There are several people I would like to thank at this time:

Professor Jack Wyman, my studio critic.

Professors Alfredo Missair and Charles Sappenfield, my outside critics.

Dr. John Travis and the staff of St. Francis Capitol Region Radiotherapy Center, Topeka, Kansas.

Professor Frank Foster, Photography Consultant

And especially my wife Marcia, for many months of patience, support, and inspiration.
PROPOSAL

THE SETTICH REGIONAL ONCOLOGY CENTER

I believe that in the design of medical facilities emphasis must be placed on patients' emotional as well as clinical needs. Architecture that provides the proper environment can help patients maintain the optimism that can be so important to their recovery.

The study of medical facilities could well be a life's work. Therefore, to reduce this study to a more manageable form, it will be restricted to a single specialty, oncology. It is the intention of this project to examine current and future methods of cancer management and develop optimum environments for them. The spaces must not only function efficiently for the staff, but also provide an encouraging and therapeutic atmosphere for patients. Perhaps more for cancer patients than most patients, emotional and physical health are closely related. Although the cure rate has improved greatly, 50% of the patients will die of their disease within five years.

Currently there are three major modalities of cancer treatment—surgery, chemotherapy, and radiation therapy. These methods can be employed individually or in combination as is most appropriate for the particular case in question.

Surgical removal is normally done on an inpatient basis within the general surgery department of a hospital. Chemotherapy and radiation therapies are primarily outpatient (85-90%). Unlike the single surgical procedure, they can consist of many weeks of daily treatments. This daily regimen often causes patients to commute long distances or move closer to a facility for the duration of treatment. This relocation often separates them from friends and relatives whose support could be a very positive influence.

This project will be limited to non-surgical oncology management. There are several fine surgical facilities within 100 to 120 miles of most cities in the study area. This does not seem an unreasonable distance to travel for excellent surgical treatment. However, there is a great need for an outpatient facility within a reasonable daily commuting range to provide non-surgical care.

The inadequacies of oncology centers today seem to be largely based on two problems. First, "non-design" centers are quite often expansions of existing hospital facilities in piecemeal fashion. There is no comprehensive growth plan to accommodate changing techniques or patient loads in the future. Second, and related to the first, is the tendency to approach design with a "make it work" attitude. Expansion becomes centered around installing the latest machine or process, and the needs of the users become secondary.

The study will be approached in two phases. The first phase of the study will involve research and analysis of how cancer treatment exists today at various centers.

The second phase will be a design of a new treatment facility in southern Illinois. The Settich Regional Oncology Center will be a new cancer treatment community that will provide state-of-the-art oncology within a humane environment. Housing will be provided for patients who might otherwise have to commute long distances daily.

Additional services will include cancer education programs for area physicians and new patients, and an outpatient hospice program for those who choose this form of cancer management. The process used will include the identification and inclusion of patients' emotional needs as an integral part of the program along with square footage requirements and equipment.

FEASIBILITY

A study of patient volume and existing treatment centers in the southernmost 34 counties of Illinois has been made for the purpose of determining how successful a new treatment facility would be in providing improved cancer management in this region.

The 1984 "Cancer Facts and Figures" published by the American Cancer Society indicates the estimated cancer deaths in Illinois to be as follows:

<table>
<thead>
<tr>
<th>STATE</th>
<th>DEATHS</th>
<th>NEW CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>22,600</td>
<td>44,900</td>
</tr>
</tbody>
</table>

The above figures were subdivided by counties on a population basis. This indicated a total of 4,563 new cases in the study area.

Based on the annual "Incidence Report" of the American Cancer Society, approximately 600 patients will be treated within the area, and 95% will be referred to institutions outside the study area or will not receive proper medical treatment.

*The actual figure from the report is 90%, however since this report only covers 75% of all hospitals, the figure has been adjusted accordingly.
The previously-mentioned statistics clearly demonstrate the existence of a sufficient quantity of new cancer cases to support an oncology center of excellence.

**LOCATION**

The center will be located on one or more of three pieces of land adjacent to Clay County Hospital, Flora, Illinois. The treatment of cancer will be self-contained within the new facility on an outpatient 8 to 9 basis. However, there will be a small percentage of patients who are not ambulatory and require 24-hour inpatient care. These will stay in a special unit of the hospital, redesigned appropriately for their needs, and patients will be transported daily to the treatment center.

Like most small hospitals, Clay County is having economic problems due to a low (45%) occupancy rate. It is projected that 50% of the hospitals existing today will be closed by the year 2,000 because of this patient shortage, and then after that time the trend will begin to reverse.

An important additional benefit of this project could be the demonstration that portions of small hospitals can be used for purposes other than general health care, giving them economic stability, and allowing them to continue to serve their communities.

The success of the study will depend on whether it can demonstrate new or untested thought in oncology center design—whether it can point a direction for these facilities that recognizes that the emotional health of the patient is an inseparable part of their physical health.

**EVALUATION**

The success of this proposal will be judged by how well it fulfills several criteria. Below is a partial list of such criteria; others will surely become evident during the course of the project.

