MIGRATORY LABOR

HEARINGS

BEFORE THE

MMITTEE ON MIGRATORY LABOR

OF THE

COMMITTEE ON

OR AND PUBLIC WELFARE

UNITED STATES SENATE

EIGHTY-SEVENTH CONGRESS

SECOND SESSION

ON

S. 3382

A BILL TO PROVIDE SANITATION FACILITIES FOR MIGRATORY FARMWORKERS

Volume 3.—Washington, D.C.

Part I.—July 26, 1962
Part II.—August 7, 1962

Printed for the use of the
Committee on Labor and Public Welfare

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U.S. GOVERNMENT PRINTING OFFICE
68321 WASHINGTON : 1963

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MIGRATORY LABOR

THURSDAY, JULY 26, 1962

U.S. SENATE,
SUBCOMMITTEE ON MIGRATORY LABOR OF THE
COMMITTEE ON LABOR AND PUBLIC WELFARE,
Washington, D.C.

The subcommittee met at 10:05 a.m., pursuant to call, in room 1318, New Senate Office Building, Hon. Harrison A. Williams, Jr., chairman of the subcommittee, presiding.

Present: Senator Williams presiding.

Committee staff members present: Frederick R. Blackwell, subcommittee counsel; Harry G. Wilkinson, research assistant.

Senator WILLIAMS. I am sorry that I am late to this meeting.

I have a statement I want to include in the record, in opening these hearings on S. 3382, to save all of our time.

(The statement of Senator Williams, the bill, S. 3382, explanation of S. 3382, and departmental reports follow:)

STATEMENT BY HON. HARRISON A. WILLIAMS, JR., A U.S. SENATOR FROM THE STATE OF NEW JERSEY

First, I would like to thank the witnesses and others gathered here today. Your presence indicates a continuing, growing concern for migratory farmworkers throughout this Nation. This concern, of course, must be translated into effective legislative action if it is to be of any help at all to the migrant. It is my earnest hope that the work of the subcommittee, which began in August of 1959, will result in the passage this year of several of the key bills which have been presented to Congress. There is, after all, no excuse for Americans to turn their backs on the misery, misfortune, and hardship so often faced by their fellow citizens, the migratory farm families. We hear much talk about the migrant, and we know that many more comfortable citizens feel genuine pangs of pity for them. But it is here, in Congress, where we can finally remove the causes of this problem. It is here, in Congress, that we can overcome some of the worst hardships and injustices facing the migrant. We owe it to these Americans to act this year in Congress, and we on the subcommittee will do everything we can in these final weeks of the session.

The legislative measure before us today is the sanitation bill, S. 3382. I would like to take a few minutes to describe its history and purposes. As you know, the subcommittee presented a comprehensive program of legislation to Congress in 1961. A bill to provide Federal assistance for State health services—S. 1130—was included. But, in the months since that time, subcommittee field trips and fur-

ther study have demonstrated that there exists a specific, chronic unmet need. This is the need for better sanitation facilities in the fields where they work and in the camps where they live.

The sanitation bill, S. 3382, unlike the health bill, S. 1130, is designed to meet this specific and acknowledged need. The sanitation bill amends the Public Health Service Act to establish a program which will improve the environmental health conditions among our migrant farm families by providing financial aid to farmers, and other appropriate persons, to assist in the construction or renovation of sanitation facilities used by migrant farm families. States lacking adequate data regarding the need for such sanitation facilities could also be provided financial aid to determine the extent of the need for such facilities.

The bill is realistic in that it recognizes that many farming operations are marginal and, therefore, it is difficult to make expenditures sufficient to provide adequate sanitation facilities for the migrants. Our experience, moreover, has shown that many of the totally inadequate sanitation facilities are found on labor camps run by marginal farmers.

In the early 1950's studies were published which demonstrated that severe diarrheal diseases are common among people living in communities having primitive sanitation facilities. Diarrheal disease represents the second leading cause of death from communicable disease among children under 2 years of age. A study in Kentucky demonstrated that disease and mortality rates were less prevalent among people who were provided with flush toilets and an inside source of water than among persons using privies and community water taps. Such findings are not new, of course. As early as 1908, Teddy Roosevelt's Country Life Commission noted the dangers in unsanitary sanitation facilities. The report said, in part:

> Theoretically the farm should be the most healthful place in which to live. Still it is a fact that there are numberless farm houses of the tenant class * * * that do not have the rudiments of sanitary arrangements * * *. The necessity for disease prevention is therefore self-evident, and it becomes more emphatic when we recall that infection may be spread to cities.

The rural health needs of 1908 are still with us today. Even a perfunctory examination of the many farm labor camps used by migrant farm families reveals the prevalence of ramshackle, unsanitary, and primitive sanitation facilities. Our subcommittee has visited these camps in more than a dozen States and the conditions in many of them are unbelievably primitive. In the fields, moreover, sanitation facilities are a rarity. Unlike other sectors of our commerce, agriculture generally does not provide migrant farmworkers with field-sanitation facilities such as toilets, hand-washing facilities, and potable drinking water.

We as consumers have good reason to be uneasy about this situation. Much of our soft foods and other produce are picked, and often field-packed by migratory farmworkers. If we object to filth anywhere, we certainly should object to it in any part of the process that brings the food from the field to our tables.

I do not want to call forth the parade of the horribles; the conditions under which these people live and work speak for themselves. The pictures on the easels in this very room can provide an accurate appraisal of some of the facts. If these facts seem difficult for us to

justify or understand, imagine how much more difficult it must be to live these facts every day of one's life and to see one's children grow up in such a milieu.

Before I call the first witness, I would like to mention briefly some of the benefits that will be fostered by the sanitation bill. The existing undesirable health situation of the migrants due to inadequate sanitation facilities will be greatly diminished. This, in turn, will promote good health conditions in communities through which the migrants pass. Moreover, once adequate sanitation facilities are within the financial reach of those employing migrants, State legislators will be encouraged to enact proper health codes applicable to farm labor camps. State health officials, likewise, will be better able to enforce existing sanitation laws. As the health conditions of the migrants are thus improved, they will be more productive workers and community resentment toward them because of their poor health conditions will diminish and thereby promote a more amicable relationship between the migrants and the host communities.

[S. 3382, 87th Cong., 2d sess.]

A BILL To amend the Public Health Service Act so as to establish a program to assist in the construction of adequate sanitation facilities for migratory farm labor

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Public Health Service Act is amended by adding at the end thereof the following new title:

"TITLE VIII—ADEQUATE SANITATION FACILITIES FOR MIGRATORY FARM LABOR

"FINDING OF FACT AND DECLARATION OF PURPOSE

"SEC. 801. The Congress hereby finds and declares that (1) the serious and extensive health problems among migrant farm families who annually reap our Nation's health-giving harvests are of national importance and concern; (2) grossly inadequate sanitation facilities are directly related to the disease and death rates among migrant farm families; (3) the interstate movement of migrant farm families, moreover, poses a serious health hazard for the entire Nation; (4) the farmer also is affected by the unmet health problems among migrant farm families because workers often become afflicted with disease or sickness, making it difficult for them to work properly; and (5) the farmer is often unable to defray the costs of constructing or renovating the sanitation facilities used by migratory farm families. Therefore, it is the purpose of this title to insure the availability of adequate sanitation facilities for migratory farm labor through a program of grants to assist in the construction of adequate sanitation facilities.

"AUTHORIZATION AND APPROPRIATION

"SEC. 802. There is hereby authorized to be appropriated for the fiscal year ending 1963, and for each of the four succeeding years, such sums, not to exceed two million dollars for any year, as may be necessary to enable the Surgeon General to make grants (1) to assist in the construction of adequate sanitation facilities used by migratory farm laborers, and (2) to assist States in conducting surveys to determine the need within the State for the construction of such facilities. From the amounts so appropriated for any fiscal year, the Surgeon General shall determine the portion to be made available to carry out the purposes of clause (1) of the preceding sentence and the portion to be made available to carry out the purposes of clause (2) of such sentence.

"STATE APPLICATIONS FOR CONSTRUCTION GRANTS

"SEC. 803. (a) From funds determined to be available for carrying out the purposes of section 802(1), the Surgeon General shall make grants to States which have submitted and had approved an application for grants to assist in

the construction of sanitation facilities for migratory farm laborers. To be approved, such an application must—

"(1) designate a single State agency as the sole agency for carrying out such purposes;

"(2) contain information satisfactory to the Surgeon General regarding the extent of the need for adequate sanitation facilities for migratory farm laborers, and the plans, policies, and methods to be followed in meeting such need;

"(3) provide that such funds shall be used solely to assist persons in constructing adequate sanitation facilities used by migratory farm laborers, and provide assurances that such facilities will be available for use by such laborers for a reasonable time after such facilities are constructed;

"(4) provide that any construction project assisted with such funds shall conform to standards prescribed by the Surgeon General; and

"(5) provide that the State agency will make reports in such form and containing such information as the Surgeon General may from time to time reasonably require.

"(b) The amount granted to any State under subsection (a) shall not exceed the amount allotted to such State pursuant to subsection (c).

"(c) From the amounts determined by the Surgeon General to be available to carry out the purposes of section 802(1) during any fiscal year, the Surgeon General shall (pursuant to regulations issued by him) from time to time make allotments to each State which has submitted and had approved by the Surgeon General an application for grants under subsection (a). Such regulations shall provide that the amount to be allotted to any State shall be determined on the basis of (1) the number of migratory farm laborers involved and the length of time they spend in the State, and (2) the extent of the need for the construction of sanitary facilities for such laborers in the State.

"REGULATIONS PRESCRIBING STANDARDS

"SEC. 804. (a) The Surgeon General shall prescribe by regulations standards as to the type of construction projects eligible for assistance from funds available for carrying out the purposes of section 801 and as to the amount which may be provided.

"(b) Such standards shall provide that—

"(1) a project must (A) be needed for the use of migratory farm labor, (B) not be of elaborate or extravagant design or materials, and (C) be adequate in size, construction, and design to fullfill the purpose for which constructed; and

"(2) the amount provided any person for any project shall be determined on the basis of the need of such person, giving due consideration to the amount of funds available to such person for the construction of such project from other sources and the terms and conditions thereof; but in no event shall the amount of such assistance exceed 90 per centum of the construction costs.

"SURVEYS

"SEC. 805. (a) From the funds determined to be available for carrying out the purposes of section 801(2), the Surgeon General may make grants for surveys to States that do not have adequate data regarding the need in such State for adequate sanitation facilities for migratory farm labor.

"(b) The amount of such survey grant shall be determined by the Surgeon General on the basis of the costs of such survey, giving due consideration to the number of migratory farm laborers involved and the length of time they spend in such State.

"DEFINITIONS

"SEC. 806. For the purposes of this title—

"(a) The term 'sanitation facilities' means drainage, water, sewage- and waste-disposal facilities, and includes field-sanitation facilities.

"(b) The term 'construction', when used in reference to sanitation facilities, includes expansion, remodeling, and alteration of existing sanitation facilities.

"(c) The term 'person' includes States, or political subdivisions thereof; corporations; companies; associations; firms; partnerships; societies; and joint stock companies, as well as individuals.

"(d) The term 'migratory farm laborer' means any individual who receives a substantial portion (as determined by the Surgeon General) of his income as a laborer on farms situated in the United States. Such term includes any member of such individual's family who accompanies him from place to place pursuant to the conduct of this occupation as a migratory farm laborer."

SEC. 2. (a) Section 1 of the Public Health Service Act is amended to read as follows:

"SHORT TITLE

"SECTION 1. Titles I to VIII, inclusive, of this Act may be cited as the 'Public Health Service Act'."

(b) The Act of July 1, 1944 (58 Stat. 682), as amended, is further amended by renumbering title VIII (as in effect prior to the enactment of this Act) as title IX, and by renumbering sections 801 through 814 (as in effect prior to the enactment of this Act), and references thereto, as sections 901 through 904, respectively.

EXPLANATION OF S. 3382

Grossly inadequate sanitation facilities cause high disease and death rates among migrant farm families whose interstate movement poses a health hazard for the entire Nation.

The sanitation bill is designed to alleviate this problem by providing funds (1) to farmers, associations, and other appropriate parties to assist in the construction or renovation of sanitation facilities used by migratory farm families; and (2) for surveys by States lacking adequate data regarding the need for sanitation facilities. The "sanitation facilities" comprehended by this bill include field-sanitation facilities.

Beginning with the fiscal year 1963, and for each of the 4 succeeding years, Federal funds not in excess of $2 million in any single year will be provided States that have submitted appropriate applications for funds to the Surgeon General. The amount provided a State would be determined by the number of migrants involved, the length of time they spend in the State, and the extent of the need for adequate sanitation facilities.

A single State agency (probably the State health department), will act as the exclusive agency to administer and provide funds to parties desiring to provide migrant farm families with adequate sanitation facilities. The sanitation facilities to be constructed or renovated must conform to standards prescribed by the Surgeon General. Such standards require, among other things, that the facilities be simple and adequate in construction and be needed for the use of migratory farm families.

The amount of financial assistance provided through the State agency for sanitation facilities will be determined by the person's ability to finance the project, giving due consideration to the amount of funds available from other sources and the terms and conditions involved. The financial assistance, however, shall under no circumstances exceed 90 percent of the total cost of the project.

The program would operate through State and Federal health agencies in accordance with the well-established, highly successful pattern of relationships now existing among such agencies.

DEPARTMENT OF AGRICULTURE,
Washington, D.C., August 8, 1962.

Hon. LISTER HILL,
Chairman, Committee on Labor and Public Welfare,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This replies to your request of June 12, 1962, for a report on S. 3382, a bill to amend the Public Health Service Act so as to establish a program to assist in the construction of adequate sanitation facilities for migratory farm labor.

This bill provides for grants not to exceed 90 percent of the cost of such facilities, to be made through State departments of health. It authorizes the appropriation of not to exceed $2 million per year to (1) assist farmers unable to afford to construct adequate sanitary facilities for migratory laborers; and (2) to assist States to determine the need within each State for the construction of such facilities.

This Department approves the objectives of this bill, but feels it deals with technical questions within the purview of the Department of Health, Education, and Welfare.

This bill's authorization for surveying needs, costs, and alternative approaches are excellent since only limited information is available. It is suggested that the project approach of S. 1130 might be the most workable beginning in the sanitation field. Grant funds could be made available for pilot demonstration projects by public and nonprofit agencies. Such projects might include field facilities which could be made available to cooperating growers on a reasonable rental basis. This latter approach, we believe, would be easier to administer than that provided in the draft bill. One of the reasons that we believe such a project approach is more workable is that we think it would be difficult to effectively administer the program as set forth in the bill until some pilot experience has been gained.

We understand that the Department of Health, Education, and Welfare has detailed suggestions to make along the foregoing lines.

The Bureau of the Budget advises that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

ORVILLE L. FREEMAN, *Secretary.*

DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, October 2, 1962.

Hon. HARRISON A. WILLIAMS, Jr.
U.S. Senate,
Washington, D.C.

DEAR SENATOR WILLIAMS: This replies to your letter of September 10, 1962, suggesting that it might be well for the Department of Agriculture to administer the proposed Public Health service bill, S. 3382.

The Farmers Home Administration of this Department is presently administering a farm labor housing program and has an experienced field staff which we believe could carry out the Federal responsibilities described in S. 3382.

The bill as drafted provides, in section 802, for an appropriation authorization of $2 million per year for 5 years for grants (1) to assist in the construction of adequate sanitation facilities used by migratory farm laborers; and (2) to assist States in conducting surveys to determine the need in the State for the construction of such facilities. The present draft of the proposed legislation provides for administration of the Federal Government's responsilities by the Surgeon General.

If the Department of Agriculture is to be assigned responsibility for administration, we believe the bill should be amended so that the title would read, "An Act to Provide Adequate Sanitation Facilities for Migratory Farm Labor"; to substitute the words "Secretary of Agriculture" for the words "Surgeon General" wherever the latter words appear in the bill; to delete all references to the Public Health Service Act; to appropriately renumber the various sections of the bill; and to provide that moneys to be expended under clauses 1 and 2 of the present section 802 be made available to the States through the U.S. Department of Agriculture, as directed by the Secretary of Agriculture.

Under the bill, the States could determine the areas of greatest need and certify this information to the Farmers Home Administration, which would then determine the allocations to be made to the States and inspect construction to see that it meets required standards. The Farmers Home Administration would need some additional administrative funds if these functions were assigned to it.

The Bureau of the Budget advises as follows:

"You are advised that, in our view, for the reasons stated in our August 2, 1962, report to the committee, a program of special demonstration and pilot projects along the lines of the recently enacted S. 1130, which provides Public Health Service grants for health services for migratory farm labor, might be considered if Federal aid is to be given for the purposes specified in S. 3382; and that, accordingly, the Bureau of the Budget recommends against enactment of S. 3382."

Sincerely yours.

CHARLES S. MURPHY, *Acting Secretary.*

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
August 1, 1962.

HON. LISTER HILL,
Chairman, Committee on Labor and Public Welfare,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This letter is in response to your request of June 12, 1962, for a report on S. 3382, a bill to amend the Public Health Service Act so as to establish a program to assist in the construction of adequate sanitation facilities for migratory farm labor.

The bill would authorize an appropriation of up to $2 million for the fiscal year 1963 and for each of 4 succeeding years to enable the Surgeon General to make grants to States (1) to assist them and their political subdivisions and farmers, associations, and other private parties in the construction or renovation of sanitation facilities used by migratory farm families; and (2) for surveys to determine the extent of the need for such sanitation facilities.

The amount provided a State would be determined by the Surgeon General, giving due consideration to the number of migrants involved, the length of time they spend in the State, and the extent of the need for adequate sanitation facilities.

A single State agency would be designated as the exclusive agency to administer and provide funds to parties desiring to provide migrant farm families with adequate sanitation facilities. The sanitation facilities to be constructed or renovated would be required to conform to standards prescribed by the Surgeon General. Such standards would require, among other things, that the facilities be simple and adequate in construction and be needed for the use of migratory farm families.

The amount of financial assistance provided through the State agency for sanitation facilities would be determined by the person's ability to finance the project, giving due consideration to the amount of funds available from other sources and the terms and conditions involved. The financial assistance, however, would under no circumstances exceed 90 percent of the total cost of the project.

As indicated in our earlier report and testimony on a related bill (S. 1130), this Department is in accord with the principle of providing Federal aid to stimulate and assist States and communities to improve the health of migratory farmworkers. We also recognize the need for extensive improvement of sanitation facilities for the use of such workers, although we do not have detailed data relating to the number, type, or probable cost of the facilities required in various parts of the country.

Despite our support of the basic objectives of this proposal, its approach and some of its specific provisions raise serious problems as to the appropriateness, effectiveness, and workability of the contemplated program. The appropriateness of direct Federal grant assistance of up to 90 percent of cost to farmers for the construction of privately owned sanitation facilities to be used by migrant workers in their employ, involves consideration of broader Federal policy in the fields of agricultural economics and labor standards for which other Federal departments or agencies have primary responsibilities. Our reservations from the standpoint of public health considerations to go to the probable effectiveness of the proposed facilities grant program and to its workability.

In the first place, we doubt that a program of construction aid would be effective without a strong parallel program of enforcement of adequate sanitation standards. Second, while there are no available data on which to project a total cost estimate, we also doubt that the $2 million authorized to be appropriated annually under the bill would meet such a significant portion of the construction needs as to provide an effective stimulus. Third, we question the effectiveness of a construction aid program that is limited to sanitation facilities and does not also embrace the housing facilities available to migratory workers.

Finally, the provisions of S. 3382 would also present difficulties from the standpoint of administrative feasibility. The most serious of these difficulties would relate to the criteria for determining the eligibility, on the basis of financial need, of various public and private applicants for financial aid and, among such eligible applicants, for determining what proportion of the construction costs (up to 90 percent) each applicant should receive. The provisions of the bill offer no guidelines governing these determinations.

For these reasons, we are unable to recommend enactment of the bill in its present form. An essential prerequisite to achievement of the bill's objec-

tives, would, in our opinion, be the development of more substantial and specific data on needs, costs, and available resources; more experimentation and evaluation of alternative approaches and methods; and more adequate technical staffs in State and local public agencies responsible for developing and administering programs to improve health services and conditions for migratory farm laborers.

A significant step in this direction will have been taken with the implementation of S. 1130, which authorizes a project grant program in this field. We recognize, of course, that both the appropriation ceilings and the focus of attention in this pending legislation will limit its effectiveness as an intermediate measure in promoting or effecting improvements in sanitation facilities for migratory farmworkers. We believe, however, that if any further Federal aid toward this objective is to be provided, it should be patterned along the lines of the special project grant approach employed in S. 1130.

Such a special project grant program would help to strengthen the competence of State and local agencies to cope with farm labor sanitation problems, and develop some of the detailed information required for effective program planning and also provide funds for experimenting with and evaluating different methods or combinations of methods for effecting needed improvements.

In such a program Federal grant funds should be available only for experimental or demonstration projects, submitted by or with the approval of the State health authority, which are designed to improve the health of migrant farmworkers through improvement of the sanitation conditions under which they live and work. Projects which involve the construction or acquisition of sanitation facilities for migrant workers should be accompanied by assurances from the State health authority that adequate standards would be established for the maintenance and operation of these facilities and that such standards would be adequately enforced. We believe that non-Federal sources should bear the bulk of the cost of any such construction projects, and that the Federal share should in no case exceed 50 percent of construction costs. Such a program could also include projects to improve or demonstrate inspection and enforcement activities As indicated earlier, another valuable type of project that could be financed in part by such project grants would be surveys to obtain reliable data on facilities needs and costs.

We are advised by the Bureau of the Budget that there is no objection to presentation of this report from the standpoint of the administration's program.

Sincerely,

ANTHONY J. CELEBREZZE, *Secretary.*

U.S. DEPARTMENT OF LABOR,
OFFICE OF THE SECRETARY,
Washington, August 2, 1962.

Hon. LISTER HILL,
Chairman, Committee on Labor and Public Welfare,
U.S. Senate, Washington, D.C.

DEAR SENATOR HILL: This is in further response to your request for our comments on S. 3382, a bill to amend the Public Health Service Act so as to establish a program to assist in the construction of adequate facilities for migratory farm labor.

There has long been a need for comprehensive action in this area. Studies conducted by Presidential commissions and congressional committees, as well as State and local groups, have clearly established the close correlation between inadequate sanitation facilities and the high disease and mortality rate among migrant farm families. A recent report of the State of California emphasized the general lack of sanitary toilet and lavatory facilities on California farms which has been a matter of public concern for many years. Not only does this situation create a danger to public health but lack of such sanitation facilities has deprived farm labor of the elementary decencies of life.

We recognize, however, that various approaches may be adopted to bring about improvement in this area. However, prior to settling on any approach such as proposed in S. 3382, further consideration should be given to the problems involved in providing adequate sanitation facilities. One possible approach which would help to determine the best and most feasible program, we think, might be something along the lines of a special project and demonstration program. Such a technique has been proposed in legislation dealing with various

unexplored problems, such as adult literacy and juvenile delinquency. We might point out that any such program provided for farmworkers' sanitation facilities, because of the public health aspects, calls for close cooperation with the local authorities in this field.

We further suggest that any program which is developed should provide for the use of information available to this Department and its affiliated State employment security offices. This information, which is constantly being compiled and studied, includes data on the composition of the migratory work force, size and numbers of families, seasonal movements, and farm labor housing.

The Bureau of the Budget advises that there is no objection to the presentation of this report from the standpoint of the administration's program.

Yours sincerely,

ARTHUR J. GOLDBERG,
Secretary of Labor.

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., August 2, 1962.

Hon. LISTER HILL,
Chairman, Committee on Labor and Public Welfare, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your request for the views of the Bureau of the Budget on S. 3382, a bill to amend the Public Health Service Act so as to establish a program to assist in the construction of adequate sanitation facilities for migratory farm labor.

The administration has been greatly concerned about the multitude of problems facing migratory farmworkers who move, often with their families, from place to place in search of agricultural work. Among these the lack of health services and sanitation facilities must be ranked high since their absence contributes to the serious health problems which lower the already depressed standard of living of the individual worker and his family.

The administration has supported a series of measures designed to help migratory workers. One of these, S. 1130, which has been passed by the Senate, is directed specifically at the workers' health problems. This bill authorizes the Surgeon General to make grants to public and nonprofit organizations to enable them to provide family health clinics and establish special projects to improve health services and health conditions of migratory workers.

S. 3382 is inadequate in many technical respects, several of which are discussed in the report on this bill submitted to your committee by the Secretary of Health, Education, and Welfare. More importantly, however, we believe that there is a need for further exploration of various possible ways in which this problem could be met before supporting any particular solution or bill. Perhaps one approach might be that such as is taken in S. 1130; namely, special project grants which would be used to study the need in specific areas and for development of demonstration or pilot projects to test different approaches.

It is believed that a program along these lines might be considered if Federal aid is to be provided in this area.

Accordingly, the Bureau of the Budget recommends against favorable consideration of S. 3382 by your committee.

Sincerely yours,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

Senator WILLIAMS. The first witness will be Mr. Reuben Johnson of the National Farmers Union.

STATEMENT OF REUBEN L. JOHNSON, DIRECTOR, DIVISION OF LEGISLATIVE SERVICES, NATIONAL FARMERS UNION

Mr. JOHNSON. Thank you very much, Mr. Chairman.

I am appearing here today in support of S. 3382, a bill to provide assistance for the construction of sanitary facilities for migratory agricultural workers.

May I say first, Mr. Chairman, that the Farmers Union wholeheartedly supports the work that the members of the committee, particularly you, Mr. Chairman, have done on the entire broad perspective of the problems of the migrant agricultural worker. Surely there are no more oppressed, exploited, or poverty-stricken workers in America than the migratory agricultural laborers.

In line with the concern that the thousands of farm family members of the National Farmers Union stated in their policy program, that—

> Legislative provisions should be strengthened regarding wage rates, health, safety, and housing conditions, for domestic migratory farm labor and for the education of the children of migrant families—

we commend the committee for the recognition that they have given to this problem.

Farmers Union members realize that their own economic welfare is closely tied wtih that of the migrant worker. They, unlike some shortsighted groups, welcome the economic advancement of the migrant worker, because by doing so, it strengthens the position of the family farmer.

Today 95 percent of the farmers in the United States use less than $2,000 annually for hired labor. It is the other 5 percent, made up largely of the corporate type of farming, that accounts for 70 percent of the hired farm labor.

The Farmers Union knows that a policy to deprive the migrant worker of a just wage and adequate living conditions means that the independent family farmer is then put in a position of competing with the migrant laborer for the value of his labor. From the standpoint of the family farmer, to do other than improve conditions of migrant workers would be to deprive himself of income and a fair living standard.

Unfortunately, the migrant worker and the family farmer have been competing with each other for too long. This has meant that both groups have been inadequately reimbursed for their efforts. Passage of this bill would be a step toward the improvement of living conditions, and would be of mutual benefit to family farmers as well as to migrant labor.

Aside from the strict economics involved in this bill to provide sanitary facilities for migrant workers, the Farmers Union believes that it warrants support from the purely social standpoint.

Our members believe that the migrant worker is truly the forgotten American. Their work, which is so important to the American economy, has gone unrewarded. The average yearly wage of the migrant is less than $1,000 a year. They do not benefit from either the minimum wage law or workmen's compensation. They are largely poverty stricken and deprived.

Mr. Chairman, the Farmers Union believes that the migrant deserves much more than he has been receiving. This bill, which would provide adequate sanitary facilities to halt the high disease and death rates, is one legislative method to improve the lot of the migrant.

We urge support for it, as we have for the other legislation, that this committee and other committees of Congress have sponsored, to enable migrants to become first-class American citizens.

Senator WILLIAMS. We certainly appreciate your support of this legislation, Mr. Johnson.

You have been before the subcommittee several times now, as we have considered legislation dealing with education and health, two of the problems confronting migrant children, and you have been in support of, a strong advocate of, all of this legislation.

There is no one bill that seems to be more important than another. They all work together. I hope we can work our way forward with all of this legislation this year. As you know, we have had success in the Senate with five of our bills. They are now before the House.

As I see it, one of the fundamental needs of migratory farm people is in sanitation. We saw this as recently as Monday (July 23) on a field trip in New Jersey, where it was obvious that sanitation facilities are one of the basic needs if migratory farm families are to have just the rudiments of healthful living.

We have hopes that this legislation will move this year, as other bills did last year, and we have hopes, too, that there will be time for the House of Representatives to pass them.

At any rate, we certainly thank you for your constant and effective support for these inexpensive but necessary programs for better living for migratory farm people.

Mr. JOHNSON. Mr. Chairman, we appeared last year before the Subcommittee on Equipment, Supplies, and Manpower, of the House Agriculture Committee, presenting a comprehensive statement of our position regarding this whole problem. I picked up a copy at the office before I left, and if your record will stand a few extra pages—it is not of great length—I think it might be well at this time to request your permission to insert it in the record and make it a part of our comments here today.

Senator WILLIAMS. We would be very glad to have it in the record at this point.

(The statement referred to previously follows:)

STATEMENT OF NATIONAL FARMERS UNION, BEFORE THE SUBCOMMITTEE ON EQUIPMENT, SUPPLIES, AND MANPOWER OF THE HOUSE AGRICULTURE COMMITTEE, MARCH 9, 1961

Mr. Chairman and members of the subcommittee, we appreciate the opportunity to appear before the Subcommittee on Equipment, Supplies, and Manpower.

National Farmers Union is a private association of family farm operators. Delegates to our most recent convention defined a family farm as "an agricultural production unit that can be efficiently operated by a typical, full-time farm operator family that furnishes most of its own labor." For all our 59 years as an organization, we have supported those programs and policies that implement, improve and give value to the family farm pattern of agriculture.

According to 1959 census data, more than one-half of the 3.7 million farm operators reporting employed no hired labor. In the month of January 1961, farm operators and their family members working on home farms accounted for four-fifths of the total farm work force.

In 1954, 96 percent of 4.3 million farm families reporting had working operator and family members and only 18 percent of farms reported hired workers. (See exhibit A.)

Census data in 1954 indicates also that of the 9.6 million farmworkers employed on 4.3 million farms working operators and family labor account for more than two-thirds—6.9 million. (See exhibit B.)

Approximately one-half million workers today on farms are Mexican nationals coming to the United States under Public Law 78.

As the subcommittee considers the extension of Public Law 78, we urge your consideration of such a program over the long range on the family operated farms which, although weakened by the pressures of low prices and income, make up the hard core of U.S. agriculture.

What is the extent of underemployment in agriculture?

Secretary Freeman testified before the House Banking and Currency Committee on the area redevelopment bill (H.R. 4569) that "the root of the trouble in agriculture is the same as in other parts of our economy: There are not enough jobs to go around. Unemployment is the basic cause of underemployment, the basic reason we have pockets of poverty in rural areas."

Secretary Freeman said that underemployment in agriculture has been calculated by research people in the Department of Agriculture to represent 1.4 million people.

What effect do low wage rates for the hired labor on large farms have on net earnings of farm operator families?

This question has not been given sufficient attention in the research studies that have been made to date. Following logically from the limited information available, however, there does appear to be a relationship between the relatively low wages of hired labor on larger than family-type farms and the low per hour earnings of all farmworkers.

In this connection, I call your attention to exhibit C, which compares the per hour earning of hired farmworkers with all farmworkers, including hired workers, farm operator and family labor, over the past 10 years. If the value of perquisite such as livestock units, housing, fuel, and other food items were added to the wage per hour of hired labor remaining on farms year round, the return would be somewhat higher than shown in the table. I would also call your attention to the fact that the wages of the lowest paid seasonal labor is averaged into the earnings per hour of hired labor.

May I ask the members of the subcommittee to reflect a moment on what these figures mean:

At 82 cents per hour family farm operators and members of their families in 1960 made the equivalent of $32.80 per week, or $1,640 for a 50-week year—about half the annual salary of the lowest paid Government worker.

At 82 cents per hour hired farmworkers in 1960 received the same average pay as their employers.

Does any member of the committee believe that an adequate family living can be attained by a modern American family on this basis? Can American democracy afford a complacent attitude toward this kind of a situation?

We in Farmers Union think not.

If the prices received by farmers for the products we produce and sell are so low that only a meager margin, if any, is left above the actual cash costs of production goods, supplies and materials, plus taxes, plus some kind of comparable return on investment, the farm operator is able to obtain neither a decent wage for himself and his family's labor nor the gross income to enable him to pay a decent wage to hired farmworkers.

How many and what type of farms employ imported labor?

We urge the subcommittee to initiate the research necessary to find the answer to this question and also the extent to which the crops grown on farms employing imported labor are the same as produced on the family-operated farms of the Nation.

We are concerned by the lack of information on the economic effect of large numbers of imported farmworkers on family-operated farms. We, therefore, urge you to provide for further study of the Public Law 78 program on our traditional pattern of family-operated farms.

In any consideration of a program to add a half-million farmworkers to our economy, we urge that you also consider the implications upon the objectives of the Unemployment Act, the Area Redevelopment Act, and the Fair Labor Standards Act. There is an urgent need, for example, for rural industries that can provide jobs for seasonal farmworkers when they might otherwise be on welfare rolls in some nearby city.

As an organization, National Farmers Union supports expansion of minimum wage legislation to cover farmworkers along with a farm income stabilization and supply management program that would assure farmers, as employers,

enough Federal protection of, or authorization for, an adequate income program to enable them to pay just wages. We believe that most farmers share this view.

Hired workers on farms, like all hired workers, should be protected by Federal law in the exercise of their rights to organize, to bargain collectively, and to protect their organizations. These rights should be provided farmworkers in the same laws and by the same enforcement machinery as provided for other workers, namely, the National Labor Relations Act. The hours and wages of farmworkers should be governed by the same minimum wage and maximum hour regulations and laws as govern workers in other industries, and should be enforced by the same agency in the U.S. Department of Labor. Farmworkers' housing should be fully as adequately provided for by Federal law as other public housing for low-income groups and administered and financed in the same manner.

It is our deep conviction that farm labor problems should not be singled out for separate and different treatment from other labor relation issues. These are principles equally as correct and just as the goal of parity farm income for farm-operator families. And these are goals to which farmers generally can and will subscribe but they must have the farm gross income from which the cost of such wages and working conditions can be paid.

In our opinion, the questions of adequate wages and housing for farm labor cannot be appropriately solved or intelligently considered in absence of adequate farm income stabilization legislation. Congress thus would not be asked to act on farm labor or wage legislation without acting on farm income legislation. And by the same logic, we believe Congress should make certain when it passes adequate farm income legislation, that adequate provision is made for protection of income of hired farm labor.

In closing, Mr. Chairman, we respectfully request that the subcommittee consider the future welfare of family farm operators and the Nation in the decisions you will make on Public Law 78. We do not think that the large majority of farmers favor a future for our Nation's agriculture that is built on a mud hill of impoverished living standards for seasonal farmworkers.

EXHIBIT A

Percent of farms reporting, and average workers reported per farm, by type of worker and economic class of farm, fall 1954

Economic class of farm	Number of farms reporting farm labor [1]	Percent of these farms reporting				Average workers per reporting farm [2]		
		Family workers			Hired workers			
		Operator and/or family members	Working operators	Unpaid family members		All types	Family workers	Hired workers
	Thousands							
All farms	4,297	99	96	40	18	2.2	1.6	3.6
Commercial:								
Class I	131	93	92	34	77	8.1	1.6	8.6
Class II	436	98	96	45	44	3.1	1.7	3.2
Class III	680	99	97	49	25	2.5	1.8	2.8
Class IV	767	99	97	49	17	2.3	1.8	2.9
Class V	702	99	97	46	11	2.0	1.7	2.8
Class VI	413	[3]	98	35	6	1.6	1.5	2.4
Noncommercial:								
Part time	492	99	95	34	7	1.6	1.5	2.1
Residential	673	99	96	22	2	1.3	1.2	1.6
Abnormal	2	83	81	11	69	7.0	1.6	8.2

[1] Of the 4,783,000 farms covered by the 1954 Census of Agriculture 486,000 did not report on farm labor. The proportion of nonreporting farms ranged from 2 percent for the class I farms to 23 percent for the residential farms.

[2] For only those farms which reported workers of the particular type.

[3] Over 99.5 percent.

Source: The 1954 Census of Agriculture, Bureau of the Census, vol. II, ch. XI, pp. 1144 and 1150.

EXHIBIT B

Farm workers, by type of worker, and average workers per farm reporting, fall 1954

Type of worker	Number of farms reporting	Workers		Average workers per farm reporting
		Number	Percent of all farm-workers	
	Thousands	*Thousands*		
Family and/or hired workers	[1] 4,297	9,597	100	2.2
Family workers, total	4,242	6,868	72	1.6
Working operators	[2] 4,142	4,142	43	1.0
Unpaid family workers	1,738	2,725	29	1.6
Hired workers, total	[3] 752	2,730	28	3.6
Regular workers	333	691	7	2.1
Seasonal workers	505	2,039	21	4.0

[1] There were 486,000 farms, or 10.2 percent of the 4,783,000 farms covered by the 1954 Census of Agriculture, which did not report on farm labor.

[2] By census definition there is always 1 and only 1 operator per farm.

[3] An additional 1,469,000 farms reported expenditures for hired labor during the year but did not report any hired workers for the week covered by the census survey.

Source: 1954 Census of Agriculture, Bureau of the Census, vol. II, ch. IV, table 4, p. 240.

EXHIBIT C

Comparison of per hour earnings—Farm operator and family labor with hired farmworkers (U.S. average)

	Hired farm labor	All farm labor hired, operator and family		Hired farm labor	All farm labor hired, operator and family
1951	$0.625	$0.920	1956	$0.705	$0.839
1952	.661	.879	1957	.728	.776
1953	.672	.874	1958	.757	.958
1954	.661	.805	1959	.798	.750
1955	.675	.754	1960	.817	.816

Source: USDA, Agricultural Marketing Service.

EXHIBIT D

Comparison of hours worked and per-hour earnings of farm operator and family labor with hired farmworkers on commercial family-operated farms (3-year averages, 1956, 1957, and 1958)

Type of farm	Farm operator and family labor			Hired labor		
	Hours worked	Return for labor	Return per hour	Hours worked	Total amount received	Return per hour
Dairy farms, western Wisconsin	3,460	$2,023	$0.58	473	$256	$0.54
Dairy-hog farms, southeastern Minnesota	3,623	2,218	.61	297	270	.91
Hog-dairy farms, Corn Belt	3,853	4,132	1.07	540	526	.97
Hog-beef farms, Corn Belt	3,250	2,732	.73	243	225	.93
Cash grain farms, Corn Belt	2,900	3,394	1.17	397	380	.96
Cotton farms, Black Prairie, Tex	2,250	440	.20	957	568	.59
Cotton farms, (nonirrigated) High Plains. Tex	2,207	3,881	1.76	1,083	647	.60
Cotton farms (irrigated) High Plains, Tex	2,477	9,377	3.79	4,467	3,170	.71
Wheat-small grain-livestock farms, Northern Plains	2,463	3,695	1.50	447	439	.98
Wheat-corn livestock farms, Northern Plains	3,510	3,058	.87	373	304	.82
Wheat-roughage-livestock farms, Northern Plains	3,333	2,077	.62	227	226	1.00
Winter wheat farms, Southern Plains	2,310	3,581	1.55	320	307	.96
Wheat-grain-sorghum farms, Southern Plains	2,897	2,691	.93	227	204	.90
Cattle ranches, Intermountain Region	4,007	5,782	1.44	1,017	918	.90

Source: Based on information in Agricultural Information Bulletin No. 176, "Farm Costs and Returns, Commercial-Family Operated Farms by type and Location," USDA Agricultural Research Service.

Senator WILLIAMS. Thank you again.

The next witness is Peter Crolius of the Vegetable Growers Association of America.

STATEMENT OF PETER C. CROLIUS, EXECUTIVE SECRETARY, VEGETABLE GROWERS ASSOCIATION OF AMERICA

Mr. CROLIUS. Mr. Chairman, I am Peter C. Crolius, executive secretary of the Vegetable Growers Association of America, the only national organization representing vegetable producers.

I appreciate this opportunity to present the views of this association on S. 3382, a bill to amend the Public Health Service Act so as to establish a program to assist in the construction of adequate sanitation facilities for migratory farm labor.

The Vegetable Growers Association of America endorses the purposes of S. 3382, and with but three reservations we support the bill as written. Our reservations are as follows:

Parenthetically, I would like to say here that these reservations are made to clarify and to enlarge on the bill.

(1) Section 803(a)(4) and section 804(a) state that the Surgeon General of the United States shall have the authority to set standards of construction. We suggest that standards of construction shall first meet existing local, county, or State regulations. In areas or States where there are no existing standards or where those standards fall short of those prescribed by the Surgeon General, standards set by the Surgeon General shall be used.

(2) We believe the bill should state more specifically in section 806(a) what projects are or are not included. For example, does the term "water facilities" include potable water facilities (wells, pumps, piping, et cetera), and does it include shower baths, laundry facilities, et cetera? Does the term "waste disposal" include, for example, kitchen refuse disposal?

Also, parenthetically, here, Mr. Chairman, I have made an addition to the written statement, which you have in your hand. There is an addendum. I will read the full text as revised.

(3) Section 806(b) presupposes that sanitation facilities already exist. We suggest, therefore, that in line 14, page 6, after the word "includes," the phrase "but not restricted to" be added, or, line 15, page 6, after the word "facilities," the phrase "or establishment of new sanitation facilities" be added.

Thank you very much for this opportunity, sir.

Senator WILLIAMS. Well, we appreciate the fact that you have appeared here this morning, so that we can get your views on this legislation. We will certainly consider the points for clarification that you have suggested.

Mr. WILKINSON. Mr. Crolius, I wonder if you can clarify one point.

Is it your opinion that the facilities you have mentioned, such as wells, pumps, and piping, or, as you call them, "potable water facilities," are directly related to the health conditions of the migrants?

Mr. CROLIUS. I believe they are, yes.

Mr. WILKINSON. The other thing I wanted to ask you about concerns your statement regarding the existing State health codes. I wonder whether you would consider, not only the fact of there being an existing health code in effect, but also that such a code would be adequately enforced? Would this be meaningful, in your opinion?

Mr. CROLIUS. Yes, perhaps that should be added also.

Mr. WILKINSON. That it should be a well-enforced standard?

Mr. CROLIUS. Yes, and I would further suggest that there be local enforcement of construction.

Mr. WILKINSON. I also wonder if you believe that this bill, since it is designed to bring adequate sanitation facilities within the financial realm of growers, would encourage State legislatures to enact adequate health laws in those States that don't have such laws? Second, in the States that do have adequate sanitation, would this bill have the effect of encouraging the health enforcement people to enforce these laws?

