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MALPRACTICE—HOSPITAL ADMINISTRATOR'S DILEMMA

By PAUL F. OPP
Assistant Administrator, St. Bernard Hospital, Chicago, IL

The current situation regarding medical malpractice and liability insurance has been termed a dilemma, as indeed it is. By definition, a dilemma is an awkward and unpleasant situation involving choices between unfavorable or unsatisfactory alternatives. A problem, on the other hand, involves considerations which generally lead to a solution or resolution of the situation. A dilemma indicates the lack of an acceptable or positive resolution of the situation.

There are a multiplicity of complicated and interrelated factors which make it virtually impossible to accurately determine objective and concrete facts about this dilemma, to define the precise perimeters of our situation, to pinpoint accurately those areas or factors involved, or to scientifically investigate or define our precise situation. And further, while we have no rock to cast, or bone to pick with the medical profession, we are required to direct our focus to large degree upon those engaged in medical practice: the physicians, because malpractice is, by definition, a bad, a wrong, a fault in the practice of medicine. Liability, on the other hand, stems from a different type of civil wrong committed against another.

While it may be an inappropriate focus, as some now argue with some reasonable justification, I would foresee that this definition of malpractice will gradually expand to encompass and include not only the physician, but the various paramedical practitioners such as nurses, physicians' assistants, technicians, and other professionals as well.

The major crisis which affects the hospital administrator today is, at the most basic root level, a cost crunch. The malpractice/liability situation is both an aggravation of this cost crunch problem as well as a dilemma of social, moral, and operational implications. Either malpractice and liability insurance is unavailable at any price and, thus, forces suspension, curtailment, or cessation of medical care services in the face of an unacceptable and untenable financial or legal risk, or such insurances have increased to such a cost level as to force unacceptable "pass-through" of this cost in the form of substantially higher charges to patients for hospital-provided services or physician service fees.

To oversimplify, insurance cost is a legitimate cost of doing business and would, in the ordinary course of operations, be passed along and included as a part of the patient charge for service. This is what is done in any form of business enterprise, and the health care business and medical care business is no exception. However, when the resulting cost of the service prices the average consumer out of the market, the business either (1) becomes a luxury-oriented or exclusive product catering to a limited clientele, (2) changes the product, product line, or product mix, or makes other adjustments or substitutions in order to remain the chosen mass market level, or (3) ceases to operate.

This is a fair methodology under the free enterprise system as we know it, and few knowledgeable people advocate change. It is a sound and effective system and business orientation principle, as it applies to most consumer and industrial goods and a system which has, historically, produced an unsurpassed variety and supply of goods and services at extremely low costs. But society and most health care, political, and other professionals feel that this principle cannot apply to the basic essentials of food, clothing,

housing, and health care.

It is assumed that, when the free enterprise, free market system no longer operates to bring adequate supplies of these basic necessities of life to the average (middle and upper-lower income level) citizen, substitution of another system is mandatory. We assume, as a national priority and commitment, that no citizen will be deprived of decent and adequate food, shelter, clothing, education, or health care as a consequence of its cost. The dilemma arises, however, as we attempt to develop the methods, procedures, mechanics, and the required hardware and software, of viable alternatives to the free market, free enterprise system.

I do not have to recite to you in detail the multitude of problems and disasters we have seen and daily hear more about in the arenas of public housing (FHA, HUD, CHA, Model Cities, and similar programs), in welfare and public aid departments, in Medicare and Medicaid programs, in food stamp and hot meal and subsidized meal programs, in public and private education, in senior citizens programs. Across the land, these problems have arisen, disaster and scandal follow one upon another, crisis follows upheaval. Suffice to say that society and its best professionals have not yet begun to find answers in any of these arenas which are acceptable in terms of cost as relates to quality of service.

The dilemma becomes even more acute in the health care arena. We can and do tolerate unacceptable quality standards in other arenas, and we do so with the full understanding that there is deprivation, suffering, or irreparable loss. We hope that, in the light of this knowledge, it will always be someone else, never ourselves, who is being deprived and suffering, and losing. But we can not and will not accept this situation in the area of health care services where the final loss may be the loss of life, or where the deprivation suffered might be the loss of a limb or of sight.

Quite the contrary, in health care we find ourselves faced with high demands and expectations for both the quality of healthcare, and in addition, in the quality of personal services. When we are ill, we want and we demand the very best in everything. When we have been injured, we demand the maximum in care and service in the hope that we can minimize our suffering or at least make our incapacition worthwhile in other terms.

I can state bluntly that we want quality and comfort, but we don't want to pay for it. To large degree, the concept of "something for nothing" has encompassed health care as it has other areas of our life.

We want a private room luxuriously appointed to rival the royal suite at the best hotels. We want gourmet cuisine and room service snacks and special preparation of special foods. We want private-duty nurses and personal valet and maid service on an individual basis. We want color television and multiple selection stereo or quadrophonic sound with our favorite selections. We want private telephone answering, message, and switchboard service. We want Doctors Welby, Kildare, and Bernard to weave their magic spells in cure of all our physical and emotional afflictions. We want no inconvenience, no unpleasantness and, certainly, no pain. We want our guests and visitors treated like royalty, but in such a manner as to pose no bother to ourselves, We want all of our complicating social and moral problems instantly resolved.

We want all of these things and more, yet we do not want, will not tolerate, and cannot understand these services cannot always be provided and the cost will not be less than $50 per day. We demand all these services, yet fight viciously and vocally when the charges for such miracles approach $85 per day. And if we can't or won't find any other alternative to this terrible state of affairs, we will demand that good old Uncle Sam do it all for us. After all, isn't that why we pay taxes? And we'll sue hell out of anyone who crosses our expectations and demands, for that is our right as free citizens!

Thus does the tip of the iceberg that is our dilemma now begin to be seen. We want and demand the very best. We will fight when our demands are not met. We will sue when our expectations are not realized. We do not wish or choose, or in some cases we cannot, pay the price, the cost. It is the quality of life (including quality and increasing standards or levels of quality in addition to increasing quantity) that is preeminent today.

Part of the problem, also, is that we cannot isolate the dilemma from the surrounding fabric of life and society. The problems regarding malpractice and liability insurance today is inextricably woven and interwoven into the fabric of our health care system, the public and private institutional systems, and the many social and economic structural systems. Thus, in order to study and attempt to understand the malpractice and liability insurance problems, one must also be conversant and knowledgeable in a vast multitude of other subjects, including economics. One cannot change or attempt to change one part of the system without first understanding the impacts of such change upon all of the other components of the many systems and structures also involved.

To detail all of these areas is impossible in the limited time of this single presentation. Thus, we will very briefly and superficially look at a few major interrelating problems in five areas only; the areas of medical practice, hospital-board-medical staff relationships, the economic arena, the new legal environment, and insurance underwriting. Through this very brief examination, we will hope to establish a context; a frame of reference and understanding by which to view malpractice and liability insurance and the current dilemma, and then develop some ideas toward resolving our dilemma.

The Medical Practice Arena

The practice of medicine in 1975 is a complex task for the physician, involving sophistication undreamed of by our forefathers. However, in recent years we have noted and acknowledged a decreasing physician-patient (family) relationship.

"Good ole Doc," who knows you and your parents and your brothers and sisters and aunts and uncles; who delivered you and your siblings, and took out your appendix and your sister's tonsils, has gone the way of the Model T, and for many and various good reasons. Medical care has suffered, and apparently must continue to suffer, from increasing depersonalization due to social mobility, increasing specialization within medical practice, from economic pressures, and from the need for physicians to improve the quality of both medical practice and personal lifestyles.

We also suffer from a lack of sufficient numbers of physicians, from "clumping" of physicians into certain specialties, geographic regions, or both. We also suffer further from the loss of trained and competent practitioners as they are lured from clinical practice into industry, research, academic, and other non-practice environments offering tangible and intangible rewards. The problem is one of pure numbers, and one of maldistribution on multiple levels.

We have heard much regarding the failure of the fraternity of healing to police itself, including the failures to report, to act, or give testimony to both purge the profession of incompetents and wrongdoers and to support those who have suffered injury or loss from their course of medical care and treatment (or the lack of it). Indeed, it has been suggested that the term "hostile Witness" in law was first applied to a physician required to give testimony against his wish.

The expectations of the patient receiving care have also changed significantly. They have increased substantially. And while the average patient is not very knowledgeable about his medical care and its quality, he is better informed than his ancestors, thanks to the public press and news media. This more knowledgeable patient is both confused and angered by the impersonal shuffle he receives in most cases in his contacts with our health care system. But there are two points of return for the patient, two places which seldom change and which we both visible and known to the patient: the hospital and the physician. These are the points to which the patient can and will return in anger and hostility when he has not received the kind, amount, or quality of care desired, or in order to attempt to resolve real or imagined problems or frustrations.

Within this arena of medical practice, the quality, the state of technology and its applications, and the incorporated sophistication have all increased. The physician has new drugs, new equipment with which to diagnose and treat, new approaches, and new techniques. The physician must know more than ever before and be able to apply this knowledge and

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the available technologies more skilfully than ever before. However, as these strides have been made, we have opened new areas of potential difficulty. Interpretations and results are often made and given by technicians or "outside" physicians. Time factors become even more demanding and critical. The areas and the potentials for misinterpretation and error are magnified and substantially increased.

And should the physician fail, should he make an error of minor or major degree, should he fail in any way to relate to the patient and his family, then the depersonalization and complexities of the system will conspire to leave the patient and/or his family apparently alone and uncared for and without apparent recourse. Then will this situation almost always produce a legal action against the physician and the hospital. This state will tend to hold true even in the face of the best attempts to practice "defensive medicine" in the anticipation of subsequent legal action.

