



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

DATE: MAY 13 2004

TO: The Commission
Todd A. Stevenson, Secretary

THRU: John Gibson Mullan, General Counsel *JGM*

FROM: Lowell F. Martin, Assistant General Counsel *L.F.M.*

SUBJECT: Petition Requesting Labeling of Weightlifting Bench-Press Benches to Reduce or Prevent Deaths Due to Asphyxia/Anoxia (CP 03-3)

Attached is a briefing package from the staff concerning a petition submitted by V. Patten Lombardi, Ph.D., requesting that the Commission require a warning label on both uprights of all "manufactured, publicly available" weightlifting bench press benches. The petitioner asserted that the labeling is necessary to reduce or eliminate deaths due to asphyxia/anoxia caused by being trapped under a bench press barbell. The staff recommends that the Commission deny the petition (Option III.).

Please indicate your vote on the following options.

I. Grant Petition CP 03-3.

Signature

Date

II. Defer decision on Petition CP 03-3.

Signature

Date

RTP/10/11

III. Deny Petition CP 03-3.

Signature

Date

IV. Take other action (please specify):

Signature

Date

Attachment: Briefing Package, Petition CP 03-3: *Petition Requesting Labeling of Weightlifting Bench-Press Benches to Reduce or Prevent Deaths Due to Asphyxia/Anoxia*, April 2004.

Briefing Package

Petition No. CP 03-3:
Petition Requesting Labeling of Weightlifting Bench-Press Benches to
Reduce or Prevent Deaths Due to Asphyxia/Anoxia

April 2004

For additional information contact:

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Washington, DC 20207
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CPSA 52X(1) CLEARED for FIVE

NO MFRS/PVT/LBLRS OR
PRODUCTS IDENTIFIED

EXCEPT BY PETITION

RTP
5/13/04

NOTE: This document has not been
reviewed or accepted by the Commission.
Initial teh Date 5/13/04

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Executive Summary

In correspondence dated March 31, 2003, V. Pateson Lombardi, Ph.D., requested that the Commission require a label on both uprights of all manufactured, publicly available, weightlifting bench-press benches. The request includes a sample label that warns of the potential for death when using these benches without a spotter, and directs consumers to use the benches according to the manufacturers' guidelines. The labeling is intended to reduce or prevent injuries and deaths associated with weightlifting bench-press benches due to asphyxia/anoxia, resulting from chest or neck compression from being trapped beneath a barbell. The request was docketed as a petition on June 24, 2003 under provisions of the Consumer Product Safety Act.

An average of one to four deaths annually, for the years 1999 through 2002, might be relevant to the petition, but only one death per year, on average, clearly involved asphyxia from neck compression while weightlifting on a bench-press bench. The staff's review of emergency room-treated injuries associated with weightlifting activities, apparel, or equipment during the year 2002 suggests that as many as an estimated 3,820 injuries may be relevant to the petition. However, less than 10 percent of these, or about 340 injuries, are most likely to have involved a loss of barbell control while weightlifting on a bench-press bench, and none of the cases specified that a bench-press bench was in use. Hence, the actual number of injuries that are potentially preventable by the petitioner's proposed labeling is likely to be less than the above numbers indicate. Ninety-five percent of those injured were treated and released, or examined and released without treatment, suggesting that the injuries sustained were relatively minor. The most common injuries were contusions/abrasions and lacerations.

Research literature shows that two major factors affecting behavioral compliance with warnings are the perceived risk associated with not complying and the perceived cost of compliance. For various reasons, consumers are likely to perceive the risk associated with not complying with the petitioner's proposed label as low, and the presence of a warning label would not necessarily change this perception. Also, consumers may view restricting the use of a bench-press bench to when a spotter is available as prohibitive. For these reasons, the staff believes that the mandatory labeling of bench-press benches would have little effect on consumer behavior, and consequently, would not significantly reduce injuries and deaths associated with their use.

The staff believes that the need for mandatory labeling on weightlifting bench-press benches, as proposed by the petitioner, is unsupported by the data, and recommends that the Commission deny the petition.



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

MEMORANDUM

Date:

MAY 13 2004

To: The Commission
Todd A. Stevenson, Secretary

Through: John Gibson Mullan, General Counsel *JGM*
Patricia M. Semple, Executive Director

From: Jacqueline Elder, *je* Assistant Executive Director, Office of Hazard Identification and Reduction
Timothy P. Smith, Project Manager, Division of Human Factors *TJS*

Subject: Petition No. CP 03-3, Petition Requesting Labeling of Weightlifting Bench-Press Benches to Reduce or Prevent Deaths Due to Asphyxia/Anoxia

Staff of the U.S. Consumer Product Safety Commission (CPSC) prepared this briefing package in response to a petition requesting that the Commission require labeling on weightlifting bench-press benches.

Petition Information (Tab A)

In correspondence dated March 31, 2003, V. Patteson Lombardi, Ph.D., University of Oregon, requested that the Commission require a label on both uprights of all manufactured, publicly available, weightlifting bench-press benches. On June 24, 2003, the CPSC Office of General Counsel docketed the request as Petition CP 03-3 under provisions of the Consumer Product Safety Act. A copy of the petition appears in Tab A.

The petition includes a photocopy of a sample label that is similar to the "bright red warning label" sought by the petitioner. The label warns of the potential for death when using weightlifting bench-press benches without a spotter, and directs consumers to use these benches according to the manufacturers' guidelines; an image of this label appears in figure 1. The petition is somewhat vague about the specific injury and hazard pattern that this label is intended to prevent, but often refers to asphyxia/anoxia resulting from chest or neck compression as a hazard pattern of concern. On July 18, 2003, a notice was published in the Federal Register (68 FR 42692) soliciting public comments on the petition. In accordance with the petitioner's description, the notice described the petition as intending to prevent

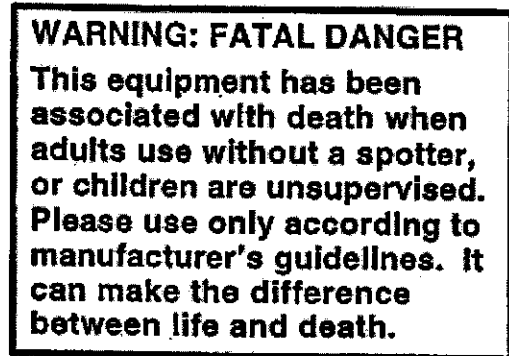


FIGURE 1.—Sample label from petition.

RTP 5/13/04

deaths associated with weightlifting bench-press benches due to asphyxia/anoxia resulting from chest or neck compression from being trapped beneath a barbell. The petitioner supplied the CPSC staff with a comment in response to this notice (see "Public Comments and Staff Responses"), and did not question or correct the staff's interpretation of the petition's purpose.

According to the petitioner, at least 20 deaths from January 1999 through December 2002 were associated with weight training. At least 14 of these deaths involved asphyxia and 12 involved a bench-press bench. The petition includes charts summarizing these incidents. The CPSC staff analysis of fatalities during this period includes these data and is discussed in the "Incident Data" section of this memorandum. The petitioner also refers to 12 weight-training deaths from March 1991 through April 1992, 11 of which involved asphyxia/anoxia with chest or neck compression, and 11 of which involved a bench-press bench. The CPSC staff did not include these data in its analysis because more recent data were available.

When evaluating this petition, the CPSC staff considered only those weightlifting benches intended for use with free weights to be potentially within scope. Selectorized strength equipment, more commonly referred to as weight machines, generally provide resistance through the use of at least one stack of weighted plates attached to cables and pulleys. Some can be used for bench pressing and may include a bench. In contrast to a free-weight barbell, the 'barbell' that raises and lowers the plates on weight machines has limited vertical movement and does not seem to pose the asphyxia/anoxia hazard described by the petitioner.

Incident Data (Tab B)

The staff reviewed available data in CPSC files on deaths and injuries associated with weightlifting activities, apparel, or equipment. As described in "Petition Information," the specific injury and hazard pattern that the petitioner proposes to prevent through labeling is death by asphyxia/anoxia resulting from neck or chest compression from a barbell falling onto or otherwise compressing the neck or chest of a consumer who is weightlifting on a bench-press bench. Data on fatalities, therefore, are discussed first. In reviewing the available injury data, however, the staff expanded the hazard pattern of interest to include any loss of barbell control, while weightlifting on a bench-press bench, that could lead to chest or neck compression. This more inclusive hazard pattern includes injuries to the head and midsection that would occur under similar circumstances.

Reported Deaths

The CPSC has received reports of four deaths between January 1, 1999, and December 31, 2002 that appear to have involved a bench-press bench and are consistent with the specific hazard pattern cited by the petitioner: asphyxia from neck compression while weightlifting. Another 12 deaths may have involved use of a bench-press bench, but the reports lack details on the precise equipment being used. Of these, 11 may be relevant to the petition: 5 are consistent with the specific hazard pattern cited by the petitioner, 1 involved asphyxiation but does not specifically describe weight being dropped onto the neck or chest, and 5 may involve a loss of barbell control but lack details that would permit the staff to draw a firm conclusion. Thus, during the 4-year

period examined, as many as 15 deaths could be relevant to the petition. The actual number of potentially preventable deaths, however, could be as low as four.

Reported Non-Fatal Incidents

Between January 1, 1999, and December 31, 2002, the CPSC received reports of seven non-fatal incidents that may have involved a bench-press bench. None of these incidents involved scenarios that are consistent with the hazard pattern of interest; however, one incident without injury involved a falling barbell and could be considered marginally relevant.

Estimated Annual Number of Injuries

The staff reviewed National Electronic Injury Surveillance System cases associated with weightlifting activities, apparel, or equipment. Based on this review, staff from the CPSC Division of Hazard Analysis (EPHA) concludes that an estimated 340 injuries treated in U.S. hospital emergency rooms in the year 2002 are most likely to have involved a loss of barbell control while weightlifting on a bench-press bench. Yet, while most of the 12 cases on which this estimate is based state that the injured person had been bench pressing, none specified that a bench-press bench was in use. An estimated 3,480 additional injuries involved cases for which, due to the limited details available on each case, the staff could not rule out the possible involvement of a bench-press bench in the hazard pattern of interest. Thus, in the year 2002, about 3,820 injuries may be relevant to the petition; however, this number likely overestimates the actual number of potentially preventable injuries.

Among those injuries that are potentially relevant to the petition, the mean and median ages of those injured was 22 years and 17 years, respectively. The ages of those injured ranged from 6 years to 55 years, and 36 percent were between the ages of 15 and 19 years. About 85 percent of those injured were male. About 95 percent of those injured were either treated and released, or examined and released without treatment, suggesting relatively minor injuries. Injuries to the head and face accounted for 53 percent of the estimated 3,820 injuries, and those to the chest accounted for 42 percent. The remaining cases involved injury to the neck or other parts of the midsection; injuries to other body parts would not, in general, be consistent with the hazard pattern of interest. The most common diagnoses among potentially relevant injuries were contusions/abrasions (40 percent) and lacerations (27 percent).

Market Information (Tab C)

In his request, the petitioner refers to a variety of weightlifting benches, including single and combination units, flat and inclined units, and adjustable and non-adjustable units. Many weightlifting benches lack barbell supports. Given the petitioner's use of the term "bench presses" to describe the relevant benches and petition references "both uprights," one can presume that benches without these supports would be outside the scope of the petition. Industry marketing statistics, however, do not make this distinction. Some market information is available for "fitness equipment" and "exercise benches," but no information on individual products is readily available. Therefore, some of the following estimates, supplied by staff from the CPSC

Directorate for Economic Analysis (EC), include products that lack barbell supports and would be outside the scope of this petition.

According to the 2003 Recreation Market Report published by the Sporting Goods Manufacturer's Association (SGMA), the global business trade association of manufacturers, marketers, and retailers in the sports products industry, wholesale shipments of exercise benches totaled about \$150 million in each of the years 2001 and 2002. Retail prices for exercise benches vary from about \$60 to more than \$500. Many models in Internet listings range from \$100 to \$200. Assuming an average retail price of \$150, EC staff estimates the average wholesale price of exercise benches to be approximately \$75. This price would correspond to annual shipments of two million units.

