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Jefferson Alumni Bulletin – Volume XLV, Number 1, December 1995

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Symposium Asks, How Will Diagnosis and Treatment Change in the Next 25 Years?
Computer-Based Teaching Reshapes How Students Learn
Will Tomorrow's Journals Be Electronic?
Antisense DNA Therapy Prevents Burkitt's Lymphoma Tumors in Mice
UPCOMING EVENTS

February 12, Monday
Alumni reception at the meeting of the American Academy of Dermatology, Washington, DC

February 22, Thursday
Alumni Executive Committee meeting

February 23, Friday
Alumni reception at the meeting of the American Academy of Orthopaedic Surgeons, Atlanta

March 15, Friday
Parents’ Day for sophomores, sponsored by the Alumni Association

April 8, Monday
Research symposium and ceremonies in honor of Robert L. Brent, M.D., Ph.D., the Distinguished Professor of Pediatrics

April 25, Thursday
Alumni Annual Business Meeting

April 26, Friday
Alumni reception at the meeting of the American College of Physicians, San Francisco

April 29, Monday
Alumni reception at the meeting of the American College of Obstetricians and Gynecologists, Denver

May 7, Tuesday
Alumni reception at the meeting of the American Psychiatric Association, New York

June 15–26, Saturday–Wednesday
Trip to Alaska (see page 11)

June 16–19, Sunday–Wednesday
Conference on the Molecular Biology and Pathology of Matrix, hosted by the Department of Biochemistry and Molecular Biology (phone 215 955 2025)

Reunion Weekend ’96

June 7, Friday
Alumni Banquet

June 8, Saturday
Clinic Presentations, Dean’s Luncheon, Reunion Parties

June 9, Sunday
Farewell Brunch

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—Frederick B. Wagner Jr. ’41, The Grace Revere Osler Professor Emeritus of Surgery, and University Historian; Alumni President 1975

“It makes me proud all over again to be a Jefferson alumna.”

—Nancy S. Czarnecki ’65, Alumni President 1989

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How Will Diagnosis and Treatment Change in the Next Quarter-Century?

We Will Fight Cancer With Molecular Therapeutics and Prediagnostics  
Behavior and Economics Will Challenge Prevention  
From Genetic Understanding to Cure  
Computer-Based Teaching Reshapes How Students Learn  
Will Tomorrow's Journals Be Electronic?  
Jefferson Health System Upgrades its Information Technology  
Molecule Essential for Cell Growth and Division is Discovered at Jeff

On the Front Cover:
The symposium "A Vision of 2020: A Look at Medicine in the Future" included Robert L. Comis, M.D. (at upper left, gesturing); Richard A. Insel '69 (upper right); and Darwin J. Prockop, M.D., Ph.D. (lower right). The audience had plenty of questions (lower left).

Photos by Don Walker

Volume XLV, Number 1
On the Back Cover: Elizabeth Warner of the library staff in a computer lab with Ben Usatch '98
Photo above and on back cover by Medical Media Services
A centerpiece of the 125th anniversary celebration of the Alumni Association was a symposium on the theme “A Vision of 2020: A Look at Medicine in the Future.” Featured speakers were Robert L. Comis, M.D., Clinical Director of the Jefferson Cancer Center; Richard A. Insel ’69, the Golser Center’s Research Center; and Darwin J. Prockop, M.D., Ph.D., Chairman of Biochemistry and Molecular Biology at Jeff. Their talks are adapted in the following pages.

We Will Fight Cancer with Molecular Therapeutics and Prediagnostics

Robert L. Comis, M.D.

Thinking for a moment about the last 25 years, a handful of clues about cancer biology have put us where we are today. One was the study of retinoblastoma, which occurs in two forms, hereditary and nonhereditary. It was hypothesized that children who have the hereditary form already carry an abnormal gene and that once they develop the cancer, further alterations occur. A second was the development of viral oncology and the realization that viruses cause human cancer; the Philadelphia chromosome discovered in the 1970s was the first consistent abnormality shown in cancer. It was known throughout the 20th century that chemicals cause cancers. Ultimately these few hints led to the definition of oncogenes that arise in the normal genome and are associated with viruses. Oncogenes are genes which up-regulate cell division; if they are mutated or translocated to another spot they often are unregulated and the cells divide out of control. Tumor suppressor genes are ones which dampen the ability of cells to divide; if they mutate the cell is uncontrolled. Recently another seminal discovery has moved research to a higher plane: the discovery that we all have genes which repair DNA damage and that if these genes are mutated it amplifies the errors that will lead to cancer, particularly that caused by chemicals.

What knowledge base allowed us to have these insights? The discovery of DNA in the past quarter-century, and then the ability of biotechnology to evaluate DNA in real time in human disease.

A field which is a harbinger of where we are heading is colon cancer. We know that it occurs from the progression of adenomatous polyps developing into carcinomas. Some carcinomas are cured with surgery; others develop metastasis. This was the classic definition in the 1970s. We now know that mutation of the polyposis gene is probably an early event. We know that a variety of mutations and other genetic alterations occur which drive these cells towards the development of invasive cancer.

So we have a redefinition of this disease. To see where the field is going, let’s run through the areas that we cancer clinicians deal with. First, prediagnosis: before any detection of cancer, finding out who is predisposed to cancer. Twenty-five years ago we had the family history; we knew certain patients were in cancer families, or that there was a tremendous predisposition for cancer but that’s all we knew. We used the social history and cytology and we had a sort of avoidance counseling.

Now we know that there are certain genes which are inherited and cause certain cancers to occur in families: the BRCA-1 gene in breast cancer, the APC gene that causes polyposis. The transition has been tremendous; as opposed to mere avoidance counseling there are trials going on around the world where we are trying to actually prevent cancer based upon the ability of certain chemicals to modulate the development of cancer.

Where will the field of prediagnosis go? There’s no question in my mind that in 2020 we will have available to us, as part of our routine care, a genetic profile of risks. This will bring up all sorts of ethical and social questions that are going to have to be addressed. But we will be able to know what the patients’ consanguinity gene types are and what the risk is; if there is counseling or intervention it will be based upon these risk patterns. Also, instead of having tests like the stool guaiac, sputum cytology, urine cytology, biochemical bloodstreams we’ll be looking at specific genotypes in these organs to determine whether or not the cancer is in process or whether the first mistake has been made and the second mistakes will follow. We will move towards biochemical, genetic, or molecular tests.

Next, chemo prevention will become part of everyday practice. Lastly, I can’t believe people aren’t going to want gene surgery if it’s possible. Not just for cancer, but for all diseases. This is going to have a tremendous impact on social, religious, and ethical areas.

As for diagnosis: 25 years ago, histopathology was the key to diagnosis. Genetics was rudimentary; you could look at the chromosomes but even the banding techniques that we have today were not available and we had nonspecific biochemical tests. Histopathology today still is a critical part of diagnosis of cancer but now we have molecular markers which are based on some of the genes I mentioned. We know the gene that is the
most important prognostic factor in neuroblastoma. There are other genes which can tip us off to the malignant process.

A major field is how translocations lead to cancer: one gene is transposed to another area and the disregulation of that gene causes cancer. Carlo Croce, M.D., Director of the Jefferson Cancer Institute, discovered that when the bel-2 gene was transferred from chromosome 14 to 18, it was a critical event in the development of lymphoma. Similar translocations cause acute promyelocytic leukemia and chronic myelocytic leukemia. We now know biochemical markers that are highly specific for cancer, HCG for testicular cancer, CA125 for ovarian cancer, PSA for prostate cancer. The transformation of oncology in 25 years has been substantial.

Some of the major advances of the future will relate to the fact that we will have specific blood tests to evaluate whether or not the malignant process has occurred or is occurring in specific organs. An example right now is PSA but this is going to be much more highly specific; we'll get a cancer "panel" for different organs.

The other thing that's going to revolutionize diagnosis is the ability to diagnose cancer at a very low tumor burden. Stage is clearly related to lethality in cancer; the lower the stage, the more likely the cure. In the next quarter-century the whole area of highly specific diagnosis is going to evolve to a very practical level. We started out with monoclonal antibodies which are highly specific ways to target certain types of tissues based on the immune system. Now we can molecularly engineer molecules that instead of being 150,000 molecular weight are 15,000 and that will go down to the point where we can tag the molecules that we are interested in to diagnose cancer early.

A paradigm for future development exists in thyroid cancer where with radioimmunodagnosis you can locate metastasis and kill it. Eventually we'll be able to do this for breast, colon, lung, and other major tumors. Diagnostic pathology will increasingly become molecular and there will be molecular definitions of diseases I mentioned.

As far as prognosis, we talked 25 years ago about stage and grade, very crude ways to evaluate prognosis. Now we have not only a clinical pathologic stage but a prognostic test based on the molecular markers which I mentioned and the ability to detect metastasis at a level which is vastly better than it was before. The ability to prognosticate will be dramatically different in 2020. Classic histopathologic diagnosis will be automated, I believe. What we really need to know is who are the people at risk to die from cancer and the molecular definition of that lethal potential I think will be clear by 2020 and we'll be able to intervene, in the people who need it, in a highly specific way.

In the next quarter-century we will be down to molecular definition of therapeutic targets. Instead of going after breast cancer we will go after a specific gene. We'll start thinking about cancer in a process-oriented way in oncology, in fact all of medicine, and the organization of medical schools will change as a result.

Let us consider therapy. In 1970 we were driven exclusively by the use of chemotherapeutics. Their effects were not specific to cancer. But in spite of that it was clear in 1970 that drugs could cure at least four cancers including childhood acute leukemia or Hodgkin's disease. Yet the ability to impact on the major cancers really didn't exist. And transplant technology relative to cancer was rudimentary.

Twenty-five years later we can cure about 15 cancers with chemicals. We can definitely impact on major diseases like breast and colon cancer if we treat them early enough. Autologous bone marrow transplantation is a routine therapy at present. And instead of having a totally empirical approach to drug development we now are after specific gene products such as tumor suppressor genes or signal transduction factors. Right now we are targeting these areas as well in developing drugs that are designed by computer rather than discovered empirically.

What's cancer therapy going to be in 2020? There will still be some role for cytotoxics but it will be meager. And once again therapeutics in cancer and other areas will be oriented towards processes instead of diseases, for example apoptosis which is important in normal immunology as well as cancer. We will have specific drugs directed towards signal transductions, the ability to repair or replace genes, and the ability to alter how tumor cells grow relative to their environment. In all of medicine pharmacologic agents will be highly specific, targeting the heart if you have a heart problem, the lung if you have a lung problem, the cancer if you have a cancer problem.

Lastly, it has been known for a century that the immune system can be altered to fight and eliminate cancer, yet the ability to do
Behavior and Economics Challenge Prevention

Richard A. Insel '69

Twenty-five years ago my teachers at Jefferson, like current Senior Vice President and Dean Joseph S. Gonnella, M.D., taught me to challenge everything. It has held me in good stead and it's going to be a vital trait for the next 25 years, because we are going to see a lot of changes and we will need to make some very tough decisions to adapt to these changes.

In this presentation, I want to touch on molecular medicine, immunologic and infectious diseases, and potential impediments that I see to any vision for the year 2020.

The Human Genome Project began in the early 1990s and it is estimated that within 18 months we will have 50 percent of the 100,000 genes in the human genome mapped, by 1998 we will have 80 percent mapped, and by the year 2000 we will have all three billion bases, encompassing 100,000 genes, mapped.

How is this going to change clinical medicine? We will see two major effects. First, it will radically change our understanding of medicine and disease and how we approach medicine.

What does this mean for clinicians? Medicine will now be approached as both gene-based and pathophysiology-based. In the past, we often did not fully understand the basis of disease. This is going to change. We will definitely see new diagnostics with population-based screening for diabetes, cancer, schizophrenia, and obesity (Jefferson will lead the way with the work of its Chairman of Medicine, José Caro IM'78).

We will definitely see new therapeutics result from this gene-based background. We will see small molecule therapy, gene therapy, new delivery systems, and even the ability to replace abnormal genes by homologous recombination (cutting out the mutant genes and putting new ones in).

All of this I hope will lead to what our goal should be in medicine: prevention.

But without a doubt, prevention is going to be much harder because for many diseases, prevention requires a change in behavior. It will prove quite difficult to change human behavior. Nevertheless, one of the first steps in prevention will be to know the exact cause of disease.

In immunology and infectious diseases, the past 25 years will be a prologue for the next 25. First, we'll see a reemergence of
infectious diseases. Second, we'll see a new association of microbes with disease. Third, we'll see vaccines being used widely for exciting new applications. Fourth, we'll see immunology being applied to many different fields.