Hospital-Board-Medical Staff Relationships

It is well known that the hospital governing board has the full legal and moral responsibility for the conduct of the business and operations of the institution and for the quality of the medicine which is practiced within the institution. The board usually achieves this objective through delegation of business and general operations through the administration, and delegation of medical care responsibilities through elected and appointed officers of the hospital medical staff.

The governing board and administration do not have direct control over the actions and activities of the individual physician or the medical staff as a unit. The only control over the individual practitioner and, thus the staff at large, is generally in the terms of his employment contract (for full-time or geographic physicians) or in the terms of his appointment (or nonappointment) to the medical staff and the granting or limiting of the clinical privileges that accompany such appointment to staff. This mechanism is, at best, a very weak control and one that hospitals and their governing boards are most reluctant to use.

Nor is there any total mechanism for the control and scheduling of patients so that resources are disbursed and distributed equitably. Thus, neither physician nor institution can plan realistically in any relatively small time frame for volume loadings, staffing, requirements for care, emergency needs, or other factors. We can and do plan within longer time frames such as annual or biennial, but we cannot achieve planning to the degree possible in most other forms of business enterprise or such areas as manufacturing or transportation.

The physician and the hospital are inseparable Siamese twins. One could not exist or function effectively without the other. The major problem in this relationship is one of a lack of understanding. The hospital (the administration, management, and staff) usually has a clear understanding of the role of the physician and his place within, and relationships to, the institution and its functioning units.

The physician, on the other hand, usually does not have this perception. His training, internship, and residency did not prepare or educate him in this area. His subsequent appointment to a hospital medical staff generally produced no further enlightenment. Thus, he has no real comprehension of the internal structure, the internal and external functions and relationships, the operations, or other aspects of the institution and no knowledge or appreciation of his role, function, or relationships within this scheme of things. As a result, the physician tends to wander from pillar to post. He tends to be uncertain, uncomfortable, and frightened. He soon becomes aggressive and belligerent. He can't seem to communicate with admitting, the lab or x-ray, the nursing staff, or the emergency room or outpatient department. The administration seems to have nothing better to do than to badger or complain about missed staff or committee meetings, incomplete medical records, or the stupid complaints of some patient or his relatives. The officers and trustees talk of budgets, staffing ratios, legal and moral requirements, service areas, census, and organization charts. Every physician knows these have absolutely nothing to do with the immediate medical care needs of his patient.

The end result of all this is a physician who does not believe the hospital and staff shares with him a common interest and goal, a physician who is harried, harrassed, and badgered, a physician totally at odds with his environment. We then see the medical staff, which is not even a loyal opposition, only one that is unalterably opposed to almost anything about, or proposed by, the hospital staff, administration, or governing board.

Finally, there is, for all concerned, the economic and political expediency. In this, hospitals are no different from any other institution or enterprise. Too often, we are placed into the position, as physician, administrator, or trustee, of making a decision, or receiving a decision, based on no more than what is economically or politically expedient. This may involve a sound and determinate consideration of the elements and basics of right and wrong, but is more frequently a compromise without recourse to the real values and measures of right and wrong. Thus, the decision is not a right decision and it is not a wrong decision; it is simply the most expedient under the circumstances. Unfortunately, the nature of the business of health care seems to produce these kinds of decisions and to create the kind of atmosphere whereby any decision, no matter how derived, is viewed as one.

Thus, the health care business for physician, administrator, and trustee is not as sound in its actions and decisions as it would like to be and needs to be, suffers from a lack of credibility, fails to relate to the basis of common goals and objectives, and is a divided unit filled with hostility and misunderstanding at all levels.

Indeed, even the leadership role is a hotly contested issue. Whether or not one can or does lead is immaterial to the issue. It is the theory as to where the role lies that is the contest with each party—physician, administrator, and trustee—demanding the prerogative.

The end result again is usually a patient and family at odds with the health care system or afloat within the health care environment. The usual consequence of this being at odds with the medical care delivery system is usually a malpractice or liability action. This tends to hold true, and is sometimes seriously aggravated, when the hospital tries to extend itself for the good of the physician, patient, or family, or when the hospital and physician(s) attempt to remain on the proper, ethical, and moral side of their respective areas.

The Economic Arena

The physician and the hospital are currently in the grip of the "cash crunch." The current economic situation of upheaval, inflation, recession, and uncertainty is no different for the physician, for the administrator, for the trustee. Whether as patient or as provider, the situation is the same; costs have, and continue to, escalate rapidly, but seems to purchase less and less and less.

As noted earlier, medical care is no different from any other segment or individual within the economic structure. As costs continue to increase for the many goods and services (wages and salaries, supplies, equipment, property, fuels, insurance) necessary for the institution in order to function, these costs must be passed along in the form of higher charges to the customer (patient) being served, distributed over the number of units of production (census), to achieve a break-even or, more hopefully, a limited excess of revenue over cost point.

The health care economic picture is compounded, however, because we cannot refuse services, no matter how expensive or prolonged, in the face of inability of the patient to pay. Further, we must compound the issue by mixing in a variety of third-party payers whose criteria or obligation for payment vary widely. The end result for the hospital is that somehow, in the face of all this chaos, we must still generate the revenue needed to pay our own obligations. We must somehow do so even if no one were to pay for the services we have given.

So while cost goes up, sources for those resources and materials which we need have decreased, and we are no better able to solve the economic situation than anyone else. Yet the health care system is still expected to function economically and efficiently, even when the rest of the economy is in total upheaval and turmoil.

In the face of this economic situation, the demands for our services continue to increase, coupled with demands for new

and more diverse services. The economic impact of these demands and, indeed, for many of the new services or new approaches to services, is nearly impossible to forecast or assess with reliability or with any degree of certainty. We have, in the absence of hard fact, been forced to move slowly and cautiously, only to find that we have, despite our best efforts, created new monsters in both economics, operations, public relations, and medical malpractice.

Physicians, likewise, in the face of these new pressures, crises, and uncertainties, are turning more and more to their hospitals as sources of aid and relief. Thus, there is an accelerator effect as the physician moves more of his practice functions and patient care problems, into what he hopes will be the safe and protected environment within the controlled hospital setting. There is increasing demand for the institution to provide more for the physician's practice of medicine, and many physicians are now demanding that their hospital provide medical malpractice and liability insurance coverage for all staff (voluntary as well as employed) physicians, particularly for those areas such as emergency room coverage, out-patient department activities, consultations, and the like.

These and similar situations have further insured and cemented the inseparability of physician(s) and hospital(s) in a medical malpractice or liability action, and compounded the difficulty of the insurance carriers, legal representatives, and courts in examining and defending actions or assessing claims—to the detriment of all concerned. It has also compounded and exacerbated the problems inherent in the interrelationships between the parties, as discussed earlier.

The situation of trying to determine fact leads to the assumed or real situation of finding error, fault, or blame. Emotions and pride are immediately involved, and the relationship tends to deteriorate even more quickly as each party seeks to protect itself or defend itself against real or imagined slights, affronts, or accusations.

The cost of legal defense of malpractice and liability actions have, like every other aspect of the economy, gone dramatically higher. Thus, the defense of minor or nuisance malpractice or liability actions has tended to erode as it has become more economical to settle the claim in an amount that is often substantially less than the cost of investigating, answering, and defending the action. Some few unscrupulous lawyers have found, to their pleasure and profit, the "$500 letter." This is the form letter, usually accompanying the form notice announcing to the physician or hospital a notice of attorney's lien. This letter is usually forwarded by the insured to his insurance carrier. The insurance carrier then learns that, for only $1500, the claimant will settle the action. Since investigation of the claim, filing of an answer, and other steps to defend against the action may well be twice this amount, there is strong economic incentive to "buy out" and settle as cheaply as possible. The attorney happily pockets his $500 (usually his fee is contingent and one-third of the settlement), the claimant has his cash in hand, and everyone, except the defendants and the insurance carriers, is happy.

The incentive to lodge such nuisance claims goes up in geometric proportion with every settlement and every economic incentive toward settlement, yet it does not appear that a "hard line" to force every claim to the courts and final judgment will have other than a very negative effect on an already atrocious economic picture. Thus, the economics of this aspect of our present dilemma, though already very bl , do not seem to have much of a potential to brighten in the future.

The involvement of third-party payers and the inception and implementation of Medicaid and Medicare are also influencing factors. Each insurance company or third-party payer has its own unique schedule for services covered, amounts of coverage of dollar limits per service covered, and conditions for payment.

Generally, most third-party payers (excluding the "Blues" and federal and state government programs) are contracts between the carrier and the patient, but require documentation from the hospital and the physician to validate the claim. The cost amount of premium and the schedule of benefits and conditions for payment are set by the insurance company, and properly so.

Added to all of the other facets of third-party involvement is the costly multitude of rules, regulations, procedures, and conditions, and the involved and complex amount of paperwork usually required of hospital and physician on numerous forms. The expensive paperwork blizzard of manuals, logs, forms, and documentation of an entrenched and remote bureaucracy has finally arrived as an almost full partner in medical care.

The Blue Cross–Blue Shield programs and federal and state involvement are by no means exempt. The only difference lies in the relationship which, in this area, is a contractual agreement between institution or provider and payer, rather than a contractual relationship between the patient and his insurer.