Product life probably varies given the large range in retail prices; for example, one would expect a \$600 bench to have a longer useful life than a \$60 bench. Based on analogous products with similar price ranges, EC staff assumes the product life of exercise benches to be 6 to 8 years, on average. After estimating past shipments by straight-line projections based on SGMA statistics of the number of participants, EC staff used the Product Population Model to estimate the number of exercise benches in use in 2003 to be between 12 and 15 million. The number of bench-press benches, as opposed to the more general category of exercise benches, is probably smaller than this estimate.

The 2003 SGMA Sports Participation Topline Report estimates the number of barbell users at 25 million, and a study completed for SGMA International found that about 40 percent of free-weight users exercise at home. These data suggest that about 10 million barbell users exercise at home. But even though weightlifting bench-press benches would include barbell supports, not all users of barbells will own one of these benches. Assuming that many of these home users own bench-press benches, EC staff estimates that the number of bench-press benches in homes may be about six to nine million. EC staff further assumes that each of the estimated 30,000 to 50,000 health clubs, schools, recreation centers, and other types of gyms in the United States are unlikely to own more than three or four bench-press benches, and estimates the number of bench-press benches outside the home to be between 90,000 and 200,000, or considerably less than one million. Thus, the total number of bench-press benches both inside and outside homes is still likely to be roughly six to nine million.

From an SGMA listing of the 50 leading fitness equipment manufacturers and a review of manufacturers' websites, EC staff identified 16 manufacturers, private labelers, or wholesalers of weight benches. A list of these 16 appears in the EC staff memorandum (Tab C). This list may not be comprehensive, however, because some brand names could not be linked to a manufacturer or private labeler. Identifying the major manufacturers of exercise benches from these 16 is difficult because available revenue figures include products other than benches, and the proportion of revenues from benches alone is unknown. Mass merchandisers (such as Wal-Mart, Kmart, Target, and Sears), video and internet stores (such as QVC, HSN, and E-Bay), and big box stores (such as Sports Authority) dominate fitness equipment sales. Some smaller regional chains also have substantial sales of fitness equipment.

Existing Standards

There are no mandatory standards for weightlifting bench-press benches. One voluntary standard published by ASTM International, ASTM F 1749, *Standard Specification for Fitness Equipment and Fitness Facility Safety Signage and Labels*, establishes requirements for safety signage and labels associated with fitness equipment and fitness facilities. The standard defines fitness equipment as “a machine or bench designed for use in exercising specific or multiple muscles of the body,” a definition that would include weightlifting bench-press benches. No other voluntary standards appear relevant.

None of the warnings specified in ASTM F 1749 identify the asphyxia/anoxia hazard described by the petitioner. The standard specifies requirements for a “general warning label,” which affixes to the equipment and must address the following items:

- the possibility of serious injury or death if caution is not used
- the need to read and follow all warnings and instructions, and to obtain proper instruction before use
- the need to replace the label if damaged, illegible, or removed
- other, specific items that may be addressed in existing ASTM International standards for particular fitness equipment

ASTM F 1749 also specifies requirements for “site specific labels,” which are affixed to fitness equipment in the immediate area of a potential hazard. These labels are required in areas of amputation or crushing hazards, pinch or nip hazards, electrical shock, body or clothing interference, and those requiring regular maintenance or inspection.

Labeling Effectiveness (Tab D)

Spotter Presence

The petitioner’s proposed labeling of bench-press benches presumes that such a label will persuade consumers to avoid using the bench to lift weights unless a spotter is present. According to staff from the CPSC Division of Human Factors (ESHF), a label must persuade consumers to consistently comply with the message or instructions conveyed in that label to effectively prevent injury and death. Behavioral compliance can be difficult to achieve and largely depends on consumers’ perceptions, beliefs, and attitudes rather than their awareness of the hazard.

A major factor affecting behavioral compliance is the consumer’s perception of the risk associated with not following the advice in the label. Several variables can affect this perception, including the perceived likelihood of injury, the perceived severity of the injury, and whether consumers believe the risk actually applies to them personally. For several reasons, consumers are likely to perceive the risk associated with not complying with a warning label that is similar

to the petitioner's proposed warning label as low, meaning a label would likely have little effect on consumer behavior.

For example, consumers are unlikely to view either weight benches or weightlifting as particularly hazardous, and are unlikely to associate these products or activities with serious injuries and deaths. Since people tend not to notice or read warnings on products they perceive as presenting low levels of hazardousness, the presence of a warning to inform consumers of this possibility and of the importance of having a spotter present would not necessarily alter this perception. Furthermore, familiarity with a product or activity tends to be inversely associated with perceived hazardousness, so those who routinely engage in weightlifting would be unlikely to view the activity as risky. Benign experiences with using a bench-press bench without a spotter, or experiences that result in minor injuries, are likely to reinforce consumers' belief that they are unlikely to be seriously injured or killed, leading them to dismiss warnings to the contrary as not credible. Some consumers may be fully aware of a hazard and its risks, but conclude that the hazard does not pose a risk to them personally. Males make up a disproportionate number of those injured and killed with weightlifting equipment, apparel, and activities (see "Incident Data"), and tend to be more confident in their ability to avoid hazards and to use products without negative results. One would expect the typical user of a bench-press bench in a home setting, therefore, to judge himself capable of either avoiding or effectively handling an unexpected loss of barbell control.

Another major factor that influences behavioral compliance is the "cost of compliance." This is the subjective cost to the user to comply with the message presented in a label, and can include the money, time, and effort required. Even minor costs, such as a loss of convenience, can have a significant effect on compliance. The cost to comply with the proposed label would be that associated with ensuring that a spotter is present while weightlifting on a bench-press bench. A significant advantage of home fitness equipment is that it is available for use, in private, whenever the consumer wants to use it. By restricting use of a bench-press bench to those times when one has a spotter on-site, one effectively removes this advantage because the convenience of working out without regard to the availability of another person is lost. Even if one simply made sure a spotter was present while performing pressing exercises or maneuvers that would place the user most at risk, the unavailability of a spotter would eliminate a group of exercises that are fundamental to developing the upper body. For these reasons, users are likely to view the cost of complying with the message as prohibitive.

Child Supervision

The text of the petitioner's sample label implies that the label may also be intended to prevent the hazards associated with a lack of child supervision near bench-press benches. Since this risk is not explicitly discussed within the petition (see "Petition Information"), staff from the CPSC Office of the General Counsel deemed it outside the scope of the petition. Still, ESHF staff briefly assessed the extent to which labeling could effectively deal with child supervision since it does appear in the sample label.

According to ESHF staff, complying with a label on the need for child supervision is subject to a variety of factors that may not be under the caregiver's control, such as fatigue, distraction, and the actions of other adults. Even close, high-quality supervision can fail because constant

vigilance is physiologically impossible and the events resulting in injury can happen quickly. For example, the sole child fatality among those reported deaths examined by the staff that clearly involved a bench-press bench, involved a bench collapse caused by the failure of a rusted weld joint.¹ Close supervision would not have prevented this, as weld failures of this kind happen too quickly for adult intervention. Only making the bench inaccessible, or changing the product or environment so the supported barbell and weights could not fall, would have protected the child. Warnings about keeping children away from a product are ubiquitous, yet injuries to children involving products labeled in this way are common. Hence, ESHF staff believes that even if incidents involving child supervision were considered to be within the scope of this petition, a warning about the need for supervision is likely to have little effect on caregivers' behavior and on preventing injuries and deaths to children.

Public Comments and Staff Responses

On July 18, 2003, a notice was published in the Federal Register (68 FR 42692) to solicit public comments on the petition. As of the closing date, September 16, 2003, the Commission had received no comments.

On October 12, 2003, the petitioner submitted a late comment, referring the staff to a website containing a Microsoft PowerPoint presentation that the petitioner presented at the 50th Annual Meeting of the American College of Sports Medicine on May 30, 2003. Most of the presentation content reiterates the information provided in the petition and has been discussed already. Additional data on fatalities for January through November 1998 appear in the presentation, but the staff did not include these data in its analysis because more recent data were available (see "Incident Data").

In his comment, the petitioner proposed that the Commission consider requiring a warning label on the pad of the bench-press bench, at the head and neck level. Whether the petitioner is proposing this label in addition to or as a replacement for the labels to be placed on both uprights is unclear. The staff presumes that the petitioner is proposing that the label content be identical to that proposed in the original petition; however, this is not explicitly stated in his correspondence. Regardless, the Human Factors staff has concluded that any label, regardless of its placement, is unlikely to be effective at reducing injuries and deaths associated with chest or neck compression while weightlifting on a bench-press bench (see "Labeling Effectiveness").

Commission Options

The Commission may respond to the petition in one of three ways:

1. Grant the petition.

If, based on the information contained in this briefing package, the Commission concludes that weightlifting bench-press benches that lack labeling may present an

¹ INDP report number 001117HCC0104

unreasonable risk of injury or death and that a rule may be reasonably necessary to eliminate or adequately reduce that risk, the Commission may grant the petition and direct the staff to develop an advance notice of proposed rulemaking under the authority of the Consumer Product Safety Act.

2. Deny the petition.

If the Commission concludes that the available information does not support a finding that weightlifting bench-press benches that lack labeling may present an unreasonable risk of injury or death that would be preventable by the approach requested by the petitioner, the Commission may deny the petition.

3. Defer decision on the petition.

If the Commission determines that there is insufficient information to decide on the petition, but that the staff could obtain such information, the Commission could defer its decision and direct the staff to obtain additional information.

Staff Recommendation and Discussion

Based on the information contained in this briefing package, the CPSC staff recommends that the Commission deny the petition.

The staff's review of reported deaths associated with weightlifting activities, apparel, or equipment suggests that one to four deaths annually might be relevant to the petition. However, only one death per year clearly involved asphyxia from neck compression while weightlifting on a bench-press bench. A review of emergency room-treated injuries further suggests that few injuries each year are relevant to the petition and potentially preventable by the petitioner's proposed labeling.

The petitioner's proposed rule would be effective at reducing the risk of death and injury only to the extent that labeling would persuade consumers to consistently comply with its message. Compliance with the petitioner's proposed labeling requires consumers to restrict weightlifting on a bench-press bench to those times when a spotter is present. The staff believes that consumers may view this restriction as prohibitive, and are likely to perceive the risk associated with not complying as low. Hence, the staff believes that the presence of labeling would have little effect on consumer behavior. Further, while a warning label discussing the risk cited in the petition might raise awareness of the risk, the overuse of warning labels, especially for unlikely hazards, may reduce consumer attention to, and the credibility of, other warnings on bench press benches or all warning labels, in general. Given the low likelihood that labeling will be effective in reducing the hazard, mandating such a label may contribute to this problem.

In conclusion, the staff believes that the labeling of bench-press benches would not significantly reduce injuries and deaths associated with their use, and that the need for mandatory labeling, as proposed by the petitioner, is unsupported by the data.

TAB A

Petition CP 03-3



EITVS
C0360005

UNIVERSITY OF OREGON

ISSUE 36

March 31, 2003

JUN 6 2003

Thomas Schroeder, MS
Division of Hazard and Injury Data Systems
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CP03-3

COMMUNICATIONS
DIVISION

Dear Tom:

We are requesting that a bright red warning label similar to the enclosed xerox sample, be placed on both uprights of all manufactured, publically available bench presses (single units, combination units/bench-press-leg extension-leg curl devices, flat, inclined, adjustable and non-adjustable devices). We are making this request based on the incidence of deaths we have tracked over the past two decades by studying US CPSC Death Certificate, Accident Investigation, and Reported Incidents files, and the National Electronic Injury Surveillance System (NEISS).

Since January of 1999, at least 20 deaths have been associated with weight training (Weight Lifting Product Code 3265)—at least 19 occurred in the home, at least 14 involved asphyxia, and 12 the bench press. This supports our previous evaluation of a 378-day period from March of 1991 to April of 1992, during which time one dozen weight training- associated deaths occurred—11 involved males in the home, 11 with the bench press, and 11 asphyxia/anoxia with chest or neck compression. The records may be delayed by as much as 1.5-3 yr from the time of incidence until the time of recording, so that we expect other deaths have occurred, but are yet to be reported.

