

Competencies for Public Health Workers: A Collection of Competency Sets of Public Health-Related Occupations and Professions

This table of competency sets of public health-related occupations and professions was produced by the Office of Workforce Policy and Planning (OWPP), Centers for Disease Control and Prevention (CDC), (www.phppo.cdc.gov/workforce) for the *Competencies and Curriculum Workgroup* of the *Public Health Workforce Development Progress Workshop* (June 18-19, 2001) and revised for the *Public Health Workforce Development Annual Meeting* (September 12-13, 2001).

This expansive table of known competency sets is intended to be a resource document for persons interested in public health workforce development and includes on-line sources for all documents listed. The competency sets listed can be used as an aid to curricula developers and instructional designers in planning training programs for the Nation's public health workers. These sets provide relevant examples of competency statements from occupations and professions that share in the work of public health. Used as a starting point, this list may help avoid duplication of efforts and build on the existing efforts among the many public health training centers across the U.S.

The competency sets are differentiated into the following categories:

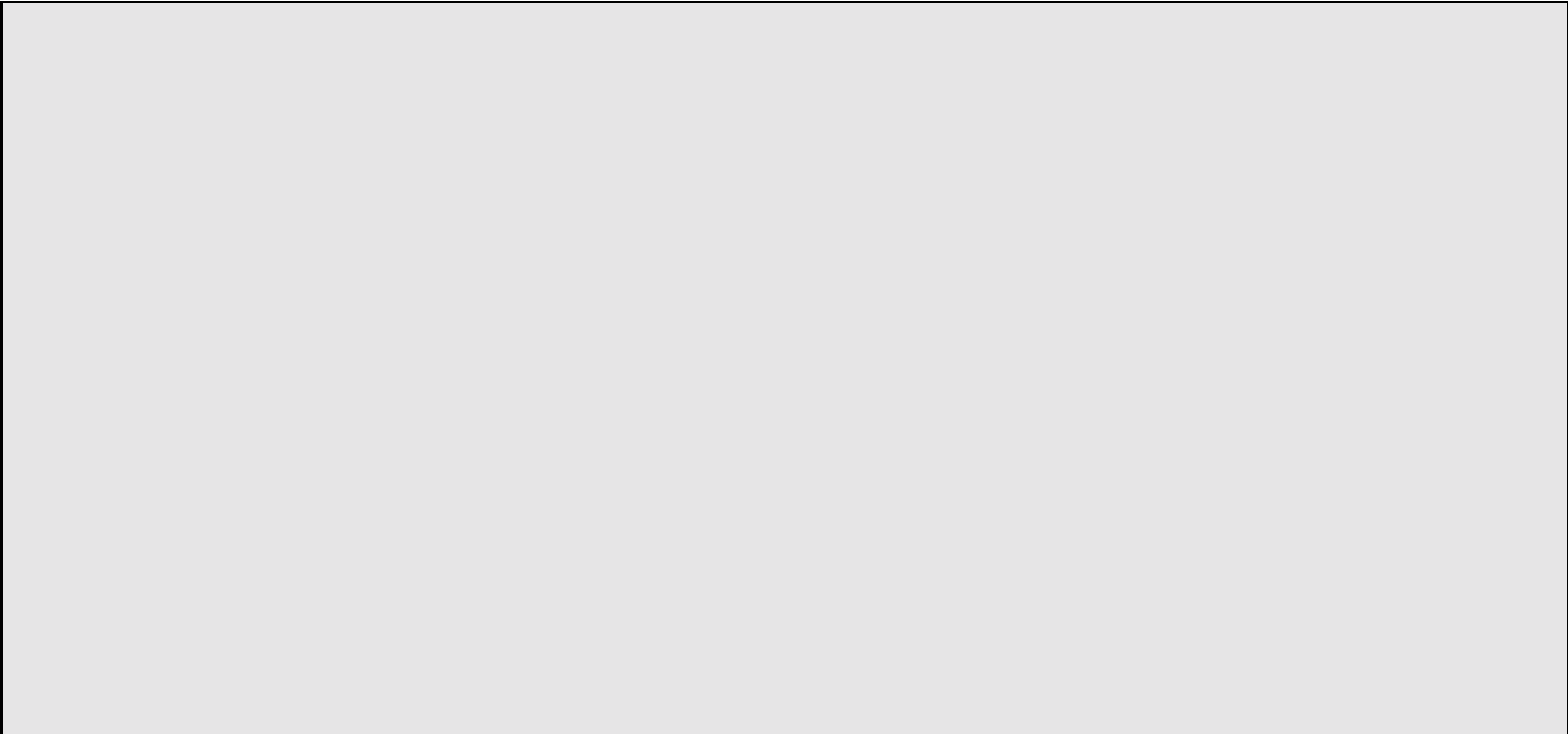
- Core - Basic Public Health (addresses the essential services of public health)
- New Topical Areas (emergency response, genomics, law)
- Functional Areas (leadership, management, supervisory, secretarial)
- Discipline Specific (professional, technical, entry-level, student)
- Other Topical Areas (MCH, STD, etc.).

