

LabAspire 2010 Public Health Laboratory Workforce Survey Report
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2010 PUBLIC HEALTH LABORATORY WORKFORCE EVALUATION BY LABASPIRE: INCREASING HUMAN RESOURCE CAPABILITIES IN CALIFORNIA'S PUBLIC HEALTH LABORATORIES

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Introduction

California's Public Health Laboratory (PHL) system is critical to the public health and safety of the state's rapidly growing population. PHLs safeguard whole communities and provide life-critical services in an era when health threats can appear overnight. For example, this system provides significant surveillance of disease-producing agents in food, air, and water, and among humans and animals. In addition, these laboratories test for ongoing and new threats such as West Nile virus, outbreaks of Salmonella and e-Coli, SARS, avian influenza, and acts of bioterrorism. PHLs also screen most newborns for various genetic and congenital disorders. Local PHLs generate data used by health care providers to diagnose, monitor and treat patients. These data are also used by local public health policy makers to assess community health status, identify health risks, and support public health program activities and decision-making (Wilson, Gradus, and Zimmerman, 2010). Despite their significance to the public's health, safety, and welfare, many of California's PHLs face potential closure because their directors are approaching retirement. In addition, due to increased Federal requirements to direct a PHL, California faces a dire shortage of qualified candidates who meet the eligibility requirements for these highly skilled PHL positions. At every level of the PHL system key workforce shortages of laboratory personnel exist starting at the bench scientist level of Public Health Microbiologist (PHM).

In response to the workforce crisis in California's PHL system, the California Public Health Laboratory Director Training Program, LabAspire was created in October 2006. Based on a statewide collaboration that included the University of California, Davis, University of California, Berkeley, University of California, Los Angeles, the California Association of Public Health Laboratory Directors (CAPHLD), and the California Conference of Local Health Officers (CCLHO), the Program is now entering a new economic environment where greater efficiencies will be needed to reach its original mandate. The LabAspire recruitment and training program continues to be supported

by general revenue funds from the State of California Department of Public Health's Division of Communicable Disease Control.¹

The overall goal of LabAspire is to promote and recruit a qualified California PHL workforce and directorship, serving the 37 PHLs located throughout California. LabAspire's mission is to develop and refine recruitment and training efforts that build public awareness, create student and professional interest, promote contact with appropriate internal and external stakeholders, coordinate communication between academic institutions and PHLs, and disseminate up-to-date Program information. A Baseline PHL Director Workforce Survey was conducted spring 2007 to measure workforce and recruitment needs at the start of LabAspire. This earlier survey was then followed by the 2010 PHL Director Workforce Survey in order to assess selected workforce variables important to the assessment of the LabAspire program as well as to conduct a second workforce assessment of California's PHLs during the last three years.

Data results from this 2010 survey were based from responses given by 33 California PHL Directors using an online survey method administered through Survey Monkey. The survey gathered detailed information from these Directors regarding staffing, recruitment, retention, and training needs as they relate to operating PHLs under state and federal standards.

LabAspire's survey summary statistics include information on the current and future workforce needs and the capacity of California's PHLs to: 1) support inservice education and occupational advancement for employees; 2) recruit and attract new applicants from appropriate fields of microbiology; 3) update staff with information concerning new state and federal requirements; 4) and support the capacity of PHL Directors and their staff to address their needs to meet critical laboratory operations.

Evaluation Methods

The sample design was based on a collection of data from thirty-three out of a total universe of thirty-seven local PHLs in California. Prior to administering the survey, the 2010 survey was approved by the UC Davis Institutional Review Board (Human Subjects) in Winter 2010. The data were collected using Survey Monkey, an on-line survey program that provided easy access to the materials and confidential collection of survey data.

The 2010 LabAspire PHL Director Workforce Survey was used as a follow-up to the Baseline PHL Director Workforce Survey that was conducted in 2007. The LabAspire 2010 PHL Director Workforce Survey collected demographic and regional information, professional networking and partnership information, and situational data, which

¹ During the first phase of the project supplemental funds to enhance the recruitment of a more diverse applicant pool for California's PHLs was supported by The California Wellness Foundation. These funds will end at the close of the fiscal year 2011.

included external and internal recruitment, employment, training and communication practices. The survey questions included: (1) forced choice responses (yes/no); (2) specific counts on categorical questions; (3) Likert scale questions; and (4) open-ended questions to collect qualitative information from the PHL directors. The instrument was modified slightly from the 2007 Baseline PHL Director Workforce Survey. A copy of the 2010 survey is presented in Appendix I. The survey was posted on-line (at SurveyMonkey.com) during the period May 1, 2010 – June 30, 2010.

Thirty-three PHL directors (86%) responded to the 2010 survey.

Survey Monkey was formatted to address more than 45 questions under the following seven general categories:

- (1) Service Area & Geographic Region,
- (2) Workforce Demographics,
- (3) Profiles of Staffing, Current Capacities, Intern Positions, & Needs,
- (4) Retention & Recruitment Strategies,
- (5) Teaching, Education & Professional Development,
- (6) Communication Capacities & Protocols, and
- (7) Professional Networking & Partnerships.

Data gathered from PHL directors were downloaded into an Excel file directly from the Survey Monkey website and then imported into a statistical database. The statistical package used to analyze and summarize the data was SPSS. All responses were confidential and only summary statistics were reported to ensure confidentiality. Descriptive statistics (frequency distributions and mean responses) and Pearson's Correlation Coefficients were used to analyze data.

Findings

1. Service Area

The following findings provide a comprehensive descriptive analysis of the data collected from California's public health lab directors in 2010. These data include empirical evidence of current workforce demographics and current and future workforce shortages; director perceptions of the underlying causes for these shortages; their knowledge of support systems; and the capacity of these systems (both internal and external to their organization) to support workforce needs. In addition, PHL directors provided an assessment of their internal and external communication capacity to meet their needs and the needs of the broader community and the state.

Thirty-three laboratories out of thirty-seven PHLs in California responded to the survey. The largest region responding was the Bay Area, followed by the Southern California Coastal and Northern Central Valley. Table 1 shows the number of laboratories reporting from each of the eight regions. The average estimated service area square

miles reported by 23 directors responding to this question was 10,678.24 with a minimum of 50 square miles and a maximum of 14,000 square miles.

