

**MANAGEMENT AUDIT**

**EMERGING INFECTIOUS DISEASES**  
**AND**  
**LABORATORY OPERATIONS**

Presented to  
the Metropolitan King County Council  
by the  
County Auditor's Office

Don Eklund, King County Auditor  
Harriet Richardson, CPA, CIA, Senior Management Auditor  
Heather Moss-Rich, Management Auditor Intern

Report No. 96-07

## Metropolitan King County Council

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**Don Eklund**  
*King County Auditor*

402 King County Courthouse  
Seattle, WA 98104-3272

(206) 296-1655  
TTY/TDD 296-1024

## MEMORANDUM

**TO:** Metropolitan King County Councilmembers

**FROM:** Don <sup>DE</sup>Eklund, County Auditor

**DATE:** November 5, 1996

**SUBJECT:** Management Audit of the Seattle-King County Department of Public Health:  
Emerging Infectious Diseases and Laboratory Operations

Attached for your review is the management audit report regarding the Seattle-King County Department of Public Health's (SKCDPH) ability to respond to emerging infectious diseases and its laboratory operations. The audit objectives were to determine how well prepared the SKCDPH is to identify and respond to potential emerging infectious diseases and how the SKCDPH might improve its preparedness. The audit found that:

- The SKCDPH is generally well prepared to handle infectious disease outbreaks at the local level. However, weaknesses at the national and international levels could affect the SKCDPH's ability to respond to an outbreak or epidemic occurring over a broader area (e.g., AIDS).
- The SKCDPH is in compliance with most local, state, and federal regulations; however, it was not fully compliant with the Washington Administrative Code requirement to establish written policies and procedures for placing staff on leave if they contract an infectious disease. The audit also found that the SKCDPH's disease surveillance efforts are sometimes limited because health care providers do not always fulfill their disease reporting responsibilities due to the lack of enforcement policies at both the local and state levels.
- SKCDPH's laboratory service fees did not reflect the actual cost of conducting tests as required by the Code of the King County Board of Health. Although the Code requires that certain clients be charged fees for laboratory testing services and that those fees be based upon health department costs, the audit found, in a sample of tests for which fees were charged, that the costs exceeded the fees by 53% to 634%. This occurred primarily because the established fees did not reflect the time required to perform each test.
- The SKCDPH laboratory has never performed a cost analysis or developed a cost allocation model for the tests it performs. This deficiency prevented the laboratory from determining:
  1. appropriate fee amounts,
  2. that direct testing hours accounted for only 6.5 of the 7.5 full-time equivalent microbiologists, or
  3. that low-volume tests were not cost-effective to perform.

- The SKCDPH has not been receptive to collaborating with the Washington State Department of Health (DOH) laboratory despite repeated attempts by the DOH laboratory director to increase collaboration and reduce duplication of services. Moreover, the SKCDPH laboratory has assumed the DOH laboratory's responsibility for confirmation testing without documented authority to do so.
- Some of the tests that the SKCDPH laboratory currently conducts, such as water and meat fat testing, are better suited to being performed in an environmental laboratory. King County has an environmental laboratory in the Department of Natural Resources that is certified to perform water tests, and meat fat tests can be performed at a lower cost by a commercial laboratory.
- Maintaining a separate laboratory in the SKCDPH may not be the most cost-effective way of serving the community's public health needs. Although SKCDPH management has determined that there is a public health purpose for the clinical tests that the laboratory performs, it has never looked at the laboratory from a business perspective to determine whether it is economically feasible to maintain the laboratory, whether it should perform some tests that it currently performs, or the proximity of the Washington State DOH and Harborview Medical Center laboratories and the overlap in service capabilities among these and other nearby laboratories.

The general audit conclusions are that the SKCDPH is generally well prepared to respond to infectious disease outbreaks at the local level but that improvements are needed in the management of the SKCDPH laboratory where many of these diseases would be identified. Due to the overlap of service capability with the state Department of Health, Harborview Medical Center, and commercial laboratories, as well as SKCDPH's failure to determine the economic feasibility of providing specific testing services, it is questionable whether the public health benefits achieved by operating a separate SKCDPH laboratory outweigh the economic costs of providing those services in-house.

The Executive's response agreed with the audit findings, except for the one which stated that maintaining a separate laboratory in the SKCDPH may not be the most cost-effective way of serving the community's public health needs. The Executive's response agreed to implement the audit recommendations, including those related to the finding with which there was disagreement. The audit response did not include a timetable for implementing the audit recommendations.

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cc: Paul Tanaka, Deputy County Executive  
Fred Stephens, Director, Department of Information and Administrative Services  
Pat Steel, Director, Office of Budget and Strategic Planning  
Dave Lawson, Manager, Executive Internal Audit  
Steve Policar, Manager, Executive Internal Audit  
Alonzo Plough, Director, Department of Public Health  
Sharon Stewart-Johnson, Deputy Director, Department of Public Health  
Dr. Henry Ziegler, Director, Prevention Services Division  
Nancy Cherry, Supervisor, Chronic Disease and Injury Prevention/Public Health Support  
Dr. Russell Alexander, Chief Epidemiologist, Communicable Diseases/Epidemiology  
Janice Boase, Public Health Service Supervisor, Communicable Diseases/Epidemiology  
Dr. Paul Swenson, Laboratory Director

## TABLE OF CONTENTS

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	<b>PAGE</b>
<b>Report Summary</b>	iii
<b>Auditor's Mandate</b>	ix
<b>Chapters</b>	
Chapter I Introduction	1
Chapter II Emerging Infectious Diseases	3
Chapter III Seattle-King County Department of Public Health Responsiveness to Emerging Infectious Diseases	11
Chapter IV Seattle-King County Department of Public Health Laboratory Operations	23
<b>Exhibits</b>	
Exhibit II-1 Examples of Emerging and Resurgent Infectious Diseases in the 1990s	5
Exhibit III-1 Washington Administrative Code Communicable Disease Reporting Categories	18
Exhibit IV-1 Comparison of Times Required to Perform Various Laboratory Tests	27
Exhibit IV-2 Calculation of Direct Labor and Overhead Costs Per Test for 1995	28
Exhibit IV-3 SKCDPH Laboratory Revenue Sources	29
Exhibit IV-4 Laboratory Budget Categories	34
Exhibit IV-5 Comparison of SKCDPH Laboratory Costs to Commercial Laboratory Fees for Same Tests	35
<b>Bibliography</b>	51
<b>Appendices</b>	
Appendix 1 SKCDPH Organization Chart	55
Appendix 2 Matrix of Infectious Diseases	57
Appendix 3 CDC Programs and Divisions Relating to Emerging Infectious Diseases	73
Appendix 4 SKCDPH Meningitis Response Timeline, Denny Middle School - February 1995	75
Appendix 5 SKCDPH Compliance With the Washington Administrative Code	79
Appendix 6 Sources of SKCDPH Policies and Procedures	83
Appendix 7 SKCDPH Laboratory Revenue Sources	85
Appendix 8 DOH Recommendations for Where SKCDPH Laboratory Tests Might Be More Efficiently Performed	87
Appendix 9 University of Washington Response to Inquiry Regarding Laboratory Services at Harborview Medical Center	89
Appendix 10 Washington State Department of Health Criteria for Evaluating Need to Provide Specific Laboratory Testing Services	91
Appendix 11 Executive Response	93
Appendix 12 Summary of Findings and Recommendations	103



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## Abbreviations

ACIP	Advisory Committee on Immunization Practices
AIDS	Acquired Immune Deficiency Syndrome
CD	Communicable Diseases
CDC	Centers for Disease Control
DOH	Department of Health (Washington State)
E. coli	Escherichia coli
EIWG	Emergency Interagency Working Group
Epi	Epidemiology
GIS	Geographic Information System
HIV	Human Immunodeficiency Virus
IOM	Institute of Medicine
MMWR	Morbidity and Mortality Weekly Report
NCID	National Center for Infectious Diseases
NIH	National Institute of Health
PHERM	Public Health Emergency Response Manual
PHLIS	Public Health Laboratory Information System
RCW	Revised Code of Washington
SKCDPH	Seattle-King County Department of Public Health
SPHL	(Washington) State Public Health Laboratory
STD	Sexually Transmitted Disease
TB	Tuberculosis
UW	University of Washington
WAC	Washington Administrative Code
WHO	World Health Organization

## **REPORT SUMMARY**

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### **INTRODUCTION**

The management audit of emerging infectious diseases was requested by the Metropolitan King County Council and was included in the 1996 Auditor's Office work program.

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### **BACKGROUND**

The Prevention Services Division of the Seattle-King County Department of Public Health (SKCDPH) administers the Communicable Disease Prevention Section, which includes the Communicable Disease/Epidemiology and Tuberculosis Control Units, and the SKCDPH laboratory, which assists in the detection of infectious diseases. Offices throughout the SKCDPH would be involved in the event of an emerging disease outbreak; however, the sections noted above would provide the primary responses and would serve integral roles in the initial management of an outbreak response.

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### **AUDIT OBJECTIVES**

The audit objectives were to determine how well prepared the SKCDPH is to identify and respond to potential emerging infectious diseases, some of which may be imported via international air travel to the Seattle-King County area, and to determine how the SKCDPH might improve its preparedness. Specifically, the audit examined:

- current issues and trends in the local, national, and international response systems to emerging infections;
  - SKCDPH preparedness to identify and respond to an emerging disease outbreak;
  - national and international preparedness;
  - local, state, and federal policies, regulations, and guidelines for responding to emerging diseases and SKCDPH compliance with these policies, regulations, and guidelines; and
  - actual and potential benefits and costs of maintaining an extensive SKCDPH laboratory.
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### **GENERAL CONCLUSIONS**

The general conclusions are that the SKCDPH is generally well prepared to respond to infectious disease outbreaks at the local level and is generally in compliance with local, state, and federal regulations for responding to infectious diseases. However, improvements are needed in the management of the SKCDPH laboratory where many of these infectious diseases would be identified. Due to the overlap of service capability with the state Department of Health, Harborview

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## REPORT SUMMARY

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Medical Center, and commercial laboratories, as well as SKCDPH's failure to determine the economic feasibility of providing specific testing services, it is questionable whether the public health benefits achieved by operating a separate SKCDPH laboratory outweigh the economic costs of providing those services in-house.

The audit also concluded that SKCDPH laboratory fees did not reflect the actual costs of conducting the tests as required by the Code of the King County Board of Health, that the SKCDPH laboratory has not performed a cost analysis or developed a cost allocation model for the tests it performs, that SKCDPH laboratory staff should collaborate more with the state Department of Health laboratory staff to ensure that laboratory testing is performed in accordance with WAC requirements, and that the SKCDPH laboratory is conducting some tests that are better suited to being performed in an environmental laboratory.

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## MAJOR FINDINGS AND RECOMMENDATIONS

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### FINDING III-A (page 11)

**The SKCDPH Is Generally Well Prepared to Handle Infectious Disease Outbreaks at the Local Level, Although Its Capabilities May Be Limited by National and International Preparedness That Is Less Than Optimal**

The SKCDPH has developed guidelines for responding to infectious disease outbreaks in its "Public Health Emergency Response Manual, and also has established a public information hotline that provides prerecorded messages regarding current public health concerns. The SKCDPH recently demonstrated its ability to respond to an infectious disease outbreak when a student at Denny Middle School in Seattle was diagnosed with meningitis. Although five students were ultimately confirmed as having active cases of meningitis and a sixth potential case was identified, the SKCDPH prevented the disease from spreading by coordinating with school officials, Washington State Department of Health staff, staff from the Centers for Disease Control, and the media to notify and dispense prescriptions to individuals who had been in direct contact with the identified or suspected cases.

The audit noted, however, that regardless of how well prepared the SKCDPH is to respond to an infectious disease outbreak at the local level, weaknesses at the national and international levels could affect the SKCDPH's ability to respond to an outbreak or epidemic occurring over a broader area (e.g., AIDS). For example, because national disease reporting requirements often differ from state reporting requirements, improvements need to be made in the method used to determine what diseases are reportable at both the

## REPORT SUMMARY

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state and national levels to create a cooperative, national approach toward disease identification and control.

The audit also noted that improvements could be made in the SKCDPH's ability to identify and respond to infectious disease outbreaks through additional cross-training of SKCDPH staff and by using a geographic information system (GIS) for disease surveillance purposes.

**The audit recommended** that the SKCDPH evaluate the feasibility of using a GIS to improve their disease surveillance, prevention, and control efforts and increase its cross-training efforts to maximize its ability to respond to a disease outbreak.

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### FINDING III-B (page 17)

**The SKCDPH Is in Compliance With Most Local, State, and Federal Regulations; However, Its Monitoring Capabilities Are Sometimes Limited Due to the Lack of Enforcement of Disease Reporting Requirements**

The SKCDPH is governed by various regulations at the local, state, and federal levels, including the King County Code, the Code of the King County Board of Health (BOH), the Washington Administrative Code (WAC), and the Revised Code of Washington (RCW). The audit found that the SKCDPH generally adheres to all applicable regulations but was not fully compliant with the WAC requirement that requires local health departments to establish written policies and procedures for placing staff on leave if they contract an infectious disease. However, the SKCDPH has hired a health and safety coordinator who is in the process of drafting a policy to implement this requirement.

The audit also found that the SKCDPH's disease surveillance efforts are sometimes limited because health care providers do not always fulfill their disease reporting responsibilities. This occurs primarily because there is no policy or procedure at the local or state level for enforcing the reporting requirements.

**The audit recommended** that the SKCDPH continue its efforts to educate the public about infectious diseases, explore alternative methods for informing health care providers of disease reporting requirements and improving disease identification and reporting rates, and develop a policy regarding placement of staff on leave if they contract an infectious disease.



## REPORT SUMMARY

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### FINDING IV-A (page 26)

#### **Laboratory Service Fees Did Not Reflect the Actual Costs of Conducting Tests as Required by the Code of the King County Board of Health**

Although the SKCDPH performs many of its laboratory tests at no cost to the client, the Code of the King County BOH requires the SKCDPH to charge fees for certain testing services provided to private physicians, private physician clinics, group practices, private laboratories, and hospitals, and that these fees be based upon health department costs. For some tests, the BOH Code listed the actual fee to be charged; however, these fees were determined in 1983 and have not been updated since. In a sample of tests for which fees were charged, the audit found that fees did not reflect the actual cost of performing the tests, and that costs ranged from 53% to 634% more than the established fees. The primary reason for fees being too low was that they did not reflect the time required to perform each type of test. Adjusting fees to reflect actual costs, as required, is likely to reduce the amount of contributions from the county's current expense fund and City of Seattle's general fund.

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### FINDING IV-B (page 31)

#### **The SKCDPH Laboratory Has Never Performed a Cost Analysis or Developed a Cost Allocation Model for the Tests It Performs**

The audit found that the SKCDPH laboratory has never performed a cost analysis of the tests it performs and has not developed a cost allocation model, although these are done routinely by other public health laboratories. The lack of these basic management systems prevented SKCDPH management from determining the cost of each test and setting fees accordingly, identifying anomalies in laboratory operations, and determining whether it was cost-effective to perform certain tests in-house. For example:

- Although SKCDPH submitted a request to increase laboratory fees in 1995 (which lapsed without approval), it did not perform an analysis to determine the appropriate amount for each fee. Consequently, the requested fee increases would not have covered the cost of performing each respective test.
- Because the SKCDPH did not monitor the factors associated with operating the laboratory, management had not identified that direct testing hours accounted for only 6.5 full-time equivalent (FTE) microbiologists although the laboratory had 7.5 FTE microbiologists, or that direct testing time accounted for only 86% to 88% of available microbiologist staff time.
- A survey of several commercial laboratories in the Puget Sound region revealed that many of the low-volume tests currently performed by the SKCDPH laboratory could be performed at a much lower cost in a commercial laboratory because SKCDPH's costs were, on average, 122% more than the fees that a commercial laboratory would charge for the tests.

## REPORT SUMMARY

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### FINDING IV-C (page 36)

**The SKCDPH Has Not Been Receptive to Collaborating With the State Department of Health (DOH) Laboratory, and Has Assumed the DOH Laboratory's Responsibility for Confirmation Testing Without Documented Authority to Do So**

The audit found that the state DOH laboratory is legally mandated, in accordance with WAC 246-100-231, to perform confirmation tests currently performed by the SKCDPH laboratory. The state DOH laboratory performs these tests for all counties in the state except King County. Although the SKCDPH laboratory is performing these tests, neither the state nor the SKCDPH has any documentation indicating that the SKCDPH has been provided the authority to perform the tests.

The audit found that the state DOH laboratory director has contacted three previous SKCDPH directors about collaborating on tests currently performed by both the DOH and SKCDPH laboratories, citing both specific areas for collaboration and numerous benefits that could be achieved as a result. Although the state laboratory director's recommendations included tests that the state laboratory is already mandated by the WAC to perform, SKCDPH has generally been nonresponsive to these requests.

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### FINDING IV-D (page 40)

**Some Tests That the SKCDPH Laboratory Currently Conducts Are Better Suited to Being Performed in Another Laboratory Environment**

The majority of tests performed in the SKCDPH laboratory are clinical in nature (i.e., testing medical specimens); however, the laboratory also conducts water and meat fat tests, which are environmental tests. The audit found that the SKCDPH laboratory conducts water tests although King County has its own environmental laboratory in the Department of Natural Resources that is both certified and set up to perform the type of water testing conducted by the SKCDPH laboratory. The SKCDPH laboratory also performs meat fat tests, although there is no public health purpose for these tests. Because clinical and environmental laboratories are generally set up quite differently from each other, the water and meat fat tests are better suited to being performed in another laboratory environment.

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### FINDING IV-E (page 41)

**Maintaining a Separate Laboratory in the SKCDPH May Not Be the Most Cost-Effective Way of Serving the Community's Public Health Needs**

The audit found that the absence of adequate management systems and controls raises the question of whether it is prudent for SKCDPH to operate its own separate laboratory. Although SKCDPH management has determined that there is a public health purpose for the clinical tests that its laboratory performs, it has never looked at the laboratory from a business perspective to determine whether it is economically feasible to maintain the laboratory, whether it should perform certain tests that it currently performs, or the proximity of the Washington State DOH and Harborview Medical Center laboratories to the SKCDPH laboratory and the overlap of service capabilities among these and other nearby laboratories.

## REPORT SUMMARY

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The audit also found that using laboratory guidelines developed by the state DOH laboratory director to evaluate each test performed could assist SKCDPH in determining not only the public health rationale, but also the business rationale (i.e., economic feasibility) of continuing to perform each test.

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**The audit recommended** that the Metropolitan King County Council:

- retain an independent laboratory consultant to evaluate the laboratory services performed by the SKCDPH and make recommendations regarding the continuation of those services;
- make a decision, based on the consultant's recommendations, regarding the level of services to be provided by the SKCDPH laboratory;

**If the Council decides to maintain the SKCDPH laboratory, SKCDPH management should pursue the following recommendations:**

- develop management systems for setting laboratory fees and identifying and monitoring anomalies in laboratory performance;
  - make a proactive effort to establish a collaborative relationship with the state DOH laboratory which should include determining which laboratory is best suited to performing certain tests;
  - establish a laboratory fee structure that reflects the cost of performing each test, as required by the Code of the King County Board of Health;
  - establish a budget format that facilitates tracking of laboratory costs; and
  - coordinate its influenza surveillance efforts with the state DOH to eliminate duplication.
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## **AUDITOR'S MANDATE**

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The Seattle-King County Department of Public Health's responsiveness to emerging infectious diseases and its laboratory operations were reviewed by the County Auditor's Office pursuant to Section 250 of the King County Home Rule Charter and Chapter 2.20 of the King County Code. The audit was performed in accordance with generally accepted government auditing standards, with the exception of an external quality control review.



# CHAPTER I

## INTRODUCTION

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### BACKGROUND

The management audit of emerging infectious diseases was requested by the Metropolitan King County Council and was included in the 1996 Auditor's Office work program.

The Prevention Services Division of the Seattle-King County Department of Public Health (SKCDPH) administers the Communicable Disease Prevention Section, which includes the Communicable Disease/Epidemiology (CD/Epi) and Tuberculosis (TB) Control Units, and the SKCDPH laboratory, which assists in the detection of infectious diseases. (The organization chart for the Prevention Services Division is included as Appendix 1.) Offices throughout the SKCDPH would be involved in the event of an emerging disease outbreak; however, the sections noted above would provide the primary responses and would serve integral roles in the initial management of an outbreak response.

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### AUDIT OBJECTIVES

The audit objectives were to determine how well prepared the SKCDPH is to identify and respond to potential emerging infectious diseases, some of which may be imported via international air travel to the Seattle-King County area, and to determine how the SKCDPH might improve its preparedness. Specifically, the audit examined:

- current issues and trends in the local, national, and international response systems to emerging infections;
  - SKCDPH preparedness to identify and respond to an emerging disease outbreak;
  - national and international preparedness;
  - local, state, and federal policies, regulations, and guidelines for responding to emerging diseases and SKCDPH compliance with these policies, regulations, and guidelines; and
  - actual and potential benefits and costs of maintaining an extensive SKCDPH laboratory.
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### AUDIT SCOPE AND METHODOLOGY

The audit focused primarily on the Communicable Disease Prevention Section and the SKCDPH laboratory within the Prevention Services Division of the Seattle-King County Department of Public Health.

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## Chapter I: Introduction

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Audit methodology included a literature review, interviews with SKCDPH staff and other involved persons, and surveys of private laboratories and health department laboratory functions in other counties. The literature review included local, state, and federal regulations; epidemiological journals, special reports and journals from the Centers for Disease Control and Prevention (CDC); and nonfictional accounts of recent disease outbreaks. (See Bibliography for a partial listing of resources consulted during this study.) Audit staff also conducted interviews with SKCDPH staff within the Prevention Services Division as well as with public and private health officials not affiliated with the SKCDPH, such as the state Department of Health (DOH) Laboratory Director, the former lab director and a public health manager from the Tacoma-Pierce County Health Department, and the U.S. Quarantine Station manager at Sea-Tac Airport. The laboratory survey conducted by audit staff included responses from the state DOH laboratory, several private laboratories located in King and Pierce Counties, and the University of Washington (UW) Department of Laboratory Medicine which administers the laboratory at Harborview Medical Center. Additionally, audit staff contacted managers of other county health departments in Washington and other states to compare laboratory functions and service levels.

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## CHAPTER II

### EMERGING INFECTIOUS DISEASES

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This chapter provides an overview of emerging infectious diseases. It is organized into three major topic areas: 1) definition and incidence of infectious diseases; 2) the roles and responsibilities of significant stakeholders in the emerging diseases arena; and 3) infectious disease surveillance and response. International, national, and local considerations are identified within the topic areas.

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#### **"EMERGING INFECTIOUS DISEASES" DEFINED**

The term "emerging infectious diseases" refers to any viral disease of infectious origin of which incidence in humans has either increased within the past two decades or threatens to increase in the near future.<sup>1</sup> Other common terms used to refer to emerging infectious diseases are communicable diseases, infectious diseases, emerging diseases, imported diseases, viruses<sup>2</sup>, and plagues. A matrix of infectious diseases, and their sources, symptoms, means of transmittal, and prevention and treatment methods is included as Appendix 2.

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#### **EMERGING DISEASES OF CURRENT INTEREST**

The recent news of an Ebola outbreak in Zaire alarmed a worldwide audience already sensitized by an array of books, magazine articles, television programs, and movies addressing the dangers of Ebola. As of August 24, 1995, a total of 315 confirmed or suspected cases of Ebola resulted in 244 deaths (a fatality rate of about 77%) in Kikwit, Zaire. Ebola was also the focus of Richard Preston's recent best seller, The Hot Zone, and an Ebola-like virus was the deadly killer portrayed in the movie "Outbreak." The recent attention to emerging viruses has fueled increasing public interest, and many people question their own susceptibility and how their local communities would respond to a possible outbreak.

Although recent attention has been devoted to exotic diseases such as Ebola and Lassa fever, these diseases are generally not health threats in the United States (U.S.) or King County. The primary reason exotic diseases reach epidemic proportions in the third world is a lack of proper medical procedures and/or supplies. For example, Ebola spread quickly in Kikwit because

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<sup>1</sup> Institute of Medicine. Emerging Infections: Microbial Threats to Health in the United States. Washington, D.C.: National Academy Press, 1992.

<sup>2</sup> Viruses are shreds of genetic information that cannot survive by themselves, but may be lethal once they enter into a host cell and begin to multiply. Viruses are largely untreatable.

## Chapter II: Emerging Infectious Diseases

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family members traditionally prepare bodies for funeral services. In the U.S. and other developed countries, basic preventive measures, such as avoiding direct contact with infected tissue, blood, secretions, or excretions, virtually eliminate the risk of infection from exotic infectious diseases. Thus, if Ebola or another similar infectious disease were to emerge in the U.S. or another developed country, the outbreak would likely be contained quickly.

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### EVOLUTION OF VIRUSES

Emerging infectious disease threats are caused by three phenomena:

- emergence of previously unknown infectious agents,
- reemergence of old infectious agents, and
- increases in drug-resistant strains.

Deforestation of the rain forests is currently considered to be a catalyst behind human contact with previously unknown infectious agents, as described by Richard Preston in The Hot Zone:

"The emergence of AIDS, Ebola, and any number of other rain-forest agents appears to be a natural consequence of the ruin of the tropical biosphere.... The rain forests are large reservoirs of viruses, since all living things carry viruses. When viruses come out of an ecosystem, they tend to spread in waves through the human population, like echoes from the dying biosphere." (page 287)

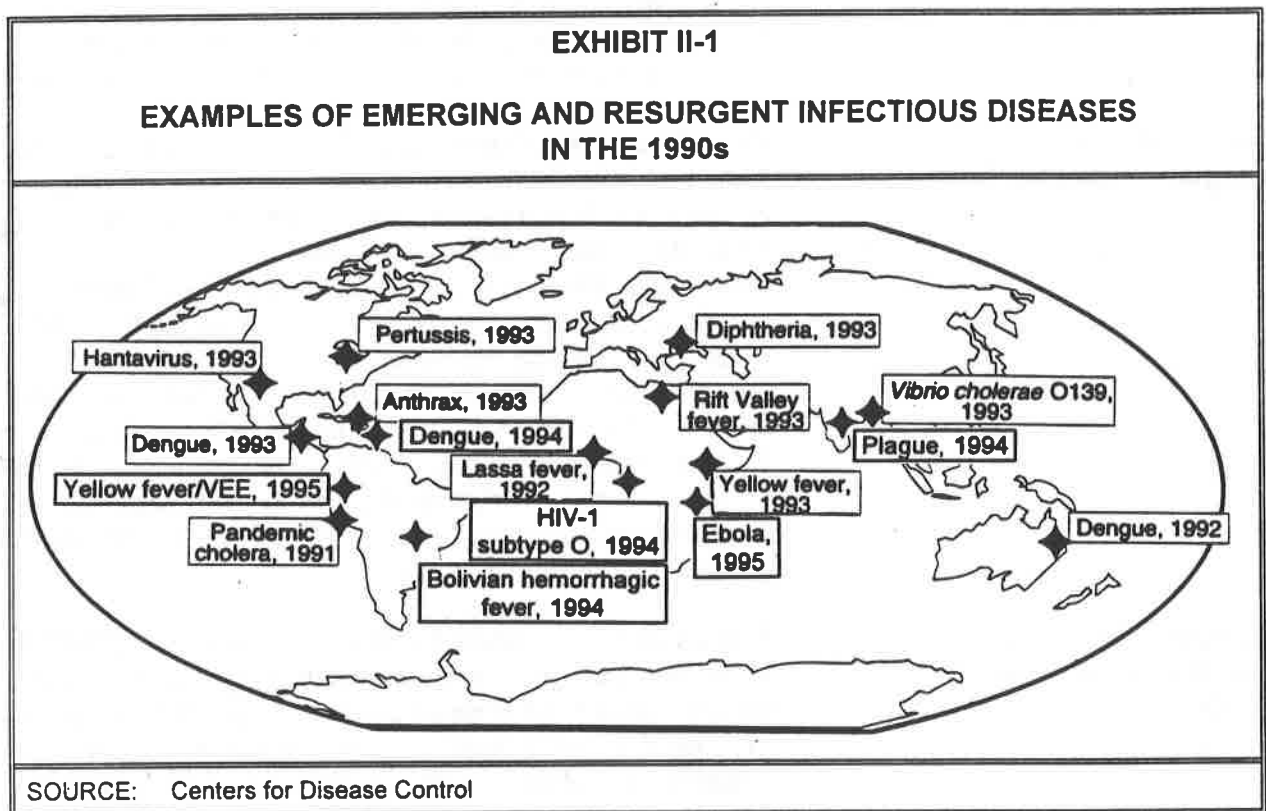
Travel is an increasingly important factor affecting the spread of disease, because people now travel from Paris, Kinshasa, or Sidney to Los Angeles, London, or Honolulu within a day. The fast pace of the current world juxtaposes people, parasites, plants, animals, and chemicals in a way that precludes timely adaptation. In addition, the combination of movement and profound change in physical environment can lead to the spread of unanticipated diseases by multiple channels.