1. **Does it provide an atmosphere which is conducive to the positive attitude of the patient?**
2. **Does this facility demonstrate new or untested thought in oncology center design?**
3. **Would the facility continue to be a success if expanded to accommodate new technologies or increased patient loads?**
4. **Is it a pleasant and efficient working atmosphere for staff?**
There are two factors which were the major determinants of this study. First, and of primary importance, was the demonstration that medical environments could be pleasant, humane places. Second was the context in which it was located.

The time spent waiting is possibly the most uncomfortable or even frightening portion of any medical treatment, and perhaps the one factor which can be best corrected by architecture. The Sethich Oncology Center is a place designed around the nodes where people sit, converse, wait, and what they experience on the connecting paths. There is always a clear destination at a waiting area, no blind halls with colored lines on the floor. Whenever possible, these nodes are extended to the outside to give some relief from the clinical environment.

When designing medical facilities it is especially important to remember that what patients experience can have a strong effect on their attitude and possibly their recovery. Architects must understand what times in any medical treatment are the most discouraging and uncomfortable. Striving to find ways to alleviate these can be more important to patients' well-being than clinical requirements or any architectural expression the complex could make.

The context of the site chosen offered excellent opportunities—a physical connection to the hospital, the re-use of the existing clinic, and the ability to make the housing a part of the neighborhood. However, the responsibility to understand and design for this established neighborhood context is quite strong.

Regardless of one's opinion of the Clay County Hospital, its facade has become an accepted part of the area. The new porches along the south facade indicate that the function of this wing is different and part of the complex beyond, and yet the main mass is unchanged. It is still a part of the symmetrical front facade of the hospital as seen from the main entrance, although it conceals an interior which is as un-hospital like as practical and still fulfills its functional needs.

While the hospital and treatment center are physically connected, it is important that they have individual identities. If the whole complex were viewed as a single building, it would overpower the surrounding neighborhood. It is also beneficial for outpatient's emotional well-being to be able to go to the center for treatments daily without perceiving themselves as going to the hospital. A continuos association with a hospital environment could only strengthen their fears of the seriousness of their disease.

The exterior image of the center does use materials and detailing from residential construction, but not in an attempt to isolate the neighborhood. The purpose is to maintain that separate identity from the hospital and at the same time be a harmonious neighbor to the surrounding houses.

The complex is a total of square feet. The outpatient center comprises , the hospital unit , and the apartments the remaining square feet.

The center can be divided into three main zones. The patient reception and waiting area are on the south. There are indoor and outdoor areas for adults and children. A special area is provided for first-time patients where family and friends can wait adjacent to the initial examination room and the patient education room.

The central portion contains the staff support areas such as testing, treatment planning, apparatus preparation, dosimetry, staff lounge, private offices, etc. These are located along a central "street" which holds all the diverse pieces together. An extension of the staff lounges and waiting areas, this is the place where the staff members will spend the bulk of their time.

On the north are the treatment areas. Patients enter this zone through the treatment waiting area after checking in at the nurses station. A narrow walled court runs the full length of the north wall. It is an opportunity to lighten the typically dismal treatment areas with sunlight, fresh air, and greenery, without sacrificing the privacy of patients.

The hospital unit contains rooms. Of these are in the existing south wing in groups of two and
Four. These are for patients who are not seriously infirm and are as non-clinical as possible. There is a high degree of privacy. Groups of rooms share porches on the north (front) facade of the hospital. The remaining units form a connection between the hospital and the center. These are for the seriously infirm patients and are by necessity much more traditional in form.

In between these two groups of rooms is the new dining area for the hospital. The existing kitchen and dining room will remain directly below in the basement. However, it is hoped that patients and staff from all parts of the hospital and center will take advantage of this dining room and terrace.

The exterior image of the hospital and out-patient center have already been discussed. Connecting the two is a new group of hospital rooms. It is almost a neutral link, its detailing not coming from the hospital or clinic, but from the one element that is consistent throughout the complex, the arcade. Whether glazed, open, the extension of a waiting room, a covered walk, or simply a trellis, it is always associated with the circulation system. It begins at the patient parking lot as a shaded walk and continues throughout the center, connecting the nodes where people sit, wait, and converse.

The existing clinic building remains unchanged on the exterior except for the replacement of windows and the addition of the arcade on the west and north. The interior partitions have been relocated to create space for administrative offices and the physics department. This is a building of 20 years in age in sound structural and mechanical condition. It lends itself well to office spaces with relatively little cost, but it would require a major investment to install the equipment associated with many other departments of the center.

The apartments relate to the neighborhood by scale, materials, and orientation. The surrounding street and sidewalk pattern is duplicated as much as possible. Carports separate units into groups of no more than two units, giving some of the detached quality of the single-family homes surrounding, even though the program necessitates dense groupings. Behind units are small terraces, some private and some shared, hopefully causing more interaction between residents.

The Seltich Regional Oncology Center is a demonstration that medical environments need not be uncomfortable for patients. To make these places humane takes a thorough investigation and understanding of patients' needs, both physical and emotional, and a decision to work from the inside out with these needs as the primary form-givers.

