

State of New Hampshire

GENERAL COURT

CONCORD

MEMORANDUM

DATE: November 1, 2018

TO: Honorable Chris Sununu, Governor
Honorable Gene Chandler, Speaker of the House
Honorable Chuck W. Morse, President of the Senate
Honorable Paul C. Smith, House Clerk
Honorable Tammy L. Wright, Senate Clerk
Michael York, State Librarian

FROM: Representative Mark Pearson, Chairman

SUBJECT: Final Report of the Commission to Study Environmentally-Triggered Chronic Illness
RSA 126-A:73 (HB 511, Chapter 166:2, Laws of 2017)

Pursuant to RSA 126-A:73 (HB 511, Chapter 166:2, Laws of 2017), enclosed please find the Final Report of the Commission to Study Environmentally-Triggered Chronic Illness.

If you have any questions or comments regarding this report, please do not hesitate to contact me.

I would like to thank those members of the commission who were instrumental in this study. I would also like to acknowledge all those who testified before the commission and assisted the commission in our study.

Enclosures

cc: Members of the Commission

FINAL REPORT

Commission Study Environmentally-Triggered Chronic Illness RSA 126-A:73 (HB 511, Chapter 166:2, Laws of 2017) November 1, 2018

Commission Membership:

House Member appointed by the Speaker	Mark Pearson
House Member appointed by the Speaker	Bill Ohm
House Member appointed by the Speaker	Joseph Guthrie
House Member appointed by the Minority Leader	Mindi Messmer
House Member appointed by the Minority Leader	Jeffrey Salloway
Senate Member appointed by the Senate President	Martha Fuller Clark
Senate Member appointed by the Senate President	Daniel Innis
NH Department of Health and Human Services	Lisa Morris
UNH Institute for Health Policy and Practice	Amy Costello
NH Medical Society	Thomas Sherman
NH Hospital Association	Thomas Wold
NH Nurse Practitioner Association	Julie Bosak

Process and Procedures:

The committee organized on Thursday, September 6th and elected Representative Mark Pearson as Chair. The Chair appointed Representative Jeffrey Salloway as commission clerk.

The committee met thirteen times throughout the study period, and issued an interim report on November 1, 2017. The minutes and interim report are attached. Minutes, documents reviewed by the commission, the interim report and this final report are also available on the Commission's webpage at:

<http://www.gencourt.state.nh.us/statstudcomm/details.aspx?id=1348&rbl=1&txtkeyword=chronic>

Documents Reviewed:

- DHHS Public Health Laboratories handout
- NH DPHS Biomonitoring Program handout
- NH State Cancer Registry handout
- Stensgaard, Anna-Sofie, et al., "Virtual globes and geospatial health: the potential of new tools in the management and control of vector-borne diseases," *Geospatial Health* 3 (2), pp 127-147.
- Health Transformation in New Hampshire: April 2016 Powerpoint
- Memorandum of Agreement between DHHS and DES re: Cooperation in the area of Environmental Public Health Tracking (July 1, 2017 – June 30, 2022)
- Empowering the Granite State: State Health System Innovation Plan Model Design Proposal, January 2016
- DPHS Data Release Guidelines, July 16, 2016
- Kaffenberger, Benjamin H., et al., "The effect of climate change on skin disease in North America," *Journal of American Academic Dermatology* vol. 76 (1), 2016, pp 140-147.
- NH Health WISDOM powerpoint, October 20, 2017, Dr. Kathleen Bush
- C8 Settlement science panel PFOA probable health link report summary
- Lead Poisoning Prevention, Executive Summary, DPHS
- Health Effects of PFAS, ATSDR
- PFAS Clinician Fact Sheet

- Woodward, Robert S., et al., “Optimum Investments in Project Evaluations: When Are Cost Effectiveness Analyses Cost-Effective,” *The Journal of Medical Systems* vol. 20 (6), 1996, pp 385-393.
- NTP Monograph on Health Effects of Low-Level Lead, Executive Summary, table 1.1 and 1.2
- Washington County, WI Community Profile
- New Bedford, MA Community Profile
- Brooklyn District 14, NY Community Profile
- NHDPHS: Female Breast Cancer Incidence Rates by State, 2014
- NH Health WISDOM: Bladder Cancer Incidence
- Elevated Bladder Cancer in Northern New England – Drinking Water and Arsenic: USGS
- Bruce Stanton, Ph.D., Dartmouth Toxic Metals Superfund Research Program, Testimony on HB 1592 (2018)
- Jamee Hood and Sonya Lunder, “Cancer-Causing Arsenic Contaminates Tap Water for 70 Million Americans,” EWG, September 20, 2017
- Proposed Metrics for Environmental Health Community Profiles: Dr. Kathleen Bush

Findings and Recommendations:

The Commission’s findings and recommendations are divided into the following sections:

- Health and Environmental Database Inventory (charges 1, 6, 7)
- Health Indicator Inventory (charge 5)
- Communications (charges 2, 3, 11, 12)
- Synthesis/Analysis (charges 4, 8, 9, 10)

Health and Environmental Database Inventory

Relevant Charges:

- (1) Determining which entities may report confirmed cases of chronic conditions or other health-related impacts to the public health oversight program.
- (6) Studying current health databases, including years available, potential for small area analysis, and privacy concerns.
- (7) Researching currently existing health data reports by agency, bureau, or organization.

After its investigation the commission found that the following data sources held promise as elements for potential future integration in a system of environmental/public health data surveillance. It should be noted, however, that each data set has its own unique limitations and presents only a partial picture.

The NH Comprehensive Health Data Information System (CHIS)

The Insurance Department requires that health insurance carriers and third party administrators (TPAs) operating in NH to submit their claims data to the Department. The data has been collected from 2005 to present, and is created when providers submit a claim for reimbursement from an insurance company.

Types of care reflected in claims include:

- Inpatient
- Outpatient
- Prescription
- Dental
- Mental Health Counseling
- Substance Abuse Counseling

NH Health WISDOM

NH Health WISDOM is an interactive system assembled by the Department of Health and Human Services, Division of Public Health Services, in order to aggregate public health data and produce customized analysis. Data in WISDOM is organized around The New Hampshire State Health Improvement Plan (NH SHIP) and the NH Environmental Public Health Tracking (EPHT) surveillance data on environmental hazards, exposures, and associated health effects. Users may access data using interactive dashboards. Data in WISDOM is compiled from the following sources:

- Behavioral Risk Factor Surveillance Survey 2005-2016
- NH Hospital Discharge Data (In-State) 2000-2009; 2012-2016
- NH Hospital Discharge Data (Out-of-State) 2000-2009; 2012-2016
- Birth Conditions 2003-2010
- Air Quality (PM 2.5 and Ozone) 1999-2014
- National Survey on Drug Use and Health (NSDUH) 2003-2015
- NH Population (Claritas) 2005-2017
- Occupational Health Data (years vary based on dataset)
- PFC blood test results 2015-2016 (varies based on location)
- NH State Cancer Registry 2000-2015 maintained through the Geisel School of Medicine at Dartmouth-Hitchcock Medical Center
- NH Vital Records (Birth/Death Certificates) 2000-2016
- Pediatric Nutrition Surveillance System (PedNSS) 2007-2013
- Third Grade Survey 2009, 2014
- Youth Risk Behavior Surveillance System 2007-2017

LIMS system, DHHS Division of Public Health, Public Health Laboratories

The LIMS system is the internal data system of DHHS's Public Health Laboratories, which is used to store data accumulated in the course of a miscellany of programs. The Public Health Laboratories have been involved in testing for water quality in conjunction with DES's MTBE investigations, arsenic and uranium in conjunction with DHHS's Biomonitoring Program, and DHHS's lead poisoning surveillance.

For details on the release of data held by DHHS to the general public and to public health researchers, consult the Division of Public Health Services

The Environmental Monitoring Database

The Department of Environmental Services Environmental Monitoring Database holds data collected through permitting, investigation and monitoring activities of the divisions of air resources, water resources and waste management. Data is collected through permitting activities and data monitoring required by state law, rules, and relevant federal statutes such as the Clean Air and Clean Water Acts.

The public facing portal to the Environmental Monitoring Database is the website OneStop, maintained by the Department.

Health Indicator Inventory

Relevant Charge:

- (5) Defining by codes, the health status indicators to be monitored, including chronic conditions, medical conditions, and poor health outcomes.

To conduct surveillance of standard chronic disease conditions, the Commission suggests using the chronic disease indicators (CDI) from the Centers for Disease Control and Prevention (CDC), the Council of State and Territorial Epidemiologists (CSTE), and the National Association of Chronic Disease Directors (NACDD). The CDI are a set of surveillance indicators developed by experts in the field for public health surveillance. For more information visit the CDC Chronic Disease Indicators website.

The Chronic Disease Indicators draw on several federal databases including, but not limited to: Behavioral Risk Factor Surveillance System (BRFSS), State Cancer Registries, the American Community Survey (ACS), National Vital Statistics System (NVSS), Youth Risk Behavior Surveillance System (YRBS), Pregnancy Risk Assessment Monitoring System (PRAMS), Alcohol Epidemiologic Data System, National Survey of Children’s Health, Centers for Medicare and Medicaid Services Chronic Condition Warehouse, National Immunization Survey, and others. This list of indicators may be refined in the future.

Summary of Chronic Disease Indicators by Indicator Group (2013)

Indicator Group	Total Number of Indicators	Individual measures
Alcohol	10	14
Arthritis	5	8
Asthma	6	12
Cancer	10	20
Cardiovascular Disease	11	18
Chronic Kidney Disease	3	4
Chronic Obstructive Pulmonary Disease	8	13
Diabetes	13	20
Disability	1	1
Immunization	1	1
Mental Health	3	3
Nutrition, Physical Activity, and Weight	22	38
Older adults	4	5
Oral health	5	9
Overarching Conditions	8	16
Reproductive Health	3	3
School Health	0	0
Tobacco	11	16
Total	124	201

To conduct surveillance of standard neurologic conditions, the Commission suggests using the following standard case definitions (adapted from St. Germaine-Smith et al., 2012 Recommendations for optimal ICD codes to study neurologic conditions. Neurology (79)).

As stated in the review article, “To ensure the accurate interpretation of population-based studies with use of administrative health data (i.e., hospital discharge data), the accuracy of case definitions for neurologic conditions needs to be taken into consideration.” Other conditions that may be of interest are difficult to

define due to too few validation studies. Examples of these rare conditions include cerebral palsy, Huntington disease, hydrocephalus, muscular dystrophy, spina bifida.

Summary of Neurologic Conditions Indicators by Category
(Adapted from St. Germaine-Smith et al., 2012)

Disease Outcome	Relevant ICD-9 or ICD-10 Code
Epilepsy	ICD-9: 345; ICD-10: G40 – 41
Motor neuron disease	ICD-9: 335, 335.2; ICD-10 G12.2
Multiple sclerosis	ICD-9: 340; ICD-10: G35
Parkinson disease	ICD-9: 332; ICD-10: G20 (limited validation)

This list of indicators may be refined in the future.

Communication

Relevant Charges:

- (3) Recommending a method to inform citizens regarding programs designed to manage chronic disease or other environmental exposure health-related impacts.
- (11) Collaborating with the National Institutes of Health, the United States Environmental Protection Agency, and the Centers for Disease Control and Prevention to develop protocols for the department of health and human services to educate and provide guidelines for physicians and other advanced health care practitioners to identify and evaluate appropriate diagnostic screening tests to assess health effects from exposure to emerging contaminants.
- (12) Collaborating with the National Institutes of Health, the United States Environmental Protection Agency, and the Centers for Disease Control and Prevention to develop protocols for programs to streamline education and outreach to health care providers about how to implement the guidelines specified in subparagraph (11). The protocols shall include education relative to methods to reduce further exposures and to eliminate the contaminants, if effective methods are available.

The commission gathered information relative to current practices, that the public concerns associated with those charges have been clearly communicated to the Departments, but that the further development of information and training protocols should be deferred until the synthesis of environmental and health data envisioned in the three stage process recommended by the commission takes place.

Synthesis/Analysis of Data

Relevant Charges:

- (2) Recommending ways to alert public health officials regarding higher than expected rates of chronic disease or other health-related impacts which may be related to exposures of unrecognized environmental contaminants.
- (4) Recommending data sources and a method to include data compiled by a public or private entity to the greatest extent possible in the development of the public health oversight program.

(8) Creating a model of desired data outputs and reports for chronic conditions and other health-related impacts.

(9) Identifying the gaps between what currently exists and the model output.

(10) Recommending the organizational structure responsible for the oversight function and mandatory reporting requirements.

HB 1356 (2018), sponsored by the commission chair and co-sponsored by all the legislative members of the commission, was signed into law by Governor Sununu on June 25th, 2018. The bill required the Department of Environmental Services and the Department of Health and Human Services to develop and implement a method by which the departments share certain health outcome and environmental data. Specifically, the departments are tasked to:

- Update a memorandum of agreement on cooperation regarding data sharing
- Sign a joint standard operating procedure on how data layers can be shared between the 2 departments to identify linkages between environmental contaminants and health outcomes
- Hold a presentation on the departments' ongoing, joint efforts under the Centers for Disease Control and Prevention environmental public health tracking cooperative agreement.
- Compile a report describing and estimating the cost to perform a 2-way pilot project between the departments on arsenic in drinking water, where both health effects and environmental data exist (see attached report).

In its August 31st report, the Division of Public Health Services noted that due to the absence of key staff, the interagency team could not currently complete the work on the pilot proposal.

Recommendations

The following three stage process, beginning with the completion of the planned pilot, is recommended by the commission.

Stage One

Conduct the pilot, including mapping areas with high arsenic levels (already available), along with review of related cancers (bladder) within those areas, to assess possible associations. This study will demonstrate the “how to” of assessing linkages. Components would include selection of appropriate data sources, mapping, epidemiologist analysis, and a write-up of methods and findings (with potential to publish in a public health journal). The DPHS and DES will collaborate and as feasible do as much of the work as possible with existing resources and also advise of any additional resources that may be needed to complete work on the study. The time frame to complete the study will be within SFY 19.

Stage Two

Building off of the lessons learned from the study, DPHS and DES will work with the legislature to propose an expanded review of environmental contaminant and health data sets – perhaps up to 10 top contaminants and/or disease focus areas. A cost/benefit discussion will be included in the proposal, as well as resource, methodology and funding required (via a fiscal note) to support the expansion. It is hoped that demonstration of value in Stage One would suggest possible federal funding options to complement state funding. DPHS and DES will partner with Dartmouth and UNH as well as federal agencies (EAP, CDC) to add academic environmental public health expertise to the design and implementation of the expansion (contingent upon funding and resources – IT and staff/contracted). Time frame for the proposal is within 6 months of completion of Stage One. Once the necessary resources

and structures are in place, the informed expansion will commence and results will be reported out to the legislature (estimated to be available by July 1, 2020).

