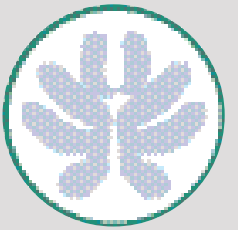
BAN ON ASBESTOS IN EUROPE

MESSA AL BANDO DELL'AMIANTO IN EUROPA



EUROPEAN RAMAZZINI FOUNDATION

Editors
Claudio Bianchi, Morando Soffritti
Franco Minardi and Jill V. Brazier

Eur. J. Oncol. - Library Vol. 3

The asbestos ban in the world: the rôle of the Collegium Ramazzini

La messa al bando dell'amianto nel mondo: il ruolo del Collegium Ramazzini

Morando Soffritti*, **, Fiorella Belpoggi*, Franco Minardi*, Michela Padovani*, Jill V. Brazier***

* Cancer Research Centre, European Ramazzini Foundation of Oncology and Environmental Sciences, Bologna, Italy

** Secretary General, Collegium Ramazzini, Bentivoglio (BO), Italy

*** Collegium Ramazzini, Bentivoglio (BO), Italy

Summary

The Collegium Ramazzini was founded in 1982 by a group of scientists working in the field of the relations between models of development, work, environment and pathology, and seeking to advance the study of occupational and environmental health issues around the world. The mission of the Collegium is to be a bridge between the world of scientific discovery and those social and political bodies responsible for acting on these discoveries to preserve life and prevent disease. The Collegium assesses the present and future potential injury and disease attributable to the environment or workplace, and transmits its views to policy-making bodies, authorities, agencies and the public. The means employed by the Collegium Ramazzini for pursuing its objectives are mainly holding conferences and symposia, publishing research papers, and publicizing its views. Asbestos is a major occupational and public health problem and, for this reason, it has been one of the main topics of interest and intervention of the Collegium Ramazzini. From 1982 until now, the Collegium has organized many conferences, workshops and special courses on the problem of asbestos in the workplace and general environment, in order to monitor, collect and spread information around the world. In 1999 the Collegium released an important Statement on asbestos that was published in many important international scientific journals.

Key words: **asbestos, ban, Collegium Ramazzini**

Riassunto

Il Collegium Ramazzini è stato fondato nel 1982 da un gruppo di scienziati impegnati nel campo delle relazioni fra modelli di sviluppo, lavoro, ambiente e patolo-

Address/Indirizzo: Dr. Morando Soffritti, Cancer Research Centre, European Ramazzini Foundation of Oncology and Environmental Sciences, Castello di Bentivoglio, Via Saliceto 3, 40010 Bentivoglio (BO), Italia - E-mail: crgensect@tin.it

gia, con lo scopo di promuovere lo studio di argomenti inerenti la medicina del lavoro e ambientale in tutto il mondo. La missione del Collegium è quella di costituire un ponte fra il mondo delle scoperte scientifiche e quello degli enti sociali e politici che hanno la responsabilità di usare queste scoperte per preservare la vita e prevenire le malattie. Il Collegium valuta i possibili danni e malattie attuali e futuri attribuibili all'ambiente o ai luoghi di lavoro, e trasmette le sue opinioni ai legislatori, alle autorità, alle agenzie ed al pubblico. I mezzi utilizzati dal Collegium Ramazzini per raggiungere i suoi obiettivi sono soprattutto quelli di tenere conferenze e workshops, pubblicare lavori scientifici, e diffondere le proprie opinioni. L'amianto è un problema professionale e sanitario di primaria importanza, e per questo motivo è stato uno degli argomenti principali di interesse e di intervento da parte del Collegium Ramazzini. Dal 1982 ad oggi, il Collegium ha organizzato molti convegni, seminari e corsi speciali sul problema dell'amianto nei luoghi di lavoro e nell'ambiente generale, per monitorare, raccogliere e diffondere informazioni in tutto il mondo. Nel 1999 il Collegium ha diffuso un importante *Statement* ("Posizione") sull'amianto, che è stato pubblicato in molte importanti riviste scientifiche internazionali.