Our primary goal is to raise public awareness so as to minimize senseless deaths and injuries associated with the use of weight/resistance training/weight lifting equipment. This is increasingly important in light of the dramatic surge in elderly participation in strength training. In January of 2001, a 70-yr male was found dead in his garage in Virginia Beach, Virginia with a 100-lb barbell across his neck. As indicated in the attachments, deaths in the older population have been associated with other equipment including treadmills and bicycle ergometers. We desire to help ensure that using weights can be safe for all Americans and to promote the safe use of weight training equipment for improving multiple components of health-related fitness. To help achieve these goals, we would be delighted to discuss or present our findings in detail. Please contact me personally for additional information.

Sincerely,

V. Patteson Lombardi, PhD
Research Assistant Professor
Human Biology & Medical Physiology
Director, Biology Advising Center
University of Oregon

7/7/03
V. Patteson Lombardi
Director, Biology Advising Center
University of Oregon

/vpl

DEPARTMENT OF BIOLOGY

College of Arts and Sciences · 1210 University of Oregon · Eugene OR 97403-1210 · Telephone (541) 346-4502 · Fax (541) 346-6056

WARNING: FATAL DANGER

This equipment has been associated with death when adults use without a spotter, or children are unsupervised. Please use only according to manufacturer's guidelines. It can make the difference between life and death.

60360005

JAN1999-DEC 2002 US Weight Training-Associated Deaths (1)

Date	Age	Gen	City	State	Mechanism	Exer/Equip
010599	31	♂	Akron	OH	Asphyxia	Bench Press
021199	42	♂	Washington	DC	CNS trauma	MP/C&J?
102699	10	♂	Riverdale	MD	Asphyxia	Machine?
111399	27	♂	Clinton	IA	Asphyxia	Bench Press
120799	52	♂	Washington	DC	Asphyxia	Row + Chain

JAN1999-DEC 2002 US Weight Training-Associated Deaths (2)

Date	Age	Gen	City	State	Mechanism	Exer/Equip
010200	22 yr	♂	Lakewood	OH	Asphyxia	Pullover Belt?
051500	49 yr	♂	Schenectady	NY	CNS trauma	Squat? BP?
061800	12 yr	♂	Johnson City	TN	Asphyxia	Lat/Tri straps?
081700	4 yr	♂♀	Jacksonville	NC	Chest trauma	Bench Press
111000	25 yr	♂	Knoxville	IA	Asphyxia	Bench Press +
112600	29 yr	♂	Waterford	CT	CNS trauma	BNP?

JAN1999-DEC 2002 US Weight Training-Associated Deaths (3)

Date	Age Gen	City State	Mechanism	Exer/Equip
012101	70 yr ♂	Virginia Bch VA	Asphyxia	Bench Press
012301	37 yr ♂	Richmond TW MI	Asphyxia	Bench Press
012701	22 yr ♂	Nuerces Co TX	Chest trauma	Bench Press?
052201	26 yr ♂	Buffalo NY	Asphyxia	Bench Press
061901	50 yr ♂	Orlando FL	CNS trauma	Free weights?
010602	50 yr ♂	Unknow MN	Asphyxia	Bench Press

TAB B

Hazard Analysis (EPA) Staff Memorandum



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON DC 20207

Memorandum

Date: January 27, 2004

TO: Tim Smith, HF, Project Manager Petition CP 03-3, Bench-Press Bench Labeling

THROUGH: Susan W. Ahmed, Ph.D. *SW*
Associate Executive Director
Directorate for Epidemiology

Russell H. Roegner, Ph.D. *RR*
Division Director, Division of Hazard Analysis
Directorate for Epidemiology

FROM: Linda M. Hooper, EPHA *R.H. for L.H.*

SUBJECT: Death, Injury, and Incident Data, Petition CP 03-3
Petition on Labeling of Bench-Press Benches

This petition (CP 03-3) calls for a warning label on both uprights of all "manufactured, publicly available" weightlifting bench-press benches. Epidemiology staff reviewed available death, injury, and incident data contained in CPSC files. This memorandum contains an overview of deaths, injuries, and incidents related to bench-press benches, as well as tabulations of data relevant to incidents potentially related to bench-press benches and the hazard pattern of interest to the petitioner.

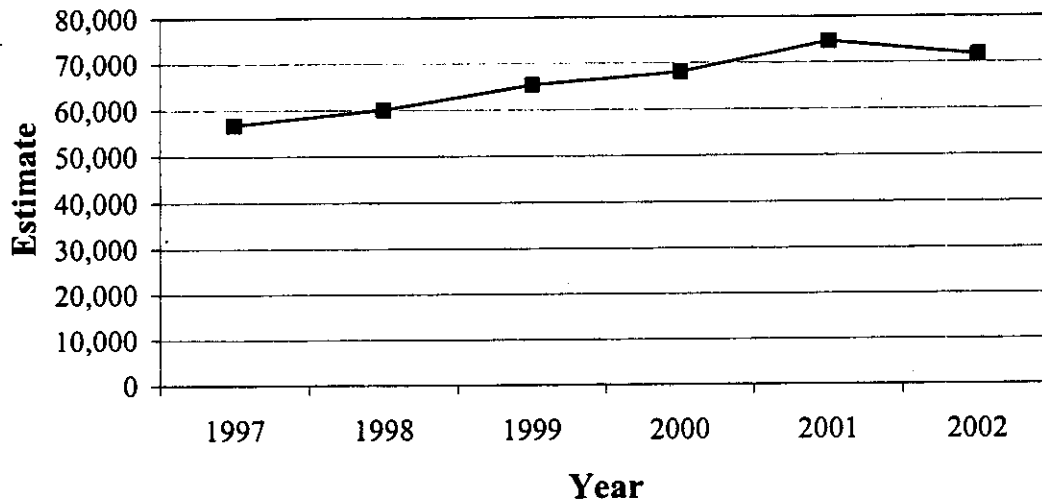
Summary of CPSC Incident Data

Estimated Annual Number of Emergency-Room Treated Injuries Associated With Weightlifting Activities, Apparel or Equipment

An estimated 71,700 injuries associated with weightlifting activities, apparel, or equipment were treated in U.S. hospital emergency departments in 2002. This includes all types of weightlifting activities, apparel or equipment coded under product code 3265 (See Appendix 1 for selection criteria).

Based on a general linear model, the number of injuries from product code 3265 had a marginally statistically significant increase between 1997 and 2002 ($p=0.0544$) (See Figure 1).

Figure 1. Estimated Number of Emergency-Room Treated Injuries Associated with Weightlifting Activities, Apparel, or Equipment: 1997-2002



Source: U.S. Consumer Product Safety Commission, National Electronic Injury Surveillance System (NEISS).

Estimated Annual Number of Emergency-Room Treated Injuries Associated With Bench-Press Benches and the Hazard Pattern of Interest to the Petitioner

The CPSC staff included in the hazard pattern of interest any loss of barbell control, while weightlifting on a bench-press bench, that could lead to chest or neck compression. As a result, non-fatal injuries in addition to fatalities were considered to be of interest. Based on the comments from records in the National Electronic Injury Surveillance System (NEISS), cases involving weightlifting activities, apparel, or equipment were examined for relevant cases. (See Appendix 2 for more information on the classification system used). The Yes category (scope=1) contains cases where it could be determined that the case most likely involved the hazard pattern. The Unknown category (scope=2) contains incidents in which the involvement of a bench-press bench in the hazard pattern of interest could not be ruled out. The Out-of-Scope¹ category (scope=3,4) contains incidents that are not associated with a bench-press bench, not relevant to the hazard pattern of interest, or very unlikely to be associated with either.

¹ There were a total of 1,911 cases that were deemed out-of-scope. The initial review of the cases was completed by EPHA staff. Based on wording in the NEISS comments which clearly indicated that the cases were outside the scope of the petition (e.g., exercise machines, squatting, and extraneous activities), EPHA staff excluded 1,220 cases (Scope=4) from the in-depth data review carried out by members of the petition team. The team members from EPHA, Health Sciences, and Human Factors reviewed a total of 798 cases individually, of which 691 were placed in the out-of-scope category (Scope=3), 95 in the unknown category (Scope=2), and 12 in the Yes category (Scope=1).

Table 1. Estimated Number of Injuries from Weightlifting Activities, Apparel or Equipment by Scope, 2002

Category	Est. Number of Injuries	Sample Size	Confidence Intervals	
			Lower	Upper
Yes (scope=1)	340	12	90	600
Unknown (scope=2)	3,480	95	2,450	4,500
Out-of-scope (scope=3,4)	67,900	1,911	58,400	77,370
<i>Total</i>	<i>71,700</i>	<i>2,018</i>	<i>61,610</i>	<i>81,790</i>

NOTE: Individual categories may not add up to the totals, due to rounding.

Source: U.S. Consumer Product Safety Commission. National Electronic Injury Surveillance System (NEISS). 2003.

A total estimated 3,820 injuries associated with the potential use of a bench press bench and the hazard pattern of interest were reported in U.S. hospital emergency departments in 2002 (Categories 1 and 2). Of these, an estimated 340 injuries (n=12) most likely involved the use of a bench-press bench. Due to the limited information in the NEISS comments, CPSC staff was unable to determine whether bench-press benches were actually in use at the time of the injury; thus, the staff also considered injury type and body part injured, as well as age, when assessing whether injuries fell within the relevant hazard pattern. For the remaining estimated 3,480 injuries (n=95), the type of injury and body part injured implied the use of a bench press. An estimated 67,900 injuries were determined to be out-of-scope to the petition (n=1,911).

The petition is interested in injuries and deaths from bench-press benches, so those categories that might contain relevant cases are the two categories where Scope=1 and Scope=2. The injury statistics that follow address the 3,820 estimated injuries (n=107) which make up these two categories.

A majority of those injured in 2002, where it was likely that a bench-press bench was being used at the time of the injury and a relevant hazard pattern existed, were treated and released from the emergency room (95 percent). The remaining cases were either transferred or hospitalized.

Table 2. Estimated Number of Injuries from Potential Bench-press Bench and Relevant Hazard Pattern Cases, 2002: By Disposition

Disposition	Est. Number of Injuries	Sample Size	Confidence Intervals		Percentage
			Lower	Upper	
Treated & Released	3,630	103	2,550	4,710	95
Transferred	*				*
Hospitalized	*				*
<i>Total</i>	<i>3,820</i>	<i>107</i>	<i>2,720</i>	<i>4,920</i>	<i>100</i>

NOTE: Individual categories may not add up to the totals, due to rounding.

* The sample counts are too small to produce estimates for these breakdowns.

Source: U.S. Consumer Product Safety Commission. National Electronic Injury Surveillance System (NEISS). 2003.

The average age of those injured was 22 years, and the median age was 17 years. The age range of those injured was 6 to 55 years of age. Thirty-six percent of those injured were between the ages of 15 and 19 years (See Table 3).

Table 3. Estimated Number of Injuries from Potential Bench-Press Bench and Relevant Hazard Pattern Cases, 2002: By Age

Year of age	Est. Number of Injuries	Sample Size	Confidence Lower	Intervals Upper	Percentage
6-14	930	25	460	1,400	24
15-19	1,380	37	810	1,950	36
20-29	740	22	290	1,190	19
30+	770	23	350	1,190	20
<i>Total</i>	<i>3,820</i>	<i>107</i>	<i>2,720</i>	<i>4,920</i>	<i>100</i>

NOTE: Individual categories may not add up to the totals, due to rounding.

Source: U.S. Consumer Product Safety Commission. National Electronic Injury Surveillance System (NEISS). 2003.

A majority of the injuries that may have involved a bench-press bench in 2002 were to males (85 percent, n=91). The remaining 15 percent were to females.

The body part most frequently injured was the head/face (53 percent) (See Table 4). The chest was the body part injured in 42 percent of injuries. In the remaining cases, the body part injured was either the neck or the midsection (excluding the chest).

