

An Overview of Education and Training Requirements for Global Healthcare Professionals

❖ *Physical and Respiratory Therapists* ❖

GLOBAL KNOWLEDGE EXCHANGE NETWORK
on Healthcare

Workforce and Training Task Force



September 2009

Sponsored By:



TABLE OF CONTENTS

| | |
|--|----|
| EXECUTIVE SUMMARY | 3 |
| SPOTLIGHT ON RESPIRATORY THERAPY EDUCATION & WORKFORCE ISSUES..... | 4 |
| EDUCATION AND TRAINING REQUIREMENTS FOR | 5 |
| PHYSICAL AND RESPIRATORY THERAPISTS..... | 5 |
| <i>United States</i> | 5 |
| <i>Physical Therapy</i> | 5 |
| <i>Respiratory Therapy</i> | 6 |
| <i>Canada</i> | 7 |
| <i>Physiotherapy</i> | 7 |
| <i>Respiratory Therapy</i> | 7 |
| <i>Physical and Respiratory Therapy Beyond North America</i> | 8 |
| <i>United Kingdom</i> | 9 |
| <i>Germany</i> | 9 |
| <i>France</i> | 10 |
| <i>Australia</i> | 10 |
| <i>Singapore</i> | 10 |
| TABLE 1: PHYSICAL AND RESPIRATORY THERAPIST | 12 |
| TRAINING AND EDUCATION – SELECT COUNTRIES | 12 |
| PROFESSIONAL ORGANIZATIONS AND RESOURCES | 14 |
| LITERATURE CITED..... | 16 |

EXECUTIVE SUMMARY

The dedicated respiratory therapist (RT) role is a relatively new profession, and in the United States (US) and Canada it originated in part as a response to the North American polio epidemic and acute care needed during warfare situations, as hospital-based schools began educating individuals in inhalation therapy as a mode of treatment.¹ Outside of the US, Canada and Germany, the respiratory therapist role does not exist, but is performed by specially trained physiotherapists, nurses and physicians. For the purposes of this education and training review, physiotherapy with a specialty in respiratory care was selected as the closest professional equivalent to an RT, but both general and specialist physiotherapy training will be reviewed.

In most reviewed countries, the 4-year baccalaureate degree is the entry point for physiotherapy practice, but in the U.S. since the late 1990's, practitioners have either a master (2-year) or doctorate degree (3-year). Countries such as Canada have envisioned transitioning to this model and included it as part of their strategic plan for the field. In all countries except for Singapore there is either a mandatory or voluntary licensure process for physiotherapists, but the country does have extensive strategic plans to further the field by making a university degree the entry point for practice, expanding the number of specialization opportunities and focusing on evidence-based practices. Continuing education and professional development options are extensive, but are only mandatory in the United States and United Kingdom. There have been great advances in this area as of late with a focus on developing competencies and the start of the first physical therapist global online continuing education option offered by the World Confederation on Physical Therapy.

The education time for RTs is uniform across the reviewed countries, and ranges from two to four years at either a diploma or baccalaureate degree program. In the US and Canada, graduates go on to take two mandatory exams in order to use the title of Certified Respiratory Therapist (CRT) and Registered Respiratory Therapist (RRT). Graduates also have the choice to further specialize by certification exams in areas such as pediatrics and sleep disorders. Licensure and continuing education requirements vary by state and province. There is significant crossover in curricula for RTs and physiotherapists, but the latter has a broader base of study to allow specialization in areas such as respiratory and cardiopulmonary systems after the initial education in human systems has been completed. In Germany, the country's Respiratory Society announced in 2004 the beginning of an RT program for current physiotherapists as a response to the increase in related conditions and in an effort to delegate physician responsibilities. The development of the RT role has proven to be successful and is continuing to the present date.

Both respiratory and physical therapists play a critical role in the healthcare team particularly during acute situations such as mass-casualty respiratory failures and disaster preparedness for individuals with mobility restrictions or disabilities. Consequently, as with other discussed healthcare professions, there is a strong need to continue educating and training future members of the workforce and address shortage issues.

SPOTLIGHT ON RESPIRATORY THERAPY EDUCATION & WORKFORCE ISSUES

“Amplified education can only improve the ability of respiratory therapists to contribute to the cardiopulmonary health of people worldwide.”²

Respiratory therapists (RT) play an important role in delivering quality care to patients in multiple settings and systematic reviews of clinical trials confirm that the fields’ professionals are effective at providing care in all clinical venues.³ Having a full-time respiratory therapist on a hospital staff was significantly associated with improved health outcomes such as shorter lengths of stay and days on a ventilator as well as lower intensive care unit costs.⁴ Respiratory professionals acknowledge that such therapy is currently often a “task-oriented technical field,” but indicate that it is at a crossroads with the potential to expand the scope of practice. By enhancing the education and credentialing standards, the role for therapists could move toward that of “physician extenders” and “critical care assistants.” As with the evolving role of the advanced nurse practitioner, therapists envision an advanced practice role for respiratory care by promoting the baccalaureate, master's and doctoral degrees for current community college students.⁵