Infectious disease is truly a burden in medicine today. It represents a leading cause of death and disability worldwide. In the United States, it accounts for 25 percent of all physician visits, with a cost greater than $120 billion annually. These problems are not going to go away. It's been said, "ingenuity, knowledge, and organization alter but cannot cancel humanity's vulnerability to invasion by parasitic life forms. Infectious disease which antedated the emergence of humankind will last as long as humanity itself and will surely remain one of the fundamental parameters and determinates of human history."

We saw cholera in South America in 1991, diphtheria epidemics in the Soviet Union in 1993, pneumonic plague in India in 1994, ebola in Zaire this year.

Epidemics are not unique to the developing world. In the United States we have serious problems with antibiotic-resistant bacterial infections and AIDS. Last year, "Cryptosporidium" accounted for an outbreak of 400,000 cases of diarrhea in Milwaukee because of a contaminated water supply. Infectious disease is going to continue.

I would never have believed 25 years ago that we would see so many new diseases associated with microbes. Rotavirus wasn't described until 1973; we now know it's the most common cause of infantile diarrhea. In recent years we've encountered Legionnaires' disease, Lyme disease, and AIDS. And if I had told my professor at Jefferson, O. Dhodanand Kowlessar, M.D., in 1969 that we would be treating peptic ulcer disease with antibiotics to treat a bacterial infection (Helicobacter pylori) rather than lowering gastric acidity, I would have been called crazy.

Looking toward the year 2020, I am sure we will discover a viral etiology for diabetes. There may be an infectious contribution to coronary artery disease and restenosis with a contribution from Chlamydia pneumoniae and cytomegalovirus. There is evidence that viruses may be contributing to the hypertensive renal disease in black urban populations. We are going to see many viruses associated with cancer. Papillomavirus is associated with cervical cancer and I think that we will see viruses associated with lung, bladder, and esophageal cancer. Helicobacter pylori is not only associated with gastric ulcers but also gastric cancer—here is a cancer that can be prevented or treated with antibiotics! We will see, I think, infectious etiologies identified for arthritis, multiple sclerosis, inflammatory bowel disease, Alzheimer's disease, and systemic lupus erythematosus. So two of the themes of the future will be new, emerging, or reemerging diseases, and new associations of microbes with disease.

The third theme will be new vaccines. They are the most cost-effective form of prevention we have. I was involved in developing a vaccine that prevents Haemophilus influenzae b disease, which used to be the most common cause of meningitis and bloodstream infections in children. This vaccine was introduced in one form in the 1980s and a more sophisticated, second-generation form in the 1990s. The vaccine has decreased the incidence of this disease by 95 percent. The cost from the federal sector to develop this vaccine was approximately $20 million. The Office of Management and Budget calculates that this vaccine is saving the U.S. approximately $450 million annually.

Vaccines will be a recurring theme during the next 25 years. First, we have new vaccine technologies. We have recombinant vaccines, novel viral vectors, and peptide vaccines. It's even possible now to use naked DNA to immunize animals against influenza, rabies, and herpes virus. We will see the use of DNA vaccines in humans. DNA vaccines represent a very significant breakthrough in vaccine development. They provide a simple approach to developing vaccines and these vaccines will be heat-stable, an important advantage in the developing world.

We are going to have new delivery systems. Besides immunizing parenterally as we do today, we will see the advent of oral vaccines against diarrheal diseases, sexually transmitted diseases, and respiratory diseases. We currently have the ability to generate vaccines in plants and it is conceivable that we will be using our vegetables to deliver vaccines in another 25 years. It could prove a very cost-effective way of vaccinating in the developing world. Finally, genetic immunization will develop that allows introduction of genes into the human genome.

Where do I see these vaccines being used? I believe we'll have a vaccine that will prevent HIV and also a therapeutic vaccine for HIV within the next 25 years. We will see new vaccines for malaria. We will have vaccines more effective than BCG (Bacille Calmette-Guérin) for tuberculosis. We will have vaccines for gonorrhea, leprosy, and the two big killers in the developing world—diarrheal diseases and respiratory diseases.

It's the goal of the Children's Vaccine Initiative, which was started by the World Health Organization in 1990, to develop for infants a vaccine that combines all childhood vaccines in one
(continued from preceding page)

dose, administered near birth, which is heat-stable, affordable, and which provides lasting immunity. I think we will reach this goal by the year 2020.

Immunology is going to provide us with two tools that will be extremely useful. We will be able to activate or turn off the immune system at will. This will be applied to allergic diseases and asthma, autoimmune disorders, multiple sclerosis, diabetes, lupus, rheumatoid arthritis, and cancer. There will be cancer immunotherapeutics, tumor-specific vaccines, and even the ability to replace tumor suppressor genes as Dr. Comis has discussed (in the preceding article).

I think we'll understand the aging process, but we will only see the lifespan increase by three to four years in the next quarter-century. There will be inherent limitations to preventing aging. We will come to understand the pathogenesis of atherosclerosis, though whether we'll change behavior to prevent atherosclerosis is questionable. I think we will have real cures for asthma. One of the great areas of advancement will be in the neurosciences. I think we'll be able to regenerate neural tissue and understand the organic basis of mental illness and make great advances in brain imaging.

But, I see some very dark clouds on the horizon. We face three major impediments.

The first is tremendous economic challenges. With any sort of health care reform and managed care, the financing of biomedical research is going to be a real question mark. There is a move afoot to cut back federal funding for biomedical research. The biopharmaceutical industry does not have the research and development dollars to invest that they have had in the past.

Second, we face workforce challenges. We must ask ourselves, are we training M.D.s who can understand the science of the year 2020?

Third, we will have major sociologic challenges to any kind of vision for the year 2020. Many of the diseases that we are faced with are societal diseases, for example, the association of lung cancer with smoking. It has been 30 years since the Surgeon General warned of the dangers of smoking. AIDS exemplifies how behavior must be changed to have an impact on disease. In spite of molecular medicine, behavioral aspects of medicine cannot be ignored.

There is no question that much disease that we see today is due to lack of access to health care. I am not sure how well we will address this problem in the next 25 years. The questions are tough. What costs are we willing to pay for improved health? Do we put our money into prevention or into therapy?

We have a problem in the public perception of biomedical research and science. Both physicians and biomedical researchers must become real advocates for research and science. The way the public perceives us will be central to what will happen with health care reform.

We are going to face tough ethical decisions about the distribution and delivery of care. Advances in genetics will generate new ethical dilemmas. Also the question of us (or U.S.) versus them: shall we concentrate on national health problems, or the global picture? Poverty, famine, and war will impact on disease and on our decisions.

Are today's advances going to alleviate the major causes of death worldwide—ischemic heart disease, cerebral vascular disease, chronic obstructive pulmonary disease—or are we going to have to come up with new strategies? For acute respiratory infections, diarrheal disease, malaria, measles, tuberculosis, neonatal tetanus, we do have good vaccines for some of these infections, and we will see improved vaccines. But the question will remain, can we deliver these vaccines to the developing world in a cost-effective fashion? The U.S. does not have a great track record in this regard; our own immunization rates are dismal.

As for AIDS, even if a vaccine is developed, I am not sure that we can handle the existing worldwide burden and its economic ramifications. Today, there are approximately 12 to 16 million people in the world who are infected with HIV, of which one million are in this country. By the end of this decade, that number will reach 30 to 40 million, of which 10 million will have developed AIDS.

It is ideal to eradicate disease, yet we've had very few successes. The one true victory was smallpox, which was declared eradicated by the World Health Organization in 1980. We eliminated poliomyelitis from the Americas by 1991. Our target is to eliminate polio from the world by the year 2000. The next two goals will be to eliminate measles by the year 2010 and possibly neonatal tetanus and leprosy by 2020. But this is a very short list. There are not many diseases that we'll be able to eraze from the globe.

And before we become complacent, consider some leading causes of death in our own country: heart disease, cancer, stroke, chronic obstructive lung disease, accidents, suicide, and homicide. Many of these diseases are rooted in behavior or low economic status. To ignore that would be dire. I fear that many of these leading causes of death today will still be on the list in the year 2020. Some of today's problems should have been addressed 25 years ago, in 1970. I fear that 25 years from now, in the year 2020, we may be trying to figure out why we neglected to solve some of these preventable diseases back in 1995.
With Genetic Understanding of a Disease We Can Prediagnose—and Cure

Darwin J. Prockop, M.D., Ph.D.

A little boy was born about 20 years ago and he appeared normal at birth. His pediatrician carefully examined him and found a little unexpected curvature of the back, but nothing else of significance. At the age of one month, his mother brought him to the emergency room with a broken leg. The initial diagnosis was battered child syndrome. By the time the child was 21 months of age, however, he had broken all his limbs repeatedly and had several fractures of his ribs. On several occasions, he broke a limb simply by rolling over in bed. Each fracture hurt as much as it would hurt you or me, and the bones seemed to repair at a normal rate, but the repaired bone was always weak.

The child in fact had osteogenesis imperfecta or brittle bone disease. The condition intrigued us for a number of reasons. Initially, we were interested in defining the reason for the bone’s weakness. We spent several years trying to analyze the type I collagen, the most abundant protein in bone and a major source of its strength. We then turned to analyzing the DNA that contains the genes for collagen. DNA is heaven’s gift to the experimental biologist. It is extremely easy to isolate and to analyze. You can obtain adequate amounts of DNA for most experiments with five ml of blood or even 10 ml of saliva. The quality of the DNA in saliva is not as good as that obtained from blood, but it is sufficient for many experiments.

The procedures for isolating the DNA are remarkably simple. You place the sample of blood or saliva in a tube, add a protease that will destroy all proteins, add a detergent that will disrupt cell membranes, and allow the sample to sit overnight. The next morning, you add organic solvent, shake the tube, pour off the organic solvent to get rid of the debris, and add salt and ethanol. You cool the tube and come back in an hour or so. Examining the tube, you see a white cloudy material. If you pass a pipette through the cloudy material and pull it out, you will have extracted strands of pure DNA. These simple steps provide DNA that is highly pure and stable for long periods of time with minimal precautions.

In the case of the boy with brittle bones, we extracted cellular DNA and analyzed the structure of the genes for type I collagen. DNA is a simple molecule in that it consists entirely of long strings of subunits called bases that are the four different letters of the genetic code. The DNA in human cells is contained in 23 pairs of chromosomes, and each chromosome contains a strand of DNA that comprises about 50 million bases. If the DNA in all the chromosomes were linked together and stretched out, it would form a strand about five feet long, containing about three billion bases. If you look in detail at the DNA, you find there are two kinds of regions, one that contains bases that code for proteins and constitute genes, and a second that contains nonessential DNA. The nonessential DNA accounts for 90 percent of the bases and does not serve any useful function we know of except to serve as a filler or carrier for the genes.

In the case of the boy with brittle bones, we had prior information that suggested that we should look at the two genes that code for the two different kinds of polypeptide chains found in type I collagen. To do this, we first isolated regions of the boy’s DNA that contained the collagen genes and then analyzed the collagen genes by DNA sequencing. Sequencing is carried out by a standard recipe that involves a large number of manipulations, but is relatively simple. The final step is to take the sample of DNA that has been treated in four separate ways, place it in four different lanes of an electrophoretic gel, and separate the DNA by electrical current that passes through the gel to generate an array of bands. The display of bands in the gel is read either from the top of the gel to the bottom or from the bottom to the top. The base sequence of the DNA is defined by whether a band appears in a lane labeled as A, G, T, or C.

In the DNA sequence from the little boy, every band on the gel was the same as in the control except for a thick band of two C’s. At this position, the boy had one C and one band indicating an A. In effect, he had a mutation that converted one of the bases known as C to a base known as A. As a result, this region of one of his collagen genes coded for the amino acid cysteine instead of the amino acid glycine. The presence of cysteine instead of glycine at this position in type I collagen made it a defective protein. In effect, a mutation that converted one of his three billion bases to another base was the cause of his brittle bones.

There are several practical consequences of being able to carry out this kind of diagnosis in children with osteogenesis imperfecta. One is that the results will provide definitive evidence that the child in fact does have a genetic disease and is not a battered child. Sadly, a number of families with children having osteogenesis imperfecta have been accused of the battered child syndrome and legally prosecuted. A definitive DNA diagnosis as described above can prevent this tragic event. Another practical consequence is that families that have one child with severe osteogenesis imperfecta have an eight percent chance of having a second child with the same disease. If the family desires another child, amniotic cells can be obtained at about 16 weeks of a pregnancy or chorionic villi cells can be obtained at about eight weeks. The cells from these two sources can be analyzed for the presence of a mutation in the collagen gene, and a diagnosis can be made as to whether the new child...
In the course of studying the child with osteogenesis imperfecta, we carried out one critical experiment to prove that the mutation was in fact causing his brittle bones. We took a mutated collagen gene similar to the one found in the boy and used it to prepare transgenic mice. The steps here, again, are relatively simple. DNA containing the mutated gene is injected into a one-cell mouse embryo which is then implanted into a pseudopregnant mouse. After the injection into the embryo, the mutated gene is, by seemingly magical steps, incorporated into a chromosome of the embryo and expressed as a protein. Therefore, this procedure allows you to prepare transgenic mice that contain a mutated human collagen gene as part of their own chromosomes, and to express the mutated gene as faulty collagen. The net result is to produce mice that have brittle bones similar to the brittle bones seen in the children. The experiment is a direct way of demonstrating that the mutated collagen gene can in fact cause brittle bones.