The resurgence of old diseases has also been facilitated by rapid travel and movement. For example, although cholera was virtually eliminated in the U.S. by modern sewage and water treatment systems, more U.S. citizens traveling abroad are returning after contracting cholera or are bringing back cholera-contaminated food. Consequently, the resurgence of cholera has again become a serious health issue in the U.S.

Disease emergence is also triggered by changes in or evolution of existing organisms, development of antimicrobial resistance

in existing agents, and breakdowns in public health measures for previously controlled infections. Examples that point to the dangers of the development of antimicrobial resistance are pertussis and tuberculosis (TB), which were both thought to be nearly eradicated. Some new strains are resistant to generally prescribed antibiotic treatments. In fact, new multi-drug resistant strains of TB and pneumococci have emerged within various areas of the U.S. and in King County.

Exhibit II-1 displays the incidence of recently emerging and resurgent diseases around the world:



It should be noted that while King County has not been plagued by many of the emerging and resurging diseases displayed in Exhibit II-1, infectious diseases were among the top ten causes of death in the United States. Furthermore, TB, which did reemerge in King County, was not only the leading cause of death among infectious diseases worldwide, but threatened more people worldwide than AIDS, cholera, Dengue fever, and other infectious diseases combined.

Other infectious diseases of concern to King County and surrounding Puget Sound area health officials during the past five years include human immunodeficiency virus (HIV)/AIDS, STDs (e.g., chlamydia and gonorrhea), measles, pertussis, enteric diseases (e.g., E. coli 0157:H7, salmonella, shigella), hepatitis, and miscellaneous food-borne illnesses. This list is

## **Chapter II: Emerging Infectious Diseases**

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relatively consistent with other areas in the United States in which HIV infection, pneumonia, and influenza were generally ranked among the top ten causes of death.

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### **ORGANIZATIONAL FRAMEWORK**

Because many infectious diseases are largely or completely preventable, it is important that the numerous international, national, and local organizations concerned with emerging infectious diseases are sufficiently organized to exchange information and resources. The significant stakeholders include organizations such as the World Health Organization (WHO); the Centers for Disease Control (CDC); U.S. Quarantine Stations; national, state, and local health departments; and local private and public health care providers.

#### **World Health Organization (WHO)**

The World Health Organization (WHO), a specialized United Nations agency with 166 member countries, is the responsible authority for directing and coordinating international health care. According to the Global Epidemic-Emergency Interagency Working Group (EIWG), a panel of international and national multidisciplinary experts convened to address the recent "super-Ebola" epidemic, the WHO is expected to lead the response in the event of a worldwide disease outbreak. However, the WHO's \$250 million annual budget hardly covers the basic needs of member nations. Nevertheless, the WHO functions as the coordinator in tracking emerging diseases and is attempting to identify several virology laboratories worldwide to provide surveillance services.

#### **Centers for Disease Control and Prevention (CDC)**

The Centers for Disease Control and Prevention (CDC), based in Atlanta, Georgia, is the disease investigation unit of the United States Public Health Service. The CDC has assumed the role of a support agency to local and state health departments, which includes coordinating and funding interstate projects related to infectious disease control. In 1995, the CDC provided over \$1,000,000 in grant funds to the Seattle-King County Department of Public Health for programs such as HIV/AIDS and STD research, infertility, child care illness and injury, and immunization support.

#### **U.S. Quarantine Station**

The U.S. Quarantine Station, located at Sea-Tac Airport, is one of seven CDC quarantine stations across the country that serve as initial investigators of potential infectious disease threats. The primary tasks of the quarantine stations are to notify airlines of potential infections and symptoms, investigate, and possibly quarantine suspected infectious disease carriers. Quarantine station staff, however, do not typically have medical backgrounds.

**Oregon State Health  
Department**

The Oregon State Health Department is one of the CDC's Emerging Infections Epidemiology and Prevention Centers. This center was provided a grant to maintain communication among academic institutions and other appropriate state, local, and community-based organizations; establish a sentinel physician surveillance network; and enhance communication of public health information. The focus of the center is surveillance of certain reportable diseases, especially those that have developed drug resistance.

**Washington State  
Department of Health  
(DOH)**

The Washington State DOH is the state coordinator of public health services. The DOH has an extensive laboratory that conducts most clinical testing for local (i.e., county) health departments, except for the Seattle-King County Department of Public Health. The DOH's Seattle-based laboratory would be an important resource in the identification and control of infectious diseases.

**Seattle-King County  
Department of Public  
Health (SKCDPH)**

The Seattle-King County Department of Public Health (SKCDPH) is a joint city-county health department providing direct public health services to all King County residents. Pursuant to the King County Code, the SKCDPH is the responsible authority for providing local public health services, including the prevention, control, and treatment of communicable diseases. The SKCDPH Prevention Services Division administers the Communicable Disease Prevention Section, which is the first line of defense in the event of a local communicable disease outbreak. SKCDPH operates its own laboratory, which is where many infectious diseases in King County are either initially identified or confirmed.

**Ebola Task Force**

The Ebola Task Force, a committee of public and private health care providers in the Seattle metropolitan area, was convened to discuss coordinating a response to the potential outbreak of an emerging disease. In addition to establishing lines of communication between health care providers, the Task Force created a formal list of suggested changes to the standard CDC protocol for responding to emerging diseases (as recorded in the "Morbidity and Mortality Weekly Report," February 28, 1988).

**Public and Private  
Physicians and Hospitals**

Public and private physicians and hospitals also serve on the front-line in treating and controlling infectious diseases. Their primary duty, even during an outbreak, is to accurately diagnose and report a disease. Although public and private health care providers are required by state law to report specific diseases to local health officials, some providers do not have the necessary experience or education to adequately diagnose all infectious diseases, which leads to misdiagnosis and/or underreporting of cases. In addition, because patients are frequently drawn from various parts of a community, it would be

## Chapter II: Emerging Infectious Diseases

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difficult for health care providers to identify an outbreak of a specific disease.

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### **DISEASE SURVEILLANCE AND RESPONSE**

#### **Surveillance Increases the Ability to Control Diseases**

The National Center for Infectious Diseases (NCID), one of the centers of the CDC, considers research and surveillance (i.e., tracking the location and frequency or occurrence of specific diseases) programs to be critical in minimizing or precluding outbreaks of infectious diseases that lead to serious health problems. Through research and surveillance, the global movement and evolution of microbes can be mapped and the integrated knowledge and skills from many disciplines (e.g., the social, biological, and physical sciences) can be used to guide effective intervention. Health authorities believe efforts should be focused primarily on systems (e.g., the ecosystem) rather than a disease, microbe, or host, and on prevention because current treatments for infectious diseases are threatened by increases in multi-drug-resistant strains.

Education and development of local resources are also considered crucial because many cases of emerging diseases in the United States are not reported due to passive surveillance or uninformed, inexperienced health care providers. The CDC, which recognized the need to improve local resources, has modified its approach to responding to emerging diseases. Instead of conducting disease investigations, the CDC now provides support, networking, and funding to state and local health agencies to develop an infrastructure to identify, investigate and contain infectious diseases. (Appendix 3 identifies the CDC's programs and divisions relating to emerging infectious diseases.) The CDC's recently-released "*Addressing Emerging Infectious Disease Threats: A Prevention Strategy for the United States*," emphasizes surveillance, research, and prevention activities. The plan also advocates the establishment of "Emerging Infections Epidemiology and Prevention Centers" at the local level, with ties to academic institutions, public and private laboratories, physicians, and community-based organizations (see previous discussion regarding the Oregon State Health Department).

#### **Infrastructure Deficiencies Decrease the Ability to Control Diseases**

Finally, it is important for public officials to focus on international, national, and local infrastructure deficiencies in the prevention and containment of infectious diseases. While adequate water supply and sewage systems are necessary to preclude or minimize the spread of infectious diseases, the WHO estimates that 78% of the population in less-developed countries are without clean water and 85% are without adequate fecal waste disposal. Aging water supply and sewage systems have even been problems in the U.S. For example, during the 1992 cryptosporidium outbreak in



Milwaukee, Wisconsin, over 400,000 people were infected via the public water supply.

### **Immigration Sometimes Affects the Number of Infectious Disease Cases**

A concern with some diseases is the number of immigrants settling in the U.S. and King County after contracting infectious diseases common to their country of origin, often due to infrastructure deficiencies. For example, 71 of the 115 TB cases (62%) reported in King County in 1994 and 90 of the 131 (69%) cases reported in 1995 were identified as persons of foreign birth. Thus, the prevention and control of infectious diseases is not only an important public health issue, but a public systems issue that requires a coordinated response from informed public officials.

### **Laboratories Have an Important Role in Disease Identification and Surveillance**

Prompt identification of diseases is one of the key factors of surveillance. Because the clinical symptoms of many diseases are often similar, most infectious diseases are diagnosed by testing specimens and cultures in a clinical laboratory. Specimens and cultures may be tested in private, commercial laboratories and, in some cases, in laboratories operated by public health departments at the local or state level. In King County, SKCDPH operates its own public health laboratory. The Washington State Department of Health (DOH) also operates a public health laboratory, located in north Seattle, which serves all of Washington State. There are also several commercial laboratories in King County, as well as the clinical laboratory located at Harborview Medical Center. All of these laboratories have specific roles and responsibilities for identifying and reporting confirmed cases of infectious diseases which increase surveillance capabilities at the local, state, and national levels.

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## CHAPTER III

# SEATTLE-KING COUNTY DEPARTMENT OF PUBLIC HEALTH RESPONSIVENESS TO EMERGING INFECTIOUS DISEASES

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### INTRODUCTION

The ability to respond to emerging infectious diseases is affected by the public health infrastructure in the location of the outbreak. In King County, the Seattle-King County Department of Public Health (SKCDPH) is the local front-line agency responsible for responding to an infectious disease outbreak. There are other organizations at the state and national level, such as the Washington State Department of Health and the Centers for Disease Control (CDC), that would respond to outbreaks extending beyond the boundaries of King County. These organizations also provide support to SKCDPH in the event of significant outbreaks of rare or highly contagious infectious diseases within King County. The findings below discuss SKCDPH's ability to respond to emerging infectious diseases, factors limiting its ability to respond to such diseases, and SKCDPH's compliance with regulations regarding infectious diseases.

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### FINDING III-A

**THE SEATTLE-KING COUNTY DEPARTMENT OF PUBLIC HEALTH IS GENERALLY WELL PREPARED TO HANDLE INFECTIOUS DISEASE OUTBREAKS AT THE LOCAL LEVEL, ALTHOUGH ITS CAPABILITIES MAY BE LIMITED BY NATIONAL AND INTERNATIONAL PREPAREDNESS THAT IS LESS THAN OPTIMAL.**

### SKCDPH PREPAREDNESS

The SKCDPH has demonstrated that it is prepared to respond to infectious disease outbreaks at the local level and has enhanced its preparedness by developing the "Public Health Emergency Response Manual (PHERM)," which establishes an orderly response procedure in the event of a public health emergency, and by providing a public information hotline.

### Recent Meningitis Outbreak Demonstrates SKCDPH's Ability to Respond to Infectious Disease Emergencies

A meningitis outbreak that occurred at Denny Middle School in February 1995 provides a recent example of the SKCDPH's ability to respond to an infectious disease emergency. Sparked by a report from the Denny Middle School nurse of a possible case of meningitis, the SKCDPH initiated a comprehensive outbreak response. Between February 13 and February 23, the SKCDPH confirmed five Denny Middle School students with active cases of meningitis, identified a sixth possible case, and dispensed over 1150 prescriptions to the staff, students, families and others in contact with the infected individuals. The response was carried out through several emergency

## Chapter III: SKCDPH Responsiveness To Emerging Infectious Diseases

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prescription clinics; weekend conference calls and meetings with the CDC, Seattle Public Schools officials, and Washington State DOH staff; SKCDPH staff overtime on evenings and weekends; and effective collaboration with the media. A complete timeline of the outbreak and SKCDPH's actions is included as Appendix 4.

### **SKCDPH'S Public Health Emergency Response Manual Provides Detailed Guidance for Responding to Infectious Disease Outbreaks**

The SKCDPH created the PHERM to provide procedures for responding to emergencies that require a planned response from the SKCDPH, but do not require implementation of the King County Emergency Operations Plan. SKCDPH concerns as a result of a major disaster, such as an earthquake or flood, include unsanitary water conditions and lack of adequate waste disposal systems, both of which can increase the incidence of illness and disease. Other concerns include disruption of the communicable disease reporting system, potential vaccine shortages, and other health care needs of people who live in disaster areas. One of the primary purposes of the PHERM is to provide accurate information to the public to prevent disease outbreaks during or after an emergency to ensure that the public is focused on the correct problem. In addition to disasters, the PHERM lists disease outbreaks as public emergencies. The PHERM identifies the following as potential disease outbreak concerns for the King County area:

- food-borne illnesses - E. coli 0157 H:7, salmonellosis, shigellosis;
- water-borne illnesses - cryptosporidiosis, giardiasis;
- vector-borne diseases - hantavirus, lyme disease; and
- diseases spread via respiratory secretions - chicken pox, influenza, measles, meningococcus, mumps, rubella, and streptococcus.

The PHERM provides detailed procedures, including checklists, for environmental health and communicable disease control staff to follow before, during, and after an emergency response situation. The CD/Epi Unit, the primary drafter of the manual, also has its own specific checklist that includes tasks such as maintaining the notifiable disease surveillance system, providing educational resources to the public, ordering emergency supplies of appropriate vaccines, and storing vaccines in the event of an extended power outage.

The PHERM and other SKCDPH responses to disease outbreaks are supported by various regulations that provide health officials broad powers to protect the public health. For example, the Revised Code of Washington (RCW) 70.28.05(2) states that "while it is important to respect the rights of individuals, the legitimate public interest in protecting the public

### **Chapter III: SKCDPH Responsiveness To Emerging Infectious Diseases**

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health and welfare from the spread of a deadly infectious disease outweighs incidental curtailment of individual rights that may occur in implementing effective testing, treatment, and infection control strategies." Control strategies might include involuntary detainment, examination, testing, treatment, and isolation of infected individuals, as well as temporary closure of infected daycare centers and schools.

#### **SKCDPH Public Information Hotline**

In order to provide the public with accurate and timely information about infectious diseases and outbreaks, the CD/Epi unit has established a public information hotline number (296-4949). The hotline has six taped messages that are changed as new public concerns or outbreaks arise. For example, the hotline messages for June 1995 included information about a toxoplasmosis outbreak in British Columbia, Canada; E. coli 0157:H7; a hepatitis-A alert for a local restaurant; the recently approved chicken pox vaccine; and head lice. In February 1996 the hotline carried information about a recent pertussis outbreak, a measles alert resulting from a confirmed case, and scabies. This hotline further demonstrates SKCDPH's proactive efforts toward preserving the public health of King County residents.

#### **Cross-Training Among Staff Could Be Improved**

CD/Epi staff identified the need to improve cross-training efforts both within and beyond the CD/Epi Unit of SKCDPH. Currently, knowledge of some specific diseases is limited to one or two individuals on staff. In the event of an outbreak, a broad base of knowledge would enable SKCDPH to more easily move staff from one area of concern to another.

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#### **NATIONAL AND INTERNATIONAL PREPAREDNESS IS LESS THAN OPTIMAL**

It is essential to understand, however, that regardless of how well prepared the SKCDPH might be, the entire international infrastructure charged with responding to emerging diseases, especially tropical diseases, is in need of fortification. It is unlikely that any changes in local response capabilities would have a significant impact on the threat of and response to emerging infectious diseases at either the national or international level.

#### **National Preparedness**

A 1992 Institute of Medicine (IOM) report evaluated national preparedness to public health issues and reiterated the need to consider issues addressed in two previous IOM reports. The previous reports, published in 1987 and 1988, found that the local, state and federal public health systems were compromised and unable to adequately perform their essential functions of "assessment, policy development, and assurance, including the detection of and rapid response to, and prevention of infectious diseases" and identified the need to train infectious disease control specialists at home and abroad as a priority. In addition to the IOM reports, a 1995 evaluation of the United

### Chapter III: SKCDPH Responsiveness To Emerging Infectious Diseases

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States' ability to respond to infectious disease epidemics concluded that the nation's tropical medicine capabilities are "dangerously inadequate."

A significant problem is that the U.S. has no single official organizational procedure for responding to infectious disease emergencies. Although the CDC has established a protocol for handling rare infectious diseases, such as viral hemorrhagic fevers (e.g., Ebola), the procedures are limited to providing instructions regarding the collecting, packaging, and transporting of virus specimens, which must be sent directly to the CDC lab. The lack of official procedures was highlighted when the Emergency Interagency Working Group (EIWG) convened in 1994 to determine the nation's ability to respond to infectious disease epidemics and concluded that the U.S. is ill-prepared to respond to and manage even small numbers of patients with a highly infectious and lethal disease. The EIWG's major findings were:

- there are no official definitions or classifications for disease-related emergencies;
- responses to emergency situations are on an ad hoc basis;
- there is no official process for determining which organization(s), either within the U.S. or internationally, should assume administrative, technical, or financial responsibility; and
- significant delays in effective response to the recent Ebola epidemic resulted from the lack of a well-defined communications network connecting the various involved national and international organizations.

#### **International Preparedness**

Although there is not an established international surveillance system, the WHO would be expected to take the lead in identifying and coordinating the logistical and financial resources necessary in the event of an international infectious disease emergency. However, the EIWG observed that the WHO's annual budget is so lean that it is unlikely that it could successfully manage this responsibility. The chair of the EIWG noted the importance of an international surveillance system for rapid detection of infectious diseases, and cited the lack of such a system as a probable cause for the rapid spread of AIDS.

### WHAT IS NEEDED

#### **Local Public Health Agencies Need an Infrastructure That Provides Early Warning of Disease Epidemics**

Public health officials have primary responsibility for addressing new and reemerging infectious diseases. Although the national and international organizations are the most informed and connected, local public health departments in the U.S. are the ones in direct contact with the most susceptible populations. Consequently, it is essential that local public health facilities have easy access to diagnostic tests and be supported by an infrastructure that can identify emerging diseases, provide early warning of an epidemic, and develop effective ways to contain such diseases before they become global. While lack of a response plan makes problems bigger and longer-lasting, it is the lack of a comprehensive surveillance system, at home and abroad, that permits entrance and spread of disease within the United States.

The geographic information system (GIS) is a method currently emerging as a means of improving disease surveillance efforts. Such systems can track disease rates and use demographic data related to identified cases to determine the characteristics most likely to be responsible for an epidemic, as well as to prevent and control such epidemics. A recent project using a GIS for disease surveillance purposes in San Bernardino County, California, concluded that GIS was a successful method for predicting where future cases of diseases were likely to occur, thereby enabling public health officials to redirect their prevention efforts as necessary. With the number of new diseases and drug-resistant strains of disease on the rise, such systems will facilitate public health officials' efforts towards disease surveillance, prevention, and control.

#### **Improvements at the Local Level May Have Limited Impact Due to the National and International Infrastructure**

It is recognized that the need for local public health workers to be able to quickly report anomalous illnesses to an international agency and the agency having the means to respond swiftly are key factors toward detecting and containing unknown diseases, such as AIDS, before they become global. As a first step toward improving international response capabilities to emerging diseases, one public health educator has suggested creating a network of surveillance clinics and virology laboratories throughout the geographic areas where diseases are likely to emerge. Unfortunately, because changes such as these must be made at the national or international level, changes made by local agencies such as SKCDPH will have little impact toward preventing an emerging infectious disease from entering and spreading throughout the United States. Additionally, because national disease reporting requirements often differ from state reporting requirements, improvements need to be made in the methods used to determine what diseases are reportable at both the state and national levels to create a cooperative, national approach toward disease identification and control.

## Chapter III: SKCDPH Responsiveness To Emerging Infectious Diseases

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### **The Internet Is Becoming An Important Tool for Obtaining and Disseminating Infectious Disease Information**

It is important to note, however, that at the national level the CDC has developed a prevention strategy that emphasizes surveillance, applied research, and prevention activities critical to maintaining a strong defense against infectious diseases that threaten the public health. One of its strategies includes using the Internet as a possible networking tool for this purpose. In fact, the CDC is currently using its Internet site to publish its newest quarterly journal, "Emerging Infectious Diseases," and the "Morbidity and Mortality Weekly Report" (MMWR) with periodic updates (such as those for the recent Ebola outbreak). The CDC is also using the Internet to print many of its other publications and to provide quick access to information regarding specific diseases.

Within the past year, the SKCDPH has provided Internet access to its communicable disease officers and other critical staff within the Prevention Services Division, and has developed priorities for providing this service in the future to others within the department. In addition to using the Internet as a resource for obtaining information, the SKCDPH has developed a home page which provides information to the general public and public health officials throughout the region.

#### **EXECUTIVE RESPONSE**

*"We concur."*

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### **RECOMMENDATIONS**

#### **III-A-1**

The SKCDPH should evaluate the feasibility of using a GIS to improve its disease surveillance, prevention, and control efforts.

#### **EXECUTIVE RESPONSE**

*"The Department will continue to look at ways of using GIS."*

*"One usage that is being examined is the linkage of the GIS with the Department's communicable disease surveillance and tracking system. The Epidemiology section presently uses a geocoding software package called GeoVista. The software assigns census tract, block group, zip and zip+4 codes to addressees. It was specifically developed in response to the need to assess community health at a variety of geographic levels. Earlier efforts to assign geocodes to health data using another software package produced an unacceptable level of errors in geocode assignments. The Department has compared the results from GeoVista with those from the County GIS and concluded that GeoVista was the best software package for assigning geographic codes to addressees associated with health events."*

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#### **III-A-2**

The SKCDPH should increase its cross-training efforts within the CD/Epi Unit, as well as within the entire King County public



health system to maximize its ability to respond to a disease outbreak.

**EXECUTIVE RESPONSE**

*"We maximize cross-training efforts currently and will continue to do so."*

**AUDITOR'S COMMENT**

During the audit, SKCDPH staff indicated that cross-training efforts were not maximized, and that increasing the number of staff within a unit who were cross-trained could significantly improve SKCDPH's ability to respond to an infectious disease outbreak. As recently as October 15, 1996, SKCDPH staff stated, in writing, that "additional training would be helpful." Audit staff believe that the Executive's response does not fully acknowledge that SKCDPH's cross-training efforts need improvement.

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**FINDING III-B**

**THE SEATTLE-KING COUNTY DEPARTMENT OF PUBLIC HEALTH IS IN COMPLIANCE WITH MOST LOCAL, STATE, AND FEDERAL REGULATIONS. HOWEVER, ITS MONITORING CAPABILITIES ARE SOMETIMES LIMITED DUE TO THE LACK OF ENFORCEMENT OF DISEASE REPORTING REQUIREMENTS.**

**SOURCES OF RULES AND REGULATORY GUIDANCE**

The SKCDPH is governed by various regulations at the local, state, and federal levels. Locally, the SKCDPH falls under the King County Code, the Code of the King County Board of Health, and miscellaneous motions. The Washington Administrative Code (WAC) and the RCW both provide guidance at the state level. An overview of the WAC regulations and SKCDPH compliance is included as Appendix 5. The federal level provides mostly procedural guidelines, and most that relate to emerging diseases are found in the Morbidity and Mortality Weekly Report (MMWR), compiled by the CDC. Other policies and procedures relevant to the Communicable Disease Prevention Section and the laboratory are listed in Appendix 6.

The Seattle-King County Department of Public Health (SKCDPH) generally adheres to and operates under all applicable local, state, and federal regulations. However, one regulation that the SKCDPH is not fully compliant with is WAC 246-100-186, under which health care settings are required to establish written policies and procedures for placing staff on leave if they contract an infectious disease. Although the SKCDPH has written a policy that explicitly states that employees who are not immune but have been exposed to measles, rubella, or varicella (i.e., chicken pox) will be placed on administrative leave until it is safe for the employee to return to work, the policy does not address the procedures for dealing with employees who have contracted some other infectious

## Chapter III: SKCDPH Responsiveness To Emerging Infectious Diseases

disease. However, the SKCDPH has hired a health and safety coordinator who is in the process of drafting a policy to implement this requirement.

### COMMUNICABLE DISEASE REPORTING AND SURVEILLANCE

#### Reporting Requirements

Disease surveillance in King County and throughout the U.S. is dependent on voluntary reporting from local laboratories and physicians. This reporting process is less than optimal, and sometimes limits the data available to SKCDPH and other public health officials for surveillance purposes. In Washington State, the process for reporting communicable diseases at the state and local levels is driven primarily by WAC 246-100, "Communicable and Certain Other Diseases," which requires local health departments to conduct surveillance activities. The WAC categorizes communicable diseases into three groups according to level of infectiousness and severity. Each of the three categories, A, B, and C, have different reporting requirements, as outlined in Exhibit III-1.