However, educational capacity issues also arise, as in the United States (US), the number of baccalaureate degree programs in respiratory therapy is limited. To address the capacity issues, professionals support the development of “bridge agreements” between community college and baccalaureate programs as well as distance education options.⁶ One survey of members of the Management Section of the American Association for Respiratory Care reported that 75% of respondents would support an exclusively distance learning baccalaureate option.⁷

The dedicated respiratory therapist role is a relatively new field, particularly in countries like Germany that first implemented training programs in 2004, partly as response to the observed increase in respiratory conditions and diseases.⁸ With an increase in international preparedness planning for potential natural disaster situations and outbreaks such as SARS, H5N1 and H1N1 influenza, respiratory therapists will be a critical part of staffing the triage team, particularly in addressing mass-casualty respiratory failures.⁹ Maintaining a workforce of educated and well trained respiratory and specialized physiotherapy staff will be of utmost importance in ensuring quality care. In the United States alone, the Bureau of Labor Statistics found that demand increased by 43% through 2008, and that an additional 29,000 RTs will be needed by 2010.¹⁰ However, this is paired with respiratory therapist workforce projections that the supply will decrease 31% by 2015.¹¹

As part of the effort to enhance the field through improved education and practitioner skills, the International Council on Respiratory Care (ICRC) has developed and is promoting its International Education Recognition System (IERS), which gives recognition to international education programs. Three levels exist, including seminar, program, and school levels, and the ICRC awards recognition based on guidelines for education standards developed from international education accreditation research.¹² For more information about the international endeavor, visit the IERS at <http://www.aarc.org/iers/6/index.cfm>.

EDUCATION AND TRAINING REQUIREMENTS FOR PHYSICAL AND RESPIRATORY THERAPISTS



Photos by: Wellcome Library, London, Wellcome Photo Library, Wellcome Images & Anthea Sieveking, Wellcome Images

United States

In the United States physical therapy and respiratory therapy are separate professions whereas in the majority of other reviewed countries, respiratory care is a subsection of physiotherapy education and an optional specialty for physiotherapists, nurses and physicians in training. The World Federation for Physical Therapy (WCPT) explains that physical therapy and physiotherapy are interchangeable terms and the same clinical health science within rehabilitative medicine.¹³

Physical Therapy

Physical therapists provide a variety of services to help patients improve function, improve mobility, and decrease pain incurred from injury, disability, or disease. The entry point for practicing physical therapy in the United States was a bachelor degree until the late 1990's and today professionals first undergo undergraduate training and then matriculate into either a two-year professional master's or three-year professional doctorate program before entering practice. The Commission of Accreditation in Physical Therapy Education (CAPTE) accredits the education programs, and the organization has not accredited bachelor programs since 2002.¹⁴

Before entering practice, degree program graduates all take the National Physical Therapy Examination administered by the Federation of State Boards of Physical Therapy (FSBPT) and then complete licensure procedures for their respective state. Licensure renewal and continuing education requirements vary by state. In addition, many graduates further their training and specialize in a particular area of physical therapy by enrolling in residency or fellowship programs. Specialist certification beyond general physical therapy is available in a

number of areas including geriatric, orthopedic, women's health, sports, and pediatrics and it is overseen by the American Board of Physical Therapy Specialists.

Many continuing education and professional development resources are available to currently practicing PTs including "aPTitude," an online program implemented by the FSBPT starting Summer 2009 where each individual can create a profile to locate and record learning activities.¹⁵ The FSBPT will begin evaluating and certifying learning activities in 2010. Also, the WCPT recently began the first PT global online continuing education option.¹⁶

Respiratory Therapy

Respiratory therapists practice under the direction of a physician to evaluate, treat, and care for patients with breathing or other cardiopulmonary problems. In the United States two levels of respiratory therapy credentialing are available by examination, including Certified Respiratory Therapist (CRT) and Registered Respiratory Therapist (RRT). Another common title is Respiratory Therapy Technician. RRTs most often work in supervisory roles and intensive care positions. In order to achieve certification (for CRT) and registration (for RRT), an individual must first attend a post-secondary institution accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) or Council on Accreditation for Respiratory Therapy Education (CoARTE). To become a CRT and/or RRT a person may either choose the associate degree (two-year) or bachelor degree (four-year) path. A limited number of master's programs are available.¹⁷

To gain entrance to the training program, a person must graduate from high school with coursework in health, biology, mathematics, chemistry and physics. Within the training program, content includes 1) Basic Science - Physics, Microbiology, Mathematics and 2) Clinical Sciences - Human Anatomy and Physiology, Pharmacology and Therapeutic/Diagnostic Procedures, Patient Care, and Clinical Practice Guidelines.