Table 1: Number of County Public Health Laboratories Completing the Survey from each Geographical Area in California.

9	Bay Area (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties)
4	Central Coast (Monterey, San Benito, San Luis Obispo, Santa Barbara, and Santa Cruz counties)
5	Northern Central Valley (Butte, Colusa, Glenn, Placer, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba counties)
1	Mountain North (Lassen, Modoc, Nevada, Plumas, Sierra, Siskiyou, and Trinity counties)
3	Southern Central Valley (Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties)
1	Mountain South (Alpine, Amador, Calaveras, El Dorado, Inyo, Mariposa, Mono, and Tuolumne counties)
7	Southern California Coastal (Los Angeles, Orange, San Diego, and Ventura counties)
3	Southern California Inland (Imperial, Riverside, and San Bernardino counties)
33	Total

2. California Ethnic and Racial Background of Staff Currently Working in California

Staffing Demographics

Ethnic and racial backgrounds of laboratory employees, provided by PHL directors and categorized by position classification, are reported on Table 2. At the time of this study, most staff working in PHLs in California were identified as White (131), followed by Asian (28), Latino or Hispanic (18), and Pacific Islander or Hawaiian (15), African American (3), and no Native American or Alaskan were represented. The total number of staff reported in this section was 214.

Table 2: Ethnic and Racial Background of Public Health Laboratory Staff Currently Working in California.

POSITION	# Asian	# African American	# Latino or Hispanic	# Native American Alaskan	# White	# Pacific Islander Hawaiian	# Other
Laboratory Director	2	1	1		22		1
Assistant Lab Director (trainee)					2		
Supervising Microbiologist III	1	0	2		20	1	
Supervisor			1		4	1	
Microbiologist II	11	1	8		49	8	3
Microbiologist I	14	1	5		25	4	2
Clinical Scientists					2		
Other: Public Health Chemist					1	1	
Other: Lab Manager							2
Other: Lab Tech/assistant			1		3		2
Other: Water Quality Specialist					1		
Clerical					1		9
Driver					1		
Total Staff	28	3	18	0	131	15	19

3. Lab Workforce: Staff, Current & Projected Needs

Staffing Needs

Table 3 provides data reported by directors regarding their current staff numbers, current staffing needs (at the time of the survey, May – June 2010), and anticipated staffing needs for replacements and/or additions to staff in the next three years. These data are reported as Full Time Equivalents (FTEs) for all positions shown. Actual positions may have different titles at some local PHLs. In addition, directors were asked

to report the average age of employees in each job category to reveal job categories that may be impacted by near future retirements.

Table 3: Current number of staff by job title, current staffing needs and anticipated staffing needs within the next three years.

Job Title	Counts Current Staff (FTE)	Counts Current Need (FTE)	Counts Need in 3 Years (FTE)	Average Age of Employees
Director	23.66	10	9	59.7 55-70
Laboratory Manager	4	1	1	55 50-60
Assistant Director	2	3	6	0
Supervisor Microbiologist III	27	7	10	54 30-65
Supervisor Microbiologist II	1	0	2	40
Supervisor I	6	5	6	52.5 45-60
Microbiologist II	81	15	22	44.8 30-55
Microbiologist I	50	11	24	35.5 25-50
Clinical Scientist (list specialty) _____ _____	2	2	5	60
Laboratory Assistant	82	14	21	43.8 30-60
Other Job Title (specify) PHM trainee, Clerical, Specialists, Lab Techs, Chemist	24	5	9	40
Other Job Title (specify) BT Coordinator, drivers	3	0	2	
Total	305.7	73	117	

A reported total of 305.66 PHL Staff were employed during the time of this study. PHL directors proportionately reflected the greatest expressed need, based on current FTE counts and future needs. (current count = 23.7 FTE, current need = 10 FTE, three year future need = 9 FTE). The greatest current staffing need reported by directors was in

the area of PHM II (15 FTE at time of reporting), followed closely by Laboratory Tech Assistant (14 FTE) and PHM I (11 FTE). Need projected for the next three years included: PHM I (24 FTE), PHM II (22 FTE), and Laboratory Tech Assistants (21 FTE).

Sixteen directors responded to the question regarding their current age. Of those responding, the director ages ranged from 50 to 70, with an average of 59.2 years, (Standard Deviation 5.47).

PHL directors reported that staff shortages, especially among certified microbiologists and directors, are anticipated in most regions of California and in most PHLs across the state. Yet as observed in Table 4, the distribution of employment needs is not equal across regions. Within the next three years, all regions of California except the Mountain North and Coastal North will need to fill a laboratory director position. Regions of California with the greatest need for workforce recruitment, currently and in the next three years, are in the Bay Area, Southern California Coastal, and Northern Central Valley. Workforce shortages also existed in the South Central Valley, Southern California Inland, and Mountain South. Currently and within the next three years the Bay Area and North Central Valley have the greatest need for Laboratory Directors.

Table 4: Current and future laboratory director, microbiologist and total (all positions) workforce needs by region in California.

Region	Current Need			Need in 3 years			Total
	Director	Micro	All Staff	Director	Micro	Other Staff	
Bay Area	2	12	8	5	18	14	59
Central Coast	1	0	4	1	1	2	9
Coastal North	0	1	0	0	1	0	0
Mountain North	0	0	0	0	0	0	0
Mountain South	1	0	0	0	1	0	2
N. Central Valley	4	15	1	0	14	6	40
Southern CA Coastal	1	7	9	2	20	13	52
Southern CA Inland	1	0	1	0	3	5	10
S. Central Valley	0	3	2	1	6	2	14
Total	10	38	25	9	63	42	186

Staff Years of Service

Directors were asked to list how many employees in specific job categories left their laboratory after being employed for less than one year. From this response, 7 directors,

4 PHMs, 4 Laboratory assistants, 1 Assistant Director, and 1 supervisor PHM for a total of 16 positions statewide left their positions within one year. Examining the individual director survey data the aggregate result of 7 laboratory directors leaving within less than a year can be explained by high turnover within three of the surveyed PHLs. Thus, the turnover of 7 PHL directors is based on the following data: two PHLs reported having two directors employed less than a year and one PHL reported having three directors employed less than a year.

