could be:

1. Educate all employees about all potential hazards to which they or their clients could be exposed. Everyone should understand these hazards and be able to protect themselves and their customers from them.
2. Keep a record of training provided to any and all employees.
3. Ensure that all new employees are trained prior to assumption of duties. This is also relevant for any trainer who adds new job tasks or deals with new equipment. Novices to a business or a task are at the highest risk.
4. All managers should be aware of all hazards to employees and customers within the gym and on gym grounds. They should follow all policies, including those related to enforcement.

In order to comply with government regulations and to show that your health and safety policy actually works, you need to document your activities. All completed forms and reports should be organized and kept in one location, and records that are legally required must be kept for as long as the law requires. These records include your gym's health and safety policy documents and documentation of any employee health and safety training. They could include workers compensation claims and reports, insurance audits, government inspections, etc. These records can aid in other aspects of business – such as supporting credit acquisition – but their primary intent is to aid in the efficient conduct of health and safety activities.

SECTION 3
KEY HEALTH AND SAFETY DOCUMENTATION

3—KEY HEALTH AND SAFETY DOCUMENTATION

Health and safety records that document accidents, injuries, illnesses and property loss help the owner or manager make business-related changes and keep employees and clients safe and healthy.

According to OSHA, HSE or any other government body, record keeping is key to improving working conditions. Record keeping archives information about accidents and illnesses so employers can determine causes and develop procedures to prevent recurrence. Although every business can benefit from record keeping, some businesses are exempt due to size. This varies by country. For example, in the U.S., businesses with fewer than 10 employees are exempt from most requirements. In the U.K., businesses with fewer than five employees are exempt from most requirements. Gym owners and independent trainers need to read the relevant regulations and determine the nature of the records they must keep. Most government health and safety offices have briefs available to simplify the search.

Keeping Records of Injury and Illness

Some businesses are exempt from keeping certain records, but those in the fitness industry do not qualify for this exception. In the U.S., gyms fall under North American Industry Classification System (NAICS) number 713940, which is not on the exemption list (www.osha.gov/recordkeeping/ppt1/RK1exempttable.html). Remember, only gyms with fewer than 10 employees are exempt from keeping records. However, all employers must report to OSHA any workplace incident that results in an employee's fatality, hospitalization, amputation or loss of eye (29 CFR 1904.39). Some time requirements govern reporting. For example, businesses must report deaths and instances in which three or more employees are injured or hospitalized simultaneously within eight hours of occurrence.

A complete injury and illness record-keeping system is generally composed of four basic activities and three forms:

1. The business must obtain and maintain a report of injury and treatment for every work-related injury or illness that requires medical treatment (this does not include injuries where simple on-site first aid is adequate). The employee should provide an account/documentation of the medical treatment. The employer will then prepare an OSHA Form 301 – Injury and Illness Incident Report (included in the packet www.osha.gov/recordkeeping/new-osha300form1-1-04.pdf).
2. Every work-related injury or illness that requires medical treatment should be noted in a cumulative annual record. In the U.S., this information will be entered into OSHA Form 300 – Log of Work-Related Injuries and Illnesses (included in the packet www.osha.gov/recordkeeping/new-osha300form1-1-04.pdf).
3. Records are meant to be seen. A summary of all injury and illness data must be completed and posted on the gym premises for all employees to see each year. This summary, OSHA Form 300A – Summary of Work-Related Injuries and Illnesses

(available in the packet www.osha.gov/recordkeeping/new-osha300form1-1-04.pdf) must be posted no later than Feb. 1 and displayed until May 1.

4. Legally, these records must be kept on file for at least five years. Periodic review can help the employer identify patterns of injury or illness that suggest areas of uncontrolled risk.

In reality, these records are not intrusive, and it is good practice for all businesses to maintain such records, even if they are exempt.

Records of Exposure to Hazards

Health and safety regulations generally monitor required documentation of exposure to hazardous substances (such as chemicals) or hazardous physical exposures (such as vibration). Elements of required documentation are:

1. Hazards information communication plan.
2. Inventory of hazardous chemicals or physical hazards in the gym.
3. Materials data sheets for all chemicals used.
4. Equipment specifications on all equipment that produce potential hazards.
5. Records of employee training.

Once these records are set up, they are relatively simple to maintain. They will require periodic review and update when new chemicals or new equipment are brought into the gym.

No specific formatting requirements govern a gym's health and safety policy document; only the reporting forms are absolute in structure, and those are available online. A gym's local documents should be structured to fit its individual circumstances to make instructions clear and record keeping efficient. The U.K. Health and Safety Executive offers a number of downloadable and modifiable documents for such use:

www.hse.gov.uk/risk/risk-assessment-and-policy-template.doc

http://www.hse.gov.uk/risk/

www.hse.gov.uk/risk/assessment.htm

www.hse.gov.uk/risk (risk management description)

SECTION 4
RISK ASSESSMENT FOR WORKSITE HAZARDS

4—RISK ASSESSMENT FOR WORKSITE HAZARDS

Hazards are circumstances, items, processes or even persons that hold the potential to cause *harm* to a person or cause damage or loss. It is extremely common to see "hazard" and "risk" used interchangeably. The nature of hazards is frequently divided into "voluntary risks" and "involuntary risks."

You jump out of a perfectly good airplane to do some recreational skydiving. You get on a treadmill, the most dangerous piece of equipment in the gym, to exercise. Those are examples of an individual who knowingly and voluntarily enters potentially hazardous circumstances.

Involuntary risks involve hazards that occur without any prior knowledge or consent. The prototypical examples are "acts of nature" or "acts of God" – lightning, fire, flood, tornado, etc. In the worksite, examples include unintended exposure to chemicals, tripping hazards or electrical hazards, among many others.

Risk assessment is a systematic determination of the nature and magnitude of occurrence of a hazard. Risk assessments are designed to enable business owners and managers to identify hazards and mitigate those hazards.

Risk is a normal part of the human condition. If the forecast calls for rain, we take an umbrella to mitigate the risk of getting soaked. Although we constantly evaluate and mitigate risks, these considerations are often unconscious.

Data indicates that only about 3 percent of all work-site accidents are the result of materials, equipment or environmental causes. Human factor is primary in the other 97 percent (SAIF Corp. data 2014). It is important to remove or minimize as many risks as possible. Hazard analysis is the first step. After hazard identification, the goal is to remove or abate risks. This process entails several steps that require attention to detail and careful application:

1. Identify.
2. Analyze.
3. Solve.
4. Implement.
5. Evaluate.

Identify

Hazard identification is likely the most important aspect risk assessment. If a hazard is not identified, risk cannot be eliminated or reduced.

Non-Human Factors—There are three basic categories of non-human factors: (1) materials, (2) equipment and (3) environment. These types of hazards are best identified by conducting a review of the workspace and assessing the employee from arrival to departure. The process of risk identification should examine:

1. The materials the employee would normally use as part of work.
2. The equipment used as part of the employee's duties.
3. The physical spaces the employee occupies during the workday.

Assessors are looking for anything that could pose a risk to employees or customers. Some common worksite hazards are:

Chemicals—Common cleaning supplies used in a gym can be injurious if used carelessly or inappropriately. Simple household bleach is a chemical hazard.

Electrical—Gyms often have numerous pieces of electrical equipment. Determine whether the power cords are exposed to walking traffic, which can wear down the insulation and expose wiring, and be wary if numerous pieces of equipment are tied into a single outlet. Many common practices with power cords and outlets increase risk of short circuit and fire.

Mechanical—Some gyms are filled with exercise machines that have moving parts that present a risk for crush injuries. Some exercise machines have open casings with exposed pulleys and cables under tension that can lacerate or amputate digits. CrossFit gyms generally limit such mechanical equipment to rowers and assault bikes, but the risk still applies. Also consider climbing ropes, ring tethers, racks and any other exercise implement as "mechanical." Wear can lead to failure and failure of equipment can be catastrophic. Inspection routines are important and safe operative status is a chief consideration.

Ergonomic—Work-place arrangement is also important. Do power cords pose a trip hazard? Are metal barbell plates stored on racks or scattered around the lifting platform? Are pieces of equipment and training areas organized so employees and customers are not at risk of injury while in adjacent areas? Metal barbell plates that are not stored properly and are lying on top of each other create a slip hazard. Other equipment left on the floor or in walkways becomes a trip hazard.

Radiation—Many fitness businesses include tanning beds as an additional revenue stream, and exposure standards must be followed.

Environment – In general, gyms are climate controlled, but if a sauna (dry or steam) is on site or considerable outdoor training is the norm, then the potential for hyperthermia/hypothermia must be considered.

Human Factors—These are factors that are introduced by trainers themselves while performing jobs. For assessment, it is normal to use interviews, walkthroughs and observation, both informal and formal, to identify hazards. The intent is to identify any risks in the normal workflow that are not essential and can be abated. Some things that would be considered hazardous elsewhere are not viewed that way in a gym. Strain and fatigue are the cases in point. Group exercise instructors often lead their sessions by performing the same exercises as their clients, so physical strain and fatigue are expected.