After completion of coursework, CRT candidates must take the Primary Certification Exam (PCE) administered by the National Board for Respiratory Care (NBRC). While the PCE is the entry-level examination to the field, a second exam, the National Registry Exam including a written section and clinical simulation, is also offered by the NBRC. A CRT does not need further formal education before taking the RRT exam, but only CRTs may take the RRT exam.¹⁸ While CRTs and RRTs may have the same amount of formal training, the RRT exam allows professionals to earn a more advanced credential. Respective states have different licensure renewal and continuing education requirements, ranging from no mandates (AL, AK, CO, HI, MI, NC, RI, UT, VT, WI, WY) to 15 - 30 hours in the remaining states.¹⁹ The number of current licensed respiratory therapists and renewal policies by state are reported by the American Association for Respiratory Care (AARC) at http://www.aarc.org/advocacy/state/2000_licensure_matrix.html#matrix.

Post-certification (CRT) and/or registration (RRT), there are options for further specialization by exam or working experience, including the following: Neonatal/Pediatric Specialist, Pulmonary Function Technologist, Registered Polysomnographic Sleep Technologist and Sleep Disorders Testing, and Therapeutic Intervention Respiratory Care Specialist.²⁰

Canada

Physiotherapy

As in all reviewed countries except the United States, the entry to practice degree in Canada is a baccalaureate degree. Students attend a four-year program accredited by either the Accreditation Council of Canadian Physiotherapy Academic Programs (ACCPAP) or (US) Council on Accreditation of Physical Therapy Education (CAPTE). There is a strong clinical component to the academic degree program and students must log a minimum of 1,000 hours of clinical work.²¹ Though the entry to practice level is the baccalaureate, master and doctorate programs are widely available.

Graduates are administered a Physiotherapy Competency Examination with written and clinical components by the Canadian Alliance of Physiotherapy Regulators and then are licensed by the respective province or territory regulatory college.²² The Canadian Physiotherapy Association and WCPT offer extensive continuing professional development opportunities.

No formal process of additional physiotherapy certification or specialization exists in Canada, but the ACCPAP is working to develop a specialty and advanced practice framework.²³ Additionally, the National Vision for Physiotherapy Services in Canada 2015 includes goals of formalizing the specialization process as well as transition from a bachelor degree entry of practice requirement to a master or doctorate.²⁴

Respiratory Therapy

The Canadian respiratory therapist education and training process bears much similarity to that of the United States. The same titles exist, Certified Respiratory Therapist (CRT) and Registered Respiratory Therapist (RRT). Other commonly used working titles include Respiratory Care Practitioner and Respiratory Technologist. In Canada, the RRT is also a voluntary national credential.²⁵

To become a respiratory therapist in Canada, a person can either complete a degree or diploma program at an institution accredited by the Council on Accreditation for Respiratory Therapy Education (CoARTE), which also acts as an accrediting body in the United States. The institution options include a two to three year hospital based program, a two-year community college or institute of technology program, and a limited number of university degree programs (four years). Graduates are awarded either a Diploma in Respiratory Therapy or a Bachelor of

Health Sciences. Similar entrance requirements include science and mathematics coursework at the secondary school level. The program content has didactic training at the college, institute or university, and clinical training in the hospital or home-care setting. Graduates must take a Prior Learning Assessment at their respective CoARTE approved program and after passing the Canadian Board for Respiratory Care National Exam, they are awarded the CRT credential. RRT candidates take the Canadian Society of Respiratory Therapists' (CSRT) National Certification Examination.²⁶ The respiratory therapist profession is regulated in four provinces (Quebec, Ontario, Manitoba, Alberta) that have additional licensure, practice hours and continuing education requirements. Overall, the profession is governed by the Canadian Board of Respiratory Care.²⁷

Since the CSRT does not offer specialty certification, many students pursue credentials with the US National Board for Respiratory Care. Health Societies within Canada also offer certified specialization and additional credentials such as the Asthma Society of Canada (Asthma Care), the Canadian Society of Clinical Perfusion (Clinical Perfusionist), and the Canadian Association of Cardio-Pulmonary Technologists, while other groups offer Chronic Obstructive Pulmonary Disease education. There is also institution-specific training and certification available in specific clinical service areas such as: neonatal, high-risk transport, intubation, arterial line insertion and tracheotomy tube changes.²⁸