Mr. CROLIUS. I think that we will see both results when this bill is passed. It will probably do more to get good sanitation bills passed by the State legislatures than probably any other means.

Mr. WILKINSON. Thank you very much.

Senator WILLIAMS. The problem, here, is characteristic of areas where migrant farmworkers are used. I do not know how broadly you have been able to travel the country since you have taken your position with the Vegetable Growers Association, but this subcommittee has been from coast to coast and in more than a dozen States.

Mr. CROLIUS. Yes, sir.

Senator WILLIAMS. And we know this is temporary employment, and people live for relatively brief periods on farms, near farms, during the period of the harvest.

It seems to me that it has been basically a question of money, providing adequate housing and sanitation facilities. There are other problems, I know. But having been on really hundreds of farms, I cannot recall seeing what we consider just the beginning of sanitary living—the flush toilet facilities.

As I indicated earlier, on Monday, July 23, we saw a system of sanitation that was used a hundred years ago, called the outhouse. And this was it, for maybe up to a hundred families.

This is, of course, related to the problems of their health.

Mr. CROLIUS. Excuse me, sir. These were probably those types of facilities which were available to me when I was working on farms, the 19th-century-type of facility, quite rudimentary.

I would like to ask you a question, Senator. Is it the opinion of the subcommittee that the establishment of these facilities or lack of establishment is due primarily to lack of money, on the part of the growers and farmers?

Senator WILLIAMS. I think it is a combination of both the expense of adequate facilities that will be used only 3, 4, or 5 weeks of the year and the background of understanding and appreciation of the migrant farmworker himself.

We have other legislation that is designed to bring just a bit of basic education to the farmworker on how to live a clean, sanitary life, and how to use the facilities that can be furnished. It is a combination.

Mr. CROLIUS. Thank you, sir.

Senator WILLIAMS. Thank you. We are very grateful to you.

Mrs. Sarah Newman of the National Consumers League.

The National Consumers League in all of our legislation also gets an award of merit. As a matter of fact, the National Consumers League was working with the problems of migrant farmworkers before we had a subcommittee, before the Congress focused its attention to the degree it has now.

STATEMENT OF MRS. SARAH NEWMAN, GENERAL SECRETARY, NATIONAL CONSUMERS LEAGUE

Mrs. NEWMAN. Thank you very much, Senator.

My name is Sarah Newman. I am the general secretary of the National Consumers League. The league was founded in 1899 on the principle that consumers have the power and the responsibility to

improve the conditions under which the goods they use are made and distributed.

Because of this belief, the league has long been concerned about that most underprivileged group of workers in the United States, the migratory farmworkers. Studies throughout the years, initiated by Congress, by executive agencies, by State governments, and by private organizations, have revealed a dismal picture of pathetically low wages, great unemployment, lack of educational opportunities, inadequate housing, lack of sanitation and health facilities—in short, a picture of unbelievably substandard living and working conditions.

As former Secretary of Labor Mitchell once said, "The migrant is a charge upon the conscience of us all."

Both of our political parties are aware of this incongruity in our affluent society, and in 1960, the Republican as well as the Democratic Party platforms called for action to improve conditions for migratory workers.

Your committee recommended, and the Senate last year did pass, some legislation which would have improved the situation to some degree. But at this late point in the second session of this Congress, the bills have not been voted on in the House, and the stream of migrants already on their way to pick this season's crops can expect very little improvement in their lot.

Only a few days ago we received a call from a private organization for help in procuring surplus foods for migratory workers and their families in a New York county which had been hard hit by drought.

I am sure that I do not need to recount to this subcommittee the grim conditions which exist in many migrant camps. It is not at all unusual to find some camps housing as many as 25 or 30 families, that have only one water faucet, with an open ditch to drain the waste water, where the only toilet facilities are a couple of pit latrines, and where no provision at all is made for garbage disposal, so that there are always rotting piles heaped high near the camp, and there is absolutely no control of insects or rodents.

When to this lack of sanitary facilities is added the crowded housing, the constant exposure to debilitating heat and cold, the overwork, the malnutrition, and the lack of adequate medical facilities, it is not surprising that large numbers of these families pose a real health hazard to communities through which they travel.

In one of the reports issued last year of an outbreak of diphtheria in a Texas county, of the 72 cases reported, 29 were among migrant farm families, and this meant that not only the 37,000 residents of that county were exposed, but all others with whom these migrants came in contact as they moved from State to State.

The transmittal of diarrheal diseases, usually carried by these families as they travel from one crop picking area to another, must result in untold needless expense to combat this highly contagious ailment.

Some of the States have had to institute crash programs to prevent the spread of tuberculosis, malaria, and venereal diseases which spread so easily, not only among the migrants themselves, but among the others in the communities with whom they come in contact.

Some States have tried to meet this problem by adopting good standards for migrant camp regulation. But with limited inspection, these standards are very rarely observed.

Minnesota, for example, has a good code, but in 1959, with only one public health sanitarian, they were able to inspect only 118 camps out of the 1,000 in the State. In these 118 they discovered 729 violations.

Even this is better than some States are able to do. Not many try, as Wisconsin does, for example, to inspect every camp each year, and to require registration and certification of its migrant labor camps.

There is at present no Federal legislation of which I am aware requiring employees of domestic farmworkers to provide adequate and sanitary housing facilities, as is required of employers hiring Mexican farmworkers under Public Law 78, and many growers are unwilling voluntarily to make the investment in better housing and sanitation for domestic migrants.

It is probably true that for some farmers this kind of an investment would be a real financial hardship, particularly for those who rent their land. This, of course, is not true for all farmers, especially the large operators. This raises the question as to whether farmers should be subsidized from public tax moneys to enable them to construct appropriate facilities.

If public money is used, perhaps the facilities should then be owned by the State, or, alternatively, perhaps the farmers could be induced to construct these needed facilities by making low interest loans available to them for such purposes.

At any rate, the public health hazard which exists as a result of these conditions is great enough to warrant some sort of Federal program of assistance to the States to help wipe out some of the conditions which cause this high incidence of disease.

Since the problem is interstate in nature, and national in scope, only Federal action can really make an impact on this situation. Encouragement and support from the Federal Government is needed by the States to help them make sure that the migrants are provided with at least the basic sanitation requirements: an adequate and convenient water supply, facilities for bathing and laundering, satisfactory arrangements for disposal of excreta and liquid waste, provisions for disposal of garbage, and provisions for insect and rodent control.

Although such improvement in the conditions under which migratory families live would be helpful, the league would like to reiterate its contention that the migrant will never become a first-class citizen until Federal legislation guarantees him a decent minimum wage with which to procure the basic necessities of a decent life; until he has fairly continuous employment; until he receives protection against injuries and unemployment; until educational facilities are provided for his children; until safe and sanitary housing is provided; and until adequate health services are made available for him and his family.

As one step in this direction, the league feels that S. 3382 would be some assistance. We are aware that this subcommittee has taken other steps to improve the lot of our "forgotten people." We would like to urge you to consider some of the other bills which have been introduced in the Senate to help the migrants, such as the stabilization bill.

We shall continue to press for action in the House on the bills already passed by this body, so that the day may come when our consciences may be free of this burden, and we will have restored first-

class citizenship to that large underprivileged group in our economy who help to bring the abundant fruits of our land to us who are so much more privileged.

On behalf of the National Consumers League, I wish to thank you for this opportunity to present our views on this subject, which has been a great concern to us for many years, as you well know.

Senator WILLIAMS. Mrs. Newman, we receive your statement with a great deal of gratitude.

I wonder if you could tell me a little bit about the National Consumers League; your makeup, and who you are, and who your membership is.

Mrs. NEWMAN. We were organized back in the 1890's by a group of women, I suppose most of them social workers, who felt that certain conditions under whch some of the people in our economy were working were really insufferable. And their decision was that the consumers, by refusing to buy commodities made by people who were exploited in the production or sale of these commodities—that this was a responsibility that consumers really should take, and that consumers could have some effect on this. And they enlisted the support of many people of like mind throughout the whole country.

Our membership is made up of a number of individuals from all States in the Union. We have over the years had local consumer leagues, as many at one time as 60, in various localities throughout the States, who have concerned themselves with specific problems.

We have worked, I think, since 1906 to help conditions of migratory farm labor.

Senator WILLIAMS. Since 1906?

Mrs. NEWMAN. 1906, I think, was the first time that we went into the field of migratory labor.

We work, of course, on other legislation which would help labor, such as fair labor standards, minimum wage. We are concerned with straight consumer legislation, as well.

We have appeared before this subcommittee, as you know, many times, in support of legislation which would help migratory farmworkers.

Senator WILLIAMS. I do not know what the quantitative measure of your membership is. I do know that it is very high. But what is the number?

Mrs. NEWMAN. We have a membership of about 1,500 individuals. In addition to that, of course, we work very closely without member relationship, with many organizations throughout the country.

Senator WILLIAMS. We had two of your most prominent members with us Monday on a field trip in New Jersey, Mrs. Reed and ——

Mrs. NEWMAN. Mrs. Hawkins, probably. And Mrs. Zwemer, maybe. They have been very active in the New Jersey league, and all three of them are members of our national board.

Senator WILLIAMS. I do not know how much opportunity you have had to go to the fields.

Mrs. NEWMAN. Very little. I have been with the National Consumers League as general secretary only since January, but I have talked with some of our board people who have been out in the field, and I have heard some of the stories.

Senator WILLIAMS. I have been out quite a bit, and I have been both in the camps and in the fields, and I know what the pattern is in the camps in terms of rudimentary sanitation.

There is another factor, however, that I think people should understand, and should know. The migrant farmworker leaves his camp generally very early in the morning, unless it is a crop that can only be harvested after the dew is burned away, and has a ride or a long walk to a vast area of harvest.

I can recall 2 years ago we were in an area of a celery harvest, and the fields were quite a long ride from where folks spent their evenings, where they lived at night.

They go to these vast areas of harvest, and there they are, from dawn until 2 or 3 or 4 in the afternoon. I have yet to see any provision for sanitation where the harvest is.

Mrs. NEWMAN. That is why I am glad that the bill includes field sanitation, because I have heard stories of this nature in many areas.

Senator WILLIAMS. It is very interesting. I mentioned the celery harvest. The system of harvest in celery is something like this: They have a vast factory on treads. The celery is chopped and brought in on moving conveyors, and the men are out chopping celery onto the conveyor belts into this moving factory, where the celery goes through a wash, it is packed in boxes, and really the next human hands that touch that celery are yours and mine in our homes. It is something to contemplate.

Mrs. NEWMAN. And the washing is not a very effective washing, judging from the celery that we buy in the stores.

Senator WILLIAMS. This is true of other fruits and vegetables, from the tree, from the ground, into a hamper, and into your house, picked by people who do not have any facilities for sanitation, where they are working 8 hours a day.

Mrs. NEWMAN. That is why I think the consumer really should take the responsibility. I do not think any consumers want to benefit from such vile exploitation of labor. If it means added costs, I think consumers would be willing to accept those.

Senator WILLIAMS. Well, we are all glad to know that President Kennedy has addressed himself and his administration to some of these problems. He has set up a division in the Department of Health, Education, and Welfare to protect the consumer, and he has discussed four rights of the consumer; the right to safety, the right to be informed, the right to choose, and the right to be heard. And so it is official now.

We want to have your opinion. We want to know what you feel. And we want to do a lot of the things you want us to do.

Mrs. NEWMAN. Thank you very much.

Senator WILLIAMS. We are getting to the hour of 11, and the Senate is in. We might run into objections. But Father Vizzard, I see, is with us.

Father, would you want to submit your statement and then just talk for 6 minutes?

STATEMENT OF REV. JAMES L. VIZZARD, S.J., DIRECTOR OF THE WASHINGTON OFFICE, NATIONAL CATHOLIC RURAL LIFE CONFERENCE

Father VIZZARD. Mr. Chairman, my statement is so brief that I can read it and be finished in 3 minutes, I believe.

Senator WILLIAMS. That will be fine, Father.

Father VIZZARD. My name is Father James L. Vizzard, S.J. I am director of the Washington office of the National Catholic Rural Life Conference, at 1312 Massachusetts Avenue NW. In this statement I am speaking not only for the National Catholic Rural Life Conference, but also, by explicit authorization, for the Bishops' Committee for Migrant Workers and the Bishops' Committee for the Spanish Speaking.

Mr. Chairman, my statement will be brief. The Catholic organizations for which I am speaking appreciate this opportunity to express before this subcommittee our urgent recommendation that S. 3382 be favorably reported by the subcommittee and passed by Congress.

Mr. Chairman, it would be inconceivable to me that there could be any opposition to this bill. The purposes of the bill are simple and uncomplicated: To provide funds to appropriate parties to assist in the construction or renovation of sanitation facilities used by migratory farm labor.

The need for such assistance is well known to anyone who has ventured out into the camps and fields where migrant farm families live and work. Almost everywhere sanitation facilities are grossly inadequate or even nonexistent. Such conditions contribute not only to the destruction of human dignity and decency, but also to the exceedingly high rates of communicable diseases among these families.

Employers have not been wholly unmindful of the critical nature of this problem, but as with housing for migrants, they claim they cannot afford to build and maintain adequate facilities for the use of workers and their families who may be in the camp or area only a few days or, at most, a few weeks out of the year.

Because of the employers' lack of interest, or their conviction that they cannot do anything about it, county and State health agencies have usually looked the other way. After all, the growers are important and influential citizens, and the migrants are not.

The program proposed by S. 3382 involves relatively only a very small sum of money, but it can be hoped that it will be enough to encourage and assist those growers and States that have serious desire and intent to correct a truly miserable situation.

In conclusion, I want to take this occasion publicly and emphatically to congratulate the distinguished chairman, Senator Harrison Williams, and all the members of the subcommittee, for the hard, intelligent, and dedicated work which has produced not only this bill, but also all the other so-called Williams bills directed toward the improvement of the conditions of life and labor of our migratory farmworkers.

The workers themselves are most often voiceless and unrepresented. But I hope it will not be considered presumptuous if I thank you in their name. If through legislative action some degree of justice and human dignity and decency are restored to that traditionally honor-

able vocation of farmworkers, it will be largely because of the energetic and selfless efforts of Mr. Williams, of this subcommittee, and of its excellent staff.

I thank you, Mr. Chairman.

Senator WILLIAMS. I am almost embarrassed for all that high praise.

We do have something new going for us, here. We have this subcommittee and its magnificent staff, and there has been a high degree of success in moving measures through the Senate, and certainly you, Father, and those with whom you work have been most helpful not only here, but in the fields we have visited in our travels across the country. It has been a community effort that has brought us where we are. We certainly are grateful, again, for your help.

As I was talking with Mrs. Newman about some of the harsh facts of life, I could see you sort of nodding your head in assent.

Father VIZZARD. I have been out in many of the fields and camps myself, Senator.

Senator WILLIAMS. I thought the way you were agreeing with me indicated that you have been close to the field situation. From where we sit in Washington, it seems somewhat academic. But you have been where the folks are who do work in the fields.

Father VIZZARD. In California, in Texas, in Michigan, and many other areas.

Senator WILLIAMS. Has your experience been, as mine, that there is a lack of sanitation and facilities in the vast fields and orchards where migratory farmworkers work?

Father VIZZARD. Indeed it has, Senator. On other occasions I have said that most consumers would gag on their salad if they saw these conditions, the lack of sanitary conditions, under which these products are grown and processed.

Senator WILLIAMS. Is this unusual, or is it the rule?

Father VIZZARD. In my experience, it is the rule.

Senator WILLIAMS. Where have you been? Where have you traveled to the fields?

Father VIZZARD. In the Santa Clara and San Joaquin Valleys of California, in the areas of west Texas and the Amarillo area, in the St. Joseph and Benton Harbor area of Michigan. Those are the ones that come to mind immediately.

I might suggest, Mr. Chairman, that in conversations recently with Congressman Zelenko, who is handling several of these bills on the House side, he indicated that there was a growing sentiment among the mayors of several large cities, of concern over the lack of sanitary facilities under which the foods come to consumers of their cities; that there have been in various cities outbreaks of communicable diseases, such as dysentery, hepatitis, and so forth, which conceivably could be traced to the lack of sanitation in the fields where the foods come from. And he expressed to me the opinion that this conviction on the part of the city officials could ultimately result in serious problems and major opposition to the callousness or the lack of concern on the part of the growers for the human needs of the people who work for them.

Senator WILLIAMS. Well, not only do we feel this is important from the standpoint of the consumer of the fruit and vegetable harvest, but the folks in the camps, too. Diarrhea is not considered to be a killing disease in our cities and towns where most of us live, and yet

among migrant farm families this is, I believe, the second reason for death of youngsters.

Father VIZZARD. That is right.

Senator WILLIAMS. The tots, the little ones of 2 and 3 years of age.

Father VIZZARD. Yes.

Senator WILLIAMS. There are other aspects that we could talk with you about, Father, the social aspects of just this little sanitation bill, this community sanitation system that is now used—privy row.

Have you any observations on that?

Father VIZZARD. We usually demonstrate what we think about other people, what consideration we have for our neighbor's human dignity, by the physical facilities in which we allow them or force them to live and work. The lack of consideration for this particular human need, that is, for potable water in the fields, and sanitary facilities and shower facilities, the fact that these are not provided, communicates to the workers indirectly but very strongly the viewpoint that the employers hold, the attitude that the employers have toward the workers.

I am certain that most of the employers provide better facilities for their household pets than they do for the human beings that work in the fields for them, and through their work make it possible for them to make profits.

This may be an intangible, but to the worker, it is a very real thing—the denial of an attitude of appreciation of human dignity and decency toward them.

This is a part, as you know so well, only a small part, perhaps, but an important part, of the overall problem—that farmwork has been demeaned. It traditionally, as I mentioned in my statement, has been an honorable vocation, but by the conditions of life and labor which have been created primarily in the last generation, this work has been demeaned. And by making advances such as this bill would provide, we can restore the dignity to this vocation and make it possible for people to make a decent living and live in decent conditions while doing this essential job.

I hope that this bill has no trouble going through the committee and through the Congress, and I hope the same, of course, for the other Williams bills.

Senator WILLIAMS. Well, this bill has received support from certain quarters where we have not had support for other measures. We have always had your support and that of the people you speak for, who are most knowledgeable and most humane individuals. This bill has across-the-board support. The representative of the Vegetable Growers Association of America, for example, testified earlier this morning in support of the bill.

We know some of our bills appear to the growers to work an economic hardship on them, and therefore they are opposed. Far from working an economic hardship, however, this bill is designed to help in an area where the grower himself, cannot reach. It is designed to help the worker in his problems of health and sanitation, and as you so well put it, his self-respect, too.

Father VIZZARD. I hope I do not seem facetious when I say that it is a tribute to your persistence and ingenuity that you have found a bill that they would support.

Senator WILLIAMS. I hope we are not unduly optimistic, here, but I feel that we are moving ahead properly.

We are very grateful to you, Father.

Father VIZZARD. Thank you again, Mr. Chairman.

Senator WILLIAMS. We do not have any other witnesses.

The staff is authorized to have included in the record the text of the bill, explanation of the bill, departmental reports, individual and organizational views, and other materials related to the bill issues or testimony.

The staff is authorized after the conclusion of oral testimony to hold the record open for such period as is necessary to carry out these instructions.

Because Senator Burdick and Senator Metcalf were unable to attend the hearing this morning, I am including their statements on S. 3382, in the record at this point.

(The statements of Senator Burdick and Senator Metcalf follow:)

STATEMENT BY HON. QUENTIN N. BURDICK, A U.S. SENATOR FROM THE STATE OF NORTH DAKOTA

The grim days of the thirties are now history. Many of us will recall the time when the Farm Security Administration assembled a group of photographers and told them to document with their cameras the agricultural world they saw about them; they did, and their pictures shocked and aroused an entire generation of Americans. City dwellers who know only that lettuce and carrots were harvested suddenly became aware of the jalopies in which migrant farm families rode to get to the harvest, the hovels in which they lived, and the sanitation problems they faced. Those photographs, now on file in the Library of Congress, record an era of depressed areas and depressed people.

Now our country is basically healthy, but those pictures still document the plight of migrants today. Unmet health needs are still one of the most critical problems facing migratory farm families. These families, for economic and educational reasons, are the very families in our Nation least able to cope with health problems. Yet the migrant farm family is more vulnerable than the general public to illness and disease because of the substandard conditions in which they are forced to work and live. In the great majority of cases, privies rather than toilets and well water rather than running water are all that are available to migrant families across the Nation.

The Senate-passed health bill, S. 1130, is designed to encourage and assist States to provide health services and programs for migratory farm families; this type of State action is, of course, critically needed. The sanitation bill, S. 3382, provides another tool by which the health problems of these deprived Americans can be solved. This bill will eliminate inadequate sanitation facilities—a major source of the sickness and disease prevalent among our migratory population.

Numerous studies have demonstrated that poor sanitation facilities are a direct cause of diarrheal diseases; they have shown that the run-down sanitation facilities which serve migrants also serve to undermine their health. There is a fantastically high mortality rate among infant and young children which results from diarrheal diseases.

Unhealthy, unsafe conditions do not prevail only where migrants live; they also prevail where they work in the fields. Agriculture is not a notable exception to the laws requiring the maintenance of sanitation standards at work locations. In other areas of commerce, especially in food-packaging industries, we do not tolerate a lack of toilets, clean drinking water, or handwashing facilities. In agricultural work, however, the health standards of the 20th century are unknown.

The sanitation bill, S. 3382, is a necessary complement to all our other attempts to help the migrant. Without decent sanitation standards, education in healthful living will be of no use at all to these unforunate citizens; they must have the chance to put into operation what they learn.

We as legislators and as consumers are not alone in being aware of the extent of this problem; the farmer is aware of these sanitation needs. Often an entire work force will come down with a sickness or disease that temporarily halts the harvest. In farming this can be disastrous. Even when the disease is not of such magnitude, the farmer knows that he is losing money because of the poor health of his workers. Aside from the fact that a sick worker is not a productive worker, a sick worker threatens the health of his fellow workers and of the community in general.

Although farmers are aware of this problem, they are often unable to expend the money needed to construct a new sanitation facility or to renovate an existing inadequate system. This financial squeeze imposes a particular hardship on small farmers or on marginal farmers—usually the farmers with the least up-to-date sanitation facilities. The financial assistance to farmers for improving sanitation facilities for migratory farmworkers provided under this bill will be a major factor in eliminating the health problems that take such a heavy toll among our migratory population.

By solving the financial problems that prohibit the farmer from providing the improved sanitation facilities for workers that he often needs and deserves, this bill also overcomes two other obstacles that stand in the way of upgrading the health of migrants. First, realistic State legislatures are hesitant to pass sanitation codes to which growers. for financial reasons, cannot conform. Second, State health officials are often reluctant to enforce health codes as they should. Neither should be blamed for recognizing the economic facts of farming; this bill is eminently realistic in that it removes the financial bar to improvement in the conditions of our migratory farmworkers. It does so in such a way as to help everyone concerned; while realizing that the needs of the migrants are the foremost consideration, it does not penalize the farmer. In fact, the benefits to the farmer from this bill and others like it will be considerable.

That poor sanitation conditions breed disease has been proven; that this bill will improve those conditions I think is evident, and I have been setting forth some of the reasons why this is so.

I can testify myself both to the unhealthy qualities of migrant sanitation facilities and to the extent to which these qualities exist in the facilities provided migrants. Just recently I made a subcommittee field trip to Maricopa and Pinal Counties in Arizona. We visited

13 camps on our 3-day field trip. In many of the camps visited, the sanitation facilities were entirely inadequate.

I know, then, from firsthand experience, of the need for this bill. The indecent, unhealthy, disease-breeding sanitation facilities provided migrants in most areas of the country must be eliminated. They are a disgrace to the people that provide them and a disgrace to the Nation that tolerates them, and a hazard to the people who use them. I do not mean to be hard on the farmers, for in several of the camps I saw farmers who were really making an effort to provide adequate facilities for their workers; yet only the most prosperous farmers with the largest farms are financially able to do this themselves. The great majority of farmers need financial aid to improve the facilities they provide for migrants, and banks and private loan associations are seldom willing to give them this aid. Yet something must be done to meet this crying need. The bill, S. 3382, answers this need. No American, no humane and just person, can ignore this need or can pretend it doesn't exist. Thus I support this bill wholeheartedly both because I know as a legislator that it is a realistic, well-thought-out solution to these problems, and because I know too as a human being of the crying necessity for this legislation. I urge as strongly as possible that it be enacted into law so that some improvement can be made in the deplorable conditions that over 2 million American citizens face daily and in which they must bring up another generation of our fellow countrymen.

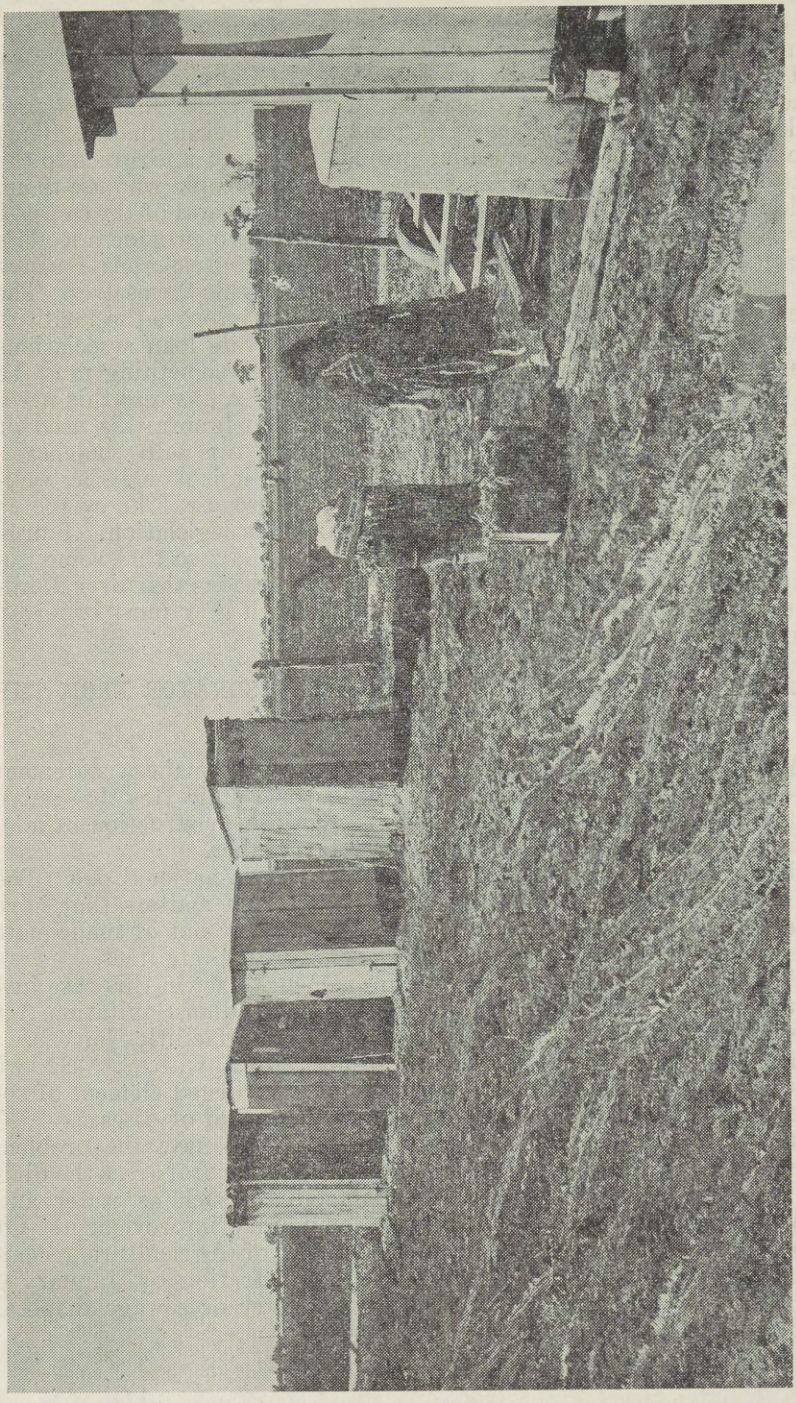
STATEMENT OF HON. LEE METCALF, A U.S. SENATOR FROM THE STATE OF MONTANA

Mr. Chairman, I appreciate the opportunity to make a statement in behalf of S. 3382 which would amend the Public Health Service Act so as to establish a program to assist in the construction of adequate sanitation facilities for migratory farm labor.

The problem this bill attempts to alleviate is a national one. The problems of migratory workers are by definition matters that have interstate significance. Health hazards that grow out of inadequate sanitation facilities in migrant labor camps cross State lines.

There is a need for the Federal Government to act in this case just as there was a need in July of 1959 when the Indian Sanitation Act was passed, under which basic sewer and water facilities have been constructed on a number of reservations. Now, with S. 3382, we again have an opportunity to help an underprivileged element of society, and at the same time try to arrest the spread of disease.

That State and local authorities are unable to meet the problem alone is as obvious as the problem itself. In many rural areas the difficulty of financing adequate sanitary facilities such as water and sewage systems has deterred general community improvement. Of the 27 projects which the U.S. Department of Agriculture recommended to the Area Redevelopment Administration by January 4 of this year, nearly half were related to water or sewage disposal projects.



Sanitation facilities observed by subcommittee during field trip to Maricopa County, Ariz.

S. 3382 would provide for the use of Federal funds by the States for surveys to determine the need for sanitation facilities, and by the appropriate parties to assist in the construction or renovation of the facilities used by migratory farm families. A single State agency would administer the program. In this way a program to alleviate many of the unmet health problems that confront migrant workers and their families would be conducted in the well-tested tradition of American federalism. I sincerely hope that the committee will reach a favorable decision on this bill.

Senator WILLIAMS. We are going to have another hearing on this bill to bring in the views of the Department of Health, Education, and Welfare. Then we hope to have an executive session, and we hope, too, that this will all be accomplished within a couple of weeks.

We are very grateful for all of those who appeared. Thank you.

(Whereupon, at 11:07 a.m., the hearing adjourned until Tuesday, August 7, 1962, at 10 a.m.)

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MIGRATORY LABOR

TUESDAY, AUGUST 7, 1962

U.S. SENATE,
SUBCOMMITTEE ON MIGRATORY LABOR OF THE
COMMITTEE ON LABOR AND PUBLIC WELFARE,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to notice, in room 1318, New Senate Office Building, Senator Harrison A. Williams, Jr., chairman of the subcommittee, presiding.

Present: Senators Williams, presiding, Burdick, and Tower.

Committee staff members present: Frederick R. Blackwell, counsel, and H. G. Wilkinson, research assistant.

Senator WILLIAMS. The subcommittee will be in order.

This morning we resume our hearings on the sanitation bill, S. 3382, a legislative measure designed to alleviate the serious and extensive health problems among migratory farm families caused by grossly inadequate sanitation facilities. This bill provides funds to assist in the construction or renovation of sanitation facilities used by migratory farm families and also to assist States to conduct surveys necessary to determine the need for such sanitation facilities.

The deplorable health sanitation of our migrant citizens has been flogged to death; their misery has been televised, surveyed, studied, charted, and analyzed. The catalog of problems is extensive, perplexing, and when encountered first hand, disheartening. The key to these inexorable, deplorable health conditions, is the kind of sanitation facilities provided migratory farmworkers and their families. For every grower who does a conscientious job of providing workers with adequate sanitation facilities, there are many more—usually the marginal grower—whose sanitation facilities are almost medieval. The pictures on either side of this room are typical. They depict not the unusual, but rather what we find in every part of the country. I have seen such facilities; they make a mockery out of the great health strides of the 20th century. Our ethical sensibilities, if not our eating habits, ought to be offended by the conditions under which our annual harvests are reaped. To permit the health standards of the 20th century to bypass our migratory farm families is as unnecessary as it is avoidable.

One of the first steps toward alleviating the existing health problems confronting the migratory farm families is the health bill, S. 1130, which passed the Senate during the last session of the Congress. This bill was given strong support by many interested groups, by the commenting agencies of the administration, and especially by the Department of Health, Education, and Welfare. Although Secretary Ribicoff, in his statement supporting S. 1130, noted briefly the prob-

lem of environmental sanitation conditions, the health bill itself was not designed to meet this problem in a comprehensive or direct manner. Subsequent field trips and further study continued to turn up more evidence that the environmental sanitation conditions are a critical problem and a major source of many of the health problems of the migrants. For instance, of the 18 States polled under a joint project of this subcommittee and the Association of State and Territorial Health Officers, 15 reported inadequate water supplies; 13 gave evidence of poor privy maintenance; 8 of sewage problems; 5 of garbage disposal facilities.

Moreover, it became equally clear that the technical assistance section of the health bill, S. 1130, could never be stretched to cover the expenditures necessary to meet the problems resulting from inadequate sanitation facilities nor foster the extensive State sanitation programs which would contribute mightily to the alleviation of unsafe, inadequate sanitation facilities for migrants.

Accordingly, the sanitation bill, S. 3382, was designed to meet this specific and acknowledged need. Similar to the health bill, the sanitation bill is designed to utilize the competence and knowledge of both the Federal and State Governments to alleviate the incessant, deplorable, and unnecessary health problems that confront this Nation today. Whereas the health bill is primarily aimed at providing financial assistance to States to provide the migrants with health services, the sanitation bill goes toward eliminating a major source of such diseases. The sanitation bill, therefore, is a valuable adjunct to the health bill, patterned after it, and will be a major factor in correcting the environmental causes of diseases which constantly afflict our migrant farm families.

Of the many studies showing the relationship between disease and inadequate sanitation facilities, a substantial number have been published in the public health reports put out by the Department of Health, Education, and Welfare.

As President Kennedy said in his health message:

> Whenever the miracles of modern medicine are beyond the reach of any group of Americans for whatever reason—economic, geographic, occupational, or other—we must find a way to meet their needs and to fulfill their hopes.

It is to this end that the sanitation bill was conceived; it is to carry out this worthy task that the Public Health Service has been called.

Senator Burdick, do you have a statement before the beginning of our continued hearings on the sanitation bill?

STATEMENT OF HON. QUENTIN N. BURDICK, A U.S. SENATOR FROM THE STATE OF NORTH DAKOTA

Senator Burdick. Mr. Chairman, I have a statement which I would like to present.

I want to say that I have seen, myself, in the fields the need for this bill; I am an eyewitness. Just recently I made a subcommittee field trip to Maricopa and Pinal Counties in Arizona. I recall visiting 13 camps on our 3-day observation program. What I saw on that trip, in many of those camps, was very disturbing to say the least. Sanitary conditions were appalling.

Some farms provided no sanitary facilities at all other than privies for their workers; most provided privies which were dirty, ramshackle arrangements; in some cases they were open. I remember one camp where four small outside privies were provided workers. They were placed within a few yards of a field, of an irrigation ditch, and of one family's dwelling unit. A more obvious health hazard would be hard to find. Few of the camps had running water in individual housing units; several had no running water at all and migrants had to depend on water from community taps. Bathing facilities were almost nonexistent.

These indecent, unhealthy, disease-breeding sanitation facilities must be eliminated. I know firsthand of the need, but there has been a great deal of documentation of it; there have been many articles written in public health journals and in public health reports describing this need.

Of the many studies made on the relationship between poor sanitation facilities and enteric diseases, perhaps that written up in Public Health Monograph No. 54–1958, "Relationship of Environmental Factors to Enteric Disease," U.S. Department of Health, Education, and Welfare, is the most pertinent here. This study compared diarrheal disease rates and incidences of Ascaris and Shigella infections among some elements of the population of eastern Kentucky.

This study measured the effects of both water supply and sanitation facilities upon the rate of diarrheal diseases. Among people who were provided with water piped inside their living units, those who had privies reported approximately twice the incidence of diarrhea, had twice as many Shigella infections, and over three times as many Ascaris infections reported as did individuals who had flush toilets. Among people who used privies, those who had water piped inside their dwelling had one-third the disease rate of those whose source of water was outside the dwelling. Those who had both inside piped water and flush toilets had the lowest rate of disease; those who had neither—who had privies and who had to go outside their dwellings to a well or ditch for water—had the highest rate of disease.

Another aspect of this problem is brought out beautifully in another article from the Public Health reports put out by the Department of Health, Education, and Welfare. Let me quote from a paragraph in "Health Needs of Seasonal Farmworkers and Their Families" by James K. Shafer, M.D.; Donald Harting, M.D.; and Helen L. Johnston, who I understand is a witness today.

> On the one hand, we health workers may try diligently to care for patients with diarrhea when they come to our attention, but we are treating only a symptom if we neglect the poor sanitary conditions which are the underlying cause. From time to time we also try to teach the workers how to maintain their own health. But what good is it to teach a worker about safe water if his only supply is obviously unsafe? And of how much value is education about good personal health practices if the only toilet is between rows of field crops or a filthy privy?

This paragraph, to me, points out the necessity of the sanitation bill, S. 3382. It is a bill which complements all our other attempts to help the migrant; without decent sanitation standards, education in healthful living will be of no use at all to these unfortunate citizens—they must have the chance to put into operation what they learn. I think this bill will do the job.

Senator WILLIAMS. Thank you, Senator Burdick. We have with us several spokesmen from the Department sitting before us as a panel.

You may proceed, Mr. Des Marais.

We are pleased to have you with us this morning.

STATEMENT OF PHILIP H. DES MARAIS, DEPUTY ASSISTANT SECRETARY OF HEALTH, EDUCATION, AND WELFARE; ACCOMPANIED BY SAM KIMBLE AND HELEN JOHNSTON, BUREAU OF STATE SERVICES OF THE PUBLIC HEALTH SERVICE

Mr. DES MARAIS. Thank you, Mr. Chairman and members of the subcommittee.

In accordance with our understanding, I do not have a prepared statement to present to the committee. Our views and comments with respect to S. 3382 are contained in our departmental report on the bill, and extra copies of this report have been supplied to your committee for the purposes of this hearing. Therefore, with your permission, what I would like to do is to read substantial excerpts from our departmental report and then answer as best I can any questions your committee may have with respect to our report or to the subject matter of the legislation under consideration. Mr. Sam Kimble and Miss Helen Johnston—both of the Bureau of State Services of the Public Health Service—are present this morning to assist me in answering your questions.

Before proceeding to select excerpts from our departmental report, I would like to make a few general observations and comments relating to the public health significance of sanitation facilities for migratory farmworkers.

Although detailed data are not available on a national basis, there can be no doubt whatsoever that the substandard, almost primitive, living and working conditions often associated with seasonal farm employment constitute a serious health problem. Cases of diarrheal disease recur nearly every year with the peak of the crop season in many migrant work areas. Where the source of water is unsafe, the supply of water is inadequate for personal cleanliness, and human filth and refuse contaminate the camp and field environments, such recurrences can be expected. By the improvement of basic sanitation in the camps and fields, a substantial step would be taken toward improvement in the health status of migrant workers and their families. Risks to the health of consumers through consumption of fruits and vegetables harvested and packed under unsanitary conditions would also be reduced.

However, the lack of proper toilets and water supply facilities is not the only health and safety hazard connected with migrant housing. Improper disposal of sewage wastes and garbage, leaking roofs, cracks in walls and floors which permit wind and dirt to blow into living quarters, lack of refrigeration, makeshift heating and cooking facilities, severe overcrowding, and infestation by rats and insects are other basic sanitation and structural housing deficiencies which contribute to poor physical, mental and social health in many migrant camps. They lead to recurring colds, ear infections, accidents, burns, food poisoning or infections, poor diet, and juvenile and adult delinquency.

Deficiencies in field conditions also go beyond the need for field toilets and for safe water in adequate supply for drinking and hand washing. Acute digestive disturbances sometimes result from eating lunches prepared in the early morning and kept in the hot fields until the noon meal.

In recognition of these public health implications, 27 States now have mandatory migratory labor camp codes which set forth standards for water supply, toilets, and bathing facilities, as well as for other sanitation aspects of housing and for the construction and livability of the housing structure. The enforcement of these standards varies greatly from one area to another, however, depending on the availability of funds to employ staff to make inspection, the adequacy and frequency of inspections, State and local pressures for and against adequate enforcement, and other factors.

Much of the information available on the present adequacy of sanitary facilities connected with camp housing is derived from inspectors' reports. Such data also vary from State to State, and from locality to locality, depending on the adequacy of inspection and reporting connected with the enforcement of labor camp codes. Where no code exists, or where enforcement is poor, data are almost invariably lacking or inadequate.

With respect to field sanitation conditions—which have been generally overlooked or neglected in health codes and programs—there is a particular lack of detailed information. In most States the personal observations of healthworkers, farm labor employment staff, churchworkers, and others having continuing contact with domestic farm migrants are the sole source of data on field toilets, drinking water, and hand washing facilities. Their observations leave no doubt, however, regarding the urgent need for substantial improvement of field sanitary conditions in nearly every locality where migrant workers are employed.

For these reasons, our Department is completely in accord with the health objectives of S. 3382. Despite our support of its objectives, however—and I am now reading from our departmental report on the bill:

> * * * its approach and some of its specific provisions raise serious problems as to the appropriateness, effectiveness, and workability of the contemplated program. The appropriateness of direct Federal grant assistance of up to 90 percent of cost to farmers for the construction of privately owned sanitation facilities to be used by migrant workers in their employ, involves consideration of broader Federal policy in the fields of agricultural economics and labor standards for which other Federal departments or agencies have primary responsibilities. Our reservations from the standpoint of public health considerations go to the probable effectiveness of the proposed facilities grant program and to its workability.
>
> In the first place, we doubt that a program of construction aid would be effective without a strong parallel program of enforcement of adequate sanitation standards. Second, while there are no available data on which to project a total cost estimate, we also doubt that the $2 million authorized to be appropriated annually under the bill would meet such a significant portion of the construction needs as to provide an effective stimulus. Third, we question the effectiveness of a construction aid program that is limited to sanitation facilities and does not also embrace the housing facilities available to migratory workers.
>
> Finally, the provisions of S. 3382 would also present difficulties from the standpoint of administrative feasibility. The most serious of these difficulties would relate to the criteria for determining the eligibility, on the basis of finan-

cial need, of various public and private applicants for financial aid and, among such eligible applicants, for determining what proportion of the construction costs (up to 90 percent) each applicant should receive. The provisions of the bill offer no guidelines governing these determinations.

For these reasons, we are unable to recommend enactment of the bill in its present form. An essential prerequisite to achievement of the bill's objectives, would, in our opinion, be the development of more substantial and specific data on needs, costs, and available resources; more experimentation and evaluation of alternative approaches and methods; and more adequate technical staffs in State and local public agencies responsible for developing and administering programs to improve health services and conditions for migratory farm laborers.