Stage Three

Development of a comprehensive system of automated mapping and analysis, complimented by expert epidemiological investigation where there are indicators of adverse population health effects related to known environmental contaminants for a wide range of contaminants, would be proposed based on the success of Stage Two. State agencies would partner with NH academic institutions to strengthen the blend or research and surveillance in a robust ongoing and sustainable system. A cost estimate and a benefit assessment would be provided for the SFY 22/23 biennial budget.

In addition to the three step process, the commission recommends that legislation be filed for consideration in 2019 to extend the commission's work for two additional years.

Conclusion

After two years of study, the commission hopes that the information gathered in this report and the recommendations made will benefit future efforts to create integrated surveillance and response in the area of environmental health.

A serious challenge for policymakers charged with protecting the public's health is the difficulty of proving a link between exposure to an environmental contaminant and an illness. Where evidence exists of a link, scientists, courts, office holders and members of the public may disagree on the standards of proof.

To assess such links, epidemiologists have developed two main types of studies which vary in their ability to confer certainty.

First, observational studies, including ecological and case-control studies. These studies are fast, inexpensive, and permit the calculation of risk in mathematical terms. While they do not prove that exposure to a contaminant causes an illness, they can strongly suggest that a relationship of some kind exists. Courts may disagree that evidence of this kind meets a required legal standard of proof.

Longitudinal studies which follow an exposed population over time, offer higher quality evidence that exposure to a contaminant causes illness, but these studies are slow and expensive.

Policymakers in this area are therefore routinely faced with a decision; act now on uncertain evidence and risk wasting resources, or wait for definitive proof at the risk of continuing damage to public health.

Public health scientists faced with this dilemma have developed the Precautionary Principle, which states that if we have some evidence that a risk factor causes a disease and if the disease has serious consequences and if the risk factor can be mitigated at reasonable cost to society and if mitigation does not further damage society — we should act — even if we are not totally certain.

However this leaves us to ask: if there is a substantial cost to mitigation — do we have the right to intervene based on uncertain evidence and demand mitigation?

This difficult question will present itself again and again in the future. It's the commission's hope that guided by its work, future policymakers, scientists and health workers in New Hampshire will be able to address emerging issues quickly, in a coordinated and informed way.

Attachments

Attached with this report, please find:

- The minority report of commission member Representative Mindi Messmer
- Appendix A: Meeting Minutes
- Appendix B: HB 1356 Preliminary Report

MINORITY REPORT OF REPRESENTATIVE MINDI MESSMER

Commission Study Environmentally-Triggered Chronic Illness RSA 126-A:73 (HB 511, Chapter 166:2, Laws of 2017) November 1, 2018

Commission Charge and Study Purpose:

The commission's study was charged with (but not limited to):

- (1) Determining which entities may report confirmed cases of chronic conditions or other health-related impacts to the public health oversight program.
- (2) Recommending ways to alert public health officials regarding higher than expected rates of chronic disease or other health-related impacts which may be related to exposures of unrecognized environmental contaminants.
- (3) Recommending a method to inform citizens regarding programs designed to manage chronic disease or other environmental exposure health-related impacts.
- (4) Recommending data sources and a method to include data compiled by a public or private entity to the greatest extent possible in the development of the public health oversight program.
- (5) Defining by codes, the health status indicators to be monitored, including chronic conditions, medical conditions, and poor health outcomes.
- (6) Studying current health databases, including years available, potential for small area analysis, and privacy concerns.
- (7) Researching currently existing health data reports by agency, bureau, or organization.
- (8) Creating a model of desired data outputs and reports for chronic conditions and other health-related impacts.
- (9) Identifying the gaps between what currently exists and the model output.
- (10) Recommending the organizational structure responsible for the oversight function and mandatory reporting requirements.
- (11) Collaborating with the National Institutes of Health, the United States Environmental Protection Agency, and the Centers for Disease Control and Prevention to develop protocols for the department of health and human services to educate and provide guidelines for physicians and other advanced health care practitioners to identify and evaluate appropriate diagnostic screening tests to assess health effects from exposure to emerging contaminants.
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UNH Institute for Health Policy and Practice	Amy Costello
NH Medical Society	Thomas Sherman
NH Hospital Association	Thomas Wold
NH Nurse Practitioner Association	Julie Bosak

Executive Summary:

The HB511 Commission was formed with the overall goal of reducing exposures in our environment that may trigger cancer and chronic disease in New Hampshire. According to the Centers for Disease Control (CDC), New Hampshire has the highest incidence rates of breast, bladder, esophageal (<https://gis.cdc.gov/Cancer/USCS/DataViz.html>), and pediatric cancers (https://www.cdc.gov/mmwr/volumes/67/wr/mm6725a2.htm#Fl_down) of all US states. In addition, a double pediatric cancer cluster was identified in a 5-town area of the seacoast in 2016 (<https://www.dhhs.nh.gov/dphs/hsdm/cancer/rms-investigation.htm>).

The importance and breadth of public health environmental threats:

“More broadly, the Global Burden of Disease Study has estimated that 9 million deaths per year can be attributed to environmental or occupational factors such as air pollution or unsafe water, sanitation, and hand washing. This represents three times more deaths than those caused by AIDS, tuberculosis, and malaria together, and 15 times more than the deaths caused by all wars. Environmental exposures are important for non-fatal illness throughout the life course, with significant impacts on birth outcomes, pediatric asthma, cardiovascular health, and other diseases.”

“Many of the solutions to environmental challenges require expertise across multiple disciplines. As such, environmental health is inherently interdisciplinary, and there are natural and sustained connections to most branches of public health...Water is a key resource that requires sustained public health attention. By documenting the connections between drinking water exposures and poor health outcomes, we provide information and data to inform both prevention and intervention strategies. The lack of control of lead in drinking water in Flint, Michigan, and the lack of attention to the aging infrastructure in many cities, represents an intertwined environmental and public health failure.”

Sandro Galea, MD, DrPH
Dean and Robert A Knox Professor, and
Jonathan Levy, ScD
Professor, Environmental Health, Boston
University School of Public Health

The work of the commission is to determine how to establish a data framework that would enable health and environmental officials to monitor areas of increased disease and illness that threaten public health in proactively before they become clusters. The model the commission is developing is meant to inform where areas of concern exist and where financial resources should be spent if these gaps are problematic. The goal is to communicate findings to the public and make concrete recommendations on how the state

and citizens can reduce exposure to environmental agents that are thought to trigger chronic illness and cancer and improve outcomes.

The charge of this Commission requires an inter-agency approach between the Department of Health and Human Services (DHHS) and the Department of Environmental Services (DES). This stumbling block to the charge of the Commission was identified early on and members sponsored enabling legislation that was signed into law in 2018 to compel the agencies to share data in order to accomplish the goals of the commission.

Introduction:

The seacoast pediatric cancer cluster consists of statistically significant higher than expected rates of rhabdomyosarcoma (RMS) and pleuropulmonary blastoma (PPB) (Department of Health and Human Services Pediatric Cancer Cluster Investigation, February 2016), as well as, almost 3 times the expected rate of brain and central nervous system cancers in children in the same 5-town area. The double pediatric cancer cluster was reported to the New Hampshire Cancer Registry by Rye resident and HB511 Commission member Representative Mindi Messmer in March 2014. While the pediatric cancers have several inherited or genetic conditions that could predispose individuals to RMS and PPB, it is thought that environmental factors may trigger onset.

The Commission discussed several environmental factors that may be contributing to cancer and chronic disease in New Hampshire from a variety of natural, industrial, and defense-related sources. According to the New Hampshire Department of Environmental Services, approximately 150 unlined landfills and 20 Superfund Sites exist in New Hampshire which are possible and proven environmental concerns. Drinking water, groundwater, surface water, soil and air contamination has been identified related to these and other sources of environmental pollution. PFAs contamination of drinking water supplies has been identified in Amherst (TCI), Rochester (Lydall), Brentwood (County Fire Training Area) and adjacent to unlined landfills across the state. Four of the largest drinking water supply wells on the seacoast have been shut down due to environmental contamination. Approximately 14.7 square miles of drinking water aquifer in the Merrimack/Bedford/Litchfield area is impacted from an airborne release by Saint Gobain and an approximate total of 64 square miles is potentially impacted. Residents across the state are currently drinking water from private and municipal sources with levels of arsenic and PFAs chemicals, at a minimum, above what other states would allow. Other releases of contaminants in private and public drinking water supplies have been identified across the state.

With the high rates of cancer in New Hampshire and the fact that the pediatric cancer cluster was identified by private citizens, highlight the fact that the need to proactively address ways to reduce and prevent cancer and chronic illness.

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The commission heard presentations from the New Hampshire Department of Health and Human Services, commission members, the Department of Environmental Services, the New Hampshire Insurance Department, and academic professionals.

With the Charge of the Commission in mind, the commission organized its work into 1) developing a database of relevant reference information reviewed; 2) developing an inventory of relevant health indicators, 2) developing an environmental and health data inventory. The following sections provide a summary of the Commission work.

Documents Reviewed:

Documents reviewed during the Commission charge are summarized below (see <http://www.gencourt.state.nh.us/statstudcomm/committees/1348/>):

- DHHS Public Health Laboratories handout
- NH DPHS Biomonitoring Program handout
- NH State Cancer Registry handout
- NIEHS Chronic Conditions and Toxin/Agents, handout
- Stensgaard, Anna-Sofie, et al., “Virtual globes and geospatial health: the potential of new tools in the management and control of vector-borne diseases,” *Geospatial Health* 3 (2), pp 127-147.
- Health Transformation in New Hampshire: April 2016 Powerpoint
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- NTP Monograph on Health Effects of Low-Level Lead, Executive Summary, table 1.1 and 1.2
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- Bruce Stanton, Ph.D., Dartmouth Toxic Metals Superfund Research Program, Testimony on HB 1592 (2018)
- Jamee Hood and Sonya Lunder, “Cancer-Causing Arsenic Contaminates Tap Water for 70 Million Americans,” EWG, September 20, 2017
- Proposed Metrics for Environmental Health Community Profiles: Dr. Kathleen Bush
- Building Environmental Health and Chronic Disease Capacity, DHHS

Health Indicator Inventory

The Commission was tasked to define by codes, the health status indicators to be monitored, including chronic conditions, medical conditions, and poor health outcomes related to environmental exposures. In order to understand what information exists regarding environmental exposures that are likely to trigger public health impacts that should be included in the framework of the monitoring system, the Commission identified available information regarding known common diseases and conditions that may be linked to environmental exposures.

Diseases and conditions strongly linked to environmental exposures and associated environmental toxins recognized by NIEHS are summarized on Table 1 (see <https://www.niehs.nih.gov/health/topics/index.cfm>).

Table 1. NIEHS Summary of Disease or Condition and Environmental Toxin

Disease or Condition	Subtype Diagnosis	Environmental Toxin(s)
Asthma	Asthma	Air pollution, ozone, fine particulates, allergens
Autism	n/a	Air pollution,
Autoimmune diseases (i.e., Lupus)	Diabetes Lupus Multiple sclerosis Rheumatoid Arthritis Celiac disease	Solvents Smoking Silica Mercury
Cancer	Breast cancer Endometrium Kidney Colon Lung Esophagus	Acrylamide (fried food) Arisotolochic acids (herbals) Tobacco Obesity Pesticides Solvents Silica Dioxins PAHs Arsenic Beryllium
Lung disease	COPD	Tobacco Allergens Air pollution Asbestos
Obesity (Obesogens)		Tobacco Tribuytlin Pesticides PCBs Phthalates Flame retardants
Parkinson's disease		Pesticides DDT
Reproductive Health		Lead Mercury

The NIEHS lists chemicals or factors in the environment to which humans are exposed that may cause adverse health effects (see <https://www.niehs.nih.gov/health/topics/agents/index.cfm>).

The Commission reviewed additional studies that determined probable links between exposure to PFAS and pregnancy-induced hypertension/pre-eclampsia, liver damage, increases in serum lipids, decreased antibody response, asthma, lower birth weight, thyroid disease, ulcerative colitis, decreased fertility, testicular and kidney cancer (<https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf> and C8Sciencepanel.org). More recent studies suggest connections with breast cancer (Ghisari M, et al., 2017 and Bonefeld-Jørgensen EC, et al., 2014).

The Commission also heard about the biomonitoring program currently underway consisting of collaboration between the NHDES and NHDHHS to assess the relationship between arsenic levels in drinking water and public health outcomes such as bladder and lung cancer. The program was implemented since New Hampshire has the highest levels of bladder cancer in the country. House Bill 1592 was passed into law in 2018 and will result in NHDES proposing a more stringent drinking water standard for arsenic by January 1, 2019 intended to reduce levels of exposure to arsenic in drinking water to prevent bladder, kidney, and lung cancer.

To conduct surveillance of standard chronic disease conditions, the Commission suggests using the chronic disease indicators (CDI) from the Centers for Disease Control and Prevention (CDC), the Council of State and Territorial Epidemiologists (CSTE), and the National Association of Chronic Disease Directors (NACDD) and the National Institute of Environmental Health Sciences (NIEHS). The CDI are a set of surveillance indicators developed by experts in the field for public health surveillance and are summarized on Table 2. The Chronic Disease Indicators draw on several federal databases including, but not limited to: Behavioral Risk Factor Surveillance System (BRFSS), State Cancer Registries, the American Community Survey (ACS), National Vital Statistics System (NVSS), Youth Risk Behavior Surveillance System (YRBS), Pregnancy Risk Assessment Monitoring System (PRAMS), Alcohol Epidemiologic Data System, National Survey of Children's Health, Centers for Medicare and Medicaid Services Chronic Condition Warehouse, National Immunization Survey, and others. For more information visit the CDC Chronic Disease Indicators website: <https://www.cdc.gov/cdi/index.html>.

Table 2. Summary of Chronic Disease Indicators by Indicator Group (2013)

Indicator Group	Total Number of Indicators	Individual measures
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Arthritis	5	8
Asthma	6	12
Cancer	10	20
Cardiovascular Disease	11	18
Chronic Kidney Disease	3	4
Chronic Obstructive Pulmonary Disease	8	13
Diabetes	13	20
Disability	1	1
Immunization	1	1
Mental Health	3	3
Nutrition, Physical Activity, and Weight	22	38
Older adults	4	5
Oral health	5	9
Overarching Conditions	8	16
Reproductive Health	3	3
School Health	0	0
Tobacco	11	16
Total	124	201

This list of indicators may be refined in the future as the work of the Commission continues to evolve.

