

DEVELOPMENT OF A WEB-BASED PATIENT CASE STUDY TEMPLATE
FOR NUTRITION EDUCATION

APPROVED BY SUPERVISORY COMMITTEE

Kimberly Hoggatt Krumwiede, M.A., Associate Professor
Biomedical Communications Graduate Program

Richard P. Howdy, Jr. M.A., Clinical Instructor
Biomedical Communications Graduate Program

Jo Ann Carson, Ph.D., R.D., L.D., Professor
Department of Clinical Nutrition and Center for Human Nutrition

DEDICATED

To my loving husband Joe, for his infinite devotion and admiration.

To my family, for all of the encouragement over the years and always believing in me.

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the completion of my graduate degree possible.

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DEVELOPMENT OF A WEB-BASED PATIENT CASE STUDY TEMPLATE
FOR NUTRITION EDUCATION

by

BELINDA JEANNE KLEIN

THESIS

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In Partial Fulfillment of the Requirements

For the Degree of

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Belinda Jeanne Klein, MA

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Supervising Professor: Kimberly Hoggatt Krumwiede, M.A.

This thesis project attempts to build a model-teaching tool by creating a computer-based patient case study. The goal of this thesis was to create a model for an interactive website that presents a patient case study for fourth-year medical students that will potentially facilitate diagnosis and treatment of patients with a nutritional condition. A preliminary step to this thesis project was the development of a web-based patient case study template. The objective was to use metabolic syndrome as an exemplary nutritional patient case study with in the template. The metabolic syndrome content included meets the requirements for medical students and the incorporation of the nationally recognized research at the University of Texas Southwestern Medical Center's campus. Additionally, the uses of different types of

media (photographs, MRIs, animations, interactive diagrams, and graphs) were used to present information in an effective manner. The test site was posted on the Internet for fourth-year medical students to review and participate in an informal survey to gather their responses on the template and its components. The website was created in a program format that meets the requirements of the campus on-line curriculum and can easily be updated in the future to ensure that information remains current and new patient case studies can be added.

TABLE OF CONTENTS

ABSTRACT	vi
LIST OF TABLES, FIGURES AND CHARTS	xi
LIST OF APPENDICES	xii
LIST OF DEFINITIONS	xiii
COMPUTER.....	xiii
MEDICAL	xiv
CHAPTER 1 - INTRODUCTION.....	1
THESIS QUESTION	1
GOAL AND OBJECTIVES	2
BACKGROUND INFORMATION	3
THE PROJECT	4
TARGET AUDIENCE	4
PURPOSE.....	4
EVALUATION.....	5
SIGNIFICANCE OF PROJECT	5
LIMITATIONS.....	7
CHAPTER 2 - REVIEW OF LITERATURE.....	8
OVERVIEW/COLLECTION	8
CURRENT AVAILABLE RESOURCES	9
2006 UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL CENTER	
CURRICULUM.....	11

SPECIFICS WITH REGARD TO METABOLIC SYNDROME	14
HISTORY AND DEFINITION.....	15
DIAGNOSIS AND COMPONENTS	16
PREVALENCE.....	22
TREATMENTS	25
CHAPTER 3 - METHODOLOGY	28
PLANNING AND OVERVIEW OF THE PROCESS.....	28
PROJECT DESIGN	30
WEBSITE DESIGN.....	31
GENERAL	31
SITE MAP	32
VISUAL ELEMENTS	33
NAVIGATION ISSUES.....	34
WEB AUTHORIZING PROGRAM	38
PRODUCT COMPONENTS.....	40
1. INSTRUCTIVE CONTENT.....	40
2. FOOD PHOTOGRAPHS	41
3. TWO ANIMATIONS	47
4. MRIs	51
5. THREE INTERACTIVE DIAGRAMS	54
6. TWO GRAPHS.....	57
7. TWO PRINTER PDF FILES.....	59

8. PRODUCTION FLOW DOCUMENT	60
SUMMARY	60
CHAPTER 4 - EVALUATIONS	62
SURVEY DEVELOPMENT	62
SURVEY DISTRIBUTIONS AND COLLECTION.....	63
SURVEY RESULTS	64
AUGUST FOURTH-YEAR MEDICAL STUDENT’S CLASS.....	64
SEPTEMBER FOURTH-YEAR MEDICAL STUDENTS AND PA’S CLASS.....	71
OCTOBER FOURTH-YEAR MEDICAL STUDENT’S CLASS - FINAL	79
SUMMARY	86
CHAPTER 5 - CONCLUSION	88
PROJECT SUMMATION	88
RECOMMENDATIONS FOR FUTURE RESEARCH.....	89
APPENDICES	91
BIBLIOGRAPHY	158
VITAE.....	164

LIST OF TABLES, FIGURES, AND CHARTS

TABLE 2-1. UT Southwestern Medical Center’s Curriculum Comparison.....	11
TABLE 2-2. Metabolic Syndrome Risk Factors.....	18
TABLE 2-3. Age Prevalence of Metabolic Syndrome for U.S. Residents.....	23
TABLE 2-4. Prevalence of Metabolic Syndrome by Ethnicity and Gender in U.S. Adults..	25
FIGURE 3-1. Metabolic Syndrome Site Map.....	33
FIGURE 3-2. Final Home Page Layout.....	36
FIGURE 3-3. Final Diagnosis and Treatment Plan Page Layouts.....	37
FIGURE 3-4. Pop-Up Window Examples.....	39
FIGURE 3-5. Control Portions to Promote Energy Balance Window	43
FIGURE 3-6. Select Fats Carefully Window	46
FIGURE 3-7. Viewing the Animation Program, Flash.....	49
FIGURE 3-8. Abdominal Fat Window	53
FIGURE 3-9. Six Components of Metabolic Syndrome Interactive Diagram	55
FIGURE 3-10. Criteria for Diagnosis of Metabolic Syndrome Interactive Diagram.....	56
FIGURE 3-11. Treatment of Metabolic Syndrome Components Interactive Diagram	57
FIGURE 3-12. Metabolic Syndrome Statistical Graphs.....	59
CHART 4-1. August Survey Results.....	65
CHART 4-2. Approximate Time Spent on the Case in August.....	70
CHART 4-3. September Survey Results	72
CHART 4-4. Approximate Time Spent on the Case in September	78
CHART 4-5. October Survey Results.....	80
CHART 4-6. Approximate Time Spent on the Case in October	85

LIST OF APPENDICES

APPENDIX A - Website and Home Page Sketches	91
APPENDIX B - Home and Secondary Pages Design Options	96
APPENDIX C - Animation Storyboards	100
APPENDIX D - Metabolic Syndrome Interactive Diagram Sketches.....	104
APPENDIX E - Metabolic Syndrome Prevalence Graph Sketches.....	105
APPENDIX F - Printer PDF Files	108
APPENDIX G - Production Flow Document	122
APPENDIX H - Student Surveys	149

LIST OF DEFINITIONS

Computer

Adobe® Acrobat® - Computer program that can create, convert, and manipulate PDF files either created within or from other computer programs.

Adobe® Flash® - A multimedia authoring and playback program for two-dimensional animated graphics. Uses both the FLA and SWF file extensions when files are created.

Adobe® Illustrator® - A vector drawing and text manipulation program.

Adobe® Photoshop® - A raster image and photograph editing program with layering capabilities. Creates files in many format types and has its own native format (PSD)

Adobe® Reader® - Computer program for displaying, printing and searching PDF files either created by Acrobat® or from other computer programs.

AI file – Adobe® Illustrator® file - native, layered file format.

ColdFusion® – A programming software created by Allaire Corporation (in 2001, Allaire merged with Macromedia) that includes a server and a development toolset designed to integrate databases and Web pages. ColdFusion® Web pages include tags written in ColdFusion® Markup Language (CFML) that simplify integration with databases and avoid the use of more complex languages to create translating programs.

CSS - Cascading Style Sheets - An extension used by Web programs, such as Dreamweaver®, to allow specific design elements (e.g. fonts, color, size) to be specified for a document or can imported into multiple HTML files.

FLA file - Native Flash file.

HTML - Hypertext Markup Language - The document format used on the Web. Web designing programs embed HTML coding that defines the page layout, fonts, graphic elements, and the hypertext links.

JPG /JPEG file - Joint Photographic Experts Group file - A standard for compressing still, greyscale or color images, with a variable range depending on the quality and size of the image needed.

Macromedia® Dreamweaver® - Web authoring program with the ability to view the layouts in both visual and HTML coding modes.

Microsoft® Word® - A word processing program with both graphic and text based interfaces.

PDF file - Portable Document Format file - A file format created in several different programs but read in Adobe® Acrobat® programs.

PSD file – Adobe® Photoshop® Default file - Native, layered file format.

SWF file - ShockWave Flash file - A Flash® movie that is published and can be played in a Web browser or other compatible program.

Medical

ASCVD - Atherosclerotic Cardiovascular Disease – a building up of plaque in arteries to organs, particularly to the heart, that may lead to heart attack, stroke or death. The term may be used synonymously with ischemic heart disease.

BMI - Body Mass Index – A measure of body fat calculated by taking the total body mass

(weight) divided by the height squared. For adults a BMI of 25 to 29.9 denotes the individual is overweight, and 30 or above is an indication of obesity.

Cholesterol - Soft, waxy substance unable to dissolve in the bloodstream. It is an important element for an individual to be healthy as the body uses it to form cell membranes, some hormones and it is needed to support other bodily functions. Cholesterol has to be transported between cells by special carriers called lipoproteins.

HDL cholesterol - High-Density Lipoproteins - Known as the “good” cholesterol and is believed to remove excess cholesterol from plaque, carry cholesterol away from the arteries, and transport it back to the liver to be eliminated from the body.

Insulin – Produced by the pancreas, insulin helps cells to utilize glucose, the simple sugar formed from the break down of food, as a main source of energy. If the pancreas does not produce enough insulin or the body is unable to use what is present, the cells can not use glucose.

Insulin resistance – There is reduced sensitivity to insulin in the body, a defect in the insulin-mediated glucose metabolism, that results from either a decrease or increase in production of insulin. Initially, the pancreas attempts to keep up with the demand for insulin and produces more. Eventually, the over-worked pancreas fails to provide enough insulin and excess glucose builds up in the bloodstream. This is often associated with type 2 diabetes and obese individuals.

Fatty Acids – A chemical molecule that structurally varies in complexity and importance in the body. Fatty acids primarily occur as a combination of glycerols (triacylglycerols) when they are stored. Most fatty acids are derived from excess dietary protein and

carbohydrates are readily converted and stored for future use as triacylglycerols.

Framingham Risk Score - A percent likelihood of having a myocardial infarction or dying due to coronary disease in the next 10 years.

Free fatty acids - Mainly derived from adipose tissue stores that release triglycerides into the blood stream through several cyclic enzyme actions.

LDL cholesterol - **Low-Density Lipoproteins** - Known as the “bad” cholesterol and is the major carrier in the blood stream. High levels of LDL cholesterol can build up with other substances in arteries to form plaque.

Lipoproteins – Because cholesterol and other fats do not dissolve in blood, they are transported between cells by these special carriers.

Metabolic Syndrome/ Syndrome X/ Insulin Resistance Syndrome - A collection of interrelated risk factors, abnormal laboratory tests, and unhealthy body measurements that directly appear to promote the development of cardiovascular disease and increase the risk of evolving into type 2 diabetes.

Pathophysiology - The basic processes and functions of a disorder.

Syndrome - Recognizable complex of symptoms that often coexists as physical or biochemical findings for which the cause is not directly understood.

Triglycerides – A compound of three molecules of fatty acid, which is synthesized from carbohydrates and stored in adipose cells.

VLDL - **Very Low-Density Lipoproteins** – Synthesized in the liver and transports triglycerides from the intestine and liver to adipose and muscle tissues.

CHAPTER ONE

Introduction

Instructors are continually looking for teaching tools to assist them with their curriculum that incorporate up-to date information and current technology. This thesis documents the development of a teaching tool that is a model for an interactive website. This website presents a patient case study for fourth-year medical students that will potentially facilitate diagnosis and treatment of patients with a nutritional condition.

Thesis Question

A fundamental question for any educator is how to teach a concept more clearly. At the University of Texas Southwestern Medical Center this is the basis for continuous improvement of the medical curriculum. Similar to any university, there is the constant challenge of keeping up with the latest research and technology and how that plays a role in preparing their students for the future. The medical field continues to evolve and as new conditions, diagnostic tools, classifications of diseases, and syndromes are identified the University has to decide the most effective way to present this information. A web-based curriculum at the University has provided some flexibility and options for the presenters, such as interactive visual presentations, PowerPoint® slides, and animations that students can access online. Presenters often use a patient case study, on varying levels, to present medical concepts. This teaching tool allows the students to practice identifying important

factors that lead to a diagnosis and treatment of the patient, without the patient's physical presence. Therefore, taking into account the online curriculum and the patient case study teaching tool, more specifically the thesis question is: can a model for a patient case study educational tool using as an example, the diagnosis and treatment of metabolic syndrome, be produced in a web-base interactive format for medical students to use during their clinical years?

Goal and Objectives

The goal of this thesis was to create a model for an interactive website that presented a patient case study for fourth-year medical students that could potentially facilitate diagnosis and treatment of patients with a nutritional condition. The main objective was to use metabolic syndrome as an exemplary nutrition patient case study within the template. Additional objectives included the conduction of an informal survey to review the initial continuing education website to get informative feedback for the production of the new model, for revision and expansion of the of both written and verbal content of the website, originally created for dietitians, and to meet the requirements for medical students and the incorporation of the nationally recognized research at the University of Texas Southwestern Medical Center's campus. Also, different types of media (photographs, MRIs, animations, interactive diagrams, and graphs) were used to present visual information in an effective manner. An additional objective was creating the website in a program format that met the requirements of the campus on-line curriculum and could easily be updated in the future to

ensure that information remains current and additional patient case studies can be completed.

The final objective was posting the finished metabolic syndrome model on the Internet for fourth-year medical students to review and participate in an informal survey to gather their responses on the template and its components.

Background information

A preliminary step to this thesis project was the development of a web-based patient case study nutrition education template. This occurred the previous year, during the second year internship course, under the instruction of Dr. Jo Ann Carson, a professor in the Department of Clinical Nutrition and Center for Human Nutrition at the University of Texas Southwestern Medical Center. The template was the basis for a continuing education module for registered dietitians. As the website progressed from concept to finished product, Dr. Carson assisted in the decision making of the design, interface, and venue for the website that would also serve as a template for other nutrition patient case studies. To have some consistency, the design of the website template followed some of the basic standards of the web-based curriculum at UT Southwestern Medical Center.

Dr. Carson presented the completed website to several second year dietetic students for their feedback. The students made positive comments on the overall look, the easily understood navigation and the objectives of the website template. Once the Commission on Dietetic Registration approves the website, registered dietitians will be able to receive professional continuing education credits by accessing the module from the University of Texas

Telecampus.

The success of the continuing education template for the registered dietitians resulted in the decision to use the dietetic Web module as an initial template for the development of the final educational tool model. It was modified for the new target audience, fourth-year medical students, and metabolic syndrome was chosen as a topic. While the main design and interface of the template remained the same, the content had to be adjusted to address the new audience and to include additional types of media, as well as conform to the medical curriculum venue.

The Project

Target audience

The fourth-year medical students were identified as the primary target audience for this educational model. In the current Medical School curriculum at UT Southwestern Medical Center it is during the fourth-year that the medical students do a clinical rotation with adults in the ambulatory care setting. Within the Ambulatory Care Rotation course, students have the opportunity to participate in guided patient visitations and complete computer-based patient case studies for their course requirements. In either scenario, students practice procedures and apply their understanding of materials in practical patient applications.

Purpose

The initial, continuing education template was created to present materials on a nutritional condition to continuing education dietetic students. For this thesis project, the template was modified to create a broader web-based module on a nutritional condition, such as metabolic syndrome, for the fourth-year medical students. The foundation of the initial template, the aesthetics, navigation, the separation of informative and question content, were incorporated into the thesis model. The original template did not incorporate many visual components, however, topics such as metabolic syndrome, made it necessary to include the incorporation of other forms of media. This web-based module was adjusted in content and reference materials to teach fourth-year medical students to: (1) identify patients with metabolic syndrome, (2) understand the qualifying components, (3) create a treatment plan to include lifestyle strategies and interventions, and (4) reference research guidelines from established groups and associations.

Evaluation

The thesis project was evaluated by the target audience in both formative and final surveys for their feedback on the written content and visual components. Their responses were taken into consideration for the final product of the web-based patient case study model.

Significance of Project

Dr. Jo Ann Carson established the need for the Department of Clinical Nutrition and Center for Human Nutrition at the UT Southwestern Medical Center to update nutrition-based

patient case studies. The existing computer-based nutrition patient case studies had outdated content and were created in an antiquated computer program. The materials were difficult to maintain and the University had updated their hardware making the patient case studies incompatible on the majority of campus computers. During a meeting with Dr. Carson, she revealed that there was several new nutrition topics that medical students needed to become more aware of. A new web-based patient case study template needed to be devised for the new topics. Having such case studies available online, and not limited to specific computers, allows viewing flexibility for the students. In turn, the website ought to be created in a program format that meets the requirements of the campus on-line curriculum and can easily be updated in the future to ensure that information remains current and additional patient case studies can be done.

One of the most important nutrition topics that Dr. Carson mentioned was metabolic syndrome and the need to incorporate the latest information about the condition, a fairly new diagnosis, into the medical students' curriculum. A brief curriculum review reveals the current UT Southwestern Medical Center medical curriculum neither discusses in detail what metabolic syndrome entails, nor incorporates metabolic principles into practical applications for nutrition. With an increase in metabolic syndrome in the United States, medical students need to be ready to diagnose and provide treatment. Therefore, the need for fourth-year medical students to have a current patient case study on metabolic syndrome is critical. The viable location identified for such a patient case study to merge into the current curriculum is the cardiovascular nutrition segment within the Ambulatory Care Rotation during the fourth-

year medical student schedule. This new model patient case study would replace the older cardiovascular patient case study (Mr. Marshman).

Limitations

There are several limitations for the template and model patient case studies prompted by the primary audience and the association with the UT Southwestern Medical Center's established curriculum. The template needs to present the material at the appropriate level for the audience and to meet the standards set by the University. The venue for the patient case study model has been determined as the medical curriculum at UT Southwestern Medical Center that can be accessed on line. Since the site was designed for the web, certain elements needed to be considered in the design: screen size, organization, navigation, resolution, and speed. Keeping such restrictions in mind, the example module must also meet the University's graphic standards to be able to publish materials within the medical program. The design of the module intentionally appears as part of the online curriculum with similar design elements being incorporated.

In conclusion, a patient case study teaching tool model has been developed for this thesis project as a possible solution for incorporating curriculum and current technology. This thesis document further explains the development of this interactive website patient case study teaching tool for fourth-year medical students that will potentially facilitate diagnosis and treatment of patients with a nutritional condition, metabolic syndrome.

CHAPTER TWO

Review of the Literature

Initial review of literature, patient case studies, the University of Texas Southwestern Medical Center's medical curriculum, current websites, and discussions with fourth-year medical students guided the direction for the development and success of this project. A portion of the literature review, examining sample patient case studies and nutrition websites, took place during the three-month internship course. The curriculum review, discussions with fourth-year medical students, searches for journal articles and books were undertaken during the development of the more expansive version of the web-based module for the fourth-year medical students.

Overview/Collection

The methodology used for collecting materials needed to be geared towards both content and visual materials. When using the University of Texas Southwestern Medical Center's library resources, thousands of journal articles were found. Therefore, searches had to be narrowed for "metabolic syndrome" by date, definition, statistics, known causes or components, diagnosis, and treatments. Visual references were more difficult to find, consequently Dr. Carson's expertise was used to locate materials containing images either in books, journal articles, curriculum slide presentations, or online resources. Slide presentations from the UT Southwestern Medical Center's curriculum were referenced to make sure the consistency of the presentation method was used in the building of the website and its support materials.

Current Available Resources

Research was used as a guide for the appropriate direction of the patient case study.

Previously, a group of UT Southwestern Medical Center's medical school faculty developed a format for computer-based nutrition cases. Dr. Carson and her colleagues reported that the use of this format demonstrated that "computer-based cases improved student knowledge and self-efficacy..."¹ Three patient case study examples were reviewed: OBGYN Nutrition Case (Suzy Jones) and cardiovascular nutrition cases (Mr. and Mrs. Marshman), to get a better understanding of how materials were presented, the program used, and any improvements that might need to be made.² An invitation to attend Dr. Carson's Cardiovascular Nutrition class for the fourth-year medical students in April of 2005 provided an opportunity to receive direct feedback from the students on the Mr. and Mrs. Marshman cases. This feedback was critical in order to decide what could be the most effective changes from the older Mr. and Mrs. Marshman cases to apply to the metabolic syndrome website module. The students asked if there could be more comparisons between a healthy individual to one with cardiovascular risks. Plus, the addition of illustrations and/or photographs with correct food portions would be helpful to include. The students recommended making the main sections about the patient, (history, physical exam, and labs etc.) easier to refer to or look at simultaneously. Participants suggested that any tables or charts would be in a separate window so this content could be viewed at the same time as the

¹ J. A. Carson et al., "Enhancing Self-Efficacy and Patient Care with Cardiovascular Nutrition Education," *Am J Prev Med* 23, no. 4 (2002).

² J. Carson et al., *Cardiovascular Nutrition Cases* ([cited August 2006]); available from <http://medschool.swmed.edu/nutrition/index.htm>.

patient information. Further discussion between Dr. Carson and the class led to the proposal of having some of the information from the web-based case condensed into a PDF file, for them to print out and refer to when treating patients.

The “Diet Obesity & Cardiovascular Disease” patient case study module produced by the Nutrition in Medicine department at the University of North Carolina at Chapel Hill proved to be a useful reference tool for how animations, videotapes, illustrations, and diagrams were used as instrumental visual components.³ The budget and time for this educational tool was quite extensive and the program had a strong sense of organization and flow between the text and visuals.

Nutrition-based websites were also reviewed to ascertain different approaches on how nutrition information is currently being presented. After doing a generic search on Google®, an instrumental site was discovered through Tufts University, Nutrition Navigator – A Rating Guide to Nutrition Websites by Gerald J. and Dorothy R. Friedman of the Friedman School of Nutrition Science Policy.⁴ This site reviews the nutrition information provided at other websites for depth and accuracy, and ranks them by using a scale of one through ten. Tuft’s navigation site also lists the other nutrition websites into different categories, such as gender, age, profession, weight management, and dietary needs. Examples of sites visited were, the

³ M. Kohlmeier et al., "Diet Obesity & Cardiovascular Disease," ed. Zeisel S.H. (Nutrition in Medicine department at the University of North Carolina at Chapel Hill, 2002).

⁴ D.R. Friedman and G. J. Friedman, *Nutrition Navigator, a Rating Guide to Nutrition Websites* (Tufts University, 2005 [cited June 2005]); available from <http://www.navigator.tufts.edu/magazine/>.

Arbor Nutrition Guide, Women's Health Matters, and the FDA Center for Food Safety and Applied Nutrition.^{5, 6, 7}

2006 University of Texas Southwestern Medical Center Curriculum

A review of the current medical student curriculum assessed the nutrition-based materials and if/how metabolic syndrome was being presented. The four year curriculum at UT Southwestern Medical Center addresses issues such as obesity, hypertension, inactivity, metabolic syndrome, general nutrition, and the body mass index (BMI). Because the medical school course content is posted on the web, it was possible to do an Intranet search for "metabolic syndrome". The results are summarized in Table 2-1.

Table 2-1. UT Southwestern Medical Center's Curriculum Comparison			
Course/Clerkship	Topic	Presenter/Author	Comments
1 st year Endocrinology	Growth and Disorders of Growth ⁸	Michelle Hutchison, M.D.	Has a short explanation concerning overnutrition (obesity).

⁵ *Arbor Day Nutrition Guide* (November 20, 2005 [cited December 2005]); available from <http://www.arborcom.com/>.

⁶ *Women's Health Matters* (The New Women's College Hospital, 2005 [cited June 2005]); available from <http://www.womenshealthmatters.com/>.

⁷ *Center for Food Safety and Applied Nutrition* (U.S. Food and Drug Administration, January 2005 1994 [cited June 2005]); available from <http://vm.cfsan.fda.gov/>.

⁸ M. Hutchison, *Growth and Disorders of Growth* [lecture pdf] (July 24 2006 [cited June 9 2006]); available from <http://curriculum.swmed.edu/endo/pdfs>.

Course/Clerkship	Topic	Presenter/Author	Comments
1 st year Human Behavior and Psychopathology	Neurobiology of Appetite Objectives ⁹	Eric Nestler, M.D., Ph.D.	Defines obesity and discusses “New Treatments for Obesity” from a hormonal and appetite-suppressant drugs approach.
1 st year Medical Biochemistry	Obesity: Environmental and Genetic Factors ¹⁰	Roger Unger, M.D.	The only time that obesity is the main focus; but as one would expect, the molecular process is explained and the treatments mentioned are bariatric surgery and drug therapies.
1st year Elective	Applied Nutrition	Jo Ann Carson, Ph.D, R.D.	Relates the biochemistry concepts from the first year’s courses and apply them to patient care by way of nutrition.
2 nd year Clinical Medicine	Cardiovascular Disease ^{11, 12, 13, 14}	Ronald Victor, M.D. John Rutherford, M.D. Jose Cardenas, M.D. Clyde Yancy, M.D.	These lectures briefly review the topics aforementioned with a cardiac and/or vascular focus.

⁹ E. Nestler, *Neurobiology of Appetite* (Lecture 33) [Lecture pdf] (May 1 2006 [cited June 9 2006]); available from <http://curriculum.swmed.edu/behavior/pdfs>.

¹⁰ R. H. Unger, *Obesity: Environmental and Genetic Factors* [Lecture presentation] (2005 [cited June 7 2006]); available from <http://curriculum.swmed.edu/biochem/pdfs>.

¹¹ R. G. Victor, *Hypertension* (14) [lecture pdf] (October 10, 2005 2005 - 2006 [cited June 9 2006]); available from <http://curriculum.swmed.edu/cvs/pdfs>.

¹² J. D. Rutherford, *Cardiac Risk Factors* (Cardiovascular) [Lecture pdf] (October 12 2005 - 2006 [cited June 9 2006]); available from <http://curriculum.swmed.edu/cvs/pdfs>.

¹³ J. Cardenas, *Clinical Aspects of Vascular Disease* [Power Point Presentation] (February 13, 2006 2005 [cited June 9 2006]); available from <http://curriculum.swmed.edu/cpn/pdfs>.

¹⁴ C. W. Yancy, *Congestive Heart Failure: Slides* [Power Point Presentation] (November 2 2005 [cited June 9 2006]); available from <http://curriculum.swmed.edu/cvs/pdfs>.

Course/Clerkship	Topic	Presenter/Author	Comments
2 nd year Multisystem II	Nutritional Pathology ¹⁵	Dinesh Rakheja, M.D.	Broadly defines and explains the neurohormonal circuits that play a role in obesity.
2 nd year Clinical Medicine	Basic Principles of Diabetes – slide version ¹⁶	Daniel Foster, M.D.	Only current lecture that defines and lists the components of metabolic syndrome, rather than just including it in a list of conditions.
3 rd year Internal Medicine	Nutrition Primer for Internal Medicine ¹⁷	Jo Ann Carson, Ph.D, R.D., and Hari Raja, M.D.	On-line reference covering applied nutrition for chronic diseases, such as diabetes, renal and heart disease.
4 th year Ambulatory Care Rotation	Cardiovascular Nutrition	Jo Ann Carson, Ph.D, R.D.	Students gain practical skills for addressing nutrition with patients. Includes computerized patient case studies.

Table 2-1. Fourteen references and lectures found on the curriculum at UT Southwestern Medical Center.

This table shows that the current UT Southwestern medical curriculum does not focus an adequate amount of time or materials on what metabolic syndrome is, why it is critical to diagnose, and how to treat it from a nutritional standpoint. In most cases when metabolic

¹⁵ D. Rakheja, *Nutrition- Malnutrition and Deficiencies* [lecture pdf] (June 19 2006 [cited June 7 2006]); available from <http://curriculum.swmed.edu/mul/pdfs>.

¹⁶ D. Foster, *Basic Principles of Diabetes:Slides* [Power Point Presentation - 30 slides] (March 22 2006 [cited June 9 2006]); available from <http://curriculum.swmed.edu/end/pdf>.

¹⁷ J. Carson and H. Raja, *A Nutrition Primer, for Care of Adults Patients with Medical Diseases* [lecture pdf] (May 5, 2004 2004 [cited June 9 2006]); available from <http://curriculum.swmed.edu/intmed/pdfs>.

syndrome is mentioned, is included it in a list of conditions and not further defined. Obesity is addressed on several occasions, however, without providing a diagnosis or treatment procedures from a nutritional point of view. Even when key components such as hypertension, BMI, and cholesterol are mentioned, the focus is generally from the cardiac and/or vascular aspects. The first year curriculum offers the Applied Nutrition elective to the students, which provides the students with definitions and tools to determine the diet for a patient and the effects of nutrition on the treatment of diseases. The third year students can refer to the on-line Nutrition Primer for Internal Medicine reference when seeing patients; however this information is not formally presented to the students. During the fourth-year, students are required to select Internal Medicine, Family Medicine, or Women's Health as the setting for their Ambulatory Care Rotation. Students in Internal Medicine and Family Medicine take the Cardiovascular Nutrition class with the requirement of completing two computer-based patient case studies.

Specifics with Regard to Metabolic Syndrome

Metabolic syndrome was selected as the topic for the fourth-year medical students' patient case study because it is a current nutritional condition that students need to be aware of, and visual media can be used to explain the variety of components. Metabolic syndrome is a topic that shows the flexibility that the nutrition patient case study template has and how it can be expanded to take full advantage the web's visual capacities. The remainder of this section explains further what metabolic syndrome is, how to establish a relationship to the

written content in the website and understand the materials used in the different visual media covered in the Methodology section.

History and Definition

Metabolic syndrome has become a popular global topic due to the increasing prevalence of obesity and cardiovascular disease in developed countries. There have been several names coined including, Insulin Resistance Syndrome, The Deadly Quartet, and Diabesity, over several years before the term became metabolic syndrome. Today the well-established term, metabolic syndrome, is the most widely accepted description for the clustering of the cardiovascular risk factors and predicting of diabetes if it is not already present.^{18, 19}

Over the years a number of worldwide expert groups have attempted to develop a unified definition of metabolic syndrome. The concept of metabolic syndrome has been difficult to define as a single diagnosis that incorporates the pathophysiology, abnormalities, and the clinical manifestations of the syndrome.^{18, 20} Clinically, metabolic syndrome proves to be the "...master of disguise since it can present in various ways according to the different components that constitute the syndrome."²¹ According to Grundy and colleagues, "Available data suggest that it is truly a syndrome, i.e., a grouping of ASCVD risk factors,

¹⁸ K. G. Alberti, P. Zimmet, and J. Shaw, "Metabolic Syndrome--a New World-Wide Definition. A Consensus Statement from the International Diabetes Federation," *Diabet Med* 23, no. 5 (2006).

¹⁹ "Getting Tough with Metabolic Syndrome," *Postgrad Med* 115, no. 1 (2004).

²⁰ V. G. Athyros, A. Karagiannis, and D. P. Mikhailidis, "Metabolic Syndrome: Which Definition for Which Objective?," (2006).

²¹ R. H. Eckel, S. M. Grundy, and P. Z. Zimmet, "The Metabolic Syndrome," *Lancet* 365 (2005).

but one that probably has more than one cause.”²² The most widely accepted definitions have been produced by the following groups: in 1998 the World Health Organization (WHO), in 1999 The European Group for the Study of Insulin Resistance (EGIR), in 2001 the National Cholesterol Education Program – Third Adult Treatment Plan (NCEP ATPIII), in 2003 the American Association of Clinical Endocrinologists (AACE) modified the ATP III criteria, and in 2005 the International Diabetes Foundation (IDF) again made modifications to the ATP III criteria. All of the groups have agreed upon the core components for metabolic syndrome to include the following: obesity, insulin resistance, dyslipidemia, and hypertension. However, there is a difference among the groups’ recommendations on the clinical criteria and the combination of components required to diagnose metabolic syndrome. Different research groups continue to strive for a better definition and diagnostic tools that would be more useful in clinical practice and amongst different populations.^{18, 20, 22, 23} To focus this thesis, the following risk factor components described will be those materials supported by the American Heart Association, the National Heart, Lung, and Blood Institute and the modified ATP III point of view.

Diagnosis and Components

There are various approaches to assessing multiple risk factors, considering risks simultaneously are better than individual factors alone. The Framingham risk score tool is for establishing the risk of an individual for future coronary heart disease by assigning a

²² S. M. Grundy et al., "Diagnosis and Management of the Metabolic Syndrome: An American Heart Association/National Heart, Lung, and Blood Institute Scientific Statement," *Circulation* 112, no. 17 (2005).

²³ D. Deen, "Metabolic Syndrome: Time for Action," *Am Fam Physician* 69, no. 12 (2004).

value to risk factors.²⁴ Metabolic syndrome is characterized by a group of six risk factors by which a diagnosis is established if an individual has three or more of five clinical parameters (starred in Table 2-2). The following table lists the 6 risk factors, a description, and the clinical criteria used to diagnose the component.

²⁴ P. Kohli and P. Greenland, "Role of the Metabolic Syndrome in Risk Assessment for Coronary Heart Disease," *Jama* 295, no. 7 (2006).

Table 2-2. Metabolic Syndrome Risk Factors		
Component	Description	Clinical Criteria
Abdominal Obesity	Excess fat in and around the waistline	* Waist circumference: Men - ≥ 40 inches (102 cm) Women - ≥ 35 inches (88 cm) Note: lower thresholds for certain ethnic populations.
Insulin Resistance	The body is unable to use insulin or blood sugar efficiently	* Fasting blood sugar ≥ 100 mg/dL
Dyslipidemia	High triglycerides, high LDL cholesterol, and low HDL cholesterol in the blood stream.	* Triglycerides ≥ 150 mg/dL * HDL cholesterol: reduced to Men - < 40 mg/dL Women - < 50 mg/dL
Hypertension	High blood pressure	* $\geq 130/85$ mm Hg
Prothrombotic	High levels of fibrinogen or plasminogen activator inhibitor-1 in the blood.	Not routinely detected in clinical practice.
Proinflammation	Elevated C-reactive proteins (CRP) within the blood	CRP > 3 mg/L

19, 20, 22, 23, 25, 26, 27, 28, 29, 30

Table 2-2. The risk factors of metabolic syndrome, a description of the risk factors and clinical criteria to diagnose metabolic syndrome.

²⁵ *What Is the Metabolic Syndrome?* (American Heart Association, [cited June 9 2006]); available from <http://www.americanheart.org/presenter.jhtml?identifier=4756>.

²⁶ *Metabolic Syndrome - Statistics* (American Heart Association, 2004 [cited June 2 2006]); available from <http://www.americanheart.org/presenter.jhtml?identifier=3020708>.

²⁷ T. Hampton, "Mitochondrial Defects May Play Role in the Metabolic Syndrome," *Jama* 292, no. 23 (2004).

²⁸ J. M. Torpy, C. Lynm, and R. M. Glass, "Jama Patient Page. The Metabolic Syndrome," *Jama* 295, no. 7 (2006).

²⁹ *Metabolic Syndrome / Syndrome X* (December 6, 2004. [cited May 26 2006]); available from <http://labtestsonline.org/understanding/conditions/metabolic-2.html>.

³⁰ *Insulin Resistance and Pre-Diabetes* (My 2004 2002 [cited June 2 2006]); available from <http://diabetes.niddk.nih.gov/dm/pubs/insulinresistance/>.

Obesity is a growing epidemic and has been known for thousands of years to have a major role on morbidity and mortality.^{31, 32} A sedentary or an inactive lifestyle is also associated with obesity. It is important to distinguish between patterns of total body fat distribution, abdominal obesity (also referred to as truncal, upper-body, male-type, and android) compared to lower body obesity (also called female-type, gynoid obesity). Abdominal obesity is considered one of the dominant underlying risk factors for metabolic syndrome. This finding was supported by life insurance data and later confirmed by epidemiological and clinical studies.^{22, 31, 32} Even though the patient's Body Mass Index (BMI) should be calculated as a standard clinical practice, waist circumference appears to be the best predictor for cardiovascular disease and metabolic syndrome.^{18, 23, 33} Although the waist circumference measurement is helpful, it should be noted that the waist cut-off values vary between population sectors.¹⁸ Excess body fat that accumulates in the abdominal area is classified as visceral (intra-peritoneal) or subcutaneous fat.²² With either classification of abdominal fat distribution there is a promotion of other risk factors such as type 2 diabetes, hypertension, dyslipidemia, and insulin resistance.^{22, 32}

Several theories hold insulin resistance as the one of the dominant underlying risk factors of metabolic syndrome.^{23, 18, 22, 31, 32} Research indicates a consistent pattern of abdominal fat,

³¹ S. M. Grundy, "Drug Therapy of the Metabolic Syndrome: Minimizing the Emerging Crisis in Polypharmacy," *Nat Rev Drug Discov* 5, no. 4 (2006).

³² N. Abate, "Obesity and Cardiovascular Disease. Pathogenetic Role of the Metabolic Syndrome and Therapeutic Implications," review of Power Point Presentation/34 slides, *J Diabetes Complications* 14, no. 3 (2000).

³³ T. R. Wessel et al., "Relationship of Physical Fitness Vs Body Mass Index with Coronary Artery Disease and Cardiovascular Events in Women," *Jama* 292, no. 10 (2004).

either visceral or subcutaneous, to be inseparable from insulin resistance and metabolic syndrome. People who do not meet the obesity classifications but have abnormal abdominal fat distribution are insulin resistant and have other metabolic risk factors. This is seen in people who have diabetic first or second degree relative(s), or individuals of various ethnic ancestries. Adipose tissue in obese individuals does not metabolize correctly and is insulin resistant. From stored adipose tissue, free fatty acids are released into the blood stream by several cyclic enzyme actions. The overabundance of circulating free fatty acids is thought to be a major contributor to the development of insulin resistance. The high levels of free fatty acids in the blood stream alter hepatic metabolism, aggravate insulin resistance in muscle, increase production of the inflammatory cytokines and plasminogen activator inhibitor-1, continue pancreatic release of insulin, stimulate renal sodium retention and inhibit peripheral vasodilatation. Obesity-related insulin resistance is a leading mechanism to various conditions such as, diabetes, dyslipidemia, atherosclerosis, and hypertension but epidemiological observations suggest that genetics or other pathophysiologic mechanisms may also need to be present.^{21,22, 32}

There are three major components of dyslipidemia that occur in metabolic syndrome: (1) increased amounts of triglycerides in the blood, (2) compositional change of LDL cholesterol to small-dense LDL, and (3) increased clearance of HDL cholesterol from the blood. These abnormalities are caused by the insulin resistant state itself, not the concentrated levels of insulin in the blood stream. A trait of insulin resistance is the concentrated levels of free fatty acids in the blood stream. The high levels of free fatty acids accumulate in the liver and

increase production of triglycerides, which is incorporated into very low-density lipoproteins (VLDL). Insulin resistance also impairs the lipoprotein lipase (LPL) activity. Higher levels of triglyceride rich VLDL and reduced action of lipoprotein lipase (LPL) elevated plasma triglycerides. As a clinical diagnosis of metabolic syndrome, hypertriglyceridemia is an excellent reflection of insulin resistance. The excess triglycerides induce an exchange for cholesterol esters with other lipoproteins such as LDL and HDL. This exchange explains the increased clearance of HDL and quantifies the compositional change of LDL to be modified into small-dense LDL.^{21, 31, 32}

Hypertension is one of the most practical clinical diagnoses for pin-pointing the start of complications. Normal blood pressure is maintained by the cycle of the kidney retaining sodium, which signals the heart to increase cardiac output that in turn is met by the accommodation of the arteries vasodilating. It is important to note that insulin is a natural vasodilator, but in the presence of insulin resistance this property is impaired. High levels of insulin in the blood, due to insulin resistance, increase the activity of the sympathetic nervous system, which can directly affect blood pressure. In addition, the abnormal insulin levels signal the kidney to continue to retain sodium, which has a modest degree of hypertension influence.^{21, 22, 31, 32}

“The primary target organ of the metabolic syndrome is the arterial wall.”³¹ Metabolic syndrome is characterized as a shift in homeostatic balance to a prothrombic and proinflammatory state. The prothrombic state is alteration by insulin resistance that causes a

coagulation of fibrinolytic proteins and an elevation of plasminogen activator inhibitor-1.¹⁸ Additional data insinuates that high circulating levels of these coagulating factors have a direct effect on ASCVD and major cardiovascular events.^{22, 31} Metabolic syndrome patients commonly present with a proinflammatory state, recognized as an elevation of C-reactive proteins (CRP) in the blood, caused by an overproduction from expanded adipose tissue. A significant relationship has been observed between the CRP levels, obesity, and insulin resistance. Data from the U.S. population correlates the elevation of CRP levels with an increasing number of metabolic syndrome components. Researchers speculate there is a tendency for plaque instability in atherosclerotic lesions accompanying the proinflammatory state. This inflammatory state is promoted by adipocytes and macrophages, associated with obesity, when they release caustic agents. Taking a CRP measurement is the simplest way to identify this state and an elevation would support a need for lifestyle changes.^{18, 21, 22, 31}

Prevalence

The prevalence of metabolic syndrome has varied depending on the definition used and the population studied. Data from the Third National Health and Nutrition Examination Survey done between the years of 1988 to 1994, estimates 47 million U.S. residents had metabolic syndrome. Because the population continues to age and more than half of adults are overweight or obese, it estimated that one-quarter (25%) have metabolic syndrome. There are very consistent findings that relate prevalence of metabolic syndrome to age. In Table 2-3, the prevalence for age ranges from 6.7 percent for 20-29 years of age to the highest at 43.9 percent for the 60-69 years old. The age-adjusted prevalence is within one percent between

U.S. men and women, with a total for U.S. adults averaging 23.7 percent. The age-adjusted percentages also vary depending on ethnicity and gender as well. Hispanic Americans have the highest age-adjusted prevalence for metabolic syndrome at 31.9 percent, with people reported as other ethnicities at the lowest percentage of 20.3 percent. Until recently, type 2 diabetes and metabolic syndrome have been deemed adult diseases. However, with the increasing rates of obesity seen in children and adolescents, it is evident that type 2 diabetes and metabolic syndrome can be present at an early age. A more recent survey in the U.S. found that one out seven children between the ages of nine and sixteen are overweight and as much as 4.2 percent of adolescents have metabolic syndrome.^{19, 21, 25, 26, 34}

Table 2-3. Age Prevalence of Metabolic Syndrome for U.S. Residents	
Population	Percentage
12-19 years of age	4.2
20-29 years of age	6.7
60-69 years of age	43.9
70 years and older	42.0
U.S. Men	24.0
U.S. Women	23.4
U.S. Adults total average	23.7
Hispanic Americans	31.9

³⁴ *Working with Your Doctor to Overcome Overweight and Obesity* (2004 [cited May 26 2006]); available from <http://familydoctor.org/788.xml>.

