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ADVISORY PANEL MEETING

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P R O C E E D I N G S (11:30 a.m.)

MS. NASHMAN: Good morning, almost good afternoon everybody. We are ready to begin this meeting of the Orthopaedic and Rehabilitation Devices. My name is Jodi Nashman. I'm the executive secretary of this panel. I am a medical engineer and a reviewer in the Orthopaedic Devices Branch.

I would like to remind everyone that you are requested to sign in on the attendance sheets, which are available on the tables by the door.

You may also pick up an agenda and information about today's meeting, including how to find out about future meetings through the Advisory Panel phone line, and how to obtain meetings' minutes, transcripts, or videos from this meeting.

I'm going to read two statements that are required to be read into the record, the deputization of temporary voting members statement, and the conflict of interest statement.

"Appointment to temporary voting status. Pursuant to the authority granted under the Medical Devices Advisory Committee charter dated October 27, 1990, as amended April 20, 1995, I appoint the following people as voting members

of the Orthopaedic and Rehabilitation Devices Panel for the January 12, 1998, session of the panel meeting: Harry B. Skinner; Dr. Michael J. Yaszemski; Dr. Albert Aboulafia; Dr. Marcus Besser; Dr. James Hill; Dr. David Nelson; Dr. Steven Stern; Dr. Richard Friedman, who has recused himself from participation in shoulder reclassification."

"For the record, these people are special government employees, and are consultants to this panel under the Medical Devices Advisory Committee. They have undergone customary conflict of interest review. They have reviewed the materials to be considered at this meeting."

"Also, because the position of panel chairperson for the Orthopaedic and Rehabilitation Devices Panel is currently vacant, I appoint Barbara D. Boyan, Ph.D., to act as temporary chairman for the duration of the meeting on January 12. For the record, Dr. Boyan is a special government employee, and is a voting member of the Orthopaedic and Rehabilitation Devices Panel. Dr. Boyan has undergone the customary conflict of interest review. She has reviewed the material to be considered at this meeting."

This is signed, D. Bruce Burlington, M.D.,
Director, Center for Devices and Radiological Health. It is dated January 7, 1998.

"In addition, pursuant to the authority granted under the Medical Devices Advisory Committee Charter of the Center for Devices and Radiological Health, dated October 27, 1990, and as amended April 20, 1995, I appoint Philip D. Lavin, Ph.D., as a voting member of the Orthopaedic and Rehabilitation Devices Panel for the duration of the meeting on January 12 and 13. For the record, Dr. Lavin is a consultant to the Center for Drug Evaluation and Research. He is a special government employee who has undergone the customary conflict of interest review, and has reviewed the material to be considered at this meeting."

This is signed Michael A. Friedman, M.D., Lead Deputy Commissioner, and it is signed January 8, 1998.

Additionally, we have the conflict of interest statement. The following announcement addresses conflict of interest issues associated with this meeting, and is made part of the record to preclude even an appearance of impropriety. To determine if any conflict existed, the agency reviewed the submitted agenda and all financial interests reported by the committee participants. The conflict of interest statutes prohibit special government employees from participating in matters that could affect their or their employers' financial interests.

Due to this prohibition, Dr. Richard Friedman will not participate in matters related to shoulder reclassification during today's sessions, however, the agency has determined that the participation of certain members and consultants, the need for whose services outweighs the potential conflict of interest involved is in the best interest of the government. Waivers have been granted for Drs. Phil Lavin, Harry Skinner, David Nelson, Steven Stern, and Richard Friedman because of their interest in firms which could potentially be affected by the panel's decisions.

The waivers granted for Drs. Lavin, Skinner, Nelson, and Stern permit them to participate in all matters before the panel during today's session. The waiver granted for Dr. Friedman allows him to participate in all matters related to elbow reclassification. Copies of these waivers may be obtained from the agency's Freedom of Information Office, Room 12A-15 of the Parklawn Building.

We would also like to note for the record that the agency took into consideration other matters regarding Drs. Barbara Boyan and Phil Lavin. Drs. Boyan and Lavin reported involvements with firms at issue, but on matters unrelated to the meeting's agenda. Since the matters are not related

to the specific issues of this meeting, the agency has determined that Dr. Boyan and Dr. Lavin may participate fully in today's deliberations.

In the event that the discussions involve any other product or firms not already on the agenda for which an FDA participant has a financial interest, participants should excuse himself or herself from such involvement, and the exclusion will be noted for the record.

With respect to all other participants, we ask in the interest of fairness that all persons making statements or presentations disclose any current or previous financial involvement with any firm whose products they wish to comment upon.

Before turning the meeting over to Dr. Boyan, I would like to introduce our panel members who are generously giving their time to help the FDA in matters being discussed today. I was initially planning to introduce everybody, but I think in the interest of people getting to see and hear each other, and for the public to hear who is who, I am going to ask each panel member to introduce him- or herself and give a brief explanation of his or her expertise.

I'll start with Dr. Boyan to my right.

DR. BOYAN: I'm Dr. Barbara Boyan. I'm professor

of orthopaedic surgery at the University of Texas Health Science Center at San Antonio, and director of orthopaedic research there. I also have an interest as chairman of the board, in a company, Osteobiologics(?), which is a company that is developing tissue engineering products. My research expertise is in the area of bone and cartilage biology. I'm a cell biologist, as well as in reconstructive devices, the design of those devices, and the use of cells with the devices for enhancing tissue repair.

Dr. Besser.

DR. BESSER: I'm Dr. Marcus Besser. I'm assistant professor of physical therapy at Thomas Jefferson University. My background is in biomechanics and mechanical engineering. Most of my work has been done in lower extremity biomechanics and gait and motion analysis, and evaluation of human performance.

DR. SKINNER: My name is Harry Skinner. I'm professor of mechanical engineering and orthopaedic surgery at the University of California-Irvine. My research interests involve gait analysis, biomechanics, biomaterials, joint reconstruction, that sort of thing.

DR. FRIEDMAN: My name is Richard Friedman. I'm a professor of orthopaedic surgery at the Medical University

of South Carolina, and a professor of bioengineering at Clemson University in Clemson, South Carolina. My clinical interests include lower extremity joint reconstruction, hips and knees, as well as shoulder and elbow surgery and reconstruction. My research interests focus on biomaterials and biomechanics related to joint replacement.

DR. ABOULAFIA: My name is Albert Aboulafia. I am a member of the orthopaedic department at Emory University School of Medicine in Atlanta, Georgia. My interests and expertise focus on orthopaedic oncology, as well as traumatology, and I do some elective reconstructive surgery.

DR. WITTEN: I'm Celia Witten, division director of the Division of General and Restorative Devices at FDA.

DR. SILKAITIS: I'm Ray Silkaitis. I'm the industry representative for the panel. I'm vice president of medical and regulatory affairs at Gliatech, Incorporated.

DR. HOLEMAN: I'm Doris Holeman. I coordinate the graduate nursing program at Albany State University in Albany, Georgia. I also serve as project director for the nursing screening clinic at Albany State University.

DR. NELSON: I'm David Nelson. I'm an orthopaedic hand surgeon in private practice in San Francisco. My research interests are in distal radius fractures, wrist

biomechanics, and tendon healing.

DR. LAVIN: My name is Philip Lavin. I'm a biostatistician with Boston Biostatistics, and I'm on the faculty at Harvard Medical School. I'll be serving as the biostatistics consultant today.

DR. YASZEMSKI: I'm Michael Yaszemski. I'm an associate professor of orthopaedic surgery and bioengineering at Mayo Clinic in Rochester, Minnesota. My clinical practice is joint reconstruction and spine surgery. My research interests are biomaterials, and bone regeneration using tissue engineering techniques.

DR. STERN: Hello, I'm Steven Stern. I'm an associate professor of clinical orthopaedics at Northwestern University. My interests are lower extremity orthopaedics with total hip and total knee replacements. My research interests are computer modeling of joint replacements.

DR. HILL: Hi, my name is Dr. James Hill. I'm a professor of orthopaedic surgery at Northwestern University. My primary interest is athletic orthopaedic injuries to the shoulder and the lower extremities.

MS. NASHMAN: Thank you all very much. At this time, I would like to turn the meeting over to Dr. Boyan, the chairperson for this meeting.

DR. BOYAN: Good morning. My name is Dr. Barbara Boyan, and I am the acting chairperson for the meeting. Today we will be making recommendations to the Food and Drug Administration on two reclassification petitions. First, the non-/semi-constrained shoulders, and second, elbows.

I would like to note for the record that the voting members present constitute a quorum as required by 21CFR part 14.

Agenda Item: Open Public Hearing

We will now proceed with the open public hearing session of this meeting. I would ask at this time that all persons come forward and speak clearly into the microphone, as the transcriptionist is dependent on this means of providing an accurate record of the meeting. When you do speak, we are requesting that as you make these statements, that you disclose whether you have financial interests in any medical device company.

Also, before making your presentation to the panel, in addition to stating your name and affiliation, please state the nature of your financial interest, if any.

Is there anyone wishing to address the panel? Do I see any hands being raised?

Since there are no requests to speak in the open

public hearing, we will now proceed to the open committee discussion. I would like to introduce Mr. Mark Melkerson, branch chief of the Orthopaedic Branch.

Mark.

Agenda Item: Open Session: Reclassification of Non- and Semi-Constrained Shoulder

MR. MELKERSON: Thank you, and good morning. I'll make this very brief and get us back on schedule, Barbara, if that is to your liking.

After each panel meeting we try to provide you with a quick update of what happened at previous meetings, also identify issues with staffing. I'm Mark Melkerson, the branch chief of the Orthopaedic Devices Branch. The staffing chart is kind of small, but the main points of interest here, this panel deals with the Orthopaedic Devices Branch and also the Restorative Devices Branch.

Today and tomorrow you will be hearing presentations from Mr. Ted Stevens, Mr. Haney Damion(?), Mr. Peter Allen, Mr. Ken McDermott, who is not with us at the moment, Dr. Orlee Panish(?), and Nadine Sloan. Dr. Witten is our division director of the four branches.

The last committee meeting, which was just before Christmas, was December 11 and 12. we had a general

discussion on the minimum acceptable follow-up lengths for patients for spinal implants. We also had discussions on three PMAs. The status of the latter is we have been in contact and discussions with each of the manufacturers to get their products to the next stage.

As has been discussed, there are four petitions before the panel proposing reclassification of preamendments and postamendments devices. Each of these petitions may contain multiple device types, which can be combined or stratified as the panel sees fit. Also, there is a classification of an unclassified preamendments device as well, which we will go into tomorrow.

The preamendments devices that we will be dealing with are: constrained elbows for cemented use, both non-constrained and semi-constrained. Just to make a correction, earlier we just mentioned constrained/non-constrained shoulders. Then patello-femoral, semi-constrained shoulders for cemented use.

In the postamendment device area there are again, non-constrained, semi-constrained shoulders for the uncemented use; patello-femoral, semi-constrained, uncemented use; then as The Federal Register notice identified, it said uni-, but it is unicondylar and total

patello-femoral knees.

Just for an example, the postamendments uni- and total patello-femoro-tibial knees have both cemented and uncemented in this postamendments grouping. Under total and unicondylar it identifies both fixed and mobile bearing. The unicondylar also identified fixed and mobile bearing. Under cemented it identifies mobile bearing and unicondylar mobile bearing.

With that, I turn it back to the chairperson.

DR. BOYAN: Thank you, Mark.

I would like now to have us adjourn for lunch for about one hour, reconvening here at exactly ten minutes until one.

[Whereupon the meeting was recessed for lunch at 11:45 a.m., to reconvene at 1:00 p.m.]

A F T E R N O O N S E S S I O N (12:47 p.m.)

MS. NASHMAN: [Administrative remarks.]

DR. BOYAN: We will now begin the discussion of the first reclassification petition for the non- and semi-constrained shoulder. We will begin with the petitioner's presentation, followed by the FDA presentation. We will then have a general panel discussion of this topic, followed by panel discussion aimed at answering FDA's questions. We will finish by going through the reclassification worksheet and supplemental worksheet, and voting upon our recommendation.

I would like to remind the public observers that while this portion of the meeting is open to public observation, public attendees may not participate except at the specific request of panel.

The first presentation will be the petitioner presentation from OSMA. I'll remind you to introduce yourself, state your relationship to a company, if any.

Agenda Item: Open Session - Reclassification of Non- and Semi-Constrained Shoulder, Petitioner Presentations

MR. SMITH: Good afternoon, members of the panel, representatives of FDA, ladies and gentlemen. I'm with

Helmedica(?), but I'm here as a representative of the Orthopaedic Surgical Manufacturers Association for your review of the reclassification petition on orthopaedic shoulder prostheses.

With me to participate in the presentation is Dr. Alan Wilde, who will be discussing the clinical aspects of the petition. Also present are Gretchen Rhodes, group director of research director of technology for Smith and Nephew Orthopaedics, and Denice Murphy, an independent consultant who assisted in preparing the petition. Ms. Rhodes and Ms. Murphy may participate in the discussion section of this review.

I will outline the petition and present the regulatory issue; Dr. Wilde will then discuss the clinical information.

In the preparation of this petition, we sought input from FDA on the informational content required for the petition. Drafts of the petition were circulated to the American Society for Testing and Materials, as well as to the Orthopaedics Research Society. In addition to review by the surgeons under the auspices of the ORS, the petition was reviewed by other surgeons familiar with shoulder arthroplasty. Input from all of these sources has been

incorporated into the petition.

Total shoulder protheses; the function of these devices is to replace the humoral head and articular surface of the glenoid. They have had 15 to 20 plus years of clinical use. As a point of reference, the Neer shoulder was developed in 1970, and for as further examples, the monospherical shoulder in 1981, the DANA in 1982. The message here is that these types of implants have a long history of clinical use.

There is a limited patient population for these devices. The figures you see up there are for 1995, and they give you a comparison between the number of total shoulder procedures done, and the numbers of procedures for total knees and total hips. Although it is not up there, the number for partial shoulder replacements, that is humeral replacements is 7,4000.

The devices that are affected by this petition. There are 59 currently cleared devices referenced by the petition, of which 47 are total shoulder devices and 12 are hemi-shoulder humeral devices. There are other devices on the market which actually predated the Medical Device Amendment, so the number is actually higher. These devices have all effectively been cleared as 510(k)s and have been

on the market, as I said, for many years.

The regulatory action this is required is brought about by the fact that total shoulders have a special status. There are what is called Preamendment Class III devices. FDA is under a legal requirement either to reclassify these into Class II, or to call for PMAs.

Now the size of the patient population for total shoulders is such that they really will not support the type of data requirements that are generally called for in Class III in terms of numbers of patients and follow-up. Were FDA to institute such a call for PMAs, there would very likely be no response, and the result would be that legally the devices would have to be taken off the market. So the reason we are here today, the reason for the petition is to demonstrate that these devices can be safely regulated as Class II devices.

The classifications of shoulders are a little complicated, so I thought it would be wise to go through them. There are five separate classes of shoulders: three total shoulders and two hemi-shoulders. The total shoulders are basically cleared for cemented use. The humeral hemi-shoulders are cleared for press fit, but not for bone cement.

The devices that are actually the subject of the petition are those which appear in the boxes. Constrained shoulders are a type of device which did exist. There were a lot of clinical problems with these devices; a lot of cases of loosening, probably due to the fact that it was an overly constrained situation. The devices are no longer used, and therefore not part of the petition.

As regards hemi-shoulders, glenoids, as far as the petitioners are aware, there is no indication for resurfacing the glenoid without some corresponding device being implanted on the humeral side. No products are marketed for this indication, and that is not included in the petition.

You should note that hemi-shoulder humerals are Class II. The reason they are part of the petition is that we make a couple of recommendations with respect to the description of those devices which appears in the classification.

To tell you up front what the petition recommendations are, they are first of all that semi-constraint and non-constraint types of devices be combined into a single class. The reason is that we were able to find no real basis for distinguishing between the semi-

constrained and non-constrained devices, either clinically in terms of patient population or surgical technique, or from the engineering point of view in terms of standards or applicable test methods.

We even found that on the regulatory side, there seemed to be some confusion as to which devices belonged in which class. Also, if you look at the clinical literature, it is somewhat of a toss up whether a surgeon classifies the device he is writing about as semi-constrained or constrained, therefore, the recommendation to combine them.

Second, that this combined class be reclassified into Class II; that modularity, that is, modular heads, stem extenders, et cetera, be written into the description of the devices; and that cement and cementless fixation be included for both total shoulders and the hemi-humeral devices.

Now how did shoulders get into Class III to begin with? The initial classification of these devices occurred in the 1970s. At that time, there were reported cases of loosening. There was limited clinical experience, and insufficient available information; basically that means in the peer reviewed literature. As a result of this, the classification panel felt the devices should be put in Class III.

Now 20 years of clinical experience has followed, and since that time there has been a great accumulation of experience. There is a good deal in the peer reviewed literature, and that really is the basis upon which this petition is being made.

Now if I can determine that the regulatory mechanics of the reclassification are to identify the risks associated with the devices, and to show that a Class II regulatory control exists for each. Let me just say as a preliminary, there are three sources of risk information that relate to these devices. When I use the term "risk," I am really talking about complications. The risks of the devices are the risks that the complications will occur. I may use those terms interchangeably as we proceed.

The three sources of information are the FDA classification regulation, the clinical literature, which is probably what we looked at most intensively, and then the FDA MDR reports, which as you may know are required reports which manufacturers and users have to submit to FDA in cases where there has been a device failure of some type.

What I have up there now are the risks from the classification regulation which are: loss or reduction in joint function; improper design or inadequate mechanical

properties leading to wear, fracture, deformation, loosening; adverse tissue reaction from the device or wear particles; and infection.

I think as you can see, these are general types of risks which can be associated with any sort of orthopaedic implant. They really weren't developed by specifically looking at the category of total shoulders.

In preparing the petition, the process we went through was to review the clinical literature, particularly those key articles which represented second level summaries of the existing clinical experience, both articles that were devoted to the procedure overall, and those which focused specifically on risks. The process by which we arrived at this handle-able list of complications is described in the petition.

Component revision appears in brackets, because while it is a very serious complication, it is an action that is taken secondary to the occurrence of one or more of the following complications. Major complications identified in the literature are: glenoid-humeral instability; component loosening; rotator cuff tear; harrier(?) prosthetic fracture; implant failure or component failure; nerve injury; deltoid weakness; tuberosity nonunion;

infection; ectopic bone formation; and several others.

We reviewed FDA's reports, MDR reports covering these types of devices. This information was gathered from a CD-ROM database. The run was made about a year ago. The time period covered by the database was from April 1986 to June 1995. There were a total of 49 reports. I think the first thing to note is this is quite a small number of reported events considering the time period.

The first two items, humeral head dissociation and glenoid liner dissociation were reported 14 times and 7 respectively. I should add in looking at the MDR reports, that these reports will tend to be focused on problems with the device, not with issues that have to do with surgical technique or patient selection. So this is really where you look to see where there have been failures of the devices.

After the glenoid liner dissociation, the next five items appeared once. There was a glenoid metal backing failure; a glenoid liner broke; humeral component broke. There was one reported case which indicated head wear and signs of metal loss. There was a revision, but no cause of the revision was given. There was another patient reoperated for pain with a finding of granulomatous inflammation and foreign body reaction; there was no further

information given.

There were several cases of failures or problems with trials or instruments. There was some mispackaging, and then a few odd reports. Again, I would say the number here is really relatively low.

Now what we are going to be doing, what the petition does is basically to take these reports and to show that there are Class II regulatory controls in place for each of these.

Before I go into a series of what may appear to be somewhat tedious slides, let me say that the approach taken by the petition is to control risks of implant failure basically through bench testing, through controls on materials from which they are made, through the good manufacturing practices regulations, and through the MDR reports, examples of which we have just seen; to control design of the devices through 510(k) findings of substantial equivalents, and from the design controls that are a part of the quality system regulation.

The types of risks and complications that are associated with patient selection and surgical technique can be controlled through labeling, through the use of adequate precautions, warnings, indications, contraindications in the

labeling. That is basically the approach that we are going to take.

The risks are basically divided into two categories. The first is general risks, and what that really means is risks which appear to be most closely associated with patient selection, surgical technique, clinical sorts of issues. Then we are going to look at implant-specific risks, which have to do with risks of failure of the device.

The first complication is glenohumeral instability. This can be controlled through labeling, as I have mentioned, through the precautions and warnings. It can also be controlled through the 510(k) process with a substantial equivalents determination on the design of the device. What that basically means is that it is proposed that FDA would look at the new device, and be assured that that fell within the design envelope of what has been traditionally established for devices of this type.

Loosening is a multi-factorial complication. It certainly can have something to do with the device, but it can also have to do with patient pathology and patient selection, so we have included it in on this list.

Again, it can be controlled through existing

labeling authority which FDA has, and again, through a finding of substantial equivalents in design. New devices would stick to what has been established for devices of this type.

The next two, periprosthetic fracture and nerve injury deltoid weakness are basically patient selection/technique issues. They can be controlled through labeling. The same can be said for rotator cuff tear, tuberosity nonunion. The idea with these again would be through adequate precautions and warnings in the labeling.

The issue of infection again can be addressed through labeling, particularly by adding sterility information provided by the manufacturer with the device. Here again, there are controls which are embodied in good manufacturing practices regulations, which have recently become the quality system regulations, which control both manufacturing and design. Specifically, there are sections there that have to do with sterilization and packaging.

Ectopic bone formation and then the category of "other" that I have there, basically there isn't a control required, because these can accompany the implantation of any type of orthopaedic prostheses. They certainly could be mentioned in the labeling.

Now we are going to look at the device-specific risks. Now one very important omission from the next few slides that you are going to see is the MDR regulation. Again, that is the regulation which says that if a device fails, the manufacturer is obliged to report that to FDA. So there is a control which permits FDA to have feedback on the performance of devices.

The first risk is lack of biocompatibility. That can be controlled through the 510(k) process by requiring that materials conform to existing standards for implant materials.

Humeral head dissociation, which we saw 14 incidences of in the MDR reports can again be controlled through the 510(k) process. FDA can, and has in the past made guidance documents to cover different types of devices. There can be one here. There can be a test requirement, with a standard procedure, so that this issue can be addressed through bench testing.