The competencies listed are those known at the time of printing. The comprehensive search for related public health worker competencies included numerous global and site-specific web searches, list-serv queries, and personal contacts. Since the field of workforce development is evolving, many competency sets—be they produced by government, academic institutions, public health and professional organizations—are in development. Therefore, this list may not contain all available competency sets. Inclusion of any competency set in the table does not imply Office of Workforce Policy and Planning endorsement.

Please notify Kimberly Geissman KGeissman@cdc.gov, OWPP/CDC of major omissions, corrections, and additions.

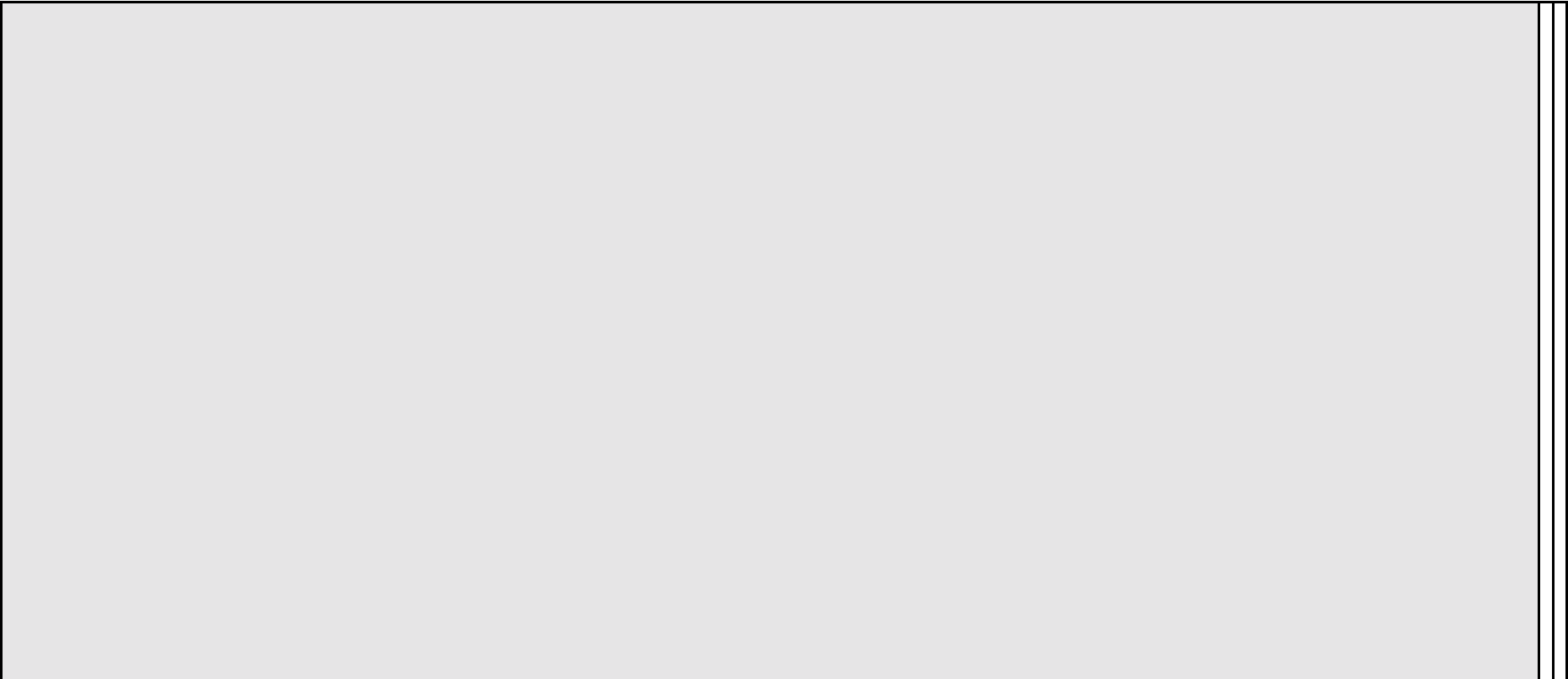
A Collection of Competency Sets of Public Health-Related Occupations and Professions