Whites	23.8
African Americans	21.6
Other Ethnicity	20.3

19, 21, 26

Table 2-3. Prevalence of metabolic syndrome described by age, gender and ethnicity in the United States

A comparison for the prevalence of people with metabolic syndrome based on their ethnicity and gender is shown in Table 2-4. There is noticeable range between the highest prevalence for Hispanic women at 27.2 percent compared to the lowest for African American men at 13.9 percent.

Table 2-4. Prevalence of Metabolic Syndrome by Ethnicity and Gender in U.S. Adults	
Ethnicity and Gender	Percentage
Whites	
Men	24.3
Women	22.9
African Americans	
Men	13.9
Women	20.9
Hispanic	
Men	20.8
Women	27.2

19, 26

Table 2-4. Prevalence of metabolic syndrome by ethnicity and gender.*Treatments*

The data demonstrates an interrelationship between the risk factors for metabolic syndrome and how one can affect the other or how they lead to the same result. This is a consideration when treating a patient with metabolic syndrome. One of the first lines of defense against metabolic syndrome and coronary heart disease is to achieve weight loss (BMI less than 25 kg/m²). This can be accomplished by increasing physical activity (thirty minutes of moderate intensity activity everyday), and healthy eating habits (reduce intake of cholesterol, saturated,

and trans fats).^{25, 33} Weight reduction is key in reducing most of the metabolic risk factors. An increase in physical activity improves insulin resistance and its relationship to obesity. According to the National Diabetes Information Clearinghouse (NDIC), lifestyle changes reduced the risk of diabetes by fifty-eight percent, and those classified with pre-diabetes returned to normal blood glucose levels. Lifestyle modifications, including diet and exercise, improve all lipoprotein abnormalities but when this is not entirely successful, drug treatments should be considered.^{31, 32} The majority of metabolic syndrome patients have an elevated blood pressure. Dr. Darwin Deen states “According to the Dietary Approaches to Stop Hypertension (DASH) study, patients who consumed a diet low in saturated fat and high in carbohydrates experienced a significant reduction in blood pressure, even without weight reduction.” A reduction in sodium can further reduce blood pressure or prevent an increase that is normally accompanied with age. An increase in the consumption of fruits and vegetables, and low fat dairy products designated by DASH, are also considered helpful in lowering hypertension.^{22, 23} Currently there are many hypertension drugs registered that reduce the risk of stroke approximately thirty percent and about twenty percent for coronary heart disease. A prothrombic state, which has elevated coagulation factors, is not routinely detected in clinical practice. The only long-term, primary prevention to counteract an arterial thrombosis is to take low-dose aspirin or other antiplatelet agents.²² Lifestyle therapies, particularly weight reduction, will reduce CRP levels and thus mitigate the proinflammatory state. Several statins, lipid-lowering drugs, are under investigation to confirm their reduction of the proinflammatory state by reducing CRP levels.^{21, 22, 31} There continues to be a debate on the best approach for treating metabolic syndrome: treat the syndrome as a whole or by

the targeting individual components. In general, therapy should be tailored to the patient's specific risk factors, conditions and medications, with appropriate decisions being accomplished by a close working relationship with a physician.

To summarize, the research done for this thesis project was discussed including the overview and the collection process for the written and visual content. Specific examples of current available resources were included such as other computer-based patient case studies, nutrition websites accessed, and the University of Texas Southwestern Medical Center's curriculum presentations. Metabolic syndrome was selected as the topic to include in this thesis project because the content lends itself to the application of a variety of visual media to explain its components. Therefore, specifics in regard to metabolic syndrome were explained in detail, as referenced to the completed website and the methodology section. A brief history of metabolic syndrome was included along with how it has been and is currently defined. An explanation of how the syndrome is diagnosed and the six risk factor components are also included. A variety of statistics are used to establish the prevalence of metabolic syndrome in the U.S. Finally, the treatment options for most of the risk factors are mentioned.

CHAPTER THREE

Methodology

Production for the fourth-year medical student nutrition web-based patient case study took approximately five months to complete. The planning and overview process are discussed in detail, including the educational and visual objectives. The approach of the project design was to unify the different types of materials, written and visual, into a functional educational tool. The step-by-step process for the website design is explained, starting with general remarks, the layout of the site map, and a discussion on how the visual elements were created. Specifics about navigation issues and the web authoring program used are analyzed for their role in the development of the website module. The detailed procedures on how the visual objectives were executed are included in the product components section. Reasoning for their inclusion, the computer programs used, how the functional features were developed, and their location in the website are explained individually. To summarize, a review of the production process from planning to the final product is included in this section.

Planning and Overview of the Process

Several meetings were held with Dr. Jo Ann Carson to plan the content, design elements, and features of the website model that would support the educational objectives. Dr. Carson produced the objectives for the students to learn from the patient case study, based on University standards and the expectations of those doing current research on the campus. The educational objectives are: 1. Discuss the metabolic consequences of insulin resistance.

2. Identify patients with metabolic syndrome using criteria defined by the American Heart Association, and National Heart Lung and Blood Institute, including correctly interpreting waist circumference.
3. Identify lifestyle intervention as a key to treatment of metabolic syndrome.
4. State key messages to assist patients in weight control.
5. Discuss the benefit of moderate physical activity at levels of 30, 60 and 90 minutes on most days.
6. Describe lifestyle strategies to: lower LDL cholesterol, lower Triglycerides, raise HDL cholesterol, and lower blood pressure.
7. Use national practice guidelines from groups such as JNC 7, ATP III and the American Diabetes Association to treat components of metabolic syndrome.
8. Use Framingham risk system to assess overall risk for heart disease.

Several meetings with the thesis advisory committee further guided the visual objectives, the instructional design, and layout of the website. Initially there was the goal of adding nine visual objectives to the fourth-year medical student version of the nutrition patient case study. The original nine visual objectives were: take food photographs, create two animations, illustrate cross-sections, produce an interactive diagram, layout an interactive medication graph, design two statistical graphs, illustrate the six step atherosclerotic process, assemble print PDF documents, and organize a production flow document. As the development of the website continued, placement for the interactive diagram was becoming difficult, as it was needed in two sections of the website. In order to handle the information in both sections, the interactive diagram became a series of three diagrams that interrelate. The information originally for the interactive medication graph was now combined into the third interactive diagram. Student surveys also helped guide visual objectives that would be

helpful to include in the site. Conclusions drawn from the formative informal surveys suggested that illustrations of the atherosclerotic process were not necessary, and instead of illustrating comparative cross-sections, the inclusion of MRIs would be more practical. As each of the visual objectives were initiated, designed, and developed the committee members provided feedback for a concise concept. The final seven visual objectives were: food photographs, two animations, MRIs, a series of three interactive diagrams, two statistical graphs, two print PDF documents, and a production flow document. For more detailed information on each of the visual objectives see the Product Components section in this chapter.

Project Design

The main goal of the project design was to merge the website, design elements, and functional features into a unified concept. The content for each section of the website, (Chief Complaint, History, Labs etc.) was analyzed and visual elements were chosen to support the written content. Each section was reexamined upon completion, to ensure that collectively the educational objectives established for the module were met. Visual elements or features are used to support the written content, but also to remain consistent throughout the site. This was accomplished through the color palette, illustrative style, and similar layout or design elements throughout the website. During the development of the site, the module was reviewed several times by a sample of fourth-year medical students. Their feedback provided perspective for what would be considered beneficial written and visual content to

include in the end product.

Website Design

General

The design of the website had to take into account a couple limitations. First, the venue for the site was the UT Southwestern Medial Center's web curriculum. Second, access to the website was online. Key style elements were selected intentionally to merge this new patient case study template visually to the established online curriculum. Such elements include: having a black background, a light blue secondary color, and similar placement of the navigation buttons and arrows. In order to have the interactive capabilities, this patient case study template was designed for online access. Viewing area and display resolution are considerations that need to be kept in mind when designing materials to be viewed on a computer screen. The viewing area for the website was ultimately chosen to be 800 pixels wide and limited to a height of no more than 900 pixels. If the screen display is set to the standard resolution of 1280 x 1024, the page layouts should not require much, if any, scrolling by the viewer to see the entire page content.

The preliminary reviews of the template suggested that the design and general organization were functional as an educational tool. The valuable visual elements and layout from the website template were going to be incorporated into the new fourth-year medical student patient case study module, such as, the iconic apple within the tri-colored ring placed on the

Home page to give the site an identifying mark. The interface of the site organized to present the patient case information in a typical clinical/hospital approach (chief complaint, history, etc.) is clearly identified on the Home page. The arrangement of informative materials separate from the questions, on the remainder of the pages, permits the viewer the flexibility to access support materials within the site or to specific outside references. Interactive questions and information help guide the student to a diagnosis and treatment plan for the patient, improve the educational impact by adding intuitive navigation and a user-friendly question-answer-feedback mechanism.

Site Map

One of the first steps in designing a website is to establish the organization of the information by developing a site map. A site map shows different page levels, starting with the Home page and its connections to direct links or secondary pages, followed by links to third level windows. Figure 3-1 shows the site map for the metabolic syndrome patient case study for the fourth-year medical students.

Figure 3-1. Metabolic Syndrome Site Map

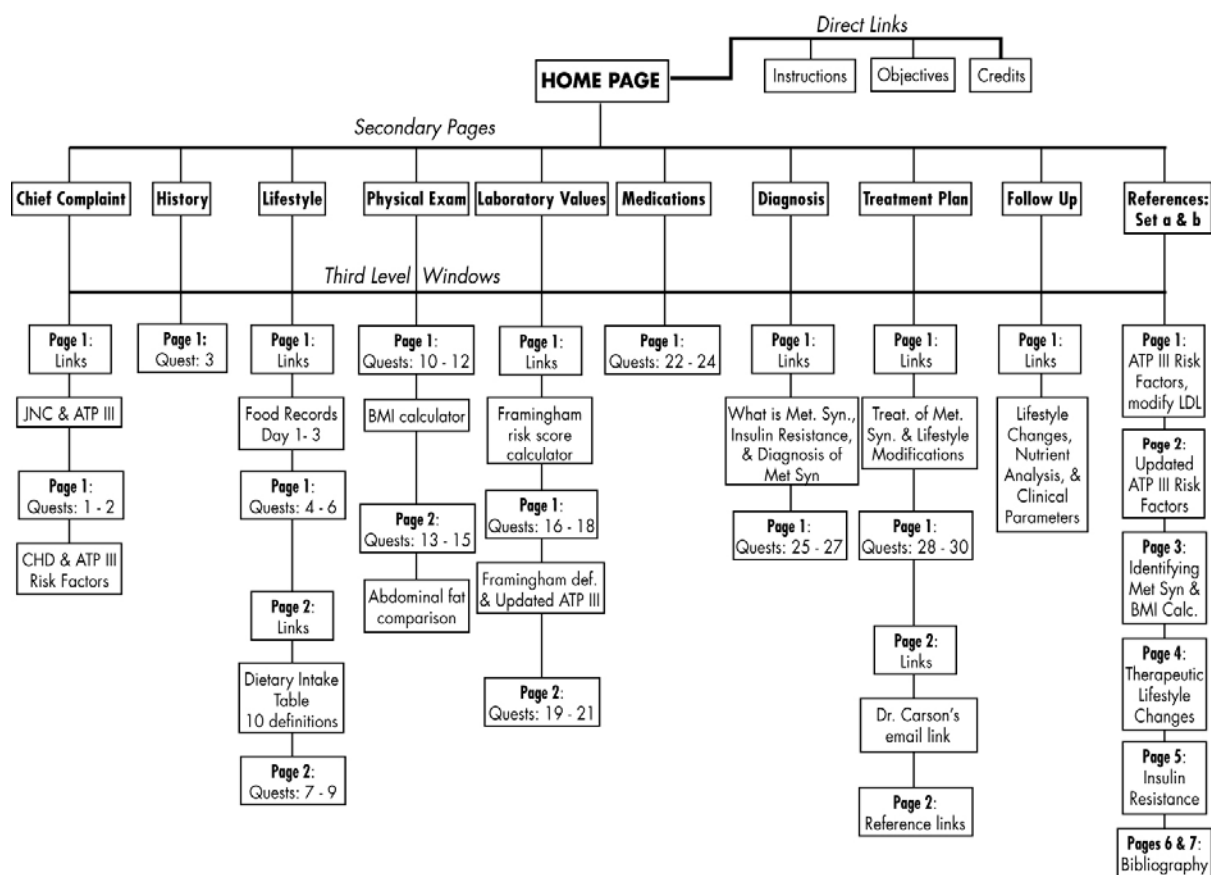


Figure 3-1. The website site map showing the organization of pages and direct links.

Visual Elements

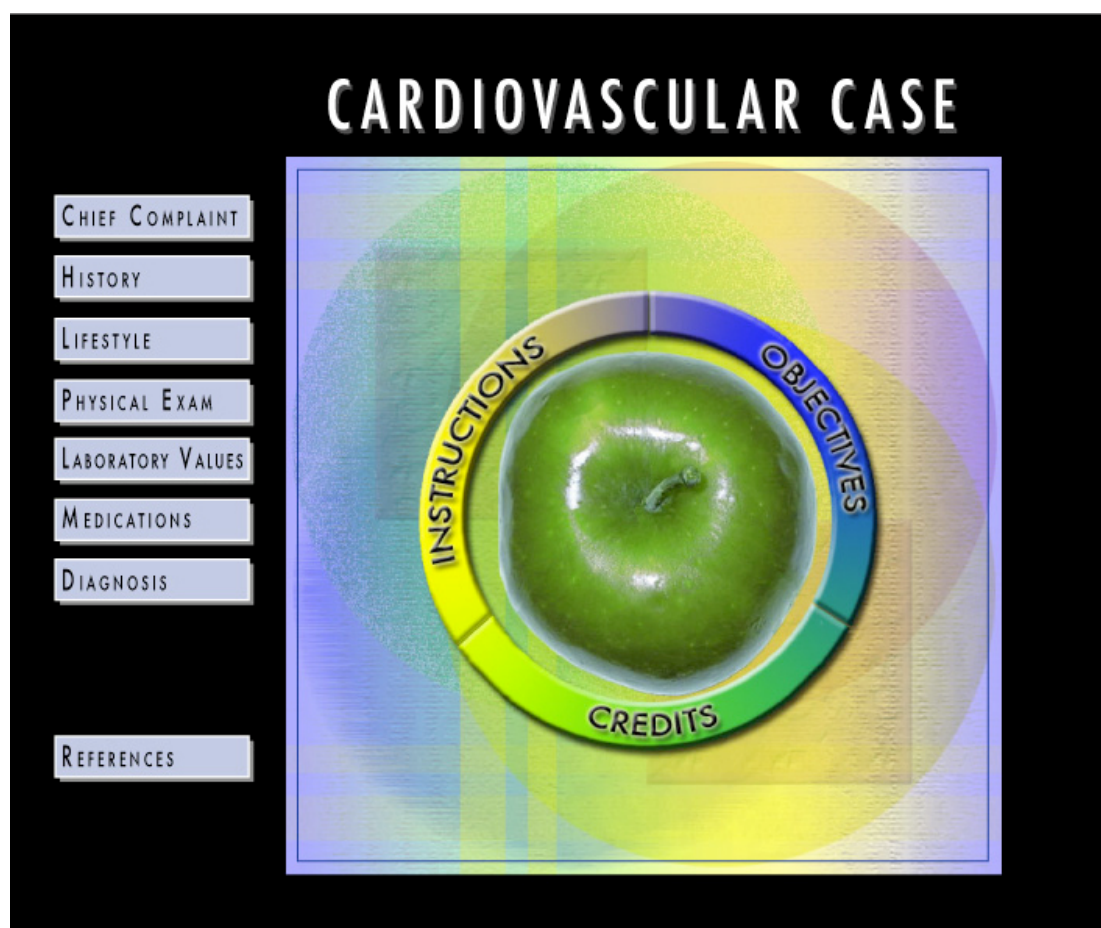
Once there is an understanding of the functions, navigation buttons, and links, needed for the website, the second step is brainstorming about the visual aspects. Several options were sketched out to decide how to organize the content materials to accommodate the navigation buttons and arrows. Additional sketches were done to provide choices for the Home page image, which would reflect the fundamentals of nutrition. (See Appendix A) A meeting with

Dr. Carson was held to discuss the sketches and narrow the direction of the web page layouts and the look of the Home page. Sample layouts were created in Adobe® Illustrator® for the Home and secondary pages to decide the specifics for the design, navigation, and the separation of informative and question content. (See Appendix B) The preliminary layouts were shown to the committee members for critique and advice.

Navigation Issues

New questions originated from the committee about the title of the case, navigation between multiple pages in a section, and how to prevent students from going directly to the end of the case and writing their assessment and plan without going through the site. The title, “Cardiovascular Case”, was chosen to accompany the class that the patient case study would be presented in, Cardiovascular Nutrition, without giving away the diagnosis of metabolic syndrome. As the informative and question content was evolving, it became clear that multiple pages were going to be needed for the compressive materials for several of the site’s sections. However, the UT Southwestern Medical Center’s curriculum standards set the size of the viewing area to limit the viewer’s need to scroll. This determined that the button and arrow navigations had to serve separate functions, to provide access to all of the sections and individual pages. The navigation buttons on the left hand side of the pages would direct the viewer to the first page of each section. In contrast, the navigation arrows would progress through the site, page by page. These two navigating systems provide flexibility to the viewer, going between sections of website and progressing through the site sequentially. The addition of page numbers indicating how many pages are in a section (e.g., Page 1 of 2, Page

2 of 2). (See Figure 3-3) To address the last committee question, concerning students completing the assessment assignment without successfully working through the site, further research and planning was required. In order for the student's work to be tracked individually and the assignment only being obtainable when all of the questions have been answered, ColdFusion® would be needed to program the site. This would need to be done through the UT Southwestern Medical Center's web curriculum support office when the project was complete, and Dr. Carson did not feel it was necessary to track the individual answers to each of the questions. She was more interested in receiving the assessment plan assignment from each student plus encouraging individual student work and learning. Rather than involve the ColdFusion® programming, the committee members made the decision to only allow portions of the website to be accessed until the student finishes the diagnosis section. This was achieved by not having a button link to the Treatment Plan and Follow Up sections for the first eight divisions of the website, including the Home page, seen in Figure 3-2.

Figure 3-2. Final Home Page Layout**Figure 3-2.** The Home page layout of the website.

Therefore, the button links for the Treatment Plan and Follow up sections are not visible until the viewer uses the arrow navigation on the Diagnosis page to advance to the Treatment Plan pages. The number of navigation buttons on the left hand side of the page layouts went from eight buttons, on the Diagnosis page to ten buttons, on the Treatment Plan page.

Figure 3-3. Final Diagnosis and Treatment Plan Page Layouts

DIAGNOSIS

Thus far, this white box has contained patient data. Now as we transition to your making decisions based on the patient data, this white box will provide you with information and resources on how to approach the data.

Before answering questions in the blue section, click on each of these **three** resources below to gain an understanding of the underlying issues with this patient.

Resources:

- I. WHAT IS METABOLIC SYNDROME?
- II. METABOLIC CONSEQUENCES OF INSULIN RESISTANCE
- III. CRITERIA FOR DIAGNOSIS OF METABOLIC SYNDROME

25. Which of the following diagnoses will you include in your impressions?

- A. Hypertension
- B. Hypercholesterolemia
- C. Hypertriglyceridemia
- D. Mixed Hyperlipidemia
- E. Metabolic syndrome

26. His diagnoses are inter-related by a common theme of?

- A. Lipid disorders
- B. Insulin resistance
- C. Obesity

27. Which criteria for the NHLBI /AHA definition of metabolic syndrome does he meet?

- A. Waist circumference
- B. Serum triglycerides
- C. HDL cholesterol
- D. Blood pressure
- E. Fasting glucose
- F. A, B and E
- G. All of the above

Page 1 of 1

Print Ref. PDF

TREATMENT PLAN

Lifestyle modification is the cornerstone of treatment for metabolic syndrome. Energy imbalance leads to obesity and insulin resistance. Thus, an important part of lifestyle modification is to reduce energy intake with dietary measures and increase energy expenditure with physical activity. For each of the five criteria for metabolic syndrome, a decision may be made to include pharmaceutical agents.

Click on the blue buttons to learn about treatment options. Then respond to the questions in the blue section.

- I. TREATMENT OF METABOLIC SYNDROME COMPONENTS
- II. LIFESTYLE MODIFICATION

28. Which lifestyle strategy will lower serum triglycerides?

- A. Lowering total dietary fat intake
- B. Inclusion of omega-3 fat
- C. Daily inclusion of one serving of alcohol

29. Which lifestyle strategy will increase HDL cholesterol?

- A. Weight loss, if overweight
- B. Limiting sodium intake
- C. Increase in physical activity

30. Which of the following is important to moderate an elevated serum glucose?

- A. Increased physical activity
- B. Selection of foods high in fiber
- C. Avoiding excessive energy intake
- D. All of the above

Page 1 of 2

Print Ref. PDF

Figure 3-3. Secondary page examples, the Treatment and Diagnosis page layouts.

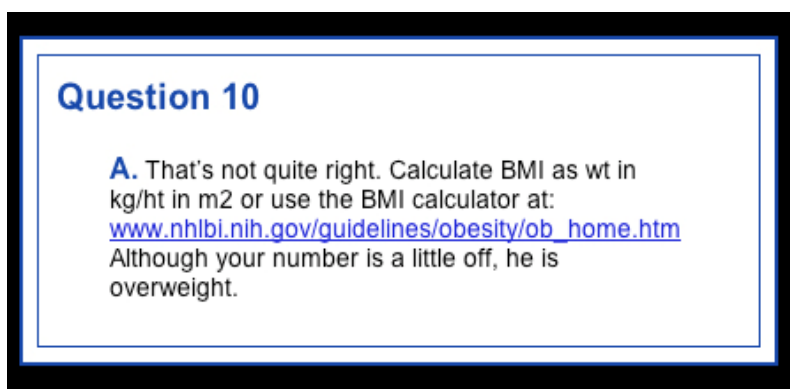
Web Authoring Program

The patient case study template was designed and produced as guide for additional case studies. The overall layout remains the same, while the content, visual elements, and interactivity can all be designed specifically for any new case study. One of the main purposes of producing the patient case study template was to construct it in a program format that meets the requirements of the campus on-line curriculum and can easily be updated in the future to ensure that information remains current. Macromedia® Dreamweaver® was selected as the web authoring program to integrate the written content, design elements, and interactivity. The overall layout (background and page divisions) was achieved in Dreamweaver® with visual elements being imported from various programs. For instance, the interactive buttons were created, prepared, and saved for the web in Adobe® Illustrator®. Each of the buttons was placed into the website and the change in appearance during the rollover action and link interactions were done in Dreamweaver®. The Home page image was designed in Adobe® Photoshop®, opened in Dreamweaver® for the rollover appearances and interactions to be possible. For specific details on how these programs and visual elements are interlaced, see the Production Flow Document in Appendix G. Because Dreamweaver® is producing the web-ready product, any visual components can easily be updated in the future by returning to the native program, make the required change, save the change for the web, and re-import into Dreamweaver®.

A second benefit to using Dreamweaver® as the web authoring program is it allows the designer to use Cascading Style Sheets (CSS styles) for display consistency. The use of a

CSS styles allows the designer to have more control over the final look of the website layout on a wide variety of computers. A set of CSS styles was constructed for the secondary pages that determine the look, size and color of the fonts within the page layouts of this site. For instance, there are CSS styles created for the white and blue box areas on the secondary page layouts. The heading, subheadings, main text, questions, and answers have a designated appearance, which is saved in a file that stays with the website, to ensure that each secondary page has the same design throughout the entire website. Similarly, separate CSS styles were created for the pop-up windows that appear when the site is viewed in a browser. For display consistency, the header or question number, sub-headings or letter choice, and the main text have also been indicated as a particular style. Examples of pop-up windows in the website are in Figure 3-4.

Figure 3-4. Pop-Up Window Examples



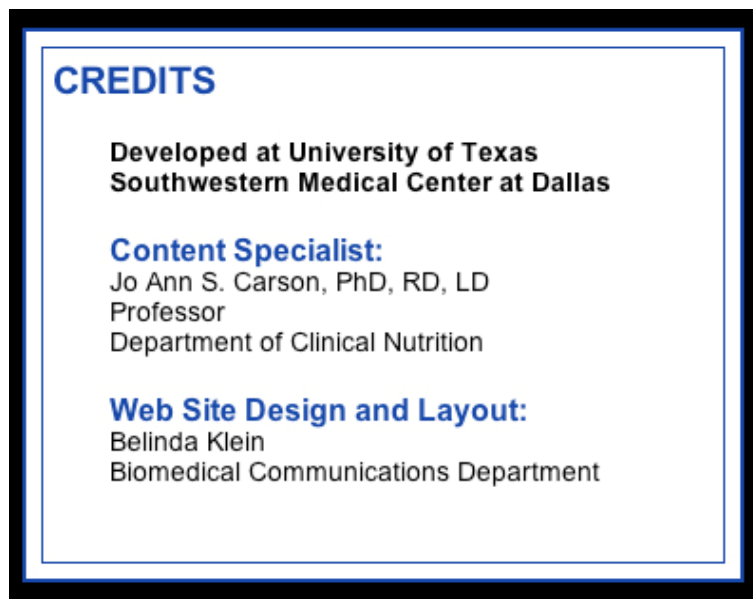


Figure 3-4. Two examples of pop-up windows created for the website.

Product Components

The eight product components are the different elements used to produce the written and visual content of the metabolic syndrome patient case study for the fourth-year medical students, using the template as a foundation. Each of the components was specifically chosen to accent the written content and provide materials for different learning styles. All the artwork for the website was created in four programs: Adobe® Illustrator®, Adobe® Photoshop®, Macromedia® Flash, and Macromedia® Dreamweaver®.

1. The metabolic syndrome content, (informative, questions, references, and bibliography) was placed into the Dreamweaver® website template. Dr. Carson communicated directly

with Drs. Scott Grundy and Nicola Abate, who are with the UT Southwestern Medical Center campus, on their latest research, for their input on the latest clinical testing definitions and curriculum requirements. The written content, provided by Dr. Carson, was easily copied and pasted directly from Microsoft® Word® into Dreamweaver®. Any of the tables were rebuilt with the “table” and “cell” options within Dreamweaver®. Future changes are simply done by replacing the verbiage and resaving the Dreamweaver document.

2. Feedback from the medical students included requests for photographic comparisons between typical and recommended portion sizes. Any supplementary photographs showing food groups that best provide preventive measures and fats to avoid would also be beneficial to suggest to patients. In general, nutrition websites provide examples of portion sizes shown with standard units of measure (i.e. cup, tablespoon, and teaspoon). A site referenced, “What’s in a Serving Size?” used other visual references (i.e. sports equipment, game pieces, CDs, etc) to help people remember appropriate portion sizes.³⁵ The food examples for the metabolic syndrome case were chosen specifically because such choices tend to be problems areas for many patients (cereal, pasta, mashed potatoes, peanut butter, steak, orange juice, and ice cream). Each photo shows both the inappropriate and the recommended portion size of the food example. Each comparative photo also includes an iconic visual reference (tennis ball, baseball, golf ball, ping pong

³⁵ *What's in a Serving Size?* (North Carolina State Nutrition and Activity Committee, [cited August 24 2006]); available from http://www.eatsmartmovemorenc.com/resources/documents/modules/portion sizes/ps_whats in serving.pdf.

ball, and deck of cards) that serves as an easy reminder for the correct serving size of that particular food. Figure 3-5 shows the layout done in Dreamweaver®, displaying two columns of different comparative photographs and a link to a reference site.


Figure 3-5. Control Portions to Promote Energy Balance Window

Lifestyle Modification

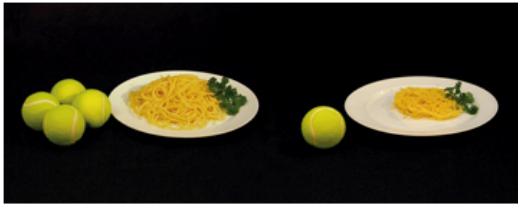
Control portions to promote energy balance

Helping patients to select reasonable portions is important (and sometimes difficult when we get used to restaurant-sized portions). Here are some examples of appropriate portions sizes:


Traditional Portion vs Recommended Portion




Cereal - 2 baseballs = 2 oz vs 1 baseball = 1 oz



Pasta - 4 tennis balls = 8 oz vs 1 tennis ball = 2 oz




Mashed Potatoes - 2 baseballs = 2 cups vs 1 baseball = 1 cup




Ice Cream - 4 golf balls = 1 cup vs 2 golf balls = 1/2 cup


Traditional Portion vs Recommended Portion



Peanut Butter - 2 ping pong balls = 4 Tbsp or 2 oz vs 1 ping pong ball = 2 Tbsp or 1 oz



Steak - 2 deck of cards = 6 oz vs 1 deck of cards = 3 oz



Orange Juice - 1 1/2 cups = 12 oz vs 1 cup = 8 oz

For more portion examples

SERVING SIZE INFORMATION

Source: <http://www.eatsmartmovemorenc.com>

Figure 3-5. The Lifestyle Modification window layout showing portion sizes.

A series of three photos will emphasize the value of unsaturated fats in the diet as a preventive dietary measure. Different foods were selected based on their benefits for each category of fat: (1) monounsaturated fats (almonds, peanuts, pecans, macadamia nuts, avocado, olive and canola oils), (2) polyunsaturated omega-3 (salmon, tuna, sardines, flaxseeds ground or flaxseed oil), and (3) polyunsaturated omega-6 (walnuts, pine nuts, sunflower, corn, safflower oils). The photos of each of the representative groups of food were taken separately, with the food arranged to anticipate that each one of the photos would occupy one-third of a circle. The three photos were combined into one image in Photoshop®. A tri-colored ring was constructed to encompass the photos and provide an area to label each type of unsaturated fat. The three colors in the ring, green, blue, and yellow, reflect a positive visual reinforcement. Division bars were added to clearly separate each portion of the circle.

An additional two photos show the two types of fat, trans and saturated, that should be lowered or eliminated from the patient's diet. Example foods were specified as the following: (1) saturated fat (marbled or surrounding fat on a steak or pork chop, poultry skin, dairy fat in whole milk and cheese) and (2) trans fat (commercially fried French fries, bakery products made with partially hydrogenated oils such as, cookies and fried pies). Each group of food was artistically distributed to fill half of a circle, so when the two photos were combined in Photoshop®, the image would fill a complete circle. The labeled, dual-color ring (red and yellow) further projects that these particular fats are

considered to be harmful. A white bar separates the two photos showing the different types of fat.

Both of the fat series photos were included in the “Select fat carefully” window layout, done in Dreamweaver®, seen in Figure 3-6, so an easy comparison can be made between beneficial fats and those to avoid. The layout has the photos encircled by each fat category, descriptive information, and a list of the foods shown.

Figure 3-6. Select Fats Carefully Window

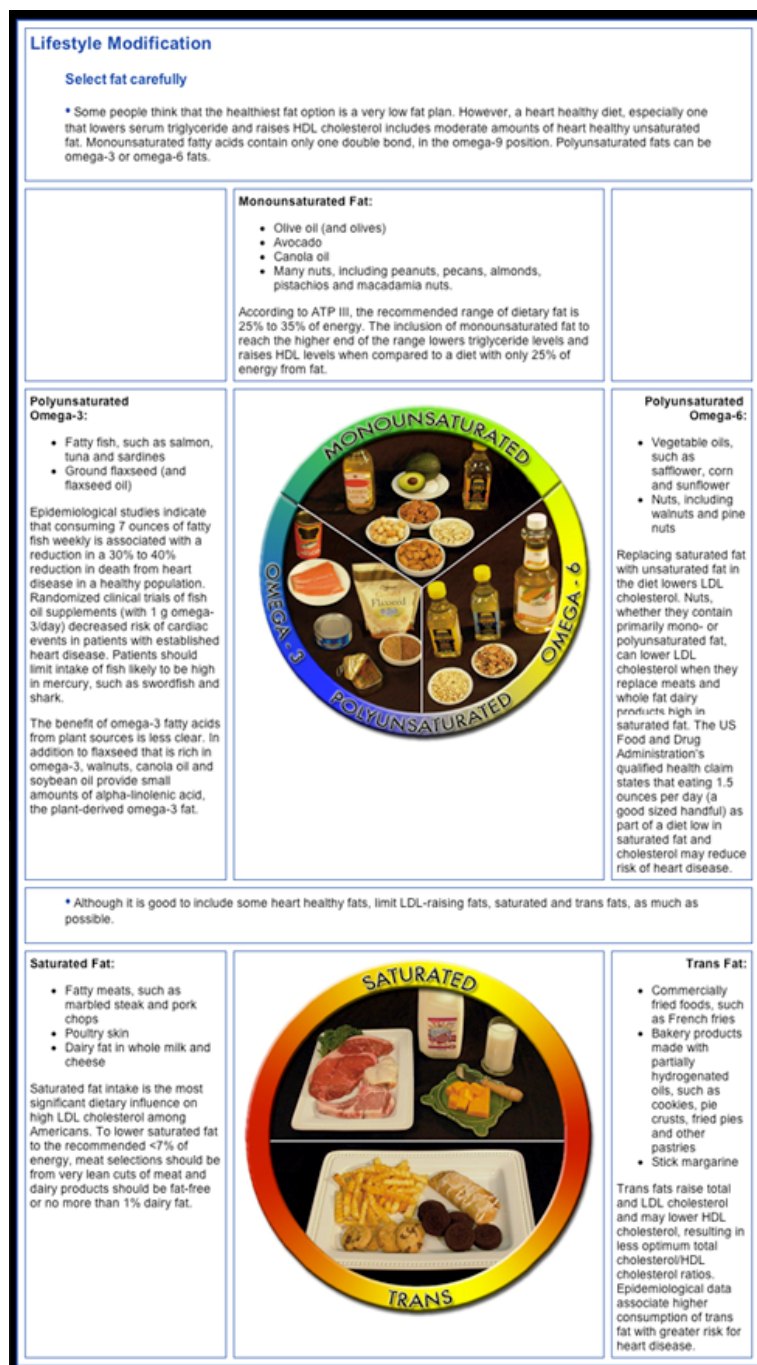


Figure 3-6. Lifestyle Modification, Select fat carefully layout shows beneficial and harmful fats.

A variety of websites were referenced as a guide on how to prepare both the still life and the set up for photographing food.^{36, 37, 38, 39} These resources helped to explain how to best set up the lights, camera angle, focus, and background. Additional reading provided tips for preparing the food, preserving the freshness, and displaying. All of the food photos were taken digitally with florescent atmosphere lights and tungsten pedestal lights against a black backdrop. Each of the images were color corrected, sized, combined for portion control comparison, and food groups in Photoshop®. The files were saved in a JPG format for easy viewing in the website. Collectively, these digital photos were added to the Lifestyle Modification segment of the **Treatment Plan** section of the website.

3. Two animations were assembled in Flash® to show a comparison between normal insulin uptake and insulin resistance. The first animation was designed to describe the normal insulin mediated uptake of glucose. The second animation was constructed to clearly

³⁶ M. Ray, *Food Photography - Lessons in Food Photography Technique* (Food Photography Blog, 2005 [cited August 22 2006]); available from http://www.foodportfolio.com/blog/food_photography/food_photography.html.

³⁷ *Food for Thought: Making Food Look Good* ([cited August 22 2006]); available from http://www.media-awareness.ca/english/resources/educational/handouts/advertising_marketing/food_ads.cfm?RenderForPrint=1.

³⁸ P. Bargh, *Guide to Colour Temperature Technique* ([cited August 22 2006]); available from <http://www.ephotozine.com/techniques/viewtechnique.cfm?recid=259>.

³⁹ S. Paddock, *Tasteful Food Photography* (O'Reilly® Digital Media, 9/15/2004 2004 [cited August 22 2006]); available from http://digitalmedia.oreilly.com/2004/09/15/food_photos.html.

show the process of insulin resistance, how it occurs in the body, and its clinical parameters in relationship to metabolic syndrome.

To understand the insulin resistance process, cutting edge researchers on the subject, Drs. Scott Grundy and Nicola Abate, were consulted. Their illustrations were modified for our purposes. As a supplement to the on-campus research, Dr. Jo Ann Carson attended a conference where she was influenced by a newer visual arrangement to shift the initiating focus of the insulin resistance process. This process was presented by Dr. Sam Klein's at the Congress of Women's Health. Several primary sketches were completed to clarify how the initiating focus changed the visual flow of the process and to choose how to organize the layout. The secondary step was to break down the steps of the insulin resistance process so they could be shown frame by frame, referred to as a storyboard. The committee members adjusted the content, layout and flow of the insulin resistance process as they reviewed several renditions of the storyboards. Similar steps were taken in preparation for the first animation, on normal insulin mediated uptake of glucose. The final storyboards were laid out in Illustrator® and can be viewed in Appendix C.

There is a resemblance in the methods in which both of the animations were completed; therefore, they will be discussed concurrently. Once the final storyboards were approved by the committee members, the animation process began. The first step was to draw the five different organs in Photoshop® (liver, pancreas, muscle, kidney, and blood vessel). For the color palette to appear harmonious, the same blue background color in

the animations was used to shade the organs. The Flash® library is a panel within the program that collects the images either created as a symbol with Flash or images imported into the program. The library panels for these animation files have been arranged with two folders, *buttons* and *graphics*. The *buttons* folder contains the four navigation buttons used throughout the animation. The *graphics* folder contains all of the *symbols* created with either text or drawings. The finished organs were imported as bitmap files to the Flash® library and converted to a symbol, which are included in the *graphics* folder. Figure 3-7 is a snapshot of the Flash® program with an animation file open, which includes many of the function windows that are discussed in this section. The library panel is open and shows two yellow folders in the lower, right hand corner.