<b>EXHIBIT III-1 WASHINGTON ADMINISTRATIVE CODE COMMUNICABLE DISEASE REPORTING CATEGORIES</b>		
<b>REPORTING CATEGORY</b>	<b>EXAMPLES OF DISEASES</b>	<b>REQUIREMENTS</b>
A	Anthrax; Botulism; Cholera; Diphtheria; Measles (rubeola); Paralytic Shellfish Poisoning; Plague; Poliomyelitis; Rabies; and any cluster or pattern of disease which may indicate an outbreak, epidemic, or related public health hazard	Report immediately upon suspicion or diagnosis of a case.
B	Brucellosis; Gastroenteritis; Hemophilus Influenza Invasive Disease; Hepatitis A and B (acute); Leptospirosis; Listeriosis; Meningococcal Disease; Paratyphoid Fever; Pertussis; Rubella; Salmonellosis; Shigellosis; Syphilis (primary, secondary, or congenital); Typhoid Fever; and unusual communicable diseases	Report within one day of diagnosis.
C	Acquired Immunodeficiency Syndrome; Amebiasis; Campylobacteriosis; Chancroid; Chlamydia Trachomatis; E. coli O157:H7; Encephalitis (viral); Giardiasis; Gonorrhea; Granuloma Inguinale; Herpes Simplex; Non-A, Non-B and Unspecified Hepatitis; Human Immunodeficiency Virus; Kawasaki Syndrome; Legionellosis; Leprosy; Lyme Disease; Lymphogranuloma Venereum; Malaria; Mycobacteriosis; Mumps; Nongonococcal Urethritis; Pelvic Inflammatory Disease; Pseudomonas Folliculitis of suspected waterborne origin; Psittacosis; Q Fever; Relapsing Fever; Reye Syndrome; Rheumatic Fever; Rocky Mountain Spotted Fever; Syphilis (other); Tetanus; Tick Paralysis; Toxic Shock Syndrome; Trichinosis; Tuberculosis; Tularemia; Vibriosis; Yersiniosis; and severe adverse reaction to immunization	Report within seven days of diagnosis.
SOURCE: Washington Administrative Code 246-100-076		

Exhibit III-1 shows that the diseases that pose the greatest health risk to the general population require immediate reporting. In addition to the specifically reportable diseases listed in Exhibit III-1, the WAC requires reporting of any "unusual communicable disease," which is defined as "a communicable disease which is not commonly seen in the state of Washington but which is of general public health concern, including, but not limited to, Lassa fever, smallpox, typhus, and yellow fever." The WAC also obligates local health departments to maintain an influenza surveillance system and to "encourage submission of appropriate clinical specimens from...influenza-like illness to the Washington State public health laboratory."

**Enforcement of  
Reporting Requirements  
Is Nonexistent**

Although reporting is required under the WAC, enforcement of the requirement is nonexistent. Consequently, the frequency and accuracy of reporting varies among health care providers, laboratories, and health departments. For example, a SKCDPH disease control officer estimated that only 5 to 10% of salmonella cases are reported. He stated, however, that inconsistent disease reporting is as much of a nation-wide problem as it is a local one. A SKCDPH communicable diseases supervisor stated that national studies have indicated that underreporting is between 0 and 95%, depending on the disease. In its report, "Summary of Notifiable Diseases, United States, 1994," the CDC attributes underreporting of diseases to a number of factors, including infected individuals not seeking medical care; the diagnostic facilities available; control measures in effect; public awareness of a specific disease; and the interests, resources, and priorities of state and local officials responsible for disease control and public health surveillance.

**Health Care Providers Do  
Not Always Fulfill Their  
Reporting  
Responsibilities**

One of the local challenges of the reporting process is that physicians and laboratories both claim the other is responsible for reporting infectious disease cases. Because most infectious diseases cannot be diagnosed unless specimens are laboratory tested, physicians claim that laboratories are the first to confirm a communicable disease and should, therefore, be responsible for reporting it. Laboratories, on the other hand, claim that health care providers are the ones with the specific patient data (race, age, sex, possible source of exposure, etc.) that are needed for a complete report of the disease. According to WAC 246-100-071(3), "Responsibility for Reporting to and Cooperating With the Local Health Department," it is the ultimate responsibility of the "principal health care provider" (i.e., the physicians) to report to the local health department, regardless of whether a laboratory also reports a positive test result or submits a specimen.

## Chapter III: SKCDPH Responsiveness To Emerging Infectious Diseases

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### **Misdiagnosis Can Affect Whether Cases Get Reported**

Other challenges to the reporting process are the misdiagnosis of infectious diseases and the failure of physicians and laboratories to respond to the public health threat beyond treating their individual patients. One obvious example of this challenge was a 1989 measles case that arrived in Seattle from Mexico. After landing in Seattle, the infected individual spent six hours in the Harborview emergency room and was diagnosed as having hepatitis. By the time the individual was released, one person on the plane and two physicians at Harborview had been infected. The individual then traveled to Yakima and was misdiagnosed again at both a clinic and a hospital. The individual continued to infect people until receiving a proper diagnosis upon the fourth visit to a medical facility.

### **SKCDPH Has Taken Steps to Increase Health Care Providers' Awareness of Their Reporting Responsibilities**

It is important to note that SKCDPH has taken proactive steps to increase the awareness of notifiable diseases and the reporting responsibilities of principal health care providers. The SKCDPH distributes packets of reporting requirement information and forms to new interns and health professionals in King County. SKCDPH also collaborates with Harborview to maintain a "reporting station" that SKCDPH routinely stocks with information and forms. Additionally, SKCDPH distributes its monthly publication, "Epi-Log," which regularly contains information about disease diagnosis and reporting, to over 5000 subscribers. Some of this information, such as disease reporting requirements and the Epi-Log, is now available through the SKCDPH's home page on the Internet. Finally, SKCDPH staff often participate in public speaking engagements regarding disease concerns.

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### **RECORDKEEPING**

RCW 70-28-020 requires local boards of health to maintain permanent records of cases as submitted by local physicians. The CD/Epi Unit in the Communicable Disease Prevention Section maintains the records that relate to all communicable diseases other than TB, AIDS, and some STDs. Once records are received and recorded in the computer, the hard copies are filed in locked filing cabinets for three years. At the end of three years, the complete files are sent to archives indefinitely. Similar recordkeeping procedures are followed at the laboratory, in TB Control, and in the STD and AIDS Units. Thus, SKCDPH was in compliance with the RCW reporting requirements.

### **EXECUTIVE RESPONSE**

*"Enforcement of disease reporting is the responsibility of the United States Center for Disease Control and Prevention (CDC) and the State Department of Health. We will continue to discuss improved enforcement strategies with both entities."*

### RECOMMENDATIONS

#### III-B-1

SKCDPH should continue its current efforts to educate the public about currently emerging infectious diseases in the Seattle-King County area.

#### EXECUTIVE RESPONSE

*"We will continue our current efforts to educate the public about emerging infectious diseases in the Seattle-King County area."*

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#### III-B-2

SKCDPH should explore alternative methods for contacting practicing health care providers in the Seattle-King County area to inform them of reporting requirements and to improve the disease identification and reporting rates. This could include coordinating with instructors at the University of Washington School of Medicine to develop a communicable disease reporting seminar or collaborating with the Washington State DOH to explore and develop enforcement options.

#### EXECUTIVE RESPONSE

*"The SKCDPH will continue to explore approaches that can better inform health care providers in the Seattle-King County area about reporting requirements and disease identification protocols. Three of the Department's four Disease Control Officers (DCOs) are closely affiliated with the University of Washington School of Medicine. They are also active and well regarded members in the King County Medical Society. They will use these relationships to expand communicable disease reporting options. Increasingly, technology will be used to share information and educate health providers. Discussions with the State Medical Director, Dr. Mimi Fields, have been initiated that will explore the development of enforcement options in this area."*

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#### III-B-3

To satisfy the requirement of WAC 246-100-186, SKCDPH should develop a policy to place staff on leave who contract an infectious disease.

#### EXECUTIVE RESPONSE

*"As noted in the draft audit report, the Department is in the process of drafting a policy to implement WAC 246-100-186."*

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## CHAPTER IV

# SEATTLE-KING COUNTY DEPARTMENT OF PUBLIC HEALTH LABORATORY OPERATIONS

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### INTRODUCTION

Because it is often difficult to distinguish among the clinical symptoms of various infectious diseases, most are diagnosed and confirmed via laboratory-tested specimens. Due to the integral role the SKCDPH laboratory plays in the identification of and, ultimately, the response to infectious diseases, audit staff analyzed the laboratory functions as they relate to SKCDPH's ability to respond to emerging infectious diseases.

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### BACKGROUND

The existing SKCDPH laboratory was built in 1951 and is located on the 13th floor of the Public Safety Building in downtown Seattle.

### Laboratory Philosophy

SKCDPH staff stated that the philosophy behind maintaining its own extensive laboratory is to diagnose diseases quickly and to provide the SKCDPH with surveillance information, which in turn facilitates SKCDPH's ability to control communicable diseases and respond to disease outbreaks within the county. This philosophy is supported by current literature which emphasizes the critical role that laboratories have in quickly identifying diseases to control their spread.

### Laboratory Functions

The primary function of the SKCDPH laboratory is to provide laboratory testing services to the community clinics and SKCDPH clinics located throughout King County. The laboratory has a daily courier service that picks up specimens from the clinics and delivers them to the SKCDPH laboratory. The community clinics perform urinalyses and other simple tests, but send most of their specimens to the SKCDPH laboratory. The SKCDPH laboratory also provides testing services to other county functions such as the jail, youth services, and the Environmental Health Services Division of SKCDPH. Additionally, the laboratory conducts confirmation or reference tests for private providers and commercial laboratories in the King County area. These additional tests are more extensive and are performed to confirm the preliminary test results of a specimen or to identify the specific strain of a disease so appropriate treatment and disease control measures can be taken.

Of the approximately 150,000 tests performed annually at the central SKCDPH laboratory, 75% originate from community clinics and SKCDPH clients, 23% originate from private health care providers, and 2% originate from other laboratories in King County. The laboratory also performs 2,500-3,000 well water

## **Chapter IV: SKCDPH Laboratory Operations**

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tests and approximately 6-7 meat fat tests annually for the Environmental Health Services Division of the SKCDPH.

SKCDPH contracts with commercial laboratories that perform select chemistry and hematology tests which the SKCDPH laboratory either does not have the capacity to do or has identified as not cost-effective to do. For example, the University of Washington (UW) contracts to perform all of the chlamydia testing for SKCDPH and performs the testing at a low cost because the data is being used in an ongoing research project, and commercial laboratories do many of the primary care, non-STD tests for SKCDPH clinic patients.

Upon positive confirmation of a communicable disease, the laboratory reports the results to the Communicable Disease Prevention Section, which then begins an investigation. Reports of testing results are also compiled and sent to the Washington State Department of Health (DOH) laboratory as required by the Washington Administrative Code (WAC).

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### **LABORATORY TRENDS**

#### **Public Health Laboratories Moving Toward Consolidation and Reduction of Services**

Public health laboratories around the state and greater western region have been moving toward consolidation and reduction of services. In Washington State, King and Spokane Counties are the only two counties that have extensive, centralized public health laboratories. Although some other counties in the state do provide minimal laboratory services, many have either never had central laboratories or recently closed their laboratories. For example, the Tacoma-Pierce County Public Health Department closed its laboratory in 1995 in an effort to focus more of its work on prevention efforts. It accomplished this by reducing services provided from an optimal to required level, transferring some tests (e.g., gonorrhea and syphilis) to the Washington State DOH laboratory,<sup>3</sup> and contracting out the remaining tests (e.g., primary care testing and water testing).

#### **Laboratory Services Available in King County**

King County has the capability of providing both environmental and clinical laboratory testing services. The SKCDPH laboratory primarily provides clinical laboratory services, meaning that it tests specimens of a medical nature. Clinical laboratory services are also provided by commercial laboratories, the Harborview Medical Center laboratory, and the Washington State DOH laboratory. The King County Department of Natural Resources has an environmental laboratory that conducts environmental tests, such as water testing. Environmental laboratory services are also available through commercial laboratories and, to a limited extent, through the SKCDPH public health laboratory. Laboratories are generally established as either clinical or environmental, providing

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<sup>3</sup> The Washington State DOH laboratory was already performing chlamydia and HIV testing for the Tacoma-Pierce County Public Health Department.



only one type of testing service. The SKCDPH public health laboratory performs both clinical and environmental laboratory services.

**The State DOH Laboratory Provides Testing Services to All Counties**

The Washington State DOH laboratory is a modern, 50,000 square foot laboratory located in north Seattle. It was built between 1982 and 1985 and serves all of Washington State. In accordance with WAC 246-100-231, the DOH laboratory provides reference testing for every county in Washington State and provides primary testing for those counties that do not have their own public health laboratories. In King County, however, most of this testing is done by the SKCDPH laboratory. For example, the SKCDPH sends its TB reference testing to the state laboratory, but conducts reference testing for other diseases. The Spokane County Health District serves as a regional laboratory for counties in eastern Washington on behalf of the Washington State DOH Laboratory. As a regional laboratory, the Spokane laboratory performs some primary tests, but also screens and serves as a clearinghouse for other tests which it subsequently transfers to the state DOH laboratory for the actual testing.

**Laboratory Structures in Counties in Other States Differ Significantly From the SKCDPH Laboratory Structure**

Public health laboratories that audit staff contacted in other states all have significantly different laboratory structures than that found in King County. For example, the public health laboratories in the Multnomah County Health Department in Portland, Oregon; Maricopa County Department of Public Health and Community Services in Phoenix, Arizona; and San Francisco City and County Department of Public Health in San Francisco, California, all exhibit much more collaboration with their state laboratories, nearby hospital laboratories, and private laboratories. The San Francisco laboratory conducts some reference testing; however, the state laboratories conduct the reference testing for both Multnomah and Maricopa Counties.

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**GENERAL CONCLUSIONS**

The SKCDPH laboratory fulfills King County's need for identification and control of infectious diseases to prevent their spread to the extent possible. However, audit staff identified several issues related to the economic feasibility of maintaining a separate public health laboratory within the SKCDPH that are discussed in the findings below. This chapter concludes with a list of recommendations which, due to their interdependency, are consolidated rather than being listed after each finding. The recommendations focus on determining whether the SKCDPH laboratory should continue operating and, if so, whether those operations should continue at their current level or at a reduced level.

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## **Chapter IV: SKCDPH Laboratory Operations**

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### **FINDING IV-A**

#### **LABORATORY SERVICE FEES DID NOT REFLECT THE ACTUAL COSTS OF CONDUCTING TESTS AS REQUIRED BY THE CODE OF THE KING COUNTY BOARD OF HEALTH.**

##### **LABORATORY SERVICE FEE REQUIREMENTS**

Many of the tests performed by the SKCDPH laboratory are performed at no cost to the client. However, in certain instances where fees are assessed, Section 3.04.010B of the Code of the King County Board of Health requires that "laboratory charges...will be based upon health department costs...." The Code further states that "in order to recover a portion of the department's costs, the director of public health is authorized and directed to charge and collect fees in the amount indicated for the following laboratory services provided for private physicians, private physician clinics, group practices, private laboratories and hospitals." The Code subsequently lists the fees required to be collected for specific tests, most of which were established by a fee ordinance adopted in 1983, and states that the fee for other laboratory procedures will be "cost." Laboratory staff confirmed that when fees are charged, the fees are supposed to cover all costs, including supplies, labor, and overhead.

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##### **LABORATORY SERVICE FEES DID NOT REFLECT ACTUAL COSTS**

Although the Board of Health Code required laboratory fees to be based upon health department costs and laboratory staff reported that the fees included the cost of supplies, labor, and overhead, SKCDPH was unable to provide any documentation regarding the actual calculation of each laboratory fee. However, SKCDPH staff did provide sufficient information for audit staff to determine that the established laboratory fees did not reflect the actual costs of the services.

##### **Fees Were Not Representative of the Amount of Time Required Per Laboratory Test**

The laboratory fees listed in the Board of Health Code were not representative of the amount of time required to perform each test. Audit staff compared the times required for microbiologists to perform 13 different tests. Exhibit IV-1 shows the results of the comparison.

EXHIBIT IV-1	
COMPARISON OF TIMES REQUIRED TO PERFORM VARIOUS LABORATORY TESTS	
TEST	TIME REQUIRED TO PERFORM TEST
Adenovirus	24 minutes
Brucella	5 minutes
Chlamydia	24 minutes
Cytomegalovirus (CMV)	7 minutes
Herpes Simplex Virus	24 minutes
Influenza A	24 minutes
Influenza B	24 minutes
Measles (Rubeola)	5, 15, or 24 minutes, depending on type of test
Mumps	15 or 24 minutes, depending on type of test
Mycoplasma	24 minutes
Respiratory Syncytial (RSV)	24 minutes
Toxoplasma	7 minutes
Tularemia	5 minutes
SOURCE: SKCDPH 1994 and 1995 Year-to-Date Laboratory Monthly Reports	

Exhibit IV-1 shows that the amount of time required to perform each of the tests ranged from 5 to 24 minutes per test. It is logical that the fees required for each type of test should vary according to the amount of time needed to perform each one. However, the required fee for each test shown in the exhibit was \$4.65. Because of the differences in time required to perform the tests, audit staff used direct labor and overhead figures for 1995, provided by SKCDPH staff, to calculate an estimated cost for each test shown in Exhibit IV-1. Exhibit IV-2 shows the results of these calculations.

EXHIBIT IV-2		
CALCULATION OF DIRECT LABOR AND OVERHEAD COSTS PER TEST FOR 1995		
TEST	COST OF TEST <sup>1</sup>	ALTERNATE COST OF TEST <sup>2</sup>
Adenovirus	\$34.14	\$16.16
Brucella	\$7.11	\$7.23
Chlamydia	\$34.14	\$16.16
Cytomegalovirus (CMV)	\$9.96	\$8.17
Herpes Simplex Virus	\$34.14	\$16.16
Influenza A	\$34.14	\$16.16
Influenza B	\$34.14	\$16.16
Measles (Rubeola)		
5 minute test	\$7.11	\$7.23
15 minute test	\$21.34	\$11.93
24 minute test	\$34.14	\$16.16
Mumps		
15 minute test	\$21.34	\$11.93
24 minute test	\$34.14	\$16.16
Mycoplasma	\$34.14	\$16.16
Respiratory Syncytial (RSV)	\$34.14	\$16.16
Toxoplasma	\$9.96	\$8.17
Tularemia	\$7.11	\$7.23
<sup>1</sup> Cost when overhead expenses are allocated to each test based on the amount of time required to perform each test. <sup>2</sup> Cost when overhead expenses are uniformly allocated to each test, regardless of the time required to perform the test. SOURCE: Audit staff calculations based on workload data, labor costs, and laboratory support costs provided by SKCDPH staff.		

#### Fees Did Not Cover Direct Labor and Overhead Expenses of Tests

Exhibit IV-2 shows that the cost of tests ranged from \$7.11 to \$34.14 and varied according to the method used for allocating overhead expenses to each test. These costs were 53% to 634% higher than the \$4.65 fee<sup>4</sup> currently being charged by the SKCDPH laboratory. In addition, the exhibit shows the cost per test using two different methods for allocating overhead expenses. In a sample calculation provided to audit staff, SKCDPH staff used the method of allocating an equal amount of overhead expense to each test regardless of the time required to perform the test (as shown in the right-hand column). Audit staff believe that a more accurate method of calculating total cost would be to allocate the overhead expense based on the amount of time required to

<sup>4</sup> During the technical review phase of the audit, SKCDPH laboratory staff indicated that the 5- and 15-minute measles and mumps tests are immune status tests for which a fee of \$15.00 is charged. The Code of the King County Board of Health does not provide separate fees for tests to diagnose measles and mumps versus tests to determine immunity to these diseases.

perform each test, as shown in the middle column, so that each test bears indirect costs that are proportionately related to effort.<sup>5</sup> Regardless of the method used, however, the \$4.65 fee was insufficient to cover the direct labor and overhead expenses for any of the tests. Moreover, in addition to the direct labor and overhead rates shown in the exhibit, fees also should include the cost of supplies used for each test. This means that current fees should be even higher than Exhibit IV-2 indicates.

**LOW REVENUES FROM  
LABORATORY FEES  
RESULT IN HIGH COUNTY  
CURRENT EXPENSE AND  
CITY GENERAL FUND  
CONTRIBUTIONS TO THE  
LABORATORY BUDGET**

One result of laboratory fees being set too low was that a large amount of money was required from county current expense and city general fund contributions. The SKCDPH laboratory's revenues were \$1.38 million in 1995 and \$1.29 million in 1994, and were generated from the sources shown in Exhibit IV-3:

<b>EXHIBIT IV-3</b>				
<b>SKCDPH LABORATORY REVENUE SOURCES</b>				
<b>SOURCE</b>	<b>1995</b>		<b>1994</b>	
	<b>AMOUNT</b>	<b>PERCENTAGE OF TOTAL</b>	<b>AMOUNT</b>	<b>PERCENTAGE OF TOTAL</b>
Contributions	\$886,090	64.22%	\$853,476	66.33%
Grants	251,136	18.20%	156,705	12.18%
Fees	244,556	17.72%	276,578	21.49%
Other	(1,962)	-0.14%	18	0.00%
<b>TOTAL</b>	<b>\$1,379,820</b>	<b>100.00%</b>	<b>\$1,286,777</b>	<b>100.00%</b>
SOURCE: 1995 and 1994 Project Detail by Performing Organization, 14th Month Reports				

Exhibit IV-3 shows that approximately two-thirds of the laboratory's revenue came from contributions (64% in 1995 and 66% in 1994), which included current expense funds from King County and general funds from the city of Seattle. The balance of revenues came from grants (18% in 1995 and 12% in 1994), fees (18% in 1995 and 21% in 1994), and a minimal amount from other sources. Appendix 7 provides the details of each source of revenue.

<sup>5</sup> It should be noted that the laboratory support figures provided by SKCDPH staff include time for laboratory staff that should be tracked as direct labor (e.g., laboratory assistants), as well as other costs that should be tracked as overhead (e.g., rent). Using a commonly accepted cost accounting approach should result in identifying costs specifically as direct labor and materials, indirect labor, and overhead. It would also result in collecting workload data and identifying a cost application base for allocating overhead in a manner that best reflects the cause and effect relationship between overhead and work performed. It is likely that tracking these costs more accurately and using a cost accounting approach to allocate costs would result in an actual per-test cost somewhere in between those shown as the "cost of test" and "alternate cost of test" in Exhibit IV-2.

## Chapter IV: SKCDPH Laboratory Operations

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### **Assessing Fees Based on Actual Costs Would Likely Reduce the Current Level of Current Expense and General Fund Contributions to the SKCDPH Laboratory at Current Levels**

Audit staff calculated the potential fee revenues that could be generated if the tests shown in Exhibits IV-1 and IV-2 were assessed fees based on actual cost rather than the \$4.65 fee currently assessed. The calculations revealed that the current fees represented only about 25% of the amount SKCDPH should actually be collecting for those tests. Audit staff determined that there was a potential for the SKCDPH laboratory to collect approximately \$1 million per year if fees were adjusted to reflect the actual cost of conducting tests, as required by the Board of Health Code. Although the current expense and general fund contributions are applied to laboratory tests in addition to those for which fees are assessed, these calculations show that the contributions to the SKCDPH laboratory are exorbitant in relation to the revenues generated from fees. The calculations also indicated that adjusting the fee structure to reflect actual costs could potentially reduce the need for current expense or general fund contributions to the SKCDPH laboratory.

It should be noted, however, that if fees are increased to represent the actual cost of providing laboratory testing services, some private providers may choose to purchase their testing services from commercial laboratories that can perform the tests more economically. Additionally, a higher number of SKCDPH clients may qualify for reduced fees due to their inability to pay the higher fees. Both of these factors could reduce the potential for increased fee revenues to completely offset the current expense and general fund contributions; however, there is at least some possibility to reduce those contributions through fee increases.

### **EXECUTIVE RESPONSE**

*"We recognize the need for Board of Health review. The nature of public health laboratory testing is that there will be fees for some tests, not others, some people who can pay and some who cannot."*

### **AUDITOR'S COMMENT**

As stated in the report, audit staff recognize that fees are not assessed for all testing services. However, in those instances where fees are required by the Code of the King County Board of Health to be assessed, those fees should be set at a level that meets the Code requirements. This includes setting fees "based upon health department costs" or "according to the maximum allowable Title XIX reimbursement levels."

**FINDING IV-B****THE SKCDPH LABORATORY HAS NEVER PERFORMED A COST ANALYSIS OR DEVELOPED A COST ALLOCATION MODEL FOR THE TESTS IT PERFORMS.****OTHER LABORATORIES ROUTINELY PERFORM AN ANNUAL COST ANALYSIS OF EACH TEST PERFORMED**

At the second annual Washington State Clinical Laboratory Conference, a speaker from the Sonora Medical Laboratory in Phoenix, Arizona, emphasized the need for laboratories to know their cost of doing business. Audit staff discussions with staff from other public health laboratories confirmed that it is customary to perform a cost analysis for each type of test on a regular basis to ensure that fees reflect the actual cost of conducting the tests. In fact, Spokane County, which operates the only other extensive public county laboratory in Washington State, has developed a cost allocation model using technician costs, operating costs, units of time per test, supply costs, and overhead costs, which it uses to conduct a cost analysis and establish fees for each test annually. Furthermore, the environmental laboratory in the county's Department of Natural Resources uses a model it developed to set fees for the services it provides. The environmental laboratory model includes direct labor that is increased by a factor for benefits as well as section, division, department, and capital overhead. Using a cost allocation model in the SKCDPH laboratory would enable SKCDPH management to identify all costs associated with each type of test conducted at the laboratory, establish fees that accurately reflect those costs, identify discrepancies in staff and laboratory performance, and make informed decisions about the efficiency and cost-effectiveness of operating the laboratory.

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**THE SKCDPH LABORATORY LACKS BASIC MANAGEMENT SYSTEMS FOR DETERMINING THE COST OF EACH TEST**

However, the SKCDPH laboratory has never performed a cost analysis of the tests it performs. Consequently, it has also never developed a cost allocation model. The lack of these basic management systems prevented SKCDPH management from:

- setting fees at appropriate levels to cover costs, as required by the Code of the King County Board of Health;
- identifying anomalies in laboratory operations; and
- determining whether it was cost-effective to perform certain tests in-house.

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**SKCDPH WAS UNABLE TO SET FEES AT APPROPRIATE LEVELS TO COVER COSTS**

As discussed in Finding IV-A, laboratory testing fees did not reflect the actual costs of performing tests as required by the Board of Health Code. The SKCDPH attempted to raise the fee for each of the tests shown in Exhibit IV-2 (see Finding IV-A) to \$7.00 in 1995, but the fee ordinance for the increased fees lapsed without approval. Although the fee ordinance was not adopted, the SKCDPH collected fees at the higher proposed rates for the first several months of 1995; however, audit staff were unable to

determine the exact amount of revenues generated as a result of SKCDPH collecting the higher fees. The calculations in Exhibit IV-2 indicate not only that the new \$7.00 fee would have been insufficient to cover the costs of performing any of the tests as required by the Board of Health Code, but also that SKCDPH's budgeting procedures did not reflect good management practice since no attempt was made to determine whether the proposed fee increase was adequate. The primary reason for these deficiencies was that there was no management system for identifying how much it cost to perform each test and for setting fees to reflect those costs. For example, SKCDPH staff did not have any documentation showing how laboratory fees set in 1983 had been determined, nor did it have any documentation showing how the proposed fee increase requested for 1995 was determined to be appropriate. Moreover, SKCDPH staff acknowledged that a cost analysis had never been conducted for each of the laboratory tests.

