

MAINE



Department of Human Services
Health & Environmental
Testing Laboratory



WINTER

NEWSLETTER

2000

HAPPY
NEW
YEAR

MORBIDITY REPORT

Disease Period Covered: 1/1/99 to 1/9/2000

MEASLES (RUBELLA)	0
MUMPS	0
RUBELLA	0
CRS (Congenital Rubella Syndrome)	0
DIPHTHERIA	0
TETANUS	0
PERTUSSIS (With Campobello 45)	35
HIB	0

Data derived from the Maine Bureau of Health Immunization Program, Weekly Morbidity of confirmed cases.

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ANIMAL RABIES IN MAINE, 1998 AND 1999

By: Tsun-Kong Lee, Dr.P. H.

In calendar year 1998, a record high of 248 cases of animal rabies was made which surpassed the previous record of 199 positive cases seen in 1971 when Canadian red fox rabies was seen throughout all 16 counties. In the current terrestrial animal cases, two rabies variants, the Mid-Atlantic raccoon and Canadian red fox, are implicated.

By species, there were 143 raccoons, 63 skunks, 26 red foxes, 6 bats, 2 woodchucks, 4 cats, 3 dogs and one beaver. By counties, 11 counties had terrestrial animal rabies. Seven counties were responsible for 88% of the cases (219/248). They were Cumberland (24), Franklin (39), Kennebec (72), Lincoln (25), Oxford (11), Somerset (27) and Waldo (21).

The five counties of Aroostook, Hancock, Penobscot, Piscataquis and Washington did not have any cases but were expected to be affected in the coming year..

In calendar year 1999, as of November 18, a total of 184 positive cases was diagnosed from 874 specimens submitted (21%). During the same time period in 1998, a total of 226 positive cases was diagnosed from 920 specimens submitted (24%). The percentage of specimens had decreased only 5% but the percent of positive specimens had decreased almost 20%. To equal the 1998 total of positive cases, we would have to diagnose 64 new positive cases by December 31 which is very unlikely. However, the raccoon epizootic has now entered 3 new counties: Penobscot with 24 cases, Hancock with 14 cases and Washington with 7 cases.

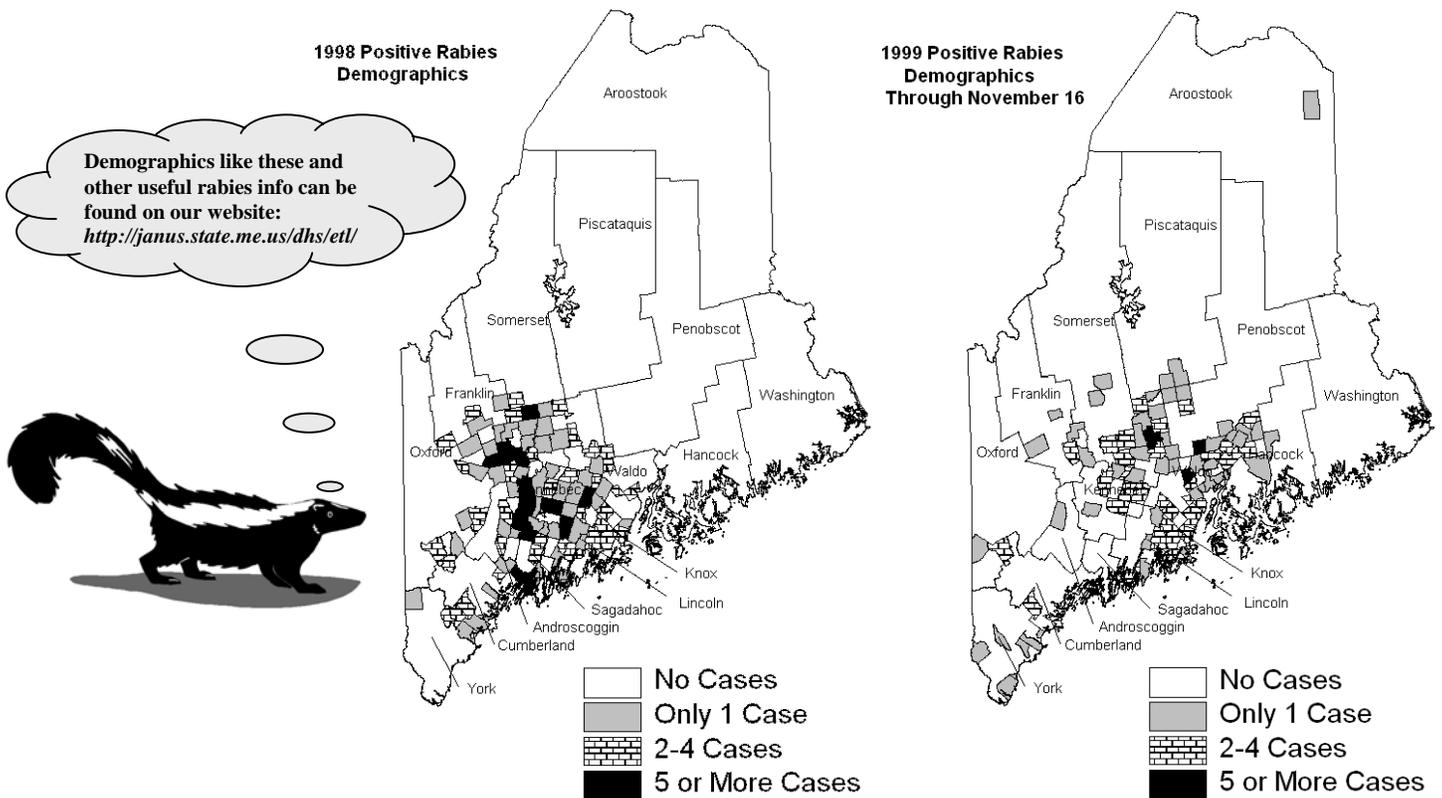
with 7 cases and Piscataquis with 2 cases. The first positive raccoon from Penobscot county was from Newburgh in late May 1999. Since then 13 towns including the city of Bangor have reported rabies cases. Hancock county had its first positive raccoon from Dedham in late August 1999 and more cases have been reported from Verona, Bucksport, Mariaville and Ellsworth. Piscataquis county had its first positive raccoon from Dover –Foxcroft in mid-October 1999 and a positive skunk was reported from Sangerville about 2 weeks later.

