Traditionally, infants in hospital nurseries and in pediatric wards receive formulas prepared in the hospital formula room. In recent years, formula services, providing ready-to-use formula products, have been developed by private business and, potentially, these formula services can replace the conventional hospital formula room. Whether a hospital will continue use of a formula room or utilize a particular formula service is a question that should be considered jointly by the administrative, pediatric, obstetric, nursing, and dietary staffs of the hospital. The purposes of this memorandum are (1) to discuss the general nature and types of formula services available, and (2) to present some of the factors which deserve consideration before a decision is made to use a formula service in a particular hospital.

General Description of Formula Services

Formula services can be divided into two major groups on the basis of whether they operate locally or are provided by companies engaged in interstate commerce. A third type, recently introduced, provides ready-to-feed formulas in disposable containers sold at supermarkets, grocery stores, or as an over-the-counter item by pharmacies. Several of the products of the commercial formula service are offered in this way. Evaluation of this third type of service is impossible at the present time.

Group I. Local Formula Services

The main characteristics of this group include:
1. Locally operated and often locally owned.
2. First introduced over a decade ago.
3. Usually located in large metropolitan areas.
4. Generally their products are not shipped across state lines and, therefore, they are subject to supervision by local and state health authorities though not federal regulatory agencies.
5. Contract with local hospitals to provide all of the hospital’s infant formulas including evaporated milk formulas as well as prepared milk and “hypoallergenic” formulas, etc.
6. Reuse nipples and bottles employed for formula distribution.
7. Use essentially the same procedures and techniques as the hospital formula room, but on a much larger scale; bulk formula is prepared and divided among individual glass bottles which are then topped by caps and nipples; the bottled formula is then terminally heated and depending upon the duration and degree of heat treatment may or may not be stored under refrigeration.
8. Deliver the desired number of formulas individually bottled and identified to each hospital in refrigerated trucks. Frequency of delivery reflects local custom, convenience, and needs.
9. In some geographic areas, deliver formulas to the home.

Group II. Manufacturer’s Formula Services

The distinguishing characteristics of this group include:
1. Have only recently been available, at most three years.
2. Operate in interstate commerce and, therefore, are subject to supervision by federal as well as state and local health agencies.
by manufacturers of various proprietary formula products and therefore provide only those formulas sold by a single manufacturer.

4. The formulas, as provided, are in a liquid form, presterilized, dispensed in hermetically sealed containers, ready-to-use, and do not require refrigeration.

5. With some “feeding systems,” formulas are provided in individual, capped bottle-size containers, without nipples attached; in another system hospital personnel must aseptically transfer formula from hermetically sealed quart containers to individual presterilized disposable plastic “nursers.”

6. Bottles are disposable, but nipples are reused optionally in some of the systems. Some local health departments do not permit reusable nipples.

7. Operate mainly at the hospital level, but some products are now being sold over the counter in pharmacies.

**ECONOMIC CONSIDERATIONS**

The hospital administrator has the primary responsibility for the economic aspects of hospital operation. However, in this day of rising hospital costs, shortage of hospital bed space, and of trained hospital personnel, appreciation and understanding by the physician of the economic problems of hospital operation is often necessary. Shenkweiler et al. have reviewed the costs of Group I formula services for hospital use and conclude as follows: “As a result of this survey, it is concluded that a medium-sized to large hospital can prepare a bottle of formula as cheaply as it can be purchased from a formula service company. However, the hospital must use efficient production and handling methods and lower cost labor classifications for all the work that does not require registered nurses.” “If space or money for equipment is not available for an efficient formula room operation, formula service companies can offer a solution to such problems.”

Recent articles deal with the economic aspects of one manufacturer’s formula service and compare costs with those encountered in maintaining a hospital formula service and suggest: (1) that there may be little or no direct financial savings, depending on individual hospital costs, but (2) space and hospital personnel formerly devoted to formula preparations become available for other uses. When the capital costs of intramural formula preparations are considered, significant indirect cost reductions may be achieved, especially in new construction.