It is clear from comparing the costs shown in Exhibit IV-2 (see Finding IV-A) with the fee increase requested by SKCDPH that such a cost analysis should be performed for each test conducted by the SKCDPH laboratory prior to submitting future requests for laboratory test fee increases. It is also clear that without such a cost analysis, SKCDPH is unable to comply with the Board of Health Code requirement to set fees at "cost" for those laboratory tests that do not have specific fee amounts cited in the Code.

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### **THE LACK OF A LABORATORY COST ALLOCATION MODEL PREVENTED SKCDPH MANAGEMENT FROM IDENTIFYING ANOMALIES IN LABORATORY OPERATIONS**

**Direct Testing Time  
Accounted for 86% to 88%  
of the Laboratory  
Microbiologist Staff's  
Available Direct Time**

Conducting a cost analysis and developing a cost allocation model would also provide management with a method for identifying anomalies in laboratory operations. It would enable management to track staff performance and laboratory efficiency, as well as facilitate the tracking of funding that goes into the laboratory budget. These benefits can provide a mechanism of accountability, which the SKCDPH cited as a priority in its budget submittal for 1996.

Audit staff identified several discrepancies among the laboratory budget, revenues generated from conducting tests, and laboratory staffing. For example, according to the year-end Laboratory Monthly Reports compiled by the SKCDPH, the laboratory spent 10,957 hours of direct testing time conducting a total of 155,518 tests in 1994 and 11,107 hours conducting 145,573 tests in 1995. These figures reveal that the laboratory conducted 9,945 (6.83%) more tests in 1994 using 150 (1.35%) fewer hours than in 1995, which indicates a notable change in performance levels from one year to the next.

Additionally, these direct testing hours equated to approximately 6.5 full-time equivalent (FTE) employees each year, based on an



assumption of 1,691.25 available hours per FTE per year,<sup>6</sup> although the laboratory had 7.5 microbiologist FTEs, or 12,684 direct hours available each year. Alternatively, dividing the direct testing hours used to conduct the laboratory tests by the direct hours available for the 7.5 microbiologist FTEs means that direct testing time accounted for only 86% of the available staff time in 1994 and 88% in 1995. It should be noted that the laboratory reports did not account for the time spent by laboratory assistants, supervisory staff, or clerical staff providing support to the microbiologists.

**Discrepancies Indicate That There Are Anomalies in Laboratory Performance That SKCDPH Should Monitor**

The difference between microbiologist FTEs available and FTE time consumed by direct testing hours indicates either that the SKCDPH laboratory is overstaffed by approximately one full-time microbiologist or that the method of capturing the amount of time used to perform each test is inaccurate. Although there may be a valid reason (e.g., the volume and testing time for each type of test performed) for the fewer number of tests performed in 1995 to have consumed more direct testing hours, a quick comparison of the numbers alone should have indicated to SKCDPH management that there was potentially a performance problem that should be researched. Using appropriate management control systems, such as cost analyses and cost allocation models, would make discrepancies such as these more apparent to management, who could then identify the cause of specific discrepancies.

**Testing Accounted for Only 77% of the Overall Laboratory Budget in 1994**

According to other data provided by SKCDPH staff, testing accounted for only 77% of the laboratory budget in 1994, as indicated in Exhibit IV-4 below.

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<sup>6</sup> Audit staff used a past audit, Budgetary Staffing Standards (85-3), to determine the average number of staff hours available per FTE per year, based on a standard work year of 2088 hours. Audit 85-3 identified an appropriate number of work hours to remove from a standard work year for breaks, holidays, vacations, sick leave, and other miscellaneous leave. The testing hours actually equated to 6.48 FTEs in 1994 and 6.57 FTEs in 1995.

<b>EXHIBIT IV-4</b>		
<b>LABORATORY BUDGET CATEGORIES</b>		
<b>1994 MAJOR TEST GROUPS</b>	<b>TOTAL 1994 COST</b>	<b>PERCENTAGE OF TOTAL</b>
Health Department Clients	\$ 635,139	49.36%
Reference and Other Testing	26,532	2.06%
Community Clinic and Teen Health Centers	85,684	6.66%
Outside Providers	242,478	18.84%
<b>TOTAL</b>	<b>\$ 989,853</b>	<b>76.92%</b>
1994 Laboratory Revenue Total	\$1,286,777	
1994 Budget Difference	<b>\$ 296,924</b>	<b>23.08%</b>
SOURCE: SKCDPH 1994 Testing Costs by Category		

Exhibit IV-4 shows that there is a \$296,924 discrepancy between the testing totals and the revenue totals. The difference between the actual costs of performing laboratory tests and the laboratory budget for 1994 indicates that the laboratory either performs tasks, other than testing, that account for an additional 23% of its budget, or that the laboratory has not maintained adequate documentation of the time associated with each test performed to determine the actual cost per test. Again, the difference between the laboratory costs and the laboratory budget should have been an indicator to SKCDPH management of a potential problem that should be researched.

**IT MAY NOT BE COST-EFFECTIVE FOR THE SKCDPH LABORATORY TO PERFORM MANY OF THE LOW VOLUME TESTS IT CURRENTLY CONDUCTS**

A third reason for performing a cost analysis and developing a laboratory cost allocation model is to determine whether each test is cost-effective to perform. Audit staff conducted a survey of several commercial laboratories in the Puget Sound area to determine the cost-effectiveness of conducting tests at the SKCDPH laboratory versus other laboratories. The survey revealed that, in many instances, it would be more cost-effective for commercial laboratories to provide the laboratory services.

**Microbiology Tests**

Exhibit IV-5 compares the cost of performing several microbiology tests in the SKCDPH laboratory with the fees that one commercial laboratory indicated in the audit survey that it would charge for each of those tests.

EXHIBIT IV-5		
COMPARISON OF SKCDPH LABORATORY COSTS TO COMMERCIAL LABORATORY FEES FOR SAME TESTS		
TYPE OF TEST <sup>1</sup>	SKCDPH COST <sup>2</sup>	COMMERCIAL LABORATORY FEE
Botulism	\$170.70	\$23.00
Cryptosporidium	\$21.34	\$21.00
Culture, diphtheria	\$42.68	\$30.50
Culture, group A strep	\$2.85	\$14.50
Culture, hemophilus ducreyi	\$42.68	\$19.00
Culture, stool (salmonella, shigella, campylobacter)	\$71.13	\$30.00
Culture, stool (E-coli 0157:H7)	\$49.79	\$30.00
Culture, yersinia	\$49.79	\$21.00
Gonorrhea, confirm	\$4.27	\$15.50
Malaria, confirm	\$42.68	\$21.00
Ova and parasites	\$42.68	\$39.00
Reference culture	\$85.35	\$18.00
AVERAGE PER TEST	\$52.16	\$23.54
<sup>1</sup> The tests listed are based upon tests currently performed by SKCDPH that the commercial laboratory indicated it could also perform. <sup>2</sup> The SKCDPH cost per test was calculated by multiplying the average number of minutes required to conduct each test by the direct labor and support costs per test, as provided by SKCDPH staff. The cost per test excludes the cost of supplies, which would increase the cost per test. SOURCES: SKCDPH 1994 and 1995 Year-to-Date Laboratory Monthly Reports; SKCDPH Memo Indicating How Laboratory Fees Should Be Calculated; and Audit Staff Survey of Commercial Laboratories		

Exhibit IV-5 shows that for ten of the twelve tests compared, it would be less costly for the tests to be performed by the commercial laboratory. SKCDPH's average cost per test was \$28.62, or 122%, more than the commercial laboratory fees. It should be noted that the tests compared in Exhibit IV-5 are all microbiology tests and that the commercial laboratory fees were generally higher than SKCDPH's costs for serology tests.

### Meat Fat Testing

The SKCDPH laboratory also conducts meat fat tests for the Environmental Health Services Division of the department. Audit staff calculated that it currently costs over \$250 for each meat fat test conducted by the SKCDPH laboratory. However, a commercial environmental testing laboratory included in the audit staff survey indicated that it would charge only \$30 per meat fat test.

## Chapter IV: SKCDPH Laboratory Operations

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### **Commercial Laboratories Can Conduct Low-Volume Tests at a Lower Cost Than the SKCDPH Laboratory**

One likely reason that it is less expensive for a commercial laboratory to perform meat fat tests and the ten tests discussed from Exhibit IV-5 is that these are all low-volume tests. Until a full cost analysis is conducted for each test performed by the SKCDPH laboratory, it would be difficult to identify every test that is less expensive for a commercial laboratory to perform versus the SKCDPH laboratory. However, the comparisons shown in Exhibit IV-5 clearly support the need to perform such a cost analysis to determine whether SKCDPH or a commercial laboratory can conduct the required tests more economically.

### **EXECUTIVE RESPONSE**

*"The SKCDPH laboratory, a federally certified lab under the Clinical Laboratory Improvement Act (CLIA), has initiated a cost analysis examination(s) but has not to date developed an effective cost allocation model."*

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### **FINDING IV-C**

**THE SKCDPH HAS NOT BEEN RECEPTIVE TO COLLABORATING WITH THE STATE DEPARTMENT OF HEALTH (DOH) LABORATORY, AND HAS ASSUMED THE DOH LABORATORY'S RESPONSIBILITY FOR CONFIRMATION TESTING WITHOUT DOCUMENTED AUTHORITY TO DO SO.**

### **THE STATE DOH LABORATORY IS LEGALLY MANDATED TO PERFORM SOME TESTS CURRENTLY PERFORMED BY THE SKCDPH LABORATORY**

The state DOH laboratory is responsible for some of the testing that the SKCDPH laboratory currently performs. WAC 246-100-231 mandates that medical laboratories "submit microbiologic cultures, subcultures, or appropriate clinical material...to the Washington State public health laboratory or other laboratory designated by the state health officer for diagnosis, confirmation, or further testing," and lists specific diseases for which such submittals are required. The state DOH laboratory director reported that there are no state records indicating that the SKCDPH had ever been delegated the responsibility for confirming reference microbial cultures, and SKCDPH staff could not produce such documentation either. Thus, SKCDPH is performing some laboratory testing beyond the scope of its authority.

**SKCDPH HAS BEEN UNRESPONSIVE TO THE STATE DOH LABORATORY DIRECTOR'S EFFORTS TO ESTABLISH A COLLABORATIVE RELATIONSHIP**

The Washington State DOH laboratory director approached three previous directors of SKCDPH to collaborate with the SKCDPH laboratory on such issues as testing coordination, co-location, and program oversight. Although the state DOH laboratory director has provided specific recommendations in writing regarding collaborative efforts with the SKCDPH, the SKCDPH rebuked or ignored most of these requests and has not followed through to increase the collaborative efforts of the two laboratories. SKCDPH transferred the tuberculosis reference testing to the state DOH laboratory, but did not transfer any of the other recommended tests to the state DOH laboratory.

The DOH laboratory director further indicated that some of the testing the state laboratory proposed to assume could be absorbed at no cost to King County, but recommended that state and county staff meet to further discuss funding issues. Again, however, SKCDPH did not respond to the state's request. Audit staff discussions with various SKCDPH staff revealed a continuing, strong resistance regarding collaboration with the state DOH laboratory.

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**THE STATE DOH LABORATORY DIRECTOR HAS RECOMMENDED SPECIFIC AREAS FOR COLLABORATION**

The DOH laboratory director is particularly interested in collaborating to determine which agency is best suited to fulfill certain tasks, and to reduce unnecessary costs to taxpayers caused by the duplication of effort that currently exists. Some of the specific issues that the DOH laboratory presented to SKCDPH for possible collaborative efforts include:

- the state would assume responsibility for examining all tuberculosis clinical specimens and reference cultures originating in King County;
- the state would assume responsibility for confirming all reference microbial cultures currently done by the SKCDPH laboratory in accordance with the requirements of WAC 246-100-231; and
- the state would coordinate with the SKCDPH in areas such as viral isolation and serology to maximize the resources of both organizations and enhance the quality of service provided to clients.

The state DOH laboratory conducts both the primary and confirmation tuberculosis tests for all health departments in Washington State; however, it performs only the tuberculosis confirmation testing for the Seattle-King County Department of Public Health. SKCDPH performs its own primary testing for tuberculosis, as well as the confirmation tests for other types of diseases. It is important to recognize that the state DOH laboratory is remodeling and upgrading its tuberculosis testing facility, which would provide it with the capacity to assume all of

the primary tuberculosis testing now done by the SKCDPH laboratory.

### **Influenza Surveillance**

Another area where collaboration with the state DOH laboratory could eliminate duplication is influenza surveillance. SKCDPH conducts a sentinel physician program through which it annually recruits 6 to 12 private physicians who agree to provide the SKCDPH with information about the viruses it is diagnosing and to send specimens to the SKCDPH laboratory to enable county public health officials to track seasonal influenza trends. Although WAC 246-100-216, Special Diseases - Surveillance for Influenza, requires local health departments to maintain an influenza surveillance system, it also states that they shall "encourage submission of appropriate clinical specimens...to the Washington state public health laboratory...." The state monitors influenza cases on a state-wide basis, and clinical specimens for influenza that originate in other counties in the state are submitted to the state DOH laboratory for confirmation of the specific influenza strain. State DOH laboratory staff reported that SKCDPH's testing of influenza specimens is voluntary but confirmed that it is used to support the county's surveillance efforts. While audit staff recognize that disease surveillance is an essential aspect of preserving public health and that laboratory testing provides valuable input to the disease surveillance effort, we were unable to determine a specific benefit from having King County's influenza specimens tested in the SKCDPH laboratory rather than having the state DOH laboratory performing the tests and sharing the information gathered from the state program with SKCDPH staff, as is done in other counties in Washington State.

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### **NUMEROUS BENEFITS COULD BE ACHIEVED THROUGH COLLABORATION BETWEEN THE DOH AND SKCDPH LABORATORIES**

The DOH laboratory director cited numerous benefits that could potentially result from collaborative efforts between the state and SKCDPH laboratories. These benefits included:

- more efficient use of expensive laboratory equipment;
- cost avoidance due to eliminating the need to replace duplicate equipment;
- lower equipment repair and maintenance costs;
- improved turn-around times and reduced backlog due to increased analytical capabilities;
- increase in technical consultative capability, personnel productivity, and quality of work performed;
- fewer management and support staff required;
- ability to reallocate some resources to methodology development, research, or other types of laboratory testing or program needs;

- elimination of the need for reference cultures to be handled by two laboratories; and
  - reduced costs per test due to higher volumes.
- 

**THE WORKLOAD  
RECOMMENDED FOR  
PERFORMANCE BY THE  
STATE DOH LABORATORY  
CONSUMED A  
SIGNIFICANT AMOUNT OF  
SKCDPH'S TIME AND  
MONEY**

Audit staff determined that transferring the tuberculosis, confirmation, and influenza testing to the state DOH laboratory would have reduced the SKCDPH laboratory's workload in 1995 by 3.9% of the volume of tests performed, 22.6% of the time required to perform the tests, and 15.5% of the total laboratory costs. This indicates that although the number of tests that the state DOH lab might absorb was low in relation to the SKCDPH laboratory's total testing volume, these particular tests consumed a significant amount of time and dollars to perform. Since the DOH laboratory could absorb at least a portion of the testing at no cost to King County, it makes economic sense to transfer this portion of the SKCDPH laboratory's workload to the state DOH laboratory.

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**SKCDPH STAFF BELIEVE  
THEY CAN MONITOR  
DISEASE TRENDS BETTER  
BY CONDUCTING  
LABORATORY TESTS  
THEMSELVES**

According to SKCDPH officials, the main reason the agency conducts its own confirmation testing is to maintain an awareness of what diseases are prevalent in the area so it can quickly identify trends related to specific diseases. While audit staff recognize that confirmation testing provides important public health information that satisfies SKCDPH's needs, discussions with other public health laboratories did not support the SKCDPH's argument, especially when one considers that the state DOH laboratory is located only a few miles from the SKCDPH laboratory and the state laboratory director has indicated that it would make its testing results immediately available to the SKCDPH for surveillance purposes.

**EXECUTIVE RESPONSE**

*"Previous discussions and functional collaboration with the State Department of Health Laboratory have been on-going over the years but a formal agreement has only been recently developed. Previous discussion with the State Department of Health (DOH) support the coordinated testing approaches. We believe that the DOH does not view the lack of documented authority to do confirmation testing as problematic."*

**AUDITOR'S COMMENT**

The Executive response indicates that previous discussions and functional collaboration with the state DOH laboratory have been ongoing and that the lack of documented authority to do confirmation testing is not viewed by the state DOH as problematic. During the audit, DOH laboratory staff very specifically stated that attempts to collaborate with SKCDPH regarding laboratory testing issues have not been successful and that all confirmation testing should be performed by the state DOH laboratory as required by the WAC. Audit staff recommend that

## Chapter IV: SKCDPH Laboratory Operations

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these issues be specifically reviewed during the consultant analysis of the SKCDPH laboratory (see Recommendation IV-1).

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### FINDING IV-D

#### **SOME TESTS THAT THE SKCDPH LABORATORY CURRENTLY CONDUCTS ARE BETTER SUITED TO BEING PERFORMED IN ANOTHER LABORATORY ENVIRONMENT.**

##### **THE SKCDPH LABORATORY PERFORMS ENVIRONMENTAL TESTING**

The majority of testing done in the SKCDPH laboratory is clinical in nature (i.e., testing medical specimens), although some of the tests are environmental. The environmental tests may be performed more effectively and/or efficiently in an environmental laboratory setting.

##### **Water and Meat Fat Testing**

For example, the SKCDPH laboratory conducts approximately 2500 to 3000 water tests and 6 to 7 meat fat tests per year. All of the requests for water tests come from either the Environmental Health Services Division or the general public, and are requested to fulfill the state and county requirement to monitor the coliform levels in well water. The meat fat tests come from the Environmental Health Services Division through the meat inspection program and provide a consumer protection purpose rather than serving a public health purpose. There is no regulatory basis for the SKCDPH laboratory to perform the meat fat tests.

##### **Testing Might be Done Elsewhere**

Although King County has an environmental laboratory in its Department of Natural Resources (previously the environmental laboratory in the former Department of Metropolitan Services) that is both certified and set up to perform the type of water testing that SKCDPH is currently doing in its laboratory, the SKCDPH laboratory is continuing to conduct the water tests that it previously performed. Environmental laboratory staff stated that environmental laboratories are set up quite differently from clinical laboratories, and questioned why a laboratory such as the SKCDPH laboratory, which is set up primarily as a clinical laboratory, would perform water testing. Further discussions with environmental laboratory staff revealed that although they have the capability to perform water testing, it is probably best suited to being contracted out because it is a routine type of test, is not required by regulation to be reviewed, and is not part of the environmental laboratory's charter.

### **EXECUTIVE RESPONSE**

*"90% of microbiology testing done in the public health laboratory is less expensive than the commercial laboratory fees listed in the audit. Commercial laboratory fees are also higher for serology tests. Tests are continually evaluated for cost effectiveness within the mission. When a test can be done less expensively in another laboratory, it is referred. Examples include, chlamydia testing, and TB reference testing."*



**AUDITOR'S COMMENT**

This finding specifically discusses environmental tests although the Executive response focuses on clinical tests. As discussed in the audit, the SKCDPH laboratory has never performed a cost analysis of the tests it conducts and its methods for determining actual direct labor, indirect labor, and overhead costs were deficient. Thus, the SKCDPH has no documentation to support its claims regarding comparison of its laboratory costs and commercial laboratory fees, and a valid comparison of costs and fees cannot be made until a reliable cost analysis is performed.

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**FINDING IV-E****MAINTAINING A SEPARATE LABORATORY IN THE SKCDPH MAY NOT BE THE MOST COST-EFFECTIVE WAY OF SERVING THE COMMUNITY'S PUBLIC HEALTH NEEDS.**

Laboratories have a critical role in the identification and control of infectious diseases because most of these diseases are diagnosed and confirmed via laboratory-tested specimens. Because public health departments are responsible for maintaining the health of their communities, it is not uncommon for local health departments to provide laboratory services, especially when the population of a jurisdiction exceeds 100,000, as it does in King County. However, it is important for local health departments to recognize when it is in the best interest of their communities to maintain their own laboratories and when laboratory services should be provided through some other source.

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**SKCDPH IS BUILDING A NEW PUBLIC HEALTH LABORATORY IN HARBORVIEW MEDICAL CENTER**

The SKCDPH is in the process of building a new public health laboratory that will be housed in the Harborview Medical Center. The funding for construction of the laboratory came from the proceeds of the early sale of bonds for the Harborview capital improvement project. The budget for the laboratory project is \$1.9 million to include design and administration, construction, and equipment. The new SKCDPH laboratory will occupy 5,500 square feet in the basement of the south wing of Harborview Medical Center. This laboratory will be contiguous to the expanded Harborview clinical laboratory, which will occupy 22,000 square feet. SKCDPH laboratory staff are expected to take occupancy of their new space in early 1997.

**1988 Study Provided Justification for New Laboratory**

The justification for the new laboratory was based on the results of a study conducted in 1988, which identified deficiencies existing in the current SKCDPH laboratory and the laboratory's future needs, and evaluated six location alternatives. This study was directed through a motion passed in August 1987, which required the SKCDPH to assess its need for a new public health laboratory and evaluate alternatives for locating a new laboratory "or otherwise meeting laboratory service needs" [emphasis added].

## Chapter IV: SKCDPH Laboratory Operations

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A second study was conducted by a consultant in 1989 to develop the space requirements for the new laboratory, giving consideration to the variables of operations, workload, staffing, and equipment, which were determined to be the drivers of space needs.

### **No Evidence That Alternate Means of Providing Laboratory Testing Services Was Given Adequate Consideration**

Audit staff were unable to determine the extent to which alternate means of providing laboratory testing services, if any, were evaluated in the laboratory study because SKCDPH staff were unable to provide a copy of the study. Although SKCDPH staff indicated that the possibility of co-locating with the Harborview Medical Center laboratory had been discussed prior to making the decision to build a new SKCDPH laboratory, the discussion appears to have focused on maintaining separate laboratories with shared space and equipment rather than consolidation of services. There was no evidence in any of the documentation provided by, or discussions with, SKCDPH staff as to whether they considered contracting out laboratory services to a commercial laboratory or entering into an agreement with the state DOH or Harborview laboratories to provide services.

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### **A SEPARATE SKCDPH LABORATORY MAY NOT BE THE MOST COST-EFFECTIVE WAY TO PROVIDE LABORATORY SERVICES**

Audit staff discussions with the state DOH laboratory director revealed that a separate SKCDPH laboratory may not be the most cost-effective way of serving King County's public health needs. In fact, the DOH laboratory director indicated that some of the work currently performed in the SKCDPH laboratory should be transferred to the state laboratory to reduce costs and duplication of effort. For example, as previously discussed, the state DOH laboratory is willing to absorb all of the reference testing and tuberculosis testing currently done at the SKCDPH laboratory (see related discussion in Finding IV-C).

### **The State Laboratory Director Provided Information as to Where Testing Might Be More Efficiently Performed**

Additionally, the state DOH laboratory director provided a detailed list of recommendations for where each test currently done by the SKCDPH laboratory might be done more efficiently (see Appendix 8). The state laboratory director suggested that the SKCDPH laboratory consider submitting its clinical specimens that the state laboratory is not able to absorb to a referral laboratory, such as the Harborview Medical Center laboratory or a commercial laboratory, for testing. This recommendation was of particular interest to audit staff since Harborview and SKCDPH are both in the process of constructing new laboratories adjacent to each other at Harborview Medical Center that will perform similar functions.

### **The Harborview Medical Center Laboratory Is Willing to Provide Testing Services to the SKCDPH**

Based upon the state laboratory director's recommendations and the future proximity of the SKCDPH and Harborview laboratories to each other, audit staff contacted the University of Washington (UW) Department of Laboratory Medicine, which administers the Harborview Medical Center laboratory, to determine the feasibility

of the SKCDPH laboratory workload being performed at the Harborview laboratory. Audit staff discussions with UW staff revealed that there had not been any serious discussions to coordinate the testing conducted by the Harborview and SKCDPH laboratories prior to SKCDPH making a decision to construct a new laboratory and, in fact, that the UW was not even aware that such a decision had been made until they saw the plans for the Harborview renovation project. UW staff did indicate, however, that they were very willing to look at the SKCDPH laboratory's workload to see what potential, if any, there is for combining the workloads of the two laboratories. Transferring the workload of the SKCDPH laboratory to Harborview would achieve many of the same benefits that the state laboratory director reported would result from collaboration between the SKCDPH and state DOH laboratories (see Finding IV-C). Additionally, because funds for some of the new equipment for the SKCDPH laboratory have not yet been committed, budgeted capital funds of approximately \$293,000 for this equipment would not have to be expended if a decision were made to transfer the SKCDPH laboratory workload to other laboratories prior to completion of the new SKCDPH laboratory.<sup>7</sup>

### **The Harborview Medical Center Laboratory Has Both the Capability and Capacity to Provide the Testing Currently Performed by the SKCDPH Laboratory**

Consequently, audit staff sent the UW Department of Laboratory Medicine a copy of the SKCDPH laboratory workload (i.e., tests and volume) for review. UW staff identified the tests that they could perform and the price for each one. Audit staff compared the UW response with the state laboratory director's list of recommendations regarding where each type of test could be performed and found that the Harborview laboratory could perform every test that the state laboratory director recommended for a referral laboratory. Although the prices provided by the UW staff appeared to include some that were higher and some that were lower than SKCDPH's current costs, audit staff could not determine whether the overall cost of transferring the SKCDPH laboratory's workload to the Harborview laboratory would be more economical due to the lack of accurate information regarding the current cost of the tests conducted by SKCDPH (see related Finding IV-A). However, if the SKCDPH transfers some of its tests to the state DOH laboratory as recommended by the DOH laboratory director, the overhead costs of the remaining tests are likely to increase. Such an increase would cause the SKCDPH laboratory to become less economical to operate, thereby resulting in further justification for transferring the remaining testing services to the Harborview laboratory.

<sup>7</sup> The total estimated cost of the new laboratory equipment is approximately \$463,000, of which \$170,000 has already been committed for owner-purchased, contractor-installed equipment. Funds for the remaining \$293,000 worth of new equipment are expected to be committed in early to mid-October 1996.

## **Chapter IV: SKCDPH Laboratory Operations**

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### **Transferring the SKCDPH Laboratory's Workload to the Harborview Medical Center Laboratory Could Meet SKCDPH's Public Health Needs**

SKCDPH staff identified two issues as critical factors supporting their need to maintain their own in-house laboratory versus sending their specimens to a commercial or hospital laboratory or the state DOH laboratory. The first factor was response time and the second was the need to maintain its ties to the UW Schools of Medicine and Public Health. Audit staff found that if the SKCDPH laboratory's workload were transferred to the Harborview laboratory, SKCDPH could still meet both of these needs.

SKCDPH staff repeatedly expressed the importance of having the ability to obtain test results quickly, especially in the event of a disease outbreak during evening or weekend hours. The SKCDPH laboratory's regular operating hours are 8:00 a.m. to 4:30 p.m., Monday through Friday. UW staff reported that they have medical technologists working in the Harborview laboratory 24 hours a day who can perform laboratory tests on an emergency basis. Additionally, the UW response stated that "laboratory medicine residents are on call 24 hours a day to answer questions, help with test selection or aid in getting unusual tests done at odd hours" (see Appendix 9). This means that the Harborview laboratory should be able to better serve the SKCDPH's needs because the UW would not incur the delay that SKCDPH would in having to call someone in after hours or on a weekend during a disease outbreak. Moreover, because the UW Department of Laboratory Services, which administers the Harborview laboratory, is part of the UW School of Medicine, the coordination between SKCDPH and the UW would continue to occur.

