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From the Editor’s Desk

The final edition of the Western Medical Journal for academic year 1988-1989 contains a certain amount of retrospection. Connie resurrects those haunting memories of second year, we pay tribute to graduating cartoonist Tom Song, and our “centrefold” takes a look at some of the faces and events that made this year a memorable one. Which brings me to the time of literary rumination for this edition: Clerkship.

It never ceases to amaze me how the brain is capable of trimming away the rough edges of life, leaving, for the most part, recollections of a “kinder, gentler” nature. It’s as if the neurons cursed with recording the most traumatic experiences experience a black depression, causing a hyperpolarization that locks away their secrets forever. Perhaps they’re just more susceptible to the supraphysiologic doses of EtOH that are used to chase away icons that caused so much gnashing of the teeth. I suppose it makes good botanical sense that from those occasions whence you were showered with the most manure, something beautiful should later grow.

So it is with clerkship. This point is graphically driven home by the cartoon on this page, courtesy of a spontaneous inspiration on the part of Dr. Reider at CHWO.

The basic problem revolves around the concept of expectations. For instance, I did not expect, when I started by first rotation, medicine, to look back on my summers on the assembly line as “those halcyon days.” I didn’t expect to be on call my first night on medicine. I didn’t expect someone to phone and tell me my pager had gone dead, and one of the patients had gone the same way as my pager. I was fairly certain this was something they had taught us was a “bad thing,” but they hadn’t taught me, and it was at 4:00 AM.

I didn’t expect to know so little. Or perhaps I was just overwhelmed by how the residents and consultants knew so damn much. This only served to confirm my theory on learning that I developed at the end of second year. Ted’s maxim: “There is no such thing as mastery of new knowledge, there is a look at some of the faces and겨울 for the most part, recollections of a centrefold” takes a look at some of the faces and events that made this year a memorable one. Which brings me to the time of literary rumination for this edition: Clerkship.

“Those halcyon days” or ‘first year’ was in daycare. I went to daycare. I usua­ly didn’t expect to know so little. Or perhaps I was just overwhelmed by how the residents and consultants knew so damn much. This only served to confirm my theory on learning that I developed at the end of second year. Ted’s maxim: “There is no such thing as mastery of new knowledge, there is only on-going acquisition of an appreciation for the depths of one’s ignorance.”

Being a clerk is much like being a bug. We are tolerated generally because we are too insignificant to bother squishing, but if we make too much noise or get in anyone’s hair—splat! I’m not sure why they don’t call us that—“clinical bugs.” It’s more accurate and descriptive than clinical clerk. Clinical “clerk” confuses people—it makes them ask questions like, “Why is a secretary doing a pelvic on my daughter?” There is some merit in the title. I suppose. The dictionary defines a clerk as “any person able to read or write,” and you often do find yourself in the position of being a highly-educated, debt-ridden scribe. Ordering godonlyknowswhata­genuse levels on something vile draining from Mrs. Fibinger's arm.

In clerkship you go through stages. The most celebrated of these is the CCCC (Clinical Clerk Cynicism Complex). CCCC can be diagnosed on the appearance of the pathognomonic facies demonstrated by the poor doc on this page. It’s that look of, “Sure, I’d love to admit 7 more 112 year-old medical disasters for a complete investigation of the cause for their supratentorial emphysema while you pontificate interminably about the differential diagnosis for ‘blue hair’ after I’ve spent the entire night on call medically achieving the perfect consistency stool and then you suggest I present a discussion on the role of NSAlDs in the Vogt-Koyanagi-Harada variant of epilepsy in myopic pygmies with Zollinger-Ellison Emmerson, Lake and Palmer Syndrome, Type 71B, that will be a handy tidbit for a G.P. in South Armpit and almost as much fun as slipping a spinal needle into my retinal arteries and aspirating my choroid plexus”.

The CCCC goes hand-in-hand, of course, with guilt. We feel tremendous guilt because of the seemingly irreconcilable conflict between our role as caring good deed-doers, and the frustration that is endemic to our position in the hierarchy. In “those halcyon days” of first year (enter selective memory), we didn’t picture ourselves in clerkship talking merrily with the team about “turfing” a patient to some other service. This wasn’t what we expected.

We lose sight of the fact that as ‘clerks’ we start 22 new jobs (teams) in 52 weeks. Let’s see how well any consultant adapts to that. Now, take the same consultant and pit him, Volia, you have a clerk—22 new jobs that we know next to diddly about, scratching the surface of 22 icebergs. We spend our days in rounds, or O.R., or lost, or chasing down lab slips on patients we see far too little of and often have little or no impact on their outcome (especially when we come and go so quickly). Alas, we all have to go through it. Maybe we should just be a little less hard on ourselves when we do inevitably get frustrated.

Fortunately, like a pack of clinical chameleons (evolution to lizard status!), we adapt to our rapidly changing surroundings. We develop a feel for what our role is (however redundant it may seem at times), and we learn to accept it. We learn with time to look beyond disillusionment because we can now look back. We reflect, and realize that what we have learned, and probably a good deal more than we will give ourselves (or our teachers) credit for.

We learn to accept our feelings as natural and appropriate. We even realize that although most of our continued course if I remember anything at all from this year of information overload.