**NURSING CONSIDERATIONS**

When a formula is prepared in the hospital formula room, the nursing and dietary staffs have the immediate responsibility for: preparation of formula, storage of formula, transfer of individual bottles to appropriate nurseries and pediatric floors, ascertaining that infants receive those formulas ordered for them and, of course, for feeding the infants. The physician’s main concerns, although not his immediate responsibilities, in this regard include assurance that (1) the formulas are properly prepared as ordered; (2) formulas are bacteriologically safe; (3) infants receive the proper feeding at the appointed time; and (4) that responsible persons carry out these various procedures.

Assuming that both groups of formula services deliver “safe” formulas to the hospital premises, the persons concerned with a decision to use a formula service must assure themselves that the nursing and dietary staffs can, in addition to their usual responsibilities, maintain “safety” of commercial formulas within the hospital and learn any new procedures demanded by the system in use. Use of a Group I formula service in contrast with some of the Group II systems requires the learning of no new techniques or procedures on the part of hospital personnel There is, however, no reason to believe that the need for training should by itself lead to rejection of Group II systems. Additional studies of personnel acceptability of both types of formula services would be desirable, and, if...
undertaken in the spirit of research by impartial observers, would provide information useful to those faced with decision on these matters.

**MEDICAL CONSIDERATIONS**

While the previously described factors deserve consideration by the physician, his major responsibility is to assure that the infant formulas employed in the hospital, regardless of source, are (1) chemically safe, (2) free from pathogenic organisms, and (3) nutritionally adequate for premature, normal, and sick infants. A major purpose of this memorandum is to provide a summary of current knowledge regarding these factors as they relate to operational standards.

**Scope and Control of Commercial Formula Service Operations**

It is estimated that this year between 400,000 and 500,000, infants in newborn nurseries will receive formulas prepared by local commercial formula services (Group I). An unknown, but considerably smaller number of infants will receive such formulas for a period of time in pediatric nurseries or in the home. A small number of premature infants will receive such formulas from shortly after birth until the time of discharge from the hospital. It is estimated that the number of infants in hospitals receiving formulas prepared by manufacturers (Group II) is similar to the number receiving formulas prepared by local formula services (Group I).

According to currently available information, local commercial formula services currently operate in Phoenix, Arizona; the Los Angeles, San Diego and San Francisco areas in California; Miami, Florida; Chicago and Peoria, Illinois; Baltimore, Maryland; Brockton, Massachusetts; Kansas City, Missouri; New York City; Cincinnati, Ohio; Allentown, Lancaster, and Philadelphia, Pennsylvania; and Seattle, Washington.

All of these services operate under supervision of city, county, and state health agencies. There is considerable diversity with respect to the various city and state regulatory codes and with regard to operational standards and compulsory quality control procedures of the individual companies. The USPHS is currently developing a code of regulations which may serve as a useful guide for the non-federal health agencies. In addition, the American Hospital Association has formed a Committee on Infant Formulas to guide hospitals and help establish operational codes with the intent of introducing some uniformity throughout the country.

An important consideration on the part of the Committee on Nutrition of the American Academy of Pediatrics has been to direct the attention of appropriate health agencies to the need for operational standards for this group of formula services which will offer protection to the infant. No assumption can fairly be made that the lack of standardization of operational codes implies that inadequate consideration has been given to protection of the infant. Nevertheless, the great diversity of practice among these services make judgment on this matter difficult. At present, a number of the formula services are attempting to form a trade association with a major objective being development of uniform operational standards by all members.

Formula services sold by manufacturers of prepared infant formulas (Group II) are subject to control by federal regulatory agencies, since they enter into interstate commerce, and hospitals using both these formula services as well as those of Group I must, in addition, conform to those local and state regulatory codes and hospital licensing acts, which deal with formulas fed to hospitalized infants and children. A majority of cities and most states have approved hospital use of one or more of the formula services.*

* The approval of all Group I services must be at a local level. For Group II services there is greater variety in the types of approval that must be obtained before a given service can legally operate. Local health agencies usually insist on approving each system individually rather than giv-
In designing an infant feeding regimen, each of the essential nutrients must be provided in amounts necessary to meet estimated requirements for growth. A formula is the major source of most, if not all, of the available nutrients during early infancy. The manufacturers of formula products are required by law to indicate the nutrient content of these products on the label. With this information, the physician can estimate the quantity of formula which should be ingested to achieve the nutritional objectives. Whether a formula is prepared in the home, in a hospital formula room, or obtained from a formula service, it seems desirable to know whether a formula, fed to an infant, actually provides the quantity and quality of nutrients which the physician presumes are present. Two factors likely to alter nutritional content of formulas are heat treatment and storage. See Appendix I and II.