The problems arise when the insurance payment does not meet the hospital and physician charges, or the terms and conditions for payment are not met or do not coincide with the patient's medical care regimen or requirements. Too often, forms are lost, mislaid, or delayed, and this also produces conflict. Too often in such situations, the anger and frustration of the patient is directed toward the hospital and the physician, and not toward the insurance company. The patient usually feels that the hospital and physician have an obligation to tailor his course of medical care to the terms and conditions and the fee schedule of his insurance coverage, whether these are realistic and sufficient or not.

Frequently, too, we see physicians who use some real or imagined element or technicality involving the third-party payer as an excuse to avoid confronting a patient or family member, or in lieu of necessary and meaningful dialogue with patients or family members. This leaves an unbridgeable gap, anxiety, and confusion, which almost inevitably turns to embarrassment, then anger, then hostility. Many malpractice and liability claims arise out of a need or desire for the patient to recover his medical care costs, to avenge himself for the health care system's lack of concern for his financial situation, or similar motives including profit.

Of all of the concerns in health care today, the malpractice and liability insurance dilemma included, the economic arena is the primary ring in which the problem must eventually be resolved, and the largest of the many complexities and involvements which abut and aggravate our dilemma. No one wants to be sick or injured, and to have to pay for the privilege (or the consequence), is literally adding insult to injury.

The Insurance Underwriting Arena

Insurers in today's marketplace are affected in their operations to the same extent and degree as are most of the rest of us by the current economic upheavals. And to fully appreciate the dimensions of the malpractice/liability crisis, we must also understand the underwriting arena.

We must not forget that an insurance company is a for-profit business venture in the best traditions of the free enterprise system. The venture is expected to return to its investors as substantial an amount of dividend per unit of investment as possible. This is a perfectly legitimate and ethical motive, and a most desirable one in our economic system.

Reduced to its simple terms, actuarial statistics are developed to determine as closely as possible the maximum probabilities for a certain occurrence and the total cost of all such occurrences. The necessary overhead for administration, plant, and other operational necessities is then added, plus a reserve for contingencies, plus a percentage for necessary profit. This raw cost is then allocated across a set number of units (policies sold or to be sold) to arrive at the premium cost per policy unit.

Because there is little chance for the premium cost to be within the necessary mass market limits under this system, some means must be found to alter this condition. First, part of the risk is underwritten by a reinsurer, and secondly, the "float" developed from premiums received by the company in advance of claims made against the company is invested in the money market in long and short term conditions in order to earn the maximum possible additional revenues for the insurance company, which are intended to offset the gap between the higher loss-paid expense and the lower premium rate income and produce the profit necessary for continuing interest

by investor stockholders.

These many involvements make an insurer susceptible to a multitude of negative factors beyond an unfavorable or negative loss expense over premium income situation. Each of these negative factors may force the insurer to either increase the premium charge in order to increase revenue, or to reduce the coverage granted in order to reduce claims-paid expense, or some combination of both. Some insurers, as a last extreme, simply cease to offer certain coverages and leave the particular market. Unfortunately, this latter action compounds the problems by further warping the supply and demand situation and also leads to higher costs for more limited coverage in a highly compressed market.

When one considers the substantially increasing percentages and numbers of claims filed, the dramatic increases in the amounts of individual settlements and jury awards, and the increasing costs of defense, there is little wonder that, on this basis alone, the present dilemma in malpractice and liability insurance has finally surfaced in this inflationary-recessionary economy. Indeed, it is most probable that it is only the soundness of the system and the expertise and management skills of the insurance industry working in concert with those of health care which have kept the crisis from coming sooner and/or from being even more acute (heaven forbid) than it presently is.

We are also concerned with many of the overlaps and duplications which are found in the present insurance system; workmen's compensation coverage, medical care policies (many times several per patient), and malpractice awards. It is frequently possible for the health care provider, his insurer, and others such as employers and their insurance carriers, to be "given the stick" or be "taken for a ride" on all three insurance coverages. It is simply a situation of an individual claiming on-the-job injury, using his own medical coverage, and then seeking a malpractice or liability award. He collects on all three, and the fraud clauses are difficult to invoke as a protective device for the insurers.

As this was explored in more detail in previous presentations, I'll not dwell on this aspect further, other than to underscore the situation.

The insurance writer is often also faced by what I have come to call the "their money syndrome." All of us outside the industry, whether physician, administrator, trustee, attorney, or patient/claimant somehow seem to quickly fall into the trap of *Mad* magazine's Alfred Newman; "I should worry—it's their money!" We don't worry about the case settlement or its amount—it's the insurance company's money. We don't worry about staying in the hospital a few days for our personal convenience—it's the insurance company's money. We don't worry as provider or patient about the unnecessary test or procedure—it's the insurance company's money. We don't worry about preventive programs or the need to be safe—it's the insurance company's money.

We have somehow come to delude ourselves by thinking that within each business or institution, particularly insurance companies, there is a gigantic money machine that spews forth unending amounts of that good green stuff called cash at the mere touch of a button. Somewhere along the road, we Americans have somehow lost the connections between cause and effect, of the cost of a good or service and the value of that good or service. In insurance, we have forgotten that we are talking about our money; our money paid in in the form of premiums based upon experience and necessary reserves. And we further forget that the insurance writer has been doing us the favor all along of adding some of his return from investments to minimize our premium cost. That factor has finally come forth to haunt us as insurers face investment losses or reduced investment incomes in the turmoil of the current economy. We have seen the spook and we don't like it.

Thus, we are seeing an already difficult situation further compounded, and we are again being forced to face the hard realities of our business circumstance and condition. We are now seeing the faults within the system, the failures and the lack of concern, and all the rest of the muddle. We are confused by the lack of statistical data and the unmeasurables and the imponderables of the human

animal, our society and social system, and its governmental units and structure. Thus, even the realities are sometimes overlooked, become confused, or are lost in the fog. And we are hurt, angered, and embarrassed by the lack of good faith, the failures, and the problems of the "other guy."

The New Legal Environment

If all the foregoing were not already fully sufficient, we must also look at our present legal environment. I would also point out that the reason we have added the word "new" is not only because of some more recent developments, but because we find all areas of government have begun using, as never before, the area of policy, procedure, and standards as mandates, in absence of law, but carrying the full weight of law.

Or primary importance in this arena are the concerns of utilization review, professional standards review, and clinical audit. While all were designed to enhance the quality of medical care, the reverse side of the coin, punitive action for its lack or absence or in conditions less than minimal, average (if there is really any such thing outside mathematics), or optimal, already being seen. For as we all determine, establish, and pin down to the degree humanly possible the standards and criteria of "quality health care" for all of the many good and sound and logical reasons, it is inevitable that anything less than the established standard will sooner or later lead to consequences large or small. Our biggest problem in this involvement is that the homo sapien seldom fits the molds we try to build and we must retreat into terms such as "average," "reasonable," "generally," "usually," and similar compromises with reality as a protection. We must then interpret, both individually and collectively, and it is in the activity of such interpretation that the situation goes to pieces and the standard becomes meaningless.

For all its failings and weaknesses and insanity, it is of vital importance that we have some objective standard(s) against which to judge or evaluate our competence, our progress, and our achievement. We cannot endure long without some qualitative and quantitative measurements, and measurement demands standards. But as surely as day follows night, when measurement reveals that the standard has not been met or achieved, consequences and retribution are required.

New technology has also produced new legal problems, most of which, unfortunately, must be resolved in the courts via malpractice and liability litigation or other civil, and in some cases criminal, proceedings. The legal definition of death, the transplant of human and artificial organs, the use of or testing of sophisticated technical experimental procedures and drugs, mechanical systems of life and body function support to maintain and prolong life and attendant suffering are but a few examples. As we continue to advance in health care applications and techniques, these steps will present complex legal issues and challenges. The answers of law will seldom satisfy all parties to the dispute as the recent abortion issue has so amply demonstrated. New definitions in the areas of mental health, drug abuse, and other areas of life will serve to change our concepts, approaches, applications, and the legal consequences in health care and must be incorporated if we are to avoid massive financial losses.

We are also seeing some new forms of legal action which have a significant and serious negative potential for impact on the already chaotic medical malpractice and liability situation such as the civil rights and class action type of lawsuits. While we have not experienced their application to much degree in or against health care, and none to date in the medical malpractice and liability area, there is no reason to suppose this circumstance should long continue.

There is also the problem of the past and continuing lack of legal insights on both sides of the fence. Attorneys, judges, juries, and the courts are, by and large, no more knowledgeable in the area of medicine and health care systems, individually or collectively, than the typical patient. On the other side of the fence, most physicians and other health care professionals are not very knowledgeable concerning the laws and the legal system, including court procedures and trial and pretrial activities. Thus, in our mutual ignorance, do we attempt to resolve an

issue, a doubt, or a complaint.

Couple this situation to already overcrowded court calendars, the confused and involved social, ethical, religious, and economic factors of our society and social system and one can readily see that there is more than a selfish interest in avoiding court if such is possible.

In previous sessions, you have heard discussed the adversary system used within the courts and the many arguments, both pro and con, concerning the contingency fee system used by attorneys. While we can very easily argue the abused and the negatives of both, I would state here that such argument must not be without careful and full consideration of the advantages and successes and benefits of these within the framework of our social and constitutional democracy and free enterprise system.

There has also been some discussion regarding the historic legal principles of precedents and the legal principles of such doctrinal elements as those of res judicata, "the thing decided"; res ipso loquitur, "the act speaks for itself"; stare decises, "let the decision stand"; and the like. Less firm, but nonetheless important and involved, are many of the doctrines of the courts, such as that of the "captain of the ship."

As has been noted, these tend to bind the courts and inhibit consideration of dissimilar cases falling within similar boundaries. As has also been noted, these principles have not altogether kept pace with the innovations and progress in health care but, at the same time, these are the sole bindings of the application of law and the substance which makes it possible to know and to anticipate legal applications. Again, we cannot tear down until such time as we can build equally or better in its place.