ASTM is at this time, working on a method for static pull off of modular heads. I'm not sure exactly what the status of that is at this point, but there is something underway which could be adapted. You'll also find in the petition a very good article by Blevins et al. which

discusses this issue and makes recommendations on tests. Other controls are manufacturing and design control and labeling.

Glenoid liner dissociation is similar. It can be controlled through the 510(k) process with a requirement for some kind of test on liner separation with the standard procedure. Here again, ASTM is working on a test of this type, and that procedure I believe has either been voted into a standard, or it is very close. So there is information available on that.

The other device failures that we saw in the MDR list: failure of the glenoid metal back or the polyethylene liner in the humeral component. These appeared only once. It did not appear to us that these need a special type of testing control, but that what is necessary is that the material be shown through the 510(k) to conform to the standards, and that it be properly manufactured in accordance with the GMPs, and that there be proper design controls.

Polyethylene wear here again, can be controlled through the 510(k) process with a requirement that material conform to standards. There is an existing guidance document which specifies testing on polyethylene, and that

can be used as reference. Again, manufacturing and design control play a role, and I would remind you again throughout all of this that you've got the MDR reporting which is feeding information back to FDA.

The next is failure of modular connection. As I mentioned, we are recommending that modularity be written into the device descriptions. That can be a 510(k) test requirement, and FDA has a guidance document now which discusses testing for modular devices.

The instrument and trials failures can be handled through proper design control and manufacturing.

Failure of fixation. The general control on failure of fixture in our opinion is substantial equivalents in device design, and substantial equivalents of the types of fixation surfaces which are used on the devices. There are some special cases there. If it's a press-fit device, and if it happens to have a plasma sprayed surface, then there is an FDA guidance document which gives specific testing for that kind of a surface.

If it is a porous ingrowth surface, again, there is an FDA guidance document which exists, which gives testing and a required characterization for those types of surfaces. Here again, good manufacturing practices and

appropriate labeling.

A few words should be said the inclusion of cementless fixation. At this point the characteristics and limitations of cementless fixation are well understood from experience in other joints. This experience has really dated since the early 1980s. There is considerable clinical experience. FDA has experiences certainly in the hip and the knee area on cementless fixation.

I think it is also true that the issue of cementless fixation is an issue which transcends all categories of orthopaedic implants. It's not an issue that is specific to the shoulder. There is, as I have said, an FDA guidance on porous surfaces for cementless fixation, as well as a guidance document on plasma sprayed surfaces with testing requirements.

Clinical results are similar to cemented. There is a reference by Cofield included in the petition, where basically he is looking at cementless glenoids. Again, the results are similar to what have been reported for cemented devices.

Another point is that the types of studies and control that are associated with Class III are not really appropriate for the case of shoulders. First of all, there

is a practical difficulty in that the types of clinical studies historically associated with Class III, that is the 200 patients, the two year follow-up, are not actually realizable with a device which has this limited a usage.

If you were to look in the petition and see the sizes of the studies that are clinically reported, they are really very small. So there is a practical difficulty of controlling that in Class III, but more importantly, the types of devices contemplated by Class III are really not the same as the situation we have on shoulders.

Class III is there, and the requirements are as stringent as they are with a view perhaps towards devices embodying new materials or a new treatment modality, a device about which very little is known, and it is very important that devices of that type be given the intensive scrutiny of Class III.

The situation with shoulders is not the same. These devices been in clinical use for, as I said, 20 plus years. The complications that can occur in these procedures are known. The methods for detecting the complications are known. The surgical steps that need to be taken to correct the complications, if they occur, are known.

We have a situation here where very much is known

about the procedure, and that simply is not the sort of situation contemplated by Class III. As we have shown, there are controls for the existing risks, therefore, we believe that cementless use in shoulders should be regulated in Class II.

Well, as a summary of what the petition says, the risks associated with shoulder devices have been identified. They are all controllable by available Class II regulation, and the shoulder devices should be placed in Class II.

Now I'm going to ask Dr. Alan Wilde to make a few comments about the clinical basis of the petition. By way of introduction, Dr. Wilde is one of the founding members of the American Shoulder and Elbow Surgeons. He was one of the original field test investigators for the Neer shoulder replacement. He has written about his experiences with the Neer replacement, and also has reviewed results of the total shoulder replacements for the American Academy of Orthopaedic Surgeons' Symposium.

In addition, he has been interested in replacement of the elbow for rheumatoid arthritis, osteoarthritis, and post-traumatic arthritis, as well as the nonunion of fractures of the distal humerus. He has written about his experience with the capitula condylar replacement, and has

also had experience with the Conrad-Morris(?) elbow replacement.

He is a former chairman of the department of orthopaedic surgery at the Cleveland Clinic Foundation. He currently is president of the Mid-America Orthopaedic Association.

DR. WILDE: I'm Dr. Alan Wilde. I am a practicing orthopaedic surgeon. I am in private practice. I have no financial interests in any of the implants that are appearing in the petition. I am not a designer or an investigator of any of these implants. I have not received any royalties, nor expect to receive any royalties for any of these devices. I'm not a consultant for any of the companies that are involved in the manufacture of these implants.

As far as my expenses are concerned, the expenses of my appearance here are being borne by OSMA. I'm not being paid by OSMA; do not expect to be paid by OSMA. My income actually is decreasing because of my appearance here, so I'm losing money by being here. I'm not receiving money. I do not get a per diem.

As Mr. Smith said, I did author a review of the existing literature in 1993, concerning total shoulder

replacement for a symposium, which has been published by the American Academy of Orthopaedic Surgeons. At that times that were 12 series of reports concerning the shoulder replacement which comprised some 646 cases.

Since that time, there have also been review articles by Henry and Thornhill and also by Cofield. As you can see, it's roughly 2,500 cases of shoulder replacement. There also have been reports by Silliman and Hawkins, and Worth and Rockwood for an additional 2,100. So it is not quite 5,000 cases, but this is not a selected bibliography. This is the entire bibliography of all reported results of the shoulder replacement, and which we are presenting copies to the panel as part of this petition.

This articles have been summarized. The complications have already been referred to by Mr. Smith. Infection in a shoulder replacement is fortunately of a lesser incidence than we are experiencing with either the total hip or the total knee, and that is because of the increased vascular supply of the shoulder.

The reports of loosening include press-fit humeral components for the Neer shoulder replacement. Initially the Neer shoulder was implanted on the humeral side without cement. So the incidence of loosening reflects the early

cases. Subsequently, cement has been used for implantation of the humeral side, so the incidence of loosening as time goes on should drop, because of improved fixation.

Also, the early reports of loosening did not include any of the currently available codings, which have been used for shoulder replacements, which have also improved fixation. So there have been a number of things that have been done to improve the clinical results over this past 20 year period.

Dislocations have occurred. For the most part they are largely technical, rather than device oriented. They have to do with operative technique rather than the design of the implant per se.

There has been some wear seen on polyethylene. This is the same type of wear that is seen on total hips or total knees, and also on total elbows.

The nerve palsies are technical, that is, the result of operative technique. Ectopic bone formation is rare in the shoulder. Dife(?) thrombosis in a shoulder replacement is rare. So I feel more comfortable in advising a shoulder replacement for a patient knowing that the incidence of complications is going to be low, and in all likelihood the implant is going to last a long time.

There have been comparatively few mechanical failures of the implant itself. The petition does state that there have been single case reports of fracture of the glenoid component or of a humeral component. So these implant failures have been infrequent.

Just in summary of all the articles that I have referred to, you can see as far as pain relief is concerned, you are looking at about 90 percent of patients that are going to achieve pain relief through a shoulder replacement, and that there will be average gain in elevation or the ability to raise the arm above the head varying from 36 to 59 degrees in my series, or 12 to 60 degrees in the series reported by Henry and Thornhill. Cofield elevation gain was from 58 to 131 degrees.

Patient satisfaction is high depending on what the indication for the surgery is. Patients with osteoarthritis are by far and away the best candidates for shoulder replacement in that the soft tissues controlling the shoulder usually are normal, and therefore if you replace a diseased joint in the face of normal soft tissue, you get an excellent result.

I should point out that the average follow-up for these studies ranged from 2 to 12 years. So this is a long

time experience with an implant that has been very favorably received by the public, and also by orthopaedic surgeons.

At this point I will stop. If there are some questions that either I can answer or Mr. Smith or others that have accompanied us, I would be happy to do so.

DR. BOYAN: Thank you, Dr. Wilde. I think we are going to hold all of the questions under after the FDA presentation, and then we'll open up the questions to the whole group of you.

So if Mr. Stevens from the FDA would make his presentation please.

Agenda Item: Open Session - Reclassification of Non- and Semi-Constrained Shoulder - FDA Presentations

MR. STEVENS: Good afternoon. I'm Ted Stevens, the lead orthopaedic branch reviewer for the total shoulder reclassification petition. I would like to thank OSMA for their presentation. Mine will be fairly brief.

I'm going to concentrate my presentation on a review of the current regulatory classifications of total shoulder joints; compare that with OSMA's proposed definition; provide an overview of the application history for shoulders. I'll also give an update on FDA's medical device reporting system, and compare that with the risks to

health identified in the original classification and in the petition.

I'll list the types of special controls that are proposed to limit those risks. After that, I'll present you with several specific questions that FDA has for the panel.

FDA has three classified shoulder devices that would be affected by this petition. The metal/polymer total shoulders are separated by the degree of constraint in their definition, non-constrained and semi-constrained. Other than that, the two definitions are identical. Both are intended to be implanted to replace a total shoulder joint. They have a metallic humeral component, and a polyethylene glenoid. They are limited to use with bone cement.

Humeral hemi-shoulders are Class II devices. the current classification for them explicitly states that they are not intended for biological fixation.

Uncemented, porous coated shoulders are Class III devices, which are postamendments, which means that unless they are reclassified, they would need an approved PMA for marketing. Later on, I'll go over the specific types of devices that have been cleared under 510(k) with the current classifications.

I won't read these next two slides. They have the

complete text of the current regulation definitions for total shoulders. The first one was for non-constrained shoulders, and the second for semi-constrained. If you will note, except for the discussion of constraint, which I have highlighted on the slide, the definitions are identical.

The classification description proposed by OSMA explicitly included metal backed glenoids, modular stems. Those are both features that have been cleared under the current classification when cemented. OSMA's proposal also provides for use with or without bone cement, and would change the classification to Class II.

The text of OSMA's proposal, which appears on the next slide, does not specify any particular surface such as porous coatings. For the sake of brevity, I won't read the full text, but I will give you a few moments to scan your copies. You may note that it is very similar to the current classification for non-constrained total shoulders.

OSMA's proposed indication is for replacement of shoulders damaged as a result of trauma or disease. It doesn't specify any particular disease states.

Likewise, the device description is fairly general. As the classification descriptions, both the current ones and the proposed state total shoulders consist

of a metallic stemmed humeral component and a polyethylene glenoid bearing. That bearing can either be all poly or metal backed.

The proposal includes stems that are smooth textured or porous coated. Porous coatings can also be applied to metal backed glenoids.

As you have heard from OSMA, there are a number of clinical articles containing information on overall outcome and on complications. They presented us with information both on the cemented experience, and shoulder-specific information on porous, uncemented devices.

As you heard, OSMA's petition was based primarily on three published reviews of the shoulder literature, with two additional reviews specific to uncemented shoulders. As they said, they gave us a full bibliography and copies of the articles.

Now I would like to go on to a description of the specific types and numbers of devices and applications that FDA reviewed for shoulders. We have cleared 79-510(k)s for shoulders; 55 of these have been either semi-constrained or non-constrained total shoulders. Looking back at the applications, there do not appear to be any striking differences in the degree of constraint between the

shoulders that were cleared for semi- or non-constrained; 24 of the 510(k)s were for humeral hemi-shoulders, and almost all of those are the same humeral component that a manufacturer uses in their total shoulder.

Those numbers represent new designs, as well as design changes, so the total number of systems available is probably less than the 79.

In addition to standard, smooth, cemented total shoulders, these 510(k)s include rip blasted humeral components for press-fit, smooth humeral components for press-fit, as well as cemented, and porous coated glenoids and humeral components when labeled for use with bone cement.

Thirteen different companies are listed as manufacturing shoulder prostheses. FDA has not reviewed any PMAs for uncemented, porous coated shoulders.

I ran an updated MDR search, because of some inconsistencies revealed in early searches. The one I ran included all product codes for shoulders including the ones for constrained, semi-constrained, non-constrained total shoulders, as well as humeral hemi-shoulders and metallic glenoids. All of the reports appear to be either for non-constrained or semi-constrained totals, despite the codes

under which they were filed.

The reporting period went from January 1985 up through June 1996. I found 20 reports of glenoid separation; 12 glenoid fracture or disintegration; 19 humeral head separation; and 10 reports of migration of components. Four of the MDRs stated there was a problem with infection, tissue reaction, or sterility. Seven didn't say what the problem was, and four reported the wrong product code, and were actually reporting problems with elbows or some other device; there were 26 problems related to broken trial prostheses instruments or labeling problems.

I think the differences in numbers between my search and OSMA's point out that even though MDR can give us an indication of the types of events and their relative incidence, there are limitations. Some reports are unreported either because the manufacturer doesn't find out about them, or they are not considered to be a problem with the device.

Some of the events in the literature, such as nerve injury or instability don't show up in these MDRs. There may be events that were reported, but were filed under additional product codes that I didn't search for. As an example, only one of these glenoid separation reports was

under the correct product code for a total shoulder.

Now I'll go on to risks to health. The original classification panel identified risks to health. These were published in the 1982 proposed rule for classification. They were the improper design or inadequate mechanical properties. Its strength, resistance to wear, et cetera could result in a loss or reduction of joint function because of wear or fracture, deformation of the device, or loosening of the device in the surgical cavity.

They said that inadequate biological or mechanical properties of the device such as lack of biocompatibility, resistance to wear could result in adverse tissue reactions. The presence of the prosthesis within the body could lead to an increased risk of infection.

OSMA's list of risks from the literature and those reported under MDR are more specifically delineated. Many of them appear to fall in the same broad categories first identified by the classification panel. There may be additional risks of which you are aware. Later on I will read some questions which will include a request for you to identify any such additional risks.

In order to control the identified risks, OSMA proposed various types of special controls. These included:

conformance to consensus standards such as ASTM and ISO standards; materials standards; testing; FDA guidance documents; labeling to insure the device's proper use in appropriate patients.

As you are considering the risks posed by the devices, you may identify other special controls that you find to be appropriate. General controls like good manufacturing practices, design controls, and 510(k) equivalents could prove to be sufficient to limit some of the risks; 510(k) determination of equivalents is how the current Class III cemented shoulders get to market.

Now that I have provided some information from the FDA perspective, I would like to address several questions regarding the shoulder prostheses, the risks, and the control of those risks to the panel. Each of you should have a copy of the questions in your packet of information.

First off, we would like to know if the proposed classification definition is sufficient to describe those actual devices that are recommended for reclassification. Currently, the regulations contain separate classifications for non-constrained and semi-constrained shoulders. Current usage as reflected in the published literature does not make a clear distinction between the terms. Is it appropriate to

combine them under one classification?

Does the petition adequately characterize the risks posed to health by these devices? If not, are there other risks which have not been described? For example, FDA is concerned that it might be difficult to revise shoulders that have well fixed, biologically ingrown stems because of limited bone stock.

Is the information that has been presented, or of which you are otherwise aware sufficient to describe special controls to minimize the risks to health presented by biologically fixed shoulders? Does this apply equally to humeral and glenoid components? The previous question and the next two do relate only to porous, uncemented shoulders.

Is the information in the clinical literature that is specific to shoulders sufficient to support the reclassification of biologically fixed or porous, uncemented shoulders? Does this apply equally to both humeral and glenoid components? If no, do you believe the data from other experiences can be used to support reclassification of porous, uncemented shoulders? Examples might be animal studies, human experience with hips, knees, other joints, et cetera. Again, would these be equally applicable to humeral and glenoid components?

I would like to thank you for your patience and attention, and I'll now turn the floor to the chair for panel discussion.

DR. BOYAN: Thank you, Mr. Stevens.

How I would like to do this is invite Mr. Stevens, Mr. Smith, and Dr. Wilde to be ready for questions, and open the discussion up to the panel. To make sure that everybody on the panel has an opportunity to ask questions either of each other or of the three witnesses or anybody else in the audience that they think might be able to address the questions that they need the answer to, we will go around the room.

We'll start with Dr. Yaszemski and go to his right. So the next questioner after Yaszemski will be Lavin and then Nelson and so forth as we go around the table. This is not necessarily panel questions, but just to get the general information out. Then we'll go to each of the panel questions.

So, Dr. Yaszemski, could you begin the questioning?

DR. YASZEMSKI: Dr. Wilde, could I ask you to help me. It seems to me, and this may be right or wrong, but it seems to me quite easy to make the transition from thinking

about a cemented or non-cemented femoral component to a cemented or non-cemented humeral component, because of the similarity in their anatomy, and their relative position if you will, with respect to gravity and how they move.

I have a little bit of a harder time making a transition from a cemented or non-cemented acid tabular cup to a glenoid. I'm not aware, just sort of at the tip of my tongue of the literature with respect to glenoid loosening separated out by cemented and non-cemented. Since you have a quite extensive review, can you help with that please?

DR. WILDE: Yes. I would call your attention to your question, there is a reference in the petition by Cofield which addresses your question, in which he has stated that the incidence of loosening with a poor coated glenoid is very similar to a cemented glenoid. So they are comparable devices.

DR. BOYAN: Dr. Lavin.

DR. LAVIN: I enjoyed your presentations very much. For me as a neophyte statistician, I can't help but ask myself that here the numbers we've seen in the presentations were pooled all together for the constrained, the semi-constrained, non-constrained, humeral, and the glenoid. My interest was how do these break out? Are they

roughly 20 percent per category? Also whether or not any particular meta analyses have been done to try to combine the data in the literature. Maybe Dr. Wilde, you could take a first shot at that?

DR. WILDE: I think Mr. Smith is better prepared to answer that question.

MR. SMITH: As far as being able to categorize the literature in terms of articles that had to do with non-constrained and semi-constrained devices is concerned, that really was very difficult, frankly impossible to do because of the lack of consistency in the terminology employed by the authors. In other words, what you would see in one case is a particular author would discuss a device as semi-constrained, and then another author dealing with a similar device would refer to the device as non-constrained.

I don't think in the medical community there is a consciousness of the distinctions that exist in FDA's classification. So no, it wasn't possible to compare. Our general impression was that we didn't see any evidence in the literature of a distinction being made between those types of devices.

Now in terms of meta analysis, there was nothing done. There were some discussions with a biostatistician

which basically had to do with given this literature, what can you do with it? His advice was, well, you really can't do much. The fundamental stumbling block is that it isn't customary in the literature to give dates of surgery, dates of revision, and so forth, and lacking that kind of information for a patient on dates in his view was that there wasn't much point in proceeding further.

It's rather a long answer, but I hope it addressed your question.

DR. BOYAN: Dr. Nelson.

DR. NELSON: My question is to Robert Smith and is fairly similar. Since we're averaging all this data together, we may be asking to approve a particular design which has been well demonstrated in the literature to be a disaster. Is there any one particular device that is overrepresented? In other words with the 59 devices in the either 14 or 20 had dissociations depending on which source of the data you are relying on.

MR. SMITH: I cannot off the top of my head, recollect the devices that were involved in the dissociations in the liner separations. One had the impression that what they reflected was perhaps a company ran into a problem at some point and then corrected it.

I noticed you used the term "approval." Again, what we are asking for in the petition is not really approval of these devices, but the agreement of the panel that those approvals can be made by FDA based on the existing authority of Class II. So we are not highlighting any particular type of devices.

DR. NELSON: Yes, I understand that, and I stand corrected. We are only talking about the reclassification, but the classification into II or III differentiates the kinds of typical or expected controls, either special controls or something else in clinical data. The question I guess that still stands and has been answered is, is there any particular device or group of devices, styles of design, et cetera, that are overrepresented in the complications, and we don't know.

I did want to respond to something you had said previously, the characteristics of cementless fixation is well understood from other joints. I think if you go to the ORS, the feeling is that there isn't a good agreement among surgeons about cementless fixation, et cetera. I think it is also hazardous to go from say the hip, where we have got most of our data, to other joints.

I also wanted to respond to just one other thing

that was said, that if we don't approve these things, they may be taken off the market because of the prohibitive cost of doing an IDE. I don't think that is true, because certainly we can ask for a PMA, and then use the historical data that you have just cited before, and approve the devices one at a time, and there is no IDE that needs to be filed, et cetera. Granted there is an expense to that, but it is nothing compared to the IDE typical PMA of a Class III.

DR. BOYAN: Would one of you like to respond to that?

MR. SMITH: I think you really had three points, and I probably remember two. Going back to whether or not there was any particular device that is overrepresented in the complications. Surely as far as the literature is concerned that would be the Neer-type device, and the simple reason for that is that type of device has been around the longest.

In terms of your last point, we really didn't say that it was too expensive to do a PMA. I think our position is that if you look at the requirements for a Class III device, you are not going to be able to get the numbers that you need as traditionally understood for Class III. We do

raise the question as to whether or not Class III really contemplates a device of this type with this sort of clinical experience.

Now you had a second point, which if you could remind me, I will --

DR. NELSON: I was just saying that the characteristic cementless fixation is well understood.

MR. SMITH: Our perception is this, that we do believe that there is an accumulated body of experience dating back to the early eighties. Now does that experience say that cementless fixation works? Yes, it works. Does it work equally well in all types of applications? No, surgeons have different opinions about that. Do all surgeons use it all the time? No.

I think there is a general consensus that yes, it works, but we recognize there is a considerable amount of discussion about where it works best. A great deal of this has to do with surgeon preference.

DR. NELSON: Madame Chairman, one more question?

DR. BOYAN: Is it a short one?

DR. NELSON: It's short.

DR. BOYAN: Very short.

DR. NELSON: Thank you. Responding to your

statement that the costs of an IDE PMA as traditionally understood for Class III, I agree with that, that would be prohibitive, but there are also other options available to the panel. I guess I'm speaking mostly to the panel about that.