Studying? With a baby in the house studying was a whole new ballgame. When I opened a textbook, she cried. I wonder if she knows something that I don’t? To preserve my sanity (and her lungs), I learned to study after she fell asleep. (Procrastination elevated to a fine art, I suspect!) Contrary to common belief, I discovered that young babies do not sleep all the time! I really discovered how much can be done when only a little bit of time is available. I like to think that I called it ‘efficiency’. At the time, though, I think that I called it ‘exhaustion’.

As Warren mentions in his editorial above, the passage of time blunts most of the bad times. Even though I can recall in September thinking, “How am I going to get through this year? A new baby, an exam every two weeks and no relief in sight.” In retrospect, I think well, it really wasn’t that bad…then I kick myself in the shin! Was it worth it? Every time I come home and see the excitement on my baby’s face, when she sits on the floor and tugs at my skirt, when she cuddles up in my arms and falls asleep after a long day, I think, “Well, yes it was.”

Connie Nasello Paterson, Meds’91

As I sit here staring at a blank computer screen, I think, there are some advantages to being an editor. Not the least of which is being able to procrastinate to absolutely the very last minute before writing. My excuse often is, well, I must type the articles that are not submitted on disc, and I can’t start writing until the rest of the Journal layout has been done, so that I know how much space I have to fill (Warren, you only left six inches! But if the truth be known, I rarely know what I am going to write about until the moment that I sit before the computer with only minutes left before press time. I have perfected procrastination as an art!

As I read over the articles in this particular issue, I am struck by the fact that this is the first issue this year where every contribution is by a medical student. Up until now, acquiring articles and drawings have been somewhat akin to pulling teeth. For most of us (first year excepted) the spring is a time that we wind down. And even for the first year class, the end is in sight. As we head off into our summer break (however short that may be for the rest of us), I would like to urge our readers to put pen to paper and write that article that you have been thinking about all year.

How well I remember at this time last year reading co-editor Warren’s article on second year, “The Blur.” In retrospect, I can see how accurate it was. For me, however, second year has been a somewhat unique experience. Having had a baby 2 weeks before the start of classes has put medical school into different perspective. While my classmates learned about labour and delivery, we didn’t picture ourselves in clerkship talking merrily with the team about ‘turfing’ a patient to some other service. This wasn’t what we expected.

We lose sight of the fact that as ‘clerks’ we start 22 new jobs (teams) in 52 weeks. Let’s see how well any consultant adapts to that. Now, take the same consultant and put him, Volia, you have a clerk—22 new jobs that we know next to diddly about, scratching the surface of 22 icebergs. We spend our days in rounds, or O.R., or lost, or chasing down lab slips on patients we see far too little of and often have little or no impact on their outcome (especially when we come and go so quickly). Alas, we all have to go through it. Maybe we should just be a little less hard on ourselves when we do inevitably get frustrated.

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Research freedom threatened

Dear Editors:

I am writing to ask that your readers join in opposing passage of Bill 190. This bill, if passed, will prohibit the use of so-called Draize and LD-50 tests in Ontario. This would have a number of serious, undesirable effects; severely hampering some types of research in Ontario.

The legislation has been vigorously supported by animal rights groups. Much of the information they have distributed suggests that this bill would only ban cosmetic testing. They also suggest that the current tests subject research animals to great amounts of stress and pain. Both positions are wrong.

As presently written, Bill 190 would ban all Draize-type testing. This type of testing currently includes anything (not just cosmetics) likely to be placed in or around eyes, either intentionally or accidentally. Imagine the potential effects of untested contact lens solutions, among other scenarios.

Similarly, data from LD-50 type tests is used for everything from Poison Control Center data (e.g., acetaminophen levels vs. time charts) to continued research.

Editorial (continued)

interactions with patients weren't pivotal, they were at least positive, perhaps sometimes even therapeutic. We also discover that with a little knowledge and experience comes the real enjoyment in medicine. The ability to manage a problem. And with that little bit of confidence, we can look beyond the academic concerns and concentrate again on the patient - i.e. the process of becoming a doctor. The realization of these things are still a long way off for us, but our appetites have been whetted. As a classmate said, "I feel frustrated as hell at a desk, because I see the residents and consultants enthusiastically talking about managing patients, and I can't play yet."

If medicine is a game, then we are just finishing our year as water-boys in the minor leagues, but we did learn the rules, and we've acquired some of the skills we need to play. The eye of retrospect tells us this was a good and important season. Now we're ready for the next step up. Like the words to the song say, "Put me in coach, I'm ready to play...centerfield."

Warren Teel, Meds '90

On Saturday, April 22, over one hundred UWO Medical students took time out from their busy schedules to take part in the Annual Meds Relay sponsored by the Hippocratic Council. The relay, now in its ninth year, is the medical school's annual fund-raising event, with all proceeds donated to a charitable organization. The Sunshine Foundation of Canada was chosen once again as this year's charity.

The relay itself consisted of a short course through the campus and then on to the streets of London for the longer distances. With the option of running anything from 400 m. up to 2500 m. on either a competitive or non-competitive team, the relay encouraged all students to participate. Indeed, there was a broad spectrum of fitness levels represented, with some runners unusually ill child on a 3 day/night vacation to Disney World.

