

Lieutenants Mae E. Peterson (left) and Helen M. Sutko give penicillin in the surgical ward of the 132nd General.

## The Use of Penicillin in the SWPA

### By Alice R. Clarke, R.N.

THE USE of penicillin has been greatly increased in this theater since the "go ahead" signal was flashed by the producers in the United States. This precious drug which has been used so sparingly and whose value appears comparable to Madame Curie's radium, is now available in sufficient quantities to administer to the many types of cases best suited for penicillin therapy. These can be divided into three groups:

1. Patients with conditions due to wounds and battle injuries are treated with penicillin both systemically and locally when necessary. They are started off on the basic dose of 100,000 units per twenty-four hours or larger doses of 200,000-400,000 units per day if the infection warrants it. This is continued for two days before surgery. After operation they receive 100,000 units per day for seven to fourteen days or longer if required. The doses are usually divided into 15,000 units every three hours, day and night.

In addition to the parenteral injections, penicillin solution, 250 units per cubic centimeter, may be administered through narrow 16 inch tubes inserted into the wound. About 3 cubic centimeters of penicillin per tube is instilled every twenty-four hours or whatever amount is prescribed by the medical officer.

2. Conditions not due to wounds and injuries such as skin infections due to dermatitis caused by staphylococcus, streptococcus, and burns infected by these gram-positive organisms improve rapidly when penicillin cream is applied directly or on gauze. Four to eight units per square centimeter is estimated to be sufficient for daily or every other day's application.

3. Patients with all sulphonamide-resistant gonorrhea, who are treated with penicillin, continue to show excellent results.

The nurse is responsible for the preparation and administration of penicillin and should have a complete understanding of its history, properties, effects, and limitations. The drug is now being used extensively in Army hospitals, giving the nurses additional responsibility and burdens. As the time element is of such importance in penicillin therapy, a standing operative procedure is established in the majority of hospitals, for administering the drug.

In certain hospital units, one nurse is account-

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able for the preparation of all the solutions for intramuscular, intravenous, and local applications. She makes up the estimated quantity for a twentyfour-hour period, discards all that older than twenty-four hours, and dispenses the prescribed doses from a central refrigerator.

Other hospitals designate the ward charge nurse to care for the individual ward's needs; to label the solutions and keep them in specified refrigerators until time for use. With either method, all equipment, such as syringes, needles, bottles, saline, or water should be ensured of sterility. As penicillin is known to be decomposed by acids, alkalies, metallic salts, and alcohol, it should not be brought into contact with incompatible antiseptics. The solution should also be protected from contamination, for many bacteria produce a ferment called penicillinase which destroys penicillin.

Lastly, it is of paramount importance in the nursing care of penicillin-treated patients that they receive their injections by the clock, for if too long a time elapses between doses, the effect is lost.

#### HISTORY OF PENICILLIN

Alexander Fleming of London, England, first described the active antibacterial agent isolated from the medium in which penicillin notatum grows in 1929. This was not fully appreciated until 1940 when Professor Florey of Oxford, England, and his associates became interested in the antibacterial substance. They proved that, prepared properly, penicillin could be injected into man without toxic reactions and that severe staphylococcus infections were greatly affected by its use. In view of the fact that the commonest cause of war wound infections is the staphylococcus which is sulfonamide resistant, it was urgent that an effective agent be found to combat this organism.

#### PROPERTIES AND ACTION

Penicillin is one of the most potent antibacterial agents now available. It is prepared in the form of a dry sodium or calcium salt powder varying in color from light yellow to brown. More darkly colored samples are generally less pure. It is freely soluble in water, glucose solution, or normal saline solution and can be administered intravenously, intramuscularly, intrathecally, or directly into the body cavities.

Once it enters the blood stream it disappears within a relatively short time, being excreted by the kidneys and liver. It cannot be given by mouth since the gastric juices promptly destroy it. Since the optimum effect can be obtained only if the organisms are in contact with penicillin for a number of hours, it is necessary to inject it either intramuscularly or intravenously at frequent intervals. There is a preference for the intramuscular route although in cases of extreme emergency, intravenous therapy is used for the constant administration of the drug.