Known Competency Sets	Worker Level ¹	Status and Where to Find Them
Core - Basic Public Health		
<i>Competencies for Providing Essential Public Health Services</i> , 1997	professional	<i>The Public Health Workforce: An Agenda for the 21st Century</i> , Public Health Functions Project, ODPHP, DHHS http://www.health.gov/phfunctions/pubhlth.pdf essential services www.apha.org/ppp/science/10ES.htm
<i>Council on Linkages: Core Competencies for Public Health Professionals</i> , 2001	front-line, senior professional, supervisor, manager	Public Health Foundation (PHF), http://www.trainingfinder.org/competencies/list.htm
<i>Competencies for Providing Public Health Services</i> , 1998	medical student	C.W.Keck, “Core Competencies for the Synergistic Practice of Medicine & Public Health” Josiah Macy, Jr. Foundation Conference, 1998 http://www.josiahmacyfoundation.org/jmacy1.html
<i>Principles of Public Health</i> course, 2001	leader, professional, technical	Based on <i>Healthy People 2010</i> , Missouri Public Health Training Network http://www.health.state.mo.us/series/
<i>Public Health 101</i> course, 2000	professional	Based on Bernard Turnock’s text <i>Public Health: What It is and How It Works</i> , 2000, Illinois Center for Public Health Preparedness http://www.aspenpublishers.com/books/turnock/overview.html
<i>Core competencies for MPH Students</i> , 1998	MPH student	Johns Hopkins School of Public Health, Master of Public Health http://distance.jhsph.edu/mph/why/core_competencies.html
<i>Masters of Public Health (MPH) in Health Behavior & Health Education</i>	MPH student	University of Michigan School of Public Health, Department of Health Behavior and Health Education http://www.sph.umich.edu/hbhe/programs/mph.html
Document in development, 2001	MPH student	Deans of the Schools of Public Health, universal SPH competencies being drafted, contact Liz Weist http://www.asph.org/aa_document.cfm/5/5/172



Emergency Response		
<i>Core Public Health Worker Competencies for Emergency Preparedness and Response, April 2001</i>	leader, administrator, professional, technical, support	Center for Health Policy, Columbia University School of Nursing http://cpmcnet.columbia.edu/dept/nursing/institute-centers/chphsr/COMPETENCIES.pdf
<i>Fire & Emergency Services Competency Module</i>	technical	Industry-Specific Competency Modules, KnowledgePoint http://www.knowledgepoint.com/products/firecomp.html
Genomics		