The transgenic mice expressing the mutated collagen gene, in turn, allowed us to take the work one step further and address a critical question: was there any way that we could help children with this disease?

Until three years ago, I was convinced that brittle bone disease was one of the worst possible diseases in which to try any type of gene therapy. The problem is simply that all the bones are involved in the disease and, therefore, any therapy would have to repair all the bones. Other human diseases seemed like much easier targets for gene therapy. Recently, however, we have succeeded with an experiment that makes us extremely optimistic that it will be possible to devise a therapy for brittle bone disease.

The study, carried out by Ruth Pereira, Ph.D. in my laboratory, and by Michael O'Hara, Ph.D. in Professor Dennis Leeper's laboratory at Jefferson, was initially designed as a marker gene experiment in which a marker gene was used to follow the fate of cells that were infused systemically into mice. The cells we were interested in are called stromal cells from bone marrow. Marrow stromal cells have several unique properties. One is that they are easy to isolate. If you place bone marrow in a culture dish, most of the cells float, but about one in 1,000 cells sticks very tightly to the plastic of the dish. The cells that stick to the plastic are quiescent for three or four days, but then begin to divide rapidly. These cells have been studied extensively for over 20 years and have been shown to be precursors of bone. They will form colonies of bone if cultured under certain conditions. They will also form bone if placed in a capsule and inserted under the skin of an animal.

In our experiments, we asked the question: what happens to marrow stromal cells if they are infused systemically into an animal? Specifically, we wanted to know whether cells infused systemically will home to bone and replace some of the cells initially found in the bone of a recipient animal. There were several indications that an experiment we designed might work, but no one had actually performed the experiment. The key to it was that by taking marrow stromal cells from a mouse expressing a mutated collagen gene, we had cells containing a marker gene with which we could follow the fate of the cells in great detail. One week after we infused the cells into a normal mouse, we could not find any of the donor cells in any of the animal's tissues. After one month or five months, however, we found that the donor cells replaced three to 10 percent of the cells in a number of tissues in the mouse. It was no surprise that the donor cells were found in marrow and spleen of the recipient mouse because these cells are closely related to bone marrow. The pleasant surprise was that the donor cells had replaced the bone cells in the recipient mouse to about the same extent that they had replaced the marrow cells. Therefore, the injected cells had in fact acted as precursors of normal bone.

The experiments have several implications. One is that they raised the possibility that normal marrow stromal cells can be used to treat a child with osteogenesis imperfecta. The normal marrow stromal cells will have to come from a donor who is immunologically matched to the child with osteogenesis imperfecta. Also, the child with osteogenesis imperfecta would probably have to receive chemotherapy to "create a space within the marrow" for the donor cells. Therefore, the therapy has some potential risks to the child. At the same time, some children with osteogenesis imperfecta have severe variants of the disease that produce death within a few weeks or months after birth. In such children, the risk of treatment with normal marrow stromal cells is probably warranted. In fact, a clinical trial of this therapy will probably begin within a few months at one of the leading centers for bone marrow transplants in the United States.

The second implication of these experiments is that it may be possible to isolate marrow stromal cells from a child with brittle bone disease, correct the gene defect by culturing the cells under appropriate conditions in the laboratory, and then return the corrected cells to the child. A number of technical problems must still be overcome in carrying out this strategy of correcting the gene defect in marrow stromal cells from a child, but we are optimistic that the obstacles can be overcome. These are the experiments that my laboratory is now engaged in.

In the future, what we have been learning about the relatively rare disease of osteogenesis imperfecta may have applications to more common diseases. We are hopeful that in the future, strategies similar to those that we and others are trying to develop in the therapy of osteogenesis imperfecta may be applicable to more common diseases of bone such as osteoporosis and perhaps to common diseases of cartilage such as severe generalized osteoarthritis.
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Hosted by William V. Harrer ’62, Past Alumni President and Professor of Pathology

General medical update topics will be presented by faculty and alumni

Led by Jerome J. Vernick ’62, Clinical Professor and Director of the Trauma Division

7/15 Sail from Vancouver Your ship the Sky Princess awaits you at the pier in Vancouver, B.C. We’ll welcome you aboard and escort you to your cabin. We’ll set sail for the stunningly beautiful Inside Passage early this evening.

7/16 Inside Passage (Cruising) Enjoy your first day of Princess pampering as your ship cruises this scenic waterway.

7/17 Ketchikan (Port of Call) They call this town the Salmon Capital of the World, but it’s also known for its magnificent totem poles. May we suggest an optional tour to Saxman Village to watch native carvers at work?

7/18 Juneau (Port of Call) Today we’ll call at Juneau, Alaska’s capital, where an optional tour to Mendenhall Glacier is a popular shore excursion.

7/19 Skagway (Port of Call) Call at Skagway—known as the jumping-off point for the 1898 gold rush. Take in the Klondike atmosphere on a variety of exciting optional tours.

7/20 Glacier Bay or Hubbard Glacier (Cruising) Today you’ll either cruise through Glacier Bay National Park or sail to Yakutat Bay and past Hubbard Glacier for a look at the massive rivers of ice for which Alaskan cruising is known.

7/21 College Fjord (Cruising) Enjoy an unforgettable day of cruising across Prince William Sound and into College Fjord, famous for its 16 gleaming glaciers cascading to the sea.

7/22 Arrive Seward/Anchorage, Fly to Fairbanks This morning we’ll transfer you from your Princess ship to the Anchorage airport for your flight to Fairbanks. When you arrive, we’ll take you on a delightful riverboat cruise along the Chena and Tanana rivers. Later, we’ll transfer you to your hotel for the night.

7/23 Fairbanks/Denali Today, board our own Midnight Sun Express Ultra Dome rail cars and travel in style and luxury to Denali National Park. Upon arrival, we’ll take you on a tour into the park. Tonight enjoy our comfortable Denali Princess Lodge.

7/24 Denali/Anchorage Spend some time exploring the park on your own this morning or enjoy an optional tour. Early this afternoon we’ll transfer you to the Midnight Sun Express and continue the scenic journey to Anchorage, tonight’s destination.

7/25 Anchorage Spend the morning discovering Alaska’s largest, most cosmopolitan city, and its beautiful surroundings on a tour. This afternoon you’ll have plenty of time to enjoy optional sightseeing tours, shopping, or exploring on your own. Overnight again in Anchorage.

7/26 Anchorage/Seattle We’ll transfer you to the airport for the flight to Seattle and your connections home.

Rates Include entire trip package (cruise aboard the Sky Princess with exterior cabin, plus land travel and lodging) but not air transportation to Vancouver or back home. Discounted rates are:

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Plus port tax: $206.00 per person

Airfare from Philadelphia: $539.00 per person. Airfare from other cities will vary. Please specify your choice of departure city. Or, you may make your own flight arrangements.

To assure your cabin choice in the ship, please call Kelly Bradley (see below) as soon as possible.

1) Reserve Now for the Trip

Contact: Kelly Bradley, Travel Counselor
American Express Travel Related Services
14 South Haddon Avenue, Haddonfield, NJ 08033
Phone 1-800-543-9168 or 609-428-0810 Fax 609-428-7510

2) Register Now for CME Credit

To register, mail the form below to: JMC Office of CME, Alumni Trip, 1025 Walnut Street G-3, Philadelphia, PA 19107. Enclose your registration fee of $250.00 payable to JMC Office of CME.

For questions regarding Continuing Medical Education credits, call the JMC Office of CME at 215 955 6992.

Name __________________________ Class Year or Jeff Affiliation _________

Guest Name __________________________

Preferred Address __________________________

City __________________________ State ________ Zip ________

Daytime Phone __________________________

☐ Yes, I am willing to give a one-hour educational presentation.
Computer-Based Teaching Reshapes How Students Learn

John J. Gartland S'44

The practice of medicine is changing rapidly and medical education must adjust to these changes to keep pace. An increasing body of research and medical knowledge and the rapid development and deployment of technology in health care has made computer managed information storage and retrieval an absolute requirement for both clinical practice and medical education. For example, the MEDLINE database of the National Library of Medicine currently contains over eight million citations and is growing at the rate of 35,000 citations per month, a growth rate far beyond the capability of any physician or medical student to keep pace with relevant medical literature. Jefferson has responded to the need for information management by creating AISR (Academic Information Services and Research) to provide leadership and service in managing scholarly information, to create TJU information resources, and to improve communication between students and faculty.

On a practical level this has merged Scott Memorial Library, the Office of Academic Computing, and Medical Media Services into a unified organization with specialized functions relating to knowledge management and communication. AISR has created JEFFLINE, a computer program which links the Jefferson community together and to distant learning centers through access to the Internet. A major local use for JEFFLINE is to access the core health sciences databases including MEDLINE, CD-ROM for other databases concerned with health care, such as BIOETHICSLINE, AIDSLINE, and Science Citation Index are available on selected computers in Scott Memorial Library. Plans call for eventually linking all Jefferson teaching affiliates together through JEFFLINE. A major educational initiative of AISR already in place is the support of an extensive library of computer-based learning software programs and the promotion of computer-based learning among faculty and students.

Headquarters for the computer-based learning initiative at Jefferson is the Office of Academic Computing (OAC), located on the ground floor of Scott Memorial Library. The OAC is headed by Rodney B. Murray, Ph.D., who, in addition to being Director, Office of Academic Computing and Instructional Technology, is an Assistant Professor of Pharmacology. The Office of Academic Computing promotes state of the art computer-based training for health care education. The OAC manages three open access computer laboratories, supports a growing library of software serving both educational and research needs and offers seminars and workshops to faculty and students in support of accessing information resources. For faculty members who are not computer literate and who wish to become so, OAC will teach them the requisite skills on request.

Proponents of computer-based learning believe using computer learning programs can add to a student’s knowledge base, can stimulate student discussion, can reduce class room teaching time and can be a convenience for both faculty and students. The computer-based learning software library maintained by OAC is extensive and covers both basic science and clinical topics. It has been acquired through software purchases and through contributions from Jefferson faculty members who have created their own programs. At present the library contains, among a vast array of other programs, 19 on anatomy, 15 on biochemistry, eight on histology programs, six on microbiology, seven on pathology, 15 on pharmacology, and seven on physiology. Instruction for the first two years of medical school now includes 51 computer-based learning programs, of which nine are required by course directors and 28 are strongly recommended to the student by course directors. A program written by the National Board of Medical Examiners is a patient simulation interactive videodisc program. Of the 51 computer-based learning programs used during the first two years of medical school at Jefferson, 34 programs were written by Jefferson faculty members.

Medical students can use these programs in either of two computer laboratories. One laboratory with 32 computers is on the third floor of the Scott Memorial Library. The other laboratory with 16 computers is on the third floor of Jefferson Alumni Hall. These laboratories contain only Macintosh computers because they are believed to be easier to use for these types of programs and also because students prefer them. Most of the monitors are 16 inches rather than the more usual 13 inches so as to provide a bigger viewing area for these instructional programs. A selected few come with even larger terminals. These laboratories are open for student use from 9 A.M. to 10 P.M., Monday through Friday, and for at least six hours on Saturday and Sunday.

In addition, Jefferson belongs to the National Educational Medical School Consortium (NEMSC), a consortium of 15 medical schools formed to encourage the collaborative and cooperative development, refinement, assessment, and sharing of computer-based educational materials using a common hardware platform and common authoring systems. Beside Jefferson, other member schools are Cornell, Dartmouth, Georgetown, Harvard, Johns Hopkins, Mt. Sinai, Michigan, New York University, Penn, Rochester, Stanford, Syracuse, Vanderbilt, and Yale. Jefferson students can download consortium programs on to computer laboratory machines or download them on a disk and run them on their own computers. Some programs are examples of so-called
hypermedia, a merger of text, graphics, video, and sound in an environment which allows the user to manage and process it. Richard R. Schmidt, Ph.D., Associate Professor of Anatomy and Developmental Biology, typifies the Jefferson faculty member who makes good use of AISR computer services, particularly electronic mail and computer-based learning. Using e-mail for communicating with students and the ADAM (Animated Dissection of Anatomy for Medicine) software program established as a course learning tool, members of Dr. Schmidt's anatomy class have become "computerized" more thoroughly than any group of Jefferson students to date. Starting with the entering medical student class of 1997, AISR gave all first-year course coordinators e-mail accounts for their classes. Dr. Schmidt uses e-mail for course administrative details such as dates and locations for examinations and laboratories and other relevant class information. He has also integrated e-mail with the course material so that instructive questions arising in class can be shared with all the students, but he is quick to point out that he does not supply e-mail answers to these questions. He believes this type of activity is a good learning experience for the students and points out that students can find the answers to most of the questions in their course material. Even after students have completed his course, Dr. Schmidt continues to send them anatomy and embryology questions because he recognizes that students must keep their knowledge of these subjects fresh for the first part of the National Board Examination at the end of the second year. Students are able to access e-mail through their home computers, at Scott Memorial Library, and at other locations.