To conduct surveillance of standard neurologic conditions, the Commission suggests using the following standard case definitions (adapted from St. Germaine-Smith et al., 2012 Recommendations for optimal ICD codes to study neurologic conditions. Neurology (79)) shown on Table 3.

As stated in the review article, "To ensure the accurate interpretation of population-based studies with use of administrative health data (i.e., hospital discharge data), the accuracy of case definitions for neurologic conditions needs to be taken into consideration." Other conditions that may be of interest are difficult to define due to too few validation studies. Examples of these rare conditions include cerebral palsy, Huntington disease, hydrocephalus, muscular dystrophy, spina bifida.

Table 3. Summary of Neurologic Conditions Indicators by Category (Adapted from St. Germaine-Smith et al., 2012)

Disease Outcome	Relevant ICD-9 or ICD-10 Code
Epilepsy	ICD-9: 345; ICD-10: G40 – 41
Motor neuron disease (incl. ALS)	ICD-9: 335, 335.2; ICD-10 G12.2
Multiple sclerosis	ICD-9: 340; ICD-10: G35
Parkinson disease	ICD-9: 332; ICD-10: G20 (limited validation)

Existing Data Framework and Data Gaps:

The following sections of this report present a summary of the Commission's work to define the framework necessary to achieve the goals of creating a monitoring system for environmentally triggered disease in New Hampshire. The Commission's findings relating to available data sources in the state are divided into the following sections:

- Health and Environmental Database Inventory (charges 1, 6, 7)
- Communications (charges 2, 3, 11, 12)

NH Health and Environmental Database Inventory

The Commission focused on determining what data is already collected in the state that is relevant to the overall goal of creating a public health environmentally triggered disease monitoring system. The Commission investigated which entities report confirmed cases of chronic conditions or other health-related impacts. The Commission studied current health databases, including years available, potential for small area analysis, and privacy concerns and researched currently existing health data reports by agency, bureau, or organization.

After its investigation the commission found that the following data sources held promise as elements for potential future integration in a system of environmental/public health data surveillance.

For details on the release of data held by DHHS to the general public and to public health researchers, consult the Division of Public Health Services.

The NH Cancer Registry

The New Hampshire State Cancer Registry (NHSCR) is a statewide, population-based cancer surveillance program that collects incidence data on all cancer cases diagnosed or treated in the State of New Hampshire. Since its inception in 1985, the NHSCR has contracted with the Geisel School of Medicine at Dartmouth by the DHHS Division of Public Health Services and the Health Statistics and Data Management Section.

In mid-1984, mortality statistics for the State of New Hampshire as provided by the National Cancer Institute showed that our population had experienced about 100 more cancer deaths than the national average each year during the period 1950-1979. This information led to the formation of a Coalition Against Cancer, established with the help of the New Hampshire Division of Public Health Services and the American Cancer Society, N.H. Division, Inc. Through the efforts of the Coalition and the passage of the Chronic Disease Prevention and Control Act, cancer was established as a reportable disease in New Hampshire. A contract between the Division of Public Health Services and Dartmouth College to establish and operate a statewide cancer registry was then approved by the Governor and Council. The NHSCR collects incidence data on all cancer cases diagnosed or treated in New Hampshire. As required by the NH Administrative Rules, the NHSCR currently collects data from hospital registrars in the larger hospitals in NH. Hospitals with fewer than 105 cases per year who generally do not have their own cancer registry are assisted by the NHSCR staff, helping these hospitals with some of their reporting duties. The NHSCR also receives case report from physician practices, free standing radiation oncology centers, pathology laboratories and other sources. In addition, the NHSCR receives case reports for NH residents who are diagnosed outside the state, based on interstate data exchange agreements. The NHSCR has an innovative, two-phase reporting system. The initial rapid report provides basic aspects of case identification and is submitted within 45 days of diagnosis. A definitive case report is transmitted within 180 days from the date of diagnosis, and includes more detailed information, such as treatment and staging information. Timely reporting is essential for registry activities.

The Cancer Registry data set is limited in the following ways:

- The stripping of direct personal identifiers prevents directly linking the data with other data sets.
- The reporting on small area incidence is restricted in order to protect privacy but may be possible. The Environmental Public Health Tracking program is investigating the potential future ability to utilize small area analysis. Strict policies and procedures have been developed to maintain confidentiality in disclosure of data.

The NH Comprehensive Health Data Information System (CHIS)

The New Hampshire Comprehensive Health Care Information System (CHIS) was created by NH state statute to make health care data "available as a resource for insurers, employers, providers, purchasers of health care, and state agencies to continuously review health care utilization, expenditures, and performance in New Hampshire and to enhance the ability of New Hampshire consumers and employers to make informed and cost-effective health care choices." The statute also required that the New Hampshire Insurance Department (NHID) and the NH Department of Health and Human Services (NH DHHS) partner on the project. The same legislation that created the CHIS also enacted statutes that mandated that health insurance carriers submit their encrypted health care claims data and Health Employer Data and Information Set (HEDIS) data to the state.

NH DHHS, Office of Medicaid Business and Policy, after a competitive bid process, contracted with Milliman in June 2012 to assume maintenance of the CHIS."

Through Health insurance carriers and third-party administrators (TPAs) operating in NH are required to submit their claims data to the NH Insurance Department. By contract the data is collected by Milliman in accordance with:

- RSA 420-G:11: Portability, Availability, and Renewability of Health Coverage
- Rules Chapter Ins 4000: Uniform Reporting System for Health Care Claims Data Set

The data has been collected from 2005 to present, and is created when providers submit a claim for reimbursement from an insurance company. Types of care reflected in claims include:

- Inpatient

- Outpatient
- Prescription
- Dental
- Mental Health Counseling
- Substance Abuse Counseling

RSA 420-G:11-a creates the NH Comprehensive Health Data Information System (CHIS) through a Memorandum of Understanding (MOU) between the Insurance Department and the DHHS, while also stipulating what data can be released:

“To the extent allowed by HIPAA, the data shall be available as a resource for insurers, employers, providers, purchasers of health care, and state agencies to continuously review health care utilization, expenditures, and performance in New Hampshire and to enhance the ability of New Hampshire consumers and employers to make informed and cost-effective health care choices. In presenting data for public access, comparative considerations shall be made regarding geography, demographics, general economic factors, and institutional size. Notwithstanding HIPAA or any other provision of law, the comprehensive health care information system shall not include or disclose any data that contains direct personal identifiers. For the purposes of this section, "direct personal identifiers" include information relating to an individual that contains primary or obvious identifiers, such as the individual's name, street address, e-mail address, telephone number, and social security number.”

While the information in the CHIS dataset has been stripped of direct personal identifiers, it does include basic information in the enrollment record such as gender, date of birth and zip code.

DHHS oversees the release of CHIS data for research purposes in accordance with:

- RSA 91-A:10: Procedure for Release of Personal Information for Research Purposes
- Rules Chapter He-W 950: Comprehensive Health Care Information System Procedures for the Release of Claims Data Sets for Public and Research Purposes

The CHIS data set is limited in the following ways:

- Only DHHS can link the CHIS data to other data sets since it is stripped of direct personal identifiers.
- The reporting on small area incidence is restricted in order to protect privacy.
- Claims data is limited to care provided to the privately insured population and does not include care provided through the Veteran's Administration, or to the privately insured living in NH but working and receiving insurance from carriers licensed out-of-state, or the uninsured.
- Contract terms require NH Medicaid managed care organizations to submit to CHIS.
- NH Medicare is also incorporated into CHIS format.

NH Health WISDOM

NH Health WISDOM is an interactive system assembled by the Department of Health and Human Services, Division of Public Health Services, in order to aggregate public health data and produce customized analysis. Data in WISDOM is organized around The New Hampshire State Health Improvement Plan (NH SHIP) and the NH Environmental Public Health Tracking (EPHT) surveillance data on environmental hazards, exposures, and associated health effects. Users may access data using interactive dashboards. Data in WISDOM is compiled from the following sources:

- Behavioral Risk Factor Surveillance Survey 2005-2016
- NH Hospital Discharge Data (In-State) 2000-2009; 2012-2016
- NH Hospital Discharge Data (Out-of-State) 2000-2009; 2012-2016
- Birth Conditions 2003-2010
- Air Quality (PM 2.5 and Ozone) 1999-2014

- National Survey on Drug Use and Health (NSDUH) 2003-2015
- NH Population (Claritas) 2005-2017
- Occupational Health Data (years vary based on dataset)
- PFC blood test results 2015-2016 (varies based on location)
- NH State Cancer Registry 2000-2015 maintained through the Geisel School of Medicine at Dartmouth-Hitchcock Medical Center
- NH Vital Records (Birth/Death Certificates) 2000-2016
- Pediatric Nutrition Surveillance System (PedNSS) 2007-2013
- Third Grade Survey 2009, 2014
- Youth Risk Behavior Surveillance System 2007-2017

Information in the WISDOM dataset has been stripped of direct personal identifiers, however, it does include indirect identifiers in the form of an assigned identifier number and basic information in the enrollment record such as gender, date of birth and zip code.

The WISDOM data set is limited in the following ways:

- The stripping of direct personal identifiers prevents cross-referencing its data with other data sets.
- The reporting on small area incidence is restricted in order to protect privacy.

LIMS system, DHHS Division of Public Health, Public Health Laboratories

The LIMS system is the internal data system of DHHS's Public Health Laboratories, which is used to store data accumulated in the course of a miscellany of programs. The Public Health Laboratories have been involved in testing for water quality in conjunction with DES's methyl-tert-butyl-ether (MTBE) investigations, arsenic and uranium in conjunction with DHHS's Biomonitoring Program, and DHHS's lead poisoning surveillance.

Information in the LIMS dataset has been stripped of direct personal identifiers, however, it does include indirect identifiers in the form of an assigned identifier number and basic information in the enrollment record such as address and zip code.

NH Public Health Laboratory

The Commission heard from Dr. Christine Bean about the public health laboratory operated by DHHS. The laboratory analyzes samples for biomonitoring and data are stored in an internal system. Dr. Bean indicated that this data could be incorporated into the NHWISDOM dashboard.

NH Biomonitoring Program

The Commission heard from Amanda Cosser about the biomonitoring program. The laboratory analyzes public and private water samples and the program is analyzing the connection between radon, arsenic and public health outcomes. Ms. Cosser indicated that this data could be incorporated into the NHWISDOM dashboard.

The Environmental Monitoring Database

The Department of Environmental Services Environmental Monitoring Database holds data collected through permitting, investigation and monitoring activities of the divisions of air resources, water resources and waste management. Data is collected through permitting activities and data monitoring required by state law, rules, and relevant federal statutes such as the Clean Air and Clean Water Acts.

The public facing portal to the Environmental Monitoring Database is the website OneStop, maintained by the Department.

Communication

The Commission was charged with recommending a method to inform citizens regarding programs designed to manage chronic disease or other environmental exposure health-related impacts.

Additionally, the Commission was tasked with collaborating with the National Institutes of Health, the United States Environmental Protection Agency, and the Centers for Disease Control and Prevention to develop protocols for the department of health and human services to educate and provide guidelines for physicians, health care providers and other advanced health care practitioners to identify and evaluate appropriate diagnostic screening tests to assess health effects from exposure to emerging contaminants. The Commission was also tasked with identifying ways to develop protocols for programs to streamline education and outreach to health care providers about how to implement the guidelines discussed above. The communication methods identified would also include education relative to methods to reduce further exposures and to eliminate the contaminants, if effective methods are available.

The commission gathered information relative to current practices, that the public concerns associated with those charges have been clearly communicated to the Departments, but that the further development of information and training protocols should be deferred until the synthesis of environmental and health data envisioned in the three-stage process recommended by the commission takes place.

In addition, the Commission heard that there are some very real limitations on communication internally between state departments and with external data sources due to antiquated computer systems making interagency cooperation and data sharing challenging.

Findings and Conclusions:

The work of the commission is to determine how to establish a data framework that would enable health and environmental officials to monitor areas of increased disease and illness proactively before they become clusters.

Examples of recent policy advanced in New Hampshire discussed in the Commission aimed to reduce rates of chronic disease and cancer include Senate Bill 247 (lead), House Bill 1532 (arsenic), and Senate Bill 309 (PFAs). Senator Dan Feltes presented to the Commission regarding SB-247 which will reduce childhood exposure to lead in paint and water.

House Bill 1532 which will result in a more stringent standard for arsenic in drinking water was signed into law during the 2018 session. Katie Bush (DHHS) discussed the EPHT study being conducted through a federal grant to assess arsenic and bladder cancer.

Senate Bill 309 was signed into law in the 2018 legislative session which will result in a rule making proposal for a more stringent and enforceable standard for five PFAS compounds in drinking water by January 1, 2019.

A serious challenge for policymakers charged with protecting the public's health is the difficulty of proving a link between exposure to an environmental contaminant and an illness. Where evidence exists of a link, scientists, courts, office holders and members of the public may disagree on the standards of proof.

Policymakers in this area are therefore routinely faced with a decision; act now on uncertain evidence and risk wasting resources, or wait for definitive proof at the risk of continuing damage to public health.

Public health scientists faced with this dilemma have developed the Precautionary Principle, which states that if we have some evidence that a risk factor causes a disease and if the disease has serious consequences and if the risk factor can be mitigated at reasonable cost to society and if mitigation does not further damage society — we should act — even if we are not totally certain.

However, this leaves us to ask: if there is a substantial cost to mitigation — do we have the right to intervene based on uncertain evidence and demand mitigation?

Professor Robert Woodward, a retired health economist from University of New Hampshire, presented to the Commission on the tension between the precautionary principle and cost effectiveness. Dr. Woodward reviewed his methodology for assessing cost-effectiveness of risk mitigations vs. the benefit of risk reduction. Assessing the cost paid by the reinsured is complex and includes assessing hospital costs, physician costs, lost days at work, and for caregiving. He compared the value of risk vs. the benefits of improving the environment. Quality adjusted life-year is a generic measure of disease burden, including both the **quality** and the **quantity of life** lived. It is used in economic evaluation to assess the value for money of medical interventions. One QALY equates to one year in perfect health. Dr. Woodward cited the need for small scale analysis; small geographical units to accomplish the Commission goal to identify and prevent environmental triggers for chronic illness.

Recommendations:

The Commission is charged with recommending the organizational structure responsible for the oversight function and mandatory reporting requirements. The DHHS provided the Commission with a legislative resource request to summarize staffing needs to establish a more centralized environmental health monitoring program within the DPHS. This would enable the Department to respond to emerging concerns and environmental health issues. This information is provided in Attachment C of the Majority Report.