Figure 3-7. Viewing the Animation Program, Flash

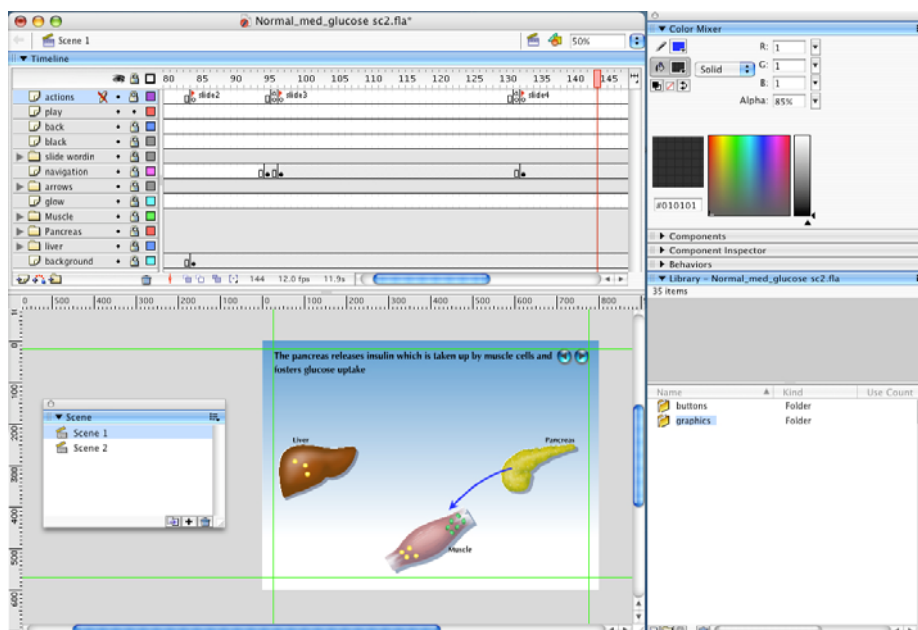


Figure 3-7. Image of the Flash program viewing the normal insulin mediated uptake of glucose animation.

As the storyboards were being fleshed out, the question arose on how to determine the length of time the text would appear with the animation. It is difficult to analyze how fast an individual reads and to time how quickly the words appear compared to the animation. The information would be difficult to review without completely re-watching the animation. Anticipating that the viewer would prefer the option to view the animation either as a step-by-step process controlling the progression of the animation, or watch it straight through, the Flash® files were set up to accommodate this. Each of the Flash® files was constructed with two scenes. Scene one has the interactive version of the animation, where the viewer needs to press the navigation arrows (upper right hand corner of the display screen) to view the next stage of the animation. Scene two shows very similar content to Scene one, but the animation plays straight through, requiring no viewer interaction. At the beginning and end of both scenes, the viewer can select which version of the animation (interactive step- by-step, or play straight through) they would like to view. The window showing the two scenes is placed in the lower left hand corner of Figure 3-7.

Animations are quite extensive in their complexity and number of components. The Flash® program was designed to be able to organize the file in a system called layers. The layer window in the Flash® program is open at the top of Figure 3-7. Each file has many layers, which have been labeled to designate what is included on that particular layer. There are folders, which contain several layers, and have been organized to include all the layers used for an entire object. For instance, there is a folder called

liver, which has all of the components' layers (text, the yellow dots, and the organ) that would be involved in the portion of the animation concerning the liver. The very top layer is called the *actions* layer. Within the *actions* layer, each step of the animation is noted with a label. Any action scripting that is written for the animation is also included in the *actions* layer at selected points along the time line.

The committee members reviewed the animations as they progressed. There are some differences between the final storyboards and the completed animation. As the animations evolved, adjustments needed to be made to the layout, wording, and visual elements so the delivery of the product would be concise, clear and functional. Once the animations were completed, Flash® produced a SWF file. This file format is the published version of the native Flash® file that can be viewed in a web browser and must be copied to the website folder to be properly accessed. These animations were added to the **Diagnosis** section of the website.

4. Abdominal obesity is a key factor involved with insulin resistance and metabolic syndrome. Originally, cross-sections of a healthy and abdominally obese person were going to be hand illustrated. However, the decision was made to show actual patient MRIs as a cross-section reference, since it is useful for the students to practice reading these images. The MRI is an imaging technique that is capable of measuring central fat precisely. The students will be able to use this practical visual to compare and contrast

the differences between a healthy person with those of two individuals that show signs of metabolic syndrome and/or insulin resistance.

The three MRIs provided by Dr. Nicola Abate were brought into Adobe® Photoshop®, so color could be added to highlight the different abdominal fats. The Photoshop® files have separate layers for the MRI and the color(s) to highlight specific areas of the MRI. Each Photoshop® layer of the MRI was saved as a separate JPG file, which is used for image swaps in the website. Dreamweaver® was used to design the complete window layout, including the informative content and the three interactive MRIs. (See Figure 3-8) The interactive capability of the MRI images was set up in Dreamweaver®, so that when the student rolls over the MRI images a color, orange or yellow, highlights the dangerous fat. The MRI layout comparing abdominal cross sections of a healthy person to two others with subcutaneous and visceral fat were added to the **Physical Exam** section of the website.

Figure 3-8. Abdominal Fat Window

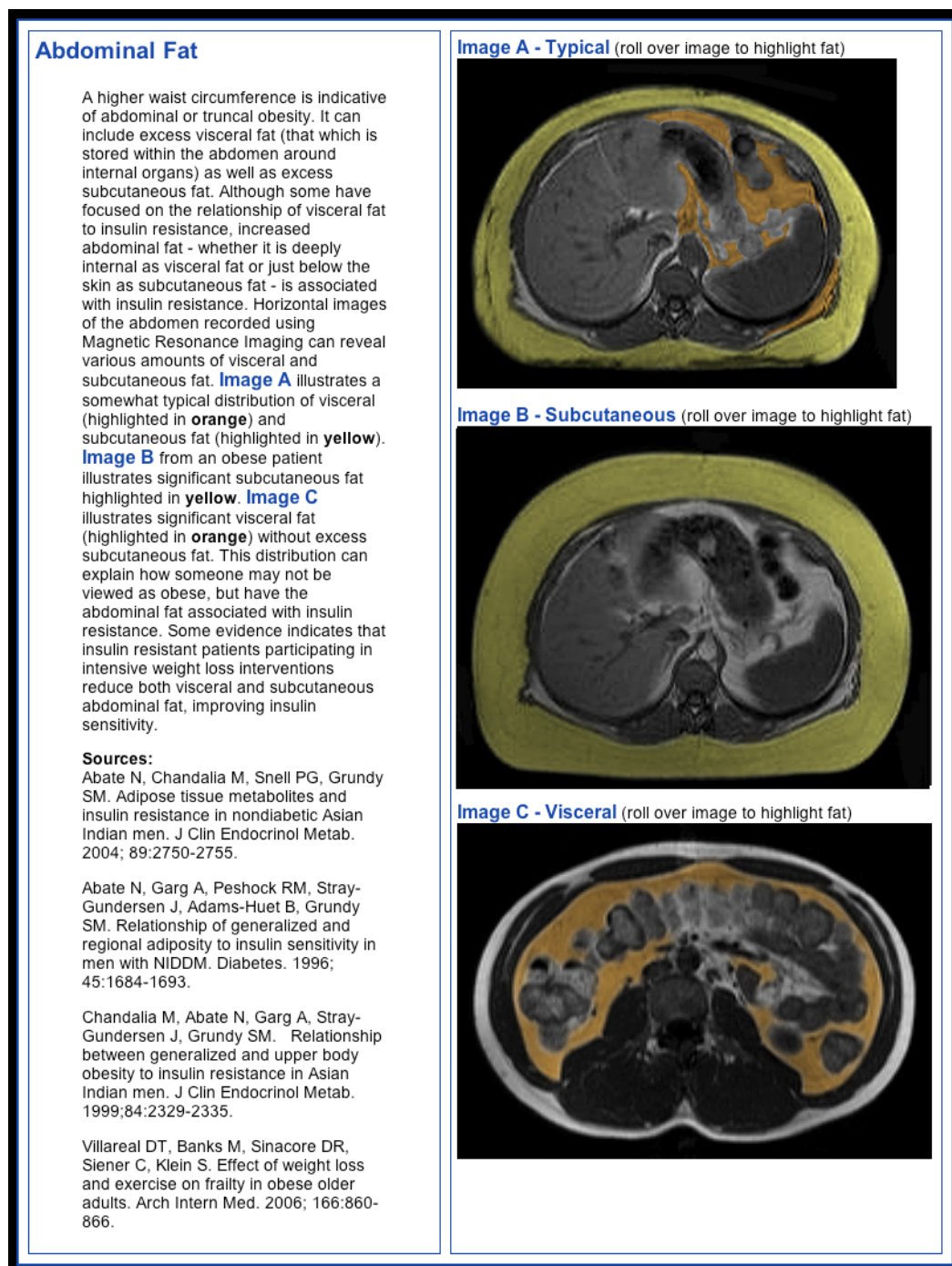


Figure 3-8. Figure shows three MRI images with the fat distribution, areas highlighted.

5. Discussions with the content advisor lead to the discovery that there was a need to create a series of interactive diagrams that showed the progression from the components to the diagnostic criteria, and then treatment of metabolic syndrome. A consistent look for the diagrams was proposed to communicate that it was a series of information that continued to build upon each other. Sketches were used to problem solve the overall layout and incorporate the same colored ring and background as the Home page image. These sketches can be viewed in Appendix D. The final look of the three diagrams was designed in Photoshop®, with different layers so individual elements could be accessed. The up and down state for the interactive buttons were also done in Photoshop® and the entire image was sliced and saved for the web. The layouts were brought into Dreamweaver® to add the rollover interaction and links to the buttons.

These three separate diagrams will be shown in two different sections of the website, focusing on the level(s) of information that pertains to that segment. The **Diagnosis** section of the website shows the version of the interactive diagram that has the six main symptomatic components that lead to the condition of metabolic syndrome. The student is able to click a button for each of these symptoms and read more information on the effects it has on the condition. Figure 3-9 shows the completed layout for this version of the interactive diagram.

Figure 3-9. Six Components of Metabolic Syndrome Interactive Diagram

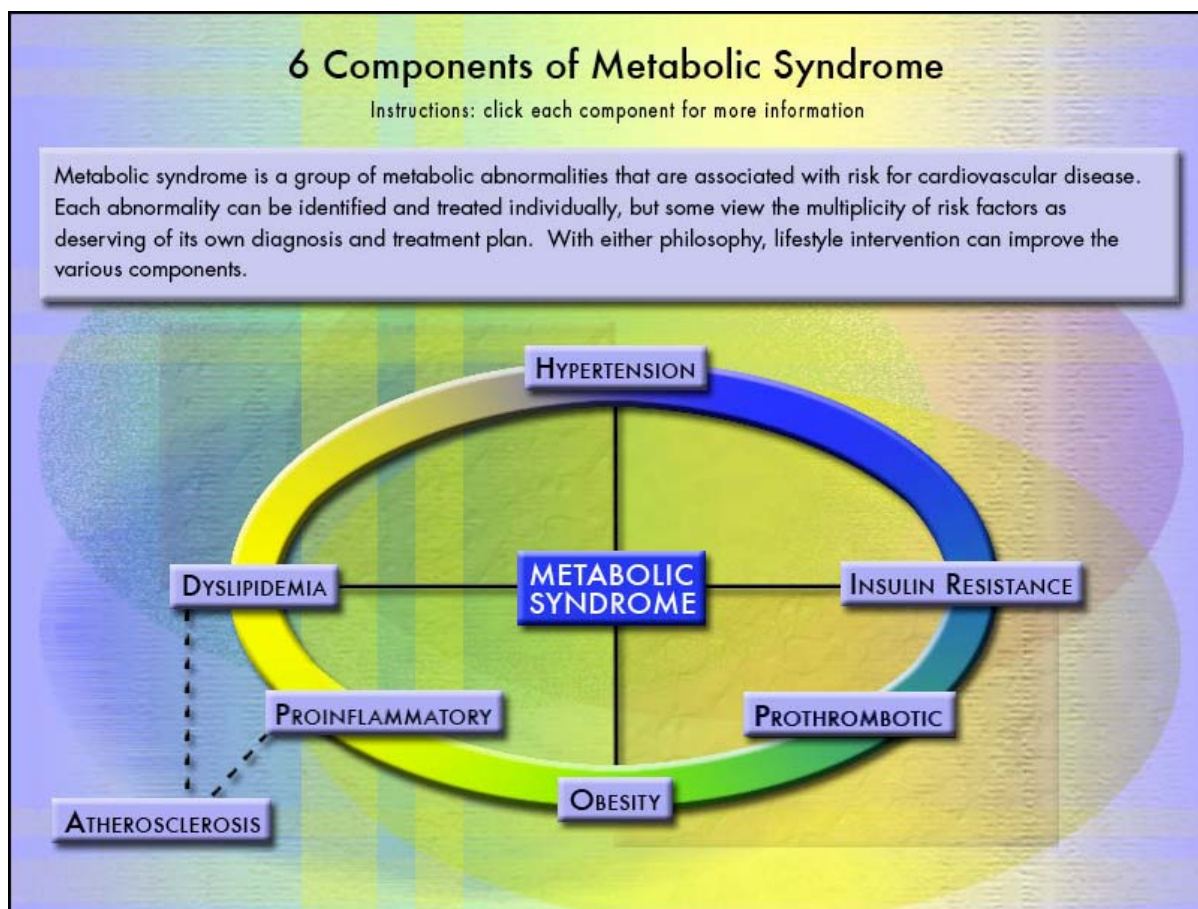


Figure 3-9. Interactive diagram which explains the six components of metabolic syndrome.

The second interactive diagram within the **Diagnosis** section of the site focuses on the clinical diagnostic tools for four of the main components that contribute to metabolic syndrome. The student clicks on each of the four buttons to see the critical testing specifications. The completed layout for this diagram is shown in Figure 3-10.

Figure 3-10. Criteria for Diagnosis of Metabolic Syndrome Interactive Diagram

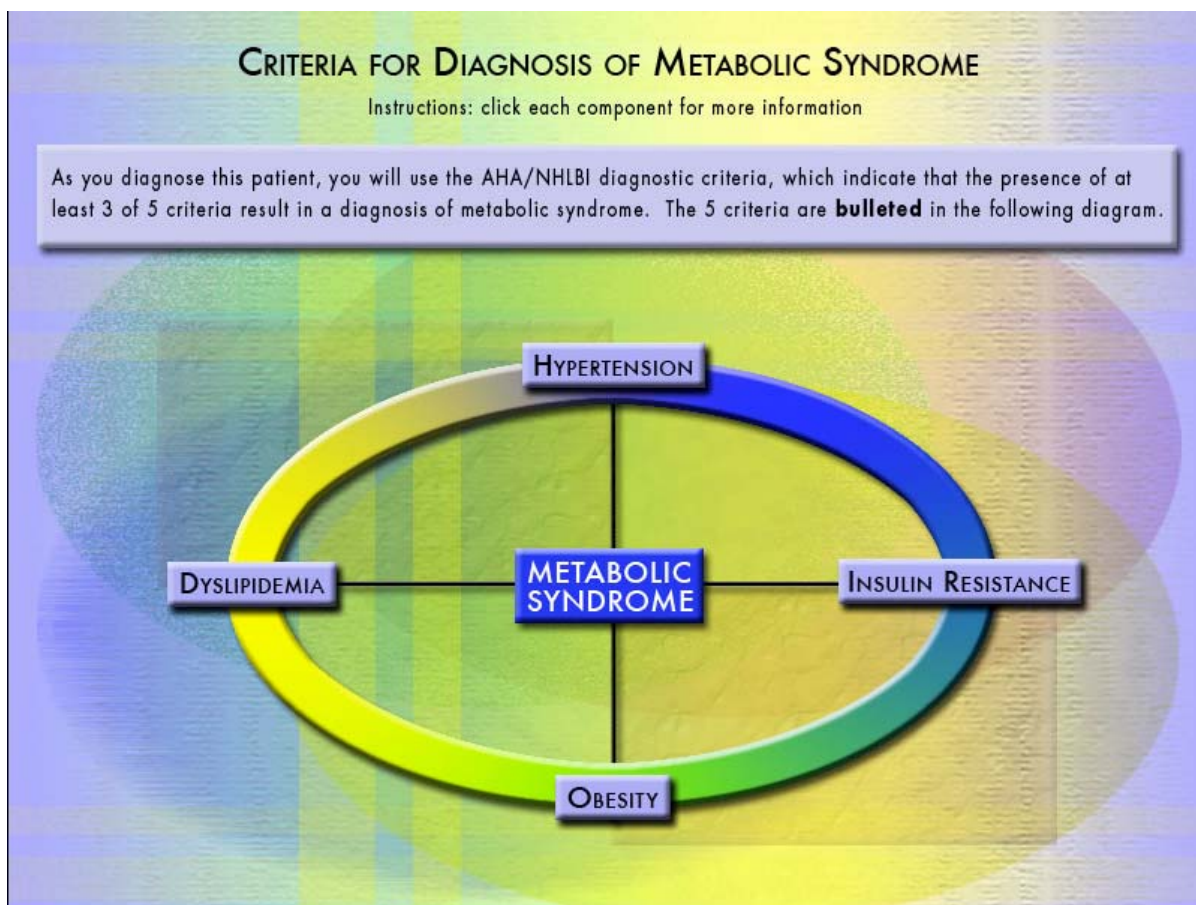


Figure 3-10. Interactive diagram explaining the criteria for diagnosing metabolic syndrome.

The **Treatment** section has the third interactive diagram in which the student can click on each of the components to show what nutritional treatments and medications are recommended. The materials presented in the diagnostic diagram, in the previous section, are now visible next to each corresponding button, for the student's quick reference. The completed version of this interactive diagram can be viewed in Figure 3-11.

Figure 3-11. Treatment of Metabolic Syndrome Components Interactive Diagram

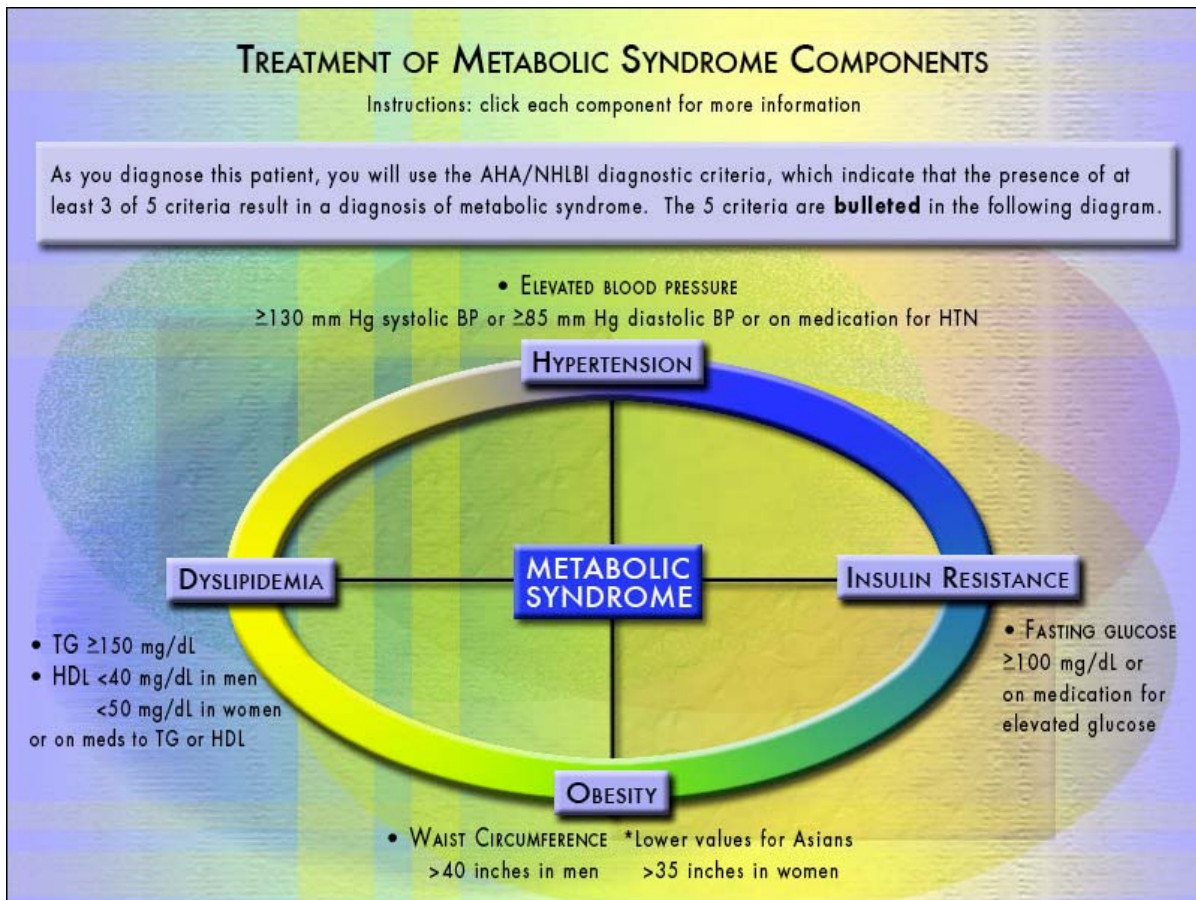


Figure 3-11. Interactive diagram showing treatments for the components of metabolic syndrome.

6. Conversations were held with committee members to focus on how to illustrate the impact of the statistical percentages of metabolic syndrome on an educational level. It became apparent that there was a need to emphasize the point that one in every four Americans has metabolic syndrome and how critical it is to be able to recognize, diagnose, and treat patients with this condition. To effectively demonstrate the aforementioned point, two

separate graphs were needed to show the information, presenting the statistics at a national level and on a day-to-day perspective for a doctor. The first graph breaks down the statistics for the nation by ethnicity and gender. The main goal for this graph is to emphasize that almost twenty-five percent of Americans have metabolic syndrome. A second graph demonstrates how common metabolic syndrome is in the U.S. by putting more relevance to the statistic by showing a common event for a doctor. This was achieved by creating an illustration of a patient waiting room. The production of a series of sketches, Appendix E, started the brainstorming process to figure out what images could convey the message clearly. Research was done to look at effective charts and graphs to guide the progression of sketches to a better instructional design of the statistics. The final layout, Figure 3-12, of the graphs were done in Illustrator® to take advantage of the program's drawing and text manipulating capacities. The graph on the left displays the percentage of people with metabolic syndrome, by gender and ethnic group, out of the total U.S. population. The illustrative waiting room graph on the right exhibits a practical scenario for a doctor to relate the statistic. Attention is brought to the three patients with metabolic syndrome (three out the of twelve patients total) by highlighting them in blue. The graphs were imported to the final layout, done in Dreamweaver®, to accompany additional written content. These graphs will be included in the **Diagnosis** section of the website within the Six Components of Metabolic Syndrome Interactive Diagram (Figure 3-19).

Figure 3-12. Metabolic Syndrome Statistical Graphs

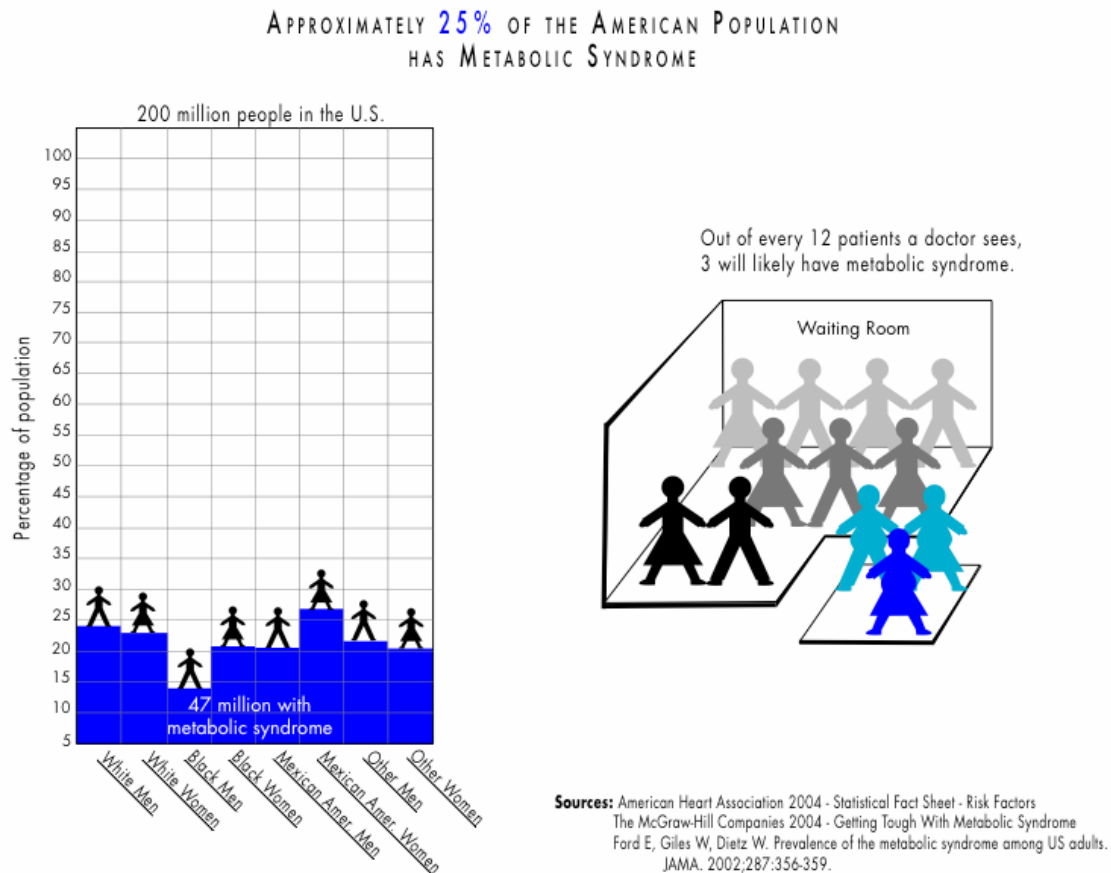


Figure 3-12. Two graphs displaying the prevalence of metabolic syndrome.

7. A suggestion from fourth-year medical students was to have the patient case study information available in a document that could be used as a quick reference guide for patient care. Two documents were laid out in Illustrator, (1) to include the patient information (not including the treatment plan and follow up sections) and (2) the reference materials (illustrations, diagrams, and static pieces of the animations). The

Illustrator® files were then saved as a PDF file that could be opened in the Adobe® Acrobat® Reader program. In Dreamweaver® each of the secondary pages has a button, next to the navigation arrows, that links to one of the PDF files, depending on the location within the site. These have provided the students with an option to print out a hard copy of the patient case study, but do not replace working through the web-based case. Both PDF files have been placed in Appendix F.

8. The entire production of the patient case study website was designed so that updates in the future can easily be done to ensure that information remains current and additional patient case studies can be developed. In anticipation of this, a Production Flow Document was created in Microsoft® Word® that describes how the website is built and organized. This document will assist in any future changes and how to use template site for other patient case studies. This Word® document has been saved in PDF format and set up with chapter links for easy reference. The completed file is in Appendix G.

Summary

The production of the metabolic syndrome patient case study began with the established template from the internship project. As Dr. Carson completed the written content, the materials were copied and pasted into the appropriate layouts, followed by links and interactions being programmed. After reviewing the content, visual elements were confirmed and progressed through the designing process. Elements of the website were produced in a

variety of other programs, but it was kept in mind that the product was being viewed on the web. The final metabolic syndrome patient case study website was produced from Dreamweaver®, with visual components imported to complete the design. Verification of several of the visual components to be included, MRI and the food photos, was not done until student surveys found that they would be valuable. The entire production process took several months but as certain stages were completed, the site was posted on the web for a sample of fourth-year medical students to review. The student feedback played a role in confirming what information would be considered useful in the preparation of a productive and valuable teaching tool.

CHAPTER FOUR

Evaluations

The evaluation process included a series of three informal surveys done with medical students in three different Cardiovascular Nutrition classes. An average of ten students attended the classes which were offered once a month. The surveys were developed to informally evaluate the effectiveness of the website and to examine fulfillment of the thesis goals and objectives. The following is a discussion on how the surveys were developed, distributed and collected. The section called, Survey Results, shows the information collected from each of the Cardiovascular Nutrition classes with a graph and text explaining the participants' responses and why a question was asked. If any conclusions were drawn from the survey responses, these have also been included. The summary section provides an overview of all three sets of informal surveys.

Survey Development

Each survey was organized into three portions: general computer questions, ranking the site, and follow up questions. The first three questions on the survey were to gather general information about the computer platform, operating system, and browser being used to view the website. This information is not only helpful to see if the site is being shown consistently across platforms but, is also as a basis for solving programming issues. The second portion of the survey has three categories (course presentation, course objectives, and materials) that were accompanied by a five-point Likert scale, ranging from “strongly disagree” to “strongly

agree”. After each question, an area was designated for the participant to make additional comments. The two-and-a-half page survey document was created in Microsoft® Word® with form fields, which restricted the participant’s comments to designated areas and secured the survey from alterations. All three sets of surveys can be seen in Appendix H.

Survey Distributions and Collection

Two formative surveys were distributed to Dr. Jo Ann Carson’s Cardiovascular Nutrition class in August and September. These two surveys were assembled to attain a clear direction for the materials needing to be presented on the patient case study website, prior to its completion. Once the entire metabolic syndrome website was accomplished, the site was posted online for the October Cardiovascular Nutrition class to evaluate for the final time.

The three sets of surveys were distributed and collected in the same manner. Once the survey was laid out in Word® and approved by committee members, the survey was attached to an email that Dr. Carson sent to her Cardiovascular Nutrition classes. Dr. Carson would also introduce the metabolic syndrome patient case study website in class, and explain the expectation of them sending her an assessment plan for their assignment. The students had three weeks to visit the site and send an email response with their assignment and survey to the Department of Clinical Nutrition and Center for Human Nutrition’s secretary. The secretary printed the surveys without any personal information, in order to keep the responses

anonymous. Each group of surveys was collected from the different classes and then analyzed for the results.

The majority of the students attending the classes were medical students, but during the September class, several physician assistant students attended. The number of students participating in the classes ranged from eight to sixteen; however the number of surveys collected did not necessarily correspond to the class size. Several of the students forgot to return surveys by email and during the final class some students had time to fill out the survey by hand.

Survey Results

August Fourth-Year Medical Student's Class

The August 2006 Cardiovascular Nutrition class was attended by eight medical students and six surveys were collected. All of the students were using Personal Computers (PC), five out of the six students had Windows XP for their operating system, with the sixth student using Windows 2000. The web browsers used were either Firefox® or Internet Explorer®. The following bar graph (Chart 4-1) displays the results from the ranking portion of the survey.

Chart 4-1. August Survey Results

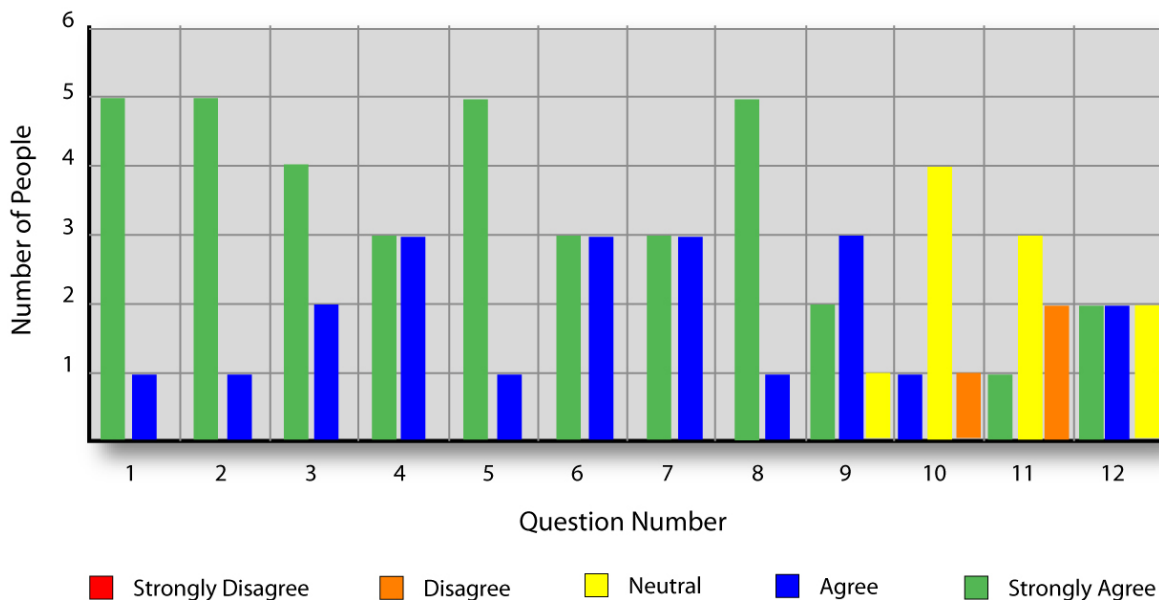


Figure 4-1. August Cardiovascular Nutrition class survey results.

Statement 1: The navigation is clear and easy to use

Five “Strongly Agreed” and one “Agreed”. This statement was asked to clarify whether the participants understood how to navigate through the site. Based on this response, it can be concluded that the navigation was clearly set up and easy to use. There were no additional comments made.

Statement 2: The aesthetics of the module were pleasing

Five “Strongly Agreed” and one “Agreed”. This question was written to receive feedback on the overall look and appeal of the site. The reaction received infers that the site was pleasant to use because of the aesthetics. No additional comments were made.

Statement 3: The information in the module is presented clearly and consistently

Four “Strongly Agreed” and two “Agreed”. Feedback on the quality of the written materials was asked of the participants, to check whether the concepts were clear and consistent through the website. The positive reply to this question suggests that the written content was presented well. No additional comments were made.

Statement 4: The website is superior in information and interface compared to other patient case studies

Three “Strongly Agreed” and three “Agreed”. The participants were asked this statement so a comparison could be made with this patient case study to others they may have viewed. The fairly strong response to this comparative statement implies this patient case study website has better information and interface. One supplementary comment was made, “Not sure how many other ones of these I have come across.”

Statement 5: The case module is an effective means of learning about the diagnosis and treatment of metabolic syndrome

Five “Strongly Agreed” and one “Agreed”. One of the main objectives for this patient case study was for the student to learn how to diagnose and treat patients with metabolic syndrome. This survey statement was asked to understand whether the participants felt the website met such an objective. It could be concluded from the ratings, that the site met the objective of teaching diagnosis and treatment of metabolic syndrome. Additional comments

were not made.

Statement 6: The case module is an effective means of learning about the nutritional aspects of metabolic syndrome

Three “Strongly Agreed” and three “Agreed”. The patient case study was presented during the Cardiovascular Nutrition class. This statement was posed because nutrition is a focus for this class, along with how nutrition affects those with the syndrome. A conclusion can be drawn from the three “Strongly Agreed” and “Agreed” responses that the website teaches the nutritional aspects of metabolic syndrome adequately. No other comments were made.

Statement 7: The case module will help me provide better patient care

Three “Strongly Agreed” and three “Agreed”. This statement was proposed to understand whether the students could apply the website information when treating patients. The positive response infers that the participants gained information from the website that would help them to provide better patient care. Supplementary comments were not made.

Statement 8: The insulin resistance animation is a clear and valuable learning tool

Five “Strongly Agreed” and one “Agreed”. The animations had been completed at this time and feedback was necessary to guide any possible changes needed for a better learning tool. The participants’ high ranking of the animation implies that it was presented successfully. No additional comments were added.

Statement 9: The graph showing 25% of Americans with metabolic syndrome is useful in explaining the statistic

Two “Strongly Agreed”, three “Agreed”, and one said “Neutral”. A visual was designed to show the prevalence of metabolic syndrome in the U.S. This statement was important to understand whether the information presented clearly stated the impact of the numbers affected by the syndrome. The majority of the participants agreed that the graph demonstrated the statistics. Additional comments were not made.

Statement 10: The addition of an illustration to accompany the descriptive steps of atherosclerosis would be helpful

One “Agreed”, four said “Neutral”, and one “Disagreed”. The atherosclerosis process has been presented multiple times within the medical curriculum. This statement was to get a better understanding whether including visuals to explain the process would be useful for a review or was not necessary. The majority of participant’s responses were “Neutral”, which raises the question whether such illustrations were necessary to include in the site. Supplementary comments were not made.

Statement 11: An illustration in cross-section comparing visceral fat between a “normal” and an obese individual would be valuable

One “Strongly Agreed”, three said “Neutral”, and two “Disagreed”. As a possible visual media, to incorporate into the website, an illustration would be used to explain the types of fat distribution. The majority of the responses were either “Neutral” or “Disagreed”,

suggesting that illustrating such a concept may not be needed. However, one respondent said, “Maybe a CT but not a drawing as that would be clinically useful.”

Statement 12: Color photos of food that depict sources of dietary fat would be helpful

Two “Strongly Agreed”, two “Agreed”, and two said “Neutral”. There was a suggestion made during an informal survey taken from the website template, that food photos might be included to show portion sizes. The statement was posed to see whether the medical students would also find their inclusion to be helpful. Most of these responses were positive but one third voted “Neutral”, and no other comments were made. Making a decisive conclusion based on these results, whether or not to include the photos is difficult.

The following are responses to the follow up statements.

Describe anything in the module that you feel conflicted with information you have

previously learned: The responses were: one respondent said “none apparent”, one said “none”, and the remaining four did not respond. These results clearly state that the information in the website does not conflict with other previously learned materials.

Describe anything you think should be added to the module: One response was

“Nothing, it is great” and another was “Seemed complete”, while the other four did not comment. Based on these responses no additional materials need to be added to complete the module at this time.

Describe anything you think should be deleted from the module: A comment by one respondent was “N/A”, another said, “Did not seem excessive”, and the other four did not respond. Such a result suggests that the module has been presented concisely and unnecessary information has not been included.

I spent approximately minutes on this case.

Time spent by all six students ranged between fifteen to forty-five minutes, with an average of thirty-one point six (31.6) minutes. The individual time spent on the website for each student is displayed in Chart 4-2.

Chart 4-2. Approximate Time Spent on the Case in August

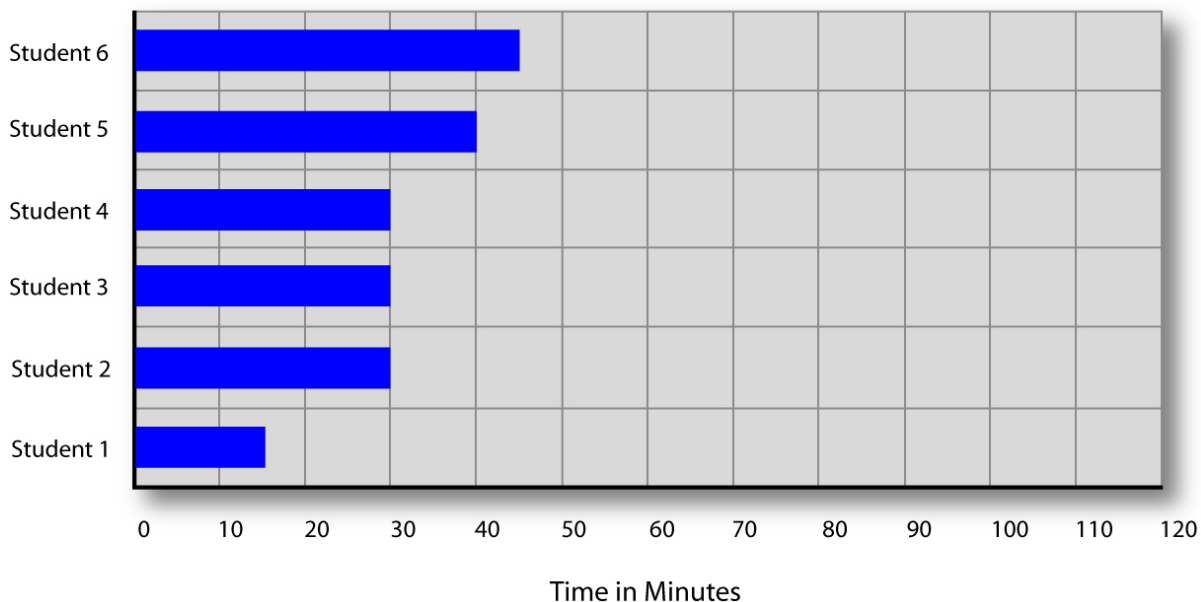


Figure 4-2. Approximate time spent on the case study by the students in August.