Analyze

After completing the hazard survey, examine the information and determine if the risk is inherent to the work or if it is extraneous and can be mitigated.

For example, it is unlikely that the construction of a piece of exercise equipment with an exposed pulley system and weight stacks can be modified in the gym to remove employee and customer access. In fact, local modification of manufactured equipment might actually increase risk of equipment failure and injury.

Sanitizing equipment with blood on it can present another potential hazard. Using protective equipment, such as latex gloves, can help mitigate the risk of chemical injury or disease transmission.

Appendix 2 of OSHA 307 —Job Hazard Analysis provides a more complete listing of common hazards and hazard descriptions.

When conducting an analysis, a number of areas are relevant:

1. *Receiving, shipping and storage*—Gym equipment is heavy and requires space. Considerations: floor planning and layout, ceiling heights and clearances, floor loads, projection of materials and equipment, movement and handling of equipment, and storage methods.

2. *Building and grounds conditions*—Exercise surfaces are important for both performance and safety. Considerations: floors, walls, ceilings, exits, stairs, walkways, ramps, platforms, driveways, and aisles through equipment.

3. *Housekeeping*—Refuse and rubble can create a variety of hazards. Considerations: simple trash removal, hazardous-waste disposal, tools, training implements, exercise equipment, leaks or spills, supply storage areas, and gym-cleaning methods and schedules.

4. *Electricity*—As mentioned above, electrical supply to equipment can present hazards. Considerations: Equipment, switches, breakers, fuses, switch boxes, junctions, special fixtures, circuits, insulation, extensions, tools, motors, grounding.

5. *Lighting* — Dark areas in the gym are not useful in coaching, safety or security. Considerations: Type of light, intensity, controls, conditions, diffusion, location, glare and shadow control.

6. *Heating and ventilation*—Although normal environmental temperatures (no climate control) are perfectly acceptable, consideration must be given to any means of heating, cooling or ventilation. Considerations: type of environmental controls, target temperature and control, humidity control, use of natural or artificial ventilation, exhaust venting.

7. *Machinery*—All machines (treadmills, weight machines, rowers, etc.) should be in good working order. Considerations: Areas of operation and spacing, flywheels,

gears, shafts, pulleys, belts, couplings, sprockets, chains, frames, controls, brakes, exhaust, adjustments/calibration, maintenance, grounding, maintenance history.

8. *Stationary Equipment*—Equipment, such as pull-up bars, rings, glute-ham developers (GHD), and racks need to be regularly inspected for wear and tear. Space surrounding this equipment should be clear and safe. Crash pads should be placed under climbing ropes and concrete should not be exposed under pull-up bars or rings.

9. *Personnel*—Employees must understand proper use of everything required for job performance and all requirements for safety. Considerations: Training, experience, equipment checks before use, appropriate clothing, relevant personal protection equipment, equipment storage, work practices.

10. *Chemicals*—Although limited in number, chemical risks are present in gyms. Considerations: Storage, handling, transportation, spills, disposals, amounts used, labeling, toxicity or other harmful effects, warning signs, supervision, training, protective clothing and equipment, hazard-communication requirements.

11. *Fire prevention*—Most local building codes and landlord contracts cover fire-prevention requirements. Considerations: Extinguishers, alarms, sprinklers, smoking rules, exits, explosion-proof fixtures in hazardous locations if present, waste disposal, training of personnel.

12. *Personal protection*—This is limited category in a gym; gloves and CPR dams are examples of protective equipment. Considerations: Type, size, maintenance, repair, age, storage, assignment of responsibility, training in care and use, rules of use.

13. *First-aid program/supplies*—Every gym needs a well-stocked first-aid kit and an emergency plan. Considerations: location of medical facilities, posted emergency phone numbers, accessible first-aid kit.

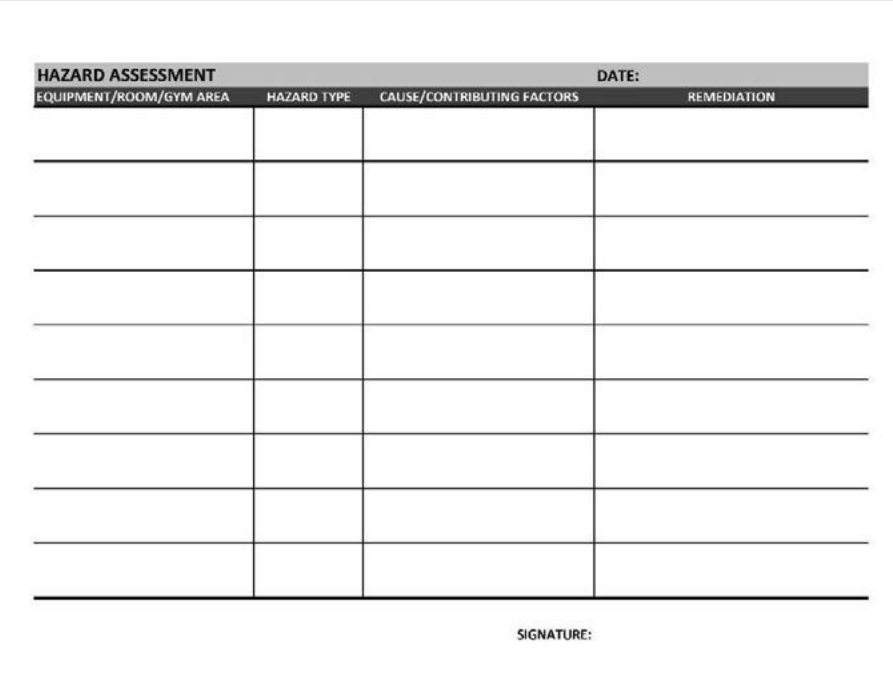
14. *Evacuation plan*—It is possible the gym might need to be evacuated for some emergency reason (fire, chemical spill, bomb threat, etc.). Considerations: procedures for an emergency evacuation, practice of plan, routes and responsibilities, employee and client accounting following an evacuation, rescue and medical duties, reporting of emergencies.

Solve

In this part of the process, plan to eliminate or minimize risk, and document your actions. Ideally, a method of remediation should be noted for every hazard seen. These recommended solutions could be as simple as purchasing a stock of latex exam gloves, clearing the pathway to an exit or changing a light bulb. In some instances, such as the non-modifiable open pulleys and cables on a lat-pull-down machine, it would be appropriate to propose training or signage as remediation.

Appendix 1 of OSHA 3071—Job Hazard Analysis provides a more complete listing of common hazard-control measures.

Once hazards are identified and solutions are determined, the plan is implemented.



HAZARD ASSESSMENT			DATE:
EQUIPMENT/ROOM/GYM AREA	HAZARD TYPE	CAUSE/CONTRIBUTING FACTORS	REMEDIATION

SIGNATURE:

Figure 4-1.
The Identify, Analyze and Solve processes can be captured on a simple document.

Implement

The implementation plan does need to be committed to print, but action must be taken. An action plan must govern what needs to be done, who is going to do it, the time frame for implementation and the outcome. The action plan details what has to be accomplished, the order of importance for tasks, who is responsible for the entire process, and who is responsible for any sub-tasks. It is often helpful to assign a realistic target completion date for each item.

Health and safety plans can change as circumstances change, so it is important to begin with the most important items – those that present the most significant risk to employees and customers. From there, progress systematically to lower risk items. Involving employees in the implementation of the plan helps them understand the specific risks and how to control those risks through responsible work conduct. Implementing an action plan with the aid of employees will expedite the process and make the gym safer.

SECTION 5
PLANNING FOR EMERGENCIES

5—PLANNING FOR EMERGENCIES

Every disaster movie shows chaos and poor decisions: People run into crumbling buildings, people stand still as a zombie horde approaches, etc. Generally, people make every bad decision possible. We don't want to be those people.

While Hurricane Harvey brought disaster to many gyms in the Texas area and highlighted the need to plan ahead, gyms are generally not afflicted by Hollywood-scale disasters. But emergencies will occur, and a plan must be in place to deal with these incidents. A written and disseminated set of procedures must govern procedures in the event of an emergency. While incidents vary, a basic emergency plan constructed according to regulations can help employers safeguard their employees and customers.

An emergency action plan is a document written to specific government standards (OSHA Standard 1910 for example).

Creating an emergency plan according to regulatory guidance is not difficult. Only a few very important items must be included in the plan.

1. Description of procedures for reporting fires or other emergencies.
2. Description of procedures and exit routes for emergency evacuation.
3. Description of procedures for any employees who remain on site in order to continue critical operations (this is likely not applicable to gyms).
4. Description of the method to be used to ensure all have exited and to account for all employees after evacuation.
5. Description of any procedures used to conduct rescue or first aid.
6. Identification of the person or persons to contact for emergency-plan information.
7. Description of the method used to alert employees to emergencies (this could be an automated alarm system in some instances).