HB 1356 (2018), sponsored by the commission chair and co-sponsored by all the legislative members of the commission, was signed into law by Governor Sununu on June 25th, 2018. The bill required the DES and the DHHS to develop and implement a method by which the departments share certain health outcome and environmental data. Specifically, the departments are tasked to:

- Update a memorandum of agreement on cooperation regarding data sharing
- Sign a joint standard operating procedure on how data layers can be shared between the 2 departments to identify linkages between environmental contaminants and health outcomes
- Hold a presentation on the departments' ongoing, joint efforts under the Centers for Disease Control and Prevention environmental public health tracking cooperative agreement.
- Compile a report describing and estimating the cost to perform a pilot project between the departments on arsenic in drinking water, where both health effects and environmental data exist.

As recommended by Dr. Woodward and Commission members, small area analysis and interagency cooperation between environmental and public health agencies is necessary to be able to build a framework that will allow public health officials to surveil, identify, and prevent clusters of chronic illness and cancer. Challenges include reforming the relationship between DES and DHHS to achieve these goals and overcoming infrastructure interoperability between departments. The Commission recommends the following three-stage pilot study process in order to further assess data gaps and challenges to overcome.

Stage One

Conduct the pilot, including mapping areas with high arsenic levels (already available), along with review of related cancers (bladder) within those areas, to assess possible associations. This study will demonstrate the “how to” of assessing linkages. Components would include selection of appropriate data sources,

mapping, epidemiologist analysis, and a write-up of methods and findings (with potential to publish in a public health journal). The DHHS and DES will collaborate and as feasible do as much of the work as possible with existing resources and also advise of any additional resources that may be needed to complete work on the study. The time frame to complete the study will be within fiscal year 2019

Stage Two

Building off of the lessons learned from the study, DHHS and DES will work with the legislature to propose an expanded review of environmental contaminant and health data sets and contaminants and/or disease focus areas. A cost/benefit discussion will be included in the proposal, as well as resource, methodology and funding required (via a fiscal note) to support the expansion. It is hoped that demonstration of value in Stage One would suggest possible federal funding options to compliment state funding. DHHS and DES will partner with academic institutions as well as federal agencies (EAP, CDC) to add academic environmental public health expertise to the design and implementation of the expansion (contingent upon funding and resources – IT and staff/contracted). Time frame for the proposal is within 6 months of completion of Stage One. Once the necessary resources and structures are in place, the informed expansion will commence and results will be reported out to the legislature (estimated to be available by July 1, 2020).

Stage Three

Develop a comprehensive system of automated mapping and analysis, complimented by expert epidemiological investigation where there are indicators of adverse population health effects related to known environmental contaminants for a wide range of contaminants, would be proposed based on the success of Stage Two. State agencies would partner with New Hampshire academic institutions to strengthen the blend or research and surveillance in a robust ongoing and sustainable system. A cost estimate and a benefit assessment would be provided for the fiscal year 2022/2023 biennial budget.

In its August 31st report, the DHHS noted that due to the absence of key staff, the interagency team could not currently complete the work on the pilot proposal at this time.

Closing:

The Commission was charged with recommending ways to alert public health officials regarding higher than expected rates of chronic disease or other health-related impacts which may be related to exposures of unrecognized environmental contaminants.

The Commission heard that there are some very real limitations on communication internally between state departments and with external data sources due to antiquated computer systems making interagency cooperation and data sharing challenging. Updates to facilitate cross agency communication and data sharing would enhance the ability to carry out the Commission's recommended actions.

Another proposal is recommended for the next legislative session to continue the important work of this HB511 Commission.

Attached Appendices (Majority Report):

A: Meeting Minutes

B: HB 1356 Preliminary Report

C: DHHS Legislative Resource Request

References:

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Appendix A:
Meeting Minutes

Commission to Study Environmentally-Triggered Chronic Illness
Sept. 6, 2017
Organizational Meeting
Minutes of the meeting

Meeting called to order at 10:00 a.m.

A. Introductions

Rep. Kotowski - called for meeting times

Sen. Fuller-Clark – identified data assessment (charge #6) as a first step in committee deliberations.

Rep. Weber – called for testimony on existing databases

Rep. Salloway – added the issue of access to the data

Rep. Pearson – called for examination of “hot spots”

Mr. Dumond – noted that environmental hot spots are the purview of Dept. of Environmental Services.

Rep. Kotowski – recommended that each member submit a list of prioritized activities

Sen. Fuller Clark – suggested items 2,3,4,10.

Dr. Sherman – reviewed a federal grant which funded a “deep dive” into state data. A final report on that project exists.

Rep. Kotowski – asked that a copy of that report be distributed to each commission member.

Dr. Sherman – reviewed the progress – or lack of the same of that report.

Mr. Dumond – raised the issue of the variety of reports prepared by state agencies. He recommended DES inclusion.

Dr. Sherman – added the need for Dept. of Insurance to be included as well.

Chair Pearson – will approach DES & insurance – called attention to objectives 6

Rep. ^{Weber}Weyler – added a need to include 7 & 8 to see where the gaps are. He added the need to look at federal data bases.

Sen. Fuller-Clark – voted the need to bring to the committee data on environmentally triggered illness.

Mr. Dumond – queried a process to identify data experts from HHS to appear.


Rep. Mark Pearson – Chairman

Rep. Jeffrey Salloway – Clerk

Next meeting Friday 9/15 at 10:00 a.m.

Meeting adjourned at 10:45 a.m.

Respectfully submitted,


Rep. Jeffrey Salloway, Clerk

Commission to Study Environmentally-Triggered Chronic Illness

HB 511

RSA Chapter: 126-A: 73

9-15-17

Call To Order:

Chairman Rep. Mark Pearson called the meeting to order at 10:01AM.

Rep. Salloway, clerk, distributed minutes of the 9-6-17 meeting and a contact information sheet to be signed by attendees. The chairman invited new members to introduce themselves. Rep. Weber is replaced by Rep. Messner. Added to the minutes was designation of Rep. Pearson as chairman and Rep. Salloway as clerk.

Organization:

A: Rep. Pearson asked that data bases be included in minutes.

David C. Bates will create a web site to make data accessible to the commission.

B: Rep. Pearson introduced Tyler Brannon of the NH Insurance Dept.

He described the NH Comprehensive Health Data Information System. This data goes back to 2005. Most people with insurance are in this data base. There is a website with this data. This has been used to assess cost of care. DHHS controls research access to this data. This is a large, complex data set.

C. Rep. Pearson noted that those who are uninsured aren't in the data base.

D. Rep. Kotowski asked about managed care data and Medicare data. These are pending,

E. Rep. Messner asked about residency data by zip code.

F. Ms. Porter noted the categories of insured, uninsured and self-pay.

G. Dr. Sherman asked who else might be missed in this data base. Mr. Brannon noted that some are not covered in the data base. Insurance department is attempting to get data from neighboring states. Dr. Sherman asked about coding for multiple diagnoses.

H. Rep. Salloway asked about death certificate data-not available on this data base. Up-coding, somewhat. DHHS has the data and some ability to analyze it.

I. There is a report available on the NH Insurance Dept. web site.

J. Dr. Sherman asked if there is a disease burden report for the state. Jo Porter identified a report from UNH which chronicles rates of chronic diseases.

K. Ms. Levesque asked about the NH Health and Equity Report Card. Rep. Messner asked that UNH report its data to the commission.

L. Dr. Wold asked about Medicaid data. Most recent data is two years old. Mr. Dumond will provide the Health & Equity Report Card.

Mr. Dumond introduced staff from Environmental Services.

A: **Dr. Kathleen Bush, Environmental/Public Health Tracking.** Dr. Bush reviewed data bases at DHHS. Data is found at <https://wisdom.DHHS.NH.GOV>. Dr. Sherman asked if data sets overlap. Untreated disease is not reported. The data exists but DHHS does not permit access. Ms. Porter noted that discharge data is more comprehensive than claims data. Rep. Salloway asked if DHHS could identify cancer spots. Dr. Bush declined. Mr. Dumond asked for examples - Lyme disease was described. Ms. Porter asked for release of the guidelines for access to data. Rep. Messner clarified the commission's need for data.

B. **Dr. Christine Bean, Director of Public Health Labs.** Dr. Bean described the role of the public health lab. Data is in a lab information data management system. It is not accessible to outsiders. Dr. Sherman asked if data could appear in the Wisdom system. Yes!

C. **Amanda Cossar, Biomonitoring Program.** She reviewed methods, criterion and programs. Water and home arsenic and uranium are being studied. The intent is to put this data on Wisdom. Dr. Sherman asked if the lab study looked at health history. Yes! Dr. Pearson asked if water testing was available to the public. Yes! Mr. Dumond asked who funds this. CDC! Rep. Kotowski asked if CDC would publish reports. Yes!

D. **Mike Wimstat, Waste Management Division.** DES has developed at one-stop data site on environment, especially hazardous waste disposal, air emissions, Dr. Kathleen Bush Dr. Kathleen Bush petroleum water discharge, solid waste facilities. EDM is environmental monitoring data. Also automated data logs report in real time. Dr. Sherman asked if geographical data is now available. Ms. Levesque asked if organizations work together

to combine information on outcomes. DHHS restricts data. DES is willing to work on this. Mr. Dumond identified efforts at cooperative efforts. Dr. Bush added descriptions of collaborative efforts. Dr. Sherman described the Seacoast cancer cluster.

E. **Whitney Hammond, Chronic Disease Prevention.** Cancer registry is federally funded since 1986. Data is available to researchers on request. Dr. Sherman, the registry is not used proactively to look for hot spots. Rep. Messner asked about out-of-state data. It is collected. Ms. Porter observed that this is cancer incidence reporting. Dr. Wold asked if there was a list of monitored chronic diseases. Yes!

Next meeting goal will be to continue identifying sources of data. Ms. Porter noted the distinction between data and reports. She will organize speakers from UNH.

Mr. Dumond will speak on lead exposure.

We will meet again on October 6, 2017. Meeting adjourned at 10:17 am.

Commission to Study Environmentally-Triggered Chronic Illness

HB 511

RSA Chapter: 126-A: 73

10-6-17

I. Call To Order:

A: Chairman Pearson called the meeting to order at 10 am and introduced Rep. William Ohm as a replacement for Rep Kotowski. (Revise minutes. Adjourned at 12:17 PM. Spell Messmer)

II. Rep. Pearson reviewed access to the committee web site.

Rep. Pearson reviewed his conversation with Dr. Sherman. He linked this to the charge to the committee.

Next meeting 10-20-17 at 10 am. Rep. Pearson asked Mr. Bates to begin drafting an interim report. Following meeting will be Monday, Nov. 13th. Final meeting will be Friday, Dec. 8th.

III. Amy Costello - Director of Health Analytics and Informatics at the Institute for Health Policy & Practice at UNH. Ms. Costello provided a demonstration of how data is used for the accountable care project. Data is broken down by county moving to Integrated Delivery Network. Data is available for commercial insurers, Medicare and Medicaid. Uninsured are missing from the data. The data base reports diagnosis and associated treatments.

Rep. Pearson asked if there were chronic diseases we wanted to target.

Dr. Wold asked about diagnosis specificity.

Rep. Salloway asked about total disease burden per county. He recommended looking at neoplastic disease, metabolic disease and neurologic disease.

Dr. Wold noted the difficulty of identifying exposure.

Rep. Ohm asked for the definition of "hot spots."

Mr. Dumond mentioned Dartmouth's data base on arsenic in water.

Rep. Messmer spoke to the need for an initial grasp at "hot spots."

Rep. Salloway spoke to the issue of exposure.

Beverly Drowin of DHHS does lead poisoning surveillance of DHHS. She described the lead testing results.

Sen. Innis asked about half-life of lead and elevated levels in New Castle.

Rep. Ohm asked if data is broken down into census tracts. Ms. Drouin said "Yes!"

Mr. Dumond introduced Michael Wimsatt of Waste Management Division of DHHS. He reported on our ability to report on regional water quality. He recommended looking at "hot spots" for disease. But the number of potential contaminants is huge. A primary route is ground water.

IV. Committee discussed its next steps.

Sen. Innis and Rep. Salloway reviewed the choice of precautionary principle when there is no demonstrated causality.

Dr. Wold noted that we can link some risks with specific diseases. He suggested developing a list of disease outcome.

Mr. Dumond will bring Ms. Bush back to demonstrate The Wisdom System.

Rep. Salloway will invite Professor Woodward to testify.

Meeting adjourned at 12:17 pm.

Respectfully Submitted:

Rep. Jeffrey Salloway, Clerk

Commission to Study Environmentally-Triggered Chronic Illness

HB 511

RSA Chapter: 126-A: 73

10-20-17

I: Meeting was called to order at 10 am by Chairman Pearson.

A: Minutes of the meeting were distributed.

1. Ms. Costello noted corrections of her title and department.
2. Dr. Sherman noted a spelling correction Mr. Wimsatt.
3. Minutes were approved.

B: Next meetings will be Monday, November 13 and Friday, Dec. 8.

C: A chart outlining risk factors and disease outcomes was distributed. Dr. Wold voted that some toxins and outcomes are possible but not adequately documented to be included.

1. This chart will be posted on the commission website.
2. Dr. Sherman added the risk of radiation.
3. Rep. Ohm observed the need to identify dose and length of exposure as variables.
 - a. Dr. Sherman suggested an expanded Excel spreadsheet.
 - b. Ms. Costello asked for clarification of categories.
4. Dr. Sherman noted the need to age-categorize.

II: Website

A: Mr. D.C. Bates noted his efforts to add data bases to the commission website.

III: Interim Report

A: Report of progress is due Nov. 1st.

1. A draft was distributed.
 - a. Ms. Costello and Dr. Sherman suggested edits. Rep. Pearson added his pithy edits.

B: An attendee (Whitney), from DHHS, asked for an edit regarding data suppression rules.

1. Rep. Pearson spoke of the need to generate data while protecting privacy.
 - a. Dr. Bush noted that such data is available publicly.
 - b. Ms. Costello asked that the data suppression rules be made available.
2. Edits were discussed and recorded by Mr. Bates for revision to the final document.

C: Rep. Messmer moved adoption of the document as amended. Seconded by Dr. Wold and passed in voice vote.

IV: Dr. Bush presented the NH Health Data Portal known as WISDOM.

A: She demonstrated the utility of WISDOM to demonstrate rates of disease incidence across the state.

1. Rep. Pearson asked if the department initiated studies.
 - a. Dr. Bush indicated that they use collected data from other sources.
2. Dr. Sherman asked if anyone is tasked with identifying hot spots.
 - a. Dr. Bush described the lead surveillance program.