Other comments: This statement was included on the survey to provide an area where general comments could be added. One student responded, “Great job!” No formative conclusions could be taken from these comments.

September Fourth-Year Medical Students and PA’s Class

The September 2006 Cardiovascular Nutrition Class was attended by fourteen medical and physician assistant (PA) students; however, only six surveys were collected. Of the six students who responded to the survey only one was a PA student. This statement was asked to see whether the type of program the student was enrolled in makes a difference in their perspective of the website. Five of the students were on Personal Computers (PCs) and one was using a MAC. The five students on PCs had Windows XP for their operating system and the student on the MAC was on OSX. The web browser used by the PC users was Internet Explorer® and the MAC user ran Safari®. The following bar graph (Chart 4-3) displays the results from the ranking portion of the survey.

Chart 4-3. September Survey Results

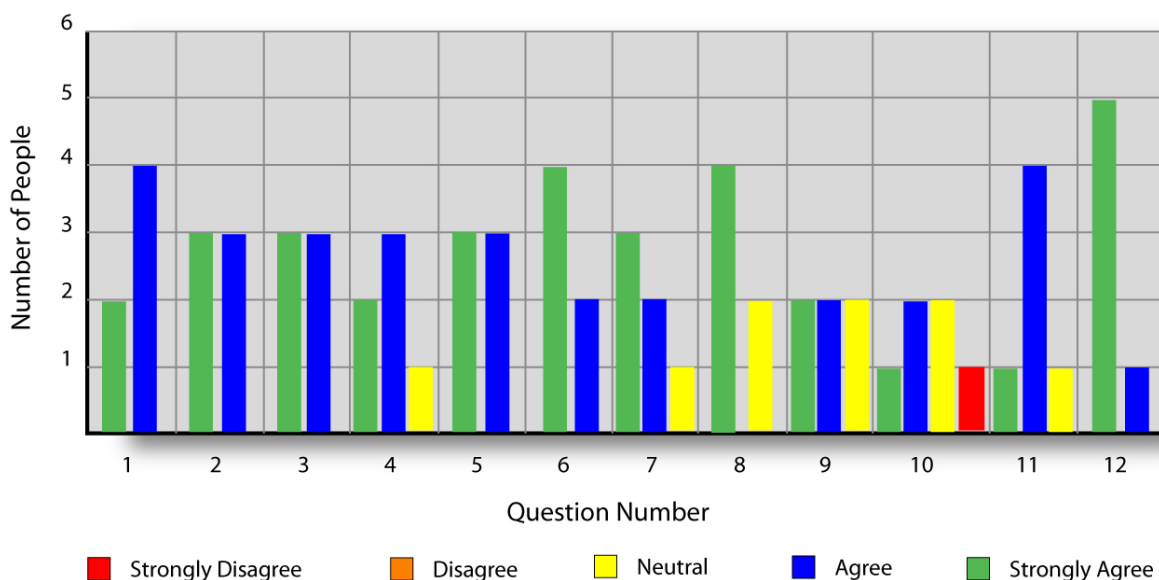


Figure 4-3. September Cardiovascular Nutrition class survey results.

Statement 1: The navigation is clear and easy to use

Two “Strongly Agreed” and four “Agreed”. This statement was asked to clarify whether the participants understood how to navigate the site. From the high remarks made, the navigation appears to be clearly set up and easy to use for most of the students. There were no additional comments made.

Statement 2: The aesthetics of the module were pleasing

Three “Strongly Agreed” and three “Agreed”. This statement was to receive feedback on the overall look and appeal of the site. The reaction received infers that the site was pleasant to use because of the aesthetics. No additional comments were made.

Statement 3: The information in the module is presented clearly and consistently
Three “Strongly Agreed” and three “Agreed”. Feedback on the quality of the written materials was asked of the participants, to check whether the concepts were clear and consistent through the website. The positive rankings to this question suggest that the written content was presented well. No supplementary comments were made.

Statement 4: The website is superior in information and interface compared to other patient case studies

Two “Strongly Agreed”, three “Agreed” and one said “Neutral”. The participants were asked this statement so a comparison could be made with this patient case study to others they may have viewed. When comparing this website to other patient case studies, the majority of the responses suggest the information and interface were better. Additional comments were not made from any of the participants.

Statement 5: The case module is an effective means of learning about the diagnosis and treatment of metabolic syndrome

Three “Strongly Agreed” and three “Agreed”. This survey statement was asked to understand whether the participants felt the website met the objective of the students learning how to diagnose and treat patients with metabolic syndrome. A conclusion could be drawn from the ratings that the site met the objective of teaching diagnosis and treatment of metabolic syndrome. A comment made by a medical student was, “The instructions, to just

write the A/P section of the patient note, seemed a little vague and may have been better if accompanied by an example.” No other responses were received from the other five students.

Statement 6: The case module is an effective means of learning about the nutritional aspects of metabolic syndrome

Four “Strongly Agreed” and two “Agreed”. Such a statement was addressed because nutrition is a focus for the class the website is presented in, along with how nutrition affects those with the syndrome. From the positive responses it can be deduced that the website teaches the nutritional aspects of metabolic syndrome effectively. No other comments were added.

Statement 7: The case module will help me provide better patient care

Three “Strongly Agreed” two “Agreed” and one said “Neutral”. This statement was proposed to understand whether the students could apply the website information to treating patients. Five of the students had a positive response, inferring that the participants gained information from the website that could help them to provide better patient care. Supplementary comments were not made.

Statement 8: The insulin resistance animation is a clear and valuable learning tool

Four “Strongly Agreed” and two said “Neutral”. The statement was asked to gather feedback that would guide any possible changes needed to produce a better animation. Most

of the students had a positive response. The PA student in this group remarked, “This animation was very informative. There was one abbreviation that I did not know...CETP.” However, a conclusion is difficult draw from the two “Neutral” opinions because only one made an additional comment of “Did not view”.

Statement 9: The graph showing 25% of Americans with metabolic syndrome is useful in explaining the statistic

Two “Strongly Agreed”, two “Agreed”, and two said “Neutral”. This statement was important to understand whether the information presented, clearly stated the impact of the U.S. citizens affected by metabolic syndrome. Two-thirds of the participants agreed that the graph is useful in explaining the statistics. One of the medical students ranked this question as “Neutral”, but added “Did not view” in the comment area.

Statement 10: The addition of an illustration to accompany the descriptive steps of atherosclerosis would be helpful

One “Strongly Agreed, two “Agreed”, two said “Neutral”, and one “Strongly Disagreed”. This statement was to get a better understanding of whether including visuals to explain the atherosclerosis process would be a beneficial review or was not necessary. A wide range of rankings was collected in response to this question, one respondent at each end of the Likert scale. One medical student noted, “We’ve read it before.” The ranges in these responses lead to the conclusion, with Dr. Jo Ann Carson, that a different approach may be necessary. The written content should be more specific and explain how components of metabolic

syndrome contribute to atherosclerosis and a visual was no longer essential.

Statement 11: An illustration in cross-section comparing visceral fat between a “normal” and an obese individual would be valuable

One “Strongly Agreed”, four “Agreed” and one said “Neutral”. As a possible visual media, to incorporate into the website, an illustration would show the different types of fat distribution. The majority of the responses on this survey suggest that an illustrated cross-section comparison would be useful. The question arises whether the students distinguished between an “illustrated” cross-section and a cross-section in general. Based on the August and September survey results for this question, it was decided with Dr. Jo Ann Carson, that emphasizing the different types of fat distribution would have a more practical application if MRIs were used rather than an illustration. No additional comments were made.

Statement 12: Color photos of food that depict sources of dietary fat would be helpful

Five “Strongly Agreed” and one “Agreed”. The statement was posed to see whether the medical students would find the inclusion of photos showing portion sizes to be helpful. These responses strongly support the idea of including photos of food portion sizes into the website. One medical student mentioned, “I am a visual learner!”, and another said “I would love to see photo representation of a proper portion size.” The other three medical students and the one PA student did not choose to add other comments.

The following are responses to the follow up statements.

Describe anything in the module that you feel conflicted with information you have

previously learned: One student said, “none”, the remaining five left this area blank. Based on the one response and the lack of comments from the other students, it suggests that the website does not have any conflicting information on it.

Describe anything you think should be added to the module: One student added, “I

wouldn’t mind being able to submit online through the web page without having to email a separate attachment.” Another commented that the “treatment of insulin resistance” should be added. The first comment recommends another option, as a convenience, for being able to turn in the assignment. In response to the second comment, the website already includes the treatment for insulin resistance in one of the interactive diagrams. It is possible that the student over looked this option in the website. The four remaining students did not have additional comments.

Describe anything you think should be deleted from the module: The feedback from this statement would encourage materials to be presented on new topics and that materials are concise. The only comment by one respondent was “none”; the other five did not have comments. A conclusion can be drawn from the one response and the lack of comments from the remaining students that the website does not include excessive information.

I spent approximately minutes on this case.

All six students did an approximation on the amount of time they spent working through the

site. The time spent ranged between forty-five minutes to ninety minutes, with an average of sixty-three point three (63.3) minutes. Chart 4-4 displays the individual time spent on the website for each student. The difference in the time spent on the site, between the first two surveys, may be due to Dr. Carson's encouragement to go through the site carefully because there was interest in their feedback.

Chart 4-4. Approximate Time Spent on the Case in September

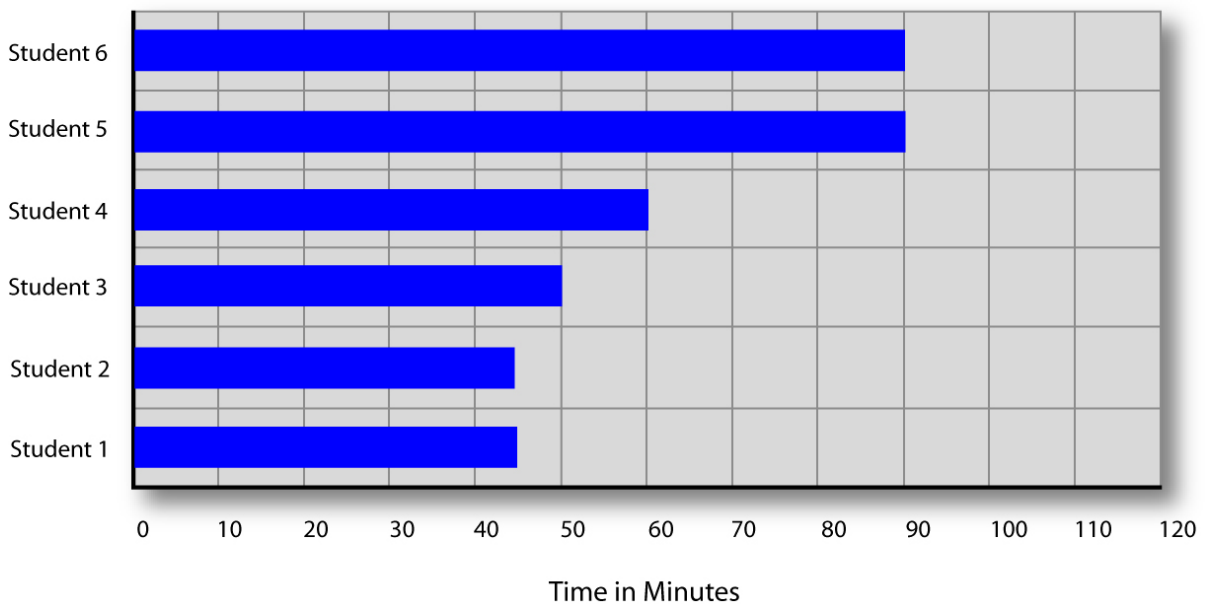


Figure 4-4. Approximate time spent on the case study by the students in September.

Which, if any of these, did you refer to on the Home page?

Instructions (Y or N)

Objectives (Y or N)

Credits (Y or N)

In this survey, an additional statement was included about which links the participant referred to on the Home page before working through the website. Five students said they read the instructions, but only two looked at the objectives and credits. This seems to verify that students are reading the instructions about the website before they begin working through the patient case study. However, only one-third referred to the objectives for guidance.

Other comments: This statement was included on the survey to provide an area where general comments could be added. A comment received was, “Great case. Thank you!” No formative conclusion can be drawn from this statement.

October Fourth-Year Medical Student’s Class - Final

The October 2006 Cardiovascular Nutrition Class was attended by nine medical students, however six surveys were returned. All six students were on Personal Computers (PCs) with Windows XP for their operating systems, five used Internet Explorer® and one used Firefox® for their web browsers. The following bar graph (Chart 4-5) displays the results from the ranking portion of the survey.

Chart 4-5. October Survey Results

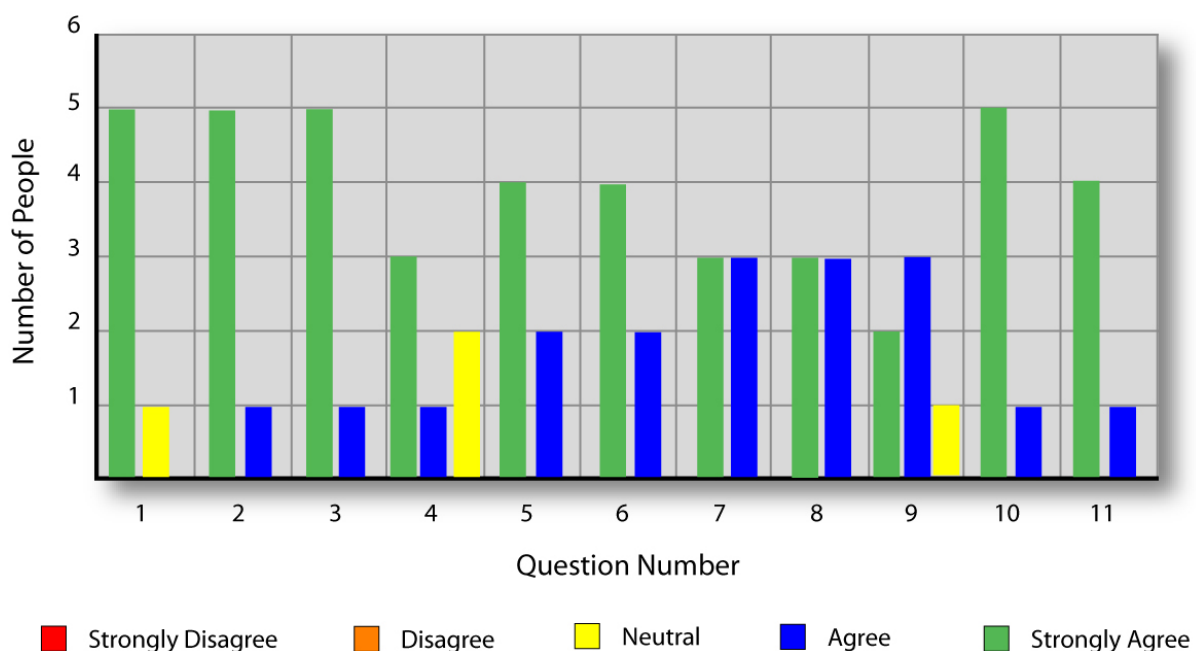


Figure 4-5. October Cardiovascular Nutrition class survey results.

Statement 1: The navigation is clear and easy to use

Five “Strongly Agreed” and one said “Neutral”. This statement was asked to clarify whether the participants understood how to navigate the site. From the positive response made, the navigation was clearly set up and easy to use for most of the students. There were no additional comments made.

Statement 2: The aesthetics of the module were pleasing

Five “Strongly Agreed” and one “Agreed”. This statement was to receive feedback on the overall look and appeal of the site. The over all response to the site infers that the site was

aesthetically pleasing. No additional comments were made.

Statement 3: The information in the module is presented clearly and consistently

Five “Strongly Agreed” and one “Agreed”. Feedback on the quality of the written materials was asked of the participants, to check whether the concepts were clear and consistent through the website. The high remarks for this statement suggest that the written content in the website was presented well. No supplementary comments were made.

Statement 4: The website is superior in information and interface compared to other patient case studies

Three “Strongly Agreed” one “Agreed” and two said “Neutral”. The participants were asked this statement so a comparison could be made with this patient case study to others they may have viewed. Two-thirds of the responses suggest the information and interface are better than other patient case studies. No comments were added, to help justify the rankings.

Statement 5: The case module is an effective means of learning about the diagnosis and treatment of metabolic syndrome

Four “Strongly Agreed” and two “Agreed”. This survey statement was asked to understand whether the participants felt the website met the objective of the students learning how to diagnose and treat patients with metabolic syndrome. The ratings concluded that the site met the objective of teaching the diagnosis and treatment of metabolic syndrome. Further comments were not made.

Statement 6: The case module is an effective means of learning about the nutritional aspects of metabolic syndrome

Four “Strongly Agreed” and two “Agreed”. Such a statement was addressed because nutrition is a focus in the class the website is presented in, along with how nutrition affects those with the syndrome. A conclusion can be drawn from high ranking responses that the website is an effective learning tool for nutritional aspects of metabolic syndrome. No other comments were added.

Statement 7: The case module will help me provide better patient care

Three “Strongly Agreed” and three “Agreed”. This statement was proposed to understand whether the students could apply the website information to treating patients. The positive response could be inferred that the participants feel the information from the website could help them to provide better patient care. Supplementary comments were not made.

Statement 8: The insulin resistance animation is a clear and valuable learning tool

Three “Strongly Agreed” and three “Agreed”. The statement was asked to gather feedback that would guide any possible changes needed to produce a better animation. One student’s comment was, “Excellent animation, clearly illustrates each step of the process.” No other responses were received from the other five students. One can conclude that insulin resistance animation was successful as a learning tool and presented the concept clearly.

Statement 9: The graph showing 25% of Americans with metabolic syndrome is useful in explaining the statistic

Two “Strongly Agreed”, three “Agreed”, and one said “Neutral”. This statement was important to understand whether the information presented clearly stated the impact on the number of U.S. citizens affected by metabolic syndrome. The majority of the participants agreed that the graph is useful in explaining the statistics. No other comments were made to supplement the ratings.

Statement 10: The MRIs showing visceral and subcutaneous fat are a helpful comparison to understanding the distribution of fat

Five “Strongly Agreed” and one “Agreed”. MRIs were included to highlight the different types of dangerous fat distribution, rather than an illustrated cross-section suggested in the formative surveys. This statement was included to see whether this practical application of MRIs clearly demonstrates a comparison of visceral and subcutaneous fat. The very positive response supports the change from an illustration to MRIs to show this concept. Additional comments were not written.

Statement 11: The color photos of food supplement my understanding of correct portion sizes and dietary fats

Four “Strongly Agreed”, one “Agreed” and one did not reply. The preliminary and formative surveys supported the need of a visual tool to explain correct portion sizes. Dr. Carson felt it was also necessary to include photos to show examples of dietary fats. Since

the addition of these photos to the website, a statement was posed to see whether what had been accomplished supported the student's understanding of portion sizes and dietary fats. Their responses suggest that these visual tools being added to the website did further the students' understanding. Additional comments were not made.

The following are responses to the follow up statements.

Describe anything in the module that you feel conflicted with information you have previously learned: A couple of students said, "none", one wrote, "N/A", and the three remaining students did not comment. A conclusion can be drawn from half of the responses that the website does not present any conflicting concepts.

Describe anything you think should be added to the module: While a couple of students either said "No", or "none", one student mentioned the need to add, "exercise guidelines". Additional comments were not received from the other three students. The general response is, that there isn't the need to add materials or concepts to the module. There is the possibility of adding more specifics concerning exercise to the website because of the module's flexibility. Due to time constraints this could be utilized in the next rendition of the website.

Describe anything you think should be deleted from the module: The feedback from this statement would encourage materials to be presented on new topics and that materials are concise. Responses for the question were, one said "none", the second said "N/A", and the third wrote, "Nothing, good way to learn the basics of nutrition." The other three students

did not comment. The responses suggest that the website does not include any unrelated or repetitive materials.

I spent approximately minutes on this case.

All six students did an approximation on the amount of time they spent working through the site. The time spent ranged between thirty minutes to one hundred twenty minutes, with an average of fifty-five minutes. Chart 4-6 show the amount of time spent on the website by each student.

Chart 4-6. Approximate Time Spent on the Case in October

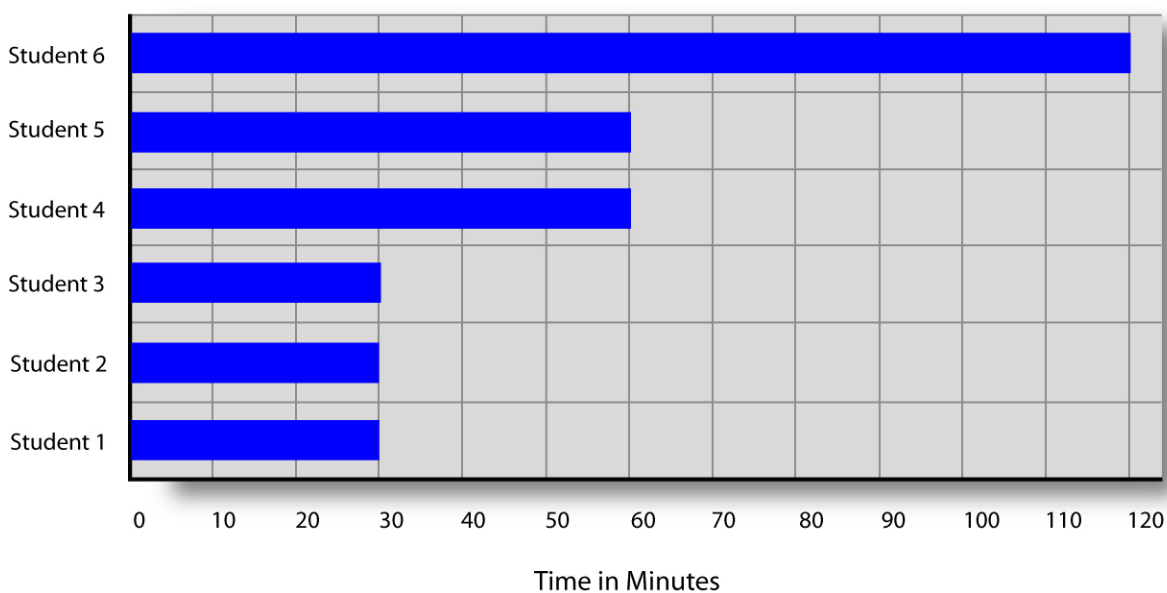


Figure 4-6. Approximate time spent on the case study by the students in October.

Which, if any of these, did you refer to on the Home page?

Instructions (Y or N)

Objectives (Y or N)

Credits (Y or N)

This statement was asked about which links the participant referred to on the Home page before working through the website. Five students said they read the instructions and objectives, but only one looked at the credits. This concludes the majority of these students did access the instructions and objectives before attempting to work through the patient case study.

Other comments: This statement was included on the survey to provide an area where general comments could be added. One participant commented “I think it would be easier to have the questions as a separate section at the end as they are distracting on the side and we sometimes did not have all of the information from the case to answer them. It would also be a really good quiz at the end to test our understanding of the material that we had just read.” This comment will be taken as a suggestion for further research study.

Summary

Out of the possible thirty-one surveys distributed to the three Cardiovascular Nutrition classes, over a period of three months, eighteen surveys (fifty-eight percent) were collected. Most of the participants had positive rankings concerning the class presentation, (navigation, aesthetics, information presented clearly and consistently, and superior information and

interface) of the website. When responding to the class objective statements (the case module is an effective means to learn about the diagnosis, treatment and nutritional aspects of metabolic syndrome, and a case helps students to provide better patient care) the majority of the participants had high remarks. The first two surveys, done in August and September, helped to focus the need for some the visual materials to be included in the website.

Participants' feedback suggested that reviewing the atherosclerosis process in either written or visual content was not considered to be useful information. The written content was redirected to provide more specific information about metabolic syndrome contributing to atherosclerosis. Initially, illustrations of cross-sections were to be done to display the different types of fat distribution. It became evident from the surveys that a more practical application, such as MRIs, might be a better approach to show the difference between visceral and subcutaneous fat distributions. Both the informal surveys done earlier with the template, and the above with module, continually suggested the inclusion of photos showing correct food portion sizes. Not only were sample portion sizes included in the website, but also examples of dietary fats to either add or subtract from a patient's diet were mentioned. In conclusion, the over all response to the website as a metabolic syndrome patient case study educational tool is positive. The additional comments from the students could be taken into account for a future version of this site. Furthermore this proves that such a module has the flexibility to incorporate what is needed to support that particular nutrition patient case study.

CHAPTER FIVE

Conclusion

Project Summation

The goal of this thesis project was to create a model for an interactive website that presents a patient case study for fourth-year medical students that will potentially facilitate diagnosis and treatment of patients with a nutritional condition. In order for this goal to be met several objectives needed to be accomplished. A metabolic syndrome model was produced as an example nutrition patient case study within the template. Preliminary and formative surveys were used as a guide for developing the written and visual content of the final website module. Different types of media (photographs, MRIs, animations, interactive diagrams, and graphs) were utilized to present information in an effective manner. A final survey was done to evaluate the completed website module for the fourth-year medical students. Finally, the website was presented in a format that met the requirements of the campus on-line curriculum and can easily be updated in the future to ensure that information remains current and new patient case studies can be added.

A preliminary survey was conducted to review the continuing education dietetic website template to get informative feedback for the production of the new expanded fourth-year medical student model. After these considerations were made, a test site built and posted on the Internet for fourth-year medical students to review and participate in a formative survey to gather their responses on the incomplete model and its components.

Based on fourth-year student feedback their responses were informative in producing the final version of the web-patient case study. Upon the completion of the fourth-year patient case study, a final survey was conducted to evaluate the final production of the module. The analyzed participants' responses concluded that the completed website module is a valuable educational tool for teaching metabolic syndrome.

Recommendations for Future Research

As mentioned before, the main goal for this project was to create a template that would serve as a basis for other web-based nutrition patient case studies. This template was set up to have the flexibility for a variety of nutrition topics. During initial discussions with Dr. Jo Ann Carson, several other topics i.e. geriatric malnutrition, were mentioned along with each patient case study being developed for different audiences. It is also possible other educators in the UT Southwestern Medical Center campus may see this example website and find ways of adapting it for their specific needs.

One issue that needed to be addressed during the development of the web-based nutrition patient case study template was that students skipping directly to the assignment without working through the site could compromise the level of integrity. To protect the integrity a higher level of tracking needs to be researched to ensure that there is individual learning and work being done. In the event that a new patient case study should be developed, a need may

arise to track the individual participant's responses to the questions to gain feedback on how to adjust the content.

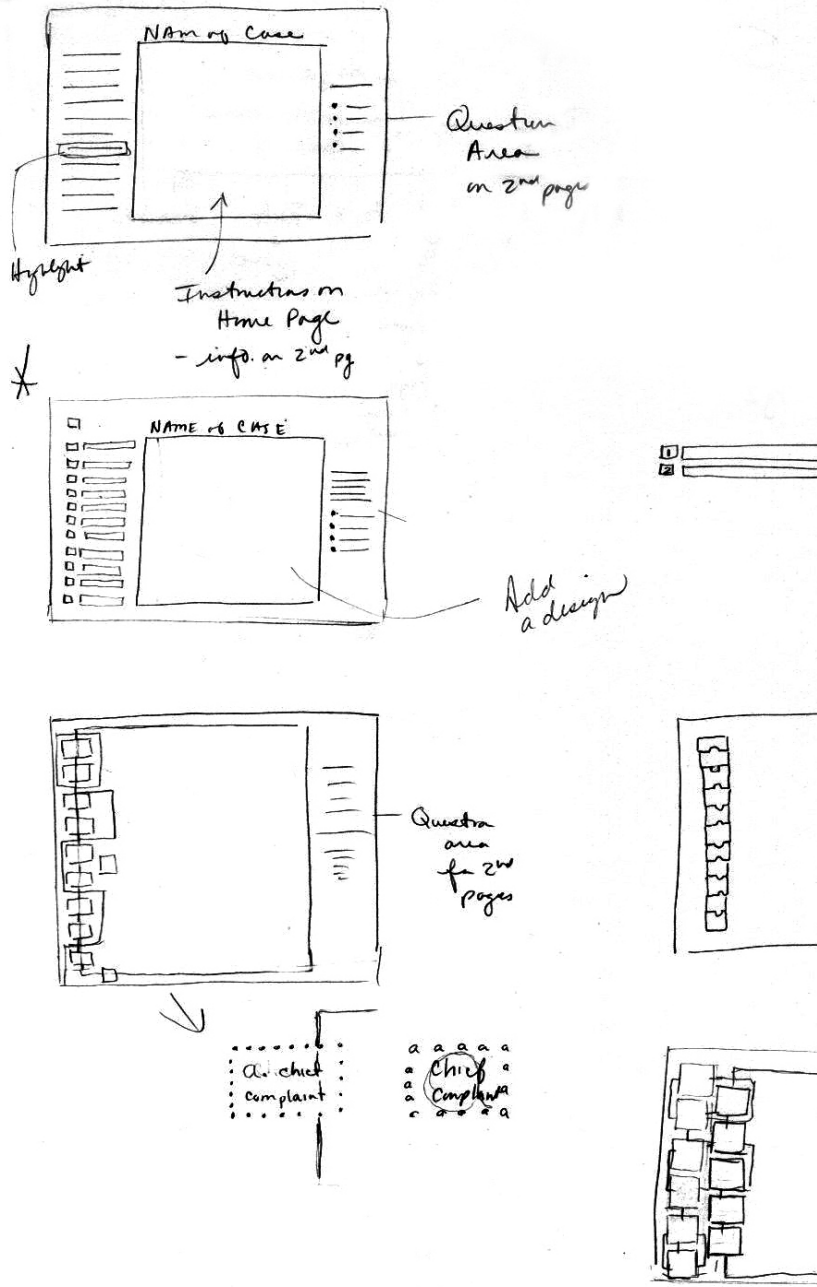
To test the effectiveness of a nutrition patient case study website at teaching a specific topic, a system of pre and post-tests would need to be organized. In order for the existence of a particular website to be necessary as a teaching tool, standard testing would need to be applied. Students would need to be tested prior to the presentation of a topic in order to have a comparison to a post-test or to determine whether further education is needed. Once the topic is determined to be necessary, two groups of students would be introduced to the topic. One group (control) would attend a traditional slide presentation while the other group would use the web-based patient case study. Post-tests would be given to each group to see whether there was an improvement in their scores compared to the pre-tests and to the control group.

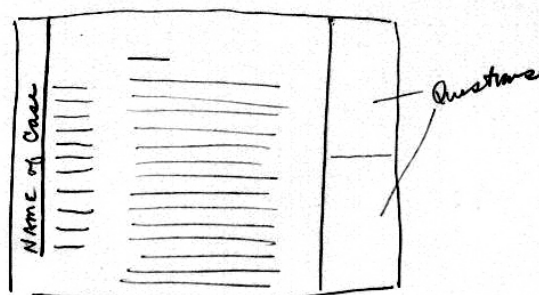
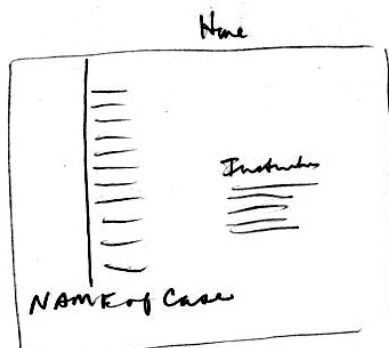
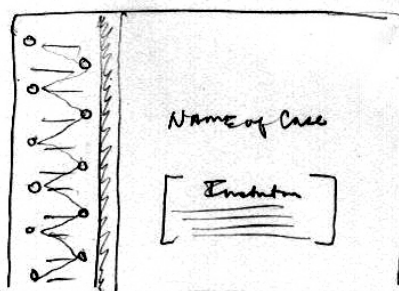
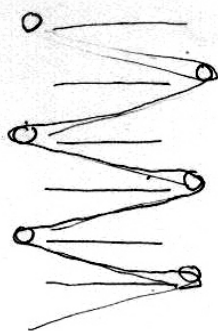
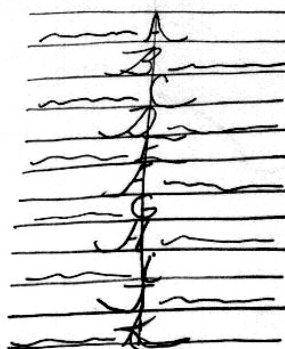
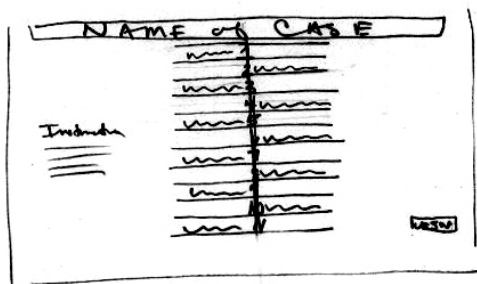
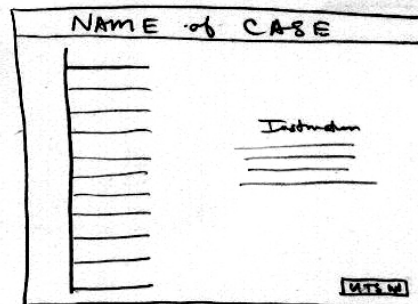
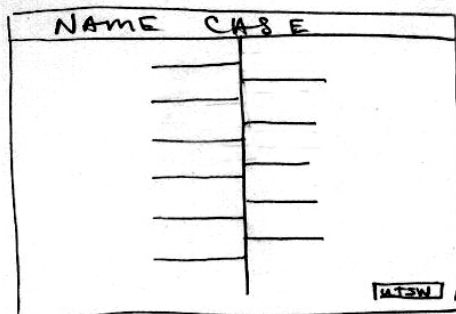
In conclusion, the objectives were completed to meet the goal set for this thesis project. A module was produced for future nutrition patient case studies to be based on and the need to present materials on metabolic syndrome to the fourth-year medical students has been met. All aspects of the nutrition education website were produced successfully and translated well across computer platforms and browsers.

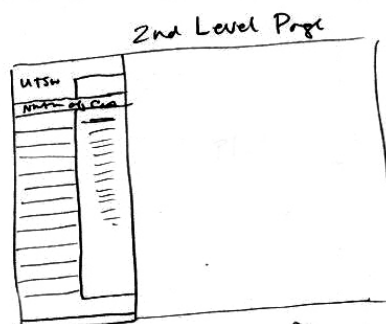
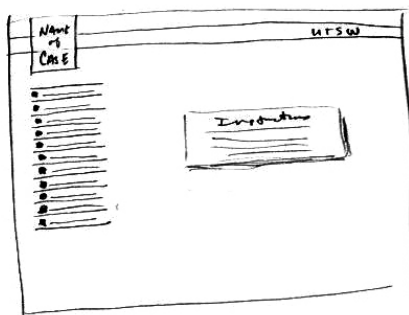
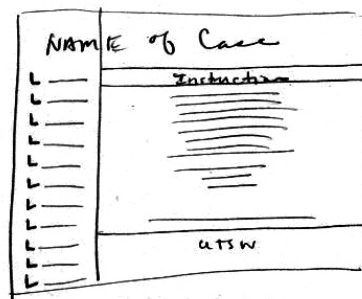
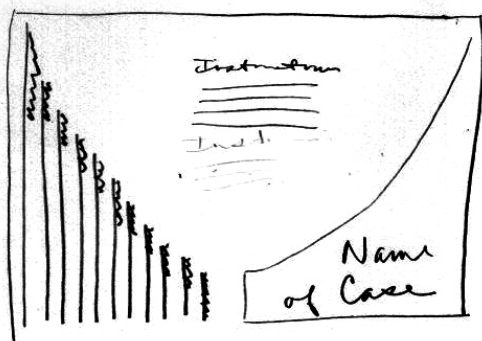
APPENDIX A

Website and Home Page Sketches

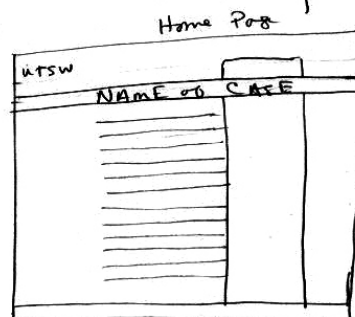
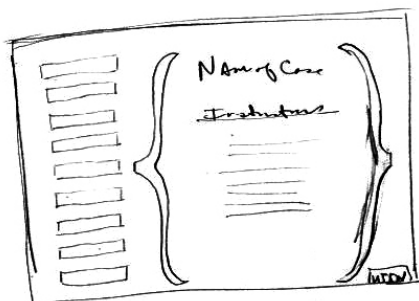
The succeeding pages are sketches showing various ideas for the layout of the patient case study website template.



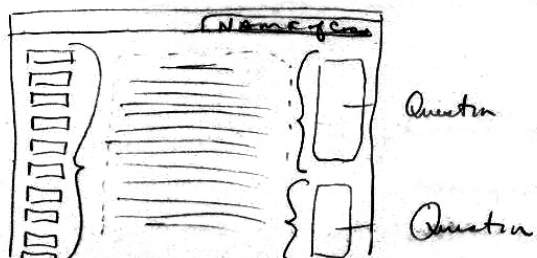
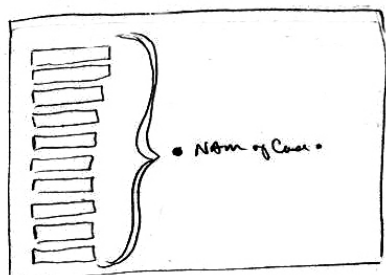
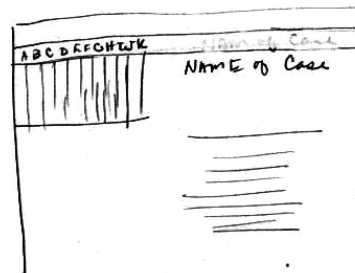
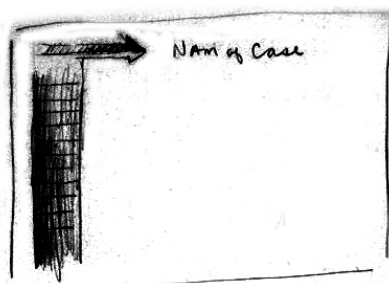




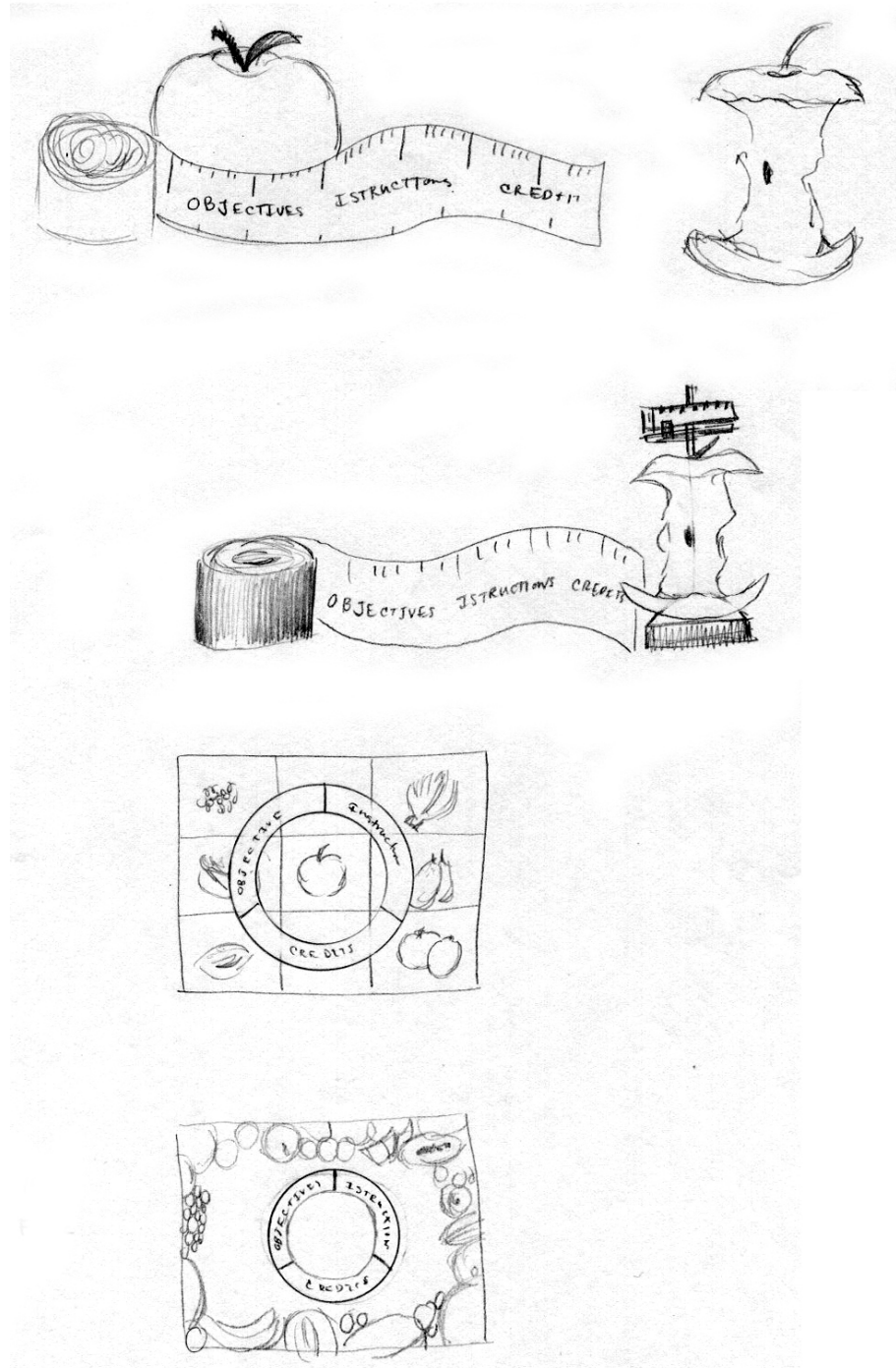
2nd Level Page



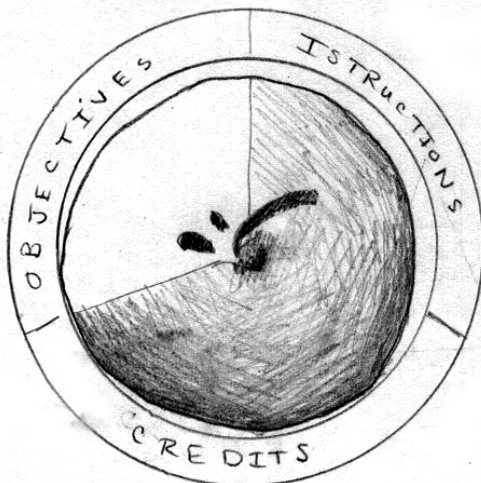
Home Page



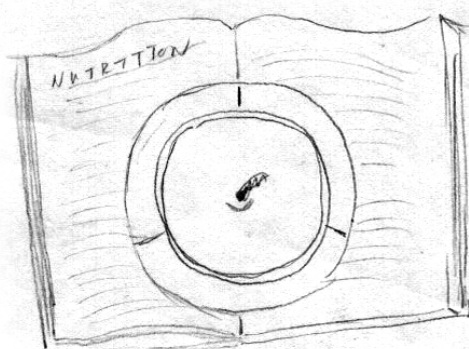
The following two pages include sketches of a variety of iconic images for the Home page layout of the website template.