Parole chiave: amianto, messa al bando, Collegium Ramazzini

I. THE COLLEGIUM RAMAZZINI: HISTORY, AIMS, ORGANISATIONAL STRUCTURE, AND ACTIVITY

1. History and aims

The science of occupational medicine emerged during the Seventeenth Century in Italy with the work of Bernardino Ramazzini[1].

Bernardino Ramazzini was born in Carpi, a small town in the Modena area, on October 4th, 1633. He attended the University of Parma where he became a Doctor of Philosophy and Medicine in 1659. In 1682 he was given the Chair of Medicine in the reopened University of Modena, where he taught for 18 years until 1700. In that year he accepted the Chair of Practical Medicine at the University of Padua.

In 1700, Dr. Ramazzini published the first edition of his most famous book, the "*De Morbis Artificum Diatriba*" (Diseases of Workers), the first comprehensive work on occupational diseases, outlining workers' diseases in 40 different occupations.

Ramazzini died in 1714, at the age of 81. He is considered the father of modern occupational medicine. He anticipated modern methods of following up health changes and detecting unusual events. He emphasized the need to investigate the working environment in order to improve it. He focussed on the need for providing workers with adequate information about health hazards and suggested measures to prevent them.

Three hundred years later, an international community of scholars formed an organisation in his honour, the COLLEGIUM RAMAZZINI, designed to advance the study of occupational and environmental health issues around the world.

The Collegium Ramazzini was founded in 1982 by a group of scientists working in the field of relations between models of development, work, environment and pathology,

among them, Professor Irving J. Selikoff, the Founder President, and Professor Cesare Maltoni, who was, from the beginning, Secretary General.

The mission of the Collegium is to be a bridge between the world of scientific discovery and those social and political institutions responsible for acting on these discoveries, to preserve life and prevent disease.

The Collegium assesses the present and future potential injury and disease attributable to the environment or workplace, and transmits its views to policy-making bodies, authorities, agencies and the public. By holding conferences and symposia, publishing research papers, and publicizing its views, the Collegium seeks to help legislators, regulators and other decision makers to understand the public policy implications of scientific findings. Its goal is to work towards possible solutions of occupational and environmental health problems.

The Collegium Ramazzini is a non-profit organisation, and is not associated with or supported by a single government body or interest group.

2. The organisational structure

The Collegium is an academy with a maximum of 180 elected Fellows, including leading scientists and other people distinguished by their concern for occupational and environmental health. The Collegium has reached out to persons of integrity in every continent and its membership is representative of many nationalities. Currently the Collegium Ramazzini is composed of 191 members, of whom 163 are Fellows and 28 Emeritus members, from 36 nationalities. The geographical distribution of the nationalities of the members is reported in Table 1.

The International Headquarters of the Collegium have been provided by the town of Carpi, in honour of its famous son and are located in the Castle of Pio, home of the Princes of Carpi.

The General Secretariat of the Collegium is located in the Castle of Bentivoglio near Bologna, Italy, once the summer residence of the Princes of Bologna. The Castle currently houses the laboratory of the Cancer Research Centre of the European Ramazzini Foundation, established by Professor Cesare Maltoni.

At present the Executive Council of the Collegium Ramazzini is composed of:

- President: Philip J. Landrigan, Chairman, Department of Community and Preventive Medicine, The Mount Sinai School of Medicine, New York, NY, USA;
- Secretary General: Morando Soffritti, Director, European Foundation of Oncology and Environmental Sciences “B. Ramazzini”, Bologna, Italy;

Table 1 - Geographical distribution of the members of the Collegium Ramazzini

Geographic areas	No. of members
Africa	5
North America	96
Latin America	4
Asia	20
Australia	3
Europe	63
Total membership	191*

* Of whom 163 Fellows and 28 Emeritus members

- Treasurer: Daniel T. Teitelbaum, Medical Toxicology, Denver, CO, USA;
- Councillors:
  - Fiorella Belpoggi, Scientific Deputy Director, European Foundation of Oncology and Environmental Sciences "B. Ramazzini", Bologna, Italy;
  - Vito Foà, Department of Industrial Hygiene, Institute of Occupational Medicine "L. Devoto", University of Milan, Milan, Italy;
  - Arthur L. Frank, Drexel University School of Public Health, Philadelphia, PA, USA;
  - Elihu D. Richter, Unit of Occupational and Environmental Medicine, Hebrew University School of Public Health and Community Medicine, Jerusalem, Israel;
  - Carlos Santos-Burgoa, Ministry of Health, Mexico;
  - Ellen K. Silbergeld, Johns Hopkins University, Bloomberg School of Public Health Sciences, Baltimore, MD, USA.