By species, of the 184 positive cases, 105 were raccoons, 60 were skunks, 4 were red foxes, 7 were bats, one was a woodchuck, 6 were cats and one was a horse. By county, 14 counties have reported terrestrial animal rabies and only 2 counties, Aroostook and Washington have not been affected yet.

Monoclonal antibody testing suggests that all the raccoons,skunks, domestic animals, and 2 foxes tested appear to have been infected with the Mid-Atlantic raccoon variant.

Only 2 red foxes were infected with the Canadian red fox variant and they were received from Weld and Winthrop in early 1999. In calendar year 1998 a total of 26 rabid red foxes were diagnosed and of 11 specimens tested with monoclonal antibody, 10 were Canadian red fox variant and one was Mid-Atlantic raccoon variant

Note: An earlier article of Maine rabies cases from 1994 to March 1998 .was reviewed in the Spring 1998 Newsletter.



PETROLEUM HYDROCARBONS

By: Larry Boston, Supervisor – Organics section

The state of Maine methods for hydrocarbons are separated into two major classifications GRO (Gasoline Range Organics-boiling range 55C-218C) and DRO (Diesel Range Organics-boiling range 170C- 430C). These methods can be used for waters, soils and pure product. Identification of compounds seen by these methods are based on the time that they appear on a gc chromatogram. For confirmed identification of the compounds a mass spectrometer must be used as the detector. The peaks that are seen in the GRO and DRO ranges may be compounds that are not seen in fuel oils or gasoline, therefore it is very important that the analyst recognize patterns that are not characteristic of hydrocarbon spills.

When we perform the DRO test the type of fuel oil spilled is determined by matching the chromatogram with that of a known fuel oil standard e.g. #2 fuel oil (FIG2). The determination of the type of product spilled is complicated by the fact that water soluble components for #2 (FIG 3) and #1 fuel oil give a chromatographic pattern similar to that of gasoline(FIG1) . This is because these components are aromatic compounds that have a much greater solubility than the straight chain hydrocarbons that compose most of the fuel oils. This is why it is important to get a sample from the surface of the water when possible to determine the type of spill that occurred.. Lubricating oils such as Motor Oil (Fig 4) have very low concentrations of the early volatile materials therefore samples suspected of lubricating oil contamination are analyzed by the DRO procedure only.

Chromatograms of water extracted in algae blooms show a pattern similar to fuel oil, but the odd numbered hydrocarbons

predominate. This is true because algae produce odd numbered hydrocarbons . The crude oils that fuel oils are produced from are formed under heat and pressure where the odd numbered hydrocarbons are broken down and reformed to create an uniform distribution of odd and even hydrocarbons.