*A detailed description of individual space requirements can be found in the appendices.
First Floor Circulation
East Elevation

South Elevation

*That portion of the trellis which borders the patient parking has been omitted from this drawing to allow a view of the building facade.*
Typical Apartment Elevations

North Elevation (Staff Entry)
June 8

My first appointment was today at 9:30. They were already 15 hours behind schedule when I arrived. I suppose that's about average. I was actually a little behind, but I made up for it in the waiting room. It was much more pleasant than anything I had to offer my patients. The receptionist showed me to a special waiting room. I'd like to know what patients sit in a beautiful room like this and wait. I've never seen anyone leave the waiting room and just sit down and cry. I suspect they prefer the quiet.

June 10

It was a shock at first. To find myself in the treatment room, and me knowing only that stupid machine going at the rate around me. But I found it was much more pleasant to watch the children playing outside than that machine moving around me.

June 13

The first treatment was today and I finally got over all of this place. There is a large central hall lined with conference areas, each delightfully small office, all bright. I was ushered to my station. I wish I could have been there to practice in. The staff thoroughly enjoy it. I wonder if they like it. The place is always behind schedule.

This is a nurse courtyard, all along the north side. The hall is the treatment machine, looks out into...
it and in Shelter with Jack.

air, grey

of flowers to growing

on the garden wall.

Nothing like the fruit

garden we had earlier.

away in local hospitals

baskets. This is a special

therapy sitting room that

looked into this courtyard;

skin to go directly there

from over on without

looking in at the first

day.

July 3

these plants going to treatment

about 3 weeks ago. Some

have been leaving lice of

corn on the leaves and

squash in the courtyard.

I enjoy watching them

spread through next. I

caught myself coming

early. Don't think it

could keep coming here.

every day if I didn't have

the birds to watch. Keeps
Flora is a rural community of 5,200 people located near the center of the study area, the southern 1/3rd of Illinois. There are no heavy industries, only small business and light industries. The two possible sites considered were both in residential neighborhoods. One site was in an area developed within the last 20 years, the other a much older neighborhood.

The Jaycox property is the largest site, approximately 11 acres. The area around it is typified by one-story homes less than 20 years old.

FIELD OBSERVATIONS AT THE JAYCOX PROPERTY

1. Small house on the east edge of the Jaycox property is in a poor state of repair.

2. The clump of trees in the middle of the site does much more to divide it than shown in the aerial photo.

3. The tree row along 10th Street almost totally obscures the houses beyond.

4. 12th and Sycamore streets are oil and chip surfaces with no curbs.

5. The structures shown in the northeast corner on the aerial photo are no longer there.


7. 10th Street is gravel surfaced, 12' wide. It is actually not a street, but an alley for all practical purposes.

8. The site is bordered on the east by a church, and beyond that a motel.

9. Electrical and telephone lines are all above ground.

The Webb-Clinic site is actually two pieces of property totaling 10 acres. It is bordered by the hospital on the west and surrounded on other sides by an older residential neighborhood of single-family homes of 1, 1½, and 2 stories.

FIELD OBSERVATIONS AT THE WEBS-CLINIC PROPERTY

1. Surrounding homes are primarily clapboard, 50 years plus in age.

2. The large clump of trees near the juncture of the two properties are mature pines, 35' in height.

3. The backyards of the houses along Holly Lane encroach upon the Webb-Clinic property.

4. The back of the hospital is used only for parking and maintenance sheds.
Jaycox Site Analysis

*Opposite: Jaycox neighborhood
*Bottom: Jaycox site
Oncology patients usually follow a complex pattern of referrals from one physician to another in a series of examinations before they actually begin treatment. Quite often, beginning with the family physician, patients can be bombarded by a series of diagnoses and opinions from professionals, family, and friends. This can lead to a high level of misunderstanding and fear about their disease before treatment ever begins. Designers must realize the importance of the first impression made by treatment facilities and techniques.

One possible improvement could be to include a new patient education program. Presentations could be in the form of slides, videotapes, printed material, etc. The space would be specifically designed to educate new cancer patients on what to expect from treatment. An honest and factual explanation would end patients' misconceptions, and hopefully allay some of their fears.
PATIENT CIRCULATION

The cancer patient is referred for consultation at a treatment center by a family physician or a cancer specialist.

On the initial visit, the patient will probably be accompanied by family or friends. They will be greeted by a receptionist and asked to wait in a general waiting area. Patients undergoing daily treatments will use a different waiting room. (Here the patient waits until medical records and test results have been reviewed by the doctor.) A nurse escorts the patient to an examining room to be interviewed and examined by the doctor. At this time there are several possibilities. More tests could be prescribed, the patient could be referred to another medical discipline, or treatment could begin.

On his second visit, the patient will be directed to a general waiting area once again. If all tests and records are complete, he will either begin chemotherapy or undergo a radiotherapy planning session. If a chemotherapy patient, he will be escorted to the chemotherapy lounge. On future daily visits, he will go here directly without waiting. Medications are normally administered by nurses, however the doctor will closely monitor progress and examine the patient weekly.

If a radiotherapy patient, he will be escorted to a simulator room. The simulator is a diagnostic X-ray unit designed to imitate the movement of treatment machines. With the patient positioned on this unit, the physician and dosimetrist can fluoroscopically visualize the tumor and plan the best method of treatment. An X-ray record is made of the planned treatment area. At this time, auxiliary devices such as lead blocks to alter the shape of the radiation beam or positioning molds, which assure the correct position of the patient during subsequent treatments, may be designed. The actual radiation treatments will begin on the next visit.