Table 5. How many staff members in the following job categories have been employed:

	Less Than 1 Year	1-5 Years	6-10 Years	11-15 Years	> 15 Years
Director	1	11	6	1	11
Laboratory Manager	0	0	0	0	4
Assistant Director	1	1	1	0	0
Supervisor Microbiologist III	1	5	2	1	15
Supervisor Microbiologist II	0	2	1	1	3
Supervisor I	1	2	1	2	1
Microbiologist II	1	25	24	4	26
Microbiologist I	5	29	9	4	11
Clinical Scientist (list specialty) _____	0	0	5	1	3
Laboratory Assistant	5	24	11	16	30
Other Job Title (specify) PH Chemist, Water Quality Specialist, Lab Techs, Drivers, and Clerical	2	4	5	1	9
Total	17	103	65	31	113

The mean number of years that directors reported serving in their PHL was 12.74 years, with a minimum of 1 year and a maximum of 40 years (SD = 11.23). To determine how long staff had been retained in their current laboratories, the researchers asked directors to list staff years-of-service for each job category (Table 5). Only 1 director reported a term of less than one year; 10 directors reported working in their labs 1-5 years; 6 reported 6-10 years; 1 director has been in his laboratory 11-15 years; and 11 directors have served over 15 years. Directors currently serving in PHLs in California tended to be in three major groups: (1) those serving 5 years or less (11 directors), those serving 6 – 10 years (6 directors) and those serving over 15 years (11 directors). The smallest years of employment category reported by directors was the “Less than 1

year” category. The largest years of employment category of staff was in the “> 15 years” category (113 staff), with 37 staff in the microbiologist job category, followed by 30 laboratory assistants and 11 directors. Forty-four percent of the workforce reported by directors had been working in their laboratories for eleven or more years. In addition, 64% of the workforce had been working in their laboratories for 6 or more years. Only 36% of the staff reported in this section had been working in their PHLs less than 5-years.

PHL job categories with the greatest number of employees working more than 15 years included: Director, Supervisor PHM, PHM II, and Laboratory Assistant. The greatest staff longevity over all time categories appeared to be in the PHM I, PHM II and Supervisor PHM positions

Overtime and Hiring Practices

Directors were asked if their PHL paid overtime, and if so, how common was it for staff to work overtime. Thirteen directors responded that their county had policies allowing for overtime, but 15 directors responded that overtime was limited or needed to be previously approved; 8 directors reported that their PHL granted “comp time” rather than paid overtime. Six directors reported that overtime was not allowed, while 4 directors reported that overtime was allowed on an emergency basis only. When asked in an open-ended question: “How common is it for staff to work overtime at your laboratory?”

- 1 director reported that staff worked overtime daily,
- 1 director reported that staff worked overtime when the PHL is understaffed, and
- 1 director reported that staff worked overtime depending on the season of the year.
- 2 directors reported that staff worked overtime every month,
- 5 directors reported that staff worked overtime every week,
- 5 directors reported that staff worked overtime every weekend,
- 6 directors reported that staff rarely worked overtime,

PHL directors were asked if their laboratory hired foreign citizens on work visas; 22 PHLs reported “No” and 6 laboratories responded “Yes”. Of those PHLs reporting “Yes”, 3 were in the Southern California Coastal Region which included Los Angeles, Orange, San Diego, and Ventura Counties; 1 PHL in the Bay Area, 1 in the Central Coast Region and 1 in the Northern Central Valley. The remaining PHLs, including those in the Mountain South, Southern Inland, and Southern Central Valley reported “No”. Refer to Table 1 for full breakdown of each geographic area.

Training & Internships

Directors reported a total of 26 intern positions available in the state in 2010; of these 26 positions, 17 were reported as paid intern positions.

Directors were asked via an open-ended question to describe what sort of internship programs their PHL sponsored:

- 2 PHLs reported having paid positions,
- 2 PHLs reported internship programs for school credit,
- 2 PHLs reported they have Public Health Nursing interns,
- 5 PHLs reported having unpaid intern positions.
- 6 PHLs reported they have grant-funded interns,
- 9 PHLs reported they had PHM certification training programs, and
- 9 PHLs reported they currently had no internship programs,

4. Outreach, Recruitment and Retention Strategies

Inadequate Staffing Issues:

Directors were asked to respond to a list of statements by using a 5-point Likert Scale to determine the most important factors contributing to inadequate staffing, with a value of 1 equaling “Strongly Disagree”, 3 equaling “Unsure” and 5 equaling “Strongly Agree”. These data are presented on Table 6. Directors were unsure if low salaries (Mean = 3.08), lack of qualified applicants (Mean = 2.96), and/or inadequate pipeline between University of California/California State University systems and PHLs (Mean = 2.75) affected inadequate staffing. Directors disagreed that lack of recruitment resources, fringe benefits and/or poor retention/high turnover were factors behind inadequate staffing. Other reasons for inadequate staffing provided by directors though an open-ended option included: budget restrictions or cuts (10 responding), hiring freeze, elimination of positions, no re-classification policies (3), and Medical or Maternity leave (2).

Table 6. Means and Frequencies of Likert Scale Ratings of Factors that may be behind inadequate staffing.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Mean	SD
Lack of resources to conduct recruitment, and retention	6	10	4	5	1	2.42	1.17
Low salary	2	9	3	7	4	3.08	1.28
Inadequate fringe benefits	6	13	5	0	1	2.08	.91
Lack of qualified applicants	3	10	1	9	3	2.96	1.31
Inadequate pipeline between UC/CSU and public health laboratories	4	5	9	4	1	2.75	1.05
Poor retention/high turnover	5	13	5	0	2	2.24	1.06

However, when directors were asked, by way of an open-ended question, what they thought were the best strategies for retaining staff: 26 directors responded good salaries and benefits, and only nine directors reported good, stable, challenging, and rewarding work environment. Seven directors said educational/professional growth

and advancement opportunities. Additional responses to this open-ended question are presented on Table 7.

Table 7. Open-ended responses by PHL Directors for best strategies for retaining staff.