You could take the data that has already been done, and even if it wouldn't be appropriate for a prospective trial, nonetheless it may be appropriate for these devices which are not widely used, and for which you would not get that 200. For instance, we did that in June for several other devices.

DR. BOYAN: Dr. Nelson, each item has to stand on its own, and we can't go back historically or forward prospectively to something we may have seen before or may see again.

DR. NELSON: No, I'm just saying that that method is available to us, and we have done it before. Just look at the device, the data that is already in the literature about it. The company would not necessarily have to do any prospective work.

DR. BOYAN: Let me state this, and then I think we need to go to the next questioner. Let's just look at what they have done right now. We have another opportunity to

deal with some of those issues later on in the session.

Dr. Holeman.

DR. HOLEMAN: I think the question that I want to ask is a very simple one, and it has to do with the definition or the reclassification definition. When I read what is already published as far as how you distinguish between the classification of constrained and non-constrained cemented, when you combine all of those -- and there were different functions or different fixations utilized -- what will the combination do in relation to how we see the use of that device when we combine the definition? We no longer can single those out as being separate.

DR. BOYAN: I think we are going to have an opportunity to address that a little bit further down, because it is the first issue we really have to address, do we combine them or not combine them? I think I would like to hear a little bit more discussion as we go around before we address that, because it will affect how we go through the rest of the procedure. I think you have raised an important question.

Did I answer your question?

DR. HOLEMAN: That's fine.

DR. BOYAN: Dr. Silkaitis.

DR. SILKAITIS: Being fourth on the list, some of the questions that I had have been answered already, but however, I would like to ask Mr. Smith, in regards to helping the panel understand the new quality system regulation in terms of design control, what would a manufacturer have to do to assure that the design is adequate, and that it meets its requirements? Could you expand on that a little bit?

MR. SMITH: I regret to say that I am not expert in the quality system regulation, so it wouldn't be appropriate for me to comment except to make the general comment that what it requires is that a manufacturer be able to show FDA the process through which they went in order to design the device to assure that it is going to be adequate for its function. Now further details than that, unfortunately I am not able to give you.

DR. BOYAN: Dr. Silkaitis, did you get the answer that you needed, or should we open it up to somebody else in the audience, maybe someone from FDA?

DR. SILKAITIS: Yes, is there somebody in the audience?

DR. BOYAN: Mr. Craig?

MR. CRAIG: I'm Tom Craig with Smith and Nephew Orthopaedics. I'm not really an expert in the quality system regulation either, but it does require a large number of things: that you consider the end application; that you adequately address the risks. It is very much like the process we are going through here. You have to define all the risks. You have to test, to the extent you can, to determine whether you have got a device that will be strong enough to meet the risks that are likely to be imposed.

You have to address things like biocompatibility. You have to address things like user feedback. You have to be able to document your design. You have to be able to document any changes, considerations or reasons for those changes. Does that change any of the basic safety data that you put together, and that sort of thing?

So there are a large number of controls under the design. Then add on top of that the manufacturing and a number of other things.

Does that help?

DR. SILKAITIS: That's what I was looking for.

Thanks.

DR. BOYAN: Thank you, Mr. Craig.

Dr. Aboulafia.

DR. ABOULAFIA: I had a couple maybe even follow-up questions, although they may be a little bit different. The question was asked by Dr. Nelson about whether certain designs were overrepresentative. I believe Mr. Smith's answer was the Neer was, because of its longevity and earlier introduction.

I think another way to ask the same question would be, are they overrepresented by percentages? In other words, the Neer has a longer experience. You may expect more long term complications, because you have longer term follow-up, but percentage-wise, i.e. complications related to the number of procedures.

DR. WILDE: Are you referring to humeral head dissociations, which is one of the questions that David Nelson brought up earlier, or to complications in general?

DR. ABOULAFIA: A short answer, everything. A long answer, in particular glenoid component loosening. There is a huge disparity in terms of clinical experience with length of time between one and another.

DR. WILDE: Glenoid loosening would be best represented by the experience with the Neer, which again, goes back to 1970. We have provided information concerning the incidence of glenoid component loosening. It is around

2.5 percent. That is part of the petition.

We did not see humeral head dissociations with the Neer, because it was not a Morris taper prosthesis. So that is a characteristic of the newer modular head prostheses, however, I should mention to the panel that some of that is not device related. Some of that is technique related in that very early on it was not appreciated that that surface between the head and the taper should be absolutely be absolutely dry when it is assembled.

If moisture, blood, or any fluid is allowed in there, then that humeral head can dissociate rather readily, and I think that accounted for a number of the early dissociations. Once that was discovered, then of course an obvious change in technique was made at the time of surgery, which I think influenced the subsequent dissociations.

There have also have been on the manufacturing side -- they have looked specifically at that taper, and the clearance dimensions. That, I believe, continues.

DR. ABOULAFIA: Again, sort of a follow-up. I guess the concern with glenoid components, you cited Cofield's review article, and "they were comparable between porous ingrowth glenoid components and cemented glenoid components." Do you think the numbers warrant for non-

cemented glenoid components? If you comment on what the numbers are. While the failure rate of 2.5 percent may be equal, one is with much longer term follow-up. So you understand the spirit of the question, I'm sure.

DR. WILDE: Yes, that is obviously the case. The incidence of loosening with the Neer goes over 20 years, so those numbers are obviously much more reliable, and they are greater in number as well in comparison to Cofield's porous-coated prosthesis, which is a more recent introduction, and also has fewer numbers.

I don't have that reference specifically, but we can find it and get you that number. The comment is true that the incidence in Cofield's hands with the uncemented glenoid is the same as the cemented glenoid on an instance basis; certainly not over a longer period of time, but on an instance basis.

DR. ABOULAFIA: Then very briefly, using the numbers that you cited, Mr. Smith, you thought it was undue burden on the manufacturers, if I can paraphrase, to provide 200 cases with two year follow-up. Using the numbers you provided, that is less than 5 percent of implants. Do you think 5 percent with a two year follow-up is a high demand or a strong burden?

MR. SMITH: I think what you are going to find is if you look at the usage of a particular device -- let's set aside the Neer, because it's got a very, very long history -- then for a given device with the proviso that you are not going to be making any changes in the device as you go along, I think it would turn out to be very difficult.

It's not just that it's the question of it being a burden. I just don't think that the usage of the device is such that you could do this within a practical amount of time.

DR. BOYAN: Thank you. Dr. Skinner.

DR. SKINNER: I have a couple of simple questions. First, for Mr. Stevens, this is a reclassification petition for a metal polymer total shoulder. I assume that precludes a polymer-metal total shoulder?

MR. STEVENS: I don't know that it necessarily does. The current classification definition and the proposed definition both specify a metallic humeral component and a polyethylene glenoid. The 510(k) process does allow for variations in design if there can be shown equivalents in terms of clinical performance or mechanical performance. So it wouldn't necessarily preclude such a device.

DR. SKINNER: A question for Dr. Wilde. The indication according to Dr. Stevens for the petition is the shoulder joint where these surfaces have been severely damaged by degenerative disease or trauma. Now recognizing that the end result of rheumatoid arthritis is degenerative disease, do you think that rheumatoid arthritis should be not included as an indication?

DR. WILDE: Of course not. Rheumatoid arthritis should be included as an indication, and there would be other conditions that would be included as well. Post-traumatic arthritis would be one; tumor is another one. Avascular necrosis of the humeral head is another one.

DR. SKINNER: I have one final question here for either Mr. Smith or Mr. Stevens. The Class II humeral hemi endoprosthesis that is Class II regulated, does that include a Morris taper head on it?

MR. STEVENS: Under 510(k) there have been modular humeral components cleared as hemis, and as components of totals.

DR. SKINNER: So those are already a Class II device?

MR. STEVENS: Those are already a Class II device either when cemented, press-fit, but not when biologically

fixed with an uncemented porous coating.

DR. SKINNER: So really what we are talking about today is the glenoid component is what it boils down to?

MR. STEVENS: And the uncemented, porous coated humeral components.

DR. SKINNER: Okay, thank you.

DR. BOYAN: Thank you. Dr. Besser.

DR. BESSER: Most of the good questions are taken already. This is a question, and I'm not sure whether any of the witnesses or possibly Mr. Silkaitis or someone from the audience can answer. Do the quality regulations that you have to go through when manufacturing include pull out-type tests or other sort of biomechanical testing of fixation?

MR. STEVENS: If we see a new mechanism for attaching a modular humeral head, or attaching a polyethylene bearing to a metal backing, we will ask for testing of that, so that it is strong enough for the expected loads.

Does that answer the question?

DR. BESSER: I'm not sure. Were we to reclassify these as Class II, and a company come to market with a new product that was substantially equivalent to the products

already on the market, would pull out testing be required for those components before being approved?

DR. BOYAN: May I clarify what I think you are asking? I see that Mr. Craig is getting to answer. What I think you are asking is in the preclinical testing is it a requirement now that they show in preclinical testing that the fixation is solid in effect, biologic fixation. If it isn't required the pretesting at the present time, which I think Mr. Craig can tell us, then we can in fact make that recommendation when we get to that place, that it be something that be required.

MR. CRAIG: I thought I understood the question to be humeral head pull off, is that correct?

DR. BESSER: No, I was more interested in I guess the fixation of the glenoid component.

MR. CRAIG: The fixation of the glenoid component would certainly be addressed in the design controls of the quality system regulation in that you would have to address fixation, and is it comparable to other methods of fixation in the design control. I think what Ted was trying to get to, in addition to the controls of the quality system regulation, we have the 510(k) regulation. If there are new attachment mechanisms for the glenoid there, we would also

have to address it under that.

So there are multiple areas of control under existing regulations where that would occur. Does that answer your question?

DR. BESSER: Yes, thank you.

DR. BOYAN: Any other questions? Dr. Hill. Pass on you. Dr. Stern?

DR. STERN: I have a question for either Mr. Smith or Dr. Wilde. The proposed definition by OSMA is relatively generic and specifically regarding the coating. When Mr. Smith was speaking, he was talking about that the manufacturers now know about good principles in terms of ingrowth coating, and that the FDA has guidance. I took that to mean that we well understand the pore size and the techniques and technology in putting the correct type of coating and getting that onto a piece of metal that we are going to place into the body.

What is not as clear to me, and I guess my question is certainly on the hips where that coating goes is not as clear. In your proposed definition it seems like any porous coating, no matter how big, how small seems to fall under this definition. Are we comfortable with that relatively generic definition?

MR. SMITH: I think you to remember that FDA has a guidance document now which covers porous coating, and it talks about things like pore size and ways of evaluating it. So in addition to this rather broad definition -- you are correct, it is deliberately broadly stated -- you do have an FDA guidance document which talks about the kinds of surfaces you can have.

The one other thing is that when a device comes in, FDA is going to look at that device in the 510(k) process as to where the coating is, and what kind of a coating it is. They will be checking that against their guidance document, and against their knowledge of porous coatings, and their knowledge of traditional designs for devices of this type.

DR. STERN: In other words, when this becomes Class II, does that mean that devices still would have to be decided that one device that is fully coated, and another device that is only partially coated may not be substantially equivalent?

MR. SMITH: That is a decision which FDA has to make when a device comes in for clearance. Basically, the definition is silent on that point. That's a matter for FDA to deal with.

DR. BOYAN: Thank you very much. Before we move to discussing specific questions, Mr. Stevens, would you like to address that point before we move off of it, about the porous coatings?

MR. STEVENS: One thing I would like to point out is the guidance document for porous coatings is largely intended to provide a basis for describing the porous coatings. It doesn't necessarily define all porous coatings that would be acceptable. For the hips, there is a range of coatings that if put on a hip, will automatically be accepted. For other coatings, we have guidelines for describing those coatings and determining whether they are equivalent to other coatings.

DR. BOYAN: As a clarification to members of the panel that maybe are new to the panel and haven't as much experience with the FDA process, could you explain what the 510(k) process requires? Specifically, I would like you to address that there is extensive preclinical testing in animals that would answer some of these questions.

MR. STEVENS: In the 510(k) the endpoint is determination of equivalents. That can be with preclinical or clinical data. We'll generally look at strength of the device, the dimensions, the materials, and we can ask for

clinical data if there is some question as to whether the outcome will be equivalent.

DR. BOYAN: Thank you very much. Does that address everybody's general questions? We can take two minutes for any additional general questions. Seeing no need for further general discussion, then let's turn to the panel questions.

DR. NELSON: Madame Chairman, could we have just a little bit of discussion?

DR. BOYAN: Yes, certainly. Two minutes.

DR. NELSON: Dr. Skinner, do you have any particular thoughts on this whole thing, rather than just the questions to them? Because I know you've got a lot of experience with that.

DR. SKINNER: I'm not sure I know what your question is, David.

DR. BOYAN: Let's do this, Dr. Nelson. Let's take the panel questions, which I think will address everything. At the end of the panel questions if we haven't satisfied everybody's need to get the full disclosure of any information necessary, then we'll have one last chance. Maybe at that point you can give a more specific question to Dr. Skinner that he could address.

Agenda Item: Reclassification of Non- and Semi-Constrained Shoulder - Questions and Voting

So at this place I'll now move us to the panel questions from Mr. Stevens, which we have copies of. The very first question is Dr. Holeman's question. I'm going to propose that we take these questions by page, because they really come as a set. We don't necessarily, as we go around the room, have to address first, proposed classification definition sufficient, and then the non-constrained, semi-constrained, because they really go together.

This is a fundamental question to everything we will do for the next hour. So it is important that we get this into our consciousness, how we feel about it. At this place, the combined panel question is, is the proposed classification definition sufficient? Should we combine non-constrained and semi-constrained? I would also ask that we consider the question of cemented versus non-cemented in the same discussion.

Yes, Dr. Holeman?

DR. HOLEMAN: Let me ask, in a review I believe by Dr. Stevens, you made the statement that the FDA has not approved any premarket approval application for porous, uncemented shoulder prosthesis. Does that in any way have

an impact on the way we classify or discuss the classification or reclassification of this device?

MR. STEVENS: I was just pointing out that FDA has not reviewed any PMAs for the uncemented, porous shoulders. So there technically aren't any that are legally marketed for that use.

DR. BOYAN: So what I'm asking you to address is the proposed classification definition, which is on the screen. In the same comment, as we go around the room, address the question of non-constrained versus semi-constrained being viewed together as a group, as well as cemented versus non-cemented.

I had a special request that I not start with new people, so I'm trying to find an old person. So let's start with Dr. Skinner. You be the first person to answer these questions. Then we'll go to Dr. Besser.

DR. SKINNER: I'm sorry, Dr. Boyan, to answer question one basically?

DR. BOYAN: Panel question one, this page right here, yes.

DR. SKINNER: I think that there is only an artificial difference between semi-constrained and non-constrained, and I think that should be deleted as a

differentiation. I think that the data is also there to deal with uncemented and porous coated also. So I think that that shouldn't be a differentiating factor in labeling these prostheses.

DR. BOYAN: How about the definition that is on the screen? Are you comfortable with that definition?

DR. SKINNER: Yes, I think so. I read it before. It's an awful lot of words, but I think it is okay.

DR. BOYAN: Dr. Besser?

DR. BESSER: I had one question I guess about the proposed new definition which states, "The device limits . . . translation in one or more planes." This would preclude what used to be called a non-constrained prosthesis, which I think limited it in no planes by the old definition?

DR. STERN: I think it limits the constrained prostheses. You said non-constrained. It would limit constrained prostheses. That would be the ones that would limit it in all planes. So that's the one that is also not used clinically at this time.

DR. BESSER: Thank you.

I have no problems with the proposed definition. As far as the second question about combining the classifications for non-constrained and semi-constrained

shoulders, it seems that the MDR has already done that. I think that it would probably be more clear to combine those two classifications than to try to keep them separate, and decide which classification the current products belong in.

DR. BOYAN: Cemented versus non-cemented?

DR. BESSER: Constrained versus non-constrained.

DR. BOYAN: Okay, I was moving you on to the next issue.

DR. BESSER: Oh.

DR. BOYAN: How do you feel about viewing cemented versus non-cemented together as a group? You don't have to make an opinion right now.

DR. BESSER: I'd like to pass for the moment on that.

DR. BOYAN: Okay. Dr. Hill?

DR. HILL: As far as the first question, non-constrained versus semi-constrained, I agree. I think that is an artificial difference between the two, and I don't see any reason it couldn't be classified together.

As far as the cemented versus non-cemented, I'm still a little bit unsure, so I don't really want to answer that part just yet.

DR. BOYAN: Dr. Stern.

DR. STERN: I think I'm going to be saying similar things. I think clearly non-constrained and semi-constrained is artificial. In clinical practice it means basically no difference.

Cement and non-cemented are -- I'm not sure. I think they may be different. That doesn't mean that they necessarily shouldn't both be reclassified, but they may be slightly different.

DR. BOYAN: Thank you. Dr. Yaszemski.

DR. YASZEMSKI: I will agree with the prior speakers that the distinction between non-constrained and semi-constrained should be dropped.

I think I will add to Dr. Stern's comment, if I might take that liberty, and say that what we are dealing with here is the issue of reclassification. With that specific issue in mind, I would venture to say that we should also not have a difference between cemented and non-cemented.

DR. BOYAN: Dr. Lavin.

DR. LAVIN: I have no problem with the difference between the semi-constrained and the non-constrained. I don't have enough data I think in those papers to differentiate between the effect of with or without bone

cement, so I defer comment on that.

DR. BOYAN: Dr. Nelson.

DR. NELSON: I agree with Dr. Lavin.

DR. BOYAN: Dr. Holeman.

DR. HOLEMAN: I think my question was answered earlier about the function, because now since constrained is not that widely used, however, perhaps a surgeon could help me understand what happened in cement as opposed to non-cement.

DR. BOYAN: Could we have a surgeon? Dr. Stern.

DR. STERN: In joint arthroplasty in general -- and this is going to be applicable to other things we may discuss -- there are basically two modes of fixation that are used, and that is either cemented fixation or uncemented fixation. Cemented fixation in the United States is normally used with bone cement, polymethyl methacrylate in which basically an epoxy of cement is injected into the canal, and polymerizes, that is hardens over approximately 10 minutes. The metal prosthetic is actually cemented to the bone with initially rigid fixation achieved in operating room.

That is in contrast with uncemented type fixation. Uncemented type fixation in the United States involves

various forms of porous surfaces. Porous surfaces have holes in them to allow, or at least to hopefully allow bone to ingrowth into the prosthesis. Uncemented prostheses do not achieve as rigid a fixation in the operating room, but hopefully allow over time, the bone to become rigidly fixed to the component. It is sometimes referred to by the FDA as biologic fixation, biologic meaning that the bone-metal interface becomes the rigid fixation. These terms are basically used whether we are talking about elbows, hips, knees or shoulders.

DR. HOLEMAN: So would a disease process be one of your deciding factors?

DR. STERN: Yes, there is relative indications depending upon the joint, depending upon the quality of bone about which of the two methods may be more effective. I think it is reasonable to say that also different surgeons may have widely different opinions about the optimal method of fixation.

In fact in almost all of these instances, there is probably not consensus among clinical surgeons in the United States about the optimal method of fixation for almost any of these devices. I think the other clinicians would probably agree with that, that each of us may have strong

opinions personally, but there may not be agreement in the community.

DR. BOYAN: I think that Dr. Skinner would like to add a few comments.

DR. SKINNER: Just one comment. The amount of porous coating for biological ingrowth on prostheses varies significantly from prosthesis to prosthesis. In the limit has zero porous coating on it, and it is called a press-fit prosthesis, which is also an uncemented prosthesis. I think that is also included in this thing that we are talking about.

DR. BOYAN: Let's just get on brief moment of clarification from Mr. Stevens. Is that included in this petition?

MR. STEVENS: The press-fit, non-porous humeral components are currently cleared as hemi-shoulders as Class II devices, so that wouldn't be a change necessarily; but yes, they are included.

DR. BOYAN: Thank you. Back to you, Dr. Holeman.

DR. HOLEMAN: Well, I think I would have to go with the definition with it being either cemented or non-cemented.

DR. BOYAN: Thank you. Dr. Silkaitis.

DR. SILKAITIS: Yes, the combination of the definitions certainly helps the regulatory people of the various industries spending many hours trying to decide if it belongs in one category or the other.

The other comment regarding the fixation with and without, FDA does have guidance documents, so that we would have to abide by those guidance documents regarding porous surfaces.

DR. BOYAN: Thank you. Dr. Aboulafia.

DR. ABOULAFIA: First, the difference between constrain and semi-constrain, I have nothing new or intelligent to add to what has already been said, and I think it's an artificial distinction.

I think the distinction between cemented and non-cemented, whether it be porous ingrowth or press-fit is significant, and I would not consider them in all one category. I think the refer that was referred to by Cofield -- and if I'm quoting the correct reference, tell me -- was from the Journal of Shoulder and Elbow Surgery in March 1992. Is that accurate?

DR. NELSON: A point of clarification while they are looking it up, Dr. Boyan. We're not trying to say that the two things are the same. We are just trying to say that

for the purpose of regulating them, we can lump them together, is that right?

DR. BOYAN: Yes, thanks, Dr. Nelson. That is what we are trying to say. I guess where we are right now is that we would consider them as a group in this context, but it would be understood that they would have to be each viewed independently as they came in, in a 510(k) application or a Class II application to the FDA.

DR. ABOULAFIA: If I understand you correctly then, I think there are real and significant differences between these two groups.

DR. BOYAN: Okay. Then we're back to Dr. Skinner. We're waiting for our clarification from Wilde?

DR. WILDE: The reference that I was referring to is Cofield all right. It actually is page -- on your petition -- 000080.

DR. ABOULAFIA: Can I borrow your copy?

DR. BOYAN: Dr. Aboulafia, are you going to make an additional comment based on this particular reference?

DR. ABOULAFIA: Yes, I would still personally consider them separately. I don't think all glenoid components are the same in that generic class, i.e., I think there is a distinct and real difference between a cemented

glenoid component and a non-cemented glenoid component.

DR. BOYAN: So let me summarize our panel response to this question. Yes, we think the definition is sufficient. We feel that there is no question that the non-constrained and semi-constrained devices can be viewed as a group.