Special thanks and congratulations to Meds '92, the top money raisers, who collected a total of $1494.52. Keep up the good work! Leaving medical school in style were Meds '89, 90, winners of the competitive run. Congratulations!

Honourable mention goes out to Meds '91, who chipped in with an impressive $964, and to Meds '90, for fielding a team in spite of their hectic clerkship schedules.

A final and sincere thanks to EVERYONE who participated in the day to help support such a worthy cause.

Meds '89 - Competitive Winners

enquiring as to the availability of ventolin puffers and oxygen stations prior to their run.

With volunteers to collect money and sponsor sheets at the starting line, and others at intersections to guide the runners through, the race soon got underway. Runners positioned themselves at the various exchange points along the course and were left to anxiously await the arrival of their classmates and to have their turn in the limelight.

At the end of the day, with all pledges tallied, the grand total raised was $3105.52 - a record-setting amount! This money will be used to send a family with a severely disabled or seri-
Radiology: A Historical Perspective

By Stewart Kribs, M.D. '89

Radiology has undergone enormous advancement since its birth almost one century ago. Diagnostic radiology is the specialty branch of medicine which uses radiological techniques to demonstrate pathological changes of disease. The first 75 years were dominated by improvements in the quality of radiographic equipment, film and photographic technique. Despite these advances, however, X-ray images remained essentially the same — two-dimensional shadowgrams of three dimensional objects. In the 1970's, the development of computerized axial tomographic (CAT, or CT) scanners revolutionized radiology by allowing objects to be imaged in three dimensions for the first time. Today, ultrasound is a well-established procedure and the potential of MRI is just beginning to be realized. A historical review of the major radiological discoveries illustrates how influential these early developments have been on the practice of radiology today.

The most significant event in the history of radiology which led to the birth of the profession was the discovery of X-rays by William Roentgen. In the late 1890's, physics and chemistry were the focus of scientific research. Notable advances were being made by students including Faraday, Boltzmann and Hertz. One area of research involved the study of cathode rays (streams of electrons generated from a negatively charged source - the cathode) in a vacuum tube. Roentgen, a brilliant German physicist born in 1845, began experimenting with cathode rays in 1894. Previous researchers had found that cathode rays (streams of electrons) were able to penetrate thin metal foil "windows" in glass vacuum tubes and propagate a few centimeters into free air. Roentgen wanted to know whether these cathode rays (electrons) could penetrate through the glass wall of the vacuum tube. It was this question which led Roentgen to make one of the greatest discoveries of the nineteenth century.

On the evening of November 8, 1895, Roentgen was experimenting with his cathode ray discharge apparatus. (This consisted of a cathode element fixed inside a sealed glass vacuum tube.) While attempting to detect cathode rays outside of the apparatus using a screen which would fluoresce in the presence of these rays, Roentgen noticed a faint screen which was illuminated. Roentgen determined that these "new kinds of rays" were generated from the cathode rays as they struck the glass wall of the discharge apparatus. These rays could travel considerable distance (several orders of magnitude greater than cathode rays) and could transmit through paper, bone, wood and metal. Considering their mysterious properties, Roentgen gave them a now famous, time-honoured term "X-rays". World response to Roentgen's break-through was unprecedented. Within one month of his discovery, Roentgen was asked to demonstrate his experiments to the German Emperor in Berlin, and his findings were independently confirmed all over the world. (It is interesting to note that the recent discovery of "cold" nuclear fusion by two chemists named Pons and Fleischmann is achieving similar instant recognition.) In less than a year, over one thousand articles were published in the field of radiation physics. The significance of Roentgen's discovery was profound. Based on X-ray experiments, researchers defined the properties of electrons and atoms and developed the quantum theory of mechanics. Einstein took radiation physics one step further and proposed the General Theory of Relativity. Ultimately, the development of nuclear physics began with Roentgen's accidental discovery of "a new kind of ray".

The discovery of X-rays proved to be an equally important scientific advance in medicine. In addition to paper, wood, and metal, Roentgen observed that X-rays could penetrate the human hand and leave a shadow of the bones on the fluorescent screen. In a wave of scientific fervor, researchers began investigating the clinical application of X-rays. Their obvious ability to demonstrate fractures in bones or metallic foreign objects (especially bullets) in soft tissues quickly became apparent. Ultimately, when patients began to be diagnosed using X-rays was a female ballet dancer in England who had been treated for a septic foot unsuccessfully for months. An X-ray in January, 1896 (three months after Roentgen's original description) detected a needle in her foot which was removed, and the patient returned to the stage. One month later, both the Lancet and the British Medical Journal published X-ray photographs. The BMJ wrote the "application of (X-rays) to the photography of hidden structures is a sensational foot".