3. Activities

Every year on the last weekend of October, the Collegium Ramazzini holds the Ramazzini Days in Carpi, birthplace of Bernardino Ramazzini.

Under the umbrella of the Annual Ramazzini Days, a meeting is held of the Council of Fellows, together with workshops on scientific topics of considerable interest from the public health point of view. During the Ramazzini Days, the town of Carpi confers the Ramazzini Award on scientists deemed by the Collegium to have made outstanding contributions to furthering the aims of Bernardino Ramazzini in safeguarding health. From the beginning to now, the following scientists have been recognized:

- 1984: Prof. MUZAFFER AKSOY (Turkey) and Prof. ENRICO C. VIGLIANI (Italy), for their contribution on the toxic and leukaemogenic effects of benzene.
- 1985: Prof. ALBERTO BISETTI (Italy), for his contribution to clinical pulmonary diseases, particularly those which affect workers; and Prof. NORTON NELSON (USA), for clarifying the association of environmental agents with human disease.
- 1986: Prof. ARTHUR C. UPTON (USA), for his basic contributions to the knowledge of radiation carcinogenesis.
- 1988: Prof. JOHANNES CLEMMESEN (Denmark), for his pioneering work on the epidemiology of cancer; and Prof. THOMAS F. MANCUSO (USA), for his research on occupational carcinogenic risks.
- 1989: Prof. DAVID P. RALL (USA), for bringing advances in the knowledge of the relationship between the environment and human health; and Prof. TAKESHI HIRAYAMA (Japan), for his contributions to the knowledge of the rôle of life style in the genesis of cancer.
- 1990: Prof. LARS EHRENBERG (Sweden), for his basic studies on molecular genotoxicology, with particular regard to mutagenesis and cancerogenesis.
- 1991: Prof. ALICE M. STEWART (UK), for her classic studies on carcinogenesis from ionizing radiation in humans, with particular regard to the exposure to low doses; and Prof. FRIEDRICH POTT (Germany), for his contributions to the knowledge of carcinogenesis from natural and man-made fibres.
- 1992: Prof. LUIGI GIARELLI (Italy), for his unique work on pathology-based epidemiology with regard to occupational cancer.
- 1993: Prof. YASUNOSUKE SUZUKI (USA), for his contribution to the scientific knowledge on the pathology of mesotheliomas among asbestos-exposed workers.

- 1994: Prof. DAVID G. HOEL (USA), for his contribution to scientific knowledge on the oncogenic effects of nuclear radiation.
- 1995: Prof. CESARE MALTONI (Italy), for his studies on the identification of the carcinogenicity of many industrial agents; and Prof. J. CARL BARRETT (USA), for his achievement in understanding the molecular determinants of cancer.
- 1996: Prof. JOHN C. BAILAR III (USA), for his important contributions to the knowledge of epidemiological trends and to the prevention of cancer.
- 1997: Prof. SAMUEL MILHAM (USA), for his outstanding contribution to the epidemiology of occupational disease, with particular reference to carcinogenic risk from electromagnetic fields.
- 1998: Prof. JOSEPH LaDOU (USA), for his important work in new areas of industrial medicine; and Prof. JORMA RANTANEN (Finland), for his exceptional contributions to occupational disease and its prevention.
- 2000: Dr. EULA BINGHAM (USA), for her life-long commitment and contributions to occupational health in the USA and worldwide.
- 2002: Dr. MYRON A. MEHLMAN (USA), for his dedicated and courageous service as a toxicologist, author and editor who has improved the lives of working men and women around the world.
- 2003: Prof. OLAV AXELSON (Sweden), for his outstanding scientific work, which has greatly contributed to the defence of the health of workers and of the public at large.