A significant step in this direction will have been taken with the implementation of S. 1130, which authorizes a project grant program in this field. We recognize, of course, that both the appropriation ceilings and the focus of attention in this pending legislation will limit its effectiveness as an intermediate measure in promoting or effecting improvements in sanitation facilities for migratory farmworkers. We believe, however, that if any further Federal aid toward this objective is to be provided, it should be patterned along the lines of the special project grant approach employed in S. 1130.

Such a special project grant program would help to strengthen the competence of State and local agencies to cope with farm labor sanitation problems, and develop some of the detailed information required for effective program planning and also provide funds for experimenting with and evaluating different methods or combinations of methods for effecting needed improvements.

In such a program Federal grant funds should be available only for experimental or demonstration projects, submitted by or with the approval of the State health authority, which are designed to improve the health of migrant farmworkers through improvement of the sanitation conditions under which they live and work. Projects which involve the construction or acquisition of sanitation facilities for migrant workers should be accompanied by assurances from the State health authority that adequate standards would be established for the maintenance and operation of these facilities and that such standards would be adequately enforced. We believe that non-Federal sources should bear the bulk of the cost of any such construction projects, and that the Federal share should in no case exceed 50 percent of construction costs. Such a program could also include projects to improve or demonstrate inspection and enforcement activities. As indicated earlier, another valuable type of project that could be financed in part by such project grants would be surveys to obtain reliable data on facilities needs and costs.

Mr. Chairman, this concludes my opening remarks and comments. I would like to say that if the Department can be of any further assistance to you and members of your subcommittee and staff in any further legislative drafting, we would be very happy to do so.

As I indicated earlier, however, we will be happy at this time to answer questions from your committee relating to the legislation under consideration or to the health problems toward which it is directed.

Senator WILLIAMS. Since you have your colleagues from the Department with you, would you like to introduce them at this time?

Mr. DES MARAIS. Miss Helen Johnston from the Bureau of State Services on my right, and Mr. Sam Kimble, also from the Bureau of State Services of Public Health Service in charge of program development.

Senator WILLIAMS. We are, of course, familiar with your colleagues and know the great work they have done and are doing. We hope there will be more programing and more work in the future.

Senator Burdick, I wonder if we might hear from the other people from the Department before we get into our questions?

Miss JOHNSTON. I do not think we have any special remarks to make, except that you used a good term in describing sanitary facili-

ties in migrant worker camps. The term "disheartening," I think, is quite appropriate.

If you looked at the camps 10 years ago and looked at them today and saw how relatively little improvement has been made, it is disheartening.

The situation varies from quite bad to quite good within any of the areas where we find migrants.

This is true in our own State and it is true in almost every other State, as you have observed, I am sure.

The factors that make some situations good and some poor have been extremely difficult to identify.

Senator WILLIAMS. Miss Johnston, in your work with the Bureau of State Services of the Public Health Service you are in a position to obtain a description of health problems and their specific cases for problems, such as the lack of adequate sanitary facilities. Have you had opportunity to go to the farms where these conditions prevail?

Miss JOHNSTON. Over the last 10 years, we have gone to a number of States and have visited labor camps in a number of work areas in almost all parts of the country.

Senator WILLIAMS. I imagine you continually get reports in your office from State health departments, too?

Miss JOHNSTON. That is true.

Senator WILLIAMS. To have the record reflect what we are talking about, could you describe what are the average sanitation facilities in migrant farm camps, and the sanitation facilities out in the fields and the orchards where migrant farmworkers do their harvesting?

Miss JOHNSTON. It is very hard to describe the migrant situation in terms of an average. I am sure your subcommittee's observations would coincide with ours that as you travel around the country you will find both good and poor situations in the same migrant work area.

In Dade County, Fla., for example, you find a relatively good situation. It is a county in which the health department has had the support of the community in employing a full-time person whose responsibility is to make regular inspections, to work with the camp owners, and to bring the housing up to a standard that is approved by the health department in Dade County.

In some of the other counties in Florida you find a different kind of situation, with almost a complete lack of staff in some cases, even to make regular visits to camps, and almost complete neglect, even though there may be a good code on the statute books.

There is simply a lack of resources to do anything, either in the way of education or in the way of legal enforcement of existing codes.

In other localities, such as in Arizona, you will find the same kind of contrast in the housing situation, in the situation relating to housing and sanitary facilities.

I think it is very hard to make a generalization.

Over the country as a whole, I think you would find that the situation is not up to the level of most urban communities, certainly.

As far as field sanitation is concerned, this is almost a completely neglected area.

Senator WILLIAMS. Have you found that sanitary facilities and the opportunities for better sanitation vary between camps where the

workers live in individual, small units of housing with their families, rather than the men living as bachelors in barracks?

Miss JOHNSTON. Are you referring to the housing provided Mexican nationals?

Senator WILLIAMS. Yes, or in my State it would be the Puerto Rican workers.

Miss JOHNSTON. I think that under the organized programs for both the Mexican nationals and the Puerto Ricans who come in under the work agreement, there is some inspection of housing by governmental representatives, and as a result that housing meets a better standard than the housing that is provided for domestic agricultural workers.

Senator WILLIAMS. It seems to me that maybe up to 90 percent of the housing provided for domestic migratory farm families living in individual housing units, does not have sanitation facilities within such homes, but are subject to the outhouse privy for sanitation facilities.

Would you say that that is a fair generalization?

Miss JOHNSTON. I think that is a fair generalization. However, I think that the outhouse type of sanitary facility does not necessarily mean a type that is not conducive to health. A generation or so ago outdoor privies were quite common for the general population. If they were properly constructed and properly maintained they were no threat to health.

I think the problem with the migrant camps is that they are sometimes neither properly constructed nor properly maintained.

Senator WILLIAMS. Running water for domestic migratory farm families is an exception rather than a rule.

Miss JOHNSTON. In the housing unit it is certainly an exception.

Senator WILLIAMS. It was said that 27 States have sanitary codes that growers must honor and live by. You also suggest enforcement.

The code is one thing and enforcement is another. For some reason there is an absence of enforcement even though there might be a fairly good sanitary code.

Miss JOHNSTON. I think Dade County, Fla., is a good illustration of what can happen when you have a good code and good enforcement. It takes community support, I think, to get either a good code or good enforcement.

Senator WILLIAMS. It requires a staff for inspection and follow-through on enforcement, and, of course, it also takes a contribution from the grower. He has to spend money to provide the better sanitation facilities as required under the code, isn't that correct, Miss Johnston?

Miss JOHNSTON. That is true.

Senator WILLIAMS. Is it not a common lament within the grower communities all the way across the country that they are operating on a small profit margin, and, therefore, cannot afford to provide sanitation facilities that would be adequate to meet the standards of the health code?

Miss JOHNSTON. I think we have often heard this. I think, though, a couple of years ago that we also heard that the lack of credit facilities was a problem.

Senator WILLIAMS. Lack of credit?

Miss JOHNSTON. The credit facilities are now available.

Senator WILLIAMS. For example, the housing and sanitation facilities that are to be provided is not the kind of housing, because it is of a temporary nature, that would support a 20-year mortgage loan; is that not true?

Miss JOHNSTON. Well, this depends on the situation. It depends on the growers' situation. It depends on the outlook for his particular product for the future. This is a question for the agricultural economist rather than people in public health.

Senator WILLIAMS. This is a question for the village banker, and he will not lend money. I will testify to that. Such expenditures must come right off the top of the farmer's cash. This is one of the basic reasons why migratory farm families are not provided with what we would consider adequate, simple, but wholesome housing, with simple but adequate sanitary facilities. In this area money is a real problem to the grower.

It is noteworthy that this bill, S. 3382, has the support of the grower community. We have had some strong, favorable testimony from the various associations. We would like to see harmony among the growers, the Department of Health, Education, and Welfare, and the Congress behind this business of providing our migratory farm citizens with adequate sanitation facilities.

When we are talking about the need for better sanitary facilities, would not you agree that the need is immediate, the situation is grave, and that very little is being done to remedy this condition which causes so many serious health problems?

Miss JOHNSTON. I think the people in our department feel that there is a real problem.

Senator WILLIAMS. It is a critical problem. This is not a slowly evolving problem. It is right with us; it is here now. That is the way the problem seems to us and that is, of course, why we have developed this legislation.

Do you have anything, Mr. Kimble?

Mr. KIMBLE. I have no general remarks to make beyond those that Mr. Des Marais made, Mr. Chairman.

Senator WILLIAMS. Senator Burdick.

Senator BURDICK. I will say to you, Mr. Des Marais, that the first half of your testimony points up a serious situation with regard to the sanitation facilities in the migratory labor areas. You give a very good case for having something done.

Miss Johnston states that she is disappointed that nothing has happened in the past 10 years. Yet you do not seem to be very enthusiastic about this legislation.

Mr. DES MARAIS. Senator, I believe that we tried to make, I suppose what you could call, constructive criticisms of some of the provisions in the bill and suggested some possible changes which, in the opinion of the professional staff of the Public Health Service, would make the program really practical and effective in accomplishing the idea of getting some sanitary facilities.

That is really our objective, as we tried to explain it in the report.

Senator BURDICK. Then you are in agreement in principle with what we are trying to do?

Mr. DES MARAIS. Yes, sir.

Senator BURDICK. The only specific recommendation I can find in your entire statement is that you want to reduce the matching to 50 percent. I do not find anything else as specific.

Mr. DES MARAIS. Well, we suggested also that in addition to reducing the Federal participation to 50 percent, that instead of having a formula grant system of making funds available in terms of the number of migrants which the bill provides, to have a project grant program analagous to the one in S. 1130, wherein specific projects could be proposed in a county or in an area, and evaluated by the State health authority and then proposed to the Public Health Service for a grant.

So that was the second specific proposal that we suggested as a possible way to carry out this program.

Senator BURDICK. Then it is your opinion that we can agree on specifics one of these days and incorporate them into the bill?

Mr. DES MARAIS. Yes, sir.

Senator BURDICK. Do you really think we have to spend all this time on gathering data, costs, and all additional information? Don't you think we have most of that now?

Mr. DES MARAIS. The problem, I think, relating to the data arises when you are making grants. There is a limited amount of money and there are a number of grant proposals from which to choose. Those that are solidly based are the ones that should get the money.

We can envision a program going on where you have simultaneous development of facts and data, and development of proposals, and the making of grants. It would be sort of a three-ring program going on at the same time.

Senator BURDICK. Of course, you know that S. 1130 does not touch this problem of sanitation. There is no substitute in S. 1130 for this type of legislation.

Miss JOHNSTON. I think the focus of S. 1130 is on services to people, and the emphasis is on family health service clinics.

The second section of S. 1130 suggests that other types of projects to improve migrant health services and conditions might also be undertaken under the authority of the bill. A good many State health officers have indicated to us that they would be interested in undertaking activities in the field of sanitation improvement.

Where the staff of the division of sanitation is completely inadequate in a State, just the addition of a couple of people who could get out into the camps, at least once a year, would have some effect in getting the information that would be needed for a construction program, for one thing; and in starting the process of developing the public education, including the education of growers, which is necessary, in order to get improvements made is also important.

The emphasis of the bill, though, is on services, as I said, and the limitations of funds in terms of the $3 million ceiling would make it difficult to cover everything that might be proposed by applicants all over the United States.

Senator BURDICK. Fortified with the present bill, we could make a better frontal attack upon this problem, could we not?

Miss JOHNSTON. The present proposal, S. 3382, is focused on the problem of sanitation.

Senator BURDICK. You both admit that sanitation is a problem?

Miss JOHNSTON. There surely is a problem.

Senator BURDICK. Miss Johnston, I do not want you to be disappointed many more years by the existence of this problem. Thank you very much.

Senator TOWER. Last December I had the opportunity to inspect a facility at Fullerton, Calif., which not only provided adequate sanitary facilities but other amenities, such as a chapel and recreation hall and that sort of thing. I think this was undertaken on the initiative of certain grower associations there.

Have grower associations in various parts of the country taken the initiative on this sort of thing?

Miss JOHNSTON. They have, in some parts of the country. This is one of the things that has puzzled us, the fact that in the same area of the country you would sometimes find completely contrasting situations, some quite good and some very poor.

What are the factors that make the difference in these two situations? This is one of the things that we really don't know. I think that in Mr. Williams' State, at Seabrook Farms—when we talk about Seabrook Farms we are not talking about a problem situation, we are talking about a place where a good many of the problems that face most migrant workers are being taken care of.

Senator WILLIAMS. If the Senator will yield, this comes back to my earlier suggestion, that where conditions are fairly adequate, generally you will find that this is not the family situation, but it will be the Mexican national living in barracks, or, in my State, the Seabrook Farms, the Puerto Rican worker, without his family.

Is Fullerton one of Mexican nationals?

Senator TOWER. Yes, braceros.

Miss JOHNSTON. There are situations where family housing is provided and where the situation is quite acceptable. One of the people on our staff has been at Kingsbury, N.Y., where they say there is a very good family camp. I believe this is operated by an association.

Senator TOWER. What seemed to be the worst areas in this connection?

Miss JOHNSTON. You are asking the same type of question that Mr. Williams asked awhile ago, tempting me into generalizing. I think you find both good and bad in all parts of the country.

Senator WILLIAMS. I do not know whether you were here, Senator Tower, but the best area was described as Dade County, Fla.

Senator TOWER. Yes, I heard that.

Senator WILLIAMS. Am I correct in feeling that an individual's whole environment is important for really good health? I am talking now about physical health—not mental health—and the physical problems of bad health arising out of bad environmental conditions.

Of course, in Mr. Des Marais' statement he describes the problems of housing. We in this subcommittee have, in various ways, tried, through legislation and Federal programs, to deal with the broad complex of environmental unwholesomeness which creates bad health and all the problems of bad housing and lack of education.

We have tried to do this by having the various departments of Government that ordinarily administer housing, education, and health programs also administer programs in these areas for migratory farm families.

What we are trying to deal with here is one of the causes of bad health, poor sanitation facilities, very poor sanitation facilities. I frankly believe that if we are to be logical in the administration of Federal health programs, the Public Health Service, the Department of Health, Education, and Welfare, and the Surgeon General are the proper administrators of the program for sanitation facilities, and that is exactly where we put it.

If anybody in our national structure has knowledge, ability, trained people, or is equipped to train people, it is your service. That is why I am really somewhat confused with your opening statement that suggests that a program for better sanitation facilities involves considerations of broader Federal policy in the fields of agricultural economics and labor standards, for which other Federal departments or agencies have primary responsibility. When we are getting down to the cause of disease arising out of woefully poor sanitation facilities, I frankly cannot see where else we should go but to you people who really occupy this field, and rightfully so.

Mr. DES MARAIS. Senator, I wonder if I may make a comment on that point?

Senator WILLIAMS. Yes.

Mr. DES MARAIS. First of all, I would want to say that, as you know, for the last 16 months the Department of Health, Education, and Welfare has enthusiastically supported and has been interested in all of the bills that you have introduced and sponsored, and we have been most encouraged by the work of your subcommittee.

In this particular connection, however, I think it is a matter of our picking out a specific procedure rather than the objective, it is the form rather than the substance; that is, the idea of having the Surgeon General make construction grants to private farmers, wherein he would have to make an economic determination of which farmer has an economic need in order to build these facilities, is a matter in which other agencies have had a lot more experience.

Construction grants for building farm facilities on a private basis is a very specific type of determination in which we have had no experience.

Did you have anything more to add on that, Mr. Kimble?

Mr. KIMBLE. I think this is very true. As the report points out, there are two major problems here with respect to the administration of the specifics, as they are contained in this particular bill.

One is the determination in a realistic fashion of the relative financial need with respect to farmers throughout the whole United States in areas where domestic agricultural migrants work, in order to determine whether they would even be eligible for a construction grant under this program, and, second, given the determination that their financial need was such as to warrant the approval of a construction grant to them, the second problem then is the determination of where in this scale between 0 and 90 percent, as proposed in this bill, their financial need places them with respect to percentage of Federal participation.

These are problems with which, as Mr. Des Marais said, we have had little experience. They are masters of agricultural economics in which other agencies do have a better background.

We certainly would agree with you with respect to the health effects of these things, the Department and Public Health Service within it are the places in which responsibility should be focused.

Senator WILLIAMS. Our staff counsel would like to present an observation or a question.

Mr. BLACKWELL. Thank you, Mr. Chairman.

The staff has been informed by the Agriculture Department of some facts of great interest on this point of eligibility and the economic data needed to make this determination. The Department of Agriculture has experience in this field, which you state the Department of Health, Education, and Welfare is relatively inexperienced in.

It is our understanding from the information we have that the Agriculture Department could draw upon their experience to service the Department of Health, Education, and Welfare, to assist in making these determinations. It would be more or less a service function, such as somebody in a business transaction providing a certain part of the information upon which the final determination would be made.

This could be, in effect, a partnership in the review of the application and, of course, in time, the Department of Health, Education, and Welfare itself would acquire the experience to carry out this responsibility within its own agency if it so desired.

We do have strong assurances that in the beginning of this program the Department of Agriculture could provide the service needed to fill this particular gap.

Miss JOHNSTON. I think there is a related problem, though. Actually, I could put this in the form of a question.

Who would you help, the most needy farmer who is really a marginal person and who may go out of business the next year, so he will no longer be employing migrants? If you have a kind of means test arrangement for providing construction grants, this is the kind of question you might get into.

Mr. BLACKWELL. It obviously is the kind of question that you would get into. It is the kind of question that is normally resolved in the administration of a program of this type.

The broad question to be decided in the legislation is to focus the reach of the legislation in its totality toward the problem, which is the inadequate sanitation facilities.

The legislation provides the broad guidelines. You have made specific suggestions this morning for improving the approach by adding other concepts to the idea of construction, and the actual implementation. These kinds of questions will be worked out by your closer relationships with the local agencies, the people there who know the general information.

Mr. Des Marais, and your associate witnesses, I would like to call attention to one of the basic premises underlying the legislation which, indirectly, has been discussed already by the members of the subcommittee.

Senator Tower cited the excellent health sanitation facilities, that he had personally observed in a visit to a California labor camp, which housed the Mexican nationals.

This example points up the need for the kind of approach in this legislation to bring to our domestic workers the same or comparable safe sanitation facilities afforded the Mexican nationals.

The sanitation facilities provided Mexican nationals, which Senator Tower has observed, which other members of the subcommittee and I have observed, are made possible because there is a very strong stimulus in the picture. Article 2 of the standard work agreement provides—the work agreement between employers and the Mexican Government concerning Mexican nationals——

> The employer agrees to furnish the Mexican workers, upon the Mexican workers' arrival at the place of employment, and throughout his entire period of employment, without cost to such Mexican worker, hygienic lodgings, adequate to the climatic conditions of the area of employment, and not inferior to those of the average type which are generally furnished to domestic agricultural workers in such area. Such lodgings shall include blankets when necessary and beds or cots and mattresses when necessary. Mexican workers may not be assigned to any lodging or quarters in such numbers as will result in overcrowding of the premises. Sanitary facilities to accommodate them shall also be furnished by the employer. The employer further agrees to comply with such housing standards as may be prescribed jointly by the United States and Mexico.

By incorporation of the terms "hygienic lodgings" and "sanitary facilities," there is a specific health standard agreement which is enforced by governmental authority with respect to the Mexican national workers. This kind of health standard probably could not be made applicable in Federal legislation. The philosophy and framework of the Federal-State relationship makes it impracticable to provide or enact this stringent a health provision between employer and workers, through a Federal bill.

This legislation, S. 3382, follows the precedents in our governmental structure of going at the problem by providing a stimulus in another way. That is through financial assistance, which, with proper implementation, has demonstrated its ability to achieve the same result over a period of years.

The sanitation bill reflects the fact that where foreign workers are involved there are very strong laws to deal with their health problem. Generally it is also the fact that where Mexican farmworkers are involved, the marginal farmer is not.

Over in the part of the problem that this legislation deals with, you do have the marginal farmer and you do have a set of inadequately enforced State laws. To deal with this, the only feasible approach that has been brought forth by the subcommittee's studies is through financial assistance.

Mr. DES MARAIS. Mr. Blackwell, I wonder if I might comment briefly. I think that your very thorough analysis of this situation in relation to the agreements between the United States and Mexico in regard to the Mexican national farmworkers points out, however, the importance of enforcement of standards.

I certainly agree with your approach that you cannot have the same kind of a program in Federal legislation for our own workers and their employers. However, I think our recommendations tried to focus attention on the importance of linking some kind of enforcement program on the local level with some kind of assistance.

I should point out, referring earlier to a comment of Senator Burdick, that we suggested that project grants for communities to develop some more effective enforcement systems under their own plans should be supported, and for this there would be 100 percent grants. There would be no limitation on the percentage, according to our proposal in this area.

Senator WILLIAMS. Could we just pause there to clarify this project grant. Would this be a project that would build sanitary facilities?

Mr. DES MARAIS. The construction of facilities, Senator, could conceivably be part of a project, yes.

Senator WILLIAMS. And this, you suggest in your testimony, might be an expanded part 2 of S. 1130.

Mr. DES MARAIS. It could be looked upon in that way. But I think that you would have to have some additional legislation, as you have maintained, to specifically provide funds for the construction of sanitary facilities.

Senator WILLIAMS. You are not reluctant to implement the sanitation program through S. 1130, and yet in your testimony on the bill before us you seem timid before the prospect of administering the program of construction of sanitation facilities. I am confused.

Mr. DES MARAIS. I think maybe we have not made ourselves as clear as we should. In the Department we have, generally, two kinds of grants-in-aid programs, as you know. We have many programs which follow the formula procedure of making grants to the States in terms which take onto account the population of the particular group to be served, as you suggest in this bill.

But we also have many programs which follow the project grant approach. That is, where we simply say to a State or a locality, or to an organization, "If you come up with a good project"—I mean the Congress has said this—"which meets certain criteria as provided for by the law, then the Secretary or the Surgeon General, whatever the program may be, will make a grant for you to carry out this project." This allows more flexibility and variety in the project.

Senator WILLIAMS. Could you give us some examples of the project grant approach?

Mr. DES MARAIS. Miss Johnston does have a list of possible examples here. I would like to have her mention them.

Miss JOHNSTON. Actually, this list is based in part on some of the things that the State health officers have said were needed, and that were reflected in the Department's formal testimony.

One thing that they have said is needed is systematic surveys of this kind of situation that has led us to develop a proposal for constructing new facilities, systematic surveys of the need for new or improved facilities and their maintenance and of the costs, resources available and other factors that are pertinent to the improvement of sanitation facilities in their relationship to general camp and work environment.

Senator WILLIAMS. Is this a program that you are operating?

Miss JOHNSTON. I say this is the kind of thing that people have said is needed.

Senator WILLIAMS. No, you misunderstood me. I want to understand what you are doing now under the project grant approach. Give me an example.

Mr. DES MARAIS. Excuse me.

To take another field, other than public health, for instance, one of our newest project grant programs is in the juvenile delinquency field, a very serious problem scattered throughout the country.

Senator WILLIAMS. Do you build day-care centers?

Mr. DES MARAIS. We are supporting under the grant approach in the juvenile delinquency problem community programs to combat delinquency.

Senator WILLIAMS. With construction of any facilities?

Mr. DES MARAIS. It could conceivably provide for this. There is no limitation on what they can do. It is merely that they come up with a project which is designed to provide activities and work, and we are even paying for the salaries of young workers in some cases under these projects.

Senator WILLIAMS. It boils down pretty much to a matter of personnel?

Mr. DES MARAIS. Yes.

Senator WILLIAMS. I wondered if any of your special project grant programs deal with hardware, construction of facilities.

Mr. KIMBLE. We have at least two that I can think of right now, Senator, that do deal with construction of facilities. One of them is the research facilities construction program, which is administered at the National Institutes of Health, and which is designed to assist educational and other types of research organizations to construct these kinds of facilities in which such research could be carried out.

This is a program that has been in existence now for some 4 or 5 years. Under this program applicants develop plans and specifications for the construction of these facilities. These are submitted, together with an application for a grant that cites a variety of things, including their purposes for which they will use it, their needs in the way of finances, their other resources which are available to them to help in the construction of it.

These applications are reviewed by a council and, based on recommendations of that council, then the Surgeon General is authorized to approve such projects.

Senator WILLIAMS. That is one example. Do you have another one?

Mr. KIMBLE. A second example is included in the Community Health Services and Facilities Act that was passed last year, under which, as part of the Hill-Burton program, grants are made for the research design and construction of facilities.

Your parent committee heard testimony last year, for example, from the representatives of the Methodist Hospital and the Mayo Clinic group in Rochester, Minn., with respect to the round hospital concept as a research design in the construction of hospitals to determine whether or not such a design would provide a better mechanism, a better framework, within which health services could be provided in the hospital.

This program, again, is a project grant type of program, in which applicants develop their proposals, submit them, they are reviewed for their conformity to the purposes of the legislation, and their relevance in relation to the ultimate objectives of research in the design and construction of hospitals and other medical facilities, and approval is then given.

Senator WILLIAMS. I rather expected this would be the kind of activity that would follow the project grant approach. What you have said really is that these programs that you administer feed resources into an institutional situation, or of a community situation. What we are trying to do here is something far removed from an in-

stitutional research situation. We are trying to reach people down on the farm.

I cannot imagine a project grant that will bring resources to the grassroots farm by farm. It is not a project. It is a program designed to meet health needs on an individual farm-by-farm basis.

Take analogous programs in housing. We do not call public housing a project grant. It is money brought to a community for a specific unit of housing for people, not in an institutional or community research sense, but a place for people to live decently.

What we are trying to do here is make possible a decent life through adequate sanitation facilities, feeding resources where they are needed, not in a research center, but right on the needy grower's farm.

Coming back to enforcement again, it is logical to me that if the money problem of the grower is met in part, then the existing health code can be made meaningful because the enforcing agents can say, "No longer can you cry poverty because we have a plan, and you either fix up or get out of business because there is no escape; we have a health plan to help you. If your need is great, you can get up to 90 percent of the cost of the facility."

Of course, a wealthy grower would get less.

Is not this right, that if a grower does have the resources for sanitary facilities for his workers, the business of health code enforcement is made much easier for this State?

Miss JOHNSTON. I would like to have you restate the question.

Senator WILLIAMS. I am saying that if the grower has the financial resources to provide proper sanitation facilities, the job of the code enforcer or sanitarian is made much easier.

Miss JOHNSTON. I would say in theory this is true. In fact, I am not sure it is, because I think it is more than having resources. I think in Dade County it is partly having some community pressure.

Senator WILLIAMS. But isn't it easier to turn the community pressure on if the fellow has the money or can get it for the needed sanitation facilities?

Miss JOHNSTON. In Dade County they found a way of getting the resources once they had the pressure.

Senator WILLIAMS. Is that primarily rental housing or is that grower-owned camp housing?

Miss JOHNSTON. It is housing of a variety of types.

Senator WILLIAMS. There is a lot of rental housing in Florida for migratory farm facilities.

Miss JOHNSTON. Yes, there is; and I think this is one of the factors we do not know enough about. How practical is it and how feasible is it to charge rent for housing that will at least meet minimal standards? It is done in some places so why isn't it done in other places?

Senator WILLIAMS. There is a greater permanency in Florida that makes the cost problems of housing somewhat easier. There is a longer period of tenancy, and, as a matter of fact, the entrepreneur in the home business can make money at it because many of the folks are there for 5 months.

I think we have a general agreement here between the Department and the committee. We all know what we are talking about. It is a very simple proposition. Maybe our bill has been oversimplified in

this hearing. We certainly respect the view of the Department that our formula bears on the side of liberality and that it ought to be 50–50 or up to 90–10. We have other programs that do not gag on 90–10, although not in your Department. You are a 50–50 agency, with Hill-Burton. Where health is concerned it is 50–50, and with highways it is 90–10. There seems to be a double standard.

Mr. Blackwell has an idea to present.

Mr. BLACKWELL. Thank you, Mr. Chairman. I was commenting to the chairman that on the basis of your report and your positive suggestions as to the way the bill might be modified and improved, I came to this hearing quite openmindedly, ready to receive more shoring up and information about how you would make this bill successful.

During the course of the testimony, though, you have just about convinced me that you are convinced you cannot administer this program. That has called my attention back to line 11 of page 3, which makes the grants to the States.

We have talked to State people who seem just as convinced that they can administer it down at the grassroots level, farm by farm, as your testimony is to the contrary. Would you prefer to resolve these administrative difficulties by passing them on down to the State folks, who say they can work them out?

Mr. DES MARAIS. Mr. Blackwell, as you point out, under the proposed bill the Surgeon General would make grants to the States which would come up with proposals for distributing this money to the farmers within the State. One of the administrative dilemmas which would face the Surgeon General, as we see it, is how to evaluate one State's proposal vis-a-vis another State's proposal within a limited appropriation of $2 million. I am not suggesting that the appropriation should be higher, necessarily.

Senator WILLIAMS. Just that it is not enough.

Mr. DES MARAIS. But with this type of formula for making grants to the States, a State grant program, and then having a very limited appropriation, it would become exceedingly difficult to pick and choose among the various State proposals as to which one should get how much money.

I imagine each State that was interested would come up with their maximum requests, and we would have to accept at face value the State proposal. Tremendous pressures, as you can see, would develop to make this State grant or that State grant. It would be very difficult to make any determination, as we see it now.

Mr. BLACKWELL. As you describe this difficulty, though, it seems much less serious or much more easy to resolve than the difficulties you described in your project grant approach. You have had this kind of problem before in administering grant programs to States, in which there was a limited amount of money, and a demonstrated need greater than the authorized amount.

In the National Defense Education Act, for example, you had a limited amount of money for scholarships or for student loans, and the same problem, but you worked it out. Is that not true?

Mr. DES MARAIS. Yes; but under the National Defense Education Act the money does not go to individuals; it goes to institutions. That makes it much easier to administer.

Mr. BLACKWELL. Ultimately to individuals. But the administrative problem is the same as you just described. There was a greater total need nationally than you had funds to supply.

Mr. DES MARAIS. Yes.

Mr. BLACKWELL. You had to go through some procedures to get the need reduced to equal available funds, and you succeeded in doing it very well.

Mr. DES MARAIS. That is a loan program, incidentally, not a grant program.

Senator WILLIAMS. Although the economic determinations are the same, let's discuss a grant program. Certainly you do not have open-ended funds for the Hill-Burton program. You have some hard decisions. Every hospital that applies cannot get a grant. You have to provide a schedule of priorities, is that not true? I imagine you have considered such factors as community need, vis-a-vis the other community, isn't this true?

Mr. KIMBLE. May I comment on that? The Hill-Burton program is certainly one in which, as Mr. Blackwell pointed out, there is less than enough money appropriated by the Congress, or authorized in our legislation, as a matter of fact, to help construct all of the hospitals that apply.

Here we do make an allotment of funds to the State on the basis of a statutorily prescribed formula, which is a mathematical computation.

Under the Hill-Burton program, the States are required to develop a State plan. In fact, in the first several years of the program and again in the first couple of years of its extension to cover more than hospitals, funds were provided to the States with which to make surveys of the need for hospital and other medical facilities in the State, to rank them in order and to develop planning methods and data within their States, upon the basis of which priorities could be developed relating the extent of unmet hospital or other medical facility needs in various communities.

When an organization decides to submit an application for Hill-Burton aid in the construction of a hospital, it goes to the State agency that is administering the program in that State. It is the responsibility of that State agency, then, on the basis of its State plan of priority determination which it has developed and which the Surgeon General has approved, to determine whether or not this particular applicant is proposing a facility in an area which has a high enough priority in terms of unmet need in order for it to qualify for Federal financial assistance.

Upon a certification then by the State agency to the Public Health Service that this particular application does meet those criteria, we are prepared to approve that particular application.

This, I think, is a considerably fuller type of background planning and priority setting that has been deliberately built into the Hill-Burton program from its very inception than what is contemplated or provided for here.

I cite these not because they are exactly comparable but because there are some relevant relationships, I think, in terms of the problems we face.

Senator WILLIAMS. Let me draw attention again to the legislation before us. This program would not be a grant of money to the Department of Health, Education, and Welfare without guidelines for determination of what States get how much.

We have on page 4 of the bill the statement that the amount to be allotted to any State shall be determined on the basis of, one, the number of migratory farm laborers involved and the length of time they spend in the State and the need for sanitation facilities within the State.

This is a matter of mathematics and these statistics we have, you know. You have them and we have them—not down to the last worker and the last day—but they are sufficiently reliable. This criteria is within our statistical capabilities now.

And, two, the extent of the need for the construction of sanitary facilities for such laborers in the State.

The difference here is the need for sanitation facilities under this legislation would be evaluated at the State level. The need in the Hill-Burton is largely determined at the State level. We might be able to accommodate you here some way.

Mr. KIMBLE. If I may comment on this particular point, we feel quite strongly that the State agencies ought to play an important and vital role in the administration of any program along this line. In fact, the report that Mr. Des Marais presented at the beginning of the hearing this morning contains proposals from the Department relating to assurances that we would like to see in any construction grant application that came to us, assurances from the State Health Department that there would be developed adequate standards of sanitation for any facilities that are proposed to be built, and also adequate provisions made for the enforcement of those standards in connection with any kind of facilities that were built.

So this, I think, is another illustration, another example, of our convictions in line with what you were saying, that the State agencies should play a very important and vital role in the administration of any program of this kind.

Senator WILLIAMS. Paragraph 5 on page 4 gives you folks the authority to require the State agencies to submit reports in such form and containing such information as the Surgeon General from time to time reasonably requires. If you combine that with 2 at the bottom of the page, and also the provisions on page 3, paragraph 2, I think there is probably enough authority within this legislation to accomplish exactly what you are describing.

Miss JOHNSTON. Actually, there is a problem with section 805(b), I think, in terms of how many places does a migrant live in in a particular State. You need to consider not just the numbers and the particular area within the State, but how many times do they move within a State. I do not know anybody who has data on that.

Senator WILLIAMS. Mr. Wilkinson might suggest something.

Mr. WILKINSON. Thank you, Mr. Chairman. I was going to say that the number of migrants in States has been determined by the Department of Health, Education, and Welfare with regard to the day care facilities for migratory farm children. This has all been done statistically. In fact, the amount of money provided the States for day care programs has been tied very closely to the number of migrants in those States.

So I think the Department of Health, Education, and Welfare does have the relevant statistics available. In fact, we have them down in the subcommittee office.

Senator WILLIAMS. Mr. Blackwell, do you have any questions on these technical aspects?

Mr. BLACKWELL. Yes, thank you, Mr. Chairman. Considerable agreement has been reached in this discussion. I wonder if we might pursue this a bit further and determine whether there might be complete agreement.

First of all, Hill-Burton has been cited as an example of a program in which you have good administrative techniques already in effect. The National Defense Education Act is another example of such a program. The Hill-Burton program, although much more complex, is still perhaps more analogous to the legislation under discussion, so we will use that as the basic point of departure.

The Hill-Burton Act does call for a State plan, expressly. The legislation before us speaks in terms of an application, but in practical language it is the same document. So we could say expressly in S. 3382 that a State plan is required.

The basic factor in Hill-Burton in determining who gets how much money, and also in the National Defense Education Act, is population; is that not correct?

Mr. KIMBLE. In Hill-Burton the per capita income of the State is also a factor.

Mr. BLACKWELL. But the population is the basic factor underlying it, and in Hill-Burton you get some adjustments on the per capita income.

Mr. KIMBLE. Some considerable adjustment.

Mr. BLACKWELL. Yes. The per capita income we could agree is not applicable here because this is to be channeled into an economically disadvantaged area, and the per capita income purpose in Hill-Burton would be taken care of by the general eligibility requirements.

So this legislation does have the population factor taken into account.

In addition, the length of time a migrant is in a State, which is relevant in this problem, is taken into account.

On the question of numbers, the problems of inadequate data, can we not also agree that when a program is made available to assist the farmers in regard to this problem, whatever absent data there are will be supplied by the farmers who wish to participate?

These are problems that will resolve themselves, in the implementation of this legislation. Could we agree there that there is adequate information with which to implement the population factor in this bill?

Mr. KIMBLE. I should think we have enough information that we could make some usable estimates, at least, of the population element of the formula.

Mr. BLACKWELL. As you gain experience with this program this information and your knowledge of the numbers will become more precise.

Next, the question of State enforcement has been one of the important points among your suggestions. Since we have the State agency involved, and a State plan expressly required, could not the idea of

better enforcement and maintenance of the facilities be incorporated into the bill?

They could be incorporated in the State plan, is that not true?

Mr. KIMBLE. It could be, I assume, covered by the Surgeon General's regulations as an element that must be provided by the State in the way of assurances.

The question, I think, is largely one for the committee and the Congress to determine in the legislation itself or in the development of the legislative history regarding the bill, whether or not this is an element that it feels the Surgeon General should or must take into consideration.

So it would not be inappropriate, I would suggest, that if the Congress felt that this clearly was an element that should be taken into account, it might include it within the legislation.

Mr. BLACKWELL. The point is that, in your report and testimony, you highlighted the fact, and you also suggest, that a construction program should be accompanied by some means of more adequate enforcement.

The question I put now is: Could not the question of more adequate enforcement be made an express part of the State plan? This accomplishes your principle. Assurances from the State that it will provide adequate enforcement as part of the consideration for receiving the Federal funds.

Mr. KIMBLE. As part of the Surgeon General's requirements of things that must go into the State plan, is that what you are saying?

Mr. BLACKWELL. Yes.

Mr. KIMBLE. Yes.

Mr. BLACKWELL. This could be in the State plan.

The bill already provides for the extent of need for construction in the State. You could add to that a provision which sets up priorities within the State as is done in the Hill-Burton program. In that way, you let the States resolve many of these questions which seemed to have been quite bothersome this morning, which farmer gets what, who is marginal this year and who is marginal next year.

Mr. KIMBLE. Mr. Blackwell, I think we are dealing here in a context in which the bill as it is currently drafted provides, for example, that the State plan shall contain five things, listed in section 803. While I think that it is true that the Surgeon General might, under a liberal interpretation of section 803, require additional things to be contained in the State plan as it is submitted, it would appear, I think, that the Congress was pretty well specifying the things which the Congress in the adoption of this particular legislation felt were the things that should be in there. And if you feel that there should be other things in there, as we have suggested that there might be, it would not be inappropriate, for those to be added in as elements that shall be contained in the State plan as provided in the legislation.

Mr. BLACKWELL. I have not made myself clear, Mr. Kimble. The interchange we have had contemplates modifications in the language before us. So we are discussing now substantive agreement which, incorporated into this bill's State plan approach, would be utilized in preference to the project grant concept.

So the last element is that we can agree that it would be feasible to have the priorities within a State established by the State agency

and reflected in its State plan, the priorities as done under Hill-Burton to be reached by the program over a period of years.

I have in mind now, Mr. Kimble, when I mention this, that a State could well decide that the great weight or the most serious part of its sanitation problem is confined to a single county, and this might be the county that it wants to go to work on.

This, perhaps, is a decision that the State agency, their health agency, could make better than someone reviewing an application at the Federal level.

Mr. KIMBLE. This county, using your illustration, might, I assume, from the context in which you are talking, not be a county in which there was the greatest financial need among farmers employing migrant laborers, but might be the county in which most of the migrant workers were, and in which the construction of more adequate facilities would serve to alleviate the environmental health problems of the largest number of migrant workers as distinct from alleviating the financial problems of the largest number of farmers. Is that it?

Mr. BLACKWELL. That is correct. The emphasis there would be on the public interest aspect.

Your comment, incidentally, brings out another element; namely, that the focus of this is the health problem, the sanitation facility. It is not conceptually oriented toward an individual's financial problems.

So those would be the predominant elements in this hypothetical situation by a State health agency.

Mr. KIMBLE. The reason I raised the question, Mr. Blackwell, was that in section 804, with respect to determining how much would be provided to any person, the emphasis there is on the financial need of the individual farmer or other applicant. This had occurred to us as being an emphasis fairly exclusively on financial need of the individual applicant as distinct from emphasis on providing the greatest coverage so far as numbers of workers were concerned.

Mr. BLACKWELL. The bill, of course, must be read in its total framework. If you focus exclusively on this particular provision it might occur to one that this would develop; keep in mind, however, the 90-percent amount is a top. It could go down to 10 percent or 15 percent; so the emphasis, therefore, is on the financial need of the individual. What you might think to be highlighted in the formula provision does not exist with respect to the overall legislation. These elements and facts, of course, would be elaborated in the committee report.

Senator WILLIAMS. This has been a very fruitful session. It shows the advantage of our system of complete consideration in subcommittee hearings. I have never seen a session which started with so many technical trouble spots which seemed to get such general resolution.

I thank the members of the staff, too, for their work in making this possible.

I wish to express our gratitude to you folks from HEW. We certainly enjoy working with you and share your pride in the fine work you are doing. I think out of this session we can see new opportunities for some of our miserable, impoverished migratory farm citizens. Let us hope that this will move on to enactment. Then we will throw the ball to you and wish you good luck and Godspeed.

Mr. DES MARAIS. Thank you, Mr. Chairman.

Senator WILLIAMS. It is a pleasure to introduce Dr. William J. Dougherty, department director of preventable diseases, New Jersey Department of Health.

STATEMENT OF DR. WILLIAM J. DOUGHERTY, DEPARTMENT DIRECTOR OF PREVENTABLE DISEASES, NEW JERSEY DEPARTMENT OF HEALTH

Senator WILLIAMS. I can cite from my personal knowledge that Dr. Dougherty is one of the heroes in the effort to bring better health opportunities to those who have the hardest time staying healthy—migrant farmworkers.

We appreciate your coming to Washington to be with us today, Doctor, and we look forward with great eagerness and anticipation to your statement.

I know your background and it suggests to me that you will bring a lot of health wisdom to our work here.

Dr. DOUGHERTY. Thank you, Senator, and members of the subcommittee.

It is indeed an opportunity to come and present one's personal views concerning the present legislation under consideration. I am rather humble, having listened to the discussions that have just taken place, and perhaps have not analyzed this bill with the extreme detail that my colleagues in the Department of Health, Education, and Welfare have done.

I must say that in reading it a general statement of approval must be given to each of the observations contained in section 801 of this bill. I don't believe we need to repeatedly stress the importance of the many difficult conditions that are found in terms of health among migrant agricultural workers.

Certainly, the relationship of many illnesses to the environment in which they exist is rather well demonstrated.

I think the core of the problem in terms of the present bill has been the inability of the farmer to meet some of the environmental circumstances that exist. I feel that in our conversations with them, the cost of adequate environmental facilities constitutes one of the major difficulties which they face.

