Wisconsin National Primate Research Center
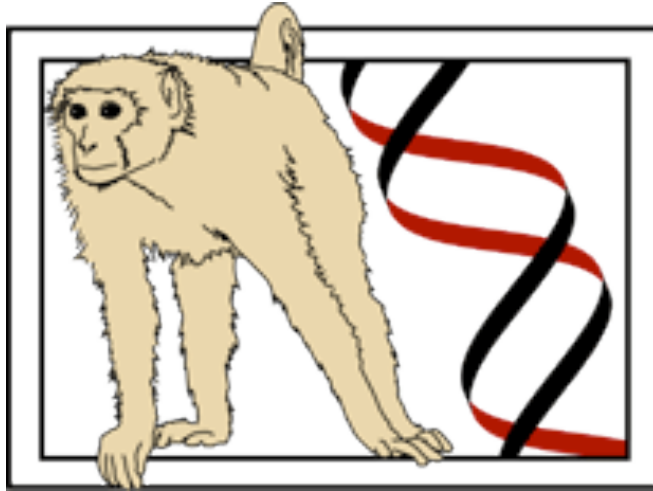
Internet Primate Aging Database

Public and Research User's Manual

Revision 2.0 July 2005

Internet Primate Aging Database User's Guide
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&
The National Opinion Research Center
University of Chicago
Revision 1.0 March, 2005
Revision 2.0 July 2005

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Preface – System Overview

The Internet Primate Aging Database (iPAD) is the second generation of computerized database system whose primary purpose is the collection and analysis of biomarkers of aging non-human primates. The original system was developed in the late 1990's using PC-based systems including Microsoft Access and Visual Basic. As the need to distribute access to this database to a broader audience arose, it became obvious that replacing the current standalone system with either a client-server based configuration or an internet-based system would be the most likely candidates for the next generation.

The new system is purely internet based with a front end that can be accessed by the average user via a web browser. There is no need for the installation of any software on the user's machine as long as they have access to a web browser such as Microsoft's Internet Explorer, Netscape Navigator, Apple Safari or any other popular browser that supports HTML. This system was designed to facilitate not only read-only access by public users and researchers, it also supports three additional classes of users who can contribute new data points, as well as two tiers of administrative support, a site administrator and a system administrator.

This User's Guide will cover the first two tiers of users and the capabilities available to them. Users of the system are expected to be familiar with some of the basic terminology of primatology and the biomarkers contained within the database. A typical user of this information should be someone who is involved with the collection and reporting of such biomarkers. If you are unfamiliar with the various measures this manual will not be a substitute for proper training in the field of primate research.

One of the more informative sections of the site, which is publicly accessible, is the Data Codebook section. This part of the site contains tremendously useful information on the information that can be more closely examined within the iPAD system. There are pages which describe the different sites that have contributed data and the site conditions, in particular the methods of anesthesia used at each site, the method/machine used for the analysis of blood chemistry and hematology panels, housing conditions, and animal diet. Other information found in the Data Codebook includes in-depth Factsheets on each species represented in the data, a like to Primate Info Net (PIN), a site created and managed by the Wisconsin National Primate Research Center (WNPRC) Library, and information about the types of measurements contained in the database. This type of information should be invaluable to anyone interested in primates.

The next few sections will go into more detail describing the user categories and system functionality. Each will be illustrated where possible with actual screen shots of

the system as a graphical means for familiarizing the user with the screens and their function.

Chapter 1 – Defining User Roles

Public User

The Public User is defined as any internet user who visits the homepage of the iPAD system. From that particular page the Public User can request a new user account from the System Administrator by filling out the form on the Login Request page. In addition, the Public User will also have the ability to review the Data Counts of the system to see how many data points exist in the system at the time of their visit. Because data are continuously being added as measurements are taken on healthy animals, the number of data points change on a regular basis. Lastly the Public User can select each of the tabs at the top of the homepage, including the WNPRC Profile page, the Data Codebook page, and finally the Contact Us page to send comments to the System Administrator.

Research User

The Research User is someone who has applied for read-only access to the iPAD system database. It is assumed that this person is someone who is either a researcher working at a contributing site, such as one of the National Primate Research Centers, or someone who is studying the effects of aging or primatology. This user has access to additional reporting capabilities such as the Statistical Measures and the Detailed Data Query. In addition to all the capabilities that were enumerated for the Public User, a Research User can now produce custom queries to examine data within the database, for review either on their computer screen, or export results for later examination and statistical manipulation into files on their system.