The means employed by the Collegium Ramazzini in pursuing its objectives are mainly:
- organizing conferences, workshops, seminars and special courses;
- publication of the proceedings of conferences, particularly in the Annals of the New York Academy of Sciences[2-8], and in the Library of the European Journal of Oncology[9];
- publications in several journals, amongst which the European Journal of Oncology;
- promotion of research and studies;
- releasing Collegium Ramazzini Statements (Table 2) for governments and international agencies on topics of particular topical interest; and
- dissemination of information to the social groups concerned.

Table 2 - Collegium Ramazzini Statements

• Report on Benzidine and its Salts (1984)[10]
• Threshold Limit Value of Benzene (1993)[11]
• Chrysotile Asbestos as a Carcinogen (1993)[12]
• Oxygenated and Reformulated Gasoline (MTBE) (1995)[13]
• 1,3 - Butadiene (1995)[14]
• Call for an International Ban on Asbestos (1999)[15]
• The Precautionary Principle: Implications for Research and Policy Making (2004)[16]
• Call for a Reduction of Exposure to Benzene to the Lowest Possible Level (2004)[17]

To step up its activity, the Collegium Ramazzini has promoted committees on important topics related to social problems, occupational and environmental issues. The Collegium Ramazzini committees, the members and their affiliations are as follows:

3.1. **Asbestos Statement Update Committee**
- E. Bingham, Department of Environmental Health, University of Cincinnati, Cincinnati, OH, USA;

- R.A. Lemen, Jasper, GA, USA;
- A. Englund, Department of Medical and Social Affairs, Solna, Sweden;
- A.L. Frank, Drexel University School of Public Health, Philadelphia, PA, USA;
- T.K. Joshi, Centre for Occupational and Environmental Health, New Delhi, India;
- H.J. Woitowitz, Institute and Outpatient Clinic of Occupational and Social Medicine, University of Giessen, Giessen, Germany.

3.2. **Cancer Policy Committee**
- J.C. Bailar, Department of Health Studies, University of Chicago, Chicago, IL, USA;
- O. Axelson†, Department of Health and Environment Faculty of Health Sciences, Linköping, Sweden;
- M. Crespi, Department of Environmental Oncology, Regina Elena Institute, Rome, Italy;
- D.G. Hoel, Department of Biometry and Epidemiology, Medical University of South Carolina, SC, USA;
- J.E. Huff, Department of Health and Human Services, National Institute of Environmental Health Sciences, Research Triangle Park, NC, USA;
- R.L. Melnick, National Institute of Environmental Health Sciences, Research Triangle Park, NC, USA;
- L. Tomatis, formerly IARC Director, Trieste, Italy.

3.3. **Communications Committee**
- C. Xintaras, formerly of Agency for Toxic Substances and Disease Registry, USA;
- N. Brautbar, University of Southern California School of Medicine, Los Angeles, CA, USA;
- P. Bulat, Institute of Occupational and Radiological Health, Beograd, Yugoslavia;
- B. Froneberg, International Labour Office, SafeWork/Occupational and Environmental Health, Geneva, Switzerland;
- F. Minardi, European Foundation of Oncology and Environmental Sciences “B. Ramazzini”, Bologna, Italy.

3.4. **Developing World Committee**
- P. Bulat, Institute of Occupational and Radiological Health, Beograd, Yugoslavia;
- H. Frumkin, Department of Environmental and Occupational Health, Rollins School of Public Health of Emory University, Atlanta, GA, USA;
- R.E. Harari Arjona, IFA Corporation for Environmental Labour, Quito, Ecuador;
- L. Claudio, Community Outreach and Education Program, Mount Sinai Medical Center, New York, NY, USA;
- J.E. Myers, School of Public Health, University of Cape Town, Observatory, South Africa;
- E.D. Richter, Unit of Occupational and Environmental Medicine, Hebrew University School of Public Health and Community Medicine, Jerusalem, Israel;
- C. Santos-Burgoa, Ministry of Health, Mexico.

3.5. **Ethics Committee**
- K. Van Damme, Centre for Human Genetics, University of Leuven, Leuven, Belgium;
- G. Franco, Occupational Medicine, University of Modena and Reggio Emilia, Modena, Italy.