I have been involved with the migrant worker for about 4 years, and in this time have gained a certain insight into the points of view of the farmer.

Originally, when I went into a migrant camp, I was appalled at the level of sanitation which I witnessed there. In other words, the inadequate disposal facilities, the inadequacies of the water supply, and so forth, were such that one would certainly wonder how they came to exist in our present society in this country.

On the other hand, as we learned of the difficulties of farming, the economic pressures that are placed upon the farmer, we came to appreciate the difficulties which he has in trying to rectify situations.

We have seen also in the past 4 years the effect of enforcement of a sanitation code. We have seen the bitter debate concerning the provision of hot and cold running water. We have seen many farmers who one might consider to be marginal, respond to the pressure of enforcement.

We have seen them develop their own wash facilities; they have put in deep wells, and they have established heating facilities for their water supplies and have provided the facilities required in the code.

There are some who still do not comply. I feel that where we find noncompliance, many times the economic factors of compliance are important.

I feel that the farmer is a man of good will in general. If he is convinced of the worth of a project and can find the way to finance it, he will take those steps that are necessary.

My feeling is that if we can work out an administrative system by which assistance can be given to a worthy project, sanitation facilities can be improved on the farms throughout this country.

In terms of the bill, itself, one of the most important features of it, I think, is the survey aspect. In other words, if a certain amount of money is set aside for the State agencies and local agencies to apply their talents to the task of determining where the problem is greatest, the characteristics of the problem, the amount of cost involved in rectifying the problem—this money will be well spent—I think that this can be done by most health agencies in this country.

Having undertaken the survey and having gathered the information necessary for correcting the sanitary difficulties, I think that the second provision; namely, the provision to apply for construction moneys, can certainly go forward.

Many of the facilities that we are concerned with perhaps are not terribly expensive, if one considers the long-range point of view. The installation of a well as a water supply on a farm may not be terribly expensive if one considers the fact that you can install a well for a cost of care and hospitalization of one case of typhoid fever or repeated hospitalization of children who have been affected with diarrheal disease.

In reviewing the bill, one of the needs that came to my attention was a clarification of definitions. Under section 806, the term "sanitation facilities" is defined to mean drainage, water, sewerage, and waste disposal facilities.

It was not clear that "water facilities" meant the provision of water supply systems necessary to support the sanitation of the environment. I think this might be clarified.

I would also suggest that there are, within the area of definitions, certain deficiencies that I think are important from a health point of view. One of these deficiencies, of course, is lighting.

In my experience, we have come across a number of camps in which there is no electric power, there is no opportunity for lighting of the environment. If there is no electric power, there can be no refrigeration of the foodstuffs that are maintained by the individuals. Refrigeration is another important element of the sanitation of one's environment.

Heating, of course, may depend upon the climate in which one lives, but I think some attention to heating, as an environmental factor, is important.

Lastly, in several of our experiences, the food preparation facilities of camps have been quite deficient.

These are areas which perhaps in the judgment of the subcommittee are not to be concerned in this legislation.

I think one must bring attention to the immediate benefits of a bill of this type. When there is a financial barrier to providing for the facilities, there is, naturally, some opposition to enforcement.

In other words, if we go on a farm and find the privy is in poor shape, it is going to cost money to repair it. The farmer, naturally, turns to us and says, "It is going to cost" and, therefore, he is reluctant to undertake it.

If one looks at the problem from the standpoint of what is the best type of sanitation facility for some of the permanent camps that we have seen, I am not at all impressed with the idea that we should retain the pit privy sort of approach.

I feel we should find some means of developing a waterborne sewerage system for disposal of the waste from the kitchen, from the individual lavatories in the houses where they exist, and, of course, for the sewerage, itself. This means that septic systems should be developed.

This would provide for a far more permanent arrangement. Depending upon the characteristics of the soil, this may be a permanent arrangement for many, many years.

Here we are fundamentally involved in the development of a long-term facilities.

Most State health departments dealing with problems of fecal disposal and waste disposal already have in existence some form of standards which allow for careful construction and proper functioning after installation.

One of the problems that comes up in enforcement, of course, is the extent of local pressure which may come to bear on the enforcing agent.

In other words, when you deal with a farmer and you face him with a problem, with which he has to comply, you do not, in a sense, win his great favor many times. On the other hand, if you are honestly firm with him, if you provide him with a means for solution, I think in the long run you win his respect, and he begins then to understand that we are not persecuting him.

Rather, we are attempting to give him a hand in moving forward and improving the environment of the workers that he employs.

I think we have to face this type of problem rather squarely, because the farmer, as an individual, not only thinks for himself but also, in farming communities, he constitutes, to a great extent, the conscience and the political structure of the community.

He helps to make the laws and the codes which go into effect in his community. If he sees that our requirements are financially impossible or practically impossible for him or for his community, he opposes our requirements even though they are well intended, even though they are soundly based on scientific and practical fact.

I think we have a dual problem here: (1) To educate the farmer concerning the needs of the people, the sanitation facilities that may be brought into existence; and also to prove to him that we have good intentions in terms of assisting him to meet his own problems.

The bill enables the construction and maintenance of facilities, but I am quite certain that enforcement is a very important element of

any future action. Certainly, the history and record of violations in New Jersey concerning the migrant health code bear this out.

If we were dealing only with the toilet facilities in migrant labor camps, 20 percent of all violations deal with this area of sanitation.

The State and local authorities to whom responsibility is given for enforcement should have a clear mandate in this bill. It is important that the bill state that regulations for enforcement will be prescribed.

This would allow States that perhaps do not have widespread enforcement activities to develop them and even provides pressure for them to develop enforcement activity.

There is another area in which the bill might have some interest. We are deeply concerned with providing the tools for healthy living. We have, from time to time, made this an obligation of the farmer. One of the important factors is that when tools are provided to people for living or for any other human endeavor, the person who gets them must be aware of their purpose and also their care and maintenance.

I think it is worthwhile to say a word or two about education of the migrant in terms of the sanitation facilities that are provided.

Part of our problem today is to reach out to the migrant and to establish some type of contact with him. This contact is not a lasting thing, because by and large it is transient. He is in a camp for a matter of a few days. We have a few hours to make an impression upon him, to educate him.

This transient contact does not really produce a full understanding, perhaps, of health needs and the methods by which he may protect his own health. The person to whom the migrant turns generally is the social leader within the camp itself.

This person may not be the crew leader but one of the other dominant persons in the camp. There is in each camp and among each group of migrants a person who may qualify, to whom they turn for advice, instruction, and example.

We have to begin to seek out the people who serve in leadership roles and help in their education so that by the example and precept of their everyday living they will help to advance the cause of sanitation within the camp.

We have heard the statement too frequently that you may provide the migrant with screens, you may provide him with a good washhouse, and they are abused.

I don't think facilities would be abused if the leadership groups in the camp recognized that the facilities are worthwhile and are of great benefit to the people in the camp. I am not certain we have made enough effort in educating the migrants concerning the value of the sanitation facilities that are provided.

Too often when we ask them how a child became ill or seek their understanding of illness, diarrheal illness particularly, there is no real understanding of how fecal contamination contributes to the repeated illness of members of their family. Thank you.

Senator WILLIAMS. That is a most helpful statement, Doctor, from you who come to us with a maximum of on-the-scene experience and a minimum of city office theory. We know where you have been, we know what you have been doing in New Jersey.

So many new thoughts come to us from you in this statement. For example, the migrant camp community leader. I can recall now, your having suggested this, that this individual or group of individuals can be useful in the educational process. So many of the community leaders we have seen, and frequently it is the crew leader—I wish I could remember the crew leader we met 2 weeks ago at White's Bog, in New Jersey—I can just see him if we had a program, doing his utmost to make sure that his people that he takes such pride in will know what a sanitary facility is all about and take pride in using it properly.

This happened to be a camp that you are no doubt familiar with, which is still in the medieval wooden privy stage. I say medieval. There were the days of yore when we all had a little farmer in use and we lived through it and prospered.

But this is not the family farm situation. This is a community facility, with numbers of people using these woefully inadequate facilities. Is that not the fact?

Dr. DOUGHERTY. That is the fact. In other words, thinking of the people who live primitively in this country, we might compare the migrant almost to the field soldier who is on bivouac.

If we have a military organization that is going to stay any length of time in an area, we build relatively permanent types of facilities. If we had men coming back to the farms in New Jersey every year for some type of military exercise, there would be much better facilities provided for them than we find right now in the camps.

Certainly we would find a better way of disposing of feces. In terms of the washing facilities that have been provided, in the past few years, in the evening clinics, which we run, we have rarely seen people who are dirty.

This was a common idea, you know, that the migrant worker was a dirty person. This is not true. The migrants use soap and water and they use it well and in abundance. They are clean and shining when they come to us in the evening.

It is rare that we see a person who is dirty. Men will actually take time out after their work, and wash and shower before they come to eat. It is my conviction that given the tools of cleanliness, the people with whom we are dealing use cleanliness. But how can you educate them if the tools are not available?

The prime purpose, as I see it, of a bill of this type is to provide the tools.

Senator WILLIAMS. You put heavy emphasis on the economics of the situation as its affects the grower, and if his economic problems can be met in part you think the other pieces will follow.

The program would be used, codes could be enforced, and right down the line the pieces would be put together.

Dr. DOUGHERTY. I believe that we should move forward on the economic front. I think every farmer in this country knows his own personal economic status. In the community of farmers, the balances are pretty well drawn between those that are doing an excellent job on a sound financial structure and those that are marginal.

I think that farmers have within their own organizations the means of determining perhaps those who need assistance most as against those who have no need. Perhape they might even apply themselves to the formulation of the 10 versus 90 percent.

I think this is a very important element of the legislation. Given the opportunity to solve these problems, related to the development of facilities, I think the people who have need for these facilities can develop their use.

Senator WILLIAMS. I have one or two additional points, Doctor.

Some time ago we got some very distressing and staggering statistics that suggested the high cost to the community of treating the person with a disease that could have been prevented.

This was a hospital in Florida that gets the crisis case of the disease that did not have to occur. I am sure there are not exact statistics, but is not this somewhat of a pattern, that disease occurs, it is not treated, it was not prevented through immunization or was not prevented through sanitary facilities, and it gets worse and worse.

Finally it becomes a crisis case and then it is a community hospital case. I would think there is a staggering community expense in taking care of unnecessary disease in the migrant farm group of people.

Dr. DOUGHERTY. My experience, sir, is perhaps a little different from that. I have to work this out, but I believe that the rigors of travel from Florida to New Jersey in effect select out many of the persons who have illnesses which will require hospitalization.

By and large, most of the people whom we have seen, who needed hospitalization, are individuals who have developed some emergency situations in New Jersey. We occasionally find a person with a cardiac condition that is prolonged and which existed in Florida.

On the other hand, accidents, automobile and otherwise, illness contracted at the time the person is in the camp, these are the types of things with which we are dealing.

Prenatal care, of course, is something which has demanded a lot of attention and demands a lot of funds to support. Hospitalization for pregnancy is another need. One of the examples which stands out most clearly in terms of the preventable aspects of care is a case of a child born in a hospital and returned home to the environment of a migrant labor camp within a matter of 2 to 3 days, after improper formula preparation and lack of refrigeration, the youngster is admitted back to the hospital with diarrhea and acidosis.

He was hospitalized for 3 or 4 days until the diarrhea and acidosis were controlled. He was returned home to his mother, to the same environment and within a matter of a few days he was returned to the hospital again.

This hospitalization cost on the order of $200. It was entirely preventable. Refrigeration of the milk would have prevented this illness. This is one of the reasons why I stressed the need for refrigeration, and one of the reasons I stressed the need for electricity.

It is the fact that we have to be aware that accidents occur. I know of an individual, a 45- or 50-year old man, who was fully capable of working but in the late evening he was knocked down and injured by the people who were scuffling.

If he had had better light and better vision, he might have avoided the accident. That is another problem we see, accidental injury due to lack of light.

Senator WILLIAMS. In that connection, we are most encouraged that the Housing and Home Finance Agency is undertaking some work in the nature of a demonstration down in Texas, in housing, which I am sure would have within it the elements that you suggest that are necessary for a better environment for general health, including refrigeration and electricity.

I have one further observation. You and I a little better than a month ago spent a very interesting morning during the harvest of strawberries in New Jersey. We were there to be part of a film that described your work in the tuberculin test in this area.

You did a lot of testing in that field. I was not going to deal with that, although it was interesting in many ways, but one of the most interesting and hopeful aspects was the acceptance by the people in the field.

There was an eagerness to be tested, it seemed. They lined up without fear or anxiety and did cooperate, did they not?

Dr. DOUGHERTY. Senator, these things can be achieved if you take the steps to do it. In other words, we recognized that the tuberculin test was something that people did not know anything about. As a matter of fact, I am sure some of the people took the tuberculin test without knowing much about tuberculosis, too.

On the other hand, the effort was made. We arranged with Mr. Pizzo for an opportunity to go and talk to each of his crews, both the Negro and the Puerto Rican group.

This allowed us to explain what was going to be done, why it was going to be done, and to seek their cooperation. I think these are the elements that are necessary. Not only was the cooperation sought in English, but it was also sought in Spanish, in a bilingual sense, bringing out the need that we have to communicate in two languages in dealing with the people with whom we are working.

Senator WILLIAMS. The observation that I wanted to make was that we were in fields that I would describe as very large, maybe 200 to 300 acres. I looked but I did not see any field sanitation facilities there.

Not to be specific about that particular farm, but as a broad proposition, what are your observations on this question of sanitation in dealing with the people with whom we are working.

Dr. DOUGHERTY. In terms of the New Jersey farms, sir, of 200 to 300 acres, I think relatively speaking that the men work in the field for a short span of time.

As a matter of fact, not more than 3 or 4 hours. The harvest begins perhaps at 5 or 6 in the morning and by 10 or 10:30 they were pretty well along toward the cleanup of the day's operation.

They are not too remote, either, from the home base, maybe 4 to 6 miles. I think the men are pretty well oriented to this timespan in terms of their personal sanitation habits.

I think the situation in New Jersey is not pertinent elsewhere. I think there are large fields, longer work hours and a need for field facilities for sanitation.

In other words, if you have men in the field for 12 or 14 hours, if they are working at long distances from their home base, then I think you have to provide field sanitation facilities for them. But I don't believe it is quite as pertinent in New Jersey.

I have never seen a farming area, or a field area in New Jersey where there have been field facilities established.

Senator WILLIAMS. In other areas, this would represent a real problem, not only for the worker but I would think in terms of the product that he is harvesting, from the possible spread of contamination disease through the fruit or the vegetable.

Dr. DOUGHERTY. In the entire period that we were in the field during the filming, when we were working closely with the men in the field, I never saw an individual who actually had an occasion to move aside, to move out of line, so to speak.

This, of course, is a very transient observation. But I am certain that where large bodies of men are working in large fields, facilities are needed.

In terms of the crop, itself, I think that by and large the processing of the crop today generally will give us a great deal of protection in terms of contamination. The method of handling is such that by and large fecal contamination should not be a major cause of disease in terms of the crop, itself.

Senator WILLIAMS. This gives us a little reassurance, and yet there are so many examples to the contrary. We have pictures here that show the lettuce harvest in one of our Southwestern States. The lettuce is picked and packed in areas where there are not any field facilities.

We have watched the celery harvests. Talk about fields, those fields are thousands of acres. There the next hands to touch the celery after that operation in the field will be ourselves when we buy it in the store to take home.

I would suggest that this could represent part of the problem.

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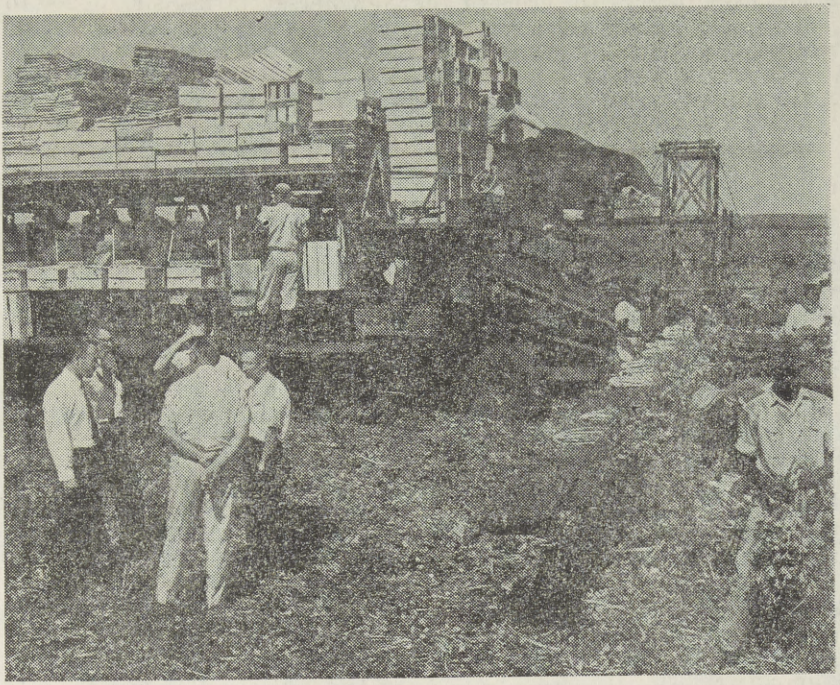

Harvest and field-packing operations observed by the subcommittee.

Senator WILLIAMS. Are there any questions of Dr. Dougherty?

If not, I wish to express our full gratitude, Doctor. We want you to know that our committee is most appreciative of your work on this bill to its final form.

Your specific suggestions have been most helpful in terms of refinement. Your experience and your conclusions will be most forceful in persuading members of this committee, and later the Senate, of the need for a program such as this.

Thank you very much.

(The prepared statements of witnesses who did not present oral testimony at the hearing follow:)

PREPARED STATEMENT OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, INC., BY NOBLE J. SWEARINGEN, DIRECTOR, WASHINGTON OFFICE

I submit to you at the request of the executive director of the APHA, Dr. Berwyn F. Mattison, the views of the American Public Health Association relative to S. 3382, a bill to assist in the construction of sanitation facilities for domestic agricultural migratory farmworkers. Although the APHA governing council has taken no position on this problem as it relates to this specific segment of our population, the views of the association and its stand relative to the necessity for healthful sanitary conditions is sufficiently inclusive to cover the problem encompassed in your legislative proposal.

The primary objective of S. 3382 is the raising of the health status of domestic agricultural migratory workers and their families. Without question, ancillary benefits would accrue from the availability of adequate amounts of safe water and ready access to shower and toilet facilities. It is to the specific reference to health conditions, however, that the APHA wishes to direct its views, and based upon the health problems resulting from a lack of sanitation facilities, supports the objectives contained in S. 3382.

Much of the disease problems persisting in migratory camps and among migrant workers was pointed out to you and to your subcommittee as well as to the considering House subcommittee in testimony relating to S. 1130. Several of the more severe epidemiclike problems are a direct result of polluted water supplies, inadequate amounts of safe water, and lack of provision of even the most elementary bathing facilities with consequential effect upon the health of migratory workers and their families. Of particular import, of course, are the dysenteries and diarrheal diseases. These are debilitating and lower the work efficiency of the victims. If allowed to go unchecked, they can have serious consequences, often resulting in hospitalization of the migrant or members of the family. Too often this cost must be assumed by the community. This suffering and expense is totally unnecessary and can be prevented—such problems have virtually disappeared from most American communities through improved sanitation. Continuation of the present situation, in the view of the APHA, would be both callously inhuman and economically unwise.

Because of this tangible and direct relationship between good sanitation facilities and good health, and the proven lack of adequate sanitary facilities in most migrant camps, the American Public Health Association urges favorable consideration of S. 3382.

This opportunity to express the opinions of the APHA is most appreciated.

PREPARED STATEMENT OF FLORIDA FRUIT & VEGETABLE ASSOCIATION, ORLANDO, FLA., PRESENTED BY K. R. MOREFIELD, MANAGER, INSURANCE DIVISION

The employer of agricultural labor is in an unusual and not to be envied position. He needs a large number of workers for a relatively short period of time. This has led to the use of what is termed "migratory farm labor."

The Subcommittee on Migratory Labor is well versed in the problems that have arisen through the migration of the workers and their families from State to State following the harvest and there seems to be no need to go over that ground again.

In order to have the large numbers of workers available, many farmers have resorted to providing or procuring housing facilities for these workers. Such housing facilities are necessarily costly for the reason that they can be occupied only for a short period of time, remaining empty the balance of the year. This system of movement from place to place and of housing being occupied by different individuals or families for short periods of time with no real incentive to care for the property has made such housing even more costly.

A natural result of this system is the problem of providing sanitation facilities for migrant farmworkers and their families. The provision of such facilities has become a tremendous burden to farmers.

S. 3382, we believe, would help alleviate this problem by encouraging the construction and improvement of sanitation facilities and would have a direct result of lowering disease and death rates among migrant farm families.

My association represents employers who employ many thousands of such workers annually. We are attempting, within the limitation of our resources, to alleviate the problems that go with the migratory labor stream, and we wholeheartedly support this bill because it will help to improve the sanitation facilities in migratory labor camps and other areas, and we recommend its passage.

PREPARED STATEMENT OF THE NATIONAL COUNCIL OF FARMER COOPERATIVES, WASHINGTON, D.C., PRESENTED BY RICHARD T. O'CONNELL, LEGISLATIVE COUNSEL

S. 3382, a bill to amend the Public Health Service Act so as to establish a program to assist in the construction of adequate sanitation facilities for migratory farm labor, has, in our judgment, the proper intent in improving sanitary facilities for agricultural migratory workers.

Adequate and proper sanitary facilities will increase the opportunity for better living standards and, thus, should hopefully increase the possibility of growing productivity among the workers involved.

The authorizations, direction and standards as established in sections 802, 803, and 804 appear to be sound in carrying out the intent of this proposed act. We, therefore, have no amendments to offer in these three sections.

In section 805, we question the granting of funds to States for the purposes of making surveys on sanitation facilities for migratory farm labor. We believe the States have a responsibility to obtain this information without resorting to the use of funds provided by the Federal Government. This, we believe, would be a needless expenditure of funds and not, fundamentally, the responsibility of the Federal Government to obtain this information. This information should be provided to the Surgeon General by the States.

We have no specific amendments to offer, other than the aforementioned recommendation. We respectfully request this letter be made part of the record.

PREPARED STATEMENT BY RICHARD C. SHIPMAN, ASSISTANT DIRECTOR, NATIONAL FARMERS UNION, LEGISLATIVE SERVICES, WASHINGTON, D.C., JULY 19, 1962

I understand that your committee will soon be holding hearings on your bill S. 3382, providing assistance for the construction of sanitary facilities for migrant agricultural workers.

May I take this means of expressing the support of the National Farmers Union for S. 3382.

At the most recent convention of the National Farmers Union on March 21, 1962, the delegates passed the following resolution expressing their concern for the welfare of migrant farmworkers:

"* * * Legislative provisions should be strengthened regarding wage rates, health, safety, and housing conditions for domestic migratory farm labor, and for education of the children of migrant families * * *."

The disease and death rates among migrant workers that result from unsanitary living conditions certainly presents a health hazard to the entire Nation. The interstate movement of these unfortunate people makes their problem one that requires the cooperation of both State and Federal Government.

We urge that S. 3382 be reported favorably and respectfully request that this letter be made a part of the record of the hearings.

Senator WILLIAMS. With this testimony, we will conclude the hearings.

(Whereupon, at 12:15 p.m., the hearing was concluded.)

Studies Relevant to the Need for the Bill S. 3382

Sanitation in the Harvesting of Field Crops

(By Frank M. Stead, Chief, Division of Environmental Sanitation, California State Department of Public Health, Berkeley, Calif.; presented at the Annual Convention of the California Farm Bureau Federation (Vegetable Department), Los Angeles, Calif., Nov. 9, 1959)

A basic and far-reaching change is certain to take place in California agriculture in the next 2 years. Practices which have gone unchallenged since the days of the great land grants are destined to disappear. The important question is: As the State makes this advance will agriculture face up to the problem and throw its weight behind the program, or look the other way? A paramount stake involved in this decision is the confidence of the public in the cleanliness of the public food supply.

THE PROBLEM

An important characteristic of food crops in California is that the sudden coming to maturity of large acreages of a given crop calls for sizable harvesting crews which move from field to field, seldom staying in one place more than a day. In spite of the large number employed at the height of the harvesting season these workers are not normally provided with either toilet or handwashing facilities.

What are the consequences? Aside from the sociological factors, which may prove in the long run to be very far-reaching, these conditions create three public health problems.

The first is the risk of disease to the workers themselves. Studies made by our department in migrant worker camps in the San Joaquin Valley in 1950–52 indicated that rates of infection in the families of migrant workers with intestinal diseases were closely related to availability of water for personal hygiene. Where hands are not washed after visiting the toilet, infection spreads through a family by direct contact and by means of handling food. That this same principle holds in the harvesting fields is indicated by a relatively high incidence of illness and absenteeism due to diarrheal disturbances among field crop workers.

The second hazard is the risk to the entire population in a community when human excreta is deposited on the ground in proximity to places of residence, particularly in situations where flies are abundant.

The third public health problem looms largest of all in the eyes of the public and this is the threat of contamination of food with human excreta. The degree of risk of transmission of disease to a consumer of food by this means is difficult to establish by scientific means, although it is certain that some risk exists. But the overwhelming consideration is the repugnance of the idea of filth on food and the insistence of the American public on clean food whenever the issue is raised.

THE BACKGROUND

The issue of lack of toilets and handwashing facilities in the harvesting of food crops in California was first raised in the lettuce fields of the Salinas Valley in the spring of 1955. An investigation by State agencies quickly verified the fact that the allegations were well founded. Conferences on the subject with representatives of the lettuce growers and shippers in that area resulted in a voluntary program by the industry which showed great promise. A novel type of mobile toilet and handwashing facility was developed and put to field trial in the lettuce fields and found to be successful. Over 40 of the units were built and put to use in the spring of 1956. It looked as though the problem was well on the way to solution in this State. Then what happened? The program failed to spread to other areas and other crops and slowly

died out in the lettuce fields of Salinas Valley, where the growers saw no reason why they should carry on alone.

In the spring of this year the issue was again raised and this time with greater vigor than in 1955. Acts of urination and defecation by fieldworkers have been documented graphically and dramatically in colored motion pictures films, which if shown generally to the public could suddenly arouse public opinion to a fever pitch and result in a virtual boycott of California field crops.

Again, the alleged conditions have been verified by the State agencies. A task force of four State departments, public health, industrial relations, agriculture, and employment, held two Statewide meetings with agriculture and other agencies and a plan of action has been mapped out. This time we must not fail.

THE LAW

California has voluminous statutes found in some 30 codes, each code being several hundred pages in volume. In addition, each of the codes is supplemented by equally voluminous detailed rules and regulations promulgated by the State departments in elaboration of the statute requirements. Surely, with all this body of law the situation of harvesting of food crops must be thoroughly covered. Actually it is not. The statutes are specific about the provision of sanitary facilities in industrial workplaces, and food processing establishments, and even on short-time construction jobs, but nowhere does the law specifically require toilets or handwashing facilities for agricultural workers in the field. The only pertinent statutes apply to this problem indirectly. The Pure Foods Act prohibits the adulteration of commercial foods by contamination during packing or processing and our department has utilized this statute to take suitable action whenever we have seen field crops actually being contaminated. Similarly, the labor code provides that all work places shall be safe and the word "safe" has been construed to mean "healthy," and the department of industrial relations is prepared to use this statute in respect to the problem in question. But, at best, these are very limited tools to use to tackle a problem as vast as the harvesting of food crops in California.

Consequently, the four departments represented on the task force have decided to seek a new, clear, and specific statute at the 1961 session of the legislature. We have come to this decision with the clear understanding that no such statute could be enacted without the support and understanding of the agricultural industry, and that even if enacted it would not be successfully enforced if practicable means for complying were not available which have been demonstrated as adaptable to the widely varying patterns of California food crops.

THE SOLUTION

For the foregoing reasons the task force has tackled as its first job the development of concepts of design of toilet and handwashing facilities which would be suitable for use in the field. With the help of the Department of Agricultural Engineering of the University of California, we have evolved three basic types of facilities.

The first is a mobile facility. Patterned after the Salinas Valley unit, this is an all-metal toilet and handwashing unit in the form of a trailer. It has a water supply tank and a chemical-type sewage tank. It can move through the field with the crew, so as to cut down lost time. Its first cost is relatively high and it is, therefore, adapted to use by growers or shippers who operate crews over considerable periods of time, but move from field to field. It is indicated for large fields and in the vicinity of areas of residence. It must be emptied, cleaned and serviced daily at a servicing depot.

The second basic type is a stationary facility. In effect, it is a pit privy with handwashing facility attached. Waste water from handwashing is disposed of underground separate from the pit. Being attached to the land this type of unit would, of course, be provided by the landowner. It could be constructed at modest cost by the owner and would be suitable in a wide variety of crops on relatively small exposed parcels of ground where crews are small and walking distances are not great or where there is need for a facility throughout the year in one location.

Both of the foregoing types of facility involve a superstructure or building and, therefore, appreciable capital outlay. It is obvious that there may be a large number of situations where operations are so infrequent or the number of workers so small that installations of this sort would not be practical. To meet this need the third type of facility has been conceived in very primitive terms as portable devices carried on a pickup truck to the point of use. In this category the toilet facility might be as simple as a 4-gallon garbage-type can fitted with a seat rim and cover, and perhaps a paper liner, while the handwashing facility would be a similar can equipped with stirrup pump, or a small tank on the truck equipped with a faucet. Natural screening would replace the superstructure and waste wash water would run onto the ground, so that this arrangement would be used only in remote locations.

These concepts are being sketched in diagrammatic form with suitable comments and will soon be available for distribution in quantity. The object is not to crystallize design thinking, but, on the contrary, to get people to think originally and exercise their ingenuity to solve the problem in the most effective manner without being bound by orthodox design concepts for toilets intended for use in camps and areas of habitation.

THE PROGRAM

It is the conviction of the task force that if the problem is to be solved it will be solved by the efforts of the agriculturists themselves, with the patterns of solution reflecting the local agricultural practices. Consequently, the plan of action is to stimulate the development in each county of a local action committee.

Concurrence was reached at the second statewide meeting (September 3, 1959) that the local health officer was the logical chairman for such a committee and, at their annual meeting in October, the local health officers agreed to assume this role. Serving with him will be the county agricultural commissioner, the farm adviser, representatives of landowners, growers, and shippers of food crops, and others.

The functions of the local committees will be to develop, and field test, designs of toilet and handwashing faciilties suited to the crops and conditions in an area. The committees will have no enforcement or coercive functions but will merely seek to demonstrate the feasibility of providing sanitary facilities in harvesting operations and to develop local interest and support.

Steps have already been taken to start this program in each county.

AGRICULTURE'S ROLE

What is the role of agriculture in this statewide endeavor? There are two things that agricultural agencies can do. The first is to seriously study this problem, take an affirmative position of endorsement and support of the local programs and assist the local committees in getting informational material to individual farmers, growers, and shippers. The action taken by the board of directors of the California Grape & Tree Fruit League at Lodi on October 8, 1959, and the well-written statement which that organization is distributing to its members serves as an excellent example of this type of support.

The second thing that agricultural organizations can do is to assist the local committees in financing the construction and field trial of the various types of toilet and handwashing facilities in each area. Experience gained in field trial is indispensable to development of satisfactory equipment, and the solving of problems associated with its use. Individual landowners, growers, or shippers may be reluctant to assume the cost and inconvenience of the demonstrations on an individual basis, while they would doubtless support a cooperative type of program in which costs are shared. The agricultural commodity organizations may well serve, therefore, as the key element in solving this problem.

For a second time in 5 years this State is tackling this statewide agricultural problem. The first effort faded out into failure, perhaps as a result of failure on the part of State agencies to follow through. This time the State agencies are determined to see the effort through to a successful conclusion. With the cooperation of the agricultural industry this task can be accomplished speedily and smoothly and California will have again pioneered and shown the way.

[Published in California's Health, June 1, 1956]

Sanitation Problems in the Harvesting of Field Crops

(By Edward W. Munson, director of sanitation, Monterey County Health Department, presented at the United States-Mexico Border Public Health Association meeting, Mexicali, Baja California, April 16, 1956.)

During the past few years an industrial revolution has occurred in the methods of harvesting and marketing many of the fruits and vegetables grown in California. Previously, in time-honored tradition, nearly all fruits and vegetables, after harvesting by field crews, were trucked to centrally located packing sheds where they were culled, packed, iced, and otherwise prepared for distribution.

With the advent of vacuum cooling and the use of cardboard containers this costly procedure was no longer necessary, particularly in packing such crops as lettuce and celery, which are now packed in the field. Public acceptance of this new packaging and cooling process has become so great that consumer demand virtually requires this change in agricultural practices.

The transfer of packing operations to the field in California has resulted in larger numbers of workers being located in the fields, with the problems of sanitation assuming an increasing importance in direct proportion to the numbers of workers employed. Problems of inadequate toilet and handwashing facilities, improperly dispensed drinking water, excessive dust, and many others became increasingly apparent.

FIELD OBSERVATIONS OBSERVED

In order to evaluate these problems, in the spring of 1955 the State Departments of Public Health and Industrial Relations dispatched teams to observe, first hand, conditions and practices resulting from the change in vegetable harvesting and packing operations. Included on each team was a sanitarian from the Monterey County Health Department. Since lettuce harvesting was then at the peak of the season the observations were confined to that one crop. Conditions encountered were illuminating and disturbing. Working crews varied from 30 to 150 according to the stage of the crop and the size of the field. In the area covered most operations had no toilet or handwashing facilities available to the workers. The absence of handwashing facilities necessitated that the workers, after relieving themselves in the field or nearby ditches, resume packing operations or eating their lunch without the opportunity of washing their hands.

Drinking water facilities were also observed. In most instances the common cup was very much in evidence. In some cases workers were observed to drink from irrigation ditches, a particularly hazardous practice in view of the occasional use of the same ditches, when dry, as places of defecation.

The conditions noted in this district are probably no different from fresh fruit and vegetable producing practices throughout the Nation. During such harvesting operations the farm or orchard virtually becomes a food processing plant with little or no preparation or provisions being made to solve the basic problems of sanitation such as water supply, sewage disposal, personal hygiene, and general cleanliness of the environment. This situation poses three basic public health problems.

First, the risk to the workers themselves of contracting a communicable disease through drinking contaminated water or being required to work or eat without washing facilities to at least cleanse their hands.

Second, the risk that food designed for human consumption will become contaminated.

Third, the risk of the spread of communicable disease to the general public if the field harvesting crews become infected with, and carriers of, diseases of enteric origin.

The exact degree to which transmission of enteric disease occurs in these three ways in the Nation is not known. The important point is that experience in many parts of the world proves beyond a shadow of a doubt that the results of each of these risks can be extremely serious if the agricultural practices are not planned with these factors in mind.

PILOT STUDY

In order to provide some concrete solutions to the problems resulting from the change in harvesting and packing operations in California, the State departments of public health and industrial relations requested that the Monterey County Health Department develop a pilot program by which alternate solutions to these problems could be studied. To do this, it was necessary for the county health department to secure the wholehearted cooperation of the Growers-Shippers Vegetable Association, which is an organization that represents the majority of the large growers and shippers of that area. The assistance obtained from the organization was spontaneous and sincere.

The first possible solution studied was that of providing privies for the use of the agricultural workers. It soon became apparent that this would not solve the problem. In the first place it would require the installation of privies in every field or it would mean transporting and setting them up in a field before harvesting operations could be started, which would entail considerable work and might, if hastily done, create unsightliness, problems of fly control, and possible fly-transmitted illness. In addition, providing handwashing facilities in conjunction with privies did not seem to be practical.

The second possible solution considered was that of obtaining chemical toilets on a rental basis, in which the rental paid would include servicing the units on a frequency which would insure a satisfactory operation. However, after study, because of the magnitude of the area and the rapidity of harvesting operations, it was concluded that rental units maintained by a service company would not be satisfactory. For example, a rental unit might be requested at a given field at a specified time with the expectation that the field would be harvested immediately. Upon arrriving at the field with the picking crew the foreman might find that the quality of the lettuce was not what had been expected or that the field would not pass the inspection of the county agricultural department because of excessive tip burn, slime, or for some other reason. Thereupon the crew might be dispatched to a field 20 or 30 miles away without time to arrange for toilet facilities from the rental company.

MOBILE CHEMICAL TOILETS

The third solution explored was that of providing mobile chemical toilets, equipped with handwashing facilities consisting of running water, a washbasin, paper towels, and soap. These units would be on an individually owned basis and each shipper of vegetables would be expected to supply at least one unit with each harvesting crew. This latter method appeared to be the best solution and received the endorsement of the agricultural interests. A local manufacturing concern was interested in mass producing these mobile chemical toilet units. To date 26 units have been purchased by vegetable growers and shippers and many more are expected to be obtained before the vegetable harvesting season gets underway.

Each unit consists of a toilet, urinal, and washbasin, enclosed in a lightweight steel building having an expanded metal floor and mounted on wheels to be transported as a trailer unit behind a pickup or truck. Water, under gravity pressure, is supplied to the handwashing basin from a 50-gallon tank fabricated into the top or back of the unit. Paper towels and soap are provided from dispensers mounted on the wall above the washbasin. The total weight of the unit is approximately 800 pounds and the cost is in the neighborhood of $650. The effectiveness of this equipment will be closely scrutinized and the results obtained from the first few months' operation of these units will be carefully evaluated.

The use of either portable pressure drinking fountains or paper cups and properly designed water-dispensing containers will be required as a normal part of each crew's equipment. The source of the water supplies and the cleanliness of the dispensing equipment will be checked periodically.

From this program it is hoped to obtain information relative to the adequacy of design, number of workers a unit can serve, maximum spacing of units in the

field to assure use and keep lost time at a minimum and the frequency of cleaning and maintenance. Another question that must be answered is, "Will these units be used or will they be simply abused?" When all this information has been obtained and verified under field conditions it is hoped that a practical solution to an increasingly acute problem will have been achieved.

History has shown that improvements in the standards of environmental sanitation do not take place uniformly. Instead sanitation patterns tend to stay static for a period of years until some dramatic occurrence takes place and the problems are clearly recognized by official agencies and individuals alike who have the responsibility for solving them. Then, improvements years overdue will take place and a new standard set for the next decade or two. The sanitation problems in the harvesting of field crops have been recognized in California, their public health and esthetic implications have been delineated, and cooperative action has been immediately forthcoming from agricultural interests. If this interest and concern continue during the coming harvest season, the successful solution to the problems of adequate sanitation for the harvesting of field crops will be assured.

[Reprinted from American Journal of Public Health, pt. I, vol. 43, No. 6, June 1953]

Diarrheal Diseases in Fresno County, Calif.

(By James Watt, M.D., D.P.H., F.A.P.H.A.; A. C. Hollister, Jr., M.D., FAPHA.; M. D. Beck; and E. C. Hemphill)

Counties of the San Joaquin Valley have consistently shown a higher infant mortality rate from diarrhea and enteritis than the State of California as a whole for many years prior to this study. Responsible health authorities have been concerned and from time to time there has been considerable public alarm. Available information did not define the nature or extent of the problem, since etiological diagnoses were rare and morbidity records inaccurate. These deficiencies mean that elements essential for intelligent control were lacking. The California State Department of Public Health, therefore, requested the Diarrheal Diseases Study Unit of the U.S. Public Health Service to assist in planning a study which would lead to a better understanding of etiology and frequency of diarrheal diseases in the Central Valley.

Fresno County, centrally located in the San Joaquin Valley and having many local conditions which facilitated initiation of the program, was selected as the site of investigation since its problems were typical of the whole area. This rich agricultural county has a number of crops harvested at various seasons of the year which require large numbers of laborers for short periods of time. Many families move from the Imperial Valley and Arizona through the Central Valley to northern States during the spring and summer following the seasonal maturation of vegetable crops, returning to the Central Valley in the fall for cotton picking on their way back to the southern part of the country where the cycle begins again. This migrant group, having no permanent home, has been particularly affected by diarrheal disease.

Previously demonstrated facts pertinent to this problem may be summarized briefly. Diarrheal diseases are caused by many etiological agents, some known, some unknown. Severe diarrheal disease is commonly caused by infection with a member of the genus *Shigella*. In turn, shigellosis has constituted a major part of the problem in all areas studied that were characterized by relatively high diarrheal disease morbidity and mortality rates. Shigellosis is not equally distributed through communities but occurs more commonly where such indexes as income, housing, and sanitation are below the community average. In addition, studies of normal population groups have demonstrated characteristic curves of *Shigella* prevalence, age, and seasonal distribution in areas where shigellosis is a major problem. Similar, though less extensive data are available for communities where the disease is of minor importance. Analogous data on the incidence of diarrheal disease also are available.

Known facts about diarrheal disease in the Central Valley were: Deaths were almost exclusively in children, a large proportion between 6 months and 2 years of age, and these children belonged, in general, to families in the lowest income groups, living in areas with incomplete or no community sanitary facilities. These facts were compatible with a presumptive diagnosis of shigellosis as a

major factor in the problem. An important objection to this diagnosis was the relatively small number of *Shigella* isolations reported from diagnostic laboratories in the area.

This objection could have been met directly by a study of sick children as seen in practice. Some indication of the fact that *Shigellas* could be found in Fresno and other areas of the Central Valley when looked for carefully in patients was obtained in 1949. The practical difficulties of such a study together with the limited application of the results led to another approach. It was decided to conduct a normal population survey to measure the prevalence of shigellosis. These data and the incidence of diarrheal disease in the families studied would establish the importance of shigellosis in the study area since they would permit a comparison of the findings with those of other areas in which *Shigella* prevalence had been related to diarrheal disease morbidity and mortality. Thus, the presumptive diagnosis would be tested and data collected by these surveys would be applicable directly to planning control activities.

PLAN OF STUDY

In preliminary discussions of this study, two approaches appeared possible: (1) to set up a complete unit for investigation of diarrheal diseases which would operate independently of existing organizations, or (2) to utilize personnel and facilities of various interested health agencies. The second approach was used for the following reasons. First, the results of this study would need to be applied as soon as possible after definitive results had been obtained. The effectiveness of application would be directly proportional to the extent that the working health organizations had participated in the study and were aware of the results. Permanent employees of the laboratory, nursing, and sanitary staffs of the health departments would be trained in the study methods used. Immediate use in their usual jobs would result and participation by these workers in various civic organizations would mean that relatively prompt development of indicated community control programs would follow. An informative report on the extent of such application was given in a recent article by Issler. Second, a number of these agencies were interested and working on the problem for various reasons. Operating budgets of these agencies provided the opportunity for immediate action. It was agreed that the first method of approach would possibly be more efficient in direct operation, but the factors in favor of the second would more than offset this possible advantage.