As long as these items are covered within the document, the format can be quite varied. A gym is not a factory, so the plans and documentation for these business types should be different.

Generally, very small operations do not require a written plan. The owners or managers may communicate the plan verbally to employees if there are less than 10 (U.S.), though it is much better to actually write it down for easy reference. This also makes training of new employees easier.

Once written, the plan needs to be disseminated to employees through training or other appropriate means. Key personnel named in the plan must be familiar with their parts, and the plan should be practiced periodically. It is important that all employees know what is expected of them during emergencies. Training and practice provide intimate knowledge of expectations and develop skills. Conducting regular fire and emergency drills will familiarize the employees with how to safeguard themselves and customers when exiting the premises.

Planning Exit Routes

An exit route, or means of egress, is defined as a continuous and unobstructed path of travel to an exit. As in airline flights, the location and route to the exits must be permanent and known to all.

> "There are several emergency exits on this aircraft – forward, aft and over each wing. Please take a few moments now to locate your nearest exit. In some cases, your nearest exit may be behind you. If we need to evacuate the aircraft, floor-level lighting will guide you toward the exit. Doors can be opened by moving the handle in the direction of the arrow. Each door is equipped with an inflatable slide which may also be detached and used as a life raft."

Anyone who flies frequently probably has that set of instructions memorized. That's exactly the intent. Whether it's in a Boeing 787 Dreamliner or in our own gyms, we want everyone to understand how to get out in the event of emergency. That means having a defined exit plan and providing instruction to employees and clients.

Three parts of an acceptable exit route are:

1. Exit access—All employees and customers must have ready access to a building exit. The portion of an exit route leading to an exit door is called exit access.
2. Exit—The part of an exit route between the workspace and the exit door is called the exit.
3. Exit discharge—This portion of the exit route is where the exit leads directly outside.

It is a common building-code requirement to have at least two exit routes in any commercial building. As the size and anticipated worker population of the building increases, so does the number of required exit routes. Placement of exit routes generally has the exits as far away from each other as is practical. For example, in a two-door building, the doors and exit routes are likely in front and in back.

Exit-route construction requirements may vary, but in general the following are good practice:

1. Exit routes must be a permanent part of the workplace because varying routes can cause uncertainty and delay egress.
2. Exit discharges must lead directly to a street, walkway, area of refuge or open space away from the worksite.
3. If stairs continue up or down past the intended exit discharge, there must be an interruption by a door, partition or some other means of directing the employees and customers out the intended door.
4. Exit-route doors must remain unlocked from the inside as to not prevent egress.
5. Side-hinged doors must be used if a room connects to an exit route, and the door must swing open in the direction of exit-route travel if more than 50 persons are to occupy the room.
6. Exit routes are governed by the maximum load of the building. For example, if the

gym has a maximum capacity of 100 persons but the working load does not exceed 50 persons at any time, it still must have a 100-person exit-route plan. Simple U.K. guidelines list the minimum number of exits as follows:

Building Maximum Capacity	Minimum Exit Routes
60 or less	1
61 to 600	2
More than 600	3

7. Although generally not an issue in gyms, the minimum ceiling height of an exit route should be 7 feet, 6 inches (2.29 meters).
8. Exit routes must be wide enough. In general, the minimum width must be 28 inches (0.71 meter), and the exit door must be wide enough to handle the maximum building load. Simple U.K. guidelines list the appropriate door width as follows:

Building Maximum Capacity	Minimum Door Width
60 or less	750 mm
61 to 110	850 mm
111 to 220	1,050 mm
More than 220	add 5 mm per person

9. Exit doors must be made of fire-resistant material. If the building is three or fewer stories in height, the door must be rated for one-hour resistance. If the building is taller than three floors, two-hour resistance is required.
10. Doors identified as part of exit routes must be self-closing, approved fire doors.

Additional considerations for safe operation and maintenance of exit routes are as follows:

1. Exit routes should be clear of obstruction at all times. Importantly, they should be free of explosive or highly flammable materials.
2. Exit routes should be designed so employees and clients do not travel toward areas of high hazard.
3. Exit routes should not be obstructed by locked doors, equipment or dead ends.
4. All safeguards along the exit route should be operational.
5. An exit route should be lighted appropriately such that a person with normal vision could identify and navigate it without confusion.
6. Exit-route doors should be free of decorations or other materials that obscure the visibility of the door or its sign.
7. Exit routes should be marked with highly visible directional exit-access and exit-discharge signs. Floor-plan signage with exit routes indicated is also useful.
8. Any door along an exit route should be marked with an identifying sign ("closet," "mechanical," etc.) so it will not be confused with an exit door.
9. Exit signs are required and must be printed in a plain, legible font.

Figure 5-1.
A typical exit sign with large red characters and a plain sans serif font.

10. Follow local ordinances for installation of an emergency alarm system. It might not be required in smaller businesses.
11. Note that some government offices might require that exit routes feature fire-retardant paint.
12. Construction or remodeling does not diminish exit-route requirements. The requirements above must be fulfilled regardless of worksite status.

Emergency-Plan Resources

The U.S. Centers for Disease Control and Prevention provides an example Emergency Action Plan Template that can be filled out by hand and used by businesses. Alternatively, the template can be recreated and adapted to fit local needs.

The Ministry of Education for New Zealand has an elaborate template for schools that can be modified for other types of businesses.

Some cities will provide resources to help businesses integrate their emergency plan into the city's plan. Check with local government offices to see if resources are available to help you create your emergency plan.

SECTION 6
FIRE SAFETY AND PREVENTION

6—FIRE SAFETY AND PREVENTION

In 2012, 92,800 non-residential fires occurred in the U.S., resulting in 65 deaths, 1,450 injuries and property losses nearing $2.5 billion. About 10 percent of all fires were started through "careless" action (FEMA, August 2014). In the U.K. in 2012, a total of 22,500 non-residential fires resulted in 17 fatalities and 1,013 injuries. Over the past decade, the incidence of fires in the workplace has dropped significantly, which clearly indicates the success of regulations, planning and implementation.

Every employer must have a plan for fire safety and prevention. As in the overall emergency plan, businesses with fewer than 10 employees may communicate the plan verbally. These small, independent gyms might not require a written plan, but it is prudent to have a written and practiced fire-safety plan. A written document makes it easier for employers to comply with the regulations that require them to inform employees of the fire hazards to which they are exposed. Businesses with 10 or more employees must have a written fire plan. These documents don't have to be elaborate. Keeping them simple and straightforward keeps composition time low and helps readers understand and implement them more effectively in times of emergency.

A standard plan for fire safety and prevention has five parts. The nature of a business will affect the contents of each.

Part 1—A list of all major fire hazards is required. Hazards should have been identified as part of the gym's analysis process. Proper handling and storage procedures for any hazardous materials on site should also be described in this section. Manufacturers often provide this information on labeling or shipping label inserts. It is simplest to obtain Safety Data Sheets for every chemical at the worksite. These sheets will be included with any purchase of chemicals, and they are also available from the manufacturer's/vendor's website or in government listings. The sheets list potential ignition sources and various methods and equipment necessary for control of spills and fire.

Part 2—This section covers any workplace procedures used to control accumulations of flammable/combustible waste materials. Gyms generally do not produce flammable or combustible waste materials, so this section is quite short. It should address paper waste primarily.

Part 3—Virtually all gyms will have some type of heating. A written procedure and schedule should govern regular maintenance of the heating equipment, and it should contain a description of any safeguards to prevent accidental ignition of combustible materials.

Part 4—Responsibility and authority must be assigned to personnel who maintain equipment and conduct any duties to prevent and control fire. These people should be specifically identified in the fire safety and prevention plan.

Part 5—It is rare for a gym to maintain a fuel source on site. Exceptions might be when oil or propane is stored on site for use in heating. Any individual who is responsible for the storage and control of fuel source hazards must be identified in this section.

This plan organization is derived from OSHA's guidance (CFR 1910.39); the content is largely compliant with international regulations (see U.K.-specific information). Ensure your plan documents comply with the regulations that apply to you.

Fire Prevention

A number of simple measures should be taken to prevent worksite fires. Though many are common sense, it is important that the measures are communicated through employee training.

Storage and disposal—Any hazardous goods stored on the premises should be stored according to federal, state and local requirements. Do not allow flammable or combustible materials to accumulate. Packaging materials, paper waste and similar materials should be removed and disposed of as quickly as possible.

Power down unused equipment—Turning off unused equipment that draws electric current saves money and reduces the risk of fire.

Clean and maintain equipment—Keep equipment clean and professionally serviced as required to limit risk. Something as simple as excess lint in a commercial dryer can ignite on a heating element, with disastrous consequences.

Ensure security—The premises should be secured (doors and windows locked) and appropriately illuminated when not occupied to deter trespassing, arson, theft and vandalism.