Data Contributor

The next level of user is the Data Contributor. As with the Research User, this user role builds upon the capabilities of the previous two roles and adds the ability to actually submit data to the system. Data Contributors are staff of one of the research centers that house primates and collects data points, such as body weight, or certain hematological measurements. These users have the ability to either upload data files for import, or directly enter data points into the system. The usefulness of iPAD increases as more data are contributed. It is the goal of WNPRC and its sponsoring agencies, the National Institutes of Health (NIH) and the National Institute on Aging (NIA), to widen the number of species and increase the number of data points for existing species in the database. If you are interested in contributing data from non-experimental, healthy

primates, please notify the System Administrator via the Login Request or Contact Us pages.

Chapter 2 – The Public View

iPAD Overview

The homepage presents an overview of the iPAD system. There is a set of tabs at the top of each page to allow the user to see the iPAD Overview, the WNPRC Profile, the Data Codebook, and Contact Us option to contact the System Administrator or their designee to ask additional questions about the system or the data available through the system. In addition to the tabs at the top of each page, there is a menu on the left side of each page that will vary from user to user depending on their role and the features they have access to.

Figure 3.1 – iPAD Overview Screen

WNPRC Profile

The WNPRC Profile page offers a profile of the Wisconsin National Primate Research Center based at the University of Wisconsin-Madison. WNPRC is the current manager of the Primate Aging Database. Through the development of the Internet Primate Aging Database system, Wisconsin has made valuable information in the iPAD accessible to the worlds of aging and primate research. The WNPRC Profile page provides insight into the type of research sponsored at the WNPRC as well as at the other seven National Primate Research Centers.
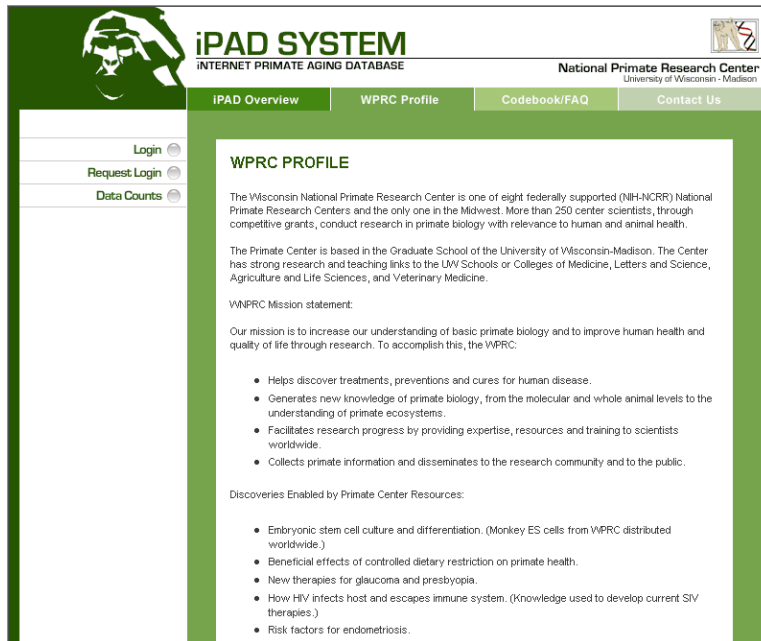

Figure 2.2 – WNPRC Profile Screen

Data Codebook

This portion of the site allows users to gain some insight to the world of primate research and the different types of animals that are housed at these various research centers. Through the Data Codebook, a user can examine extensive Factsheets about various primates involved in research, locate links to institutions that have contributed data, examine details about a particular measurement being collected, read about various site conditions, and link to Primate Info Net (PIN), a network of original content and links to resources about nonhuman primates created and administered by the WNPRC library.

Under Taxonomic Groups, Factsheets about the different species represented can be found. Additionally, a link to PIN can be found here in order for users to explore more material about nonhuman primates. Under Sites, the site address, contact name and email address of each of the contributing institutions can be found. The Site Conditions page provides further details about the housing conditions: the various anesthesia methods used at the different sites, the hematology and blood chemistry methodologies and technologies used for analysis, and the diet provided at each of the research facilities. The Measurements page provides the definition, description, clinical application, and scientific units for each of the biomarkers in the database as well as links to PrimateLit and PubMed to locate current related papers on each of the measurements. A sampling of related papers is provided for each measurement in this section as well.
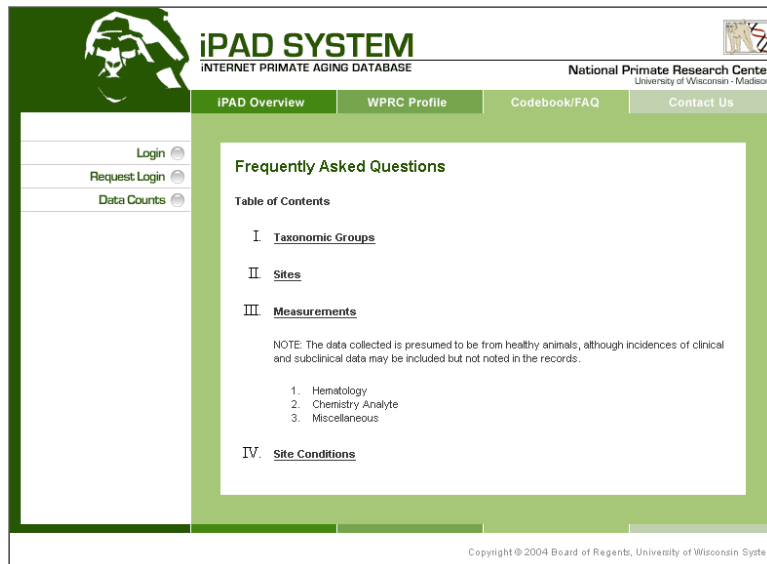