Physical and Respiratory Therapy Beyond North America

In all reviewed countries except for the United States, physical therapy is more commonly known as physiotherapy and the professionals within the field are physiotherapists. Except for the United States and Canada, very few countries have a dedicated professional role for respiratory health. In these countries, respiratory care is provided by physiotherapists, nurses and physicians that have chosen to specialize in this area. Though the dedicated Respiratory Therapist role does not translate directly to other countries, for the purposes of this report, the training for physiotherapists as well as physiotherapists specializing in cardiopulmonary work will be described, as it is the closest equivalent. There is significant crossover in curriculum content for RTs and physiotherapists, and most programs teach the following subjects as outlined by the World Confederation for Physical Therapy (WCPT)²⁹:

- Biological and Physical Sciences (anatomy/cellular biology, histology, physiology, biomechanics, kinesiology)
- Professional curriculum
 - Clinical Sciences: Cardiovascular, pulmonary, endocrine, metabolic, musculoskeletal, and other systems
 - Social Sciences: applied psychology and sociology, communication, ethics and values, management, evidenced based practice

The WPCT further elaborates on the specifics of physiotherapy education at the following site: <http://www.wcpt.org/node/29550>.

United Kingdom

As previously mentioned, respiratory therapy in the UK is not a recognized specific profession, but a specialization route available to physicians, nurses, physiotherapists and occupational therapists. Common titles include Respiratory Nurse, Clinical Respiratory Physiologist, Cardio-Respiratory Physiotherapist and Cardio-Respiratory Occupational Therapist.

Physiotherapists in training may either pursue a diploma (two years) or bachelor's degree (four years) from an accredited post-secondary institution. At the diploma level, an individual receives a Diploma of Higher Education in Respiratory Care or Respiratory Disease Management. At the degree level, a Bachelor of Science in Clinical Physiology is issued with a specialist option in respiratory physiology. Beyond the diploma and degree level, Master of Science programs in Respiratory Care, Respiratory Disease Management, Advanced Cardiology and Clinical Respiratory Physiology are available.³⁰

To gain entrance to the program, General Certificates of Secondary Education are required in numerous science fields. Following program completion, there is no national exam or licensure process; however, individuals may voluntarily register with the Registration Council for Clinical Physiologists. In addition, the Chartered Society of Physiotherapy Standards of Practice recommend that new graduates undergo two years of rotations in clinical specialties before specializing in particular areas of clinical practice.³¹ While the National Health Service has always encouraged Continuing Professional Development, the 2001 Health Act and the Health Professions Council require physiotherapists to engage and record time spent in learning and development activities from clinical supervision to conferences and journal clubs.³² The Continuing Professional Development Standards were enacted in 2006, and assessors review electronic portfolios or document submissions against the standards to ensure compliance.³³

Germany

Physiotherapists initially undergo three years of practical training and examinations outlined by federal law at specialized technical schools within the health care system (affiliated with a hospital or clinic). The student is issued a certificate upon successfully passing an exam administered at the state level (Zeugnis or Abschlusszeugnis der Berufsfachschule) and an additional certificate to practice is obtained either from the state, county, or district level to enter professional practice.³⁴

The German Respiratory Society (Deutsche Gesellschaft für Pneumologie und Beatmungsmedizin e. V. (DGP)) first issued a resolution to develop the dedicated respiratory therapist (RT) role in 2004 as a means to increase the quality of patient care, delegate physician duties and respond to the observed increase in respiratory conditions and diseases. In 2006-2006, a year-long pilot training program was offered to established nurses and physiotherapists, and 49 participants enrolled at two different site-based training courses located at specialty clinics. Following completion of the program, most graduates were employed in hospitals performing respiratory care, 75% reported

enhanced vocational stature, and job satisfaction increased in some regards. However, in most instances, the salary level did not increase with the additional training. Additional RT training courses are reported to have started and that the individuals in the pilot study have started their own section within the German Respiratory Society known as "Medical Assistenzberufe" or a medical assistance professional. However, it is unclear how far the country has moved forward in implementing the training program on a national scale. Researchers report that significant additional work is necessary to define and position the role of the respiratory therapist within the current healthcare system.³⁵

France

In France, physiotherapy is a three-year State Diploma program, but there have been recent developments in creating a four-year program as part of the Bologna Process where students would share a common first year with other healthcare professional candidates followed by three years of field specialization.³⁶ Respiratory therapy is a sub-specialty of physiotherapy in France. Post-graduate opportunities available through a bridge system of courses that transition students from undergraduate to graduate studies.³⁷

Australia

In Australia, persons pursuing the physiotherapy profession may choose to specialize in respiratory care. Bachelor, master and doctorate level programs are widely available. Following training, there is not a national exam or licensure process; however, graduates must register with their respective province or territory registration board.