The HETL lab reports out total hydrocarbons in the GRO (our test code = TSM) range and also reports MTBE and Benzene as tentative identified compounds. These compounds are reported because they have low MEGS (Note 1). Tentative identifications for these compounds are almost always confirmed when they are analyzed by GC/MS. Gasoline identification can be complicated by the fact that the water soluble components of fuel oil look like gasoline. The presence of MTBE confirms the presence of gasoline.

NOTES:

1. The MCL (Maximum Contaminant Level) is established by the federal government. The MEG (Maximum Exposure Guideline) is established by the state. The state toxicologist is the process of revising the MEG list and expects the revised list to be available in the near future. Some compounds have MEGS and no MCL. One of the primary compounds of concern recently (MTBE) has a MEG of 35 ug/L, but has no MCL. Benzene has a MCL(MEG) of 5.0 ug/L.
2. For regulated drinking water supplies the TSN test (EPA method 524) covers the same range of compounds as the TSM test, but confirms the identities of the compounds.
3. For drinking water supplies the TSO test (EPA method 525) covers the same range of compounds as the as the DROW test and identifies a list of target compounds.

GC CHROMATOGRAMS

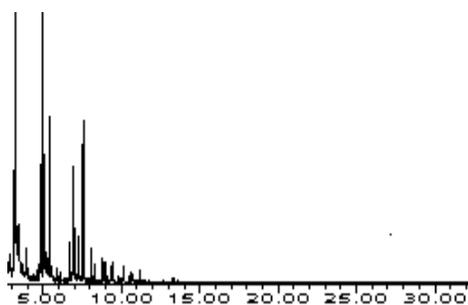


Figure 1 - Gasoline Standard

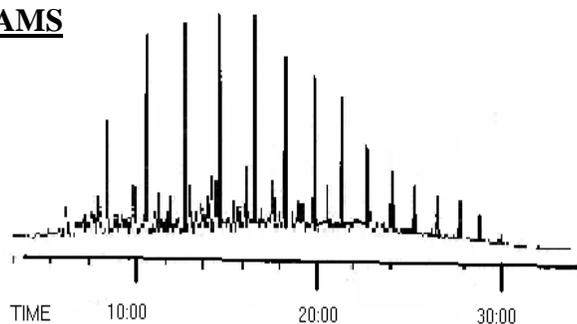


Figure 2 - #2 Fuel Oil Standard

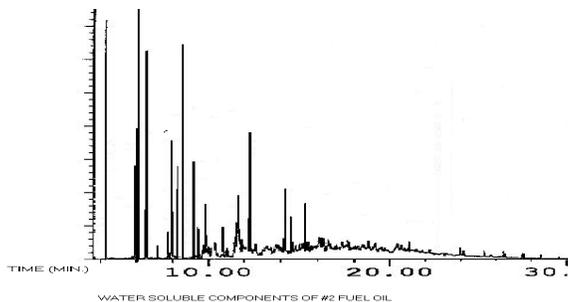


Figure 3 – Water Soluble Components of #2 Fuel Oil

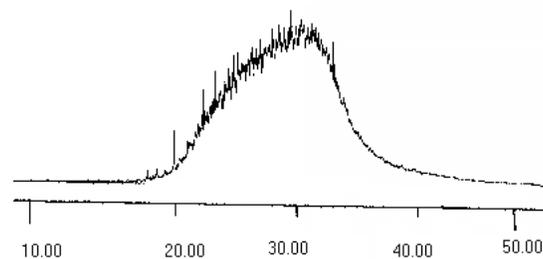


Figure 4 – Motor Oil Standard

ENVIRONMENTAL LEAD SECTION

By: Michael Corbin

Senator Susan Collins chaired a field hearing of the U.S. Senate Public Health Subcommittee of the Health, Education, Labor, and Pensions Committee in Lewiston on November 15, 1999. Senator Jack Reed (D-RI) joined Senator Collins, with whom she held a similar meeting in Providence, RI. The hearing was focused on lead poisoning threats in the home, which are often hidden. In addition to chairing these two hearings, Senator Collins is raising awareness about the dangers of childhood lead poisoning by sponsoring an effort to establish, the 4th week of October as "National Childhood Lead Poisoning Prevention Week."

Governor Angus King Jr., held a kick off to the "Lead Safe" campaign. The Maine Childhood Lead Poisoning Prevention Program along with Maine State Housing Authority and the Department of Environmental Protection have been working on brochures, place mats, and TV ad campaigns. Along with the kick off, **Fleet Bank** has announced that they will help the median income families with a reduced interest rate loan.