HEAT TREATMENT—DEFINITION OF TERMS

A number of terms describing heat treatment will be used in the discussion which follows, and these must be defined. Raw milk contains bacteria and if milk is incubated at temperatures only slightly above 4°C bacteria will multiply. If the bacteria are non-pathogenic to man (L. casei, L. bifidus, etc.), neither their presence in milk nor multiplication is significant except in so far as flavor is concerned. Pasteurization, heating milk to 61°C for 30 minutes will destroy all potentially pathogenic bacteria (S. aureus, S. hemolyticus, S. typhosa, M. tuberculosis, P. pneumoniae, etc.). This type of heating does not destroy all spore forms, but does retard bacterial multiplication in milk stored at low temperatures. Terminal heating as practiced in hospitals (100°C, 25 minutes; or 110°C, 15 minutes) renders milk free of all pathogens, but the product is not completely sterile. These terminal heating times represent total periods of heating and include the time necessary to reach the prescribed temperature within the liquid sample. Refrigerated storage at temperatures close to 4°C is essential if all bacterial multiplication is to be avoided in terminally heated milk.

After commercial or industrial sterilization procedures (heating milk in a sealed can at 116°C, 16 minutes), a product can be stored at room temperature indefinitely without supporting growth or multiplication of bacteria. These heating times represent actual holding time at the prescribed temperature and do not include the time required to reach the specified temperature. Certain spores may remain viable after this heat treatment but the anaerobic conditions of storage apparently prevent bacterial growth.

Finally, flash sterilization has come into common use. By this technique, liquid milk is subjected to high temperatures, 132°C, for very short periods of time, 6 to 20 seconds, and is then injected aseptically into presterilized containers which are then hermetically sealed. The product is equivalent in sterility to commercially sterilized milks. The issues, which the manufacturer has to examine in determining heating conditions of his product, relate not only to anticipated method of storage and assurance of freedom from potentially pathogenic bacteria, but also the chemical nature of some of the constituents of the product, particularly the carbohydrate component.

Group I Formula Services

In order to improve bacteriologic safety and keeping qualities, some Group I formula services apparently use a heat treatment greater than that usually employed in hospital formula rooms. Furthermore, they
may purchase a liquid formula already sterile as a result of heat treatment during manufacture, and reheat it after bottling. Some hospitals, intramurally, subject formulas purchased from Group I formula services to another course of heat treatment. This is neither technically nor nutritionally justifiable, but rather reflects local usage or the requirements of specific health ordinances. In addition, formulas from Group I formula services may be kept in storage at the preparative level for 24 hours or more before delivery to the hospital so as to provide time for bacterial culture of selected samples when this is required by local ordinance. In some cases, this delay may amount to 3 or 4 days. Depending upon frequency of delivery, these formulas may be stored for some additional period of time at the recipient hospital.

Two published studies and two unpublished studies concerning the nutritional properties of formulas prepared by Group I formula services, or made in a closely similar manner, have come to our attention. A study by Fomon and Owen compared retention of nitrogen by full-term infants receiving an autoclaved formula with that retained using other non-autoclaved formulas. In this study, four infants received the autoclaved formula as the sole source of nutrients (except for vitamins and iron drops) from age 5 days to 4 months. The nitrogen balances achieved in three infants were compared with those found in three other groups of infants who received (1) similar but unheated formula prepared aseptically, having a slightly higher nitrogen content than the autoclaved formula, (2) pooled human milk, or (3) a proprietary formula. The authors concluded that autoclaving formula did not interfere with nitrogen balance although the infants receiving the autoclaved formula received somewhat more nitrogen than the comparable control subjects.