While continuing education is not a requirement, the Australian Physiotherapy Association (APA) offers the opportunity for further titles and memberships based on completed stages of additional work and training.³⁸ At Level One, the APA member joins their respective Clinical Group, in this case Cardiorespiratory Therapy, and also completes educational and professional development activities. At Level Two, obtaining a master's degree in the specialty field allows the person to become a titled member of the clinical group. Level Three involves completing a two-year program of clinical experience, facilitated clinical development, and clinical and oral examinations. After Level Three is completed, the professional is admitted to the Australian College of Physiotherapists.³⁹ ou

Singapore

In Singapore, similar to other discussed countries, respiratory care is provided by specially trained physiotherapists that train for three to four years in a formal degree program. Currently the field is not regulated or licensed and continuing education and professional development are voluntary. To join the Singapore Physiotherapy Association, a candidate member must first pass a Safety and Professional

Ethics Exam that covers the following areas: Environmental Health Safety Issues, Infection Control, Fire Safety, Falls Precaution, Medico-Legal Issues and Ethical Issues.⁴⁰ The general Singapore Physiotherapy Association and Cardiopulmonary Special Interest Group both offer voluntary education events, from research activities to round table discussions to share current knowledge and skills.⁴¹ In addition key physiotherapy workforce leaders have been engaged in strategic planning to further the profession and outline its goals in the document Physiotherapy 21, 2005 – 2010. The goals include:

- Transition from a polytechnic diploma as entry point to a university-based degree program
- Pursuing registration/licensure for physiotherapy practice in Singapore,
- Encouraging academic departments to focus on teaching and developing evidence-based practices
- Adapting the American Physical Therapy Association's clinical competency standards to the country's needs
- Enhancing the practice specialization opportunities.⁴²

**TABLE 1: PHYSICAL AND RESPIRATORY THERAPIST
TRAINING AND EDUCATION – SELECT COUNTRIES**

| Requirement | | US | UK | France |
|---|----------|--|--|--|
| Previous undergraduate degree required? | PT | Yes, 4 years | No | No |
| | RT | No | N/A | N/A |
| Years of school | PT | 2 – 3 | 2 - 4 | 3 - 4 |
| | RT | 2 – 4 | N/A | N/A |
| Degree Title | PT | Master of Physical Therapy Doctor of Physical Therapy | Bachelor of Science in Clinical Physiology Diploma of Higher Education in Respiratory Care or Respiratory Disease Management | State Diploma, 4 year baccalaureate program in development |
| | RT | Associate Degree in RT Bachelor of Science in RT | N/A | N/A |
| Clinical/residency training | PT | Optional residency or fellowship | 2 yrs of clinical specialty rotations recommended before specializing in particular areas of clinical practice | |
| | RT | Clinical training during degree or diploma program | N/A | N/A |
| Specialty training | RT PT | Not required but available | Respiratory care is an optional specialty within physiotherapy | Respiratory care is an optional specialty within physiotherapy |
| Licensing/Certification/Registration | PT | Federation of State Boards of Physical Therapy hosts national exam and State Board licenses | Voluntary registration with The Registration Council for Clinical Physiologists | Licensing process |
| | RT | Exam based Certified Respiratory Therapist (CRT) and Registered Respiratory Therapist (RRT) credential | N/A | N/A |
| Re-licensure | PT | Varies by state | No | No |
| | RT | | N/A | N/A |
| Continuing Education required for renewal? | PT | Varies by state | Yes, mandated by 2001 Health Act | No |
| | RT | http://www.ceu.org/requirements.html | N/A | N/A |

| Requirement | Germany | | Australia | | Canada | | Singapore | |
|---|----------------|--|--|-------|---|--------------|--|-------|
| Previous Undergraduate degree required? | PT | No | PT | No | PT | Yes, 4 years | PT | No |
| | RT | Yes, respiratory training intended for established physiotherapists and nurses | RT | N/A | RT | No | RT | N/A |
| Years of school | PT | 3 | PT | 2 - 4 | PT | 2 - 3 | PT | 3 - 4 |
| | RT | Additional 1 year after PT | RT | N/A | RT | 2 - 4 | RT | N/A |
| Degree Title | PT | Bachelor in Physiotherapy | Bachelor in Physiotherapy | | Baccalaureate in Physiotherapy | | Polytechnic Diploma | |
| | RT | Respiratory Therapist | N/A | | Diploma in Respiratory Therapy, Bachelor in Health Sciences | | N/A | |
| Clinical/ residency training | PT | Yes, clinical training during the education program | Yes, clinical training during degree or diploma program | | Yes, clinical training during degree or diploma program (over 1,000 clinical hours) | | Yes, clinical training during degree or diploma program | |
| | RT | | N/A | | Yes, clinical training during degree or diploma program | | N/A | |
| Specialty training | PT | Optional | Respiratory care is the physiotherapy specialty | | Working towards specialty certificate programming | | Respiratory care is an optional specialty within physiotherapy | |
| | RT | Respiratory care is an optional specialty after physiotherapy training | N/A | | Not required but available | | N/A | |
| Licensing/ Certification/ Registration | PT | Yes, State Examinations and Certificate either at state, district or county level required to practice | Register with respective territory or state | | Licenses by province or territory regulatory college | | No | |
| | RT | No | N/A | | Regulated in four provinces; Exam based Certified Respiratory Therapist (CRT) and Registered Respiratory Therapist (RRT) credential | | N/A | |
| Re-licensure | PT | No | Varies by state and territory | | Varies by province and territory | | No | |
| | RT | | N/A | | | | N/A | |
| Continuing Education required for renewal? | PT | No | No, but Australian Physiotherapy Association offers extensive CE options | | No, voluntary | | No, voluntary | |
| | RT | N/A | N/A | | Varies by province and territory | | N/A | |