- b. Dr. Sherman asked if the data were coordinated. Dr. Bush noted limited resources. Dr. Bean described how coordinating committees struggle to bring people, agencies and data together.
3. Rep. Guthrie asked what resources are needed to advance this effort.
 - a. "Something is better than nothing," Dr. Bush, i.e., it takes time.
4. Ms. Costello asked about task force funding. There is none.
5. Rep. Salloway noted that outcomes as reported are "dirty data" and we need to be cautious in attributing outcomes to risk.
 - a. Ms. Costello and Dr. Bush discussed the concept of attributable risk.
6. Mr. Bates noted the decline in federal funding.
7. Dr. Sherman asked if there is a way to measure the results of surveillance and intervention
 - a. Rep. Salloway issued a caveat that measuring outcome is difficult.

V: Rep. Pearson suggested agendas for future meetings.

A: Dr. Sherman asked for a witness who could describe the power and utility of statistical data.

1. Rep. Pearson offered perspective on using data from other states.

B: Dr. Sherman asked if we could build a map of the location of data sets.

1. He suggested that we reach out to other states to both gather and disseminate our results.

VI: Meeting adjourned at 11:56 am.

Respectfully Submitted:

Jeffrey Salloway, Clerk

Commission to Study Environmentally-Triggered Chronic Illness

HB 511

RSA Chapter: 126-A: 73

11-13-17

- I. Meeting was called to order at 10:06 am by Chairman Pearson.
In attendance were: Reps. Salloway, Pearson, Messmer, Ohm and Guthrie; Sen Fuller Clark, Mr. Dumond, Ms. Cappiello and Ms. Costello.

A: Rep. Pearson reported on the overlap with the Seacoast Cancer Cluster Commission and the potential for joint session.

B: Rep. Olm has recommended that Rep Pearson visit with DHHS to discuss data needs.

1. This is an ongoing discussion.

C: Mr. Bates is out ill.

D: Next meeting is Dec. 8 and may be a joint meeting.

II. Rep. Salloway introduced Professor Robert Woodward retired health economist from UNH.

A: Dr. Woodward reviewed his methodology for assessing cost-effectiveness of risk mitigations vs. the benefit of risk reduction.

1. One problem is assessing the cost paid by the reinsured. Costs include hospital costs, physician costs and then last days at work, caregiving; it becomes quite complex.
 - a. He compared the value of risk vs. a value such as housing accessible to a beach.
 - b. He cited the need for small scale analysis; small geographical units.

B: Mr. Dumond noted the difficulty measuring the cost of lead abatement vs. increases in rent.

1. Dr. Woodward posed an alternative approach to lead: rent only to older residents.

C: Rep. Olm asked about direct and indirect costs.

1. Dr. Woodward discussed air pollution and asthma as indirect costs.

D: Rep. Pearson noted the argument of cost-effectiveness vs. compassion.

1. He asked for links to literature on cost effectiveness.
2. Dr. Woodward indicated that this literature is risk-specific. There is the potential for a map of chronic illnesses and some data on cost. He would be willing to collaborate with DHHS, Ms. Costello and Rep. Salloway.

E: Rep. Messmer asked for Dr. Woodward's publications.

F: Rep. Olm asked if there were confidence levels on predictions of cost effectiveness.

G: Rep. Messmer noted the need to generate data.

H: Rep. Salloway noted a study on air pollution and asthma. It was difficult to demonstrate a relationship. He noted the precautionary principle.

1. Dr. Woodward reviewed the tension between this precautionary principle and cost effectiveness.
- I. Ms. Costello noted the need for analysis of attributional risk.
 1. Dr. Woodward described his own work on indirect costs of air pollution in Maine.

J: Rep. Pearson thanked Dr. Woodward and threatened further contact!

III. Sen. Fuller Clark asked for a definition of chronic disease.

A: Rep. Salloway identified cancers, metabolic and neurologic disease.

1. Mr. Dumond and Dr. Bush discussed what is available as coded data.

B: Ms. Costello provided a list which Dr. Wold had offered.

1. She noted the public health tracking grant and the possible convergence with the work of the commission.
2. Dr. Bush listed the diseases she is tracking on her grant.
3. Mr. Dumond described the resource limitations on DHHS and the tracking grant.

C: Dr. Woodward advised the use of correlation coefficients rather than map points.

1. Dr. Bush agreed.

D: Rep. Olm asked about spurious correlations.

1. Dr. Woodward replied that this is an arcane art.
2. Rep. Salloway discussed the problem of multi-collinearity in data.

E: Sen. Fuller Clark questioned how the commission might move forward to identify specific threats.

F: Mr. Dumond documented the risk factors already being identified by DPHS.

IV. Meeting adjourned by 11:25 am.

Respectfully Submitted:

J.C. Salloway, Clerk

Draft

Commission to Study Environmentally-Triggered Chronic Illness
December 15, 2017
Minutes of the meeting

IN ATTENDANCE: Mike Dumond-DHHS, Pamela Levesque, Clark Friese, Tom Sherman, Rep. Mindi Messmer, Rep. J.C. Salloway, Rep Mark Pearson, Sen. Martha Fuller-Clark, Thomas Wold

- I. Call to Order
 - A. Commission was called to order at 10:10 by Chairman Pearson
 - B. Minutes for 10-20-2017 were moved.
 1. Dr. Sherman noted a spelling correction for Wainsatt
 2. Sen. Fuller-Clark asked for an attendance list
 - C. Minutes for 11/13/17 were moved
 1. Dr. Dumond voted a change to DPHS and not DES in III F.

- II. Sen. Feltes appeared in testimony on the lead abatement bill
 - A. Bill has passed committee- Senate Bill 247!
 1. Seeks to reduce to 5 micrograms blood level.
 2. Mandates universal testing
 3. Adds water testing
 - B. This is a bipartisan bill.
 - C. Children are being poisoned.
 1. Every dollar invested in abatement returns \$17 on investment
 - D. Rep Pearson asked how we might increase press coverage
 - E. Leadership of both parties are in support.
 - F. Sen. Fuller-Clark called for an op-ed piece
 1. Rep. Pearson offered to work on this
A parallel improvement was the move to unleaded gasoline.
 - G. Ms. Levesque noted the role of the Nurse Practitioners Assoc.
 - H. Mr. Dumond spoke in praise of Sen. Feltes
 1. He noted a nationwide drop in lead levels with elimination of leaded gasoline.
 - a. He distributed a chart of lead effects.
 2. 700-800 children per year test between 5-10 micrograms per deciliter.
 - I. Rep. Salloway noted rental restrictions as an option.
 - a. Sen. Feltes noted the conflict with the Fair Housing Act.
 - b. Rep. Pearson suggested a warning could be implemented, i.e. avoid lead if you have children.
 - J. Dr. Sherman pointed out the need for tracking procedures for contaminated housing units.
 1. Dr. Sherman noted the need for warning to tenants prior to rental.
 2. Ms. Levesque asked about opt-out/opt-in provisions
 3. Sen. Feltes and Mr. Dumond both spoke of current procedures to screen for lead.

- III. Chairman Pearson returned to the minutes of 11-13-17
 - A. Mr. Dumond moved to accept with corrections, Rep. Messmer seconded.
 - B. Motion passed.

- IV. Asst. Commissioner of DES Clark Friese spoke on collaboration between DES & DHHS
 - A. There is extensive sharing of data.
 - 1. DES & DHHS created a coordinated program to get public health needs regarding contaminated water – testing water/testing blood.
 - B. Rep. Pearson described the problem of identifying what is knowable and where data is accessible.
 - 1. Ms. Levesque asked how the data sharing process was put into place.
 - 2. Rep. Messmer asked what barriers exist to merging data on environmental risk and healthy outcomes. How do we make a dashboard work?
 - 3. Dr. Sherman pointed out the extreme diversity of data bases and the challenge of redirecting the complexity of these data sets.
 - a. Commission Friese spoke of the IT challenges.
 - b. There are shortcomings in the current system.
 - C. Rep. Pearson summarized the needs of the commission.
 - 1. Dr. Sherman asked DES to consider how we might create a solution to the data needs of the commission.
 - 2. Commissioner Friese said this was difficult and expensive and you can get it wrong!!
 - 3. Rep. Sherman asked what we have to do to accomplish this.
 - a. Commissioner Friese suggested the need to have a consultant to map the process.
 - 4. Dr. Wold commented on what the outcomes would look like.
 - a. Dr. Katie Bush said we need to do an IT assessment.
 - 5. Rep. Messmer discussed the pilot studies on arsenic as a demonstration.
 - 6. Rep. Salloway warned that observational studies can be fraught with bias and erroneous conclusions.
 - 7. Mr. Dumond cited the lead analysis as an example of a program that works.
- V. Chairman Pearson discussed future agendas.
 - a. We will meet January 19th and February 9th.

Meeting adjourned at 12:06

Commission to Study Environmentally-Triggered
Chronic Illness
(RSA 126: A: 73)
January 19, 2018
Minutes of the meeting

IN ATTENDANCE: Kathleen Bush, Thomas Wold, Kerry Nolte, Joe Guthour, Rep. Mark Pearson, Rep. J.C. Salloway, Rep. Mindi Messmer, Michael Dumond, Rep. Bill Ohm, Tom Sherman

- I. Commission was called to order at 11:15 by Chairman Hon. Mark Pearson
 - a. The Chair reviewed an agenda
 1. He introduced Dr. Katie Bush
 - b. Next meeting will be February 9th.
 - c. He welcomed Katie Nolte, Nurse Practitioner.
 - d. Motion to approve minutes
 1. Wimsatt is misspelled
 2. Mr. Dumond does not celebrate a doctorate-yet.
 3. Minutes were moved, seconded and passed.
- II. Rep. Salloway presented on epidemiologic method.
(See attached)
 - a. Rep. Ohm & Dr. Sherman and Rep. Messmer continued the discussion.
 1. Rep. Messmer summarized the goals of the commission to identify the most pressing risks to the public and recommendations.
- III. Dr. Katie Bush of DHHS spoke about sources of data from DHHS.
 - a. In particular she spoke of the need to inform the public of risks and resources
 - b. DHHS needs to author new reports from their data bases. They are working in this direction.
 1. She sees the need for community profiles.
 - c. Chairman Pearson recommended that the commission include the need for a department to continuously review data in search of unexpected health outcomes.
- IV. Meeting adjourned at 12:50

Respectfully submitted,

Jeffrey Salloway, Clerk

Epidemiology and the Search for Certainty

Casual Remarks by J.C. Salloway

I. Introduction

- A. The speaker's credentials
 - 1. Prof. Emeritus at UNH — teaching epidemiology
 - 2. Author of four books on epidemiology
 - 3. Author of dozens of published articles
 - 4. Award for total lack of humility and no sense of humor

II. The Problem:

- A. Determining
 - 1. What do we know?
 - 2. How confident are we that what we think we know is true?
 - a. Philosophy of Science, cf Kaplan, Conduct of Inquiry
- B. Jacob's error
 - 1. The torn, bloody coat of many colors — a case
 - 2. Jacob concludes: An evil beast has killed my son.
 - 3. Assumptions
 - a. There has been a death
 - b. We know the cause of death
 - c. The perpetrator was evil — a killer rabbit [cf. Monty Python]
- C. Our challenges in examining causes of disease in populations
 - 1. What is our evidence?
 - a. Are there biases built into our evidence? [cf. Jacob]
 - 2. What are the suspected chains of causality?
 - a. Can we demonstrate the causal chains?
 - 3. How confident are we of
 - a. Cases — are they real?
 - 1. Are there confounders?
 - b. Causes?
- D. The importance
 - 1. Is our standard of proof agreed upon?
 - a. Scientists vs. the courts — the case of chlordane heptachlor.
 - b. In civil suit, the plaintiffs lost. In administrative action the government banned the possible pathogen.
 - 2. If we aim to intervene to reduce cases, we need to have full confidence in what we know.

III. Types of Studies

A. Observational

1. Descriptive
 - a. Disease surveillance and surveys
 - i. Static and dynamic
 - b. Ecological
 - i. Comparing regions which are different in their exposures
2. Advantages of observational studies [retrospective or case-control studies]
 - a. Fast
 - b. Cheap
 - c. Intellectually appealing
3. Disadvantages of observational studies
 - a. There are no controls over duration of exposure, dose, time in the life cycle, migration of those exposed, etc.
4. Quantifying observational studies
 - a. Calculating risk
 - i. Attributable risk; attributable risk percentage
 - ii. Logistical regressions
5. Do observational studies prove causality?
 - a. No! They are indictments but not definitive proofs.
6. Do we reach hard conclusions from observational studies?
 - a. No!
7. Can observational studies be correct in their allegations?
 - a. Yes, they can!
8. How can we know? The power of statistics and the limits of proof.
 - a. A troubling tale of exposure and the search for truth — Sidney.

B. Longitudinal Studies

1. Most texts include studies which follow a population over time as observational studies. In a total lapse of of reason, I suggest that they are a better than pure observational studies and not as good as interventional studies. [cohort studies]
2. In a longitudinal study [prospective or cohort studies] rather than looking at data which has been collected, we follow two cohorts forward over time.
 - a. One cohort is exposed to a risk factor, the other is not.
 - b. At the end of the study, we examine the health outcomes of the exposed and the non-exposed to look for differences.
3. Advantages
 - a. This give us a much better look at causality.

Epidemiology and the Search for Certainty
Casual Remarks by J.C. Salloway-3

4. Disadvantages
 - a. This is much more expensive and takes much longer to do.
 - b. Subject to biases in loss of subjects, subject migration, record-keeping.
 5. Overall this is a far more powerful tool to identify causality — if we have the time and money.
- C. Interventional Studies — The Clinical Trial — the Double or Triple Blind Study
1. The gold standard.
 2. We place people randomly in experimental or control groups.
 3. The investigator and the subjects don't know which groups they are in.
 - a. Real ethical concerns!
 4. We track the progress of both groups before and after exposure.
 5. Only at the end of the trial do we identify who got the experimental intervention and who did not. This is how clinical trials are done.
 6. Are they foolproof? No!
 - a. The Breast Cancer Intervention Trial.
- IV. So How Confident Are We That We Know What We Know?
- V. Policy Implications
- A. The Precautionary Principle
 - B. Public Health Professionals have developed the Precautionary Principle
 1. If we have some evidence that a risk factor is causal for a disease and if the disease has serious consequences and if the risk factor can be mitigated at reasonable cost to society and if mitigation does not further damage society — we should act.
 - a. Even if we are not totally certain!
 2. However, if we are not certain and if there is substantial cost to mitigation — do we have the right to intervene and demand mitigation?
 3. And so, we are Jacob, faced with the torn and bloodied coat which is our current world.