There is a general feeling that for the sake of classification as Class II, that cemented and uncemented devices could be considered together, however, we do feel -- and it was stated in many different ways -- that the mechanisms of fixation are significantly different between cemented and uncemented that there needs to be at least some recognition of that in the review of the devices.

I am not quite clear from Dr. Aboulafia if you feel that would mean that an uncemented component would not necessarily fit into the Class II definition, but we will wait for that until we get to the vote.

DR. SILKAITIS: I would like clarification in terms of what was the issue regarding the porous and the non-porous. Was it specifically to the glenoid component and not the humeral component?

DR. ABOULAFIA: Yes.

DR. BOYAN: Okay, so uncemented versus cemented is

specific to the glenoid component, and not to the humeral component. So as far as we have general acceptance that for the humeral component, that they could all be considered as a group? Okay.

Let's move to the next question. This one deals with risks to health. The question is, are the risks to health adequately characterized in the petition? Are there other risks that were not considered that we should point out to the FDA?

For this, let's begin with Dr. Lavin, and we'll go next to Dr. Nelson.

DR. LAVIN: I would seem to believe that those adequately represent the risks.

DR. NELSON: Yes.

DR. HOLEMAN: Yes.

DR. SILKAITIS: I pass.

DR. BOYAN: Dr. Aboulafia.

DR. ABOULAFIA: I would say yes, with the exception of the non-cemented glenoid component. I think in Cofield's paper and in others they address issues related specifically to a metal back component that is different than a non-metal back component, i.e., metal ion release, metal on metal, and higher incidence of polyethylene debris.

So with that exception, yes.

DR. BOYAN: Thank you. Dr. Skinner.

DR. SKINNER: Dr. Aboulafia, could you clarify that? Was that the glenoid or the humeral component you were talking about? Glenoid, wasn't it?

DR. ABOULAFIA: Glenoid.

DR. SKINNER: I think the risks are adequately defined here by the list.

DR. BOYAN: Dr. Besser.

DR. BESSER: I agree.

DR. BOYAN: I would like to have a clearer definition along the lines of Dr. Aboulafia. I think that the risks to health may not be the question of wear debris in quite this context, but certainly wear is a problem that we are understanding better now, and as more information concerning wear and its consequences to the long term viability of a prosthesis of these kind, that we should take that new information into consideration as we go along.

Dr. Hill.

DR. HILL: I feel that the risk to health is adequately described.

DR. STERN: I agree. A question to Dr. Boyan. Are we also answering question four now of the FDA's

concerns?

DR. BOYAN: Not yet. Dr. Yaszemski.

DR. YASZEMSKI: I think they are adequate.

DR. BOYAN: Okay, so any other comments on this?

Seeing none, let's move to the next panel question.

In this question we are addressing the information that is in place to insure that there are special controls to minimize the risks to health for both the humeral and the glenoid. When you address this question if there is something specific to one or the other, you should define that.

Let's start this time with Mark Besser, and then we'll go around to Dr. Hill. Is information sufficient to describe special controls to minimize the risks to health?

DR. WITTEN: Excuse me, Dr. Boyan. I think a couple of people had a comment on question four, and you had said we would defer it to after question three.

DR. BOYAN: You know why? Because we are dealing with two different lists. We're dealing with the typed list, and we're dealing with the slides from Mr. Stevens. Okay, so let's do question number four. Are there other risks that have not been described? For example, FDA is concerned that it may be difficult to revise shoulders that

are well fixed by biological ingrowth because of limited humeral bone stock. Dr. Stern, I think you were primed for that question, so let's go to you next.

DR. STERN: The only thing I wanted to say to the FDA was that if it is difficult to revised an uncemented shoulder component, I want to point out to them that a well fixed, cemented component would be even more difficult to revise, and would be even more deleterious to the bone stock.

So there is not much bone stock to work with, and if you have a well fixed component, it would be very, very difficult to get it out without -- a well fixed, cemented component. So I think in that sense cement is as difficult, if not even maybe more so than uncemented.

DR. BOYAN: So as long as we're with Dr. Stern, why don't we just keep going. Dr. Yaszemski, question four.

DR. YASZEMSKI: I don't know of any other risks which have not been described with respect to the question regarding removing a well fixed component. I'm not sure if I could think of an instance other than perhaps infection, when I would want to do so, and the bone stock wouldn't be my main concern there. So I don't think that's a concern.

DR. BOYAN: Dr. Lavin.

DR. LAVIN: No other concerns.

DR. BOYAN: Dr. Nelson.

DR. NELSON: No.

DR. BOYAN: Dr. Holeman.

DR. HOLEMAN: I guess I would have to go with Dr. Stern relative to the removal, since the literature did point out that there were times when there had to be reoperation.

DR. BOYAN: Dr. Silkaitis.

DR. SILKAITIS: No additional concerns.

DR. BOYAN: Dr. Aboulafia.

DR. ABOULAFIA: No.

DR. BOYAN: Dr. Skinner.

DR. SKINNER: No additional concerns.

DR. BOYAN: Dr. Besser.

DR. BESSER: No additional concerns.

DR. BOYAN: Dr. Hill.

DR. HILL: No additional concerns.

DR. BOYAN: All right, now we are ready for question number five. Here we are addressing the information presented, or any other information that we might be aware of. Is this sufficient to describe special controls sufficient to minimize the risk to health presented

by biologically fixed shoulder prostheses?

Let's begin with Dr. Besser.

DR. BESSER: I would agree for both the humeral and the glenoid components of the prosthesis.

DR. BOYAN: As we go past this, I think we want to make special note to FDA that they look for preclinical testing that shows that these devices are in fact well fixed in an animal, and not simply based on design considerations.

Dr. Hill.

DR. HILL: I agree also that the information was well presented and sufficient. That is question five.

DR. BOYAN: Dr. Stern.

DR. STERN: I think I'm agreeing here. I just want to make sure what I'm agreeing to. Is this basically the question of making it Class II? Is this basically the question?

DR. BOYAN: This is basically the question, do you feel that there is sufficient well accepted information that the preclinical testing and limited clinicals if necessary would be sufficient; there would be sufficient controls in place in the system already to account for a risk that might come up from a new design?

DR. STERN: I guess I agree. I just want to make

sure that the point that I had earlier that as a component would come to the FDA, that there would be some review about for instance on the humeral side, the extent of circumferential coating, on the glenoid side, the extent -- especially if it was uncemented -- the extent of the thickness of the polyethylene being adequate to minimize lysis.

DR. BOYAN: Dr. Yaszemski.

DR. YASZEMSKI: I will say yes for both humeral and glenoid. I believe that the Class II special controls are sufficient for both.

DR. BOYAN: Dr. Lavin.

DR. LAVIN: I would agree with Dr. Yaszemski. Also, I would like to see down the road, better attempts made to characterize the duration of follow-up and the number of subjects in there, so that we can really embrace this more definitely by saying a stronger yes.

DR. BOYAN: Dr. Nelson.

DR. NELSON: I would say yes, and specifically bearing in mind that special controls could involve some animal studies, and some limited preclinical studies, as well as -- I forget the exact term -- I think it is called registry data.

DR. BOYAN: Dr. Holeman.

DR. HOLEMAN: I would agree.

DR. BOYAN: Dr. Silkaitis.

DR. SILKAITIS: In terms of the special controls, FDA does have controls on the porous surfaces, the type of characterization of that surface, so yes, I think there are sufficient controls currently available to the FDA to control the process under a 510(k).

DR. BOYAN: Dr. Aboulafia.

DR. ABOULAFIA: Is this an all or none, or can we select one thing out?

DR. BOYAN: You can make any recommendation that you think needs to be made here.

DR. ABOULAFIA: Okay, I would say generally yes for all, except again, the glenoid component. During the discussion I took the time to just go over Cofield's data. He has looked at 180 patients total. Of those, 5 cases of glenoid component at four to five year follow-up, of those 18 had three to four year follow-up, 69 had two to three year follow-up, 52 had one to two, and the second largest group was less than one year follow-up with 56.

So that leaves a total of 23 patients with greater than two year follow-up, meaning three to five year follow-

up. He had a 16 percent complication rate. So I think when we look at all this data, and we talk about 2,000 reported, reviewed cases, an awful small percentage of clinical data exists on glenoid non-cemented components.

DR. BOYAN: So to paraphrase, what I think you just said is you think that there is not sufficient information on glenoid non-cemented components?

DR. ABOULAFIA: I do, unless anyone can tell about information that I don't know of, like animal models. Especially Dr. Wilde, please. Thanks.

DR. WILDE: Well, you're absolutely right. We have said that; that there is a small number of these. What experience there is has been equivalent, but you are not looking at the same numbers, as you just pointed out, that we have with cemented glenoid.

DR. BOYAN: Thank you, Dr. Wilde. Dr. Aboulafia, last comment before we move to the next.

DR. ABOULAFIA: So I guess my question is then why should we, as a group -- and I really mean this as an honest question -- why should we think about putting something in a Class II where we really don't have any animal studies; we don't have hardly any experience; and even the authors that do write about it, i.e. Wilde and Cofield, say that there

are very limited applications, if any, and the future will soon tell us.

MR. SMITH: Mr. Smith --

DR. BOYAN: Wait, wait, wait. This is a little bit irregular here. This is a panel discussion where we are making recommendations, and I understand that you might have a response. I need to get a clarification from my executive secretary. One second.

Mr. Smith, if you can answer that question reasonably quickly, I am going to give you an opportunity to rebut.

MR. SMITH: There is actually a great deal of animal data on what I'm going to call the standard types of porous coatings. You certainly are going to have difficulty finding an animal study that shows that it works in shoulders, but does it work? Well, yes, animal data does exist.

The petition has also clearly presented the uncemented data. We recognize that it is limited, but our position is that you have to take into consideration also everything you know about porous coatings from other areas.

DR. BOYAN: Thank you. Dr. Skinner.

DR. SKINNER: Well, taking this in two parts, I

think the glenoid is a separate thing from the humerus. I think the humerus is straightforward; that the only thing that hasn't been approved is the biological effects humerus, and I think there is plenty information that is available on that, and I think special controls will take care of that without any problem.

Regarding the glenoid, I think that the data is much more limited, and I think that the results are roughly equivalent to the cemented for the uncemented, and I think that the results are partially bad because of the anatomy, and partially because of the lack of experience of the surgeons with either of them. I think there is better experience with the uncemented, so it might be slightly better.

I think that the controls that are available are adequate at this time to put it in Class II.

DR. BOYAN: Thank you, Dr. Skinner.

So we are back to Dr. Besser, and we are ready to move to the next question, which is our last question. It's a repeat. The next question that we have is, is the information in the clinical literature specific to shoulders sufficient to support the reclassification of biologically fixed shoulders, humeral and glenoid?

I think that we adequately addressed that on the last go round, however, there was a sense that there may be insufficient data available on the uncemented glenoid, and we are asked to discuss whether or not there should be additional studies, or what kinds of experiments would be necessary and of value in the deliberation.

Maybe we'll just take a few seconds. I'll go very quickly if you have something that you would like to add to this discussion. Dr. Hill.

DR. HILL: I guess the question is do we have enough data. I just wanted some clarification on the question. The question is do we have enough data as far as the glenoid?

DR. BOYAN: The question is, is there sufficient clinical information? I think we basically have heard clearly that the amount of clinical information is much, much less for the glenoid than it is for the humerus. So if we start from that position, what additional information might there be available in the literature already existing that could help us in this determination, or is there just insufficient information, and what kinds of experiments need to be done in order to make this kind of decision?

DR. HILL: I think it is insufficient based on the

numbers that we just reported in Cofield's article. The glenoid and its fixation is such a unique situation, that there is no comparable joint or animal studies that you can really do to do it outside of a clinical study.

DR. BOYAN: Dr. Stern. Nothing? Dr. Yaszemski?

DR. YASZEMSKI: Nothing new to add.

DR. BOYAN: Dr. Lavin.

DR. LAVIN: I would add that I would recommend a patient registry for the glenoid subjects.

DR. BOYAN: Thank you. Dr. Nelson?

DR. NELSON: I agree with Dr. Lavin.

DR. BOYAN: Dr. Holeman.

DR. HOLEMAN: Nothing new to add.

DR. BOYAN: Dr. Silkaitis.

DR. SILKAITIS: In terms of the registry, Dr. Lavin, could you explain that a little bit as to what your idea is about a registry?

DR. BOYAN: Dr. Lavin.

DR. LAVIN: There are several ways that a registry could proceed. Not to try to impose any one specific way on the community, but one idea is to have a central group, perhaps this group that is submitting the petition, they could simply be a repository for any such subjects who

undergo the procedure, and could call into that group. These patients could then be prospectively followed-up say at annual intervals, just to be able to get a sense for overall safety, overall effectiveness, and concordance with the data that have already been presented today.

That is one simple way of doing it. Other ways of doing it would be to have individual investigators who put in sufficient numbers of subjects do such a series of small studies. I think this group here overseeing it would probably be the best suited, the group that is doing the petition.

DR. BOYAN: Dr. Nelson, do you have something to add to that discussion?

DR. NELSON: Yes, I believe the mechanism for doing the registry is already well established within the FDA, so we don't need to do that. My thought, Dr. Silkaitis, in talking about a registry would be that there isn't adequate information, but I'm not sure I want to pull it off the market. Using this kind of special control would prevent you from having it put in Class III. That would be I think an advantage to the company and the patient.

DR. BOYAN: I get the drift of your point, but I don't think that we are to concern ourselves with whether or

not something is pulled from the market. I think that's an independent decision outside of this group.

DR. SILKAITIS: I'm sorry, Dr. Boyan, I just wanted to add a final comment. In terms of a registry, certainly that does sound like a nice thing to do in terms of trying to gather information, but because of the use of the implant on various conditions and situations, the collection of that data I'm not sure would provide sufficient information to make a particular judgment, because it involves various age groups. It involves various disease conditions. It involves surgical technique, the expertise of the person utilizing the device.

So while on the surface a registry does sound nice, it is used in a very limited matter as far as I understand; in those situations where it is life threatening. So I am not sure that a registry would be appropriate in this particular situation.

DR. BOYAN: Thank you for that comment. I think that Dr. Skinner and then Dr. Aboulafia. Dr. Skinner.

DR. SKINNER: I agree with Dr. Silkaitis. There are 13 manufacturers of these prostheses, and some 5,000 or 6,000 of them done a year. You divide that up, and a registry sounds like a good idea, but it is going to be

years and years and years in a pseudo-post surveillance mode to get any information that is worthwhile when you start talking about those manufacturers and small numbers each year.

DR. BOYAN: While you speak, Dr. Aboulafia, because I would really like you to address, since the glenoid is something that you have made a specific point on, if you could look at question number seven, would you address specifically the question of animal studies, whether or not hip and knee data are relevant to the discussion of either the humerus or the glenoid?

DR. ABOULAFIA: The answer to me is simply no. I think every joint is different. We know that. We looked at metal backed components in the patella, which were very different than other metal backed components in other places. So to say something is the same, a non-cemented component in the glenoid is the same as a non-cemented component in the humerus I think is very different.

I do think that Dr. Silkaitis said these are very limited. I agree, but if it is very limited, maybe there is a reason it is very limited. The reason it is very limited in my humble opinion is because most surgeons don't feel comfortable using an implant that has little track record.

Then you said that it was used in life threatening situations. I would say it is never used in a life threatening situation. I have never heard of a life threatening situation where a glenoid --

DR. BOYAN: Just a clarification, so he doesn't have to defend himself. He is agreeing with you. You and Dr. Silkaitis are in agreement at this point.

Dr. Besser, do you have any other comments that you would like to add to this discussion?

DR. BESSER: No comments at this time.

DR. BOYAN: Okay, since we have now discussed the panel questions, we have to move on to the reclassification worksheet. Lisa Rooney from the FDA is going to explain to us how we are going to use this worksheet for the first time in my experience. So this is going to be painful, and I hope everybody has a sense of humor about it.

Lead us through this.

MS. ROONEY: My name is Lisa Rooney. I am the reclassification coordinator for the Center for Devices.

Before we go through the actual general device classification questionnaire, I want to raise two points. First and foremost, I want to just clarify that we are doing is we are reclassifying a generic type of device. The

agency has defined a generic type of device to be, a grouping of devices which do not differ significantly in design, material, or any other feature that is related to the safety and effectiveness of the device, and for which the agency believes or the panel believes similar regulatory controls can provide reasonable assurance of safety and effectiveness.

If for example, we have a device that we are going to include within a generic take, and there are certain features regarding that device that you don't believe allow it to be identified and classified in the generic type of device, we can take it out and classify it separately.

Moreover, if there is a difference in materials or design, as for example the cemented versus uncemented, if we don't think the differences are that significant to Class II to identify them separately, we can keep them in the same identification, but we can separate the type of classification. Say for cemented, we can classify this Class II; uncemented, we can keep it in Class III. I wanted to clarify that, because I know that was an issue with you.

DR. BOYAN: The first thing I was going to bring up is that we have to decide. Now I want to share with you a very important piece of information. Everything we

separate out of this group, we have to do a separate sheet on. I think full disclosure is important here. So this is not a threat, this is informational, however, we have to decide at this point.

I have heard from the group that we can with relative non-stress, do non-constrained and semi-constrained together as a group. If there is someone who does not think that, raise your hand now. So we have now gotten ourselves to two potential groups. Now we have to decide if we're going to do uncemented and cemented together as a group.

For the record, nobody felt that we had to separate out semi-constrained and non-constrained as a group.

Now for the record, we can consider the cemented and uncemented together, or we can separate them. What I propose is that we consider them together and make special allowance in the discussion. I'm not quite certain how to handle this.

Lisa, can you help me with this. We're not exactly voting here, we're just getting into the worksheet, so it's not an official vote yet. This is just to consider them as a group.

Yes, Dr. Yaszemski?

DR. YASZEMSKI: I suspect we're all thinking about how we are going to stand on this one issue. Maybe if I think out loud a little bit, answers to what I'm thinking can help.

Supposing that the non-cemented and cemented glenoids were considered together and became Class II. When individual companies then came forward to try to get a specific prosthesis that they are making approved, it is my understanding -- and correct me now if I'm wrong -- would the same special controls have to be applied to every one of them, or are the special controls applied separately as each application comes through? Hence, could that provide the differentiation for the level of control necessary for non-cemented versus a cemented?

DR. BOYAN: Either Dr. Witten or Mr. Dillard. I think Mr. Dillard is going to address this.

MR. DILLARD: Jim Dillard, Food and Drug Administration. I think that's a very important point and a very good question. I believe that you do have flexibility with special controls under a same generic type of classification that not every special control has to apply to all the devices under consideration in that classification.

What you don't want to have is multiple exceptions, however, because once you get into multiple exceptions, it might be better and more appropriate to break out different classifications for device types. They may or may not have the same classification, as Lisa talked about in the end. It may be that it's just very appropriate to have two descriptions for product types, even though they might have the same class, because the special controls are so different that they really don't overlap enough to even be considered in the same or under the same classification, excuse me.

If you are in a situation, for example -- and we do have some examples of this in classification, not necessarily in orthopaedics, but within the office -- that there are product types that under the classification definition, most of the products are described with a set of special controls that cover a large percentage, with a smaller percentage broken out with a slightly different classification definition associated with it that also might have one or two different special controls.

Generally they are additive as opposed to subtractive. That is something that can be done in the classification process with relative ease. So I think that

more so than being too terribly worried about exactly what your recommendation might be, and where you might get hung up on should it be a different classification, should it not be a different classification, I think if you work through the sheet, some of that, I believe come out, and it might be very clear then which direction or which recommendation that you are making to us, which I think is really the crucial part here.

DR. BOYAN: So what I think you have suggested to us is that we start working through the sheet as if everything is in the group. If it becomes difficult to keep something in the group, it will become painfully obvious?

MR. DILLARD: I believe that that is the way it would end up, yes.

DR. BOYAN: Okay, so let's start with that in mind. Dr. Nelson?

DR. NELSON: Could I ask just an informational question? Can someone say approximately how many total case histories -- it looks like we have four different types of device that we have evidence for. Let's lump together non-constrained and semi-constrained, but just cemented and uncemented humeral component, and cemented and uncemented glenoid component, how many data cases are we talking about

on those?

For instance we are going to vote do we think there is enough data to say that it should be Class II? Are we talking about five patients in an uncemented glenoid component?

DR. BOYAN: In the documentation that was provided to us, we have to assume that that information has been given to us already, and that if it was insufficient, the information that is provided, you don't feel that it is adequate, then it has to rise and fall on those merits. So whatever sense of security you gleaned from the information provided by the petitioner is what we have to start from.

Now I think we have had a lot of discussion. One thing that has been said to us both by the petitioner and by our experts on the panel is that there is significantly less information available for the glenoid than is available for the humerus. I think that's what we have to go forward with.

DR. NELSON: Again, just an informational question. Do we know what those numbers are? I don't.

DR. BOYAN: I'll take a point here to give the petitioner -- okay, one of the panel members can address this. Dr. Aboulafia.

DR. ABOULAFIA: Open to criticism from anyone, but according to Cofield's paper, and it's the Cofield implant, four to five year follow-up is five patients. Three to four year follow-up is 18 patients. That means 23 total patients with a follow-up of greater than three years.

DR. NELSON: This is uncemented, both sides?

DR. ABOULAFIA: This is uncemented glenoid side.

DR. NELSON: Thank you.

DR. SILKAITIS: I would like to said Dr. Aboulafia how many were greater than two years?

DR. ABOULAFIA: Greater than two years is 69 plus 23, 92.

DR. SILKAITIS: The reason I ask that is two years is the typical review period of a clinical study of prostheses, so I think 93 would be the number of devices that were reviewed. I believe typically it is about 100 cases that we look at in evaluation of a device.

DR. ABOULAFIA: I would say that of those, they report a complication rate of 16 percent for all of them, which included an equal number of patients with less than two year follow-up. So we have 16 percent complications in patients with greater than two and less than two. They didn't break it out into those who had greater than two

years. If we attribute this to the technique, it is one surgeon, and it is the developer, presumably a competent surgeon.

DR. BOYAN: All right, I'm going to go ahead and get us back onto the worksheet. I have a sense that this will sift out here very quickly. So Ms. Rooney.

MS. ROONEY: The generic type of device we are discussing is the shoulder joint metal/polymer prosthesis, both non-constrained and semi-constrained, as well as the cemented and uncemented.