Agencies which finally contributed to this study are:

1. Fresno County:
   - (*a*) County health department:
     - (1) Nursing services.
     - (2) Sanitation services.
     - (3) Laboratory services.
2. California:
   - (*a*) State Department of Public Health:
     - (1) Division of Local Health Services.
     - (2) Bureau of Maternal and Child Health.
     - (3) Bureau of Acute Communicable Diseases.
     - (4) Division of Laboratories.
     - (5) Bureau of Vector Control.
3. Federal:
   - (*a*) Public Health Service:
     - (1) National Institutes of Health, National Microbiological Institute, Laboratory of Infectious Diseases.
     - (2) Bureau of State Services, Communicable Disease Center, Epidemiology Branch.
   - (*b*) Armed Forces Epidemiological Board, Commission on Enteric Infections.

All of these shared some responsibility for the investigation and control of diarrheal diseases and agreed to assist in this study. Personnel, funds, and equipment were thus assembled.

SCOPE OF OPERATIONS

The survey was designed to determine the prevalence of *Shigella* and *Salmonella* infection in the portion of the population which had experienced the largest number of deaths from diarrheal disease in recent years. This group of people were, for the most part, residents in either farm labor camps or "fringe areas" of the cities and towns of the county.

Families selected for study were classified primarily according to the nature, location, and ownership of their living quarters. Tabulations and discussions which follow will refer to three groups described in more detail below, called for convenience, camps, town fringe areas and housing projects.

1. *Camps.*—Labor camps were housing areas owned by growers or community organizations located in or near farming districts producing seasonal crops. Rent was free or nominal in amount. Usually housing in any one camp followed a uniform pattern, but variation between camps was sometimes very great (vide infra). Better camps had well built, small homes with adequate sanitary and related facilities. On the other hand, some were simply clusters of shacks or tents with a minimum of sanitation. Pure water was available in all, but the distribution system varied from a complete bath and kitchen in the better camps to a few public faucets in poor camps. The latter group had privies as the only sewage disposal system. Residence was restricted to agricultural workers.

2. *Town-fringe areas.*—Groups of dwellings near the edge of towns usually owned by the occupants, but because of low income they were of poor construction and crowded together. Sewer lines were lacking, but city water of good quality was available to all through community faucets and to some in individual homes. These fringe areas were in general quite similar to each other. There were no occupational restrictions on residence, but a majority of the inhabitants were agricultural workers; the remainder, for the most part, were unskilled or semiskilled laborers.

3. *Housing projects.*—These were community sponsored housing areas publicly owned. Well built, individual family dwellings or apartments were the rule with good plumbing in each unit. Families were, on the average, in a higher income group than those found in camps and town-fringe areas. Some were agricultural workers; others were engaged in clerical and similar occupations. The housing project families were selected for comparison with the camps and town-fringe areas since relatively few severe diarrheal diseases had occurred in such projects; while both camps and town-fringe areas had a recurrent problem due to these disorders.

A fourth group of families was studied for a short time because of convenience. These families attended child health conferences operated by the County Health Department. No consistent housing pattern existed but, in general, families served by these conferences were from low-income groups.

Once a camp, town-fringe area, or housing project had been selected for study, an attempt was made to obtain the participation of all resident families. This generally resulted in from 80 to 90 percent cooperation. None of the families in attendance at the observed child health conferences failed to participate.

METHODS

A. Preference of infection

The prevalence of Shigella and Salmonella infections was determined by a method used previously in several field studies, consisting of rectal swab cultures obtained from children 10 years of age and under in homes and clinics. Material on the swabs was plated immediately to one SS agar plate and the swab was placed in a tube of tetrathionate broth (2 ml.). Plates and broth cultures were returned to the laboratory for incubation. Suspicious colonies were picked from SS agar plates to triple sugar iron agar slants following 24 hours incubation. The plates were incubated for another 24 hours at room temperature and picked again in an attempt to increase the positive findings. Tetrathionate broth cultures were streaked on SS agar after 24 hours incubation. These plates, in turn, were "fished" following the same routine as for the original SS agar plates.

Bacterial colonies which gave the proper reactions in triple sugar iron agar were submitted to two coarse screening tests: (1) semisolid mannite agar for checking motility and acid production, and (2) urea agar. The remainder of the biochemical tests were performed by the Fresno County Public Health Laboratory and the final definitive typing[1] was done at the California State Division of Laboratories. The field laboratory staff was thoroughly indoctrinated in methods used in previous surveys to insure comparability of results.

[1] Shigella alkalescens was identified when found but has been excluded from all tabulations of Shigella prevalence.

B. Incidence of diarrheal disease

Home visits to all families in the study were used to obtain illness records. Information was obtained and recorded as nearly as possible in the informant's own words. Questions about diarrheal disease were asked in a uniform manner, with the use of colloquial synonyms whenever negative replies were obtained to initial questions. All reported diarrhea was recorded together with a list of symptoms. Reported cases which occurred in some other area than that being studied were excluded from all tabulations recorded here. A form was utilized which had been developed by the Public Health Service for particular studies in Texas. Some families were visited one time only and the visit was timed to occur during the week after cultures had been taken. Many groups of families had cultures taken at intervals of from 4 to 6 weeks. In each of these groups a record of illness since the last visit was also obtained. Interviewers were given a detailed series of instructions before histories were taken on the use of forms and on methods of asking questions. Incidence rates are based on diarrheal disease occurring in the study area and reported for the 6 weeks prior to the interview.

RESULTS

Collection of information began early in July 1950, and continued for 6 months. The results are analyzed below under the following headings: prevalence of infection, comparison of Fresno County prevalence rates with other areas, and incidence of diarrheal disease.

Prevalence of infection.—Table 1 gives the total survey cultures taken, number of Shigellas found and computed prevalence rates for the four different population groups under study. Data for child health conferences and housing projects were obtained in July and August, those for camps and towns were for the entire 6-month period of the study. Crude rates presented must be corrected for seasonal variation in prevalence as well as for differences in age composition of the various population groups before specific conclusions are drawn.

TABLE 1.—*Survey cultures in 4 population groups with prevalence rates for the genus* Shigella, *Fresno County, Calif., July–December 1950*

Population group	Total cultures	*Shigella*	
		Number positive	Percent positive
Camps	3,624	222	6.1
Towns (fringe areas)	2,574	100	3.9
Housing projects	278	1	.4
Child health conferences	589	1	.2
Total	7,065	324	4.6

Survey cultures and *Shigellas* obtained from residents of labor camps and from fringe areas of towns in Fresno County are shown in table 2 by month for the 6-month period, July through December 1950. Somewhat higher rates seen in both town fringe areas and camps in July compared with August and September suggest that these early cultures measure the latter part of a seasonal high commonly encountered in the United States in the spring and early summer in mild climates. There is evidence of an increase in rates in labor camps in October which continued for some time, but the short duration of this study precludes any definite interpretation of these variations as true indications of a consistent seasonal trend.

TABLE 2.—*Survey cultures taken in labor camps and town fringe areas and* Shigella *isolations in each month, Fresno County, Calif., 1950*

Month	Camps			Town fringe areas		
	Total	*Shigella* positive	Percent positive	Total	*Shigella* positive	Percent positive
July	199	15	7.5	273	16	5.9
August	831	24	2.9	981	30	3.1
September	464	14	3.0	425	19	4.5
October	877	84	9.6	483	27	5.6
November	780	57	7.3	217	1	.5
December	473	28	5.9	195	7	3.6

TABLE 3.—*Survey cultures, July–September and October–December quarters, in labor camps and town fringe areas, Fresno County, Calif., 1950*

Population group	July–September			October–December		
	Total	*Shigella* positive	Percent positive	Total	*Shigella* positive	Percent positive
Camps	1,494	53	3.5	2,130	169	7.9
Towns (fringe areas)	1,679	65	3.9	895	35	3.9

The fall increase in prevalence of *Shigella* infection in labor camps is emphasized when the rates are grouped by quarters (table 3). The rate for labor camps in the July–September quarter was doubled in the October–December quarter (3.5 to 7.9 percent). On the other hand, the town rates were the same for both periods (3.9 percent) and at a level comparable with that seen in the earlier period in the camps. The statistically significant difference in rates observed between the two population groups ($P=0.0001$) for the entire period is thus the result of high rates observed in the camps in October, November, and December.

Survey cultures were principally from children under 10 years of age, the distribution by age group being shown in table 4. Observed rates varied from 3 percent positive in the first year of life to 6.3 percent in the second year with a slight decline in prevalence for the next few years.

TABLE 4.—*Age distribution of survey cultures, camps, and town fringe areas combined, and* Shigella *Isolations, Fresno County, Calif., 1950*

Age group year	Cultures taken	*Shigella* positive	Percent positive
Less than 1	823	25	3.0
1	746	47	6.3
2 to 4	2,342	132	5.6
5 to 9	2,121	112	5.3
Over 10	164	6	3.7
Unknown	2		
Total	6,198	322	5.2

TABLE 5.—*Age distribution of survey cultures, camps, and town fringe areas separately, and* Shigella *isolations, Fresno County, Calif., 1950*

Age group year	Camps			Town fringe areas		
	Total	*Shigella* positive	Percent positive	Total	*Shigella* positive	Percent positive
Less than 1	532	19	3.6	291	6	2.1
1	455	40	8.8	291	7	2.4
2 to 4	1,408	86	6.1	934	46	4.9
5 to 9	1,130	72	6.4	991	40	4.0
Over 10	97	5	5.2	67	1	1.5

TABLE 6.—*Comparison of prevalence observed in child health conferences and housing projects with theoretical prevalence derived from observations in town fringe areas and camps*

Age group year	Child health conference				Housing projects			
	July and August		Theoretical prevalence applying 2-month rates		July and August		Theoretical prevalence applying 2-month rates	
	Total cultures	Number positive	Fringe areas	Camp	Total cultures	Number positive	Fringe areas	Camp
Less than 1	179	1	1.4	----	27	----	0.2	----
1	99	----	3.0	1.9	23	----	.7	0.4
2 to 4	190	----	8.9	7.9	108	----	5.1	4.5
5 to 9	78	----	3.1	4.3	107	1	4.3	5.9
Over 10	3	----	----	----	12	----	----	----
Not stated	----	----	----	----	1	----	----	----
Total	549	1	16.4	14.1	278	1	10.3	10.8

Similar data are shown in table 5 for camps and town fringe areas separately. The difference in rates between the two areas is apparent not only in the totals shown above but also in each age group examined.

Prevalence rates for children observed in housing projects and in child health conferences were significantly lower than those found in either the town fringe areas or the camps during a comparable period of time. Data supporting this conclusion are in table 6 which shows the age distribution of the children cultured in child health conferences and in housing projects. The age-specific infection rates found in town fringe areas and in camps during July and August are applied to the other two populations in order to obtain theoretical (or expected) infections; i.e., the number of infections expected if no difference in rates existed. If the town fringe area rates had occurred, 16 positives would have been expected in the child health conference group as compared with a single observed positive. Similarly, in housing projects, 10 positives would have been expected but only 1 was observed. Entirely comparable differences were found when the camp rates were applied similarly. This relative scarcity of *Shigella* infection in housing project and child health conference families were established by the end of August so that investigation of these families was discontinued to free laboratory and interviewer time for more intensive study of groups where important amounts of shigellosis had been found.

The low prevalence rate found in housing projects is consistent with observations made relative to much larger geographic areas. Shigellosis has virtually disappeared from communities in the United States with a uniformly high level of sanitation and housing. The shift from high to low prevalence occurs during a period of general improvement and the relative influence of various factors has not been defined because improvements in individual housing, water supply, garbage and sewage disposal, higher standards of living, and better education are usually concurrent and may be accompanied by, or the result of, communitywide changes.

A comparison of prevalence of infection in housing projects with findings in different groups of camps suggests that, in addition to these changes due to interrelated factors, *Shigella* prevalence may be much more directly influenced by modification of a single sanitary factor than has been demonstrated up to this time.

Table 7 lists the cultures taken in A: housing projects, a moderate-income group with plumbing in each individual housing unit and generally good sanitation; B: camps with housing facilities comparable to A but a difference in socioeconomic level; C: camps with poor housing, without indoor plumbing, but with fewer than 15 people per water outlet; and D: camps like C, but with more than 15 people per water outlet. Thus A and B differed socioeconomically, but were otherwise comparable; B and C were similar economically, but differed with respect to housing and multiple sanitary factors as flush toilets, screening, etc.; C and D were alike in all attributes of economics and sanitation except accessibility of water. Quality of water was comparable in all groups. In groups A and B, water was in the homes and yards, in group C, occupants of one or two houses used a faucet in or near their yards for water, and in group D, water was obtained from a faucet serving a much larger group of houses with a consequent greater distance from living quarters to water source.

TABLE 7.—Shigella *prevalence found in housing projects and labor camps compared according to availability of water supply and economic status*

Group	Economic status	Water supply	Cultures taken	Number positive for *Shigella*	Prevalence rate
A	Moderate	In family home	278	1	0.4
B	Low	do	376	8	2.1
C	do	Out of home—less than 15 per faucet	2,182	116	5.3
D	do	Out of home—more than 15 per faucet	1,051	97	9.2

NOTE.—"Probability" of a difference as great or greater being due to chance when comparing—
A with B equals 0.08 (exact probability)
B with C equals 0.01
C with D less than 0.0001

Prevalence rates show a progressive rise from group A to group D, and while the differences shown between individual groups are not all statistically significant, the trend is consistent, conforms with general knowledge, and suggests that these are not simply chance variations. Considered in this light, the difference between D and C is related to the single factor of water availability or its consequent, water use; the difference between C and B is related to a combination of water use, better housing, etc., and the difference between B and A is the result of higher income with the multiple variables associated with a family budget that provides for more than the essentials of food and clothing.

Comparison of Fresno County prevalence rates with other areas.—All of these data on *Shigella* prevalence were collected primarily to provide an objective basis for comparison with other areas of the country in which *Shigella* prevalence rates have been specifically related to diarrheal disease morbidity and mortality. Data collected by the Public Health Service during the past 15 years in three intensively studied areas are chronologically listed in table 8; New Mexico 1937–38 and 1948, Georgia 1939 and 1949, and Texas 1946–48. The initial study (New Mexico, 1938) showed that in this area of high mortality from diarrheal disease (100 per 100,000), shigellosis caused the majority of these deaths. This fact was also demonstrated in South Georgia,

an area of moderate diarrheal mortality (18 per 100,000) in 1939. Both of these areas were studied 10 years later.

Diarrheal disease mortality had decreased significantly in both areas (New Mexico 50 per 100,000, Georgia 8 per 100,000) and so had the *Shigella* prevalence rates. Two levels of *Shigella* prevalence in Texas were found during diarrheal disease control studies; high rates were those observed in communities without organized fly control, while low rates were from communities with major fly control activities. The prevalence of *Shigella* infection was shown to be related directly to diarrheal disease morbidity and mortality in the course of the investigations.

TABLE 8.—Shigella *prevalence rates by age and year found in New Mexico, Georgia, Texas, and California*

Age in years	Total	*Shigella* positive	Percent positive	Total	*Shigella* positive	Percent positive
	New Mexico, 1937–38			New Mexico, 1948		
-1	264	17	6.4	1,866	26	1.4
1	56	10	17.9	1,936	78	4.0
2–4	279	36	12.9	3,994	157	3.9
5–9	408	59	14.5	3,631	72	2.0
	South Georgia, 1939			South Georgia, 1949		
-1	127	4	3.2	1,059	10	0.9
1	111	8	7.2	1,235	25	2.0
2–4	322	13	4.0	3,159	71	2.2
5–9	606	23	3.8	2,402	44	1.8
	Texas, no fly control, 1946–47			Texas, fly control, 1946–47		
-1	2,577	43	1.7	2,567	28	1.1
1	2,332	131	5.6	2,411	60	2.5
2–4	5,932	310	5.2	6,274	158	2.5
5–9	4,161	144	3.5	4,331	91	2.1
	California camps, 1950			California fringe areas, 1950		
-1	532	19	3.6	291	6	2.0
1	455	40	8.8	291	7	2.4
2–4	1,408	86	6.1	934	46	4.9
5–9	1,130	72	6.4	991	40	4.0

Prevalence of *Shigella* infection in California camps was higher than that seen in Texas, in south Georgia in 1939 and 1949 and in New Mexico in 1948, but somewhat lower than the 1938 figures in New Mexico. The fringe area rates, slightly lower than those in the untreated Texas towns, were quite comparable to those seen in New Mexico in 1948 and definitely higher than those observed in Georgia in 1949. Thus, shigellosis rates in one population group in California were second only to the extremely high rates seen in New Mexico almost 15 years ago. (It is significant that diarrheal disease problems in this population group, the residents of labor camps, were a primary factor in initiating these studies.) Prevalence rates in general population groups equal to those seen in the fringe areas have not been observed in the Public Health Service studies in the absence of an important diarrheal disease problem nor have there been any such reports in the literature on the subject.

Salmonellosis was a relatively infrequent infection in all California groups studied. A *Salmonella* was isolated 29 times in 7,065 cultures, a prevalence rate of 0.4 percent. These positives were proportionally distributed in the various age groups cultured. The numbers were too small to justify any other analyses of the data. The ratio of 11 *Shigella* to each *Salmonella* found and a low prevalence rate of *Salmonella* indicate that salmonellosis was both relatively and absolutely a minor part of the problem in the groups studied.

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These facts do not mean that all diarrhea problems are related to shigellosis. They do provide a sound base for the inferences that (a) *Shigellas* were causing the major portion of diarrheal disease in labor camps and town fringe areas studied and that (b) diarrheal diseases caused by *Shigella* represent a major public health problem to these two populations.

Incidence of diarrheal disease

Additional support for the inferences given above is obtained by consideration of incidence of diarrheal disease found in these same California populations. Table 9 lists age-specific attack rates observed in camps and town fringe areas in California during the period of study. Since prevalence rates found in California were most nearly like those from the Texas area without fly control, incidence figures for this area are provided for comparison. The similarity of reported incidence of diarrheal disease in the two areas is remarkable. Just as prevalence rates of *Shigella* infection were slightly higher in each group in California, so were incidence rates of diarrheal disease.

TABLE 9.—*Diarrheal disease attack rates per 1,000 per annum by age groups in California camps and town fringe areas (July–December 1950) and in Texas untreated areas (March 1946–February 1948)*

Age group	California			Texas		
	Observed person months experience	Cases	Rate per 1,000 per annum	Observed person months experience	Cases	Rate per 1,000 per annum
Less than 1	1,275	86	809	4,384	222	608
1	1,206	81	806	4,028	263	784
2 to 4	3,264	100	368	10,888	224	247
5 to 9	4,481	75	201	13,612	68	60
10 to 14	3,659	35	115	11,036	30	33
15 to 34	9,056	94	125	31,696	81	31
35 or over	6,326	88	167	23,462	76	39
Unknown	355	2		230	2	
Total	29,622	561	227	99,336	966	117

TABLE 10.—*Quarterly attack rates for diarrheal disease; adjusted for age; camps and town fringe areas per 1,000 per annum*

Area	All ages combined		Less than 10 years	
	July through September	October through December	July through September	October through December
Camps	67	526	107	91
Town fringe areas	303	214	559	45

One further comparison is particularly interesting in light of higher shigellosis prevalence in camps than in town fringe areas during the quarter from October through December shown in table 3. The reported incidence of diarrheal disease (table 10) remained relatively stable in the fringe area populations, and a marked increase was recorded for the camp residents. The increase affected all age groups, not just the younger group for which prevalence data were available. The two population groups in camps and town fringe areas were quite comparable in average income, and similar respects, but important differences were noted. Camp populations in July, August, and September were small isolated groups who remained after seasonal emigration; crowding was marked in occupied houses, but a large percentage of the houses were vacant and relatively few new residents were moving into the areas. In October, the fall immigration was in full force and a tremendous increase in camp populations

occurred. Population in the town fringe areas was, by contrast, quite stable. These families were never so isolated as were camp populations in midsummer, nor did the crowding ever approach the intensity seen in the camps in the fall.

Rises in reported diarrheal diseases and in prevalence of infection found in camps following increase in crowding bring to mind similar observations in institutional populations. In a study of institutional inmates, it was observed that new admissions to a group infected with *Shigella* experienced a significantly higher incidence of clinical disease in the beginning and, as time went on, continued to show a higher infection rate than the portion of the group in residence longer. Further *Shigella* infection was shown to recur in epidemic form in one group to which new inmates were being added at a fairly rapid rate; whereas in another group, similar in size but with few new admissions, infection continued to spread at a low, even rate without recurrent epidemics. The comparison of camp and town fringe area populations to these institutional populations receiving new susceptibles at different rates provides an intriguing explanation of differences in observed reaction to infection in California.

DISCUSSION

The prevalence of *Shigella* found in two population groups in Fresno County was equal to or greater than that observed in several sections of the country in which such rates had been demonstrated to be directly related to morbidity and mortality from diarrheal disease. It was further shown that in these comparison areas, reduction in prevalence, either the result of long-range nonspecific improvement or the result of community activity specifically directed toward diarrheal disease control, was accompanied by proportional reductions in morbidity and mortality from diarrhea.

Diarrheal disease mortality in New Mexico and Georgia declined 50 percent over a 10-year period and comparable reductions in shigellosis were noted. Prevalence rates reliably reflected mortality changes in these two areas. Similarly, prevalence, morbidity, and mortality were equally effective indexes of change brought about by community activities in Texas.

Thus, crude mortality figures are useful measures of the relative importance of shigellosis even in populations having only broad similarities, but serious misinterpretation can result from the use of such data when major disproportions in the populations at risk are involved. This danger is illustrated perfectly by a comparison of Fresno County diarrhea mortality rates with those reported for Hidalgo County, Tex., the area reported on above. The populations studied in these two counties had similar prevalence and incidence rates in contrast to reported mortality from diarrheal disease in Fresno County of 20 per 100,000 and 250 per 100,000 in Hidalgo County in 1949.

The apparent contradiction is accounted for largely, if not entirely, by the difference in total population at risk. The compared incidence and prevalence rates were obtained from populations believed to be at greatest risk of enteric infection. In Hidalgo County at least three-quarters of the population belonged in such a group; in Fresno County the population at risk was a decided minority, even at times of peak density, and a large part of this group was present only for short harvest periods.

Counties or States may show steady decline in mortality rates and attain a level which compares favorably with the country as a whole, but have improvements which apply so disproportionately to citizen groups that some suffer disease rates comparable to those seen 50 and more years ago.

Health officers who wish to define and effectively attack a diarrheal disease problem need to know the frequency of occurrence of infection specific for various groups of citizens in their jurisdiction. They also need to be able to speak, for very practical reasons, in terms of numbers of sick people and of deaths. *Shigella* prevalence rates are much more useful to them when translated into morbidity and mortality due to *Shigella*.

Information needed to make such a conversion from prevalence of infection to incidence of disease is available from several sources and is brought together below. As stated by Densen, "The general relationship of prevalence (P) and incidence (I) may be expressed as $P=I \times D$ when D is the average duration of disease in an individual case expressed in the same time units as I." An additional factor is needed in the formula when infection does not consistently result

in disease and the known P is prevalence of infection. This factor is the ratio of individuals sick from the infection to the total number of infected people which will be called R. The formula then becomes

$$P=\frac{I\times D}{R},$$

and solved for I, it is

$$I=\frac{P}{D}\times R.$$

Table 11 shows the essential information and results of such a computation in columns 1 through 4. The prevalence rates (column 1) given are those found in camps and fringe areas in the study. The duration of infection (column 2), 4 weeks, or 1/13 year, is an average found in institutional groups in which untreated shigellosis was observed by daily stool cultures. The ratios (R) of infected individuals having diarrheal disease to total infections is available from a study of normal populations. Substituting these values in the formula for each age group and solving (column 4) gives the expected incidence rate due to *Shigella* corresponding to discovered prevalence.

TABLE 11.—*Computation of expected cases of* Shigella-*caused illness from prevalence rates found by population survey*

Age in years	1 Prevalence of infection per 1,000 (P)[1]	2 Average duration of infection in years (D)[2]	3 *Shigella* disease/ infection (R)[3]	4 Computed *Shigella* disease rate/1,000 P.A. (I)[4]	5 Person-years experience (Y)[5]	6 Computed *Shigella* disease expected cases (E)[6]
Under 1	30	1/13	9/10	350	106	37
1	63	1/13	2/3	590	100	59
2 to 4	56	1/13	2/5	290	272	79
5 to 9	53	1/13	1/4	170	373	63
Total						238

[1] P—from table 4.
[2] D—Watt [17]
[3] R—Watt and Hardy [7]
[4] $I=\left(\frac{P}{D}\right)R$
[5] Y—from table 9.
[6] $E=YI$.

It is perhaps unnecessary to point out how these computed rates (I) can be used. Neverthless an example is included in table (table 11) using person-years experience (Y) (column 5) in the population studied in Fresno County. Multiplication of the population in each group by its corresponding computed incidence rate of *Shigella* disease (I) gives the number of cases of *Shigella* diarrheal disease expected (E) in the population when they suffer from such rates. Total expected cases derived in this manner is 238 and our survey recorded 342 cases of diarrheal disease from all causes. (Table 9, under 10 years of age.) The ratio of *Shigella* diarrheal disease (computed) to total diarrheal disease (reported on survey) is 238–342 or 70–100. For practical purposes, crude rates, which have the virtue of simplicity of computation, may serve equally well if used with recognition of the potential inaccuracies of interpretation. The decided difference in the ratio of sick to well from one age group to another could easily result in a misleading product where major disparities in age distribution exist. Crude rates for this example (P=52, R=1/2.5, Y=851) give expected cases as 230, an equally useful value.

How then does this ratio (70 cases of *Shigella* diarrhea to 100 total diarrhea cases) obtained by computation, compare with the results of specific etiological studies of the acute diarrheal diseases by various workers over a period of years? The resemblance is striking. The proportion of acute diarrheal disorders found positive for *Shigella* as reported by Flexner and Holt, TenBroeck and Norbury, Davidson, Hardy, and Watt, and Watt varied from 60 to 75 percent. An even

greater proportion of the diarrheal disease deaths reported in the literature cited was caused by shigellosis. Thus it would be reasonable to conclude that if shigelloisis were eliminated from camps and town fringe areas, the diarrheal diseases currently found would be reduced by two-thirds and deaths by an equal or greater amount. Direct confirmation of this reasoning is found in the Texas studies cited. *Shigella* prevalence rates and diarrheal disease incidence were quite similar to Fresno County rates. Community activities directed against spread of *Shigella* resulted in a reduction in the prevalence of these organisms. Diarrheal disease morbidity and mortality rates fell at the same time to approximately the extent expected from the computations.

SUMMARY

This study was designed to provide a better understanding of the etiology of diarrheal diseases in the Central Valley in California. Rates of *Shigella* infection were determined in normal populations of representative areas (labor camps and fringe areas of towns) having the greatest number of reported diarrheal deaths in recent years. For comparison, a population (housing projects) in which diarrheal disease mortality was not considered to be important was selected. A distinct difference in prevalence rates was found in this comparison. Shigellosis demonstrated in camps and town fringe areas was equivalent to or greater than the prevalence reported from most of the areas in which a major portion of diarrheal disease morbidity and mortality was caused by *Shigellas*. It was inferred from these comparisons that shigellosis was of similar importance in the California populations having this high prevalence rate.

Incidence of diarrheal disease discovered in the course of these investigations supported these inferences, since the relationship of incidence to prevalence was consistent with that reported in other studies of etiology.

Variations in prevalence demonstrated in labor camps suggested that the problem in these groups was analogous to that seen in institutional populations since a major increase in prevalence of *Shigella* and incidence of diarrheal disease occurred following immigration of large numbers of workers (new susceptibles) for the fall harvest. Further, data suggested that modification of a single environmental factor, water use, may significantly lower *Shigella* prevalence when the risk of acquiring this infection is great.

The relationship of *Shigella* infection to disease caused by this genus is discussed and illustrated by a computation using discovered prevalence, P; duration of infection, D; and the ratio of sick individuals to total infections, R. Rates thus determined led to the estimate that 70 percent of the discovered diarrheal disease in these camps and town fringe areas was due to *Shigella*. The significance of this computed percentage is enhanced by comparison with etiological studies in the literature which have shown 60 to 75 percent of acute diarrheal disorders to be caused by *Shigella*.

(Public Health Monograph No. 54—1958, Public Health Service, Department of Health, Education, and Welfare)

Relationship of Environmental Factors to Enteric Disease

INTRODUCTION

The Cumberland Field Station of the Communicable Disease Center, Public Health Service, was established in Prestonsburg, Ky., in 1954, to investigate the associations between specific environmental conditions and the occurrence of diarrheal disease and to estimate the levels of control attainable by selective environmental changes. Studies were terminated and the station was closed in June 1957. The basis for undertaking the study, its objectives, the methods of operation, observations, analyses, and interpretations are described in this monograph.

Status of diarrheal diseases

Acute diarrheal diseases are a major cause of death in most countries of the world. According to Hardy, mortality rates in 1952 were less than 10 per 100,000 persons only in Australia, New Zealand, the United States, Canada, and the northwestern countries of Europe. In the Western Hemisphere diarrheal diseases are currently the primary cause of death in nine countries and the

secondary cause of death in three others. Children among seven-eighths of the world population, or more than 2 billion people, are at substantial risk of dying from diarrheal diseases.

Mortality from diarrheal diseases in the United States, while declining steadily since 1900, continues to cause approximately 6,000 deaths annually. The great majority of these deaths occur in children under 2 years of age, and they presently represent the second leading cause of death from communicable disease in this age group. Comparison of average annual death rates from diarrheal disease among children under 2 years of age in various States for the 2-year period 1948–49 shows that the rate of decline in different States has not been uniform. In New Mexico, Arizona, Texas, and Kentucky, mortality rates from diarrheal diseases were 694, 578, 475, and 307 per 100,000, respectively. In the other 44 States, rates ranged from 196 in West Virginia to 30 per 100,000 in Oregon. By 1952–53, the average annual death rate had declined in New Mexico, Arizona, Texas, and Kentucky to 412, 461, 252, and 154 per 100,000, respectively. Variations in mortality rates among States are caused, in many instances, by exceedingly high rates of diarrheal disease in some occupational groups, such as transient agricultural laborers and coal miners, and in certain ethnic populations, such as the Latin Americans and the American Indians.

The decline in mortality from diarrheal diseases since the turn of the century is attributable to many factors related to improvements both in general sanitation and in medical care. Bacillary dysentery (shigellosis) has been shown to be the principal cause of mortality from acute diarrheal disease in several areas having high endemicity levels of enteric diseases. Shigellosis constituted a serious problem during World War II; typhoid fever, on the other hand, presented essentially no problem. The comparative success of typhoid fever control was essentially due to the availability of an effective immunization. The advent of chemotherapy and antibiotic treatment no doubt further reduced the prevalence of clinical and carrier states of shigellosis and salmonellosis without greatly reducing prevalence of diarrhea from other causes. Proportionately, therefore, typhoid fever, shigellosis, and salmonellosis constitute less of a national problem now than in former years because of improvements in environmental hygiene and patient care.

Directly and indirectly, such diverse influences as rural electrification, modern plumbing, safely packaged and stored foods, and demonstrations of healthful practices of living through the media of press, radio, and television are all reflected in the overall reduction of enteric diseases. The increased availability and quality of hospital facilities, diagnostic techniques, therapeutic agents, and supportive treatment have done much to reduce mortality from these diseases. Concurrent sanitation improvements by health personnel in water supplies, excreta disposal practices, control of insect and rodent vectors, milk and food handling, refuse disposal, and housing have reduced substantially the mortality and incidence of enteric disease, as shown by several studies. Investigations by the Communicable Disease Center in Louisville, Ky., during the period 1946–49 showed that the death rate from diarrheal diseases in the population under 2 years of age was six times as high in slum areas as in well-sanitated areas. Stewart and associates reported that *Shigella* rates in Georgia communities varied in direct proportion to the number of housing deficiencies.

Programs designed specifically for prevention of diarrheal diseases have been relatively few. Enteric infections are, however, usually included in the justification for general community health projects. The multiplicity of factors involved in the spread of diarrheal diseases and the wide variety of etiological agents have long been recognized by public health workers, but precise information concerning much of the epidemiology of enteric infections is lacking. For these reasons, local projects have relied on generalized environmental improvements, and no great emphasis has been given to development of specific and more economical programs for suppression of diarrheal diseases.

While the concept of generally improving environmental sanitation is a laudable public health objective, the costs of broad sanitation programs are prohibitive in many parts of the world where diarrheal disease control efforts are needed urgently. Development of specific measures usually requires precise information on the mechanism of transmission and the relation of various environmental factors to dissemination of enteric pathogens. With increasing costs of generalized community environmental improvements and with the foci of infection becoming more sharply defined in certain populations which have a character-

istically high incidence of mortality from diarrheal disease, the necessity for precise preventive measures has become more practical and of increasing importance.

Objectives of the study

To provide basic information for the development of specific control measures, plans were made to carry out investigations which would supplement the data available on the epidemiology of specific enteric pathogens. The first task was selection of a general region where incidence of diarrheal diseases was high but where intensity of infection and sanitation in different communities varied sufficiently to enable studies in contrasting situations. Plans were developed to obtain the following information from the study areas:

Seasonal and annual incidence of enteric diseases in human populations of areas differing from one another in one or more measurable characteristics of environmental sanitation.

Identity of causative agents responsible for diarrheal diseases in the different areas.

Evaluation of levels of sanitation in households and communities where the above data were obtained.

The study area

After examining available data and reviewing candidate areas, the eastern coalfield region of Kentucky was selected as the location for the study. This area is a mature, stream-dissected plateau covering approximately 10,450 square miles. Soils of the area are principally Muskingum stony silt loam and, to a lesser extent, Hartsells fine sandy loam. The climate is characterized by long growing seasons with only moderately high temperatures, uniformly distributed rainfall averaging 44 inches a year, and winters with limited snow cover. Rates of mortality from diarrheal disease considerably in excess of the State and National averages had been consistently reported from the study area. Many of the numerous coal mining camps in the area had uniform housing and sanitary facilities. The houses were in comparatively isolated clusters near the mines. Although within many camps there was little variation in housing and sanitary facilities, individual camps varied in these respects.

The majority of the people in the study area obtain their livelihood directly or indirectly from the coal mining industry. Years ago the isolated, mountainous character of the region, inadequate roads, and limited transportation facilities necessitated construction of housing adjacent to mining operations. Coal mining camps are characteristically self-sufficient. Each camp is usually provided with schools, churches, stores, and water distribution and sewage collection systems. Unlike lumber camps and the towns surrounding many metal mines in western States, most coal camps are established communities. However, they usually lack governmental organization beyond that provided by the mining companies. Gradually, the conditions of poor transportation which made coal camps obligatory have been altered. Because of this change, a number of mine operators have sold the houses and utilities to individual miners. Also, many miners now live away from the camps; some supplement their income by small truck farming. Where these changes have occurred, lack of local civic government has frequently left camp residents without adequate utilities.

Over one-third of the working population of eastern Kentucky is engaged to some extent in farming, usually at subsistence level. The low income from farming is due in part to the small acreage of cropland per farm, loss of soil fertility through erosion and leaching, and inaccessibility of markets. Many residents of small farms supplement their incomes by mining. Limitation of land suitable for cultivation, restricted number of all-weather roads, and limited transportation facilities, combined with need for supplemental income from mining, frequently have resulted in the concentration of rural housing in narrow valleys. Occupants residing in such concentrated areas are classified as living in rural hamlets. With some exceptions, rural homes are provided with insanitary pit privies and open dug wells.

Methods and Procedures

After headquarters were established at Prestonsburg, Ky., a preliminary survey was made of all large coal mining camps and several rural populations within a radius of 100 miles. The uniformity and quality of housing and sanitary facilities in each location and the general suitability of each area for further study

were determined. Detailed maps were made showing the location of each house in the areas selected for further work. Initial visits to each dwelling unit were then made by public health nurses and enumerators trained to obtain from each family census data, past histories of morbidity, and type and use of sanitary facilities in the home. Sanitary surveys were made of community water supplies, and water samples were tested routinely for bacteriological quality. In addition, seasonal estimations of fly abundance were recorded.

Measurement of diarrheal diseases

Reports of diarrheal disease were obtained by public health nurses and enumerators during monthly visits to households with children under 15 years of age. A manual was developed to standardize interviewing and recording, and field personnel were given a period of training at the beginning of employment. Possible bias in reporting due to personality differences was minimized further by regular rotation of assignments among the interviewers.

Visits were made to each household within the week following monthly collection of rectal swab cultures from preschool children. The interviewer obtained information on diarrheal disease and other illness experienced by each member of the family during the preceding month. Data were obtained from a reliable informant, usually the housewife. Prior to the revisits, basic information obtained on the initial visit, such as study area, family name, location, household number, and names of each member of the household were typed on a recording form. Whenever necessary, adjustments in age from one statistical age group to the next were made in the office and checked in the field at the time of the revisit. During each revisit, any change in household composition or environmental facilities was recorded.

Once a year, the complete census procedure which had been followed on initial visits was repeated so that significant changes in availability and use of sanitary facilities could be recorded.

Determination of enteric infections

The prevalence of *Shigella* and *Salmonella* infection in preschool children was determined by obtaining rectal swab cultures at monthly intervals. Specimens were obtained from the children at the homes in the manner described by Hardy and Watt. Inoculum was obtained by inserting a sterile cotton swab into the rectum. An SS agar plate was immediately streaked with the material on the swab and the swab was then placed in a tube of tetrathionate broth. The inoculated plates and the broth cultures were returned to the laboratory and incubated. Suspect colonies were picked from SS plates to triple sugar iron agar slants after incubation at 24 and 48 hours. The swab in tetrathionate broth was incubated at 37° C. for 24 hours and then streaked on brilliant green agar plates. These plates were subsequently examined in the same manner as the original SS plate. Bacterial colonies whose reactions in triple sugar iron agar indicated the possibility of their being *Shigella* or *Salmonella* were examined biochemically and serologically as described by Edwards and Ewing. Representative samples of the positive cultures were forwarded to the International Typing Center at the Communicable Disease Center in Atlanta, Ga., for confirmation.

Determination of intestinal parasites

Stool specimens for parasitological examinations were collected semiannually from individuals of all ages in the various study areas. Half-pint waxed cardboard cartons were distributed to the homes with simple instructions for obtaining fecal samples unmixed with extraneous material. Return visits were made daily for as many as 3 days to get specimens from as many individuals as possible. Samples were transported directly to the laboratory, refrigerated, and examined within a few days. Fecal smears were examined and helminthic egg counts were performed according to the Beaver direct smear method.

Stool samples from a few selected areas were concentrated by the formalin-ether technique to facilitate examination for protozoa and helminths. These specimens were placed in 5 percent formalin as soon as they reached the laboratory.

Determination of fly abundance

Monthly measures of fly abundance were made to determine the relative importance of flies as vectors of *Shigella* and other diarrheal agents. Fly populations were measured with the Scudder fly grill during the fly seasons between the period August 1954 to September 1956. Samples were obtained from groups of houses, corresponding roughly in size to city blocks, representative of all types of housing and conditions of environmental sanitation. After inspecting all concentrations of flies that could be located within a sample block, the five highest grill counts were recorded. Sampling techniques were similar to those developed and tested by Lindsay and associates.

Evaluation of water quality

Standard procedures were followed in procurement and examination of water samples. Initial samples were examined by presumptive and completed tests for members of the coliform group with coliform density estimated by the most-probable-number method. The membrane filter procedure with M-HD Endomedia (Difco) was employed in the examination of the majority of the samples with direct counts of coliform organisms. Periodic tests for presence and number of coliform bacteria were made of all public and semipublic water supplies and of a representative number of drilled and dug wells used by families in the study areas. Nearly all private water supplies were sampled at least once.

Selection of study areas

Of 62 communities evaluated, 13 areas in Floyd, Letcher, and Perry Counties, Ky., were selected for continued observations. Individually, the selected communities represented the greatest homogeneity of housing, sanitary facilities, and economic status obtainable in the region; as a group, they represented the extremes and the various levels of development. Observations were begun in 4 study areas during the fall of 1954 and in 8 additional areas during the spring and summer of 1955 (fig. 1). In the spring of 1956, observations were also begun in Leatherwood, a large mining camp in Perry County some 100 miles from station headquarters. Data from Auxier and Leatherwood are not included in the analyses because a full year's observations were not obtained. Four of the remaining 11 areas presented some limitations as study sites because of either small populations or distant locations. Studies in these 4 areas were discontinued after 1 year of observation, since findings were similar to those obtained in the other 7 areas. Therefore, data from 11 study areas are included in the analyses, except in cases necessitating equal representation of data for each season.

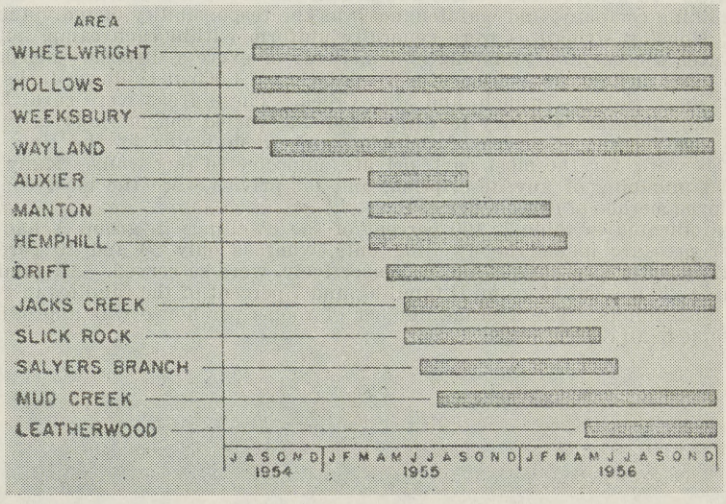

FIGURE 1. Time period of study of enteric disease in eastern Kentucky, by area.

Characteristics of study areas

Each of the 11 populations selected for continuous study was placed in one of three groups on the basis of environmental characteristics (table 1).