A study of growth, weight gain, and a variety of biochemical modalities was examined in four groups of 27 infants receiving milk with two levels of protein density and sterilized by brief (flash sterilization) as opposed to prolonged autoclaving. The infants receiving the non-autoclaved or "flash sterilized" formula with lower nitrogen content (0.36 gm/100 ml) showed greater weight gain per gram of nitrogen consumed in comparison with the infants receiving the comparable autoclaved formula. However, the design of the study makes it impossible to assign conclusively this superiority to decrease in heat injury of protein, since the nitrogen intakes of both groups of infants were not identical nor was type of fat in formulas the same. It should also be pointed out that growth rates of the various groups of infants were virtually identical.

In one of the unpublished studies, weight gains were compared in two groups of premature infants; one group received formulas prepared in a hospital formula room and the other, formulas prepared by a Group I formula service. Comparable weight gains were demonstrated.

In the second unpublished study, decreases in vitamin content and available lysine were clearly demonstrated in a variety of formulas subjected to various heat treatments and storage periods. The magnitude of the decreases was directly proportional to the intensity of heat treatment and length of storage period. The clinical significance of these decreases is difficult to assess because the heated or stored formulas, if consumed in the usual amounts, would still provide more than the estimated minimum nutritional requirements of the various vitamins and lysine. The deleterious effect upon lysine described in this study results from conjugation under heat of this amino acid with carbohydrates, a reaction occurring even while the lysine is still bound as a protein constituent. Subsequent digestion may split the peptide bond, but the lysine-carbohydrate complex cannot be further digested and the amino acid as such is of no nutritional value.

It would appear unwise to dismiss these observations as unimportant, since lysine is an essential amino acid and conditions of feeding and variation in consumption dur-
ing disease may render these differences significant for individual infants. Nutritional considerations such as these may be relatively unimportant to newborn infants who receive the formula for only a few days; such considerations would almost certainly be more important to premature infants receiving the formulas during a prolonged stay in the hospital or to infants who were fed the formulas in their homes for long periods of time. In addition, the nutritional effect of heat treatment may well be more significant in formulas with protein content similar to that of breast milk and less important in the evaporated milk formulations containing 2.7% protein.

**Group II Formula Services**

Formulas purchased from Group II formula services are sterilized by the manufacturer and do not require further heat treatment before use, although the considerations discussed in relation to Group I formula services may, under certain situations, result in reheating in hospitals prior to consumption. In addition, once made ready for use in the hospital, these formulas are not subjected to further storage because they are fed to the infant immediately.

**CHEMICAL CONSIDERATIONS**

Fortunately, the accidental use of such substances as boric acid or table salt when compounding formulas is rare. When such mistakes occur, however, the results are often disastrous. As a matter of self-protection, and in conformance to the universal requirement of all regulatory codes, all formula services use the strictest procedures to prevent such errors. Theoretically and historically, the chances for such an error occurring are greater in the hospital formula room than in the preparation rooms of a formula service. However, if a formula service should make such an error, the number of infants involved could be large.

**BACTERIOLOGIC CONSIDERATIONS**

Freedom of formulas from pathogenic microorganisms is a matter of paramount concern to everyone sharing the responsibility for formula preparation and feeding. Consequently, many of the quality control procedures required of hospitals and formula services by the various local, state, and federal health agencies deal with bacteriological safety.

**Group I Formula Services**

The specific requirements applicable to these services vary from one state or municipality to another; for example, in some areas formulas prepared by Group I formula services must be fed to infants within 24 hours after preparation on the basis that chances for both bacteriologic contamination and multiplication of bacteria increase in direct proportion to length of time formula is stored. In some areas, spot bacteriologic testing is performed randomly at 1-2-3-, or 4-week intervals. In other areas, the formula service cannot release a particular batch of formula for consumption until a report indicating absence of bacterial pathogens is available. Such bacteriologic studies require several days to complete and, thus, these formulas cannot be used for a number of days after preparation.

Bottles and nipples are returned by the hospital after use and washed and sterilized so contamination of an individual bottle or nipple may be more difficult to detect when spot checking a batch. However, this danger is no greater than that which exists in any hospital formula room.

Little information is available concerning bacteriologic controls employed by hospitals after the formulas have been delivered and before they are fed to the infants.

**Group II Commercial Formula Services**

According to published and unpublished data, chances for bacteriologic contamination are quite small with formulas prepared by Group II formula services, presumably because such formulas are “commercially sterilized.” See Appendix III and IV. Accordingly, chances for contamination
seem to be greatest in the hospital at the time when nipples are attached to bottles or when milk formula is transferred from larger containers to feeding bottles.