DR. BOYAN: So far. I would write that in there. That's not going to last.

MS. ROONEY: Now we need the classification recommendation.

DR. BOYAN: Do I hear anybody arguing that we not recommend at this point, Class II? Let the record state that I hear no one -- wait. Yes, Dr. Aboulafia?

DR. ABOULAFIA: For all of the implants being considered?

DR. BOYAN: Okay, so it's sifting out right now. Go ahead, Dr. Aboulafia.

DR. ABOULAFIA: Yes for all except the obvious one that everyone knows that I have a problem with, which is the

non-cemented glenoid component.

DR. BOYAN: I think we're going to have to separate out the non-cemented glenoid component and do a separate sheet for that. Right now everything else that is under discussion is now being discussed in the framework of a Class II.

If there is an objection to that, would someone raise their hand. Dr. Skinner.

DR. SKINNER: Does this have to be unanimous?

DR. BOYAN: No, we're just trying to get going.

DR. SKINNER: Why separate it out if there might only be one objection to that?

DR. BOYAN: The difficulty that I'm experiencing with the current system that we're being asked to deal with is that we are voting without voting in effect, but we are trying to get a worksheet done, and then we're going to vote on the worksheet. So at each step in the worksheet, we can have this discussion. We can have unofficial votes, group votes on each step, but this is going to be one of those experiences that we're all going to regret.

So the question is -- I think that we are going to listen to the same glenoid discussion every time. I really feel like I need some help here from Dr. Witten.

MS. NASHMAN: I'll take a stab at this, Dr. Witten. We could fill out this worksheet any which way we like, and then vote upon it. If we do not vote for the worksheet, we are going to be starting from scratch again, trying to fill out the worksheet or multiple worksheets, until there is a consensus, until we have a positive vote.

Therefore, what Dr. Boyan is doing is trying to get a majority, or separate it out each step of the way, so that we don't have to retrace our steps. If that isn't clear, if somebody could just let me know.

DR. BOYAN: What I think we need to do is we need to take the glenoid question and reserve it. Let's get the worksheet down for everything else, and then let's see if we can fit the glenoid back in. How is that for you, Dr. Skinner?

DR. SKINNER: That's fine with me. I'm just concerned about this, because having done this operation myself, I think that there is a whole lot more problems the surgeon can cause with a cemented or uncemented prostheses for the glenoid than is the difference you get from the prosthesis. I just don't see a difference here.

DR. BOYAN: So I think that my system might get us to the endpoint that will fit the most number of opinions if

we just reserve the glenoid. We're not going to discuss it. We're going to get a worksheet, and then we'll see if the glenoid can go back in with the rest of the group.

So heading down the worksheet, is the device life sustaining or life supporting? I think this got answered very clearly. Dr. Aboulafia, it is life sustaining or life supporting?

DR. ABOULAFIA: No.

DR. BOYAN: Is the device for a use which is of substantial importance in preventing impairment of human health? Is there anybody that would argue that it is not important?

DR. NELSON: It is important.

DR. BOYAN: Anybody that feels like another position should be taken?

DR. YASZEMSKI: Dr. Boyan, could I just make a suggestion for going through quicker? Perhaps with the previous discussion, if you could state the expected answer and then ask for objections, it might go quicker.

DR. BOYAN: Thank you, Dr. Yaszemski, that is wonderful.

Does the device present a potential unreasonable risk of illness or injury? I have heard nothing that would

suggest that it does, so the answer there would be no.

If you are going to argue with me, please speak up, because I'm going to focus my bifocals onto the sheet here.

DR. NELSON: I think the answer to that is supposed to be yes. It has the potential. Jodi, you can correct me on this. It keeps it in the -- other than the Class I.

MS. NASHMAN: I think the term we are focusing on here is "unreasonable."

DR. NELSON: Okay.

DR. BOYAN: Now we did answer yes to question number two. So we now go down to item seven. We are at question number four now. Our answer to number one is no. Our answer to number two is yes. Our answer to number three is no. Our instructions say did you answer yes to any of the above three questions? Yes, so we go to item seven.

Item seven, is there sufficient information to establish special controls to provide reasonable assurance of safety and effectiveness? We all felt in the discussion the answer to that was yes.

If yes, check the special controls needed to provide such reasonable assurance for Class II. Postmarket

surveillance was discussed, and I would say that felt that it should at least be monitored, but we didn't feel that a postmarket surveillance-type study was necessary.

For performance standards we wanted there to be clear performance standards in agreement with the guidance documents, and with ASTM standards for the component parts. In addition, we wanted the preclinical testing and any minor clinical testing to address the question of pull out strength for the biologically cement prostheses.

We discussed patient registries in detail, and felt that they may be too complicated given the number of companies that are involved, and the actual number of yearly uses of the device.

For device tracking, we discussed in the sense of the patient registries, and the same information applies.

Testing guidelines I think we just addressed in terms of the preclinical testing and any limited clinical testing.

Was there anything else that we need to address here. Anything under "other" that I have missed? Dr. Yaszemski.

DR. YASZEMSKI: Could you summarize for us which boxes have checks in them.

DR. BOYAN: I checked all of them, so that there would be a little comment after each one so that we covered it. There would be a little statement after each one along the lines of what I just said.

We checked postmarket surveillance, and we felt that it wasn't necessary? Don't check it.

Performance standards we checked, and we said what they were.

Patient registries we don't check any more.

Device tracking we don't check any more.

Testing guidelines we check.

Other we have not agreed upon there being any other, so we're not going to check it.

Now I've got it, right? Okay.

Now to question number eight. If a regulatory performance standard is needed to provide reasonable assurance that the safety and effectiveness of a Class II or III device, identify the priority for establishing such a standard.

Now this would be the case where we are talking about probably our glenoid situation or uncemented devices would fit here. Do we feel that coming up with a regulatory performance standard for the uncemented devices, which is

the only issue that we really have had, is low priority; medium priority; high priority; or really not applicable?

DR. BESSER: Before we vote on this, as I read this, this refers to any of the performance standards that we said above. Am I reading it right or wrong?

DR. BOYAN: Lisa, we need a clarification.

MS. ROONEY: If you look on the back page, it says that questions eight and nine are not applicable unless a regulatory, subject to section 514 of the act has been designated. So you pass over both eight and nine.

DR. BOYAN: All right, number ten. For a device recommended for classification/reclassification in Class III, which we did not do, so we are out of that one.

Next page, can there otherwise be reasonable assurance of its safety and effectiveness without restrictions on its sale, distribution, or use because of any potentiality for harmful effect on the collateral measures necessary for the device's use?

I think we felt that it was reasonably safe and effective.

MS. ROONEY: This goes to whether or not we are going to restrict the device in one of three ways. You can

either restrict it to prescription use only, that's one. You can restrict it to be used only by persons with specific training; certain types of physicians. Or you can restrict it to use in only certain facilities.

So if you believe that any of those three are necessary for classification/reclassification in the Class II, you would mark those off.

DR. BOYAN: Obviously, it has to be by prescription use, because it is used in a surgical setting. It can only be used by orthopaedic surgeons, so we check that. It can only be used in operating rooms. What kind of thing do you mean by certain facilities?

DR. ABOULAFIA: Can I ask you a question? I think prescription use means you have to write out a prescription for the implant. Like custom implants, you have to write out a -- I'm wrong.

DR. YASZEMSKI: May I say, Dr. Aboulafia, it does mention that under 11B to answer your question, on the written or oral authorization of practitioner. So I think that covers it.

DR. BOYAN: How specific in certain facilities is certain facilities?

DR. SILKAITIS: I was going to ask FDA for

clarification, because I think that means certifying the hospitals that are involved, and I'm not sure that we want to get into that.

DR. BOYAN: Dr. Skinner, do you have a comment?

DR. SKINNER: Yes, I agree with Dr. Silkaitis.

The second box there implies that the FDA is going to regulate medical practice, and although they have done that in the past, I would rather not have them do it this time.

DR. BOYAN: Ms. Rooney, can you comment on that?

MS. ROONEY: Yes. This is intended to limit the use of the device to say orthopaedic surgeons as compared to general practitioners or something along those lines. We don't mean to interfere with the practice of medicine in that regard.

DR. SKINNER: In the past for instance, you regulated chimopapane(?) only to those physicians who had experience with back surgery. I don't think family medicine doctors are going to be doing this operation. I think the lawyers can adequately take care of that without having the FDA get involved in it.

DR. BOYAN: Thank you, Dr. Skinner. Dr. Nelson.

DR. NELSON: I think this is a question for the FDA, what does this line mean?

DR. BOYAN: Lisa?

MS. ROONEY: Generally, for example another device we just reclassified, we have limited it to physicians who have undergone a specialized training program for the use of this device. It can be something as minor as that, or as broad as just orthopaedic surgeons.

DR. BOYAN: In the context of Dr. Skinner's comments, which we can clarify I think in another format, maybe by not checking that box the FDA can use its discretion, and we don't necessarily make a statement that our entire panel is not comfortable with making. Is there an objection to my unmarking that box?

DR. NELSON: No. I think this has got to be just a simple FDA question. For instance, if it has to be by prescription, I doubt people who aren't doctors are going to be doing the surgery either. So this is really just a pro forma for the FDA. What are we supposed to put in this box?

DR. BOYAN: I think this is one of those discussions that can go on for ten years, so let's agree to leave the box to the discretion of the FDA. I think that the FDA has heard from us that we intend for orthopaedic surgeons to use this device.

Let's now go to our second homework page, the

supplemental data sheet. Now we're on the same group. We have to tell them what are the indications for use prescribed, recommended, or suggested in the devices labeling that were considered by the advisory panel.

We addressed the health risks that could be identified, and we found those to be sufficient. We are in compliance with the recommendation of the petitioner for the suggested use. Was there any objection to the petitioner's suggested use for these devices?

DR. SKINNER: Are you referring to question four?

DR. BOYAN: Four.

DR. SKINNER: I think that we shouldn't limit it to just what was on the FDA thing anyway, which was basically degenerative disease or trauma. I think it ought to include, as Dr. Wilde mentioned, tumors, rheumatoid arthritis, osteonecrosis --

DR. BOYAN: Wait, wait, tumors. What was the next one? Rheumatoid arthritis?

DR. SKINNER: Rheumatoid arthritis, osteonecrosis, or maybe even an et cetera in there or something.

DR. WILDE: We had mentioned post-traumatic arthritis.

DR. BOYAN: Are there any other indications that

we should add?

MS. ROONEY: Just for clarification purposes, indications for use are what were proposed by OSMA, plus these that we have just listed, correct?

DR. BOYAN: That is correct.

Question five, I propose that we use what was stated in the petition. Is there anything anybody wants to add? Seeing no additions, we will go to the second part of question five, which is specific hazards to health. Are there any specific hazards to health other than what was in the petition that we should note?

Seeing none, let's go over to any specific characteristics or features of the device that are associated with hazard. Other than those stated in the petition, are there any additional features of the device that we should note?

Seeing none, let's go down to the recommendation. We are recommending the classification of a Class II. Any objections to that?

Seeing none, question seven, if the device is an implant or is life sustaining or life supporting, and has been classified in a category other than Class III, explain fully. We did not use that, so we don't have to answer it.

MS. ROONEY: If it is an implant it has to be answered.

DR. BOYAN: Okay, back to plan A. The reasons for the lower classification with supporting documentation and data. Is there anything we want to add in addition to what is in the petition?

Okay, hearing none, we will go to number eight, summary of information including clinical experience or judgment upon which classification recommendation is based. Is there anything in addition to what was submitted in the petition that we should add?

Seeing none, we'll go to number nine. Identification of any needed restrictions on the use of the device. The petition did not address any restrictions on the use of the device. Do we want to suggest that there be any restrictions on the use of the device?

DR. ABOULAFIA: Can I ask that we ask for postmarket surveillance on any one of them, again, the same thing, glenoid component, or is that pretty much a wash?

DR. BOYAN: Well, actually we reserved the glenoid component from out of this, and then we're going to see if we can put it back in.

DR. ABOULAFIA: Okay.

DR. BESSER: I think that is where we put in the written or oral prescription or something.

MS. ROONEY: Right, that's the three questions that we talked about on the general classification questionnaire.

DR. BOYAN: Okay, there were no other restrictions. Hearing no additional restrictions, we will go to question ten.

If the device is in Class I -- and it's not, so we don't have to do that.

Existing standards applicable to the device, device subassemblies, or device materials. Now the petition has stated a very extensive description of the existing standards and what will be done. Is there any addition to what was in the petition? I would like to add one, which is that as new information becomes available on biologic fixation, it be taken into consideration; biologic fixation and consequences of wear.

DR. NELSON: Dr. Boyan, I think it's a good idea. Why are you proposing these?

DR. BOYAN: Let me write them down before I do it. The reason that I am proposing them is that as I have sat here on this panel now for some two years, I have found that

often arguments are made that something at the time the study was started wasn't known, and therefore a different standard may apply. I think double jeopardy is unfair to companies, but I do feel that the information that was available to the orthopaedic research community ten years ago was essentially engineering in context, and not biological.

Now the information base in biology is growing exponentially, and the kind of fixation that an uncemented device relies on is a biological fixation that is subject to wear consequences. We are only beginning to begin to understand about metal wear. We have some very limited information on polyethylene wear.

As these devices come out, if the biological consequences aren't understood, we may find ourselves where we are making decisions that are inappropriate for the state-of-the-art. So I would like if information is available in the literature when a company comes forward, that they be able to show that their device considers that information, the biological information that is in the literature.

That was the gospel according to Dr. Boyan. Now, we complete this form, which we have just now done. Now I

would like us to go back. We are happy with this form, as a collective unit for all aspects of the class that was brought forward to us by the petitioner with the exception of the glenoid uncemented device. If we place some commentary on the glenoid uncemented device, could we fit it into this sheet.

I would like to address Dr. Aboulafia. Do you feel that by making some comments on the supplemental data sheet, that we could give FDA enough guidance that they could include that in this group?

DR. ABOULAFIA: My guess is yes. I don't know what kind of guidance we can give them. My guess is certainly.

DR. BOYAN: So one thing that we need to give them is you have raised the issue of postmarket surveillance, and that may be a recommendation we make is that for the glenoid uncemented component, that there be a postmarket surveillance study of some kind. So we need to write that into what is the answer of what?

MS. ROONEY: You can go back to general device classification, number seven. Mark on postmarket surveillance, and put a note next to it for uncemented only.

DR. BOYAN: Okay, uncemented glenoid.

Any other issues related to the uncemented glenoid? Dr. Yaszemski, you had some comments about cemented versus uncemented.

DR. YASZEMSKI: No, this is a different comment. I was relooking over the supplemental data sheet, and on number six we recommended classification Class II. Did we have to speak to priority on the right side of that line, or did we do that?

MS. ROONEY: No, we don't, because priority only relates the adoption of performance standards under part 514 of the Act. We are looking at voluntary standards instead.

DR. YASZEMSKI: Thank you.

DR. NELSON: In order to just clarify what we are voting on so it will go through nice and smoothly, do you want to, or does someone else want to try summate what it is that we are doing here vis-a-vis Class III or Class II? That's basically what we are doing.

DR. BOYAN: What we are proposing to recommend is that the shoulder joint metal/polymer prosthesis as a group, which included the uncemented and cemented devices for the glenoid and the humerus, as well as the cemented devices non-constrained and semi-constrained be reclassified as Class II devices.

We found that the devices were not life sustaining or life supporting. We did find that they had substantial importance in preventing impairment of human health. We don't think that they present an unreasonable risk of illness or injury. We have recommended that there be postmarket surveillance specifically for the uncemented glenoid device since the amount of clinical information is limited.

We feel that the performance standards that were presented in the petition are adequate to provide any special controls that are necessary to insure the safety of the devices, and we've recommended that the preclinical testing and any limited clinical testing that is required could be designed in such a way that it would insure that biologic fixation issues were being met.

We also feel identified the restriction that the device could only be used on the written or oral authorization of a practitioner licensed by law to administer the device.

We found that we increased the indications recommended for use to include what was described in the petition, and we added degenerative disease, trauma, tumors, rheumatoid arthritis, osteonecrosis, post-trauma

degenerative disease, and I guess that's it. That's our recommendations for use.

Again, we identified the health risks as being those as stated in the petition. The reasons that we are recommending this lowering of classification to Class II were stated adequately in the petition. The information was adequate as provided.

We added that the standards applicable to device as provided in the petition, but as new information becomes available on biologic fixation and consequences of wear, that they be taken into consideration. So that is the summary of what we are proposing in the worksheets.

Now it is time to vote upon the worksheet.

DR. HILL: One question before we vote. Getting back to the issue about the non-cemented glenoid component, there is a question eight that talks about priority as far as the postmarketing surveillance. I kind of agree that that's difficult, and I think we ought to give it high priority. So we didn't answer that question for that specific area.

DR. BOYAN: That is a good point. So is there an objection to us stating that for the uncemented glenoid, that the postmarket surveillance be given high priority?

DR. STERN: Could you just give a sense of what's the difference between low priority or high priority? Are we about to say that this is something that should be done immediately? So we have some sense of what we are deciding here.

DR. SKINNER: I think that priority business refers to the performance standard. It is not applicable.

DR. BOYAN: That was my impression as well, but we do want to convey to the FDA that we feel that they focus in with some degree of intensity on the concept that postmarket surveillance of the uncemented glenoid be expedited.

MS. ROONEY: By way of background, under the Act, we can require a manufacturer to come in with a protocol. We can notify them within 30 days of our decision to reclassify to let them know that we expect them to come in with a protocol that is designed to bring about the information that we are still in question regarding.

DR. BOYAN: Thank you, Ms. Rooney.

DR. STERN: I guess I just want to comment I don't know how the FDA envisions high, medium, and low priority, but somehow I would think that high priority might be things that are more life threatening than uncemented glenoid. I guess I'm a little concerned with us using the term "high"

priority for this.

DR. BOYAN: We actually haven't. We're just encouraging them to pay attention. That is all we are doing. We haven't made an official recommendation along those lines.

So what we are voting on is everything I just read to you, with the exception of this priority of the postmarket surveillance study on the glenoid.

Dr. Silkaitis.

DR. SILKAITIS: I don't know if this is the right time to talk about it, but in terms of postmarket surveillance, I understand that we would want to have a low complication rate, clearly, without a doubt. In terms of postmarket surveillance, are you looking at like 50 patients on an open study to evaluate the performance, or are we talking about a huge study?

DR. ABOULAFIA: No, I'm talking about a small number of patients. We could look at a specific protocol. Fifty I think is a big number when you have a prospective, randomized study. Obviously, it can't be double-blinded.

DR. SILKAITIS: Thank you.

DR. BOYAN: That's an important clarification, Dr. Silkaitis, thank you. Let me just remind us, this is our

first one of these kind. I am anticipating that we will go very swiftly through all remaining reclassification/classification discussions. If we do recommend a postmarket surveillance, as was pointed out to us by Dr. Silkaitis, we need to be prepared to give some guidelines to FDA as to what we really mean by that.

So is everybody clear on what we are actually going to vote on? We have the worksheet. We have the supplemental data sheet. It is fairly straightforward. We have included the uncemented glenoid with the proviso that there be some sort of limited postmarket surveillance study.

Now I need a motion. Ms. Nashman, you normally read the instructions to us on the vote. I'm in shock that you don't have instructions.

MS. NASHMAN: No, there are no instructions for this. What we are going to require is somebody to make a motion that we accept the worksheet as it has been done.

DR. NELSON: I will make a motion we accept the motion as read by Dr. Boyan.

DR. YASZEMSKI: Second.

DR. BOYAN: Is this one of these situations where we can raise our hand, or do we actually have to go all the way around the room and vote for the record? We have to

vote for the record. So let's start the voting with Dr. Nelson, and we'll go this direction.

DR. NELSON: In favor.

DR. LAVIN: In favor.

DR. YASZEMSKI: Yes.

DR. STERN: Yes.

DR. HILL: Yes.

DR. BESSER: Yes.

DR. SKINNER: Yes.

DR. ABOULAFIA: Yes.

DR. BOYAN: That's it. The motion carries, and we have voted on our first process.

[Whereupon the motion to approve the worksheet as prepared is unanimously approved.]

Now the recommendation of the panel is that the cemented shoulder non-constrained, the cemented shoulder semi-constrained, the uncemented shoulder non-constrained, the uncemented shoulder semi-constrained be recommended for a classification as a Class II device.

We get a ten minute break.

MR. SMITH: I would just like to thank the panel on behalf of OSMA.

[Brief recess.]

Agenda Item: Reclassification of Elbow

DR. BOYAN: If we could start to assemble, it would be appreciated.

We are now going to begin the discussion of the second reclassification petition for the elbow joint. We will begin with the Petitioner's presentation, followed by the FDA presentation. We will then have a general panel discussion of this topic, followed by a panel discussion aimed at answering FDA's questions.

We will finish by going through the reclassification work sheet and supplemental work sheet and voting upon our recommendation. And now that we know how to do these things, we will do them in a very expeditious manner.

I would like to remind the public observers at this meeting that while this portion of the meeting is open to public observation, public attendees may not participate, except at the specific request of panel.

The Petitioner will make the first presentation and the presentation will come from OSMA again. I would like to remind the presenter to identify herself, what company she is associated with, any financial interest she might have in that or any other company that is under

discussion.

Agenda Item: Petitioner Presentation

MS. HUGHES: Thank you, Dr. Boyan.

My name is Jackie Hughes and I am an employee of Solser(?) Orthopaedics, Incorporated in Austin, Texas. I am here as an OSMA representative today and have no financial consideration in any company, who has one of these elbow prostheses.

Presenting with me this afternoon will be Dr. Alan Wilde, who helped present on the shoulder, and Ms. Gretchen Rhodes(?) will be available from Smith & Nefu(?) Richards. While she is not an elbow engineer, she has volunteered to try to assist in answering any questions, if needed.

The submission of this petition stated the call for PMAs for this Class III preamendment device. Prior to final submission, this petition was reviewed by the AAOS, ORS, FDA and ASTM.

The purpose of this presentation is not to approve a new device, but to demonstrate to the panel that reclassification of these prostheses to Class II is appropriate because sufficient knowledge exists in the literature about the risks associated with elbow arthroplasty and these risks can be controlled through

typical Class II special controls.

