of comparisons of the FPM test with the other standard tests in this laboratory, indicating the similarity of the two FPM tests in their inability to agree with other tests in identifying positive specimens.

The results at the Mazzini laboratory show a higher percentage of agreement between the FPM test and standard tests than was obtained by any of the other laboratories. The agreement of FPM results with the diagnoses established by the medical centers was also much higher in this laboratory than in the other testing laboratories. However, the control group of VDRL slide-Mazzini-cardiolipin tests is also in high agreement (99.3 percent) which is significantly different (5-percent level) from the FPM-VDRL slide (93.3 percent) and the FPM-Mazzini-cardiolipin comparison (92.6 percent), again indicating the lack of reactivity in the FPM test (table 3).

The comparison of results from the Kahn laboratory shows somewhat higher agreements between standard tests (with the exception of the Mazzini laboratory) than those obtained in the other three laboratories. However, the conclusion reached from results obtained by all reporting laboratories appears to be the same—the failure of the FPM test to identify positive specimens. The degree of agreement between the control groups can be seen in table 3. These five groups of tests have an average agreement of 96.3 percent compared to 81.0 percent between the FPM and standard tests.

Since the FPM test is less reactive than the commonly employed laboratory tests, it would be less efficient as a "detector" test for field survey use. However, as stated in the previous report (*2*), this fact should not militate against the use of the FPM test under conditions in which another type of blood collection cannot be used.

Summary

1. Filter paper strips and tubes of whole blood from 276 donors were distributed to 5 laboratories.

2. Each laboratory performed the FPM test in accordance with the testing protocol and any modification of the FPM test if they so desired. The tube of whole blood was used to perform other testing procedures employed in the laboratories.

3. Two methods of analysis are presented. Both methods show that a significant difference (5-percent level) exists between the ability of commonly employed laboratory tests and the FPM test to identify positive and doubtful serologic specimens.

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Use of the FPM Test In a Control Program

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When the filter paper microscopic (FPM) test for syphilis was reported by Hogan and Busch (*1*), it appeared to present a simple method of collecting, shipping, and testing blood. This method seemed especially desirable in screening children for congenital syphilis, since it obviated the necessity for jugular punctures. In Ohio, the test has been studied from the standpoint of ease of use under field conditions and by comparison with the standard serologic tests currently being performed by the Ohio Department of Health.

Use in Mass Testing Programs

The FPM technique is suitable for use in mass testing programs. Although more time is required to obtain a specimen of blood for the

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FPM test than for venipuncture, the preliminary preparation time for the FPM test is much less. The supplies necessary to carry out a testing program with the FPM test are minimal, and the specimens are easily handled and transported. It is not difficult to train a person to obtain a specimen for the FPM test, although experience obtained under supervision is necessary to insure suitable specimens.

During a mass blood testing and chest X-ray program in a northeastern Ohio county having a low syphilis incidence, blood specimens for the FPM test were collected from 902 persons of all ages. Three tests were positive. Results of serologic tests on blood samples obtained from these three persons by venipuncture, together with the histories and findings on physical examination, indicated that they were suffering from previously undiscovered latent syphilis.

After completion of the mass survey, two local health department nurses obtained 187 specimens for the FPM test from children in households which they visited in the ordinary course of their duties. They were enthusiastic about the procedure as a suitable method of obtaining blood specimens in the home. They pointed out that it would eliminate numerous nursing visits and the problem of arranging for attendance at clinics, in addition to overcoming parents' reluctance to permit jugular punctures on infants and small children.

Usually, little or no objection is offered to obtaining a blood specimen by finger puncture. Parents volunteer for the test and urge their children to submit to it. As many persons volunteered for the FPM test as for the chest X-ray. Of the 902 persons tested, 86 (9.5 percent) were under 10 years of age.

Figure 1. Collecting blood for the FPM test from a child in his home.

Comparison With Standard Tests

Following exploration of the suitability of the FPM test for field use, a comparison was made of results of this test and results of standard Kahn, Kline, and Kolmer tests performed as a daily routine at the Ohio Department of Health laboratory. Specimens of blood in 8-cc. amounts were obtained by venipuncture from 897 persons admitted to the Central Ohio Rapid Treatment Center. Filter paper strips were saturated by dipping them into the tubes of blood. They were then drained and allowed to dry and the FPM test was performed by the method of Hogan and Busch (*1*). The tubes of blood were forwarded to the laboratory of the Ohio Department of Health for serologic testing.