3.6. **International Collaboration Committee**
- B. Froneberg, International Labour Office, SafeWork/Occupational and Environmental Health, Geneva, Switzerland;
- F.E. Mirer, Health and Safety Department, International Union of United Automobile, Aerospace and Agricultural Implement Workers of America, Detroit, MI, USA;
- F. Giannasi, Labour Ministry, San Paolo, Brazil;
- J. Takala, InFocus Programme "Safework", International Labour Office, Geneva, Switzerland;
- A. Tompa, National Institute of Chemical Safety, Budapest, Hungary.

3.7. **Precautionary Principle Committee**
- P. Grandjean, Institute of Public Health, Department of Environmental Medicine, University of South Denmark, Odense, Denmark;
- J.C. Bailar, Department of Health Studies, University of Chicago, Chicago, IL, USA;
- D.M. Ozonoff, Boston University School of Public Health, Boston, MA, USA;
- M. Soffritti, European Foundation of Oncology and Environmental Sciences "B. Ramazzini", Bologna, Italy;
- C.L. Soskolne, Department of Public Health Sciences, University of Alberta, Edmonton, Alberta, Canada.

3.8. **Priority topics and meetings**
- M.A. McDiarmid, Occupational Health Project, School of Medicine, University of Maryland, Baltimore, MD, USA.
- F. Belpoggi, European Foundation of Oncology and Environmental Sciences "B. Ramazzini", Bologna, Italy;
- R.D. Dobbin, National Institute of Environmental Health Sciences, Research Triangle Park, NC, USA;
- B. Froneberg, International Labour Office, SafeWork/Occupational and Environmental Health, Geneva, Switzerland;
- R.J. Jackson, Centers for Disease Control and Prevention, Atlanta, GA, USA;
- G.V. Poje, US Chemical Safety and Hazard Investigation Board, Washington, DC, USA;
- R.L. Melnick, National Institute of Environmental Health Sciences, Research Triangle Park, NC, USA;
- C.H. Rice, Department of Environmental Health, University of Cincinnati, Cincinnati, OH, USA;
- K. Ringen, formerly of Laborers' National Health and Safety Fund, Seattle, WA, USA;
- G.R. Wagner, Division of Respiratory Disease Studies, National Institute for Occupational Safety and Health, Morgantown, WV, USA.

II. ACTIVITIES OF THE COLLEGIUM RAMAZZINI RELATED TO THE ASBESTOS BAN IN THE WORLD

Asbestos has been one of the main topics of interest and intervention of the Collegium Ramazzini. From 1982 until now, the Collegium Ramazzini has organized many conferences, workshops and special courses on the problem, namely:

1. International Conference on "Mariners' health with an emphasis on asbestos-related

problems", held in Athens, March 22 and 23, and in Delphi, March 24, 1987, and organized by Dimitrios Trichopoulos.

2. Special Course on "Scientific basis for evaluation of asbestos-associated disease", held at the Mount Sinai School of Medicine, New York City, March 6-17, 1989, and organized by Irving J. Selikoff, President of the Collegium Ramazzini.
   The course presented an intensive review of the knowledge concerning asbestos-associated disease, its history, development, current status and perspectives. The course considered: 1) history of asbestos disease; 2) epidemiological methods in asbestos research; 3) radiological abnormalities; 4) pulmonary function measurements; 5) pathology; 6) morbidity studies in asbestos-exposed population: asbestosis; 7) mortality studies in the asbestos-exposed populations: cancer; 8) legacy of past inadequacies; 9) projections; and 10) disability.

3. Collegium Ramazzini Workshop on "Disease potential of different asbestos fiber varieties" held in Ottawa, Canada, March 20-22, 1989, and organized by Irving J. Selikoff. The aim of the workshop was to highlight the analysis of available information by many of the world's experts who had contributed to the consideration of the problem of the differing pathogenicity that some types of asbestos fibres may have. During the workshop sessions, perspectives were presented derived from pathology, epidemiology studies, experimental pathology, mineralogy and tissue burdens of inorganic particles.

4. International Conference on "The third wave of asbestos disease: exposure to asbestos in place", held in New York City, June 7-9, 1990, and organized by Irving J. Selikoff. The conference was called in an effort to better understand the kinds of problems of asbestos exposure we face, and to better address the issues of low-level exposure and what its consequences might be.
   The proceedings of the conference were published in volume no. 643 of the Annals of the New York Academy of Sciences[5].