Table 4. Estimated Number of Injuries from Potential Bench-press Bench and Relevant Hazard Pattern Cases, 2002: By Body Part Injured

Body Part	Est. Number of Injuries	Sample Size	Confidence Lower	Intervals Upper	Percentage
Neck	*	1			*
Chest	1,610	45	1,020	2,210	42
Head/Face	2,010	57	1,120	2,910	53
Midsection (except chest)	*	4			*
<i>Total</i>	<i>3,820</i>	<i>107</i>	<i>2,720</i>	<i>4,920</i>	<i>100</i>

NOTE: Individual categories may not add up to the totals, due to rounding.

* The sample counts are too small to produce estimates for these breakdowns.

Source: U.S. Consumer Product Safety Commission. National Electronic Injury Surveillance System (NEISS). 2003.

The most common diagnosis was contusions/abrasion (40 percent) (See Table 5). Twenty-seven percent of the injuries involved the diagnosis of laceration. It should be noted that the petitioner is interested in deaths from the use of a bench-press bench. However, due to the nature of NEISS data, incidents that involve deaths that occurred at the scene are not usually in the NEISS database, because, if a person is fatally injured, they usually are transported to the morgue rather than the emergency room.

Table 5. Estimated Number of Injuries from Potential Bench-press Bench and Relevant Hazard Pattern Cases, 2002: By Type of Diagnosis

Diagnosis	Est. Number of Injuries	Sample Size	Confidence Lower	Intervals Upper	Percentage
Contusions, Abr.	1,540	43	940	2,140	40
Fracture	*	5			*
Laceration	1,020	30	490	1,560	27
Strain, Sprain	*	2			*
Concussion, Crushing, Dislocation, F.B., Dental injury,...	*	14			*
Other	*	13			*
<i>Total</i>	<i>3,820</i>	<i>107</i>	<i>2,720</i>	<i>4,920</i>	<i>100</i>

NOTE: Individual categories may not add up to the totals, due to rounding.

* The sample counts are too small to produce estimates for these breakdowns.

Source: U.S. Consumer Product Safety Commission. National Electronic Injury Surveillance System (NEISS). 2003.

Data from Injury and Potential Injury Incidents (IPII) and Death Certificates(DTHS) Databases

With regard to deaths associated with weightlifting activities, apparel, or equipment reported to CPSC between January 1, 1999 and December 31, 2002, there were 21² deaths identified in IPII and DTHS databases for the product code 3265 (See Appendix Table 1). This includes all of the deaths noted by the petitioner plus four additional deaths.

It is not easy to classify the type of weight training equipment used at the time of death because of limited details contained in the comments and/or imprecise reporting of the equipment involved in the incidents. There are 5 cases where it is clear that a bench-press bench was involved in the death³. However, only 4 of these cases were relevant to the petition. In another 12 cases, it is unknown if a bench-press bench was being used at the time of the death. However, only 11 of these 12 cases are potentially relevant to the petition. This is because the victim in the 12th incident “fell onto the equipment” which is inconsistent with the hazard pattern of interest. In the remaining 4 cases, bench-press

² A total of 21 deaths for the period January 1999 through December 2002 have been reported to CPSC as of August 31, 2003, which includes 3 deaths that occurred during the period of the petitioner’s data (January 1999 through December 2002), but were not reported to CPSC until 2003, as well as one death entered into EPIR on 10/08/2002 that occurred on 5/15/2002.

Date entered into EPIR	Date Occurred	Document No.
7/21/2003	9/17/2002	0206165497
2/3/2003	8/21/2002	X0310365A
2/20/2003	12/8/2002	X0320711A
10/08/2002	5/15/2002	0226041644

³ This includes one incident where a young child was in the same room as a bench-press bench. The in-depth investigation found that the age of the bench-press bench contributed to the death because a “rusty weld joint failed and caused the bench...to collapse” on the child. However, it was decided that the child was not using the bench-press bench in a manner relevant to the petition’s hazard pattern.

benches were not involved in the incident (e.g., “exercise machine collapsed”, “chained both arms and chest to equipment”, “entangled by cloth belts”, and “cable in machine got wrapped around neck”).

Other Incident Data from IPII

From January 1, 1999 through December 31, 2002, 32 incidents (excluding deaths) were reported to CPSC and appear in the IPII database involving the product code (3265) for weightlifting equipment, apparel, or activities (See Appendix Table 2). Staff’s review determined that only 1 incident appeared to be marginally relevant to the hazard pattern of interest in that it involved the use of a bench-press bench and falling barbell weights, even though no injury was sustained.

Comments on the Petitioner’s Incident Data for the March 1, 1991 – April 30, 1992 Period Cited in the Petition

The petitioner included data from 2 time periods in the petition. This section addresses the earlier time period (March 1, 1991 – April 30, 1992).

On August 13, 2003, EPIR was queried for data on deaths from product code 3265 between March 1, 1991 and April 30, 1992 (IPII, DTH, and INDP were searched). Nine death certificates and 7 IPII records were found, of which 4 were duplicates for a total of 12 deaths associated with weight lifting product code 3265 during the 13-month period. This agrees with the number of deaths cited in the petition for this time period.

All 12 cases involved males. Eleven occurred in the home and 1 was in an unknown location. Nine deaths were from asphyxia/anoxia with chest or neck compression, 1 from strangulation, and 2 from fallen objects (no other cause was mentioned).

From the wording of the narratives, EPHA staff concludes that 2 deaths involved the use of a bench-press bench in a manner relevant to the petition. The use of a bench-press bench could not be determined in 9 of the deaths. In 1 death, it was clear that a bench-press bench was not involved (narrative included wording about an exercise machine).

Population at Risk

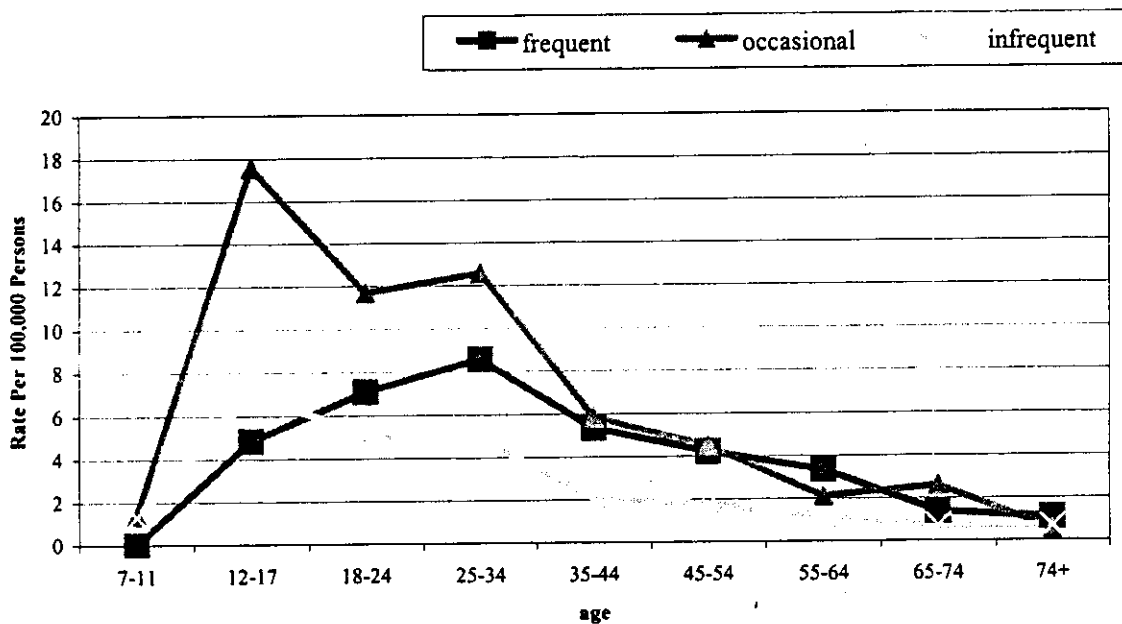
Data on sports participation from the National Sporting Goods Association show in 2002 approximately 18,400,000 males and approximately 9,700,000 females aged 7 and older participated at some level in weightlifting⁴. A majority of participants in weightlifting activities were male (in 2002, 65 percent were male and 35 percent were female). The mean age was 33.0 years for males and 34.9 years for females.

⁴ *Sports Participation in 2002: Series I*. National Sporting Goods Association. Mount Prospect, IL. Sports participation data are collected from a statistical sample of 10,000 American households.

The above data are tabulated into 3 categories based on how often the respondents participated in weightlifting: frequent participation (110+ days), occasional participation (25-109 days), and infrequent participation (6-24 days). In 2002, 30 percent of total respondents reported to be frequent users, 48 percent occasional users, and 22 percent infrequent users.

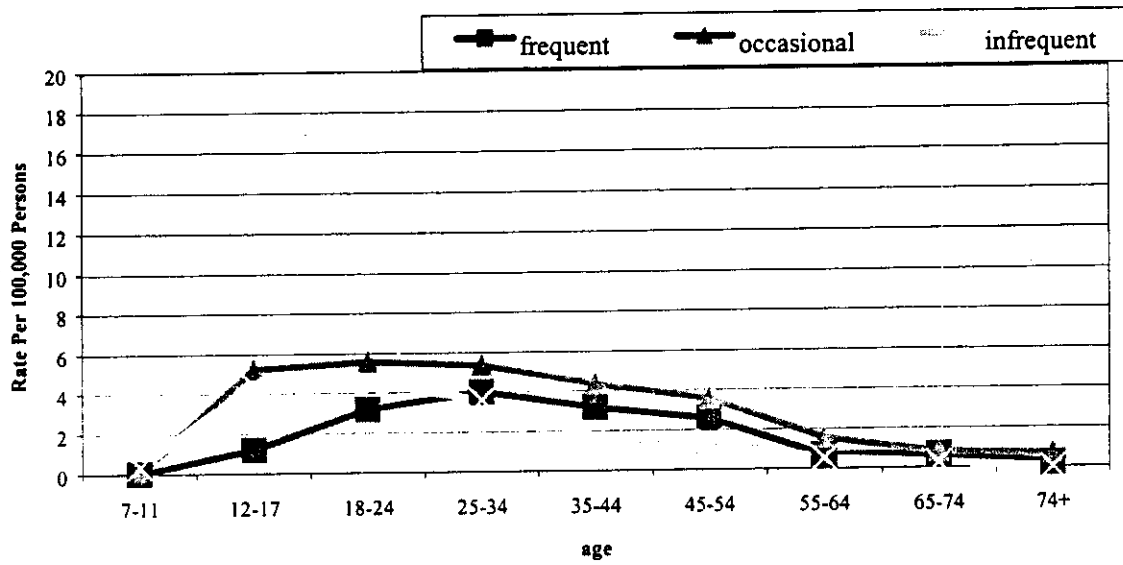
Using population projection data from the U.S. Census Bureau for 2002, participation rates per 100,000 persons were calculated by age, sex and frequency of participation. Weightlifting participation rates for each sex by age group and level of participation for 2002 are presented in Figures 2 (males) and 3 (females). The rates are shown with the same scale in both figures to aid in comparison.

Figure 2. Participation Rates for Males, by Age Group and Frequency, 2002



Source: *Sports Participation in 2002: Series I*. National Sporting Goods Association. Mount Prospect, IL.

Figure 3. Participation Rates for Females, by Age Group and Frequency, 2002



Source: *Sports Participation in 2002: Series J*. National Sporting Goods Association. Mount Prospect, IL.

Appendix 1. Data Search Criteria: Retrieving Data from CPSC Databases

Data were extracted from the CPSC databases using the following query criteria. The query results were read manually to determine the product involved and other details of interest.

Queries were extracted from IPII, DTSH, and INDP on August 13, 2003 and September 3, 2003.

Query 1: Entered Date: 01/01/1999 – 12/31/2002
Product Code: 3265
Disposition: 8

Query 2: Entered Date: 01/01/1999 – 12/31/2002
Product Code: 3265

Query 3: Entered Date: 03/01/1991 – 04/30/1992
Product Code: 3265
Disposition: 8

Queries were extracted from NEISS on September 8 and 10, 2003.

Query 4: Injury Date: 01/01/2002 – 12/31/2002
Product Code: 3265

Appendix 2. Classification of Incidents into Categories based on Whether Cases are within the Scope of the Petition

In order to determine the relevance of cases to the petition, team members from Epidemiology, Human Factors, and Health Sciences utilized a consensus approach to classify cases by scope. We considered relevant information (e.g. narrative details, victim's age, and injury diagnosis) when assigning cases to one of three categories. The three categories are 1 (yes), 2 (unknown), and 3/4 (no). Descriptions of the categories and appropriate examples follow below.