<i>Genomics Competencies for the Public Health Workforce, May 2001</i>	administrator, professional*, all workers (technical, support)	Office of Genetics and Disease Prevention and Public Health Practice Program Office, CDC http://www.cdc.gov/genetics/training/competencies/ *(clinicians, educators, environmental workers, epidemiologists, laboratorians),
<i>Competencies in Public Health Genetics, June 1999</i>	MPH, MS, PhD student	“Public Health Genetics In the Content of Law, Ethics and Policy” Program, Institute for Public Health Genetics, Public Health Genetics Training Collaboration (CDC, HRSA funded) http://depts.washington.edu/phgen/DegreeTracks/competencies.html
<i>Core Competencies in Genetics Essential for All Health Care Professionals, February 2000</i>	all health care professional, student	National Coalition for Health Professional Education in Genetics (NCHPEG), (RWJ, DOE funded) http://www.nchpeg.org/news-box/corecompetencies000.html
<i>Medical School Core Curriculum in Genetics, 1995</i>	medical student	American Society of Human Genetics (ASHG) http://www.ashg.org/genetics/ashg/policy/rep-01.htm
Law		
<i>Core Legal Competencies for Public Health Practitioners, June 2001</i>	health official, governance boards, front-line, senior-level professional, supervisor, manager	Center for Law and Public’s Health at Johns Hopkins and Georgetown Universities (with CDC, PHF) http://www.publichealthlaw.net/Training/Methods.htm



Leadership

<p><i>Public Health Leadership Competency Framework, August 2000</i></p>	<p>health director, health officer</p>	<p>Public Health Leadership Network (PHLN), CDC http://www.slu.edu/organizations/nln/competency_framework.html Wright, K, Rowitz, L., Merkle, A. etal. “Competency Development in Public Health”, <i>American Journal of Public Health</i>, August 2000, vol 90, no 8.</p>
<p><i>Project Management Body of Knowledge, (PMBOK Guide) 2000</i></p>	<p>leader, project manager</p>	<p>Public Health Leadership Institute (PHLI), CDC http://www.phls.org Guide found at Project Management Institute http://www.pmi.org/publicctn/pmboktoc.htm</p>
<p><i>Leadership Competencies for Assistant Deputy Ministers and Senior Executives</i></p>	<p>senior manager</p>	<p>The Learning Centre, Public Service Commission of Canada http://www.psc-cfp.gc.ca/aexdp/leaders_e.htm</p>

<i>Leadership Development Competencies: The Leadership Challenge</i>	leader	Exploring Inspired Leadership, The Banff Center http://www.banffmanagement.com
Management		
<i>Core Competencies for Supervisors, Managers, and Executives, 2000</i>	director, executive, team leader, program manager, supervisor	School of Public Health Leadership & Management Development, CDC Corporate University; Vicki Johnson, HRMO, VJohnson1@cdc.gov http://intranet.cdc.gov/hrmo/masdevpl.htm
<i>Supervisors' and Managers' Critical Elements, October 1999</i>	supervisor, manager	Headquarters Performance Management System, DOE http://www.hr.doe.gov/hqpms/supstan.htm
<i>Management Academy for Public Health Competencies March 1999</i>	public & private sector manager	Management Academy for Public Health (MAPH), North Carolina Institute for Public Health (CDC, HRSA, Kellogg, RWJ funded); http://www.maph.unc.edu Stephen Orton sorton@email.unc.edu
<i>Competency Profile: Public Service Managers</i>	middle-managers	The Learning Centre, Profile for Leaders and Managers, Public Service Commission, Canada http://learnnet.gc.ca/eng/comcentr/manage/profile/auto.htm
<i>Public Health Prevention Service Competency Set, September 1997</i>	MS-prepared entry-level manager	Public Health Prevention Service (PHPS) Fellowship, CDC (to be updated fall 2001) http://www.cdc.gov/epo/dapht/rfa.htm#perform
<i>Competencies for Professional Development: Managing in the Middle, 1998</i>	mid-level manager	Exploring Inspired Leadership, The Banff Center http://www.banffmanagement.com
Secretary - Support		
<i>Competencies for Secretary and Office Automation Clerk (GS-318, GS-326), 2000</i>	secretary, office automation clerk	School of Public Health Business Management, CDC Corporate University; Jessi Stevens, HRMO JStevens@cdc.gov http://intranet.cdc.gov/hrmo/crses.htm
<i>Sample Elements and Tasks for Secretary</i>	secretary	Headquarters Performance Management System, DOE http://www.hr.doe.gov/hqpms.secy.htm
<i>National Competency Standards – Public Administration, Competency Based Assessment and Training Handbook, 1999</i>	mid-level administrator, clerical	Office of the Commissioner for Public Employment, Australia's Northern Territory Government http://www.nt.gov.au/ocpe/documents/people-development/comp-standards