5. Workshop on "Carcinogenicity of chrysotile asbestos", held in Carpi (Italy), October, 29-31, 1993, as part of the Annual Ramazzini Days.
   At the end of the meeting a Statement on "Chrysotile Asbestos as a Carcinogen" was released. The document stated that *"the Collegium Ramazzini reaffirms its position that chrysotile asbestos is a cause of cancer, with well documented data from both animal and human studies demonstrating the development of lung cancer and mesothelioma following exposure. There should be no doubt at this time that chrysotile is carcinogenic"*. The conclusion was that *"government action should move to eliminate future use of asbestos, including chrysotile, and to minimize risks to asbestos in-place, through in-place management and removal where appropriate. These actions are necessary to protect public health and prevention of malignant and non-malignant disease caused by chrysotile"*. The Statement was signed by Eula Bingham, Cesare Maltoni, Myron Mehlman and David P. Rall.

6. Workshop on "Updating the epidemiology of asbestos disease", held in Carpi (Italy), October, 29 and 30, 1994, during the Annual Ramazzini Days.
   The Workshop was organized by the Collegium Ramazzini to honour its Founder and First President Irving J. Selikoff. The conference was entitled "Updating the epidemiology of asbestos disease", a topic on which Dr. Irving J. Selikoff had given funda-

mental and unique scientific contributions. The aim of the conference was to establish the epidemiological state-of-the art of various countries on asbestos disease, with particular regard to cancer, and to expose new categories found to be at risk.
The Proceedings of the Workshop were published in a issue of "La Medicina del Lavoro", the oldest journal in the world dealing with occupational medicine[18].

7. Workshop on "Presentation to the Collegium Ramazzini of the recent data on the epidemiology of asbestos-related cancers in Italy", held in Carpi (Italy), October 27, 1996, as part of the Annual Ramazzini Days.
The Conference was convened to deal with the epidemiology of asbestos-related cancers, and more specifically mesotheliomas in Italy. New occupational categories at risk of asbestos cancer were identified, with particular regard to the growing evidence that non-occupational environmental exposure to the mineral may also cause cancer.
The Proceedings of the Workshop were published in a special issue of "La Medicina del Lavoro"[19].

In 1999 the Collegium Ramazzini released the new Statement on asbestos "Call for an International Ban on Asbestos"[15]. The Statement pointed out the reasons why the Collegium Ramazzini calls for an immediate ban on all mining and use of asbestos in the world. The full text of the Statement is reported in the enclosed Appendix.

The Statement was signed by several Fellows of the Collegium Ramazzini and published in important international scientific journals, namely:
- American Journal of Industrial Medicine
- Canadian Medical Association Journal
- Environmental Epidemiology and Toxicology
- Environmental Research
- European Journal of Oncology
- International Journal of Occupational and Environmental Health
- International Journal of Occupational Medicine and Environmental Health
- Journal of Occupational and Environmental Medicine
- La Medicina del Lavoro
- Scandinavian Journal of Work, Environment and Health
- Toxicology and Industrial Health

The conferences, workshops and special courses on asbestos are usually attended by scientists, union representatives, and people exposed in various situations to asbestos.

III. ACTIVITY OF THE GENERAL SECRETARIAT TO SUPPORT INITIATIVES FOR THE ASBESTOS BAN IN THE WORLD

The General Secretariat of the Collegium Ramazzini is heavily involved in collecting and disseminating information on projects being carried out on asbestos in various parts of the world. Particular attention is given to activities in progress in developing countries, where asbestos is still used in varying amounts.

Furthermore the Secretariat of the Collegium houses a rich databank on the uses, diffusion and regulation of asbestos in the world. The databank is continuously being enriched and updated by information from Fellows, Unions, and citizens concern groups.

Information on the activity of the Collegium Ramazzini is available on the website: www.collegiumramazzini.org.