What are elbow prostheses? They are basically reconstructive devices replacing the distal humerus and the proximal ulna. They are very limited in their use. Only .2 percent of the total orthopaedic market are total replacement elbows.

According to a Fosten(?) Sullivan survey, about 1,200 to 1,500 total elbow arthroplasties were performed in the U.S. for 1996. The figures for 1997 are not available at this early date in 1998; however, they were not anticipated to be larger than those in 1996.

The market share reports indicate also that over 65 percent of those 1996 figures were for hinged devices, of the loose, sloppy hinge type. Goals of elbow arthroplasty are to relieve pain and improve function.

The indications for total elbow arthroplasty are rheumatoid arthritis, post traumatic arthritis, supracondylar non-union, ankylosis, oncology and failed surgical interventions, such as synovectomies.

During the initial classification in the 1970s, the panel recommended Class II for elbows, but FDA disagreed, due to very poor experience with the early devices, many reported cases of loosening and poor clinical

experience with rigid hinges. There had been at that time very limited experience with loose hinges.

The early surgeries were resection of the joint with or without interpositional material. Early rigid hinges were made of high friction metals and the designs did not allow normal movement of the joint. Prior to 1967, very little literature existed at all on elbows.

In 1972, InterD(?) introduced cemented techniques and then major design revisions appeared, including loose hinge and resurfacing prostheses in the late 1970s and early 1980s. The current status of elbow device classifications are 888.3150 for constrained elbows, Class III. These devices are the subject of the reclassification request.

The basic description provides linkage across the joint. There are six devices currently marketed with such linkage across the joint and these are all preamendment Class III devices, which need to be reclassified or there will be a call for PMAs on these devices.

We need to look into why the regulatory definition of "constrained" is this linkage across the joint. As we go into 888.3160, which are really semi-constrained elbows already in Class II, the regulatory description is no linkage across the joint. There are 11 devices listed on

the CD ROM database in this classification.

However, in closely looking at what those devices are, many of them or several of them have loose hinges; that is, for an example, the triaxial. The reason is that the medical community's definition for semi-constrained is articulation with some degree of freedom, usually in the amplitude of 8 to 10 degrees in varus and valgus and axial rotation. Unconstrained has no linkage and the medical community considers no linkage non-constrained, but there is no official regulatory classification for a non-constrained elbow.

For the purposes of this presentation, the data has been regrouped per the description in the regulations, as is shown in this next slide. I have put down today's current elbow options, which are on the market in the first column. In the second column, I have indicated whether there is some linkage across the joint or whether there is no linkage, which would make them semi-constrained.

In the third column are the year of initial use of these devices. The top one is the Cunrad-Free(?), which is a link device I showed in use since 1981. This is the latest design in since 1981. Dr. Cunrad's original design was started in 1971. The original Pritchard(?) Walker was

first implanted at the Mayo Clinic in 1976. This is listed as the Mark 2 or the second device on there.

Some of these devices were initially introduced in Europe. So, the dates may reflect that experience rather than their U.S. experience, but these are all dates that were contained in the petition.

Requests have been made in the -- excuse me -- we do have some devices that are moving around the room and those will be examples of all of these types of devices. There is one which is a rigid hinged device, which there are no other examples on the market currently. There are semi-constrained devices going around. This is a picture of another one, which is a capitella condylar, a non-linked semi-constrained device, which has been in use since 1974. This is already Class II and the reason we are talking about this today is because it is an example of a metal-backed ulnar component.

This is another resurfacing type Class II device, semi-constrained, the ERS and this is an example of a snap fit device or modular device. There are not examples here today of every single one of these, but the ones that are coming around the room, in addition to the slides that I have shown you, will pretty much represent what I am talking

about in the petition.

These were the requests that (1) address the definitions of "constrained," "semi-constrained" and "non-constrained," so that the regulatory community and the medical community will have a common definition. Also, miscellaneous requests were included to include modularity, metal backings, ulnar components in the semi-constrained classification and titanium alloy for a better representation of the cleared devices available today.

In preparing both the petition and this presentation, FDA asked us to address the risks as outlined in the classification regulation and the literature, as well as how those risks can be addressed through Class II special controls.

47 FR 29052 came from the classification regulations. These are the risks that were identified at the time the classifications were done. No. 1 is device loosening; No. 2, infection; No. 3, failure of prosthesis. All of these can be controlled through the special controls of Class II devices, such as the 510(k) requirements for a substantially equivalent intended use, a substantially equivalent design, preclinical testing in the labeling for indications, contraindications, precautions and warnings.

Again, 510(k) and QSR requirements for sterility are also important and material conformance to standard. These are all similar to the controls that were demonstrated for the shoulder. In elbow arthroplasty, patient selection is very important and device loosening and failure of prosthesis can also be controlled in the labeling and instructions for use.

It is also important to remember that this device also is subject to the MDR reporting regulation and a doctor or manufacturer must report when intervention is required or a prosthesis malfunctions.

Additional risks identified were loss or reduction of joint function and adverse tissue reaction, again, going down the special controls, 510(k) requirements for substantially equivalent designs, material conformance to standards, preclinical testing, GMP or QSR controls covering manufacturing and design controls can take care of these risks.

Again, more from the regulation, bone erosion and resorption resulting in fracture of the bone, difficulty in salvaging the joint if the device is removed and metal sensitivity. Most of these can be controlled by labeling controls in the precautions and warning sections. Metal

sensitivity can be an SE(?) design and material conformance to standard.

Many, if not all, of these general risks share a commonality with other orthopaedic devices already successfully regulated as Class II devices. In identifying those risks in the literature, in summarizing the literature that was included in the petition, the risks or complications that were found were infection, ulnar nerve lesions and paresthesia, which can be controlled by a 510(k) requirement for sterility in the QSRs to ensure that sterility and labeling precautions, warnings, indications and contraindications.

Details for the key references are presented in Tables 2 and 4 for the revisions and the complications in Tables 3 and 5. Further itemization of those complications are found in Amendment 2.

Continuing with the clinical references to complications, instability, disassembly, dislocation and subluxation, all can be controlled by typical Class II controls, 510(k) requirements for substantially equivalent intended use and design, labeling controls for indications, contraindications, precautions and warnings and, again, you have the QSR or GMPs to control manufacturing and design

controls.

Again, remember, in elbow arthroplasty, patient selection and good surgical technique are very important. In continuing with the clinical references to complications, intraoperative and other fractures and prosthesis failure or other revisions can be controlled by labeling and 510(k) requirements. Heterotopic and ectopic bone formation or evulsion of soft tissue, the same as in the shoulder, there are not really any controls required. These can occur with any orthopaedic device.

In fact, all of these risks can occur with any orthopaedic device already regulated as a Class II device. A review of the MDRs was done from January 1985 through March 1996. We found a total of 77 reports, including 15 for hemi-elbow, classifications which are not really subject to this petition. However, because of the existing confusion on the definitions, coupled with diverse people making the MDR reports, accurate reports as to how these are classified were not always filed so analysis was very difficult.

The key points here were that there were no unusual complications as compared to 47 FR 29052 or the literature. All of these events were similar to other

orthopaedic devices that are already regulated in Class II. The MDRs are presented in Tables 6 through 9 in the petition.

Based on this, our recommendations are to reclassify both rigid and loose hinged elbows into Class II, to include modularity and ulnar components in descriptions of semi-constrained devices. This incorporates snap fit assemblies and ulnar components, which were probably just an oversight during the massive classification effort and add titanium alloy as an option for all elbow classifications since this is an acceptable orthopaedic biomaterial used in all joints and is the material of some of today's marketed elbows.

In support for the reclassification of constrained elbows for the rigid hinge, Swanson stated, "a condylar sparing restraining hinge can restore stability and function to unstable elbows, while providing a low, loosening rate and no failures related to implant material. He reported on 42 elbows with follow-up of up to 16 years with only a 7 percent loosening rate and 31 elbows followed for an average of 77 months, he reported excellent pain relief and an average range of motion.

While studying semi-constrained or loose hinged

devices, Broomfield(?), et al., in 1990, reported that 4 out of 36 patients required more constrained elbow. Likewise, Kaston and Skinner in 1993 reported 2 out of 48 required a more constrained elbow.

Lastly, Maury, et al., in 1989, required 6 out of 29 patients with a more constrained type elbow. In joint replacement arthroplasty, Maury goes on to state, "It is obvious that more than one design may be necessary to adequately treat the spectrum of pathology that involves the elbow joint."

In support of the loose hinge elbows, again, in joint replacement arthroplasty, Maury reviewed seven loose hinge device designs between 1978 and 1979, with an average of three years follow-up. He found 90 percent pain relief, 24 percent complication rate, a 3 percent revision rate and 88 percent overall satisfactory results.

This petition contains a total of 26 references in supporting constrained elbow reclassification and all of these are design concepts, which have been in use for 20 years.

In summary, I would like to say that there is sufficient data existing on the improved surgical techniques and implant designs to regulate these devices in Class II.

Many of the general risks share a commonality with other total joint prostheses, which are successfully regulated in Class II already and the device specific risks can also be addressed with the special controls of Class II.

The types of studies and controls associated with Class III products are inappropriate for these devices, which have been in use follow-up for over 20 years.

I would like to have Dr. Wilde now address the clinical references within the petition.

Thank you.

DR. WILDE: Thank you very much, Jackie. I am Dr. Wilde. And, again, I am not an investigator of any of these devices that we are going to talk about. I have not received any royalties as a result of that. I have no consulting arrangements with any of the companies involved. Only my expenses will be paid for this meeting and there will be no income received from the companies for the presentation.

I did want to contrast the capitella condylar elbow replacement, which is already classified as a Class II device. It is really not part of this petition, but in order to contrast the results of the loose or sloppy hinges and the fixed hinges, I felt we should make some comments

about an unconstrained elbow and one of these is the capitella condylar.

It is used in patients with rheumatoid arthritis or in the elderly osteoarthritic. This is a review of three series, comprising a total of 293 cases, including the series by Ewald, the developer of the implant, Weiland, who was then at Hopkins, and John Ruth and I.

The average follow-up for these three series was 6 1/2 years. Pain relief is quite good. It is almost 90 percent, as you can see. Complications or other things that we all are so vitally interested in, infection in elbows is higher than it is certainly with shoulders, probably reflecting the patient's disease.

These are patients with -- largely, with rheumatoid arthritis, who are immunely compromised and who may also have some problems with their skin. So that the infection rate, as you can see, varies from 1 1/2 percent all the way to 8 percent and loosening is not frequent in this series, however. You are looking at a 1 1/2 percent to 2 1/2 percent instance, but there are some problems with dislocation, as you can see, ranging from 3 1/2 percent to 6 percent or recurrent dislocation of 2 1/2 percent.

So, there are some peculiarities of the

unconstrained prostheses and one of them that you don't see with a fixed or a sloppy hinge is dislocation or recurrent dislocation.

Now, let's just take a look now at the implants that we are talking about in this petition. This is the Cunrad Maury elbow replacement. It is a sloppy hinge. It is joined. There is a bolt, which joins the humoral and the ulnar components.

This is a report by Maury and Adams in 1992, some 58 cases followed in not quite four years on the average. There is a gain in motion, which is small gains, as you can see.

Let's look at complications, which is our main focus. Complication rate of infection, again, is higher than what we would expect in shoulder or hip or knee and, again, that, I think, reflects the patient population and the fact that the elbow is comparatively close to the surface of the skin.

Fractures occurred in almost 12 percent of patients. I think that, again, is reflecting the osteoporotic bone that is found in the rheumatoid arthritic, ulnar neuritis, 1.4 percent. The evulsion of the triceps really has nothing to do with the prosthesis. More is due

to the approach. There was one fracture of the ulnar prosthesis in that series. The implant has since been changed and there are no further fractures that have appeared.

The main reason to show this slide is that you do not see instances of dislocation and recurrent subluxation, mallocation, all those things that you do see with a minimally constrained two piece prosthesis. So that there very definitely are some advantages to an implant like this. It also can be used for far more indications than a minimally constrained elbow like the capitella condylar; namely, that you can use it for non-unions of distal humoral fractures. You can use it for revisions of loose other elbow replacements, including the capitella condylar.

You can use it in cases where the elbow is unstable or where there are tumors. So, there are far more indications for this particular prothesis and, yet, our experience has been quite good and quite satisfactory to date.

The review articles are in your packet. The article by Figge includes a number of different implants. A lot of them were triaxials. The triaxial elbow replacement is now off the market. There was a rather high -- as you

will see, a rather high complication rate in that series, but there also were quite a number of complicated cases in that series.

These numbers are small. You will notice that all of them are small, even Geshlin, the major author of the GSB, only has 144 cases and the next largest series is Morea, which is 94. So, this is even a smaller situation than what we just showed you with the shoulder.

The follow-up, however, is from 2 to 17 years with these implants. If you look at the overall complication rates, the series by Figge is very high and that is 73 percent. That includes fractures. It includes fractures of the triaxial bearing, the bushing, ulnar neuritis, infection and a number of things.

The reason that the article is included is that there were reports of the osteonic elbow and that is why it was included. However, if you look at the overall revision rate, you are looking at the rate of around 10 percent. This is in distinction to the earlier experience with hinge elbow replacements, in which the revision rate was from 27 to 41 percent. So, this is a remarkable change.

The implant is better. The surgery is better. The indications for patients are better.

So, the recommendations from OSMA are to reclassify both the rigid and the loose hinge elbows into Class II to include modularity in the ulnar components in the description of the semi-constrained devices and to add the use of titanium alloy for elbow replacements, which is, again, not a new recommendation, but was not present in the previous petitions.

Thank you very much.

MS. HUGHES: Dr. Boyan, this is Jackie Hughes.

DR. BOYAN: Yes, Jackie.

MS. HUGHES: Dr. Wilde might not be aware but the triaxial is not off the market. It is still a currently sold device, but not actively marketed.

DR. WILDE: Well, it is not used.

Agenda Item: FDA Presentation

DR. BOYAN: The FDA presentation will be given by Mr. McDermott.

Again, panel members, if you need a copy of the petition, there is one lying next to me. Just send a note or come and point my way that you need it.

MR. MC DERMOTT: Good afternoon. I am Ken McDermott, FDA's reviewer for the elbow reclassification petition.

I would like to thank OSMA for their presentation and my colleagues and my bosses for their help in preparing for this presentation.

I am covering basically the same types of things that Ted Stevens covered for the shoulder and trying to give you some idea of what FDA hopes to obtain from your review.

There are two devices in this petition. The Class III device is the one that we have the main focus on. It is a constrained metal on metal or metal on polyethylene articulation cemented device and there have been six cleared by 510(k).

The second device is a Class II device, semi-constrained, metal on polymer articulation, cemented and 15 have been cleared by 510(k). There have been no IDEs nor PMAs for either of these devices. The Class III device is the main focus and the Class II device just involves a device description change.

So, both devices actually, we are making a device description change in the petition and only the Class III is under consideration for reclassification. No changes in the indications for use.

Currently, the semi-constrained device is a humoral device with cobalt chrome and a radio component made

out of polyethylene, one piece. This is proposed in a petition to be changed to adding the titanium metal, adding an ulnar component, either one or two piece component. The radial component will go from one piece polyethylene to two piece

-- one or two pieces and by one piece we mean polyethylene, two pieces meaning polyethylene plus a metal backing, cobalt chrome or titanium.

The rest of this presentation will focus on the Class III device. I will only return to the Class II device at the very end in the panel questions. This Class III device, the changes are proposed from III to II is a constrained; however, the petition is recommending the difference between a rigid hinge and a loose hinge and adding a titanium to the metal components.

Now, there are three issues I would like to bring your attention to for this Class III device. One is the rigidity, rigid devices or preamendment devices, loose hinged were mostly cleared by 510(k) later. Item 2, there is a problem with a conflicting understanding of what "constrained" means. The regulatory definition, "constrained" means across the joint linkage. "Semi-constrained" means no across the joint linkage preventing

motion in at least one plane.

There is conflicts with what the clinician and the rest of the orthopaedic community defines as constraint. And the third issue involved with this device is the question of metal on metal articulation. There are not many or any devices which have this type of articulation and it does pose possible additional risks, compared to the metal on polyethylene articulation.

So, the general risk to health, which may be applicable to any orthopaedic device, infection, adverse tissue reaction, loss of joint function due to loosening or dislocation and revision due to any of these, the loss of joint function due to loosening may be broken down into various cause and effects, which I laid out in my review memo to you, as well as adverse tissue reaction we may break down as well.

But these are general risks that I have laid out in the memos to you. Now, metal on metal may add additional risk that you may want to consider due to greater metal generation, particle generation. Our experience may be that the dimension and tolerances may have to be better than a metal on polyethylene device. The surface structure, composition and properties probably will have to be better

than a metal on polyethylene and metal on metal involves greater friction than metal on polyethylene.

These may all increase the metal particle debris. Another concern is the fact that you have metal on metal; whereas, the metal on polyethylene may be a little less rigid due to polyethylene having a lower modulus(?) and that may lead to an effect on bone remodeling.

The most frequently reported MDRs out of 77 total between 1985 and 1996, dislocation, implant fracture and locking pin not seated. Due to the limitations that have been discussed all afternoon, I wouldn't attempt to go into further detail. The big problem, as Jackie Hughes mentioned, is the problem with the constrained. These were all mixed up between four different classifications and it was very difficult to stratify out the different devices because they were really classified wrong.

There is also a general lack of information in the MDRs to go into much detail. The petition supporting data, you know, numerous articles, the loose hinged, metal polymer version, the four articles on the rigid hinged metal polymer version, we don't have any data that I am aware of on the metal on metal articulation.

I think OSMA did a pretty thorough job on the

special controls and since there are so many, I won't go into that.

So, to recap before I get into the panel questions, these were the three issues for this Class III device that we would like to focus on: rigidity, the constrained definition and metal on metal articulation.

So, what I have presented is a possible classification breakout between rigid versus loose hinged and metal polymer versus metal-metal articulation and for each of these questions, I would like to consider these groups.

Should any of the following be classified separately because of the potential risk and/or special controls are different?

Have appropriate controls been identified? If not, what additional controls are necessary to address the risks?

Do the data support the reclassification of each of the following four device types from III to II?

What, if any, additional labeling is necessary for these?

So, that concludes the panel questions for the rigid and loose hinged Class III device. Now, this Class II

device is totally separate from the Class III device and it is really a technical question of do we want to change the device description of this? So, you should completely divorce these two devices in your deliberations.

The question here is whether semi-constrained elbow or the proposed modifications supported by the information of the petition. The next slide summarizes my previous slide of what these changes were. It remains semi-constrained, but we are adding a titanium alloy. The petition is suggesting the titanium alloy and an ulnar component and also the one or two piece ulnar and radial components.

That concludes my presentation. I want to thank everybody very much.

DR. BOYAN: Thank you.

We are now ready for our panel discussion and the idea here is that we will ask the questions -- we will eventually address the FDA questions, but at this point it is a general discussion. We have Ms. Hughes, Dr. Wilde and Mr. McDermott and feel free also to ask each other questions that you might want clarification on if you want one of the panel experts.

For this part, again, we will go around. Not --

everybody have one or two questions that you may want clarification on. If you don't have a question, feel free to pass. Why don't we begin with Dr. Friedman because he has had nothing to do all morning.

DR. FRIEDMAN: Thank you, Madame Chairman.

This is Richard Friedman.

The one big concern I have relates to the metal-metal articulation. I am not aware of any current arthroplasty systems that have a loose hinge that is metal on metal. Is that correct?

MS. HUGHES: This is Jackie Hughes.

I could find no devices of today that did not have metal polymer articulation.

DR. FRIEDMAN: Yet, you are asking us to go ahead and reclassify these to Class II?

DR. WILDE: I think the rationale -- Wilde, Alan Wilde -- the rationale for that is, of course, you are aware that there is new technology in total hips for metal on metal in which, at least so far, wear debris is not as frequent, at least not as frequent as what has been seen with metal and polyethylene. I think the rationale for putting this in as a request was so that it would allow investigation into this newer technology.

DR. FRIEDMAN: But there is a difference between the hip joint where you can have very, very tight tolerances, being a ball in a socket, versus the elbow where the biomechanics are much more complex and you are getting motion in many planes and you have the potential of getting wear debris.

For example, you do not see any metal on metal total needs for that reason because you have roll back and you have motion in more than one plane and I worry about similar things in the elbow. With none currently on the market nor any clinical data, I would be concerned about approving some that doesn't exist.

I think if there is a new technology that is going to come along that really isn't out there, hasn't been tried yet, then it needs to stand on its own merits and be studied by itself as such, rather than jumping in and reclassifying it.

Getting back to the rigid metal on metal, are there currently prostheses in clinical use right now with that design?

MS. HUGHES: There are currently no prostheses in use with metal on metal articulation, either rigid or non-rigid.

DR. FRIEDMAN: And the four studies you mentioned, those are all older prostheses?

DR. BOYAN: Dr. Friedman, Ms. Hughes -- Dr. Friedman, all morning long you have been watching us have to give our names.

DR. FRIEDMAN: Yes. Richard Friedman.

The four studies you mentioned, they are all from older prostheses that were rigid metal on metal back from the 1970s. Correct?

MS. HUGHES: Jackie Hughes.

I am not sure as to which four studies you are referring to. All of the studies in this petition were on newer devices that employed the loose hinge. They made references to earlier studies and the complications seen in those studies.

DR. FRIEDMAN: Okay. Richard Friedman, again.

So, then there are no studies in your petition that look at rigid metal on metal designs?

MS. HUGHES: Jackie Hughes.

No, there are not. And, Dr. Friedman, the metal on metal articulation was part of the original classification and that is why it is being brought up because the original classification read, "An elbow joint

metal on metal or metal polymer constrained."

DR. BOYAN: Dr. Skinner -- or, Dr. Friedman, are you through asking questions?

DR. FRIEDMAN: Richard Friedman. Yes, I am finished.

DR. BOYAN: Okay. Dr. Skinner.

DR. SKINNER: Well, just one comment.