<i>CASAS Competency List</i>	basic life skills	Secretary's's Commission on Achieving Necessary Skills, DOL http://www.casas.org/01AboutCasas/01Competencies.html
<i>High School Student Competencies and Indicators</i>	high school graduate	National Occupational Information Coordinating Committee (NOICC), Academic Innovations http://www.academicinnovations.com/noicc.html
Discipline Specific		
Epidemiology		
<i>Health Science and Epidemiology Competencies, 2001</i>	professional	School of Public Health Science and Research, CDC Corporate University, draft to be validated; Charlotte Wilson, HRMO CWilson@cdc.gov
<i>Core Activities for Learning (CALs)</i>	doctoral-level Epidemic Intelligence Officer	Epidemic Intelligence Service (EIS), CDC Jim Alexander, EPO/DAPHT JAlexander1@cdc.gov
<i>Evaluation of EIS Competency Domains: Epidemiologic Process, Communication, and Professionalism, 2001</i>	doctoral-level Epidemic Intelligence Officer	Epidemic Intelligence Service (EIS), CDC Jim Alexander, EPO/DAPHT JAlexander1@cdc.gov
<i>Maternal and Child Health Epidemiology Fellowship Competency Guidelines</i>	professional	Council of State and Territorial Epidemiologists (CSTE) with CDC http://www.cste.org/MCHcompetencies.pdf
<i>Infection Control and Epidemiology: Professional and Practice Standards, 1998</i>	professional	Association for Practitioners in Infection Control & Epidemiology (APIC) and Community and Hospital Infection Control Association, Canada (CHICA) http://www.apic.org/pdf/pracstnd.pdf
Informatics		
<i>Public Health Informatics Competencies, 2001</i>	professional	CDC, draft in development; Patrick O'Carroll, PHPPPO POCarroll@cdc.gov
<i>Information Resources Management Competencies, 2001</i>	professional, technical	School of Public Health Information Resources Management, CDC Corporate University, draft to be validated; Tonya Henderson, HRMO TSHenderson@cdc.gov
<i>Math and Statistical Competencies, 2001</i>	professional, technical	School of Public Health Science & Research, CDC Corporate University, draft to be validated; Charlotte Wilson, HRMO CWilson@cdc.gov

<i>Recommendations of the International Medical Informatics Association (IMIA) on Education in Health and Medical Informatics, October 2000</i>	physician, nurse, pharmacist, manager, record administrator, teacher, student	American Medical Informatics Association (AMIA), Health and Medical Informatics Education Workgroup http://www.amia.org/ updated: introductory, intermediate, advanced levels, found at International Medical Informatics Association (IMIA) http://www.rzuser.uni-heidelberg.de/~d16/rec.htm
<i>Registered Health Information Administrator (RHIA) and RHIT (technician) Examination Content: Domains, Subdomains and Tasks</i>	administrator, technical	American Healthcare through Quality Information (AMIMA) http://www.ahima.org/certification/exam.html
<i>Certified Coding Specialist (CCS) Coding Competencies</i>	coder	American Healthcare through Quality Information (AMIMA) http://www.ahima.org/certification/exam.html
<i>Medical School Objectives Project: Medical Informatics Objectives, August 2000</i>	MD student	Association of American Medical Colleges (AAMC), School Objectives Project http://www.aamc.org/meded/msop/informat.htm
<i>On-line Technology Competencies</i>	undergraduate student	College of Education and Applied Professions, Western Carolina University http://www.ceap.wcu.edu/Martin/Compdef.htm
<i>Student Technology Competency Matrix</i>	high school graduate	Millbury Public Schools http://millbury.k12.ma.us/~hs/school/techplan/studentmatrix4.3B.html
Environment		
<i>Environmental Health Competency Project: Recommendations for Core Competencies for Local Environmental Health Practitioners, May 2001</i>	front-line, local-level professional	American Public Health Association (APHA) and National Center for Environmental Health (NCEH/CDC) with NEHA, NACCHO, ASTHO, FCA, AAS, NALBOH, final draft in clearance June 1, report due August 2001. Patrick Bohan, NCEH PBohan@cdc.gov http://www.apha.org/ppp/ehproject.htm
<i>Environmental Health Competencies: Core Competencies for the Effective Practice of Environmental Health</i>	professional	Funding Opportunity, Association of School of Public Health (ASPH), Developing Communities of Excellence in Environmental Health http://www.asph.org/fac_document.cfm/69/69/5968
<i>Registered Environmental Health Specialist/Registered Sanitarian Examination</i>	entry-level professional	National Environmental Health Association (NEHA), exam content outline; Ryan Rudolph rrudolph@neha.org http://www.neha.org