PROFESSIONAL ORGANIZATIONS AND RESOURCES

United States

- American Association for Respiratory Care, <http://www.aarc.org/>
- National Board for Respiratory Care, <http://www.nbrc.org/>
- Commission on Accreditation of Allied Health Education Programs (CAAHEP), <http://www.caahep.org/>
- Council on Accreditation for Respiratory Therapy Education (CoARTE), <http://www.csrt.com/en/coarte/index.asp>
- American Physical Therapy Association, www.apta.org

United Kingdom

- The Chartered Society of Physiotherapists, <http://www.csp.org.uk/>
- The Association of Chartered Physiotherapists in Respiratory Care, <http://www.acprc.org.uk/>
- Association for Respiratory Technology & Physiology (ARTP), <http://fp.artpweb2.f9.co.uk/>

Australia

- Australian Physiotherapy Association, <http://www.physiotherapy.asn.au/>
- Cardiorespiratory Therapy Australia, <http://www.apaconferenceweek09.asn.au/index.php/nationalgroupprograms/cardiorespiratory>
- Australian and New Zealand Society of Respiratory Science, <http://www.anzsrs.org.au>

France

- Fédération Française des Masseurs Kinésithérapeutes Rééducateurs, <http://www.ffmkr.org/>
- Association française pour la recherche en kinésiothérapie (AFREK), <http://www.afrek.com>
- Collège français de kinésiologie professionnelle (CFKP), <http://www.kinesiologie-pro.net>

Germany

- German Respiratory Society (Deutsche Gesellschaft für Pneumologie und Beatmungsmedizin e. V. (DGP)), <http://www.pneumologie.de/>
- German Physiotherapy Association, (Deutscher Verband für Physiotherapie - Zentralverband der Physiotherapeuten), <http://www.zvk.org/s/content.php?area=109>

Canada

- Canadian Board for Respiratory Care, <http://www.cbrc.ca/>
- Canadian Society of Respiratory Therapists, <http://www.csrt.com/>
- Asthma Society of Canada, <http://www.asthma.ca/adults/>
- Canadian Society of Clinical Perfusion, <http://www.cscp.ca/>
- Canadian Association of Cardio-Pulmonary Technologists, <http://www.cacpt.ca/>

Singapore

- Singapore Physiotherapy Association, <http://www.physiotherapy.org.sg/>
 - Cardiopulmonary Special Interest Group, <http://www.physiotherapy.org.sg/htdocs/sigroup/cardio.htm>
- Physiotherapy 21, 2005 – 2010, http://www.physiotherapy.org.sg/htdocs/aboutspa/SPA_Vision_Mission_P21.pdf

Other Resources:

- "2015 and Beyond: Charting a Future for the Respiratory Therapy Profession", American Association for Respiratory Care, <http://www.slideserve.com/presentation/2309/2015-And-Beyond--Charting-a-Future-for-the-Respiratory-Therapy-Profession>
- The International Council for Respiratory Care, <http://www.irccouncil.org>
- Annual International Respiratory Congress, http://www.aarc.org/education/meetings/congress_09/
- International Congress of Respiratory Science, <http://www.respiratory-science.org/>
- European Network of Physiotherapy in Higher Education, <http://www.enphe.org/emc.asp>

