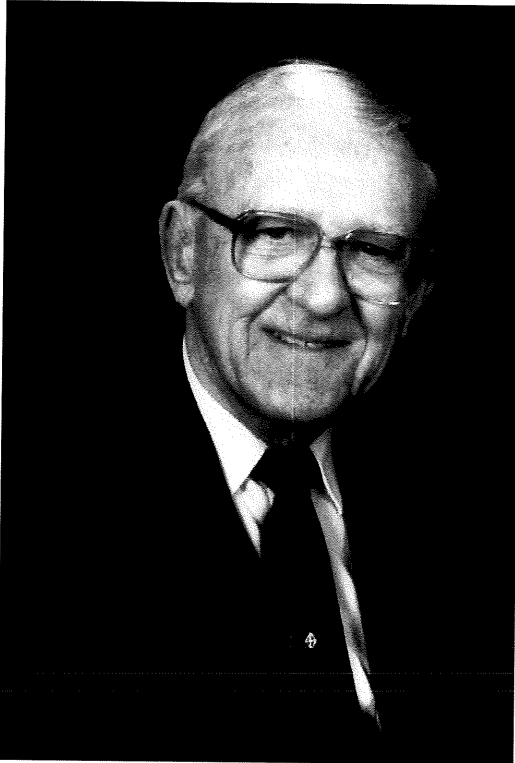


Chapter 19

Public Health Laboratory



"Work was not work. It was a stimulant to my life. I was constantly challenged, searching for answers."

Dr. Henry Bauer, 1999

Henry Bauer, Ph.D.

**Director of Minnesota Public
Health Laboratory, 1949 to 1976**

In 1949, the public health laboratory, though housed in an old dilapidated building, continued to be the backbone of the Health Department. Headed by Dr. Henry Bauer, who succeeded Dr. Paul Kabler as director, it was a "people's lab." Dr. Bauer believed strongly that the department served the citizens of the state. He stressed that the laboratories belonged to the people of Minnesota and invited them to come and visit. He said he was always glad to answer questions by mail or telephone.¹⁴⁶³

Fifty years later, the laboratory is named the Henry Bauer Laboratory, in honor of Dr. Bauer who first worked for the department in 1938 as a bacteriologist, was named director of the medical laboratory in 1949, and continued as the director for 27 years, retiring in 1976. From 1960 to 1966 he also worked as the deputy to the executive

¹⁴⁶³ MDH, *Minnesota's Health*, Vol. IV, No. 3, March 1950, p. 2.

officer, Dr. Robert Barr. It was in this role that he was influential in getting a new building for the department at 717 Delaware Street.

A native of Minneapolis, Dr. Bauer received degrees from the University of Nebraska and later a Ph.D. in bacteriology from the University of Minnesota. During World War II he served in the South Pacific as chief of the bacteriology section of the Sixth Army medical laboratory.¹⁴⁶⁴

Experiences during World War II enhanced and honed Dr. Bauer's skills in public health. In Guadalcanal he encountered skin lesions on hospitalized American troops. The surprising cause turned out to be diphtheria, which rarely affects the skin. Once the organism was identified, Dr. Bauer needed to find the source. To do this, he wanted to take throat cultures and test the sputum of local residents. Here he encountered one of the non-scientific challenges of public health. The local population did not want any part of themselves removed. They were suspicious of his motives. He had to figure out a way to work with the people, in the same way he would later figure out how to successfully work with legislators, other public health professionals, national and international figures and the people of Minnesota.

Dr. Bauer was committed to the Minnesota Department of Health, and in 1961 he declined a position with the World Health Organization in view of his duties at the department. On hearing the decision, Board President Frank Krusen, M.D., said: "This is a devoted public servant speaking, and we should be proud to have such a man on our staff."¹⁴⁶⁵

During Dr. Bauer's 27 years as head of the public health laboratories, he supported the department's long-time history of helping people throughout the state. Doctors often called him for advice. Believing in the importance of informed professionals and an informed public, Dr. Bauer taught classes at the University of Minnesota School of Public Health and the University of Minnesota Medical School. He began teaching at the university in 1947 and continued through his career at the Health Department.

At his retirement in 1976, Dr. Bauer identified what he saw as his three outstanding achievements during his work with the department: 1) research and development of a single-dose polio vaccine containing the three types of virus, 2) author or co-author of 61 medical publications and 3) acquisition of a building for the department.

(Note: The department's role in the eradication of polio is described in Chapter 3.)

(Note: Acquisition of the department's new building is described in Chapter 7.)

Throughout his career in public health, Dr. Bauer strongly endorsed and promoted the public health model shown below:

¹⁴⁶⁴ MDH, *What in Health's News*, Vol. 4, No. 26, December 17, 1976.

¹⁴⁶⁵ BOH, *Minutes*, October 31, 1961, MHS, pp. 381-382.