We could go further in this vein, but this would only serve to be repetitious of earlier presentations. However, I believe we have now sketched in the broad picture in sufficient scope and depth as to now be able to appreciate the full impact and dimension of the malpractice and liability insurance dilemma.

To some degree, the present crisis and dilemma leads very nicely into the "hidden agenda" within the federal bureaucracy and particularly within the Department of Health, Education, and Welfare. This hidden agenda is, pure and simple, a total national health program, a program of federally controlled, possibly socialized, medicine and health care.

Government participation in health care activities at all levels—Medicare and Medicaid and welfare—has mushroomed substantially since first introduced less than 15 years ago. Interestingly enough, the Federal government, and state, county, and municipal governments have had no better success in solving the problems and economics of health care than anyone else. Nor have the highly-touted systems of the European and Scandinavian experience been any more successful. The final actions of all are exactly those which have already been applied by insurers, physicians, health care institutions, and business: raise charges (real or by taxation), reduce the quality and scope of service, inhibit or remove the legal actions by recipient against providers, or impose restriction or conditions on access to and types and quality of services, and rigid control of the basic human and other required resources.

These mechanisms have not been acceptable to the American public in the past, and one must assume they will be no less or no more acceptable when governmentally sponsored. In addition, most recent information indicates these mechanisms are no longer acceptable to other societies which have had longer experience with them and have historically held lesser levels of service demand and quality expectations. Thus, the final solution is most probably one of massive reeducation of society on broad lines and one encompassing private enterprise activities, rather than governmental intervention. We may have to endure, as a part of our educational process, a totally federalized system, but the end result will probably be the same. We will have to eventually learn that, like prohibition, you cannot legislate public morals, ethics, and demand expectations, and that "you pays for what you gets."

Some within the health care system have suggested that if government is such a glutton for punishment, we should do all in our power to seek and promote a national health system and let Congress and the bureaucracy, in its infinite wisdom,

solve those problems which appear unsolvable. This way, we can buck all the problems elsewhere and simply do our assigned jobs by the book and by the clock as any other employee. The fallacy of this suggestion is the lack of concern for the afflicted.

In the meantime, however, what can be done? What course or courses of action will be most sensible and productive? Well, before we start, I must hedge by again stating that, by definition, a dilemma involves an awkward situation involving unsatisfactory or unfavorable alternatives; there is no single, clearcut, fully acceptable answer in solution of our stated problem.

I would suggest that all is not lost and the situation is not without hope. I would suggest to you that the way out of our dilemma is, like the problem itself, a matter of the application of a multitude of complex and interrelating considerations across the same broad spectrum of the health care, medical practice, economic, legal, insurance, and social arenas. It will be a long, rocky, uphill grind but, in the long run, a rewarding trip.

I would most strongly suggest that, while legislation most probably can and should serve to ameliorate our dilemma on a temporary basis, and should be sought and encouraged for this reason, legislation cannot and will not solve our problems for us or serve as the cure-all to this or any similar dilemma.

However, if we have analyzed our dilemma with any degree of certainty and accuracy, it is only axiomatic and logical that steps which alter an unfavorable condition to create a favorable condition will resolve the issue favorably. The human animal has a unique habit of creating new monsters as he slays the old, and this is the major condition we must guard against in the process of translating unfavorable circumstances into favorable ones. In the tearing down, we must rebuild promptly in equal or better fashion without creation of new problems or conditions and without antagonism to the other allied and abutting factors, systems, and considerations. Thus, I do not propose the following as other than food for thought, as possible approaches that must be carefully considered and analyzed, and altered or tailored to fit.

It is indisputable, also, that we must pay the price of our progress as we go along. As we go forward, we will continue to see new forms and ingredients in malpractice and liability actions and claims. And we shall forever continue to see many of the old. That also is part of the human condition. Thus, I suggest that we must reexamine our present loss control and safety programs and make even better those programs now existent as well as develop new programs and strengthen our efforts in loss control.

I suggest to you that it is now past time to repersonalize health care. Both physician and institution must return to the orientation of viewing health care through the eyes of the patient and his family. We must cease talking about the whole patient and his environment, and begin to practice it. We must return the patient to the status of human and intelligent participant in the health care system, rather than maintaining him as a something to be accommodated and the physical body upon which medicine and health care is practiced.

Our society is highly mobile, and I seriously doubt that we can ever return to the days of "good ole Doc." But I firmly believe we can deinstitutionalize and repersonalize our health care system through reemphasis of first-line, family-type, preventive health care and through personalization on a broad scope and depth throughout the health care activities spectrum.

I suggest, also, that we must begin to educate our various publics on a broad front. The public must know, understand, and appreciate our health care system, both good points and bad. They should, through education, learn what the physician, the health care institution, and paramedical establishment and staff is, how they function and interrelate, what each can and cannot do, and how to use the variety of health care services wisely and economically and with realistic expectations. In short, we must educate our publics in order that the patient, individually and collectively, may knowledgeably participate in the health care system with realistic expectations.

We in health care must also contribute to the general education or reeducation of society in established value systems. We

all must understand, again, the vital importance and the personal pride derived from doing for oneself. We must revitalize the work ethic and contribute our share toward the destruction of the myth of "the freebie." We must realize and emphasize that you must pay on the line for the goods and the services which you consume. We must again realize that utopias are nice dreams and have their place in life, but that there are hard, cold realities of life and economic values that must be reconfronted.

I suggest to you that we must reexamine the system of medical education and practice in order to learn and understand those factors influencing physicians in choosing both type and locale of practice and develop those incentives needed to overcome and end the maldistributions of physicians without elimination of the exercise of free choice and personal motive. We must look at our systems and procedures in order that the clinical practice of quality medicine may become and be made more personally rewarding for the individual practitioner.

We must strive to educate the physician and the patient to their roles and relationships within the health care institution in order that each may be able to understand the commonalty of goals and objectives and in order that each may contribute in full measure in a cooperative and harmonious effort.

I suggest also, that we must educate our various hospital and health care institutional trustees and directors. It is long past time for us to finally realize that health care institutions are, despite their nonprofit and voluntary nature, business institutions and must be conducted as such. Directors and trustees should be paid as they are in other forms of business enterprise.

We must strengthen our internal self-policing mechanisms and consider other internal and external positive policing systems in order to weed out and eliminate the incompetent and the charlatan, but even more importantly to reward, compliment, and enhance the conscientious, competent, and striving practitioners and to encourage, without threat or coercion, the improvement in quality of the less gifted practitioner.

We must examine our internal systems of hospital (institutional) health care practice. Trustee and administrator and manager must be innovative and creative in the operation of the facility in meeting the public need in a sound, pragmatic, economical manner. We must devote efforts to development of alternatives to institutional health care and the sound and effective economical utilization of all resources in the health care system. We must also devote new effort and innovate new systems to bring the physician into partnership within our institutions and end the dichotomies of physician function within the institutional setting.

We must explore new avenues and new approaches to health care planning in all areas. Those more traditional mechanisms which have, to date, proved less than adequate or satisfactory should be discarded and new mechanisms developed. We can no longer afford the luxury of going our own way or of experimenting as we go along. These approaches are too expensive and are unprofessional and unbusinesslike. We must become more businesslike in our operations and in our decision making. We must demand uncompromising excellence, not only from the physician, but from every health care worker, supervisor, and manager.

We in health care, working in concert with government, the insurance industry, and social agencies must develop new mechanisms for paying the costs of health care services. We must provide for those who are medically indigent and cannot pay for all or part of their care, without at the same time creating free rides or encouraging individual reliance on public resources or the public dole. We need to examine the system and our relationships with third-party payers to end overlaps and gaps and multiple coverages. Hopefully, we can devise some universal standardizations which will promote adequate health care coverages at affordable premiums.

Finally, we must take the initiative in the development and application of new approaches and mechanisms for handling malpractice and liability claims. Acting in concert with the legal profession and insurance industry, I believe many claims can be handled expeditiously and economically with justice and fair-play for all those involved without the need to resort

to the difficult, time-consuming, and expensive present system and court actions.

I freely admit that all of this is easier said than done. I also admit that we have, too often, talked a lot and ended up with little or no action. This is the state of affairs which we must, above all, finally face and end. The strongest voice we have is not words, but positive action.

As long as there has been, or continues to be, a system of medical practice and hospital care, there will be malpractice and liability claims. Physicians and hospital personnel are human beings and, as such, we are fallible. We are able, with the best of motive and intent and without malice or prejudice, to make terrible and costly mistakes. When these mistakes affect only time, money, or physical properties, such mistakes can be rectified and are tolerable, because damage can usually be corrected. The overriding factor in medicine is that the mistake involves the well-being and health, physical and emotional, and, indeed, even the life of another human being. Thus, the mistake, however honest and whatever its motive, is less tolerable because its effect is more serious and the damage is not so easily correctable.

In the area of malpractice and liability, we are also reduced to dealing with intangibles, only nebulous and vague in communication. Define exactly and precisely the words "suffering" and "pain." Is a "nuisance" the same to all of us at all times? What is an emergency?

We recognize that medicine is both an exact science and, more often, an inexact science and an art. There is more that is unknown in medicine and health care than known. We deal daily with the complex imponderable, and we have a certain mystique. We have trouble with a diagnosis, and this difficulty multiplies manifold should we later attempt rediagnosis in the event of legal action. Obviously, hindsight is always more acute and more accurate than is foresight and current view.