TABLE 1.—*Population and sanitary facilities of diarrheal disease study areas, eastern Kentucky, 1954–56*

Grouped study areas	Average study population	Average number of households visited monthly	Average number of households cultured monthly	Percentage of dwelling units with—					
				Flush toilet	Privy	Water inside		Water outside	
						Hot and cold	Cold only	Under pressure	No pressure
All areas	3,928	560	299	46	54	48	19	3	30
Group A: Wheelwright [1]	1,295	194	98	100	0	100	0	0	0
Group B: [2]	1,624	230	118	20	80	27	39	5	29
Weeksbury	403	57	33	11	89	19	15	7	59
Wayland	545	83	40	29	71	44	52	1	3
Manton	107	15	9	14	86	14	45	9	32
Hemphill	270	36	15	16	84	24	28	6	42
Drift	299	39	21	20	80	18	55	5	22
Group C: [3]	1,009	136	83	7	93	6	13	4	77
Hollows	211	38	16	17	83	13	20	9	58
Jacks Creek	306	39	26	7	93	7	13	2	78
Slick Rock	100	15	10	0	100	0	12	13	75
Salyers Branch	150	15	10	4	96	4	9	0	87
Mud Creek	242	29	21	0	100	0	5	0	95

[1] Complete community sanitary facilities.
[2] Lacking complete community sanitary facilities.
[3] No community sanitary facilities.

Group A, which averaged 1,295 people, included families housed in regularly maintained, uniformly built structures and provided with all necessary community sanitary facilities—flush toilets, hot and cold running water, approved water and sewage treatment plants—and with regular refuse collection services. All of these families were located in Wheelwright, a large, well-organized mining community, wholly owned, managed, and maintained by a coal mining company.

Group B averaged 1,624 people and included families at Weeksbury, Wayland, Manton, Hemphill, and Drift, who were incompletely served by public sanitary utilities. In general, the houses and utilities in group B areas had been sold by the mining company, and maintenance was the responsibility of individual owners. Housing structures were generally uniform within each camp, but types of water sources and plumbing and methods of excreta disposal varied.

Group C included an average study population of 1,009 at Hollows, Jacks Creek, Slick Rock, Salyers Branch, and Mud Creek. These areas were rural hamlets with only nominal sanitary facilities; housing varied considerably in facilities and construction. Sources of drinking and wash water at the time of the studies were, for the most part, private, unprotected dug wells. Many homes lacked plumbing of any description, and pit privies were the most commonly employed method of excreta disposal.

As indicated in table 1, 100 percent of the dwellings in group A had water under pressure inside the dwelling unts, whereas only 66 and 19 percent of dwelling units in groups B and C, respectively, were so served. All families in group A, 20 percent of group B families, and 7 percent of the families in group C had flush toilets. The average number of rooms per house was approximately the same in all three groups.

Results

Reported prevalence of disease

The age-specific incidence of reported diarrheal disease per 1,000 persons per annum is shown in table 2. Since there was little difference in the age distribution of the grouped study populations (table 3), and since extreme variations in morbidity were reported, rates were not adjusted by ages. More than 50 percent of the cases were reported for children up to 4 years old, and the majority of these were in children under 2 years of age. In areas grouped according to sanitary facilities, B and C populations, respectively, showed morbidity rates for all ages that were 1.9 and 2.6 times as high as rates for group A during the entire period of observations.

Incidence reported in the seven camps which were observed throughout the year September 1955 to August 1956 was compared with reported incidence for all areas for their full period of observation (table 4). Of the seven study areas, those in groups A and B showed lower morbidity rates, while those in group C showed higher rates, for the 1-year period than for the total period of observation. During the 1-year period, population groups B and C reported diarrheal rates which were 1.6 and 5.1 times as high for children up to age 4 as the rate reported for that age group in group A. Since the trend and difference between categories was consistent, incidence data collected for the total period of study were used in subsequent comparisons between incidence of disease and sanitation deficiences.

TABLE 2.—*Age-specific diarrheal disease morbidity rates reported in study populations, eastern Kentucky, 1954–56*

Grouped study areas [1]	Age groups (years)														
	All ages			Less than 4			5 to 9			10 to 14			15 and older		
	PME [2]	Cases	Rate [3]	PME [2]	Cases	Rate [3]	PME [2]	Cases	Rate [3]	PME [2]	Cases	Rate [3]	PME [2]	Cases	Rate [3]
All areas	70,826	1,343	227	11,210	705	754	13,754	205	178	12,143	118	116	33,719	315	112
Group A: Wheelwright	27,511	310	135	4,038	139	413	5,207	53	122	4,530	29	76	13,736	89	77
Group B	27,969	586	251	4,692	291	744	5,247	86	196	4,998	57	136	13,032	152	139
Weeksbury	9,165	208	272	1,660	102	737	1,876	27	172	1,546	15	116	4,083	64	188
Wayland	11,652	240	247	1,802	117	779	1,936	37	229	2,318	27	139	5,596	59	126
Manton	894	23	308	184	13	847	188	3	191	109	2	220	413	5	145
Hemphill	2,169	37	204	300	17	680	476	6	151	359	3	100	1,034	11	127
Drift	4,089	78	228	746	42	675	771	13	202	666	10	180	1,906	13	81
Group C	15,316	447	349	2,480	275	1,330	3,300	66	240	2,615	32	146	6,951	74	127
Hollows	4,767	126	317	594	58	1,171	878	21	287	721	14	233	2,574	33	153
Jacks Creek	4,963	131	316	808	85	1,262	1,200	22	220	860	8	111	2,095	16	91
Slick Rock	1,069	34	381	190	16	1,010	238	9	453	166	2	144	475	7	176
Salyers Branch	1,311	15	137	252	14	666	280	0	0	258	0	0	521	1	23
Mud Creek	3,236	141	522	636	102	1,924	704	14	238	610	8	157	1,286	17	158

[1] See footnotes to table 1.

[2] Person-months experience.

[3] Rate per 1,000 per annum.

TABLE 3.—*Age distribution of study population, by area, eastern Kentucky, 1954–56*

Grouped study areas [1]	Total population	Age groups (years)									
		Less than 4		5 to 9		10 to 14		15 to 19		20 and older	
		Number	Percent of all ages	Number	Percent of all ages	Number	Percent of all ages	Number	Percent of all ages	Number	Percent of all ages
All areas	3,928	646	16	729	19	653	17	371	9	1,529	39
Group A: Wheelwright	1,295	184	14	219	17	212	16	124	10	556	43
Group B	1,624	275	17	301	18	273	17	155	10	620	38
Weeksbury	403	76	19	72	18	74	18	35	9	146	36
Wayland	545	82	15	89	16	101	19	65	12	208	38
Manton	107	21	20	21	20	13	12	5	5	47	43
Hemphill	270	41	15	60	22	41	15	26	10	102	38
Drift	299	55	18	59	20	44	15	24	8	117	39
Group C	1,009	187	19	209	21	168	17	92	9	353	34
Hollows	211	29	14	37	18	30	14	21	10	94	44
Jacks Creek	306	50	16	68	22	54	18	34	11	100	33
Slick Rock	100	20	20	21	21	15	15	7	7	37	37
Salyers Branch	150	31	21	34	23	27	18	12	8	46	30
Mud Creek	242	57	24	49	20	42	17	18	7	76	32

[1] See footnotes to table 1.

TABLE 4.—*Reported diarrheal disease morbidity rates of study populations, by age and area, eastern Kentucky, 1954–56*

Grouped study areas [1]	September 1954 to December 1956				September 1955 to August 1956			
	Less than 4 years		All ages		Less than 4 years		All ages	
	PME [2]	Rate [3]	PME [2]	Rate [3]	PME [2]	Rate [3]	PME [2]	Rate [3]
All areas	11,210	754	70,826	227	4,449	755	27,938	213
Group A: Wheelwright	4,038	413	27,511	135	1,496	328	10,446	94
Group B	4,692	744	27,969	251	1,805	525	10,329	196
Weeksbury	1,660	737	9,165	272	700	394	3,773	165
Wayland	1,802	779	11,652	247	684	649	4,225	215
Manton	184	847	894	308	[4]			
Hemphill	300	680	2,169	204	[4]			
Drift	746	675	4,089	228	421	541	2,331	211
Group C	2,480	1,330	15,346	349	1,148	1,672	7,163	412
Hollows	594	1,171	4,767	317	230	1,304	1,913	370
Jacks Creek	808	1,262	4,963	316	500	1,512	3,124	353
Slick Rock	190	1,010	1,069	381	[4]			
Salyers Branch	252	666	1,311	137	[4]			
Mud Creek	636	1,924	3,236	522	418	2,066	2,126	536

[1] See footnotes to table 1.
[2] Person-months experience.
[3] Rate per 1,000 per annum.
[4] Data for full period not available.

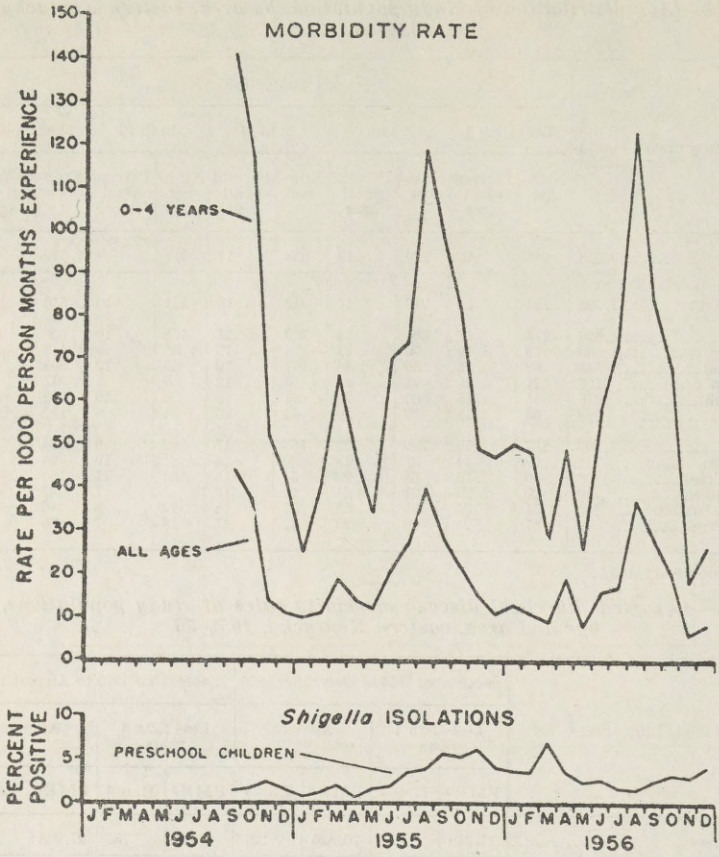

FIGURE 2.—Monthly incidence of reported diarrheal disease morbidity in persons of all ages and *Shigella* prevalence in preschool children, eastern Kentucky, 1954–56.

Rates of reported diarrheal disease per 1,000 per annum, ages 0–4 and all ages for all study areas, are shown in figure 2, by months. Marked seasonal trends were observed, the highest incidence ocurred during August and September. The ratio of "summer" diarrhea to "winter" diarrhea for the years 1955 and 1956 was approximately 2 to 1. The increased incidence of diarrheal disease observed February–April 1955, and the plateau observed November 1955–February 1956 in children 0–4 years of age were attributable to diarrheal illness associated with nausea, general malaise, and vomiting. An outbreak of diarrhea limited to a single camp (Drift) was responsible for the increased incidence observed during April 1956.

Monthly data on reported prevalence of diarrheal disease in the three population groups are shown in figure 3. Seasonal peaks were most marked in areas B and C, ranging to only slight seasonal variations in population group A. Data shown in figure 3 also indicate that in the areas with poorer sanitation, incidence of diarrhea increases earlier in the spring and persists longer at a high level in the fall.

A total of 1,343 instances of diarrheal disease morbidity was reported by all families in the study to the enumerators during the period September 1954–December 1956. Abdominal pain, vomiting, fever, and mucus and blood in the stool, in that order of frequency, were the outstanding symptoms reported. The

modal number of stools per day was 5, and the median 6. The average duration of illness was 4 days. In approximately 12 percent of the instances of diarrheal disease the individual was confined to bed for 1 day or more; 24 percent received medical attention, including 2 percent who were hospitalized. Less than 1 percent of all cases were of 1-day duration or less, and 15 percent of the individuals reported 3 stools or less in a 24-hour period.

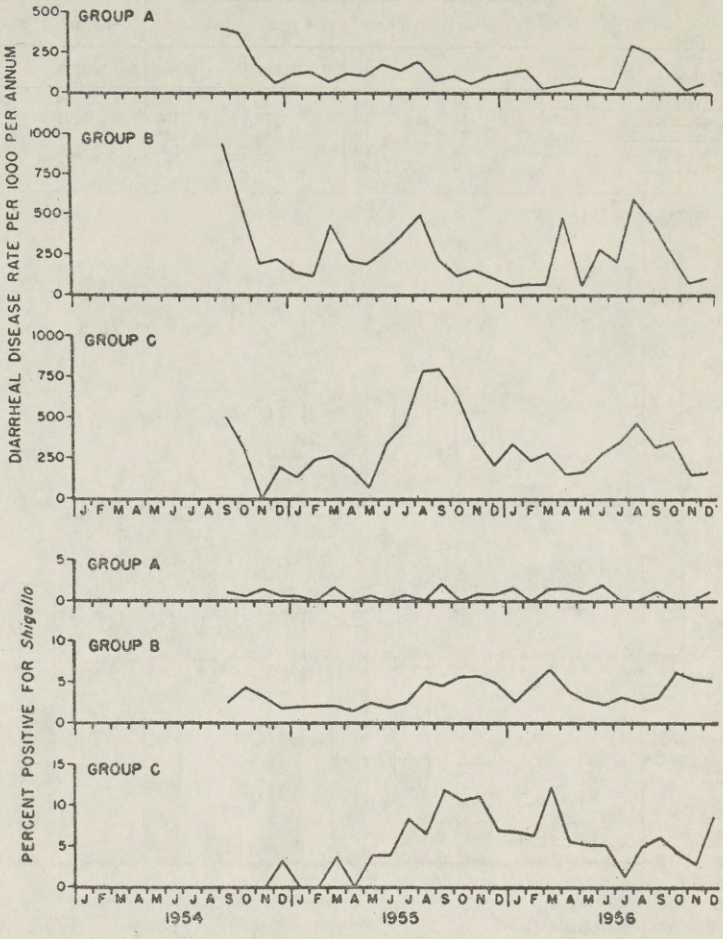

FIGURE 3.—Monthly incidence of reported diarrheal disease morbidity in persons of all ages and *Shigella* prevalence in preschool children, eastern Kentucky, by grouped areas, 1954–56.

Reported diarrheal disease cases for children 0–4 years old represented 45 percent of all cases in group A, 50 percent in group B, and 62 percent in group C (table 5). Milder diarrhea, indicated by 5 stools or less in a 24-hour period, was reported more frequently in group A than in the B and C groups; this difference was more marked for all ages combined than for the 0–4 age level alone. In group A, 19 percent of all individuals reported 3 or fewer stools per day, compared with 12 percent and 13 percent for B and C groups, respectively. In the category of 10 or more stools per day, representing the most severe diarrhea, data from the 3 population groups were closely comparable: group A reported 16 percent of all cases; group B, 18 percent; and group C, 15 percent.

TABLE 5.—*Frequency of stools per day in reported diarrheal disease cases, by grouped study areas,[1] eastern Kentucky, 1594–56*

Number of stools in 24 hours	Cases reported					
	Group A		Group B		Group C	
	0–4 years	All ages	0–4 years	All ages	0–4 years	All ages
Total	139	310	291	586	275	447
1–3	23	58	40	68	38	58
4–5	47	112	78	166	92	147
6–9	37	70	96	186	79	137
10 and over	23	49	61	106	51	66
Unknown	9	21	16	60	15	39

[1] See footnotes to table 1.

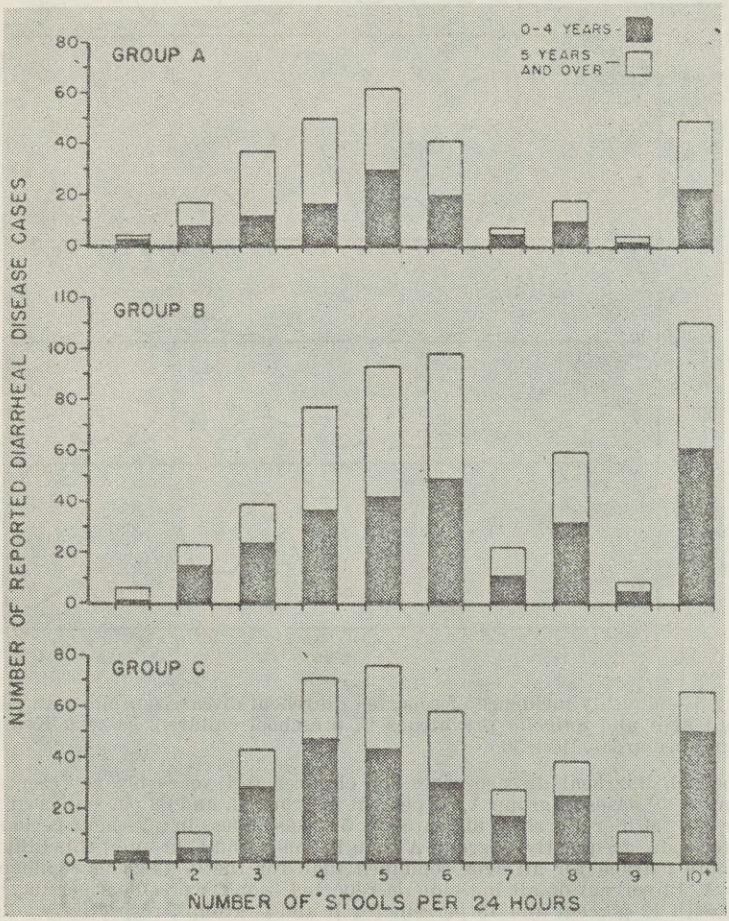

FIGURE 4. Frequency of stools per day in reported diarrheal disease cases, by grouped areas, eastern Kentucky, 1954–56.

The distribution of stool frequencies in reported diarrhea experienced by individuals aged 0–4 years and all ages is shown by grouped populations in figure 4. In comparing the three groups of data, it should be remembered that numbers, not rates, of cases are given. Irregularity in the distribution curves of all 3 groups is evident in frequency categories beyond 6 stools per day. In these instances the respondents evidently favored even numbers in reporting, although the enumerators were careful not to suggest numbers when eliciting information. The category of 10 or more stools may have served as a convenient repository for many diarrheal disease experiences with which the respondents associated several stools, but could not recall the exact number. In such circumstances a certain amount of unconscious exaggeration is understandable.

Prevalence of bacterial pathogens

Shigella was isolated from 354 of the 11,264 rectal swab cultures collected. Of these 354 isolations, 29 were from population A, 165 from B, and 160 from C. Eight biotypes of *Shigella* were represented (table 6) : the Manchester biotype of *Shigella flexneri* 6, representing 42 percent of the total isolations, was the most frequently isolated type; *Shigella sonnei* represented 20 percent; and *S. flexneri* 1b, 10 percent. Recovery rates and atypical biochemical reactions of the Manchester variety as compared with other shigellae in the area have been described previously. Only 4 biotypes were isolated in population A, of which 62 percent were *S. flexneri* 6, Manchester variety.

TABLE 6.—*Species of* Shigella *isolated from rectal swab cultures taken from preschool children, by grouped study areas,*[1] *eastern Kentucky, 1954–56*

Shigella species	All Areas		Group A		Group B		Group C	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	359	100.0	29	100.0	[2] 167	100.0	[3] 163	100.0
S. dysenteriae	14	3.9	------	------	4	2.4	10	6.1
S. flexneri 1b	34	9.5	------	------	19	11.4	15	9.2
S. flexneri 2a	26	7.2	1	3.4	11	6.6	14	8.6
S. flexneri 3	5	1.4	------	------	3	1.8	2	1.2
S. flexneri 4a	46	12.8	4	13.8	19	11.4	23	14.1
S. flexneri 6, Boyd 88 variety	11	3.1	------	------	4	2.4	7	4.3
S. flexneri, Manchester variety	152	42.3	18	62.1	64	38.3	70	42.9
S. sonnei	71	19.8	6	20.7	43	25.7	22	13.5

[1] See footnote to table 1.
[2] 1 individual had *S. flexneri* 1b and 3, and another had *S. flexneri* 4a and *sonnei*.
[3] 1 individual had *S. flexneri* 2a and Manchester, 1 had *S. flexneri* 4a and Manchester, and another had *S. sonnei* and Manchester.

Rates of *Shigella*-positive cultures obtained by the rectal swab examination of normal preschool children are presented in table 7 by individual and grouped study areas. The lowest rates were observed in group A and the highest rates in group C. Rates by individual study areas ranged from 0.7 percent in Wheelwright to 10.2 percent in Salyers Branch. No *Shigella* isolations were obtained from children under 6 months of age in the study areas represented in the table, although cultures were obtained from an average of 18 children per month in this age group. Most of these children were between 3 and 6 months old. The highest rates observed were in the 4-year age group. When the areas were grouped by level of community sanitary facilities, a shift in the peak *Shigella* prevalence to the younger age groups was observed to accompany progressive increase in number of sanitary deficiences. Infections occurred in younger children and infection rates were consistently higher in children 0–4 years old in the group C areas than in the B areas. In group C areas, the highest infection rates were observed among 2-year-olds (9.1 percent) ; in group B and group A areas, highest rates were among 4-year-olds (5.2 percent and 1.6 percent, respectively).

TABLE 7.—*Rectal swab cultures and* Shigella *isolated from preschool children, by age and area, eastern Kentucky, 1954–56*

Grouped study areas [1]	Age groups															
	All ages [2]		0-5 months		6-11 months		1 year		2 years		3 years		4 years		5 years	
	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of cultures	Percent positive
All areas	11,264	3.1	500	0.0	798	1.1	1,942	2.4	2,240	3.3	2,062	3.6	1,984	4.5	1,607	3.5
Group A:																
Wheelwright	4,074	0.7	176	0.0	307	0.0	722	0.3	815	0.5	694	0.4	697	1.6	636	1.4
Group B	4,698	3.5	248	.0	336	1.2	698	2.4	852	2.2	983	4.5	885	5.2	631	5.1
Weeksbury	1,735	3.6	80	.0	122	.8	270	.7	306	2.0	346	4.9	341	6.2	250	5.6
Wayland	1,828	3.4	111	.0	137	2.2	275	2.9	347	3.2	384	3.1	312	3.8	228	6.6
Manton	162	3.1	11	.0	10	.0	33	.0	28	3.6	33	6.1	26	3.8	20	5.0
Hemphill	297	2.0	18	.0	28	.0	27	3.7	38	.0	47	2.1	64	6.2	65	.0
Drift	676	4.3	28	.0	39	.0	93	6.4	133	.8	173	6.9	142	5.6	68	2.9
Group C	2,492	6.4	76	.0	155	3.2	522	5.2	573	9.1	385	7.3	402	8.2	340	4.4
Hollows	644	2.6	36	.0	56	1.8	104	1.9	126	5.6	88	4.5	101	1.0	125	1.6
Jacks Creek	801	8.1	13	.0	50	2.0	199	4.5	212	13.2	87	10.3	122	12.3	98	3.1
Slick Rock	230	6.1	2	.0	15	6.7	40	10.0	41	12.2	46	4.3	37	2.7	41	2.4
Salyers Branch	236	10.2	6	.0	9	.0	69	4.3	57	10.5	50	10.0	31	25.8	14	14.3
Mud Creek	581	6.9	19	.0	25	8.0	110	8.2	137	4.4	114	7.0	111	7.2	62	11.3

[1] See footnotes to table 1. [2] Some 6-year-olds included.

TABLE 8.—Shigella *isolations from rectal swab cultures of preschool children, by area, entire study period and 1-year period September 1955–August 1956*

Grouped study areas [1]	September 1954–December 1956		September 1955–August 1956	
	Number of cultures	Percent *Shigella* positive	Number of cultures	Percent *Shigella* positive
All areas	11,264	3.1	4,424	4.0
Group A:				
Wheelwright	4,074	0.7	1,452	1.0
Group B	4,698	3.5	1,787	4.2
Weeksbury	1,735	3.6	722	3.0
Wayland	1,828	3.4	686	5.1
Manton	162	3.1	[2]	
Hemphill	297	2.0	[2]	
Drift	676	4.3	379	4.7
Group C	2,492	6.4	1,185	7.5
Hollows	644	2.6	241	4.6
Jacks Creek	801	8.1	495	9.3
Slick Rock	230	6.1	[2]	
Salyers Branch	236	10.2	[2]	
Mud Creek	581	6.9	449	7.1

[1] See footnotes to table 1.
[2] Data not available for full period.

Prevalence rates of shigellae in the seven areas where data were obtained for the year September 1955–August 1956 only were compared with rates of all cultures obtained between September 1954 and December 1956, the entire period of the study (table 8). Rates for the 1-year period were slightly higher than for the total study period, but the overall trends are consistent despite variation between camps.

Salmonellae were recovered from the rectal swab cultures of preschool children on 25 occasions (table 9). *Salmonella tennessee*, isolated 6 times, occurred most frequently; *Salmonella montevideo* was isolated 5 times, *Salmonella derby* and *Salmonella typhimurium* each 3 times, and *Salmonella muenchen* twice. Six other types were each recovered once. Fourteen of the isolates were from area B populations, 5 from area C, and 6 from area A.

TABLE 9.—*Species of* Salmonella *isolated from rectal swab cultures taken from preschool children, eastern Kentucky, 1954–56*

Salmonella species	Isolations		*Salmonella* species	Isolations	
	Number	Percent		Number	Percent
Total	25	100	*S. infantis*	1	4
			S. bareilly	1	4
S. derby	3	12	*S. tennessee*	6	24
S. paratyphi B	1	4	*S. muenchen*	2	8
S. typhimurium	3	12	*S. meleagridis*	1	4
S. thompson	1	4	*S. anatum*	1	4
S. montevideo	5	20			

A small survey was made to determine the prevalence of four enteropathogenic serotypes of *Escherichia coli* in the normal study population of preschool-age children. A total of 1,000 rectal swab specimens obtained February–August 1955 from preschool children in Wheelwright, Wayland, Weeksbury, and Jacks Creek were streaked upon MacConkey agar plates supplementing the routine field culturing procedure. The cultures were examined for *E. coli* serotypes 026 : B6, 055 : B5, 0111 : B4, and 0127 : B8, as well as for *Shigella* and *Salmonella*. Sixty-nine *Shigella* and 13 enteropathogenic *E. coli* isolations were obtained. It was concluded from the limited study that the four strains of *E. coli* did not contribute appreciably to prevalence of diarrheal disease during the time of the study.

Prevalence of intestinal parasites

Single fecal specimens were collected from 2,798 individuals in the study areas during the period September 1954–December 1956. In the early phases of the study, 843 specimens were examined for both intestinal protoza and helminths. Results of the examinations for intestinal protozoa have been reported previously by Atchley and coworkers. The highest infection rates were in the group aged 10–14 years. Of the 843 stool specimens obtained from individuals of all ages, 3.3 percent were positive for *Entamoeba histolytica*, 21 percent for *E. coli*, 5.9 percent for *Endolimax nana*, 0.6 percent for *Iodameoba bütschlii*, 9.5 percent for *Giardia lamblia*, and 0.5 percent for *Chilomastix mesnili*.

The percentage of stools positive for any helminth and the percentage of all stools positive for *Ascaris*, *Trichuris*, *hookworm*, *Strongyloides*, or *Hymenolepis* infections are presented by age and by grouped study areas in table 10. Inasmuch as stool examination procedures are inadequate for the detection of *Enterobius*, reliable rates were not obtained for this species, but other incidental observations implied a very high prevalence. Occurrences of all helminth species were lowest in group A and highest in group C. Rates of *Trichuris* infection approximated that of roundworm, although the whipworm infections were almost invariably much lighter as judged by egg counts.

TABLE 10.—*Helminth isolations by age and study area group, eastern Kentucky, 1954–56*

Study area [1] and age group (years)	Number of specimens	Specimens positive for any helminth		Percentage [2] of specimens with—				
		Number	Percent	*Ascaris*	*Trichuris*	Hookworm	*Strongyloides*	*Hymenolepis*
Group A:								
All ages	765	164	21.4	6.9	7.8	0.0	0.8	0.7
0–4	186	37	19.9	8.6	7.0	.0	.5	.0
5–9	201	68	33.8	11.4	15.9	.0	1.0	1.5
10–14	104	30	28.8	9.6	7.7	.0	1.9	1.0
15+	274	29	10.6	1.5	2.6	.0	.4	.4
Group B:								
All ages	1,197	591	49.4	26.4	20.2	.5	3.3	.8
0–4	308	136	44.2	32.8	16.6	.3	.0	.6
5–9	293	213	72.7	44.7	40.6	.3	1.7	1.4
10–14	189	112	59.3	27.0	27.0	.0	2.6	1.6
15+	407	130	31.9	8.1	5.2	1.0	7.4	.2
Group C:								
All ages	836	515	61.6	41.5	36.2	1.9	8.1	2.0
0–4	197	117	59.4	47.2	31.5	.0	4.1	1.0
5–9	211	180	85.3	60.7	57.3	.9	10.9	5.2
10–14	139	103	74.1	49.6	47.5	4.3	16.5	1.4
15+	289	115	39.8	19.7	18.7	2.8	4.8	.7

[1] See footnotes to table 1. [2] Includes multiple infections.

TABLE 11.—*Specimens positive for* Ascaris lumbricoides, *by age and area, eastern Kentucky, 1954–56*

Grouped study areas [1]	Age groups					
	2–12 years			All ages		
	Number of specimens	Specimens positive for *Ascaris*		Number of specimens	Specimens positive for *Ascaris*	
		Number	Percent		Number	Percent
All areas	1,413	561	39.7	2,798	716	25.6
Group A: Wheelwright	377	44	11.7	765	53	6.9
Group B	606	258	42.6	1,197	316	26.4
Weeksbury	173	77	44.5	310	97	31.3
Wayland	199	90	45.2	433	112	25.9
Manton	35	14	40.0	57	15	26.3
Hemphill	90	39	43.3	195	44	22.6
Drift	109	38	34.9	202	48	23.8
Group C	430	259	60.2	836	347	41.5
Hollows	71	37	52.1	150	44	29.3
Jacks Creek	129	77	59.7	255	112	43.9
Slick Rock	45	27	60.0	100	37	37.0
Salyers Branch	50	23	46.0	82	29	35.4
Mud Creek	135	95	70.4	249	125	50.2

[1] See footnotes to table 1.

The number and percentage of stool specimens positive for *Ascaris lumbricoides* are shown by age and study area in table 11. In the group 2–12 years old, rates ranged from approximately 12 percent in Wheelwright to 70 percent in Mud Creek. Nearly the same numbers of individuals of other ages were examined in the 11 study areas. Closely similar variations in infections were observed, but at lower rates. One-fourth of the 2,798 individuals examined were positive for *Ascaris*. Omitting group A, 33 percent of the specimens from all ages combined were positive.

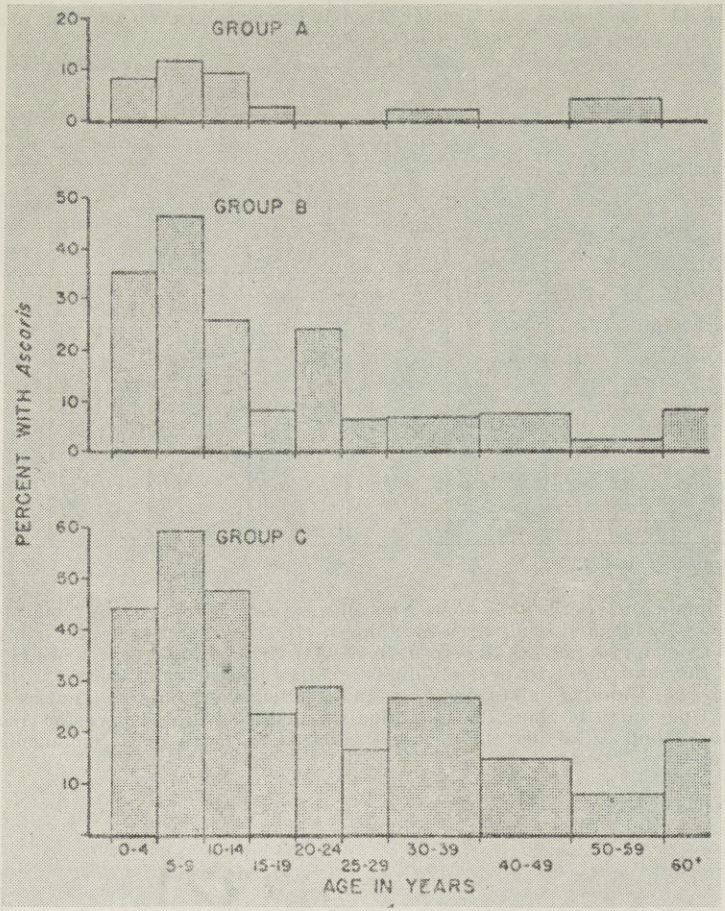

FIGURE 5.—Percentage of individuals, infected with *Ascaris*, by age, in study areas grouped according to sanitary facilities, eastern Kentucky, 1954–56.

Figure 5 shows the distribution of *Ascaris* infections by age group in the three population areas. The greatest proportion of positive specimens came from children 5–9 years old, with 12, 47, and 59 percent infected in areas A, B, and C, respectively. In general, the age distributions were similar in the three groups, except where only small numbers of cooperating individuals were available in certain age groups.

TABLE 12.—*Average grill count of houseflies by study area group, eastern Kentucky, August 1954–August 1956*

Study area group [1]	1954			1955						1956		
	August	September	October	May	June	July	August	September	October	June	July	August
Group A	2.8	2.8	(2)	0.4	0.1	0.6	1.5	2.2	1.2	0.1	1.8	1.1
Group B	13.5	20.6	12.6	.8	1.3	4.0	7.9	11.8	7.4	.6	4.8	3.3
Group C	5.5	13.1	(2)	1.0	.6	4.1	10.1	13.9	(2)	.5	2.5	(2)

[1] See footnotes to table 1.
[2] No grill counts made.

Fly abundance

Sarcophagids, *Phaenicia* spp., and *Musca domestica* were the most common flies observed in the study areas. Scattered garbage and waste water were the most common attractants. Because of the demonstrated role of *M. domestica* as a vector of *Shigella* and the close association between this species and humans, grill counts of houseflies only were measured (table 12). Houseflies were seen first in the study areas about the middle of April each year; a few *Cynomyopsis*, *Calliphora*, *Phaenicia*, and sarcophagids were seen about a month earlier. Houseflies increased slowly in May and June and more rapidly thereafter to a peak in September of 1954 and 1955. During the summer months, *M. domestica* comprised one-half to three-fourths of the total fly population. Generally windy conditions during August 1956 seriously interfered with fly measurements; counts for the month probably would have been much higher if winds had not been so strong. Although no grill counts were made in the fall months of 1956, on the basis of occasional field observations housefly abundance appeared to reach a peak during the first 2 weeks of October.

Consistently smaller fly populations, both of *Musca* and of total flies, were observed at premises of group A than at premises of group B or C. This finding was anticipated, since Wheelwright was the only study area where general use was made of covered garbage containers and refuse collection service. There were no consistent differences in fly abundance between group B and group C areas. Group B had higher *Musca* counts than group C in 5 of the 9 months for which comparable data are available (table 12). It was noticed that, although about the same number of flies per attractant were obtained at premises in the two groups, on the whole there appeared to be more attractants in the yards of group C homes. Typically, houses in both groups were screened inadequately or not at all; during the summer months numbers of *Musca* and *Phaenicia* were commonly observed indoors.

TABLE 13.—*Water sources examined for bacteriological quality, by area and type, eastern Kentucky, 1954–56*

Grouped study areas [1]	Public water systems	Semipublic drilled wells	Individual drilled wells	Individual dug wells	Springs
Group A:					
Wheelwright	1				
Group B	6	1	30	46	7
Weeksbury	1		14	26	6
Wayland	2		3	6	
Manton	1	1	3	2	
Hemphill	1			5	
Drift	1		10	7	1
Group C	0	6	32	96	8
Hollows		4		24	2
Jacks Creek		2	14	37	2
Slick Rock			3	13	2
Salyers Branch			14	5	
Mud Creek			1	17	2

[1] See footnotes to table 1.

Examinations of water

Bacteriological examination of water samples was conducted from January 28, 1955, through December 1956. The number of water sources examined included 7 piped public supplies, 7 semipublic supplies, 62 private drilled wells, 142 private dug wells, and 15 springs (table 13). Frequency of sampling was generally related to the number of individuals served by the water supply. Most wells used by a single family were tested only once or twice, but the larger public systems were sampled as often as 3 or 4 times a week. During the late summer and early fall, many of the drug wells and springs were dry, and a number of families obtained water temporarily from creeks or from supplies outside the study area. With the exception of these emergency sources and a few infrequently used dug wells, all water supplies available to the populations under study were tested for bacteriological quality at least once.

Only in Wheelwright were all houses provided with piped water. An abandoned mine was used as a water source and reservoir. The water was regularly treated by coagulation, filtration, storage, and chlorination. Houses at Wayland were served by a common supply, with a few exceptions. The Wayland service included two systems, which were connected during most of the period of investigations. Abandoned mines, a creek, and a deep well were used separately and in combination as water sources. Treatment included filtration, storage, and occasional chlorination. In Manton and Hemphill, water was obtained from mines and piped to homes without treatment other than storage. Deep wells were used by Weeksbury and Drift; treatment consisted of storage and intermittent chlorination in Weeksbury and storage only in Drift.

Coliform contamination was lowest in the piped public supplies and highest in the individual dug wells (table 14). Dug wells in eastern Kentucky were usually lined with flat rocks laid without mortar. The wells rarely were covered or otherwise sheltered. In most instances, the water probably was contaminated both during drawing operations and by surface drainage.

TABLE 14.—*Distribution of coliform contamination in water samples, by source and degree of contamination, eastern Kentucky, 1954–56*

[In percent]

Water source	Number coliforms per 100-milliliter sample			
	0–1	2–19	20–99	100 and over
Public water systems	89.4	7.0	1.8	1.8
Semipublic drilled wells	64.3	7.1	9.6	19.0
Individual drilled wells	51.9	8.9	13.9	25.3
Springs	18.5	25.9	26.0	29.6
Individual dug wells	12.1	9.9	28.0	50.0

The Wheelwright water system was the only public supply in the study area which consistently produced water of good quality during the period of observation. No coliforms were recovered from any of 183 samples collected over a period of 62 weeks. With one exception, the samples were free of turbidity, sediment, and color; the pH usually ranged between 7.2 and 7.4. Chlorine residuals taken at a point distant from the treatment plant usually ranged between 0.2 and 0.4 parts per million; chlorine residual was present in all but 4 of the 183 samples.

The record of 572 examinations of the Wayland system over a period of 61 weeks shows erratic and frequently inadequate settling, filtration, and chlorination. Sixty-eight (12 percent) of the samples, representing 27 weeks' observation, revealed varying degrees of contamination by coliform bacteria; in 14 of the 68 instances, however, the count was only 1 coliform per 100 milliliter of sample. In general, sources in group B study areas usually provided water subject to frequent bacterial contamination.

Heavy pollution was most consistently present in group C water sources which consisted of open dug wells for the most part.

Socioeconomic factors

Studies of the relationship between sanitary facilities and enteric disease are complicated by the difficulty, or improbability, of securing population groups in which the desired variables are represented, but which are otherwise similar. Such closely comparable groups can be approximated only in highly artificial populations, such as military camps. Even with the most careful selection of available alternatives, population groups exhibiting measurable social and economic differences had to be included in the present study.

Table 15 summarizes information concerning a number of these factors, which were analyzed to determine their possible influence upon correlations of sanitary facilities and diarrheal disease incidence. One factor which influenced selection of the eastern coalfield region for these studies was the heavy unionized single industry, which served to minimize differences in the nature of employment and family income and, partly as a consequence, to effect some uniformity in the study population. A large proportion of the inhabitants of the area, even of the rural hamlets in group C, were dependent upon mining for a livelihood. The majority of the unemployed were miners by trade. The lowest rate of persons engaged in coal mining, 30 percent in Mud Creek, coincided with the highest unemployment rate of 35 percent. Employment

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information was obtained during the initial visits to the camps; during this time period, mining employment was coincidentally at a low level. The opening of numbers of small truck mines in 1955 and 1956 unquestionably reduced greatly the percentage of unemployed and raised the percentage of individuals engaged in coal mining, particularly in the Mud Creek area. With these acknowledged statistical limitations, for all areas, coal mining employment averaged 67 percent, full-time agriculture 1 percent, all other employment 22 percent; about 10 percent were unemployed.

Information on annual income of the study families was not obtained directly since the question was considered sufficiently personal to encourage misleading answers and perhaps arouse resentment as well. Instead, coal operators and union officials were consulted for estimates of average income of miners in the study populations. These estimates, supplemented by information from a limited number of individuals in each study area, indicated an approximate 1956 average family income in group A of $4,800 and in groups B and C of $3,600 and $3,000, respectively. House rentals in group A averaged $25 per month and in groups B and C, $10.

TABLE 15.—*Characteristics of study populations, eastern Kentucky, 1954–56*

Grouped study areas [1]	Percent employment of head of household			Median school grades completed by housewife	Percentage of households changing residence during 1 year		Median family size	Fertility index [2]	Percentage of households with—		
	Coal mining	Other	Unemployed		Within camp	From outside			Mechanical refrigerator	Television set	Washing machine
Group A:											
Wheelwright	88	12	0.4	9	17	10	5	655	100	95	98
Group B	56	30	14	8	16	11	5	879	92	[3] 74	92
Weeksbury	73	15	12	7	20	16	5	1,056	88	95	87
Wayland	40	44	16	8	14	12	5	837	96	90	97
Manton	68	27	5	8	5	10	4	954	100	[4]	96
Hemphill	58	26	16	7	6	6	5	745	92	[4]	95
Drift	57	29	14	8	29	9	5	833	88	45	85
Group C	51	33	16	7	15	6	6	979	75	[3] 59	86
Hollows	32	61	7	6	24	9	4	547	83	54	88
Jacks Creek	65	22	13	8	13	7	7	909	78	88	87
Slick Rock	44	31	25	8	6	0	7	1,111	56	[4]	78
Salyers Branch	82	18	0	6	5	0	6	1,291	86	[4]	88
Mud Creek	30	35	35	6	16	8	6	1,390	62	32	85

[1] See footnotes to table 1.
[2] Number of children under 5 years for every 1,000 women aged 15–44 years.
[3] For camps for which information was available.
[4] Information not available.

The median school grades completed were 9, 8, and 7 in groups A, B, and C, respectively; medians ranged from 6 to 9 in the individual areas.