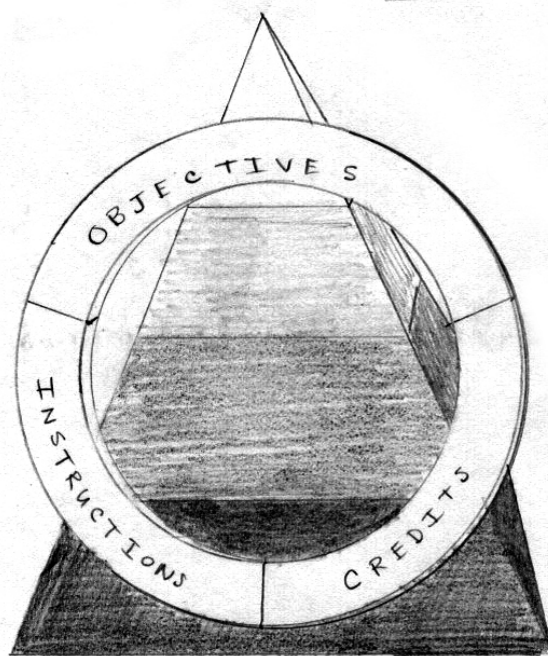
cut wedge of the apple moves
w/ the selection



Or swap out for a different fruit
or vegetable in the middle - when
the selection is made



Pear
orange
tomato
plum/nectarine
Lemon/Lime
Catalpa
onion
Peppercorn
Kiwi
Avocado

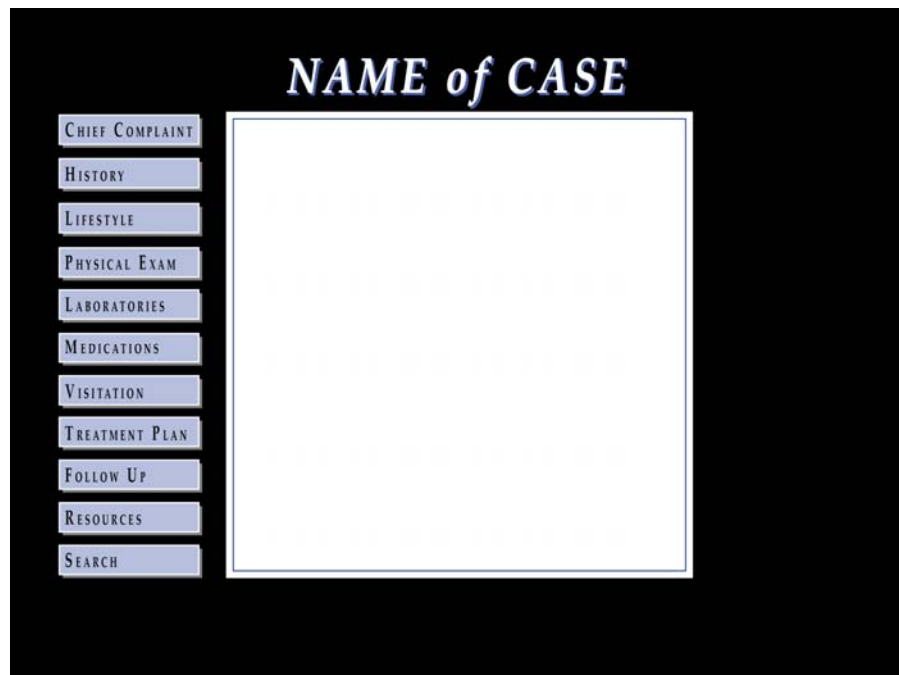
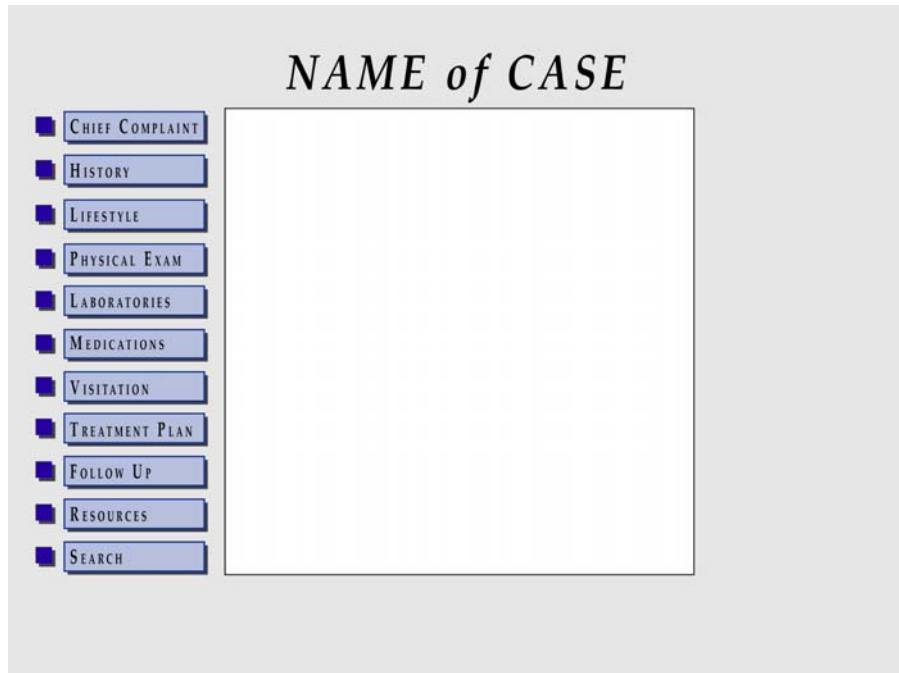


Different shade of the same color for the pyramid
(Keep it simple)

APPENDIX B


Home and Secondary Pages Design Options

Several Home page layout alternatives:





NAME of CASE

- CHIEF COMPLAINT
- HISTORY
- LIFESTYLE
- PHYSICAL EXAM
- LABORATORY VALUES
- MEDICATIONS
- DIAGNOSIS
- TREATMENT PLAN
- FOLLOW UP
- RESOURCES
- SEARCH




NAME of CASE

- CHIEF COMPLAINT
- HISTORY
- LIFESTYLE
- PHYSICAL EXAM
- LABORATORY VALUES
- MEDICATIONS
- DIAGNOSIS
- TREATMENT PLAN
- FOLLOW UP
- RESOURCES
- SEARCH



The following are secondary page layout options:



METABOLIC SYNDROME

CC

HISTORY

LIFESTYLE

PHY. EXAM

LABS

MEDS

DIAGNOSIS

TREAT. PLAN

FOLLOW UP

RESOURCES

SEARCH

HISTORY

Review of Systems (positives and pertinent negatives noted.):
No orthopnea, PND (paroxysmal nocturnal dyspnea), no dyspnea on exertion. He can walk approximately 1 mile in 30 minutes without dyspnea or chest discomfort. No blurry vision, no change in appetite. He has gained 20 pounds over the past year because he reports being "stressed" at work.

Other Medical History

- Hypertension - Diagnosed 5 years ago and treated with ACE inhibitors. No side effects noted from ACE and BP control has been excellent on the medications.
- Hypercholesterolemia - He has been on Simvastatin® 40 mg per day. Mr. M. reports occasional heartburn on this medicine.

Past Surgical History: None

Allergies: None

General Health Maintenance: Last tetanus shot unknown. Never had a pneumovax or flu vaccine. PSA normal with a normal prostate examination 6 months ago. Flexible sigmoidoscopy performed 8 years ago and negative.

Question 1


Asdlaitaao ladjfoetj adlitaldto oeto toj d ato ajdtooadauo altja lalita al;sd lita oraet a

A. liajdorjajaito
B. alkjroaer sikotjial
C. alkjoea tapjspe uta'y;
kdlijt aejlaks apoet a
D. liaejr pladj tat-wt i;dkk

Question 2

Asdlaitaao ladjfoetj adlitaldto oeto toj d ato ajdtooadauo altja lalita al;sd lita oraet a

A. liajdorjajaito
B. alkjroaer sikotjial
C. alkjoea tapjspe uta'y;
kdlijt aejlaks apoet a
D. liaejr pladj tat-wt i;dkk



METABOLIC SYNDROME

CC

HISTORY

LIFESTYLE

PHY. EXAM

LABS

MEDS

DIAGNOSIS

TREAT. PLAN

FOLLOW UP

RESOURCES

SEARCH

LABS

Chemistries (fasting)		
Sodium	141	135-145 mmol/L
Potassium	4.3	3.6-5.0 mmol/L
Chloride	100	98-109 mmol/L
CO2 content	24	22-31 mmol/L
BUN	14	7-21 mg/dl
Creatinine	1.0	0.6-1.2 mg/dl
Glucose	112	65-100 mg/dl

Lipids (fasting)	
Test	Patient Result
Total cholesterol	230
Triglycerides	280
HDL cholesterol	38
LDL cholesterol	135

CBC is normal

As the physician evaluates the lipid profile, any secondary causes for elevated cholesterol need to be ruled out.

Do you see evidence of any of the secondary causes of hypercholesterolemia?

YES NO

Using ATP III criteria how would you classify his serum triglyceride level?

WITHIN NORMAL LIMITS BORDERLINE HIGH HIGH

Question 1

The appropriate LDL level for the patient is

A. 122
B. 4
C. 50
D. 200

Question 2

A question here concerning HDL

A. liajdorjajaito
B. alkjroaer sikotjial
C. alkjoea tapjspe uta'y;
kdlijt aejlaks apoet a
D. liaejr pladj tat-wt i;dkk

Question 3

A question here concerning glucose.

A. liajdorjajaito
B. alkjroaer sikotjial
C. alkjoea tapjspe uta'y;
kdlijt aejlaks apoet a
D. liaejr pladj tat-wt i;dkk



METABOLIC SYNDROME

CC

HISTORY

LIFESTYLE

PHY. EXAM

LABS

MEDS

DIAGNOSIS

TREAT. PLAN

FOLLOW UP

RESOURCES

SEARCH

LABS

Chemistries (fasting)

Sodium	141	135-145 mmol/L
Potassium	4.3	3.6-5.0 mmol/L
Chloride	100	98-109 mmol/L
CO2 content	24	22-31 mmol/L
BUN	14	7-21 mg/dl
Creatinine	1.0	0.6-1.2 mg/dl
Glucose	112	65-100 mg/dl

Lipids (fasting)

Test	Patient Result
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LDL cholesterol	135

CBC is normal

Question 1

The appropriate LDL level for the patient is

- A. 122
- B. 4
- C. 50
- D. 200

Question 2

As the physician evaluates the lipid profile, any secondary causes for elevated cholesterol need to be ruled out.

Do you see evidence of any of the secondary causes of hypercholesterolemia?

- A. Yes
- B. No

Question 3

Using ATP III criteria how would you classify his serum triglyceride level?

- A. Within normal limits
- B. Borderline high
- C. High

Question 4

A question here concerning HDL

- A. liajdorjajaito
- B. aljkroaer slkotjjal
- C. alkjoea tapjspe uta'y; kdlijt aejlaks apoet a
- D. liaejr pladj tat-wt i;dkk

Question 5

A question here concerning glucose.

- A. liajdorjajaito
- B. aljkroaer slkotjjal
- C. alkjoea tapjspe uta'y; kdlijt aejlaks apoet a
- D. liaejr pladj tat-wt i;dkk

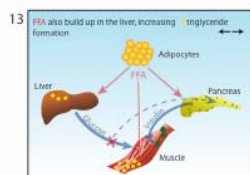
APPENDIX C

Animation Storyboards

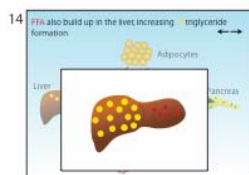
Final storyboard for the Insulin Resistance animation:

June 28, 2006

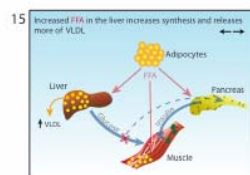
<p>1</p> <p>Metabolic Consequences of Insulin Resistance</p> <p><small>Sources: Eckel, Grundy and Zimmet, The Lancet, 2005 Abate, Journal of Diabetes and its Complications, 2000 Belinda Klein ©2006</small></p>	<p>2</p> <p>Instructions: Use the set of arrows ↔ in the upper right hand corner to navigate through the animation. Click the → arrow to proceed to the next step or click the ← arrow to go back to the previous step.</p>	<p>3</p> <p>Healthy adipocytes prompt normal levels of triglycerides and glycogen in liver and muscle</p>
<p>Title comes in first</p> <p>Then source info and copyright</p> <p>Trans: Text fades out</p>	<p>Fade in instruction information</p>	<p>Have glycogen and trig. symbols fade in the organs</p>
<p>4</p> <p>Obese individuals have more adipocytes and about twice as much fat stored in each cell</p>	<p>5</p> <p>Greater adiposity increases release of free fatty acids (FFA)</p>	<p>6</p> <p>Increased FFA enter the muscle increasing triglycerides</p>
<p>Enlarge and multiply the adipocytes</p> <p>Slight color change will also help</p>	<p>Have red arrows grow towards each of the organs</p>	<p>This frame stays a background to the enlarged muscle inset</p> <p>Fade back the rest</p> <p>Start enlarging the muscle in the frame</p>
Project: Insulin Resistance Animation	Client: __Thesis/Dr. Carson	© Belinda Klein 2006
<p>7</p> <p>Increased FFA enter the muscle increasing triglycerides</p>	<p>8</p> <p>Higher levels of FFA impair action of insulin in muscle cells</p>	<p>9</p> <p>Glucose attempts to enter the muscle but can NOT because insulin receptors are NOT available</p>
<p>Previous slide stays as the background faded back</p> <p>in the enlarged window of the muscle</p> <p>add 4 more trig. to the muscle</p>	<p>Have the Insulin line grow and move into the muscle</p>	<p>Have the Glucose arrow grow and move just outside of the muscle</p> <p>Red "X" appears</p>
<p>10</p> <p>Therefore, FFA inhibit insulin mediated uptake of glucose by the muscle. triglyceride levels in the muscle drop</p>	<p>11</p> <p>Serum glucose levels increase</p>	<p>12</p> <p>In creased glucose stimulates the pancreas to release more insulin</p>
<p>Previous slide stays as the background faded back</p> <p>Fade in enlarged muscle inset</p> <p>In the inset show the Glycogen fade away down to 3 in the muscle</p>	<p>Show Glucose arrow thickening</p>	<p>Show a new arrow going from the "X" to the Pancreas - dashed</p> <p>Thicken blue Insulin arrow and "X"</p>
Project: Insulin Resistance Animation	Client: __Thesis/Dr. Carson	© Belinda Klein 2006



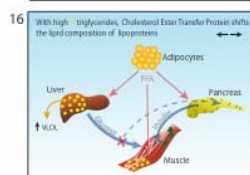
Fade back (50 - 60%) blue lines/arrows, red "X", and red arrows
This is the background for the enlarged inset of the liver



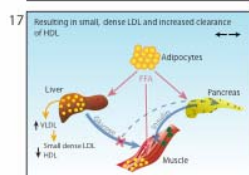
Previous slide stays as the background faded back
FFA are fading into the liver (red circles)
Add more Trigly. in the liver



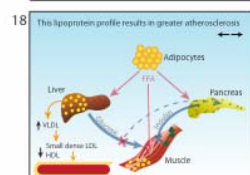
Make arrow from Trig. in liver to "increased VLDL" text



No animation shown here



Fade in main text
Make and grow the second orange arrow and fade in the wording at the end

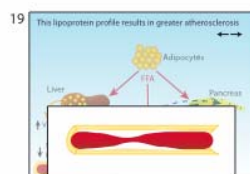


Fade in next orange arrow
Fade in Blood vessel

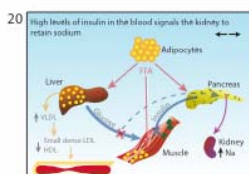
Project: Insulin Resistance Animation

Client: ___Thesis/Dr. Carson

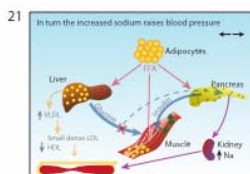
© Belinda Klein 2006



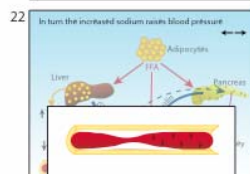
Previous slide stays as the background faded back
Enlarge inset of the BV and build up plaque in the vessel



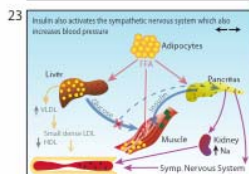
Fade back the VLDL chain of events.
Fade in Kidney
Fade in "increase Na"



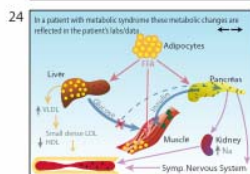
Add purple arrow from kidney to the BV



Previous slide stays as the background faded back
Add purple arrow from kidney to the BV
Add black arrows to show pressure



Add purple arrow from Pancreas to SNS words
Fade in "Sym Ner. Syst."
Fade in purple arrow from SNS to BV
Cont. to Show arrows pushing in BV

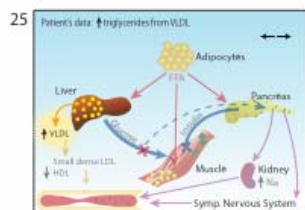


Fade purple arrows
Fade "increased Na"

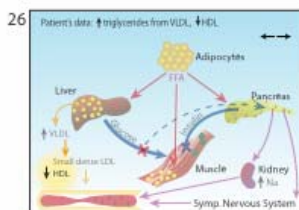
Project: Insulin Resistance Animation

Client: ___Thesis/Dr. Carson

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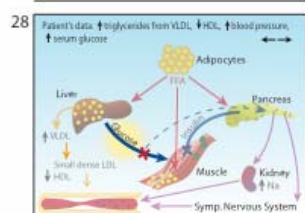
Everything except the liver, 1st orange arrow and "Increase VLDL" are faded back
Create a glow behind the "increased VLDL"



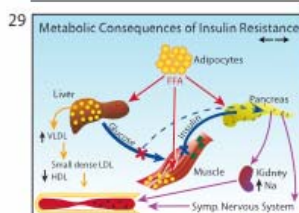
Everything except 2nd orange arrow Increase op. of "Decreased HDL" are faded back
Create a glow behind the "decreased HDL"



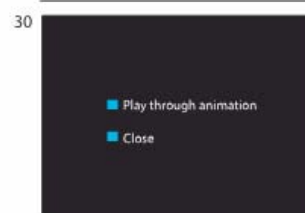
Everything except 3rd orange arrow and both last purple arrows are faded back
Glow behind the blood vessel



Everything except thick blue arrow and the word glucose are faded back
Glow behind glucose arrow



Everything at 100% opacity



Fade out to a black screen

Project: Insulin Resistance Animation

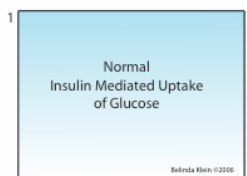
Client: ___Thesis/Dr. Carson

© Belinda Klein 2006

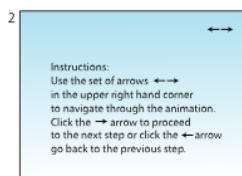
Continued on next page.

Normal glucose mediated uptake animation's final storyboard:

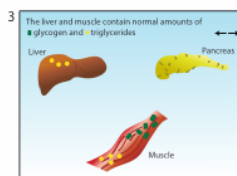
July 11, 2006



Trans: Fade out title

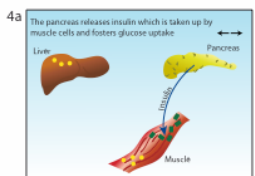


Fade in instruction information

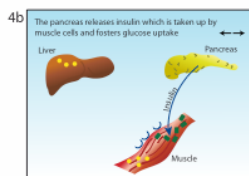


Fade in organs

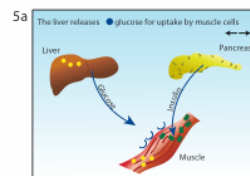
Have glycogen and trig. symbols fade in the organs



Move an arrow from the pancreas to the muscle



Create a receptor on muscle surface

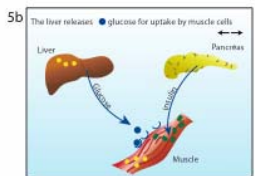


Have arrow grow from the liver to the muscle

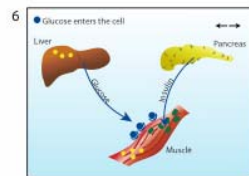
Project: Insulin Resistance Animation

Client: ___Thesis/Dr. Carson

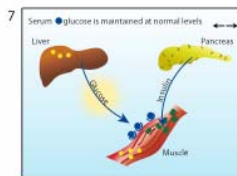
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Fade in a glucose moving towards the receptors on the muscle



Finish moving in glucose in receptors



Show glow behind "glucose"

Trans: Fade to Black



Project: Insulin Resistance Animation

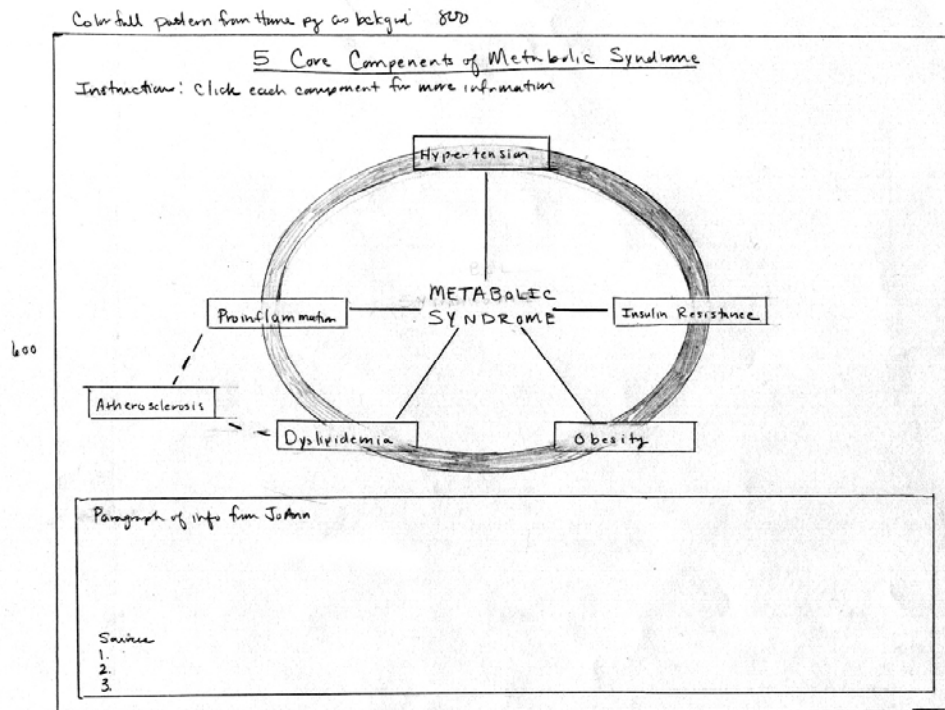
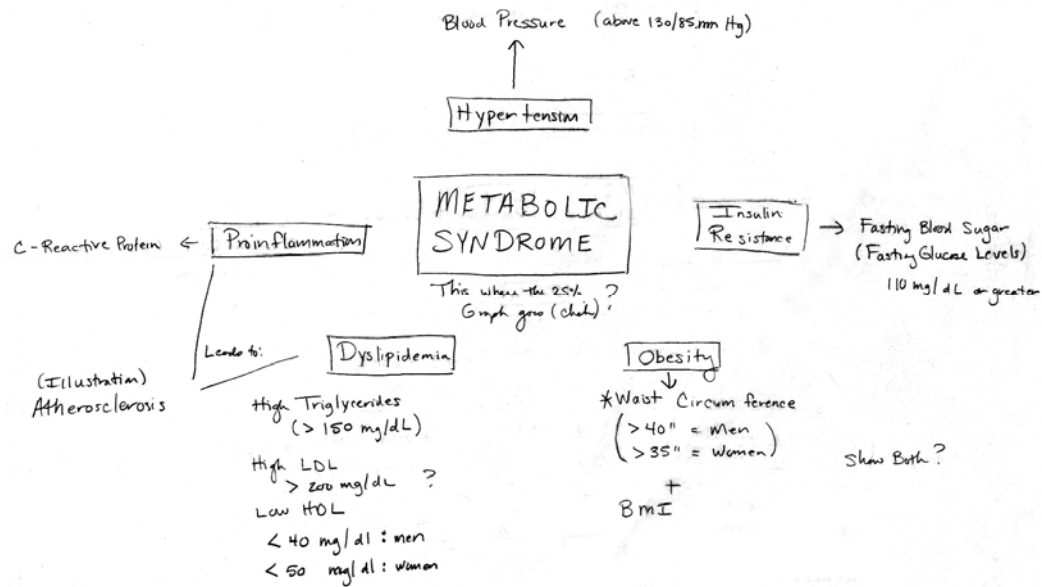
Client: ___Thesis/Dr. Carson

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APPENDIX D

Metabolic Syndrome Interactive Diagram Sketches

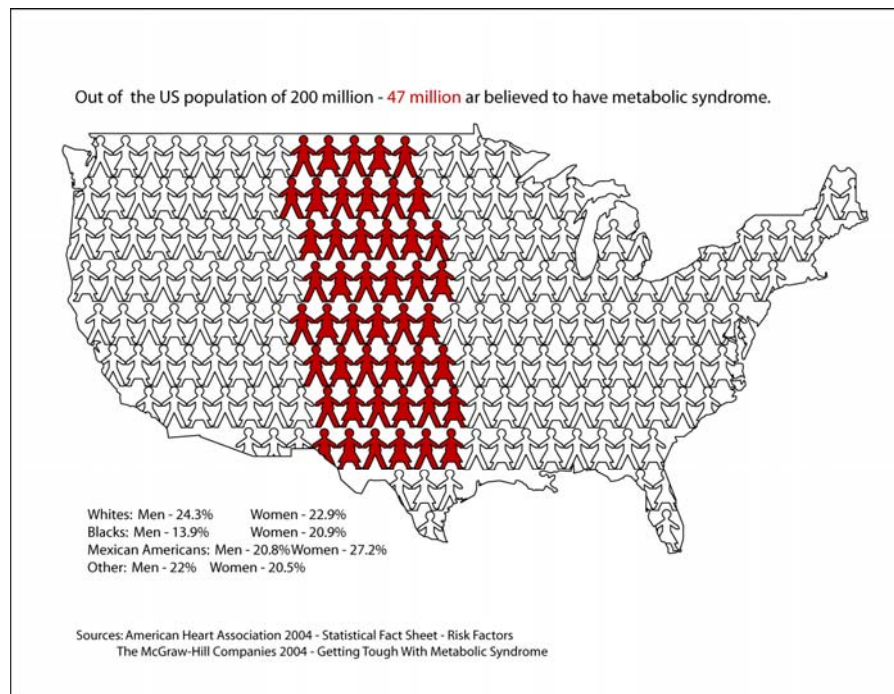
Several sketch ideas of interactive diagrams:

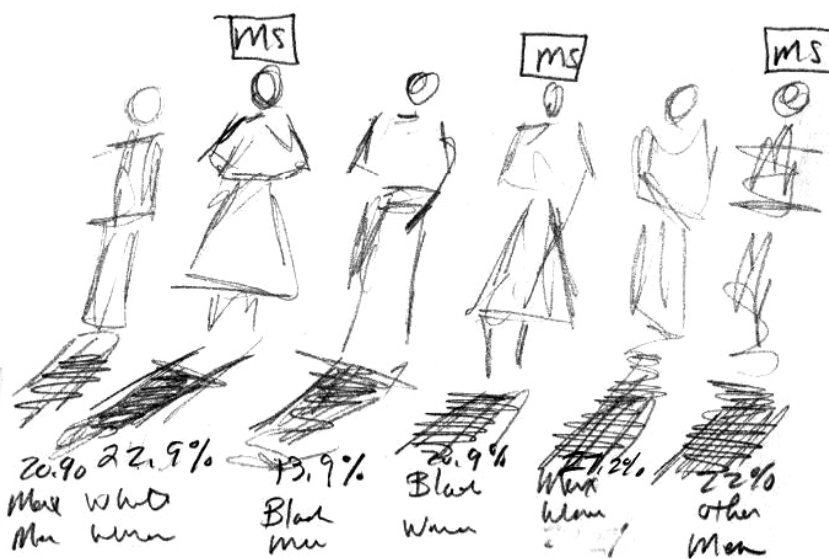
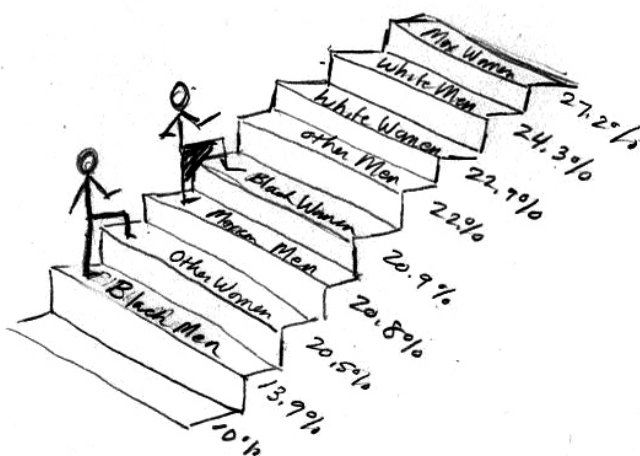


APPENDIX E

Metabolic Syndrome Prevalence Graph Sketches

The following are different sketch ideas to illustrate metabolic syndrome statistics:





12 people - indicates 3 of them

WHO
HAS
Met Synd.?

Average of 12 patients a day
3 will have

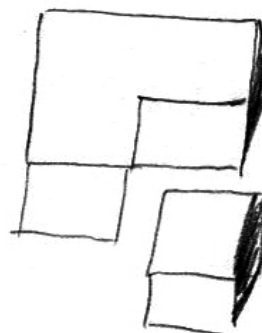
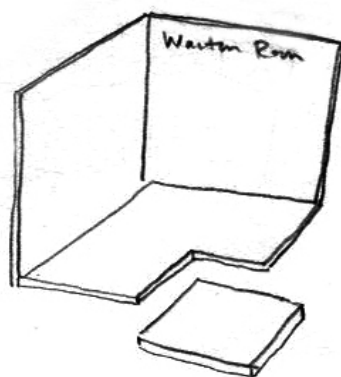
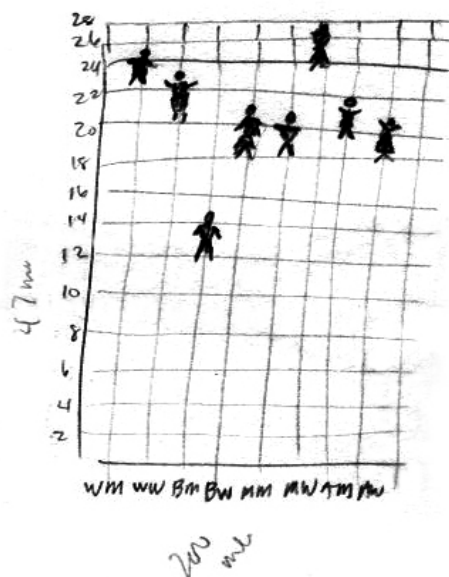
200 million US people

47 million have Met Syn.

Use the apple to indicate what signs



Patient charts stretched (12) a folders
Flay 3



APPENDIX F

Printer PDF Files

The printer PDF file, which includes the patient information:

CARDIOVASCULAR PATIENT CASE STUDY:

CASE INFORMATION

CHIEF COMPLAINT

Mr. Johnson is a 56 year old white male who takes medications for hypertension. He made this appointment with his new primary care physician after seeing a story on the television news regarding heart attacks in middle aged men.

HISTORY of PRESENT ILLNESS

Review of Systems: (positives and pertinent negatives noted.): He walks approximately 1 mile in 30 minutes without dyspnea or chest discomfort. No blurry vision, no change in appetite. He has gained 20 pounds over the past year because he reports being "stressed" at work.

Other Medical History: Hypertension - Diagnosed 5 years ago and treated with ACE inhibitors. No side effects noted from ACE and BP control has been excellent on the medications.

Past Surgical History: None

Family History: Father had a non-fatal MI at age 53 and a fatal MI at age 55. Mother died at age 71 in an accident. He has two living brothers, one of whom has CHD.

Allergies: None

General Health Maintenance: Last tetanus shot 4 years ago. PSA normal with a normal prostate examination 6 months ago. Colonoscopy 4 years ago. Flexible sigmoidoscopy performed 8 years ago and negative.

LIFESTYLE

To assess his lifestyle habits, keep **WAVE** in mind:

Weight: stable around 180lbs until weight gain of 20 lbs within the last year.

Activity: sedentary, works at desk on computer most of the day as an economist. In the evenings, he reads, watches television and surfs the Internet.

Variety in the diet and Excess in the diet can be observed by reviewing his intake from a 3 day food record and computerized nutrient analysis. Because he is concerned about heart disease, you will want to note less beneficial foods high in saturated and trans fat and cholesterol, as well as beneficial foods high in fiber.

Mr. Johnson's 3 day food record:**DAY 1****Breakfast**

2% milk (1/2 cup)
 Corn flakes (1 cup)
 Sugar (1 tsp)
 Grape juice (6 fl oz)

Lunch

Spaghetti with meat sauce (2 cups)
 Garlic bread (1 slice)
 Tossed salad (1 cup)
 Italian salad dressing (2 Tbsp)

Dinner

Chicken breast (6 oz)
 Chicken flavored rice (3/4 cup)
 Mixed broccoli, carrots, & cauliflower (3/4 cup)
 White wine (6 fl oz)

Snack

2% milk (1 cup)
 Lemon meringue pie (1 slice)
 Coffee with cream & sugar
 (4 cups during the day)

DAY 2**Breakfast**

Coffee with cream and sugar (1 cup)
 2% milk (1/2 cup)
 Corn flakes (1 cup)
 Sugar (1 tsp)
 Apple juice (6 fl oz)

Snack

Coffee with cream and sugar (1 cup)

Lunch

No lunch

Snack

Roasted peanuts (2 oz)

Dinner

Steak, eye of round beef (6 oz)
 Steak sauce (2 Tbsp)
 Mashed potatoes (3/4 cup)
 Margarine (1 Tbsp)
 Broccoli, steamed (1/2 cup)
 Cheese sauce (2 Tbsp)
 Red wine (6 fl oz)

Snack

2% milk (1 cup)
 White cake with icing (1 piece)
 Coffee with cream and sugar (1 cup)

DAY 3**Breakfast**

Egg, fried (1 egg)
 Sausage link, pork (3 links)
 Toast, white bread (2 slices)
 Margarine (1 Tbsp)
 Orange juice (6 fl oz)

Lunch

Fish sandwich
 French fries (2 oz)
 Beer (12 fl oz)

Dinner

Chicken a la King (10.6 oz dinner)
 Dinner roll (1 roll) with margarine (1 tsp)
 Green beans (3/4 cup)
 Rice, white (1 cup)
 White wine (6 fl oz)

Snack

Nacho tortilla chips (4 oz)
 Beer (24 fl oz)
 Coffee with cream and sugar
 (2 1/2 cups during the day)

Tobacco and alcohol: He is a non-smoker. He drinks wine with dinner occasionally and consumes 6-10 beers per week. No history of drug use.

Dietary Intake: Computerized nutrient analysis of his food record indicated an average daily intake of:

Kilocalories	2525
Protein	98gm
Carbohydrate	259gm
Fat	99gm
Saturated Fat	30gm
Monounsaturated Fat	37gm
Polyunsaturated Fat	22gm
Cholesterol	389mg
Dietary Fiber	10gm
Sodium	3660mg

Explanation of terms in Glossary

PHYSICAL EXAM

Blood pressure: 135/84 sitting

Pulse: 80 beats per min;

Respiratory rate: 11 breaths per min;

Temperature: 37 °C.

Height: 5'10"

Weight: 202 lbs.

Waist circumference: 42 inches

General: Overweight white man in no distress.

Head, Eyes, Ears, Nose, Throat: Pupils equal, round, reactive to light and accommodation; extraocular movements intact; oropharynx clear; tympanic membranes normal.

Neck: No thyromegaly, no lymphadenopathy, no jugular venous distension appreciated, no carotid artery bruits.

Cardiovascular: Regular rate and rhythm; point of maximum impulse at 5th left intercostal space; no murmurs, rubs or gallops.

Lungs: Clear to auscultation bilaterally.

Abdomen: Soft, non-tender, not distended, + bowel sounds x 4 quadrants, no hepatosplenomegaly, no abdominal bruits.

Neurologic: Normal.

Extremities: No clubbing, cyanosis or edema; 2+ pulses bilaterally, normal perfusion.

LABS

Chemistries (fasting)		
Sodium	141	135-145 mmol/L
Potassium	4.3	3.6-5.0 mmol/L
Chloride	100	98-109 mmol/L
CO2 content	24	22-31 mmol/L
BUN	14	7-21 mg/dl
Creatinine	1.0	0.6-1.2 mg/dl
Glucose	112	65-100 mg/dl

Lipids (fasting)	
Test	Patient Result
Total cholesterol	230 mg/dl
Triglycerides	280 mg/dl
HDL cholesterol	38 mg/dl
LDL cholesterol	135 mg/dl

CBC is normal

MEDICATIONS

His current meds include:

Capoten (captopril) 25 mg bid

No over the counter medications or dietary supplements

The reference printing PDF file for the patient case study:

CARDIOVASCULAR PATIENT CASE STUDY: REFERENCE INFORMATION

DIAGNOSIS

Refer to the three resources (A- C) below to gain an understanding of the underlying issues with this patient.