1 (yes) Most likely to be in the hazard pattern and to have involved a bench-press bench. Specifically mentions bench pressing or benching, and states that the victim was struck by a barbell, bar, or weight, or that the barbell/bar/weight fell or was dropped on the victim.

Examples of cases coded in the Yes category:

- 16 YO patient injured lower lip when weight bar fell while bench pressing Dx: Lip laceration (cno=4230207, hid=3L562045, date= 01/22/2002)
- 31 YO was bench pressing when 135 lb barbell struck chest Dx: contusing IT (cno=3613818, hid=8B232018, date=03/06/2002)
- Rt chest muscle pain. 27 YO states benching 275 lbs weight, the bar fell on chest. Dx: muscle strain. (cno=404570, hid=8T251018, data=10/16/2002)

2 (unknown) May be in the hazard pattern. Unknown if person was bench pressing at the time of injury, but it appears at least possible. There is insufficient information to confirm or deny that unknown cases fall in the specific hazard pattern of interest. Cases in this category range from low likelihood to possibly within the specific hazard pattern Also, the injury is consistent with what one would expect if in the hazard pattern (e.g., contusion). Essentially anything that doesn't fall into category 1 (above) or 3 (below).

Examples of cases coded in the Unknown category:

- Barbell hit 16 YO patient on face and then rolled down to ankle. Dx: closed head injury, laceration/abrasions. (cno=11417623, hid=3L562045, date=1/17/2002)
 - *It could not be determined if the patient was squatting or if the patient was using the bench press.*
- 15 YOM dropped 205 weight on chest at school. Dx: Upper chest pain wall pain/trauma (cno=26789, hid=3A10255, data=01/20/2002)
 - *It could not be determined exactly what the patient was doing at the time of the incident or even if a bench press bench was involved.*
- 14 YO struck face on weight lifting bar at school. Dx: Left eyebrow laceration. (cno=20020138, hid=6W861016, data=05/01/2002)
 - *It could not be determined exactly what the patient was doing at the time of the incident or even if a bench press bench was involved. The generic term "weight lifting" does not indicate what specific activity was being done.*

3 (no)

Not in the hazard pattern, very unlikely to be in the hazard pattern (i.e., no suggestion that traumatic injury resulted from loss of control of weights and subsequent impact by weights while bench pressing).

Examples of cases coded in the No category:

- 83 YO patient with a cockroach in right ear - also was lifting heavy weight at home - pain to rectum area. (cno=21693994, hid=3N952022, date=4/23/2002)
 - *Clearly not relevant to the petition.*
- 5 YO patient was accidentally struck in the mouth with a barbell. (cno=954698, hid=6P721034, date=3/30/2002)
 - *It is not clear what was happening at the time of the incident. Also, this cases involves a young child (5 and under). It was decided that children of this age would not be using a bench press bench in the hazard pattern of interest to the petition.*
- Blunt trauma to the chest sustained when 33 YOM was laying on a table lifting weights and dropped 245 lbs on his chest. (cno=892951, hid=8c201018, date=5/7/2002)
 - *Although this appears to be in the hazard pattern of interest, the description specifically states that the consumer was laying on a "table" lifting weights. Therefore, it does not appear that a bench-press bench was in use at the time.*

4 (No)

Outside the scope of the petition. Cases involving exercise machines, squatting and extraneous activities.

**Appendix Table I. Deaths Associated with Weightlifting Activities, Apparel or Equipment Reported to CPSC
between January 1, 1999 and December 31, 2002**

FROM IPII (Search Criteria: 01/01/1999 To 03/31/2003, Pcode 3265, And Disp=8)

Number	Docno DTHS	Or Trno	Death Certificate (DTHS)	Dt_Inj	State	City	Age	Sex	Bench Press Involvement	Cause Of Death	
1	X0051749A	000512HC2530	9939006978	01/05/1999	OH	AKRON	31	Male	Yes	Asphyxiation	LONGNARR A 31 YEAR OLD MALE DIED FROM ASPHYXIATION CAUSED BY HIS EXERCISEEQUIPMENT. VICTIM WAS FOUND ON HIS WEIGHT BENCH WITH BARBELLSCOMPRESSING HIS NECK. 45119
2	X9993272A			02/11/1999	DC	WASHINGTON	42	Male	Unk	Blunt trauma to head	A MAN, AGE 42, DIED AFTER STRUCK IN HEAD BY 50 LBS. OF WEIGHT LIFT CAUSE OF DEATH: BLUNT IMPACT TRAUMA OF HEAD. 99-0592
3	X99A3590A	991028CBB0047		10/26/1999	MD	Riverdale	10	Male	No	Asphyxiation	A 10 YEAR OLD BOY DIED FROM ASPHYXIATION WHEN AN EXERSIZE MACHINECOLLAPSED ON HIS NECK. HE WAS NOT USING THE MACHINE, BUT WASAPPARENTLY TRYING TO MOVE THE MACHINE, IN THE BASEMENT OF HIS HOME,WHEN THE ACCIDENT TOOK PLACE.
4	9919024001			11/13/1999	IA	Clinton	27	Male	Unk	Asphyxiation	DECEDENT WAS WEIGHT LIFTING AND BARBELL APPARATUS FELL ON HIS NECK - TRAUMATIC ASPHYXIA; BARBELL FALLING ON NECK - AUTOPSY YES
5	X0152353A			12/07/1999	DC	WASHINGTON	52	Male	No	Asphyxiation	A MAN, AGE 52, DIED OF ASPHYXIA AFTER HE PLACED A CHAIN ON WEIGHTLIFTING EQUIPMENT AND CHAINED BOTH HIS ARMS AND CHEST AREA TO THEEQUIPMENT. 99-4384
6	X0083655A		00393331628	01/02/2000	OH	LAKEWOOD	22	Male	No	Asphyxiation	A MALE, AGE 22, DIED OF ASPHYXIA WHEN HE BECAME ENTANGLED BY CLOTHBELTS, LOOPED AROUND HIS NECK, AND ATTACHED TO A BARBELL AT HIS HOME.#236264
7			0036038665	05/15/2000	NY	SCHENECTADY	49	Male	Unk	Cardiorespiratory arrest	WEIGHT LIFTER,450 LBS FELL ON HEAD AND NECK AFTER SLIP - RADIO RESPIRATORY ARREST; ACUTE COMPRESSION OF SKULL - AUTOPSY REFUSED
8	N0070261A	000721CNE5673		06/18/2000	TN	JOHNSON CITY	12	Male	No	Anoxia	12 YEAR OLD MALE DIED AFTER A CABLE ATTACHED TO A WEIGHT MACHINE GOTWRAPPED AROUND HIS NECK WHILE WORKING OUT AT HOME.

Number	Docno DTHS	Of Tkno	Death Certificate (DTHS)	Dt_Inj	State	City	Age	Sex	Bench Press Involvement	Cause Of Death	LONGNARR
9	X00B5247A	00117HCC0104		08/17/2000	NC	JACKSONVILLE	4	Female	Yes, OOS	Crushing injury to chest	A 4 YEAR OLD FEMALE DIED OF CRUSHED CHEST INJURY WHILE PLAYING IN AP LAYROOM ALONE. A SET OF BARBELL WEIGHTS WAS FOUND ON THE FLOOR. SHE APPARENTLY DISLODGED THE WEIGHTS AND SUFFERED CHEST COMPRESSIONS AS THEY FELL. 00-6830
10			0019022969	11/10/2000	IA	KNOXVILLE	25	Male	Unk	Asphyxiation	WEIGHT LIFTING - ASPHYXIATION: ACCIDENTAL - FRACTURE OF TENDONITIS - AUTOPSY NO
11	N00C0316A			11/26/2000	CT	WATERFORD	29	Male	Unk	Unknown	A MAN, AGE 29, DIED AFTER A WEIGHTLIFTING ACCIDENT AT HOME.
12	X0141319A		0151003615	01/21/2001	VA	VIRGINIA BEACH	70	Male	Yes	Asphyxiation	A MAN, AGE 70, DIED OF MECHANICAL ASPHYXIA/NECK COMPRESSION. HE WAS FOUND IN HIS GARAGE WITH A BARBELL ON HIS NECK. T59408
13			0126003501	01/23/2001	MI	RICHMOND TW	37	Male	Unk	Asphyxiation	COMPRESSION OF NECK BY EXERCISE WEIGHTS - ASPHYXIATION
14	X0173374A			01/27/2001	TX	NUERGES COUNTY	22	Male	Unk	Internal hemorrhage due to laceration of abdominal aorta	A MAN, AGE 22, DIED IN AN ACCIDENTAL INJURY WHICH OCCURRED DURING THE COURSE OF WEIGHT LIFTING. CAUSE OF DEATH: INTERNAL HEMORRHAGE DUE TO LACERATION OF ABDOMINAL AORTA & LEFT COMMON ILLIAC ARTERY. 01-146-SC
15	X0194164A			05/22/2001	NY	BUFFALO	26	Male	Unk	Asphyxiation	A MALE, AGE 26, DIED OF TRAUMATIC ASPHYXIA WHEN 235 LBS OF WEIGHT FROM THE WEIGHT LIFTING EQUIPMENT FELL ON HIM. 385-01.
16			0112086274	06/19/2001	FL	ORLANDO	50	Male	Unk	Shock	FELL ON WEIGHT LIFTING EQUIPMENT - SHOCK - AUTOPSY NO
17	X0252368A			01/06/2002	MN	UNK	50	Male	Yes	Asphyxiation	A 50 YEAR OLD MALE DIED FROM ASPHYXIATION CAUSED BY HIS EXERCISE EQUIPMENT. HE WAS FOUND ON HIS WEIGHT BENCH WITH BARBELLS COMpressing HIS NECK. 02-41

CASES ENTERED INTO EPIR AND OCCURRING DURING TIME PERIOD BUT NOT INCLUDED IN PETITION

Number	Docno Or Dths	Tkno	Death Certificate (Dths)	Dt. Inj	State	City	Age	Sex	Bench Press Involvement	Cause Of Death	Longharr
18			0226041644	05/15/2002	MI	WAYNE	38	Male	Unk	Asphyxiation	FOUND WITH WEIGHT BAR ACROSS NECK. POSITIONAL ASPHYXIA. AMANTADINE INTOXICATION. MULTIPLE SCLEROSIS. AUTOPSY-YES.
19			0206165497	09/17/2002	CA	SAN DIEGO	19	Male	Unk	Asphyxiation	ASPHYXIATED BY BAR BELL WITH WEIGHTS AT HOME (YARD). EXTERNAL NECK COMPRESSION.
20	X0310365A			08/21/2002	MA	MALDEN	45	Male	Yes	Asphyxiation	DIED WHEN HE WAS FOUND LYING SUPINE ON THE WEIGHT BENCH WITH A METAL BAR RESTING ON HIS NECK AT HOME.
21	X0320711A			12/08/2002	OH	RAY	15	Male	Unk	Unk	DIED WHEN HE WAS FOUND ON THE FLOOR, PROBABLY WAS LIFTING WEIGHTS.