Figure 2.3 – iPAD Codebook Screen

Contact Us

The Contact Us section can be used to ask questions or provide feedback to the System Administrator at WNPRC.

Figure 2.4 – Contact Us Screen

Login Request

The Login Request screen is available to all users to submit a formal request to the System Administrator for an account to access additional system capabilities. The form allows the user to provide key information necessary for the approval process. In addition to the user's basic information, such as name, phone number and institutional email address, the system also requires that an organizational affiliation be identified, including the institution name, department, the requestor's supervisor's email address, as well as the requestor's research interests, position and proposed use of the information in the database. This request is submitted and filed with the System Administrator and potentially reviewed by the iPAD Steering Committee for approval. Upon approval the requestor will be notified whether their request has been approved or denied and if approved this notification will be followed up with a username and password.

Figure 2.5 – Login Request Screen

Data Counts

The only publicly accessible data is in the Data Counts section. It allows the casual user to see the total number of available data points that are included in each measurement category. These counts are broken down by each species type, site, and gender of primates in the database. It does not allow for the examination of specific measurements or specimens, just a count of the total number of data points found in the database.

The following screens depict how a user might see information and how they can view current counts. On the left there is a table of Data Counts by Category. The table on the right will display the Data Count Detail for all of the measures in the database when the user clicks on a particular category in the table on the left. The left table allows the user to manipulate by clicking on the + or – buttons to expand or contract the visible categories. Starting at the top you will see Total for all measures in the database. If you used the mouse to click Total then the Data Count Detail, a breakdown of counts by measurement, would be displayed in the table on the right.
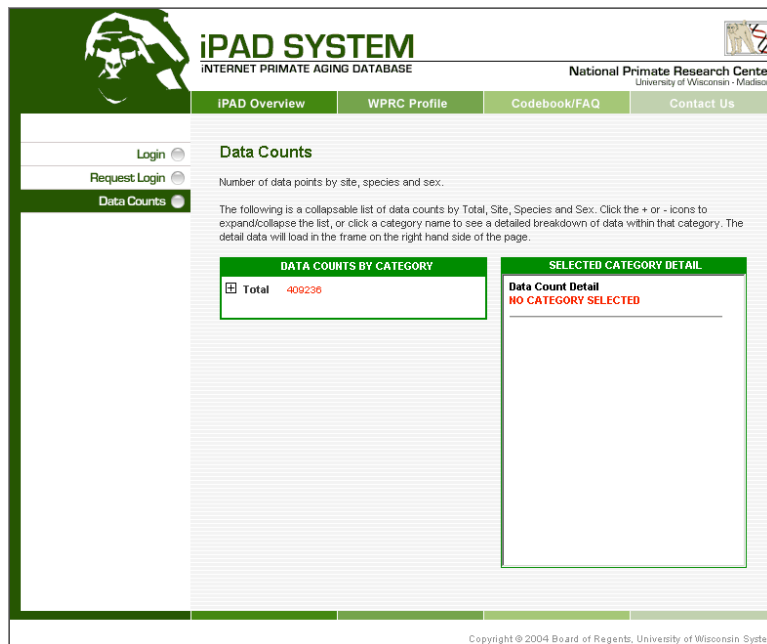

Figure 2.6 – Data Counts Screen

Should the user hit + Total will expand out to display all of the species in the database. If you then expand further the next level shown within each species would be the list of sites which house this type of animal. Expand once more and you would see within species and site the count broken down by gender. Always to the right of each

category, in red, is the current count of measures for that particular category, starting at the Total category. The screen below shows that the user has expanded down to the lowest level, gender within owl monkeys at the New England PRC. The total count of measurements for owl monkeys is displayed to the right of the title; next to New England PRC on the right is the count of measures for that site (notice that since New England is the only site listed under Owl Monkey that the count for the species and site are identical). Under New England you see both Male and Female displayed with a count to the right of them. You now are able to determine how much data is available in the system for a given species, site and gender. At any point at any of these levels you can click on the category you are interested in, and display a breakdown of measurements and their counts for that category. In addition to seeing the count of measurements in the database you also see displayed the age range, in years, of the primates from which these measurements were taken.