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### **THE ABSENCE OF ADEQUATE MANAGEMENT SYSTEMS AND CONTROLS RAISE THE QUESTION OF WHETHER A SEPARATE SKCDPH LABORATORY IS PRUDENT**

The absence of effective management systems and controls lead to the question of whether it is prudent for SKCDPH to be operating its own laboratory. Audit staff concluded that although SKCDPH has determined that there is a public health purpose for the clinical tests that it performs, SKCDPH management has never looked at its laboratory from a business perspective to determine whether it is economically feasible to maintain the laboratory, i.e. whether it should be performing certain tests (e.g., meat fat tests) that do not serve a legitimate public health purpose, whether it should be performing tests that are not clinical in nature (e.g., water and meat fat tests), or whether there are other factors that could affect the decision to perform specific tests. For example, SKCDPH's failure to develop adequate management controls (e.g., reliable time accounting and cost allocation systems) prevented SKCDPH from developing an accurate fee schedule and from determining which tests were not cost-effective for the laboratory to perform. In some instances, such as with environmental tests (see related discussion in Findings IV-B and IV-D), the SKCDPH laboratory performed tests based upon their ability to perform them rather than a valid determination that there was a public health need for the tests or

that the tests were economically feasible to perform. Additionally, SKCDPH failed to explore alternate and potentially more cost-effective means of providing laboratory services and, in fact, resisted efforts by the state DOH laboratory to pursue such a strategy.

**State DOH Laboratory  
Guidelines Provide Criteria  
for Evaluating the Need for  
Specific Laboratory Tests**

The state DOH laboratory director has developed guidelines, which may be used by any public health laboratory, to determine the need to provide specific public health laboratory services. These guidelines provide 19 criteria (see Appendix 10) for evaluating each laboratory test to determine not only the public health rationale, but also the business rationale (i.e., the economic feasibility), for providing each test. The guidelines include criteria which consider medical or environmental program needs, legal or professional requirements, technical and personnel considerations, and other managerial considerations to enable laboratory managers to determine whether each test should be performed in the public health laboratory, sent to a referral or contract laboratory, or eliminated. Using such guidelines would have provided the SKCDPH with a mechanism for determining whether it should continue to operate its own laboratory or obtain laboratory services from the state DOH laboratory, the Harborview Medical Center laboratory, or a commercial laboratory.

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**CONCLUSION**

Audit staff believe that the SKCDPH laboratory has clearly fulfilled a critical need for disease identification and control within King County. However, the SKCDPH's failure to determine the economic feasibility of providing specific testing services; the overlap of service capability with the state DOH, Harborview Medical Center, and commercial laboratories; and the proximity of the state and Harborview laboratories to the SKCDPH laboratory lead audit staff to believe that SKCDPH management could have used taxpayer dollars more efficiently. Additionally, the prevailing trend within Washington State to obtain public health laboratory services from sources outside of county health departments leads us to believe that the economic benefits of obtaining laboratory services from outside sources may outweigh the public health benefits of providing those services within a separate county laboratory.

**EXECUTIVE RESPONSE**

*"We disagree."*

**AUDITOR'S COMMENT**

A determination as to whether maintaining a separate laboratory in the SKCDPH is the most cost-effective way of serving the community's public health needs cannot be made until the laboratory's services are evaluated and a cost-allocation model is developed and applied to each test performed to determine the average cost for each type of test. Thus, audit staff are puzzled by the reasoning behind the Executive's disagreement with the

## Chapter IV: SKCDPH Laboratory Operations

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finding but concurrence with the audit recommendations that flow from this finding.

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### RECOMMENDATIONS

- IV-1** The Metropolitan King County Council should retain an independent laboratory consultant to evaluate the laboratory services performed by the SKCDPH. This review should include development and use of a cost-allocation model and use of the criteria developed by the state DOH laboratory director for each test currently performed by the SKCDPH laboratory. The consultant should issue a report to the Council and Executive recommending the level of services that the SKCDPH laboratory should provide, giving adequate consideration to the services offered by other public health and commercial laboratories in the region, the cost-effectiveness of each test, and the county's public health responsibilities.

### EXECUTIVE RESPONSE

*"We concur. The SKCDPH agrees that an independent laboratory consultant should be retained to evaluate the laboratory services performed by the SKCDPH and will make extra-help dollars available for that purpose."*

*"A list of independent external consultants, who have both credentials and experience in this area, will be generated through a variety of sources including the University of Washington; the College of American Pathologists; and public health laboratory experts around the Country. The Department will cooperate fully in any independent evaluation."*

*"We welcome an evaluation of the Department's laboratory services by an independent laboratory consultant using guidelines similar to those developed by the State DOH laboratory. We agree that the review should include the development of a cost allocation model."*

*"We will consider enrolling in a program such as the Laboratory Management Index Program of the College of American Pathologists or take other action to develop and implement more stringent management systems and controls that will enable the SKCDPH laboratory to monitor the total cost of each test."*

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- IV-2** Based upon the results of the independent consultant's evaluation in Recommendation IV-1, the Metropolitan King County Council should determine whether it wants to:
- maintain a laboratory within the SKCDPH that provides laboratory services at current levels,

- have the SKCDPH obtain all of its laboratory services from other sources within King County, or
- maintain a laboratory within the SKCDPH that provides certain (i.e., cost-effective) laboratory services while obtaining the remaining services from other sources within King County (e.g., the state DOH laboratory, the Harborview Medical Center laboratory, and/or commercial laboratories).

Specifically, consideration should be given to transferring clinical laboratory testing functions to the state DOH laboratory and to the Harborview Medical Center laboratory due to their proximity to the SKCDPH laboratory, transferring environmental laboratory testing functions to an environmental laboratory, and transferring low-volume tests to a public or private laboratory where they can be performed more cost-effectively. Any decision to transfer certain tests to a different laboratory from where they are currently performed should give adequate consideration to the need to protect the public's health, as well as the need to minimize the costs to taxpayers. Additionally, any decision to transfer work from the SKCDPH laboratory to another laboratory should be coordinated with the King County Board of Health.

**EXECUTIVE RESPONSE**

*"This recommendation is directed to the County Council, and accordingly, we defer to the King County Council and Board of Health. The State Department of Health agrees that there is a role for both labs and they should exist in partnership. An agreement outlining this partnership has been reached."*

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**If the Council decides to maintain the SKCDPH laboratory, SKCDPH management should pursue the following recommendations:**

**IV-3**

Develop management systems and controls that will enable it to identify and monitor anomalies in laboratory performance. Such a management control system should also include procedures to accurately track the time required to perform each laboratory test over a period of time to update the elements of the cost-allocation model as necessary. SKCDPH should also use the cost-allocation model on a regular basis to determine when fee adjustments are required.

**EXECUTIVE RESPONSE**

*"We concur. We will establish management systems and controls, including an improved budget format and a cost allocation model, that facilitates detailed tracking of all laboratory costs and assist management in monitoring level of effort, costs, fee structure and performance."*

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## Chapter IV: SKCDPH Laboratory Operations

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- IV-4** Make a proactive effort to establish a collaborative relationship with the state DOH laboratory. Specifically, SKCDPH staff should work with the state DOH laboratory staff to identify which laboratory is best suited to perform certain tests, especially those mandated by the WAC to be performed by the state DOH laboratory, develop procedures to share information for disease surveillance and control, and develop a method for providing reciprocal support to each other for tests performed by only one of the laboratories.

### **EXECUTIVE RESPONSE**

*"We concur. We have developed an agreement to enhance our partnership with the State DOH laboratory. While maintaining separate laboratories, we will be working together to over the next three months to turn the two laboratories into one functional seamless public health laboratory system, improving service and cost effectiveness for both local and state citizens."*

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- IV-5** Establish a laboratory fee structure that reflects the cost of performing each test, as required by the Code of the King County Board of Health:
- If the SKCDPH transfers its laboratory testing to another laboratory (see Recommendation IV-2), the fees established should be the same as those charged the SKCDPH by the laboratory performing the tests.
  - If SKCDPH performs its own laboratory tests, the SKCDPH should establish fees based on the cost-allocation model developed in Recommendation IV-1.

### **EXECUTIVE RESPONSE**

*"We will investigate establishing a revised fee structure which reflects the cost of performing each laboratory test in accordance with the Code of the King County Board of Health, SKCDPH policy, other applicable laws, and our public health mission. The fee structure must be related to the integrated mix of population health activity that we cannot bill for and individual or institutional laboratory activity that we can and should bill for."*

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- IV-6** Establish a budget format that facilitates tracking of all laboratory costs, regardless of whether they are directly test-related or related to other tasks performed by the laboratory.

### **EXECUTIVE RESPONSE**

*"We will investigate establishing a revised fee structure which reflects the cost of performing each laboratory test in accordance with the Code of the King County Board of Health, SKCDPH policy, other applicable laws, and our public health mission."*

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- IV-7**      Coordinate its influenza surveillance efforts with the state DOH to eliminate duplication. This should include requesting sentinel physicians to submit their sample specimens to the state DOH laboratory, which would in turn share the results with the SKCDPH.

**EXECUTIVE RESPONSE**

*"We will continue to coordinate our influenza surveillance efforts with the State DOH. We will discuss the State DOH laboratory whether it has the capacity to conduct approximately 300 influenza cultures on specimens from King County each year and determine if transferring this work to the state laboratory would have any adverse effect on influenza surveillance in King County."*

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## BIBLIOGRAPHY

"Addressing Emerging Infectious Disease Threats: A Prevention Strategy for the United States,"  
Centers for Disease Control, 1994.

ASM News, American Society for Microbiology, vol. 60, no. 5, May, 1994.

Close, William T., MD. Ebola. New York: Ivy Books, 1995.

Garrett, Laurie. The Coming Plague: Newly Emerging Diseases in a World Out of Balance. New York:  
Penguin Books, 1994.

Morse, Stephen S., ed. Emerging Viruses. New York: Oxford University Press, Inc., 1993.

Preston, Richard. The Hot Zone. New York: Random House, 1994.

Shilts, Randy. And the Band Played On: Politics, People, and the AIDS Epidemic. New York: St.  
Martens Press, 1987.

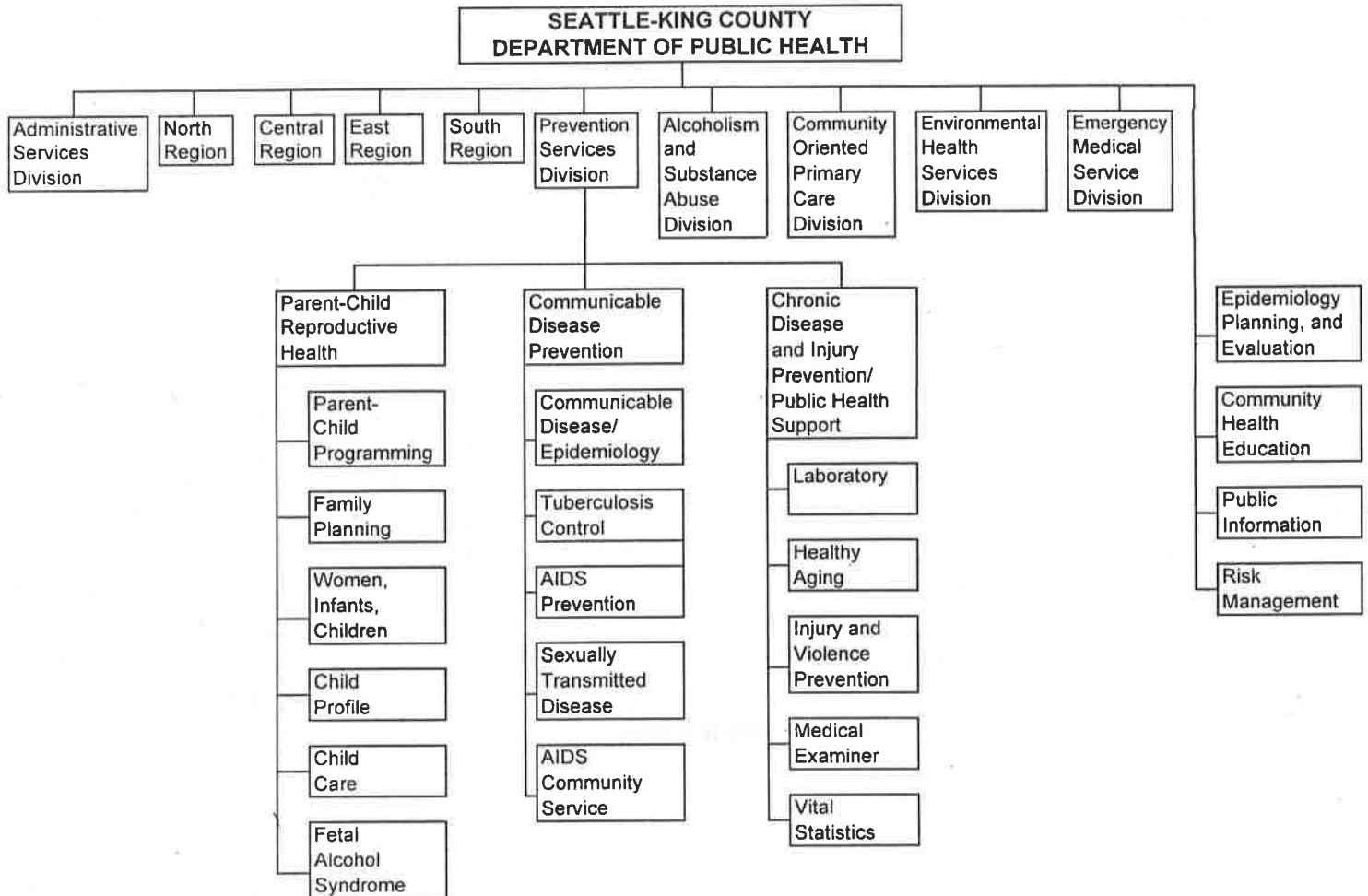
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## **APPENDICES**

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## APPENDIX 1

### SKCDPH ORGANIZATION CHART



EXHIBIT

EXHIBIT A - [illegible]

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## MATRIX OF INFECTIOUS DISEASES

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
<b>DISEASES REQUIRED BY WAC TO BE REPORTED IMMEDIATELY UPON SUSPICION OR DIAGNOSIS OF A CASE:</b>				
Anthrax (malignant pustule, woolsorter's disease)	bacteria called bacillus antracis found in soils or wool or hair of animals; primarily an occupational disease	skin exposure symptoms - boil-like lesion with a black center, malaise, headache, fever, nausea, vomiting, and swelling of lymph glands under arms respiratory exposure symptoms - influenza-like symptoms which may progress to severe breathing problems, shock, and coma	inhaling contaminated soil particles, handling wool or hair of diseased animals, ingesting undercooked meat from diseased animals	Prevention: vaccine for people in high-risk occupations; vaccine for animals; cook meat to proper temperatures Remedy: antibiotics (penicillin, tetracycline, erythromycin, or streptomycin)
Botulism (food-borne and infant)	foods containing a toxin produced by the bacteria Clostridium botulinum	food-borne symptoms - blurred vision, vomiting, constipation or diarrhea, general weakness, poor reflexes, muscle paralysis, dry mouth and difficulty swallowing; infant botulism symptoms - difficulty breathing, visual disturbances, poor feeding, poor reflexes	food-borne - ingesting contaminated food that has not been properly cooked or reheated after the toxin has been produced infant - colonization of botulinal spores in the gastrointestinal tract and toxin production in vivo	Prevention: proper processing of canned and preserved foods; avoid eating foods from damaged containers or that have off-odors; avoid feeding honey to infants Remedy: hospital care; antitoxin in certain cases of food-borne botulism (if given within 72 hours of onset of symptoms)
Cholera	bacterial germ called Vibrio cholerae that invades the small bowel; occurs most often in underdeveloped countries lacking adequate water supplies and proper sewage disposal	profuse watery diarrhea, vomiting, muscular cramps, and dehydration	ingesting contaminated food (especially seafood from countries where warm coastal waters are subject to sewage contamination) or water or through contact with an infected persons' feces	Prevention: vaccine (not dependable; provides only partial protection for a short duration); drink bottled water or boil water before drinking it; avoid eating uncooked vegetables and fruit or undercooked meats (especially seafood) when traveling to foreign countries; follow traveler's advisories in countries reporting cholera Remedy: plenty of fluids; rehydration solution of sugar and salt; antibiotics such as doxycycline or tetracycline
Diphtheria	bacteria called Corynebacterium diphtheriae that infects the nose and throat or the skin	nose and throat type - sore throat, low fever, enlarged lymph nodes in the neck skin type - painful, swollen, and reddened lesions	contact with secretions from an infected persons' nose, throat, skin, eyes, and lesions	Prevention: immunization (part of required DTP series) Remedy: antibiotics such as penicillin and erythromycin

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Measles (rubeola, hard measles, red measles)	acute viral infection caused by the paramyxovirus called Morbillivirus	runny nose, cough, high fever, reddened eyes that are sensitive to light, red blotchy rash that usually begins on the face and spreads down the body, and tiny white spots in mouth	airborne transmission or by contact with nasal or throat secretions of infected persons	Prevention: immunization (part of the MMR series in the pediatric immunization program) Remedy: none
Paralytic Shellfish Poisoning	toxins that are derivatives of saxitoxin and develop from shellfish feeding on planktonic algae called dinoflagellates; occurs most frequently among tourist populations	tingling, burning, numbness, drowsiness, incoherent speech, and respiratory paralysis	ingesting toxic shellfish, especially mussels, clams, cockles, and scallops	Prevention: avoiding eating potentially hazardous shellfish by obeying official quarantine notices and following traditions of safe consumption Remedy: respiratory support within 12 hours of exposure
Plague	bacteria called Yersinia pestis found in rodents	swollen, inflamed and tender lymph gland near site of bite, chills, high fever; may progress to blood infection and pneumonia	bites from fleas that have been infected by rodents; handling tissues of infected animals (especially rabbits or rodents); airborne droplets from infected humans or animals; laboratory exposure	Prevention: treat clothing, baggage, and patient to kill fleas that may be attached; quarantine patients for 72 hours after beginning antibiotic treatment; control rodent and flea population; use insect repellent to prevent flea bites Remedy: antibiotics such as streptomycin, tetracycline, or chloramphenicol
Poliomyelitis (infantile paralysis, polio)	viral disease caused by the enterovirus called Picornaviridae that affects the central nervous system	fever, malaise, headache, nausea, vomiting, excruciating muscle pain and stiffness in the neck and back	contact with feces of infected person	Prevention: vaccine (included in the pediatric immunization program) Remedy: none for the disease itself; symptomatic therapy
Rabies (hydrophobia)	viral disease affecting the central nervous system	irritability, headache, fever, and sometimes itching or pain at exposure site, progressing to paralysis, throat muscle spasms, convulsions, delirium, and death	exposure to a rabid animal, usually through a bite, but sometimes through scratches and saliva contact with broken skin	Prevention: control stray dogs and cats, avoid contact with wild animals, and vaccinate pets Remedy: prompt scrubbing of the bite site followed by administration of rabies immune globulin and five doses of human diploid cell rabies vaccine at specified intervals

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
<b>DISEASES REQUIRED BY WAC TO BE REPORTED WITHIN ONE DAY OF DIAGNOSIS:</b>				
Brucellosis (undulant fever, Bang's disease)	bacteria in livestock	intermittent or irregular fever, headache, weakness, profuse sweating, chills, weight loss, generalized aching	drinking unpasteurized milk from diseased cows or contact with discharge from cattle, sheep or goats that abort their fetus	Prevention: drink only pasteurized milk, avoid contact with infected livestock Remedy: tetracycline or tetracycline plus streptomycin
Gastroenteritis of suspected food-borne or waterborne origin (gastroenteritis, intestinal flu, stomach flu)	a variety of enteric (intestinal) bacteria	vomiting, nausea, fever, chills, abdominal pain, and water diarrhea	ingesting contaminated food, especially dairy products, raw shellfish, and fresh raw vegetables; antibiotics	Prevention: drink only bottled water and avoid eating uncooked vegetables and fruit when traveling; avoid food from street vendors and eat only cooked foods and fruit that can be peeled Remedy: no specific treatment for the illness itself; bed rest and drinking plenty of clear fluids are recommended; avoid aspirin or antibiotics and solid foods until symptoms subside
Haemophilus Influenza Invasive Disease Type b (Hib, Hemophilis b)	bacterial infection, most common in children three months to three years old	fever, lethargy, vomiting, and stiff neck; may cause meningitis, blood stream infections, pneumonia, arthritis, and other infections	contact with mucus or droplets from the nose and throat of an infected person	Prevention: vaccine (now included in the pediatric immunization program); rifampin for carriers of the bacteria Remedy: antibiotics such as ampicillin or chloramphenicol
Hepatitis A (infectious hepatitis)	liver disease caused by a specific virus	poor appetite, fatigue, fever, vomiting, dark urine, and jaundice (yellow skin and whites of eyes)	ingesting contaminated food or water or contact with feces of an infected person	Prevention: thorough handwashing; avoid handling foods during the contagious period; immune globulin shots for persons in close contact with an infected person (must be given within two weeks of exposure) Remedy: gamma globulin may be given, but generally only bed rest
Hepatitis B (serum hepatitis)	blood-borne liver disease caused by a specific virus in the class hepadnaviridae	poor appetite, fatigue, fever, vomiting, dark urine, and jaundice (yellow skin and whites of eyes), joint pain, and hives or rash	contact with infected body fluids (usually by needle stick injury or sexual contact)	Prevention: vaccine (now included in the pediatric immunization program); proper personal hygiene; not sharing personal items such as razors and toothbrushes Remedy: antiviral substance may be given, but generally only bed rest

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Leptospirosis (Weil's disease)	bacteria associated with wild and domestic animals, especially rats; primarily an occupational disease	fever, headache, chills, vomiting, jaundice, anemia, and sometimes rash	contact with urine of infected animals	Prevention: good sanitation, use of boots and gloves in hazardous places, rodent control, and immunization of farm and pet animals Remedy: antibiotics such as penicillin, streptomycin, tetracycline, and erythromycin; kidney dialysis in some cases
Listeriosis	bacteria called <i>Listeria monocytogenes</i> found in soil, vegetation, and sewage	none to fever, headache, aches and pains, vomiting, and diarrhea; serious cases may progress to meningitis or septicaemia (blood poisoning)	ingesting contaminated food, especially undercooked meat, raw vegetables, unpasteurized milk, soft cheese, pate, diced chicken, sliced deli meat, and smoked fish and mussels	Prevention: proper food handling and sanitation Remedy: antibiotics (penicillin, erythromycin, or tobramycin)
Meningococcal Disease (spinal meningitis, cerebrospinal fever, meningococcemia)	bacteria called meningococcus that causes meningitis (swelling of the brain); meningococcal disease refers to the disease problems (e.g., bacteremia, pneumonia, arthritis) caused by meningococcus	fever, headache, chills, vomiting, stiff neck and back, extreme sleepiness, and a rash; in infants the soft spot on the head bulges upward	close contact with nose or throat discharges of an infected person	Prevention: rifampin or sulfa drugs given to people who have been in close contact with an infected person; vaccine (recommended only in outbreak situations or for travel to areas of world where high rates of the disease occur); avoid sharing food, drink, or eating utensils Remedy: antibiotics, especially penicillin
Pertussis (Whooping Cough)	bacteria called <i>Bordetella pertussis</i> that infects the respiratory tract	initial symptoms similar to common cold, e.g., sneezing, runny nose, slight fever, and mild cough; cough progresses to a deep cough ending in a high-pitched whooping sound	contact with discharges from nose and throat, usually through droplets sprayed into the air during coughing spells	Prevention: vaccine (included as part of the DPT vaccination in the pediatric immunization program) Remedy: generally no specific treatment for the disease although sedatives may be given to control coughing, rehydration may be necessary, and antibiotics such as erythromycin may be given
Rubella (German measles), including congenital	viral infection caused by a togavirus called Rubivirus	rash, slight fever, joint aches, headache, discomfort, runny nose, reddened eyes, and swollen lymph nodes behind the ears and at the back of the neck	contact with nasal or throat secretions of infected persons; from mother to fetus	Prevention: vaccine (included as part of the MMR vaccination in the pediatric immunization program) Remedy: None

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Salmonellosis (including Paratyphoid Fever)	bacteria called <i>Salmonella</i> found in food products	diarrhea, stomach cramps, fever, headache, vomiting (occasionally) and dehydration	ingesting contaminated food or water, especially raw meat, eggs, unpasteurized milk and cheese products; contact with infected pet turtles, chicks, dogs and cats; contact with feces of infected persons	Prevention: proper care of uncooked meats; cook meats and eggs to temperatures high enough to kill bacteria; drink only pasteurized milk; proper sanitation of food preparation surfaces; thorough handwashing after using restroom and before eating or preparing food Remedy: no specific treatment although extra fluids may be required to prevent dehydration
Shigellosis	bacteria caused by the shigella germ in the intestinal tract	diarrhea, fever, traces of blood or mucous in the stool, nausea or vomiting, and dehydration	contact with the feces of infected persons or ingesting contaminated food or water	Prevention: thorough handwashing Remedy: no specific treatment although extra fluids may be required to prevent dehydration
Syphilis (primary, secondary, or congenital)	STD caused by the bacteria <i>Treponema pallidum</i>	lesion (chancre) at site of initial contact, swollen glands, fatigue, fever, sore throat, headache, hoarseness, and loss of appetite	sexual contact; congenital syphilis passes from mother to fetus	Prevention: limit number of sex partners, use condoms, abstain from sexual contact while infected, proper personal hygiene, notify partners so they can receive treatment; prenatal blood test for pregnant women Remedy: penicillin or tetracycline
Typhoid Fever	bacteria caused by a unique human strain of salmonella called <i>Salmonella typhi</i>	fever, headache, constipation or diarrhea, sore throat, weakness, inability to think clearly, rose-colored rash on the trunk, and an enlarged spleen and liver	contact with the feces or urine of infected persons; ingesting contaminated food or water	Prevention: vaccine (generally reserved for people traveling to developing countries where significant exposure may occur); strict attention to food and water precautions while traveling in underdeveloped countries Remedy: antibiotics such as chloramphenicol or ampicillin, or ciprofloxacin
<b>DISEASES REQUIRED BY WAC TO BE REPORTED WITHIN SEVEN DAYS OF DIAGNOSIS OF A CASE:</b>				
Acquired Immunodeficiency Syndrome (AIDS)	a secondary immunodeficiency syndrome resulting from HIV infection	opportunistic infections, malignancies, and neurologic dysfunction in an HIV-positive person	contact (e.g., during sexual intercourse or sharing syringes) with body fluids containing infected cells or plasma	Prevention: limit number of sex partners, use condoms, notify partners so they can be tested; not sharing syringes; glove use by all medical and dental professionals Remedy: none