Mobility as a characteristic of study populations was found to vary greatly between areas (table 15). The greatest movement occurred in Drift, where only 62 percent of the households remained in the same house for a year or more. The least mobility was observed in Salyers Branch, where only 5 percent moved before they had stayed a year at a residence, and all of these

remained in the study area. Little differences were observed in percentages of households changing residence within each population group, although variations between individual camps ranged from 5 to 29 percent. The percentage of households moving into groups A and B was greater than the percentage entering group C. Almost all people moving into the study areas during the investigations came from similar environments in eastern Kentucky. Therefore, since people moving into group A could only come from equal or poorer environments, the net effect of these shifts was a possible increase of disease rates in group A and a lowering of rates in group C.

Median family size in all study areas was 5 (table 15). The number of families with five or more members averaged 61 percent for all camps. As a rule, families in the rural hamlets tended to be larger than those in the mining communities. The median family size was somewhat larger in group C populations; therefore, the average number of persons per room and the level of crowding was greatest in group C, since the average size of houses did not differ greatly among the three grouped areas.

The fertility index (number of children under 5 years old for every 1,000 women aged 15–44 years) ranged from 547 in Hollows to 1,390 in Mud Creek. For group A, it was 655; for group B, 879; and for group C, 979. The fertility index for the entire study population was 772, compared with a Kentucky average of 544 (1950 U.S. census). The proportion of individuals under 5 years of age was 14, 17, and 19 percent in groups A, B, and C, respectively (table 3). In the A, B, and C areas 33 percent, 35 percent, and 38 percent of the population, respectively, were in the group aged 5–14 years.

The highest percentage of households with mechanical refrigerator, television set, and washing machine was in group A, and the lowest in group C (table 15).

The possible effect of racial factors upon the results of the investigations appeared to be minimal. Only 7 percent of the study populations was Negro and these lived in three camps: Wheelwright (18 percent), Hollows (5 percent), and Weeksbury (7 percent). The sex ratio for both whites and Negroes was reasonably well balanced in all camps, averaging 51 percent female.

Implications of the information presented above were that variations among the groups in such factors as family size, education, and crowding were sufficiently randomly distributed as to have no more than a moderate correlative influence upon the enteric disease indexes.. Analysis of the separate factors tended to confirm this hypothesis since the individual effect of each, when considered in terms of environmental facilities, indicated a moderate degree of positive correlation with *Ascaris* and *Shigella* data, but inverse relationship with reported morbidity.

The results of this analysis prompted a three-way comparison of enteric disease indexes with family size and crowding (table 16); family size and education of the housewife (table 17); and crowding and education of the housewife (table 18).[1] Separation of the data into so many cells naturally resulted in limited numbers for many categories; thus in many instances significant comparisons between the various factors were not obtainable. Interpretation of results is complex because the factors are not mutually exclusive; however, several conclusions are possible.

[1] Numbers in tables 16–18 and 20 do not agree with numbers in tables 2, 4–8, 10, 11, and 19 due to some instances of incomplete data on environment.

TABLE 16.—*Comparison of enteric disease indexes, by selected sanitary facilities, family size, and crowding, eastern Kentucky, 1954–56*

Sanitary facilities available	Family size	Reported diarrheal disease incidence in all ages				Prevalence of *Shigella* in preschool children				Prevalence of *Ascaris* infections in all ages			
		Persons per room				Persons per room				Persons per room			
		Uunder 1.5		1.5 and over		Under 1.5		1.5 and over		Under 1.5		1.5 and over	
		PME [1]	Rate [2]	PME [1]	Rate [2]	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of specimens	Percent positive	Number of specimens	Percent positive
Total		22,012	155	11,949	109	2,835	0.6	2,182	1.7	660	4	300	15
Flush toilet and water inside dwelling	2–5	16,826	175	262	137	2,354	.3	21	4.8	511	3	5	0
	6–9	4,690	99	8,744	119	416	1.0	1,520	1.1	130	8	231	12
	10 and over	496	24	2,943	77	65	7.7	641	3.0	19	16	64	27
Total		10,769	225	4,052	275	1,423	1.5	772	3.9	462	22	203	32
Privy and water inside dwelling	2–5	5,586	223	504	119	678	1.3	92	3.3	266	15	20	50
	6–9	3,976	193	2,898	318	449	2.0	556	3.8	155	28	140	26
	10 and over	1,207	338	650	203	296	1.4	124	4.8	41	46	43	42
Total		4,578	249	6,305	350	722	3.5	1,266	7.1	220	34	313	45
Privy and water outside dwelling on premises.	2–5	2,298	250	313	460	371	2.2	66	10.6	114	24	27	33
	6–9	2,090	246	4,820	348	302	4.3	1,003	7.1	96	47	228	46
	10 and over	190	252	1,172	327	49	8.2	197	6.1	10	30	58	47
Total		4,691	337	6,028	471	762	3.8	1,244	7.3	185	29	320	51
Privy and water outside dwelling off premises.	2–5	2,711	336	673	410	389	5.1	206	9.2	109	29	47	38
	6–9	1,777	378	4,147	489	334	2.7	823	7.8	76	28	215	55
	10 and over	203	0	1,208	447	39	0	215	3.7	0	----------	58	48

[1] Person-months experience.

[2] Rate per 1,000 per annum.

TABLE 17.—*Comparison of enteric desease indexes, by selected sanitary facilities, family size, and education of housewife, eastern Kentucky, 1954–56*

Sanitary facilities available	School grades completed by housewife	Reported diarrheal disease incidence in all ages (number in family)						Prevalence of *Shigella* in preschool children (number in family)						Prevalence of *Ascaris* infections in all ages (number in family)					
		2 to 5		6 to 9		10 and over		2 to 5		6 to 9		10 and over		2 to 5		6 to 9		10 and over	
		PME [1]	Rate [2]	PME [1]	Rate [2]	PME [1]	Rate [2]	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of specimens	Percent positive	Number of specimens	Percent positive	Number of specimens	Percent positive
Total		17,088	174	13,434	112	3,439	69	2,375	0.4	1,936	1.1	706	3.4	516	3	361	11	83	24
Flush toilet and water inside dwelling.	6 and under	2,694	151	3,308	116	1,120	96	284	2.5	452	2.0	271	4.4	70	4	96	22	27	44
	7 to 8	4,184	126	4,065	100	1,357	44	572	0	527	1.1	217	5.1	126	6	99	10	44	18
	9 and over	9,627	206	5,932	117	962	74	1,454	.1	957	.6	218	.5	313	1	162	4	12	-------
	Unknown	484	99	129	186	0	-------	65	1.5	0	-------	0	-------	7	0	4	0	0	-------
Total		6,090	214	6,874	246	1,857	290	770	1.6	1,005	3.0	420	2.4	286	17	295	27	84	44
Privy and water inside dwelling.	6 and under	2,156	128	3,466	228	487	468	185	4.9	476	2.3	121	2.5	100	12	149	32	18	44
	7 to 8	2,357	249	3,036	276	1,157	207	251	.8	480	4.0	238	2.1	119	19	126	21	54	39
	9 and over	1,544	287	343	174	213	338	328	.3	41	0	61	3.3	67	21	20	20	12	67
	Unknown	33	0	29	0	0	-------	6	0	8	0	0	-------	0	-------	0	-------	0	-------
Total		2,611	275	6,910	317	1,362	317	437	3.4	1,305	6.4	246	6.5	141	26	324	46	68	44
Privy and water outside dwelling on premises.	6 and under	1,587	340	4,068	330	993	410	208	4.3	721	7.8	196	5.1	93	31	160	52	54	43
	7 to 8	620	135	2,317	300	219	0	158	3.2	507	4.9	13	15.4	38	16	129	40	4	100
	9 and over	326	294	214	560	150	160	57	1.8	45	0	37	10.8	7	14	18	22	10	30
	Unknown	78	0	311	115	0	-------	14	0	32	9.4	0	-------	3	0	17	71	0	-------
Total		3,384	351	5,924	455	1,411	382	595	6.6	1,157	6.3	254	3.1	156	32	291	48	58	48
Privy and water outside dwelling off premises.	6 and under	2,088	333	4,129	465	755	445	394	7.6	754	6.0	123	4.1	105	31	195	49	44	43
	7 to 8	907	423	1,417	465	568	338	118	5.9	311	8.7	106	2.8	23	43	85	51	14	64
	9 and over	371	258	378	317	0	-------	78	2.6	92	1.1	0	-------	23	26	11	9	0	-------
	Unknown	18	666	0	-------	88	136	5	0	0	-------	25	0	5	20	0	-------	0	-------

[1] Person-months experience. [2] Rate per 1,000 per annum.

TABLE 18.—*Comparison of enteric disease indexes, by selected sanitary facilities, crowding, and education of housewife, eastern Kentucky, 1954–56*

Sanitary facilities available	School grades completed by housewife	Persons per room											
		Reported diarrheal disease incidence in all ages				Prevalence of *Shigella* in preschool children				Prevalence of *Ascaris* infections in all ages			
		Under 1.5		1.5 and over		Under 1.5		1.5 and over		Under 1.5		1.5 and over	
		PME [1]	Rate [2]	PME [1]	Rate [2]	Number of cultures	Percent positive	Number of cultures	Percent positive	Number of specimens	Percent positive	Number of specimens	Percent positive
Total		22,012	155	11,949	109	2,835	0.6	2,182	1.7	660	4	300	15
Flush toilet and water inside dwelling	6 and under	4,187	143	2,935	102	503	2.0	504	3.6	124	7	69	39
	7 to 8	5,999	100	3,607	109	721	.8	595	1.8	170	7	99	13
	9 and over	11,334	192	5,286	111	1,548	.1	1,081	.6	359	1	128	4
	Unknown	492	97	121	198	63	.0	2	50.0	7	0	4	0
Total		10,769	225	4,052	275	1,423	1.5	772	3.9	462	22	203	32
Privy and water inside dwelling	6 and under	4,017	218	2,092	200	437	3.4	345	2.3	169	20	98	36
	7 to 8	4,724	213	1,826	361	573	.7	396	5.6	200	22	99	28
	9 and over	1,999	270	101	356	405	.7	25	.0	93	27	6	17
	Unknown	29	0	33	0	8	.0	6	.0	0	----------	0	----------
Total		4,578	249	6,305	350	722	3.5	1,266	7.1	220	34	313	45
Privy and water outside dwelling on premises.	6 and under	2,397	285	4,251	378	297	2.7	828	8.1	108	41	199	46
	7 to 8	1,286	233	1,870	256	279	3.2	399	5.8	70	19	101	48
	9 and over	506	237	184	652	100	5.0	39	.0	22	27	13	15
	Unknown	389	92	0	----------	46	6.5	0	----------	20	60	0	----------
Total		4,691	337	6,028	471	762	3.8	1,244	7.3	185	29	320	51
Privy and water outside dwelling off premises.	6 and under	2,908	309	4,064	504	443	3.6	828	7.7	113	28	231	50
	7 to 8	1,034	452	1,858	413	149	6.7	386	7.0	37	38	85	56
	9 and over	734	277	15	800	165	1.8	5	.0	33	21	1	0
	Unknown	15	800	91	131	5	.0	25	.0	2	0	3	33

[1] Person-months experience.

[2] Rate per 1,000 per annum.

Approximately one-third of the people providing enteric disease data resided under optimum conditions of environment; that is, they had water and flush toilets inside the house, minimum crowding, and higher levels of education as contrasted with occupants of premises having water outside the house. More than 55 percent of the inhabitants of the more poorly sanitated areas had water outside the dwelling unit, had larger families, were more crowded, and were less well educated.

Data in table 16 show that, for occupants of dwellings having person-per-room ratios greater than 1.5, *Shigella* and *Ascaris* rates were about two or more times as high as those rates for individuals living under less crowded conditions. These differences in infection rates were almost as great as rates according to types of sanitary facilities compared under identical conditions of crowding. Inverse relationships between crowding and reported diarrheal experience were observed in the well-sanitated areas. The effect of family size was not apparent except insofar as it resulted in greater crowding.

The effects of family size and educational differences are shown in table 17. Prevalence of *Shigella* and *Ascaris* infections in general varied inversely with educational level. Although the data are limited, there was some indication that larger family size increased the infection rates observed. It is apparent from the data that persons in higher educational levels tended to report more diarrhea than those in lower educational levels.

Data in table 18, comparing indexes of disease by differences in education and crowding, reflect generally higher rates of diarrheal disease and *Shigella* and *Ascaris* prevalence wherever conditions of crowding are greater, and also where the educational level is low. Again, the incidence of enteric disease was primarily affected by availability of water and sanitary facilities.

It was concluded from the comparisons in tables 16, 17, and 18 that the combination of increased crowding, large families, and low educational levels tend to increase the prevalence of diarrheal disease. It was concluded further, however, that in the perpetuation of enteric disease the combined effects of these factors are not as significant as the effects of inadequate sanitary facilities.

DISCUSSION

Efforts have been made previously to estimate the effect of a single or of a limited number of environmental factors on the occurrence of diarrheal diseases. Investigations by Watt and Lindsay in Texas and by Lindsay and associates in Georgia demonstrated that effective fly control in communities with high-to-moderate fly populations reduced the prevalence of diarrheal disease and *Shigella* infections. Investigations among prisoners of war in Korea during the fall of 1951 by Schliessmann showed that prevalence of diarrheal diseases decreased with increased quantity of water available to prisoners for bathing. Watt and associates, in studies of migratory workers in California, suggested that use of water as a diluent might reduce the prevalence of shigellosis. Subsequent investigations of similar situations by Hollister and coworkers indicated that *Shigella* prevalence was associated with availability of water for personal hygiene. Similar observations were made in southern Georgia by Stewart and others, who indicated that not only the potability of water but also its availability for personal hygiene must be considered in any diarrheal disease control program. The studies reported in this monograph were an extension of these investigations and were designed to provide statistically reliable information on a number of measurable environmental factors which might affect the incidence of diarrheal disease.

Sanitary facilities

The lowest rates of reported diarrheal disease, *Shigella*-positive cultures, and *Ascaris*-positive stools were from the area in group A where all residents were provided with complete community sanitary facilities. Group B areas were served by some but not all public sanitary services, and rates of all three enteric diseases indexes were higher. Highest rates were observed in group C study populations, where community sanitary facilities were entirely lacking (table 19). Reported diarrheal disease rates in group B populations were about twice as great, and in group C populations, about three times as great, as those in group A. *Shigella*-positive culture rates were approximately five and nine times as large in groups B and C, respectively, as in group A. *Ascaris*-positive stool rates in group B were four times as great, and in group C, for ages 2 to 12 and all ages, five and six times as great, respectively, as in group A.

TABLE 19.—*Reported diarrheal disease morbidity rates,* Shigella *infections in preschool children, and percentage of population infected with* Ascaris, *by area, eastern Kentucky, 1954–56*

Grouped study areas [1]	Morbidity rate				*Shigella* prevalence		*Ascaris* prevalence			
	Under 4 years		All ages				2 to 12 years		All ages	
	PME [2]	Rate [3]	PME [2]	Rate [3]	Number of cultures	Percent positive	Number of specimens	Percent positive	Number of specimens	Percent positive
All areas	11,210	754	70,826	227	11,264	3.1	1,413	40	2,798	26
Group A: Wheelwright	4,038	413	27,511	135	4,074	0.7	377	12	765	7
Group B	4,692	744	27,969	251	4,698	3.5	606	43	1,197	26
Weeksbury	1,660	737	9,165	272	1,735	3.6	173	44	310	31
Wayland	1,802	779	11,652	247	1,828	3.4	199	45	433	26
Manton	184	847	894	308	162	3.1	35	40	57	26
Hemphill	300	680	2,169	204	297	2.0	90	43	195	23
Drift	746	675	4,089	228	676	4.3	109	35	202	24
Group C	2,480	1,330	15,346	349	2,492	6.4	430	60	836	42
Hollows	594	1,171	4,767	317	644	2.6	71	52	150	29
Jacks Creek	808	1,262	4,963	316	801	8.1	129	60	255	44
Slick Rock	190	1,010	1,069	381	230	6.1	45	60	100	37
Salyers Branch	252	666	1,311	137	236	10.2	50	46	82	35
Mud Creek	636	1,924	3,236	522	581	6.9	135	70	249	50

[1] See footnotes to table 1.
[2] Person-months experience.
[3] Rate per 1,000 per annum.

The effect of several specific sanitary facilities upon occurrence of enteric disease, as measured by rates of reported disease and *Shigella* and *Ascaris* prevalence, was both marked and consistent. People provided with water piped inside the house and with privy excreta disposal reported approximately twice the incidence of disease, had twice the prevalence of *Shigella* infections, and over three times the *Ascaris* infection rate of individuals who not only had access to water inside the dwelling unit but also had flush toilets (table 20 and fig. 6). Reported incidence of diarrhea and *Shigella* and *Ascaris* infection rates for individuals who used privies but who had water piped inside their dwellings were compared with the same rates for persons who used privies but whose source of water was outside the house. Rates of reported morbidity and *Ascaris* infection were approximately one-third lower among persons having access to

water inside their dwellings than among persons whose source of water was outside the house. In addition, the *Shigella* infection rate in preschool children having access to water inside their dwellings was approximately 50 percent less than rates among children whose source of water was outside their dwellings. Where water was not piped inside the house, reported morbidity rates among individuals who had water available on the premises were approximately 30 percent lower than for those who had to obtain water from a distant source; rates of *Shigella* prevalence and *Ascaris* infection evidently were not affected by this variable.

Limited data indicated *Shigella* and *Ascaris* prevalence rates to be about two and three times lower, respectively, among occupants of dwellings with installed bath fixtures, than the same rates for individuals not having access to installed tub or shower but otherwise provided with similar facilities. There were also indications that where hot water was available to families, *Shigella* and *Ascaris* rates were lower than where there was access to cold water only, all other factors remaining constant.

TABLE 20.—*Reported diarrheal disease morbidity rates,* Shigella *infections in preschool children, and* Ascaris *infections according to selected sanitary facilities, eastern Kentucky, 1954–56*

Sanitary facilities	Morbidity rate				*Shigella* prevalence		*Ascaris* prevalence			
	0–4 years		All ages				2–12 years		All ages	
	PME [1]	Rate [2]	PME [1]	Rate [2]	Number of cultures	Percent positive	Number of specimens	Percent positive	Number of specimens	Percent positive
Total	11,121	756	70,384	228	11,206	3.0	1,334	39	2,663	25
Water inside dwelling:										
Flush toilet	5,040	428	33,961	139	5,017	1.1	458	12	960	7
Privy	2,200	829	14,821	238	2,195	2.4	313	42	665	25
Water outside dwelling:										
On premise	1,900	953	10,883	307	1,988	5.8	290	58	533	41
Off premise	1,981	1,320	10,719	413	2,006	6.0	273	62	505	43

[1] Person-months experience.
[2] Rate per 1,000 per annum.

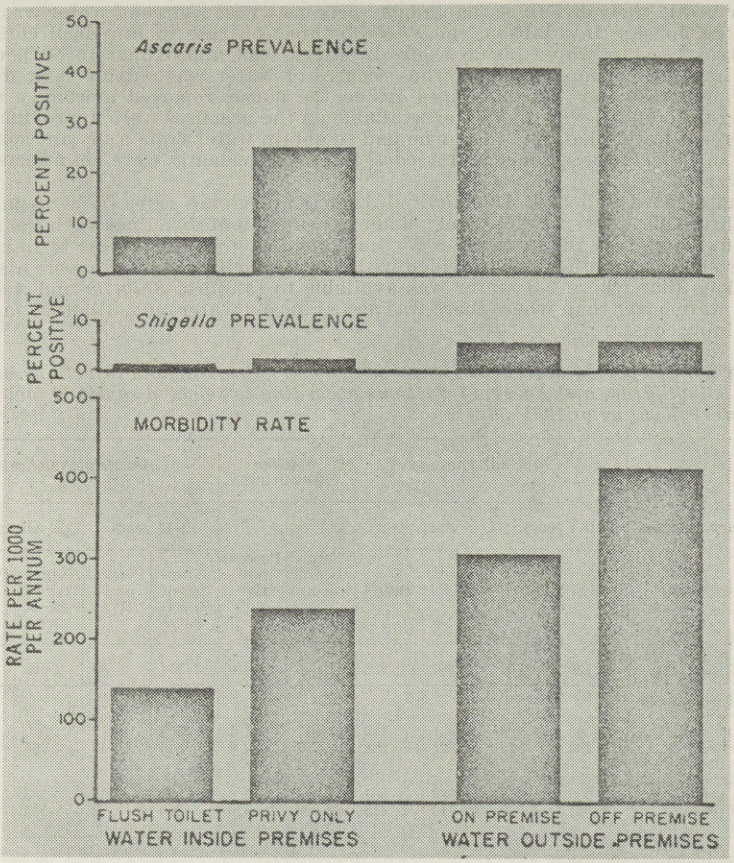


FIGURE 6.—Diarrheal disease morbidity rates: *Shigella* infections in preschool children percentage of study population infected with *Ascaris*, according to selected sanitary facilities, eastern Kentucky, 1954–56.

Flies

Comparison of seasonal housefly abundance (table 12) with seasonal incidence of reported diarrheal disease morbidity (fig. 2) reveals a superficial correlation between the two sets of data. Discrepancies are evident, in that the highest morbidity rates were obtained in August 1955 and August 1956 while periods of highest *Musca* prevalence were September 1955 and early October 1956. Moderate peaks of diarrhea prevalance in March 1955 and April 1956 occurred during periods when adult houseflies were absent, or nearly so. There is even less agreement between seasonal housefly abundance and the *Shigella*-positive culture rates shown in figure 2. The fall of 1954, which was a period of comparatively high fly populations, was evidently a period of low *Shigella* prevalance; the September *Shigella* rate, in particular, failed to correspond with the peak of housefly abundance. In 1955 and 1956, *Shigella* rates remained at a comparatively high level throughout the winter, whereas fly populations definitely did not.

Studies in Texas and Georgia showed that reduction in incidence of diarrheal disease was accomplished by fly control. The standard measure of effective fly control was a Scudder grill count average of 10 houseflies or less. This standard has been employed in evaluating effectiveness of chemical insecticides for the control of flies. Housefly populations in the present study, in general, were below the level established as a standard of fly control in the earlier studies mentioned.

It appears that these vectors did not contribute appreciably to the transmission of diarrheal disease in eastern Kentucky during the period of observations.

The Wheelwright water system (group A) was the only public supply in the study areas which consistently produced water of good drinking quality during the period of observation. It does not appear likely that the Wheelwright public water supply was involved in the transmission of *Shigella* or of other enteric bacteria during the period of observation.

Examinations of the Wayland city water system revealed frequently inadequate purification, and other water sources in group B study areas generally provided water subject to frequent bacterial contamination, in contrast to the heavily chlorinated water in group A. Group C water sources, open dug wells for the most part, were the most consistently and heavily polluted of all. Transmission of enteric pathogens by water in the B and C study populations could have occurred easily. There was, however, nothing in the results of the water examinations which we could relate to any outbreak of disease, to *Shigella* prevalence, or to the morbidity rate reported within the study areas. Therefore, the apparent correlations between water quality and *Shigella*, *Ascaris*, and reported morbidity rates were not considered to be an expression of causal relationship.

Socioeconomic factors

Despite efforts to minimize inclusion of socioeconomic variables by a careful selection of study areas, quantitative social and economic differences were shown to exist between the observed population groups. During the course of the study, employment in mining operations and wages were comparatively high. The minimum wage of miners established in September 1956 was $21.16 per day. While monetary incomes by groups varied directly with level of sanitation, incomes of the more poorly sanitated groups were supplemented frequently by agricultural activities and were compensated further by low rental costs. The high percentage of households having television sets (group A, 95 percent; B, 74 percent; and C, 59 percent) which, in this fringe reception area necessitates extensive aerial installations and boosters and cables from the mountains, attests to the fact that the population groups had sufficient income over and above the minimum required for survival. These data strongly suggest that economic factors did not account for the diversity in incidence of enteric disease in the different study groups.

The effect of low level of education of the housewife, as well as the interrelated effects of large families and increased crowding, all were shown to accompany increased prevalence of *Shigella* and *Ascaris* infections. Similar relationships with reported illness were not as apparent. The housewife customarily assumes the responsibility for household cleanliness and the personal hygiene habits of the children, and the level of her educational background was considered to be a measure of the adequacy of hygiene practices in the home. Families in which the housewife had a higher educational level, however, tended to create bias in reporting. These families were smaller on the average, so that complaints of individual family members might be expected to receive more attention. Also, the housewives with a higher educational level apparently were more concerned about illness within the family than were those with less education. These factors may have contributed to the remembering and reporting of more diarrheal episodes of milder character.

Etiological agents

Since it was not possible to obtain clinical appraisals or multiple fecal specimens from acute diarrheal cases reported to the public health nurses during their monthly visits, definitive information on etiology was not obtained. However, data gathered from monthly culturing of preschool children and from periodic stool examinations permit the drawing of presumptive conclusions. The low *Salmonella* infection rates in the study populations suggest that this genus did not contribute appreciably to the morbidity experienced in any of the areas. Likewise, data obtained during a 6-month survey of four enteropathogenic *Escherichia coli* serotypes (026:B6; 055:B5; 0111:B4; and 0127:B8) revealed a low prevalence of all types and suggested their comparative unimportance as a cause of morbidity in the study populations.

Age-specific prevalences of *Shigella* infection in group B and C populations were comparable to those reported in Texas in 1946 and in New Mexico in 1938 and 1948. In the Texas and New Mexico studies, it was shown that prevalence of *Shigella* infection was related directly to diarrheal disease morbidity and mortality, and that bacillary dysentery caused the majority of illnesses and deaths due to diarrheal disease. Therefore, as in studies in migratory labor camps in California, it was concluded that shigellae were the primary cause of acute diarrheal disease in groups B and C of the present study.

The low *Shigella* isolation rate observed in the well-sanitated group A area indicated that bacillary dysentery was not a primary cause of acute diarrheal disease in that area, in contrast with findings in group B and C populations. In the absence of clinical appraisal of diarrheal illnesses in group A, it was not possible to determine whether the primary cause of the cases reported was an infectious agent, a dietary manifestation, an allergic response of some nature, or a combination of these. It is apparent, however, that factors which contribute to a law rate of *Shigella* in well-sanitated areas result in a reduction of other enteric infections and diarrheal disease morbidity in such areas.

Infection rates of *E. histolytica* were low in the entire study area, and no frank cases of amebiasis were known to have occurred during the period of investigation. High prevalences of certain helminth species were noted and a number of observations of relationships between helminths and disease were made. Local physicians expressed concern over infections of *Ascaris* and *Strongyloides*, as well as over the presence of large numbers of *Trichuris*, particularly among persons less than 3 years of age. Also, heavy ascarid and similar infections in young adult females and mothers of small children were considered to constitute an important hazard for family health and especially for the well-being of younger members of the family. However, appreciable evidence was obtained which indicated that the majority of helminthic infections did not cause manifest disease.

To study rates at which reinfections with *Ascaris* took place, a semiannual program of treatment for ascariasis was instituted. A single dose of piperazine citrate alone was found to be effective in almost three of every four cases treated. A major portion of the study on treatment has been reported by Atchley and associates. Instances in which the single dosage was not completely effective, according to posttreatment fecal examinations, were observed to occur with greatest frequency in heavily infected individuals. Study areas with highest ascarid prevalences showed the greatest rates of reinfection when examinations were conducted some 6 months later. Tendencies to become reinfected were least among adults, but 80 percent of those children who had been cured were positive again when examined during the following year. Of the nearly 500 persons of all ages participating throughout the entire investigation of treatment and reinfection over a period of a year and a half, approximately 80 percent of the adults and 40 percent of the children were never observed to harbor *Ascaris*. A majority of these negative individuals resided in the well-sanitated area. While the promotional and temporary therapeutic values of single-dose treatments were well established, this measure requires implementation by additional public health procedures to give lasting improvement within a limited time.

Applicability of enteric disease indexes

The validity of morbidity rates obtained from data of reported diarrheal disease episodes unsupported by bacteriological examinations as a measurement for elucidating differences in prevalence of diarrheal disease between population groups has been questioned frequently. In this investigation, reported diarrheal disease morbidity rates, *Shigella* or *Ascaris* infection rates, and the results of an environmental survey all were found to be satisfactory indexes for describing the relative differences in the enteric disease problem between study populations.

Although variations in reporting were observed between study groups, results of the investigation indicate that reported diarrheal disease morbidity may serve in many situations as a single index of enteric disease prevalence. Reliability of this index in differentiating differences in the diarrheal disease problem between population groups will be dependent upon several factors. Therefore,

consistency in the routine of questioning respondents is essential, and questions should be explicit, easily understood, and free of bias. In addition to information on age of patient, date of onset, and data on duration of illness, number of stools per day, and whether the individual was compelled to defecate at night will aid in establishing the degree of severity of the episode. The significance of reported diarrheal episodes of 1-day duration, or of three or less stools, or both is not known. Accuracy of reporting frequency of stools beyond six stools a day was poor in this study; probably the highest category used for recording frequency should be six or more stools. Analysis of the data to establish a definition of diarrhea based on criteria of significant severity will assist in comparing morbidity rates between population groups by eliminating many mild diarrheal episodes reported by individuals in higher socioeconomic levels.

Reliability of the *Shigella* infection rate as an index of enteric disease prevalence and of environmental hygience has been well established. In the region selected for the present study, helminthic parasite rates were high, and *Ascaris* infection rates were shown to be at least as suitable an index as *Shigella*. Ascarid infections usually persist for about 1 year, and transmission of infection is directly dependent upon improper methods of excreta disposal as well as on deficiencies of personal hygiene. Other intestinal helminth species showed rate trends paralleling that for *Ascaris*, but were less satisfactory indexes either because of their mode of transmission or because of a tendency to persist in the host for relatively long periods. The latter characteristic would necessarily complicate evaluations of the effectiveness of a particular sanitary improvement because of the need for prolonged observation.

The relative opportunities for dissemination of enteric organisms and the subsequent risk of a population exposed to diarrheal disease can be predicted on the basis of an environmental survey. The extensiveness of the survey to designate portions of a community where enteric diseases are probably most prevalent will depend on the purposes for which the information will be utilized. The populations subject to the greatest risk of contracting diarrheal disease can be determined in a few days by a rapid reconnaissance of water sources, excreta disposal practices, and general esthetic conditions of housing, yards, and neighborhood. Such economically and rapidly obtained information would be of aid in planning work and scheduling activities of local public health nurses and sanitarians. If more extensive programs are planned, or if it should prove desirable to evaluate effectiveness of the local health department program, a more detailed survey would be required.

Application of findings

The importance of such socioeconomic factors as income, family size, education, and crowding has been recognized, but in this study their effect on the incidence of disease was secondary to the effect of the presence or absence of sanitary facilities. Diarrheal diseases are not a specific entity and may result from a number of causes, not all of which are fecally transmitted. However, the observed close correlation of reported diarrhea and such parameters as *Shigella* and *Ascaris* infections with various levels of environmental sanitation provides presumptive evidence that the majority of infectious diarrheal diseases have similar routes of transmission. It is axiomatic, therefore, that since sanitary facilities tend to improve personal hygiene, provision of such facilities will result in decreased incidence of infectious enteric disease.

The results of this study strongly support the premise that incidence of acute infectious diarrheal disease may be reduced significantly through selective modification of specific environmental factors within communities without regard to etiological or sociologic differences. Variation in the degree to which reductions in disease incidence can be attained through these modifications may well vary between population groups because of regional differences in living habits, etiological agents, and fly abundance, and in milk and food control sanitation practices. However, preventive measures may be formulated with confidence that specific environmental improvements, based on a knowledge of local deficiencies, will invariably effect significant reductions in enteric disease.

SUMMARY

Studies of the relation of environmental factors to the occurrence of enteric diseases were conducted in 11 mining camps in the eastern coalfield region of Kentucky from June 1954 through June 1957 by the Cumberland Field Station, a field unit of the Communicable Disease Center, Public Health Service. The objective of the investigations was to provide basic information for development of specific control measures by (*a*) determining seasonal and annual incidence of diarrheal disease among human populations of areas differing from one another in one of or more measurable characteristics of environmental sanitation; (*b*) identifying causative agents of diarrheal disease in the different areas; and (*c*) evaluating levels of sanitation in the households and communities studied.

Reported diarrheal disease morbidity rates for all ages in 7 study populations for which a full year of comparative data was available ranged from 94 to 536 per 1,000 persons per annum. The average rate for the 7 study populations was 213. More than half the total cases were reported from the group aged zero to 4 years, and within this group the majority of illnesses were reported from children under 2 years of age. Marked seasonal trends were observed, the highest incidence occurring during August and September. The ratio of "summer" diarrhea to "winter" diarrhea for the years 1955 and 1956 was approximately 2 to 1. Diarrheal disease incidence increased earlier in the spring and persisted at a high level later in the fall in the areas with poorer sanitation. The modal frequency of reported stools per 24-hour period was five, and the median, six. Average duration of illness was 4 days. Severe diarrhea was reported more frequently from the poorly sanitated areas.

Shigella isolation rates obtained by rectal swabbing of preschool children ranged between 0.7 and 10 percent by individual study areas. The highest rates for all study populations combined occurred in the 4-year age group; in the most poorly sanitated areas, children were found to be infected at an early age, and the highest prevalence was in the 2-year age group. *Shigella* was isolated from 354 rectal swab cultures of the 11,264 collected. Eight biotypes were found, with *Shigella dysenteriae* making up 4 percent; *S. sonnei*, 20 percent; and 6 biotypes of *Shigella flexneri*, 76 percent. Of the *flexneri* group, the most common isolate was the Manchester variety, which made up 42 percent of all positive cultures. Bacillary dysentery (shigellosis) probably was responsible for the majority of acute diarrheal disease experiences observed in poorly sanitated areas, but was not a primary cause in the most well-sanitated area.

There were only 25 *Salmonella* isolations from all 11,264 rectal swab cultures collected. Thirteen isolations of enteropathogenic *Escherichia coli* were obtained from a series of 1,000 rectal swab specimens collected from preschoolchildren and examined for 026: B6, 055: B5, 0111: B4, and 0127: B8 serotypes. Salmonellae and the enteropathogenic *E. coli* evidently did not contribute substantially to enteric disease morbidity reported in the study areas.

Of 2,798 individuals of all ages examined, 1 of every 4 had stools positive for *Ascaris lumbricoides*. In the 1,413 of these individuals aged 2 to 12 years, *Ascaris*-positive rates ranged from 12 to 70 percent. Rates of *Trichuris trichiura* approximated those of roundworm, although the whipworm infections, as judged by egg counts, were almost invariably much lighter. *Strongyloides* and *Hymenolepis*

infections were recorded occasionally. Hookworm infections were rare. Among 843 stool specimens examined for intestinal protozoa, *Entamoeba histolytica* was found in 3.3 percent and *Giardia lamblia* in 9.5 percent.

In previous investigations, when a reduction of diarrheal disease was obtained by control of flies, an average grill count of 10 or less was considered effective fly control. In this study, average grill counts were generally well under 10. Also, housefly abundance was not significantly correlated with morbidity or *Shigella* prevalence in the present investigation.

Transmission of enteric pathogens by polluted water could have occurred easily. Many water sources in use by the study populations were subject to possible fecal contamination and may have been responsible for some cases of diarrheal disease. There were, however, no instances in which water quality could be implicated in disease outbreaks or correlated with seasonal differences in morbidity rates or *Shigella* prevalence.

Lowest rates of reported diarrheal disease, *Shigella*-positive cultures, and *Ascaris*-positive stools were recorded among study families served by complete community sanitary facilities. Markedly higher rates of these enteric disease indexes were experienced by households served by some but not all public sanitary services, and the highest levels of the three indexes were reported from populations living where community sanitary facilities were entirely lacking. Individuals living in homes provided with inside piped water and privy excreta disposal reported approximately twice the diarrhea, had twice the *Shigella* prevalence, and over three times the *Ascaris* infection rate experienced by individuals using inside piped water and flush toilets.

For the population groups using privies, *Ascaris* infection rates and reported morbidity rates were one-third lower, and *Shigella* infections were 50 percent fewer, among those who had water inside the house than among those whose water source was outside. Where water was not piped inside the house, persons having access to water on the premises reported a third less diarrhea than individuals obtaining water away from the premises. Where the water source was outside the dwelling unit, *Shigella* and *Ascaris* infection rates were comparable regardless of water source location in relation to the premises.

Limited data were available concerning the influence of bathing facilities; there were trends, however, to indicate that lower rates of *Shigella* and *Ascaris* infection accompanied the existence of installed bathing fixtures. Desirability of installed hot water systems was also indicated.

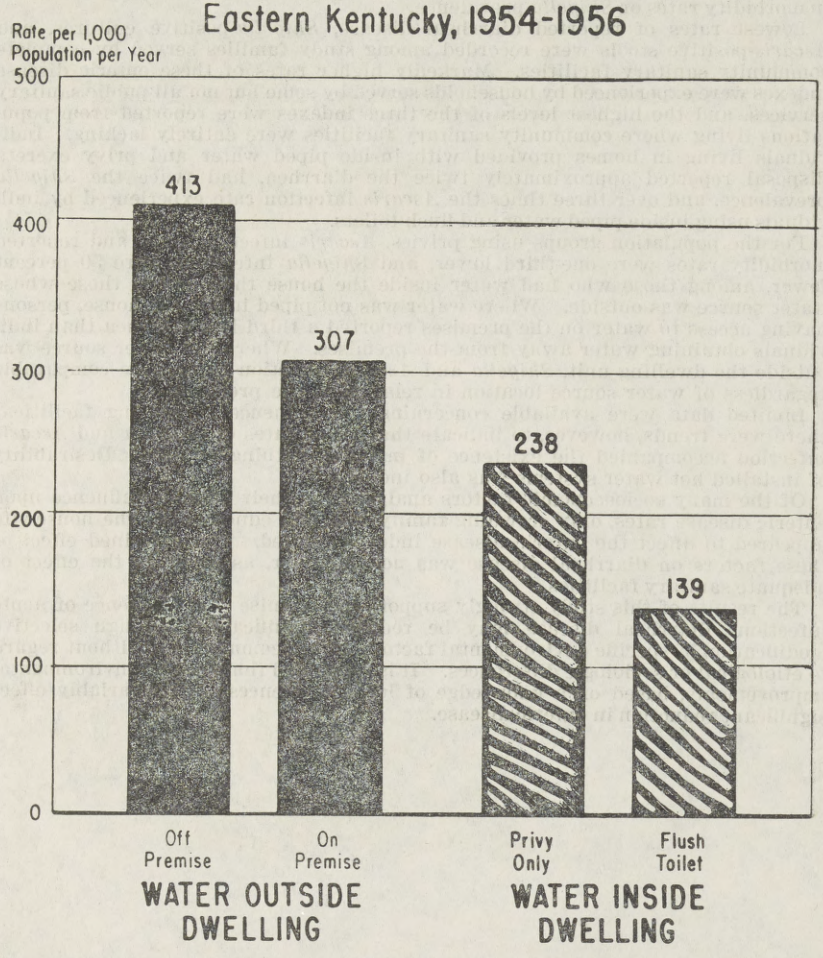
Of the many socioeconomic factors analyzed for their possible influence upon enteric disease rates, only crowding family size, and education of the housewife appeared to affect the enteric disease indexes studied. The combined effect of these factors on diarrheal disease was not, however, as great as the effect of adequate sanitary facilities.

The results of this study strongly support the premise that incidence of acute infectious diarrheal disease may be reduced significantly through selective modification of specific environmental factors within communities without regard to etiological or sociologic differences. It is concluded that specific environmental improvements, based on a knowledge of local deficiences, will invariably effect significant reduction in enteric disease.

RELATIONSHIP OF ENVIRONMENTAL FACTORS TO ENTERIC DISEASE

DIARRHEAL DISEASE MORBIDITY RATES ACCORDING TO SELECTED SANITARY FACILITIES

Eastern Kentucky, 1954-1956



Source: Public Health Monograph No 54-1958 (PHS Publication No. 591)

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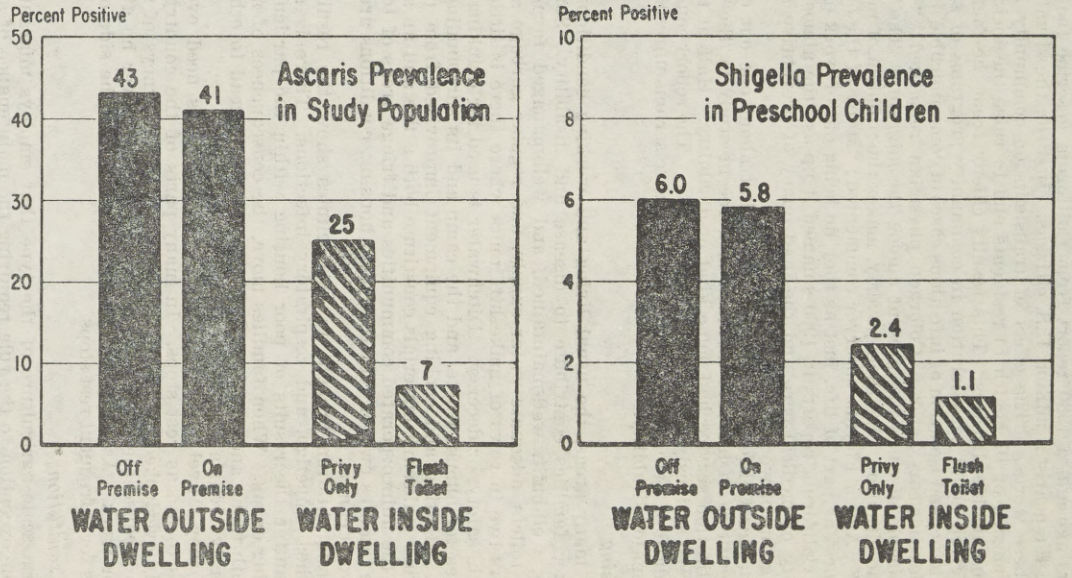
RELATIONSHIP OF ENVIRONMENTAL FACTORS TO ENTERIC DISEASE

ASCARIS AND SHIGELLA INFECTIONS ACCORDING TO SELECTED SANITARY FACILITIES

Eastern Kentucky, 1954-1956



Source: Public Health Monograph No. 54-1958 (PHS Publication No. 591)

[Public Health Service, U.S. Department of Health, Education, and Welfare, vol. 76, No. 6, June 1961]

Health Needs of Seasonal Farmworkers and Their Families

(By James K. Shafer, M.D., Donald Harting, M.D., and Helen L. Johnston[1])

The past 10 or even 20 years have brought few improvements in the lives of migrant farmworkers and their families. A Public Health Service report of 20 years ago and a 1960 report from California describe the same lack of health care for nearly a million U.S. citizens. In 1940, the situation was summarized in these words. "The effect of transients on community health is to increase the hazard of ill health to residents and to raise the incidence of most of the communicable diseases. This results chiefly from the fact that transients are not given equal consideration in community programs of sanitation, preventive medicine, and isolation of infectious cases of communicable disease."