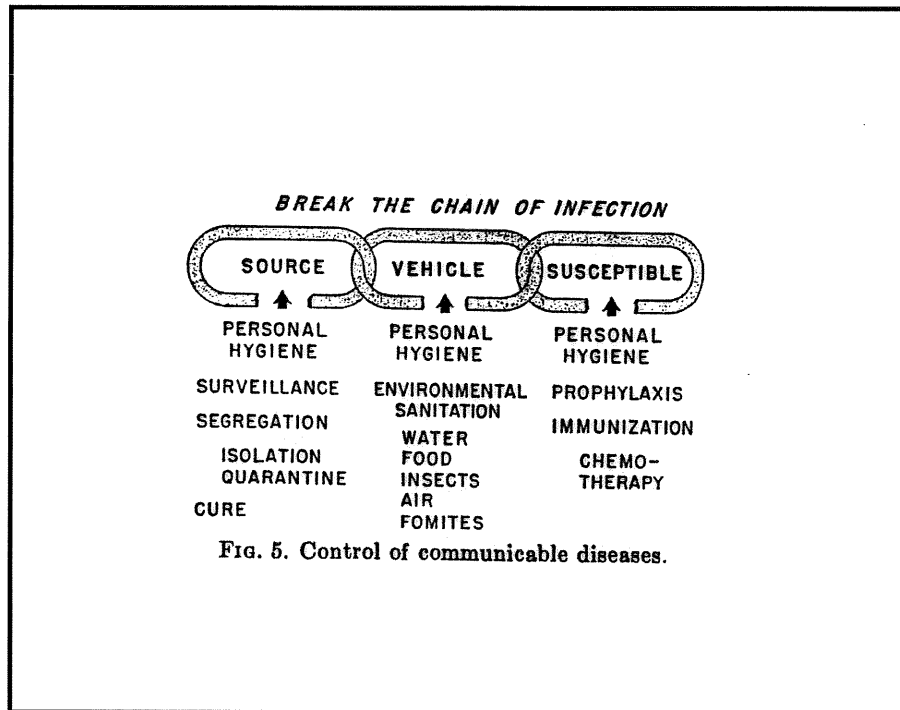


Fig. 5. Control of communicable diseases.

He distributed copies and pointed out that 50 years later, the model remains as applicable as it did in 1949. Only the diseases and conditions most commonly encountered have changed.

The Laboratory in the 1950s and 1960s

As described by Dr. Bauer, laboratory workers of the 1950s were like detectives, testing specimens, and searching and probing to uncover disease organisms. All registered physicians in the state could and did depend on the department to assist them in the accurate diagnosis of disease. In 1949, 475,910 tests from specimens throughout the state were performed in the department's laboratories. Of these, 322,023 were done in the serology section; 142,526 were done in the microbiology section; and 11,361 were done at the Duluth branch laboratory.¹⁴⁶⁶

In the 1950s most of the blood tests in the serology section were conducted in search of syphilis. Syphilis was present in tissues of an infected person and couldn't be grown on a culture medium. Therefore, tests were made on the blood serum to determine if any changes in blood might indicate syphilis.

In addition to testing for syphilis, the serology section also searched for typhoid fever, paratyphoid fever, undulant fever, tularemia and Rocky Mountain spotted fever. Anne Kimball, Ph.D., was head of the serology section in 1949. When she temporarily left the

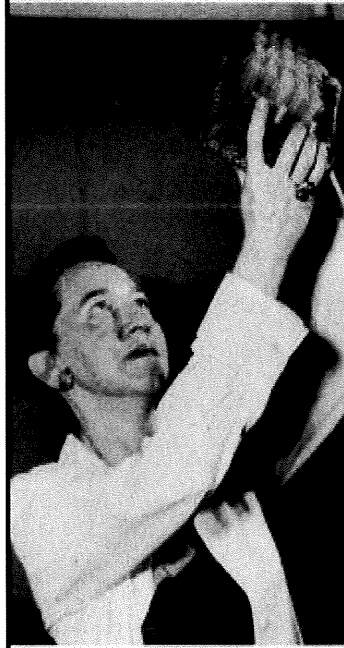
¹⁴⁶⁶ MDH, *Minnesota's Health*, Vol. VI, No. 5, May 1952, p. 3.

department in 1952 to work overseas with the World Health Organization, Yvonne Pinke stepped in. When Dr. Kimball returned to the department, she assumed leadership of the special laboratory studies section, and Yvonne Pinke remained as head of serology through 1973.

The medical laboratory's microbiology section examined stool and sputum samples under the microscope. Stool samples were examined for the presence of bacteria-causing diseases such as typhoid fever, paratyphoid fever and dysentery – diseases transmitted through invasion of the intestinal tract by bacteria contained in fecal material. Sputum samples were examined for tuberculosis. Nose and throat cultures were studied to determine if a person had diphtheria. Some of the other communicable diseases identified in the microbiology section included dysentery, undulant fever, tularemia, gonorrhea and malaria. Mary Giblin, M.S., was chief of the microbiology section in 1949, and continued as head until 1960 when Leon Damsky, Ph.D., assumed the position.