By the time the patient returns, all auxiliary devices will have been constructed, and the dosimetrist will have calculated the prescribed radiation dose. He will be directed to a secondary waiting room, one used exclusively by patients undergoing daily treatments. A few minutes before treatment he will be directed to a dressing room, change into a gown, and will go directly from there to the treatment room itself.

The patient will return to this treatment room by way of the secondary waiting room Monday through Friday for several weeks, depending upon the extent of his disease and the type of treatment. During this period he will be examined at least once a week by his physician. Periodic X-rays and other tests will be used to determine the progress of treatment.

After treatment is complete, the patient is put on a follow-up exam schedule from 3 to 6 months for the first five years and decreasing in frequency to eventually become yearly.

Patient Circulation
In a typical day, the doctor will see patients in consultation, patients undergoing treatment, and follow-up exams. He frequently consults with other oncologists, technicians, and nurses. For this reason, a planning room is at the center of his activities. From here he makes his way to the exam rooms, labs, workshops, treatment rooms, etc. Here he is readily available for consultation with colleagues.

The activities of the simulator and treatment room technicians are primarily centered in their own departments. They frequently discuss problems with the doctor, physicist, dosimetrist, and mold room technicians. The treatment machine technician is responsible for keeping treatment records up to date, taking verification films, and often escorts patients to and from the dressing area.

Nurses perform a variety of functions. They escort patients, administer medications, interview patients, and assist in examinations. Their activities are centered around the nurses' station, which must give them the best possible vantage point for observing patients and hopefully anticipating their needs.

The physicist is responsible for the accuracy of treatment equipment. He calibrates the machines and makes necessary adjustments. He reviews dosimetry calculations and procedures, and is frequently called in to planning sessions.

Other personnel such as the dosimetrist, mold and block technician, electrician, pharmacist, transcriptionist, etc., have their activities primarily centered in their own departments.
The following is a room-by-room description of some of the more important functional and psychological needs of individual spaces. I would especially like to thank Dr. Travis, Dr. Borko, Dr. Powers, and Ms. Parn, whose help was invaluable in assembling this data.

**Treatment Planning/Physician's Workroom**

**Functional:**
This is the nerve center of any facility. Doctors must be able to come and go to all areas in as few steps as possible. The biggest benefit of doctors working here rather than in their offices is that it promotes consultation among them. The space must include workstations with provisions for computer terminals, a film viewing area, a conference table, and storage areas (70 square feet per M.O.)

**Psychological:**
Needs are similar to the dentists, however the doctors will be given private offices also.

**Exam Room**

**Functional:**
Exam rooms will have the same standard equipment expected in any medical facility with the addition of a view box. Doors should open away from the wall to form a partial screen for patients. There should be at least one exam room close to the doctors' offices for follow-up. One room should be large enough for both an exam table and a gurney, or contain no table whatsoever. One room should be equipped with a head and neck chair in addition to the examination table. (1 per M.O. at 120 SF each)

**Psychological:**
The need for washable finishes and all necessary equipment at arm's reach could produce the typical cold clinical atmosphere. It may be possible to lessen this by introducing natural light and concealing some of the lesser-used equipment along with some finishes and decoration that is less indelible in appearance. Patients should be somehow kept in contact or at least be aware of the direction of the waiting room in order to avoid totally separating them from the support of their family and friends.

**Reception**

**Functional:**
The reception desk must be able to observe the entire waiting room area. It must be highly visible upon entering the facility. It must remain in constant contact with the nurses station and interview area, and it should be possible for a single person to manage these areas during the lunch hour.

**Psychological:**
This is the patient's first impression of the center. It should be inviting, as non-clinical as possible, belonging to the waiting area and not just a gate to the medical side.
Nurses Station

Functional:
Nurses probably cover more area than any other staff member. They must assist patients in all areas, move records, and in general be aware of all events affecting patients. One of the best ways to increase the effectiveness of the nursing staff is by reducing the number of steps necessary to perform its duties. The nurses station in the hospital unit is not only a base for nursing operations, but also acts as a reception desk and coordinates patient transfers to the center.

Psychological:
Although being in the forefront is essential, nurses must also have the option of a certain measure of privacy in order to work undisturbed on records, discuss delicate matters with other staff, and interview patients confidentially.

General Waiting Area

Functional:
As described earlier, this area is for patients on initial visits and follow-up exams, not daily treatments. Patients will tend to be accompanied by family members, and the square footage must be increased appropriately. Some areas which will be helpful include: a phone lounge, a vending lounge, and a playground or game room for small children. This area should be readily visible and accessible from the visitors' parking area. (1/4 daily capacity at 15 square feet each.)
Psychological:
Seating should be designed for conversation in family groups. Parents should be able to observe their children in play areas, however the noise must not upset other patients. Decorations should be residential in nature, and should not be the sterile, clinical atmosphere of the past, nor the bold supergraphics that have been used more recently.

Patient Education

Functional:
This space must have the ability to accommodate a variety of presentation media including slide or video.

Psychological:
By the time the patients get here, they are as confused about cancer as they ever will be. They must be comfortable, and their attention must be focused to help them digest a great deal of information in regards to exactly what lies ahead in order to alleviate some of their fears.