Engineering		
<i>Sample Elements and Tasks for Engineer</i> , October 1999	professional	Headquarters Performance Management System, DOE http://www.hr.doe.gov/hqpms/engineer.htm
Health Education		
<i>Responsibilities & Competencies for Health Educators</i> , 1997	professional	Nat'l Commission for Health Education Credentialing (NCHEC), endorsed by Society for Public Health Education (SOPHE), American Association for Health Education (AAHE), Association of State and Territorial Directors of Health Promotion and Public Health Education (ASTDHPPHE) update due August 2001, http://www.ncheec.org/competencies.htm
<i>Core Competencies/ "The Extension Educator"</i>	professional	Department of Agriculture and Natural Resources Education and Communication Systems (ANRECS), Michigan State University, staff professional development http://www.anreecs.msu.edu/extension/profdev/10areas.htm
Communications		
<i>Public Health Education and Communication Competencies</i> , August 2000	manager, public relations specialist, visual information specialist, technical writer, editor, audio-video technician	School of Public Health Education and Communication, CDC Corporate University; Christopher Stallard HRMO http://intranet.cdc.gov/hrmo/masdev2.htm
Library and Information Science		
<i>Information Literacy Competency Standards for Higher Education</i> , January 2000	undergraduate student	Association of College and Research Libraries (ACRL), American Library Association (ALA), http://www.ala.org/acrl/ilcomstan.html
<i>Competencies for Special Librarians of the 21st Century</i> , 1998	entry-level professional	Special Libraries Association (SLA), supported by Association for Library and Information Science Education (ALISE) and Medical Library Association (MLA) http://www.sla.org/content/memberservice/researchforum/lisprograms/lisps.cfm

<i>Students' Information Literacy Needs in the 21st Century: Competencies for Teacher-Librarians</i>	teacher-librarian, high school student	Association for Teacher-Librarianship in Canada (ATLC) http://www.atlc.ca/Publications/competen.htm
<i>Knowledge and Skills for Entry-Level Cataloguers</i>	entry-level technical	American Library Association (ALA), Association for Library Collections & Technical Service (ALCTS), Committee on Education, Training and Recruitment for Cataloging http://www.uky.edu/~lhjeng00/cetrccmp.htm
Human Resources		
<i>Human Resource Competencies for the Year 2000: A Professionals' Toolkit for Professional Development</i>	professional	Northeast Human Resources Association, (NEHRA), www.nehra.com/about.php3 Society for Human Resource Management (SHRM) book, profiles of 31 competencies http://shrm.org/competencies/home.htm
<i>Human Resources Management Competencies, 2001</i>	leader, manager, professional	School of Public Health Business Management, CDC Corporate University, draft to be validated; Jessi Stevens, HRMO JStevens@cdc.gov
<i>Directory of Competencies for the Human Resources Community in the Public Service of Canada, October 1998</i>	professional	The Learning Centre, Public Service Commission, Canada http://learnnet.gc.ca/eng/lrncentr/index.htm
<i>Human Resource Competency Model</i>	manager	International Personnel Management Association (IPMA), 22 competencies http://ipma-hr.org/public/training_template.cfm?ID=12
Laboratory		
<i>Body of Knowledge</i>	laboratorian, specialist, phlebotomist, technician	American Society of Clinical Laboratory Science (ASCLS), book, competencies for CLS and CLT regardless of setting, http://www.ascls.org/index.htm
Nutrition - Dietetics		
<i>Core Competencies for the Supervised Practice Component of Entry-Level Dietician (Technician) Programs, 1997</i>	dietitian student, dietetic technician student	Commission on Accreditation for Dietetics Education, "Accreditation Manual for Dietetics Education Programs, Revised 4 th Edition," Catalog #6107 http://www.eatright.org/cade/standards.html