The law and the court is not immune, either. They are plagued with the same problems, complexities, and vague efforts at accurate communication. They sometimes fail, too. The legal profession is plagued with many of the same problems and ills as affect the medical profession and the health care professions. The mix is not the most conducive for problem resolution, but it is the milieu in which we must work in our effort to resolve our malpractice/liability dilemma. I am convinced that men of integrity and good will on both sides can and will be productive and successful in such efforts.

In the excellent presentations which have preceded, we have heard detailed discussion of some possible avenues for resolving, ameliorating, and solving the malpractice/liability dilemma. I was both impressed and pleased with the quality of these presentations, the discussions, and the quality of the suggestions offered. It was quite evident that much homework has been done and comprehensive research involved. Certainly, they are all worth our very careful attention and consideration. Most of all they deserve constructive and positive action. In addition to these previously offered possibilities, I would like to offer for your consideration a few additional possibilities.

1. I would like to see the physician and the hospital have the right to offer free follow-up or to suspend, pending investigation, the charges for care and service with such action being not an indication or admission of liability, but a presumptive action of good faith which would mitigate and minimize award in the event of later action and legal finding of liability.

2. I would like to see alternatives within our present legal system better utilized in the malpractice/liability case. The use of small claims courts being one possibility. Medico-legal panels working under supervision and jurisdiction of a judge would also be a workable alternative.

3. I would like to see the development of a system which would enable exonerated malpractice/liability action defendants and their carriers to recover from the unsuccessful plaintiff and attorney(s) the full cost of defense. Alternatively, a system to reimburse exonerated defendants for a major portion of the cost of defense or some other fee to minimize the cost of a defense would be desirable. This would serve the interest of justice and fair play by making it more desirable to defend and making it necessary for plaintiff and his attorney to insure that the claim is valid and substantive. Possibly

some combination of small claims courts or medico-legal panel for actions seeking only limited damages could work in combination with the regular courts for actions seeking substantial awards. In such a situation, defense cost reimbursement would be limited to cases seeking major awards and be based upon a minimum specified amount or percentage of the damages sought.

4. I would like to see also, a total hospital-wide loss prevention and loss-control program of stature and strength within every health care institution and involving physicians. We must do everything humanly possible to stop the malpractice and liability action before it can start. We must identify and eliminate the causes and the risks. And we must be prepared to immediately investigate and minimize any occurrence. We must practice the highest forms of the art and science of prevention.

These offerings would, I believe, assist us all in resolving our dilemma. I believe that they would tend to diminish both the number of claims, and the magnitude of the resulting claims. I would hope that they might tend to eliminate the nuisance action and frivolous or biased actions. I believe that it is vitally necessary to insure that those cases which must be tried in courts of law are well-founded.

I do not believe that any of us fear an action or are unwilling to recompense the unfortunate who is the innocent victim of honest error. We all, however, dislike judgments which we feel are unreasonable or which are not based in fact. I believe these suggestions are in keeping with this philosophy.

We find ourselves in a changing world. A world which has advanced to high levels of technical achievement and standards. The malpractice and liability insurance dilemma is but one facet of the upheavals our system must suffer to shed the old and bring forth the new. But I must strongly restate that the best cure is prevention. Prevention will serve us well in ending this and our other dilemmas.

Occupational Health Nursing Sessions

INDUSTRIAL HAND INJURIES

By WILLIAM B. FRYMARK, M.D. Elmhurst, IL

Industrial hand injuries could include multiple problems. Actually, this presentation is divided into three parts. The first part is what everyone would expect to see and hear about hand injuries; the second part is a discussion of what one must understand so they can participate in part three.

The first part of this paper presents the usual hand injuries, all of them open and ranging from puncture wounds from foreign bodies, to retained foreign bodies, to the more severe injuries. These conditions include partial finger amputations; injury to the soft tissues and the bone with actual tissue loss; roller-type injuries with degloving of the skin of the hand; crushing-type injuries, injuring the thenar muscles and the blood supply to other fingers; fractures; and, finally, the severe amputating-type injuries sustained in punch presses. These injuries can be quite devastating to the hand.

I am going to discuss the less severe and sometimes difficult to diagnose conditions, probably or possibly due to trauma. In my conversation with nurses and individual physicians, these are frequently the injuries most misunderstood and difficult to access, even regarding the time of injury and compensability. Anyone can relate the time of the laceration from a sheet of steel, but who can tell which bump on a machine or even on a door at home caused the restricted motion in the fingers which gradually appeared?

The topic of this paper, then, is closed or minimal injuries of the hand. Closed injuries can be likened to fractures that are simple or closed, compared to the compound or open variety. At this point, to understand what I am going to discuss subsequently, we should have a brief review of pertinent anatomy of the hand, which makes up part two of this paper.

In this portion of the paper, I am going to discuss not only the intricacies of the anatomy of the hand, but also the important parts of the anatomy pertaining to our discussion. It is important to note in the finger that two flexor tendons are responsible for most of the flexion action of the finger. The distal or long or profundus tendon is inserted into the distal phalanx, and it is primarily responsible for the flexion of the distal interphalangeal joint. The more proximal tendon or the sublimis or superficialis is responsible for flexion of the proximal interphalangeal joint. Both of these tendons work in conjunction with each other, giving strength to flexion. Flexion in the metacarpophalangeal area results not only from action of these tendons, but also from the intrinsic muscles in the hand. In the thumb, there is only one long flexor tendon, because there is only one interphalangeal joint.

On the dorsum of the hand the extensor mechanism is quite different. The common extensors of the hand are responsible for the extension of all four fingers, but not the thumb. These tendons course over the dorsum of the hand and are finally inserted into the proximal portion of the middle phalanx as the central slip or central band. They are partially connected to each other in the hand by connecting tendon fibers, so that if one of the tendons is divided, partial extension of the finger is still possible. Further distally in the finger, the distal or long extensor is made up of fibers from the lateral extensor mechanism over the proximal interphalangeal joint, and then the fibers insert onto the proximal part of the distal phalanx. The central slip is responsible for extending the proximal interphalangeal joint; the common or distal extensor is responsible for the extension of the distal interphalangeal joint.

It is also to be noted that the little finger has an extra extensor tendon, the extensor digiti quinti and the index finger

has an extra extensor tendon, the indicis proprius tendon. These tendons can be utilized for tendon transfer over the dorsum of the hand. The remainder of the discussion of the anatomy demonstrates further how these tendons work.

Part three of this paper now concerns the conditions which we are going to discuss, primarily the closed injuries of the hand. In the first disease under consideration the individual either cannot open or completely close the finger without pain and is hesitant to go through these motions. Most of the time when this patient is seen with this pathology, he holds his finger in an extended or semiflexed position and will not move the finger despite your encouragement. When the finger is finally moved, the person will jump with pain, usually cry out and grab the finger. If you listen and watch closely, you will see the finger snap at a certain position and then flex easily. The same pattern will be followed with extension. This, then, is a snapping finger or thumb and is usually described as a trigger finger, the motions simulating the movement of a finger when the trigger of a gun is pulled. This is a rather common phenomenon in industry and occurs either when the finger is flexed a good deal or where repeated trauma occurs to the palm of the hand, especially from tools such as pliers, scissors, etc. The pathology is a thickening or nodularity of the tendon, accompanied by a thickening of the tendon sheath and annular ligament. The condition is commonly referred to as a stenosing tenosynovitis.

The treatment is directed toward the inflammation of the tendon sheath and starts usually in order with local heat or cold, analgesics, and anti-inflammatory drugs, immobilization by splinting, and finally treatment with steroids either orally or injected locally. Often after a few weeks when all measures fail, as they frequently do, surgical release of the annular ligament under local anesthesia is required. Healing should be uneventful, but like most compensable conditions, at least two weeks off work is required. Immediately after the procedure is performed, motion is restored and remains normal, except for occasional patient hesitancy. No permanent disability should result from this condition.

The next disease was usually not considered for coverage under workmen's compensation in the past, but now an occasional case is seen where the history suggests repeated injury as the possible etiologic factor. I refer to Dupuytren's contracture or palmar fasclitis. You can note the contracture deformity of the little finger in this patient, but you cannot see the nodularity in the palm under these circumstances. Most patients feel a little lump in the skin of the palm and think they have developed a little cyst or skin tumor, never realizing that the real problem is under the skin and will cause considerable hand and finger deformity if not treated properly. In this particular patient, there is swelling about the base of the thumb, which is due to a concomitant lipoma of the hand. Treatment for this condition has varied from injections of medications to steroids in hope of aborting the progression, but the only real answer to the problem is surgical excision of the hypertrophied palmar fascia.

In hypertrophy of the palmar fascia involving the fingers rather than the palm, the thickened fascia contracts, causing flexion deformities, primarily in the proximal interphalangeal joint, with seldom extension into other distal areas of the hand. The fascia encircles the digital bundle in the hand and must be carefully dissected free to preserve the blood vessels and the nerves. After the fascia is removed, the finger can be extended to an almost normal straightened position.

There can be spontaneous tendon rupture. One patient had spontaneous rupture of both flexor tendons of a middle finger, with normal flexion of the accompanying fingers and complete extension of the involved finger. It is somewhat unusual to rupture both flexor tendons, but the force can be great enough to cause this problem.

In rupture of the common extensor tendon to the middle finger, the finger, of course, cannot be extended to the neutral position, but some extension is still possible in the finger due to the attaching fibers from the neighboring tendon. Degenerative changes also play a large part in tendon rupture. It is quite difficult to rupture a tendon in a young, healthy person without a tremendous force. However, in the middle-age person and sometimes arthritic patient with typical degenerative changes, rupture occurs much easier and more frequently.