Dosimetry

Functional:
Dosimetry calculations will be primarily computerized. There must be a dedicated space at each work station for a terminal. There must also be common space for a printer, plotting screen, view-box, storage, and a common work table for group discussions. (150-200 square feet + 80 square feet for each additional person over 2.)

Psychological:
Dosimetrists will not have offices. Therefore, they must be given every possible practical measure of privacy at their work stations and be given the opportunity to personalize them.

Simulator Room

Functional:
Requirements are much the same as for treatment rooms, however shielding is much less due to use for diagnostic X-rays only. There must be a direct link to the control booth for films. A tomograph will be needed to take patient measurements for devices such as lead blocks and positioning aids. (Simulator 300 square feet, simulator control 80 square feet.)

Psychological:
This is the patient's first and longest exposure to the machines, taking 1 to 2 hours. It is possible to include windows and skylights here without voiding shielding requirements. If patients are asked to be gowned for simulation, they will probably change in the room itself, and must have access to a restroom without going into a corridor.

Film Processing

Functional:
Almost all processing today is done mechanically due to the much shorter time required than for hand processing. However, should equipment break down and hand processing become necessary, it could be done in the hospital darkroom. The most important points to consider concerning the darkroom are:

(1) Direct relationship to the simulator/dosimetry areas
(2) Fumes from the photo chemicals
(3) Using the space exclusively for film work, not letting it become a storage room.

Radioactive Source Room

Functional:
The source room is used for the storage of radioactive materials which will be transported to the implant room. Implantation of materials within a tumor is one method of treatment. The source room requires close proximity to the physicist, but must not be next to high-occupancy areas due to the low levels of radiation which will exist. The diagram shown is quite sufficient for most installations.

Psychological:
It is important that the patient not be in contact with this room. It can only cause apprehension, and close proximity to treatment is of no real value.

Current Waiting

Functional:
This is an area for patients on daily treatments of all kinds. It should be large enough to accommodate a minimum of one hour of patient flow.

Psychological:
The biggest problem is not the waiting for treatment, but that it happens over and over again every day. The space must be designed to give the most possible distractions to patients.

Med and Block Workshop

Functional:
These areas are to be remote from patients due to noise.

dust, and fumes. Equipment includes melting pot with vent hood, drill press, work tables, sinks, vacuum form, cutter, rolling carts, ample counter and storage space, and a "clean" computer space. (350 SF)

Dressing and Gowned Waiting

Functional:
Patients enter a few minutes before treatment, change, wait for treatment, and after treatment dress and leave. Restrooms should be directly accessible. There should be a dedicated space for nurses to draw blood. (1-hour capacity at 15 SF each.)

Psychological:
Hospital gowns are always embarrassing, and seating should be designed to facilitate conversation or to allow privacy. It is very important to give the patient something else to do besides think about the treatment machine such as a pleasant view or television. It must not be forgotten that this is probably the most frightening space short of the treatment rooms themselves.

Chemotherapy Lounge

Functional:
Chairs are used for outpatient chemotherapy since beds aren't necessary and take up too much space. There needs to be the opportunity for the nurses station or a volunteer to observe patients at all times in case of side effects from medication. (40 SF per chair)

Psychological:
The only medical equipment which is absolutely necessary at each station is an I.V. rack or a similar device. Beyond that, furnishings should be selected for the best comfort. Patients must be given opportunities for conversation, a pleasant view, television, etc.—anything to take the patient's mind off his treatment. Patients must not feel watched constantly.

Hyperthermia

Functional:
Hyperthermia is a heat treatment method. The device itself is quite small, and the patient reclines on a couch during treatment. The only shielding needed is a thin copper mesh. A mechanical room or space must be provided adjacent and be able to hold transformer units 2' x 2' x 3' high. Storage and counter requirements are the same as for other treatment rooms. (200 SF)

Psychological:
The machine is far less frightening than other equipment, and shielding can be totally hidden.

Radiation Therapy

Functional:
The shielding requirements for radiation therapy are the dominant feature in any room design. Shielding may be up to five feet of concrete or eight inches of lead. Entrances are equipped with mazes to prevent direct rays from striking the lead door. A control area must accompany each room, containing the control panel, video monitor, and space for updating and storing current charts. Within the treatment room itself must be storage for all auxiliary
equipment, blocks, molds, and a counter with sink. One room must be 50% larger to accommodate vertical patient equipment. (Treatment room 720 SF, control room 80 SF)

Psychological:
This room is the worst for patients. The treatment may only last 1 to 1½ minutes. However, the size and appearance of the machine is oppressive, and the sound of the beam door closing is quite memorable. Patients desperately need some distraction from all of the clinical apparatus around them.

Patient Nourishment

Functional:
This is a small kitchen designed to provide snacks for patients with special dietary problems (a possible side effect of treatment). It may also be used by a dietician to demonstrate to patients what types of special foods can be prepared at home. This area should be accessible to nurses in any part of the center, but is directly related to the dietary management office.

Staff Lounge

Functional:
A place for staff members to eat lunch, take breaks, keep personal items, make phone calls, etc. Equipment needed includes a kitchen, table and chairs, lockers, rest rooms, etc.