LITERATURE CITED

-
- ¹ Mathews, P., Drumheller, L. Respiratory care manpower issues. *Critical Care Medicine*. 2006. 34(3): S32 - S45.
- ² Shelledy, D.C., Wiezalis, C.P. Education and Credentialing in respiratory care: where are we and where should we be headed? *Respiratory Care Clinics of North America*. 2005. 11(3): 517 – 530.
- ³ Stoller, J.K. 2000 Donald F. Egan Scientific Lecture – Are respiratory therapists effective? Assessing the evidence. *Respiratory Care*. 2001. 46(1): 55 – 66.
- ⁴ Brill, R.J., Spevetz, A., Branson, R.D., Campbell, G.M., et al. Critical care delivery in the intensive care unit: defining clinical roles and the best practice model. *Critical Care Medicine*. 2001. 29(10): 2007-2019.
- ⁵ Shelledy, D.C., Wiezalis, C.P., 2005. Merendino, D., Wissing, D.R, New roles for respiratory therapists: expanding the scope of practice. *Respiratory Care Clinics of America*. 2005. 11(3): 543-555.
- ⁶ Douce, F.H. Bachelor of science degree education programs: organization, structure, and curriculum. *Respiratory Care Clinics of North America*. 2005. 11(3): 401 – 415.
- ⁷ Becker, E.A. Respiratory care managers' preferences regarding baccalaureate and master's degree education for respiratory therapists. *Respiratory Care*. 2003. 48(9): 840 – 858.
- ⁸ Karg O, Bubulj C, Esche B, Geiseler J, Bonnet R, Mader I., The Respiratory Therapist, *Pneumologie* 2008;62(11):685-689.
Karg O, Bonnet R, Magnussen H, Kohler D., Respiratory Therapist: Introduction of a New Profession, *Pneumologie* 2004;58(12):854-857.
- ⁹ Donnellan, M.E. Are we ready? *RT For Decision Makers in Respiratory Care*. July 2009.
http://www.rtmagazine.com/issues/articles/2009-07_04.asp
- ¹⁰ United States Department of Labor, Bureau of Labor Statistics, *Occupational Outlook Quarterly*, Available at:
<http://www.bls.gov/opub/ooq/2000/Spring/art01.pdf>. Kocher, N., Chapman, S., Dronsky, M., *Respiratory Care Practitioners in California: The Center for the Health Professions*, UCSF, July 2004.

-
- ¹¹ Walsh, B.K., The AARC: Partnering with you for a brighter future. Children's Hospital Boston, n.d., Available at: <http://www.idasrc.org/AARC%20Update.pdf>.
- ¹² Sinopoli, L.M. Changes in Education for the 21st Century: A Web-based International Education Recognition System. 51st International Respiratory Congress. December 3 – 6, 2005. Available at: <http://www.elcamino.edu/faculty/lsinopoli/International%20respiratory%20care%20education%20recognition%20san%20antonio%2005NOsoundfor%20pdf.pdf>.
- ¹³ Medical News Today. What is Physical Therapy (Physiotherapy)? What Does a Physical (Physiotherapist) Do? August 14, 2009. Available at: <http://www.medicalnewstoday.com/articles/160645.php>.
- ¹⁴ American Physical Therapy Association. Education Programs: Physical Therapy Education Frequently Asked Questions. Available at : <http://www.apta.org/AM/Template.cfm?Section=Clinical&CONTENTID=41500&TEMPLATE=/CM/ContentDisplay.cfm>.
- ¹⁵ The Federation of State Boards of Physical Therapy. Continuing Competence, aPTitude. Available at: <https://www.fsbpt.org/ForCandidatesAndLicensees/ContinuingCompetence/aPTitude/index.asp>.
- ¹⁶ World Confederation for Physical Therapy. Continuing Professional Development. Available at: <http://www.wcpt.org/node/27531>.
- ¹⁷ U.S. Bureau of Labor Statistics. Respiratory Therapists. *Occupational Outlook Handbook 2008-09*. Washington, D.C.: United States Department of Labor. 2009. Available at: <http://www.bls.gov/oco/ocos084.htm>.
- ¹⁸ Mathews, P., Drumheller, L., Carlow, J.J., 2006.
- ¹⁹ U.S. Bureau of Labor Statistics. Institute for Continuing Education, State Continuing Education Requirements. 2009. Available at: <http://www.ceu.org/requirements.html>.
- ²⁰ Scanlan CL, Wilkins RL, Stoller JK, *Egan's Fundamentals of Respiratory Care*, 7th ed., Saint Louis, Missouri: C.V. Mosby, 1998. Burton G., Hodgkin J., *Respiratory Care: A guide to clinical practice*, Philadelphia: JB Lippincott, 1984.
- ²¹ Canadian Physiotherapy Association. University Education Programs. Available at: <http://cpa.amsasp.com/Public/public.asp?WCE=C=47%7CK=222504>