I have some of the same concerns that Dr. -- Harry Skinner -- I am sorry -- I have some of the same concerns that Richard has regarding the metal on metal. I would like to ask Dr. Wilde what he thinks of titanium as a plastic -- as a material to bear against plastic? Is that a good idea or should there be a limitation on where titanium is used in the elbow joint?

DR. WILDE: Alan Wilde.

We both are aware that the titanium as a bearing surface is not a good surface as it produces a high amount of wear debris against polyethylene.

DR. SKINNER: Dr. Skinner, again.

I would agree with that. I think that titanium on titanium as a bearing material is probably not a good idea and I think titanium on polyethylene probably isn't a good idea as a bearing material. As a back-up material, I think

there is good rationale for it. It could well be cheaper, easier to make and so forth.

DR. BOYAN: Thank you.

DR. Besser.

DR. BESSER: I have the same concerns -- I am sorry -- Dr. Besser -- I have the same concerns about the metal on metal articulations as have been mentioned by Dr. Friedman and Dr. Skinner. To my knowledge, there has been no metal on metal loose hinge kind of construction in any kind of prosthetic device for any joint.

Can someone correct me if I am wrong?

MS. HUGHES: This is Jackie Hughes.

I found no evidence of that.

DR. BESSER: Thank you. That is all.

DR. BOYAN: Okay. Dr. Hill.

DR. HILL: This is Dr. Hill. Dr. Skinner already addressed the question I had.

DR. BOYAN: Okay. Dr. Stern.

DR. STERN: Dr. Stern. I think I wrote down about the same thing on my piece of paper that Dr. Skinner and Dr. Friedman had and that was the question about titanium as a bearing surface.

Should I expand on that? My question was, I

believe that we are coming to a metal on metal articulation and that titanium is also being asked to be included as an acceptable metal and my concern is or my question is is there any available evidence?

MS. HUGHES: This is Jackie Hughes.

We are not really asking for it to be as a bearing surface. There are elbows out there today that have already been approved as all titanium with only a polyethylene bushing in the connection.

DR. STERN: Dr. Stern, again.

Let me make my question to Dr. Wilde. We are talking about achieving fixation in these total elbows with cement and, at least, if you look at some of the hip literature, cementing a titanium prosthesis is not necessarily a good thing. Just so I -- because I don't know the answer to this question -- are most of the cemented total elbows now titanium or are they cobalt chrome?

DR. WILDE: Alan Wilde.

I believe most of them are cobalt chrome.

DR. STERN: Stern. No further questions.

DR. BOYAN: Dr. Yaszemski.

DR. YASZEMSKI: Michael Yaszemski.

I have nothing new to add. I would echo and

support the separation of the metal and metal joint bearing surfaces and not including titanium as a potential bearing surface. Nothing new.

DR. BOYAN: May I clarify something with the Petitioner?

When I looked at this petition, I didn't have the sense that we were looking at the titanium as a bearing surface. I thought you were looking at it as the stem part of the component. Is that incorrect?

MS. HUGHES: Jackie Hughes.

Actually, the only device that I have been completely able to identify as a titanium device is the Osteonics Total Elbow, which is a loose hinged device. It has been in use since 1983 at the Hospital for Special Surgery in New York.

DR. BOYAN: In the petition, what you are asking for -- this is Boyan -- and specifically what you are asking for in my reading of what you were petitioning for, it was for the use of titanium in the stem part of the device and not necessarily in the bearing part of the device.

MS. HUGHES: Jackie Hughes.

Yes, that is correct.

DR. BOYAN: Dr. Lavin is next.

DR. LAVIN: Yes. Dr. Lavin.

I would like the data that you presented with the longer follow-up time. I was somewhat curious about the complication rates that seemed higher than what we saw earlier. I wondered if you had any sense for what complications occurred when and whether that complication rate was pretty evenly divided over the long follow-up period?

DR. WILDE: Alan Wilde.

Some of those complications, obviously, are early. Infection may be an early complication. It can also be a late complication. So, it can affect either one. The problems with insertion of some of the implants resulting in fractures in the operating room are, obviously, early and that is a problem of exposure. It is a problem of quality of the bone that you are dealing with.

It also reflects the early experience of the surgeon in using these, first learning how to use these devices. Then once the surgeon knows how to do this operation, then those technical issues become less frequent as time goes on.

I think the other thing that you are alluding to, perhaps, may be the loosening. Is there a difference

between early and late loosening? Usually, you don't see loosening early. It is a later phenomenon.

DR. BOYAN: Dr. Skinner, I think, had a comment to make on the same subject.

DR. SKINNER: Dr. Skinner.

I just wanted to echo what Dr. Wilde said. This is an infrequently done operation and virtually everybody who does this operation, unless they are at a center, like the Mayo Clinic, where they can gather 94 of them, does this operation once a year or twice a year, something on that order.

Maybe Dr. Friedman would disagree with that, but it is an operation that is prone to complications because it comes with a wide variety of joint destruction and many different prostheses and even using one prosthesis, you can't always fit all particular combinations of problems.

Based on that, the complication rate is just not going to come anywhere near what we get for total hips or total knees. I think we just have to accept that.

DR. BOYAN: Thank you.

Dr. Nelson.

DR. NELSON: Yes, Dr. Nelson for Ms. Hughes.

I think you are fairly clear that there is no

clinical data currently on the metal on metal. I am sorry I can't see you looking around that projector.

Did I correctly understand you that there is no clinical data on fully constrained prostheses as well?

MS. HUGHES: This is Jackie Hughes.

There is nothing presented, other than one article by Swanson on fully constrained within the petition. As I showed in my slide, there were several small instances in studies where doctors were actually studying semi-constrained loose hinged devices, where they felt a more constrained elbow was necessary.

In other words, it is very small usage where there is massive bone loss and lack of soft tissue support, perhaps because of oncology or severe trauma.

DR. NELSON: Yes. Dr. Nelson, again.

I am aware of the indications for the use of a fully constrained elbow and I have put in a few. Did you segregate out and did I just miss, what are the results on using that fully constrained one. Were they approximately -- what were they? Because I thought it was kind of lumped together. Could you just review it separate?

DR. WILDE: Alan Wilde.

The article by Swanson, which Jackie referred to,

did clearly delineate the complications of the fixed hinge. Swanson's hinge is a fixed hinge. We can go back to those slides, perhaps, and -- because we summarized that on the slide. It might be the easiest way or we have a reference in the petition.

DR. NELSON: Dr. Nelson.

Could you just review it verbally?

DR. WILDE: Let's see if we have it, Jackie.

Yes. Alan Wilde.

Here are the results summarized from Swanson's paper. Follow-up up to 16 years on 42 elbows; 7 percent loosening rate; 31 elbows followed an average of 77 months, excellent pain relief and average range of motion.

DR. NELSON: Dr. Nelson.

Thank you. Could you clarify something for me? If you have a titanium stem and it has a polyethylene hinge, isn't that still going to be -- have to be considered to be a titanium on polyethylene with the same wear problems?

DR. WILDE: Not to the same -- Alan Wilde -- not to the same degree that I think we both worry about with, let's say, a femoral -- a titanium femoral bearing and a polyethylene tibial(?) component, for instance, which we know is going to wear.

DR. NELSON: Dr. Nelson, again.

Given the fact that the hip has got such uniform pressure on it, granted it is higher loads, we are not going to see higher point loads, though, on the titanium on a, you know, hinged or constrained elbow that is titanium and polyethylene.

DR. WILDE: I am sorry. Say that one again.

DR. NELSON: Would we not see higher point loads on a constrained titanium polyethylene elbow and, therefore, there might be some particular concerns about that particular design?

DR. WILDE: Alan Wilde. I have no information about that. That would just a matter of conjecture at this point.

DR. BOYAN: I think Dr. Friedman was making motions like he might have a comment. Is that true?

DR. FRIEDMAN: Richard Friedman.

In the hinged devices that are made of titanium, the polyethylene is fixed up against the titanium. So, there is no motion occurring between the two planes. The only motions occurring is between the polyethylene bushing and the pin that goes across and I am honestly not sure in the osteonics. I think that bushing may be cobalt chrome,

though. I don't think it is titanium.

So, the only plane of motion between the bushing and the polyethylene is where you might get wear and if it is cobalt chrome, you would not have a problem because the polyethylene is fixed to the titanium.

DR. NELSON: Dr. Nelson.

Thank you.

DR. BOYAN: Dr. Holeman.

DR. HOLEMAN: Dr. Holeman. No question at this time.

DR. BOYAN: Dr. Silkaitis.

DR. SILKAITIS: This is Dr. Silkaitis.

I have nothing to add, but I would like Ms. Hughes to answer this one question and it relates to the fact that there are only 1,200 procedures performed per year. How many companies provide implants for that patient group? Approximately.

MS. HUGHES: Seven.

DR. SILKAITIS: Okay. Thank you.

DR. BOYAN: Thank you.

Next is Dr. Aboulafia.

DR. ABOULAFIA: Aboulafia. Nothing to add.

DR. BOYAN: Then we are back to Dr. Friedman. You

have stated what you have to state. So, we are now going to the next part of the process, which is to address -- yes, Dr. Nelson?

DR. NELSON: Could I ask one more question?

DR. BOYAN: Sure.

DR. NELSON: Dr. Nelson.

Jackie, in the prostheses that were handed around, one of them was the link prosthesis, which has got a totally round stem as opposed to non-round. When I looked at that, I thought that they might have an increased problem with it in terms of loosening and rotation. Do you know if there is any particular data on that one?

MS. HUGHES: I am sorry. Could you -- this is Jackie Hughes -- if you could show me which prosthesis you mean, I can identify it.

The prosthesis that Dr. Nelson has identified is the link prosthesis, which is a rigid hinged device, which Mark Melkerson provided to me today. This is the first time I have seen this device. I believe it is no longer in use.

DR. NELSON: Dr. Nelson.

Does no longer in use mean that they took it off the market or just no one buys it or what does that mean?

MS. HUGHES: Perhaps someone from the FDA can

answer that because I couldn't find a listing for it, but it is a preamendment device.

DR. BOYAN: Mr. Melkerson?

MR. MELKERSON: The link device is a preamendment device. It can legally be marketed. I believe Link(?) still carries them in a very limited order basis.

DR. BOYAN: Thank you.

Any further questions?

[There was no response.]

So, to summarize the discussion to this point, we have discussed the concept of metal on metal as possibly being separate from the metal on polymer devices. We have discussed to some extent titanium and now we need to move on to the panel questions.

Beginning with Panel Question No. 1, the first question that is being asked of us is: Should any of the following be classified separately because of potential risks and/or special controls are different?

Now, remember, this is more than one sheet, but if we feel strongly about it, we need to do it. So, we have four different groups here; rigid hinged, which are metal on metal articulation; rigid hinged, which are metal polymer; loose hinged, which are metal polymer and loose hinged,

which are metal-metal.

I distinctly heard in the discussion what sounded to me like a general consensus to separate metal-metal from metal polymer and I see a lot of nodding of heads. I think that, yes, that -- if there is someone here who does not want to separate those two, raise their hand.

Right now, then we have separated these into two groups, metal-metal and metal polymer. Now, we have the other issue of rigid hinged and loose hinged and I did not pick up any conversation on that particular subject. If there is someone here that has a -- would like to separate rigid from loose, they should so identify themselves.

So, we are now -- we are suggesting to FDA that there be two groups, one which is all elbow prostheses, whether they be loose or rigid, that are metal-metal and all prostheses, whether they be loose or rigid that are metal polymer. Am I stating it correctly?

Okay. Panel Question 2: Have appropriate controls been identified? If not, what additional controls are necessary to address the risks? For this one, we will go around the room. We will start with Dr. Stern. We haven't started with him before. And if you could then address any special controls in the two groups that we are

identifying, being specific as to whether or not it is rigid loose, metal-metal or metal polymer.

DR. STERN: Dr. Stern.

I guess my initial feeling would be that appropriate controls have been identified for the metal on polymer articulation, but that I am not clear that appropriate controls -- saying this right -- metal on metal or making different -- and I think the reason is because there has not been the clinical data that is present for the metal on polymer.

DR. BOYAN: Dr. Yaszemski.

DR. YASZEMSKI: Dr. Yaszemski.

I think the appropriate controls are in place for the metal on metal -- excuse me -- are not in place for the metal on metal. They are for the metal on polymer. And although I don't think it is significant, I am just going to bring up for discussion in case anyone else wants to comment on it, this issue of titanium and that it had a cobalt chrome pin would also imply that the cobalt chrome touches and moves against the titanium ulna. If that is not true, I would just like, perhaps, someone else to explain that to me.

DR. BOYAN: Dr. Skinner.

DR. SKINNER: The prosthesis is designed so it has a polyethylene bushing between the two. So, you put the bushings in the titanium stem that goes in the humerus, for instance, and then you put the two prostheses together and the other has a polyethylene. So, you put the axle through all three of them and you have got it.

DR. YASZEMSKI: Yaszemski here.

So, both the ulnar and humoral components have a polyethylene bushing.

Thank you.

DR. BOYAN: Remember, as we go through this, that if you -- no, let's do it this way. As we go through this, to identify what studies you would propose to do that -- what additional controls would be necessary for metal on metal. And if that seems too difficult right now, we can go quickly around this and do this metal on metal versus metal on polymer question and come back.

Let's do that. Okay. Let's just go around addressing now: Are the controls in place for metal on metal? Are the controls in place for metal on polymer?

Dr. Lavin.

DR. LAVIN: Dr. Lavin. No and yes.

DR. BOYAN: Dr. Nelson.

DR. NELSON: Dr. Nelson. No and yes.

DR. BOYAN: Dr. Holeman.

DR. HOLEMAN: Dr. Holeman. No and yes.

DR. BOYAN: Dr. Silkaitis.

DR. SILKAITIS: I have nothing else to add.

DR. BOYAN: Okay. Dr. Aboulafia.

DR. ABOULAFIA: Aboulafia. Nothing else to add.

DR. BOYAN: And Friedman.

DR. FRIEDMAN: Dr. Friedman. No and yes.

DR. SKINNER: Dr. Skinner. No and yes.

DR. BOYAN: And Besser.

DR. BESSER: Dr. Besser. No and yes.

DR. BOYAN: And finally, Dr. Hill.

DR. HILL: Dr. Hill. No and yes.

DR. BOYAN: Okay. So, we have general agreement that we do not have sufficient controls for metal on metal. Now we are going to go around in the same order and add -- tell me what additional controls you would recommend that would be useful for the metal on metal prosthesis.

Dr. Stern.

DR. STERN: Dr. Stern.

To the extent that I am supposed to come up with controls, I think that any metal on metal articulation needs

to be subjected to ASTM standards. You would need to do wear testing to ensure that there was not a significant amount of wear debris and you also, I think, would need some degree of clinical studies if there is absolutely none. I think that is the answer to that or at least I am in the right ball park, I hope.

DR. BOYAN: Got it. Okay.

Dr. Yaszemski.

DR. YASZEMSKI: Dr. Yaszemski.

I suspect a metal on metal bearing is perhaps going to be a novel -- maybe not, but perhaps a novel composition of a metal and will likely have to go through laboratory testing followed by perhaps something in animals and then in the clinic, in a clinical trial, in an approved clinical trial.

DR. BOYAN: So, basically, you are just saying it has to go through the process. Okay.

Dr. Lavin.

DR. LAVIN: I would agree -- Dr. Lavin -- that it would go through that same process.

DR. BOYAN: Dr. Nelson.

DR. NELSON: Dr. Nelson.

Special controls could easily include the

engineering tests, et cetera, and it could be that this is going to need something more than just the engineering or animal tests, require some human data. But I don't think I am qualified to answer that.

But I just want to make the point that some of those that we were mentioning that we should have are special controls.

DR. BOYAN: Dr. Holeman.

DR. HOLEMAN: I would say that it has to go through the process since we have no previous experience with metal on metal.

DR. BOYAN: Dr. Silkaitis.

DR. SILKAITIS: This is Dr. Silkaitis.

I understand the issues that surround the metal on metal. One of the things that I heard earlier was the fact that there were no IDE studies for the elbow prostheses that are available. Is that correct?

MS. HUGHES: Jackie Hughes.

That is correct.

DR. SILKAITIS: So, I guess we can go through that process of specifying what the requirements are, but I am not sure how useful that is going to be. Because there are so few procedures performed, it does create a certain

dilemma. I do agree with that.

DR. BOYAN: Thank you.

I would like to ask for clarification. This is Boyan. Jackie, are these -- no U.S. studies -- is there experience with metal on metal in other countries?

MS. HUGHES: This is Jackie Hughes.

To the best of my knowledge, not in the elbow.

DR. BOYAN: Okay. Thank you.

Dr. Aboulafia.

DR. ABOULAFIA: Nothing to add. Thank you.

Aboulafia.

DR. BOYAN: Friedman.

DR. FRIEDMAN: Dr. Friedman.

Is this not a moot point if we choose in the next question not to support reclassification for these and this becomes moot, doesn't it?

DR. BOYAN: It is about to be, but we still have to -- we just have to go through the order. It is about to be moot, yes. Is that your comment?

DR. FRIEDMAN: Yes.

DR. BOYAN: Okay. Dr. Skinner.

DR. SKINNER: Dr. Skinner. I agree with Dr. Silkaitis on this. This is something of a dilemma. I would

hate to see the metal on metal left in Class III, where it will never, ever be approved because you could never get 200 cases, 100 of each, controls and so forth, followed for two years. So, I am concerned about that, but I don't know how to address that.

DR. BOYAN: Well, actually, we have a way of -- this is Boyan -- we have a way of addressing it and it is not in these questions, but I think that the -- I can bring it up because now it is my mind, but the question, would there be -- if the preclinical testing was of a sufficient depth to satisfy the FDA that the metal on metal articulation was safe, then would we feel comfortable recommending a Class II classification?

DR. NELSON: Dr. Nelson. I think it kind of depends on what the metal on metal was doing in other joints they have tremendous experience in.

DR. BOYAN: Well, that is the question, Dr. Nelson. This is Boyan. Would we accept data from the hip or the knee as being -- in clinical use, as being of value to FDA for making a determination in the elbow.

DR. NELSON: Dr. Nelson. I think it would be of value, but it wouldn't be the only thing, but we would feel a lot more comfortable in talking about it if everybody was

selling metal on metal hips right now.

DR. FRIEDMAN: Richard Friedman.

I don't think it really makes a difference. I think that with the issue of metal on metal and high tolerances and the potential problems, you have to look at each joint on its own because they are all very biomechanically different and what will perform in the hip will not necessarily perform in the knee, shoulder or the elbow.

I think that regardless of what data you get, either in vitro or in animal studies, I still think it is going to come down to having clinical studies to look at the data to see what really happens. I am not even aware of any animal models that you could put an elbow into that could at least give you some idea of how it is going to perform as you have, for example, a total hip in the dog.

So, even though you may see it with these special controls, I don't think, at least for me, that would give me enough confidence to change the classification. I think this is different enough that you would need clinical studies to see how they do before I would be comfortable saying it is okay.

DR. NELSON: Dr. Nelson.

I think also -- and this would be a question maybe to Mark Melkerson or somebody else at FDA. Let's say we are talking about a device where we know you are not going to get a prospective randomized 200 patient, two year follow-up in the next 30 years. You are not going to require that, would you? I mean, does the FDA routinely require things that are impossible?

DR. BOYAN: Well, that is a -- I mean, that is a rhetorical question and we can't expect them to answer that on tape.

So, let's go back to Dr. Skinner. Are you through with your questions, Dr. Skinner -- oh, wait. Dr. Witten is going to answer it.

DR. NELSON: Wait a minute. Dr. Nelson.

I think that is a legitimate question still.

DR. WITTEN: I am not going to answer exactly that question. Maybe I will rephrase it and answer a different question.

DR. BOYAN: Okay. That is fair, Dr. Witten.

DR. WITTEN: I would just like to first mention that it sounds like what you are all struggling with is since there is no data on this type of device, then I am not sure whether you are talking about special controls to

adequately address the risks or whether even the risks have been identified for this type of device.

So, that is one thing that I have heard. As far as what we would expect in a clinical study, whether that was viewed as a special controller because of the class of the device, we certainly look to work with the sponsor to develop and design a study that is appropriate for the type of device and the patient population for which it is intended.

So, I guess I would say we routinely try to be reasonable.

DR. NELSON: Thank you.

DR. BOYAN: And I think we should enter into the record that there is a mechanism for dealing with this, with the FDA. If a device is necessary for a special population that is less than 4,000 patients, there is the humanitarian device exemption that is available.

Dr. Friedman, unless we are going to progress this forward, I would like to move -- and we can come back to that.

Dr. Besser, would you like to add any comments to this?

DR. BESSER: No.

DR. BOYAN: We are on the special controls for metal on metal.

DR. BESSER: Dr. Besser. No. Everything that I would like to bring up has already been brought up.

DR. BOYAN: Dr. Hill.

DR. HILL: Dr. Hill. I don't have any special comments, but my take on it is that seeing as we have no data at all that we need to start from a PMA type of situation.

DR. BOYAN: All right. So, that gets us to the next panel question. Do the data support the reclassification of each of the following four types of devices from III to II?

Now, we have already combined metal and polymer, rigid and hinged together. So, we really have two groups here that we are discussing.

Do the data support the reclassification of each of the following devices from III to II for metal on polymer? And the order is working good, so, let's go back to Dr. Stern.

DR. STERN: I think we have answered this. Dr. Stern. Yes, for metal on polymer.

DR. BOYAN: In fact, why don't you do "yes" and

whatever you feel about the metal on metal at the same time.

DR. STERN: I am not sure what my options are for -- Dr. Stern -- options for metal on metal. I appreciate all the comments about the difficulty of attempting to have everyone start from scratch, but I don't know a good way that we could -- I don't know what our other options are, but I certainly would not feel comfortable making metal on metal Class II.

DR. BOYAN: Dr. Yaszemski.

DR. YASZEMSKI: Dr. Yaszemski. Yes for metal on polymer. No for metal on metal.

DR. BOYAN: Dr. Lavin.

DR. LAVIN: Yes and no. Dr. Lavin. Yes and no.

DR. BOYAN: Dr. Nelson.

DR. NELSON: Dr. Nelson. Yes and no.

DR. BOYAN: I think Mr. Melkerson is about to speak to us.