ADAM (Animated Dissection of Anatomy for Medicine) is a commercially produced, self-paced, self-directed computer learning program and represents a much more complex application of computer technology than e-mail. It runs off both a CD and a network server, and has been called the "Gray's Anatomy of the 21st Century" by faculty at medical schools who have used it. When viewed in the computer laboratory of the Office of Academic Computing, ADAM is truly an exciting educational experience and a convincing indicator of how the future of medical education will evolve. ADAM is a multimedia program with beautiful pictures and excellent dissection overlays. Faculty users can add text and pictures, make subroutines, drop in Quick Time video segments, and customize the visuals in ADAM with CT or MR images. With the help of student interns, Dr. Schmidt has added text information for most areas of the body. Dr. Schmidt points out that student use of computer-based learning can be expected to increase rapidly once material specific to ADAM and other computer-based learning programs begins to appear on the examinations.

ADAM has been touted to be the computer graphics program that may replace hands-on cadaver dissection in medical schools some day. Dr. Schmidt does not believe that will occur in the foreseeable future because learning anatomy is still a hands-on experience. He believes it will be several decades before computers can simulate the experience of a gross anatomy laboratory but he does expect these computer programs to become more realistic as time passes. The National Library of Medicine in December 1994 released on the Internet a three-dimensional computer-generated "cadaver" known as "The Visible Man." This "cadaver" was created from thousands of images of a human body collected with state-of-the-art radiographic and photographic techniques. The composition of the "cadaver" is so complex that those who wish to download it in its entirety will need up to two weeks of uninterrupted Internet time and 15 gigabytes of computer storage space. The National Library of Medicine expects to release "The Visible Woman" sometime in 1995. The computer technology that might make hands-on cadaver dissection obsolete some time in the future is virtual reality. For the present, however, virtual reality is not practical for regular use in medical education or to replace hands-on cadaver dissection in medical school anatomy laboratories.

Faculty members are finding it increasingly helpful to use computer-based presentations for lectures and other teaching purposes. An OAC Educational Technology Survey of selected faculty in 1992 found that the majority of faculty respondents at that time preferred to support their lectures with a 35mm slide projector. Since then, however, the pendulum has swung sharply toward computer-based presentations. Computer skills training provided to faculty members by OAC has been very assistive in fostering this change in faculty attitude toward lecture support methods. Course handouts can be computer designed and printed for distribution to students. Computers
can project lecture outline material and all illustrations, including those with an audio component. Faculty members who use computer-based presentations no longer need carousels, 35mm slides or projectors. However, a screen is still needed when presenting information to large audiences. Using a computer to project images to an audience provides more advantages than using 35mm slides because it is cheaper in the long run and last minute changes can be made in the material to be projected, which is impossible to do with 35mm slides. Computer-based presentations also allow the showing of simulation programs to reinforce text information presented to students. For example, when lecturing to students about drug actions in pharmacology, Dr. Murray uses MACKINETICS, a simulation program designed to show students the pharmacokinetics of drug actions.

While it is not quite accurate to say that, initially, faculty members and students had to be dragged kicking and screaming to the computer learning laboratories, it is true that medical student acceptance and use of computer-based learning programs at Jefferson began slowly and followed a typical learning curve. Over a relatively short time period, however, faculty members have come to appreciate the value of computers as teaching aids. In like manner, Jefferson medical students have made increasing use of computer-based learning programs as more and more students have begun to appreciate the contribution computer-based learning can make to their medical education. The computer laboratories now service a swelling population of medical students.

At the present time the medical students use a program called Versa Term to access their AISR e-mail accounts, the JEFFLINE system, and the OVID search engine, which is Scott Library’s front end to the core data bases such as MEDLINE, CINAHL, and Current Contents. They use a program called NETSCAPE to access JEFFLINE’s graphical interface to the INTERNET on the World Wide Web. During January 1995, a combined Genetics/Informatics course was delivered entirely on-line to the first-year medical students. The program combined hypertext, graphical images, and easy connections to major knowledge bases such as MEDLINE and MICROMEDEX. During the past quarter of the medical school year, software use statistics generated in the computer laboratories indicate that medical students spend about one-third of their computer laboratory time on computer-based learning programs, one-third of their time with NETSCAPE which provides access to the INTERNET on the World Wide Web and one-third of their time with word processing programs and spread sheet applications for data analysis. Freeing students of the constraints imposed by fixed teaching times and classroom attendance, computer-based learning programs can be expected to become an even greater force in the education of future Jefferson medical students as the technology improves and better hypermedia learning programs are produced.

Will Tomorrow’s Journals Be Electronic?

John J. Garland ’44

The continuing growth of computer capacity and information technologies has unleashed digital streams of sound, images, and text into cyberspace, revolutionizing the way physicians access and disseminate information. Electronic storage is fast replacing paper as the most cost-effective storage mechanism for information, and digital archiving has obvious advantages over costly library stack shelving. A logical response to this evolving and improving technology is the development and use of wide-area, comprehensive, networked information systems which constitute, in effect, an information highway (reference 7). Stretches of this information highway lie along several networks, each with its own traffic. Telephone lines, for example, carry conversations and faxes. Cable TV is now testing interactive programs. The Internet, a global web of computer connections, combines various networks to deliver text, sound, and images. At Jefferson, the Internet helps to provide and promote use of computer-based learning programs among faculty and students.

The Internet is the sum of tens of thousands of computer-based networks that are believed to interconnect millions of individual computer users. The future of Internet communications is believed to lie with tools like World Wide Web (WWW) which permits intuitive searches and extensive use of graphics. The World Wide Web, a global communication and information network, is the fastest growing, graphics-rich subset of the Internet, in addition to being the most user friendly part of the network. Software programs called browsers allow users to move around from one World Wide Web site to another. The communication and information retrieval value of personal computers for physicians is tied inextricably to the use of networks like Internet and World Wide Web (6).

With appropriate software programs, physicians can now consult extensive databases maintained by the National Library of Medicine in order to stay current with rapidly changing medical knowledge. Electronic mail (e-mail), the simplest and most basic use for the Internet, provides physicians with an easy means of communicating and exchanging information with colleagues and patients. E-mail is used extensively by researchers and medical specialists for the exchange of new information. Clinical practice guidelines, sponsored by the Agency for Health Care Policy and Research, are available on CD-ROM in medical libraries and can be read by physicians on their own computer screens, can be printed for office use, and can be downloaded on their own computers. More complex is telemedicine, the use of telecommunication technologies to provide medical information and medical services by remote electronic consultation (3). As this technology evolves, it is believed that physicians will be able to interview, examine and
advise patients who are at remote sites, and will allow physicians access to electronically stored medical records, x-ray examinations, and laboratory results. The technology will eventually allow instant access to on-line libraries of medical information, treatment algorithms, and patient instructional material, and will provide computer-based scheduling for referrals to specialists and allied health personnel.

A logical extension of e-mail, the point of entry for exploiting more sophisticated resources, is electronic publishing. The Internet has the capability to speed up information flow and can convert it from a one way channel to live interactive forums. Publishers of on-line medical journals lure authors with the claim that the information contained in their articles will be disseminated immediately and can be available everywhere with a few computer keystrokes. The real probability exists of an increasing number of medical journals appearing on-line in the near future. These new electronic methods of disseminating clinical and research information are beginning to pose a challenge to the preeminence of traditional print medical journals which, admittedly, are much slower in getting published information to their readers.

The driving push toward electronic publishing is economic, as well as the allure of the new technologies that make it possible. The deputy editor of The British Medical Journal, for example, is quoted in the July 31 issue of American Medical News as saying that it is incredibly expensive and inefficient to communicate research results on paper. Libraries are buying fewer print journals even as more become available, thanks to the increasing complexity of biomedical research, and the development of new medical and surgical subspecialties. The price of print journals is increasing steadily, up an average of 10 percent every year since 1986. Consequently, major academic centers have bought 0.5 percent fewer journals every year since 1986. So, with paper costs rising, print journal advertising revenues declining, and subscription price increases forcing libraries and physicians to cut back on print journal purchases, even as they continue to demand the best and most current medical information, are on-line medical journals the electronic answer for physicians?

Proponents of electronic publishing believe biomedical publishing is now at a watershed (1). They believe print journals have been rendered almost obsolete by these evolving communication technologies. They point out that original work and its acquired criticisms, plus supporting documents, charts, references and data bases are now accessible on a computer screen through a series of mouse clicks. Franklin Electronic Publishers, Inc. of Mount Holly, New Jersey, for example, is now the world's largest publisher of electronic books. This publisher has sold more than 10 million books, including dictionaries and medical, legal, and financial reference works. Periodicals on the Internet increased tenfold between 1991 and 1995 and now number just over 1,000. Five to 10 new titles appear almost daily, and many major book and journal publishers are preparing to convert hundreds of existing publications to an on-line format. At present, medical journals make up only a fraction of the total number of on-line journals, but this number is expected to increase quickly in the near future. Experts attribute the explosion in electronic publishing to new powerful software programs that make tapping the Internet as easy as pointing and clicking on a computer screen. Electronic publishers say their goal is to go to full text on the Internet, including hypertext links to other resources. Hypertext, a type of hyperlink, lets users jump from one source to another, even if the other source is a computer on the other side of the world.

Publishers of print medical journals are far from surrendering the field and are busily reorganizing themselves to ward off more challenges from electronic journal publishers (8). Some print publishers have responded to the electronic challenge by diversifying to produce other materials, such as practice management periodicals, medical newsletters, and abstracts of new biomedical information. Annals of Internal Medicine, for example, is collaborating with The British Medical Journal to produce a publication titled Evidence Based Medicine, which distills information from 50 top print medical journals.

Other print medical journal publishers are strengthening their operations by acquisitions, mergers, and amalgamations. For example, Wolters-Kluwer acquired J. B. Lippincott and Raven Press, then joined them together. Britain's Reed joined Holland's Elsevier, and Germany's Holtzbrinck bought 70 percent of Macmillan, owners of Nature and Nature Medicine. These moves signify a new era of collaboration among publishers of print medical journals designed to lower competitive barriers between them and to make their positions stronger in face of increasingly stronger challenges from electronic publishers.

Physical scientists are acknowledged generally as being the first within the scientific community to adopt electronic publishing. Physicists, for example, have been communicating and conducting research electronically since 1991. Most information experts, however, believe physicians and some biomedical researchers will be slower to accept electronic publishing because training in the use of such technology among medical professionals is limited. Publishers of medical print journals tend to believe that the open-ended system that seems to work for physics will not work as well for health care where sloppy studies and flawed conclusions could compromise patient care. Not unexpectedly, most publishers of print medical journals oppose the freewheeling, unreferred
approach of electronic publishing, particularly when it is realized
the public has full access to the Internet. Many print medical
journal editors believe the scientific quality of what is now
pouring into cyberspace is too uneven to permit wholesale
acceptance of electronic publishing in its present state of
development. Many medical researchers, however, are clamoring
for change and demanding a more rapid and efficient way of
disseminating their study results. Some publishers of electronic
medical journals are calling on medical researchers to bypass the
comparatively slow peer reviewed journals entirely and publish
their findings directly on the Internet. Electronic publishers claim
their new formats serve physicians and medical researchers better
because they are faster, cheaper, and more widely available, and
the publications can be indexed and searched electronically.

Before cancelling their print medical journal subscriptions in
favor of electronic ones, physicians would do well to balance the
present drawbacks and disadvantages of on-line medical journals
against the advantages promised by electronic medical journal
publishers. One present drawback is lack of
reader ease in extracting the sought after
information. To read on-line medical
journals physicians need computers,
modems, and appropriate software
programs, plus new skills and a lot of
patience to access the sought-after
information. This drawback becomes more
obvious when one considers how easy it is
to extract information from print journals.

Another drawback is that on-screen
reading is 20 to 30 percent slower and
much less comfortable than print reading
at the present time because of screen
problems such as glare and flickering
images. Screen reading will have to be
improved if electronic medical journals hope to attract a large
number of physician readers.