Smoke Alarms

Smoke alarms are required in small businesses by local government codes. It is imperative that gym owners contact the appropriate local entity or fire department to determine how many are required.

In general, no less than one smoke alarm will be required on each floor of a gym, including the basement (if present). Alarms should be mounted, per manufacturer specifications, high on walls (no more than 12 inches from the ceiling) or on the ceiling. They should not be installed near windows, ventilation ducts, doors or within 10 feet of cooking appliances in order to prevent improper function or false alarms (from cooking).

Two basic types of smoke alarms exist: ionization and photoelectric. Ionization smoke alarms are more responsive to flames, and photoelectric smoke alarms are more responsive to smoking fires. Either type is acceptable but having both provides the best coverage. A number of manufacturers produce "dual-sensor smoke alarms" with both types of sensor.

Each alarm should be tested for function (as described in manufacturer's instructions) each month. If the alarm begins to chirp, replace the batteries. When chirping, the battery and alarm are still functional but the battery must be replaced before failure. Annual bat-

tery replacement is recommended even if the low-battery alarm is not sounding.

If a wired smoke-alarm system is used, it should be professionally installed and maintained.

It is recommended that smoke alarms are replaced every 10 years to ensure continued reliable function and to benefit from any new technology.

The U.S. Environmental Protection Agency maintains the page "Buying a Smoke Detector," and consumer review sites can also offer guidance.

Fire Extinguishers

Businesses must have readily available fire-extinguishing equipment. Most gyms satisfy this requirement by keeping portable fire extinguishers on site. Although evacuation is the primary consideration in case of fire, these extinguishers can be used to prevent small fires from spreading or to control larger fires until the fire department arrives.

All employees should be properly trained in the use of a fire extinguisher. Extinguishers should only be used if the a willing employee has an unobstructed route of escape from the fire and workplace. During operation of the fire extinguisher, the employee should maintain a distance of 6-8 feet from the leading edge of the fire.

In general, fire extinguishers are operated according to a sequence that can be presented as a simple acronym—"PASS":

P— Pull the pin located in the handle assembly of the extinguisher.
A—Aim the nozzle low, at the base of the fire.
S—Squeeze the lever of the handle assembly to start the flow.
S—Sweep the stream from side to side until the flames are extinguished or the extinguisher is empty. Use both hands to better control dispersion.

The most common fire extinguishers are "multi-purpose dry chemical extinguishers," which suppress and extinguish fires by delivering a thin layer of fire-retardant powder that coats the materials fueling the fire, thus separating the fuel from the oxygen needed to propagate the fire.

Building size determines the required number fire extinguishers. The OSHA requirement states that the employer shall distribute portable fire extinguishers for use by employees on Class A fires so that the travel distance for employees to any extinguisher is 75 feet (22.9 m) or less. Additionally, a fire extinguisher must be present on every floor of a building and adjacent to the stairway.

Employers are responsible for maintaining the fire extinguishers and completing a visual inspection monthly. The employer is also responsible for ensuring annual maintenance checks are done. Stored pressure extinguishers do not require an internal examination. The employer must record the annual maintenance date and retain the record for one year

after the last entry or the life of the shell, whichever comes sooner.

Specific information on local requirements will be provided by a local government office or fire marshal when you open your business. An inspection by a fire marshal is generally required before a certificate of occupancy is issued.

Sprinkler Systems

Automatic sprinkler systems to combat industrial fires were first patented in 1872 and have become a mainstay in construction of commercial buildings. Many commercial structures have sprinkler systems installed. In general, the owner of the building is responsible for maintenance and testing of the system.

Sprinkler systems are installed per national and local regulation by authorized and approved installer. They must also be maintained in a similar manner. Records of the company contracted to supply these services and records of the dates of service should be maintained at the worksite.

A sprinkler system generally delivers water to a fire. The individual heads of the system are designed to activate when the heat is high enough to melt a fusible link in the head. This triggers the flow of water or suppressant to the active fire. A variety of fusible links are available and typically melt within a range of 100-625 F (38-329 C). The installation technician will select the fusible link that is compliant with regulations and appropriate for your gym.

When the system activates it is not an all-or-nothing response. One head might activate near a small fire; many will activate near a large fire. The sprinkler system is designed to extinguish or contain a fire until the fire department arrives, but, unlike fire extinguishers, a sprinkler system works independently and allows evacuation by all occupants.

Planning Resources

You can modify this fire safety plan template for use in your business.

The current comprehensive U.S. Fire Prevention Code can be obtained from the National Fire Protection Agency. Previous editions can also be found on the internet.

U.S. fire statistics can be found on the Federal Emergency Management Agency's website.

OSHA offers a quick fact sheet on fire safety.

Also see Title 29 of the Code of Federal Regulations, Part 1910 Subparts E and L; and Part 1926, Subparts C and F.

SECTION 7
CHEMICAL SAFETY

7—CHEMICAL SAFETY

Thousands of different chemicals are used in all workplaces. Whether cleaning the gym restroom, cleaning equipment, using a laser printer or using a can of bug spray, we frequently deal with chemicals that carry exposure risk.

Many chemicals that we use frequently and consider harmless can cause injury or illness if not handled properly. Read labels carefully. For example, laundry bleach can cause injury or irritation to eyes and skin. Its vapors can also be a trigger for an asthmatic episode.

As an employer, you must recognize and manage exposures. As an employee, you have a right to know about any hazardous chemicals you will be required to work with and how to use them safely.

When an employer provides information on chemical use as part of your job, it is important to follow all standards and guidelines. These steps aren't inconvenient or unnecessary; they are safeguards set up to protect you from exposure to potentially harmful chemicals.

A hazardous chemical is defined as any chemical that can do harm to your body. Most chemicals found in a workplace can harm you at some level of exposure. Exposure refers to and depends on how much of the chemical gets into or onto the body and length of exposure.

EXPOSURE ROUTES

The way a chemical enters the body is generally called the "route of entry." The route of entry is important because chemicals might have serious effects through one route of entry but minimal or no effects through a different route of entry.

Hazardous chemicals enter the body by three basic processes: (1) inhalation, (2) absorption and (3) ingestion.

Inhalation

Inhalation is the most common and fastest entry route. When a chemical vapor is inhaled, it can affect both the bronchi (the tree of respiratory tubes) and the lungs. The lungs are intimately associated with circulation (the lungs have a dedicated network of vessels called the pulmonary circulation), so any chemical vapors entering the lungs can directly enter the bloodstream.

Absorption

Chemicals can be absorbed through the skin to enter into body fluids and potentially the blood. This is the second most common entry route. Nearly all chemicals absorbed

through the skin are in liquid form, although solid chemicals and gases can dissolve into moisture on the skin, such as sweat, and get absorbed. The eyes are included in this exposure route. Although the eyes do not represent a very effective avenue of entry, they are very sensitive and irritable. It is always important to protect the eyes. Note that an open cut or rash can also mediate entry into the blood.

Ingestion

Just like food and drink, worksite chemicals can enter the gastrointestinal system via the mouth. Anything that goes in the mouth can carry contamination or present a chemical hazard itself. A common example: consumption of food and drink contaminated by unwashed hands, contact with contaminated gloves or clothing, or exposure to worksite chemicals. The gastrointestinal system is generally a slower and less effective route of chemical entry. Symptoms might not immediately manifest, but some acids, caustic agents and organic chemicals can cause immediate chemical burns following ingestion.

HEALTH HAZARD CATEGORIES

Health hazards from chemical exposure fall into five basic categories:

1. Toxic.
2. Corrosive.
3. Carcinogenic.
4. Reproductive.
5. Sensitizers.

Toxic chemicals—Toxic: "containing or being a poisonous material especially when capable of causing death or serious debilitation." Toxic hazards affect one or more organs or systems in the body, and the effects can be quite varied in nature and severity depending on the chemical. A toxic chemical might damage a single structure, such as the lungs. It also might alter functions, such as nervous-system activity, or damage other systems simultaneously.

The effects of a toxic chemical will often be seen away from the chemical's entry point into the body. Workplace solvents (paints, thinners and solvents) provide a common example. The exposure route for these chemicals is generally through inhalation or absorption through the skin. Once in the body, these chemicals can affect the central nervous system, the liver and the kidneys. (For a list of highly toxic chemicals, follow this link.)

The effect and time course of injury from toxic chemical exposure might develop immediately or manifest over months to years. Toxic effects are "dose dependent" – this refers to a change in effect (increased severity or increased number of symptoms) that is directly related to increasing levels of exposure to a chemical hazard (the "dose"). As the amount of chemical exposure increases either in a single exposure or through repeated exposure, the severity of injury increases.

Gym owners and managers should be progressive in dealing with toxic chemicals because failure to take exposure seriously can be quite expensive (see the outcome of a court case involving a gym here).