<i>Standards of Professional Practice for Dietetics Professionals</i>	dietitian	American Dietetics Association (ADA) http://www.eatright.org/qm/standardslist.html
Physical Activity		
<i>Athletic Training Clinical Proficiencies, 1999</i>	entry-level professional, student	National Athletic Trainer's Association (NATA) http://www.nata.org , clinical focus "Athletic Training Educational Competencies" http://www.cewl.com/
<i>Physical Education for Lifelong Fitness, course</i>	teacher, director, student	American Alliance for Health, Physical Education, Recreation & Dance (AAHPERD) http://www.aahperd.org curriculum book http://americanfitness.net/Physical_Best/
<i>Standards of Competence, August 2000</i>	therapist	Federation of State Boards of Physical Therapy http://www.fsbpt.org/news.htm
Medicine		
<i>Preventive Medicine Residency (PMR) Competency Matrix 2000-2001</i>	MD-trained, Preventive Medicine Resident	Preventive Medicine Residency Program (PMR), CDC Jim Lando, EPO/DAPHT JLando@cdc.gov
<i>Core Competencies and Performance Indicators for Preventive Medicine Residents, 1999</i>	MD-trained, Preventive Medicine Resident	American College of Preventive Medicine (ACPM) with HRSA http://www.acpm.org/corecomp.htm
<i>Occupational and Environmental Medicine Competencies, January 1998</i>	physician administrator, generalist, specialist	American College of Occupational and Environmental Medicine (ACOEM) http://www.acoem.org/paprguid/guides/comp.htm
<i>An Inventory of Knowledge and Skills Relating to Disease Prevention and Health Promotion, 1989</i>	MD student	Association of Teachers of Preventive Medicine (ATPM) http://www.atpm.org/library/inventory/inventory1.htm
<i>Competencies at the Terre Haute Center for Medical Education: Competency Definitions</i>	MA-MD student	Terre Haute Center for Medical Education, Indiana University School of Medicine http://web.indstate.edu/thcme/duong/Competency/Definitions.html

Nursing		
<i>Public Health Nursing Practice for the 21st Century</i> , 2001	professional	Minnesota Department of Health, Division of Nursing and University of Minnesota, School of Nursing (HRSA-funded) draft tool for assessment, undergoing validation by the Association of Community Health Nurse Educator (ACHNE); Derryl Block dblock@d.umn.edu
<i>National Competency Standards for the Registered Nurse</i> , 2000	registered nurse, student	Australian Nursing Council, Inc. (ANCI) http://www.anci.org.au/competencystandards.htm
<i>Delivery of Occupational and Environmental Health Services</i> , May 1998	nurse professional	American Association of Occupational Health Nursing (AAOHN) http://www.aaohn.org/servicedelivery_position.htm
Dentistry		
<i>Competency Statements for Dental Public Health</i> , September 1997	professional	American Association of Public Health Dentistry (AAPHD) http://www.pitt.edu/~aaphd/dph.competency.html
Pharmacy		
<i>Certification in Geriatric Pharmacy Practice: Content Guide</i> , 1997	professional	“Certified Geriatric Pharmacist: A Bridge to Enhanced Respect, Expanded Responsibility- and More” by David K. Buerger http://www.ascp.com/public/pubs/tcp/1997/jun/gerpharm.html
<i>Competency Statements: Disease State Management (DSM) Examinations</i>	professional	National Association of Boards of Pharmacy (NABP) http://www.nabp.net/
Behavioral/Social Science		
<i>Behavioral & Social Science Competencies</i> , draft 2001	professional	School of Public Health Science and Research, CDC Corporate University, draft to be validated; Charlotte Wilson, HRMO CWilson@cdc.gov
<i>Description of the Doctoral Program: Educational Objectives</i>	PhD students	School of Social Work, University of North Carolina at Chapel Hill, learning objectives http://www.sowo.unc.edu/doctoral/description/index.html