Network enthusiasts talk excitedly about creating a garden on the
Internet where freedom of speech would thrive. This kind of talk
should raise a caution flag to physicians because, if this garden
comes to full bloom, how will physicians be able to distinguish
good patient care information from bad patient care information
on the Internet? Technology promises more and more
information for less and less effort, but this trade off can be a
dangerous concept for physicians who must rely on the validity
of the medical information they receive in order to care for
patients appropriately. In the final analysis, it will come down to
the integrity of the electronic medical journal to ensure the
validity of the information it disseminates. At this time, it does
not appear likely that electronic medical publishing has advanced
to the stage of being able to provide that assurance.

Other questions arise about electronic medical journals such as
how they will be archived and how copyrights are protected on
the free-flowing Internet. Another question medical investigators
must consider is whether posting preliminary findings on the
Internet constitutes prior publication, thus making a subsequent
printed text ineligible for publication in a peer reviewed print
journal. The New England Journal of Medicine announced in June
1995 that it now considers reporting research results on the
Internet to be prior publication, similar to publishing the data in
any other format (2). However, as before, research results can be
presented at scientific meetings without that type of presentation
being considered prior publication.

A deep concern physicians should have about electronic medical
journals is the public's increasing ability to access such information
on the Internet, sometimes even before physicians themselves have
had a chance to digest and evaluate the same information. At
present, it is not likely this medical information receives much
objective review before its presentation on the Internet, thus
rendering the accessing public virtually clueless as to the validity of
the information they have read. Because the ultimate purpose of
information published in either print or
electronic medical journals is to improve the
care given to patients, it is vitally important
that the information presented to readers be in
the simplest and clearest terms possible. The
information must be accurate and valid in itself
and be presented clearly and logically so that
physicians who read either print or electronic
journals are in no danger of misinterpreting or
misunderstanding the information.

One of medicine's professional strengths is the
existence of editorially independent peer
reviewed medical journals in which physicians
and scientists, the public, the media and
patients can put their trust (4). Readers can
believe that what they read in these publica-
tions will be as correct as it is humanly possible to be at that time.

The practice of editorial peer review is based on the social habit of
relying on consensus to validate action. The scientific community,
including medicine, relies on the peer review process as the
acceptable way of judging the validity and study design of a
reported work in order to determine whether the reported results
are valid and significant enough to be added to the permanent store
of recorded information. The ultimate issue in the peer review
process is the quality of the scientific literature and the degree of
faith it deserves from readers and researchers. However, it can not
be denied that the traditional peer review process delays the
publication of medical information in print journals, a delay that
proponents of electronic publishing claim is unnecessary.

Critics of the traditional peer review process can be expected to
favor electronic medical journals. In addition to the delay it causes
in the time to publication, these critics object to traditional peer
review on the ground that it tends to allow only conventional work
into the print medical journals, and tends to discourage those they
consider to be truly significant innovators or original thinkers. Proponents of electronic publishing claim that publishing on the Internet does not necessarily mean abandoning the peer review process. However, physicians should note that as of May 1995, less than one-quarter of on-line journals described themselves as being peer reviewed (1). At this time, it is not clear how electronic journals claiming to be peer reviewed accomplish this task. This particular topic will be addressed in depth at the International Congress on Biomedical Peer Review and Global Communications, hosted jointly by The Journal of the American Medical Association and The British Medical Journal to be held in Prague in September 1997 (5).

There can be no doubt that the Internet and the World Wide Web offer tremendous opportunities to physicians for expanding their knowledge bases. CRISP (Computer Retrieval of Information on Scientific Projects), a quarterly CD-ROM from the U.S. Public Health Service, allows users to obtain current information on federally supported biomedical research, even before the research results appear in the published literature. A new home page on the World Wide Web provides information about proposed and ongoing clinical trials. This service helps select patients for clinical trials by screening some candidates and by listing participation criteria.

Physicians should not be surprised, therefore, that electronic medical journals are emerging on the Internet. It seems a safe assumption that the number and importance of electronic medical journals will increase and expand over the next few years. At the present time, however, it seems wise for physicians to remain cautious in their acceptance of information contained in electronic medical journals until these journals can provide them with better assurances that the information they publish is both accurate and valid. The concern physicians should have about the transfer of any medical information is, and remains, that the information being transferred not be capable of being misinterpreted nor misunderstood, nor carry the potential for harm to patients. Until electronic medical journals can provide that assurance, physician reliance on them for medical information should be cautious and limited.

References

Computers in Patient Care: Jefferson Health System Continues to Upgrade Information Technology

HealthLINK, the Jefferson Health System’s initiative to upgrade and standardize its information technology, is making rapid progress. The ultimate goal is the capability to follow patients through the care delivery system and have access to complete information about them, wherever and whenever they receive care. The technology will combine cost and care information and create data bases needed to identify variations, define best practices, and establish and manage quality and cost. Thomas Jefferson University is working closely with Main Line Health, a partner in the Jefferson Health System, to coordinate initiatives needed for JHS to operate as an integrated care delivery system. Key aspects include:

Health Services Network Connectivity

Expanding the computer network will ensure that employees can easily and quickly access information. Cabling is being overhauled, and locations are being determined for workstations. Major new electronics equipment is being evaluated that will provide increased network speed and support more network “traffic.”

Common Patient Registration

A common patient registration is key to increasing patient convenience and satisfaction, and improving the accuracy of information as it is used to treat patients across sites and settings. Currently patients register at each Jefferson site; under a common program they will register once and the information will be available at all sites.

Physician Practice Management

The Physician Practice Management Information System will provide the physician office with a billing and accounts receivable tool to manage financial data, optimize collections, and generate comprehensive reports. It will also provide required managed care capabilities including eligibility, referral, and co-pay management.

Order Entry, Results Reporting, Resource Scheduling

Order entry, results reporting, and resource scheduling have been identified as strategic projects to effectively coordinate care and services throughout the Jefferson Health System. It will be possible to easily order tests and other clinical services, quickly obtain results, schedule clinical resources, and ensure a continual record as patients are treated at all phases.
Female Alcoholics More Adversely Affected by Alcohol

A Jefferson study indicates that female alcoholics have a greater propensity to alcohol-induced cardiac damage than male counterparts.

In a study in the July 12 Journal of the American Medical Association, researchers from Jefferson and the University of Barcelona in Spain conclude that the heart of a woman is more sensitive to alcohol abuse than that of a man.

In the study, which was led by Emanuel Rubin, M.D., the Aponte Professor and Chairman of Pathology, Anatomy, and Cell Biology, investigators assessed the strength of 150 male and female alcoholics by conducting muscle biopsies, echocardiograms, cardiac angiographies, treadmill-exercise electrocardiographies, and additional lab studies.

It was observed that female alcoholics had the same prevalence of cardiomyopathy as male alcoholics, despite having consumed far less alcohol. This finding contradicts a widely held belief among medical professionals that few female alcoholics get cardiomyopathy. Dr. Rubin emphasizes that degeneration of the heart muscle requires longstanding chronic alcoholism. By contrast, light-to-moderate drinking may exert a protective effect against coronary artery disease and heart attacks.

"Since the majority of alcoholics are men, it is not surprising that most cases of alcoholic cardiomyopathy and skeletal myopathy have been reported in men," says Rubin. It was also noted that the threshold dosage level for the development of myopathy and cardiomyopathy is considerably lower in women than in men.

In addition, the investigators observed that for a given amount of alcohol, there was a greater decrease in heart contraction strength in female alcoholics versus participating male alcoholics. The researchers plotted on a graph the total lifetime consumption of ethanol per kg of body weight against the left ventricular ejection fraction (a measure of the heart's strength during contraction) for 50 alcoholic women and 100 alcoholic men. The slope of the line for women was considerably steeper than the one for men, indicating that for the same dose of alcohol, the hearts of female alcoholics were more severely damaged.

"Despite the fact that the average amount of alcohol in female alcoholics was only 60 percent that of male alcoholics, cardiomyopathy and myopathy were as common in the females as in the males. This, together with the more pronounced response of the heart to a given dose of alcohol, indicates that women are more sensitive than men to the toxic effects of alcohol on striated muscle," says Rubin.

There are a growing number of significant studies that describe susceptibility differences between men and women to the toxic effects of alcohol. Women appear to be at greater risk for developing alcoholic liver disease and to have a greater vulnerability to brain damage than males.

Risk factors for heart disease explain only half of the variation among individuals in the development of heart disease. For example, people with similar blood cholesterol concentrations and blood pressures can have different extents of disease.

The Jefferson-Columbia collaboration highlights the importance of focusing on the tendency of a person's arteries to trap or retain LDL. Finding a family history of heart disease may indicate that family members' arterial tissue is more likely to retain LDL, even if the same plasma concentrations of LDL would not cause extensive atherosclerosis in individuals with other genetic backgrounds.

"Right now we have fairly good, preliminary information about how and why retention of LDL occurs in arterial walls," states Williams.

He also acknowledges that much remains to be learned about retention. It is still unclear how factors regarding retention are different in individuals with positive family histories for heart disease. He believes such work could lead to new strategies for prevention and treatment.

Two other hypotheses that have been proposed to explain the onset of atherosclerosis are addressed by Dr. Williams and Ira Tabas, M.D., Ph.D., Associate Professor of Medicine and Anatomy and Cell Biology at the College of Physicians and Surgeons of Columbia University, who co-authored the study.

"One theory proposes that shear stress on the branch points in the arteries produces molecular changes that lead to lesion formation," he explains. "Upon closer examination, it is evident that shear stress is not an essential contributor to heart disease because lesions can develop in nonbranch points of arteries as well."

Williams and Tabas also cite the oxidized LDL hypothesis in their article. Oxidation of LDL is an unfavorable biological process which can generate byproducts stimulating the growth of lesions that block arteries. But

continued at right
Molecule Essential for Cell Growth and Division is Discovered

In a basic biological science development, researchers at the Jefferson Cancer Institute have identified a new protein as essential for cell growth and division. The new protein, PISSLRE, apparently becomes activated during the phase of the cellular life cycle known as G2 and continues to exert its effects until the M phase. Expression of PISSLRE by cellular DNA is essential for human cells to grow and divide properly. The finding is presented in the September 15 issue of Cancer Research.

Jefferson researchers have been studying the relationship between proteins and the cellular life cycle in order to better understand a variety of diseases, including cancer, and to design new drugs against them. "We hope that as we learn more about the cell cycle, we can apply our findings to the development of drugs that only target cancer cells—without effects on normal cells," says Antonio Giordano, M.D., Ph.D., Assistant Professor of Microbiology and Immunology. "As it stands, chemotherapy is toxic to many other cells in the body other than tumor cells."

Giordano and other investigators identified the PISSLRE protein as essential for mammalian cells to move from the G2 stage to the M stage.

Cell-cycle regulatory proteins are of significant therapeutic interest because the molecules are expected to provide a basis for developing potent drugs that act more specifically than those currently available. Regulatory proteins are only present in dividing cells and are only activated at particular times within the cell cycle. This should allow for the development of drugs that only target proliferating cells, with no side effects to resting cells. Chemotherapy, in contrast, acts nonspecifically, and is toxic to normal cells. In addition, different CDK molecules and other cell cycle regulatory proteins are present in tumor cells than in normal cells, making the targeting of tumors a possibility.

Dr. Giordano was the first to find a direct physical link between cell-cycle regulation and cancer. His latest research builds on this body of knowledge. His work demonstrates that in order for human cells to transform and become cancerous, oncogenes interact directly with the cyclin and CDK molecules, effectively deregulating the cell cycle. Normally in humans, if alterations in the cell growth or division process are sensed, cells are induced by their DNA either to stop dividing and become inactive, or, if they have suffered damage, to undergo apoptosis. When errors in the chromosomes are present, the genes may produce abnormal cyclins and CDKs that lead to a chain of molecular events resulting in cancer.

Abnormalities in the cyclin and CDK molecules have been found in a variety of human cancers.

For example, Giordano's laboratory recently demonstrated that a defect in the RB-2/p130 gene may result in a genetic predisposition to nasopharyngeal cancer when exposed to certain environmental agents. The researchers also showed that this gene maps to a region of the human chromosome that is frequently missing in a number of human cancers, such as breast, ovarian, and prostate cancers.

Mammograms Are Cost-Effective and Significantly Reduce Death Rate

The medical community's ongoing controversy over whether mammography is recommended for women age 40 to 49 has left many wondering, is it necessary? Safe? Worth the expense? Yes to all three questions, according to Jeff research published in the November 15 issue of Cancer.

The study takes a look at a recent meta-analysis of seven randomized trials. The combined trial results show that mammography screening for women age 40 to 49 significantly reduces the mortality rate.

As far as risks, they are negligent or nonexistent compared with the benefit from screening, notes Stephen A. Feig, M.D., Professor and Director of the Breast Imaging Center and author of the study. No woman has ever developed breast cancer due to mammography, even with exams at doses many times higher than the current dose used.