Dr. Kimball to Burma

Dr. Anne Kimball, director of the Division of Serology, Minnesota Department of Health, leaves in September



Dr. Anne Kimball

for Rangoon, Burma, where she will work with the World Health Organization. She will teach serology in the Pasteur Institute there as a member of a public health unit concerned with venereal disease and its relationship to maternal and child health. Other members of the unit include a pediatrician, a specialist in the diagnosis and treatment of venereal disease, and nine nurses. Dr. Kimball has been director of the Division of Serology since 1947. She has been with the Health Department since 1932.

The viral laboratory had been established in 1937, with Rockefeller Foundation funding. Its original purpose was to study the influenza virus, as there was concern at this time over a possible outbreak similar to the one in 1917-19. In the 1950s the virus and rickettsia unit continued to hunt for influenza, as well as mumps, toxoplasmosis antibody, amebic dysentery and other organisms much smaller than bacteria. Rabies belonged in this category, and during the 1950s a large number of tests were conducted searching for an indication of rabies.¹⁴⁶⁷ Marion Cooney, B.A., headed the viral and rickettsia unit in 1949, and she continued in this position through 1966. Robert Siem, Ph.D., became head of the unit in 1967.

¹⁴⁶⁷ MDH, *Minnesota's Health*, Vol. IV, No. 3, March 1950, pp. 1-2.

Laboratory tests changed, as the incidence of a disease changed. In 1949, a notable decrease was apparent with gonorrhea. 12,701 specimens were tested in 1940, compared with 9,158 in 1949. The number decreased to 7,938 in 1950.¹⁴⁶⁸



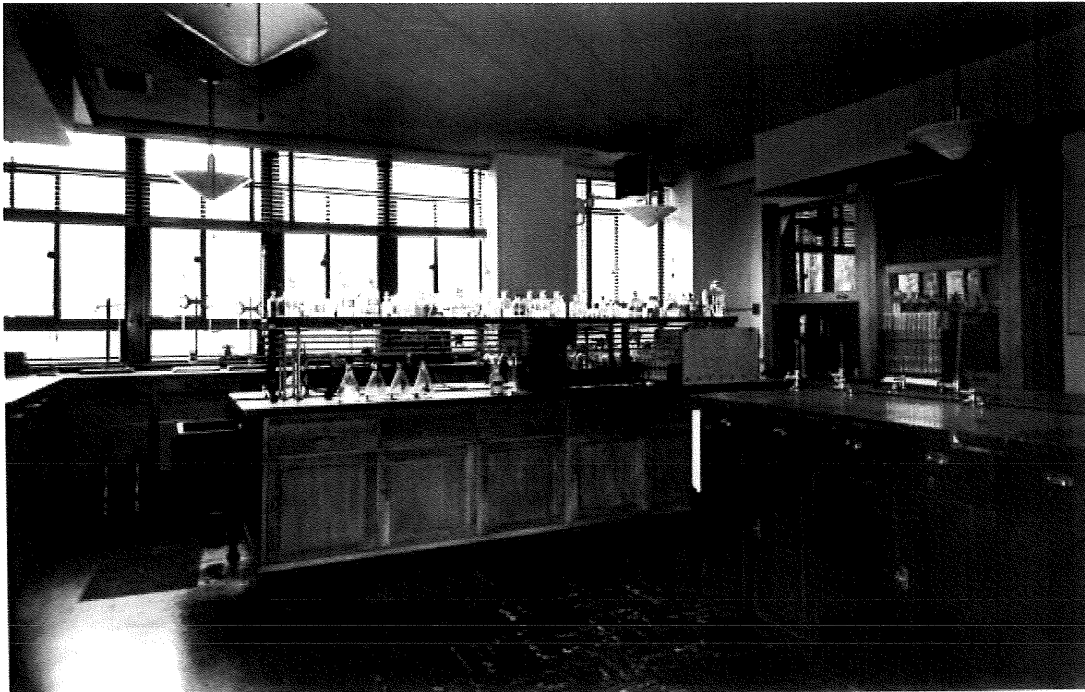
Minnesota Department of Health Serological Laboratory in Campus Building

The laboratory structure changed as needs changed. For a period in the 1970s there was a cytogenetics unit. A genetic metabolic lab, later named hereditary/metabolic and viral diseases, was added in 1980. In the 1980s the serology section was replaced by an immunology section. In 1985 all sections were reorganized and renamed. The three sections remaining in 1999 were: clinical labs, the chemical labs, and lab services.

The chemical laboratory section has tested environmental samples for the department's environmental health division, as well as for several other state agencies and local governments in Minnesota. Environmental testing has been done for potential contaminants in samples of air, water, waste water, sludge, sediment, soil, wildlife, vegetation and hazardous waste; physical agents; chemical and bacterial contaminants; and radiation.

¹⁴⁶⁸ MDH, *Minnesota's Health*, Vol. VI, No. 5, May 1952, p. 3.

The clinical laboratory section has tested human specimens for bacteria, parasites, fungi, viruses and other infectious disease agents. Some services, not available elsewhere in the state, have been obtained here. For example, the department has been the only facility in the state that does rabies testing. For some uncommon tests the lab has served as a referral center for specimens sent to the U.S. Centers for Disease Control and Prevention.