The next case is an example of a person with rupture of the lateral extensor tendons to both the little and ring fingers. In this case, the extensor digiti quinti tendon was also ruptured. In some patients, rupture of this tendon alone causes a dropping of only the little finger. Repair is accomplished with the tendon transfer or with a tendon graft; however, since the tendons have usually undergone degeneration and are quite frayed, a tendon transfer is more desirable.

The next example is a spontaneous rupture of the long extensor tendon of the thumb with inability to raise or extend the end of the thumb. Rupture in these cases usually occurs at the wrist due to the wear and tear of the tendon on a bony prominence. This makes repair almost impossible, and even a tendon graft becomes somewhat difficult. Accordingly, a tendon transfer is again often the treatment of choice and the indicis proprius extensor tendon can easily be used for this transfer.

A very common condition both in industry and in private life is the "mallet deformity" or the "baseball finger." It, too, is a tendon injury, but of a different source. It is usually due to a sudden blow to the forcefully extended finger, causing the extensor tendon, which is in tension, to either tear at its insertion in the bone or else to rupture the tendon. In this case, however, rupture consists of a stretching of the fibers without complete loss of extension. The demonstration showed a 40-degree drop of extension, which is felt to be an indication for surgical repair. Treatment is almost always conservative at first, especially if instituted within ten days of the accident. X-rays must be taken to determine the type of injury, since the length of splinting will depend on whether the injury is primarily bone injury or tendon injury. Bone avulsions are usually splinted for four weeks, whereas tendon stretching should be splinted for six weeks. It is imperative that the splint not be removed except by trained personnel who will prevent the finger from flexing. Otherwise, all is lost. Should this treatment fail and 30 degrees or more drop is present, then surgical repair is indicated.

By moving proximally one joint, we come to another extensor tendon injury, the so-called boutonniere deformity. This actually is a combination of two conditions, the first being a rupture of the central slip of the extensor tendon, the other being the button-hole portion where the lateral extensor tendons slip flexorward with shortening of the tendon, thus causing extension of the distal interphalangeal joint at the same time as flexion of the proximal interphalangeal joint is present. Treatment of this condition in its early stages is also conservative, by splinting, or else treatment consists of aggressively repairing the defects in the extensor apparatus surgically. The results are frequently less than satisfactory and seldom as good as the mallet deformity.

There are several lumps and bumps that are frequently difficult to determine as to origin and, when diagnosed, difficult to establish the cause. The first case is a cyst over the dorsum of the hand, which was secondary to a fracture. It becomes difficult to determine whether the cyst is actually secondary to trauma or whether a spontaneous dermal cyst due to some trivial injury is the cause of the swelling.

Epidermal inclusion cysts are quite common in the hand.

A condition which is quite similar in appearance to an epidermal inclusion cyst, but usually is much larger in size and occurring on the palmar aspect of the finger, is a giant-cell tumor of the tendon sheath. This is a benign tumor, supposedly related to trauma and completely cured when the tumor is removed satisfactorily.

The next is a skin tumor, which is raised, reddened, and presents with a small granulating area in the central portion. It proves to be a granuloma of the skin, and after excision and skin grafting heals satisfactorily.

The next tumor, although appearing much like a giant-cell tumor during removal and like a lipoma prior to removal, proved actually to be a hemangioma, which is a benign blood-vessel tumor. In another example of a similar condition the apposing side of a finger, was covered by callus formation of the skin. When the swelling would not disappear when the callus was treated, surgical excision

proved the lesion to be a sclerosing hemangioma.

The next patient presented with a history of trauma over the finger. There was primarily hemorrhage at the start, but later appeared to be bony thickening over the phalanx. When the lesion was finally exposed and removed, it proved to be an osteochondroma.

Infections of the hand can also cause swellings which simulate tumors. For example, an osteomyelitis of the distal portion of the thumb, which involved not only soft tissue, but also the fingernail. This condition was quite refractory to treatment.

Discoloration and blistering of the ends of the fingers usually doesn't occur in the warm climates, but rather in people with outside jobs in the winter or where the job is responsible for prolonged exposure to cold—for example, in refrigerated areas. A case of frostbite with early gangrene of the fingers demonstrates the severity of the condition.

Finally, a few words should be said about joint injuries and accompaning bone and ligamentous injuries. In one case the finger had an injury approximately two years prior to first examination. At that time, about 20 degrees of ulnar deviation at the proximal interphalangeal joint was present, and x-ray examination confirmed a subluxation at this joint. It was felt that surgical repair. should be performed, and at the time of surgery, a portion of the proximal phalanx had to be removed and the lateral ligament repaired. The final result demonstrated much improvement over the initial condition.

In summary, we strive for two objectives in hand surgery. The first is a good functional result, and the second is a good anatomic result. The former, by far, is the more important, and we try for a good anatomic result only if it will not interfere with obtaining the functional result. A good-looking hand which doesn't work well is strictly second-best.

INDUSTRIAL EXPERIMENTAL TOXICOLOGY

By CARL U. DERNEHL, M.D.
Associate Corporate Medical Dir., Union Carbide Corp., New York, NY

The science of toxicology is used by industry for many reasons. Clear and obvious reasons are to comply with governmental regulations in transportation of products, to comply with requirements of consumer products safety regulations, and to meet the regulations of the EPA and the FDA on products which may contaminate the foods we eat. OSHA regulations on many chemicals are based upon experimental toxicology data, and looming in the background is a Toxic Substances Act which depends upon the science of toxicology for its fulfillment.

While all of the activities to comply with governmental regulations are reason enough for industry to use toxicologists, it should be pointed out that the three earliest industrial toxicology laboratories were established before the government became so heavily involved in regulatory activities. These laboratories were established more than 35 years ago because the supporting industries felt a sense of responsibility toward the health of employees and of customers who were using more and more of the new chemicals being introduced by a burgeoning chemical industry. There was a feeling that it was not appropriate to wait until humans were harmed by working with a chemical. Rather, it seemed sensible to try to define the toxic hazards by animal studies so that appropriate precautions might be taken to protect people. This protective concept resulted in labeling practices for chemicals in which toxicology studies are used in the assignment of proper warnings, precautions, and first aid treatment for new chemicals with which there has been no prior human experience. Thus today, through the use of experimental toxicology, it is possible to assign a complete precautionary label to a product which has been made only in experimental quantities in the laboratory.

In the early years, toxicology data was difficult to interpret because each scientist had his own approach in selecting the investigative techniques that were used. In many respects, it was almost impossible to compare the work from one laboratory with that of another because of variation in dosage, differences in species of animals used, differences in the ways of administration, and other variations. There was obviously a need for consistency, and the early research efforts were in this direction.

Early on, consideration was given to what kinds of tests should be done on new chemicals. It was quickly decided that the basic tests should be directed toward the three ways in which a chemical might be expected to enter the body of a workman, namely, by swallowing a chemical, by inhalation of the vapors of a chemical, and by absorption of the chemical through the intact skin. A reasonable elaboration was that consideration must also be given to a potential for harm by local effects on the skin and on the surface of the eye. Thus there was established a sequence of five tests which tell much about the possible effects of chemicals on workmen. The term "range finding tests" has been coined to cover this single-dose acute testing program.

The next obvious need was related to selection of appropriate dosage in each of these exposure areas. Unless there was some agreement, it would be impossible to compare results of studies in which there was a wide variation in dosing. A dose which killed half of a group of test animals would be a good definitive level, and for greater consistency, that dose should be based upon the weight of the test animal. This was important, because the effects of a dose of five grams in a 150-gram rat would be far larger than the same five grams given to a 300-gram rat. So we have now established a concept of a dose per unit of body weight which will kill half of a group of test animals. For even greater consistency, a time factor had to be added, or else one investigator might draw his conclusions at the end of 24 hours and another investigator wait two or three days before terminating his

observations. It has been generally agreed that 14 days of observation were appropriate to detect delayed acute effects.

We now have the first definition of a term commonly used in reporting toxic effects. This is the LD_{50}, or the dose which kills 50 per cent of test animals. Actually the LD_{50} is appropriately defined as the dose per kilogram of body weight which kills a statistically determined half of a group of test animals in a 14-day observation period. The LD_{50} can be determined for a chemical given by mouth or by contact with the skin. In the case of skin contact, the chemical is held in place under an impervious cover for 24 hours, after which it is removed and the animals observed for 14 days. The LD_{50} concept can be applied to any species of animal, and so it is customary to report the data as rat oral LD_{50}, rabbit skin LD_{50}, and so forth.

For inhalation exposure, a slightly different terminology is used. Here the dose is described as the concentration of vapors in the air which by inhalation kills a statistically determined 50 per cent of animals after a four-hour exposure followed by a 14-day observation period. This is designated as the four-hour LD_{50}.

Skin contact is generally described in only two classes. A material can be an irritant, which term probably needs no further definition, or it can be a corrosive, which implies destruction of the skin at the point of contact. In skin contact tests, as described in federal regulations and now widely used by industrial toxicology laboratories, a given quantity of chemical is applied to a small patch, which is then applied to intact and to abraded skin under an impervious cover for 24 hours. Readings of responses are then made at 24 and 72 hours, specified numerical values are assigned to observed responses, and from these numbers a determination is made whether the chemical is an irritant. This test is quite rigorous, because of the use of the impervious cover, and results would really be meaningful in terms of human experience only for prolonged contact with clothing wet with a chemical. We believe we get this same information from observation of the skin in the skin absorption LD_{50} test. For added information, we have for many years used an uncovered skin contact test in which .01 ml of the chemical is placed on the skin of the rabbit belly from which the hair has been removed. After 30 minutes in restraint the animal is returned to its cage, and on the following day the skin is observed for any effects which may have occurred. We believe this test is meaningful for contact of chemicals with the bare skin of the hands, arms, and face of workmen. Quite frequently the results of this test reflect the responses noted in the covered patch test. Usually, discrepancies are noted when a highly volatile chemical is tested which evaporates from the skin so rapidly that no meaningful contact can occur. When this happens in animals, we also find the same thing will occur in humans.