Corrosive chemicals—Corrosives are highly reactive chemicals that can cause obvious damage to living tissues with which they come into contact (see a list of corrosives here). Corrosive chemicals cause irritation and damage to the biological structure through oxidation of biological chemicals in the tissues (oxidation is the loss of electrons from an atom, molecule or compound). Usually the effect is immediate. Acids and bases are examples (remember high-school chemistry: An acid has a pH below 7 and a base has a pH above 7). Corrosive chemicals pose serious and immediate risks to the skin, tissues, eyes and any other exposed parts of the body.

Carcinogens—Any chemical or substance that has been shown to directly cause cancer is a carcinogen. Chemical carcinogens act to damage the genome (your DNA) or to disrupt cellular metabolic processes. Carcinogens can be relatively insidious, as their effects are generally not immediately apparent. Many substances have been identified as carcinogenic. Among the more common carcinogens are asbestos, some pesticides, arsenic, radon and components of tobacco smoke. The list of known and probable carcinogens is quite large (see a fairly comprehensive list here), but please note that in most instances there is a critical dose above which risk becomes significant.

Reproductive Hazards—These are substances or agents that can affect the health and function of the reproductive system in men and women. Their effects include infertility, impotence, miscarriage and birth defects. The effects on fetal health are particularly profound in the first trimester of pregnancy. Common examples of reproductive hazards are lead, insecticides and diesel exhaust fumes (find a larger list of reproductive hazards here).

Sensitizers—These chemicals induce no immediate effects upon initial exposure but will cause an immune-system-mediated allergic-type reaction after repeated exposures. An easy way to think of this: Exposure to sensitizers causes hypersensitivity to chemicals. The most commonly seen reactions are skin disorders such as hives, eczema and respiratory disorders such as asthma. Formaldehyde and latex are two very common sensitizers (for a more complete list visit this searchable site).

GLOBALLY HARMONIZED SYSTEM

In many countries, hazard classification and communication laws were similar in purpose but different enough to result in inconsistent hazard classifications for similar and identical products. The methods of labeling and provision of safety information were also dissimilar. International sales of products were affected because manufacturers needed multiple document sets to meet requirements in different countries.

The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) is designed to replace the various standards used by different countries through development and use of consistent criteria for classification, standard labeling for packaging, and uniform Material Safety Data Sheets.

The worldwide system revises and standardizes the criteria used to classify and label chemical hazards. It creates a uniform format for Safety Data Sheets and establishes employee training requirements relative to labels and data sheets. The system also uses pictograms to more easily communicate the hazards associated with chemicals.

Businesses in which employees are exposed to hazardous chemicals as part of their duties must develop a hazard-communication training program that includes information on:

1. Labeling.
2. Safety Data Sheets (accessing and interpreting).
3. Training on hazardous chemicals in the workplace.

Labeling

Formal and clear labeling ensures – to the greatest degree possible – that chemicals are not mistakenly used for the wrong purpose. It is important to use the right chemicals for the right job. The wrong chemicals can cause damage to equipment or buildings, and, more importantly, incorrect use can sicken or injure workers and customers.

Standards of labeling are important on both the primary containers provided by the manufacturer and secondary containers used on the worksite. For example, cleaning solution prepared in a larger container will generally be poured into a handheld spray bottle for easy use. This bottle, the secondary container, must be labeled to indicate its contents any convey appropriate warnings. The labeling should be intuitive. If several spray bottles contain clear liquid, which one contains bleach solution for cleaning and which one is full of water for misting plants?

The minimal labeling in the U.S. requires:

1. Product/chemical name.
2. Chemical hazard category.
3. Other hazard statements.
4. Supplier name.
5. Supplier contact information.

More formal labeling according to ANSI Z129.1 (compliant with Globally Harmonized Standards) is common for commercially supplied chemicals and products. These labels have six basic elements and are illustrated in the following figure (7-1).

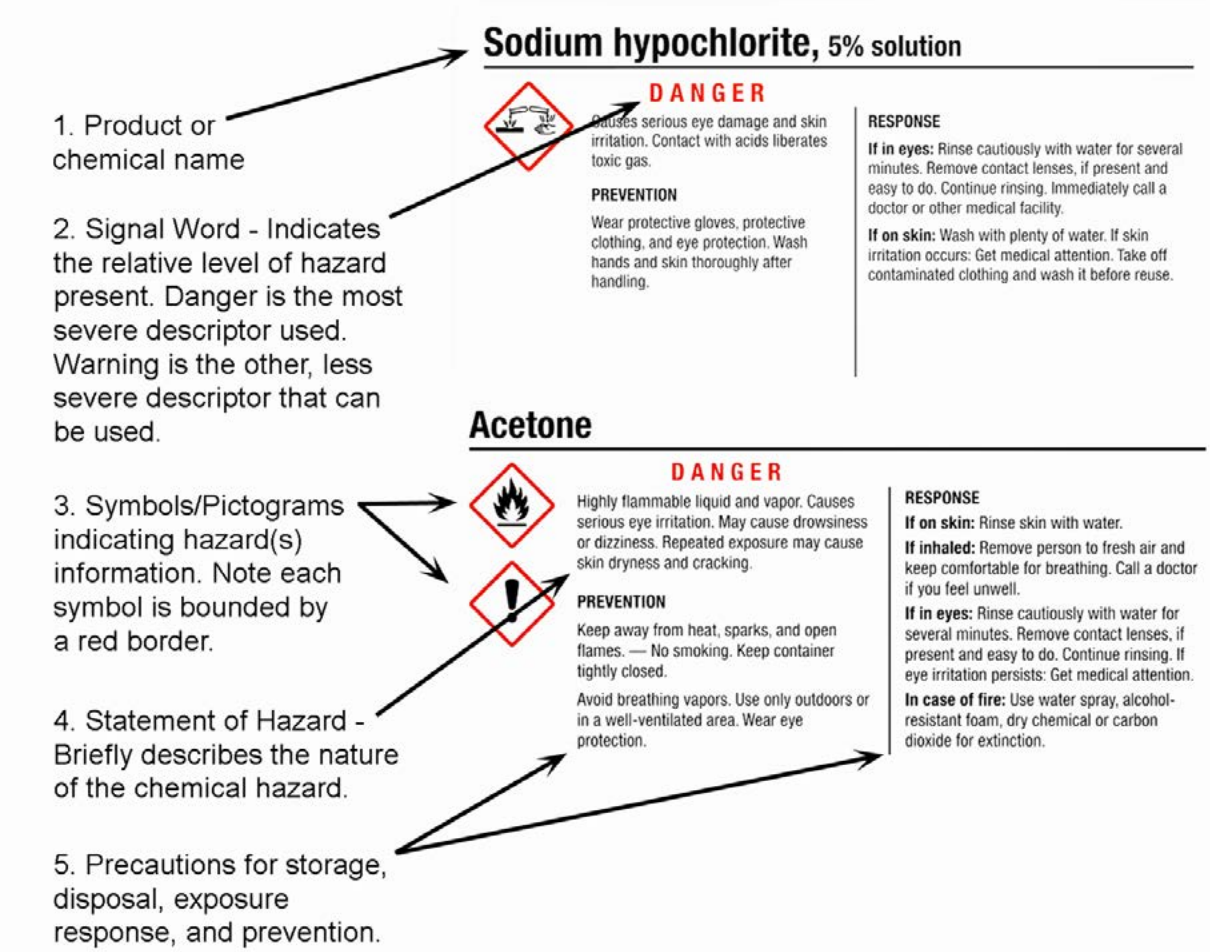


Figure 7-1.
Chemical labeling will include six pieces of information that enable appropriate use and storage of a chemical. Note: Sodium hypochlorite is the chemical name for the active ingredient in household bleach. Acetone is the active ingredient in nail polish remover. Gasoline is known as petrol outside the U.S.

The symbols or pictograms used in labeling are shorthand indications for the hazard within the labeled container. Nine pictograms are currently proposed for use in the Globally Harmonized System.