FLEXIBILITY AND FREEDOM OF CHOICE

A requirement for a reasonable degree of flexibility and freedom of choice of formulas by the physician was defined by the American Academy of Pediatrics' Committee on Fetus and Newborn in the manual, Standards and Recommendations for Hospital Care of Newborn Infants: "The physician should give written orders for the milk mixtures and for any change in them. The advantage of a routine formula in saving time is obvious. One or two formulas should be agreed upon by the medical staff, and special milk mixtures ordered only for good cause."

This statement was prepared with a hospital formula room in mind. Use of formulas prepared by Group I formula services would not seem to hinder flexibility and physician freedom of choice as defined in the foregoing statement. Formula services in Group II permit the physician freedom of choice only to the extent that a single manufacturer sells several preparations.

SUMMARY

Traditionally, formulas fed to infants in hospitals are prepared in the hospital formula room. In recent years, commercial formula services, representing alternate sources of infant formulas, have been developed and may eventually replace hospital formula rooms. These services represent acceptable sources for formulas fed to hospitalized infants, provided standards of sterility and nutritional quality are scrupulously maintained. The general nature of the two major types of formula services has been described, and some factors deserving consideration in regard to use of formula services have been presented.

COMMITTEE ON NUTRITION

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REFERENCES

During the usual heat-sterilization process used in the manufacture of evaporated milk (about 116°C for 16 minutes), the following losses occur:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Concentration in Cow's Milk per 100 ml</th>
<th>Percentage Destroyed or Made Unavailable</th>
<th>Concentration in Evaporated Milk per 100 ml (Reconstituted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lysine</td>
<td>57 milligrams (1)</td>
<td>4% (2)</td>
<td>195 milligrams</td>
</tr>
<tr>
<td>Thiamine</td>
<td>42 micrograms (1)</td>
<td>40 (3)</td>
<td>35 micrograms</td>
</tr>
<tr>
<td>Vitamin B₆</td>
<td>58 micrograms (4)</td>
<td>50 (4)</td>
<td>29 micrograms</td>
</tr>
</tbody>
</table>

If an evaporated milk formula containing 1.65 gm of protein per 100 ml and supplying 20 calories per ounce with 50% of the calories derived from evaporated milk by dilution were again terminally sterilized by the formula service under the same conditions used during manufacture of evaporated milk (a moderate amount of overheating), the availability of the same heat labile constituents at time of feeding would be even less, theoretically:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Concentration in Unheated Formula per 100 ml</th>
<th>Percentage Destroyed or Made Unavailable</th>
<th>Concentration in Formula after Terminal Sterilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lysine</td>
<td>97 milligrams</td>
<td>24 (1)</td>
<td>74 milligrams</td>
</tr>
<tr>
<td>Thiamine</td>
<td>13 micrograms</td>
<td>40</td>
<td>8 micrograms</td>
</tr>
<tr>
<td>Vitamin B₆</td>
<td>15 micrograms</td>
<td>50</td>
<td>7-8 micrograms</td>
</tr>
</tbody>
</table>

At a daily intake of 110 calories per kg (163 ml) this formula would supply the following amounts of these heat labile components. The table also lists published estimates of the infant's requirements.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Intake/kg/day</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lysine</td>
<td>103 mg/kg/day (5)</td>
<td>103 mg/kg/day (5)</td>
</tr>
<tr>
<td>Thiamine</td>
<td>0.4 mg/day for a 1 yr-old infant</td>
<td>0.4 mg/day for a 1 yr-old infant</td>
</tr>
<tr>
<td>Vitamin B₆</td>
<td>Not established*</td>
<td>Not established*</td>
</tr>
</tbody>
</table>

* The view is held by many nutritionists that the requirement for vitamin B₆ is about the same as for thiamine.†

The data indicate that overheating a 50% milk formula prepared from evaporated milk may reduce the content of lysine nearly to the estimated requirement and the content of thiamine and vitamin B₆ to levels below those recommended by the Food and Nutrition Board if the formula were consumed in conventional amounts.