Appendix Table 2. Incidents (Non-Deaths) Associated with Weightlifting Activities, Apparel or Equipment Reported to CPSC between January 1, 1999 and December 31, 2002

Number	Docno Or Tkno	Dt Inj	State	City	Age	Sex	Scope	Injury	
1	C0215025A, C01B0008A	07/26/2001	MA	EASTHAMPTON	55	Female	Out	Yes	LONGMARR A WOMAN, AGE 55, WAS CUT ON HER LIP DURING USE OF AN 8 LB DUMBBELL. THE DUMBBELL CAME OFF THE BAR AND HIT HER IN THE FACE.
2	H0040231A	03/15/2000	GA	GROVETOWN	0	Male	Marginally In	No	AN ADULT MALE WAS SITTING ON BENCH PREPARING TO LIFT WEIGHTS WITH WEIGHTS RESTING ON SUPPORT BAR. THE METAL FRAME HOLDING THE WEIGHTS SUDDENLY COLLAPSED, SENDING WEIGHTS AND BAR CRASHING DOWN TO FLOOR. NO INJURY.
3	H0110486A	01/31/2001	AZ	PHOENIX	0	Unk	Out	No	CONSUMER WAS ASSEMBLING WEIGHT BENCH PER MANUFACTURER'S INSTRUCTIONS WHEN THE HORIZONTAL SEAT SUPPORT DETACHED FROM THE HORIZONTAL CROSSBEAM. NO INJURY. CONSUMER FEELS THAT THE WEIGHT BENCH'S EXTREMELY WEAK WELD CAN POSE A FALL HAZARD.
4	H0120106A	12/04/2000	MI	CLINTON TWP.	216	Male	Out	Yes	A 16 MONTH OLD MALE WAS CUT ON HIS FINGER WHEN HE STUCK IT IN PIN'S HOLE ON THE WEIGHT BENCH WHEN THE BENCH'S SEAT SUDDENLY FELL DOWN WHILE PLAYING AROUND WEIGHT BENCH WHEN HIS SISTER REMOVED METAL ROUND PIN USED TO ADJUST THE SEAT FROM THE WEIGHT BENCH.
5	H0160355A	06/17/2001	OK	OKLAHOMA CITY	0	Male	Out	No	A MAN BECAME ILL AFTER OPENING THE WEIGHT SET'S PACKAGING AND SMELLED A TOXIC ODOR FROM THE WEIGHT SET.
6	H0160432A	05/22/2001	VA	ARLINGTON	43	Male	Out	Yes	WEIGHT EXERCISING MACHINE CABLE BROKE OFF DURING USE, CAUSING THE METAL BARS TO CRUSH AGAINST A 43 YEAR OLD MALE'S FACE. HE SUSTAINED LACERATION TO FOREHEAD, NOSE AND RECEIVED 12 SUTURES.
7	H0210232A	01/10/2002	ID	OLD TOWN	21	Male	Out	Yes	A MAN, AGE 21, WAS INJURED WHEN HE WAS LOWERING BAR ON TO THE BARBELL SUPPORT WHILE LYING ON A METAL WEIGHT LIFTING BENCH. HE RECEIVED ACUT ON HIS FINGER FROM THE SIDE OF THE BARS WHERE WEIGHTS ARE RESTED.

8	H0220374A, 020402HCC2371	12/26/2001	KS	LENEXA	34	Female	Out	Yes	A WOMAN, AGE 34, WAS INJURED WHEN THE WEIGHT BENCH PRESS BROKE IN TWO PIECES DURING USE.
9	H0250140A, 020521CWES012	04/24/2002	CA	SÉLINAS	50	Male	Out	Yes	A MAN, AGE 50, WAS INJURED USING A WEIGHT BENCH WHEN THE BENCH'S PLYWOOD BOARD BROKE IN HALF. HE WAS JERKED BACKWARDS HITTING THE BACK OF HIS HEAD ON THE LATERAL RAISE BAR LOCATED BEHIND THE BENCH.
10	H0290348A	09/01/2002	NY	HOLLEY	23	Male	Out	Yes	A MAN, AGE 23, PLACED 40 LB. WEIGHTS ON THE CURVED BAR AND STARTED TOWORK OUT. THE BAR BROKE WHERE IT IS WELDED TOGETHER AND FELL ON HIS FOOT. HE SUFFERED A FRACTURED TOE.
11	H99C0277A	12/03/1999	GA	ELLENWOOD	12	Male	Out	Yes	12 YEAR OLD MALE BAR BELL WEIGHT SET GAVE OFF A NOXIOUS AMMONIA SMALL. 12 YEAR OLD MALE AND CONSUMER'S EYES IMMEDIATELY WATERED AFTER OPENING BOX. PLASTIC BAG TURNED A YELLOW/GREEN TINT.
12	H99C0155A	12/01/1999	FL	BOYNTON BEACH	64	Male	Out	Yes	A MAN, AGE 64, WAS INJURED IN HIS MOUTH WHEN STRUCK BY THE CURL BARON HIS WEIGHT BENCH WHEN A CABLE SNAPPED.
13	10010170A, 10010170B	12/23/1999	NY	ROCHESTER	36	Female	Out	Yes	A WOMAN, AGE 36, SMASHED HER HEAD WHEN THE HITCH ON A WEIGHT LIFTING GYM EXERCISE MACHINE BROKE AND SHE SLID DOWN.
14	10050238A	03/12/2000	PA	WARMINSER	44	Male	Out	Yes	A 44 YEAR OLD MALE SUFFERED A DEEP CUT TO HIS FOOT AFTER THE PLATE OF A LEG PRESS MACHINE FELL ONTO HIS FOOT. HE IS CONCERNED ABOUT THE AMOUNT OF WEIGHT IT CAN HOLD.
15	10080003A, 000803HCC0917	07/30/2000	NJ	WHARTON	29	Male	Out	Yes	29 YEAR OLD MALE RECEIVED A OPEN WOUND WHEN THE METAL BAR ON THE HOME GYM EQUIPMENT STUCK ON HIS HEAD AFTER THE CABLE BROKE WHILE HELD LIFTING WEIGHTS.
16	100B0240A	11/18/2000	VA	SPOTSYLVANIA	50	Male	Out	No	A MAN, AGE 50, COULD HAVE BEEN INJURED DURING USE OF AN EXERCISE MACHINE WHEN THE WELD ON THE PRESS UP BAR ATTACHMENT BROKE.
17	10130048A	01/01/1999	FL	OCCALA	69	Male	Out	Yes	A MALE, AGE 69, WAS USING AN EXERCISE MACHINE WITH A PULL DOWN WEIGHT BAR WHEN THE WEIGHTS DROPPED ON HIS NECK. THE WEIGHTS WERE HEAVIER THAN EXPECTED.

18	10130065A	03/01/2001	AZ	PHOENIX	0	Unk Out	No	A WEIGHT LIFTING BENCH PRESS HAS UPPER SUPPORTS THAT ARE TOO CLOSE AND SCREWS PROTRUDE THAT INTERFERE WITH LIFTING. NO INJURY.
19	10140096A	04/08/2001	MN	MAPLEWOOD	47	Male Out	Yes	A MALE, AGE 47, RECEIVED A MINOR BRUISE WHEN ONE OF THE CABLES OF THE HOME GYM BROKE DURING USE. CONSUMER IS CONCERNED AS THE FAILURE OCCURRED UNDER FULL LOAD. INJURY COULD HAVE BEEN MORE SEVERE DEPENDING UPON THE EXERCISE BEING USED.
20	10160032A	05/29/2001	ME	OXFORD	54	Male Out	No	A MAN, AGE 54, HAD SHOULDER AND HEAD PAIN FROM USE OF A WEIGHT LIFTING GYM WHEN HE TRIED TO REACH FOR THE CABLES AND FELL ONTO THE FLOOR. THE BASE IS SMALL, CAUSING THE BENCH TO LEAN TO ONE SIDE.
21	10180122A	08/01/2001	CA	LAKESWOOD	0	Unk Out	No	A FITNESS GYM RECENTLY PURCHASED NEW FLAT WEIGHT BENCHES THAT DO NOT HAVE BAR RESTS. NO INJURY.
22	10190174A	09/01/2001	NC	MEBANE	0	Unk Out	No	COATED DUMBBELLS EMITTED A VERY STRONG ODOR THAT COULD BE VOLATILE OR CAUSE HEALTH PROBLEMS. NO INJURY.
23	101B0314A	11/18/2001	FL	SANFORD	32	Female Out	No	WEIGHT BENCH RISES UP, TILTS & FALLS OVER WHEN ANY WEIGHT IS PUT ON THE LEG CURL BAR. A FEMALE, AGE 32, WAS NOT INJURED DURING USE. THE BENCH HAS A 1000 POUND WEIGHT CAPACITY.
24	10220129A	02/03/2002	VA	FALLS CHURCH	57	Male Out	No	A RUBBER WEIGHT BAND SNAPPED AS A MAN, AGE 57, WAS USING AN EXERCISE MACHINE. HE FEELS BANDS SHOULD NOT FAIL BASED ON THE PRICE OF EQUIPMENT.
25	10230403A	01/01/2002	GA	ATHENS	15	Male Out	Yes	SMALL SLIVERS OF CHROME STARTED COMING OFF OF THE WEIGHT LIFTING BAR DURING FIRST WEEK USE. TWO MALES, AGE 15 & 49, WERE INJURED WHEN THE SLIVERS STUCK IN THEIR HANDS, FEET & IN THEIR EYES.
26	10240142A, 1020430CWE5020	02/27/2002	WA	MONROE	32	Male Out	Yes	A MAN, AGE 32, WAS INJURED WHEN HE WAS STRUCK IN THE HEAD WHILE USING A HOME GYM WEIGHT LIFTING EXERCISER WHEN PARTS BROKE AND HE WAS STRUCK.

27	10320222A	11/11/2002	CA	MARTINEZ	28	Female	Out	Yes	A WOMAN, AGE 38, SUFFERED AN AMPUTATED FINGERTIP USING A BICEP CURLWEIGHT MACHINE AT A UNIVERSITY.
28	10360156A	12/12/2001	KS	LENEXA	35	Female	Out	Yes	A WOMAN, AGE 35, SUFFERED A BACK INJURY AFTER A BENCH PRESS BROKE ASSHE WAS DOING LEG CURLS.
29	19940158A	04/16/1999	MN	MAPLE GROVE	38	Female	Out	Yes	A WOMAN, AGE 38, HAD THE TIP OF HER FINGER SEVERED WHILE OPERATING AWEIGHT BENCH.
30	199B0003A	10/21/1999	VT	ST. ALBANS	15	Male	Out	Yes	A BOY, AGE 15, WAS NEARLY INJURED WHEN A WEIGHT BENCH SEAT SNAPPEDOFF DURING USE AND FLIPPED OVER.
31	J0190001A	08/21/2001	PA	CARLISLE	29	Male	Out	Yes	A MAN, AGE 29, HYPEREXTENDED HIS ARM AND INJURED HIS ELBOW WHEN A 50LB FLEX ARM ON WEIGHT LIFTING EXERCISE EQUIPMENT BROKE.
32	N0130017A, 010316CNE6232	03/16/2001	FL	BOCA RATON	16	Male	Out	No	THE METAL LOWER PULLEY CABLE COMPONENT OF A WEIGH LIFTING EXERCISEAPPARATUS BROKE DURING USE BY A MALE, AGE 16, WHILE HE WAS DOINGBUTTERFLY EXERCISES. THE RELEASE OF THE WEIGHT CAUSED HIS ARMS TOMOVE FORWARD WITH THE BUTTERFLY ATTACHMENT. NO INJURY.

TAB C

Economic Analysis (EC) Staff Memorandum



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: April 1, 2004

TO : Timothy P. Smith, Project Manager, Labeling of Bench Press Benches,
CP03-03

THROUGH: Gregory Rodgers, Ph.D., AED, EC *GR*

FROM : William W. Zamula, EC *WZ*

SUBJECT : Petition for Labeling of Bench Press Benches, CP03-3

The Commission received a petition from a university researcher to require labeling of both uprights of all bench press benches to address the hazard from neck or chest compression when a consumer is trapped under a barbell. This memorandum provides readily available information on annual bench press bench sales, the number of manufacturers, the estimated number of products in use, as well as preliminary information on the societal cost of deaths and injuries associated with the hazard pattern.

Market Information

The petitioner includes a variety of weight or "bench press" benches in his request, including single units, combination units/bench press leg extension-leg curl devices, flat, inclined, adjustable, and non-adjustable devices. This description of products includes some benches that may or may not have uprights included with the bench, although uprights should be used when performing certain exercises, e.g., a military press, on a bench.

Some market information is available for broad categories of products e.g. "fitness equipment," "gym/exercise equipment" or "exercise benches," but there is no readily available information on the individual products. The exercise bench category includes equipment such as dumbbell benches and sit-up benches, as well as bench press benches. The estimates provided below therefore contain an unknown proportion of products that may be outside the scope of this petition.