A comparison of the results of the FPM test with each of the other tests is presented in table 1. Based on the figures in table 1, the percentages of agreement between the FPM and

Table 1. FPM test results compared to results of Kahn, Kline, and Kolmer tests on specimens from 897 patients at Central Ohio Rapid Treatment Center

FPM	Kahn		Kline		Kolmer	
	Positive and doubtful	Negative	Positive and doubtful	Negative	Positive and doubtful	Negative
Positive and doubtful	686	41	726	1	714	13
Negative	51	119	106	64	87	83

Table 2. Diagnostic classification of 110 individuals whose blood specimens were negative with the FPM test but positive with 2 or more of the standard tests

Diagnosis	Previously treated	Not previously treated	Total
Primary-secondary	1	2	3
Early latent	22	11	33
Late latent	25	6	31
Asymptomatic central nervous system	15	4	19
Tabes dorsalis	6	0	6
Paresis	2	0	2
Early congenital	0	1	1
Late congenital	5	3	8
No venereal disease	0	7	7
Total	76	34	110

Kahn, Kline, and Kolmer tests were 89.7, 88.1, and 88.9, respectively; disagreement, 10.3, 11.9, and 11.1. The percentage of agreement indicates the number of instances in which both the FPM test and the standard tests gave positive or doubtful results, plus the instances in which both gave negative results. "Disagreement" means the number of times varying results were obtained by the two tests. Most of the disagreement between the FPM and Kline tests and the FPM and Kolmer tests is due to the large number of specimens that were positive by the standard tests and negative by the FPM test. While this discrepancy is also noted in the FPM-Kahn tests comparison, it accounts for a much smaller part of the disagreement.

Table 3. Results of quantitative Kahn test on 51 specimens negative to the FPM test

Kahn units	Number of specimens negative to FPM test
1	20
2	11
3	11
4	4
10	1
20	---
40	2
80	1
160	1
Total	51

Of the 897 specimens tested, 110 were negative to the FPM test and positive to two or more of the serologic tests. The diagnoses of these 110 individuals are presented in table 2. Of 34 patients with untreated syphilis in all stages, blood tests of 27 were negative to the FPM test, but positive to two or more of the other tests. Results in Kahn titers on 51 specimens negative to the FPM test but positive to the Kahn test are shown in table 3.

Figure 2. Collecting blood for FPM test in a clinic.

Discussion

The FPM test offers a simple method for the collection of blood specimens, and, under field conditions, the test has definite advantages: (*a*) greater willingness of individuals to submit to and to allow their children to submit to finger punctures; (*b*) ease of obtaining specimens by nurses and other personnel after a minimum of instruction; and (*c*) saving of clinic and nursing time, since the test can be made at home. Little time is saved in mass testing programs, but the avoidance of time lost in handling supplies and equipment for venipuncture more than compensates for the time required to obtain blood for the FPM test.

However, the obviously lower reactivity of the FPM test mitigates its usefulness as a screening test. FPM, Kline, Kahn, and Kolmer tests on a series of patients at the Central Ohio Rapid Treatment Center yielded many more negative reactions with the FPM test than with the standard serologic test (table 1). Tests on

110 serums were reported negative to the FPM test and positive to at least two of the other tests (table 2). In a screening procedure with the FPM test these seropositive persons probably would have been missed. Despite its advantages in collecting, the lower sensitivity of the FPM test makes it of questionable value in obtaining reliable evaluation tests on children. These observations on reactivity are consistent with the previously reported findings of Harris and Olansky (*2*).

Summary

1. Results of field use of the FPM test in a demonstration screening of 902 individuals in an Ohio county and in obtaining 187 specimens from children during routine public health nursing visits to homes are reported. The filter paper method of blood collection has definite advantages, as it is suited to mass as well as home use, and professional personnel can be quickly trained to get satisfactory specimens.

2. Comparative studies of the FPM and standard tests in routine use in Ohio performed on 897 patients at the Central Ohio Rapid Treatment Center are reported. The lower reactivity of the FPM test by comparison with the other tests negates the definite advantages of ease of specimen collection, and limits the use of the test to instances in which no other method of obtaining a specimen is possible. False security which might result from a negative report by the FPM test renders the advisability of the test's limited use doubtful.

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Tularemia From a Wood Rat in New Mexico

By DEAN H. ECKE, M.S., and ROBERT HOLDENRIED, Ph.D.

Tissue from a wood rat (*Neotoma albigula*) found dead at Gran Quivira National Monument, N. Mex., April 12, 1951, was shown in the laboratory to be infected with *Pasteurella tularensis* (McCoy and Chapin). This is the first time that *N. albigula* has been found naturally infected with tularemia. Tularemia in a Pacific Coast species (*Neotoma fuscipes*), however, has been previously reported (*1*).

The superintendent of the Gran Quivira National Monument had observed dead cottontails (*Sylvilagus auduboni*) in the area during the previous 8 months. At his request a survey was conducted to determine the cause of the epizootic. Field-collected material was obtained by the plague survey crew of the New Mexico Department of Public Health. The crew cooperated with the Public Health Service's Western Communicable Disease Laboratory, San Francisco, Calif., which conducted the laboratory tests. The findings of this survey are recorded in the table.

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