This should provide trained researchers sufficient information to decide whether the data contained within the database would be useful for their particular research. If this is the case, they could then apply for a user account using the Login Request page, allowing them to run more sophisticated analysis once they have access to the system.
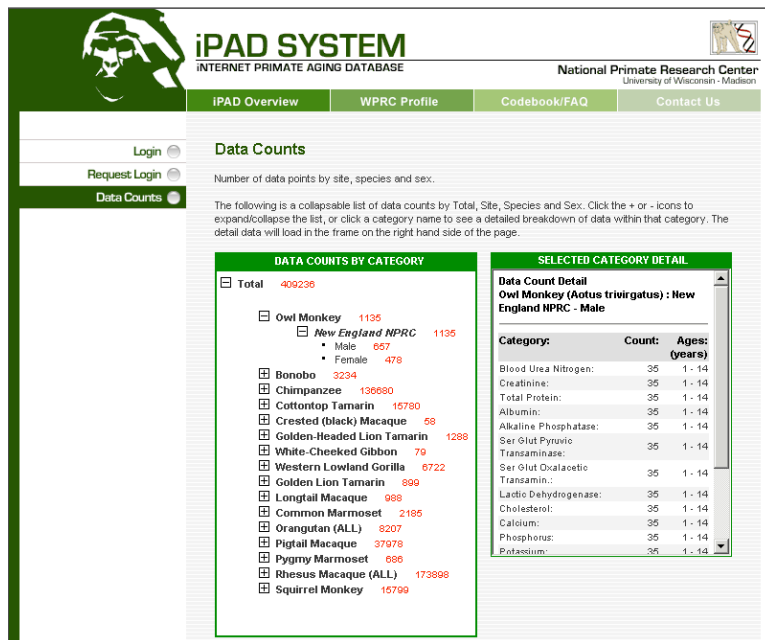

Figure 2.7 – Data Counts Screen (fully expanded)

Login

The last screen accessible to the Public User is the Login Screen shown below in Figure 2.8. Depending on the account provided, the user will have a varying number of functions at their disposal.

Figure 2.8 – iPAD Login Screen

Should the Login fail, an error message will appear (Figure 2.9). The User Name and Password for this system are both case sensitive. In other words the User Name "Mary_Brown" is different from "mary_brown" just as the password "SECRET" is different from "Secret" or "secret".
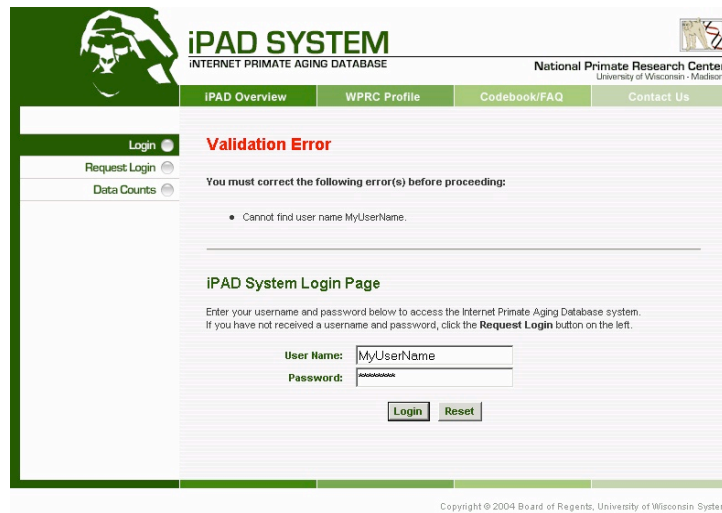

Figure 2.9 – Failed Login

Chapter 3 – System Functions

Once a user has successfully logged into the iPAD system additional capabilities are displayed on their menu (left column) depending on their permissions. The next level of access above the Public User is the Research User, who can run a variety of queries using either the Statistical Measures tool or the Detailed Data Query. The next level up would be the Data Contributor who in addition to the two query tools can also upload or data enter new records for consideration to be added to the database.