Number	Response
26	Good Salaries and Benefits
10	Good, stable, challenging and rewarding work environment
7	Educational/professional growth and advancement opportunities
3	Job Security
3	Job Recognition
2	Hire staff with family and ties to local community.
1	County to support more positions in lab
1	Engage in cutting edge technology
1	Train our own and they stay.
1	Flexible 4/10 work schedule
1	No problems with retention.
1	Don't Know

Reasons Staff Leave within the First Year of Employment

Directors were asked to rate the main reasons that they thought staff left within the first year of employment at their laboratory. Using a 5-point Likert Scale with 1 equaling “Very Infrequently”, 3 equaling “Unsure” and 5 equaling “Very Often”. Directors reported that they were unsure if staff left for professional advancement (Mean 3.40), for financial reasons (Mean 2.57), Personal/family (Mean = 2.67), and Location (Mean = 2.62). They reported that staff were infrequently terminated due to Layoff (Mean = 2.29). These data are presented on Table 8.

Table 8. Main reasons employees leave within a year of employment.

	Very Infrequently	Infrequently	Unsure	Often	Very Often	Mean	SD
Financial reasons due to salary	4	4	2	2	2	2.57	1.45
Professional advancement	2	1	2	9	1	3.40	1.18
Personal/family	4	2	1	4	1	2.67	1.50
Location	4	3	2	2	2	2.62	1.50
Layoff	5	3	3	3	0	2.29	1.2

Other reasons why employees leave within a year of employment provided by directors by way of an open-ended question included: “Didn’t like the job or work environment”,

“new position at another laboratory”, and “our laboratory has not been rehiring and has lost 9 employees this budget year”. Four directors reported not having any employees leave within the first year of employment.

Recruitment and Retention of Staff

Importance of Recruitment

Using a 5-point Likert Scale with a value of 1 equaling “Strongly Disagree”, 3 equaling “Unsure”, and 5 equaling “Strongly Agree”, directors strongly agreed that they believed recruitment was important to develop a pipeline of qualified applicants (Mean = 4.52) and that outreach was important to ensure they had competent staff (Mean = 4.63). Directors agreed that recruitment was important to ensure adequate staffing in the long term (Mean = 4.42) and that recruitment was important to attract a diverse pool of applicants (Mean = 4.41). However one director disagreed or was unsure with all of these statements and reported via an open-ended comment that his PHL had little turnover so there was no need for a pipeline. Counts and means for these data are presented on Table 9.

Table 9. Director ratings of the importance of recruitment.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Mean	SD
In order to develop a pipeline of qualified applicants	0	1	0	10	16	4.52	.700
To ensure adequate staffing in the long term	0	1	0	12	13	4.42	.703
To attract a diverse pool of applicants	1	0	0	12	14	4.41	.844
To ensure we have competent staff	0	0	1	8	18	4.63	.565
Other: We have little turnover so there is no need for a pipeline.							

Tools, Supplies and Sources for Recruitment

Using a 5-point Likert Scale, with a value of 1 equaling “Strongly Disagree”, 3 equaling “Unsure” and 5 equaling “Strongly Agree”, directors were asked to rate 9 statements regarding their PHL’s recruitment efforts. Directors reported that they were unsure that their laboratories had adequate tools for recruitment (Mean = 3.21), with only 12 directors out of 27 agreeing with this statement. Directors were unsure that their laboratories had adequate funding for recruitment (Mean = 2.63) with only 8 directors out of 25 agreeing with the statement. Only 10 directors agreed that they had adequate staff to support recruitment efforts (Mean = 2.76). Looking at these data more closely using Pearson Correlation, no relationships were observed between the number of employees in the PHL compared with director responses to the statements regarding:

adequate tool for recruitment ($r = 2.72$, $p = .209$), adequate funding for recruitment ($r = .227$, $p = .299$), and available staff support for recruitment ($r = .113$, $p = .598$).

In total, directors were unsure that they used social networking among other laboratory directors (Mean 3.21) and/or professional organizations to recruit staff (Mean = 3.11). Directors reported they disagreed that their PHLs relied primarily on conferences (Mean = 2.48), Newspapers (Mean = 2.36), and/or internal recruitment (Mean = 2.26) as a means to recruit staff. Eight directors reported they did not engage in recruitment at all, and one director was unsure. These data are reported in Table 10.

Table 10. Statements regarding tools, supplies and sources for staff recruitment.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Mean	SD
I feel that our laboratory has adequate tools for recruitment.	0	8	8	10	2	3.21	.957
I feel that our laboratory has adequate funding for recruitment.	4	10	5	8	0	2.63	1.08
I feel that our laboratory has staff to support recruitment efforts.	4	10	5	9	1	2.76	1.15
For recruitment, our laboratory relies primarily on newspapers.	7	10	6	4	1	2.36	1.13
For recruitment, our laboratory relies primarily on professional organizations.	2	7	7	8	3	3.11	1.15
For recruitment, our laboratory relies primarily on conferences.	3	14	6	2	2	2.48	1.05
For recruitment, our laboratory relies primarily on social networking among laboratory directors.	2	7	5	11	3	3.21	1.16
For recruitment, our laboratory relies primarily on internal recruitment.	4	16	3	4	0	2.26	.90
Our laboratory does not engage in recruitment for staff.	8	11	1	4	4	2.46	1.43

Best Strategies for Increasing the Applicant Pool

Directors were asked by way of an open-ended question what they thought were the best strategies for increasing the PHL applicant pool. Most directors (7) responded that “Outreach and recruitment to students” was an important strategy for increasing the applicant pool, 3 directors believed “Outreach to the public” was important, 3 directors reported that the LabAspire Model was important to increase the applicant pool. Additional responses are presented on Table 11.

Table 11. Director responses for best strategies for increasing PHL the applicant pool.

Number	Response to Open-ended Question
7	Outreach and Recruitment to Students
3	Educate the public about the role of Public Health and Public Health Microbiologists (PHMs).
3	Use LabAspire Model to increase pool and train qualified personnel.
2	Train Clinical Laboratory Scientists and allied disciplines.
2	Unsure
2	Increase in training/training funds has increased applicant pool for PHMs.
2	More funding for Public Health Laboratories.
1	Develop a more robust career ladder with diverse paths, with ability for PHMs to sabbatical in other Public Health Labs (PHLs) for education/training.
1	Increased staff upward mobility.
1	Make it easier for PHL directors to apply from other states.
1	Good compensation and benefits and location of the lab.
1	Networking with PHLs and recent PHM trainees.
1	Advertise
1	Word of Mouth
1	In our area, PHMs move to Kaiser where they are paid more

Outreach Activities PHLs Will Support

Directors were asked by way of 5-point Likert Scale statements what kinds of outreach activities their PHL would support: with a value of 1 equaling “Not Support”, 3 equaling “Unsure” and 5 equaling “Support”. Fifteen directors indicated they would “support” organized public tours, 13 indicated mentorship programs for college students, and 12 reported internship programs. One director reported that he supported high school job shadowing. These data are provided in Means and counts on Table 12.