Minnesota Department of Health Laboratory in Campus Building

When the division reorganized in 1985, the medical laboratory's name was changed to public health laboratory division.

(Note: The department's role in communicable disease is described in greater detail in Chapter 2.)

(Note: The department's role in outbreaks and outbreak investigation is described in greater detail in Chapter 15.)

(Note: The department's role in STD/AIDS is described in greater detail in Chapter 14.)

The public health laboratories division has historically worked closely with other divisions, particularly the preventable disease division. In fact, in the 1950s clerical employees were pooled between the two divisions. Another indication of their close relationship was the recommendation by the Governor's Efficiency in Government

Commission in 1950. It proposed that the medical laboratories division be made a section within the division of preventable diseases.¹⁴⁶⁹

When the state laboratory was reviewed by the U.S. Public Health Service in 1951, three weak features were identified: 1) discontinuation of intra-state evaluation program (due to inability to find personnel); 2) heavy dependence on federal funds – about 47 percent of laboratory's budget; and 3) low salaries at the extremes of professional grades.¹⁴⁷⁰

Overall, however, the laboratory received high marks. E. J. Tiffany, senior surgeon in charge of the laboratory consultation service of the U.S. Public Health Service's communicable disease center, said after his visit to the laboratory in 1951:

"It is the opinion of this consultant that the organization and administration of this laboratory, its relationship with the State University, the interest shown in investigations and problem studies, and the quality of the work performed and service rendered, have earned for it a place among the better state department of health laboratories in this country."¹⁴⁷¹

Dr. E. J. Tiffany, United States Public Health Service, 1951

Dr. Bauer was especially pleased with the evaluation. He spoke about it at the April 30, 1951 board meeting: "The fact that he considers our laboratory one of the better ones in the United States is something. Some laboratory directors in other states have said, 'Be careful of him. He'll tear you apart.'"¹⁴⁷²

The medical laboratory's achievements were made despite unsafe and unpleasant working conditions through the 1960s. The department's new building, completed in 1969, housed a new and safe laboratory, a dramatic change from the one at the previous building on the University of Minnesota campus. The new lab was safer for other department employees, as well. With the laboratory located in the center of the floor, surrounded by large hallways, negative pressure was established. In the new laboratory air moved from inside into the center laboratory area – not from the laboratory to the outside. This prevented infectious material from escaping into the hallway.

Duluth Laboratory

The public health laboratory, located in Minneapolis, had a satellite office in Duluth for many years. The Duluth laboratory was established in 1905 to serve physicians in northern Minnesota, using space in St. Mary's Hospital.

¹⁴⁶⁹ J.L. Jacobs & Company, "State of Minnesota Organization and Management of Public Health Agencies: Summary Report for the Efficiency in Government Commission," October 1950, p. 90.

¹⁴⁷⁰ BOH, *Minutes*, April 30, 1951, MHS, pp. 103-105.

¹⁴⁷¹ MDH, *Minnesota's Health*, Vol. V, No. 5, May 1951, p. 2.

¹⁴⁷² BOH, *Minutes*, April 30, 1951, MHS, pp. 103-105.

An era ended with the closing of the Duluth branch laboratory on July 1, 1958, following the death of Harold Hoff, bacteriologist in charge. With his death, no specimens were received and no work was done there. The work was being sent to the main laboratories in Minneapolis. The board decided it was time to close the Duluth laboratory permanently.¹⁴⁷³

The closing of the laboratory did not go unnoticed. Dr. Edward Tuohy, a native of Chatfield, who began working as a bacteriologist at the Duluth laboratory in 1905, commented on its passing. Now working in California, he reflected on the importance of the Duluth laboratory.¹⁴⁷⁴

It is easy to see why it should be closed at this time. Typhoid, tuberculosis, water and milk supervision--all have passed under routine inspection, and probably the most notable routine work with which I had some busy periods was the matter of throat cultures for B. Diphtheria.

Over and beyond that line of laboratory routine, which should be entered on the Medical History side of the work, was the certainty that the first organized effort to control tuberculosis in the area stemmed from the laboratory and its personnel. Then it should be recalled that the support which I received from Doctors H. M. Bracken and F. F. Wesbrook¹⁴⁷⁵ enabled me to tie into the teaching facilities of the University of Minnesota the most stimulating incentives to develop the work of the clinical and Post Mortem work in both of the major Duluth hospitals. Thus do I wish to pass some further judgment upon the life tenure of what to many seem only a passing and unessential detail of passing events.¹⁴⁷⁶

Improving the Quality of Laboratories and Technicians

The quality of laboratory work done in many facilities in Minnesota was not satisfactory in the 1940s and 1950s. Because of this, the department didn't encourage bacteriology in hospitals and laboratories. As Dr. Bauer explained in 1951:

...one of the reasons for our success with syphilis serology is that practically 90 percent has been done here and we have controlled it and know what is going on in the State. That is the policy we are going to try to follow along as far as public health bacteriology and laboratory work are concerned and try to go along with the developing of the clinical aspects of it...¹⁴⁷⁷

Using Public Health Service grants and Kellogg Foundation funds, the department began to survey hospital laboratories in the 1950s. For a six-month period, unknown specimens were sent each month to hospital laboratories. Performance was classified, and those laboratories with poor performance were offered special help. Dr. Bauer wanted uniform laboratory procedures throughout the state. He wanted the standards raised, and he advocated for continual training for lab workers.¹⁴⁷⁸

¹⁴⁷³ BOH, *Minutes*, May 22, 1958, MHS, p. 146.