-
- ²² Canadian Alliance of Physiotherapy Regulators. Physiotherapy Competency Examination Overview. Available at: http://www.alliancept.org/exams_overview.shtml.
- ²³ Li, LC, Westby, MD, Sutton, E, Thompson, M, et al., Canadian physiotherapists' views on certification, specialization, extended role practice, and entry-level training in rheumatology, 2009, *BMC Health Services Research* 9: 1 – 11, Available at: <http://www.biomedcentral.com/content/pdf/1472-6963-9-88.pdf>. Canadian Alliance of Physiotherapy Regulators, *National Guidelines for the Use of Title and Credentials By Physiotherapists in Canada*, October 2002, Available at: http://www.alliancept.org/pdfs/alliance_resources_newsroom_use_title_eng.pdf.
- ²⁴ Ashe, M, Mathur, S. National Physiotherapy Advisory Group Project, National Vision for Physiotherapy Services in Canada 2015. *Background Paper Physiotherapy Practice in Canada*. April 2004. Available at: <http://www.physiotherapy.ca/PublicUploads/222543PhysiotherapyPractice.pdf>.
- ²⁵ Health Canada. *Health Care System, Health Careers - Respiratory Therapists*. 2004; Available at: <http://www.hc-sc.gc.ca/hcs-sss/hhr-rhs/strateg/recru/respiratory-inhalotherapeutes-eng.php>.
- ²⁶ The Canadian Institute for Health Information, *Respiratory Therapists*, 2006, pp. 221-226. The Canadian Society of Respiratory Therapists, Education Programs, n.d., Available at: http://www.csrt.com/en/education/education_programs.asp.
- ²⁷ Ontario Job Futures. 3214 Respiratory Therapists, Clinical Perfusionists, Cardio-Pulmonary Technologist. 2005. Available at: <http://www.ontariojobfutures.ca/profile3214.html#side3>.
- ²⁸ Piccolo CM. Respiratory Therapy Specialty Certificates - Canada. 2008; Available at: <http://www.medhunters.com/articles/respiratoryTherapySpecialtyCertificationsCAD.html>.
- ²⁹ World Confederation for Physical Therapy. Position Statement: Guidelines for Physical Therapist Professional Entry Level Education. March 31, 2009. Available at: <http://www.wcpt.org/node/29550>.
- ³⁰ National Health Service. NHS Careers in Detail, Healthcare Science - Clinical Respiratory Physiologist. n.d.; Available at: <http://www.nhscareers.nhs.uk/details/Default.aspx?Id=247>.
- ³¹ Roskell C, Cross V. Student Perceptions of Cardio-Respiratory Physiotherapy. *Physiotherapy*. 2003. 89(1):1-11.

-
- ³² Johnson, H.C. CPD Decisions: Exploring the reasons why NHS physiotherapists engage in career long learning. n.d., Available at: http://www.leeds.ac.uk/medicine/meu/lifelong08/papers/Helena_Johnson.pdf
- ³³ The Chartered Society of Physiotherapy. The Health Professions Council Standards for Continuing Professional Development. July 2008. Available at: http://www.csp.org.uk/uploads/documents/csp_PD011_HPC_CPD_standards.pdf.
- ³⁴ Eftekari, T., Bainbridge, L. Towards a Better Understanding of Physiotherapy Education and Practice in Germany. Canadian Alliance of Physiotherapy Regulators. May 6, 2005. Available at: http://www.alliancept.org/pdfs/credential_news_physio_in_germany.pdf.
- ³⁵ Karg, O., Bubulj, C., Esche, B., Geiseler, J., Bonnet, R., Mader, I., 2008. Karg, O., Bonnet, R., Magnussen, H., Kohler, D., 2008.
- ³⁶ World Confederation for Physical Therapy. Federation Francaise des Masseurs Kinesitherapeutes Reeducateurs (F.F.M.K.R.). n.d. Available at: <http://www.physioeurope.org/download.php?memberprofile=25&PHYSIOEUROPE=85b2791bb6feb3e5725a57a463ef6000>.
- ³⁷ European Region of the World Confederation for Physical Therapy. Summary of Physiotherapy Education Within the National Education System. September 2003. Available at: <http://www.physioeurope.org/download.php?document=67&downloadarea=18&PHYSIOEUROPE=93dbb36eb228170abc482e7ad8361655>.
- ³⁸ Australian Physiotherapy Association. Physiotherapy in Australia, Registration Boards. 2008. Available at: <http://physiotherapy.asn.au/index.php/careers/registration>.
- ³⁹ Australian Physiotherapy Association, Specialisation, 2008, Available at: <http://physiotherapy.asn.au/index.php/physiotherapy-a-you/specialisation/specialisation>. Australian Physiotherapy Association, Overview, Continuing Professional Development, 2008, Available at: <http://physiotherapy.asn.au/index.php/pd/overview>.
- ⁴⁰ Singapore Physiotherapy Association. Membership Admissions. Available at: <http://www.physiotherapy.org.sg/htdocs/aboutspa/membership.htm>.
- ⁴¹ Singapore Physiotherapy Association. Cardiopulmonary Special Interest Group. Available at: <http://www.physiotherapy.org.sg/htdocs/sigroup/cardio.htm>.

⁴² Singapore Physiotherapy Association. *Physiotherapy 21: 2005 – 2010*. February 2004. Available at:
http://www.physiotherapy.org.sg/htdocs/aboutspa/SPA_Vision_Mission_P21.pdf