Table 12. Recruitment Activities Public Health Laboratory Directors will support.

	Not Support	Might Not Support	Unsure	Might Support	Support	Mean	SD
Organized public tours	1	2	1	9	15	4.22	1.09
Mentorship programs for college students	1	3	0	12	13	4.21	.92
Internships	1	0	4	12	12	4.14	.93
Other: High school job shadowing						5	0

On-line Advertising

By way of an open-ended question, Directors were also asked how they used online services to advertise vacant positions: 11 directors said they used their county website; 6 used the California Association of Public Health Laboratory Directors (CAPHLD) website; 3 used commercial sites such as monster.com and Craig’s List, 2 used the LabAspire Website, and 1 used professional association sites. Seven directors said they did not use online services or were unsure. Eighteen directors said “Yes” that they would be interested in advertising vacancies online to interested applicants.

Networks with University or California and California State Universities

When asked how their laboratory taps into the educational pipeline of California State University (CSU) and University of California (UC) for recruitment, 3 directors said they have close working relationships with UC, 3 reported they provide internships for college students, 2 make visits to campus to attend health and job fairs, 2 visit college campuses via the LabAspire program, 3 advertise job vacancies at college campuses, and over 1 in 3 PHL Directors said they did not have contacts to recruit from these educational systems.

5. Teaching, Education and Professional Development

Importance of Teaching, Education and Professional Development

Directors were asked to respond to a 5-point Likert Scale with regards to factors related to teaching, education and professional development: with a value of 1 equaling “Strongly Disagree”, 3 equaling “Unsure” and 5 equaling “Strongly Agree”. The overwhelming majority of directors believed that teaching, education and professional development were important to: maintain or improve retention of qualified staff (mean = 4.28); ensure adequate staffing in the long run (Mean = 4.24); improve communication and coordinate between different public health agencies (mean = 4.07); to ensure competent staff (Mean = 4.31); be aware of the latest scientific advances in the field (Mean = 4.31); and to be aware of the latest state reporting requirements (Mean = 4.14). These data are presented on Table 13.

Table 13: Director ratings of the importance of teaching, education, and professional development for staff.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Mean	SD
To maintain or improve retention of qualified staff	1	0	1	15	12	4.28	.841
To ensure adequate staffing in the long term	1	0	1	16	11	4.24	.830
To improve communication/ coordination public health agencies	1	0	3	17	8	4.07	.842
To ensure we have competent staff	1	0	1	14	13	4.31	.850
To be aware of the latest scientific advances in the field	1	0	2	12	14	4.31	.891
To be aware of the latest state reporting requirements	0	1	2	17	8	4.14	.705
Other (Continuing Education)					1	5	0

Capabilities for Training

Table 14: PHL capabilities to meet required education and professional development.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Mean	SD
I feel that our laboratory has adequate equipment and supplies to meet requirements for education and professional development.		7	4	17	1	3.65	.907
I feel that our laboratory has adequate funding to meet requirements for education and professional development.	1	18	4	6		2.52	.871
I feel that our laboratory has access to adequate support staff to coordinate activities for education and professional development.	3	12	3	10	5	2.79	1.146

Directors were asked via a 5-point Likert Scale questions about the training capacity of their PHL: with a value of 1 equaling “Strongly Disagree”, 3 equaling “Unsure” and 5

equaling “Strongly Agree”. When asked if they believe that their laboratory had adequate equipment and supplies to meet requirements for education and professional development, 18 directors agreed (Mean = 3.65). However, they did not believe that they had adequate funding to meet these requirements, with 19 directors disagreeing with this item (Mean = 2.52). When asked if they had adequate support staff to coordinate educational or professional development, laboratory directors were split between agree (15) and disagree (15), and 3 directors reporting they were unsure (Mean = 2.79). These data are presented on Table 14.

Capacity to Train for PHM Certification

By way of a “Yes” or “No” question, directors were asked if their PHL trained microbiologists for California PHM Certification. Eighteen directors responded: “Yes”, 10 responded “No” and one director reported occasionally as needed. Eighteen PHLs reported they trained 1 to 5 microbiologists for PHM Certification each year, with an overall mean of 1.25 trainees per PHL.

Directors were then asked to report the specific components of the PHM curriculum they offered for PHM Certification. Of those who responded to the question, only 2 directors reported that their PHL had the capacity to teach all components of PHM certification, but one of these respondents reported working closely with the state laboratory for various modules for training. The remaining laboratory directors (18) stated that they must send their trainees to other laboratories for training they themselves do not offer. The main laboratory providing needed training was the CDPH State Laboratory in Richmond.

Of those laboratories engaged in training, 5 reported they taught all components of the curriculum except virology. Other directors reported a variety of curricula offered, including: parasitology, mycology, mycobacteriology, water and food microbiology, syphilis, serology, TB, bacteriology molecular techniques, parasitology, rabies, enteric bacteriology, molecular diagnostic, safety and administration.

Seventeen directors out of 22 reported that their laboratory does support leadership education opportunities for assistant laboratory director positions. In an open-ended response, 7 directors indicated that they would accept an assistant director for training if funding were available.

Cultural Competency Educational Opportunities

Directors were asked by way of an open-ended question if staff received education in cultural competency to effectively communicate with and serve diverse populations. Only six directors reported that their staff received any type of training related to the question. Of these, two PHL directors indicated they had undefined training, one indicated the staff receive yearly training through the county, one indicated that all supervisory staff were required to take a cultural competency course offered by the county. One director indicated they were required to take county sponsored courses every two years. A final director reported that staff must have mandatory training, with a refresher every two years. Nine directors reported that staff received no diversity training in their PHL.