Psychological:
There needs to be the ability for varying sizes of groups to meet to socialize, discuss work problems, have birthday celebrations, etc. There must be a provision for individual privacy also, especially in the phone and locker areas.
Staff should be able to enter and leave the lounge without being viewed by patients. Once there it should be a space that gives them the best possibility of relaxation and relief from problems.

**Library/Classroom**

Functional:
The design should be quite flexible. It should be possible to have total privacy in the library, or to have it open to the classroom. Both spaces would be used by staff to keep up on the changes in the field of oncology.

Psychological:
The important aspects of a library would be quiet, the proper amount and quality of light, and comfortable furnishings.

**Electronics and Physics Department**

Functional:
It is convenient for the physicist and electrician to work in the same room since they frequently consult with each other. However, they must have separate work and storage space for tools and equipment. Ample storage space for current and future equipment is essential.

Psychological:
It would be advantageous to have this space in a fairly remote, quiet area to support the complex work and study done there.

**Medical Records/Transcription**

Functional:
All transcription will be done on word processors. The transcription stations themselves can be quite small. However, X-ray films will continue to be stored full-size due to the high cost of reduction. This will take an extremely large space since records are usually kept five years in this area before being moved to a dead file area. Potentially the files might have to hold 10,000 records at a time. (50 SF per transcription station)

Psychological:
Transcriptionists will spend the entire day at their work station with little time away. Their stations do not need to be in direct contact with other staff members at all times, however they should not be so remote as to feel isolated. Transcriptionists should have every opportunity to personalize their own area.

**Outreach Services**

There are several services which will be lumped together since their functions and spaces required are so similar: psychological counseling, hospice office and counseling, community information, and dietary management. (1,000 SF)

Functional:
Relatively standard offices and conference room spaces and furnishings. Could be quite remote from the rest of the center since they function fairly independently.

Psychological:
These spaces are primarily for counseling and advice to individuals and groups, and there is a great need for quiet and privacy. Natural light and fresh air could be very helpful in removing the clinical atmosphere.

**Hospital Rooms**

Functional:
Approximately 40% of patients will need the typical sterile, fully-equipped hospital room. The rest could have equipment most conceivably and with less sterility, more "homey" atmosphere.

Psychological:
For patients who are not seriously infirm (60%), the hospital room can be "de-hospitalized." It is important that the patient feel as at home as possible. Equipment should be concealed or removed outside the room. Furniture should be residential in nature, not hospital-like, and provisions should be made for family members who need to stay over. Finishes should not be slick and so obviously washable, but offer some texture to the touch. The floor should be carpeted. Patients will be encouraged to get out of the rooms as much as possible. Although a wheelchair must be used, it should be stored in such a way that patients don't always have to look at it and be reminded of it.

There are several spaces which have relatively standard functions and do not require a detailed analysis at this point. They include:

- Doctors Offices
- Physicist Office
- Administrative Offices
- Head Nurse's Office
- Pharmacy
- Laboratory
- Staff Toilets
- Patient Toilets
All programming is based on an estimated initial patient load of 1,000 new patients per year and a five-year projected patient load of 2,000 new patients per year. Site and quantity requirements are based on published sources (see appendices) and observations during visits to existing centers.

<table>
<thead>
<tr>
<th>Staff</th>
<th>Initial</th>
<th>5 Year</th>
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<tbody>
<tr>
<td>Medical Oncologists 1 per 250-300/yr.</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Radiation Oncologists 1 per 250-300/yr.</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Physician 1 per 400-500/yr.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Radiation Technologists 2 per Machine</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Dosimeters 1 per 300/yr.</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Simulator Technician 1 per 600/yr.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Nurses (Rad. &amp; Chem.) 1 per 200/yr.</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Medical Technologist (Lab)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Tumor Register Clerk</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Maintenance</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Transport Technician</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Electronics Technician</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Administrative Director</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Administrative Secretary</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Billing Clerk 1/50/day</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Transcriptionists 1 per 200/yr.</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Receptionist 1 per 800/yr.</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>30</strong></td>
<td><strong>59</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spaces</th>
<th>Initial</th>
<th>5 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Areas Private Offices</td>
<td>2,000 SF</td>
<td>3,000 SF</td>
</tr>
<tr>
<td>Treatment Planning, Examination, and Associated Areas</td>
<td>1,600 SF</td>
<td>3,000 SF</td>
</tr>
<tr>
<td>Waiting Areas</td>
<td>1,500 SF</td>
<td>2,000 SF</td>
</tr>
<tr>
<td>Simulation &amp; Apparatus Preparation</td>
<td>1,500 SF</td>
<td>2,000 SF</td>
</tr>
<tr>
<td>Treatment</td>
<td>3,500 SF</td>
<td>5,500 SF</td>
</tr>
<tr>
<td>Outreach Program</td>
<td>1,000 SF</td>
<td>1,000 SF</td>
</tr>
<tr>
<td>Maintenance, Storage, Mechanical</td>
<td>1,400 SF</td>
<td>2,000 SF</td>
</tr>
<tr>
<td>Circulation</td>
<td>3,750 SF</td>
<td>6,000 SF</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>16,250 SF</strong></td>
<td><strong>25,700 SF</strong></td>
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**BUILDING TYPES STUDY**

Several facilities have been visited during the course of research. They varied in size from 30 to 200 patients per day. Some offered only radiation, some only chemotherapy, some both.