Estimates of shipments (including past shipments) in conjunction with estimates of expected useful life can provide us with estimates of the numbers of exercise benches in use. Total wholesale shipments of "exercise benches," which would likely include bench press benches, were about \$150 million in both 2001 and 2002 according to the SGMA 2003 Recreation Market Report. While retail prices for exercise benches range from about \$60 to \$500 or more, many models in internet listings are in the \$100-\$200 range. Also, special attachments (arm curls, for example) are often offered as options for weight benches. If we assume an average retail price of \$150, then the wholesale price might be approximately \$75. Unit

shipments would then amount to about 2 million units annually (\$150 million wholesale shipments/ \$75 estimated wholesale price).

Product life is likely to be somewhat variable, in view of the large variations in retail prices. A \$600 bench is likely to have a longer useful life than a \$60 bench. Based on analogous products (e.g., bicycles) with similar price ranges, we assume a product life range of 6-8 years. We estimate past shipments using straight-line projections based on SGMA statistics of increases in numbers of participants since 1990. The Product Population Model estimates the number of exercise benches in use in 2003 at 12-15 million, using these parameters. The actual number of bench press benches, as opposed to the more general category of exercise benches, is likely to be somewhat smaller.

Another approach to estimating the number of bench press benches in use is to examine available market research survey data. The SGMA Sports Participation Topline Report, 2003 Edition, estimates the number of users of barbells at about 25 million. Not all users of barbells will have their own weight benches, so the number of weight benches in homes is likely to be less than 25 million. A summary of a study done for SGMA International, "Trends in Free Weight Training Participation – August 2002, American Sports Data, Inc.," states that 40 percent of free weights users exercise at home and 20 percent at a commercial health club. Information was not provided on the remaining 40 percent of users, but presumably they use other facilities including schools, public and private recreation centers, and employee exercise facilities. Thus, if each home free weight user owned a bench press, there would be about 10 million bench presses in homes (25 million barbell users x 40% who exercise at home). We assume that a high proportion of these 10 million home users, say 60 percent to 90 percent (or 6 to 9 million), own bench press benches. Health clubs, schools, recreation centers, and other types of gyms account for the other 15 million users (25 million barbell users x 60% who do not exercise at home). There are perhaps 30,000-50,000 of these facilities and there are unlikely to be more than three or four bench press benches in each facility. Thus, the number of bench press benches outside homes could be 90,000-200,000. Including these bench presses outside the home may raise the total for bench press benches to 6.1 to 9.2 million of the 12-15 million exercise benches estimated by the Product Population Model; the remainder accounted for by the various types of benches used without uprights in homes, gyms, or other facilities.

We have not made an attempt to distinguish consumer-oriented products from "professional" products. The inexpensive products are clearly oriented toward the home user, and a number of manufacturers have separate consumer and professional lines of equipment. However, the more expensive products are used by consumers at health clubs, gyms, hotels, etc., even if they are not necessarily purchased by consumers.

Table 1 identifies manufacturers, private labelers or wholesalers of bench press benches from an SGMA magazine listing of the 50 leading fitness equipment manufacturers, along with 2002 revenues. A firm may manufacture certain fitness products, but only distribute others, which is the reason for characterizing the firms from the SGMA list as manufacturers, wholesalers or private labelers. Firms were eliminated from the SGMA listing as manufacturers or private labelers of bench press benches by reviewing the product lines on their websites. In

most cases, firms were eliminated because they did not produce or private label any type of bench.

The list may not be comprehensive. For example, some brand names were listed on several retail sites, but could not be linked to a manufacturer or private labeler. Some firms in the SGMA listing could not be readily identified, but may have been acquired by other firms or gone out of business. The revenue figures from the SGMA magazine include products other than benches, such as treadmills, and the revenues for bench press benches may be a small fraction of the total.

Table 1: Manufacturers of Fitness Equipment and Revenues from Fitness Equipment

Manufacturers/Brand Names	2002 Fitness Equipment Revenues in Millions of Dollars
Icon/Weider/Reebok/Image/Gold's Gym	896
Nautilus	585
Life Fitness	457
Cybex	82
Keys	50
York Barbell	50
Stamina Products	36
Impex/Marcy/Competitor/Powerhouse	34
Extreme Performance Products	20
Tuffstuff	20
Paramount	15
Hoist Fitness	10
Cap Barbell	7
Universal Gym Equipment/Spartan	7
Quantum	4
Body Solid	3

Source: Sports Edge Magazine, July 2003

According to the SGMA magazine, retailing of fitness equipment is dominated by the mass merchandisers (Wal-Mart, Kmart, Target, Sears), video/internet stores (QVC, HSN, E-Bay), and big box stores, such as Sports Authority. There are a number of smaller regional retail chains, which also have substantial sales of fitness equipment.

Preliminary Societal Cost Estimates of Weight Bench Injuries and Deaths

Based on NEISS data for the period January 1, 1999 through December 31, 2002, Epidemiology staff estimate a range of 1-4 deaths per year that could potentially be associated with bench-press benches (January 27, 2004 memorandum written by L. Hooper). The benefits of preventing these deaths using a statistical valuation of life of \$5 million would amount to \$5-\$20 million annually.

Epidemiology derives estimates of the addressable injuries by excluding injuries other than frontal head, neck and torso injuries and excluding most strains and sprains. Further analysis of the hazard patterns produced a range of addressable injuries from 340 (most likely to be in the hazard pattern) to 3,820 (upper bound of injuries addressed). From these 340 to 3,820 emergency room injuries, the Injury Cost Model projects 820 to 9,230 medically treated injuries with associated injury costs of \$15-165 million. Thus, total annual societal costs for injuries and fatalities that might be addressed by the petition would range from about \$20 million to \$185 million. The societal cost per product in use per year would range from roughly \$2 (\$20 million/9.2 million bench press benches in use) to \$30 (\$185 million/6.1 million bench press benches in use).

TAB D

Human Factors (ESHF) Staff Memorandum



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: April 1, 2004

TO : Timothy P. Smith, Project Manager
Division of Human Factors

THROUGH: Hugh McLaurin, Associate Executive Director *Hm*
Directorate for Engineering Sciences

Robert B. Ochsman, Ph.D., Director *BO*
Division of Human Factors

FROM : Catherine A. Sedney, Engineering Psychologist *CS*
Division of Human Factors

SUBJECT : Petition for Labeling of Bench Press Benches (CP 03-3)

Background

In July of 2003, V. Patteson Lombardi, Ph.D., petitioned the Commission to require "a bright red warning label," similar to that shown below, on both uprights of all "manufactured, publicly available" weightlifting bench press benches. As described in the Federal Register notice, the label is intended to address the risk of asphyxia/anoxia that may result when a consumer is trapped under a barbell (68 FR 42692, July 18, 2003). This event is precipitated when, while using free weights to perform bench presses without a spotter, the user loses control of the barbell. If the user is unable to lift the weight, or shift it away from his body, it can compress the chest, preventing inhalation, or the neck, inhibiting the flow of blood and/or air. Further, if the user drops the barbell, the impact may result in crushing injuries to the trachea (windpipe) or chest, which in turn would lead to asphyxia/anoxia.

WARNING: FATAL DANGER

This equipment has been associated with death when adults use without a spotter, or children are unsupervised. Please use only according to manufacturer's guidelines. It can make the difference between life and death.

In a subsequent comment, Dr. Lombardi suggested optional locations for the label, such as the padded surface of the bench. The Commission received no other comments on the petition.

Incident Data

The petition includes a list of fatalities involving exercise equipment that had been reported to the CPSC. Several of these reflect the asphyxiation scenario specified in the FR notice. EPHA staff searched the Commission databases and identified additional fatal and non-fatal incident reports (IPII, DTHS, and INDP), and provided national estimates of emergency room visits due to injuries related to this product area (NEISS) (Hooper, 2004).

IPII, DTHS, and INDP Cases

These databases contained 21 reports of fatalities associated with weightlifting activities, apparel, or equipment (product code 3265) between 1/1/99 and 12/31/02. Of these, the four cases described below appear to reflect the "loss of control" scenario, and specifically cite: 1) a bench and 2) asphyxiation consequent to weights or weighted barbells compressing the victim's neck.

- A 31-year-old male was found, at home, on a weight bench with a barbell across his neck. The barbell, weighted with 335 lbs., was supported at one end by a spotter stand; the opposite end was on the floor. The matching support stand was angled away from the bench (000512HCC2530; 9939006978).
- A 70-year-old man was found in his garage lying on a bench press with a barbell weighing 100 lbs. balanced across his neck. The medical examiner's report states that the evidence suggests that the victim "...an experienced weight lifter, suffered an unexpected cardiac event, relaxed his arms and allowed the barbel [sic] to come to rest on his neck, causing accidental asphyxia" (X0141319A; 0151003615).
- A 50-year-old man was found in his basement "...with bar (60 lbs) across chest/neck pushed against bench [sic]" (X0252368A).
- A 45-year-old man was found at home lying on a metal weight bench with a metal weight bar resting on his neck (X0320711A).

A fifth fatality, one included in the petitioner's list, involves a weight bench and barbells, but the victim was a young child who was not using the equipment; the incident thus differs markedly from the principle scenario defined in the petition.

- A four-year-old child was found gasping on the floor in her father's workout room (bedroom) near a metal bench. A barbell and weights estimated to weigh a total of 140 lbs. was on the floor near her. The weights had been supported on the bench. A rusted weld joint apparently failed, causing the bench to collapse, and the weights fell, crushing the girl's chest (X00B5247A; 001117HCC0104).

In six other cases, the records are suggestive in that death resulted from asphyxiation related to weights or weightlifting, but use of a bench is not specified.¹ Five of these describe weights

¹9919024001 0019022969 0126003501
X0194164A 0226041644 0206165497

falling on or compressing the victim's neck, while the sixth is simply reported as accidental asphyxiation due to weightlifting. Among this group is one in which the medical examiner attributed the incident to amantadine² intoxication, the possible side effects of which (e.g., tremor, difficulty breathing, fainting, seizures) may have resulted in a loss of motor control or loss of consciousness (S. Inkster, Ph.D., Directorate for Health Science; personal communication, 12/03). Five additional cases involve, or probably involve, weight lifting, and could involve loss of control of free weights while using a bench, but the available information is either unclear or insufficient to make a determination.³ The remaining five cases appear unrelated⁴ to the hazard scenario described in the FR notice.

In 14 of the 16 cases that may be pertinent to the petitioner's concerns, the victims were adult males ranging in age from 19 to 70 (mean = 38). Two cases involved children; one is the four-year-old girl cited above, and the other, a 15-year-old boy for whom the cause and circumstance of death (described as "probably weightlifting") is unknown. Thirteen of the reports also specify a home setting (e.g., basement, garage, yard, bedroom); the location is not given for three cases. When reported, the weights apparently in use ranged from 50 to 450 lbs.

Thirty-two non-fatal incidents associated with the product code also were identified in these databases. Of these, one appears relevant in that it involved a weight bench. However, it reportedly involved the collapse of "the metal frame holding the weights." The complainant was present, but no injury occurred because the product was not in use at the time.

In summary, for the four-year period evaluated, the databases contain 16 incidents, all fatalities, that may be relevant to the petition. Of these, one, and possibly two, involved⁵ equipment failure, one was attributed to cardiac failure, one to overdose of a prescription drug, and the relevance of five is questionable.

NEISS Data

In its memorandum, EPHA staff presents estimates of the number of consumers who visited emergency rooms in 2002 due to incidents deemed relevant, or potentially relevant, to the petition.⁶ EPHA estimates that 340 emergency room visits were most likely associated with loss of control of free weights during use of a weight bench (Category 1). An additional 3,480 emergency room visits could have involved this scenario (Category 2). Of this estimated 3,820

² The death certificate cites multiple sclerosis, certain symptoms of which are treated with amantadine, as a contributing condition.

³X9993272A 0036038665 N00C0316A
X0320711A X0173374A

⁴These included three incidents of strangulation (X0152353A, X0083655A, and N0070261A); one case involving the collapse of a glider-style exercise machine (X99A3590A); and one described as "fell on weight lifting equipment" with shock as the cause of death (0112086274).