In the United States, news of Roentgen's breakthrough began an epidemic of "Roentgen fever". Researchers and patients alike were excited by the possibility of seeing what was hidden within the body without opening it up. Medical researchers at Yale University beat their adversaries at Harvard by one day in producing the first American radiograph. The first clinical radiograph was performed at Dartmouth University and demonstrated a Colles fracture in a patient's injured arm. Even the fashion magazine Harper's Bazaar held a contest for the first X-ray photograph. Edison's assistant, Thomas Edison, was drawn into X-ray research; on February 5, 1896 Edison was asked by William Randolph Hearst, publisher of the New York Journal, to make a "cathodograph [radiograph] of a human brain". (Despite an amazing one hour exposure of his assistant's head to the X-ray apparatus, Edison only achieved a picture of "curvilinear murkiness"; he concluded that any subsequent attempt would be "futile as the bony structure of the cranium would offer an insuperable obstacle".) Roentgen's first report of the possibilities of X-ray was published in the October of 1896. Within a year, more than 100 papers (published in the scientific press) had become permanently established in the practice of medicine.

The impact of Roentgen's discovery on both the scientific and medical community led to a universal acceptance of the benefits of X-rays. The harmful effects of X-ray irradiation were much slower to be recognized. Early X-ray photographers did not shield themselves from their X-ray apparatus. Within months of Roentgen's first publication of X-rays, burns to the hands of X-ray workers were being reported. (Although the dose of radiation Roentgen received was not known, he apparently enjoyed relatively good health until his death in 1923. It is possible that he was protected during his experiments by chance because he worked in a large metal cage which blocked the light from the discharge apparatus from interfering with his luminescence detectors.) In late 1896, scientific thinking was sharply divided regarding the source of the injurious effects of X-rays. One famous investigator, Nikola Tesla, asserted that X-ray associated dermatitis was not caused by X-ray exposure but instead resulted from repeated local electrical burns when working in close proximity to an X-ray tube.

With such influential voices proclaiming X-rays harmless, some researchers continued their work despite early warning signals of impending doom. A glassworker employed by Thomas Edison named Clarence Dally became the first American casualty. Dally worked in Edison's laboratory standardizing X-ray devices with his bare hands. Although he was unharmed, Dally was severely irradiated and within only a few months in the laboratory, he insisted on continuing his work. Dally died in 1904 from metastatic squamous cell carcinoma despite 144 failed skin grafts and bilateral arm amputations. Dally's death illustrates the importance of maintaining a vigilance for the potential detriments of X-ray technology.

Other scientists were expressing grave concern for the possible adverse effects of X-rays. In 1901, a Boston physician named William Rollins demonstrated that a guinea pig in a closed, electrically insulated box could be killed by X-rays. (His work was appropriately titled "A Note on the Mortality of Guinea Pigs Under Irradiation".) Rollins observed that the guinea pig died with no visible burns. He concluded that a lack of skin damage does not indicate that a given level of X-ray exposure is safe. These results were strongly reinforced on both sides of the Atlantic by a paper published in the Italian literature in 1916 titled "Autopsy of a Radiologist". The demise of a radiologist named Emilio Tiraboschi who had been practicing radiology for fourteen years without protection was detailed. His autopsy showed profound aplastic anemia (and testes shrunk to the size of tangerines) which revealed the systemic effects of prolonged X-ray exposure. Researchers concluded that when performing X-ray examinations, the smallest possible beam should strike the patient, and no rays should strike the observer. This important axiom continues to be enshrined today.

As interest in the field of radiology rapidly disseminated, many individuals began seeking the potential applications of X-rays to medical practice. Most individuals were honest physicians with sound medical intentions. Reports
of others with unscrupulous backgrounds trying to defraud the public with unfounded claims began casting doubt on the legitimacy of X-ray diagnosis. The pioneering radiologists were asked to address these concerns, and they established the Roentgen Ray Society in London, England in 1897. The purpose of the society was to identify those qualified to use X-rays, to establish standards of training and expertise, and "to set those so qualified apart from unprincipled pretenders and charlatans". The Society was renamed the British Institute of Radiology in honour of the Queen, and its journal had continued as the British Journal of Radiology.

By the turn of the century, X-rays were showing great promise in diagnosing many medical disorders. The challenge in radiology was trying to earn professional respect and recognition. At that time, radiologists were viewed as inquisitive, invisible-light photographers who had abandoned their clinical duties in order to search for hidden shadows in the pictures they produced. Dr. George C. Johnston, president of the American Roentgen Ray Society in 1909, stated that the work of the radiologist was "being appreciated by about one physician in three-hundred and fifty". In an attempt to upgrade the profession, one prominent radiologist named Pancoast (best known for his description of the Pancoast tumour syndrome) outlined four essential qualifications of a roentgenologist. He stated that a roentgenologist must be a "specially trained physician" who had obtained "suitable practical experience through training as an assistant". The radiologist should have a "thorough theoretical knowledge of photography and physics", and take every possible precaution to protect patients, other workers and themselves from the "unnecessary evil of X-ray exposure". Today the words of Pancoast are echoed throughout the profession and his ideas formed the foundation for radiology residency training programs.

From the turn of the century to the present, the history of radiology has been characterized by a lengthy list of impressive technological advancements. Until the introduction of computers and CT in the 1970s, radiologists were able to keep pace with their expanding profession. The introduction of "high technology" radiology including CT, digital subtraction, Doppler/ultrasound and MRI has led to an explosion of new information. Even the most dedicated general radiologists have been forced to narrow their imaging expertise. Radiologists have accepted these challenges. Their interest, flexibility and dedication throughout the history of the profession have enabled diagnostic radiology to keep its central position in medicine.