7. Communication Capacities and Protocols

Types of Communication

Directors were asked what they thought were the most effective communication tools used to communicate with other laboratories or other directors for education and professional development purposes. Responses included the following:

- 21 (75%) directors agreed E-mail,
- 19 (66%) directors agreed video conferencing
- 17 (59%) directors agreed web-based system,
- 14 (45%) directors agreed phone,
- 10 (34%) directors agreed mail, and
- 6 ((21%) directors agreed Fax

Directors were asked to evaluate the status of their laboratory’s communication systems and information technology using a 5-point Likert Scale: with a value of 1 equaling “Very Ineffective”, 3 equaling “Unsure”, and 5 equaling “Very Effective”. Seventeen directors rated their communication system “Effective” or “Very Effective”, 8 directors rated their system “Ineffective”, and 3 directors responded they were “Unsure”.

Directors were asked if there was a common system or tool that they would prefer to use to train staff: 14 directors reported “Yes” and 12 reported “No”. By way of an open-ended question, directors were asked which communication system they would prefer to use to train staff. Eleven directors reported web-based systems or webinars, and 2 directors reported teleconference or videophones.

7. Public Health Laboratory Partnerships with Other Agencies

Table 15: Director ratings of coordination that takes place between other agencies to cultivate professional development among staff.

	Very Ineffective	Ineffective	Unsure	Effective	Very Effective	Mean	SD
Other laboratory directors and staff regionally.	0	8	3	14	3	3.53	1.05
Local, state, and national public health agencies.	0	5	10	12	1	3.32	.814
Nonprofit public health organizations.	1	8	13	4	2	2.93	.990
Private sector public health organizations.	0	10	15	2	1	2.79	.797
Other public sector institutions.	0	8	12	3	0	2.78	.751

Using a 5-point Likert Scale, where a score of 5 indicates “Very Effective”, a score of 3 = “Unsure”, and a score of 1 indicates “Very Ineffective”, directors were asked to rate the coordination that takes place between their laboratory and other agencies. Most directors reported that they had effective coordination with other PHLs (17), however, 8 directors reported a score of 2 or ineffective in this category (Mean = 3.53). Most directors (15) indicated that they were unsure or viewed as ineffective the level of coordination with local, state and national public health agencies (Mean = 3.32). Directors were unsure of their coordination with non-profit health organizations (Mean = 2.93), and unsure of their cooperation with the private sector health organizations (Mean = 2.79), and other public sector institutions (Mean = 2.78). These data are presented on Table 15.

Types of partnerships

Directors were asked what sorts of partnerships their laboratory had in the areas of information dissemination, recruitment, scientific information, government policies or regulations and other important partnerships. Overall, directors reported that they use the California Association of Public Health Laboratory Directors (CAPHLD) organization and the Association of Public Health Laboratories (APHL) for “Information Dissemination.” Directors reported using CAPHLD, LabAspire, and “Other Lab Directors” for “Recruitment”. Directors reported a variety of sources for “Scientific Information”; seven directors listed professional meetings, conferences, and teleconferences. Directors specifically listed APHL, Centers for Disease Control and Prevention (CDC), California Department of Public Health (CDPH), and American Society of Microbiology (ASM) as sources of Scientific Information. Two Directors reported “None”. Most directors reported that they used APHL for “Government Policies and Regulations” followed by CAPHLD, CDC and CDPH. These data and “Other Important Partnerships” are presented on Table 16.

Table 16: Types of partnerships in which PHLs participate

Information dissemination	#	Responses
Information dissemination	6	California Association of Public Health Lab. Directors (CAPHLD)
	4	None
	3	Association of Public Health Laboratories (APHL)
	2 Each	Hospital, Teleconference, LabAspire, California Department of Public Health
	3	State and Local Laboratories
1 Each	Professional meetings, California Conference of Local Health Officers (CCLHO), California Tuberculosis Controllers Assoc. (CTCA), American Society of Microbiology (ASM)	
Recruitment	8	California Association of Public Health Laboratory Directors
	5	LabAspire
	4 Each	Lab Directors and None
	3	City or County Human Resources
	2 Each	State Laboratory Field Services, Email or Direct Mail
1	Association of Public Health Laboratories (APHL)	
Scientific information	7	Professional meeting/Conferences/ teleconferences, APHL
	4	Centers for Disease Control and Prevention (CDC), CDPH
	3	Literature/Journals
	2	Training, ASM, Other organizations
	1	None
	1	College of American Pathologists (CAP), Vendors, American Association of Bioanalysis,
	1	American Association of Bioanalysts (AAB)
	1	Science Web sites
	1	American Public Health Association (APHA)
	1	National public health agencies
Government policies or regulations	7	APHL Teleconferences
	6	Professional associations, and CAPHLD
	5	Centers for Disease Control and Prevention (CDC)
	4	CDPH
	3	State trainings
	2	Laboratory Response Network
	1 Each	Web sites, Legislative liaison, National public health agencies, , County Health Executives Associate of California (CHEAC), Clinical Laboratory Improvement Amendments (CLIA)
Other important partnerships	3 Each	APHL, State Lab
	2 Each	Local Labs, None
	1	CAPHLD, ASM, CDC, Joint Regional Intelligence Center (JRIC), CCLHO, Respiratory Lab Network, Laboratory Response Network

Conclusions and Discussion

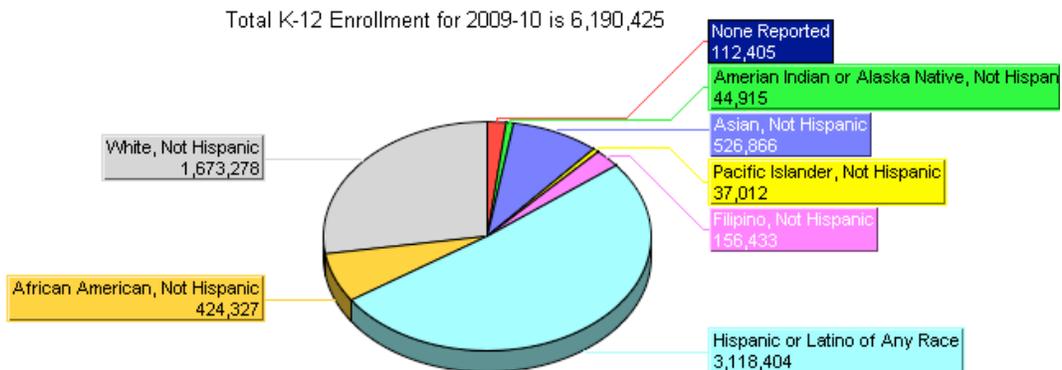
1. Service Area and Generalizability of Findings

Thirty-three out of thirty-seven California PHLs were represented in this 2010 study, resulting in an approximate 90% response rate from the PHL directors responsible for these laboratories. The sample also included representation from all geographical areas in California, including urban, suburban, and rural areas. From this sample description, we can conclude that the collected survey data reflect a significant representation of the perceptions of California's PHL directors and that reasonable generalizations and inferences derived from these data may be made about the current PHL workforce issues facing the state of California.