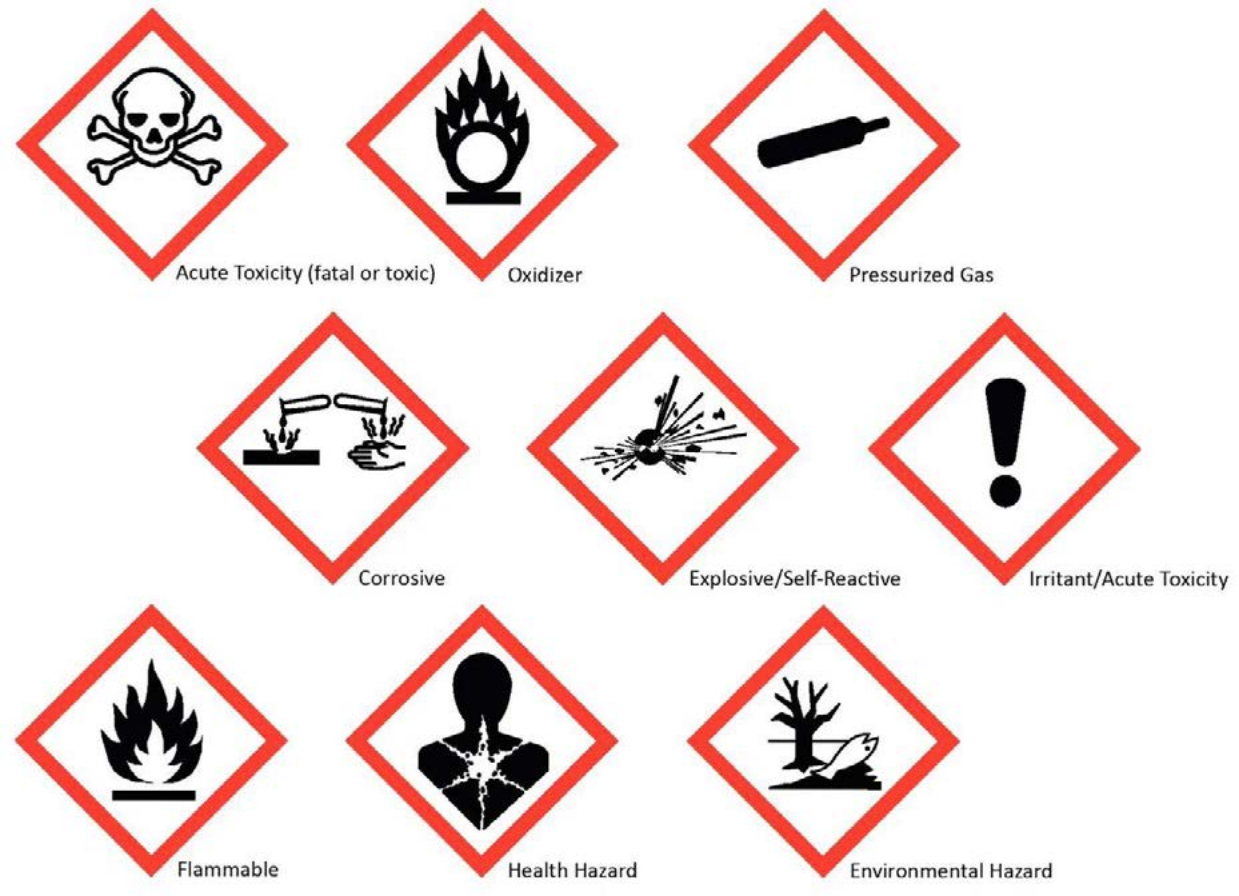


Figure 7-2.
The nine GHS hazard pictograms.

You can find a more elaborate description of the hazards associate with each pictogram by visiting the OSHA website specific to globally harmonized labeling (see section 4.3 of "A Guide to the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)" or review the U.K. Health and Safety Executive's guidance on the topic; see the section "Labelling and Packaging" on its website).

Safety Data Sheets

A Safety Data Sheet (SDS), formerly known as a Material Safety Data Sheet (MSDS), is a document provided by a chemical manufacturer to describe the hazards of that chemical and the precautions that allow safe use. An SDS is not intended for use by the general public; it is intended for those who work with the chemical in an occupational setting. These documents must be kept for each chemical used at a gym no matter how frequent

the use. Cleaners, lubricants, disinfectants and other chemicals commonly found in gyms all have SDS documents that are available from the manufacturer or vendor. The documents typically arrive packed with the chemical but can also be found on manufacturer websites. Periodically check your file of Safety Data Sheets against your physical chemical inventory. If necessary, add the sheet for any new workplace chemical or product.

It is a common practice to have a simple binder dedicated to these documents, although for a gym a manila file will likely suffice due to the few chemicals present.

An owner or manager must consider several questions when developing a chemical-safety communication program:

1. Is a Safety Data Sheet for each chemical in the inventory present in the file?
2. Have any non-inventory Safety Data Sheets or duplicate/obsolete documents been removed from the file?
3. Are the Safety Data Sheets available and easily accessible to workers?

What's on a Safety Data Sheet?

Every Safety Data Sheet for a chemical or product, regardless of manufacturer, will consist of 16 descriptive sections. These sections and their basic content are:

1. Identification of the chemical/product and manufacturer/vendor.
    a. Product identifier.
    b. Relevant identified uses of the substance or mixture and uses advised against.
    c. Details of the supplier of the Safety Data Sheet.
    d. Emergency telephone number.
2. Hazards identification information.
    a. Classification of the substance or mixture.
    b. Label elements.
    c. Other applicable hazards.
3. Composition or information on chemical ingredients.
    a. Substances.
    b. Mixtures.
4. First aid in case of exposure.
    a. Description of first-aid measures.
    b. Most important symptoms and effects, both acute and delayed.
    c. Indications any immediate medical attention and special treatment are needed.
5. Firefighting measures.
    a. Extinguishing methods.
    b. Special hazards.
    c. Advice for firefighters.

6. Accidental release measures.
    a. Personal precautions, protective equipment and emergency procedures.
    b. Environmental precautions.
    c. Methods and materials needed for containment and clean-up.
7. Handling and storage.
    a. Precautions for safe use and handling.
    b. Conditions for safe storage, to include incompatibilities with other chemicals.
    c. Specific and intended end use(s).
8. Exposure controls and personal protection.
    a. Control parameters.
    b. Exposure controls.
    c. Required personal protection equipment.
9. Physical and chemical properties.
    a. Information on basic physical and chemical properties.
    b. Other relevant information.
10. Stability and reactivity.
    a. Chemical reactivity.
    b. Chemical stability.
    c. Potential hazardous reactions.
    d. Conditions to avoid.
    e. Incompatible materials.
    f. Hazardous decomposition products.
11. Toxicological information.
    a. Toxicological effects.
12. Ecological information.
    a. Environmental toxicity.
    b. Persistence and degradability.
    c. Bioaccumulative potential.
    d. Mobility in soil.
    e. Results of PBT and vPvB assessment.
    f. Other relevant adverse effects.
13. Disposal considerations.
    a. Waste treatment and disposal methods.
14. Transport information
    a. UN number.
    b. UN proper shipping name.
    c. Transport hazard class or classes.
    d. Packing group.
    e. Environmental hazards.
    f. Special precautions.
    g. Bulk transport instructions.
15. Regulatory information.
    a. Chemical-specific safety, health and environmental regulations or legislation.
    b. Chemical safety assessment.
16. Other pertinent information.

Training

Any new employee should have chemical-hazard training upon hire and prior to assuming gym duties. Every worker should know which chemicals he or she will be using and how to control their hazards. There should be an annual review of any new chemical introduced to the gym. If work duties are such that workers are required to wear personal protective equipment (PPE), training on use should occur prior to commencement of duties, and refresher training should be provided annually. All training documentation should be retained in personnel files.

Personal protective equipment generally consists of:

1. Glasses, goggles or a face shield, all of which should be chemical-resistant.
2. Either latex or nitrile gloves.
3. Chemical apron.
4. Respirator.
5. Chemical-resistant foot protection.

The individual chemicals present will dictate which protective items should be supplied. In general, gym workers will require only gloves and safety glasses.

Storage

It is important to store chemicals according to manufacturer instructions and industrial guidelines (this information is on Safety Data Sheets). Properly labeled and stowed chemicals, in both primary and secondary containers, create an organized environment that ensures the safety of employees and customers.

Chemicals should be stored on shelves, off the floor and no higher than eye level for the average individual. Larger and heavier containers should be on lower shelves. These safeguards minimize the danger of falls or drops if workers lose control of unwieldy containers. Labels should be legible and oriented for easy reading. All containers should be tightly closed, and the containers should be free of any damage.

If a container leaks, make sure the leak is contained using appropriate and safe methods. Refer to the Safety Data Sheet for the leaking chemical to determine the correct course of action for containment and decontamination.

Keep in mind that not all chemicals are compatible. If some chemicals at the worksite are combined, a chemical reaction can create hazardous or toxic products. For example, if the common cleaning products bleach and ammonia are combined, a dangerous reaction produces chloramine vapor, a toxic chemical that can rapidly render a person unconscious. In an open container, the mixture will simply evolve toxic gas into room air. If the container is closed, it becomes a pressure vessel, and the evolving gases can cause it to explode.

It should be apparent that some chemicals should not be stored in proximity to each other. Safety Data Sheets provide limited information on reactivity and compatibility.

Resources

United Nations Economic Commission for Europe – Chemical Safety

http://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev02/English/01e_part1.pdf

http://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev02/English/02e_part2.pdf

http://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev02/English/03e_part3.pdf

SECTION 8
PRECAUTIONS FOR BIOLOGICAL FLUIDS

8—PRECAUTIONS FOR BIOLOGICAL FLUIDS

Occasional exposure to blood is not uncommon when working or training in a gym. Occasionally, shin scrapes or badly torn calluses can contaminate equipment. What you do with that blood determines the possibility of transmission of infectious agents.