Penicillin is today one of the most potent thera-



U. S. Army Signal Corps Lieutenant Suzanne Sheridan, 9th General Hospital, irrigates a compound fracture wound with penicilin.

peutic agents available for treating infections due to staphylococcus, streptococcus, pneumococcus, gonococcus, and Welch's bacillus. Because it inhibits the growth of susceptible bacteria, has almost no local or systemic toxicity, and its action is unimpaired by serum, blood or pus, it is remarkably successful in the prevention of wound infections in battle casualties. It is also one of the few drugs that carries no danger from overdosage.

#### USE AND COMPLICATIONS

The drug is sealed in vials containing 100,000 units for intramuscular and intrathecal injections. The contents of a vial are added to 20 cubic centimeters of isotonic saline or, glucose solution and administered in the desired number of units per dose. The potency of penicillin is expressed in terms of Oxford units per milligram. Actually only from 10 per cent to 20 per cent penicillin is supplied in the preparation at present.

When in solution, the drug must be kept in a refrigerator; it can never be used if it has been prepared over twenty-four hours. In the dry form, in unopened ampules, it retains its potency for three months and perhaps longer at 40°C. The dosage has become established at 15,000 units every three or four hours intramuscularly or intravenously.

In local administration the drug should have

adequate access to all infected parts; this depends upon surgical technic, a major problem in the use of penicillin. For topical applications, 1,500 units is dissolved in from 2.5 to 3 cubic centimeters of distilled water or saline, and a dilute solution of 250 to 500 units per cubic centimeter is prepared and issued in quantities sufficient for a single day's use. A daily application is sufficient.

The only complications of this drug noted to date have been infrequent cases of urticaria and other minor reactions suggesting serum sickness. These are temporary with no permanent sensitization or harmful ill effects.

Penicillin was first delivered to this theater in October 1943, but because of the limited supply was used only for patients with specific, severe infections. Now, with an adequate supply in the SWPA, its use is greatly extended to every condition where it is known to be of value.

The forward areas have afforded a proving ground for the value of penicillin in the prophylaxis of wound infection. The experiences of this theater and others have demonstrated that the avoidance of sepsis and the freedom from wound infection are of utmost importance in the surgical treatment of battle casualties and offer the most reassuring method of reducing the present mor tality among the wounded.

# Business Methods in the Nursing Office

By Elizabeth S. Moran, R.N.

THE DEPARTMENT OF NURSING at the Henry Ford Hospital, Detroit, consists of two offices: a small one for the director of nursing and a large one in which are located two assistant directors and a secretary.

The assistant director plans the nursing service and deals directly with head nurses and supervisors. She prepares weekly time schedules which are made up one week in advance, and on Thursday of each week all time for the following week is posted. Special requests must be in the office at this time. Emergency requests are handled on an individual basis.

The second assistant works on student placement and rotation. The majority of the rotation is worked out in advance for entire classes. Weekly rotation is given to the first assistant who incorporates new students in her time schedule and transfers old students to new assignments. In departments such as obstetrics, pediatrics, and psychiatry, where students go on the Saturday preceding their weekly assignment, for an orientation in the service, the head nurses know at the beginning of the week whom they are to receive. Students are notified when to go for orientation; head nurses receive their notifications on Thursdays. Every supervisor and head nurse knows, when she receives a student, how long she may expect to have her; consequently, she is able to plan ahead for the experience this student will receive.

The secretary in our office relieves the director and assistants of much work that is done by nurse members of nursing school office staffs in some schools. In a busy nursing office the director may save herself many contacts as well as much routine work if she delegates certain definite responsibilities to her secretary. In our office the secretary answers all immediate telephone calls and, in the majority of them, she is able to give the desired information. These calls may relate to the school or they may be about hospital and volunteer aides, applications from graduate nurses, and other routine matters, as well as the usual calls which are handled between the hospital wards and the nursing service. The secretary handles all appointments, because she knows the people who should be seen. Much of the correspondence must be read by the

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