¹⁴⁷⁴ MDH, *Minnesota's Health*, Vol. 13, No. 1, January 1959, p. 4.

¹⁴⁷⁵ Dr. H. M. Bracken was BOH executive officer from 1897 to 1919, and Dr. Frank Wesbrook was laboratories director from 1895 to 1911.

¹⁴⁷⁶ BOH, *Minutes*, August 13, 1958, attachment: letter to Dr. Robert Barr from Dr. E.L. Tuohy, dated August 2, 1958, MHS, p. 218.

¹⁴⁷⁷ BOH, *Minutes*, October 16, 1951, MHS, p. 324.

¹⁴⁷⁸ BOH, *Minutes*, May 23, 1962, MHS, pp. 216-217.

Some laboratory technicians weren't getting the continuing education they needed, and in 1952 Dr. Bauer proposed refresher courses for laboratory technicians. He received strong support from the Board of Health. Board member Prof. Bosch said:

I think the State should take a leadership in improving each of the groups that affect the public health. Anything that the State can do to improve his training or his knowledge will reflect ultimately to the value of the State. We are carrying out refresher courses in a number of fields.¹⁴⁷⁹

First given in St. Gabriel's Hospital in Little Falls in 1952, the refresher courses for lab technicians were sponsored by the University of Minnesota, the Minnesota Hospital Association, the Minnesota State Medical Association, the Minnesota Society of Clinical Pathologists, the Minnesota Society of Medical Technologists, the Third District Society of Medical Technologists, and the Minnesota Department of Health. Emphasis was placed on routine procedures.¹⁴⁸⁰ Additional classes were given in Hibbing, Morris and Red Wing.

The public health laboratory has continued its monitoring function by providing reference and confirmatory testing of specimens from hospitals, clinics and other clinical labs throughout the state. In 1999 this included the certification of environmental laboratories that do environmental testing for government agencies.

One of the reasons for the poor quality of laboratory work in some facilities in the 1950s appeared to be the result of inadequate technique training received by technicians. Several schools in Minnesota were considered borderline. One school in particular was severely criticized, and it brought forth a slander suit against the Hennepin County Medical Society. Legislation to control these schools had been proposed but always defeated. In 1963 the board decided to seriously consider adoption of regulations governing the general sanitation and health service requirements of trade schools.¹⁴⁸¹

Dr. Bauer thought fraudulent schools could be eliminated by setting standards for lab technicians. The schools would be forced to raise their standards.

Innovative Activities

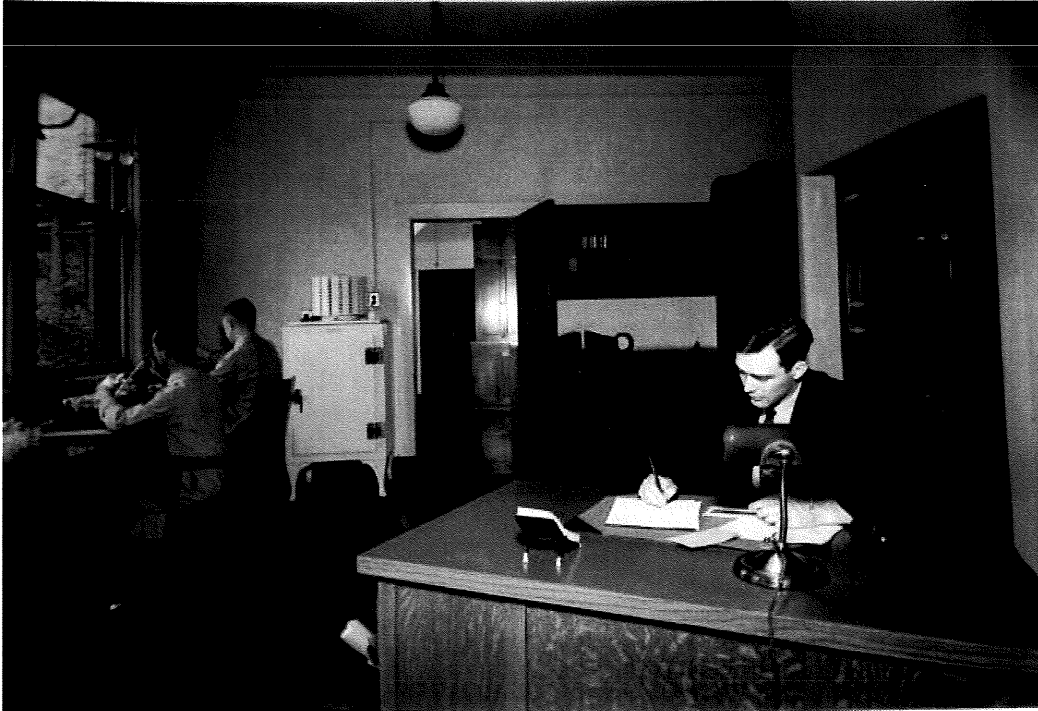
The department's laboratory has been innovative and drawn national attention for a number of its activities. It made many contributions in the polio eradication effort, especially in the development of oral polio vaccine. In 1961 the polio studies in Minnesota were identified as the most carefully controlled of all studies to date.¹⁴⁸² The medical laboratory was also influential in establishing a blood bank system in Minnesota in the 1950s.