You can reduce risk through simple precautions, such as teaching proper exercise technique, encouraging clients to wear sweats to reduce shin scrapes or recommending clients properly manage their calluses.

However, there are other ways to control the risk of disease transmission from blood exposure. Regulations can be put in place to prepare for and deal with blood in the workplace. Also consider the risks of other body fluids, such as sweat and vomit.

U.S. regulations on protection from blood-borne pathogens (CFR 1901.1030) are targeted specifically to protect workers who are exposed to blood, other bodily fluids or materials that might pose an infection hazard as part of their employment. Such workers include medical laboratory personnel, nurses, physicians, emergency medical personnel, researchers, police officers and others. Although not specifically targeted by the regulation, blood exposure and exposure to other bodily fluids and materials can happen in the gym, albeit on a rather infrequent basis. The regulation covers all employees who could be "reasonably anticipated," as the result of their work, to be exposed to contact with blood and other potentially infectious materials. The regulation, as written, does not attempt to specify all occupations in which exposures could occur, so it is up to the employer to make an informed and conscientious determination. Providing first aid after simple accidents in a gym setting would be considered a "Good Samaritan" act and not occupational exposure. Simple accidental exposures – such as helping someone with a bloody nose or similar – are not considered occupational exposure. So in general, a gym is not subject to these regulations unless the gym, for example, offers boxing, wrestling, mixed martial arts or other contact sports or activities in which bleeding can be reasonably expected to occur as a matter of course. Even if a gym is not specifically bound by regulation, parts of these regulations are easily emplaced to make the worksite safer.

Blood, Sweat and the Gym

Blood is the primary target of safety regulations because it poses the greatest risk. In general, universal precautions do not apply to feces, nasal secretions, sputum, sweat, tears, urine and vomit unless they contain visible blood. The risk of transmission of HIV and hepatitis viruses from exposure to these other fluids and materials is extremely low to the point of approaching zero. However, some of these materials can present a risk for infections with other pathogens and require some precautions.

Sweat—When humans exercise, body temperature rises and the natural response is sweat. This response is compounded by higher environmental temperature and humidity. Luckily, sweat does not generally act as a carrier of pathogens. The primary concern is that sweat can transmit methicillin resistant staphylococcus aureus (MRSA) from the skin of

one person to the skin of another or to a piece of exercise equipment.

In any gym used by multiple people, especially where there is contact of skin to shared surfaces, clothing choice is important. For group health, a barrier between the skin and contact surfaces, whether machine or floor, is needed to diminish the risk of the spread of bacterial infection (read this article by Green, et al.). Staphylococcus can easily spread from one person to another if both come into contact with the same surface. This spread can be prevented with regular cleaning of contact surfaces and by recommending clients wear clothes that stop skin-to-surface contact. The gym's proposed method of risk control should be included in documentation.

Blood—Although relatively infrequent, minor scrapes are likely the most common source of blood in the gym. Blood can carry a number of diseases. These include but are not limited to hepatitis B, hepatitis C and human immunodeficiency virus (HIV, the apparent causative agent for AIDS).

Most gyms, unless they offer combative-type exercise training, will not see significant blood in the workplace. Small accidents can be dealt with through simple first-aid procedures. Despite the low frequency of exposure, it is prudent to adopt standards similar to those recommended for occupations with higher exposure rates.

Vomit—Trainees might occasionally vomit during or after training, though this is relatively uncommon. Higher-intensity repeated intervals seem to be the most common stimulus. Vomit is a biological fluid and might or might not be hazardous. The best course of action is to treat it as hazardous and take steps to protect the cleaner and anyone else in the vicinity.

Vomit is simply the ejection of stomach matter. It occurs for a variety of reasons, such as illness, motion sickness and exercise. Vomit poses the highest risk to trainers and other clients if induced by infection or disease, where an infectious agent is present or blood is present in the vomit. Infectious agents are invisible to the naked eye (you can't see germs), while the latter is quite visible.

If vomiting occurs in the gym, ensure hazards are identified and unintended contact is prevented. Regardless of the amount of vomit or the absence or presence of blood, it's important that no one comes into contact with it other than the individual charged with clean-up.

The next step is removal. Equip yourself with proper personal protective gear, including gloves, clothing, a face mask and eyewear, as appropriate. Use absorbent and disposable materials to manage the viscosity of the materials for easier removal.

Next, disinfect and sanitize using detergent and disinfectant solutions or sprays.

Bag, seal and dispose of all clean-up materials.

Exposure-Control Planning

U.S. regulation requires that employers identify, within a written plan, any tasks and procedures in which exposure to blood, body fluids or other biological materials might occur as part of employment. The document is required to provide a schedule for implementation of regulatory standards, and it should specify procedures for evaluating circumstances surrounding exposure. Employers must review the plan and update it on at least an annual basis. It must also be updated if job duties or potential exposure circumstances change. The document must be readily accessible to all employees.

Elements of an Exposure-Control Plan

Compliance with regulations begins with creation of a plan. As noted previously, it is important to understand that not all exposure regulations apply to a gym.

The major part of a gym's exposure-control plan should be a mandate that all employees follow universal precautions when they encounter situations in which blood, body fluids or other such materials are present. The easiest way to implement a plan is to recommend employees treat all body fluids/materials as if they are infectious. The written policy must address the elements of how the employees will engage with the basic elements of universal precautions:

Hand Washing—The universal precaution standard strongly emphasizes that employees engage in hand washing. It requires employers to provide sanitary facilities and dictates that employees wash in these facilities following exposure to blood or other potentially hazardous body fluids or materials.

Barriers to Contact—The regulation requires barriers be used to prevent disease transmission. Types of barriers: gloves, gowns, masks, eye protection and face shields. The barrier required is determined by the circumstances of potential exposure. In gyms, the most likely barriers are gloves (for cleaning blood and other materials from the workspace or to prevent exposure during the rendering of first aid) and CPR dams to prevent salivary transfer during cardiopulmonary resuscitation. Use latex exam gloves when dealing with people and initial exposures. Any wounds on employees or clients should be covered with a bandage.

Sanitation—The plan should include the methods used to clean areas of exposure. The regulation mandates that equipment be decontaminated before further use. Use general-purpose vinyl gloves for equipment decontamination and preventative sanitation.

Figure 8-1.
A simple schematic of universal precautions.

Employers carry the equipment burden. They must provide, at no cost to the employee, any needed personal protective equipment, to include gloves, gowns, masks, mouthpieces and resuscitation equipment. Further, it is the employer's duty to require employ-

ees to use appropriate personal protective equipment whenever a hazard is present. Equipment must be in good working order and free of defects such as punctures, tears or any other sign of deterioration.

The plan should also include a written schedule for cleaning of equipment and surfaces. The method of cleaning should be specified as well. Further, a documented process should detail disposal of contaminated materials to minimize subsequent exposure.

Finally, a plan cannot be implemented without training. Within the document, provide a description of how the blood-borne-pathogen plan will be disseminated to employees. Employee training materials should include a copy of or access to the regulatory text and an explanation of how the standard affects the employee. Training should also include information on blood-borne disease and transmission, how the employer's exposure-control plan functions, personal protective equipment, proper response to emergencies involving blood, and how to handle other exposure types. Records of training should be maintained for three years. The regulation also specifies other aspects of training that are not relevant to the fitness industry (which is not subject to this regulation).

Resources

An informational poster for first responders from the Centers for Disease Control and Prevention contains much relevant information.

OSHA provides a downloadable communication standard (a template) that can be modified to create your gym's policy for blood-borne pathogens.

Review the U.S. Environmental Protection Agency's fluid hazards effective against HIV and Hepatitis.

Review the U.S. Environmental Protection Agency's fluid hazards effective against methicillin-resistant staphylococcus aureus.

Review the HSE's checklist on recommended precautions and clean-up of biological fluid hazards.

SECTION 9
GYM-SPECIFIC SAFETY

9—GYM-SPECIFIC SAFETY

In 2014, a total of 62,700 injuries were associated with exercise equipment, as reported by the U.S. Consumer Product Safety Commission. About 24,400 of those injuries were from treadmills, the single highest source of injury in gyms.

About three people die while using treadmills each year and about 10 people die each year from bench-press accidents. The bench-press deaths generally occur in homes, but this statistic urges vigilance in the commercial gym.

The inherent injury risks of exercise are outweighed by its benefits to function and health. About 54 million Americans have gym memberships, and if you factor in the Consumer Product Safety Commission injury data above, you can expect one injury per 861 trainees per year – a low risk. A gym is a safe environment as long as we are conscientious about making it so.

Each of the many training activities seen in gyms has unique risks associated with it, but the risk of injury is low (read these articles):

Injury risk from weightlifting or weight training (Hamill – Kilgore).

Injury risk from running (van Gent et al.).

Injury risk from calisthenics (Leaf et al.).