The HETL has confirmed the date of December 10, 1999 for a re-accreditation audit. Steven Lerman will be conducting the on site audit. We have been working for the past couple of months compiling the required documentation he will need for his laboratory visit.

COMPARISON OF ORAL MUCOSAL TRANSUDATE (OMT) FLUID EIA TESTING WITH SERUM EIA ASSAYS FOR THE DETECTION OF HIV-1 ANTIBODIES

By: Audrey Littlefield, Microbiologist

Enzyme Immunoassay (EIA) for the detection of HIV-1 antibodies in serum and plasma has been utilized by this laboratory since 1985. All repeatable reactive specimens then undergo confirmation testing by Western Blot. Gingival crevicular fluid or mucosal transudate also contains serum components passively transported through the oral mucosa of the mouth. The Orasure HIV-1 collection device enhances the flow of mucosal transudate and contains preservatives to prevent degradation of antibodies by enzymes present in oral fluid. HIV-1 antibodies are detectable in this fluid by EIA and can be confirmed by Western Blot.

To perform OMT testing the provider must undergo training for collection of samples and complete a physician's letter of agreement that is submitted to the testing laboratory. The laboratory must also complete training by Organon Technika and test its proficiency with the Orasure HIV-1 Qualification Panel supplied by Epitepe Inc. The laboratory is then listed as one of the laboratories in which providers can submit Orasure specimens.

Oral fluid samples are collected with an Orasure collection device without the use of needles. This eliminates the risk of needle stick injuries to the provider and can allow more

comfort to the patient. Collection of samples in the field is easier and doesn't require the provider to transport sharps or sharps storage containers. Oral fluid samples can be transported at ambient temperatures by traditional carriers following Federal, state, and local regulations for the transport of etiologic agents (39CFR 111). After receipt, the sample is centrifuged and testing can be done if the volume of the eluate is at least .75 mls. Samples can be stored at 4°C to 37°C for a maximum of 21 days or frozen at -2°C for 6 weeks.

For the study, samples of oral mucosal transudate (OMT) were collected using the Epitepe OraSure HIV-1 Collection Device in conjunction with serum from 277 patients seen at statewide STD clinics. The OMT fluid was tested by the Organon Technika (OTC) Oral Fluid Virostika® HIV-1 Microelisa System. Serum was tested by both the Organon Technika Virostika® HIV-1 Test and the Abbott Laboratories HIV-1 EIA. All serum positives were confirmed by the Biorad Novapath™ HIV-1 Immunoblot (Western Blot) Kit.

The OTC Oral Fluid Virostika HIV-1 kit contains Dilsim™ as a specimen diluent. The OTC Virostika Serum Assay contains Dilsim™ II as its specimen diluent. The Oral Virostika® has less specificity resulting in a higher false positive rate, which increases the cost and time of testing. To increase the specificity without reducing sensitivity it has been reported at the 13th Annual Conference on Human Retrovirus Testing that Dilsim™ II can be substituted for Dilsim™ in testing repeats of all initially reactive OMT samples. (Abstract from the Michigan Department of Community Health, "Substitution and Validation of Diluent During Testing of Oral Fluid by Organon Technika Enzyme Immunoassays") In this study all reactive OMT samples were repeated in duplicate by using both Dilsim™ and Dilsim™ II. By this method, of the 9 initially reactive OMT samples 5 were determined to be false positives. Specificity without Dilsim™ II was 98.2% with sensitivity of 100%. With the Dilsim™ II specificity was 100%, with a sensitivity of 100%.

In comparison, both the OTC and Abbott serum assays had no false reactivities or false non-reactives in testing the 277 samples. The one true reactive was detected by all 3 assays and confirmed by Western Blot.

The OMT Virostika® appears to be an acceptable method for testing for HIV-1 in the general population. It should not be considered as a complete substitute for serum testing, but can be utilized by providers when it is more convenient to collect OMT samples than serum. There is reduced sensitivity and specificity with the OMT compared to serum testing. Test results should only be released to the provider ordering the test or some one under the supervision of the provider. All confirmed reactive results should be followed up by serum testing.

As a result of this study, we will be implementing oral fluid testing in conjunction with serum testing at the beginning of the year 2000.