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Amebiasis (amebic dysentery)	microscopic parasite called <i>Entamoeba histolytica</i> ; observed mostly in people arriving from tropical or subtropical areas, individuals in institutions for the developmentally disabled, and homosexual males	mild cases include nausea, diarrhea, weight loss, abdominal tenderness or cramps, occasional fever; severe cases may result in a liver abscess	contact with fecal material from infected persons	Prevention: thorough handwashing; proper sewage disposal Remedy: specific antibiotics such as metronidazole
Campylobacteriosis	bacteria called <i>Campylobacter jejuni</i> found in livestock; usually occurs in summer months	diarrhea, fever, traces of blood in the stool, stomach cramps, vomiting, convulsions	eating or drinking contaminated food (especially poultry) or water; occasionally by contact with infected people or animals	Prevention: proper care of uncooked meats; cooking meats and eggs to temperatures high enough to kill the bacteria; proper sanitation of food preparation surfaces; avoid drinking unpasteurized milk; thorough handwashing Remedy: often no treatment; plenty of fluids may be given for rehydration; antibiotics (tetracycline, chloramphenicol, erythromycin) may be used to prevent recurrence of symptoms, shorten the carrier phase, or treat severe cases
Chancroid (soft chancre)	STD caused by a bacterium; common in tropical countries	sores or raised bumps on the genital organs; enlarged and hardened lymph glands in the groin	sexual contact	Prevention: limit number of sex partners, use a condom, proper personal hygiene Remedy: antibiotics
Chlamydia Trachomatis	STD caused by the chlamydia trachomatis organism that has features both of a virus and a bacteria	often no symptoms; women may experience pelvic pain, pain with urination, vaginal discharge, and pain and/or bleeding with intercourse; men may have a clear discharge prior to urinating in the morning	sexual contact; from mother to infant during childbirth	Prevention: limit number of sex partners, use a condom Remedy: antibiotics such as tetracycline or doxycycline

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
E. coli 0157:H7	bacteria called Escherichia coli that lives in the intestines of humans and animals	severe bloody diarrhea and abdominal cramps; kidney failure if the disease develops a complication called hemolytic uremic syndrome; the most severe symptoms occur in children under five years old	ingesting meat contaminated during slaughtering (especially ground beef) or through the feces of infected persons	Prevention: cook contaminated food to temperatures high enough to kill the bacteria; drink only pasteurized milk; thorough handwashing Remedy: usually no specific treatment for the illness itself, but lots of fluids given to avoid dehydration; avoid anti-diarrheal medication
Encephalitis, viral	virus carried by Culex mosquitoes	none to fever and headache progressing to inflammation of the brain	bites from infected Culex mosquitoes; birds serve as a host for the virus and the mosquitoes	Prevention: use screens on housing; use repellents containing DEET on clothing and exposed skin Remedy: none
Giardiasis	microscopic parasite called Giardia lamblia	nausea or vomiting, abdominal cramps, diarrhea (may alternate with constipation), appetite loss, fever, headache	ingesting contaminated food or water (particularly water from lakes, reservoirs, and streams); contact with the feces of an infected person or animal	Prevention: avoid consuming improperly treated drinking water; thorough handwashing; proper disposal of sewage waste Remedy: often no treatment; sometimes antibiotics such as atabrine, metronidazole or furizolidone are given
Gonorrhea (gonococcal infection, clap, drip)	STD caused by germs in the mucous areas of the body	often no noticeable symptoms in women; males experience burning while urinating and a yellowish-white discharge	sexual contact; from mother to child during birth	Prevention: limit number of sex partners, use condoms, abstain from sexual contact while infected, notify partners so they can receive treatment Remedy: penicillin or other antibiotics; disease is becoming resistant to standard medications
Granuloma Inguinale (donovanosis)	STD caused by bacteria in the genital area; occurs primarily in tropical and subtropical areas	lumps or blisters in the genital area that slowly enlarge to open sores	sexual contact	Prevention: limit number of sex partners, use condoms, abstain from sexual contact while infected, proper personal hygiene, notify partners so they can receive treatment Remedy: antibiotics
Hepatitis, Non-A, Non-B (NANB) and unspecified	hepatitis C and E and unidentified viruses	yellowing skin and eyes, appetite loss, nausea and vomiting, fever, extreme fatigue, stomach pain (can lead to chronic liver disease or cirrhosis)	contaminated drinking water, blood transfusions or other contact with blood of an infected person	Prevention: avoid water sources not properly treated Remedy: none

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Herpes Simplex (genital herpes or neonatal)	STD caused by a viral infection	a cluster of blister-like lesions in the genital area that spread and merge, break and crust over; painful urination, urethral or vaginal discharge; swollen lymph nodes; headache, fever, chills, and muscular weakness occur with first exposure or primary episode	sexual contact with infected person who is secreting the virus	Prevention: limit number of sex partners, use condoms, abstain from sexual contact while infected Remedy: acyclovir
Human Immunodeficiency Virus (HIV)	viral infection caused by one of several related retroviruses that become incorporated into host cell DNA	can lie dormant for years; initial acute mono-like symptoms and low t-cell blood count; leads to complete failure of immune system	contact (e.g., during sexual intercourse or sharing syringes) with body fluids containing infected cells or plasma	Prevention: limit number of sex partners, use condoms, notify partners so they can be tested; not sharing syringes; glove use by all medical and dental professional Remedy: none, but zidovudine (ZDU, previously called azidothymidine, or AZT) or dideoxyinosine (DDI) may be used to reduce progression to AIDS
Kawasaki Syndrome (mucocutaneous lymph node syndrome)	thought to be caused by an infectious agent; occurs primarily in children under age five	high spiking fever; irritability; swollen lymph nodes; red eyes, lips, throat, and tongue; rash that may cover entire body and is sometimes followed by peeling skin on the hands and fingers	unknown for certain; does not appear to be transmitted from person to person; believed to be transmitted by an infectious agent	Prevention: preventive measures are unknown Remedy: hospital care, and aspirin and immunoglobulins
Legionellosis (Legionnaires' disease)	bacteria called Legionella pneumophila found in creeks, ponds, water taps, hot water tanks, water in air conditioning systems, and soil at excavation sites; occurs primarily in middle-aged or older men, particularly those who smoke or drink heavily, and in summer months	flu-like muscle aches, headache, fatigue, and dry cough followed by high fever and chills with occasional diarrhea; chest X-rays often show pneumonia	airborne - inhaling mist from a contaminated water source or soil	Prevention: preventive measures are unknown Remedy: antibiotics such as erythromycin



DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Leprosy (Hansen's disease)	bacteria called <i>Mycobacterium leprae</i>	skin lesions, chronically stuffy nose, sensory loss	uncertain, but believed to be from inhaling germs in the air from the nasal discharge of untreated persons	Prevention: early diagnosis and treatment, immediate and annual examinations for five years after last contact with infectious person Remedy: rifampin, clofazimine, and dapsone; multiple drug therapy required to prevent development of drug resistance to a single drug
Lyme Disease (tick-borne borreliosis, Lyme arthritis)	bacteria called <i>Borrelia burgdorferi</i> carried by ticks	large red skin rash around or near the site of a tick bite; fever, headache; fatigue, and stiff neck; muscle and joint pain may also be present	deer ticks and western black-legged ticks	Prevention: reduce potential for exposure to ticks by wearing light colored clothing and tucking pants into socks and shirts into pants; use repellent containing DEET; rodent control Remedy: antibiotics (doxycycline, amoxicillin, erythromycin)
Lymphogranuloma Venereum (LGV)	STD caused by a specific strain of chlamydia; occurs mostly in tropical or subtropical climates	painless pimples or lesions on the genitals; may include inflamed and swollen lymph glands which may drain and bleed	sexual contact	Prevention: limit number of sex partners, use condoms, abstain from sexual contact while infected, proper personal hygiene, notify partners so they can receive treatment Remedy: tetracycline or sulfamethoxazole
Malaria	four different blood parasites called Plasmodium	fever, chills, sweats, and headache; may progress to jaundice, blood coagulation defects, shock, kidney or liver failure, central nervous system disorders and coma	bites from infected Anopheles mosquitoes (found primarily in the tropics and subtropics of Asia, Africa, and Central and South America)	Prevention: use insect repellents and bed nets to limit exposure to mosquito bites; preventive drug therapy available for persons traveling to malarious areas Remedy: treatment varies due to changing patterns of drug-resistant strains
Mumps (infectious parotitis)	acute viral disease of the salivary glands caused by a paramyxovirus; more common during winter and spring	fever, headache, and swollen and tender salivary glands; males may experience swollen testicles	airborne transmission; contact with infected saliva and discharges from the nose and throat of infected individuals	Prevention: vaccine (part of MMR series of pediatric immunization program) Remedy: none for the disease itself although treatment (e.g., acetaminophen) sometimes used to treat specific symptoms
Mycobacteriosis	mycobacteria other than tubercle bacillus	similar to tuberculosis - cough and expectoration	contact with airborne germs from infected soil or water	Prevention: persons infected with HIV should avoid contact with infected persons Remedy: drug treatment generally ineffective

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Nongonococcal Urethritis (NSU, NGU)	STD caused by an agent other than gonorrhea; usually caused by the chlamydia germ; occurs primarily in males	slight burning or tingling while urinating, sometimes accompanied by a slight clear discharge	sexual contact	Prevention: limit number of sex partners, use condoms, abstain from sexual contact while infected, proper personal hygiene, notify partners so they can receive treatment Remedy: antibiotics such as tetracycline
Pelvic Inflammatory Disease	ascending inflammatory reaction involving the entire female genital tract	none to fever, leukocytosis, and abdominal tenderness; sterility; ectopic pregnancy	sexual contact with person infected with an STD such as gonorrhea or chlamydia	Prevention: prompt treatment of STDs Remedy: antibiotics
Pseudomonas Folliculitis	bacteria caused by the genus pseudomonad	inflammation of the ear, often with drainage; lung infection; draining sinuses, corneal ulceration; may lead to urinary tract infection, pneumonia, and other problems; burn and cystic fibrosis patients are particularly susceptible	waterborne; often found in moist areas such as sinks, antiseptic solutions, and urine receptacles, especially in hospitals	Prevention: disinfect hospital surfaces regularly, thorough handwashing Remedy: antibiotics, although now becoming drug-resistant
Psittacosis (parrot fever, ornithosis)	bacteria found in birds in the parrot family, turkeys and pigeons; most commonly occurs in pet store workers, farmers, and slaughterhouse workers who process turkeys	fever, headache, chills, and sometimes pneumonia	inhaling dust from dried droppings from bird cages and handling infected birds	Prevention: clean bird cages often, quarantine imported birds in the parrot family prior to selling, give domestic nestlings and imported birds a feed containing tetracycline for 45 continuous days Remedy: antibiotics such as tetracycline
Q Fever	micro-organism called Coxiella burnetii carried by cattle, sheep and goats; primarily an occupational disease	fever, headache, malaise, chills, chest pain, and cough	contact with animal feces or urine; inhaling dust from infected premises; ingesting infected raw milk	Prevention: vaccine (but only for persons not already infected or immune); drink only pasteurized milk Remedy: antibiotics (tetracycline and chloramphenicol)
Relapsing Fever	bacteria called Borrelia carried by soft ticks found in remote and pristine areas	abrupt onset of high fever, chills, tachycardia, headache, myalgias, arthralgias, abdominal pain, and malaise	bite of an infected ornithodoros (soft) tick	Prevention: use tick repellents and frequently check clothing and skin when in an infested area Remedy: antibiotics such as tetracycline and erythromycin
Reye Syndrome	complication of common childhood respiratory infections	vomiting that rapidly increases in severity, fever, lethargy, delirium, and/or coma	results from taking aspirin or other remedies containing aspirin for treatment of symptoms related to chicken pox or influenza	Prevention: refrain from giving children aspirin when they are ill with chicken pox or influenza Remedy: no specific treatment; fluid and electrolyte replacement

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Rheumatic fever	acute complication resulting from an untreated streptococcal infection	severe pain, redness and tenderness in joints (arthritis), carditis, rash, and involuntary movements of face muscles and extremities	results from not treating a streptococcal infection	Prevention: prompt treatment of streptococcal infections Remedy: penicillin (usually given over a long term and in some instances continued for life), bed rest, nutritional support, massive amounts of vitamin C
Rocky Mountain Spotted Fever (tick-borne typhus fever)	ricketsial organism carried in saliva of certain ticks	sudden onset of moderate to high fever, severe headache, fatigue, deep muscle pain, chills and rash	bite of an infected American dog tick, lone-star tick or wood tick	Prevention: use tick repellents and frequently check clothing and skin when in an infested area; apply pesticides to vegetation along trails; frequently mow grass in yards in areas where the ticks are generally found Remedy: antibiotics such as tetracycline or chloramphenicol
Syphilis (other)	STD caused by the bacteria Treponema pallidum	illness in the skin, bones, central nervous system and heart	sexual contact	Prevention: limit number of sex partners, use condoms, abstain from sexual contact while infected, proper personal hygiene, notify partners so they can receive treatment Remedy: penicillin or tetracycline
Tetanus (lockjaw)	spores of the bacteria called Clostridium tetani found in soil and animal feces; occurs primarily in agricultural workers who have contact with animal manure	muscle stiffness in the jaw followed by neck stiffness, difficulty in swallowing, rigid abdominal muscles, spasms, sweating, headache, sore throat, chills, and fever	open wound (especially a puncture wound) contact with the spores of the bacteria	Prevention: vaccine (included in the DPT vaccination given as part of the pediatric immunization program) Remedy: prompt, thorough cleansing of open wounds and removal of dead or devitalized tissue; booster injection; or treatment with tetanus immune globulin, antitoxin or antibiotics (penicillin) if patient not previously immunized
Tick Paralysis	neurotoxin carried in salivary glands of certain ticks	symmetric weakness of lower limbs that may progress to paralysis	bite of an engorged gravid female tick	Prevention: use tick repellents and frequently check clothing and skin when in a tick-infested area Remedy: remove tick
Toxic Shock Syndrome	exotoxin-producing strains of the phage-group 1 bacteria called staphylococcus aureus	high fever, vomiting, diarrhea, confusion, headache, sore throat, skin rash; may progress to severe and intractable shock	primarily from using tampons	Prevention: avoid constant use of tampons or use of maximum absorbency tampons Remedy: penicillin; or cephalosporin; fluid and electrolyte replacement

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Trichinosis	microscopic parasite in animal meat, especially pork	fever, muscle soreness, painful and swollen eyes, thirst, profuse sweating, chills, weakness and fatigue, and chest pain	ingesting undercooked meat of infected animals	Prevention: thoroughly cook pork and wild animal meat (at least 150°F) or store infected meat at -13°F for 10 days or more Remedy: mebendazole
Tuberculosis (TB)	bacteria called tubercle bacillus that affects the lungs (pulmonary TB)	fever, night sweats, fatigue, weight loss, and persistent cough	prolonged contact with germs that get into the air from an infected person coughing or sneezing without covering the mouth and nose	Prevention: preventative drug treatment for 6-12 months; cover the mouth and nose when coughing or sneezing Remedy: two or more antituberculosis medications for a minimum of six months (certain strains have become resistant to treatment from multiple drugs)
Tularemia	bacteria called Francisella tularensis found primarily in rabbits	lesion(s) and swollen glands, throat infection, intestinal pain, diarrhea, vomiting, fever, and pneumonia-like symptoms	contact with blood or tissue of infected animals; contact with fluids from infected deer flies or ticks; handling or eating insufficiently cooked rabbit meat; drinking contaminated water; inhaling dust from contaminated soil; handling contaminated animal pelts or paws	Prevention: wear rubber gloves when skinning or handling animals, especially rabbits; thoroughly cook wild rabbit and rodent meat; wear protective clothing to avoid deer fly and tick bites; avoid drinking, bathing, swimming or working in untreated water Remedy: antibiotics such as streptomycin, gentamycin, and tobramycin
Vibriosis	bacteria called Vibrio parahaemolyticus found primarily in coastal waters	diarrhea, cramps, weakness, nausea, vomiting, chills, and headache	ingesting raw seafood contaminated with large numbers of bacteria, especially oysters, shrimp, crabs, and clams	Prevention: keep raw and cooked seafood refrigerated; cook seafood thoroughly; prevent cross-contamination between raw and cooked seafood Remedy: usually only fluid replacement therapy, antibiotics such as tetracycline or chloramphenicol sometimes used in severe cases
Yersiniosis	bacteria called Yersinia enterocolitica and Yersinia pseudotuberculosis found primarily in animals	diarrhea, fever, nausea, vomiting, and abdominal cramps (may mimic appendicitis)	ingesting contaminated food or water; contact with feces of infected animals or persons; primary food sources are raw milk, ice cream, unpasteurized chocolate milk, tofu, shellfish, and wild animals	Prevention: avoid drinking raw milk and improperly treated surface water; thorough handwashing Remedy: generally none although antibiotics may be used to treat severe symptoms or bloodstream infections

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
<b>DISEASE THAT IS NOT REPORTABLE BUT FOR WHICH THE WAC REQUIRES SURVEILLANCE:</b>				
Influenza A and B	virus in the orthomyxovirus family	fever, coughing, headache, muscle aches, fatigue, sore throat, runny nose, burning eyes, and intestinal symptoms	airborne virus; direct or indirect contact with infectious mucous	Prevention: annual vaccine Remedy: generally only bed rest; antiviral drugs such as amantadine or rimantadine (for Influenza A) for complicated cases
<b>ADDITIONAL DISEASES RECOMMENDED BY THE CDC TO BE REPORTED (REPORTABLE UNDER WAC AS UNUSUAL COMMUNICABLE DISEASES):</b>				
Coccidioidomycosis (Valley Fever)	fungus called Coccidioides immitis, found in the arid areas of Mexico and the southwestern United States	mild cases have symptoms similar to a slight cold; severe cases have flu-like symptoms, including fever, aching joints, chills, sweats, fatigue, cough, headache, and skin rash and may develop into meningitis	inhaling spore-laden dust during long periods of drought followed by heavy rain	Prevention: avoid digging, plowing, or driving through the soil of endemic areas; apply oil, asphalt, water, sod, etc. to fungus-bearing soils; avoid outside exercise (e.g., jogging) during dust storms in or near endemic areas Remedy: mild cases need no treatment; severe cases treated with the anti-fungal (oral) medications Nizoral, Diflucan, or Sporanox or intravenously with amphotericin-B
Hantavirus Pulmonary Syndrome	virus found in the saliva, urine, and feces of rodents (especially brush, pinon, and deer mice and cotton rats) and other small mammals such as the western chipmunk	fever, severe muscle ache, headache, and cough which progress to severe lung disease	direct contact with or inhaling airborne particles of contaminated saliva or excreta	Prevention: rodent control in and around the home; occupational groups with potential for rodent contact should wear rubber gloves and respirators when entering rodent-infested areas Remedy: none
Hemolytic Uremic Syndrome	kidney disease caused by the toxins produced by the E. coli 0157:H7 bacteria	irritability, fatigue, pallor, and noticeable decrease in urine production; symptoms may progress to lethargy, seizures, cerebral infraction, blindness and coma	ingestion of meat contaminated during slaughtering (especially ground beef) or through the feces of infected persons	Prevention: cook contaminated food to temperatures high enough to kill the bacteria; drink only pasteurized milk; thorough handwashing Remedy: no specific treatment for the illness itself, but blood transfusions and kidney dialysis are often provided

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Pediatric Infection with HIV	infection caused by a cytopathic human retrovirus of which the end stage is AIDS	can lie dormant for years; initial acute mono-like symptoms and low t-cell blood count; leads to complete failure of immune system	congenital or perinatal transmission from an infected pregnant woman to her fetus, or to her infant at delivery or through breastfeeding; transfusions of infected blood	Prevention: screen donated blood for HIV antibody; prevent HIV infection in women of child-bearing age; require HIV-positive women to avoid pregnancy; HIV-positive mothers should avoid breastfeeding Remedy: none
Pneumococcal Disease, Drug-Resistant	bacteria called <i>Streptococcus pneumoniae</i>	abrupt onset of fever, shaking chill or rigor, pleuritic chest pain, cough, rusty sputum, shortness of breath or rapid breathing, and malaise	contact with the respiratory droplets of infected persons	Prevention: vaccine (recommended only for adults with chronic illnesses, adults age 65+, or children age 2+ at risk due to other long-term illnesses) Remedy: vancomycin
Yellow Fever	a flavivirus called <i>Haemagogus</i> ; occurs primarily in tropical and subtropical areas	fever, headache, vomiting, backache, slow and weak pulse, bleeding gums, bloody urine, and jaundice	bites from <i>Aedes aegypti</i> mosquitoes	Prevention: vaccine for individuals traveling to areas where disease occurs Remedy: none for disease itself; symptomatic treatment
<b>EXAMPLES OF DISEASES UNLIKELY TO OCCUR IN KING COUNTY BUT REQUIRED BY WAC TO BE REPORTED AS UNUSUAL COMMUNICABLE DISEASES:</b>				
Cryptosporidiosis	parasitic infection caused by a protozoa called <i>Cryptosporidium parvum</i>	Intestinal: headache, abdominal cramps, nausea, vomiting, low-grade fever, and prolonged diarrheal illness Pulmonary or tracheal: coughing, low-grade fever, severe intestinal distress	drinking contaminated water (contaminated city water in Milwaukee in 1993 - 403,000 persons affected), ingesting salad vegetables fertilized with infected manure, and person-to-person contact	Prevention: avoid ingesting contaminated water or food, wash hands before handling food or after changing a baby's diapers, boil water before drinking it during an outbreak Remedy: none, but temporary relief is provided with medication and rehydration

DISEASE	SOURCE	SYMPTOMS	TRANSMITTAL	PREVENTION AND REMEDY
Hemorrhagic Fevers, including Argentine (Junin), Bolivian (Machupo), Crimean-Congo, Dengue, Ebola, Lassa, Marburg, and Rift Valley	viral diseases caused by a variety of RNA viruses, including nairoviruses, filoviruses, and arenaviruses	varies according to the specific disease, but most begin with flu-like symptoms such as headache, drowsiness, fever, vomiting, and stiff neck or joints that may progress to tremors, mental confusion, convulsions, hemorrhaging, coma and death	varies according to the specific disease - Argentine, Bolivian, and Lassa are transmitted via contact with the infected urine of specific species of mice; Crimean-Congo is transmitted via the bite of an infected tick; Dengue and Rift Valley are transmitted via the bite of an infected mosquito; and the host for Ebola and Marburg is unknown although Marburg is known to have been transmitted via contact with Ugandan green monkeys; all can be transmitted via contact with the secretions or excretions of an infected person	Prevention: primarily rodent, tick and mosquito control where host is known; avoid contact with secretions or excretions of infected persons Remedy: mostly symptomatic treatment, Ribavirin IV may be given in some cases
Leishmaniasis (Kala-Azar, Oriental Sore, American Leishmaniasis, Diffuse Cutaneous Leishmaniasis)	parasitic infection caused by a species of Leishmania; occurs primarily in areas that are poverty-stricken or undergoing significant economic development or environmental changes	irregular fever, skin lesions, weight loss, swelling of spleen and liver	source is an infected female sandfly; known hosts range from horses to domestic dogs to sloths	Prevention: good oral hygiene, adequate nutrition, avoid contact with sandflies if traveling in an area where the disease is known to occur Remedy: antibiotics (pentavalent antimony compounds, or pentamidine), rest, chemotherapy (occasionally)
Trypanosomiasis (Chagas' Disease, African Sleeping Sickness)	a parasitic infection caused by the protozoa Trypanosoma	boil-like sore at site of bite, fever, headaches, joint pain and severe illness; may lead to facial edema, enlarged intestines and heart disease; may progress to a coma and death	bite from an infected tsetse fly; contact with the feces of reduviid bugs (usually found in adobe or thatch structures); transfusion of contaminated blood	Prevention: minimize contact with insects, limit travel to infected areas, wear wrist and ankle length clothing in infected areas, use bed nets and insecticides Remedy: acute cases may be treated with nifurtimox or benznidazole, but possible chronic organ damage is irreversible

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### APPENDIX 3

#### CDC PROGRAMS AND DIVISIONS RELATING TO EMERGING INFECTIOUS DISEASES

PROGRAM OR DIVISION	ROLE
Public Health Laboratory Information System (PHLIS)	An electronic reporting system used to gather, analyze, and transmit data among multiple sources of public health laborator information; provides an automated database program to detect outbreaks
National Center for Prevention Services	Assists states in preventing and controlling human immunodeficiency virus infections, sexually transmitted diseases, tuberculosis, and oral diseases, and preventing the introduction of diseases from other nations
Epidemiology Program Office	Strengthens the public health system by coordinating public health surveillance at CDC and providing domestic and international support through scientific communications, statistical and epidemiologic consultation, and training of experts in surveillance, epidemiology, and applied public health, and prevention effectiveness
International Health Program Office	Leads the CDC's collaboration with other nations and international organizations to promote healthy lifestyles and prevent excess disease, disability, and death
Public Health Practice Program Office	Strengthens the public health system by building an effective work force, developing community leadership, communicating information for public health action, and establishing a science base for public health practice
National Immunization Program Childhood Immunization Initiative	Provides national leadership for the planning, coordinating, and conducting federal, state, and local immunization activities
National Center of Infectious Diseases (NCID) - Division of Bacterial and Mycotic Diseases	Prevents and controls the many emerging, re-emerging, drug-resistant, and other important bacterial and mycotic diseases in the United States and around the world
NCID - Division of Vector-Borne Infectious Diseases	Serves as the focus for information, surveillance, prevention, and control of vector-borne infectious diseases for the Public Health Service, state and local health departments, educational institutions, and professional organizations in the United States and around the world; investigates national and international epidemics of viral and bacterial diseases transmitted to humans by arthropods; performs laboratory and epidemiological research to improve diagnosis, surveillance, prevention, and control of vector-borne infectious diseases of major public health importance or that occur sporadically or in periodic epidemics
SOURCE: Various CDC Publications	

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## APPENDIX 4

### SKCDPH MENINGITIS RESPONSE TIMELINE, DENNY MIDDLE SCHOOL - FEBRUARY 1995

<u>Date</u>	<u>What Occurred On This Day</u>
February 13	Case #1 reported midday by school to SKCDPH as suspected case of meningitis.
February 14	Case #1 was lab confirmed as meningococcus. Family contacts treated with rifampin. SKCDPH faxed letter to school.  Case #5 onset.
February 15	Denny Middle School began distributing letter to all students. Because it was a snow day, only about half of the letters actually got delivered that day.  Case #2 began developing symptoms in the morning. A sibling recognized the symptoms as those listed in the letter and told parent.  Case #5 was seen in a clinic and sent home.
February 16	Denny Middle School completed distribution of its letter.  Case #2 was seen in an emergency room.  Case #5 was seen in a clinic again and sent home again.
February 17	Children's Hospital and Medical Center reported to SKCDPH that Case #2 had been admitted for suspected meningitis. It was discovered that Cases #1 and #2 rode the same bus and participated in a photographic session together. Later in the day, Case #2 was confirmed as meningococcus. SKCDPH requested a list of students who shared the bus and were at the photographic session. Denny Middle School sent a second letter to all students who rode the bus with Cases #1 and #2, and sent the first letter to the entire student body. Case #2's contacts were treated with rifampin.  Case #3 came to the school nurse's office at 10:00 a.m. because she was ill. Her mother picked her up at 2:00 p.m. and took her to the emergency room at Riverton Hospital. The doctor released her to go home because he could see no signs of meningismus, but he drew blood cultures.
February 18	Children and the bus driver who shared the bus with Cases #1 and #2 or were at the photography session were contacted by telephone in the morning. Dr. Alexander of SKCDPH called in rifampin prescriptions to local pharmacies.