The total cost of screening women age 40 to 49 runs from $6,930 to $13,413 per year of life expectancy gained, including downstream costs such as core or excisional biopsy for women with a suspicious abnormality. Mammography screening itself is more cost-effective than many other accepted lifesaving interventions for women age 40 to 49, such as cervical cancer screening or osteoporosis screening, points out Dr. Feig.
Antisense DNA Therapy Prevents Burkitt's Lymphoma Tumors in Mice

Researchers led by Eric Wickstrom, Ph.D., Professor of Pharmacology, have prevented tumor formation in mice predisposed to Burkitt's lymphoma. In the longest test of antisense DNA therapy in animals to date, three-week-old mice without tumors were treated for six weeks with a gene-targeted drug. The study, which appeared in the September issue of Molecular Medicine, represents the first demonstration of antisense DNA therapy to prevent tumor onset. The work suggests that similar genetic therapy might one day be used to prevent Burkitt's lymphoma in humans with a genetic predisposition to the disease.

For some diseases caused by defective proteins, Jefferson genetic researchers may be able to block the cell's ability to make the protein. Antisense DNA drugs work by binding to RNA messages from genes, so that their genetic code cannot be read. Antisense DNA fits up against its target like a matching puzzle piece. Once bound, the drug prevents the gene from being copied, or the message from being read. The term antisense has been adopted because the RNA message from a gene carries the genetic code for a specific protein to be read in the correct sense, and the antisense DNA must have the opposite, or anti-, sense, in order to bind to the gene copy.

Dr. Wickstrom and co-investigators used transgenic mice engineered to carry a chromosomal translocation that causes Burkitt's lymphoma. The rearrangements cause rapid proliferation of blood cells. The mice almost always develop lymphoma tumors by 16 weeks, and die soon after.

In the experiment, 95 percent of the control mice that did not receive the antisense DNA drug developed tumors by 16 weeks. In contrast, 75 percent of the mice that received the drug were tumor-free at 26 weeks—17 weeks after treatment had ended—suggesting the establishment of long-term resistance. "The rarity of tumor onset after the end of treatment surprised us," says Dr. Wickstrom.

The goal of nucleic-acid-based therapeutics, like the one used in this study, is to turn off the mutated genes that cause cancer. When the genes are turned off, they can no longer make the protein products that lead to disease. This approach attacks the initial cause of cancerous growth. In contrast, current cancer chemotherapy drugs are designed to stop the activity of the proteins.

The DNA used in the antisense drug in this study consists of only 15 letters of genetic code that correspond to a 15-letter target in the c-myc gene, which contains over 4000 letters of code.

Antisense DNA binds to the c-myc RNA messages so that they can no longer express the proteins that lead to uncontrolled blood-cell proliferation and cancer. Although the Jefferson researchers were unable to inactivate expression of c-myc in established tumors, the antisense DNA did prevent tumor initiation.

The researchers hope that tumor resistance might be similarly induced by antisense DNA therapy in humans who have the same chromosomal rearrangements. In addition to Burkitt's lymphoma, such a therapy might be applied against many types of lymphomas, multiple myeloma, breast cancer, and colon cancer.

Wickstrom expects clinical trials to begin in approxi-mately one year. The group's next experiment will reveal whether long-term protection against lymphoma in mice depends on activation of the immune system.

Burkitt's lymphoma is found in higher rates in central Africa, but is reported from many other areas. The Epstein-Barr virus, a herpes virus, has been isolated from Burkitt's lymphoma tumors and has been implicated as a causative agent in about 25 percent of cases. Those afflicted with the disease express a characteristic chromosome crossover between chromosomes 8 and 14, and more rarely, 8 and 22, and 2 and 8. Each of these translocations causes production of the c-myc gene in large amounts, leading to tumors.
Medical Humanities in the Jan Plan: Transforming Practice into Healing

Emilie S. Passow, Ph.D., an Assistant Professor of English Literature at Swarthmore College, teaches in Jefferson's January mini-semester. Her reflections on this curriculum are adapted below from the Jefferson Student Examiner.

Over the past two decades, tension between the increased use of advanced medical technology and a growing concern for the quality of clinical encounters has stimulated a reassessment of health care training and delivery in many institutions. The issues are far-reaching. What impact, for example, do these new technologies along with rising patient demand for greater involvement in health care decisions have on the physician's role? How can physicians develop empathy without losing the professional distance necessary for their own and their patients' well-being? How may gender, race, ethnicity, and values affect the expectations that patients and physicians bring to medical situations and the choices that they make?

Expanding factual knowledge and tighter budgets make the challenge of being a physician even more complex than it inherently is.

At Jefferson Medical College, the Jan Plan mini-semester includes an elective in literature and medicine to help students explore the emotional and ethical dynamics involved in current medical practice. Dramatizing conflicts that patients, families, and personnel are likely to experience, imaginatively inviting the reader into the consciousness of characters who face pain, disability, even death, literature, art, and social science ethnography that deal with suffering expose its many layers and possible responses in richly textured, nuanced ways that scientific descriptions and factual case studies alone cannot provide. Literary pieces, in particular, foster an appreciation of how the very language used to explain anything, medical or otherwise, itself both reflects and shapes our perceptions of the subject.

The medical humanities course I have taught the past three years, "Perceptions of the Human Body," has focused on experiences in the gross anatomy lab, because dissecting the human body initiates students into knowledge of the body and the ethos of medicine through an experience radically distinct from other modes of learning and from what other human beings usually do. A privileged, ambiguous place of dread and wonder, of disgust and gratitude, the gross anatomy lab might, in effect, be seen as the crucible of a physician's character. The attitudes and strategies developed toward dissection, many assert, set the tenor and direction for attitudes and methods of care giving and adaptation to crisis throughout a medical career.

The texts we discussed in the course revolved around this connection. In what way is the cadaver the first patient? How can one handle the confrontation with mortality, including one's own, implicit in handling a cadaver? To whom does the body belong and how do different views of ownership underlie various ethical positions and emotional responses to medical intervention and death? Deformity and beauty: how can they be conceptualized while maintaining clinical professionalism? What demarcates patient and physician perceptions of illness and its meaning? What is the connection between the patient's charts and the patient, between the physical body and life itself?

Teaching these courses is satisfying, yet frustrating precisely because discussion generates sensitive and illuminating insights from the students. I often leave these seminars feeling that we have barely sipped an aperitif, much less shared a meal. But I know that the students will have many years to simmer this food for thought, and I am convinced that our readings and discussions will influence clinical behavior.

Deeper understanding of the patient-physician relationship is the ultimate rationale and reward for including humanities in a medical education already strained by traditional allotments of academic time and turf. Such understanding can be a cornerstone of transforming the practice of medicine into healing.

College, Hospital Cited as Leaders by U.S. News

U. S. News & World Report included Jefferson Medical College and Thomas Jefferson University Hospital in its annual rankings of medical schools and hospitals. The college was ranked among the top schools that excel in training primary care physicians, based on two equally weighted reputation surveys of deans and residency directors. In the hospital ranking, Jeff ranked among the nation's best as a center for AIDS treatment, cardiology, gastroenterology, geriatrics, gynecology, neurology, orthopaedics, rehabilitation, rheumatology, and urology.

Books Into the 21st Century

David B. Nash, M.D., M.B.A., Director of Health Policy and Clinical Outcomes, and Leonard M. Rosenfeld, Ph.D., Assistant Dean of Jefferson's College of Graduate Studies, are among the four editors of Medicine and Health Care into the 21st Century, published by the Pennsylvania Academy of Science. 612 pages, numerous contributors. $50.
Benjamin Bacharach '56 (being congratulated above by Senior Vice President and Dean Joseph S. Gonnella, M.D.) was Jefferson Medical College's Distinguished Honoree at the National Philanthropy Day celebration of the National Society of Fund-Raising Executives. He was also nominated to honorary membership in the Alpha Omega Alpha Honor Medical Society by the AOA members from Jefferson's Class of '95. Dr. Bacharach is Associate Dean for Admissions at the medical college, a Clinical Professor and Vice Chairman of Surgery, and Chairman of Jefferson's President's Club (see page 25).

Marluc Bibbo, M.D., the Warren Lang Professor of Pathology, Anatomy, and Cell Biology, received the newly established George L. Wired Lifetime Achievement Award in Cytologic Research at the 12th International Congress of Cytology. More than 1,300 cytopathologists from 60 countries were in attendance. Dr. Bibbo is also President of the International Academy of Cytology.

Leonard G. Gomella, M.D., the Godwin Associate Professor of Prostate Cancer, has been named an Editor-in-Chief of the new journal Techniques in Urology. This quarterly peer-reviewed journal covers surgical and nonsurgical management of urologic diseases. Among the members of the editorial board are Demetrius H. Bagley, M.D., a Professor of Urology at Jefferson, and Michael B. Chancellors, M.D., an Assistant Professor.

Harold B. Grunwald, Ph.D., Professor of Pathology, Anatomy, and Cell Biology, has been invited to serve on the Visual Sciences C Study Section in the Division of Research Grants for the NIH. Study sections review NIH grant applications, and survey the status of research in their field.

Elena G. Hityaya, M.D., Ph.D., a rheumatology fellow, has been selected by the Arthritis Foundation as the 1995 McDuffie Postdoctoral Fellow for her research into how and why collagen accumulates in excessive amounts in scleroderma. Dr. Hityaya was judged the best applicant in basic science nationwide for this award.

James M. Hunter '53, the Distinguished Professor of Orthopaedic Surgery, was honored as a Pioneer in Hand Surgery by the International Federation of Societies for Surgery of the Hand. Dr. Hunter is renowned for developing the world's first successful artificial tendon for reconstructing severely damaged hands. The Hunter artificial tendon was targeted for cases in which there was so much scar tissue that a conventional tendon graft had little chance of functioning. Until a new tendon sheath formed, human tendon could not operate properly and would not be sufficiently nourished. Inserting the Hunter Tendon Implant permits the scarred tendon bed to rebuild a new sheath in response to tendon implant gliding.

Christine Laine, M.D., M.P.H., Assistant Professor of Medicine, has been named a Picker/Commonwealth Scholar by the Commonwealth Fund. The award carries a two-year grant of $100,000 to support her research on patient knowledge following primary care visits. Dr. Laine is an Associate Editor for Annals of Internal Medicine.

Carl M. Mansfield RO'63, Adjunct Professor of Radiation Oncology, has been appointed Associate Director of the Division of Cancer Treatment of the National Cancer Institute in Bethesda, Maryland; he's responsible for the Radiation Research Program.

David B. Nash, M.D., M.B.A., Director of Health Policy and Clinical Outcomes, was presented with the Clifton J. Latoilais Honor Medal at the meeting of the American Managed Care Pharmacy Association. Dr. Nash's recent activities include being immediate past chair of both the Center for Clinical Quality Evaluation, a not-for-profit research group in Washington, D.C., and the Clinical Evaluative Sciences Council of the University Hospital Consortium.

William E. Staas Jr. '62, President and Medical Director of Magee Rehabilitation Hospital, will serve a six-year term as a Director of the American Board of Physical Medicine and Rehabilitation, and an indefinite term as Director of the Medical Advisory Board of Bayada Nurses, a regional home health agency.

Osterholm Portrait: A Collegial Team Lauds One of its Members

Colleagues and friends of Jewell L. Osterholm, M.D., Professor and past Chairman of Neurosurgery, presented his portrait to Thomas Jefferson University on October 11.

Clinical Associate Professor Bruce E. Northrup, M.D. explained to the portrait presentation audience that early in his career Dr. Osterholm made the observation on which his discoveries and patents hinge: that following a stroke, there is a crucial interval of time during which measures can be taken to minimize permanent neurological damage (see the September 1995 Bulletin, page 17).

Jerome M. Cotler '52, the Gordon Professor of Orthopaedic Surgery and a spine surgery expert, praised Dr. Osterholm's spirit of "working alongside other specialists without the interference of ego or jealousy."

Drs. Ditunno and Cotler congratulate Dr. Osterholm.

John F. Ditunno Jr., the Michie Professor and Chairman of Rehabilitation Medicine and Director of the Spinal Cord Injury Center, characterized him as "open, honest, and supportive." Dr. Osterholm himself told the audience, "In medicine there are no longer personal successes as much as collaborative ones, not individual stars as much as teamwork. I am grateful to the support staff and residents and patients who taught me as much as I taught them—who challenged me, and showed me to be humble and to understand suffering."

The portrait is the first in the university's collection painted by Mark Skolsky. —M.C.