2. California Ethnic and Racial Background of Staff Currently Working in California

California PHLs continue to constitute a predominantly white non-Hispanic workforce. White non-Hispanic workers outnumbered Asian PHL workers almost 5 to 1, Latino or Hispanic PHL workers over 7 to 1, and Pacific Islander or Hawaiian PHL workers by almost 9 to 1. According to the 2006–2008 American Community Survey from the US Census Bureau (2006), California's population racial and ancestral makeup is approximately: 42.3% White (non-Hispanic), 36.6% Hispanic or Latino, 12.5% Asian, 6.7% Black or African American, 2.6% Multiracial, and 1.2% Native American or Alaska Native. The total K-12 enrollment for the 2009-2010 school year in California was 6,190,425. Actual numbers for each racial and ethnic group are presented on Figure 1.

Figure 1.



K – 12 data from the school year 2009-2010 were compared with 2006-2007 data collected at the start of the LabAspire program on Table 17. These data show that the largest growing populations in California are Hispanic/Latino and Asian American. To ensure a Public Health professional workforce that reflects the rich diversity of California, the LabAspire Program must continue to actively recruit qualified students and candidates from these subpopulations at all levels of the training program. Moreover, research is needed to identify the primary barriers to building a diverse PHL workforce at the higher management / director levels and develop strategies to

overcome those barriers (CDE, Educational Demographics Unit prepared 6/15/2007 and 2/14/2011).

Table 17. California K-12 Student Demographics

Student Ethnicity and Racial Background	Percent of Total Enrollment 2006-2007	Percent of Total Enrollment 2009-2010
Hispanic or Latino of Any Race	48.14%	50.37%
American Indian or Alaska Native	.77%	0.73%
Asian	8.12%	8.51%
Pacific Islander	.62%	0.60%
Filipino, Not Hispanic	2.63%	2.53%
African American	7.59%	6.85%
White	29.41%	27.03%
Two or More Races	Not available	1.56%
None Reported	2.72%	1.82%
Total	6,286,952	6,190,425

3. Laboratory Workforce: Staff, Current and Projected Needs

Survey responses indicated that at the time of this study, 10 directors were needed full-time in California, and an additional 9 directors would be needed in the next three years. These findings support the need for continued general recruitment and training of qualified PHL directors in California. Furthermore, without targeted and immediate recruitment and continued training efforts at the higher level post-doctoral/ assistant director stages, the shortage of qualified individuals to fulfill director positions will become more severe in the next three years.

At the time of this study, California PHL directors reported that their laboratories had the capacity to train 3 additional assistant laboratory directors. Another 6 assistant laboratory director positions were reported as needed within the next three years. The LabAspire Program funded 1 assistant laboratory director at the time of this study; these findings suggest that additional assistant laboratory director training positions would continue to be available if funding could be secured to support these positions.

Regions of California with the greatest need for workforce recruitment currently and in the next three years exist in the Bay Area, Southern California Coastal, and Northern Central Valley. The North Central Valley and Bay Area share the highest current need for laboratory directors. Within the next three years the greatest need for laboratory directors will be in the Bay Area, followed by the Southern California Coastal. Recruitment and training efforts should give priority to those regions of greatest need, with emphasis on recruiting new staff, training and retention. Long-term goals for recruitment to doctoral programs should focus on undergraduates and graduate students from these areas, along with PHL scientific staff in the regions of need, who want and are able to return to school to complete a doctoral degree. Individuals,

especially in remote, rural regions, are more likely to fulfill and stay in career positions if they are returning home or have family ties to communities when compared with external recruits from other regions or states (Daniels, et. a. 2007).

The numbers of anticipated vacancies for California PHLs overall are relatively large and growing; given the current size of the workforce. These findings reflect an urgent need to sustain recruitment and training activities. In all, PHLs expected to need as many as 186 new employees by 2013. These data clearly show that there continues to be a critical need to fill positions in all job categories, with the PHL director and PHMs being the most critical.

A handful of PHLs in California fill professional job vacancies with qualified and certified international applicants. However, an overwhelming high number of PHLs in the state do not hire foreign citizens on work visas. This policy limits the capacity of these PHLs to fill vacant professional positions with internationally trained professionals and increases the need to recruit and train the future PHL workforce from within the US.

A number of staff members were reported to leave their positions with less than one year of service, with three PHLs reporting a high turnover in PHL directors. Further investigation is needed to determine the cause of the high turnover rate. A tentative hypothesis is that the high turnover rate for the laboratory directors may be caused by the lack of CLIA-certified PHL directors available to supervise PHLs in California. Because of this issue, PHLs may hire short-term directors or hire a part-time director from another county until a permanent director can be hired. These one-year turnover rates should create some concern, given that these job categories have the highest number of current and future employee vacancies.

There continues to be a large pool of experienced PHL directors who will be retiring in the near future, a smaller cohort of middle stage professionals, and a larger pool of new directors with less than 5 years of experience in their PHLs.

There appears to be a high level of career longevity in the California PHL workforce. The greatest staff longevity by length of time of employment were in the following job categories: (1) PHM I, (2) PHM II, (3) Supervisor PHM, (3) Laboratory Assistant, and (4) Laboratory Director. These findings suggest that if staff do not leave their positions within the first five years of service, they tend to stay in their PHL employment throughout their careers. Directors reported that retention of public health staff has been maintained by providing job advancement opportunities within the PHM series.