REFERENCES

Letters (continued)

monitoring water pollution. If Bill 190 passed, water-quality monitoring in this province would be immediately and severely hampered.

Proponents of the Bill use emotionally-effective photos, such as severely damaged eyes of rabbits, to make their point. However, the tests have been greatly modified since their initial use. Current protocols have minimal effects on research animals.

Of particular concern is the politicians' tendency to respond only to what they think the public wants. Thousands of people have written to support Bill 190, while researchers and other knowledgeable persons have been relatively silent.

If the medical community does not respond to threats against good science, such as Bill 190, we may one day awaken to find our hands have been legally tied. We will not be permitted to do sound and needed research. Only by opposing such bills can we preserve our ability to do important research. I urge readers of the Medical Journal to write the Premier, their MPP, and other politicians to oppose Bill 190.

Allan Garbutt, Meds '91
"Good ethics is good medicine."

That statement was made at a recent conference, held at Western, on teaching medical ethics to undergraduate students. Like most aphorisms, it probably oversimplifies the situation, but there is a very large element of truth to it.

The comment answers the question posed in the title of this article, while also providing the reason for it. Most undergraduate medical students at Western will have realized by now that there are only a few hours of classroom time devoted to ethical issues. The instruction provided is tightly constrained by the need to complete the lectures in a relatively short time, and to cover a wide range of topics at least briefly.

A further problem with the present ethics presentations is that most of them involve only medical students and doctors. In real life, medical-ethical questions will involve people from a variety of backgrounds. Nurses, social workers, occupational therapists, physiotherapists, and the patient/family will be involved, along with the physician(s).

While most students know there are a large number of potential ethical problems in the practice of medicine, relatively few have opportunities to seriously discuss any such problems at length with knowledgeable persons. As a result, many of today's students are likely to have their first serious encounter with ethical issues in a clinical setting. That situation, with its frequent need for quick answers, is probably not the best place in which to review a range of options and make decisions that may have far-reaching implications. It would be preferable to debate at least some issues in a more relaxed atmosphere, where there is time to thoroughly discuss and review all the options and their implications. Such a background should make it much easier to reach the appropriate decisions when necessary.

To help overcome some of these problems, a group of students is organizing an interdisciplinary ethics discussion group. It will begin with a talk to the students, as well as to present the winning entrant and runners-up with their prizes. This year's winner was sponsored by the London CPPNW on a week-long trip to the United Nations in New York.

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As many as 3000 London and area primary school children are taking part in the International Peace Lanterns Exchange Program sponsored by the London CPPNW. This is the first year that London has taken part in the project, and we will be joining cities in over 125 countries, including Japan, the U.S., Germany, and the Soviet Union. Several Western medical students have joined London area physicians and other health professionals in promoting the project by acting as emissaries to local schools.

Colourful candle-lit lanterns bearing the children's personal messages of peace will be set afloat at the Forks of the Thames on August 5, 1989 to symbolize their commitment to world peace. The London Canoe Club will be on hand to collect the lanterns downstream.

Some of the paper lanterns that the children make will be sent to other countries to be floated. On the Thames will float lanterns from the U.S., Japan and the Soviet Union. In this manner, each child is paired with a 'pen twin' to whom they send a personal wish of safety and peace.

The ceremony itself will take place in Harris Park on August 5, with the lanterns placed in the water at dusk. We hope that if you are in town that you will come and join the ceremony, and help us put the lanterns together, starting at 5 p.m. If you are interested in helping, or would like more information, please contact Ana Thompson, 667-4806.

Why take part in this project, you ask? Because, "It is better to light one candle than forever curse the darkness."
Problem-based learning, or PBL as it is more affectionately known, is a new and innovative approach to education recently being implemented into the curriculum of the Medical School at the University of Western Ontario. To most of us in the faculty of Medicine, PBL was, until recently, an unknown acronym or something dreaded and horrifying. It was looked upon as a method of instruction so off the wall that only a medical school such as McMaster would attempt to use it as a means of teaching. Problem-based learning was so foreign to both students and faculty that it felt threatening to even entertain the idea. I mean, why should we tamper with a form of education that has consistently proven itself and has stood the test of time? What is wrong with sitting in a classroom for hours at a time being lectured to by an expert in the field? Is this not the best form of teaching? Is this not what they do? And don’t they expect? Or is it not what they expect? Maybe not anymore.

PBL requires students and the faculty away from the didactic lecture setting in which the lecturer speaks and the student writes, rarely stopping to think about what has been said. Instead, PBL breaks up the class into groups of approximately 8 students and each group is assigned its own facilitator/tutor - NOT lecturer. The 9 group members then meet in a smaller room to discuss clinical cases that are designed to generate thought and discussion amongst the group members.

I’m sure at this point that all of you skeptics are now nodding your heads and saying to yourselves, ’See, I told you. PBL is nothing more than a group discussion and an utter waste of my time’. How could I possibly learn anything or teach anything in such an unstructured, unorganized setting? These were the same thoughts that clouded my head before I became involved with the PBL programme. However, after having been exposed to PBL in both faculty training sessions and in actual practice, my opinions have drastically changed. PBL is not just a welcome change from the stuffy confines of UH-B or DS1002; it is much, much more.