## APPENDIX 4 (Continued)

### Date

### What Occurred On This Day

While contacting students, SKCDPH discovered that Case #4 was ill with a high fever and rash. Case #4 was referred and admitted to Children's Hospital and Medical Center.

Case #5 went to the emergency room at Children's Hospital and Medical Center at approximately the same time that Case #4 arrived. Case #5 had been ill since early in the day of February 14, had been seen twice by her doctor, but had not yet been diagnosed as having meningitis. Since Case #5 had not been in school since February 13, her parents had not been sent the Denny Middle School advisory letter. SKCDPH staff interviewed the families of Cases #4 and #5 at the emergency room. Blood cultures for Cases #4 and #5 were confirmed as positive for meningococcus.

Case #3 went to Providence West Seattle Clinic in the morning with a fever, rash, headache, and vomiting. She was sent home. Because she got sicker as the day progressed, her parents took her to the emergency room at Children's Hospital and Medical Center in the evening.

Dr. Alexander of SKCDPH discussed the meningitis outbreak with staff from the Washington State Department of Health (DOH), the Centers for Disease Control (CDC), and Children's Hospital and Medical Center to determine a course of action.

February 19

Dr. Alexander and Janice Boase of SKCDPH held a conference with the state epidemiologist, a representative of the CDC, and a local meningococcal expert to discuss the situation. They determined to recommend prophylaxis (i.e., treatment to prevent the disease from spreading) for the entire staff and student body of Denny Middle School.

SKCDPH staff met at 11:00 a.m. with Seattle Public School officials and scheduled rifampin clinics at Denny Middle School and the SKCDPH Columbia Health Center Clinic from 4:00 to 8:00 p.m. that evening. SKCDPH sent out a press release at 2:00 p.m. and telephoned contacts of confirmed cases to advise potentially affected people of the rifampin clinics. School district interpreters assisted SKCDPH staff by contacting foreign language speaking parents. Other SKCDPH staff located rifampin and bottled it for the clinics, prepared and sent notices to the local health care community, prepared fact sheets and consent forms for the rifampin clinics, and recruited SKCDPH and Seattle Public Schools staff to assist at the clinics. The clinics provided 350 prescriptions, and a doctor cultured a sample of students for meningococcus during the clinic sessions.

## APPENDIX 4 (Continued)

<u>Date</u>	<u>What Occurred On This Day</u>
	Case #6 was traveling when he became ill. He went to an urgent care center in Chehalis, WA, where he was cultured and treated with antibiotics.
February 20	Two rifampin clinics were scheduled at the Columbia Health Center and Denny Middle School, from 7:00 a.m. to 12:00 noon and from 4:00 to 8:00 p.m. A total of 487 prescriptions were given at the clinics. A doctor continued to culture Denny Middle School students for meningococcus, and collected a total of 373 samples that were processed by the state and SKCDPH laboratories.  Case #6's family came to the rifampin clinic at the Columbia Health Center to get medicine for Case #6. SKCDPH staff gave the family rifampin and told the parents to contact Children's Hospital and Medical Center. Case #6 was admitted to the hospital that evening.
February 21	SKCDPH staff continued to provide rifampin at Denny Middle School and Columbia Health Center, as well as the Seattle Teen Center.
February 22	SKCDPH staff continued to provide rifampin at Denny Middle School, Columbia Health Center, and the Seattle Teen Center. School district staff reviewed student rosters and questioned students and families. By 4:00 p.m., less than 75 students were left to prophylax. All staff had received rifampin.
February 23	SKCDPH staff continued to provide rifampin at Denny Middle School and Columbia Health Center. By 4:00 p.m., only 12 students had not yet received rifampin. Of those 12 students, 3 parents had refused to have their children treated.

### Summary

Cases #1-5 were laboratory confirmed cases of meningococcus. Case #6 had a positive throat culture; however, his blood culture never grew. SKCDPH dispensed over 1150 rifampin prescriptions to all Denny Middle School staff, 888 out of 900 students, and the families and contacts of Cases #1-6.

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## APPENDIX 5

### SKCDPH COMPLIANCE WITH THE WASHINGTON ADMINISTRATIVE CODE

WAC CODE AND DESCRIPTION	REQUIREMENT	METHOD OF COMPLIANCE
246-100-016(1b) Confidentiality	<ul style="list-style-type: none"> <li>establish and implement policies and procedures to maintain confidentiality related to a patient's medical information</li> </ul>	Locked data files, controlled access to limited computer files.
246-100-016(4) Confidentiality	<ul style="list-style-type: none"> <li>maintain individual case reports as confidential records consistent with WAC 246-100-091</li> </ul>	Same as above.
246-100-036(1) Responsibilities and duties - local health officers	<ul style="list-style-type: none"> <li>review and determine appropriate action for all reported cases, any threatening diseases, reported or suspected outbreaks, and institution of containment actions</li> </ul>	Infection Control officers and staff meetings in CD/Epi Unit.
246-100-036(2) Responsibilities and duties - local health officers	<ul style="list-style-type: none"> <li>submit reports to state</li> <li>establish confidentiality system</li> <li>notify health care providers about reporting requirements</li> <li>distribute appropriate forms to disease reporters</li> <li>notify principal health care provider prior to conducting a case investigation</li> <li>make HIV testing and AIDS counseling and pre- and post-test counseling available</li> <li>make HIV/AIDS testing information available</li> <li>destroy documentation of referral information upon notification of infected person and partner or 3 months</li> </ul>	Diskette with reporting information submitted to the state on a monthly and quarterly basis; mail reporting packet to new interns and residents annually; counseling provided by AIDS unit; document destruction done by AIDS unit.
246-100-072(5) Rules for notification of partners at-risk of infection	<ul style="list-style-type: none"> <li>upon referral of a HIV notification, notify infected individual, and/or notify potential partners of the infected individual</li> <li>offer post-test counseling</li> <li>destroy all written evidence of referral</li> </ul>	AIDS unit regulations.

## APPENDIX 5 (Continued)

WAC CODE AND DESCRIPTION	REQUIREMENT	METHOD OF COMPLIANCE
246-100-091 Handling of reports by local health departments	<ul style="list-style-type: none"> <li>• notify the state of all Category A diseases by phone immediately</li> <li>• submit approved case report within seven days</li> <li>• submit approved case report within seven days of the end of an outbreak investigation</li> <li>• maintain confidentiality in reporting</li> </ul>	Category A diseases are reported by phone immediately; other cases are reported weekly via a diskette sent in the mail; confidentiality addressed above.
246-100-186 Special settings - health care facilities	<ul style="list-style-type: none"> <li>• adopt written policies and procedures restricting direct contact work of staff diagnosed with a communicable disease</li> <li>• permit staff to return to work when measures have been taken to contain the disease or contamination is over</li> <li>• comply with communicable disease screening and control laws and rules</li> </ul>	<b>Currently not established, but the SKCDPH has hired a "Health and Safety Coordinator" who is in the process of drafting these policies.</b>
246-100-207(1) HIV testing	<ul style="list-style-type: none"> <li>• provide referral for or offer pretest counseling</li> <li>• obtain specific consent for HIV testing</li> <li>• provide referral for or offer post-test counseling for positives</li> </ul>	AIDS unit regulations.
246-100-207(6) HIV - Lab reporting	send prevalence results reports for all HIV testing to the state office on AIDS	Reports sent by lab to the state.
246-100-208(1) and (2) AIDS counseling	health care providers must provide or ensure AIDS counseling for all pregnant women, clients seeking information on STDs and clients of drug treatment programs	AIDS unit regulations.
246-100-209 AIDS counseling	must provide at least one individual pre- and post-test counseling session in all AIDS testing	AIDS unit regulations.
246-100-211(2) Tuberculosis	<ul style="list-style-type: none"> <li>• maintain TB control program</li> <li>• maintain TB register of all infected persons</li> <li>• follow isolation regulations</li> <li>• maintain outpatient clinical services</li> <li>• submit reports to the state</li> </ul>	TB unit maintains complete records on all TB cases and provides extensive outpatient services; reports are submitted monthly to the state.
246-100-216 Surveillance for influenza	<ul style="list-style-type: none"> <li>• maintain a flu surveillance system</li> <li>• encourage submission of clinical specimens to the state lab</li> </ul>	Surveillance system maintained by CD/Epi unit, specimens are processed by local lab and results are sent to the state.



## APPENDIX 5 (Continued)

WAC CODE AND DESCRIPTION	REQUIREMENT	METHOD OF COMPLIANCE
246-100-226 Duties of labs	<ul style="list-style-type: none"> <li>• labs performing prenatal serologic tests must be approved by the state</li> <li>• labs must subscribe to a proficiency testing program</li> </ul>	Lab undergoes regular proficiency testing and lab inspections by the Lab Quality Assurance office for the state DOH.
246-100-231 Duties of labs	<ul style="list-style-type: none"> <li>• labs must submit cultures of diseases listed in 246-100-231(2) and (3) to the state lab for diagnosis, confirmation, or further testing</li> </ul>	<b>Specimens are not sent to the state because SKCDPH does its own confirmation testing. Reports are submitted to the state by the CD/Epi unit.</b>
246-170-030 TB responsibilities	<ul style="list-style-type: none"> <li>• each health department shall operate a chest clinic</li> <li>• must maintain a TB case register</li> <li>• have one or more doctors qualified to treat TB on staff</li> <li>• must provide inpatient care by contract</li> </ul>	Chest clinic operated by TB unit; case register addressed above. One Disease Control Officer (MD) is assigned to TB unit; unit provides inpatient care at St. Charles Hotel.
246-170-080 Case monitoring	<ul style="list-style-type: none"> <li>• clinic must monitor all patients</li> <li>• must provide detailed records</li> <li>• must submit quarterly report to state</li> </ul>	Addressed above - all units are in compliance.
246-170-090 Program review	<ul style="list-style-type: none"> <li>• maintain adequate operational records</li> <li>• comprehensive annual program review</li> </ul>	Records are maintained as tracking cards, hard copies of full reports, and computer files; program review conducted annually.
SOURCE: Washington Administrative Code		

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## APPENDIX 6

### SOURCES OF SKCDPH POLICIES AND PROCEDURES

RESOURCE	AUTHOR	PURPOSE
Immunization Manual	SKCDPH	Lists nineteen diseases with descriptions, immunizations, and vaccine procedures.
Advisory Committee on Immunization Practices (ACIP) Manual	Advisory Committee on Immunization Practices	Reviews vaccine use and other preventive measures, provides general immunization recommendations, and lists all vaccines and related procedures available.
Child Care Infection Control Guide	SKCDPH	Lists immunization laws and schedules, and outlines policies relating to child care facilities, including minimum licensing requirements for child care facilities and protocols for illness management in those facilities.
CD Protocols	SKCDPH	Provides a categorical listing of reportable diseases, animal bite protocols, clinical cleanliness and waste disposal procedures, and biologics release procedures.
Infection Control Policies	OSHA/WISHA	Outlines clinic cleanliness and disposal of waste, and details an exposure control plan, dental sterilization processes, substantial exposure policy, employee immunization requirements and guidelines, and identifies an emergency response team.
Control of Communicable Diseases in Man	American Public Health Association	Provides comprehensive information on how to control various communicable diseases in man.
CDC - Health Information for International Travel	CDC	Outlines guidelines for health precautions during international travel.
Report of the Committee of Infectious Diseases (the "Red Book")	Committee of Infectious Diseases	Offers recommendations for infectious disease treatment by pediatricians.
Emergency Preparedness Manual (DRAFT)	SKCDPH	Outlines a step-by-step response plan for significant public health emergencies (e.g., flooding, disease outbreaks, or power outages) that would not call for the implementation of the full King County Emergency Operations Plan.
SOURCE: SKCDPH Staff		

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# APPENDIX 7

## SKCDPH LABORATORY REVENUE SOURCES

SOURCE	1995		1994	
<b>Contributions</b>				
Current Expense (County)	\$835,896.47		\$811,832.95	
General Fund (Seattle)	50,193.62		41,643.00	
Total Contributions		\$886,090.09		\$853,475.95
<b>Grants</b>				
Omnibus (state HIV funding)	\$89,309.00		\$59,610.00	
NIDA-Exchange Evaluation	94,573.00		44,250.00	
Fed-HIV Vaccine	28,215.75			
CC-Fed-Seroprevalence	37,686.57		51,807.25	
CC-Fed Lab Hep B Test	1,351.99		1,038.00	
Total Grants		\$251,136.31		\$156,705.25
<b>Fees</b>				
FQHC-FFS	\$18.63			
DOH-HIP Fees			\$87.00	
Title XIX (Medicaid)	16,220.12		29,242.56	
Title XVIII	283.27		384.60	
Lab Fees (outside providers)	217,820.01		235,616.73	
Water Plan Review	400.00		399.32	
Operations Checks	1815.00		2,754.62	
Swimming Pool Permits	332.91		335.73	
Food Establishment Permits	4620.87		4,607.31	
Meat Licenses and Permits	3,045.41		3,149.77	
Total Fees		\$244,556.22		\$276,577.64
<b>Other</b>				
Sales of Drugs and Supplies	(\$2,134.00)			
Other Misc. PH Revenue	171.60		\$17.85	
Total Other		(\$1,962.40)		\$17.85
<b>TOTAL</b>		<b>\$1,379,820.22</b>		<b>\$1,286,776.69</b>
SOURCES: 1994 and 1995 Project Detail by Performing Organization, 14th Month Reports				

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## APPENDIX 8

### DOH RECOMMENDATIONS FOR WHERE SKCDPH LABORATORY TESTS MIGHT BE MORE EFFICIENTLY PERFORMED

SPHL	Submit specimen to the state Public Health Laboratory
SPHL - Outbreak	Submit clinical and environmental specimens to the state Public Health Laboratory when involved in a disease outbreak investigation by the Seattle-King County Department of Public Health
SPHL - Confirm	Submit cultures of unknown microbial agents isolated by other laboratories in King County to the state Public Health Laboratory to have their identity confirmed
Referral Laboratory	Refer routine microbiological immunological testing to a hospital or commercial laboratory

TYPE OF TEST OR SERVICE	RECOMMENDED LABORATORY
<b><u>MICROBIOLOGY:</u></b>	
Acid fast bacillus smear	SPHL
Botulism	SPHL - outbreak
Campylobacter	SPHL - confirm
Cryptosporidium exam	Referral laboratory, except in outbreak
Culture, acid fast bacillus with smear	SPHL
Culture, Diphtheria	SPHL - outbreak
Culture, Gonorrhea	Referral laboratory
Culture, Group A Strep	Referral laboratory, except in outbreak
Culture, Group B Strep	Referral laboratory, except in outbreak
Culture, Hemophilus ducreyi	Harborview
Culture, Herpes simplex	Referral laboratory
Culture, Pertussis with smear	SPHL - outbreak
Culture, stool (salmonella, shigella, campylobacter, E. Coli 0157:H7)	Referral laboratory, except in outbreak and confirm
Culture, virus (adenovirus, cytomegalovirus, enterovirus, herpes simplex, influenza, measles, mumps, parainfluenza, respiratory syncytial, varicella zoster)	Referral laboratory, except measles, influenza and outbreak or confirm
Culture, Yersinia	SPHL
Diphtheria, confirmation	SPHL - outbreak
E. Coli 0157:H7, confirmation	SPHL - confirm
Food bacteriology	SPHL - outbreak
Gonorrhea, confirmation	Referral laboratory, except CPS and legal
Hemophilus influenzae, confirmation	SPHL - confirm
Malaria, confirmation	SPHL - confirm
N. Meningitides, confirmation	SPHL - confirm
Ova and parasites	Referral laboratory, except in outbreak
Pertussis, confirmation	SPHL - outbreak
Pinworm examination	Referral laboratory
Reference culture	SPHL - confirm
Rotavirus antigen, EIA	Referral laboratory
Salmonella, confirmation	SPHL - confirm
Shigella, confirmation	SPHL - confirm
Vibrio cholera, confirmation	SPHL - confirm

## APPENDIX 8 (Continued)

TYPE OF TEST OR SERVICE	RECOMMENDED LABORATORY
<b><u>SEROLOGY:</u></b>	
Adenovirus antibody	SPHL
Brucella antibody, agglutination	SPHL
Chlamydia group antibody	SPHL
Cytomegalovirus antibody, quantitative	Referral laboratory
Hepatitis A IgM antibody	Referral laboratory
Hepatitis B surface antigen	Referral laboratory, except in outbreak
Hepatitis B core antibody	Referral laboratory, except in outbreak
Hepatitis B surface antibody	Referral laboratory
Hepatitis C antibody	Referral laboratory
Herpes simplex virus antibody	Referral laboratory
HIV-1, HIV-2 antibody, routine	Referral laboratory
HIV-1 antibody, confirmation	SPHL - confirm
HIV-2 antibody confirmation	Genetic Systems
Influenza A antibody	SPHL (no other state capacity)
Influenza B antibody	SPHL (no other state capacity)
Measles antibody, diagnostic	SPHL - outbreak
Measles antibody, immune status	Referral laboratory, except in outbreak
Mumps antibody, diagnostic	SPHL (no other state capacity)
Mumps antibody, immune status	Referral laboratory
Mycoplasma antibody	Referral laboratory, except in outbreak
Respiratory syncytial virus antibody	SPHL (no other state capacity)
Rubella antibody, immune status	Referral laboratory, except in outbreak
Rubella antibody, diagnostic	SPHL - outbreak
Syphilis, cerebrospinal fluid	Referral laboratory
Syphilis, cerebrospinal fluid, confirm	SPHL - confirm
Syphilis, confirmation	SPHL - confirm
Syphilis, routine	Referral laboratory
Syphilis, treponema antibody	SPHL - confirm
Toxoplasma IgG antibody, qualitative	Referral laboratory
Toxoplasma IgM antibody	Referral laboratory
Tularemia antibody, agglutination	SPHL
<b><u>ENVIRONMENTAL:</u></b>	
Water, total and fecal coliforms	Referral laboratory
Water, fecal coliforms	Referral laboratory
Water, Pseudomonas	Referral laboratory, except in outbreak
Rabies	SPHL - outbreak
Meat Fat	Referral laboratory

SOURCE: Memo from the state Public Health Laboratory to the King County Auditor's Office



## APPENDIX 9

### UNIVERSITY OF WASHINGTON RESPONSE TO INQUIRY REGARDING LABORATORY SERVICES AT HARBORVIEW MEDICAL CENTER

UNIVERSITY OF WASHINGTON SCHOOL OF MEDICINE



August 15, 1996

*Department of  
Laboratory Medicine*

Box 357110  
Seattle, WA 98195-7110  
Phone: (206) 548-6131  
Fax: (206) 548-6189

Dear Harriet,

On behalf of the UW Department of Laboratory Medicine, thank you for your interest in our laboratory testing services. I have included the key aspects of our referral testing program.

#### ***High quality —***

Our clinical laboratory operations are directed by PhD and MD level professionals (all of whom have faculty appointments at the UW). Each lab section also has a technologist level supervisor, many with Master's degrees. All these individuals are available for technical and clinical consultation at no charge.

Our laboratories are CAP-accredited and CLIA-registered. We participate in formal proficiency testing programs of CAP.

We have one of the highest percentages of medical technologists (laboratory professionals with 4-year college degrees) in the industry comprising our testing staff. The technologists oversee the small number of lab assistants and technicians we employ. All testing personnel are ASCP certified or equivalent.

#### ***Clinical Consultation—***

Our department has over 20 full time clinical faculty available for consultation in all areas of laboratory medicine including clinical chemistry, hematology, coagulation, microbiology, virology, immunology, and molecular diagnostics. Faculty are available to answer questions on test selection, diagnostic strategies, and test interpretation.

Faculty are backup by clinical fellows in many areas including hematopathology, virology, and microbiology. In addition, laboratory medicine residents are on call 24 hours a day to answer questions, help with test selection or aid in getting unusual tests done at odd hours.

No other laboratory organization in Seattle can provide this level of consultative support.

#### ***Local testing—***

We refer testing out to other laboratories on a very limited basis - less than 1% of our total volume. Our own laboratory facilities are all located in Seattle. This means nearly all testing is performed locally, resulting in excellent turnaround times, fewer problems with specimen integrity, and lower transportation costs.

## APPENDIX 9 (Continued)

**Contacts:**

Community Services Office (main contact for referral testing services information)

M-F, 8 am-5 pm

(206) 548-6066

1-800-713-5198

After-hours contact (clinical laboratories are operated 24 hours a day, 7 days a week)

UWMC Clinical Laboratory (206) 548-6224

HMC Clinical Laboratory (206) 223-3451

24-hour resident on-call

(206) 548-6190

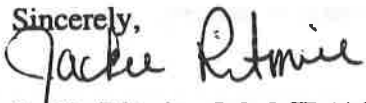
Faculty consultation

(206) 548-6131 (local number)

1-800-326-5300 (MEDCON access)

We are very accommodating and willing to negotiate test prices and methodologies. If you have any questions or would like to receive brochures and/or newsletters, please call me or Lisa Westlund (director of Community Services) at 548-6066.

Sincerely,



Jackie Ritmire, BS, MT (ASCP)

Community Services

UW Department of Laboratory Medicine

## APPENDIX 10

### WASHINGTON STATE DEPARTMENT OF HEALTH CRITERIA FOR EVALUATING NEED TO PROVIDE SPECIFIC LABORATORY TESTING SERVICES

#### 1) Medical or environmental program needs

- Type and scope of services rendered by county and state health departments in their delivery of primary health care (e.g., the development of certain diagnostic tests appropriate to a state or county clinic's patient population).
- Type of disease prevalent in area (e.g., development of certain laboratory tests as necessitated by the prevalence of certain diseases in a community (e.g., rabies or plague which are endemic in Arizona).
- Necessity for immediate laboratory results to ensure public health officials can quickly assess the effect of public health controls or take prompt corrective action when an immediate environmental hazard or outbreak of a communicable disease is involved.
- Diagnostic confirmation (e.g., providing certain tests in the public health laboratory to confirm a presumptive laboratory diagnosis which has been obtained in a local hospital or independent laboratory).
- Epidemiological considerations (e.g., the need to provide tests for certain communicable diseases that require additional epidemiological data to define or control a disease outbreak, such as serotyping or phage typing for salmonella, shigella or staphylococci microorganisms).
- Public health research (e.g., to characterize certain population parameters in relation to either infectious or environmental related disease, such as the study of nitrate in water).

#### 2) Legal or professional requirements

- State and local laws
- Professional certification or licensing by federal government
- Quasi-legal requirements

#### 3) Technical and personnel considerations

- Availability of other tests revealing identical or comparable information
- Availability of adequate equipment, methods, and reagents
- Availability of experienced, competent laboratory personnel
- Lack of sufficient and recent experience/workload to maintain proficiency
- Workload
- Safety
- Stability and transportation of specimens

#### 4) Other managerial considerations

- Availability of acceptable services elsewhere
- Need for verification of selected laboratory results by an analytical facility independent of agency initiating regulatory action
- Anticipating projected "state of act" (i.e., development of diagnostic/analytical capability based on technological advancements)

SOURCE: "Guidelines for Evaluating the Need for Public Health Laboratories Services," Washington State Department of Health, Rev. 8/94

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## APPENDIX 11

### EXECUTIVE RESPONSE



King County Executive  
GARY LOCKE

**RECEIVED**

NOV 1 1996

KING COUNTY AUDITOR

October 31, 1996

Don Eklund  
King County Auditor  
Room 402  
COURTHOUSE

Dear Mr. Eklund:

Thank you for the opportunity to respond to your audit of the Seattle-King County Department of Public Health's (SKCDPH) emerging infectious diseases and laboratory operations. We are proud of our public health department's proven high level of readiness for emerging infectious diseases and epidemics, and the clinical and laboratory excellence which makes this possible. We welcome recommendations that will further improve the department and its laboratory.

Many of the recommendations made in this audit address the public health laboratory. The SKCDPH laboratory provides core laboratory services which are required to meet the medical, epidemiologic, and environmental program needs of the SKCDPH.

Our public health laboratory is mandated to:

1. Make tests available at little or no cost to tested persons which identify infections which put the community at risk. (Code of King County Board of Health, Title III, Chapter 3.04);
2. Rapidly and accurately conduct any one of the dozens of different tests which will identify an emerging threat to the community before it can infect and possibly kill large numbers of residents. (Code of King County Board of Health, Title III, Chapter 3.04 - R&R 74 1, 12-11-91: Ord. 65 1, 12-18-90: R&R 51 1, 12-1-89: R&R 43 1, 12-15-88: R&R 35 amdt. 1, 12-1986: R&R 35 amdt. 1, 12-6-85: R&R 35 1, 12-8-82).;
3. Assist disease surveillance and prevention efforts as better and less expensive ways of monitoring disease prevalence and eradicating dangerous infections are found;
4. Maintain the flexibility to rapidly conduct large numbers of tests as an epidemic surfaces in order to gain prompt control of the epidemic. (WAC 246-100-241).

## APPENDIX 11 (Continued)

Don Eklund  
October 31, 1996  
Page 2

The epidemiologic and laboratory staff in SKCDPH feel strongly that the functions of the public health laboratory must be maintained. These functions require public support without dependence on a fee payment. This is because the beneficiaries of such testing are not just the patients themselves but the community at large. Without such testing capability the public is at significant risk. The coordinated laboratory response to the recent E-coli outbreak again demonstrates the margin of safety our public health laboratory provides the residents of King County.

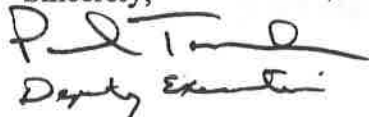
Our very capability to respond to emerging diseases outlined in the first half of the audit is based upon maintaining a strong laboratory. The \$720,464 investment during 1996 of County Current Expense (CX) for the laboratory leverages an additional \$663,148 and ensures the expectation of the taxpayer that we will protect the public's health. The \$720,464 investment buys disease protection for the 1.6 million people in the County.

The audit has identified several areas in the SKCDPH laboratory which need to be addressed and improved. We will take whatever action is necessary to ensure that the SKCDPH laboratory fulfills its public health mission as efficiently as possible.

For ease of presentation, our attached response is referenced to each of the findings and recommendations contained in the Auditor's preliminary draft report.

Again, thank you for the opportunity to respond to the audit. We look forward to the discussion of the final audit at the November 5 meeting of the Management, Labor, Customer Services Committee.