Tests for effects on the eye are specified in federal regulations and are known as the Draize test. This test consists of placing 0.1 ml of a chemical in contact with the eye. I will not go further into the details of the test except to state that the kinds and degrees of injury are then observed at specified times after the initial contact. While this test tells whether a material is an eye irritant or a corrosive, we believe the test is weak because it does not really define the degree of irritancy very effectively. For years in our laboratories we have used a dilution series to place eye effects into 10 categories. Category 1 reflects no injury to the eye. Category 4 is the equivalent of the Draize irritancy response, and category 10 would be a material which produces severe injury in the undiluted state and still produces significant eye injury when diluted to a one per cent concentration. Other materials in the 10 grade system may produce severe injury in the undiluted state, but no longer cause significant injury at dilutions of 15, five or one per cent. We hold this kind of information to be important in evaluating the potential of a chemical for causing injury to the eye.

All of the tests I have spoken of have been a single dose response which would be meaningful in a single accidental exposure of a workman. The facts are, of course, that workmen are more apt to be exposed on a continuing basis to some amount of a chemical in a working environment. Observations made following a single exposure are not good predictors of responses to repeated exposures. For one

thing, a systemic injury produced by a single exposure may start to heal promptly, but healing may not be complete for several days. A second exposure before healing is complete may be expected to have a more profound effect and might possibly, at least in experimental toxicology, result in death of all the animals. This effect of repeated exposure, to which the name chronicity has been given, varies widely with different chemicals. Some may have practically no chronicity, and others may have a very high chronicity. Because the single dose tests do not show the existence of chronicity, there has been a tendency to include a seven-day repeated feeding study along with the acute tests already given. While this seven-day test does not sharply define the degree of chronicity, it does help to identify those substances in which chronicity should be sought diligently.

The testing described to this point is usually completed early in the history of a new chemical. As a use pattern develops for the new chemical, consideration is given to more specific tests. For example, a chemical which is used as a volatile solvent might well be considered a candidate for repeated inhalation studies. A surfactant that might get into a dishwashing preparation would be a candidate for repeated feeding studies. These repeated exposure tests are generally performed for 30 or 90 days. Most testing is now leaning toward 90 days, because it seems that if there is going to be a harmful systemic effect it will have become evident in 90 days.

Certain uses for chemicals such as pesticides and food additives require more sophisticated testing to detect any possibilities of carcinogenic, mutagenic, or teratogenic action. Carcinogenic testing usually becomes a lifetime study, which means two-year tests in rats and 18-month tests in mice. Mutagenic tests require observations in several generations of rats or mice, and so may take a year or more to complete. While these long-term tests were used to a limited degree in past years both because of their high cost and long performance time which tied up laboratory space, recent proposals in the Toxic Substances Act suggest that the tests may be required much more frequently than in the past. Unless some meaningful screening process is developed to eliminate those materials obviously free of these hazards, it is predictable that there will not be enough laboratory space to conduct all the tests that must be made.

Because all of the testing I have described is designed to use observations in animals to predict a human response, it is important that the toxicologist work closely with plant medical services. The ability to relate observations in animals to known human responses in the case of commonly used chemicals becomes important in predicting human responses from animal data on new chemicals. One point should be made quite clear. These toxicity data are not infallible in predicting human response to chemicals. I am mindful of an experience we had with ethylene oxide back in the 1940's. Tests in animals had indicated no particular harmful effects on the skin, but our plant physicians were seeing massive vesiculation on human skin following contact with ethylene oxide. Repeat studies in animals again were essentially innocuous. In the conflict which arose over these two different observations, one of our toxicologists applied ethylene oxide to his skin to prove that the plant observations were the result of some contamination and not due to the ethylene oxide itself. The toxicologist was disabled for some days by a severe vesiculation of the skin of his leg where he had applied the ethylene oxide.

Fortunately, differences in response of this kind are rare, but they lead us to the prudent position that the responses we see are not absolute measures of effects. Rather, these experimental observations should be used to place chemicals into broad classes of hazard. Perhaps these could best be described as we do it in our Toxicology Studies sheets, where we attempt to class hazards for each means of entry or contact into four grades. Slight hazard indicates no effect or, at worst, a trivial effect of no real significance. A moderate hazard indicates that some harmful effect is possible, but a permanent injury is not likely. Only minimal precautionary measures are pertinent. A definite hazard suggests significant harm will occur, and that some permanent effect is possible. Precautions should be taken to avoid contact with the chemical

or its vapors. Serious hazard indicates that permanent harm or even death may occur following contact, and that exceptional precautions must be taken when handling the chemical. Range-finding toxicity tests readily lend themselves to these kinds of classifications and make it possible to give guidance in the safe handling of the chemicals.

Certain areas of toxic responses do not lend themselves well to animal testing. Chief among these is respiratory sensitization and to a lesser degree skin sensitization. It is possible to elicit sensitization responses on the skin of animals, but this does not always mean that the material will be a sensitizer in man. A positive animal test suggests that patch test studies should be made on human volunteers if the product is going to be used in a manner involving fairly frequent skin contact. I know of no way to use animals for testing for respiratory tract sensitization. We have tried it on numerous occasions, using compounds known to have caused asthmatic attacks in humans, and have been completely unable to elicit a similar response in animals. Here we must rely on observations in workmen to confirm or deny suspicions which may have been raised by positive responses in skin sensitization tests in animals.

It would be quite impossible to cover all the tests performed by toxicology laboratories or to go into great detail about the specifics of the test methods. What I particularly want to leave you with is a realization that a great many chemicals used in industry today have been subjected to animal toxicity testing and that these tests tend to cover the ways in which a workman might be exposed to chemicals. The results of these tests are not absolute in application to man, but they serve as a rough guide to proper precautions to be taken when working with a chemical and as a rough guide to the adverse effects which might occur in case of exposure to humans. In the last analysis, however useful and important animal toxicology may be, observations in humans take precedence and become the controlling factor.

THE NURSE'S ROLE IN TOXICOLOGY

By ELAINE NELSON, R.N.
Occupational Health Advisor, NIOSH, Rockville, MD

A factory worker misses a warning light on the machine he monitors. Does he have the Monday morning syndrome of "I would rather be any place but here"? Or could his response be fuzzed by years of on-the-job exposure to lead?

Does the young man with the acute ailment that resembles bronchitis really have bronchitis? Or are the symptoms caused by his exposure to beryllium dusts and fumes?

A nurse anesthetist's reactions are too slow during a serious operation. Is she thinking of the new man in her life? Or is her body being hindered by the anesthetic gases she has inhaled during the average workweek in the operating room?

Why did the employee with the heart condition, who was working in a routine job which required little physical exertion, suffer a fatal heart attack? Could it have been caused by the commercial paint stripper that he worked with which contained methylene chloride? Did the methylene chloride metabolize to carbon monoxide and place too great a burden on the man's heart and trigger the attack?

These are troubling situations because they could very well have been caused by hazardous materials in the working environment, where the industrial worker spends a large portion of his adult life.

For the first time there is a federal law stating that no worker's life should be shortened, endangered, or lost because of hazards in his work environment. The union sees the Occupational Safety and Health Act as the workers' Bill of Rights.

The states started to improve the lot of the industrial workers as far back as 1842. Massachusetts had the first child-labor law and, in 1877, passed the first safety law which required guardrails on certain machines. In 1893, the first National Railroad Safety Act passed. In 1900, 14 states had laws on inspection of factories and 22 on mines. The year 1911 marked the beginning of the first valid state workmen's compensation laws. Ten states passed legislation in that year. The same year, California had the first law on reporting of occupational diseases and injuries; and New York City had the infamous Triangle Shirtwaist fire that killed 146 workers. The first fire-safety law came into existence, which brought to hundreds of sweat shop workers in the garment district greater safety from threat of fires. The first government recognition of an occupational disease concerned the use of white phosphorous in matches in 1912. The early 20's brought the ban on use of radium in watch dials. In the early 1930's a tragic occupational catastrophe took place in Gauley Bridge, West Virginia during a tunnel construction for Union Carbide. Four hundred and seventy-six workers died from silica exposure or were killed by accidents. Fifteen thousand workers were disabled. One-half of the deaths were caused by exposure to particles of rock called silica. In 1936, the Walsh-Healy Act gave the Federal government first authority over industrial health and safety in industries with federal contracts. The passage of the Wagner Act gave workers the right to organize. In 1947, the Taft-Hartley Act provided health and welfare provisions. Social Security Act and other pieces of legislation still did not offer legislation to protect the workers. The Long Shoreman's Act of 1959 set safety standards for longshoremen and shipyard workers.

There was social upsurge and changes in the 1960's. In 1966, we had the passage of the Federal Mine and Safety Act. The mine disaster of 1969 in West Virginia, where 78 miners were killed in a mine blast, led to a strongly organized labor lobby and forced the passage of the Coal Mine and Safety Act of 1969 and, on its heels, the Occupational and Safety Act of 1970.

Here for the first time was a legal basis for protesting the health and safety of millions of men and women at their workplace. This presents a new and greater responsibility for the occupational health nurse, who is generally the

point of entry for the employee into the medical system.