Dr. Osterholm, his wife Anne, their daughter Kristy, her husband John Vaccarelli, and daughter Kaitlyn
Dean Gonnella is Named the AAMC Co-Chair of the LCME

Joseph S. Gonnella, M.D., Senior Vice President for Academic Affairs, Thomas Jefferson University, and Dean, Jefferson Medical College, has been elected the Co-Chair of the Liaison Committee on Medical Education (LCME) from the Association of American Medical Colleges (AAMC). The LCME, of which Dr. Gonnella has been a member since 1992, is a partnership between the AAMC and the American Medical Association. Dr. Gonnella will serve as Co-Chair through December 1997.

The LCME is the accrediting agency for U.S. and Canadian medical education programs. It is recognized for this purpose by the U.S. Secretary of Education, by the U.S. Congress in various health-related laws, and by state medical licensing boards. The AAMC and AMA each appoint six professional members and one student participant to the LCME; the LCME itself appoints two public members; and a member represents the Committee on Accreditation of Canadian Medical Schools.

LCME accreditation is required for schools to receive federal grants for medical education and to participate in federal loan programs. Students and graduates of LCME-accredited medical schools are eligible to take the United States Medical Licensing Examination (USMLE). These graduates also have unrestricted eligibility to enter residencies approved by the Accreditation Council for Graduate Medical Education. Graduation from an LCME-accredited U.S. school and passing a national licensing examination are accepted as prerequisites for medical licensure in most states.

—M.C.

BoardWelcomesNewTrustees

Seven new members have joined the Thomas Jefferson University Board of Trustees.

Robert Poole III ’53 was elected one of the three Alumni Trustees for Jefferson Medical College, and Rhonda Karp, Ed.D. was elected the Alumni Trustee for the College of Allied Health Sciences. Dr. Karp has served as Executive Director of the Greater Philadelphia Health Care Congress and the Greater Philadelphia Higher Education Congress. She has been a department chair in Jefferson’s College of Allied Health Sciences and from 1987 to 1990 was Executive Associate to Lewis W. Bluemle Jr., then President of the University.

Other new trustees are:

Ben Burke Howell, Esq. is a member of the business and finance group in the law firm Reed Smith Shaw & McClay. He is Vice Chair of the American Bar Association’s subcommittee on commercial and real estate lending. Mr. Howell chairs the Planned Giving Committee of Episcopal Community Services in Philadelphia.

Charlesetta Meade, Esq. practices civil law. She has chaired the City of Philadelphia Tax Review Board. In 1993 she received the City of Philadelphia Citation for Outstanding Contributions.

John A. Salvatore is a managing partner of the L&M Beverage Company. He sits on the Board of Directors of Prime Sources, a chocolate extract company.

Robert Scandone, Esq. has a practice encompassing civil, commercial, antitrust, and criminal litigation. He is a member of the Board of Directors of All Pro Championships, Inc. and the Gibraltar Equity Growth Fund.

Cuyler H. Walker, Esq. specializes in business and health care law with the firm Pepper Hamilton & Scheetz. He is a member of the Barnes Foundation Board of Trustees, Chairman of the East Marlborough Land Trust, and a member of the Board of Managers of the Philadelphia Foundation.

The Class of '99

- 223 first-year medical students selected from 11,694 applicants
- out of a nationwide medical school applicant pool of 46,591 (i.e. nearly one-quarter of all students apply to Jefferson)
- the freshmen come from 26 states and one foreign country, and from 91 different undergraduate colleges
- 96 are female, or 43 percent
- age ranges from 19 to 38
- 19 already hold master’s degrees and three hold doctorates
- 11 students are part of the Physician Shortage Area Program that funnels graduates to practice in underserved areas

Alan B. Kelly, Esq.
Appointed University Counsel

Alan B. Kelly, Esq. has been appointed University Counsel and a senior officer of Thomas Jefferson University. Previously he was corporate counsel for West Jersey Health System. Mr. Kelly received his J.D. and a master’s degree in hospital and health care administration from St. Louis University, and a master of laws degree in trial advocacy from Temple University.
The creation of the Paul A. and Eloise B. Bowers Professorship in Obstetrics and Gynecology has been made possible by the support of these superbly loyal Jeffersonians. A member of the Class of ’37, Dr. Bowers has served as President of the Alumni Association and as an Alumni Trustee of Thomas Jefferson University. Mrs. Bowers is a past President of the Women’s Board of Thomas Jefferson University Hospital, and of the Faculty Wives Club.

At the President’s Club Dinner, where the professorship was announced, Dr. Bowers reminisced about his long career at Jeff and declared, “I am so glad to be here today and able to give this professorship to this fine medical college.” He received a tremendous round of applause for his and Mrs. Bowers’s exceptional generosity.

After graduation from the medical college and an internship here, Dr. Bowers completed a residency in Chicago, then returned to Jeff to join the practice of Thaddeus L. Montgomery ’20, who was later Chairman of Obstetrics and Gynecology.

Bowers went on to serve as Chief of the Section at the Philadelphia General Hospital and President of its Medical Staff. He also became President of the Obstetrical Society of Philadelphia. A member of Jeff’s clinical faculty, he was honored by the presentation of his portrait to the university in 1982.

Dr. Bowers’s record of service has been paralleled by Mrs. Bowers’s many contributions on the Women’s Board and the Faculty Wives Club.

“The new professorship is a prime example of the interest our alumni and their families take in the medical college,” says Paul C. Brucker, M.D., President of the University. “We could not sustain our efforts to cure disease without this support from individuals who care about Jefferson and its mission.”

Senior Vice President for Academic Affairs, and Dean of the Medical College Joseph S. Gonnella, M.D. adds, “We cannot push ahead in our efforts to teach and to relieve human suffering without philanthropy such as this. We are grateful for the opportunities this professorship affords.”

Women’s Board Celebrates its 100th Year

The Women’s Board of Thomas Jefferson University Hospital celebrated its 100th year at the Jefferson Ball it presented at the Hotel Atop the Bellevue. The Women’s Board promotes the hospital, and brings state-of-the-art care and comfort to patients, by supporting projects proposed by the hospital administration. Among the board’s ongoing programs is the Penny Wise Thrift Shop.
President's Club Celebrates Gifts

The annual dinner for those who support the university at the President's Club level was hosted in the spectacularly rehabbed Reading Terminal Train Shed at the Pennsylvania Convention Center a few blocks from campus. Each guest was presented with a book about the historic Reading Terminal and Market in period photos.

The President's Club is chaired by Benjamin Bacharach '56. Highlighting the evening was the announcement of the Paul A. and Eloise B. Bowers Professorship in Obstetrics and Gynecology. The 1995 Cornerstone Award was presented to the Dr. Ralph and Marian C. Falk Medical Research Trust. Dr. Falk, a 1907 alumnus, and his wife were lauded for supporting groundbreaking research at Jeff. The trust they established made a grant of $1.5 million in 1992 that permitted studies of the ALL-1 gene by the Jefferson Cancer Institute, and recently the trust made an additional $1.8 million gift to further research into other types of cancer that may be influenced by the ALL-1 gene.

New Fellows of the President's Club announced at the dinner are Mrs. Florence E. Braun (widow of William Braun '36); Louis G. Kareha '43; Dr. and Mrs. James J. Kelly '39; F. M. Kirby II; Dr. and Mrs. Dane A. Miller; Herman A. Tolz; Martin Whalen. Dr. and Mrs. Kelly recently created a trust honoring John A. Carlson Jr., M.D., Director of Gynecologic Oncology. The trust will provide funds for unrestricted use in the medical college.

Central Pennsylvania Alumni Welcome Dean Gonnella, President McGehee

On a beautiful sunny Sunday, October 15, alumni from central Pennsylvania gathered to welcome Senior Vice President and Dean Joseph S. Gonnella, M.D. and Linda Gonnella, and Alumni Association President Edward H. McGehee '45 and Carolyn McGehee. Hosting the brunch reception at the Hotel Hershey were Raymond C. Grandon '45 and Doris Grandon.

Jeff graduates from the thirties through the nineties were introduced by representatives from their decades: William Tyler Douglass Jr. '37, Herbert Jordan Jr. '46, Robert Bashore Jr. '52, Bruce Goodman '55, Morton Rubin '67, Robert Peters III '78, Mary Simmons HEM '80, and Joseph Iocono '93. Many others served on the reception committee as well. The new video about Jefferson Medical College, The Rise of the Morning Star, was viewed with great interest. “We were warmly welcomed by our Hershey-area alumni, who truly showed us their best hospitality,” says Dr. McGehee, a classmate of Dr. Grandon's. "There was a spirit of informal fellowship. Everyone enjoyed renewing friendships, as well as learning about developments at Jeff.”
Harry F. Suter ‘31 died March 3. He practiced general medicine and cardiology in Penns Grove, NJ. He served as Chief of Medicine at Memorial Hospital, Salem NJ, 1953–1968, and was President, Salem County Medical Society, 1938–1939. He is survived by his wife, Helen, and two daughters.

James J. Grace ‘32 died July 27. He practiced family medicine in Montrose, PA for 57 years, in addition to serving as coroner’s physician and deputy in the Susquehanna County Coroner’s office. He served as school physician in Montrose, PA and Elk Lake, PA for over 50 years. Dr. Grace served three terms as President, Susquehanna County Medical Society. There are no immediate survivors.

Herman C. Rogers ‘32 died July 10. He specialized in chest diseases, with an emphasis on tuberculosis. He practiced at the Bonnie Burn Sanitarium, Scotch Plains, NJ, and Eagleview Sanitarium, Norristown, PA, and was Superintendent and Medical Director, State Tuberculosis Sanitarium, Mt. Vernon, IL. He later directed an occupational health clinic at the Germantown, MD facility of the Department of Energy. He is survived by his wife, Helen, a daughter, and son William ‘65.

John L. Farmer ‘36 died July 23. He practiced general surgery in Lancaster, PA and served as Chief of the Surgical Service, Lancaster General Hospital. He was a fellow of the American College of Surgeons and a former president of the Lancaster City and County Medical Society. He is survived by four daughters and two sons.

Paul A. Leisawitz ‘37 died June 25. He practiced general surgery in Reading, PA. He was on staff, St. Joseph Hospital, Reading, PA and had courtesy privileges at Reading General and Community General Hospitals, Reading, PA. He is survived by his wife, Harriet, and two sons.

Louis T. Gabriel Jr. ‘40 died May 7. A board-certified general surgeon, he was on staff at Ashland State General Hospital, Ashland, PA. He was a fellow of the American College of Surgeons and served as Medical Director, Ashland State General Hospital, Ashland, PA. He is survived by six sons.

Raymond E. Deily ‘42 died June 26. He practiced occupational medicine in Bethlehem, PA from 1946 to 1963. He was then appointed Medical Director of the Bethlehem Steel Corporation’s plant in Bethlehem, PA where he remained until retirement. He is survived by his wife, June, and two daughters.

Allen E. Hamburg ‘43 died June 27. A board-certified orthopaedic surgeon, he practiced in Glenside, PA. He was on staff at Abington Memorial Hospital, Abington, PA and Holy Redeemer and Jeannes Hospitals, Philadelphia, PA. He was a fellow of the American Academy of Orthopaedic Surgeons. He is survived by two sons and a daughter.

Thomas A. Shaffrey ‘43 died August 16. He practiced general medicine and surgery in Patterson, NJ and was a member of the Essex County,NJ, Medical Society. He relocated to Sun City Center,FL after retiring in 1974. He is survived by two daughters and a son.

William A. Phillips ‘47 died June 5. He was a dermatologist and practiced with the Lower Cape Fear Dermatology Group in Wilmington, NC. He is survived by his wife, Phoebe.

Charles L. Saunders ‘50 died May 31. He practiced obstetrics and gynecology in Burlington, NC. He made an anatomical contribution of his body to the University of North Carolina School of Medicine, Chapel Hill, NC. He is survived by a daughter.

Martin D. Shickman ‘54 died April 21. He practiced internal medicine and cardiology in Beverly Hills, CA. He was on staff at Cedars-Sinai Medical Center, Los Angeles, CA and was Clinical Professor of cardiology at the UCLA School of Medicine. From 1973 until his death, he served as the director of the UCLA Extension Department of Continuing Education in Health Sciences, and as Coordinator of the UCLA Division of Continuing Medical Education. He is survived by his wife, Lois, and three sons.

David W. Beggs ‘55 died May 24. He was on the dermatology staff at River View Medical Center in Red Bank. At the 21st Annual Art Exhibit held in conjunction with the 1993 annual meeting of the American Academy of Dermatology, his entry was awarded first place in photography and was declared “Best of Show.” He is survived by his wife, Evelyn, a son, and a daughter.

Marshall A. Pepper ‘59 died September 29. He practiced internal medicine in Miami, and was a medicolegal expert with a Miami law firm. He is survived by his wife, Janice, a son, and a daughter.