Statistical Measures

The Statistical Measures query tool allows users to develop a summary of statistical averages of the various measurements referred to in the Data Counts section. Here the user can select search parameters including site, species, measurement, and age group. A user can further refine the search by selecting sex, diet, and type of housing of the species of interest. The end result is a report including mean, standard deviation, and standard error of the chosen measurement(s) as well as the total number of data points from which the statistics are derived and the total number of primates from which the measurements were taken.

An example query might be to select the following attributes:

Site = California NPRC
Species = Rhesus Macaque
Measure = Body Weight
Age Range = 4-6 years
Gender = Male

Figure 3.1 – Statistical Measures Selection Screen

By not selecting diet or housing attributes, the user has selected all diet types and all housing conditions. Once the parameters have been collected, click Search. Here we see that there were a total of 122 data points used to calculate a Mean Body Weight of just over 9 pounds with a Standard Deviation of 1.773. Notice that there is a button near the bottom of the selection screen to allow the user to choose whether the output is viewed online (default) or if the data accessed should be sent to a comma separated variables, or .csv file. This file can be imported into EXCEL or most other spreadsheet, database, or statistical applications. When data is exported to a spreadsheet, it will appear like in Figure 3.3. This allows the user to save the results for later review, or as we will see in the Detailed Data Query section, additional analysis can be run on the data.

The selection screen in Figure 3.1 allows the user to select multiple items within the drop down menus by using either the Shift or Ctrl keys (under Windows). To accomplish this with a contiguous block the user would use the left mouse button to highlight the first item in the block to be selected. Next, holding the Shift key, the user would locate the last item in the block to be marked and click the left mouse button to highlight the entire block. To select multiple items in one of the drop down menus that are not contiguous, the user would use the left mouse button to again select the first item, then subsequent items would be selected by holding down the Ctrl key and using the left mouse button to highlight each item. This theme of functionality is repeated throughout the system in the Detailed Data Query section.
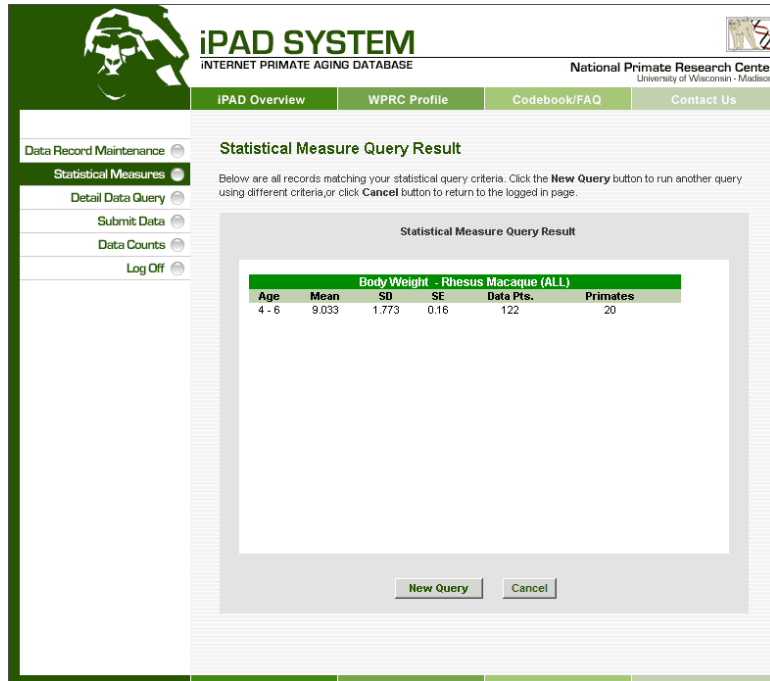
Figure 3.2 – Statistical Measures Results Screen

Figure 3.3 – EXCEL Output shown within the browser

The ability to output to this format allows the users to save and manipulate the results and graph data in separate statistical programs.

Detailed Data Query

This feature allows the user to review specific measures by individual primate over a specified period of time for each given specimen that meets the user selection criteria. The user can specify whether they wish to see the data broken down Quarterly, Half-yearly, or Yearly.

Figure 3.4 – Detailed Data Query Selection Screen

Should there be one or more primates that meet the user's selection criteria then individual data points are displayed in spreadsheet format, as shown in figure 3.5. Each row represents data for an individual primate identified by an ID in the first column under the Primate List column header. The next column over is the current age of that individual. Each column following the age is the quarterly mean value that exists for that primate for that measurement. There may not be a measurement for each time segment. The user can then scroll up or down as well as to the left or right to be able to see each data point within the window provided for the results. The other option is to output the information into a .csv file for importing into EXCEL or another data manipulation tool that can read in comma separated values as data. This allows the user to conduct further analysis with their tool of choice. It makes more sense to view the Detailed Data Query output as a .csv file rather than online if a user is interested in further analysis since it consists of individual data points. Figures 3.6 through 3.8 show the various screens one would see if the .csv option is selected and what the resulting output looks like.