Most of the PHLs in California (21) reported that staff needed to work overtime, ranging from daily to rarely. There were two major reasons stated for the need for staff to work overtime. These included during periods of staff shortage and during periods of high-test volume. For example, the swine flu pandemic and county budget cuts may have significantly increased the needs of PHLs to pay overtime for staff to meet the testing needs of their service areas in 2010.

A substantial number of PHLs in California continued to offer internship positions ranging from high school through post-doctoral levels. Expansion of paid internship positions at all levels of the pipeline should be considered in order to recruit a workforce committed to PHL work. The role of internships could be a very useful mechanism to help recruit young people into the profession and expand public knowledge of the roll of PHLs in community safety.

4. Outreach, recruitment and Retention Strategies

Given California's current economic uncertainty due to the prolonged recession and slow economic recovery, directors were unsure whether inadequate staffing is caused by a lack of qualified applicants or low salary. In addition, they did not cite lack of fringe benefits, poor retention, or lack of resources to recruit as causes of inadequate staffing. Several directors reported not having any staff leave this past year. However, when asked the best strategies to retain staff on an open-ended question, 26 directors reported that good salaries and benefits were the best strategies to retain staff. This mixed response may be a reflection of the economic environment, such that staff are staying in the positions they have for reasons of security by virtue of seniority rather than salary or benefits; and/or that local laboratories have not been able to recruit needed staff due to budget constraints. In addition, directors responded that the main reason staff would leave within the first year of employment was for professional advancement.

Directors strongly believed that outreach is very important to develop and attract a pipeline of qualified, diverse and competent staff, and to ensure long term staffing. However, directors were unsure if they had adequate tools, funding, and staff to effectively recruit and conduct outreach, regardless of the size of the laboratory.

Directors did not rely on newspapers, conferences, or internal resources for recruitment, and they were unsure if they used professional organizations. By way of an open-ended question, directors responded that they did use their county HR websites, the CAPHLD website, commercial websites, and the LabAspire website to recruit. Most directors agreed that they would be interested in using on-line advertising to recruit applicants. These findings highlight the increased use of the Internet and electronic media to recruit staff. They appear as well to support the opportunities for the centralized work of LabAspire via its recruitment efforts and Website to increase public awareness of the role of PHLs, and advertise PHL vacancies at all levels. However, LabAspire needs to do more marketing within CAPHLD such that all PHL directors in California take advantage of available job listing resources on the LabAspire website.

PHL directors believed that outreach and recruitment to students was the best strategy for increasing the PHL workforce applicant pool, followed by outreach to the general public to educate them about the role of public health and PHLs in California. To support these efforts, directors agreed that they could help this venture through organized public tours of their laboratories, mentorship programs for college students,

and supported internship programs. LabAspire should explore recruitment and internship opportunities that engage local PHLs in university mentoring partnerships.

A number of PHL directors reported that they did have working relationships with California State University (CSU) and University of California (UC) campuses that are located in their areas. Two PHLs reported that they visited local college campuses to support LabAspire. There continues to be an opportunity for LabAspire to conduct activities that connect PHLs with relevant college and university science programs in their regions, as well as medical schools and doctoral and post-doctoral programs that train potential candidates at all levels of the PHL academic pipeline. These activities would educate students about public health and the work PHLs do for the community, and reach the best and brightest students and professionals, increasing their awareness of the career opportunities for which they might become qualified through additional training. In addition, LabAspire staff should continue working with PHLs and campus academic enrichment programs to help coordinate PHL presentations and tours for pre-health sciences majors.

5. Teaching, Education and Professional Development

Directors agreed offering continuing education opportunities to their staff and professional development of staff were important strategies to retain staff, ensure adequate staffing, and ensure that their laboratory staff are aware of new and emerging technologies in the field, as well as changes in state and federal regulations. Most directors agreed that their laboratories had adequate equipment and supplies to meet their laboratories' requirements for staff education and professional development. However, they did not believe that their laboratory had the funding to meet these requirements (e.g., to pay trainers), nor did most PHLs report having adequate staff to coordinate activities for staff education and professional development. There is a concern that PHLs may not have the ability to adequately train and up-date staff as needed and that there may be a critical need for additional resources to support PHL staff training. This lack of professional development training could affect staff retention over time.

Almost two-thirds of the directors reported that they did train 1 to 5 microbiologists for PHM Certification when needed. However, only two laboratories have the capacity to teach all components of the curriculum. Most PHLs send their trainees to other laboratories, including the CDPH state laboratory, for training they do not offer. It is possible that opportunities such as collaborative training grants and workforce development grants can help strengthen the PHL training environment.

Most PHLs do support leadership training, and at least seven PHLs indicated that they would accept an assistant PHL director for training if funding to pay that individual's salary and training costs were available.

Many PHLs do not offer staff training in cultural competency and in response to this query, most indicated that they received "diversity training" through their city or county. In light of our earlier discussion of the emerging demographic shift within California to a

more ethnically diverse population that will be served by and will enter the PHL workforce, there is a need to provide more targeted cultural competency programs to PHL directors that address service delivery and workforce issues. The current disconnect between past PHL professionals, many whom are close to retirement and this new workforce demographic could be addressed through more targeted cultural competency programs that help enhance understanding and bridge communication gaps across these groups so that customer service and recruitment and retention of new employees can be optimized.

6. Communication Capacities and Protocols

Directors primarily use electronic devices such as e-mail, video conferencing, and web-based systems to communicate with other laboratories for education and professional development of staff. Mail and fax were listed as the least used for communication and training. Future training venues for staff could include the use of web-based modules or webinars.

7. Public Health Laboratory Partnerships with Other Agencies

Most directors reported effective communication with other PHLs and staff regionally, perhaps due to the established professional network that exists as a direct result of CAPHLD. The uncertainty expressed by PHL directors regarding their own coordination activities with external public health constituents requires further attention such that opportunities exist to increase communication and networking regarding the work of PHLs with other public health agencies at the local, state, and national levels, and with nonprofit and public-sector public health organizations.

Directors participated in a wide range of partnerships for information dissemination, recruitment, and scientific information procurement. Most directors relied on CAPHLD, and APHL for information dissemination. There is a concern that a few directors do not rely on a partnership for this information. Directors relied mainly on CAPHLD and LabAspire for recruitment, followed by other PHLs. Most directors relied on professional meetings, conferences/teleconferences and APHL for scientific information and information about government policies and regulations.

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