PBL is defined as “the learning which results from the process of working towards the understanding or resolution of a problem” (Barrow, H.S. and Tamblyn, R.M., Problem-Based Learning - An Approach to Medical Education, Springer Publishing, New York, 1980). Students get together in groups of 6 or so students to discuss a clinical situation. Contrary to popular belief, PBL is not just another form of local problem. Instead of attacking an idealized case with the goal of formulating a differential diagnosis and an approach to management, PBL’s approach is to stimulate students to think about the clinical issues introduced by the case, and then in a student-directed, self-motivated manner, obtain the knowledge necessary to meet the learning objectives identified by the group. PBL sessions do not allow students to simply regurgitate what was fired at them in rapid sequence during a lecture. Rather, this innovative method of instruction encourages students to actively participate in their own education, decide how they wish to spend their time learning what they believe to be important.

But how does a first or second year medical student know what is important? They are just beginning to get a grasp on the vast universe of medicine. How could a student possibly decide on his or her own what should or should not be learned? Won’t important points be missed, skimmed over or ignored completely? I don’t think so. Each PBL case is designed to raise certain issues that the student must identify as learning objectives. If the group of students miss or choose to ignore a certain area - say the basic physical properties and principles of a normal synovial joint - it is the job of the facilitator to point to the student that in order to fully comprehend what is clinically wrong with the knee and how best to treat a damaged anterior cruciate ligament, one must study the synovial joint. The knowledge of structure and function is absolutely essential. The facilitator is any faculty member who has had proper PBL training and has at his or her disposal a description of the learning objectives intended by the authors of the PBL cases. The facilitator does not, however, surrender these learning objectives freely. In most instances, the students themselves are able to identify what they need to know, either at the onset of the case discussion, or when they are acquiring the knowledge that they decided was needed to better understand the case.

After having researched their learning objectives, either individually or as a whole, the group meets again to share and discuss the information that they have obtained. No, it does not then have to become a series of mini-lectures on ‘what I learned in the library’ unless that is what the group decided to do. Instead, most groups simply go around the table sharing ideas, trying to answer each other’s questions, and discussing in a thought-provoking manner various aspects of medical knowledge and application. It is often at this second session that in trying to explain concepts to one another that students identify areas of deficit. Just try to explain to someone why arthritic joints ‘gel’ without an understanding of the viscous properties of synovial fluid. It is next to impossible. However, if the students in the group continue to miss a fundamental learning objective, then it becomes the responsibility of the facilitator to get the students back onto the right track, so that important points are not missed. The facilitator does not give the students the answers that they are lacking, instead the group facilitator merely encourages the students to think about certain issues that they have overlooked, or of which they are not aware.

Phrases such as ‘This is the answer/reason according to...’ are no longer a part of the faculty member’s vocabulary. Instead, phrases such as ‘what about...? How do you explain...? Could you tell me why...? are used instead. This type of student-faculty interaction is such a welcome change from the unidirectional bombardment that occurs in the lecture setting. Gone is the ‘I speak, you write’ approach. Instead, students and faculty can share ideas and knowledge, learn from each other, and interact in a very co-operative, productive manner.

But how can PBL possibly cover all of the material present in medicine today? And how will it be able to keep up with the ever-expanding sea of knowledge that often-times becomes so easy for students (and faculty) to flounder in. PBL is not designed to teach the students the picky details, nor is it intended to replace the lecture setting completely. Its prime objective is to provide an environment in which students can learn general concepts that can be applied to a wide variety of clinical situations. By learning this fundamental knowledge it then should become much easier to acquire new ideas in detail (in lectures and in practice) as they pertain to a rapidly changing field. ’PBL is a way of learning which encourages real understanding of the material rather than copious amounts of knowledge’ (Western, W.W., Introducing problem-based learning into the ICC course, UWO, 1989).

In summary, PBL serves the following functions: It allows students to recognize their own areas of strength and weakness with respect to medical knowledge. It allows students to decide how to learn the material that they need to know. PBL encourages students to explore new resources such as the library, articles, journals, CBCL, clinicians, etc. PBL helps to teach students and faculty to cooperate and function productively within a group. And lastly, PBL helps the students and faculty develop skills that will allow them to tackle any problem presented to them, either individually or in a group, and how to think about and solve the clinical situation in a very productive manner.

PBL is a very new and innovative approach to education, but it is still somewhat of a mystery to many within the faculty of Medicine. In order to completely understand the full benefits of PBL to both the students and faculty members, it must be experienced. The success of the PBL programme will require the continued participation and cooperation of BOTH the students and faculty. PBL will become a very important part of the curriculum in the faculty of Medicine here at Western, as it is at several other medical schools in both the U.S. and Canada. PBL can become an excellent means of complementing the didactic lectures that presently consume first and second year medical students, as well as helping students to develop the interpersonal skills that will be absolutely invaluable in the practice of medicine. In order for PBL to function effectively and to its full potential at Western, it will require an objective approach from students and faculty members. PBL will require a continuous flow of participation and ideas so that it can evolve into a component of medical education that will be enjoyable and invaluable to all who practice medicine.