Figure 3.5 – Detailed Data Query Results Screen
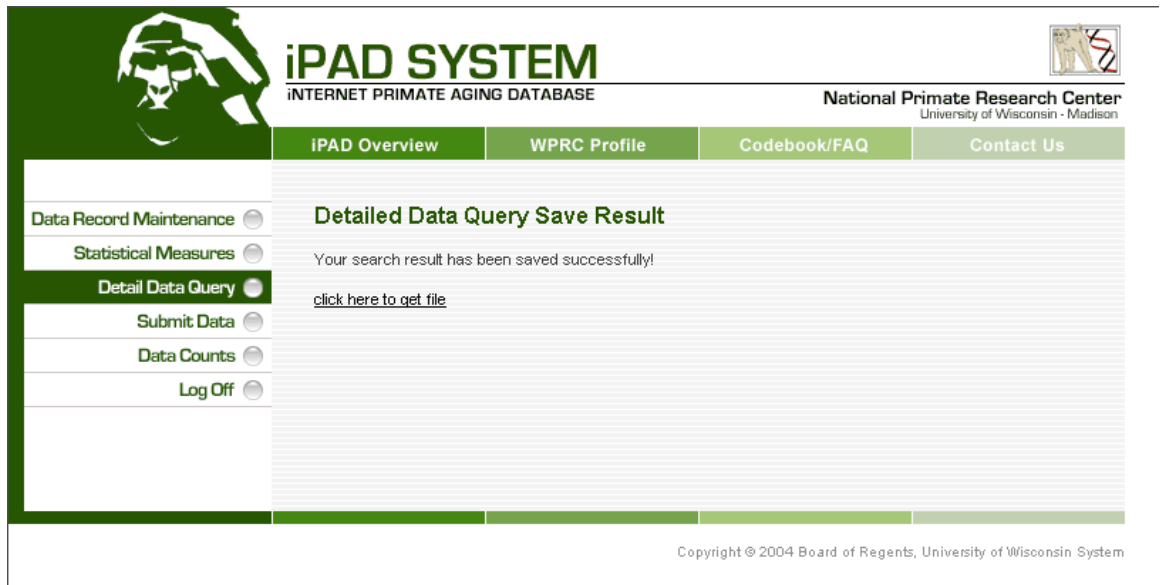
Figure 3.6 – Detailed Data Query Results via .CSV option
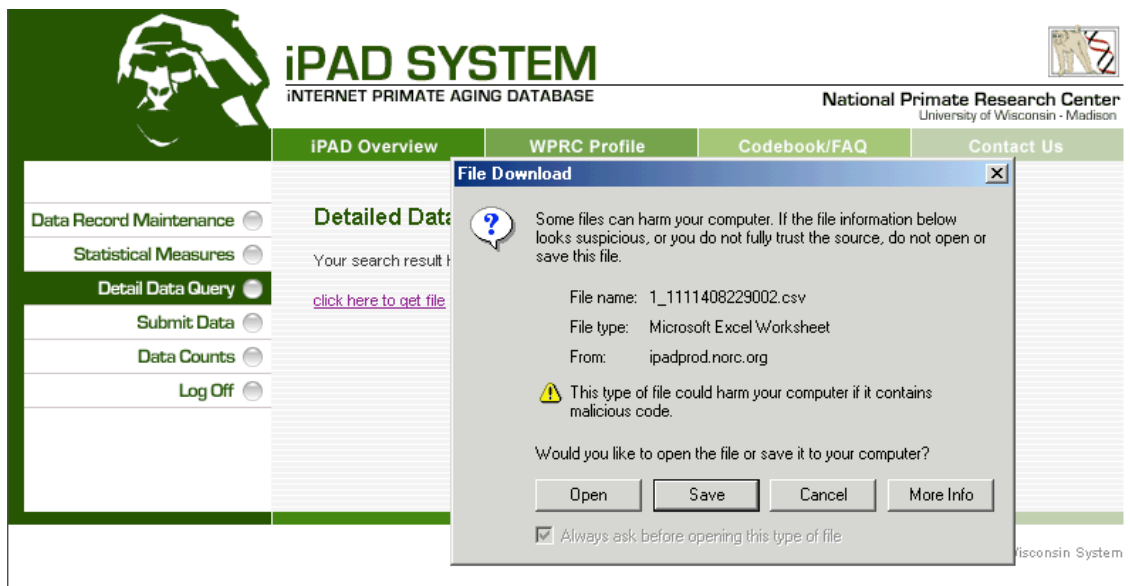
Figure 3.7 – Opening the .CSV File