MR. MELKERSON: The question on options, Dr. Boyan already mentioned the HDE. With the product development protocol, that is another option for these types of devices, where you have a very limited population and that would be brought in and we would get panel input early on in the process if somebody wanted to pursue a metal on metal.

So, your options are basically leaving it as a Class III or reclassifying it. We are basically being asked that by Congress.

Thank you.

DR. BOYAN: Thank you.

I think -- yes, Dr. Holeman, you are next, right?

DR. HOLEMAN: Dr. Holeman. No for metal on metal and yes for metal on polymer.

DR. BOYAN: Thanks.

Dr. Silkaitis.

DR. SILKAITIS: This is Dr. Silkaitis.

I appreciate Mark Melkerson's comments. With regard to the surgeon's comments and their concerns, I agree with the comments made earlier.

DR. BOYAN: Thank you.

Dr. Aboulafia.

DR. ABOULAFIA: Aboulafia. I would say "no" for a metal on metal articulation and "yes" for a metal polymer articulation.

DR. BOYAN: Dr. Friedman.

DR. FRIEDMAN: Richard Friedman, yes for metal on poly and no for metal on metal.

DR. BOYAN: Dr. Skinner.

DR. SKINNER: This is Dr. Skinner. Yes and no in that same order.

DR. BOYAN: And Dr. Besser.

DR. BESSER: Dr. Besser. Yes and no. Same order.

DR. BOYAN: Dr. Hill.

DR. HILL: Dr. Hill, yes and no in the same order.

DR. BOYAN: Okay. Good.

We are moving on to the next question. Now, we need to address the question of labeling and what, if any, additional labeling would be necessary for these and I think here if you could address metal on polymer first, metal on metal second.

Why don't we go the reverse direction? Why don't we do Hill and go around the other way -- oh, were you all ready, Dr. Stern?

DR. STERN: No, no.

DR. BOYAN: Okay.

DR. HILL: This is Dr. Hill.

As far as the labeling, I don't have any problem with the metal on polymer, but I do think that a special stipulation as far as not being a studied entity, the metal on metal should be made.

DR. BOYAN: Dr. Besser.

DR. BESSER: I have no problem with the labeling on the metal on polymer. Again, the metal on metal, I think, needs to go through the whole Class III process. So, it is early to specify labeling now.

DR. BOYAN: Okay.

Dr. Skinner.

DR. SKINNER: Dr. Skinner. Same.

DR. FRIEDMAN: Richard Friedman.

The issue about labeling is moot if we choose not to reclassify the metal on metal. Correct?

DR. WITTEN: This is Dr. Witten. Correct.

DR. BOYAN: Correct. Okay. So, then let's stick with the labeling at that point in metal on metal, if there is anything additional we need to add -- I mean, metal on polymer.

DR. FRIEDMAN: Metal on poly, I think the labeling is fine.

DR. BOYAN: Okay. And just zap right down the line.

Dr. Aboulafia.

DR. ABOULAFIA: Aboulafia. Agree with the current labeling or the recommended labeling is fine for metal on polymer.

DR. SILKAITIS: Dr. Silkaitis. Agree.

DR. BOYAN: Dr. Holeman.

DR. HOLEMAN: Dr. Holeman. Agree.

DR. NELSON: Dr. Nelson. Nothing to add.

DR. LAVIN: Phil Lavin. Agree.

DR. YASZEMSKI: Yaszemski. Agree.

DR. STERN: Dr. Stern. Agree. I would like to just add that I hope that the labeling -- that this is a relatively rare indication and that the labeling should be, you know, still for severe osteoarthritis of the elbow. We shouldn't be putting these in in patients with minor or milder arthritic changes.

DR. BOYAN: Okay. Thank you. Or severe -- does it need to be osteoarthritis? Just severe --

DR. STERN: Stern. I stand corrected. Severe degenerative changes. All I am saying is that this not something that should be -- it should remain, I think, with relatively rare and stringent indications.

DR. FRIEDMAN: Richard Friedman. May I ask a question?

The labeling has to do with the company marketing. Is that correct? It doesn't really tell us as a surgeon what we can and cannot use it for. That is up to us and our

discretion.

DR. BOYAN: Oh, no. This is absolutely the other way, Dr. Friedman.

DR. FRIEDMAN: Who is speaking? Richard Friedman.

DR. BOYAN: This is Boyan. That was Friedman and this is Boyan. The labeling is a critical issue for you as a surgeon. So, if the restriction of only to be used for severe degenerative changes is uncomfortable for you, this should be the time that you say something.

DR. FRIEDMAN: No, it is not.

DR. BOYAN: Okay. All right.

Now, we are to question 5. The question 5 is for the 21 CFR 88.3160 semi-constrained elbow.

Dr. Nelson, you be the starting person.

DR. NELSON: Yes. Dr. Nelson. I don't think we can answer that question because we are lumping the two together, aren't we?

DR. BOYAN: No.

DR. NELSON: No? You are going to separate?

DR. BOYAN: This is the other one.

MR. MC DERMOTT: This doesn't include anything we have talked about so far.

DR. BOYAN: Right. This is the one that was held

out separate by the FDA as a separate category.

DR. NELSON: I have to pass.

DR. BOYAN: This was a -- Boyan -- this is a point of order and I would like to get Mr. McDermott back up to the microphone. We need just for you to take two minutes to clarify why you feel again why this one is a separate issue.

MR. MC DERMOTT: This is a Class II device, semi-constrained. It has nothing to do with the Class III device, which is constrained. This is merely -- the petition is suggesting that they make a device description change, adding the ulnar component and adding the titanium alloy.

DR. BOYAN: Okay. Mr. Melkerson.

MR. MELKERSON: Mark Melkerson, FDA.

The changes that are being proposed by OSMA in this classification are products that have been either cleared through 510(k) already and they are just asking that these be clarified and modify the classification to reflect those clearances.

DR. NELSON: Dr. Nelson.

I recognize what we are voting on now or discussing now. This seems pro forma. I have no objection.

DR. BOYAN: Okay. Dr. Lavin.

DR. LAVIN: Dr. Lavin. It is a "gimme."

DR. BOYAN: Dr. Yaszemski.

DR. YASZEMSKI: Yaszemski. Approve.

DR. STERN: Stern. Yes.

DR. BOYAN: Hill.

DR. HILL: Hill. Yes.

DR. BOYAN: Besser.

DR. BESSER: Besser. Yes.

DR. SKINNER: Skinner. Yes.

DR. FRIEDMAN: Friedman. Yes.

DR. ABOULAFIA: Aboulafia. Yes.

DR. SILKAITIS: Silkaitis. Yes.

DR. HOLEMAN: Holeman. Yes.

DR. BOYAN: Okay. Thank you very much.

We have now completed the questions and we are ready to start the work sheet. Let's go to page 1 of the work sheet, which I have in front of me.

Would anybody like a new work sheet?

DR. BESSER: Yes, please. Besser. Yes.

DR. BOYAN: I must say that you guys are highly malleable to work with. This is great. And Ms. Rooney can see that we are trainable, too.

So, we are limiting our discussion now. We have

combined into a group the hinged and rigid hinged and loose hinged metal polymer articulation and we are not -- since we are not recommending -- may I just -- since we are not recommending a change in classification for the metal on metal, we don't even need to do a sheet for that. Is that correct? Or do we have to do a sheet that says that we don't recommend it?

MS. ROONEY: Because you are going to vote, I recommend filling out a sheet for that one.

DR. FRIEDMAN: Richard Friedman. I mean, if we all agree that we don't want to reclassify, then there is nothing we have to do. We shouldn't have to even spend time doing that.

DR. NELSON: Dr. Nelson. But we just have to vote on it?

DR. BOYAN: We will handle it. We will handle it. We will do a sheet. The sheet will go like so fast you won't believe how fast that sheet is going to go.

Okay. So, our device that we are doing now is the metal on polymer elbow and I will just walk us right through here again, like we did the last time and then speak up if we get to something that isn't what we are agreeing to.

We are recommending the metal on polymer elbow be

reclassified as a Class II device. Is there no objection to that?

[There was no response.]

Seeing none, is the device life-sustaining or life-supporting? No.

Is the device for a use which is of substantial importance in preventing impairment of the human health? Yes.

Does the device present a potential unreasonable risk of illness or injury? No.

We did answer "yes" to one of these questions. So, we have to go down to Question 7. Okay. Down in Question 7, we are not recommending postmarket surveillance. We are not recommending a change in performance standards. We are not recommending a patient registry. We are not recommending device tracking. We are not changing any testing guidelines. And there was no "Other." Is that correct?

PANELISTS: Correct.

DR. BOYAN: Question 8. We don't have to answer that. No, we don't have to do -- yes, the answer to that is "yes." Okay. Eight we do nothing. Nine, nothing.

Ten, nothing. Wait. Let me just see if 9 was to

check "yes" or "no."

DR. BESSER: I don't understand the answer to Question 7. If we check "yes" --

PANELIST: Mark, who is speaking?

DR. BESSER: I am sorry. I am. Besser.

If we are filling out this form and you are checking --

DR. BOYAN: "Yes," on No. 7.

DR. BESSER: -- yes, then you have to pick something down below. If you don't pick anything below, then you should have answered "no" and then it ends up in Class III, the way I read this form.

DR. NELSON: Dr. Nelson.

I think you are reading it correctly. Mark, isn't -- we just have to specify that you have some performance standards written out already?

MR. MELKERSON: You can either take --

PANELIST: Who is speaking?

DR. BOYAN: Mr. Melkerson. Mark.

I checked performance standards.

MR. MELKERSON: This is Mark Melkerson, FDA.

The issue in performance in proposed special controls, you can either accept those proposed by the

Petitioner or you can add to those as you see fit or come up with your own list.

DR. BOYAN: That is the next sheet. We are not there yet.

MR. MELKERSON: Right, but on this --

DR. BOYAN: We have to check it.

MR. MELKERSON: -- on this question what are you proposing. If you are answering "yes," there are special controls, what are they?

DR. BOYAN: Okay. We checked performance standards.

All right. No. 11 A --

PANELIST: We don't have to answer 9?

DR. BOYAN: Yes. I just was making sure. I just heard my name. Yes? Who was speaking to me.

DR. YASZEMSKI: Dr. Yaszemski. I don't want to beat this, but I heard for No. 7 if we checked perhaps "Other" and say except those suggested by Petitioner, then we wouldn't have to answer No. 8, which if we check performance standards, then we are going to have to -- at least, the way I read this answer to No. 8. So, I would suggest we just accept those suggested by the Petitioner under "Other" for No. 7.

MS. ROONEY: You only have to fill out 8 and 9 if you suggesting recommending the adoption of performance standard under Section 514 of the Act. However, the performance standards that were identified in the petition were voluntary type standards. So, 8 and 9 would not apply.

DR. YASZEMSKI: Yaszemski. Thank you.

DR. BOYAN: I thought we were actually doing it correctly for a change. Okay. We are back on. We checked performance standards because in the supplemental data, we get to tell them it is as in petition.

Now, can there otherwise be reasonable assurance of its safety and effectiveness, I have to just read this one. I think that is a "no." Okay. No. 11a.

No. 11b, we are going to again put the oral authorization. Is that correct with everybody?

[There was no response.]

Okay. Now, that sheet is done and now we are on the supplemental data sheet. Elbow metal polymer. Is our device an implant? This is an important question because, remember, we have looked at some devices that were questionable.

Okay. Indications for use prescribed, recommended or suggested in the device's labeling that were considered

by the advisory. As in petition. Is that all right with everyone?

DR. BESSER: Yes. I believe we -- this is Dr. Besser -- I believe we added some level of severity for the degenerative change.

DR. BOYAN: Oh, yes. I have the exact wording, too. Let me find that.

Relatively severe degenerative changes of the elbow.

DR. YASZEMSKI: Dr. Boyan, Yaszemski.

Just a note. I would just exclude that and leave that to the discretion of the surgeon.

DR. BOYAN: Okay. Is there -- Dr. Stern, would you --

MS. NASHMAN: I am just going to note -- this is Jodi Nashman -- that you can make the -- what you all are making is a recommendation. When you start using terms like "relatively," that is going to have to be redefined when we make recommendations in turn to manufacturers. So, it has been stated. It is for the record. I would say that FDA is now under advisement and we can just proceed.

DR. BOYAN: Okay. "Relatively" just was removed. Were there any health risks presented by the

device that we need to take into consideration? I think that in this case we should include the subject of potential wear. When I looked at the device, to me, I saw a great opportunity for generation of wear. But I think that that is pretty much stated in the petition and that we can say "as stated in the petition."

Were there any specific hazards to health that need to be noted? Any characteristics of features of the device that are associated with the hazard? Anybody who would like to make a statement about either of those two issues?

DR. FRIEDMAN: Friedman. Can you just put down "as in the OSMA petition"?

DR. BESSER: Dr. Besser. I am not sure whether this is the right slot to put some note as to a concern if there were a titanium on polyethylene articulating surface?

DR. BOYAN: This would be a place to state it. We will note that.

DR. BESSER: Stick that there.

DR. BOYAN: All right. Now, we need to recommend a panel classification and we recommended II. We did not need to state a priority here. If the device is an implant or is life-sustaining or life-supporting and has been

classified in a category other than Class III, explain fully why we lowered the classification and we did that because of the reasons as stated in the petition.

No. 8, summary of the information, including clinical experience or judgment, upon which the classification recommendation is based, as in petition.

If you want to add anything additional, speak up, again.

Okay. Identification of any needed restrictions on the use of the device. Do we want to make that statement here, severe degenerative changes of the elbow or not?

DR. STERN: While I still this is important, I am happy with Ms. Nashman's comment that the FDA is advised.

DR. BOYAN: Okay. Then we have -- we are not in Class I, so we are down on No. 11. Existing standards applicable to the device, device subassemblies or device materials, as stated in petition. Anything additional?

I make that comment about new information on wear being applicable.

Okay. Now, we have to vote on this sheet before we can go to the metal on metal. We are, in summary, recommending that this device be reclassified as a Class II. It is not life-sustaining. It is of substantial importance

to the health of people. It does not present a potential unreasonable risk.

We are suggesting that the performance standards as stated in the petition are adequate for assuring safety and effectiveness. We --

DR. NELSON: Madame Chairman, Dr. Nelson.

We all agree on it. I think we can agree and you don't have to read the whole thing.

DR. BOYAN: Good. It is all in everybody's brain?

DR. FRIEDMAN: Richard Friedman.

Do you need a motion now?

DR. BOYAN: I need a motion.

DR. FRIEDMAN: I make a motion that we accept the questionnaire form as outlined.

DR. BOYAN: I need a second.

DR. NELSON: It is seconded.

DR. BOYAN: Okay. We are just go right around the room, starting with Stern, Yaszemski, so forth. Yes or no.

DR. STERN: Stern, yes.

DR. YASZEMSKI: Yaszemski, yes.

DR. LAVIN: Lavin, yes.

DR. NELSON: Nelson, yes.

DR. ABOULAFIA: Aboulafia, yes.

DR. FRIEDMAN: Friedman, yes.

DR. SKINNER: Skinner, yes.

DR. BESSER: Besser, yes.

DR. HILL: Hill, yes.

DR. BOYAN: Aboulafia voted. He was buried underneath me. Vote again, please, Dr. Aboulafia.

DR. ABOULAFIA: Aboulafia, yes.

DR. BOYAN: Okay. So, the motion carries.

Now, let's go quickly to the next work sheet, which is going to be the metal-metal elbow and we will zap right through this one.

MS. NASHMAN: After we finish this next one, don't get up yet. I have some announcements I need to make. Don't run.

DR. NELSON: Dr. Nelson.

I think we covered this before, but rather than fill out the whole thing, we can say -- because it seemed to be unanimous around, just take a vote and we don't need to do the paper.

DR. BOYAN: We are just going to recommend a classification here. III.

Now, is there anything specific that we want to state here that we need to get to them a message on the

supplemental data sheet?

MR. MELKERSON: Excuse me, Dr. Boyan.

DR. BOYAN: Yes.

MR. MELKERSON: Because these were originally classified --

PANELIST: Who is speaking?

MR. MELKERSON: This is Mark Melkerson, FDA.

Because these two devices were classified originally as Class III together, if we are going to basically decouple them, we would need to have you go through the work sheet for decoupling.

DR. BOYAN: I am willing to work through the decoupling if we can go -- we will go very quickly and even Dr. Nelson will be happy with the speed.

Okay. It is a -- is this a device that is life-sustaining or life-supporting? No. It is yes, it is important. No, it -- yes, it has a potential unreasonable risk of illness or injury. Is that what we are stating here?

DR. NELSON: Yes.

DR. BOYAN: Okay. All right. Then there is not sufficient information to determine that general controls are sufficient. So, the answer is "no."

And No. 6, is there sufficient information to establish special controls? And the answer is --

PANELIST: No.

DR. BOYAN: "No."

PANELIST: Where are you? We should have skipped down -- we should have skipped 5 and 6.

DR. BOYAN: No, I did 5. I did 5. The answer to 5 --

PANELIST: From 4 to 7.

DR. BOYAN: Oh, you are right. You are right. You are right. All right.

No. 7. Okay. The answer is "no."

MS. ROONEY: So, then we have to answer No. 10.

DR. BOYAN: All right. Now we are down to 10.

For a device recommended for is this a low, medium or high priority or not applicable, and here we get down to the situation that it services a very small number of patients. So, we need to make some sort of statement. I have a recommendation on the floor from Dr. Lavin as for low priority. Is there a second for that concept?

DR. FRIEDMAN: Friedman. I will second that.

DR. BOYAN: Okay. Anyone who is voting against a low priority or would like to make a statement against the

idea that this has low priority, please identify yourself.

[There was no response.]

Seeing none, then I will check --

DR. BESSER: Dr. Besser. I would like to ask one question. I am not ever sure this is applicable. If no one wants to create a medical device that is a metal on metal elbow prosthesis, does the FDA still create or ask for PMAs?

DR. BOYAN: I think that that is a non-issue for us to concern about. I think we just simply have to go through this process and let them take our information to them however they are going to use it. There is no way to shorten this process, you guys. We are going to be here -- listen, it is only 5:30. We have worked until 11:00.

Okay. Can there otherwise be reasonable assurance of its safety and effectiveness without restrictions on sale? No.

Identify the needed restrictions. We, obviously, want it to be prescribed by an appropriate person orally.

Okay. Supplemental data sheet. Metal on metal elbow.

Okay. Indications for use prescribed, recommended or suggested in the device's labeling that were considered by the advisory we did as in petition. That part isn't a

problem.

Okay. Identification of any risks to health presented by device. And we agreed that the wear debris is unknown. Any other risks?

DR. BESSER: Dr. Besser. All the other ones that were listed in the application also.

DR. BOYAN: Any others that we have missed?

[There was no response.]

All right. Specific hazards to health is the wear and any features of the device. And that is the metal on metal articulation.

What about the -- does anybody want to say anything about the fact that the metal is titanium, the potential for titanium on titanium? We will just write it down.

PANELIST: Chairman's prerogative.

DR. BOYAN: Well, it came up. I heard it mentioned several times.

Okay. Our recommendation is for Class III. If the device is an implant, which it is or we wouldn't have to do this.

Okay. Summary of information including clinical experience upon which the classification recommendation is

based, and that was as in petition, but it was felt that the information was inadequate because there are no clinical -- there were no clinical studies. Right?

PANELIST: Yes, no information.

DR. NELSON: Dr. Nelson.

Madame Chairman, we decided that since there was no information, it was inadequate.

DR. BOYAN: Okay. Any identification of any needed restrictions on the use of the device? And this waits for information.

All right. 10. If the device is in Class I, which it is not -- existing standards applicable to the device, device subassemblies or device materials, waiting for information.

All right. We are finished. Now we have to vote.

DR. NELSON: Madame Chairman, I move that we accept the proposal as you have just outlined it.

DR. BOYAN: Do we have a second on this?

DR. BESSER: Besser. Second.

DR. BOYAN: Okay. Let's go right around the room, starting with Stern.

DR. STERN: Stern, yes.

DR. YASZEMSKI: Yaszemski, yes.

DR. LAVIN: Lavin, yes.

DR. NELSON: Nelson, yes.

DR. ABOULAFIA: Aboulafia, yes.

DR. FRIEDMAN: Friedman, yes.

DR. SKINNER: Skinner, yes.

DR. BESSER: Besser, yes.

DR. BOYAN: And Dr. Hill.

DR. HILL: Dr. Hill, yes.

DR. BOYAN: All right. Motion carries.

Now, no one can leave this room. We have to wait for Ms. Nashman to tell us what to do next.

MS. NASHMAN: Slight moment of power. Not really. It is not worth it.

I have a quick few announcements. Some of them are related to tonight and some of them are related to tomorrow morning. Since it is essentially 5:31, we are on time. If all the panel members could meet up at the front of the room, we can take you back to your hotel to change. We have dinner reservations at 7:00.

You need to let me know who is going to be in attendance, so we don't wait for you in the hotel lobby after we drop you off and wait for you.

DR. BOYAN: Can we leave our stuff here?

MS. NASHMAN: You beat me to it. Please take all of your review material home with you now. I have no idea what the state of this room is going to be. If you don't care about the stuff, you can leave it. I am leaving forms here, but I don't care what happens to them. Anything I want, I am taking it with me.

I know you have all brought a lot of information with you. Tomorrow, bring everything that you have with you. We will take care of it and dispose of it for you. Anything that isn't disposed of tomorrow, you can either shred yourself or there are FedEx labels included within your red folders. That takes care of the large quantity of information you have.

Don't leave it tonight. Bring it tomorrow. Tomorrow morning, we are going to need to get you here at 7:30 a.m. There is going to be more traffic down 270. We would like you to meet in the hotel at 6:50, so we can get you here by 7:30 and also get your signed in so that we can start promptly.

I have been told that you all want to get out of here on time tomorrow to catch connections home. So, no complaining, please.

With that, I believe we are adjourned.

MS. HUGHES: Excuse me, Jodi. This is Jackie Hughes. I would just like to thank Dr. Boyan and all the members of the panel for their recommendations today and Mr. McDermott and Dr. Wilde's help in the presentation.

Thank you.

[Whereupon, at 5:30 p.m., the meeting was recessed, to reconvene the following morning, Tuesday, January 13, 1998.]