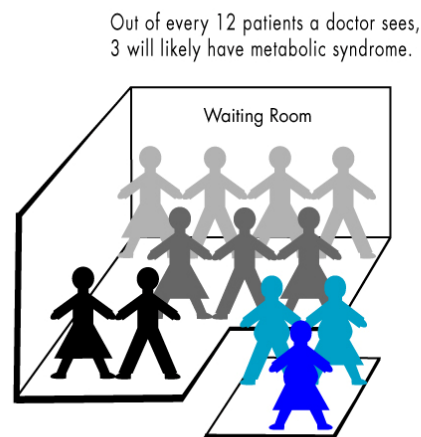
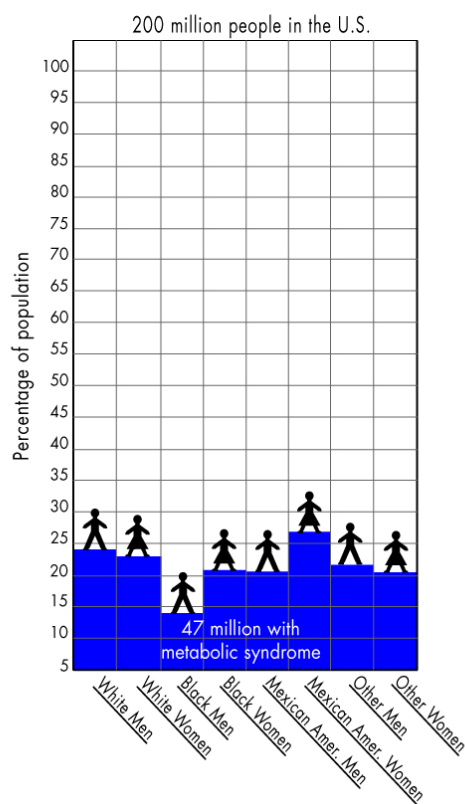
A. 6 Components of Metabolic Syndrome

Metabolic syndrome is a group of metabolic abnormalities that are associated with risk for cardiovascular disease. Each abnormality can be identified and treated individually, but some view the multiplicity of risk factors as deserving of its own diagnosis and treatment plan. With either philosophy, lifestyle intervention can improve the various components.

Metabolic Syndrome: Also termed Syndrome X or insulin resistance syndrome, metabolic syndrome is defined by several criteria. Although the World Health Organization and the International Diabetes Federation have similar criteria, the recent American Heart Association and the National Heart, Lung and Blood Institute criteria provide a clinically practical system with a focus on cardiovascular risk.

It is estimated that at least one fourth of the US adult population meets the criteria for metabolic syndrome. The proportion increases among older patients.

APPROXIMATELY 25% OF THE AMERICAN POPULATION
HAS METABOLIC SYNDROME



Sources: American Heart Association 2004 - Statistical Fact Sheet - Risk Factors
The McGraw-Hill Companies 2004 - Getting Tough With Metabolic Syndrome
Ford E, Giles W, Dietz W. Prevalence of the metabolic syndrome among US adults.
JAMA. 2002;287:356-359.

1. **Hypertension:** Both higher levels of insulin resulting in insulin resistance and obesity can raise blood pressure, resulting in hypertension.

2. **Insulin Resistance:** In insulin resistance, the capacity of insulin to promote glucose transport into the cell is reduced. Excessive body fat contributes to insulin resistance and abnormalities in how the body handles glucose and fat. Insulin resistance may be indicated by sophisticated euglycemic clamp studies, by oral glucose tolerance tests (in WHO criteria) or simply fasting blood glucose (in the AHA/NHLBI criteria).

3. **Prothrombotic State:** Common within metabolic syndrome are factors conducive to clot formation, including increased plasminogen activator inhibitor (PAI)-1 and fibrinogen.

4. **Obesity:** Obesity (defined as a body mass index of 30 or greater) and especially abdominal obesity has an unfavorable effect on the other clinical parameters—blood pressure, triglycerides, HDL cholesterol and insulin resistance. Abdominal obesity is defined clinically by use of waist circumference or waist to hip ratio.

5. **Proinflammatory:** An increased inflammatory response (as evidenced by higher levels of C-reactive protein or CRP) is frequently present with metabolic syndrome. Atherogenesis is now viewed to result as an inflammatory process

6. **Dyslipidemia:** The pattern of serum lipids seen in the background of insulin resistance and abdominal obesity is specific. An increase in free fatty acids entering the liver results in production and release of triglyceride-rich VLDL. In the setting of hypertriglyceridemia, cholesterol content of other lipoproteins is reduced, resulting in lower HDL levels and a smaller, more dense LDL particle.

Atherosclerosis: How do the dyslipidemia and proinflammatory environment of metabolic syndrome contribute to greater atherogenesis?

The changes in lipid metabolism result in a lipid profile that increases plaque formation.

- The smaller, more dense LDL particles that are generally present with higher triglyceride and lower HDL levels appear more atherogenic than larger particles. They may be cleared from circulation more slowly, more easily oxidized and retained more tightly when they enter the intima of the artery wall.
- High serum triglyceride levels that result from higher amounts of Very Low Density Lipoproteins can also result in greater influx of lipoproteins into the artery wall.
- Lower levels of High Density Lipoproteins reduce the mechanism available for carrying cholesterol away from artery walls.

The proinflammatory environment evidenced by inflammatory markers, such as C-reactive protein and cytokines results in endothelial dysfunction and a setting conducive to greater development of plaque within arteries.

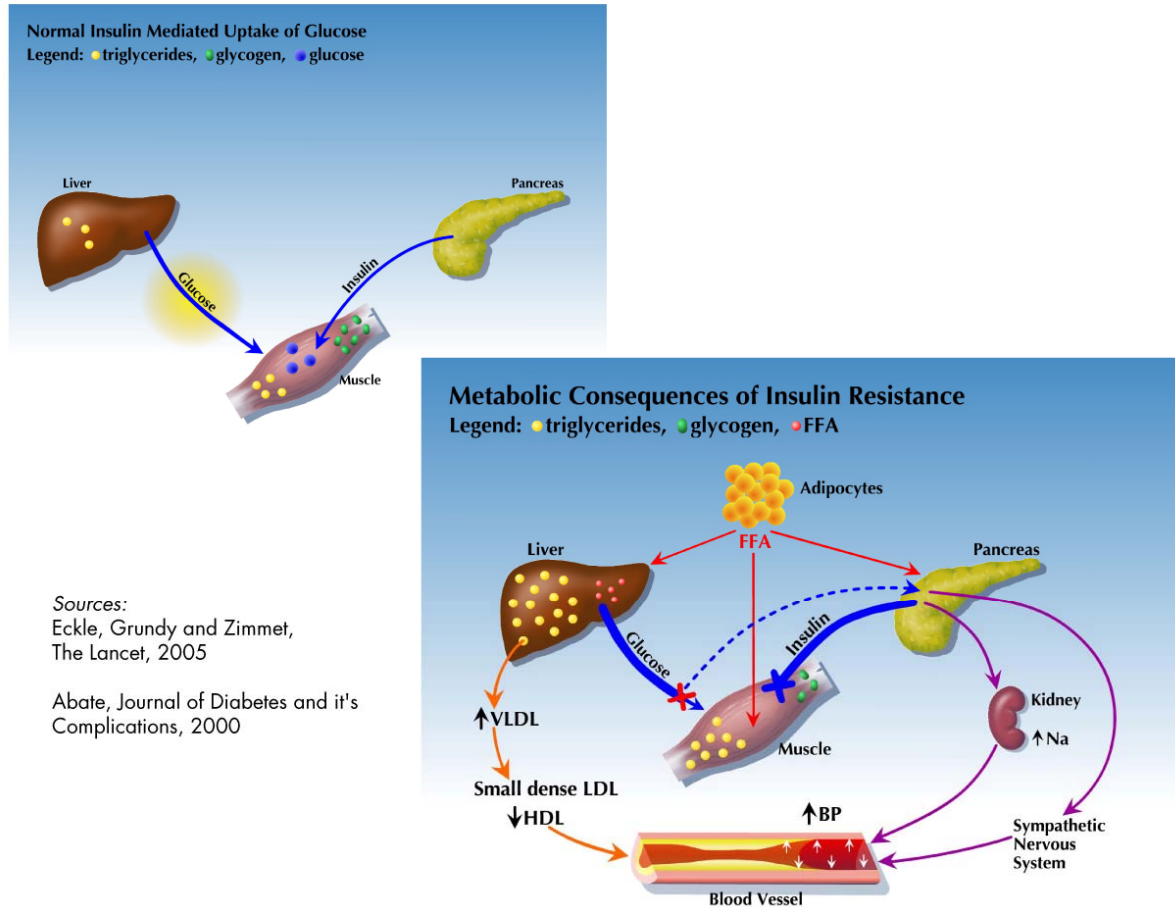
Sources:

Krauss RM. Triglyceride-rich lipoproteins, LDL particle size, and atherogenesis. Presentation at the American Association of Clinical Endocrinologists Ninth Annual Meeting and Clinical Congress, 2006. Available at <http://www.medscape.com/viewarticle/420330>. Accessed on August 30, 2006.

Paoletti R, Gotto AM, Hajjar DP. Inflammation in atherosclerosis and implications for therapy. *Circulation*. 2004; 109:III-20-III-26.

B. Metabolic Consequences of Insulin Resistance

The “Normal” diagram shows the insulin process in a healthy individual. The “Insulin Resistance” diagram shows how it results in the parameters of metabolic syndrome.”



C. Criteria for Diagnosis of Metabolic Syndrome

As you diagnose this patient, you will use the AHA/NHLBI diagnostic criteria, which indicate that the presence of at least 3 of 5 criteria result in a diagnosis of metabolic syndrome. The 5 criteria are **bulleted** below.

Hypertension

- **Elevated blood pressure:** ≥ 130 mm Hg systolic BP or ≥ 85 mm Hg diastolic BP or on medication for HTN

Insulin Resistance

- **Fasting glucose:** ≥ 100 mg/dL or on medication for elevated glucose

Source: Grundy, et al. Diagnosis and Management of the Metabolic Syndrome: An American Heart Association/National Heart, Lung, and Blood Institute Scientific Statement. Circulation. 2005;112:2735-2752.

Obesity

- **Waist circumference:** ≥ 40 inches in men ≥ 35 inches in women

Note: Lower values for Asians - Lower waist circumference cut point (eg, ≥ 90 cm [35 inches] in men and [31 inches] in women) appears to be appropriate for Asian Americans.

Dyslipidemia

- **TG** ≥ 150 mg/dL
 - **HDL** < 40 mg/dL in men < 50 mg/dL in women
- or on meds to treat TG or HDL - Fibrates and nicotinic acid are the most commonly used drugs for elevated TG and reduced HDL-C. Patients taking 1 of these drugs are presumed to have high TG and low HDL.

TREATMENT**4 Key Aspects of Metabolic syndrome****Hypertension**

Lifestyle recommendations (based on JNC 7):

- Lose weight or maintain weight within a healthy range of a BMI of 18.5 - 24.9.
- Follow the DASH Eating Plan rich in fruits and vegetables and lowfat dairy products.
- Reduce dietary sodium to 2,400 mg or less.
- Include regular aerobic physical activity at least 30 minutes on most days.
- Limit alcohol intake to < 2 drinks/day for men and < 1 drink/day for women.

Medications based on the JNC 7 algorithm that includes thiazide-type diuretics in Stage 1 Hypertension without compelling indications with consideration for other agents as shown on the JNC 7 reference card (<http://www.nhlbi.nih.gov/guidelines/hypertension/phycard.pdf>)

Source: Hark LA, Parker R, Deen DD, Pi-Sunyer FX. Metabolic syndrome: a time for action. In: Carson JAS, Burke FM, Hark LA. Cardiovascular Nutrition: Disease Management and Prevention. Chicago, IL: American Dietetic Association, 2004.

Insulin Resistance

Fasting glucose > 100 mg/dL

Lifestyle modification includes:

- Weight reduction if overweight
- Increased physical activity
- Moderate carbohydrate intake with a focus on higher fiber options

Medications, depending upon extent of insulin resistance and glucose levels, can extend from metformin, other oral anti-diabetic agents and insulin.

Source: Hark LA, Parker R, Deen DD, Pi-Sunyer FX. Metabolic syndrome: a time for action. In: Carson JAS, Burke FM, Hark LA. Cardiovascular Nutrition: Disease Management and Prevention. Chicago, IL: American Dietetic Association, 2004.

Obesity

Lifestyle modification focuses:

- Negative energy balance
One approach is to create a 500 calorie daily deficit to result in a one pound loss per week.
- For some patients, medications, such as sibutramin or orlistat can be helpful.
- For patients who meet NIH defined criteria, including a BMI in excess of 35 (see http://www.nhlbi.nih.gov/guidelines/obesity/sum_clin.htm) bariatric surgery may be indicated.

Source: Hark LA, Parker R, Deen DD, Pi-Sunyer FX. Metabolic syndrome: a time for action. In: Carson JAS, Burke FM, Hark LA. Cardiovascular Nutrition: Disease Management and Prevention. Chicago, IL: American Dietetic Association, 2004.

Dyslipidemia

High serum triglyceride (> 150 mg/dL)

Lifestyle modification includes:

- Weight reduction if overweight
- Increased physical activity
- Moderate carbohydrate intake with a focus on higher fiber options
- Moderate fat intake with inclusion of omega-3 choices
- Limit alcohol

Medications can include fibrates and/or nicotinic acid.

Low HDL (<40 mg/dL for men and <50 mg/dL for women)

Lifestyle modification includes:

- Weight reduction if overweight
- Increased physical activity
- Balance of slightly higher healthy fat and lower carbohydrate intake

Medications can include fibrates and/or nicotinic acid

Insulin Resistance (Fasting glucose >100 mg/dL)

Lifestyle modification includes:

- Weight reduction if overweight
- Increased physical activity
- Moderate carbohydrate intake with a focus on higher fiber options

Medications, depending upon extent of insulin resistance and glucose levels, medications can extend from metformin, other oral anti-diabetic agents and insulin.

Source: Hark LA, Parker R, Deen DD, Pi-Sunyer FX. Metabolic syndrome: a time for action. In: Carson JAS, Burke FM, Hark LA. Cardiovascular Nutrition: Disease Management and Prevention. Chicago, IL: American Dietetic Association,

ATP III Risk Factors

Major Risk Factors (exclusive of LDL Cholesterol) that Modify LDL Goal *

1. Cigarette smoking
2. Hypertension (BP>140/90 mmHg or on anti-hypertensive medication)
3. Low HDL cholesterol (<40 mg/dL)**
4. Family history of premature coronary heart disease (CHD in male first degree relative <55 years; CHD in female first degree relative <65 years)
5. Age (men >45 years; women >55 years)

* In ATP III (Adult Treatment Panel III), diabetes is regarded as a CHD risk equivalent.

** HDL cholesterol >60 mg/dL counts as a "negative" risk factor; its presence removes one risk factor from the total count.

Source: National Cholesterol Education Program, ATP III

LDL Goal and Treatment According to Risk Category by Update to ATP III

Risk Category	LDL-Cholesterol Goal	LDL Level at which to Initiate Therapeutic Lifestyle Changes (TLC)	When to begin Medications
High Risk: CHD or CHD Risk Equivalents (10-year risk > 20%)	< 100 mg/dL (optional goal: <70 mg/dL)	≥ 100 mg./dL	≥ 100 mg./dL
Moderately High Risk: 2+ Risk Factors (10-year risk 10%-20%)	< 130 mg/dL	≥ 130 mg./dL	≥ 130 mg/dL (100-129 mg/dL, consider drug options)
Moderate Risk: 2+ Risk Factors (10-year risk <10%)	< 130 mg/dL	≥ 130 mg./dL	≥ 160 mg/dL
Lower Risk: 0-1 Risk Factor	< 160 mg/dL	≥ 160 mg./dL	≥ 190 mg/dL (160-190 mg/dL; LDL-lowering drug optional)

Source: Adapted from Grundy SM et al. Implications of recent clinical trials for the National Cholesterol Education Program Adult Treatment Panel III Guidelines. Circulation. 2004;110:227-239.

Valuable Web Links

ATP III: <http://www.nhlbi.nih.gov/guidelines/cholesterol/index.htm>

JNC 7: <http://www.nhlbi.nih.gov/guidelines/cholesterol/index.htm>

BMI Calculator: www.nhlbi.nih.gov/guidelines/obesity/ob_home.htm

The Framingham Risk Score can be calculated from the web site:

<http://hp2010.nhlbiin.net/atpiii/calculator.asp?usertype=prof>

Patient Booklet, Aim for a Healthy Weight

http://www.nhlbi.nih.gov/health/public/heart/obesity/aim_hwt.htm

Abdominal Fat

A higher waist circumference is indicative of abdominal or truncal obesity. It can include excess visceral fat (that which is stored within the abdomen around internal organs) as well as excess subcutaneous fat. Although some have focused on the relationship of visceral fat to insulin resistance, increased abdominal fat - whether it is deeply internal as visceral fat or just below the skin as subcutaneous fat - is associated with insulin resistance. Horizontal images of the abdomen recorded using Magnetic Resonance Imaging can reveal various amounts of visceral and subcutaneous fat. **Image A** illustrates a somewhat typical distribution of visceral (highlighted in orange) and subcutaneous fat (highlighted in yellow). **Image B** from an obese patient illustrates significant subcutaneous fat highlighted in yellow. **Image C** illustrates significant visceral fat (highlighted in orange) without excess subcutaneous fat. This distribution can explain how someone may not be viewed as obese, but have the abdominal fat associated with insulin resistance. Some evidence indicates that insulin resistant patients participating in weight loss interventions reduce both visceral and subcutaneous abdominal fat, improving insulin sensitivity.

Sources:

Abate N, Chandalia M, Snell PG, Grundy SM. Adipose tissue metabolites and insulin resistance in nondiabetic Asian Indian men. *J Clin Endocrinol Metab.* 2004; 89:2750-2755.

Abate N, Garg A, Peshock RM, Stray-Gundersen J, Adams-Huet B, Grundy SM. Relationship of generalized and regional adiposity to insulin sensitivity in men with NIDDM. *Diabetes.* 1996; 45:1684-1693.

Chandalia M, Abate N, Garg A, Stray-Gundersen J, Grundy SM. Relationship between generalized and upper body obesity to insulin resistance in Asian Indian men. *J Clin Endocrinol Metab.* 1999;84:2329-2335.

Villareal DT, Banks M, Sinacore DR, Siener C, Klein S. Effect of weight loss and exercise on frailty in obese older adults. *Arch Intern Med.* 2006; 166:860-866.

Image A - Typical

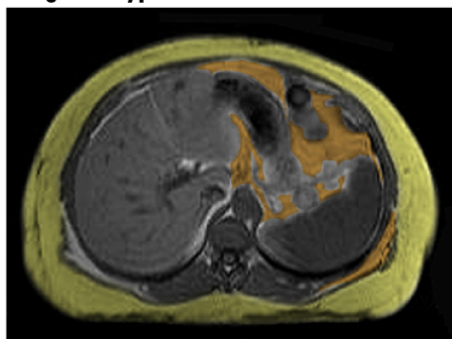


Image B - Subcutaneous

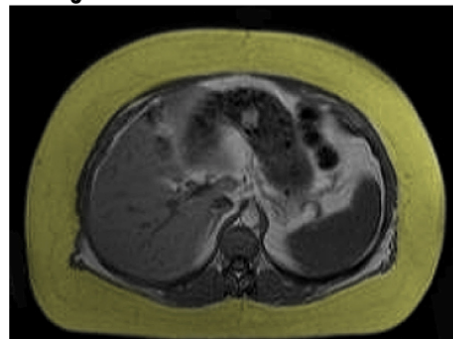
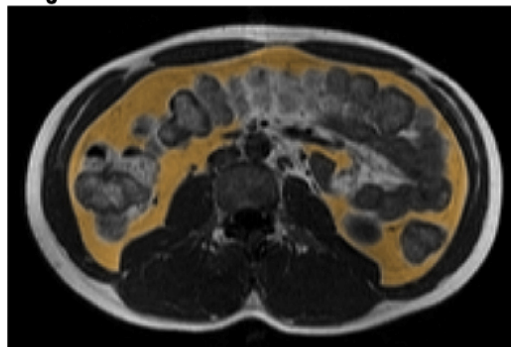


Image C - Visceral



Components of Therapeutic Lifestyle Changes (TLC)

• Limit LDL raising nutrients	o <7% kcal from sat fat
	o <200 mg chol/day
	o Limit trans fat
• Add therapeutic options	o 2 gm plant stanol/day
	o 10-25 gm viscous (soluble) fiber/day
• Balance total calories	Adjust total caloric intake to maintain desirable body wt/prevent wt gain
• Include physical activity	Include enough moderate exercise to expend at least 200 kcal/day
• Distribute macronutrient calories	25% to 35% of energy from fat
	15% of energy from protein
	50% to 60% of energy from carbohydrate (with 20 to 30 gm dietary fiber)
Source: Adapted from National Cholesterol Education Program, Adult Treatment Panel III, Table V.2-1	

Lifestyle Modification

Control portions to promote energy balance

Helping patients to select reasonable portions is important (and sometimes difficult when we get used to restaurant-sized portions). Here are some examples of appropriate portions sizes:

Traditional Portion vs Recommended Portion

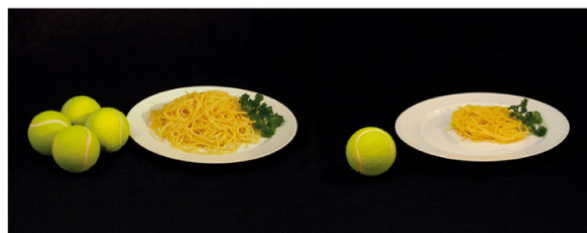


Cereal - 2 baseballs = 2 oz vs 1 baseball = 1 oz

Traditional Portion vs Recommended Portion



Peanut Butter - 2 ping pong balls = 4 Tbsp or 2 oz vs 1 ping pong ball = 2 Tbsp or 1 oz



Pasta - 4 tennis balls = 8 oz vs 1 tennis ball = 2 oz



Steak - 2 deck of cards = 6 oz vs 1 deck of cards = 3 oz

Traditional Portion vs Recommended Portion

Mashed Potatoes - 2 baseballs = 2 cups vs
1 baseball = 1 cup

Traditional Portion vs Recommended Portion

Orange Juice - 1 1/2 cups = 12 oz vs 1 cup = 8 oz



Ice Cream - 4 golf balls = 1 cup vs 2 golf balls = 1/2 cup

For more portion examples

http://www.eatsmartmovemorenc.com/resources/documents/modules/portion sizes/ps_whatinserving.pdf

Source: <http://www.eatsmartmovemorenc.com>

Limit sugary beverages to promote energy balance

Drinking one's calories makes it more difficult to recognize how many calories one is consuming. Sodas and fruit juices are particular culprits. Helping clients switch to water or skim milk can promote weight loss. A patient at a stable weight who cuts out one 12 ounce sugared soda per day and makes no other changes can lose 15 pounds in a year.

Select fat carefully

- Some people think that the healthiest fat option is a very low fat plan. However, a heart healthy diet, especially one that lowers serum triglyceride and raises HDL cholesterol includes moderate amounts of heart healthy unsaturated fat. Monounsaturated fatty acids contain only one double bond, in the omega-9 position. Polyunsaturated fats can be omega-3 or omega-6 fats.

Monounsaturated Fat:

- Olive oil (and olives)
- Avocado
- Canola oil
- Many nuts, including peanuts, pecans, almonds, pistachios, and macadamia nuts.

According to ATP III, the recommended range of dietary fat is 25% to 35% of energy. The inclusion of monounsaturated fat to reach the higher end of the range lowers triglyceride levels and raises HDL levels when compared to a diet with only 25% of energy from fat.

Polyunsaturated Omega-3:

- Fatty fish, such as salmon, tuna and sardines
- Ground flaxseed (and flaxseed oil)

Epidemiological studies indicate that consuming 7 ounces of fatty fish weekly is associated with a reduction in a 30% to 40% reduction in death from heart disease in a healthy population. Randomized clinical trials (with 1 g omega-3/day) decreased risk of cardiac events in patients with established heart disease. Patients should limit intake of fish likely to be high in mercury, such as swordfish and shark. The benefit of omega-3 fatty acids from plant sources is less clear. In addition to flaxseed that is rich in omega-3, walnuts, canola oil and soybean oil provide small amounts of alpha-linolenic acid, the plant-derived omega-3 fat.



Polyunsaturated Omega-6:

- Vegetable oils, such as safflower, corn and sunflower
 - Nuts, including walnuts and pine nuts
- Replacing saturated fat with unsaturated fat in the diet lowers LDL cholesterol. Nuts, whether they contain primarily mono- or polyunsaturated fat, can lower LDL cholesterol when they replace meats and whole fat dairy products high in

saturated fat. The US Food and Drug Administration's qualified health claim states that eating 1.5 ounces per day (a good sized handful) as part of a diet low in saturated fat and cholesterol may reduce risk of heart disease.

- Although it is good to include some heart healthy fats, limit LDL-raising fats, saturated and trans fats, as much as possible.

Saturated Fat:

- Fatty meats, such as marbled steak and pork chops
- Poultry skin
- Dairy fat in whole milk and cheese

Saturated fat intake is the most significant dietary influence on high LDL cholesterol among Americans. To lower saturated fat to the recommended <7% of energy, meat selections should be from very lean cuts of meat and dairy products should be fat-free or no more than 1% dairy fat.



Trans Fat:

- Commercially fried foods, such as French fries
 - Bakery products made with partially hydrogenated oils, such as cookies, pie crusts, fried pies and other pastries
 - Stick margarine
- Trans fats raise total and LDL cholesterol and may lower HDL cholesterol, resulting in less optimum total cholesterol/HDL cholesterol ratios. Epidemiological data associate higher consumption of trans fat with greater risk for heart disease.

Include dietary fiber

The indigestible components of plants are fiber, some are insoluble in water and others are soluble. It appears that soluble fiber is especially helpful in lowering LDL cholesterol. Keeping one's fiber at the higher end of the 20-35 g/day recommendation can help to lower triglyceride and possibly raise HDL cholesterol.

Some people like to get a substantial amount of fiber (perhaps 13 g) from a serving of bran cereal for breakfast, but including fiber throughout the day is a good approach:

- At breakfast, choose whole fruit rather than juice and whole grain cereal
- For lunch, select whole grain breads for a sandwich or have a big salad.
- For dinner, include a salad and at least a cup of high fiber vegetables

Good sources of soluble fiber include:

Barley
Oatmeal and oat bran
Kidney beans
Winter squash
Eggplant
Pear
Mango
Orange
Brussels sprouts
Okra



Increase physical activity

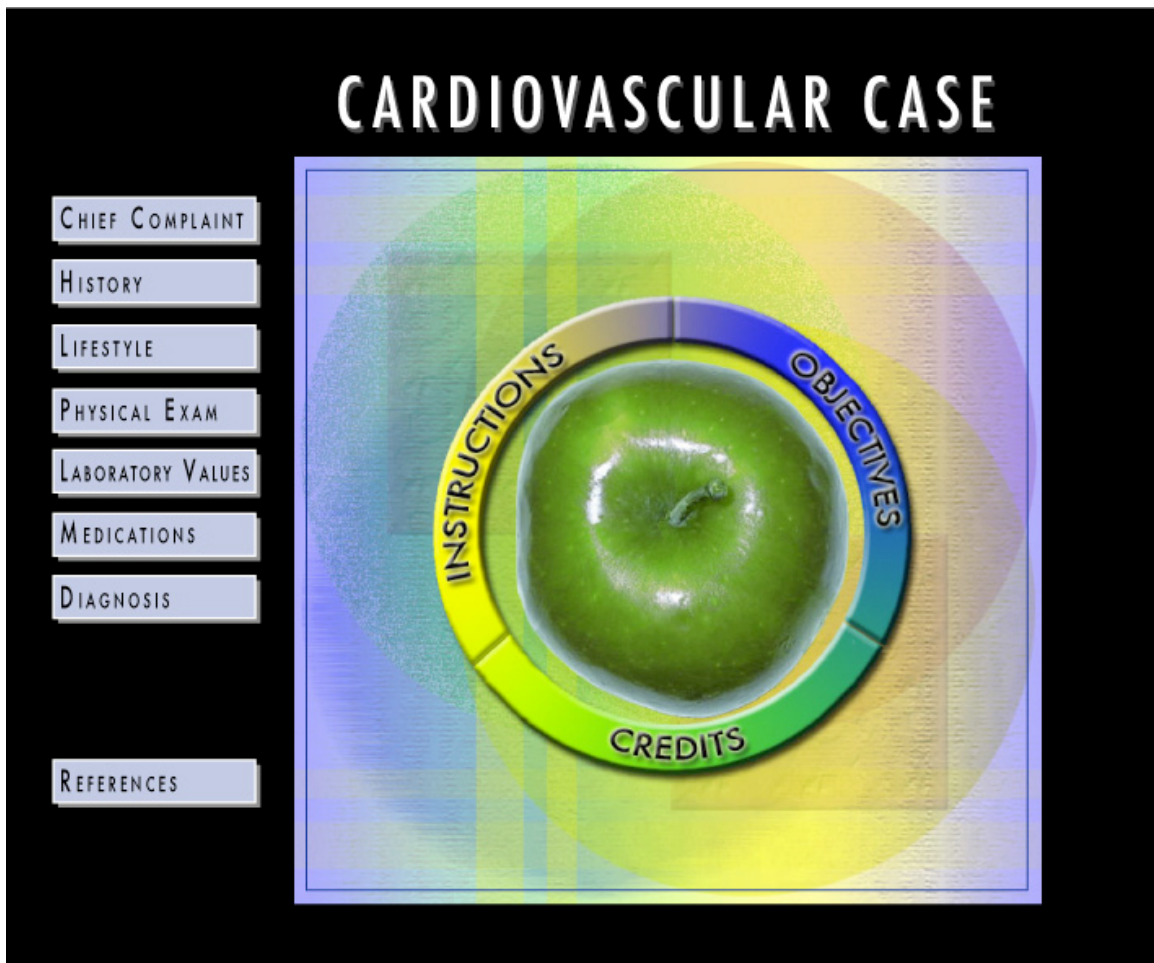
Increasing physical activity is a key component of treating metabolic syndrome. It can be a challenge for patients in whom obesity or cardiac function has limited physical abilities. These patients can benefit from referral to a physical therapist.

In general, the following principles are valuable:

- Include intentional physical activity daily
 - 30 minutes to promote cardiovascular fitness
 - 30-60 minutes to prevent weight gain
 - 60-90 minutes to maintain weight loss
- Track daily activity with a pedometer (optimally individuals take at least 10,000 steps per day, with 12,000-15,000 to support weight loss efforts)
- Increase activities in daily living by parking further away, climbing stairs, pacing while talking on the phone, etc.
- Decrease inactivity by reducing time spent watching television, sitting at the computer and playing video games.

APPENDIX G

Production Workflow Documentation and Reference Guide



Computer-Based Cardiovascular Patient Case Study
For the Medical Students during Clinical Years
Created by: Belinda Klein
October 2006

Production Workflow Documentation and Reference Guide

Computer-Based Cardiovascular Patient Case Study

Table of Contents

	Page
I. File Organization-----	4-6
A. Artwork-----	4
1. Food Photos	
2. Graphs	
3. Insulin Res Animation	
4. MRIs	
B. MS Website-----	4
1. Images -----	4
a. – k. sub-folders -----	5
2. Links -----	5
C. Web Content -----	6
D. Web Templates -----	6
1. Home Page	
2. Interactive Buttons	
3. Interactive Diagrams	
4. Printer PDF files	
5. Secondary Pages	
E. Work Flow Document-----	6
II. Naming Conventions -----	7-14
A. Main File names-----	7
1. Most files names	
2. Multiply page layouts	
3. Files for References Pages	
B. Images file names -----	7
1. Button files names -----	7
2. Diagnosis Metabolic Syndrome Diagram-----	8
3. Food photos-----	8
4. home_pg_images -----	9
5. Metabolic Syndrome Diagram -----	10
6. mris -----	10
7. Button images for the first 7 main pages and Reference set “a” -----	11
8. Button images for the Follow Up, Treatment, and Reference set ”b” -----	11
9. Metabolic Syndrome Diagram in the Treatment Section -----	12
C. Link files names-----	12

1. Majority of Links -----	12
2. Diagnosis Metabolic Syndrome Diagram, Metabolic Syndrome Diagram, and Treatment Page links -----	13
3. Follow Up Links -----	13
4. Lifestyle Page 2 Links-----	14
5. Question Feedback-----	14
III. Artwork-----	15-25
A. Templates -----	15-16
1. Home Page-----	15
2. Interactive Buttons-----	15
3. Interactive Diagrams-----	16
4. Printer PDF files -----	16
5. Secondary Pages -----	16
B. Animations -----	17-18
1. Flash files (fla) -----	17
a. File organization-----	17-18
2. Swf files -----	18
3. Jpg files-----	18
C. Photos-----	18-19
1. Food Photos-----	18-19
2. MRIs-----	19
D. Graphs -----	19
E. HTML pages -----	20
1. Page Organization-----	20-22
a. Navigation -----	20-21
b. Division of materials -----	21
i. White Box	
ii. Blue Box	
c. Printer PDF button-----	22
2. Cascading Style Sheets (CSS styles)-----	22-25
a. Secondary Windows-----	22-23
b. Pop-up Windows -----	23-25

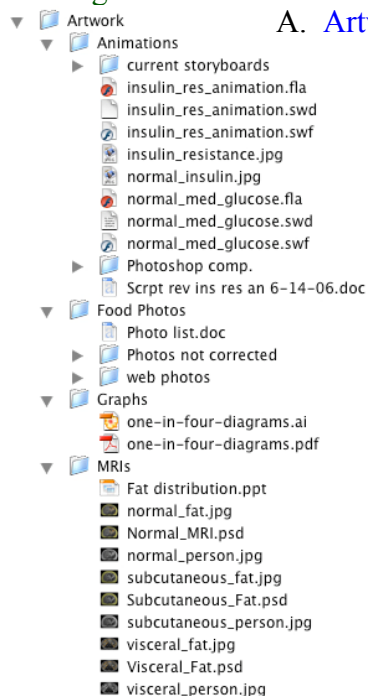
Production Workflow Documentation and Reference Guide

Computer-Based Cardiovascular Patient Case Study

I. File Organization:

There are 5 main folders on the CD that contain all of the files for the Cardiovascular Case website with multiply sub folders to organize the materials.

Image A



A. **Artwork** folder:

Contains 4 more folders with the original and editable art in their native applications (psd files for Photoshop®, ai files for Illustrator® files, fla files for Flash) for any artwork included in the website. **Image A**

1. **Animations**:

Within this folder are the original Flash files for both of the animations included in the website, **insulin_res_animation.fl** and **normal_med_glucose.fl**. The swf files and a folder with the storyboards have also been included.

2. **Food Photos**:

There are two folders within the **Food Photos** folder: **Photos not Corrected** and **web photos**. The **Photos not Corrected** folder includes individual folders for each type of food (cereal, fiber, and ice cream. etc). The **web photos** folder has the photos that are already sized, cropped, and color corrected for the website.

3. **Graphs**:

The original Illustrator® (ai) and the pdf file are included in this folder.

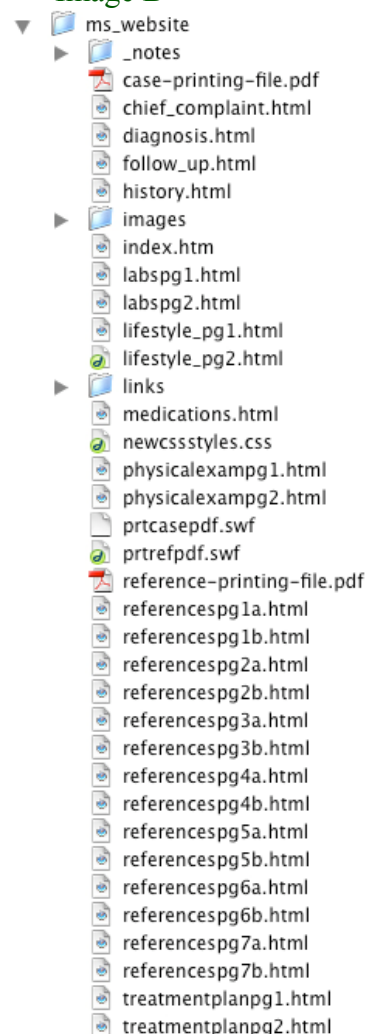
4. **MRIs**:

This folder contains the original Photoshop® layer files (psd) of all three MRIs, which has the highlighted color on a separate layer. The jpg MRI images files are used for image swamps in the website. The Power Point (ppt) document provided by Dr. Nicola Abate with the MRIs and explanation has been included.

B. **ms_website** folder: **Image B**

The main pages (html files) and the cascading style sheet (**newcssyles.css**) document for the website are included in this folder. There are 4 files within this folder that are not html files. These files concern the option of printing a pdf version of the website while in the browser. There

Image B



two Flash® buttons ([prtcasepdf.swf](#), [pritrpdf.swf](#)) placed on the secondary pages which to link to the print pdf files ([case-printing-file.pdf](#), [reference-printing-file.pdf](#)). The [_notes](#) folder was created by Dreamweaver® for the Flash® buttons. There are 2 sub-folders that were created to organize the site.

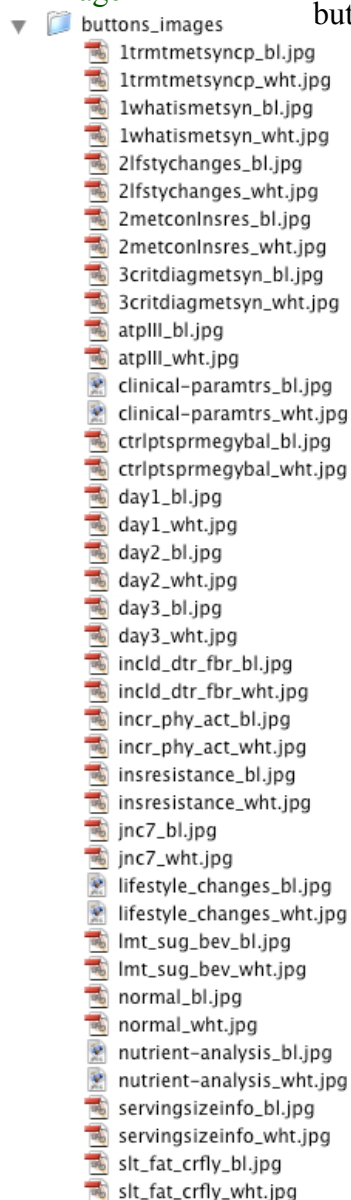
1. [images](#):

Image C



This folder has the images that were exported from Illustrator® and Photoshop® to build the design components (buttons, interactive diagrams, navigation arrows, patient photo, and graphs) for the website. These images are collected here for easy linkage to the website. **Note:** if an image file is removed from or moved within this folder/sub-folders the image will need to be re-linked on the page layout in Dreamweaver®. There will be an icon that appears in the page layout that indicates that the image link has been severed. [Image C](#)

Image D 2



There are several sub-folders within the images folder to separate images of buttons or for specific page layouts. [Image D 1](#)

a. [button_images](#): ([Image D2](#))

The files in this folder are the images exported from Illustrator® and Photoshop® for the interactive buttons in the white box or windows throughout the website.

b. [diagnosismet_syn_images](#):

This folder has all of the images required for the interactive Diagnosis Metabolic Syndrome diagram (Third button link on the main Diagnosis page layout). This file ([diagnosismetsynd.html](#)) is in the [diagnosismtsn_dgrmpg](#) folder within the [links](#) folder.

c. [Food_photos](#):

Within the images folder the food photography incorporated in several areas of the site has been collected in this folder.

d. [home_pg_images](#):

Contains all the images for the Home page ([index.htm](#)) layout. **Note:** this file ends in [.htm](#) (this is to accommodate the server)

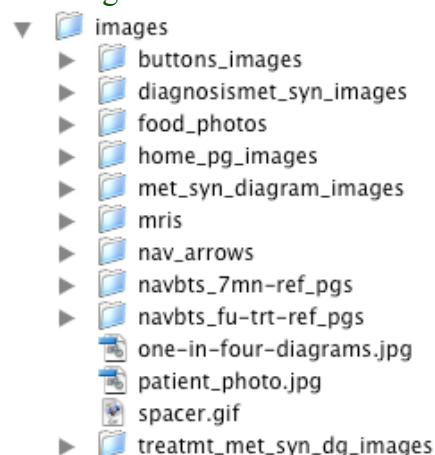
e. [met_syn_diagram_images](#):

The images for the Metabolic Syndrome Diagram (first link on the main Diagnosis page layout) have been collected in this folder. This file ([metsyndr_diagram.html](#)) is in the [met_syn_diagram](#) folder within the [links](#) folder.

f. [mris](#):

Within this folder are all of the MRI images (jpg) that are inserted in the [abdominal_fat.html](#) window.