¹⁴⁷⁹ BOH, *Minutes*, May 27, 1952.

¹⁴⁸⁰ MDH, *Minnesota's Health*, Vol. VI, No. 4, April 1952, pp. 3-4.

¹⁴⁸¹ BOH, *Minutes*, January 22, 1963, MHS, p. 22.

¹⁴⁸² BOH, *Minutes*, May 23, 1961, MHS, p. 164.



**D. M. Taylor, Bob Merman and John Wilson
Health Department Laboratory on University Campus**

(Note: The department's role in establishing the blood bank system is described in Chapter 4.)

From 1948 to 1958, the laboratory conducted studies on toxoplasmosis, trying to identify the elusive source. Anne Kimball, Ph.D., took the lead in these research investigations, which included parts of Meeker, Renville, Sibley, McLeod, Kandiyohi, Wright, Hennepin, Anoka and Ramsey counties. In 1959 findings from studies indicated an association between toxoplasmosis and contact with farm animals.¹⁴⁸³

In 1956 the laboratory, working with the University of Minnesota, identified the Coxsackie B-5 virus as the cause of an epidemic of aseptic meningitis.¹⁴⁸⁴

Between February 1961 and January 1962 the laboratory joined with the University of Minnesota in studying staphylococcal infections at the new 17-bed isolation unit at the University of Minnesota Hospital.¹⁴⁸⁵

¹⁴⁸³ Anne Kimball, Ph.D. et al., "Epidemiological Studies on Toxoplasma Antibodies in Obstetrical Patients," *University of Minnesota Medical Bulletin*, Volume XXX, Number 8, February 15, 1959, pp. 226-249.

¹⁴⁸⁴ Jerome T. Syverton, M.D. et al., "Outbreak of Aseptic Meningitis Caused by Coxsackie B5 Virus," *Journal of the American Medical Association*, Vol. 164, No. 18, August 31, 1957, pp. 2015-2019.

In 1962, the laboratory, working with the University of Minnesota, identified the Giles virus, which caused an outbreak of aseptic meningitis in the state in 1960.¹⁴⁸⁶

Beginning February 1, 1963, the public health laboratories offered drug sensitivity testing for tubercle bacilli and other acid-fast organisms. This was available to Minnesota physicians to determine the effectiveness of drug therapy using isoniazid, streptomycin and p-amino salicylate.¹⁴⁸⁷ Private physicians had begun caring for an increasing number of tuberculosis patients when sanitariums were closed. There were no facilities in the state where physicians could have sensitivity tests done on acid-fast organisms.¹⁴⁸⁸ Dr. Henry Bauer suggested that more attention and work be done in the area of acid-fast bacteriology. He suggested terminology be changed from "tuberculosis" to "diseases due to acid-fast bacteria."¹⁴⁸⁹

In 1967 the laboratory began performing tests to determine if pregnant women had German measles. This service was available to physicians in the state, and Minnesota was one of several laboratories in the nation to offer this service.¹⁴⁹⁰

Newborn Screening – Phenylketonuria (PKU)

One of the major initiatives by the department in the 1950s and 1960s was led by the medical laboratory and resulted in the prevention of serious morbidity and early death to a number of Minnesota children. While the number of children affected each year was small, the potential for changing their lives and cumulative effect of the initiative was enormous.

Every year a few Minnesota children were born with phenylketonuria (PKU), a hereditary metabolic disease. Without treatment, most became profoundly retarded. In 1962, Dr. Robert Guthrie of Buffalo, New York, developed a test that made it possible to identify which infants were affected with this disease.¹⁴⁹¹ Dr. Guthrie, originally from Minnesota, had a daughter afflicted with PKU disease. With Dr. Guthrie's test, it was now possible to distinguish those children who could, through a diet low in phenylalanine, escape the devastating effects of the disease, as scientists in Germany had discovered.

Beginning in 1957, a PKU screening pilot study was done in Clay, Becker, Otter Tail, and Wilkin counties by the Four-County Project, working with the Clay-Becker-Park Region medical societies. The project was jointly sponsored by the Health and Public

¹⁴⁸⁵ Ward E. Bullock, M.D. et al., "A Staphylococcal Isolation Service," *Annals of Internal Medicine*, Volume 60, No. 5, May 1964.