PBL - a place at Western? You’d better believe it!
YEAR IN
Diagnosis of Pneumocystis Carinii Pneumonia

Pneumocystis Carinii Pneumonia (PCP) is a disease of the compromised host, which occurs in two settings:

1) Epidemic illness among premature or debilitated infants.
2) Sporadic illness among immunocompro­
   mised children/adults.

PCP is a fatal illness if left untreated.1

Pneumocystis carinii is a protozoan. There are three major forms which include a tropho­
zoite, sporozoite and a cyst. Mature cysts are thick-walled and contain up to eight spor­
ozoites. Some cysts are crescent-shaped because of incomplete development or encyst­
ment of some of the sporozoites, resulting a partial col­
lapse of the cyst. Following release, the sporozoites develop into mature trophozoites
containing mitochondria, a nucleus, and endo­plastic reticulum. They appear to be
eukaryotes. Trophozoites attach to host cells by pseudopodial extensions through which they can
obtain nutrients. Following this, the host cell
degenerates.

Serologic studies show that up to 75% of
children develop detectable antibodies by 2-4
years of age. This suggests that diseases due to
pneumocystis carinii may be rare, but infection
is very common.

Virtually all cases of PCP in the United States
and Canada occur in immunocompromised
patients. The most common presenting symptom
of AIDS is PCP occurring in approximately 50%
of cases.2

The normal immune response to P. carinii is
not known. However, PCP is usually associated
with dysfunction of the cellular immune system.
More recently, it has been suggested that anti­
bodies are important in opsonizing and
phagocytosis of the organism by macrophages.

Other causes of pneumonia, including viral,
bacterial, and fungal agents, may co-exist with
PCP. Combined infection with cytomegalovirus
is especially common after organ transplanta­
tion, which may be due to either the incidence of
two common infections in these groups or to
an immuno-suppressive effect of the CMV infec­
tion itself.3

Pathological findings vary depending on the
ability of the host to mount an inflammatory
response. Classically, there is a foamy intra­
alveolar exudate consisting of masses of cysts
and desquamated alveolar cells, and an intersti­
tial infiltrate of plasma cells and lymphocytes.
A polymorphonuclear leukocyte alveolar infiltr­
te is rare in the absence of a concomitant
bacterial infection. Lymphocytes are predomi­
nant, and plasma cells are rare.

Special stains are needed to demonstrate the
organism in tissues or secretions. These include
methenamine silver, toludine blue O (TBO), as
well as Giems and Gram-Weigert. The use of
these special stains for P. carinii is usually
by surgical pathology rather than microbiology lab­
oratories due to the nature of the specimens
submitted and the complexity of the stains.

A PCP in AIDS patients is often characterized
by a number of organisms present in their secre­
tions. Methenamine silver, TBO and
Gram-Weigert stain the cyst walls, leaving the
trophozoites and internal sporozoites unstained.
Giems stains detect the internal sporozoites
and trophozoites, but leave the cyst walls
unstained. A disadvantage of both the Gram­
Weigert and Giems stains is that the tissue cells
and other debris are also stained, and substan­
tial expertise is required to read them accurately.
All of these special stains are non-specific, such
that P. carinii must be distinguished from yeasts
and other structures based on morphology.

Kovacs and colleagues4 showed an improved
detection of P. carinii in sputum with the use of
monoclonal antibodies. In this study, they
respectively studied the sputum of 63
patients. 49 of whom were ultimately given
the diagnosis of P. carinii. The sensitivities of the
three stains used in this study were 45/49 (92%)
for immunofluorescence (IFA), 37/49 (76%) for
Giems stain and 39/49 (80%) for TBO. There
were no false positive immunofluorescent
stains. IFA was found to be statistically more
sensitive than Giems stain (p<0.008) and TBO
(p<0.007). They also pointed out that IFA had
no false positives, and was the quickest to per­
form, taking 5-15 minutes. Giems stain and
TBO took 5:30 and 5:20 minutes respectively to
perform.

Gill and colleagues5 completed a similar study
comparing the sensitivities of IFA, Giems and
TBO. They used a combination of three mono­
clonal antibodies, two prepared against human
and one against rat P. carinii, in an indirect fluo­
rescent antibody stain in both bronchoalveolar
lavage and lung biopsy specimens. This com­
bined technique demonstrated specificity for
P. carinii and showed fluorescence of both P.
carinii cysts and trophozoites. The IFA and TBO
showed a 97.6% agreement. They concluded
that IFA was a fast, simple and sensitive method
for diagnosing P. carinii.

Gay and coworkers6 found that concentrated
preparations contained a significantly greater
number of cysts when compared to impressions
prepared by imprinted open lung biopsies.

Pneumocystis infection is usually manifested
in immunocompromised patients by the suba­
cute development of a non-productive cough
and plasma cells are rare.

Pathological findings vary depending on the
ability of the host to mount an inflammatory
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Bronchial lung biopsy (TBB) have proven to be sensitive techniques for identifying pulmonary infections in patients who are immunocompromised.\textsuperscript{9,20,21} Fiberoptic bronchoscopy with BAL and TBB can be performed under local anesthetic by using a transoral or less commonly, a transnasal approach. Unless there is a focal abnormality on the chest radiograph, the procedure can be done without fluoroscopic guidance. The bronchoscopic procedure should include inspection of the hypopharynx, vocal cords, and airway from the trachea to the subsegmental bronchi, looking for the characteristic lesions of Kaposi's sarcoma. Endobronchial lesions, including mycobacteria or fungi may also be seen.