Commission to Study Environmentally-Triggered
Chronic Illness
(RSA 126: A: 73)
February 9, 2018
Minutes of the meeting

IN ATTENDANCE: Mike Dumond-DHHS, Katie Bush-DHHS, Rep Bill Ohm, Julie Bosak, Tom Sherman, Rep. Mindi Messmer, Rep. J.C. Salloway, Rep Mark Pearson, Thomas Wold

- I. Call to Order at 10:04 by Chairman Rep Pearson.
 - A. Rep. Pearson announced that he has been able to place a bill regarding sharing of data between DHHS and DES on the House Consent Calendar.
 1. Today's task is to review and implement the charge to the committee.
 2. Minutes of 1-19-2018 were distributed and reviewed.
- II. Chairman Pearson began to lead the commission in review of charges to the commission.
 - A. Rep. Messmer commented on methods of deliberation-Environmental Public Health Tracking Program.
 1. Rep Ohm suggested addressing broader public health topics.
 2. Rep Salloway commented on the commission's need to focus on policy and procedure rather than specific risks.
 3. Rep Ohm and Rep Messmer and Dr. Wold discussed identifying key agencies to name as policy partners.
 4. Mr. Dumond outlined the relation between DES & DHHS.
 - a. The Institute for Health Policy and Practice at UNH is to be included.
 - b. Rep Messmer noted that entities at DHHS and UNH are often grant funded. Thus they may not be permanent.
 - c. Mr. Bates noted that the Div. of Public Health Services is the overarching organization.
 1. State Medicaid should be included.
 5. Dr. Wold suggested adding NIH, CDC, National Institute of Environmental Health Services.
 6. Dr. Sherman added NH Dept. Of Corrections.
 7. Rep. Salloway asked Dr. Bush to comment of the DHHS Wisdom system.
 8. Rep Ohm asked about data available from Dartmouth.
- III. Rep. Salloway recommended the need for a local public health infrastructure.
 - A. Mr. Dumond described our Regional Public Health Networks and state public health planning councils. We do not have to bash county public health systems.
 1. Rep Salloway asked if the commission ought to recommend the mandate of county public health departments. Mr. Dumond recommended an initial review of current structures.
 - a. Dr. Sherman and Mr. Dumond will cooperate in assessing what structures exist in the state.
 - B. Rep Ohm asked for a definition of higher than expected rates.
 1. This is an epidemiological determination.
- IV. Dr. Sherman described news media outlets.
 - A. Dr. Sherman noted that a state media organization probably exists.
 1. Rep Salloway will contact Howard Altshiller to ask.
 2. Mr. Diemond described the DHHS media system.
 - B. Rep Ohm asked for definitions- is there a threshold for informing citizens?
 1. Dr. Wold noted that information can flow up from local officials and down from the state.
 2. Mr. Dupont explained that DPHS currently does not have its own public relations person, but that the Department does have a Public Information Officer.

3. Dr. Bush suggested that health care providers were important partners in the distribution of health information.
4. Dr. Sherman recalled successes and lapses in efforts to disseminate public health information.
5. Ms. Bosak described what data flows down.
 - a. Mr. Dumond described what data flows down.
 - b. Chairman Pearson decried inflammatory announcements from the media.
 - c. Dr. Sherman and Rep Salloway discussed creation of a public health/media advisory group to assist DHHS in crafting responsible information dissemination.
 - d. Rep Messner noted the Kingston drought and fire station incident re: PFC's.
 1. Fire stations commonly release some fire suppressants with PFC's and thus contaminate wells.

V. No. 4 reproduces item #1.

VI. Dr. Wold suggested using the list of indicators used in the WISDOM database.

A. Dr. Sherman spoke on the example of the Seacoast cancer cluster.

1. Mr. Dumond described DHHS privacy protections.
2. There is a need for data use agreements which are ironclad.
 - a. Dr. Bush says data is DE identified
 - b. Amy Costello will be asked to work with Rep Messmer on this.
3. Rep Salloway, Mr. Dumond, Dr. Bush and Dr. Sherman discussed privacy protections.

VII. This is covered in items 1 & 4. To be done

VIII. This is covered under other headings.

A. The gap is with environmental data. To be continued

IX. Follow from items 8 & 9.

X. Discussion followed on using diagnostic tests at the practitioners' level.

A. Dr. Sherman and Dr. Wold and Rep Messmer addressed screening tests and surveillance.

B. It is essential that patient surveillance data from practitioners flow up.

XI. There needs to be a coordinated effort to train practitioners.

Next meeting will be Friday April 13th at 10am

Clerk will list tasks and agents. Mr. Bates will circulate contact information

Meeting adjourned at 12:18p.m.

Respectfully submitted,

Rep. Jeffrey Salloway, Clerk

Commission to Study Environmentally-Triggered
Chronic Illness
(RSA 126: A: 73)
April 13, 2018
Minutes of the meeting

In Attendance: Rep. J.C. Salloway, Rep. Mindi Messmer, Julie Bosak, Rep. Mark Pearson, Rep Joe Guthrie, Tom Sherman, Mike Dumond, Thomas Wold

- I. Call to Order at 10:10 by Chairman Rep Pearson.
 - A. Rep. Pearson reported on the progress of HB 1356 mandating collaboration between DHHS & DES.
 - B. Rep. Pearson spoke to final results emphasizing the need to facilitate data flow.

- II. Homework Assignments
 - A. Rep. Pearson asked Rep. Salloway to report on Media announcements of environmental risks.
 1. Howard Altshiller of Seacoast Media Group provided information.
 2. The committee added links from DHHS & DES to the public.
 3. Rep Pearson suggested creating categorized lists for public, professionals, and environmentalists.
 - a. Dr. Sherman suggesting regionalized lists.
 4. Rep. Pearson noted the need to include Mass, Maine and Vermont TV Media.
 5. Rep. Salloway will update the distributed list as passed out by Mr. Bates.
 - a. DHHS & DES can be asked to create categorized lists. They already do this.

Salloway	Where does the decision get made as to how widely info is disseminated?
Sherman	By rule we want to protect privacy but not insult public.
Pearson	Not insult, but unnecessarily alarm. Sounds like DES/DHHS have thought of this.

6. Mr. Dumond cautioned to meet the levels of health literacy in the public.
 - a. Rep. Pearson will invite PIO's from DHHS & DES for our next meeting.

- III. Dr. Sherman reported on the committee with Dr. Bush and Mr. Dumond.
 - A. How to communicate risk and public health.
 - B. They asked what data they have.
 1. Dr. Bush had previously distributed much material.
 2. Dr. Sherman chronicled the number of contaminants that we may not know.
 - a. He described the current methods used in emerging contaminants. Their data is at the town level.
 - b. The key is how granular the data can be reported without violating privacy.
 - c. Rep. Salloway noted that we can get down to census track data but this is not equivalent to exposure time.
 - d. Data maybe misleading.
 - e. Commission could recommend review of the rules regarding privacy.
 - C. Claims data, cancer registry, hospital data are all available.
 1. Amy Costello and Tyler Boannon have reviewed these data bases previously. Some data is missing.

2. Dr. Sherman believes the volume of missing data is small.

D. Mr. Dumond noted that DHHS is updating systems.

1. The committee learned a great deal from Massachusetts

E. Dr. Sherman recommended regional coordination.

F. Mr. Dumond suggested the limits of sharing data.

G. Dr. Bush described national efforts at coordinating methods, software and data.

1. Mr. Dumond and Dr. Bush have limited time availability to participate in the final report.

IV. Chairman Pearson reviewed what we need to accomplish in the final report.

A. Rep. Messmer pointed out that these are bills in the Senate to fund a state toxicologist and risk assessment.

B. Dr. Sherman cautioned the absence of Dr. Bush and retirement of Mr. Dumond.

C. Dr. Wold added to Rep. Messmer's list of diseases to track.

D. Mr. Dumond noted the costs which Mass spent on similar activity.

1. There is increased Federal funding.

E. Rep. Salloway reviewed general directions for a final report.

F. Rep. Messmer went arsenic and bladder cancer.

1. She suggested extension of the life of this commission

G. Dr. Wold commented on Mass. Link of cost to clinical outcomes.

1. Dr. Sherman explicated that link.

V. Next meeting will be

Meeting adjourned at 12:00 PM.

The next meeting will be held on June 1st.

Respectfully submitted,

Rep. Jeffrey Salloway, Clerk

Commission to Study Environmentally-Triggered
Chronic Illness
(RSA 126: A: 73)
June 1, 2018
Minutes of the Meeting

- I. Hearing was called to order at 10:07 with the introduction of Jay Chiles a film producer.
 - a. Minutes of the meeting from 4/13 were distributed.
 - i. Rep Pearson reported that HB 1356 was passed by both Houses and been sent to the Governor.
 - b. Dr. Bush and Jackson will attend the next meeting.
 - c. Thanks to Mike Dumond for his service
 - d. Motion to accept minutes made and seconded.
- II. Chairman Pearson has asked that Dr. Sherman's report be circulated to the commission.
 - a. House Bill 1592 re: arsenic and cancer has passed both houses and gone to the Governor. This is a successful outcome of the Commission.
 - b. Sen. Fuller-Clark suggested that the Commission send a letter to our Congressional delegation requesting that the EPA release its data on risks in NH.
- III. James Martin of DES joined us to discuss his role as Public Information Officer for DES.
 - a. Rep Salloway posed a detailed set of questions about how information gets distributed.
 - i. The NH media market is not segmented. Press releases go out to TV, radio and joint media.
 - a. Posts go to DES's webpage.
 - b. There is an email list for those who request it. And a Twitter account, these are about 6,000 hits
 - c. Chairman Pearson asked about out of state TV.
 1. Mr. Martin noted that these are minimal.
 - d. Sen Fuller-Clark asked how media are promoted.
 1. Chairman Pearson suggested an op-ed in the Union Leader to promote email & Twitter contacts
 - e. Chairman Pearson asked how to protect about panic.
 1. Mr. Martin offered examples.
 - ii. One was the St. Gobain situation in southern NH this led to a very large ground water investigation.
 - iii. Rep Messmer asked for further details.
 - iv. There has been direct communication with residents.
 - f. DES puts our monthly municipal eco letter. Drinking/groundwater puts out a quarterly newsletter.

- g. Rep Salloway asked about direct communication with residents.
 - i Mr. Marting chronicled DES efforts to disseminate information.
 - ii. Sen Fuller Clark asked if resources were adequate for Incident Command System
- IV. Jake Lion, Director of Public Information for DHHS
- a. He described DHHS Incident Management Model.
 - 1. He described a blood testing management program.
 - a. Challenge is balancing public demand and program availability.
 - b. Sen Fuller Clark asked about resources for the Incident Command System.
 - 1. Mr. Leon was reassuring
 - 2. Sen Fuller Clark asked what demand was.
 - 3. Mr. Dumond described continuous training needs.
 - c. Rep Messmer asked if training ought to be expanded on a state level. Mr. Dumond agreed.
 - d. Chairman Pearson asked how broad training is for Incident Management.
 - 1. Mr. Leon described coordination of the top levels of DHHS, DES, Homeland Security, etc.
 - 2. Mr. Dumond asked if recipients of notices respond.
 - 3. Chairman Pearson asked about how close Mr. Leon is with local reporters.
- V. Dr. James Chethaler, State epidemiologist for state public health lab.
- a. Rep Salloway asked for details
 - i. Dr. Chethaler described his responsibilities
 - b. Rep Messmer asked for details on water tests vs. serum tests
 - c. Rep Salloway asked if resources were adequate.
 - i. There are so many new chemicals-no lab could trace them all.
 - d. Mr. Dumond asked about federal grant support
 - i. He asked what path of results exists. How are results reported?
- VI. Commission continued with review of letter to Congressional Delegation
- a. The letter will come from legislators.
 - i. Letter was edited.

Meeting was adjourned 11:30.

Commission to Study Environmentally-Triggered
Chronic Illness
(RSA 126: A: 73)
September 28, 2018
Minutes of the Meeting

- I. Meeting was called to order by Chairman Pearson at 10:12.
- II. The Committee reviewed minutes of the meeting of 6-1-2018.
 - A. Sen Clark asked for the list of attendees and moved inclusion of the list.
Motion passed.
 - B. Gobain is to be St. Gobain
 - C. Dr. Chithalen's title is Toxicologist.
 - D. Correct Jim Chiles to Jay Chiles.
 - E. VI, A- letter will come from legislators.
 1. That letter should be posted under documents on our website.
 - F. Sen Fuller Clark asked for distribution of revised minutes. Motion passed.
- III. Lisa Morris, Director of Public Health Services came forward.
 - A. Dr. Sai Cherala, Director of Population Health
 - B. Michelle Roberge appeared.
 - C. Lisa Morris presented her preliminary report and signed memo of agreement with DES.
 - D. She described a proposed pilot study on arsenic and uranium exposures.
- IV. Dr. Cherala reported on the progress of DPH and DES toward data sharing.
 - A. The work group established standard operating procedures. This is not yet final.
 - B. She described pilot studies proposed for arsenic and uranium.
 1. The work group is examining what data exist on exposures and outcomes.
 2. Is it possible to do this?
 - C. Rep Ohm compared the proposed pilot to the need for research on opioids.
 1. Lisa Morris replied.
 - D. Rep Salloway noted that opioid is a policy issue and arsenic/uranium is environmental.
 - E. Dr. Sherman commented that environmental risk is not going away. Federal funding will go away. We need to do long-term planning.
 1. Rep. Pearson asked if this would be embedded in the budget process.
 2. Amy Costello noted that federal funding may shift.
 3. Rep Pearson related toxic waste dumping in Leominster, Massachusetts. He recommended including cost effectiveness measures in the documents.
 4. Rep Pearson and Salloway encouraged contact with Prof. Robert Woodward in Lee, NH.
 5. Sen Fuller Clark asked what financial resources are in place and what is needed to do this work.

Commission to Study Environmentally-Triggered
Chronic Illness
(RSA 126: A: 73)
October 16, 2018
Minutes of the Meeting

Members present: Amy Costello; Rep. Bill Ohm; Rep. J.C. Salloway; Rep. Mark A. Pearson; Tom Sherman; Rep. Mindi Messmer; Lisa Morris; Sen. Martha Fuller Clark; Rep Joe Guthrie; Thomas Wold; Michele Roberge.