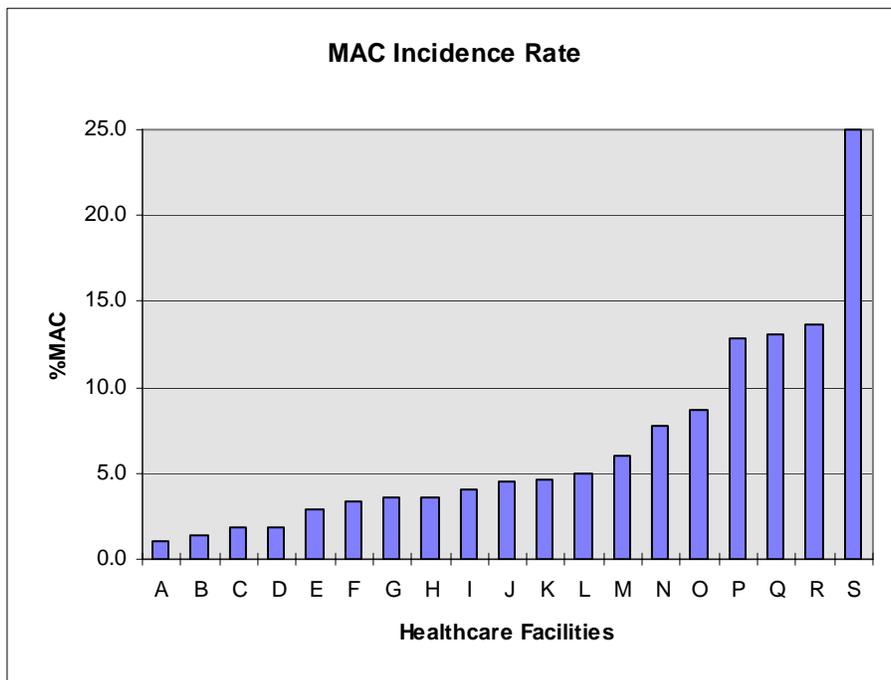
MYCOBACTERIUM AVIUM COMPLEX, AN INCREASING RATE OF ISOLATION

By: Rose Wright, Microbiologist

Are we seeing more *Mycobacterium avium* complex (MAC) than we used to in the past? This is a question asked of us in Public Health. The answer is yes. In 1988 we isolated MAC in 39 specimens from 24 patients. In 1998 we isolated 186 isolates from 112 patients. We do not know how many of these were causing disease. The increase in MAC isolation is not unusual. MAC was rarely isolated years ago but today is common in laboratories across the country. Some of the upsurge is due to the AIDS epidemic. Some seem to speculate that our water distribution systems may be partly responsible (1). MAC is ubiquitous in the environment, found in soil, fresh and salt water, and animals. Studies suggest that water may even be a source of infection (1,2). An epidemiological investigation implicated a hospital hot water system as the source of MAC infections. The authors propose that the recirculating hot water systems used in facilities such as hospitals may allow organisms like MAC to multiply. The report concludes that patients may have acquired their infections while showering or drinking water (1).

If water can be a source of infection then water may also be a source of specimen contamination. The HETL Mycobacteriology Lab has isolated MAC from water sources submitted by healthcare facilities. The HETL provides this service, for a \$10.00 fee, to facilities that suspect a contamination problem in their water systems. There is an additional \$25.00 charge to identify MAC isolates.

Below is a chart of Maine healthcare facilities who submit clinical specimens to the HETL Mycobacteriology Lab. The chart represents only those facilities that submit specimens directly to the HETL lab. I did not include facilities that decontaminate and culture specimens then submit isolates to the HETL for identification. If you are interested in the MAC incidence rate in your facility call 287-1706.



Each letter on the x axis represents a Maine Healthcare Provider. Data was collected over a nine month period from 7/1/98 to 3/29/99

References

- 1 Von Reyn CF, Maslow JN, et al (1994) Persistent colonisation of potable water as a source of MAC infection in AIDS. *Lancet* 343:1137-1141.
- 2 du Moulin GC Sherman IH, Hoaglin DC, Stottmeier KD. *Mycobacterium avium* complex, an emerging pathogen in Massachusetts. *J Clin Microbiology* 1985; 22:9-12.