⁵ The design of the spotter support, and why one side of it was angled away from the bench is not detailed in IDI 000512HCC2530. It is not clear if there were two independent supports, one of which fell over, or if the two sides formed a single unit, one side of which failed.

⁶ EPHA screened NEISS cases involving weightlifting activities, apparel, or equipment (product code 3265) to eliminate cases that were clearly unrelated to the petition. EPHA, HS, and ESHF staff reviewed the remaining incidents to identify those that either most likely involved (1) or possibly involved (2) the product and pattern identified; incidents that could not be placed in either category were deemed out of scope.

consumers, 95% were treated and released, or examined and released without treatment. The remainder were hospitalized, or treated and transferred.

Discussion

The petitioner's proposed label identifies two potentially hazardous scenarios involving weight benches and free weights. The first is use of the bench, presumably to press weights, without a spotter. The second is the unsupervised interaction of children with a bench and the weights it may be holding. This response will focus on the former. In the petition itself, Dr. Lombardi does not address deaths and injuries involving unsupervised children. For this reason, Office of General Counsel staff determined the topic to be outside the scope of the petition, and staff did not evaluate incidents involving children unless the available information suggested the "loss of control" hazard scenario. However, inclusion of the issue in the proposed label indicates the petitioner's concern, and warrants a brief response regarding the potential effectiveness of a label to prevent incidents among children.

Use of Bench without a Spotter

The petition is based on the premise that a warning label will persuade people to avoid using a weight bench to lift weights except when a spotter is present. Considerable research is available on consumer response to warnings and other types of safety information in a wide variety of circumstances. Based on this literature, and to a lesser extent, the available incident data, it seems unlikely that a label would achieve the petitioner's desired result.

To be effective in preventing injury or death, a warning must persuade users to comply consistently with its instructions. Compliance is difficult to achieve because it is dependent largely on the perceptions, beliefs, and attitudes of the users, rather than their knowledge of hazards per se. In basic terms, people subjectively weigh the costs of compliance with a warning against the risks of non-compliance; if the costs are perceived as outweighing the risks, compliance is unlikely (Wogalter, 1994). These two factors, perception of risk and cost of compliance, are discussed below.

Compliance is directly related to the level of risk users perceive in the hazardous situation to which the warning refers, which is influenced by a number of product- and user-related factors. Variables inherent in the circumstances specific to the petition are likely to cause users to perceive the overall level of risk as low, and suggest that a warning label would have little effect on their behavior. It seems unlikely that consumers would regard either the product, a weight bench, or weightlifting, as an activity, as very hazardous. Although training injuries such as strains and sprains are commonplace, consumers in general are unlikely to associate use of a bench and free weights with more serious trauma-related injury or death.

Adding a warning to correct consumers' understanding of the risk of lifting weights without a spotter, and specifying that death is a possible consequence, would not necessarily alter either perceptions or behavior. First, people tend not to notice or read warnings on products they perceive to present a low level of hazardousness. Further, a robust finding in the literature is that familiarity with a product or activity is inversely associated with perceived hazardousness. Hence, a product will seem safer as one gains experience using it (or a similar product, e.g., Godfrey & Laughery, 1984), even when warnings are present. This is reflected in users'

behavior even with products that present obvious hazards. For example, Otsubo (1988) found that experienced users of power saws were less likely to read and follow safety instructions than were novices.

One explanation for this is that people tend to dismiss warnings that contradict their experience. The type of experience one has is, of course, important. Benign experience, in which one uses a product without incident, promotes a sense of confidence, lowers perceived hazardousness, and ultimately reduces warning compliance. Research on the effect of prior injuries is mixed; however, they do not necessarily increase safe behavior, even with relatively high-risk activities (DeJoy, 1999; pp. 235-236). Additionally, minor injuries may create or reinforce users' perception that they are unlikely to be seriously hurt or killed, and that they, therefore, are at little risk.

The NEISS reports are relevant here because they describe incidents of sufficient concern to send users to the emergency room, but from which fatalities are typically excluded.⁷ The 12 incidents on which the EPHA Category 1 estimate (Hooper, 2004) is based closely match the pattern of user loss of control of a weighted barbell. In these cases the victim was struck in the head, face, or chest by a bar, barbell, or weights, while "benching" or "bench-pressing".⁸ Two of the incidents occurred in schools, and one, at home; the location was not specified for the other nine cases. When reported, the amount of weight being lifted ranged from 85 to 275 lbs. One of the injuries was potentially serious (concussion); the others were minor (e.g., contusions). In each case, the victims were either treated and released, or examined and released without treatment. The incident descriptions have too little detail to determine if the victims were lifting without a spotter, and it seems likely that in at least in a school setting, a spotter may have been present. However, it may be important that victims suffered only minor injuries after being struck by significant amounts of weight. Based on the estimates, events of such little consequence seem relatively common compared to fatalities. If users are familiar with such incidents, they may perceive strong warnings as exaggerating the risk of using a bench without a spotter.

The foregoing addresses users' assessment of risk in terms of external factors. Equally important are users' evaluation of themselves and their abilities, and their personal sense of risk independent of their knowledge of possible outcomes. Research suggests that most people tend to be unrealistically optimistic in judging their personal level of risk for adverse outcomes (DeJoy, 1999; p. 235). This sense of confidence is most clear in research related to driving. When people are asked to judge themselves as drivers, 75 to 90% believe they are safer and more skillful than other drivers (Svenson, 1981; as cited by DeJoy, 1999, p. 198). Particularly relevant to the group at risk for weightlifting injuries, males tend to be more confident of their abilities both to avoid hazards and to use products without experiencing negative consequences (DeJoy, 1999, citing Friedmann, 1988; Young, Martin, & Wogalter, 1989; and Vredenburg & Cohen, 1993; p. 235). There are sure to be differences among users, however, lifting weights may generate a sense of personal competence that would contribute to an optimistic self-appraisal in this context. It seems likely that the typical user in the home setting, even despite knowledge of the possibility of death, would judge himself capable of either avoiding or effectively handling an unexpected loss of control.

⁷ Because the NEISS database contains reports of emergency room visits, it typically does not capture incidents resulting in deaths at the scene, or deaths that occur subsequent to admission.

⁸ Although the NEISS database is representative of emergency room visits, due to the small numbers involved, discussion of these cases is intended for descriptive, not statistical, purposes.

The preceding assessment indicates that users are likely to believe that ignoring the warning entails little personal risk. This alone suggests a low likelihood that a warning would be effective. An equally important factor that interacts with risk perception is the user's appraisal of the cost to comply with the instructions in the warning. Common costs include time, money, effort, and convenience. Not surprisingly, the higher the cost, the lower the likelihood of compliance, and even minor increases in cost can significantly reduce the likelihood of compliance. For example, research with safety equipment suggests that virtually any type of discomfort, restriction of movement or freedom or other encumbrance can serve as a barrier to compliance (DeJoy, 1999; p. 201). In the main scenario addressed in the petition, compliance requires that one use a spotter while using the bench-press bench to lift weights. A principle advantage of any home fitness equipment is that it is available for use, in private, when the consumer is ready to use it. To restrict use of a weight-lifting bench to times when one has a spotter on-site eliminates that advantage. At the very least, one loses the convenience of being able to work out without regard to the availability of another person. At worst, it may be impossible to schedule a spotter routinely, leaving one unable to complete a workout and still comply with the warning. One might even attempt to comply by simply avoiding barbell-pressing maneuvers, which entail the most risk, unless one has a spotter. This, however, would eliminate a category of exercises critical to the development of the upper body. As this is a principle purpose of strength training with free weights, users are likely to view the cost of complying with the warning regarding spotters as prohibitive.

In summary, the label requires a compromise that is costly in order to address a risk that users are likely to perceive as small. This assessment does not dismiss the hazard or the value of a spotter: If one assumes that the incidents identified in the databases match the petitioner's scenario, it seems obvious that the presence of a capable spotter might have prevented or mitigated the effects in each case. However, nothing in the literature suggests that a spotter would have been present to assist the user had the bench included a warning that instructed as much.

Supervision

As with a warning to use a spotter, the cost of compliance and the perception of risk are relevant to a warning advising adults to supervise children. However, compliance requires a qualitatively and quantitatively different response, and the likelihood that it would mitigate risk is perhaps even lower. Compliance with a warning to use a spotter is a relatively simple matter of not using the equipment except under the specified condition. In contrast, compliance involving supervision is part of an ongoing process within the household, and is subject to a variety of influences that may not be under the caregiver's control (e.g., fatigue, distraction, the actions of other adults and older children, etc.). Even close, high-quality supervision can fail because "constant vigilance" is physiologically impossible, and events resulting in injury happen quickly. Note that the incident that resulted in the death of the four-year-old (X00B5247A; 001117HCC0104) would not have been prevented by close supervision; a weld failure of the type reported happens too quickly to allow intervention. Enforcement of rules restricting children from the room might have reduced exposure to the hazard, however, that strategy has obvious weaknesses. Only by making the equipment inaccessible, by locking it away or otherwise modifying the environment so that the bar and weights could not fall, would the child have been protected. Warnings specifying this type of protection, that is, to keep children away

from a product, are ubiquitous, yet injuries to children involving labeled products are commonplace. Therefore, a label addressing this hazard seems unlikely to yield changes in supervision or a reduction in deaths or serious injuries.

Summary and Conclusion

The research literature on warnings indicates that compliance tends to be low when users perceive their risk to be low and the cost of complying with the warning to be high. This characterization seems generally applicable to the circumstances addressed in the petition, and suggests that a warning label is likely to have little effect on use of a weight bench and free weights without a spotter. Similarly, a warning label that admonishes users to supervise children is unlikely to affect the injury and death rate among children exposed to weight benches and free weights.

A reasonable response is that although there is little chance it will be effective, a label may serve at least to raise awareness, and can do no harm. This may not be the case. Reviews of the literature have raised concerns that the large number of warnings to which consumers are exposed dilutes the effectiveness of warnings in general. Reported and potential negative effects of overuse of warnings include reduced attention to warnings generally; reduced attention to individual messages within warnings; reduced recall of some messages; reduced credibility of warnings; reduced ability to differentiate the relative magnitude of risks; and undue reliance on the completeness of warning labels (Frantz, Rhoades, Young & Schiller, 1999). Requiring a warning that promises little likelihood of influencing behavior would seem to contribute to these possible effects rather than adding a measure of safety.

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TAB E

Public Comment

From: Pat Lombardi [mailto:lombardi@oregon.uoregon.edu]
Sent: Sunday, October 12, 2003 8:09 PM
To: Stevenson, Todd A.
Subject: Petition CP 03-3, Petition for Labeling of Bench Presses Benches

October 12, 2003

Todd A. Stevenson
Office of the Secretary
US Consumer Product Safety Commission
Washington, DC 20207
Phone: 301-504-0800
Facsimile: 301-504-0127

Dear Mr. Stevenson & Members of the US Consumer Product Safety Commission
Review Board:

Please forward/distribute this communication to all Review Board Members of the Commission. Over the past 2 months, I have attempted on several occasions to send directly (by electronic mail) a copy of our presentation at the 50th Annual Meeting of the American College of Sports Medicine (Session E-14B, Free Communication Slide, Epidemiology, 10:15 am, Friday, May 30, 2003, Moscone Center, San Francisco, CA). Unfortunately, the size of the presentation was so large as to limit its transmission. So that all, including members of the general public, could have easy access, I have established with help of our Instructional Media Center staff, a website containing the complete presentation. The website currently has all slides used in the presentation, and will have the corresponding audio of the presentation and discussion included within a week or so. In the meantime, should you desire to see the visual component of this developing website, you can do so at:

<http://darkwing.uoregon.edu/~lombardi/lombardiacsm03v1.ppt>

While the original petition requested a warning label on both uprights, the Commission may want to consider also the advantages and disadvantages of requiring a large warning label on the bench press pad at head and neck level--the site which may (1) be most highly visible from all viewpoints, (2) provide for the most surface area for a warning label, and (3) have the most powerful impact since it indicates accurately the anatomical sites where deaths have occurred.

Please let me know if you need additional information or materials. Thank you sincerely for your efforts in making weight training safe and effective for all Americans.

Sincerely,

Pat Lombardi

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