Sincerely,



Gary Locke  
King County Executive

Attachment

cc: Paul Tanaka, Deputy County Executive  
Dr. Alonzo Plough, Director, Seattle-King County Department of Public Health  
Pat Steel, Director, Budget & Strategic Planning

## APPENDIX 11 (Continued)

### Response to Findings and Recommendations

#### **FINDING III-A**

**THE SEATTLE-KING COUNTY DEPARTMENT OF PUBLIC HEALTH IS GENERALLY WELL PREPARED TO HANDLE INFECTIOUS DISEASE OUTBREAKS AT THE LOCAL LEVEL, ALTHOUGH ITS CAPABILITIES MAY BE LIMITED BY NATIONAL AND INTERNATIONAL PREPAREDNESS THAT IS LESS THAN OPTIMAL.**

#### **RESPONSE:**

*We concur.*

#### **RECOMMENDATION III-A-1**

**The SKCDPH should research the feasibility of purchasing and implementing a GIS to improve their disease surveillance, prevention, and control efforts.**

#### **RESPONSE:**

*The Department will continue to look at ways of using GIS.*

*One usage that is being examined is the linkage of the GIS with the Department's communicable disease surveillance and tracking system. The Epidemiology section presently uses a geocoding software package called GeoVista. The software assigns census tract, block group, zip and zip+4 codes to addressees. It was specifically developed in response to the need to assess community health at a variety of geographic levels. Earlier efforts to assign geocodes to health data using another software package produced an unacceptable level of errors in geocode assignments. The Department has compared the results from GeoVista with those from the County GIS and concluded that GeoVista was the best software package for assigning geographic codes to addressees associated with health events.*

#### **RECOMMENDATION III-A-2**

**The SKCDPH should increase its cross-training efforts within the CD/Epi Unit, as well as within the entire King County public health system to maximize its ability to respond to a disease outbreak.**

#### **RESPONSE:**

*We maximize cross-training efforts currently and will continue to do so.*

#### **FINDING III-B**

**THE SEATTLE-KING COUNTY DEPARTMENT OF PUBLIC HEALTH IS IN COMPLIANCE WITH MOST LOCAL, STATE, AND FEDERAL REGULATIONS. HOWEVER, ITS MONITORING CAPABILITIES ARE SOMETIMES LIMITED DUE TO THE LACK OF ENFORCEMENT OF DISEASE REPORTING REQUIREMENTS.**

## APPENDIX 11 (Continued)

### **RESPONSE:**

*Enforcement of disease reporting is the responsibility of the United States Center for Disease Control and Prevention (CDC) and the State Department of Health. We will continue to discuss improved enforcement strategies with both entities.*

### **RECOMMENDATION III-B-1**

**SKCDPH should continue its current efforts to educate the public about currently emerging infectious diseases in the Seattle-King County area.**

### **RESPONSE:**

*We will continue our current efforts to educate the public about emerging infectious diseases in the Seattle-King County area.*

### **RECOMMENDATION III-B-2**

**SKCDPH should explore alternative methods for contacting practicing health care providers in the Seattle-King County area to inform them of reporting requirements and to improve the disease identification and reporting rates. This could include coordinating with instructors at the University of Washington School of Medicine to develop a communicable disease reporting seminar or collaborating with the Washington State DOH to explore and develop enforcement options.**

### **RESPONSE:**

*The SKCDPH will continue to explore approaches that can better inform health care providers in the Seattle-King County area about reporting requirements and disease identification protocols. Three of the Department's four Disease Control Officers (DCOs) are closely affiliated with the University of Washington School of Medicine. They are also active and well regarded members in the King County Medical Society. They will use these relationships to expand communicable disease reporting options. Increasingly, technology will be used to share information and educate health providers. Discussions with the State Medical Director, Dr. Mimi Fields, have been initiated that will explore the development of enforcement options in this area.*

### **RECOMMENDATION III-B-3**

**SKCDPH should develop a policy regarding placement of staff who contract an infectious disease on leave to satisfy the requirement of WAC 246-100-186.**

### **RESPONSE:**

*As noted in the draft audit report, the Department is in the process of drafting a policy to implement WAC 246-100-186.*



**FINDING IV-A**

**LABORATORY SERVICE FEES DID NOT REFLECT THE ACTUAL COSTS OF CONDUCTING TESTS AS REQUIRED BY THE CODE OF THE KING COUNTY BOARD OF HEALTH.**

**RESPONSE:**

*We recognize the need for Board of Health review. The nature of public health laboratory testing is that there will be fees for some tests, not others, some people who can pay and some who cannot.*

**FINDING IV-B**

**THE SKCDPH LABORATORY HAS NEVER PERFORMED A COST ANALYSIS OR DEVELOPED A COST ALLOCATION MODEL FOR THE TESTS IT PERFORMS.**

**RESPONSE:**

*The SKCDPH laboratory, a federally certified lab under the Clinical Laboratory Improvement Act (CLIA), has initiated cost analysis examination(s) but has not to date developed an effective cost allocation model.*

**FINDING IV-C**

**THE SKCDPH HAS NOT BEEN RECEPTIVE TO COLLABORATING WITH THE STATE DEPARTMENT OF HEALTH (DOH) LABORATORY, AND HAS ASSUMED THE DOH LABORATORY'S RESPONSIBILITY FOR CONFIRMATION TESTING WITHOUT DOCUMENTED AUTHORITY TO DO SO.**

**RESPONSE:**

*Previous discussions and functional collaboration with the State Department of Health Laboratory have been on-going over the years but a formal agreement has only been recently developed. Previous discussion with the State Department of Health (DOH) support the coordinated testing approaches. We believe that the DOH does not view the lack of documented authority to do confirmation testing as problematic.*

**FINDING IV-D**

**SOME TESTS THAT THE SKCDPH LABORATORY CURRENTLY CONDUCTS ARE BETTER SUITED TO BE PERFORMED IN ANOTHER LABORATORY ENVIRONMENT.**

**RESPONSE:**

*90% of microbiology testing done in the public health laboratory is less expensive than the commercial laboratory fees listed in the audit. Commercial laboratory fees are also higher for serology tests. Tests are continually evaluated for cost effectiveness within the mission. When a test can be done less expensively in another laboratory, it is referred. Examples include, chlamydia testing, and TB reference testing.*

## APPENDIX 11 (Continued)

### **FINDING IV-E**

**MAINTAINING A SEPARATE LABORATORY IN THE SKCDPH MAY NOT BE THE MOST COST-EFFECTIVE WAY OF SERVING THE COMMUNITY'S PUBLIC HEALTH NEEDS.**

#### **RESPONSE:**

*We disagree.*

### **RECOMMENDATION IV-1**

**The Metropolitan King County Council should retain an independent laboratory consultant to evaluate the laboratory services performed by the SKCDPH. The review should include development and use of a cost-allocation model and use of the criteria developed by the state DOH laboratory director for each test currently performed by the SKCDPH laboratory. The consultant should issue a report to the Council and Executive recommending the level of services that the SKCDPH laboratory should provide, giving adequate consideration to the services offered by other public health and commercial laboratories in the region, the cost effectiveness of each test, and the county's public health responsibilities.**

#### **RESPONSE:**

*We concur. The SKCDPH agrees that an independent laboratory consultant should be retained to evaluate the laboratory services performed by the SKCDPH and will make extra-help dollars available for that purpose.*

*A list of independent external consultants, who have both credentials and experience in this area, will be generated through a variety of sources including the University of Washington; the College of American Pathologists; and public health laboratory experts around the Country. The Department will cooperate fully in any independent evaluation.*

*We welcome an evaluation of the Department's laboratory services by an independent laboratory consultant using guidelines similar to those developed by the State DOH laboratory. We agree that the review should include the development of a cost allocation model.*

*We will consider enrolling in a program such as the Laboratory Management Index Program of the College of American Pathologists or take other action to develop and implement more stringent management systems and controls that will enable the SKCDPH laboratory to monitor the total cost of each test.*

## APPENDIX 11 (Continued)

### **RECOMMENDATION IV-2**

**Based upon the results of the independent consultant's evaluation in Recommendation IV-1, the Metropolitan King County Council should determine whether it wants to:**

- **maintain a laboratory within the SKCDPH that provides laboratory services at current levels,**
- **have the SKCDPH obtain all of its laboratory services from other sources within King County, or**
- **maintain a laboratory within the SKCDPH that provides certain (i.e., cost-effective) laboratory services while obtaining the remaining services from other sources within King County (e.g., the state DOH laboratory, the Harborview Medical Center laboratory, and/or commercial laboratories).**

**Specifically, consideration should be given to transferring clinical laboratory testing functions to the state DOH laboratory and to the Harborview Medical Center laboratory due to their proximity to the SKCDPH laboratory, transferring environmental laboratory testing functions to an environmental laboratory, and transferring low-volume tests to the public or private laboratory where they can be performed most cost-effectively. Any decision to transfer certain tests to a different laboratory from where they are currently performed should give adequate consideration to the need to protect the public's health, as well as the need to minimize the costs to taxpayers. Additionally, any decision to transfer work from the SKCDPH laboratory to another laboratory should be coordinated with the King County Board of Health.**

### **RESPONSE:**

*This recommendation is directed to the County Council, and accordingly, we defer to the King County Council and Board of Health. The State Department of Health agrees that there is a role for both labs and they should exist in partnership. An agreement outlining this partnership has been reached..*

### **RECOMMENDATION IV-3**

**If the SKCDPH continues to operate its own laboratory, management staff should develop management systems and controls that will enable SKCDPH management to identify and monitor anomalies in laboratory performance. such a management control system should also include procedures to accurately track the time required to perform each laboratory test over a period to time to update the elements of the cost-allocation model as necessary. SKCDPH should also use the cost-allocation model on a regular basis to determine when fee adjustments are required.**

### **RESPONSE:**

*We concur. We will establish management systems and controls, including an improved budget format and a cost allocation model, that facilitates detailed tracking of all laboratory costs and assist management in monitoring level of effort, costs, fee structure and performance.*

## APPENDIX 11 (Continued)

### **RECOMMENDATION IV-4**

**SKCDPH staff should make a proactive effort to establish a collaborative relationship with the state DOH laboratory. Specifically, SKCDPH staff should work with the state DOH laboratory staff to identify which laboratory is best suited to perform certain tests, especially those mandated by the WAC to be performed by the state DOH laboratory, develop procedures to share information for disease surveillance and control, and develop a method for providing reciprocal support to each other for tests performed by only one of the laboratories.**

### **RESPONSE:**

*We concur. We have developed an agreement to enhance our partnership with the State DOH laboratory. While maintaining separate laboratories, we will be working together to over the next three months to turn the two laboratories into one functional seamless public health laboratory system, improving service and cost effectiveness for both local and state citizens.*

### **RECOMMENDATION IV-5**

**The SKCDPH laboratory should establish a fee structure that reflects the cost of performing each test, as required by the Code of the King County Board of Health:**

- **If the SKCDPH transfers its laboratory testing to another laboratory (see Recommendation IV-2), the fees established should be the same as those charged the SKCDPH by the laboratory performing the tests.**
- **If SKCDPH performs its own laboratory tests, the SKCDPH should establish fees based on the cost-allocation model developed in Recommendation IV-1.**

### **RESPONSE:**

*We will investigate establishing a revised fee structure which reflects the cost of performing each laboratory test in accordance with the Code of the King County Board of Health, SKCDPH policy, other applicable laws, and our public health mission. The fee structure must be related to the integrated mix of population health activity that we cannot bill for and individual or institutional laboratory activity that we can and should bill for.*

### **IV-6**

**If the SKCDPH laboratory remains in operation, the SKCDPH should establish a budget format that facilitates tracking of all laboratory costs, regardless of whether they are directly test-related or related to other tasks performed by the laboratory.**

### **RESPONSE:**

*We will investigate establishing a revised fee structure which reflects the cost of performing each laboratory test in accordance with the Code of the King County Board of Health, SKCDPH policy, other applicable laws, and our public health mission.*

## APPENDIX 11 (Continued)

### **IV-7**

**The SKCDPH should coordinate its influenza surveillance efforts with the state DOH to eliminate duplication. This should include requesting sentinel physicians to submit their sample specimens to the state DOH laboratory, which would in turn share the results with the SKCDPH.**

### **RESPONSE:**

*We will continue to coordinate our influenza surveillance efforts with the State DOH. We will discuss the State DOH laboratory whether it has the capacity to conduct approximately 300 influenza cultures on specimens from King County each year and determine if transferring this work to the state laboratory would have any adverse effect on influenza surveillance in King County.*

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## APPENDIX 12

### SUMMARY OF FINDINGS AND RECOMMENDATIONS

#### FINDING III-A

THE SEATTLE-KING COUNTY DEPARTMENT OF PUBLIC HEALTH IS GENERALLY WELL PREPARED TO HANDLE INFECTIOUS DISEASE OUTBREAKS AT THE LOCAL LEVEL, ALTHOUGH ITS CAPABILITIES MAY BE LIMITED BY NATIONAL AND INTERNATIONAL PREPAREDNESS THAT IS LESS THAN OPTIMAL.

#### RECOMMENDATIONS

III-A-1

The SKCDPH should evaluate the feasibility of using a GIS to improve its disease surveillance, prevention, and control efforts.

III-A-2

The SKCDPH should increase its cross-training efforts within the CD/Epi Unit, as well as within the entire King County public health system to maximize its ability to respond to a disease outbreak.

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#### FINDING III-B

THE SEATTLE-KING COUNTY DEPARTMENT OF PUBLIC HEALTH IS IN COMPLIANCE WITH MOST LOCAL, STATE, AND FEDERAL REGULATIONS. HOWEVER, ITS MONITORING CAPABILITIES ARE SOMETIMES LIMITED DUE TO THE LACK OF ENFORCEMENT OF DISEASE REPORTING REQUIREMENTS.

#### RECOMMENDATIONS

III-B-1

SKCDPH should continue its current efforts to educate the public about currently emerging infectious diseases in the Seattle-King County area.

III-B-2

SKCDPH should explore alternative methods for contacting practicing health care providers in the Seattle-King County area to inform them of reporting requirements and to improve the disease identification and reporting rates. This could include coordinating with instructors at the University of Washington School of Medicine to develop a communicable disease reporting seminar or collaborating with the Washington State DOH to explore and develop enforcement options.

III-B-3

To satisfy the requirement of WAC 246-100-186, SKCDPH should develop a policy to place staff on leave who contract an infectious disease.

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## APPENDIX 12 (Continued)

FINDING IV-A		LABORATORY SERVICE FEES DID NOT REFLECT THE ACTUAL COSTS OF CONDUCTING TESTS AS REQUIRED BY THE CODE OF THE KING COUNTY BOARD OF HEALTH.
FINDING IV-B		THE SKCDPH LABORATORY HAS NEVER PERFORMED A COST ANALYSIS OR DEVELOPED A COST ALLOCATION MODEL FOR THE TESTS IT PERFORMS.
FINDING IV-C		THE SKCDPH HAS NOT BEEN RECEPTIVE TO COLLABORATING WITH THE STATE DEPARTMENT OF HEALTH (DOH) LABORATORY, AND HAS ASSUMED THE DOH LABORATORY’S RESPONSIBILITY FOR CONFIRMATION TESTING WITHOUT DOCUMENTED AUTHORITY TO DO SO.
FINDING IV-D		SOME TESTS THAT THE SKCDPH LABORATORY CURRENTLY CONDUCTS ARE BETTER SUITED TO BEING PERFORMED IN ANOTHER LABORATORY ENVIRONMENT.
FINDING IV-E		MAINTAINING A SEPARATE LABORATORY IN THE SKCDPH MAY NOT BE THE MOST COST-EFFECTIVE WAY OF SERVING THE COMMUNITY’S PUBLIC HEALTH NEEDS.
RECOMMENDATIONS	IV-1	The Metropolitan King County Council should retain an independent laboratory consultant to evaluate the laboratory services performed by the SKCDPH. This review should include development and use of a cost-allocation model and use of the criteria developed by the state DOH laboratory director for each test currently performed by the SKCDPH laboratory. The consultant should issue a report to the Council and Executive recommending the level of services that the SKCDPH laboratory should provide, giving adequate consideration to the services offered by other public health and commercial laboratories in the region, the cost-effectiveness of each test, and the county’s public health responsibilities.
	IV-2	Based upon the results of the independent consultant's evaluation in Recommendation IV-1, the Metropolitan King County Council should determine whether it wants to: <ul style="list-style-type: none"><li>• maintain a laboratory within the SKCDPH that provides laboratory services at current levels,</li><li>• have the SKCDPH obtain all of its laboratory services from other sources within King County, or</li></ul>



## APPENDIX 12 (Continued)

- maintain a laboratory within the SKCDPH that provides certain (i.e., cost-effective) laboratory services while obtaining the remaining services from other sources within King County (e.g., the state DOH laboratory, the Harborview Medical Center laboratory, and/or commercial laboratories).

Specifically, consideration should be given to transferring clinical laboratory testing functions to the state DOH laboratory and to the Harborview Medical Center laboratory due to their proximity to the SKCDPH laboratory, transferring environmental laboratory testing functions to an environmental laboratory, and transferring low-volume tests to a public or private laboratory where they can be performed more cost-effectively. Any decision to transfer certain tests to a different laboratory from where they are currently performed should give adequate consideration to the need to protect the public's health, as well as the need to minimize the costs to taxpayers. Additionally, any decision to transfer work from the SKCDPH laboratory to another laboratory should be coordinated with the King County Board of Health.

**If the Council decides to maintain the SKCDPH laboratory, SKCDPH management should pursue the following recommendations:**

- IV-3** Develop management systems and controls that will enable it to identify and monitor anomalies in laboratory performance. Such a management control system should also include procedures to accurately track the time required to perform each laboratory test over a period of time to update the elements of the cost-allocation model as necessary. SKCDPH should also use the cost-allocation model on a regular basis to determine when fee adjustments are required.
- IV-4** Make a proactive effort to establish a collaborative relationship with the state DOH laboratory. Specifically, SKCDPH staff should work with the state DOH laboratory staff to identify which laboratory is best suited to perform certain tests, especially those mandated by the WAC to be performed by the state DOH laboratory, develop procedures to share information for disease surveillance and control, and develop a method for providing reciprocal support to each other for tests performed by only one of the laboratories.
- IV-5** Establish a laboratory fee structure that reflects the cost of performing each test, as required by the Code of the King County Board of Health:

## APPENDIX 12 (Continued)

- If the SKCDPH transfers its laboratory testing to another laboratory (see Recommendation IV-2), the fees established should be the same as those charged the SKCDPH by the laboratory performing the tests.
- If SKCDPH performs its own laboratory tests, the SKCDPH should establish fees based on the cost-allocation model developed in Recommendation IV-1.

### IV-6

Establish a budget format that facilitates tracking of all laboratory costs, regardless of whether they are directly test-related or related to other tasks performed by the laboratory.

### IV-7

Coordinate its influenza surveillance efforts with the state DOH to eliminate duplication. This should include requesting sentinel physicians to submit their sample specimens to the state DOH laboratory, which would in turn share the results with the SKCDPH.

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## **REPORTS BY THE KING COUNTY AUDITOR'S OFFICE**

**1980 - 1989**

- 1980** Police Officer Hiring Process (M)  
Accounts Payable System (F)  
Public Works Equipment Rental and Revolving Fund (M/F)  
Financial Management of Forward Thrust Bond Proceeds  
and General Obligation Bond Levy Monies (M/F)
- 1981** Housing Programs Study (S)  
Harborview Medical Center 1977 Construction  
Capital Project Fund (F)  
King County Budget Process (M)  
King County Jail Cash Management Functions (F)  
Emergency & Inpatient Alcoholism Treatment Programs (M)  
King County Park Operations (M)  
1980 Year-End Expenditure Transactions (F)
- 1982** Investment Program Internal Controls (F)  
King County Jail Cash Mgmt. Functions (F)  
Police Staffing, Allocation & Scheduling Audit (M)  
Cash Management of Federal Funds (F)  
King County Park Acquisition and Development Fund,  
1968-1981 (F)  
City of Seattle Park Acquisition and Development Fund,  
1968-1981 (F)  
King County Arterial Highway Development Fund/City of  
Seattle Arterial Development Fund, 1968-1980 (F)  
Dept. of Judicial Administration Internal Controls (F)  
Sheriff's Real Property Sales (M)  
Road Fund Property Holdings (M)  
Emergency Medical Services Division/Funding  
Allocation, Service Delivery, & Financial  
Management Functions (M)  
Public Defense System (F)
- 1983** 1966 Harborview Hospital Construction Fund (F)  
Follow-Up Study, King County Park Operations (S)  
New Jail Construction Contract Administration (F)  
King County Investment Management (F)  
Gambling Tax Collection Process & Internal Controls (F)
- 1984** Solid Waste Staff Utilization (M)  
DPPRC--Systems Development Process (M)  
King County Parking Facilities Study (S)  
Residential Real Prop. Assessment Level & Uniformity (M)  
Roads CIP Budgeting and Scheduling Practices (M)  
Review of King County Accounting Funds (S)  
BALD Permit Fee Collection Process (F)
- 1985** Alcoholism and Substance Abuse Services Division  
Receivables (F)  
Test of Real Property Tax Systems Computer Files (F)  
Budgetary Staffing Standards (M)  
Police Overtime Usage and District Court Scheduling (S)  
Roads CIP Budgeting and Staffing Practices Follow-Up (M)  
Insurance Fund (F)  
King County International Airport (F)  
Equipment Management/Utilization, Maintenance, &  
Replacement Practices (M)
- 1986** Business License Inspection Practices (M)  
County Gasoline Contract (M)  
Parks Maintenance (M)  
Collective Bargaining Agreements (M)  
Finance Office Cashiering (M)  
Risk Management Audit (F)  
H&CD Housing Loans Administration (F)  
Public Defense Program Fund Balance Levels (F)  
King County Reporting of State Excise Tax (F)  
Department of Public Safety, Financial and Personnel  
Administration (S)
- 1987** Harborview Medical Center Master Plan and CIP (M)  
Jail Intake, Transfer, and Releases (M)  
County Airport Historical Funding (F)  
County Airport Operations (M)  
Motor Pool Financing (S)  
Meat Inspection Program (M)
- 1988** Accounts Payable (F)  
Public Health Pooling Fund (S)  
DPH Financing Provisions of 1984 Interlocal Agreement (S)  
District Courts Time-Pay Collections Clerks (S)  
Political Contributions by Charitable Organizations (S)  
Surplus Personal Property (F)  
Solid Waste Cashiering (F)  
Project Management Cost Allocation Procedures (F)  
Court Services (M)  
Natural Resources and Parks Division Rental Houses (S)  
M/WBE Utilization Requirements for Financial Services  
Contracts (S)  
DPH, County Funded Community-Based Health Clinics  
and WIC Program (S)  
Court Detail, Operation and Staffing (M)  
Jail Classification Services (M)  
Restaurant Inspection Program (M)
- 1989** Audit Coverage in King County Government (S)  
Real Property Records (M)  
Solid Waste Accounts Receivable (F)  
Department of Public Health Car Rental (S)  
Records Management (S)  
Department of Public Health, Computer System  
Planning and Development (S)  
Performa '87 (F)  
Parks Capital Improvement Program (M)  
1988 Consultant Selection Processes for Harborview  
Capital Projects (S)

## **REPORTS BY THE KING COUNTY AUDITOR'S OFFICE**

### **1990 - PRESENT**

- 1990** Jail Intake, Transfer and Release – Workload, Operations and Staffing (M)  
Arbitrage Rebate Requirements on Tax-Exempt Bonds (F)  
Conservation Futures (F)  
Real Property Sale, Lease & Exchange Practices (M)  
Youth Services (M)  
Office of Civil Rights & Compliance (M)  
Criminal Investigations & Special Operations (M)  
Business and Occupation and Public Utility Taxes (F)  
Earthquake Preparedness (M)  
District Courts and Warrants Division Revenues (S)  
State Auditor Use of County Facilities and Equipment (S)  
Department of Youth Services Health Program (M)  
Code Enforcement Program Building and Land Development Division (M)  
Assigned Take Home Vehicles and Agency-Paid Parking (S)
- 1991** Carpentry Shop (F)  
County Fuel Station Internal Controls (F)  
County Agency Performance Monitoring Survey (S)  
King County Elections Practices (M)  
King County Purchasing Agency (M)  
Farmlands and Open Space Preservation Program (M)  
King County Detoxification Center (M)  
Dept. of Public Safety Field Training Officer Program (S)
- 1992** King County Office of Emergency Management (S)  
King County Dept. of Stadium Administration Revenues (F)  
Environmental Health Charges to Solid Waste (S)  
Sierra PERMITS Automation System (M)  
King County Office of Human Resource Management (M)  
BALD Financial Guarantee Administration (M)  
Northshore Youth and Family Services (F)  
Dept. of Youth Services Drug & Alcohol Program (M)  
Dept. Adult Detention & Youth Services Overtime (S)  
SEPA Revenues and Accounts Receivable (F)  
Methodology for Funding Legal Services for Non-Current Expense Fund Agencies (S)  
Accounts Payable (F)  
Solid Waste Equipment Replacement Practices (M)
- 1993** Dept. of Development and Environmental Services Assigned Vehicles (M)  
Certificate of Occupancy Process (M)  
Collection of Civil Penalties and Recovery of Abatement Costs (F)  
DDES Field Inspection Function (M)  
Police Overtime for Court Appearances (M)  
Dept. of Youth Services Sex Offender Unit and Special Sex Offender Dispositional Alternative Program (M)  
Office of Open Space Financial Administration (M/F)  
Collection Enforcement Section (S)  
Cellular Phones (S)  
Surface Water Management Service Charges (F)  
Acceptance of Special Waste at County Landfills (S)  
Solid Waste Division Internal Controls for Handling and Storage of Parts, Fuel, and Other Operating Supplies (F)
- 1994** Span of Control (S)  
Community Diversion Program (M)  
Dept. of Development & Environmental Services Reduction-In-Force Process (S)  
Cedar Hills Alcohol Treatment Facility (CHAT) Accounting Procedures and Staffing Levels (M)  
DDES Fire Marshal's Office Fire Investigation Unit (S)  
DDES Accounts Receivable (F)  
Travel Expenses and Credit Card Use (M/F)  
Services & Treatment Alternatives for Developmentally Disabled Offenders Incarcerated in the King County Correctional Facility (M)  
Board of Appeals and Equalization (S)  
Surface Water Management Non-Construction CIP Costs (S)  
Tracking and Reporting on Lawsuits Involving King County (S)  
Jail Overtime Study Follow-Up (S)
- 1995** Dept. of Metropolitan Services Temporary Contract Workers (M)  
King County Purchasing Practices & Supply Contract Prices (M)  
Sewage Facilities Capacity Charge (F)  
Audit Recommendation Implementation (S)  
Dept. of Metropolitan Services Professional Services Contract (M)  
Human Services Dept. Monitoring of Contract Compliance (F)  
Biomedical Waste Regulation Enforcement (S)  
Customer Service Motion Survey (S)  
County Fair Financial & Contract Management (F/M)  
Supported Employment Program (M)
- 1996** Dept. of Metropolitan Services West Point & Renton Wastewater Treatment Facilities  
1990 Code Enforcement Audit Follow-Up (M)  
Dept. of Metropolitan Services Compensatory Time Policies, Procedures, and Practices (S)  
King County Women's Program (M)  
Cultural Programs (Hotel/Motel Tax Distribution) (F/M)  
Investment Management (F)  
King County Road Construction Fund and Capital Improvement Program (M)  
Emerging Infectious Diseases and Laboratory Operations (M)  
DUI Offender Program (M)

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(M) Management Audit  
(F) Financial Audit  
(S) Special Study