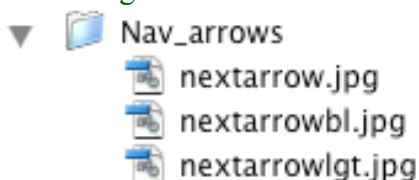
Image D 1



g. [nav_arrows](#): (Image D 3)

The main arrow image and the two files for the image swaps of the navigation arrows for the secondary pages are included in this folder

Image D 3



h. Buttons images for pages with 10 navigation buttons:

([navbts_7mn-ref_pgs](#)) The first 7 main pages (Chief Complaint – Diagnosis and set “a” of the References) have 10 navigation buttons on the left hand side of the page layout. The images for these buttons are included in this folder.

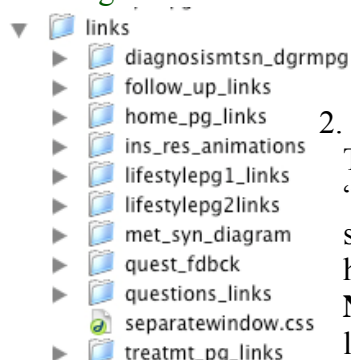
i. Button images for pages with 12 navigation buttons:

([navbts_fu-trt-ref_pgs](#)) The layouts for the Treatment, Follow Up, and set “b” of References has 12 navigation buttons on the left hand side of the page. The images for these buttons are included in this folder.

j. [treatmt_met_syn_dg_images](#):

This folder contains images for the interactive Metabolic Syndrome Diagram in the Treatment section of the website. This file ([treatmtmetsyndiag.html](#)) is in the [treatmt_pg_links](#) folder within the [links](#) folder.

Image E

2. [links](#):

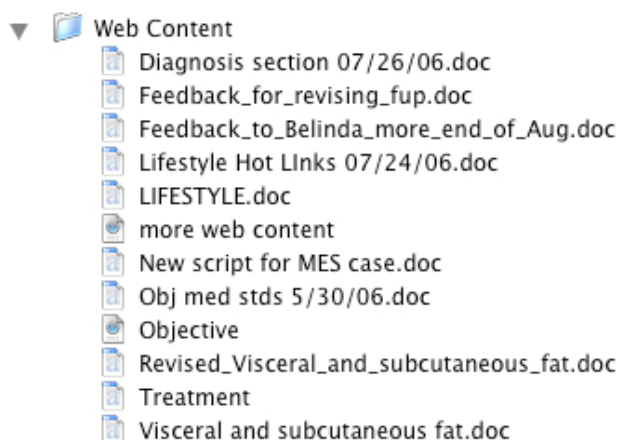
The html files within this folder are the documents created as separate “windows” that can be accessed throughout the website. The cascading style sheet ([separatewindow.css](#)) that dictates the look of the window layout has also been included in the [links](#) folder and in any other sub- folders.

Note: if a link file is removed from this folder the file will need to be re-linked in Dreamweaver® on the page layout that it is connected to.

a. Sub-folders:

Each sub-folder, within the [links](#) folder, has those specific window layouts that are linked to a particular page layout. (See Naming Conventions) Image E

Image F

C. [Web Content](#) folder: (Image F)

The original Word® documents that contain the web content provided by Dr. Jo Ann Carson and communication are included in this folder.

D. [Web Templates](#) folder: (Image G)

The files in this folder are native Illustrator® (ai) and Photoshop® (psd) files of web components before they

were exported for the Web, such as the buttons and interactive diagrams. There are five sub-folders to further organize the template materials.

1. [Home Page](#):

Contains the [Home Page template.ai](#) file and a folder that contains the images linked to this file ([Home images](#))

2. [Interactive buttons](#):

Within this folder are the templates used to build the interactive buttons for the website.

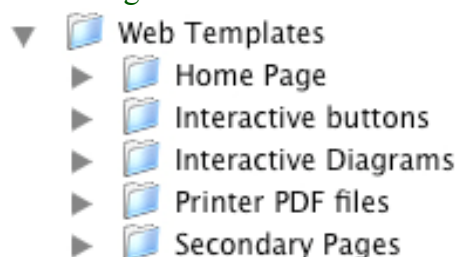
3. [Interactive Diagrams](#):

The three original Photoshop® files (psd) for the interactive diagrams included in the website are located in this folder.

4. [Printer PDF Files](#):

The patient case study has the option (button) for the website's content to be printed out from two pdf files. The building files are in Illustrator® and the support files are included in a sub-folder.

Image G



5. [Secondary Pages](#):

This folder has the template ([MS2ndpagetemp.sl.ai](#)) for all the secondary page layouts and the images linked to this file (jpgs). **Note:** this file was not used in its entirety for the html pages, only used for preliminary layout. The [2ndpgallbuttons.psd](#) file was used to “Save for Web” the buttons built for these pages.

E. [Work Flow document](#) folder:

This is the folder that contains this document in the original Word® format and the pdf file. There is a sub-folder that has all of the links placed in the Word® document for visual reference.

Production Workflow Documentation and Reference Guide

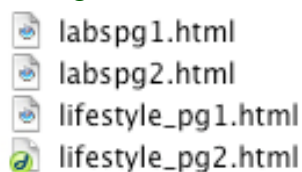
Computer-Based Cardiovascular Patient Case Study

II. Naming Conventions for Web Files:

The most *important aspects* in naming files for a website is the need to for lower case, no spaces, file extensions included, and to keep file names short.

Image H

A. Main File names:



1. Most files names:

As much as possible the files were named to specifically identify the name of the page's contents as it corresponds to the organization of the website. For example, [chief_complaint.html](#) shows the content for the Chief Complaint page of the website. See [Image B](#).

2. Multiply page layouts:

In some instances there is multiple page layouts for the content in that section. These are named with the page's name and a page number. For example, there are two page layouts for the Labs section of the website the file names are: [labspg1.html](#) and [labspg2.html](#). [Image H](#)

3. Files for References Pages:

There are two sets of References pages ("a" and "b"). This was done to keep students from prematurely having access to certain areas of the website. (Example files: [referencepg1a.html](#) and [referencepg1b.html](#)) ([Image I](#)) **Note:** Both sets look exactly the same, any changes need to be made to both sets.

- The Reference "a" set is linked to the pages (Chief Complaint, through Diagnosis) prior to the Treatment and Follow Up buttons being visible for students to access.
- The Reference "b" set is linked to the Treatment and Follow Up pages once they are available for access.

Image I

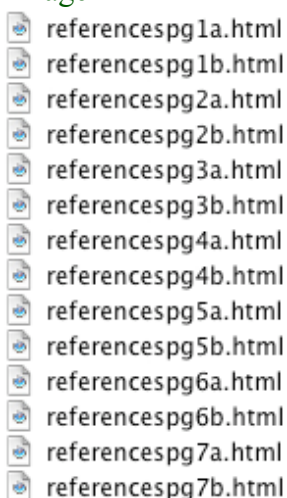


Image D 2 Note: not entire contents of folder.

Image J

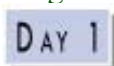


Image K



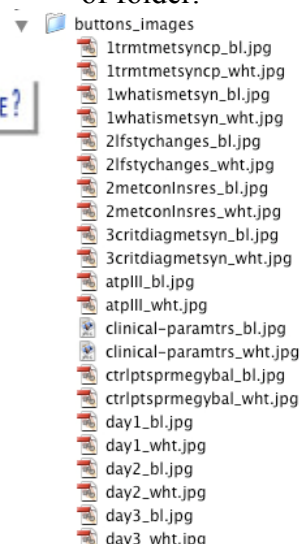
Image L



B. Images file names:

1. Button files names ([buttons_images](#) folder):

The files in this folder are the images exported from Illustrator® and Photoshop® for the interactive buttons in the white boxes and windows throughout website. The file names tend to be the wording on the button or an abbreviation. For example, [day1_bl.jpg](#),

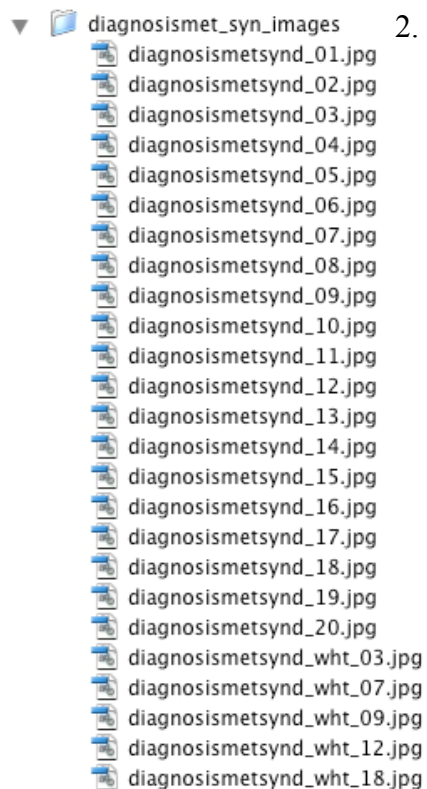


atpIII_bl.jpg, for an abbreviation 1whatismetsyn_bl.jpg. Image D 2

a. Button colors:

To make an image swap possible in Dreamweaver® each button layout has been created in two colors – for the up and down positions of the button. The button files names indicate which background color is being used with the addition of a “_bl” to signify a blue background and “_wht” signifies that the button has a white background. Sample files: day1_bl.jpg (Image J), day1_wht.jpg or 1whatismetsyn_bl.jpg. and 1whatismetsyn_wht.jpg (Images K and L).

Image M



2. Diagnosis Metabolic Syndrome Diagram: (diagnosismet_syn_images) The layout was originally built and sliced in Photoshop® (Image N). When Photoshop® exports the file for Web the program uses the file's name and numbered the slices 01 – 20. (diagnosismetsynd_01.jpg) The five buttons that interact have images, with “wht” and then also numbered. (diagnosismetsyn_wht_03.jpg) Image M

Image N

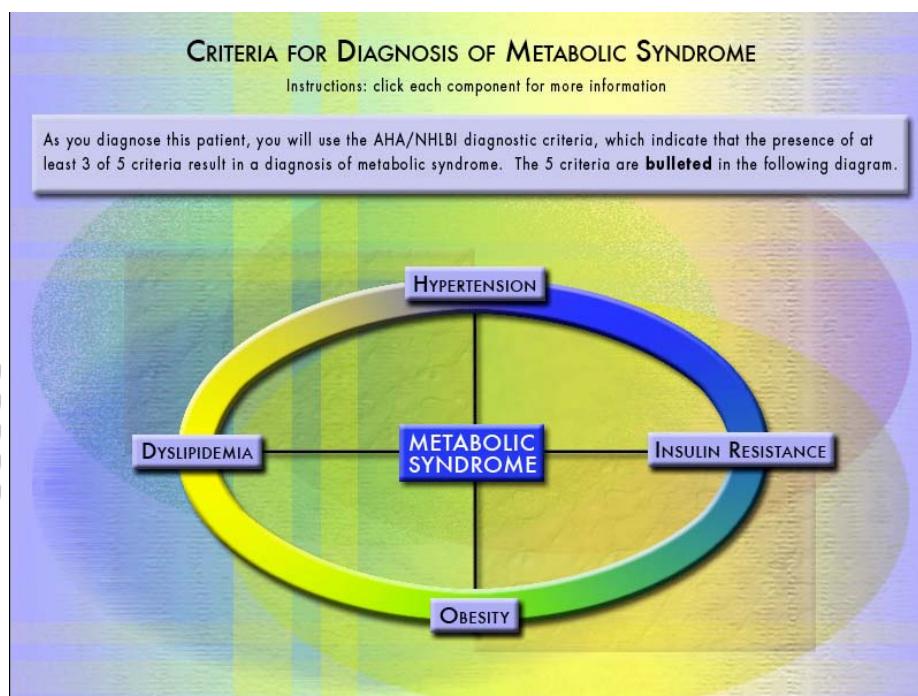
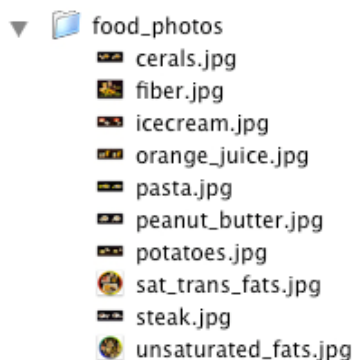


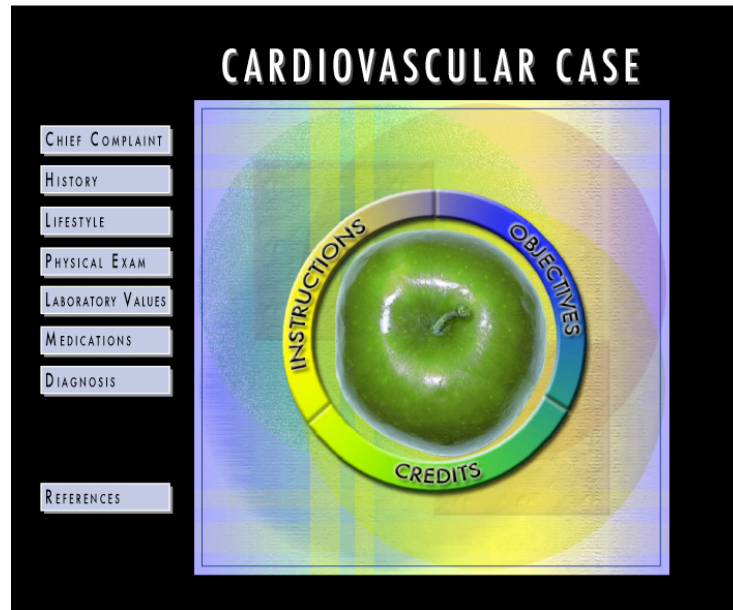
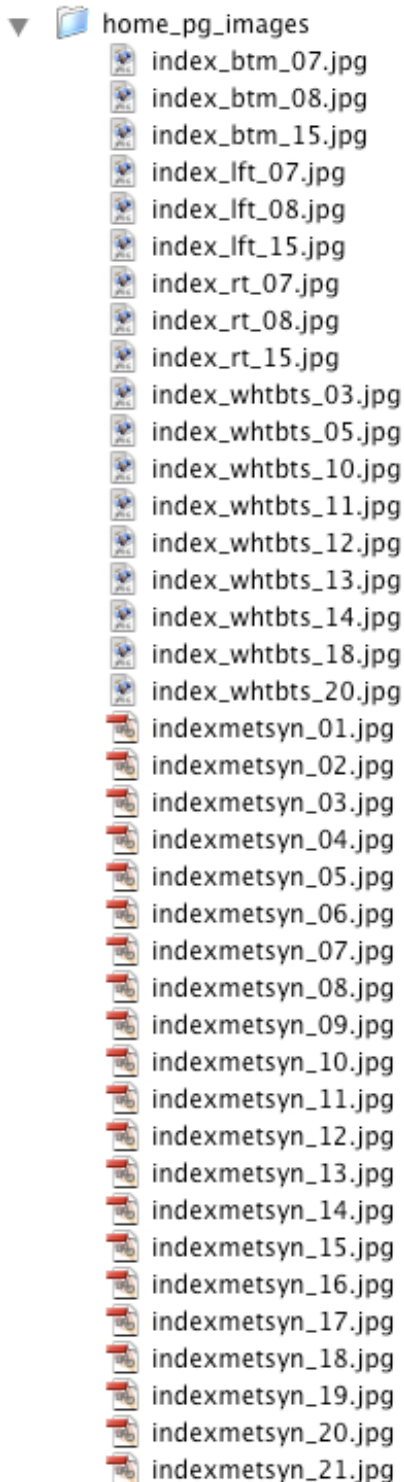
Image Q



3. Food photos:

Each photo is labeled with the food name (pasta.jpg) or the category of foods in the same photo (fiber.jpg, sat_trans_fats.jpg) Image O

Image P

4. [home_pg_images](#): (Image Q)

a. Index: Image P

It is the standard naming convention and Web server procedure to call the Home page layout “index”. Any file starting with the word “index” is related to the Home page layout. The [home_pg_images](#) folder contains all the images for the Home page layout that were exported from Photoshop®. Photoshop® exports the slices for Web use by using the file name, plus a number (Example: [indexmetsyn_01](#)).

b. Interactive Buttons:

The interactive buttons on the left side of the Home page also have images that will swap to make the button background white (Image Q). These 8 button images files have the file name, “_whtbts”, underscore, then and the number of the slice. (Example: [index_whtbts_03.jpg](#)) Image P

c. Apple Image:

Since slices can only be created with 4 straight sides (square or rectangle) the circular image is divided into 3 rectangles (Image Q). This creates some overlap of the apple image into all 3 slices. The areas of the apple have been indicated at the *left*, *right*, and *bottom*. For the image to show correctly all 3 slices are involved when each apple wedge appears cut. The images files will have *index* first, which section of the apple is going to show up cut, with the slice number. Example: [index_btm_07](#), [index_btm_08](#), [index_btm_15](#) are

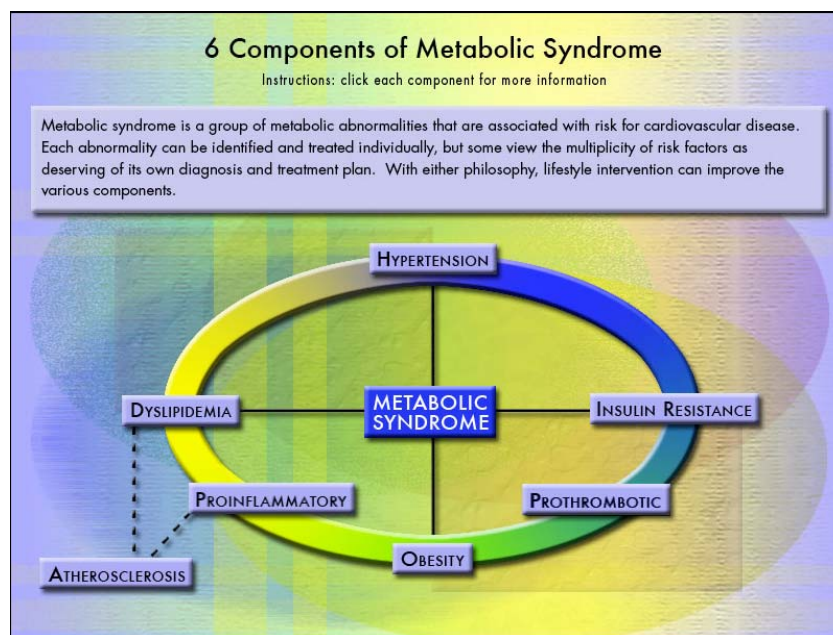
the three images that need to be swapped when the apple appears to be cut on the bottom one third of the image. **Image P**

Image R

- ▼ met_syn_diagram_images
 - met_syndromediagram_01.jpg
 - met_syndromediagram_02.jpg
 - met_syndromediagram_03.jpg
 - met_syndromediagram_04.jpg
 - met_syndromediagram_05.jpg
 - met_syndromediagram_06.jpg
 - met_syndromediagram_07.jpg
 - met_syndromediagram_08.jpg
 - met_syndromediagram_09.jpg
 - met_syndromediagram_10.jpg
 - met_syndromediagram_11.jpg
 - met_syndromediagram_12.jpg
 - met_syndromediagram_13.jpg
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 - met_syndromediagram_29.jpg
 - met_syndromediagram_30.jpg
 - met_syndromediagram_31.jpg
 - met_syndromediagram_32.jpg
 - met_syndromediagram_wht_03.jpg
 - met_syndromediagram_wht_07.jpg
 - met_syndromediagram_wht_09.jpg
 - met_syndromediagram_wht_12.jpg
 - met_syndromediagram_wht_18.jpg
 - met_syndromediagram_wht_21.jpg
 - met_syndromediagram_wht_26.jpg
 - met_syndromediagram_wht_29.jpg

5. Metabolic Syndrome Diagram ([met_syn_diagram_images](#)): This layout was originally built and sliced in Photoshop® (**Image S**). When the file was exported for the Web the Photoshop® program uses the file's name and numbered the slices 01 – 32. ([met_syndromediagram_01.jpg](#)) The eight buttons that interact have images, with “_wht” and then also numbered. ([met_syndromediagram_wht_03.jpg](#)) **Image R**

Image S



6. [mris](#): This folder has all of the MRI images needed for the [abdominal_fat.html](#) window. There are three sets of images included: *normal*, *subcutaneous*, and *visceral*. For the three sets of images, the main images have been indicated with “person” in the file name ([subcutaneous_person.jpg](#)) The image swap file has the word “Fat” included in the file name (an area in this image has been highlighted to show the fat in the MRI) ([subcutaneous_fat.jpg](#)) **Image T**

Image T

- ▼ mris
 - normal_fat.jpg
 - normal_person.jpg
 - subcutaneous_fat.jpg
 - subcutaneous_person.jpg
 - visceral_fat.jpg
 - visceral_person.jpg

Image U



7. Button images for the first 7 main pages and Reference set “a” ([navbtn_7mn-ref_pgs](#)):

The files are images for the interactive buttons on the left hand side of all of the pages. (Image U) These seven pages are considered to be secondary pages within the site, thus the file name starting with “2ndpage”. There is a blue and white background version for each button, indicated in the file name with either a “_bl” or a “_wht”, followed by a number that corresponds to how the image was sliced (2ndpagebuttonsb_l_02, 2ndpagebuttonswht_02). Image V

8. Button images for the Follow Up, Treatment, and Reference set “b” ([navbts_fu-trt-ref_pgs](#)): The files are images for the interactive buttons on the left hand side of all of these pages (Image X). These pages are considered to be secondary pages within the site and also have their file names beginning with “2ndpg”. There is a blue and white background version for each button. The “white” version is indicated in the file name with either a “_bl” or a “_wht”, followed by a number that corresponds to how the image was sliced (2ndpgallbuttonsb_l_02, 2ndpgallbuttonswht_02). Image W

Image W

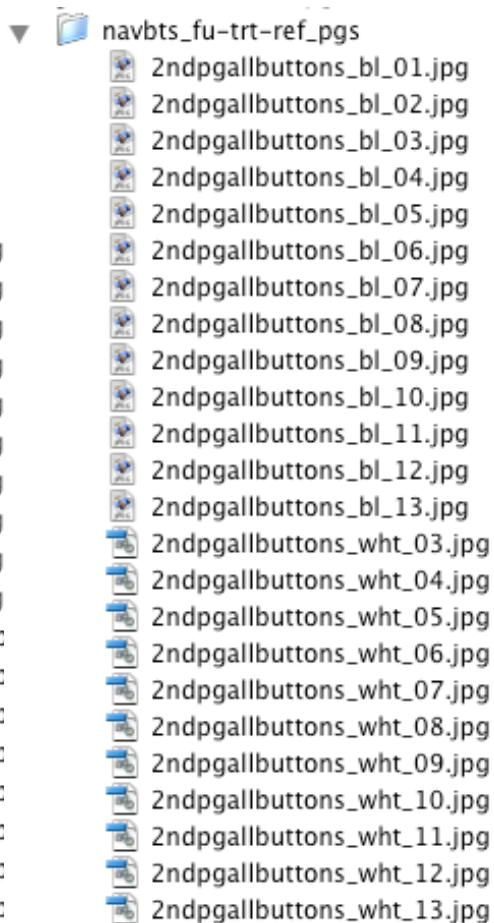


Image X



Image V

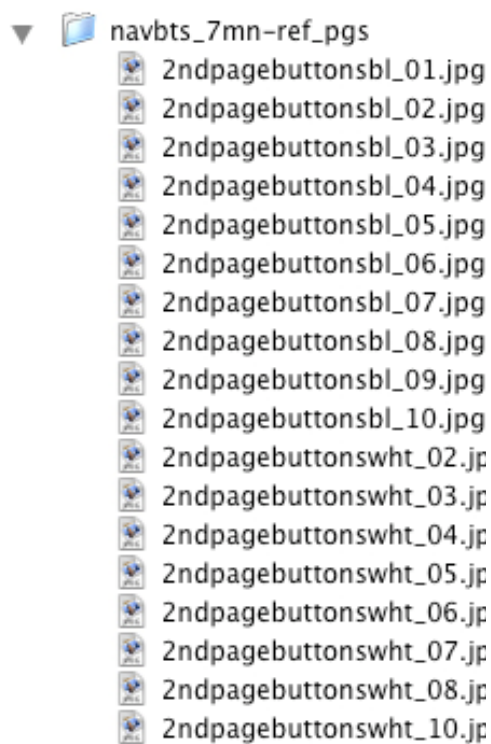
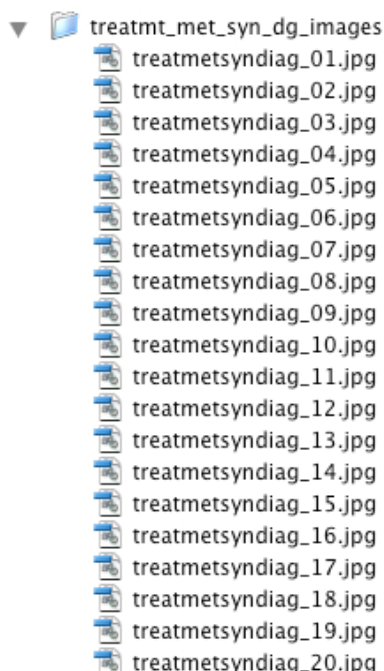


Image Y



9. Metabolic Syndrome Diagram in the Treatment Section

([treatmt_met_syn_dg_images](#)): This layout was originally built and sliced in Photoshop® (Image Z). When the file was exported for the Web the Photoshop® program uses the file's name and numbered the slices 01 – 20. ([treatmtmetsyndiag_01.jpg](#)) The four buttons that interact, have swap images but use the images from the Metabolic Syndrome Diagram, therefore those files are in that image folder. ([metsyndromediagram_wht_03.jpg](#)) Image Y

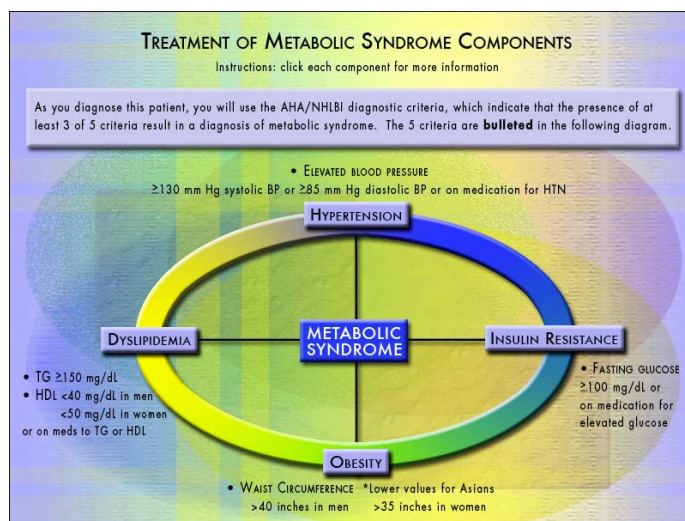


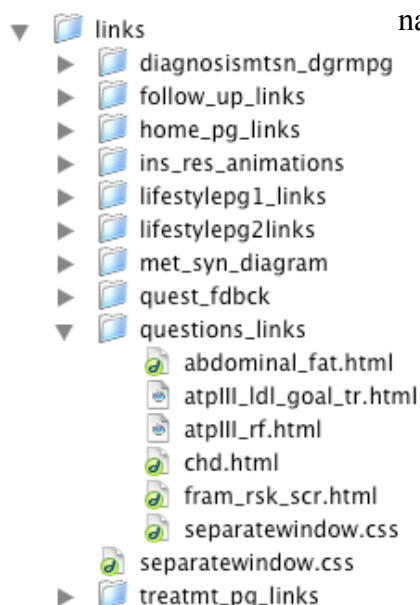
Image Z

C. Link files names:

1. Majority of Links:

The files are extra windows that appear after a button has been selected in the website. In general the name of the button corresponds to the name of the window/link. The files for these links have also been named to reflect the window's name. Images AA, BB, and CC

Image AA

Image BB – [atpIII_ldl_goal_tr.html](#)

Risk Category	LDL-Cholesterol Goal	LDL Level at which to Initiate Therapeutic Lifestyle Changes (TLC)	When to begin Medications
High Risk: CHD or CHD Risk Equivalents (10-year risk > 20%)	< 100 mg/dL (optional goal: < 70 mg/dL)	≥ 100 mg/dL	≥ 100 mg/dL (< 100 mg/dL: consider drug options)
Moderately High Risk: 2+ Risk Factors (10-year risk 10%-20%)	< 130 mg/dL	≥ 130 mg/dL	≥ 130 mg/dL (100-129 mg/dL: consider drug options)
Moderate Risk: 2+ Risk Factors (10-year risk < 10%)	< 130 mg/dL	≥ 130 mg/dL	≥ 160 mg/dL
Lower Risk: 0-1 Risk Factor	< 160 mg/dL	≥ 160 mg/dL	≥ 190 mg/dL (160-190 mg/dL: LDL-lowering drug optional)

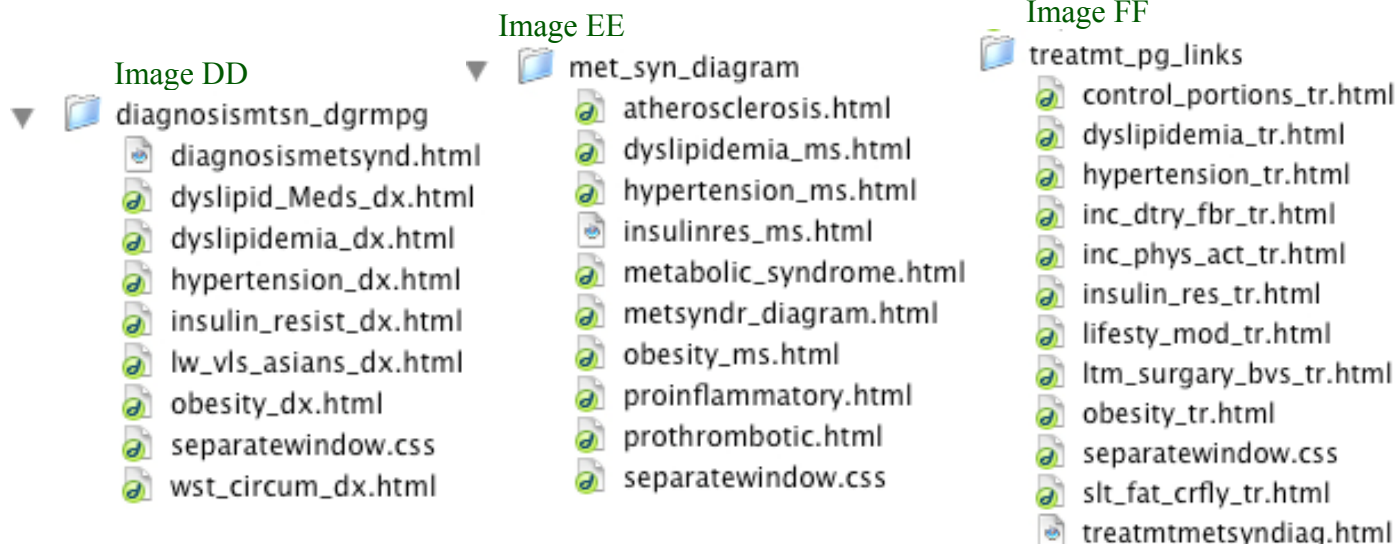
Source: Adapted from Grundy SM et al. Implications of recent clinical trials for the National Cholesterol Education Program Adult Treatment Panel III Guidelines. Circulation. 2004;110:227-239.

Image CC – [atpIII_rf.html](#)

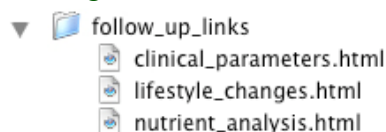
Major Risk Factors (exclusive of LDL Cholesterol) that Modify LDL Goal *
1. Cigarette smoking
2. Hypertension (BP>140/90 mmHg or on anti-hypertensive medication)
3. Low HDL cholesterol (<40 mg/dL)**
4. Family history of premature coronary heart disease (CHD in male first degree relative <55 years; CHD in female first degree relative <65 years)
5. Age (men >45 years; women >55 years)
* In ATP III (Adult Treatment Panel III), diabetes is regarded as a CHD risk equivalent.
** HDL cholesterol >60 mg/dL counts as a "negative" risk factor; its presence removes one risk factor from the total count.
Source: National Cholesterol Education Program, ATP III

2. Diagnosis Metabolic Syndrome Diagram ([diagnosismtsn_dgrmpg](#))

[Image DD](#), Metabolic Syndrome Diagram ([met_syn_diagram](#)) [Image EE](#), and Treatment Page links ([treatmt_pg_links](#)) [Image FF](#): These links are the windows that would show up from pressing a button on these page layouts. These names reflect the name of the button as well as the name of the window.



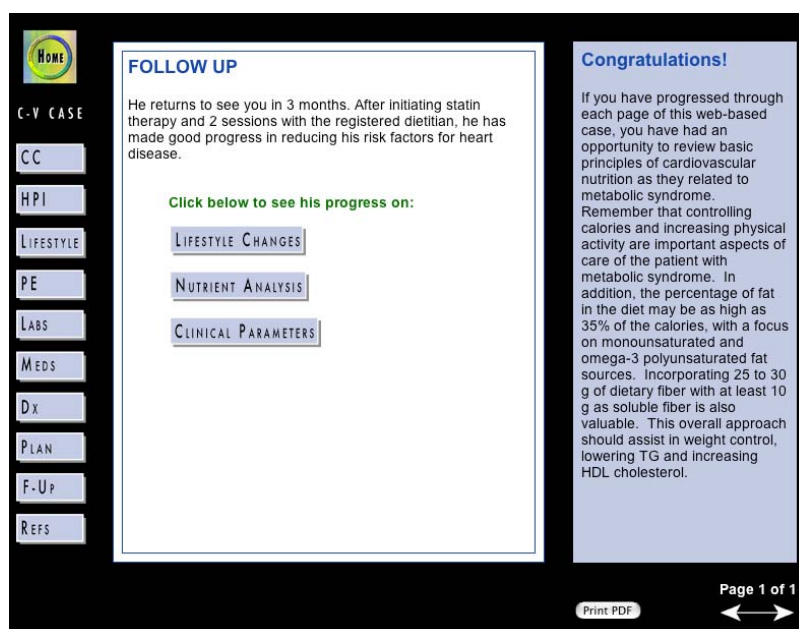
[Image GG](#)



3. [follow_up_links](#):

There are three window files included in this folder for buttons on the [follow_up.html](#) page ([Image GG](#)). These files are named the same as the button's name on the Follow Up page layout. [Image HH](#)

[Image HH](#)

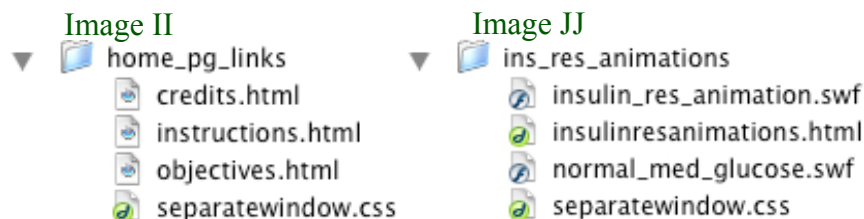


4. [home_pg_links](#): Image II

There are 3 link files for the interactive buttons on the Home page included in this folder.

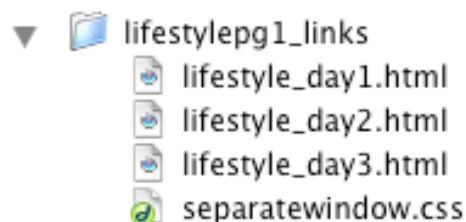
5. [ins_res_animations](#): Image JJ

Within this folder are the two *swf* animation files and the window file ([insulinresanimaitons.html](#)) that links to the animations.

6. Lifestyle Page 1 links ([lifestylepg1_links](#)): Image KK

The three window files that display the patient's food record are located here. ([lifestyle_day1-3.html](#))

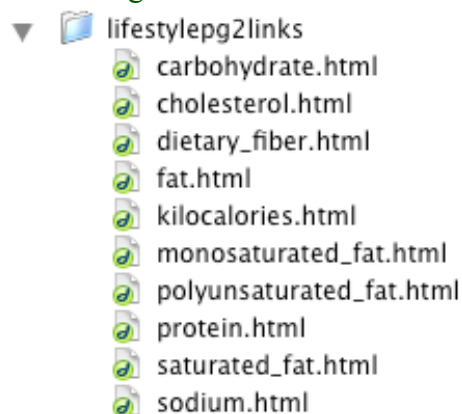
Image KK

7. Lifestyle Page 2 Links ([lifestylepg2links](#)):

On the second Lifestyle page there are 10 links that can be selected with in a table for more information and definitions. (Image LL) These window's files are named the same as the word being defined in the table. Image MM

Image LL

Image MM



LIFESTYLE

Tobacco and alcohol: He is a non-smoker. He drinks wine with dinner occasionally and consumes 6-10 beers per week. No history of drug use.

Dietary Intake: Computerized nutrient analysis of his food record indicated an average daily intake of:

Kilocalories	2525
Protein	98 gm
Carbohydrate	269 gm
Fat	99 gm
Saturated Fat	30 gm
Monounsaturated Fat	37 gm
Polyunsaturated Fat	22 gm
Cholesterol	389 mg
Dietary Fiber	10 gm
Sodium	3660 mg

Click on each of the above nutrients for more information.

7. The notable source of mono-unsaturated fat in his diet is?

- A. Margarine
- B. French fries
- C. Cheese sauce
- D. Peanuts

8. Good sources of fiber in his diet includes?

- A. Cornflakes
- B. Rice
- C. Broccoli
- D. Mashed potatoes

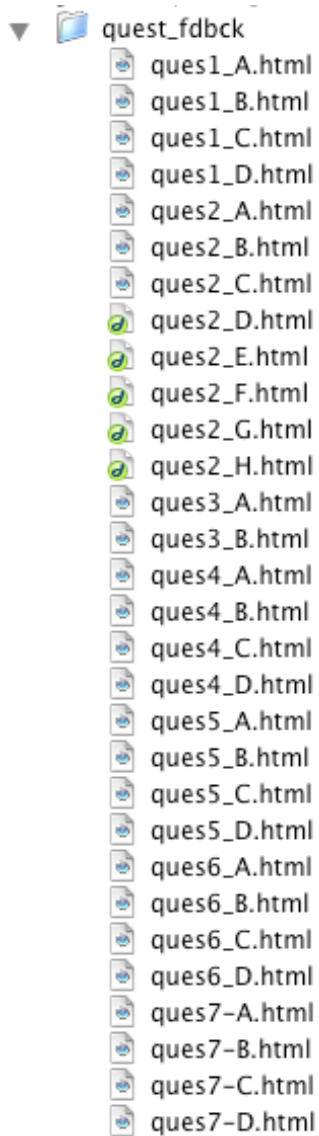
9. His 99 grams of daily fat provides 35% of his 2525 calories. This is?

- A. Less than the recommended level
- B. Within the recommended level
- C. Above the recommended level

Page 2 of 2

Print PDF

Image NN – **Note:** not entire contents of folder.