<i>Ethical Principles of Psychologists and Code of Conduct</i> , December 1992	professional	American Psychological Association (APA), “General Principles” http://www.apa.org/ethics/code.html
Biological Science		
<i>Biological Science Competencies</i> , draft 2001	professional	School of Public Health Science and Research, CDC Corporate University, draft to be validated; Charlotte Wilson, HRMO CWilson@cdc.gov
Public Health Advisor Series		
<i>Competencies for Public Health Advisors (GS-685)</i> , 2001	professional	School of Public Health Administration, CDC Corporate University, intranet assessment of 1) foundation competencies and 2) occupational competencies; Ronald Lake, HRMO RLake@cdc.gov



<i>Competencies for Public Health Analyst (GS-685), 2001</i>	professional	School of Public Health Administration, CDC Corporate University, draft to be validated; Ronald Lake, HRMO RLake@cdc.gov http://intranet.cdc.gov/hrmo/analyst.htm
<i>Career Development: Core Competencies (Evaluation and Inspections), December 1999</i>	manager, program analyst, team leader, administrator, technical support, secretary	Office of Evaluation and Inspections (OEI), Office of Inspector General (OIG), http://www.hhs.gov/oig/oei/evaluator/evaluator.html

Policy Analysis		
<i>Generic Policy Analyst Draft Competency Profile</i>	professional	The Learning Centre, Public Service Commission, Canada http://learnnet.gc.ca/eng/lrncentr/index.htm
Economics		
<i>Nebraska Standards in Business Education Essential Learnings: Focus on Economics</i>	student, public	EcEd Economics Education Web competencies and learning objectives http://ecedweb.unomaha.edu/standards/home.htm
<i>National and State Content Standards in Economics</i>	student, public	EconomicsAmerica, National Council on Economic Education (NCEE), 20 standards, learning objectives and performance benchmarks http://www.economicsamerica.org
Finance		
<i>Core Competency Framework for Entry into the Accounting Profession: Functional Competencies</i>	entry-level professional	American Institute of Certified Public Accountants (AICPA) http://www.aicpa.org/edu/func.htm
<i>Competency Model for the New Finance Professional</i>	professional, technical, support	American Institute of Certified Public Accountants (AICPA) tool being piloted http://www.cpatoolbox.org
<i>Core Competencies (future of the CPA profession), 2001</i>	professional, technical	Vision Project Team and State Societies, CPA Vision Project: 2001 and Beyond http://www.cpavision.org
Other Topical Areas		
Community-based Health <i>Community Health Scholars Program: Goal and Competencies, June 1999</i>	post-doctoral student	Community-Based Public Health (CBPH), University of Michigan School of Public Health, Kellogg sponsored, program competencies http://www.sph.umich.edu/chsp/goal.html
MCH <i>Maternal and Child Health Competencies, February 2001</i>	professional	Association of Teachers of Maternal and Child Health (ATMCH) http://www.atmch.org/mchcomps.pdf
Cultural/Diversity		

<i>The Provision of Culturally Competent Health Care</i>	leader, professional, technical, support	Amy V. Blue, PhD., Assistant Dean for Curriculum and Evaluation, Medical University of South Carolina College of Medicine http://www.musc.edu/deansclerkship/rccultur.html
<i>Bridge to Wellness: Cultural Competency</i>	clinician	Evelyn Lee, EdD, Executive Director of Richmond Area Multi-Services, Inc. (RAMS) http://www.serve.com/Wellness/culture.html
STD/HIV <i>Program Operations Guidelines for STD Prevention: Training and Professional Developments</i>	clinician, disease investigator, HIV counseling	Center for HIV, STD, and TB Prevention, CDC; Frankie Barnes, NCHSTP/DSTD FBarnes@cdc.gov http://www.cdc.gov/std/program/training.pdf

¹Categories: Leader, Professional, Technical, Support. *The Public Health Work Force Enumeration 2000*, National Center for Health Workforce Information and Analysis, HRSA, DHHS. (Order document at <http://www.ask.hrsa.gov/detail.cfm?id=BHP00079>, download at <http://cpmcnet.columbia.edu/dept/nursing/chphsr/enum2000.pdf>)

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