- I. The meeting was called to order by Chairman Pearson at 10:06.
 - A. Michele Roberge introduced herself
 - B. The Chairman asked for review of the amended minutes of June 1. Turned 'Legislatures' to 'legislators'. Minutes approved as amended.
 - C. Chair asked for review of minutes of September 28. Minutes were approved with amendments.
- II. Chairman Pearson reviewed an agenda
 - A. Commission can elect to include submitted documents as
 1. Part of the final report
 2. Appendices
 3. Posts on the website.
 - B. Dr. Sherman noted that extension of the work of the commission ought to proceed as a commission to include non-legislators.
 - C. The Chair asked if Rep. Salloway's testimony on epidemiologic method ought to be included.
 1. Rep. Ohm and Dr. Sherman recommended that it be referenced in the report and included in an appendix.
 - a. Rep. Messmer will write a paragraph representing the conclusions. Rep. Salloway will assist. The full document will be in an appendix. So moved by Sen. Fuller Clark and approved.
 - D. Dr. Bush's report is already included.
 - E. Dr. Sherman's sub-committee report is already included. He recommended a summary paragraph.
 1. Sen. Fuller-Clark suggested a summary of recommendations.
 2. Rep. Ohm suggested an executive summary.
 - a. Sub-Committees will meet and their work will be circulated electronically.
 3. Sen. Fuller-Clark suggested omitting the initial list of charges to the commission.
 - a. Dr. Sherman suggested including a summary of the charges in the abstract.
 - b. Mr. David Bates recommended putting the charge into the appendix.
 - c. Dr. Wold suggested placing recommendations following each of the four sub-headings.
 - d. Dr. Wold asked to soften verbiage on up-coding.

- e. Ms. Costello suggested omitting "while the CHIS data set" and "The CHIS data set is limited" and the full paragraphs.
 - i. Each data set has strengths and limitations.
 - ii. Dr. Bush encouraged a general statement on limitations of data sets. She noted that all data bases are limited.
 - iii. D. Sherman and Rep. Messmer agree on the need to note that there are data base limitations.
4. Rep. Ohm asked for an executive summary to be circulated in advance of a final meeting.
5. Dr. Wold, Dr. Sherman and Rep. Messmer will attend to an executive summary. Rep. Pearson will participate along with Rep. Ohm.
6. Commission will meet 10/30 at 10:00am.

III. Chair Pearson discussed legislation to continue the commission.

- A. Dr. Bush reported that DHHS has a draft document for supportive legislations to fund health and chronic disease capacity.
 1. Sen. Fuller Clark asked if there was a budget request yet. There is not.
 2. Lisa Morris reviewed the status of the request.
 3. Rep. Messmer spoke in support.
 4. Rep. Ohm observed that support at this time goes beyond the charge to the commission.
 5. Dr. Sherman approved the initiative and suggested the initiative for the next commission.
 6. Sen. Fuller Clark suggested that we include a call for further resource development.
 7. Dr. Wold approved of the need for further resources.
 8. Rep. Guthrie asked Dr. Bush to identify where DHHS is in the process, she deferred to Lisa Morris. She placed this as an early initiative.
 9. Dr. Chithalen, state toxicologist, clarified which federal funding was providing.
 10. Dr. Sherman reviewed the progress we have made.

Motion to adjourn by Rep. Salloway. Second by Rep. Guthrie. Adjourned at 11:20.

Commission on Environmental Risk and Chronic Disease
Tuesday, Oct. 30, 2018
RSA 126-A:73
Minutes of the meeting

- I. Meeting was convened by Chairman Pearson at 10:08
 - Chair asked for review of the minutes of 10-16-18.
 - Rep. Messmer moved approval of the minutes
 - Dr. Sherman seconded
 - Minutes were approved as distributed.

- II. Final Report
 - Chair reviewed the status of the final report and distributed copies to the committee
 - Rep. Ohm moved approval of the report. Rep. Guthrie seconded.
 - Dr. Sherman requested an executive summary.
 - He added the need for a conclusion calling for extension of the commission.
 - Further he asked for inclusion of the appendices.
 - He moved an added conclusion continuing the commission.
 - Rep. Messmer called in addition for inclusion of her written additions.
 - Rep. Ohm asked for review of these Rep. Messmer additions.
 - Dr. Wold noted that additional pieces could be included on the website.
 - Rep. Guthrie asked if this chair would file continuation legislation.
 - Dr. Sherman observed that conclusions were incomplete.
 - The Chair noted that he would support this
 - Dr. Sherman moved an amendment for the commission to introduce legislation to continue the work of the commission for two years. Rep. Guthrie seconded.
 - Rep. Ohm spoke in support – passed unanimously

- III. Motions to amend
 - Rep. Messmer asked for inclusion of an executive summary
 - The Chair suggested placing it on the website
 - Rep. Ohm objected.
 - Dr. Sherman suggested referencing materials which are on the website in the final report.
 - Dr. Wold spoke in support of Dr. Sherman
 - Rep. Salloway questioned if the website appears with the full authority of the commission.
 - Rep. Ohm called for a limit to the scope of our work
 - Ms. Costello spoke in favor.
 - Clerk of the House, Paul Smith, reviewed options for inclusion of a minority report.
 - Additional reports may be included as appendices.
 - Dr. Sherman observed that these documents can be included on the website. Or it can be a print appendix. Or it can be a minority report.

- Rep. Ohm noted that the appendix has not been distributed.
- The Clerk observed that the website is an appropriate location for additional materials.
- Rep. Salloway asked about an executive summary
- Dr. Wold denied the need for executive summary.
- Rep. Salloway pointed out that continuation of the commission is not guaranteed.
- Dr. Sherman spoke for inclusion on the website.
- Dr. Wold and Rep. Messmer spoke on the means by which serious materials with real consequences might be included.

IV. Approval of report as amended. Approved 8-1.

- Dr. Sherman moved that any member of the commission be allowed to add to the website.
- Ms. Costello seconded
- The clerk noted that work ceases November 1.
- A minority report must be submitted by 4:30 pm on Nov. 1st.
- Chair inquired of the clerk how best to proceed.
- Dr. Wold asked for review of tactics. Dr. Sherman and Ms. Costello commented.
- Rep. Ohm noted the tight deadline.
- Ms. Bosak asked about the time deadline.
- Dr. Sherman explained his position. He called the question.

Motion passed 8-1

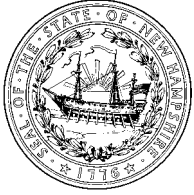
Rep. Messmer passed out her addendum.

Dr. Sherman moved to adjourn at 11:15 a.m.

Respectfully submitted,

Rep. J.C. Salloway, Clerk

Appendix B:
HB 1356 Preliminary Report



STATE OF NEW HAMPSHIRE
DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH SERVICES

Jeffrey A. Meyers
Commissioner

Lisa M. Morris
Director

29 HAZEN DRIVE, CONCORD, NH 03301
603-271-4501 1-800-852-3345 Ext. 4501
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www.dhhs.nh.gov

August 31, 2018

Honorable Representative Mark Pearson, Chairman
Commission to Study Environmentally-triggered Chronic Illness
Legislative Office Building/Room 205
Concord, NH 03301

Re: HB 1356 (RSA 126-A:76, III, Chapter 296:1, Laws of 2018)
*Report on Data Sharing between the New Hampshire Departments of Health and Human Services
and Environmental Services.*

Dear Chairman Pearson:

As required by HB 1356 (RSA 126-A:76, III, Chapter 296:1, Laws of 2018), please find the attached preliminary report on data sharing practices between the Departments of Health and Human Services and Environmental Services. The following documents are enclosed:

- HB 1356-Final Version
- Preliminary Report
- Appendix C-Inventory Arsenic Data
- Memorandum of Agreement

A presentation of the report to your Commission to Study Environmentally-Triggered Chronic Illness will be held at the next regular meeting scheduled for September 28, 2018. Please let me know if you have any questions by contacting me.

Respectfully submitted,

A handwritten signature in black ink that reads "Lisa Morris".

Lisa Morris
Director

ENCLOSURES

CC: House Speaker Gene Chandler
Senate President Chuck Morse
Honorable Michael York, New Hampshire State Librarian

MEMORANDUM OF AGREEMENT
between the
DEPARTMENT OF HEALTH AND HUMAN SERVICES/DIVISION OF PUBLIC HEALTH SERVICES
and the
DEPARTMENT OF ENVIRONMENTAL SERVICES

This Memorandum of Agreement (MOA) describes the environmental health data sharing activities that have been agreed to between the Department of Health and Human Services, Division of Public Health Services (DHHS/DPHS), and the Department of Environmental Services (DES). The goal of the MOA is to build on existing state capacity and expertise in environmental health surveillance to make information-driven decisions to protect public health. Through this MOA, DHHS/DPHS and DES are able to consistently design, implement, and evaluate environmental public health actions which are supported by environmental health data and information which are scientifically valid, useful, and meaningful.

This MOA covers the period July 1, 2018, through June 30, 2022. The MOA contains the option to renew for an undetermined period of time based on agreement of the parties. This MOA replaces any other agreements that have established between DHHS/DPHS and DES for a specific program.

For the purposes of this MOA, DHHS/DPHS and DES agree to cooperate as follows:

I. Department of Health and Human Services/Division of Public Health Services

The Department of Health and Human Services/Division of Public Health Services agrees to:

1. Assist DES with project planning and implementation when appropriate.
2. Assist DES staff with access to aggregated public health data via the NH Health WISDOM Data Portal.
3. Assist DES staff with access to data within the DHHS Enterprise Data Warehouse.
4. Share technical expertise on data interpretation.

II. Department of Environmental Services

The Department of Environmental Services, agrees to:

1. Assist DHHS/DPHS with project planning and implementation when appropriate.
2. Assist DHHS/DPHS staff with access to environmental monitoring data via DES OneStop and explore opportunities for direct access to database systems as deemed appropriate by DES staff.
3. Abide by the confidentiality rules defined by DHHS/DPHS to protect the identity of all personal information within health records as outlined in 'Guidelines for Public Release of Public Health Data'.
<http://www.dhhs.nh.gov/dphs/hsdm/documents/publichealthdata.pdf>
4. Share technical expertise on data interpretation.

III. Mutual Agreements of the Parties

It is further understood and agreed between DPHS and DES:

1. The parties will maintain communication via regular meetings between program staff to ensure collaboration on work that is being conducted.
2. The parties agree to facilitate the exchange of information and appropriate data sets to support work in the field of Environmental Health.
3. That this MOA may be modified in writing at any time by mutual consent of both parties.
4. In the event that changes in either State or Federal laws or regulations occur which render the performance of the activities set forth in this MOA illegal, void, impractical or impossible, this MOA shall terminate immediately.
5. The parties will review this MOA at least once each year to determine whether it should be revised, renewed, or terminated.

IN WITNESS WHEREOF, the respective parties have hereunto set their hands on the dates indicated.

Jeffrey A. Meyers
Commissioner
Department of Health and Human Services

Robert R. Scott
Commissioner
Department of Environmental Services

Preliminary HB 1356 Legislative Report

New Hampshire Department of Health and Human Services/Division of
Public Health Services and New Hampshire Department of
Environmental Services

August 30, 2018

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Introduction

The following is a preliminary report on deliverables related to House Bill (HB)1356, which directs the Department of Environmental Services (DES) and the Department of Health and Human Services (DHHS) to improve the data sharing and usability of health and environmental data.

Data are an important tool that can help build common understanding, allow for more informed decision making, and improve efficiency and effectiveness. This preliminary report includes background information on communication and engagement processes across DES and DHHS, a memorandum of agreement, an update on standard operating protocol, and arsenic-related data assets. The next report will include final standard operating protocols, description of a pilot project, and cost estimates of the pilot.

Background

HB1356 charged the DES and DHHS to establish a data sharing protocol for health and environmental information collected by each agency. Under HB 1356 (attached as Appendix A), DES and DHHS were asked to provide a report on or before September 1, 2018 to the Speaker of the House of Representatives, the Senate President, the State Library, and the commission to study environmentally-triggered chronic illness to include the following items:

- a. An updated memorandum of agreement (MOA) regarding data sharing between the DES and DHHS.
- b. A standard operating procedure on how data can be shared between the two departments to identify linkages between environmental contaminants and health outcomes.
- c. A description and estimate of the cost to perform a two-way pilot project on arsenic in drinking water, a contaminant where both health effects and environmental data exist.

This preliminary report reflects on an approach that is intended to foster the relationship and build the investment necessary to accomplish this task within both agencies and among stakeholders in order to assure that HB1356 and the larger data-sharing vision will be sustainable over time. Multiple interagency meetings have taken place in order to respond to the requests as outlined by the bill. This process ensured that careful consideration was given to the resources across both agencies while also considering the feasibility and public health importance of the environmental issues at hand.

Memorandum of Agreement

The mission of DHHS is to join communities and families in providing opportunities for citizens to achieve health and independence. Promoting and protecting health and preventing disease are key functions of DHHS through the work of the Division of Public Health Services (DPHS).

The mission of DES is to help sustain a high quality of life for all citizens by protecting and restoring the environment and public health in New Hampshire. The preservation and wise management of New

Hampshire's environment are the important goals of the DES.

Environmental health and welfare for all citizens of the state are responsibilities shared by DHHS and DES. These organizations have a long history of working together to address environmental health concerns, and have focused on the accountability of public agencies, quality and efficiency in addressing the needs of citizens, improving health outcomes, and consistency in messaging. In recent years, DES and DHHS officials have faced community concerns over higher-than-expected rates of cancer and chronic diseases and existing and emerging environmental issues. To proactively address these ongoing concerns, DHHS and DES have worked to update the existing MOA to be more inclusive of DES and DHHS programs. This will allow the agencies to collect health data and information that are scientifically valid, useful, and meaningful and, as a result, will improve consistency of design, implementation, and evaluation of environmental public health actions which are supported by environmental data.

The MOA directly aligns with the primary goals of DES and DHHS which are to protect, maintain, and improve the health of all New Hampshire citizens. Moreover, it integrates data and expertise from DES and DHHS into public health practice. The updated MOA is attached under Appendix B.

Standard Operating Procedure

An interagency team of technical staff are working to establish the standard operating procedure (SOP) for data sharing. The workgroup has been making advancements towards identifying and establishing the purpose, key principles, responsibilities, staff leads, and the processes and procedures necessary for data sharing. This process will ensure that careful consideration is given to the existing data sources, legislation, and rules surrounding privacy protections.

The process to finalize the SOP has been delayed due to vacancies/absence of key staff including bureau chiefs for the Bureau of Public Health Protection and Bureau of Public Health Statistics and Informatics. Once finalized, the interagency team will provide regular updates and a final standard operating procedure on data sharing across agencies.