The nurse must become familiar with and identify the potential hazardous material in the environment in which the employee works.

NIOSH recommends that employees be informed about the nature of chemical hazards to which they may be exposed. The agency also recommends an identification system and marking of all hazardous materials in the workplace.

A hazardous material, for the purpose of this paper, will be defined as a substance or mixture of substances having essential properties capable of producing adverse effects on the health and safety of the employee.

The nurse must observe, record, and report symptoms definitely or potentially related to occupational health or conditions. A non-occupational disease may be aggravated by exposure to certain substances in the industrial environment. For instance, an employee is being treated for non-occupational anemia. If his work exposes him to a substance such as benzene, his non-occupational disease might become occupational, or at least be aggravated by his work experience.

The following case study illustrates the importance of being knowledgeable of the environment. Mrs. A was a fairly new employee who complained of a sudden severe, gripping chest pain which caused her difficulty in breathing. She became pale and felt cold. Her oral temperature was elevated to 102°F. She awoke the following morning in severe diaphoresis. Her temperature subsided the next day, but she complained of extreme tiredness. The family physician suggested she stay home from work for a few days. She returned to work in five days, and two days later experienced another attack before leaving work. The sequence of events was similar to the first attack, and her oral temperature reached 104°F. She was admitted to the hospital for fever of unknown origin. She returned to work and had a severe attack of gripping chest pain, fever, and shivering the same way.

It was only after careful questioning by the medical department that it was discovered the patient was a cigarette smoker who would smoke before washing her hands at rest periods and breaks. The patient was employed in the molding of miniature electrical coils and would spray the molds with a fluorocarbon-releasing agent containing micronized Teflon. The onsets stopped after the patient was supplied with disposable plastic gloves, which chiefly seemed to deter frequent cigarette smoking. The diagnosis of polymer-fume fever could have been made earlier if the health professional had questioned the employee about her workplace.

The nurse must also have an understanding and knowledge of the subject of industrial toxicology. With the increasing rate of production and the growing use of industrial chemicals, it seems that no occupation is entirely free of exposure to a variety of chemicals capable of producing undesirable effects.

Toxicology is the study of the harmful actions of chemicals on biologic tissue. It therefore involves an understanding of chemical reactions and interactions. The term is derived from a Greek word referring to the poison in which arrows were dipped. The word "toxic" may be considered as being synonymous with "harmful" in regard to the effects of chemicals. "Toxicity" is a term commonly used in comparing one chemical with another. It is common to say that one chemical is more toxic than another chemical. A toxic substance is one that demonstrates the potential to induce cancer, tumors, or neoplastic effects in man or experimental animals; to induce a permanent transmissible change in the characteristics of an offspring from human or experimental animal parents, and to cause the production of physical defects in the developing human or experimental animal embryo.

The National Institute for Occupational Safety and Health (NIOSH) is required by the Occupational Safety and Health Act of 1970 to publish a Toxic Substances List to help protect the health of the worker from chemical hazards. Its purpose is to identify all known toxic substances which may exist in our environment, along with the dose or concentration at which toxicity is known to occur.

Toxic agents can enter the body by various routes. The most important route of exposure in industry is inhalation, because the diseases are of a more serious nature. Next in importance is contact

with skin and eyes, and the third is by ingestion. The response to a given dose of toxic agent may vary markedly, depending on the route of entry.

The nurse should make an elementary environmental survey, especially if she works alone in the health unit. She should learn how to do a walk-through survey.

The nurse must know when and how to activate industrial hygiene services.

The nurse should establish co-operative working relationships with those responsible for safety and industrial hygiene activities. There is opportunity to learn from the other members of the team. The industrial hygienist can teach the nurse to recognize a process or a hazard and suggest where she can obtain more education to increase her knowledge, especially for the time when she works alone. The safety engineer can teach the nurse about proper investigations of accidents and the types of protective equipment the workers should have.

The nurse should observe workers in the course of plant tours for apparent deviation from normal health, for the use of protective equipment and observation of safety rules, for comfort of workplace, and for hygiene on the job. Being alert to violations of such things as personal hygiene, cleanliness, housekeeping, and ventilation can prevent exposure to occupational hazards.

This would be most beneficial to management. One of the requirements under the Act is for the employer to furnish to each of his employees a place of employment free of recognized hazards that are causing, or are likely to cause illness, injury, or death to his employees.

The nurse should assist in the identification and control of environmental factors at work having a potentially harmful effect on employees' health. The nurse should learn the establishment's potential health hazards that are associated with process and products and keep records of all this information. The employee's personal medical records should contain information on the type of work performed, and any specific hazards they may be exposed to. Finally, there should be added to the records the measurement in the workplace of potentially dangerous levels of noise, dust, and fumes. These areas should be checked regularly. So, we have the health records of individual workers and a hazard record for the workplace itself.

The occupational health nurse is in an epidemiologically luxurious setting, and she should participate in the study of the prevalence, incidence, and effects of occupational disease and/or injury in the work environment. It is very important to identify individuals or groups who are at increased risk; i.e., workers who are hyper-susceptible to industrial chemicals, or the employee who likes to have a few drinks during the working day and handles the chlorinated hydrocarbon solvents such as carbon tetrachloride and tetrachloroethane. The combination of the solvent and alcohol can lead to liver damage and chemical hepatitis.

The nurse must keep health hazard report forms. These become especially valuable when there are a series of reports on the same hazard. For example, some 400 rubber workers in similar jobs but in different plants came down with the same respiratory illness at about the same time. Many were disabled and several died. The culprit: a chemical fume released when rubber was processed and subjected to heat.

The nurse should be involved with a medical surveillance system to detect any problems, to identify where they are occurring, in what departments or manufacturing processes, what kinds of illness, disabilities, or causes of death were affecting how many workers over what periods of time.

The medical monitoring should be part of a comprehensive occupational program. The nurse should learn what tests are appropriate for medical surveillance in her particular plant. It is necessary to take a complete medical history from each employee. Ideally, this should include a chronological lifelong history of the patient's employment, with a detailed history of all chemicals to which he was exposed. A good health record will provide details essential to an ultimate diagnosis if one becomes necessary, e.g., the employee who has an industrially-induced allergic respiratory disease. Any surveillance must be able to detect upper respiratory or respiratory symptoms as soon as possible after onset. It is essential for the nurse to get an accurate history if a

physician is not present. Management should be notified so that an immediate investigation will take place.

OSHA and NIOSH are working on a two-year project to write more complete standards for 400 toxic substances listed under section 1910.93 of OSHA's general industry standards. These standards will include monitoring, medical surveillance, training and work practice requirements, and informing employees of hazards and exposures.

The nurse should be involved with education of the workers about the types of tests that are being given and any follow-up that is made. Workers should also be informed as to how they got ill, if this is the case. Frequency of medical monitoring depends on environmental exposure level, toxicity of substance, chance of exposure, and history of the individual or group having problems.

In the development of the medical examinations and tests, NIOSH/OSHA are planning to follow these principles: (1) the required examinations must be pertinent to monitoring for the effects of the substance covered by the standard; (2) the requirements must be the minimum necessary to maintain medically acceptable surveillance over the effects of the agent, and to the degree possible, each examination should not be the subject of controversy or be considered experimental; (3) the examinations and tests, as a rule, must be generally available and feasible from a medical manpower and cost standpoint; (4) allowance must be made for the employer to provide alternate medical surveillance examinations, if, in the judgment of the physician, these will offer equal or better protection to the worker.

Medical monitoring examination may include the following: (1) medical history (Make sure to question the employee about any medication being taken. The ability of environmental pollutants to modify drug action is now under active investigation.); (2) occupational history; (3) physical examination; (4) laboratory tests (blood tests—hemoglobin, hematocrit, white blood count; urinalysis—sugar, protein, PH, blood ketones, bilirubin); (5) additional tests—vision, audiometric, chest x-ray, pulmonary function, and electrocardiogram.

Medical surveillance and education of the woman worker of child-bearing age is very necessary. When taking a medical history on a woman employee, it is important to learn if she is pregnant. In its recommended standard for occupational exposure to vinyl chloride, NIOSH notified OSHA that it recommended that a woman who is pregnant or expects to be pregnant should not be employed directly in vinyl chloride monomer operations. The recommendation was based on findings of pregnant rats who were exposed to vinyl chloride and gave birth to offspring affected with angiosarcoma. The recent benzene criteria document from NIOSH also devotes specific attention to the potential hazards for pregnant workers. Exxon plans to start a research program on the effects of benzene on women.

The placenta is a limited barrier, and molecules of almost all substances can cross the placenta by simple diffusion. Therefore, almost every chemical entering the pregnant woman by inhalation, skin absorption, or ingestion ultimately will be found in the fetus.

Women workers should be encouraged to report pregnancies early, because the first three months is the most dangerous time for the developing fetus. If possible, the pregnant employee should be assigned to an area where she will not be exposed to potentially toxic chemicals.

The nurse must also develop the occupational disease section in the Nursing Policy and Procedure Manual.

It is very evident that the nurse has an important role in toxicology. She not only has the responsibility to administer proper emergency care to the chemically exposed employee, but today she must become familiar with potential hazards in the environment and learn how to evaluate the effects of an occupational exposure to toxic substances and hazardous materials. The nurse must be concerned with all aspects of the work environment that may harm an individual.

There are too few full-time physicians in the occupational setting. It is necessary for the nurse to be prepared to assume this role so that, as a health professional, she will make a valuable contribution to the health and safety of the worker.

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National Safety Council

A Membership Organization Dedicated to Protecting Life and Promoting Health

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To Whom It May Concern:

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Respectfully,

Robert J. Marecek

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