Nutritionally inadequate formulas would not be likely if (1) the formula is prepared from pasteurized milk or spray-dried products in which the concentrations of vitamins and amino acids are about the same as in fresh milk, and (2) the proportion of milk is higher, for example, two-thirds milk formula.
### APPENDIX II
Effects of Refrigerated Storage on Nutrients of Two Infant Formulas

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Ster.*</th>
<th>Percentage Retention of Nutrients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Immediately after Rester.</td>
</tr>
<tr>
<td>Thiamine</td>
<td>AHA</td>
<td>92.5</td>
</tr>
<tr>
<td></td>
<td>FL</td>
<td>80.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>86.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>82.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>92.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>82.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>79.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>69.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>77.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>67.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

* Sterilized by two procedures: American Hospital Association (AHA: 10 min at 112°C); Formula Lab (FL: 19 min at 118°C). The percentage retention is the average found for a soya and proprietary milk formula respectively.

Made available through the kindness of Dr. Robert Stewart, Gerber Products Company, Fremont, Michigan.
APPENDIX III

Results of Study of Bacterial Contamination at Level of Consumption of a Single Type II Formula Service Product*

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Duration of Study (mo)</th>
<th>Units Fed</th>
<th>Units Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reusable Nipple System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>2</td>
<td>1,908</td>
<td>38</td>
</tr>
<tr>
<td>II</td>
<td>3</td>
<td>27,675</td>
<td>689</td>
</tr>
<tr>
<td>III</td>
<td>2</td>
<td>2,234</td>
<td>39</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>31,117</td>
<td>766</td>
</tr>
<tr>
<td>Disposable Nipple System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>2.5</td>
<td>1,185</td>
<td>74</td>
</tr>
<tr>
<td>V</td>
<td>2</td>
<td>3,072</td>
<td>98</td>
</tr>
<tr>
<td>VI</td>
<td>3</td>
<td>9,414</td>
<td>237</td>
</tr>
<tr>
<td>VII</td>
<td>2</td>
<td>560</td>
<td>58</td>
</tr>
<tr>
<td>VIII</td>
<td>2.5</td>
<td>3,394</td>
<td>124</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>17,565</td>
<td>591</td>
</tr>
</tbody>
</table>

* Results: All cultures negative.
Made available through the kindness of Dr. L. J. Filer, Jr., Ross Laboratories, Columbus, Ohio.

APPENDIX IV

Results of Study of Bacterial Contamination at Level of Consumption of a Single Type II Formula Service Product Using Bulk Delivery of Formula and Aseptic Transfer in the Hospital*

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Duration of Study (mo)</th>
<th>Units Fed</th>
<th>Units Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposable Nipple System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>1</td>
<td>7,682</td>
<td>48</td>
</tr>
<tr>
<td>II</td>
<td>1</td>
<td>7,392</td>
<td>48</td>
</tr>
<tr>
<td>III</td>
<td>1</td>
<td>3,384</td>
<td>60</td>
</tr>
<tr>
<td>IV</td>
<td>1</td>
<td>5,688</td>
<td>78</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>24,196</td>
<td>324</td>
</tr>
</tbody>
</table>

* Results: All cultures negative.
All bottles tested were set up as for use by nursery personnel and then transported to the bacteriology laboratories for culture. A sample from each bottle was cultured in thioglycollate broth and incubated for 14 days.
Made available through the kindness of Dr. Thomas C. McPherson, Mead Johnson Laboratories, Evansville, Indiana.

REFERENCES

PREPARED INFANT FORMULAS AND COMMERCIAL FORMULA SERVICES:
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Pediatrics 1965;36;282

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use of services provided, sharing ideas and suggestions as to nutritional needs and problems of their patients as well as possible approaches to solving them, pediatricians can promote more effective use of public health nutrition services.

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CORRECTIONS

The following alterations should be made in two previous communications from The Committee on Nutrition:

1. Vitamin D Intake and the Hypercalcemic Syndrome (Letter, PEDIATRICS, 35:1022, June, 1965) the reference to the American Journal of Diseases of Children should be deleted.

2. Committee Report: Prepared Infant Formulas and Commercial Formula Services (PEDIATRICS, 36:282, August, 1965) heading to Appendix IV should read: “Results of Study of Bacterial Contamination at Level of Consumption of Type II Formula Service Products in Ready-to-use Bottles.”