Pilot Project

In recent years, DHHS and DES staff have faced community concerns over higher-than-expected rates of cancer and chronic diseases as well as other emerging and existing environmentally-related concerns. Approximately 450 substances are known or reasonably anticipated to be carcinogenic, but there are substantial practical challenges in attributing individual cancers or chronic diseases to specific chemical exposures. The existing public health data or environmental data sources and conventional statistical approaches can be labor-intensive and may not be sufficient at determining whether an increase in a health outcome (including cancer or chronic disease) are real or due to random variation. These data sets don't provide conclusive answers about causes of disease. Whether an individual develops a disease or condition depends on the type, dose, and timing of the environmental exposure, whether they have also been exposed to other toxic compounds (such as radon or tobacco), and many personal factors such as genetics, nutrition status, and overall health.

The situation in New Hampshire reflects the current state nationally and illustrates a clear need for new methods to assess and investigate cancer and chronic disease links to environmental contaminants including arsenic. To address the common underlying concern that environmental pollutants may be causing cancer or chronic diseases and to fulfill the deliverable under HB1356, DES and DHHS are proposing a pilot project between the departments on arsenic in drinking water.

The interagency team and academic researchers from Dartmouth Toxic Metals Superfund Research Program developed a pilot project between the departments on arsenic in drinking water. The team proposed evaluating current collaborations across the agencies, current data assets, limitations relating to linking health and environmental data, and the scientific feasibility and public health importance of the proposed pilot to assure resources are used wisely. At this point in time, due to absence of key staff, the interagency team could not complete the work on the pilot proposal. A subsequent report is forthcoming that will include details of the pilot.

Current Collaborations

DHHS and DES have had various collaborations over the years around addressing public health concerns. The following highlights two projects in particular. The New Hampshire Public Health Laboratories (PHL), NH Biomonitoring Program (located within DHHS) has received a five year cooperative agreement from the Centers for Disease Control and Prevention to conduct two biomonitoring studies: 1) a targeted study assessing arsenic and uranium exposure from private well water and 2) a statewide surveillance study assessing exposure to a panel of metals (including arsenic and arsenic species), pesticide metabolites, per- and polyfluoroalkyl substances (PFAS), and cotinine (a nicotine metabolite). The Biomonitoring Program is about to enter Year 5, the final year of the agreement. Both projects are leveraging interdepartmental relationships and resources. The following will describe one of these efforts.

Collaboration Example: The Targeted Arsenic and Uranium Public Health Study

The Targeted Study aims to assess the relationship between arsenic and uranium in private well water and body burden by testing both household drinking (well) water and individuals' urine for those metals. The PHL worked with the Environmental Public Health Tracking (EPHT) Program to identify twenty-five (25) towns at increased risk for having arsenic above the Environmental Protection Agency's (EPA's) maximum contaminant level (MCL) in their groundwater. Modeling produced by the US Geological Survey was utilized and each data point (within a town) was given an estimate of arsenic risk. The town estimates were averaged and towns in southern and southeastern NH that had an estimated risk of arsenic above the MCL of $\geq 35\%$ were selected for this study.

NH PHL staff worked with DES to use the OneStop Well Database for well location identification. DES has a memorandum of understanding (MOU) with the NH Department of Revenue Administration for tax parcel data. The MOU allows for sharing of tax data with NH DES which includes owner name, tax number, property information, and address. This is the most accurate way for DES to find ownership of

the well/property from OneStop information. NH DES was able to share de-identified well, line, and public parcel data with the NH Biomonitoring Program to identify well locations within the targeted towns.

The NH Biomonitoring Program worked to overlay the MOSAIC tax data with the GPS coordinates from OneStop. Wells in public water systems were removed from the study, as public water systems must treat their water to meet the EPA MCLs for all contaminants, including arsenic and uranium. Parcels that contained no wells or more than one well were also removed, as well as parcels without complete address information. The remaining addresses were run through the NH Department of Safety's E9-1-1 address locator to verify accuracy and correct any obvious errors. What remained was an inventory of property addresses with a well registered in OneStop.

These addresses were randomized and some households were selected for invitation into the study. The households were mailed recruitment postcards and letters. Those interested contacted the Biomonitoring Program and people who were at least 5 years old were enrolled, and an in-person meeting was scheduled. Informed consent/assent was given at the meeting followed by administration of the exposure survey. This survey collected demographic, occupational, and recreational information as well as a limited health history (self-reported) and food intake assessment. Participants then self-collected urine and water at their homes on a pre-determined date. Water and urine samples were packaged into a cooler, picked up by a contracted courier, and delivered to the NH PHL for testing by the Water Analysis Laboratory and the Biomonitoring Laboratory. As previously mentioned, water was tested for arsenic, uranium, and VOCs. As part of the incentive for participation in this study, water was also tested for cadmium, iron, manganese, copper (stagnant/flushed), lead (stagnant/flushed), hardness, and pH. The Biomonitoring Program also worked with the NH DES Methyl-tertiary-butyl-ether Remediation Bureau to coordinate free volatile organic compound (VOC) testing of private well water for participants who consented to this process. Water reports were mailed to the participants upon testing completion and, urine reports will be mailed at the conclusion of the study (this study is ongoing).

Throughout this process, the NH Biomonitoring Program has consulted with the Biomonitoring Technical Advisory Committee (TAC) for feedback on study design and methods. The TAC consists of members of academia, the DES Drinking Water & Ground Water Bureau, the Dartmouth Toxic Metals Superfund Research Program, the New England Poison Control Center, DHHS epidemiologists/statisticians, local town administration, health departments, and hospitals. Data collected from this study will be shared on EPHT's WISDOM health data portal as well as with members of the NH Arsenic Consortium, of which DES and DHHS work very closely together.

The NH Biomonitoring Program hopes to secure future funding from the CDC to continue this testing, as well as receive State funding to augment the program. Continuation of this program is critical for assuring the public's health in NH. First, the Biomonitoring Program hopes to evaluate how NH

addresses the environmental contaminants that were tested in the current project and to determine whether the programs in place are successful in reducing levels of these chemicals in NH residents. Second, the Biomonitoring Program is working closely with the DES to determine what new contaminants of concern are emerging and then incorporating them into the NH Public Health Laboratories' test panel. The Biomonitoring Program will reapply for federal funding through a competitive process in 2019. This competitive application is strengthened if the applying state has State funding available to enhance or expand the Biomonitoring Program.

The interagency team has presented The Targeted Arsenic and Uranium Public Health Study as one example of collaboration across agencies to collect public health data related to environmental exposures.

Arsenic Related Data: Assets and Limitations

There are numerous data sets which include measures relevant to the topic of arsenic and associated health outcomes. While many of the data sets are owned or stewarded by the DES and DHHS, some data sets belong to other agencies or organizations or are not maintained in one central location (e.g. private well water test results which are housed by DHHS and many private businesses). As organized in Appendix C, the identified arsenic-related data sets can be divided into three categories: health outcome data for conditions associated with arsenic exposure or potential exposure data, and behavioral data such as water testing, treatment, and consumption.

Appendix C provides detail about each of the identified data sets, including relevant data and indicators, the data steward, the available years and geographic granularity, and limitations and, additional notes for context. In addition to the limitations noted for the individual data sets, there are overarching limitations such as the fact that data is presented in different formats with limited or no ability to make linkages or, that the data sets are not centralized. Additionally, the inclusion of protected and identifiable health information within certain data sets restricts the sharing of data at the record level.

While a memorandum of agreement can facilitate collaboration and data sharing, in particular among State agencies, the State is limited in its regulatory authority to compel certain organizations such as private labs to share data. This poses a significant limitation on the ability to receive water test results for environmental contaminants. These limitations in addition to those noted in the table, impact the ability to produce analyses from which meaningful conclusions can be drawn. Nonetheless, improved sharing practices may help us to come closer to being able to quantify and visualize the potential association between certain environmental factors and health outcomes. Further, outlining the data assets and limitations helps us to better understand the gaps and factors that prevent more meaningful analysis. This understanding can guide efforts to improve and expand upon data collection practices and to formalize partnerships and/or develop legislation to maximize data sharing across entities.

Proposed Pilot Arsenic in Drinking Water

As mentioned in a previous section, due to the absence of key staff, this process is delayed. Additional information will be provided at a later date to include updates on next steps, a final proposed pilot project, and cost estimates.

Appendices

Table 1. Inventory of arsenic related data by type

Data Type	Data Set	Relevant Data Included in Set	Steward	Relevant Indicators	Geographic Granularity	Years Available	Limitations and Additional Notes
Health outcome: note that these health outcomes are not linked to arsenic alone, but to a number of contributing factors	NH State Cancer Registry	Cancer incidence	DPHS (HSDM)/Dartmouth	By type/age/year/geography: case counts, incidence rates	Address-aggregated to town	1990-2015	No residential history, no exposure information (behavioral, occupational, etc.), screening data not collected, data less reliable from 1990-1994; data are good from 1995 onward To calculate rates or standardized incidence ratios, population data is needed (Claritas, US Census, etc.); statistics can be calculated based on cancer type, age at diagnosis, year of diagnosis, stage, and geography
	NH Vital Statistics	Cancer related deaths	DPHS (HSDM)	By type/age/year/geography: mortality counts, mortality rates	Address-aggregated to town	1999-2016	Inconsistent coding of cause of death; ICD coding of cause of death began in 1999 2017 data not yet available due to delays in out of state reporting To calculate rates, population data is needed
Exposure/ potential exposure: note that the presence of arsenic in water does not necessarily indicate exposure	NH Public Health Lab Well Water Quality	Well water test results	DPHS (PHL)	Private well water quality- Arsenic level	Address		There is no requirement for private well owners to test their water quality, and only a portion of those who test do so through the PHL; cannot draw conclusions about a geographic area based on results at one address (results can vary even between next door neighbors); the presence of arsenic does not necessarily mean exposure as people may obtain drinking water from another source Approximately 46% of NH residents receive water from private wells
	Private Lab Well Water Quality	Well water test results	Accredited private labs throughout NH and neighboring states	Private well water quality- Arsenic level	Address	NA- historically this data has not been shared/ made available	Same limitations as PHL well water quality results; RDL limit may vary between labs (a “no detect” reading may be based on a different minimum limit, ex. 5ppb vs 0); MCL changed in 2001 from 50 ppb to 10 ppb Private labs are not compelled to share data, DES and DPHS have not been successful in obtaining data from private labs
	DPHS Biomonitoring	Well water test results, exposure data (based on blood and urine)	DPHS (PHL)	Private well water quality- Arsenic level, arsenic exposure	Address- limited to towns targeted by study	2017	For well water quality- same limitations as PHL well water quality results; for exposure, sources other than water are not controlled for Biomonitoring study is targeted to specific towns, data is not representative of the State
	NHDES MtBE Remediation Bureau Results	Well water test results	DES	Private well water quality- Arsenic level	Georeferenced points		Same limitations as PHL and Private Lab well water quality results Program funding covers MtBE VOC related testing, but participants are given the option to pay for additional analysis (approximately 20% opt to have a test that includes arsenic), those who opt-in sign a waiver granting access to results to DES. Results from optional tests are not submitted to the EMD, but the Bureau has used the results that they receive to populate a separate database to track participation and exceedances (not all concentrations). Effective 7/1/2018, all data will be submitted to the EMD, including optional tests.
	DES Public Water System Monitoring Data	Water test results of PWSs - Arsenic	DES	PWS water quality- Arsenic level	PWS (population served), can be associated with approximate PWS service area	1994-Present	Prior to 2011, data was collected via paper- only results that exceeded 50% of the MCL were recorded electronically; MCL changed in 2001 from 50 ppb to 10 ppb; RDL may vary between labs; results are not constant (results are collected quarterly and may vary over time based on natural variation and treatment) PWS definition- a system that serves 25+ people, or 15+ service connections, for 60 or more days/year. Arsenic reporting is required for community PWSs (residential/year round), and non-transient/non-community systems (workplaces, schools, etc.) that serve the same 25+ people for at least 180 days/year. Transient systems (restaurants, motels, etc.) do not monitor for arsenic.
	USGS Arsenic Probability	Arsenic presence in groundwater	USGS	Probability of arsenic in groundwater at >1 ppb, >5 ppb, >10 ppb	Georeferenced points	2011	Data is modeled- it indicates a high probability of the presence of arsenic, based on a limited number of factors (excluding regional groundwater redox information, groundwater pH, well depth, fracture location and depth, and other groundwater chemistry measures) and on a limited number of samples, as such, it cannot be used to determine which individual wells will be at risk; presence of arsenic in groundwater does not necessarily translate to exposure Data most relevant when considering potential exposure among residents with private wells, a high probability of

							arsenic in bedrock where there is a PWS would not likely translate to exposure
	USGS	Arsenic presence in groundwater	USGS	Point in time level of arsenic in specific well locations	Georeferenced points/ well location	2006	Wells are located statewide, samples were drawn in 2006 and analyzed in 2015 (tested and proven to be sound) 3 new wells on the seacoast monitored bi-monthly from 2014-2018 for arsenic (and uranium) to show arsenic trends and seasonal variation
Behavioral Data: water source and consumption, testing, and treatment	NH BRFSS	Behavioral data around testing and consumption	DPHS (HSDM)	Drinking water source, water consumption, well water testing (ever/when), mitigation (avoidance or testing), awareness of health impacts from water contaminants, source of information/guidance about testing and treatment	Record level-aggregated to county (ability to look at Manchester and Nashua exclusive of Hillsborough County) or PHN	2014, 2017	Sample size may be too small to draw conclusions at the county level or to stratify by other factors (such as income, education, etc.), questions have not remained consistent year-to-year 2017 sub-state data will be released in the fall of 2018; 2018 data is in process of being collected, no timeline yet for data release
	NH PRAMS	Behavioral data around testing	DPHS (HSDM & MCH)	Drinking water source, well water testing (in 12 months prior to delivery), health care worker advisement on testing	State	2013-2016	Data limited to women who have recently given birth; no information about results or treatment
	Private Well Owner Survey	Behavioral data around testing, consumption, and treatment	Dartmouth Toxic Metals Superfund Research Program	Well water testing, well water treatment, concern about arsenic, water consumption, demographic data	State/regions within the State	2014	Not a representative random sample, results may not be generalizable ⁷⁹⁹¹

Acronym Key:

BRFSS: Behavioral Risk Factor Surveillance System

DES: Department of Environmental Services

DPHS: Department of Health and Human Services, Division of Public Health Services

EMD: Environmental Monitoring Database

HSDM: Bureau of Health Statistics and Data Management

MCL: Maximum Contaminant Level

MtBE: Methyl tert-butyl ether

PHL: Public Health Lab

PHN: Public Health Network

ppb: parts per billion

PRAMS: Pregnancy Risk Assessment Monitoring System

PWS: Public Water System

RDL: Reporting Detection Limit

USGS: United States Geological Survey

voc: volatile organic compound