	Primate List	Age (in Ye)	1.75-2.0	2.0-2.25	2.25-2.5	2.5-2.75	2.75-3.0	3.0-3.25	3.25-3.5	3.5-3.75	3.75-4.0	4.0-4.25	4.25-4.5
1	Body Weight												
3	Cf-Rh-49	19.5											
4	Cf-Rh-50	29.5											
5	Cf-Rh-51	29.5											
6	Cf-Rh-52	29											
7	Cf-Rh-55	28.75											
8	Cf-Rh-57	29.5											
9	Cf-Rh-61	28										6.7	7.2
10	Cf-Rh-62	27.75									7.9	9	9.9
11	Cf-Rh-66	27.75											7
12	Cf-Rh-70	27.75									7.5	7.9	9.2
13	Cf-Rh-74	27						6.3	7.5	8.9		10.1	11.6
14	Cf-Rh-75	27						5	5.2	6.5		6.7	6.8
15	Cf-Rh-76	27						4.5	5.2	6.1		6.8	7.2
16	Cf-Rh-77	27						5.9		8.2	8.7	9.05	
17	Cf-Rh-81	26.75					4.7	5.1	6.3		6.8	7.9	8
18	Cf-Rh-82	26.75					5.1	5.7	6.9		7.4	8	9.2
19	Cf-Rh-84	26.75					3.8	4.3	5.3		5.7	6.1	7.5
20	Cf-Rh-85	26.75						5.1	6.1		5.65		7.4
21	Cf-Rh-89	26		3.5		4.3	4.5	4.85	5.8	6.5	7.1	7.7	
22	Cf-Rh-90	25.75	3.4	3.6	4		4.4	4.8	5.8			6.2	
23	Cf-Rh-91	25.75	3.2	4.4	5.1		5.6	6.7	8.2			8.5	
24	Cf-Rh-92	25.75	3.2	3.6	4		4.4	4.9	5.8			6.9	7.7
25													

Figure 3.8 – Viewing the .CSV File

The Statistical Measures and Detailed Data Query are the only additional tools that the Research User has at their disposal that the Public User does not.

Log Off

When the user selects the Log Off option on the menu the system prompts them to confirm that they in fact wish to logout, as displayed in Figure 3.12. Upon confirmation of the desire to log out, the system displays the screen in Figure 3.13.
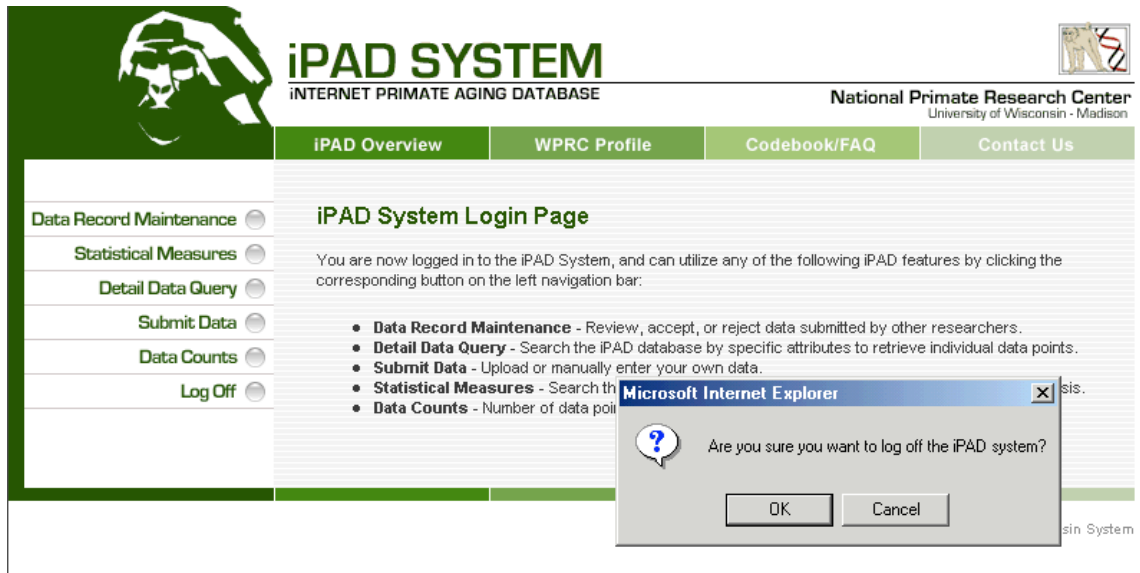
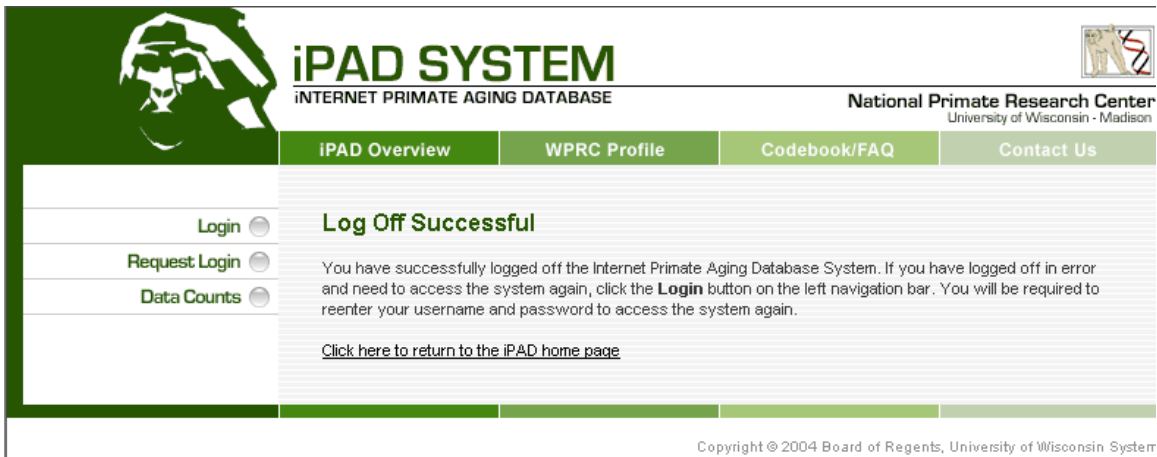**Figure 3.12 – System Log Off Confirmation**