<table>
<thead>
<tr>
<th>Parking</th>
<th>Initial</th>
<th>5 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor Parking 2-Hour Flow</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Current Patient Parking 1-Hour Flow</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>Staff</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Apartments 1.25 Each</td>
<td>21</td>
<td>42</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Housing</th>
<th>Initial</th>
<th>5 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartments 17, 25, 3 Bedroom Units</td>
<td>17</td>
<td>34</td>
</tr>
</tbody>
</table>

A mixture of 1, 2, & 3 bedroom units—all must be designed to accommodate handicapped persons.
DEPARTMENTAL SCALE

Issues of visual and acoustical privacy, access and lighting were examined on a departmental scale. These ideograms were then put together in the arrangement arrived at during the site survey to see how the needs of the individual departments related to the center as a whole and to the existing context.
Site Survey

1. View Out
2. View In & Out
3. No View
4. Switched View
5. Acoustical or Visual Barrier
6. Patient Circulation
7. Staff Circulation
Several facilities were visited during the course of research. They varied in size from 30 to 200 patients per day. Some offered radiation only, some chemotherapy only, some both.

Community Hospital, Indianapolis, Indiana
Detroit Oncology Center, Detroit, Michigan
Indiana University Medical Center, Indianapolis, Indiana
Parkview Hospital, Ft. Wayne, Indiana
Springfield Memorial Hospital, Springfield, Illinois
St. Francis Capitol Region Radiology Center, Topeka, Kansas
St. John’s Hospital, Anderson, Indiana

The waiting areas at Parkview Hospital show the most concern for patients’ needs. They at least recognize the importance of natural light and comfortable furnishings. By far the most common and most serious problem encountered was the lack of proper planning of circulation and expansion. Storage of equipment and records has also been generally forgotten or undersized.

Comments From Staff Members

(1) “Combining radiation and chemotherapy improves patient care because multi-disciplinary conferences and cross-referrals are much easier to arrange.” (Parkview)

(2) “Radiation therapy makes money, chemotherapy loses money.” (Parkview)

(3) “12-15 patients are transferred from the hospital daily. Patients enjoy the trip outside, away from clinical atmospheres.” (Parkview)

(4) “Physicians are grouped into kinds of cancers within the administrative area.” (Detroit)

(5) “Powers Priorities”
(a) Reduce risk of malpractice, avoid patient isolation & injury
(b) Quality assurance of treatment
(c) Circulation
(d) Aesthetics (Detroit)

(6) “There are no dressing rooms. Patients dressing in treatment rooms slow scheduling greatly.” (IU Med. Center)

(7) “The simulator control room is much too small for the number of staff needed, and needs direct access to the dark room.” (Topeka)

(8) “We need a space set aside to draw blood near the dressing rooms.” (Topeka)

(9) “Doctors need to be close to everything and have privacy at the same time.” (Topeka)

(10) “Corridors have to fit into everywhere.” (Topeka)

(11) “Radiation falls off by the inverse square law.

The skylights should be safe from 10’ on up.” (Topeka)

(12) “All private rooms is the best possible arrangement.

The sick patients need to be isolated from others.

This helps in both avoiding problems of infection and discouraging patients.” (Springfield Memorial)

(13) “All rooms should be large enough to include a cot for family members.” (Springfield Memorial)

(14) “60% of all patients will be in a stable enough condition that it would be possible to make rooms much more "homey," not the traditional sterile room equipped for any type of patient.” (St. John’s)

(15) “All except terminal patients would be encouraged to be out of their rooms as much as possible to avoid "nesting." Patients will always be moved in wheelchair.” (St. John’s)

(16) “Nursing for oncology patients takes almost twice as much time as for other patients.” (St. John’s)

(17) “There should be a ‘family’ room for patients’ families to stay over, and perhaps be equipped with cooking facilities where they could prepare a normal family meal.” (St. John’s)

(18) “Tinted mirrors should be used throughout.” (St. John’s)
The following photos are from the six existing facilities.
A quantity/quality survey was made of both sites to determine which was a more appropriate location for the treatment center.

A quick study of the possible massing of the building was made. This was then overlaid with circulation paths to see what implications this arrangement had for patients' needs. The process was repeated to refine the arrangement. This arrangement was then tested on both sites to see which was most appropriate.
CONCLUSIONS

The Webb/Clinic property is deemed to be the best for this purpose.

(1) It allows a physical connection between the treatment center and the hospital. This eliminates the need for a transport van, and allows sharing of services between the hospital and the oncology center.

(2) The apartments (and their residential) can be more successfully integrated into their surroundings here since there is already a strong neighborhood fabric.

(3) Residents of the inpatient section would not feel isolated from other patients if the two facilities were connected.
A similar study was made of the hospital to determine what possibilities the existing configuration and structure offered.

Based on interviews at existing facilities, a maximum commuting range could be 40-50 miles. This leaves 50% of patients outside the commuting range. It is assumed that at least 2/3s of these would have relatives within the commuting range or be on short enough treatment regimens that they could choose to stay at the motel one block away. This leaves 17% of all patients who will be needing apartment units, or 17% initially and 3% at the five-year projection.