LABORATORY QUALITY ASSURANCE

By: Richard French , Quality Assurance Officer

The Health and Environmental Laboratory (HETL) is currently certified or accredited by three outside agencies. This past July we were reevaluated by HCFA and received reaccreditation under CLIA 88 for clinical microbiology and toxicology. The laboratory is currently accredited by AIHA for environmental lead analysis and have just been reevaluated for reaccreditation in 2000. The HETL is currently certified by the EPA to analyze drinking water for total coliforms and E. coli, trace metals, nutrients, pesticides, herbicides, semi-volatile and volatile organics, disinfection byproducts, and radionuclides. We were reevaluated for radionuclides this past spring and are scheduled for a laboratory reevaluation for certification the end of February 2000. The HETL is planning to apply for NELAP accreditation for all environmental and drinking water testing by 2003.

The HETL recently conducted a search of the LIMS system to determine the number of samples that were sent out this year but not returned to the laboratory. We determined over 2300 samples from over 900 clients were not returned for testing. Many of these non-returned samples will result in non-compliance action being taken. The HETL is in the process of sending out letters to each of the clients listing the non-returns and requesting return of the unused sample kits. This is being done at considerable expense to the laboratory just in the postage costs alone.

The laboratory in cooperation with the Division of Health Engineering (DHE) automatically sends out the required compliance samples as a service to our clients. As stated in previous newsletters if you receive a compliance sample kit from the laboratory, it is important that you fill the sample bottles according to instructions and return the kit to the laboratory for testing. If you have a question on the necessity of the testing, you should call DHE at 287-2070 for this determination. Only DHE staff can waive the requirement of testing. Approximately 98 percent of the sample kits on the automatic shipping schedule for 1999 were for required compliance testing.

A Y2K Editorial – Our Computers Survived!! Now, Let's Stop and Think about the Century for a Nano Second

By: Jack Krueger, Chief HETL

At the turn of a century, with so much attention paid to the survival of our computers, it would be remiss not to mention some of the cultural "human" changes in the laboratory world that have taken place over the past one hundred years, let alone the millennium!!

Here are just a few laboratory facts to consider while we plug along at our fast paced new aged life style:

- The State Laboratory of Hygiene, the forerunner of the State Public Health Lab was established in 1888, just about the time that there was an outbreak of smallpox in Gardiner at the Cumberland Mills. Tuberculosis (~1,500

deaths/year) and Typhoid fever (286 deaths/year) were major causes of death at this time.

- In 1901, the first samples were analyzed in the State Laboratory of Hygiene
- Between 1904 and 1905, 427 tuberculosis, 624 diphtheria, 187 typhoid, and 700 water samples had been examined.
- In 1903 a typhoid epidemic allegedly due to contaminated river water, precipitated the establishment of water districts. Regular chlorine treatment was not to appear in Maine until 1916, but was not accepted by most communities due to the use of chlorine gas during World War I. Up to January 1923 city of Augusta had been drawing its water from the Kennebec River near the Edwards Manufacturing Plant without any filtration; this was considered the direct cause of a typhoid epidemic in 1922.
- In 1923 the process was initiated for regular monthly testing of water for drinking safety, however it was not until 1963 before all water districts would apply chlorine treatment routinely
- The existing public health laboratory was built in 1967-1969 and moved from the current Department of Education Building.
- In 1969, 96 hours were needed to provide a bacteria result with multiple tube fermentation (MPN), it was reduced to a 24 hour presumptive result with the membrane filter, and presently has been reduced to a 24 hour confirmation for total coliform and E coli, using a highly specialized enzymatic reaction.
- In 1970 a virology laboratory was established under the directorship of Dr. Charles Okey. At that time this lab was the only laboratory north of Boston which could identify polio and influenza cases.
- In 1971 the Legislature passed an emergency act to require a service fee of \$2.00 for the testing of private water supplies.
- In 1972, the first issue of Lab Gab newsletter was published by the State Public Health Lab.
- The first word processor was utilized in the lab in 1984, though a computer operated instrument was usable in 1980. Both of these computers have been replaced by smaller units more than 10-100 times as fast!!
- In 1984, Maine began routinely analyzing for gasoline and petrochemicals in water.
- In 1991 the legislature merged the DEP laboratory with the Public Health Laboratory to form the HETL; the actual merger was in 1993.

Needless to say, during the past 20 years, there have been undreamed of improvements in technology and instrumentation that would probably not have been envisioned even fifty years ago. To list a few: Induced Coupled Plasma Spectroscopy, Gas Chromatograph /Mass Spectrometry, Ion Chromatography, Autoanalyzers, Ion selective electrodes, Pulsed Field Gel Electrophoresis, Polymerase Chain Reaction Test (DNA Amplification), TMA (RNA Replication/Amplification), Western Blot, Enzyme Linked

Immunosorbent Assay. And of course, there are those computers, too!.

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