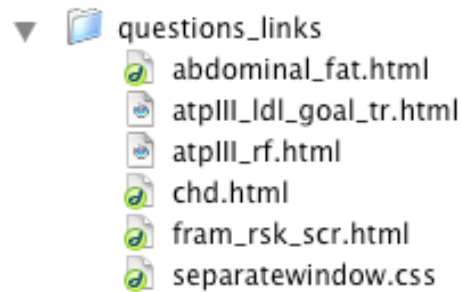
8. Question Feedback ([quest_fdbck](#));

There is question feedback provided for each answer choice in the blue box on the right side of most of the Web page layouts. There may only be 2 answer choices provided or 8, but each choice is lettered (A – G). The questions are numbered 1 – 30. Each question feedback files names start with the question number, underscore, then the letter that corresponds to the answer choice. Examples: [ques1_A.html](#), [ques1_B.html](#), [ques2_C.html](#), [ques2_D.html](#). Image NN

9. [questions_links](#):

This folder contains any window files that are links from the question area (blue section) throughout the website. Image OO

Image OO



Production Workflow Documentation and Reference Guide

Computer-Based Cardiovascular Patient Case Study

III. Artwork

All the artwork for the website was created in four programs: Adobe® Illustrator®, Adobe® Photoshop®, Macromedia® Flash, and Macromedia® Dreamweaver®.

A. Templates ([Web Templates](#) folder):

Separate files were created for the website's design elements such as, interactive buttons and diagrams which each have their own folder.

1. [Home Page](#) folder:

The contents of this folder include the original Illustrator® file ([Home Page template.ai](#)) for the entire Home page layout, a sub-folder ([Home images](#)) with the linked images for the Illustrator® file in jpg format, and the original Photoshop® file for the apple image ([Home page image.psd](#))

a. [Home page image.psd](#): (Image PP)

This original Photoshop® file only has the apple image with the geometric background, not the entire Home page layout. The file was set up with layers that are labeled to help identify what is on that layer. For example: *buttons*, *top view gr*. There are several folders to organize the layers into groups for the different colors of lettering (red or black) and the background.

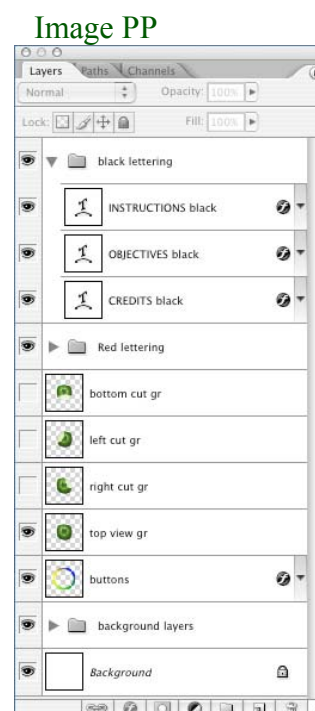
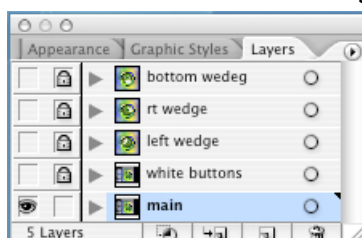


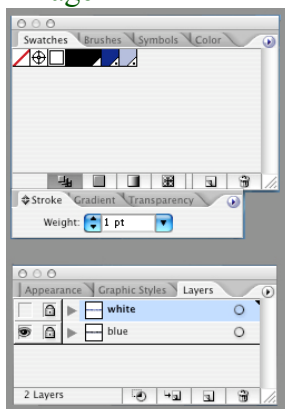
Image QQ



b. [Home Page template.ai](#): (Image QQ)

This original Illustrator® file has the entire page layout with several layers built into the file. The *main* layer has the complete layout and with a solid apple shown. There are 3 other layers (*Bottom wedge*, *rt wedge*, *left wedge*) that when visible show the different sections of the apple cut. The remaining layer, *white buttons*, has the interactive buttons built with a white background on the left hand side of the page layout. **Note:** the file was saved with these 4 layers not visible and locked. This file has already been sliced and is ready to “Save for Web”.

Image RR



2. [Interactive Buttons](#) folder:

Within the [Interactive Buttons](#) folder are the native files for design elements created in Adobe® Illustrator®; these file name's end in an “ai”. For example: [lwhatismetsyn.ai](#).

a. Files:

An individual file has been created for each button because the wording and size have been customized. Each file has been created with two layers for each stage of the button (up and down) and they are locked. (Image RR) The layers are labeled with *white* or *blue*, which matches the background

color of the button as seen in [Images SS](#) and [TT](#). The files have been saved with the *white* layer not showing. The file was saved with both layers locked. ([Image RR](#))

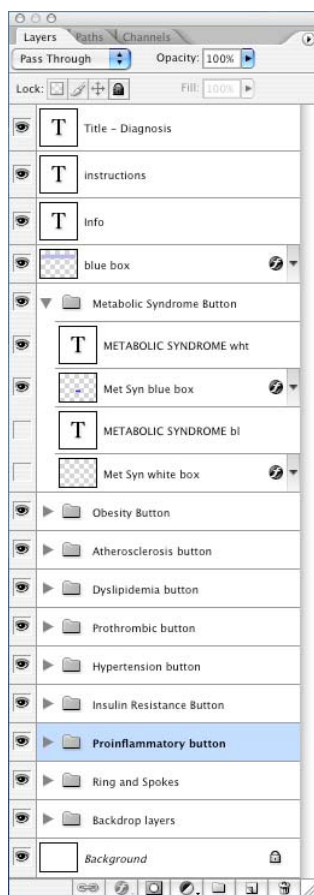
Image SS

Image TT




The Color Swatches panel shows only the colors that have been used in the file and the Color Mode has been set to RGB. ([Image RR](#)) The files have also been sliced and are ready to “Save for Web”. To see the slices in Adobe® Illustrator® go to “View” in the toolbar and pull down to “Show Slices”.

Image UU



3. [Interactive Diagrams](#) folder:

Within the [Interactive Diagrams](#) folder are the native files for the interactive diagrams created in Adobe® Photoshop®; these file name's end in a “psd”. There are three files in this folder for each of the interactive diagrams that are within the website. ([diagnosismetsynd.psd](#), [metsyndromediagram.psd](#), [treatmetsynddiag.psd](#)) See naming convention

a. Files ([Image UU](#)):

These files have been created in Photoshop® with layers that have been labeled to designate what is included on that particular layer, for example, *Title – Diagnosis* or *instructions* layers. Folders have also been created to organize the layers into sets that pertain to a button or the backdrop. The folders that were created for each of the buttons have the wording and background box for both the up and down states of the button. Image MM shows the Metabolic Syndrome Button folder open. The *Metabolic Syndrome wht* and *Met Syn Blue Box* layers are visible (eye next to the layer); this is the up state of the button. The other two layers, *Metabolic Syndrome bl* and *Met Syn white box* are not visible and are the down state of the button. These files have been sliced and are ready to “Save for Web”. These slices can be viewed by selecting “View” on the toolbar and dragging down to “Extras”. The color mode for these files has been set for RGB, a requirement for Web viewing.

4. [Printer PDF file](#) ([Printer PDF files](#) folder):

The original files were built in Adobe® Illustrator® (“ai”) with the linked files for the [reference-printing-file.ai](#) stored in a sub-folder ([ref printing links](#)). The Illustrator® files were then saved as a pdf file that could then be opened in the Adobe® Acrobat Reader program ([case-printing-file.pdf](#), [reference-printing-file.pdf](#)).

5. [Secondary Pages](#) folder:

Image VV



- Contains the original Illustrator® file ([MS2ndpagetemp_sl.ai](#)) that was used for preliminary layouts **only**, for the secondary pages. There are two files stored in the folder that are links for this Illustrator® file that are in jpg format.
- There is a layered Photoshop® file ([2ndpgallbuttons.psd](#)) for the buttons on the left hand side of the secondary page layouts. (Image VV) The file includes two layers, one for the up state (blue) and the down state (white) of the buttons. It is this Photoshop® file that was sliced, “Saved for Web”, and inserted into the Dreamweaver® page layouts for the interactive buttons.
- A blank secondary page was created in Dreamweaver® as a template ([SecondaryPgTemp.html](#)). The CSS style is in this folder ([newcssstyles](#)) and has been applied to the text and the links are intact for the interactive buttons and Print PDF button. New links would need to be created for the navigation arrows. Image WW

Image WW

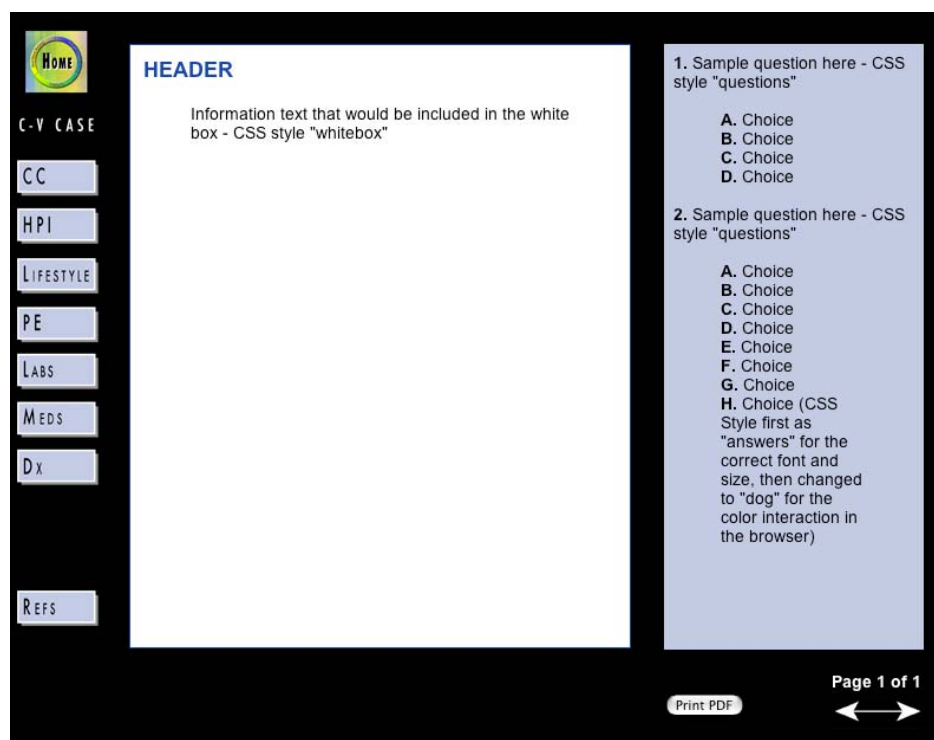
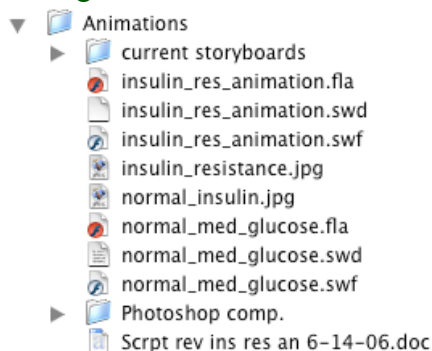


Image XX



B Animations

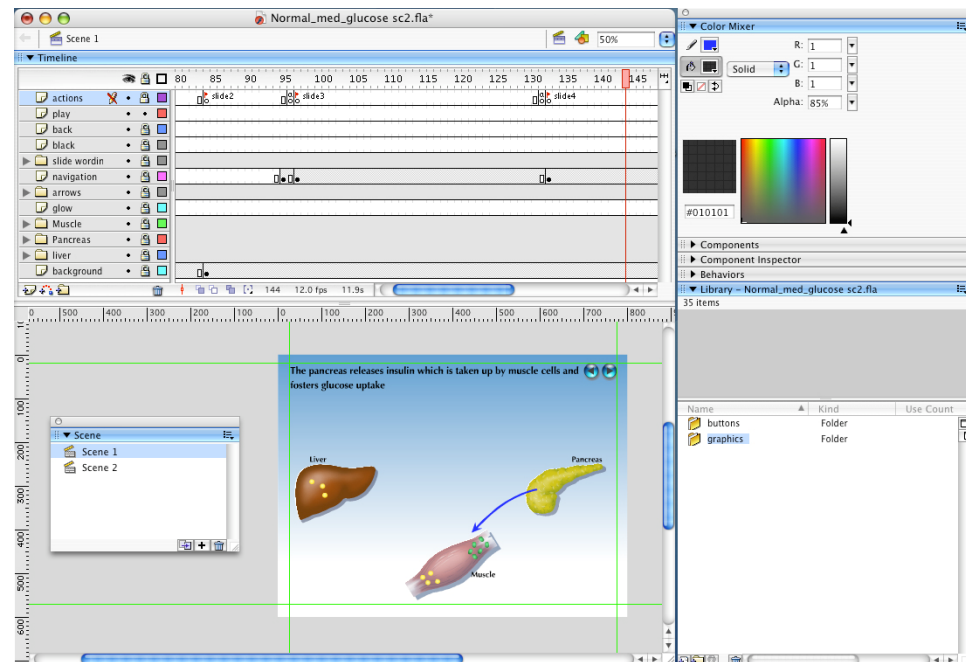
Within the Artwork folder on the CD is another folder called [Animations](#). (Image XX) This folder contains 3 types of files: *fla* (native animation Flash file), *swf* (published version of the Flash animation file), and *jpg* (still taken from the Flash animation file).

- fla* files (native Flash files):

There are two files within the Animations folder that are original files that the animations were created in. These files are [insulin_res_animation.fla](#) (shows how the insulin resistance process occurs in an overweight person) and [normal_med_glucose.fla](#) (shows the normal process of glucose in a healthy person).

a. File organization:

Image YY



i. Scenes: (Image YY)

Each of the Flash files have been constructed with 2 scenes in them. *Scene 1* has the interactive version of the animation, where the viewer needs to press the navigation arrows (upper right hand corner of the display screen) to view the next stage of the animation. *Scene 2* shows very similar content to *Scene 1*, but the animation plays straight through, requiring no viewer interaction. At the beginning and end of both scenes the viewer can select which version of the animation (step by step interactive, or play straight through) they would like to view.

ii. Layers: (Image YY)

Each file has layers that have been labeled to designate what is included on that particular layer. There are sub-folders which contain all the layers used for an entire object. For instance there is a sub-folders called *liver* which has all of the components (label, the yellow dots, and the organ) that would be involved in the animation concerning the liver.

The very top layer is called the *actions* layer. As the time line is moved it is within the actions layer that each step of the animation is noted with the term *slide* followed by a number (*slide3*). Any action

scripting that needed to be written for the animation is also included in the *actions* layer at selected points along the time line (a cursive “a” appears above an open circle).

iii. Flash Library: (Image YY)

Within the Library panel there have been 2 folders created, *buttons* and *graphics*. The *buttons* folder contains the 4 navigation buttons used throughout the animation. The *graphics* folder contains all of the *symbols* created with either text or drawings. There are also several bitmap images included in the graphics folder, and these are organ (i.e. liver, pancreas, and muscle) images that were created in Photoshop® and imported in Flash.

2. swf files (published files): (Image XX)

There are 2 swf files within the [Animations](#) folder. These files are the published versions of the 2 native Flash files, allowing the animations to be viewed on the Web. These two files have been copied into the [links](#) folder within the [ms_website](#) so the files can be properly accessed by the patient case study website.

3. jpg files (stills): (Image XX)

A still was taken from the Flash files of the final stages shown in the animation sequence to be placed in the Printer PDF file as a study guide. ([insulin_resistance.jpg](#), [normal_insulin.jpg](#))

4. Storyboards (current storyboards):

There are two documents within this folder, [Comp in res storyboard.pdf](#) and [Comp Normal storyboard.pdf](#). These two files show the final storyboard layout that guided the animations being done in Flash.

C. Photos:

There are two types of photos included in the [Artwork](#) folder, Food Photos and MRIs.

1. Food Photos:

These photos were taken digitally with florescent atmosphere lights, tungsten pedestal lights on a black backdrop.

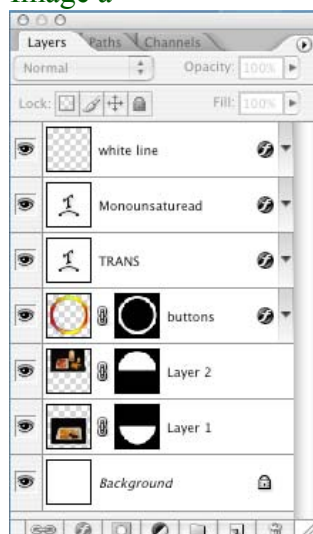
a. The files within the [web photos](#) folder have been color corrected, sized, combined for portion control comparison, and food groups in Photoshop®. Most of the files have been saved in a jpg format for easy viewing in the website. [Image ZZ](#)

i. There are two files that have also been saved in their native Photoshop® file (psd) as well ([sat_trans_fats.psd](#), [unsaturated_fats.psd](#)). ([Image ZZ](#)) The images of these files are a combination of photos that explain a food group. Within the Photoshop® file layers have been created to put each design element and photo on a different layer ([Image a](#)). The layers are named to easily identify what has been included on that particular layer. Note some layers include image masks.

Image ZZ



Image a



- ii. There is a sub-folder called [Separate items](#) that has the final (color corrected and sized) single images before they were combined for portion control. The file names indicate the amount of food shown in the photo by starting with “Sgl” (for single serving) or “Dbl” (for a double serving size). (Examples: [Dbl_icecream_FinalRGB.jpg](#), and [Sgl_icecream_FinalRGB.jpg](#))
 - b. Within the [Photos not corrected](#) folder are the original images with no color correction or sizing done to them ([Image ZZ](#)). They are organized by category of food into sub-folders.
2. [MRIs](#) ([Image b](#))

Image b

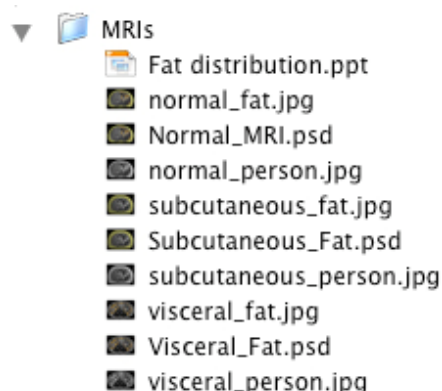
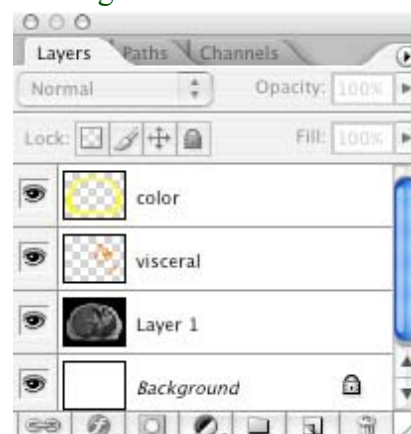


Image c

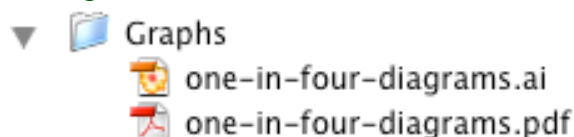


This folder contains the Power Point (ppt) document provided by Dr. Nicola Abate with the original MRIs and explanation. The jpg MRI images files are used for image swaps in the website. The original Photoshop® layer files (psd) of all three MRIs are also included in this folder. These psd files have separate layers for the MRI and the color(s) to highlight specific areas of the MRI.

Image c

D. [Graphs](#) folder: ([Image d](#))

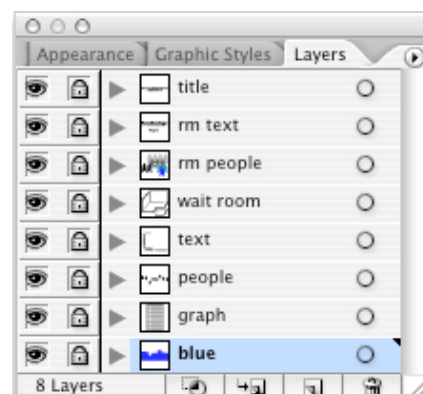
Image d



Contains two files: [one-in-four-diagrams.ai](#) and [one-in-four-diagrams.pdf](#).

The native Illustrator® file (ai) is where the original graphs were constructed. This file has layers that are labeled to indicate what is on that particular layer, such as *title* and *wait*

Image e

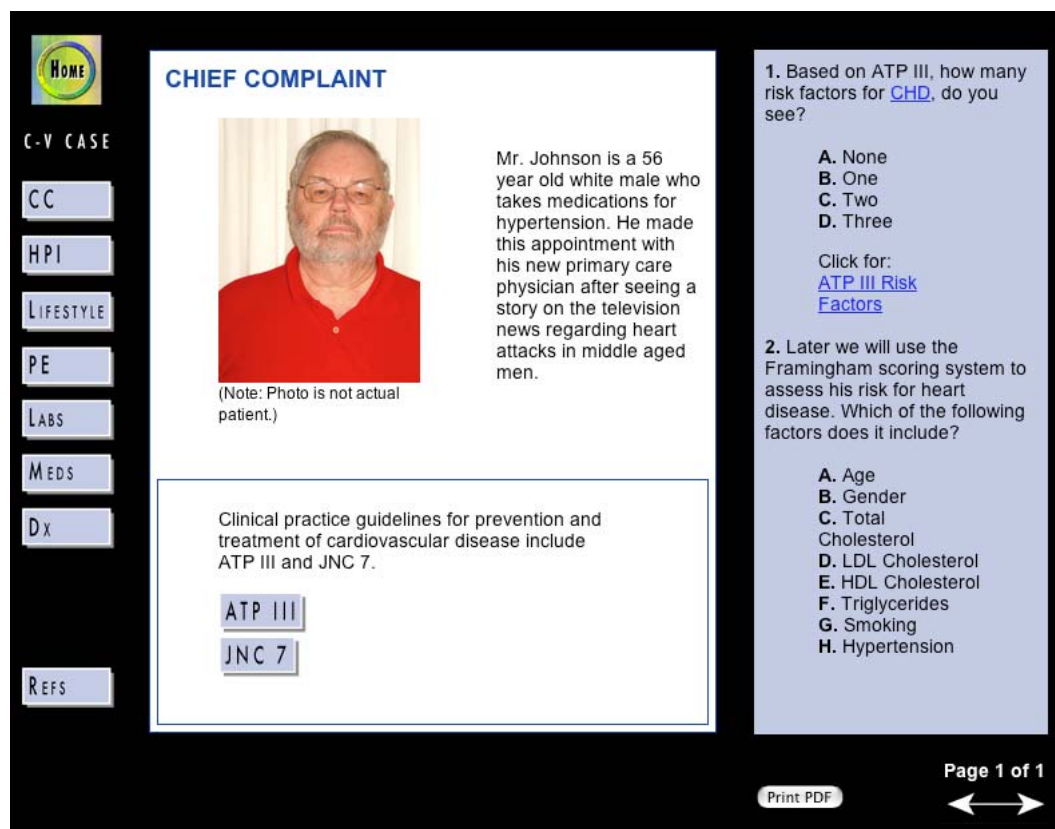


room. (Image e) **Note:** the file was saved with all layers locked. The Illustrator® file was then converted into a *pdf*.

E. HTML pages

These pages were laid out in Macromedia® Dreamweaver® (htm or html extension on the end of the file) with components built directly in the program or imported from Adobe® Photoshop® and Illustrator®. Much of the Home page ([index.htm](#)) layout has been discussed under the Artwork section A. Templates. This section will be more focused on the secondary pages layouts. Referring to Image b, the secondary pages are all set up in a similar fashion.

Image d



1. Page Organization: (Image d)

a. Navigation:

i. Buttons:

Each page is set up with navigation buttons, which may vary in number, on the left hand side including a “Home” button. To help keep students from skipping straight to the Treatment Plan section of the website and completing the assignment without viewing the website materials, more navigation buttons become available when they complete the Diagnosis section. The order of these buttons, from top to bottom, follows the procedure of a typical patient’s chart

setup at a hospital or clinic, Chief Complaint, History, etc. The Home page shows these navigation buttons with full name of that section. On the secondary pages these buttons are minimized in size and an abbreviation is used in order to provide more space to the rest of the materials. Each button within Dreamweaver® has been linked (Properties manager) to the corresponding secondary page layout.

ii. Arrows:

There is a set of arrows on each of the secondary pages in the bottom right hand corner. These arrows allow the viewer to proceed to the next page of materials or return to the previous page. In order for this to be possible, the arrows on each secondary page needs to be linked (Properties manager) to the appropriate page that is before or after that current page. Just above these arrows an area that has been designated to show which page the viewer is on in each section.

Note: there may be as many as 7 pages in a section for this patient case study.

b. Division of materials:

The materials on each page have been divided into two sections, the white or blue box. The layout and look of these boxes has been determined, see Cascading Style Sheets.

i. White Box: (Image d)

The white box area on each secondary page layout contains information about the patient's case. Depending on the materials that need to be presented, this area can contain photos, tables, and other resource links, such as the ATP III and JNC 7 buttons on the Chief Complaint page (Image a), for the viewer to clearly understand the materials that are being presented.

ii. Blue Box: (Image d)

The blue box is the designated area for questions that are specific to that sections information. The student should be able to answer all the questions based upon the information provided in the white box or other links provided within that question, such as Question #1 on the Chief Complaint page (Image a),. Each question is in a multiple-choice format. The number of choices provided (2-8) will vary from question to question. Each answer choice has feedback, that when viewed in a browser comes up in a separate window. (See Naming Conventions for Web Files, Link file names, Question Feedback) For this feedback to be possible, each answer has the following set up:

- Properties Manager Window – In the Link area there needs to be a # symbol. (Image e)

Image e

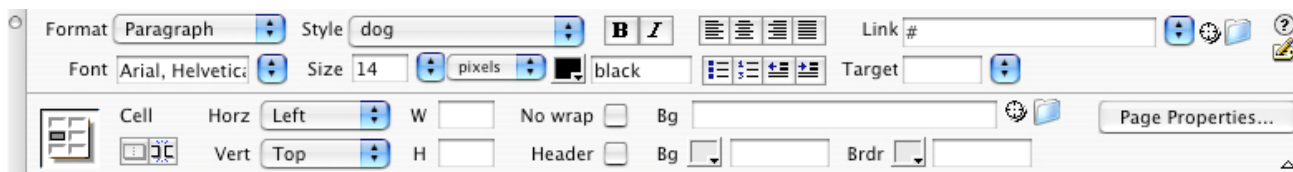
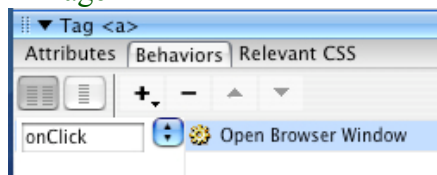


Image f



- Behaviors Window – the option “Open Browser Window” needs to be selected. Follow the prompts/windows to the correct link file. Then make sure that the “onClick” choice is showing in the reaction area (next to double arrow) in the Behaviors window.

(Image f)

c. Print PDF button:

Each page also has a “Print PDF” button available. This allows the viewer to print the materials provided only in the white boxes throughout the majority of the website. The Treatment and Follow Up sections have purposely been excluded to ensure the student completes the learning objective on their own. This button needs to be linked (Properties Manager) to the original pdf file for this to function properly.

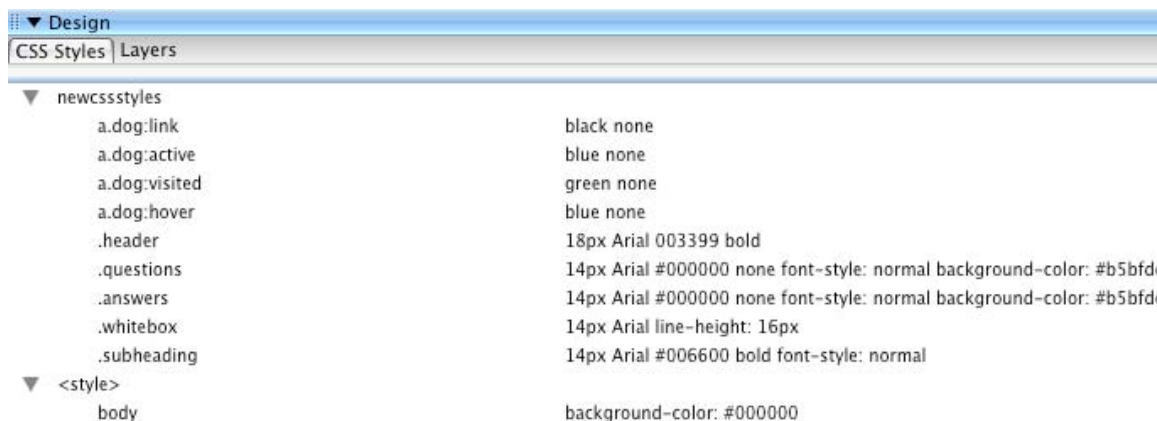
2. Cascading Style Sheets (CSS styles):

The use of a CSS style allows the designer to have more control over the final look of the layout on a wide variety of computers. If for some reason the fonts are not appearing correctly, or a new page is made, the CSS file may need to be reloaded so the proper access to file is made.

a. Secondary Pages:

Within the [ms_website](#) folder there is a file called [newcssstyles.css](#) that has already been set up to determine the look of the fonts within the page layouts of this site. Once the style sheet is loaded into the site correctly, to choose which style will be used for certain text, this can be done in the Properties Manager window (Image e). Image g shows the style options available in the [newcssstyles..css](#) file.

Image g



i. CSS for the White Box:

• Page Headings:

For each secondary page the white box always includes a page header in the upper left hand corner to indicate what section the material is covering (Image d). For the proper size, color and font

for the page header the style “header” (Image e) needs to be selected in the “style” pull down menu in the Properties Manager. (Image e)

- Subheadings:

To help bring attention to sections of materials within the white box a green subheading has been used. In the Properties Manager (Image e) in the “style” pull down window select “subheading”.

- Majority of text:

The majority of the text within the white box is black, 14pt Arial (Image d). To ensure that the size, color and font are consistent throughout the website select the “whitebox” as the style on the Properties Manager pull down window (Image e and g).

ii. CSS for the Blue Box:

- Questions:

Each question is numbered throughout the website sequentially. To ensure consistency the number and the question itself use the style referred to as the “questions” style option in the Properties Manager. (Images e and g). Once the style has been selected then the question number can then be put in bold (Properties Manager).

- Answers:

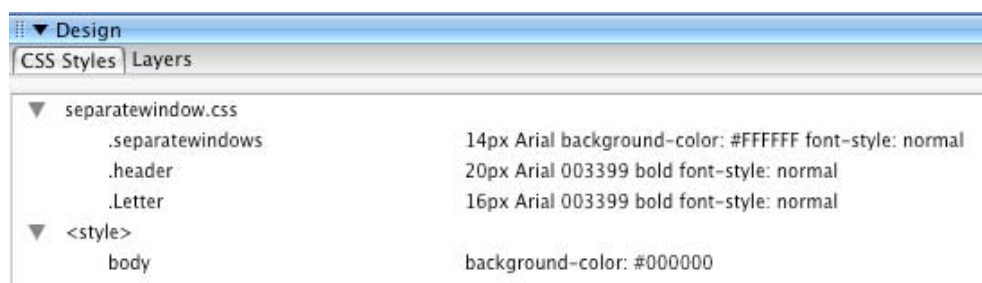
The style for any of the answers throughout the website requires a two step process:

1. Type in the answers choices with letter option in caps. Select the text and in the Properties Manager (image c) pull down the “style” window to “answers”. Make each letter option bold.
2. Then select only the answer choice (not the letter option) and in the Properties Manager (Image c) select the style “dog”. The “dog” style has the coding to show these words with a color reaction when the viewer rolls over, clicks on, or has already selected, the words in a browser. Image g lists the 4 “dog” styles that make this possible.

b. Pop-up Windows:

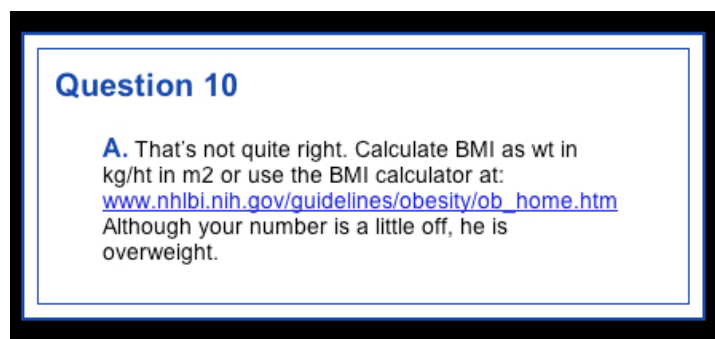
A separate CSS was set up for the separate windows that pop-up when the site is viewed in a browser ([separatewindow.css](#)). Because these files are classified as links, a copy of this CSS styles file is in the [links](#) folder and each of it’s sub-folders within the [ms_website](#) folder. Image h shows the style options available in the [separatewindow.css](#) file.

Image h



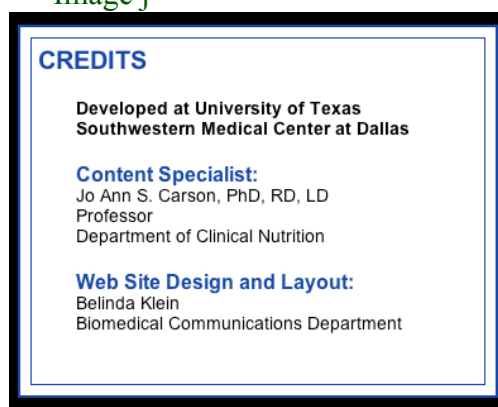
- i. Question Windows: Each question feedback window is set up exactly the same (Image i).

Image i



- The word “Question” and the number that follows uses the style option called *“header”* (Properties Manager).
 - The letter option is in caps and uses the style called *“letter”* (Properties Manager “style” pull down menu).
 - The majority of the text in the box is the feedback for that specific question’s answer choice. Making sure to select all of this type, and then in the Properties Manager window, pull down the “style” menu to *“separatewindows”*. This will make sure the size and color remain consistent in all of the windows.
- ii. Other Pop-Up Windows: Other windows through out the site remain consistent by using the [separatewindow.css](#). An example is shown in Image j.

Image j



- The word “Credits” shown in Image h uses the style option called *“header”* (Properties Manager “style” pull down menu).
- The wording “Content Specialist” and “Website Design and Layout” uses the style called *“letter”* (Properties Manager).
- For the remainder of the text in the box, in the Properties Manager window, select the “style” *“separatewindows”*. Then bold can be used as an option to separate content as shown in Image j, “Developed at University of Texas...”

APPENDIX H

Student Surveys

Survey distributed to the August 2006 Cardiovascular Nutrition class.

Web Based Training (WBT) Patient Case Study Evaluation Form

Course title: Cardiovascular Case

Course website: <http://www.swmed.edu/medillus/metsynmedstd>

Date:

Your feedback is important in helping us to increase the quality of our Web Based Training program. Please return your anonymous form to joan.crane@utsouthwestern.edu. Thank you!

Instructions: Please click the square that corresponds to your level of agreement with the statement to the left. Additional comments may be added after each statement.

Which computer platform did you use to view the case study (Mac, PC, etc)?

Which operating system did you use (OSX, Windows XP, etc)?

Which browser did you use (Explorer, Netscape, Safari, etc)?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Course Presentation					
1. The navigation is clear and easy to use	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
2. The aesthetics of the module were pleasing	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. The information in the module is presented clearly and consistently	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
4. The website is superior in information and interface compared to other patient case studies	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
Course Objectives					
5. The case module is an effective means of learning about the diagnosis and treatment of metabolic syndrome	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
6. The case module is an effective means of learning about the nutritional aspects of metabolic syndrome	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
7. The case module will help me provide better patient care	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
Materials					
8. The insulin resistance animation is a clear and valuable learning tool	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
9. The graph showing 25% of Americans with metabolic syndrome is useful in explaining the statistic	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. The addition of an illustration to accompany the descriptive steps of atherosclerosis would be helpful	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
11. An illustration in cross section comparing visceral fat between a "normal" and an obese individual would be valuable	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
12. Color photos of food that depict sources of dietary fat would be helpful	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					

Describe anything in the module that you feel conflicted with information you have previously learned:

Describe anything you think should be added to the module:

Describe anything you think should be deleted from the module:

I spent approximately minutes on this case.

Other comments:

Survey distributed to the September 2006 Cardiovascular Nutrition class.

Web Based Training (WBT) Patient Case Study Evaluation Form

Course title: Cardiovascular Case

Course website: <http://www.swmed.edu/medillus/metsynmedstd>

Date:

Your feedback is important in helping us to increase the quality of our Web Based Training program. Please return your anonymous form to joan.crane@utsouthwestern.edu. Thank you!

Instructions: Please click the square that corresponds to your level of agreement with the statement to the left. Additional comments may be added after each statement.

Are you a medical student or PA student (MS or PA)?

Which computer platform did you use to view the case study (Mac, PC, etc)?

Which operating system did you use (OSX, Windows XP, etc)?

Which browser did you use (Explorer, Netscape, Safari, etc)?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Course Presentation					
1. The navigation is clear and easy to use	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
2. The aesthetics of the module were pleasing	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
3. The information in the module is presented clearly and consistently	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. The website is superior in information and interface compared to other patient case studies	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
Course Objectives					
5. The case module is an effective means of learning about the diagnosis and treatment of metabolic syndrome	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
6. The case module is an effective means of learning about the nutritional aspects of metabolic syndrome	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
7. The case module will help me provide better patient care	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
Materials					
8. The insulin resistance animation is a clear and valuable learning tool	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
9. The graph showing 25% of Americans with metabolic syndrome is useful in explaining the statistic	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
10. The addition of an illustration to accompany the descriptive steps of atherosclerosis would be helpful	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11. An illustration in cross section comparing visceral fat between a "normal" and an obese individual would be valuable	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
12. Color photos of food that depict sources of dietary fat would be helpful	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					

Describe anything in the module that you feel conflicted with information you have previously learned:

Describe anything you think should be added to the module:

Describe anything you think should be deleted from the module:

I spent approximately minutes on this case.

Which, if any of these, did you refer to on the Home page?

Instructions (Y or N)

Objectives (Y or N)

Credits (Y or N)

Other comments:

Survey distributed to the October 2006 Cardiovascular Nutrition class.

Web Based Training (WBT) Patient Case Study Evaluation Form

Course title: Cardiovascular Case

Course website: http://www.swmed.edu/medillus/ms_website

Date:

Your feedback is important in helping us to increase the quality of our Web Based Training program. Please return your anonymous form to joan.crane@utsouthwestern.edu. Thank you!

Instructions: Please click the square that corresponds to your level of agreement with the statement to the left. Additional comments may be added after each statement.

Which computer platform did you view the case study (Mac, PC, etc)?

Which operating system did you use (OSX, Windows XP, etc)?

Which browser did you use (Explorer, Netscape, Safari, etc)?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Course Presentation					
1. The navigation is clear and easy to use	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
2. The aesthetics of the module were pleasing	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
3. The information in the module is presented clearly and consistently	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. The website is superior in information and interface compared to other patient case studies	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
Course Objectives					
5. The case module is an effective means of learning about the diagnosis and treatment of metabolic syndrome	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
6. The case module is an effective means of learning about the nutritional aspects of metabolic syndrome	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
7. The case module will help me provide better patient care	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
Materials					
8. The insulin resistance animation is a clear and valuable learning tool	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
9. The graph showing 25% of Americans with metabolic syndrome is useful in explaining the statistic	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					
10. The MRIs showing visceral and subcutaneous fat are a helpful comparison to understanding the distribution of fat	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Comments:					
11. The color photos of food supplement my understanding of correct portion sizes and dietary fats	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Comments:					

Describe anything in the module that you feel conflicted with information you have previously learned:

Describe anything you think should be added to the module:

Describe anything you think should be deleted from the module:

I spent approximately minutes on this case.

Which, if any of these, did you refer to on the Home page?

Instructions (Y or N)

Objectives (Y or N)

Credits (Y or N)

Other comments:

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VITAE

Belinda Jeanne Giltner Klein was born at Vandenberg Air Force Base, CA on September 19, 1971, the daughter of Blase and Elizabeth Giltner. Sister of six siblings, Belinda was raised primarily in Wyoming and Colorado. After completing her work at Campbell County High School, Gillette, Wyoming in 1990, she entered Casper Community College at Casper, Wyoming to complete an Associates of Applied Arts in Commercial Design in 1992. She received the degree of Bachelor of Science with a major in scientific illustration from Arcadia University in May 1995. During the next nine years she married Joseph Klein, and worked as a graphic designer and manager for several printing companies and a seasonal product company. In May of 2004 she entered the Graduate School of Biomedical Sciences at the University of Texas Southwestern Medical Center. During the second year of attending this program, Belinda was named a Vesalian Scholar for recognition of her thesis project grant proposal. She was awarded the degree of Master of Arts in December of 2006.

Current Address: 3231 Bellville Drive
 Dallas, Texas 75228