How you attend to gym-specific risk is crucial. The first consideration is making your gym safe and working to manage any risks. Risk can never completely be eliminated, so the second consideration is managing your legal safety. Screen customers prior to participation, obtain informed-consent and waiver-of-liability forms from each customer, and ensure liability insurance is in place. Make sure your records and forms for each client are complete and accurate.

As previously mentioned, no health and safety laws apply specifically to gyms, but gym owners, managers and staff still must comply with the general provisions under the Health and Safety at Work Act of 1974 (U.K.) or the Occupational Safety and Health Act of 1970 (U.S.) and any associated amendments. Beyond this legal responsibility to employees, gyms must implement sufficient health and safety measures to control risks for customers.

Making Your Gym Safe

Supervision and instruction of customers is imperative. Even if your gym business model is pay-for-access and the customers use the equipment and facilities on their own, it is sound practice to actively survey the exercise floor. People will do strange things with your equipment if left to their own devices.

To control risk and ensure a safer work and training environment, customers must be educated about how to use the premises and equipment. At signup, each customer

should be given instruction and documentation on acceptable use. Acceptable signage is needed if a personal trainer is not providing supervision and instruction. Further, an unattended exercise floor is not conducive to the safety of people and property. If you are an employee or employer, you simply cannot effectively provide a safe environment without interaction with customers and supervision of their activities.

How important is supervision? *Of all the court cases reviewed, 80 percent referred to supervision—generally lack or inadequacy of supervision—as a factor that contributed to injury*. Very limited objective information exists with regard to supervisory ratios and space requirements. Most recommendations are for strength-and-conditioning operations that prepare athletes for sport, but a similar intent to improve fitness means these recommendations can serve as rough guidelines to be modified to fit individual commercial gyms as well.

Weights and Safety

As noted above, weightlifting, powerlifting and weight training are safe activities, according to the injury data. That said, free weights and weight machines can cause catastrophic accidental injury to participants or bystanders.

For safety, spacing must allow people to easily pass between free-weight stations or weight machines with no risk of being hit by moving barbells or dumbbells or being entangled by the moving parts of a weight machine (see below).

Barbells and weight machines should be maintained in good working order at all times. If it doesn't work, customers should not be able to use it.

Although they reduce the need for trained staff, machines do not absolve gym management from instructional responsibility. For weight machines, users should be educated about individual adjustments for body dimensions, the weight-changing process and how to perform movements as intended by the manufacturer.

Free weights provide a larger safety issue. In general, free-weight exercises require in-person instruction and these instructions should be made available in the gym. Fundamentally sound technique provides the best results in terms of fitness and safety.

Spotting free-weight exercises is often considered essential – if you don't have spotters, don't lift. This is largely false. Untrained spotters can be a hazard to the trainee and to themselves. The large loads of compound lifts, the movement patterns of ballistic lifts and the anatomical strains caused by incorrectly supporting joints or body segments makes spotting dangerous if performed incorrectly. If spotters are to be required, they must be trained and competent. It is often safer to teach trainees how to properly "dump" "miss" or "bail out" of a repetition with a weight (as is taught by USA Weightlifting). Trainees must learn how to move their bodies in relation to implements in order to avoid being hit, pinned or injured by the weight.

Exercise-Machine Safety

Machines are a mainstay of many gyms. Rowing machines were among the earliest of exercise machines, and they continue to be a popular (read this brief history) .

The most popular endurance exercise machine in the gym is the treadmill, a device originally devised as a punitive and corrective device for problem inmates in U.K. and U.S. penitentiaries during the 19th century. Prisoners would be required to do eight hours on the non-motorized treadmill each day; in fact, the prisoners were forced to be motors, and their enforced walking-against-resistance efforts powered grain mills (hence the name treadmill) or other machines. By the end of the 19th century, treadmills in prison were outlawed as cruel and unusual punishment.

The recreational running boom of the 1960s led to the reintroduction of a tamer, motorized treadmill for use in gyms. Treadmills offered convenience and air-conditioned comfort, as well as risk because injury is always possible when working with machines. Although treadmills are the site of more gym injuries than any other area in the gym – accounting for about 39 percent of injuries – think about how many people use them and how many hours are spent on treadmills. Twenty two thousand injuries distributed across more than 50 million users represent a small risk. However, any powered machine must be maintained in good working order at all times. Treadmills should be on a regular preventive-maintenance schedule to keep their electrical, structural and moving parts functioning properly (schedules and instructions are generally available from manufacturers or vendors).

Clients should be introduced to proper usage, safety and repercussions of abuse in tutorials prior to use.

Spacing

Access to and clearance around exercise machines must be considered. Foot traffic around any piece of equipment should be unencumbered by the machine or the person using it. One of the easiest ways to accomplish this is to design the floor plan according to disability-access regulation (Americans with Disabilities Act – Disability Discrimination Act U.K.). Other recommendations exist for equipment spacing, such as floor plans including 36-48-inch walkways between free-weight areas (such as lifting platforms) and 24-36-inch walkways between exercise machines (weight and endurance).

Planning is essential in gym layout whether you are starting from blueprints or moving into an existing structure. Think about emergency plans along with ease of movement and safety before a problem exists.

However you design your gym layout, you must be able to demonstrate that it is compliant with national and local health and safety regulations.

Equipment Maintenance Checklist

Properly maintaining gym equipment is very important when minimizing risk within the gym. Below is a checklist of common gym equipment that should be checked and maintained on a daily, weekly, and monthly basis in the CrossFit gym.

DAILY:

1. Clean surfaces shared by members:
    a. Pull up bars
    b. Barbell grip area
    c. Dumbbell grips
    d. Kettlebell grips
    e. Medicine balls
    f. Jump rope handles
    g. Rower handles
    h. Ab mats
    i. Grips on boxes for box jump
2. Check all floors for slippery areas inside the gym and outside dedicated areas like stairs and entryways.
3. Scan for tripping hazards.
4. Scan the gym for items temporarily stored too close to workout space.
5. Scan for exposed sharp objects and edges.

WEEKLY:

1. Check equipment used daily for dangerous wear.
    a. Jump ropes with exposed wire
    b. Pads that are under pull-up bars, rings, climbing ropes, etc.
    c. Check lifting mat edges for trip hazards

MONTHLY:

1. Check stretch bands for separation of joints.
2. Check climbing ropes for wear, especially at attachment points.
3. Check pull-up bars for soundness of connections.
4. Check connections of racks that are secured to floors, walls or ceilings.
5. Look under floor mats and lifting platforms where weights are routinely dropped.

Be extra cautious about use of home-made equipment. There is an increased risk of equipment failure when using "Do It Yourself" equipment such as:

1. Do not use stretch bands made from inner-tubes
2. Storage shelves that are not strongly attached to walls (drywall without studs)
3. DIY pull-up bars

Author Biographies

Lon Kilgore, Ph.D—Very few academics can lay claim to such a varied and deep background relative to science, exercise and the fitness industry. He earned a bachelor of science degree in biology with a minor in chemistry from Lincoln University, a master of science degree in physical education from Kansas State University, and a doctorate from the Department of Anatomy and Physiology in the College of Veterinary Medicine at Kansas State University. He earned the rank of professor (full) at three universities (U.S., Ireland, U.K.) and has published many dozens of academic papers. During his university student years he worked as a roofer and department-store assistant manager, provided security services, and spent time as an autopsy assistant. Prior to his work in academia, he was a sergeant in the U.S. Army, earning multiple commendations for his work in chemical weapons disarmament and disposal. Athletically, he has appeared on many national event podiums in weightlifting and powerlifting over his near half-century of competition. He has competed, less successfully, in wrestling, rowing and golf. He has a coaching portfolio that includes tutelage from old-guard elite coaches such as Carl Miller, Russ Knipp, Tommy Kono, Bill Clark, Marty Cypher and even Bob Hoffman. His background also includes provision of long-term coaching to many top U.S. weightlifters, provision of short-term consultancy to several international-level athletes, time as an NCAA strength coach, and more than a decade of experience teaching USA Weightlifting coach certifications on the road and at the U.S. Olympic Training Center in Colorado Springs, Colorado. He might be best known for his industry-changing work with Mark Rippetoe, as concept originator, co-author, illustrator and book designer for "Starting Strength" and "Practical Programming" (first and second editions). He also co-created the Basic Barbell Training and Exercise Science specialty courses offered through CrossFit in the mid-2000s. Lon is a regular contributing author to the CrossFit Journal, with 40 or so articles appearing there since 2006. He also has provided a number of volunteer services to a variety of academic and corporate education committees. He is a small-business owner, educational content creator and business consultant within the fitness industry.

Valarie Perry, SHEP—Valarie is an OSHA-certified instructor and credentialed paralegal who works as a safety officer for the U.S. Department of Defense. She has nearly a decade of experience overseeing health and safety operations across the military branches, to include oversight of base fitness facilities. Her experiences also include health and safety curriculum development and extensive time in course instruction.