Eleven years later a Colorado physician remarked: "We know that communicable diseases are present among the migrants. The fatalistic acceptance of the situation, plus their poverty, makes the problem of medical care a critical one." And a Florida observer commented: "Many of the older ones just accept sickness as part of life, just as they do being out of work or living in a shack." The California reports in 1960 summed it up as "the almost complete nonavailability of medical care and the inadequacy of preventive services available to this group of workers."

Another California study indicated that about one out of five adults among itinerant farm laborers included in a recent study by the State vocational rehabilitation service had some kind of disability. Half of these disabled adults suffered seriously reduced earning capacity. The report concludes: "Due to their standard of living, they are * * * apt to have serious unresolved health problems and major disability."

Housing

In many areas, the usual living and working conditions of seasonal farmworker families contribute to disease and disability. Some families live in large, well-built, well-maintained, and well-managed farm labor camps with good toilets, adequate water supply, and regular garbage and trash collection. Others live in rows of makeshift units where there is little regard for human health, safety, or decency. Ditchwater is used for drinking and washing, filthy privies for human waste, and the camp and its surroundings for dumping garbage. Heating and cooking equipment improvised from discarded oil drums or other makeshift materials constitute both a fire and an accident hazard.

In the unincorporated communities and fringe areas of towns where some of these families own or rent their own housing, conditions are often as bad as in the worst camps.

Young children brought to local clinics show the results in severe burns, diarrhea, impetigo, and respiratory infections. There is no effective way to quarantine the results of poor housing within the particular area where the housing exists. When families move, the consequences of a bad situation may go with them, and filth-borne diseases may be spread to others even though all presently live in a good camp.

As they travel for long distances, the families need overnight shelter and places to use as rest stops. In many parts of the country, this need is completely overlooked. No stops may be made for journeys of several hundreds of miles because the driver is told to move on wherever he attempts to park his bus or truck. As a result, the families must use the side of the road between towns for infrequent rest stops.

Field sanitation

Large-scale agriculture of the type that employs migrant farmworkers is a notable exception to the rule requiring the maintenance of sanitation standards at work locations. In other businesses and industry, we do not tolerate a complete lack of toilets, drinking water, or hand-washing facilities where people are employed all day. This is still the widely accepted practice in commercial agriculture.

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[1] Dr. Shafer is chief, Division of Community Health Practice, Public Health Service. Dr. Harting is assistant chief and Miss Johnston is public health adviser of the Division's Public Health Administration Branch. The paper is based on a speech by Dr. Shafer at the Conference on Families Who Move With the Crops, San Jose, Calif., Oct. 23–24, 1960.

Testimony offered early in 1960 at the Cobey committee hearings in California indicates that although slight risk to the health of consumers results from the lack of field facilities, a sound field sanitation program would have definite psychological benefits to consumers and sociological benefits to the workers. It seems likely to be only a matter of time until consumers will insist upon good sanitation practices being followed in fields and orchards. Their esthetic sense, if nothing more, will be offended beyond the point of tolerance as they become increasingly aware of the conditions under which some of their food is picked.

The workers themselves also object to the lack of field sanitation facilities. One picker told a representative of the California Council of Churches: "There were no restrooms in the fields where we worked last season. We went down the row far away where there was nobody working and nobody could see. The women do not like to work in the fields because of this."

Both the housing and the field sanitation situations introduce conflict into migrant health programs. On the one hand, we health workers may try diligently to care for patients with diarrhea when they come to our attention, but we are treating only a symptom if we neglect the poor sanitary conditions which are the underlying cause. From time to time we also try to teach the workers how to maintain their own health. But what good is it to teach a worker about safe water if his only supply is obviously unsafe? And of how much value is education about good personal health practices if the only toilet is between rows of field crops or a filthy privy?

Occupational health

Control of occupational hazards is notably lacking in commercial agriculture. In still another respect, this type of enterprise has a strange immunity. Children under 15, working or not, are seldom seen in a large factory. Yet children under 15, some of them workers, suffer each year from disabling accidents in industrial agriculture. Sometimes the mangled hands or arms suffered by young children who get caught in harvesting machinery have alerted a community to the larger migrant health problem.

Occupational risks arise not only from machines, ladders, and other farm equipment but also from agricultural poisons. Sometimes crops are sprayed while workers are in the fields, or without regard for the proximity of workers' housing. Pickers sent into the fields too soon after spraying may also suffer from poisoning. Cases of parathion poisoning affecting 70 cropworkers were reported in the Journal of the American Medical Association. Last summer a 2½-year-old boy died in a labor camp in Illinois, apparently because he drank from a jar that still contained a little of the milky liquid used to spray cabbages.

Transportation to and from the labor camp or nearby town to the worksite, as well as long-distance transportation, is still another hazard of agricultural work. Such transportation may be by rattletrap bus or other makeshift vehicle.

On the east coast, discarded schoolbuses, some of them decked in bright new coats of paint, are replacing many of the trucks that were used to haul workers to and from the fields as well as from State to State. Some crew leaders are making an honest effort to meet the recent regulations of the Interstate Commerce Commission. In many places, however, there is no regulation to govern short hauls of farmworkers.

Health services

In a study of a group of Spanish-speaking migrants, sponsored by Texas, Michigan, and the Public Health Service, few, if any, had previously had contact with a public health agency.

Our experience in Texas and Michigan showed that there can be no assurance that a service started in one location will be completed in another, even when a migrant follows instructions. One family, for example, had their first immunization shots without charge in a local health department clinic in Texas. The mother went to the local health department in the north, as she had been instructed, but was referred to a private physician since the health department did not give inoculations. The physician charged a fee for each of the children for the second shots. The mother did not return for the third. This is hardly surprising in view of the typically uncertain income of such families and their lack of conviction of the value of such preventive services as vaccination.

Followup may be difficult even when a community makes an effort. The results of chest X-rays, for example, often become available after migrant families have moved to a new location. Local health workers in the new area

may find that the information forwarded to them about the time the family will arrive or the place where they will work is incomplete or inaccurate. Even if the sick person is found, it may be hard to persuade him to go to a hospital. He may have a strong compulsion to work while work is available so that his family will have something to live on for the rest of the year. Moreover, his fear of disease may be far less than his fear for an "Anglo" hospital where rules bar him from seeing his family and friends.

Fear and lack of understanding or acceptance of our health ways are factors that must be considered in trying to adapt the usual community health services to the special circumstances of seasonal farmworkers and their families. These reasons, rather than neglect, may explain why few of these families have had immunizations and why cases of illness they bring to a physician or clinic may be far advanced. In the Texas-Michigan project the use of folk remedies for treatment of a young infant delayed the family's taking her to a hospital for about a week. The baby died on the same day she was finally taken to a hospital.

Some conventional health methods make little sense when looked at from the migrant family's point of view. Special clinics, for example, held at different times and places for different purposes are time consuming, costly if a family must arrange and pay for transportation, and result in loss of income if time must be taken from work, since a migrant paid on a piece rate or hourly basis earns only while he works.

Our earlier example of the mother whose children needed to complete their immunization series is another case in point. The conditions under which the first shots were obtained were quite different from those in another location. Generally we expect the migrant to make all the adjustments as he seeks needed health care in one work area after another.

Current migrant health activities

The West Side clinics in Fresno County, Calif., have circumvented some of these problems by the excellent cooperative relationships maintained over the years among the medical society, county hospital, health department, local growers, welfare department, and other groups. The clinics have been possible because of the grant from the Rosenberg Foundation that helped get them started and the continuing interest and wholehearted support of many local citizens.

At first, it wasn't easy to encourage the families in Fresno County to take advantage of clinic services. There were more staff than patients at a few of the early clinic sessions, and the first patient at an early maternity clinic was a man. The clinic staffs gradually learned, through experience, that papa and his needs had to be considered, as well as mama and the children, if Spanish-speaking migrant families were to use the health services offered. Furthermore, clinics had to be scheduled in the evening so that people wouldn't lose time from work.

Now the Fresno County clinics are proud that mothers come for prenatal care before the sixth month of pregnancy. Before the clinics started, some mothers would have gone without medical care even at the time of delivery. The clinics have also turned out to be a good device for tuberculosis and venereal disease casefinding, in part because the relationship between the families and the physicians and nurses encourages visits to the clinic for care when symptoms first appear rather than after an emergency develops. The frequent, friendly contact of the county health department's nurses with families in the labor camps is still another important factor in the Fresno County operation and may be one of the keys to the success of the West Side clinics.

There are few demonstrations such as that in Fresno County elsewhere in the Nation. Health services for migrant families are usually sporadic, unplanned, and unorganized within as well as between communities.

If the million-plus migrants, including domestic workers and their families and foreign workers, were all settled in one place, they would be surrounded by an organized network of services to protect and maintain health. Instead, the people are scattered and groups of varying size and composition travel to widely separated counties of the same State or different States to work each year. Each new community that becomes their temporary home has its own unique network of services, adapted to the needs and convenience of its own permanent residents. Usually built into this network are restrictions that limit the services available to outsiders.

Local and State action

To improve the health of migrants, many different types of action might be taken. The improvement of housing seems a good place for most communities and States to start, since this would automatically relieve some other problems. A start on several fronts could logically be made.

1. Educate the community, including growers and migrant families, as to the basic requirements for providing and maintaining safe, healthful housing. This would be a first step toward developing understanding and relationships that would support good housing and crowd out bad. At present the grower who provides good housing receives no sure reward, and the one who neglects his workers' housing suffers no sure penalty. Even where housing codes set standards, inspections may be infrequent and cursory.
2. Determine the elements of motivation, planning, and management that make it financially possible, and perhaps profitable, for some employers to provide good housing in the same area where others provide rudimentary shelter.
3. Develop simple construction plans and mass-production techniques, if they do not exist, to reduce the cost of acceptable housing.
4. Develop methods of financing housing adapted to (*a*) the migrant himself if a permanent farm-labor-supply pool is needed in a particular area; (*b*) growers and their associations; or (*c*) the community, if a public authority of some type would be the appropriate agency to provide, maintain, and manage housing.

Another greatly needed step is for large-scale agriculture to accept more of the responsibilities long ago assumed by large-scale industry. California has taken a step in this direction by its extension of workmen's compensation coverage to agricultural employment. In field sanitation, control of work hazards, and other matters pertinent to the health and well-being of workers and families, growers generally have a long way to go.

Agriculture differs from other industry in some important respects. Nevertheless, this difference does not justify a do-nothing policy.

In the provision of health services, a California physician warns that a "major roadblock to solving the health problems of seasonal farmworkers is the ease with which we can, if we let ourselves, pass the problem on to someone else, and not tackle it as it must be tackled—as a community health problem." Certainly, the community where a person lives at a particular time is the place where he can best receive the health care he needs. Moreover, the community where a migrant makes an economic contribution owes him some assurance of service on a par with that received by other local citizens while he works in the area.

National responsibility

Although emphasizing local and State responsibility is appropriate, the periodic shifting of workers and families from one community to another implies the added need for national leadership and assumption of responsibility. The separate action of single communities and States is likely to result in the duplication of some services to migrant families and gaps in others. Interstate planning and exchange, across the continent if necessary, can be facilitated by active national leadership and participation.

Recent Public Health Service efforts devoted solely to migrant workers have consisted of limited consultation and technical assistance, chiefly what three people in the Division of Community Health Practice could do on a part-time basis. Other programs have included migrant health within their scope, but this has not been their major focus. Some of us feel that our past effort has been grossly inadequate in view of the fact that the migrant health situation represents an indefensible gap in the application of knowledge we have long ago applied to the general population.

We in the Public Health Service also feel quite strongly that waiting for the problem to disappear is no way to deal with it. The Service report of 20 years ago and the California report of 1960 bear out this contention. The problem recurs with the same regularity as the crop seasons. Mechanization and other changes in farming and employment practices have radically changed some local situations. They have not affected the national situation materially in recent years. The fluctuations in local and State situations seem to us, however, to add to the necessity for national leadership in order to keep what is done adjusted to current needs.

Some have felt that the number of persons in the farm migrant population as compared, for example, with those affected by chronic diseases and automobile accidents make their health needs negligible for consideration at the national level. We do not share this view. Instead we look at the situation as evidence of about a half-century lag in the application of existing knowledge to a sizable population, one as large as the 1960 census shows for any one of more than a dozen States.

Moreover, the size of the migrant population is not an accurate measure of the extent of the problem. Each time a person moves with his family he must have adequate shelter, safe drinking water, and safe methods of disposal of human and other waste at his new location. Each new community must also be ready to provide him with health services according to his need while he is in the local area. For these reasons, we feel that a more accurate measure of the national problem can be obtained by multiplying the population by at least the number of times the people move each season. Using two as a multiplication factor would be conservative.

In 1960 the president of the American Public Health Association submitted a proposal to the Senate Subcommittee on Migratory Labor. The Public Health Service has endorsed the principles outlined in the association statement. We agree that there is urgent need for health aid for migrants, including preventive health measures, arrangements for medical care, training for health leadership within the migrant group, and further study to determine cultural blocks and other difficulties that restrict provision and acceptance of health care.

The health needs of seasonal farmworker families are as broad as those of other families. Accordingly, the health aid available to them should encompass the range of preventive and curative services offered by communities to their permanent residents. The experience of many years has demonstrated, however, that without adaptation the usual community services often fail to reach seasonal farmworker families. To be effective in meeting their health needs, services must be geographically accessible, geared to the families' living and working situation, culturally acceptable, and planned in a way that relates the services of one area to those for the same families elsewhere.

Family health services alone, of course, are not the answer. With these must go services to safeguard living and working conditions in order to prevent needless illness and disability. With the further addition of a strong health education focus to both types of activities, the worker and his family will be helped most effectively. They will then be on the road to assuming responsibility for their own health needs in an effective way.

Return to Laredo

(By Grant H. Burton)

[Published in Texas Health Bulletin, Texas State Department of Health, Austin, Tex., October 1958]

There is an excellent chance that the eyes and ears of the world will be focused on Laredo next summer when the World Health Organization convenes in Geneva, Switzerland. The reason: A 4-year-old project of community sanitation without parallel in the United States, possibly the world, masterminded from a single small room in Laredo's city hall.

Plans are now being made to "write up" the project for presentation at the 1959 WHO conference, the theme of which will be "Health Education of the Public."

Back in July of 1955, a year after the unique project began, I went to the border city to see what was going on.[1] I found that a long-legged specialist in community sanitation named Reuel Waldrop had ridden into town on the crest of a Rio Grande flood and stayed to give the city a thorough house cleaning.

Waldrop's assignment to Laredo had been wrangled by V. M. Ehlers, veteran director of sanitary engineering at the State department of health, and Frank J. Von Zuben, Jr., the burly, moustachioed senior engineer who heads the department's general sanitation services section. The two men were worried about

[1] See "It's Happening in Laredo," August 1955 Texas Health Bulletin.

the fact that Laredo consistently reported almost half the State's incidence of diarrheal diseases. In 1954, for example, of the 7,212 cases of shigellosis reported in the entire State, 3,394 were in Laredo. In addition, high rates of tuberculosis, venereal diseases, typhoid and typhus were commonplace. A demonstration project, they felt, would show once and for all that the border and disease do not necessarily go hand in hand.

In the public health business nothing ever happens overnight. Changes come slowly. It took 2 years for Ehlers and Von Zuben to work up the support they felt they needed. Finally, in June of 1954, after Ehlers shed his usual cloak of diplomacy and published a stinging indictment of border health conditions, Waldrop was assigned to ramrod the demonstration project.[2] From the very beginning one of the program's most enthusiastic boosters was Mayor Joe Martin.

Laredo is an old town, founded more than 200 years ago. Hot in summer, mild in winter, some 80 percent of the city's 62,000 population is of Mexican descent and fiercely proud of it. Of the city's 15,000 residential units, the choicest are located on the east side of town. Zacate Creek, a dry arroyo except during the three or four gully-washing downpours which account for the town's 19.7 inches of annual rainfall, cuts the city in two.

As the principal point of rail and highway commerce between the United States and Mexico, Laredo is a leading center of tourist and import business. Many local laborers are employed in extensive truck gardening operations close to home; others prefer to join migratory labor forces which each year take to the road to follow harvests in distant fields.

The day Waldrop arrived in town, 20-inch rains sent the normally quiet Rio Grande on a mad rampage. It was a disaster of the first magnitude, with border towns virtually paralyzed for weeks. An ocean of muck and silt settled over homes and fields.

To check the threat of epidemic disease and to ease the misery of homeless people, State and Federal health and disaster relief teams converged on the stricken region. The floods gave Waldrop the chance he had been looking for. He knew the temper of such communities, that people don't always take kindly to surveys of their personal lives and property, no matter how well-intentioned. But since all privies in town now had to be disinfected, it was a simple matter for Waldrop to record owners' names and addresses and later incorporate the information into the master survey he had in mind.

It took 2 months of backbreaking work to clean up the havoc wreaked by the flood. Emergency workers, all except Waldrop, packed up and left. Waldrop stayed quietly at his task. Mayor Joe Martin had promised to back the demonstration project and he was as good as his word. Mario Sanchez, a sanitarian on the staff of the enthusiastic local health department, was assigned as Waldrop's assistant. Other staff members made themselves readily available for advice and encouragement.

That initial survey of sanitary conditions in Laredo took 4 months to complete. When it was finished, Waldrop had a bird's eye view of what he was up against:

More than 35 percent of homes within city limits had privies, although sewer lines were available to three-fourths of them. Three of every four homes were using unapproved types of garbage cans. Garbage trucks were old and unserviceable and collection systems were haphazard and costly. There were enormous fly populations and rat harborages. Sewer lines were infested with cockroaches. Hogs, sheep, cows, and poultry could be kept at will within the city limits.

All this I learned on that hot July day 3 years ago when I first visited the "Gateway to Mexico." Last week, in company with Engineer Von Zuben, I went back to see what progress had been made, to verify reports that the results were worth world attention.

Waldrop is gone now, having been transferred to a post in Oklahoma. He took with him the admiration of all Laredo. Joe L. Gonzalez, public health engineer for the local health department, is now in charge of that mapfestooned office in city hall. Mario Sanchez, Waldrop's early-day assistant, is chief vector control sanitarian, ably abetted by Joe T. Sanchez, Frank G. Hernandez, and Secretary Maria Rivera.

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[2] See "We Need a Border Buffer Zone," May 1954 Texas Health Bulletin.

Again it was hot—103 as we sat talking in Gonzalez' tiny office. Mayor Joe Martin and City Attorney Bill Allen were there. So were Honore Ligarde, vice president of the Union National Bank, and Joe Guerra, a hardware merchant.

Gonzalez is a 34-year-old graduate of Notre Dame University's School of Engineering. He took over the post of public health engineer when Fernando Zuniga, the engineer who helped Waldrop get the project underway, resigned to enter private industry. Gonzalez sketched in the present-day workings of the project: "It's broken into four concurrent phases," he said. "Investigation, legislation, education, and enforcement. The initial investigative phase is over. So is most of the legislation. We passed a garbage ordinance in May of 1956, an antiprivy ordinance in August and an animal ordinance in November. In December we adopted a milk ordinance in line with the State code. We still have pending an area sanitation ordinance involving premise sanitation, and a dog vaccination and stray dog control ordinance."

Gonzalez anticipates the education and enforcement phase will last indefinitely. His active partners in both are the city attorney and Judge W. R. Blackshear of corporation court.

The city now has 13 packer-type garbage trucks, plus three flatbeds for brush pickup. Brush pickup will be made on request, Gonzalez said, but most of the time the three trucks are roaming town looking for business.

Premise inspections carried on by Mario Sanchez and his crew have been worked out to an exact science. Working block by block, a sanitarian makes a personal inspection of each yard. He looks for unapproved garbage cans, scattered garbage and trash, rat harborages, stacked lumber, fly breeding, poultry or livestock, etc. If any are found, the owner is given 15 days to make a correction before reinspection.

Six local hardware stores sell approved garbage cans (20–30 gallon capacity, covered, galvanized steel) at cost, and permit payment at the rate of 25 cents per month. As of right now, 90 percent of all homes in town are using them.

It's the privy elimination work that has been most impressive. When the project began, there were 5,048 in use in the city. Today there are only 2,597 and these are being eliminated at the rate of 10–20 daily. Gonzalez explains how:

"We work in a single section of town at a time. We talk to the people, find out what their financial abilities are, explain the hazards of insanitation and the advantages of good health. We let them think about it for a few days, then send out notices giving them 30 days to connect to the sewer system. We give them a list of plumbers we know will do good, honest work. Plumbers get the names of people to whom connection notices have been sent, and they follow up with personal calls."

One of the most reputable firms working in this field is the Guerra Hardware and Supply Co. I talked with Joe Guerra, and he explained his routine: He quotes prices to homeowners for one-, two- or three-piece bathrooms. He'll sell the fixtures if a homeowner wants to do the work himself, subject to city inspection, or he'll arrange for a plumber to do the work. If there's a question of money involved—and there always is—Guerra will help the homeowner make a bank loan. But more about this later.

The day I talked to Guerra he sold a three-piece bathroom unit to Sabas Rodriques, a former pony express rider. Now 82 years old, the grizzled old veteran used to ride between Laredo and Zapata. He retired from postal work 10 years ago.

If a homeowner fails to make the connection within the prescribed length of time, he is summoned into court. That's where Bill Allen comes in. Allen is the 35-year-old former State representative from Webb County who has been Laredo's city attorney for the past 3 years. He handles the enforcement phase of the program.

"We've handled 110 'complaints' so far," the boyish Allen says. "But we haven't yet levied a single fine. We want compliance, not fines. We even print the summons on different colored paper than a regular summons and have it delivered by a police officer in civilian clothes. All cases involving the antiprivy ordinance are called on the same day at the same time so as to completely divorce the proceedings from run-of-mill prosecutions."

Does it work, doing things this way? Certainly, says Allen.

"The case isn't even filed until the offender has had at least five chances to make a connection to the sewer line. When it is filed, we announce the filing just to prove we mean business, but disposition of the case is never publicized.

As far as I'm concerned, enforcement—I don't even like the word—is an added attempt at education."

Allen stressed the point that corporation court is the place where a man gets his first impression of justice. To avoid the "doctrine of desculparse"—buck passing or I-didn't-know-anything-about-it alibis—Allen said the first thing that the judge does on days when these cases are called is to talk intimately with offenders about the health hazards of privies.

The attorney credited the local health department with making his job easy. "They did such intensive preliminary work over there in developing detailed investigation of cases and screening them from a financial standpoint that not one offender has appeared in court with an attorney. To me that spells one thing: Offenders knew why they were being summoned into court. I like to think of this as the benevolent approach to enforcement."

Prosecution is accomplished one area at a time. "This way," Allen pointed out, "a man in the 600 block hears about a man in the 300 block getting a court summons and he gets on the ball."

Allen is convinced that education has been the single most important factor to the success of the entire program. "When the health department sends out the 30-day connection notices, that's education. When the judge delivers his lecture on sanitation, that's education. When the nurses and sanitarians go into a different neighborhood every Tuesday night to show films and talk to the people, that's education."

Between June 24 and August 5 when I visited Laredo, 1,756 people had attended these neighborhood meetings. Approximately 14,000 have attended since Waldrop started the weekly practice in 1954. The meeting place might be a corner grocery store, a schoolyard or a vacant lot. Held outside, people for blocks around are attracted to them by the lights and the noise and the promises made via sound trucks that there will be free movies and prizes.

I asked Honore Ligarde, a prominent local banker, how these people—most of them of such obviously limited means—could afford the cost of adding a bathroom to their homes and how could his bank afford the risk?

"El pobre es el mejor pagador," Ligarde said. "That's a common expression down here. It means 'the poor is the best pay.'"

He knew there was an element of risk in undertaking the financing, but backed up by a civic-minded president and board of directors, the risk has paid off. "In the first 2 years we didn't have more than one-tenth of 1 percent delinquency," Ligarde reported. "Today those loans are the best paper we've got."

Ligarde's bank, the Union National, is the only one in town that would tackle the financial end of the project. Now it has the home improvement loan market cornered, so to speak, and other lending institutions are kicking themselves for missing the opportunity.

About 1,000 loans have been made under the program so far, totaling some $500,000. Most are in the $600 range, title I FHA, with a 36-months-to-pay feature.

Mateo Lopez, an electrician's helper who lives at 1913 Water Street, is a typical borrower. Ligarde loaned him $475 to install a modern bathroom for his family of six. He's paying off the loan at the rate of $15 per month, including interest. Mario Sanchez grinned broadly as he translated La Senora Lopez's response to a question as to how she liked it:

"Good! No running out at night!"

In the beginning Waldrop posted ten objectives on his office wall:

(1) Make a municipal vector control sanitary survey.

(2) Review and revise all municipal legislation pertaining to vector control sanitation.

(3) Cause municipal refuse to be stored in a sanitary manner on residential and business premises.

(4) Improve and maintain municipal refuse collection program to meet acceptable sanitation standards.

(5) Sanitary disposal of all municipal wastes.

(6) Enforce edict against installing new privies within city limits.

(7) Plan and activate a practical, systematic, and progressive elimination program.

(8) Cause all organic industrial wastes to be handled and disposed of in a sanitary manner.

(9) Restrict animals most difficult to keep in a sanitary manner and develop sanitary regulations for other animals and poultry.

(10) Develop and activate an effective program for the application of insecticides and rodenticides as a supplemental aid to sanitation.

All ten objectives have now been realized. Result: A whopping 52 percent reduction in diarrheal diseases so far and the promise of a steadily declining rate; marked reduction in venereal disease, tuberculosis and typhus; greatly reduced fly populations and the virtual annihilation of rats. A Federal wildlife biologist went to Laredo last April to test a new rat poison. He and three health department sanitarians searched for days for a rat with absolutely no luck.

What's the city's official attitude toward the project? Mayor Martin puts it like this:

"It's the most important thing my administration has done. The voters approved a bond issue to purchase trucks and equipment. Beyond that, the people who benefit are paying the bill. There is absolutely no paternalism in it."

I tried but failed to find someone who wasn't benefiting. The bank is making money. It's boom business for plumbers and hardware merchants. And you can literally feel the pride people like Mateo Lopez and his family and expony express rider Sabas Rodriques take in their new possessions.

The return trip to the "Gateway to Mexico" was well worth it. This thing is worth talking about.

[Reprinted from American Journal of Public Health, vol. 45, No. 3, March 1955]

Influence of Water Availability on "Shigella" Prevalence in Children of Farm Labor Families

(By Arthur C. Hollister, Jr., M.D., F.A.P.H.A.; M. Dorothy Beck; Alan M. Gittelsohn, M.P.H.; and Emmarie C. Hemphill, M.P.H.) [1]

The marked effect that a sanitary facility may have upon the transmission of diarrheal diseases is strikingly pointed up.

The agriculture of California's San Joaquin Valley is dependent on a large and flexible supply of migrant temporary labor. In the 1952–53 season at the peak, October 1952, an estimated 175,000 temporary workers were engaged in agricultural activities in the valley. The number fell to 25,000 in March of 1953. There are shifting, short-time labor needs within the valley, and there is constant change in the composition of the labor force.

Cotton picking is the largest and latest seasonal crop activity in the State and, therefore, is frequently the last job of the year for many workers. Because the valley is climatically and traditionally a favored area for spending the winter and because there is considerable housing available, the migratory workers tend to remain here during their period of unemployment with consequent problems of health, welfare, and education.

The migratory farm labor camps of California's Central Valley are housing areas owned by growers or community organizations and located on large farms producing seasonal crops. The camps are maintained to house temporary labor during the crop season and rent is usually free. The types of housing and plumbing facilities provided vary from camp to camp. Some camps are composed of permanent dwellings with complete inside plumbing; other camps are made up of temporary one-room structures or tents, or both, with communal faucets, showers, laundry facilities, and pit privies. The quality of the water supplies was tested and found to meet minimum standards in all camps.

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This paper was presented before a joint session of the engineering, epidemiology, food and nutrition, and laboratory sections of the American Public Health Association at the 82d annual meeting in Buffalo, N.Y., Oct. 13, 1954.

This study was supported in part by the Office of the Surgeon General, Department of the Army, through the Commission on Enteric Infections of the Armed Forces Epidemiological Board.

During 1950 in Fresno County, the etiology of the diarrheal diseases occurring among several population groups with a high incidence and mortality was studied. The major finding of this survey was that shigellosis constituted an important problem in agricultural labor camp populations and the most important mode of transmission was person-to-person contact. Our concern has been with this particular host-parasite-environmental complex. The 1950 study further suggested that a single environmental factor—water availability—played an important role in determining the prevalence of *Shigella* infections. Therefore, the main purpose of the 1952–53 study, here reported, was directed toward more clearly defining the relationship between *Shigella* prevalence and the availability of water for personal hygiene (laundry, bathing, and especially hand washing). If the relationship proved to be a strong one, increased water availability could be utilized as an efficient control mechanism over the occurrence of *Shigella* infections in the labor camp populations.

SURVEY METHODS

The survey methods used in 1952–53 were essentially the same as in 1950. At the initial visit sanitary facilities were recorded, and at every visit and in each camp a complete census was taken. Rectal swabs for the isolation of *Shigella* and *Salmonella* organisms were obtained from all available children, 10 years of age and under, usually one-half to two-thirds of all the children in these camps. The swabs were plated on SS agar immediately and then placed in tetrathionate enrichment broth at the camps. These cultures were returned to the field laboratory for screening tests. Cultures resembling *Shigella* or *Salmonella* were sent to the Fresno County Health Department Laboratory for further biochemical tests. The final definitive serological typing[2] was done by the Division of Laboratories, California State Department of Public Health.

There are more than 350 labor camps maintained in the irrigated areas of Fresno County's west side. From these camps 70 were selected for study, primarily on the basis of size. One hundred and fifty-seven visits were made to the camps. The interval between visits in a given camp was at least 1 month.

Collection of data began in October 1952, and continued for 7 months through April 1953. During this period, 6,111 cultures were processed and 4.8 percent (296) found positive for *Shigella* organisms. Both individuals and families were utilized as the basis for analysis. For this purpose a family was considered as all persons living in one household, and a "positive" family, one in which at least one child was found to be positive for *Shigella* during any month's period. Multiple cultures on any individual at an interval of less than 1 month were counted as only one culture.

ANALYSIS

In table 1 persons and families cultured are classified by the location of water faucets in the camp of residence. The percentage of positive cultures encountered varied widely, low in camps in which all cabins were equipped with private or inside water faucets, high in camps in which no cabins had inside faucets. Camps, where only a portion of the cabins had inside supplies, fell between the two extremes. In such mixed facility camps, the "inside plumbing" portion experienced lower positivity rates than the "outside plumbing" portion. However, the significance of these associations must be interpreted with consideration given to environmental and other factors related to the epidemiology of *Shigella* infections.

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[2] *Shigella alkalescens* was identified when found, but has been excluded from all tabulations of *Shigella* prevalence.

TABLE 1.—*Total persons and families cultured and percent positive for* Shigella *by location of water faucets in camps, Fresno County, 1952–53*

Location of water faucets in camp	Persons cultured			Families cultured		
	Total	Positive		Total	Positive	
		Number	Percent		Number	Percent
Total	6,111	296	4.8	2,707	244	9.0
Inside all cabins	428	3	0.7	208	2	1.0
Mixed:						
Inside	1,245	34	2.7	569	29	5.0
Outside	3,821	214	5.5	1,702	173	10.2
Outside all cabins	617	45	7.2	228	40	17.5

Data for these factors on cabins, classified on the basis of the availability of water, are next analyzed. The statisical grouping of all cabins within a given camp with one type of plumbing has been designated as a "subcamp." The term does not imply physical contiguity for, generally, in the mixed facility camps cabins with inside plumbing were not located together but were scattered.

Three types of "subcamps" were defined as follows: Type 1—cabins equipped with private water faucets, and private showers (tubs) or private toilets, or both; Type 2—cabins equipped with inside water faucets only, other facilities being outside and available for communal use; and Type 3—cabins equipped with no plumbing, all facilities being communal.

Table 2 also illustrates how Shigella prevalence rates increased markedly as plumbing facilities became more primitive in the subcamps. Rates of 1.6, 3.0, and 5.8 percent were observed in types 1, 2, and 3 subcamps, respectively.

The magnitude of the child population was the first factor considered. It is to be noted in table 2 again, that the type 3 subcamp provided the greatest proportion of total cultures. This is a reflection of their larger child populations. However, analysis showed that there was an equal chance of finding infected individuals in small and large subcamps of one type. Hence, the higher rates observed in the type 3 group could not be explained on this basis.

TABLE 2.—*Number of surveys, cultures, and families by type of subcamp, Fresno County, 1952–53*

	Total	Type of subcamp by plumbing inside of cabin		
		Faucet and shower and/or toilet	Faucet only	None
Number of subcamps	123	40	35	48
Number of subcamp surveys	279	77	78	124
Number of surveys per subcamp	2.3	1.9	2.2	2.6
Number of cultures obtained	6,111	985	688	4,438
Average number of cultures per survey	21.9	12.8	8.8	35.8
Number of positive cultures	296	16	21	259
Percent positive	4.8	1.6	3.0	5.8
Number of families	2,707	472	305	1,930
Number of positive families	244	12	19	213
Percent positive	9.0	2.5	6.2	11.0

Source: State of California, Department of Public Health, special study records.

TABLE 3.—*Total and positive* Shigella *cultures by type of subcamp and season, Fresno County, 1952–53*

Season	Type of subcamp								
	1			2			3		
	Total culture	Positive		Total culture	Positive		Total culture	Positive	
		Number	Percent		Number	Percent		Number	Percent
Total	985	16	1.6	688	21	3.0	4,438	259	5.8
October-November	205	10	4.9	162	7	4.3	1,426	95	6.7
December-January	332	4	1.2	242	10	4.1	1,395	88	6.3
February-March	251	1	.4	161	1	.6	1,011	37	3.7
April	197	1	.5	123	3	2.4	606	39	6.4

TABLE 3a.—*Total and positive families by type of subcamp and season, Fresno County, 1952–53*

Season	Type of subcamp								
	1			2			3		
	Total families	Positive		Total families	Positive		Total families	Positive	
		Number	Percent		Number	Percent		Number	Percent
Total	472	12	2.5	305	19	6.2	1,930	213	11.0
October-November	103	7	6.8	78	6	7.7	625	81	13.0
December-January	161	3	1.9	99	9	9.1	614	71	11.6
February-March	120	1	0.8	71	1	1.4	416	29	7.0
April	88	1	1.1	57	3	5.3	275	32	11.6

Source: State of California, Department of Public Health, Special Study Records.

Seasonal patterns were generally the same for each subcamp type (table 3). The peak occurred in October–November with a drop to a low point in February–March, and an apparent increase in April. The numbers of cultures collected in the three types were fairly proportionate during each season. Hence, differences in prevalence rates could not be accounted for by disproportionate seasonal sampling. Similarly, other factors such as persons per household, persons per toilet, and persons per shower were examined and found not to be significantly associated with Shigella prevalence in this situation.

On the basis of these data from the original 70 camps, the 26 having only a type 2 and a type 3 subcamp were selected for further study. A total of 58 surveys had been made in the 26 selected camps, each survey providing a paired observation on both subcamp types. Thus 58 type 2 subcamp surveys and 58 type 3 subcamp surveys were made available.

The shower and toilet facilities for each pair of subcamps were communal and used by all occupants of the camp. Housing, flies, garbage, and other environmental factors were comparable for both types 2 and 3 within a given camp. Each season is equally represented for both types. In this sense, the seasonal effect can be considered as controlled. Similarly, persons per shower and persons per toilet and other communal environmental factors are matched. This represents proportionate sampling between the two subcamp types according to the extraneous sources of variation.

TABLE 4.—*Average values of 6 variables by matched subcamps, Fresno County, 1952–53*

Variable	Average value	
	Type 2 (inside)	Type 3 (outside)
Percent total camp population with faucets inside cabins	14.3	14.3
Average number persons per household	6.1	6.0
Persons per faucet	6.1	9.2
Persons per shower	21.8	21.8
Persons per toilet	10.9	10.9
Child population under 11 years	6.9	61.2

In table 4 are listed the average values of six variables for each subcamp type. "Percentage of faucets inside" is based on the total camp populations and, hence, must be the same for both. The average number of persons per household is approximately the same for the two types. In the "inside" group (subcamp type 2) faucet ratio is determined by persons per household, since each household has a private (inside) faucet. Showers and toilets being communal, the ratios are the same for both "inside" and "outside" groups. The average number of children under 11 years per subcamp is seen to be widely different for the two groups. However, as noted above, there is little indication that positivity rates were affected by the child population size. Typically there were no physical separations between the subcamp types in the 26 selected camps. Cabins with inside faucets were generally scattered in the camp. There is little, if any, segregation between children of families living with either type of plumbing facility.

Table 5 shows the results of the 58 surveys in the 26 camps. Of the cultures taken in households with inside water faucets, 1.2 percent were positive for *Shigella*, whereas five times as many (5.9 percent) of the cultures taken in households with outside water faucets were positive for *Shigella*. Where an "average prevalence rate" (obtained by averaging 58 rates for each subcamp type) is calculated, the comparison is even more significant, and the probability of as large a difference occurring by chance is less than once in 1,000 (fig. 2, matched subcamps).

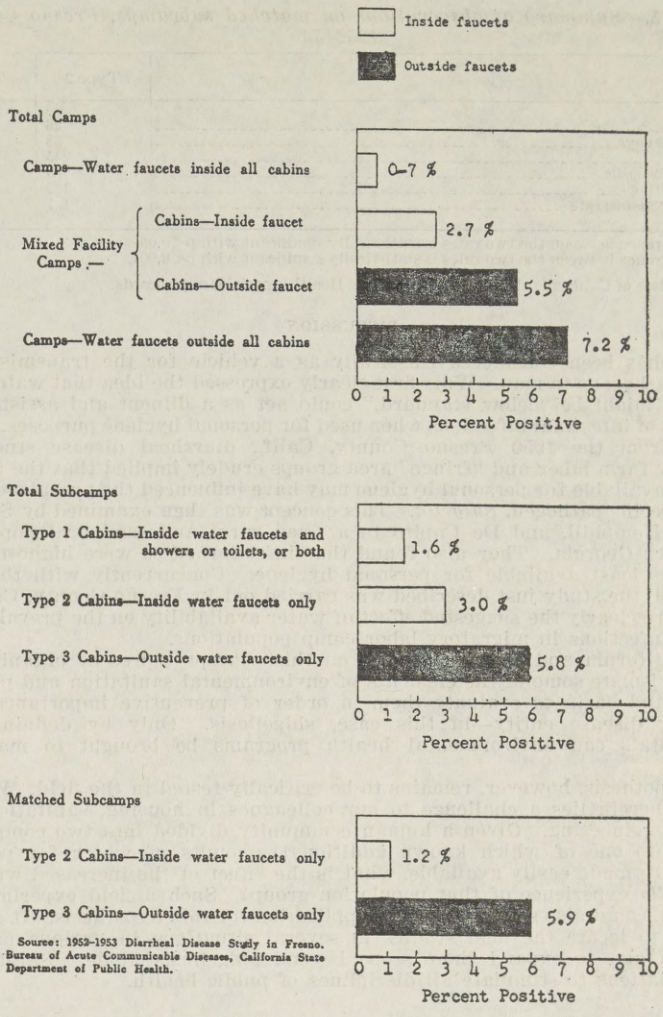

FIGURE 2.—*Shigella* positivity rates by water availability.

TABLE 5.—*Summary of observations on matched subcamps, Fresno County 1952–53*

	Type 2	Type 3
Subcamps	26	26
Subcamp surveys	58	58
Cultures	245	2,147
Positive for *Shigella*	3	127
Percent positive [1]	1.2	5.9
Average prevalence rate [2]	1.1	5.3

[1] The difference between the two rates is statistically significant with $p<0.05$.
[2] The difference between the two rates is statistically significant with $p<0.001$.

Source: State of California, Department of Public Health, special study records.

DISCUSSION

Water has been considered classically as a vehicle for the transmission of certain pathogens to man. Watt first clearly expressed the idea that water, even though it might be "below standard," could act as a diluent and assist in the reduction of intestinal infections when used for personal hygiene purposes.

Data from the 1950 Fresno County, Calif., diarrheal disease studies in migratory farm labor and "fringe" area groups crudely implied that the amount of water available for personal hygiene may have influenced the prevalence rates for the specific pathogen, *Shigella*. This concept was then examined by Stewart, McCabe, Hemphill, and De Capito in a fixed rural and semirural population in southern Georgia. They also found that infection rates were highest where water was least available for personal hygiene. Concurrently with the work in Georgia, the study just described was carried out in Fresno County, Calif., to define more clearly the suggested effect of water availability on the prevalence of *Shigella* infections in migratory labor camp populations.

The California and Georgia studies on this concept represent organized attempts to isolate some of the elements of environmental sanitation and personal hygiene, and begin to evaluate them in order of preventive importance for a particular disease entity—in this case, shigellosis. Only by defining such fundamentals can environmental health programs be brought to maximum efficiency.

The hypothesis, however, remains to be critically tested in the field. We submit that herein lies a challenge to our colleagues in housing, sanitation, and sanitary engineering. Given a human community divided into two comparable groups, into one of which known additional amounts of water for personal hygiene are made easily available, what is the effect of the increased water on the *Shigella* experience of that population group? Such a field experiment, if successful, could also set the limits of application for this hypothesis. It may be desirable to locate the field studies in several situations in various parts of the world and to expand their scope beyond shigellosis alone. Surely here are speculations to stimulate all disciplines of public health.

SUMMARY

A study of shigellosis in migratory labor camps in Fresno in 1950 suggested that water as a diluent might reduce the prevalence of shigellosis. The present study has shown that *Shigella* prevalence was associated with availability of water for personal hygiene. Other measured environmental variables did not account for the differences seen. This observation has been independently confirmed by similar findings in a fixed rural ad semirural population in southern Georgia.

The finding implies that control of *Shigella* infections may be significantly improved through a single practical modification of the environment—provision of easily accessible water for personal hygiene. Proof of causative association requires critical, quantitative determination of the effect, if any, of a known increase in water availability for personal hygiene upon a suitable population's experience with *Shigella* organisms.

It is suggested that workers in the environmental sanitation field might well accept this challenge since the potential knowledge to be gained could have wide application in many places around the world.

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