¹⁴⁸⁶ MDH, *Minnesota's Health*, Vol. 16, No. 4, April 1962, p. 2.

¹⁴⁸⁷ MDH, *Minnesota's Health*, Vol. 17, No. 4, April 1963, p. 1.

¹⁴⁸⁸ BOH, *Minutes*, January 16, 1962, MHS, p. 36.

¹⁴⁸⁹ BOH, *Minutes*, February 24, 1959, MHS, p. 37.

¹⁴⁹⁰ MDH, *Minnesota's Health*, Vol. 21, No. 8, October 1967, p. 1.

¹⁴⁹¹ BOH, *Minutes*, July 10, 1962, MHS, p. 332.

Welfare departments.¹⁴⁹² In 1961, the board approved a study to promote testing statewide.¹⁴⁹³

To prevent PKU from developing in any child born in Minnesota, the department supported screening all infants born in the state. This was contrary to the recommendations of the American Medical Association and the American Academy of Pediatrics, which recommended voluntary physician participation. The department initiated a statewide screening program for all newborns on a voluntary basis in 1964.¹⁴⁹⁵

Reflection on PKU Pilot Program

"The pilot program was successful, and I will never forget how some of us wept at the discovery of the first victim with the realization that proper measures would insure a productive human being who would otherwise have been a helpless dependent person."¹⁴⁹⁴

Representative of St. Paul
Association of Retarded Citizens, 1976

The PKU screening was available on a voluntary basis, but the board pushed for mandatory testing for all infants. When a bill for mandatory testing was presented to the Legislature, Dr. Bauer demonstrated to legislators, through graphs and presentation, the value of such legislation. In 1964 PKU legislation passed, and the following year PKU testing became required in Minnesota. All newborns born July 1, 1965, or later, had to be tested.¹⁴⁹⁶

Dr. Bauer, made arrangements with Dr. Robert Fisch, pediatrician at the University of Minnesota, to treat all cases identified. Families of affected infants were instructed on the proper diet that would prevent the disease. The department supplied the food for these cases. All cases received screening and follow-up, as well as genetic and nutritional screening, from the department's division of special services.

PKU testing was challenged several times, as to whether or not the expense was worth it. In 1975, 10 years after the screening became mandatory, Dr. Henry Bauer and Dr. Ronald Campbell, chief of the department's maternal and child health division, responded to a newspaper article that suggested that PKU testing was one of the costly tests that may not be necessary for every baby:

In 1975, it cost the Minnesota Department of Health Laboratory \$25,214 to perform 72,160 tests or approximately thirty-five cents per test. In this year, three infants were found with PKU at a cost to the Department of \$8,404.67 per infant. Without treatment, these individuals would be severely retarded and would likely need institutional care for their entire lives. The current daily custodial and medical cost in the institution for mentally retarded is \$48.55 per day, or \$16,735 per infant per year. If these three infants had not been discovered and were placed in a State institution, it would cost the state \$50,205 per year. Multiply this by 25, which is the average number of life years of the untreated PKU patient in institutions; there is a potential total cost of \$1,255,143 plus the tragic loss of three children and the anguish of their parents. This tabulates

¹⁴⁹² MDH, *Minnesota's Health*, Vol. 15, No. 5, May 1961, p. 1.

¹⁴⁹³ BOH, *Minutes*, April 24, 1961, MHS, p. 104 and p. 131.

¹⁴⁹⁴ Letter from Franklin Smith to the *Minneapolis Star*, August 28, 1976.

¹⁴⁹⁵ *St. Paul Pioneer Press*, "State Starts Program to Screen Babies for Retarding Disorder," September 6, 1964.

¹⁴⁹⁶ Minnesota State Statute 61, Sec. 144.159.

just one year's experience; each year we detect three or four children through the screening program.¹⁴⁹⁷

The PKU legislation had strong support from the St. Paul Association for Retarded Citizens. A representative of the organization wrote: "We are grateful to the State Health Department for their cooperation, but I especially want to mention Dr. Henry Bauer."¹⁴⁹⁸

By 1999, state legislation had mandated the testing of newborns for phenylketonuria, hemoglobinopathy (sickle cell) and other inborn errors of metabolism as prescribed by the commissioner of health.¹⁴⁹⁹ These included galactosemia, hypothyroidism and congenital adrenal hyperplasia. The public health laboratory has conducted the testing for these hereditary metabolic diseases in conjunction with the family health division.