After inspection of the airways, the bronchoscope is wedged into a peripheral airway, most commonly in the right middle lobe. Approximately 100 ml of sterile saline is installed in 20 ml aliquots. Suction is used following each bolus. The aspirated return is approximately 50 ml. BAL can be performed using a fiberoptic catheter or a double-lumen, balloon-tipped catheter. Neither of these requires bronchoscopy. The lavage specimen should be centrifuged, and the sediment smeared and stained for \( P. \) carinii, mycobacteria, and fungi. Mycobacterial and fungal cultures should be performed as well.

If a TBB is to be performed it should be done after the lavage. When there is diffuse lung disease, the biopsy specimens are generally taken from the right lower lobe. If a radiograph abnormality is localized, the biopsy specimens should be taken in the area of greatest abnormality with fluoroscopic guidance. Multiple specimens are normally obtained. Specimens for microbiological examination should be placed on moistened gauze sponge and transported in a capped jar. Specimens for histological study should be placed in formalin. The complications of TBB include hemoptysis and pneumothorax. Broadus et al.\textsuperscript{22} described pneumothorax occurring in 9% of their patients, with 5.9% of them requiring chest tube placement. There were no deaths and no hemoptysis occurred in this series of 253 patients. Absolute contraindication to TBB includes an uncorrectable coagulopathy. Respiratory failure severe enough to require mechanical ventilation is a relative contraindication to TBB. BAL can be safely performed in both of these situations.

Stover reported the results of bronchoscopic procedures in 72 patients with AIDS.\textsuperscript{19,23} Both TBB and BAL had a high degree of sensitivity (88% and 85% respectively). When combined, the sensitivity rose to 94%. The yield of the two procedures was especially high for \( P. \) carinii at 94%.

Broadus et al.\textsuperscript{22} had similar results. They reported the efficacy of BAL and TBB in a series of 276 fiberoptic examinations performed on 171 patients with known or suspected AIDS. BAL and TBB had sensitivities of 86% and 87%, respectively. For \( P. \) carinii, BAL had a sensitivity of 89% and TBB had a sensitivity of 97%. For patients who had both procedures (BAL and TBB) the sensitivity was 100%.

Golden et al.\textsuperscript{20} used BAL alone. They reported that BAL detected PCP in 36 of 37 patients, for a sensitivity of 97%. The sensitiv-
Ognibene et al.11 assessed the sensitivity of BAL in patients with proven PCP. These investigators found that in patients whose conditions were worsening while receiving treatment for PCP, repeat bronchoscopies showed only 
P. carinii. They concluded that in patients with AIDS who have persistent worsening pulmonary infiltrates despite therapy, repeat bronchoscopy after a short interval was unlikely to have any benefit. In contrast, they found that patients whose pulmonary involvement initially resolved may benefit from an aggressive diagnostic approach if new pulmonary infiltrates appeared. In their study, new treatable diseases were found in 59% (27 of 46) if bronchoscopy was repeated greater than thirty days after the initial bronchoscopy. This improved the short-term survival rate.

The prognosis from sporadic 
P. carinii pneumonia in immunocompromised hosts is serious, and mortality rates are 90-100% without treatment. Even with the available treatment of effective chemotherapy, 20-40% of patients will die, and delays in diagnosis may contribute to their mortality.

References

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MANAGER J. G. (JIM) MARTIN


PCP Dx
SUMMARY

History: AIDS patient / ↑ risk group

O/E: fever, cyanosis, crackles
evidence of other opportunistic pathogens
eg. Kaposi's Sarcoma, hairy leukoplakia

Lab: WBC normal or ↑
A - a gradient between rest / exercise

Chest radiograph

Typical or suggestive
1. bilateral interstitial infiltrates
2. diffuse alveolar pattern

Gallium Scanning
Sputum (100% sensitivity)
(range of sensitivity 55 - 79%)

BAL ± TBB

TBB contraindication:
1. uncorrectable coagulopathy
2. mechanical ventilation

open lung bx indicated:
1. all of above negative
2. contraindications to TBB, in BAL

Treat Consider another dx
SWAN SONG

To celebrate the departure of Tom Song, Meds '89, we have dedicated this page to our most prolific cartoonist. His own unique brand of humour has kept us "In Stiches" during his 4 years at Western. Farewell and good luck!

---

**IT'S BOOSTER TIME KIDS...**

**DR. RAMBO, PEDIATRICIAN**

... THEN BOB BEGAN TO WONDER... IF THIS WAS HIS RECTAL THERMOMETER...

WHERE HAD HE LEFT HIS PEN?

---

**... AFTER HOURS AT THE DENTAL CLINIC...**

---

**... LET'S TURN DOWN THE JUICE TO THE CAUTERY...**

**BRADFORD! THIS ISN'T FUNNY ANYMORE, BRADFORD!**

---

**THIS ISN'T A PACEMAKER.... WE'VE JUST IMPLANTED THE HEADPHONES TO MY SON'S WALKMAN.**
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