Figure 3.13 – Successful System Log Off

The system has a default inactivity timeout limit of 15 minutes at which point it will automatically log the user out and require that they provide their user name and password again. This can also occur during rather large queries using the Statistical Measures feature or the Detailed Data Query feature.

Appendix A – Species of Primates in iPAD

Aotus sp. (owl monkey)

Callithrix jacchus (common marmoset)

Callithrix pygmaea (pygmy marmoset)

Gorilla sp. (gorilla)

Hylobates (Nomascus) leucogenys (white-cheeked gibbon)

Leontopithecus chrysomelas (golden-headed lion tamarin)

Leontopithecus rosalia (golden lion tamarin)

Macaca arctoides (stumptail macaque)

Macaca fascicularis (long-tailed macaque)

Macaca mulatta (rhesus macaque)

Macaca nemestrina (pigtail macaque)

Macaca nigra (crested black macaque)

Pan paniscus (bonobo)

Pan troglodytes (chimpanzee)

Pongo sp. (orangutan)

Saguinus oedipus (cotton-top tamarin)

Saimiri sp. (squirrel monkey)

Appendix B – Aging Biomarkers/Measures

The list below is made up of all the biomarkers that currently exist in the iPAD database as of the first release of the iPAD system. Definitions for each can be found in the Codebook/FAQ section of the site

Albumin
Albumin/Globulin Ratio
Albumin/Protein Ratio
Alkaline Phosphatase
Axillary Body Temperature
Basophil-%
Basophil-abs
Bilirubin-direct
Bilirubin-total
Body weight
Bone thickness
BUN (Blood urea nitrogen)
BUN/Creat Ratio
Calcium
Carbon Dioxide
Chloride
Cholesterol
CPK (Creatine phosphokinase)
Creatinine
Eosinophils-%
Eosinophils-abs
Fibrinogen
Fingernail growth rate
GGT (Gamma glutamyl transferase)
Globulin
Glucose
Glycosylated Hemoglobin
Hematocrit
Hemoglobin
Iron
Lactic dehydrogenase
Lymphocyte-%
Lymphocyte-abs
MCH (Mean corpuscular hemoglobin)
MCHC (Mean corpuscular hemoglobin concentration)
MCV (Mean corpuscular volume)
Monocyte-%

Monocyte-abs
Neutrophil-band %
Neutrophil-band-abs
Neutrophil-segmented-%
Neutrophil-segmented-abs
Phosphorus
Platelets
Potassium
Rectal Body Temperature
Red Blood Cells
SGOT (Serum Glutamic Oxalacetic Transaminase)
SGPT (Serum Glutamic Pyruvic Transaminase)
Sodium
Total Protein
Total Solids
Total-T4
Triglycerides
White Blood Cells