Testing done on Minnesota newborns, along with the estimated incidence, are listed in the chart below. The chart also identifies the effects of the disease, if undetected and untreated. Testing has made it possible to identify diseases and initiate treatment before harmful effects occur.

| DISEASE | INCIDENCE | EFFECTS | TREATMENT |
|--|---|---|----------------------------------|
| Phenylketonuria (PKU) | 1:13,900* (1:12,000)** | Mental Retardation | Low phenylalanine diet |
| Galactosemia | 1:31,800* (1:50,000)** | Failure to Thrive, Mental Retardation, Death | Avoidance of milk products |
| Hypothyroidism | 1:4,500* (1:4,000)** | Mental Retardation | Oral thyroid hormone |
| Hemoglobinopathy (sickle cell disease) | 1:12,600* (1:12,000)** (1:500 in African-Americans) | Sickle crises, Death | Prophylactic penicillin |
| Congenital Adrenal Hyperplasia | 1:16,500* (1:12,000)** | Adrenal crisis, Ambiguous genitalia in females, Death | Glucocorticoid mineralocorticoid |

* Minnesota incidence

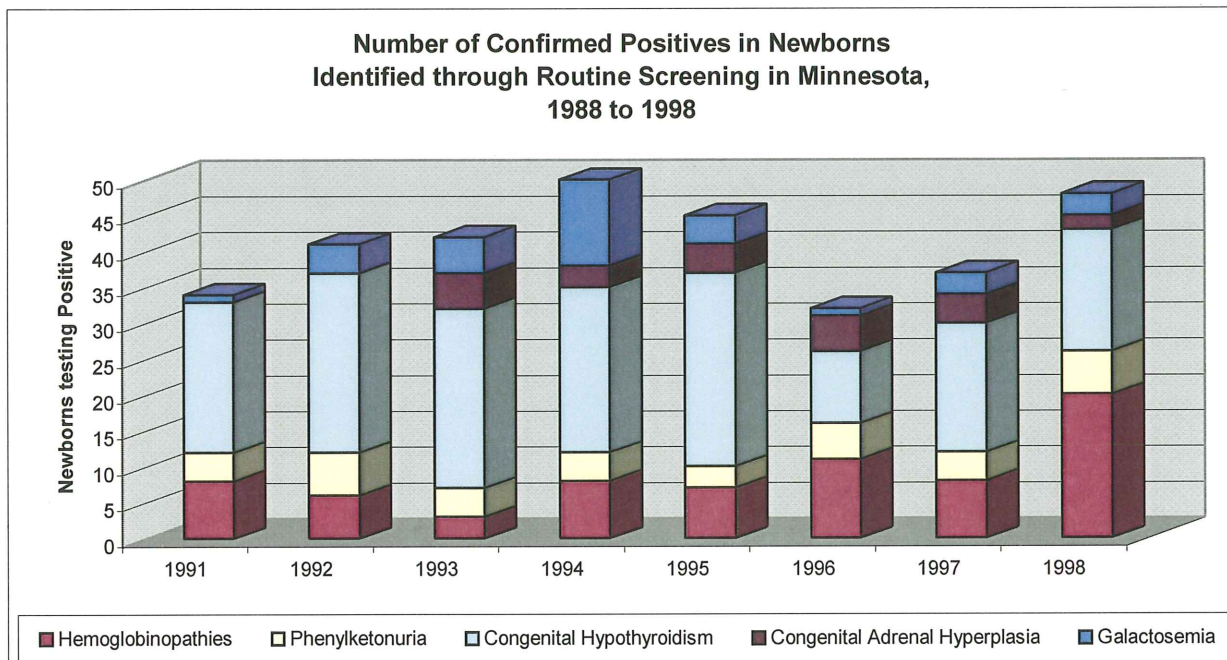
** National incidence

¹⁴⁹⁷ *Minneapolis Star*, "Value of Mandatory Tests on Newborns," August 19, 1976.

¹⁴⁹⁸ Letter from Franklin Smith to the *Minneapolis Star*, August 28, 1976.

¹⁴⁹⁹ Minnesota Statute 144.125.

The graph below indicates the number of confirmed positives found from 1991 to 1998 through the routine testing of Minnesota infants. This chart shows the number of infants who have escaped or who have had reduced distress from a serious disease. The cumulative cost savings in the prevention of institutional and medical care has been significant. The value to the potentially affected children and their families in the prevention of pain and suffering is un-quantifiable.



Public Health Laboratory – 1872 to 1999

The first focus of the department, when it began with one person in 1872, was laboratory work. Dr. Hewitt used his own laboratory in Red Wing to develop vaccine, which he distributed throughout the state. In 1893 the department's laboratory was moved from Red Wing to the University of Minnesota campus. In 1999 it remained close to the University of Minnesota, housed in 717 Delaware Street S. E., while much of the rest of the department had relocated to St. Paul.

The technical areas addressed in the public health laboratory in 1999 contained some terms unheard of by Dr. Hewitt:

- inorganic non-metals
- inorganic trace metals
- microparticulate
- organic chemistry
- radiochemistry
- water microbiology

- bacteriology
- enteric bacteriology
- immunology
- molecular epidemiology
- mycology
- mycobacteriology
- newborn screening
- parasitology
- rabies
- sexually transmitted diseases
- virology

Dr. Bauer, retiring as director of the labs in 1976, contemplated the possibilities present in 1999 and somewhat wistfully noted the exciting times ahead for the laboratory. With advancements such as molecular identification of organisms, new opportunities presented themselves and the potential for making a difference in the health of the people of the state increased.