Joseph J. Prorok ‘63 died September 2. A board-certified general surgeon, he practiced in Allentown, PA. He was an attending surgeon at Sacred Heart Hospital and a senior attending surgeon at Lehigh Valley Hospital. He was Clinical Instructor of Surgery at the Medical College of Pennsylvania from 1970 to 1974. He is survived by his wife, Sylvianne, three sons, and three daughters.

Robert L. Hellman ‘71 died May 24. He was a board-certified pathologist and was Associate Professor of Pathology at the University of Miami School of Medicine, Miami, FL. He was Director of UM’s Pathology Reference Services and, from 1981 to 1988, he was Director of the pathology residency education program at the medical school. He is survived by his wife, Susan.

Hugh P. Schieren, Ph.D., Assistant Professor of Anesthesiology and Pharmacology, died September 9. After an illustrious career in academia and industry, he joined the Jefferson faculty in 1988 as Assistant Professor of Anesthesiology and Director of the Anesthesia Research Laboratory. In this capacity he provided the laboratory support for departmental clinical studies and served as a mentor for young faculty members, residents, and medical students. He is survived by his wife, Jan, and three daughters.
'38

William I. Heine of Elkins Park has written a book, Edwin A. Jarecki, M.D., Resident Physician, Jewish Hospital of Philadelphia 1892–1934: A Centennial Commemoration, which was published by Albert Einstein Medical Center, Philadelphia, where he is a senior attending physician, emeritus.

Morris J. Shapiro was inducted into the Rochester Jewish Sports Hall of Fame at the annual dinner of the Rochester, NY chapter of Sports for Israel at the Jewish Community Center.

'40

Randolph V. Seligman of Albuquerque, after many years of private practice of obstetrics and gynecology, is now teaching at the University of New Mexico which he finds “very enjoyable and rewarding.”

'42

J. Wallace Davis was nominated to honorary membership in the Alpha Omega Alpha Honor Medical Society by the AOA members from Jefferson’s Class of ’95.

'44

Emil Howanitz of Kingston, PA is still practicing and “would not know what to do if retired.” He enjoys visiting his son E. Paul Howanitz ’78 who is Chief of Cardiothoracic Surgery at St. Joseph’s Hospital in Reading.

'45

Mon Q. Kwong is volunteering at the Chinatown Service Center Clinic in Los Angeles. His specialty is dermatology.

'52

Robert L. Evans was honored with the dedication of the educational building at York Hospital, York, PA in his name. He served as the first Director of Medical Education at the hospital from 1960 to 1971.

Burwell M. Kennedy and his wife, Dr. Marian Kennedy, received Ambassador's Awards from the American Ambassador to the United Arab Emirates in recognition of their contributions to medical services in that country. The Kennedys had established Oasis Hospital in Al-Ain in 1960 and for 15 years were closely identified with the institution, which was known informally as "Kennedy Hospital."

George T. Wolff was awarded the 1995 Distinguished Service Award by the University of North Carolina School of Medicine and its Medical Alumni Association.

'54

Francis J. Nash of Milton, MA regretfully lost Mary, his wife of many years, a year ago after a long illness. She had been active in civic affairs.

'55

Edwin D. Arsh of Springfield, PA has retired from family practice after 35 years.

'56 40th Reunion June 7–9

Edward W. Lyczynski has retired and he and his wife Sally are living in Williamstown, MA and enjoying retirement immensely.

Charles J. Stahl III of Rockville, MD received the Distinguished Fellow Award at the annual meeting of the American Academy of Forensic Sciences in Seattle. This award was given in recognition of “a lifetime of service to the forensic sciences profession.”

'67

Robert G. Altschuler has been appointed an Instructor in Medicine at Jefferson.

Robert J. Karp has been promoted to Professor of Clinical Pediatrics at the State University of New York at Brooklyn. He recently published an article in the Archives of Pediatrics and Adolescent Medicine and a chapter in Childhood Nutrition (CRC Press, 1995).

Carl L. Stanitski has been awarded the Citizen of the Year Award by Operation Friendship from the Detroit Public School League. He set up an outreach program between the Orthopaedic Department at Children's Hospital of Michigan and the Detroit Public Schools.

JOIN THE FACULTY CLUB

On behalf of the Board of Directors of the Jefferson Faculty Club, you are cordially invited to join the club as a member of the Alumni Association. The dues from January 1 to June 30, 1996 are $25 (including your spouse). The club is open for lunch from 11:30 until 2:00 Monday through Friday, and is also available to members for private functions. To join, simply fill out this form and enclose your check for $25 payable to the Jefferson Faculty Club; mail it to the club at 1020 Locust Street M-32, Philadelphia, PA 19107. You will receive your membership card in the mail.

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where they provided preseason physical examinations for their athletes and seminars concerning injury recognition and prevention for their coaches. He was very honored to receive this award which has been given annually since 1976.

'69

Judith Cooper Anderson has been appointed interim Chief of the Department of Orthopaedic Surgery at Detroit Medical Center's Harper Hospital. She is the first woman to lead the department.

'70

Peter D. Pizzutillo has been appointed Co-Chief of the Section of Orthopaedic Surgery at St. Christopher's Hospital for Children, Philadelphia, and Professor of Orthopaedic Surgery and Pediatrics at Medical College of Pennsylvania and Hahnemann University.

'71 25th Reunion June 7–9

Daniel B. Gould has been helping to write the nephrology board exam over the past three years "although anesthesia remains my full-time delight." Last season he was an extra—an assistant sacristan—in 10 performances of Tosca by the Opera Theatre of St. Louis. Son David is a sophomore at Jefferson.

'73

Marc R. Goldenberg has been appointed an Instructor in Surgery at Jefferson.

'74

William J. Gibbons has been appointed by the Trustees of the Holy Redeemer Health System to serve on the Board of Directors for Holy Redeemer Hospital and Medical Center in Meadowbrook, PA. He has also been elected President of the Medical Staff.

'75

Ellis R. Levin, Professor of Medicine and Pharmacology, UC-Irvine, and Chief, Endocrinology and Metabolism, VA Medical Center, Long Beach, has been appointed to the editorial board of The Journal of Biological Chemistry. He recently published a review article on endothelins in New England Journal of Medicine.

Bradley D. Wong of Honolulu was selected for the annual Excellence in Teaching Award by the students of the John A. Burns School of Medicine of the University of Hawaii.

'77

Thomas G. Sharkey and his wife Anne of Moosic, PA are thrilled at the addition of their littlest son, Jeffrey Patrick, now two years old. Dr. Sharkey continues his ophthalmology practice.

'78

Robert P. Boran of Pottsville, PA has been accepted as a member of the American Association of Hip and Knee Surgeons. He and his wife Kitsy are the proud parents of their third daughter, Mary Margaret.

'80

Patrice Hyde has joined Jefferson as a Clinical Assistant Professor of Dermatology and Pediatrics.

Christine K. Stabler of Lancaster was reelected to the Board of Directors of the Pennsylvania Academy of Family Physicians.

Would you like to contact the Alumni Office electronically?
If so, you can send your name, class/year/specialty, e-mail address, and information such as address changes or personal and professional changes to: fullam1@jeflin.tju.edu. The e-mail address of the Bulletin is: iedl72w@tjuvm.tju.edu.

Nominations
Readers are encouraged to submit nominations for either: Alumni Trustee of Thomas Jefferson University: One is elected each year for a three-year term (he or she may be reelected for one additional term). Please submit names of worthy candidates to "Attention: Alumni Trustee Committee," 1020 Locust Street, Suite M-41, Philadelphia, PA 19107.

Alumni Achievement Award: Although the award carries no monetary stipend, each recipient's name is permanently affixed to a plaque prominently displayed at the entrance to Jefferson Alumni Hall. The recipient is presented with a handsome silver tray, suitably engraved and bearing the seal of the medical college, as the highlight of the Alumni Banquet in June. The Achievement Award Committee of the Alumni Association is charged with the final selection; the committee's decisions are not subject to review. Please direct curricula vitae and bibliographies of alumni whose professional activities are sufficiently outstanding to warrant consideration to "Attention: Achievement Award Committee," 1020 Locust Street, Suite M-41, Philadelphia, PA 19107.
'81 15th Reunion June 7-9

Scott A. Brenman has been appointed an Instructor in Surgery at Jefferson.

'83

John G. Bertolino writes that he "can now lay claim to the fact of living longer in his present place than in any other since leaving the Phi Chi house in 1983. However, as per the usual two to three year routine," he has a new job. In July he assumed the position of Program Director of the family practice residency at Latrobe Area Hospital and has the luxury of working with six third-year Jefferson students on a daily basis. The opportunity is a fantastic way to keep in touch with undergraduate medical education.

Peter A. Cognetti of Waverly, PA is now President-Elect of the Pennsylvania Academy of Family Physicians.

Joseph T. Maguire has been appointed an Instructor in Ophthalmology at Jefferson.

'84

Robert D. Wallace is head of the Division of Plastic and Reconstructive Surgery at Naval Medical Center, San Diego. He has been promoted to the rank of Commander.

'86 10th Reunion June 7-9

David J. Eschelman has been appointed an Assistant Professor of Medicine at Jefferson, Deborah A. Snyderman has been appointed an Instructor in Psychiatry and Human Behavior, and George P. Valko has been promoted to Clinical Assistant Professor of Family Medicine.

'87

Juriz R. Bilyk has been appointed an Instructor in Ophthalmology at Jefferson. Harris S. Silver, an otolaryngologist, has joined MeritCare Medical Group in Fargo, ND.

'88

David A. Cautilli has joined the orthopaedic surgery staff at Holy Redeemer Hospital and Medical Center in Meadowbrook, PA. Patricia M. Curtin of Chadds Ford, PA and her husband Tom are the proud parents of Mary Bridgeit Curtin White, born August 24.

John J. Sirotnak III completed a residency in otolaryngology at the State University of New York in Buffalo and is presently completing a fellowship in surgical oncology of the head and neck at Roswell Park Cancer Institute in Buffalo. He plans to join his father, John J. Sirotnak Jr. '59, in private practice in Scranton, PA.

'89

Christopher T. Siegel and wife Margaret E. Groh of Chicago proudly announce the arrival of their son, Evan Joseph Siegel, on August 17.

Denise G. Kreider Voloshin and husband Michael of Hermitage, PA are the proud parents of Andrew Michael, born December 24, 1994.

'90

Sandra Chern completed a fellowship in vitreoretinal disease and surgery at the Massachusetts Eye and Ear Infirmary in Boston. Maury A. Jayson has joined Suffolk Urology Associates in Bay Shore, NY.

'91 Fifth Reunion June 7-9

James W. Freeman has completed his residency in family practice and joined his father, William A. Freeman '64, and grandfather Albert W. Freeman '36 in Shippensburg, PA. He and his wife Sadie CAHS '88 are the proud parents of Hailey, now two years old.

Eric R. Rittenhouse has completed his residency and is now practicing at St. Luke's Hospital in Bethlehem. His specialty is obstetrics and gynecology.

Maria E. Sophocles of Baltimore married John A. Martin on July 22. She has joined an ob/gyn practice with Samuel F. Rudolph Jr. '58.

'92

Kevin C. Mange has been appointed Chief Medical Resident and an Instructor in Medicine at the Deaconess Hospital/Harvard Medical School in Boston.

'93

Daniel B. Casto and Rachael Pendleton BSN'93 were married in Tucson on July 15.

Joseph A. Iocono of Palmyra, PA has won a National Research Fellowship Award from the NIH. It is a two-year fellowship to study wound healing in the Department of Surgery at Pennsylvania State University's Hershey Medical Center, under department chairman Thomas Krummel, M.D. Joe and his wife Susan are the proud parents of Amanda Danielle, born October 1.

'95

Robin M. Sarner is in the Eau Claire Family Practice Residency program in Eau Claire, WI.

Postgraduate Alumni

Sucha O. Asbell RO'71 is Chair of the Department of Radiation Oncology at Albert Einstein Medical Center in Philadelphia.

Howard S. Caplan HS'73 has been appointed a Clinical Assistant Professor of Surgery at Jefferson.

Daniel L. Wolk FP'84 has been appointed an Instructor in Family Medicine at Jefferson.

Francis E. Becker IM'85 joined Internal Medicine Associates in Frederick, MD.

Kathleen R. Noll AN'86 has been appointed an Instructor in Anesthesiology at Jefferson.

David M. Kastenberg GE'92 has been promoted to Clinical Assistant Professor of Medicine at Jefferson.

Tuar J. Shah Al'93 has opened a practice of allergy, asthma, and clinical immunology in East Brunswick, NJ.

Frank J. DeMartino EM'94 has been appointed an Instructor in Surgery (Emergency Medicine) at Jefferson.

Elizabeth A. Sengstaken FP'94 has been promoted to Clinical Assistant Professor of Family Medicine at Jefferson.

Timothy M. Greco OTO'94 has been appointed an Instructor in Otolaryngology-Head and Neck Surgery at Jefferson.

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