The east wing of the Clay County Hospital is a single-story brick structure of approximately 6,800 square feet. Since its construction in the 1950's, it has contained 1/2 of the hospital's 45-bed capacity. In recent years hospital occupancy has only been 45%, making it entirely feasible that this wing could be reused as a dedicated portion of the treatment center without hampering the effectiveness of the remaining hospital.

It is estimated that 15% of cancer patients will require hospitalization. Based on projected patient loads, I expect this number to be 20-25 people, split evenly between chemotherapy and radiation therapy. Chemo patients may or may not be taken to the center for treatment, depending upon their preferences, physician preferences, their medical condition, the weather, etc. Radiation patients must always be moved to the treatment facility.

The majority of patients (60%) will not be in such an infirme condition as to need the sterile, constantly observed atmosphere prevalent in a modern hospital floor. A room that is much more like home could offer an important measure of comfort and strength the belief that they will go home and have not been resigned to hospitals forever. These accommodations will be broken up into distinctly separate bedroom, bathroom, living room, and porch. Rooms for the remaining 40% will be essentially smaller versions of the traditional hospital room.

Since a positive attitude and belief in their own recovery is essential, it is important to challenge patients to do some things for themselves--to help them believe that they do indeed have control over their own lives.
The first concept was based on a north/south circulation spine with plug-in elements. People elements occur primarily to the west of the spine, oriented to the outdoor area shared with the hospital. Technical elements occur primarily to the east of the spine.

The primary benefit of this solution is the system of courtyards which allow an abundance of outdoor activities, pleasant views, and natural light to both the oncology center and the hospital. There are few circulation conflicts, and "plug-in" elements lend themselves to renovation for future needs.
Concept #2, originally intended as organized around an east/west circulation spine, has become a system of three courtyards. The treatment center surrounds one, the second forms the addition of several hospital rooms, and the third is an interface between the center and the hospital containing outdoor activity areas of both.

The relationship between the hospital and the center is much stronger than in the previous concept. The outdoor space is much more usable since all three individual areas can be designed for specific uses and needs. Transportation of inpatients could be direct from hospital rooms with no need for a holding area. This connection also makes intra-operative radiotherapy possible.
APARTMENTS

The neighborhood surrounding the Webb/Clinic property is all single-family homes. This pattern cannot be duplicated due to the number of units required. However, it would be possible to make rows of units appear as single large houses or as individual houses fastened together. Either of these approaches would tend to give the apartments some individual identity and better integrate them and their residents into the surrounding neighborhood.
One Bedroom Apt.

Three Bedroom Apt.

Typical Apartment Elevation

*Opposite: Overall & detailed view of Concept #2
Concept #3 is a linear arrangement. It was originally done as an energy exercise, stretching itself out along an east/west axis to the sun's rays, but offered several other design possibilities.

There is a very clear and understandable circulation. Patient areas and staff departments are oriented to the neighborhood held together by a staff corridor “street” which runs along the north, oriented to the back yard to provide the staff with some relief from their surroundings.

A rough estimate of energy efficiency in all three concepts shows a relatively equal BTU/Square Foot usage. It would seem that the third concept, which was supposed to be an energy-efficient one, was not too successful, but it must be evaluated on several levels.
All three energy analyses assumed equal insulation levels, occupancy, internal gain factors. All three buildings are relatively the same size (26,400 to 30,000 square feet.) However, Concept 3 has 27% more glass area than #1 and 39% more than #2. The increased glass area reduces electrical costs by increasing the amount of daylight available. The analysis method used also does not include benefits available from the solar mass storage available in concept #1, which would further reduce heating loads.

When the above factors are considered, #3 clearly becomes the most energy efficient.

**Building Efficiency**

- #1 12.07 M BTU/ SF/ HR
- #2 11.8 M BTU/SF/HR
- #3 12.6 M BTU/SF/HR

*Opposite: Overall & detailed view of Concept #3*
BIBLIOGRAPHY

"Anxiety Care, A Growth Industry Report"  
Prepared by Educational Facilities Laboratories

"CA-A Cancer Journal For Clinicians"  
Published by The American Cancer Society, Jan./Feb. 1985

"Cancer Facts and Figures 1984"  
Published by The American Cancer Society

American Cancer Society, Illinois Division

"Community Cancer Programs in the United States--1982-83"  
The Delegate Holder of the Association of Community  
Cancer Centers

"The Community Radiation Treatment Center"  
Billman G. McKenie

"The Lurie D. Carter Memorial Hospital Case Study--A  
Behavioral Approach to Environmental Normalization in  
Mental Health Settings"  
By Alfredo R. Miesar and Bruce F. Meyer

A Planning Guide For Community Radiation Oncology Facilities  
Robert D. Farmer, M.D.  
Sponsored by The Committee on Cancer Management  
American College of Radiology

Planning Guide For Radiologic Installations  
Committee on Department Planning  
Commission on Radiologic Equipment and New Technology  
American College of Radiology

"St. Francis Hospital & Medical Center Master Plan Report"  
Rees Associates, Inc.

"Saint John's Medical Center Comprehensive Cancer Program"  

"Summary Results From the Fourth Facilities Master List  
Survey Conducted by the Patterns of Care Study"  
American College of Radiology

INTERVIEWS

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