References

1. Di Pietro P. Bernardino Ramazzini biografia e bibliografia - Bernardino Ramazzini biography and bibliography. Eur J Oncol Library 2001; 1.
2. Maltoni C, Selikoff IJ (Eds). Living in a chemical world – occupational and environmental significance of industrial carcinogens. Ann NY Acad Sci 1988; 534.
3. Davis DL, Hoel D (Eds). Trends in cancer mortality in industrial countries. Ann NY Acad Sci 1990; 609.
4. Maltoni C, Selikoff IJ (Eds). Scientific issues of the next century. Ann NY Acad Sci 1990; 610.
5. Landrigan PJ, Kazemi H (Eds). The third wave of asbestos disease: exposure to asbestos in place. Ann NY Acad Sci 1991; 643.
6. Bingham E, Rall DP (Eds). Preventive strategies for living in a chemical world. Ann NY Acad Sci 1997; 837.
7. Bailar JC, Bailer AJ, Maltoni C, *et al* (Eds). Uncertainty in the risk assessment of environmental and occupational hazards. Ann NY Acad Sci 1999; 895.
8. Mehlman MA, Bingham E, Landrigan PJ, *et al*. (Eds). Carcinogenesis bioassays and protecting public health: commemorating the lifework of Cesare Maltoni and colleagues. Ann NY Acad Sci 2002; 982.
9. Grandjean P, Soffritti M, Minardi F, *et al* (Eds). The precautionary principle: implications for research and prevention in environmental and occupational health. Eur J Oncol Library 2003; 2.
10. Collegium Ramazzini. Report on benzidine and its salts. First Collegium Ramazzini Statement (1984). Eur J Oncol 1999; 4 (3): 325-8.
11. Collegium Ramazzini. Threshold limit value of benzene. Second Collegium Ramazzini Statement (1993). Eur J Oncol 1999; 4 (3): 329.
12. Collegium Ramazzini. Chrysotile asbestos as a carcinogen. Third Collegium Ramazzini Statement (1993). Eur J Oncol 1999; 4 (3): 329.
13. Collegium Ramazzini. Oxygenated and reformulated gasoline (MTBE). Fourth Collegium Ramazzini Statement (1995). Eur J Oncol 1999; 4 (3): 330.
14. Collegium Ramazzini. 1,3-Butadiene. Fifth Collegium Ramazzini Statement (1995). Eur J Oncol 1999; 4 (3): 330-1.
15. Collegium Ramazzini. Call for an international ban on asbestos. Sixth Collegium Ramazzini Statement (1999). Eur J Oncol 1999; 4 (3): 320-4.
16. Collegium Ramazzini. The precautionary principle: implications for research and policy making. Seventh Collegium Ramazzini Statement (2004). Eur J Oncol 2004; 9 (1): 7; and Am J Ind Med 2004; 45: 380-1.
17. Collegium Ramazzini. Call for a reduction of exposure to benzene to the lowest possible level. Eighth Collegium Ramazzini Statement (2004). Eur J Oncol 2004; 9 (1): 13-4.
18. Updating the epidemiology of asbestos disease. Proceedings of the Irving J. Selikoff Scientific Conference, Carpi, 1994. Med Lav 1995; 86 (5).
19. The Ramazzini Lecture 1996 and Presentation to the Collegium Ramazzini of the recent data on the epidemiology of asbestos-related cancers in Italy. Med Lav 1997; 88 (4).

Appendix

SIXTH COLLEGIUM RAMAZZINI STATEMENT (1999). CALL FOR AN INTERNATIONAL BAN ON ASBESTOS

To eliminate the burden of disease and death that is caused worldwide by exposure to asbestos, the Collegium Ramazzini calls for an immediate ban on all mining and use of asbestos. To be effective, the ban must be international in scope and must be enforced in every country in the world.

Asbestos is an occupational and environmental hazard of catastrophic proportion. Asbestos has been responsible for over 200,000 deaths in the United States, and it will cause

millions more deaths worldwide. The profound tragedy of the asbestos epidemic is that all illnesses and deaths related to asbestos are entirely preventable.

Safer substitutes for asbestos exist, and they have been introduced successfully in many nations. The grave hazards of exposure to asbestos and the availability of some safer substitute materials have led a growing number of countries to eliminate all import and use of asbestos. In the United States, a drastic reduction of asbestos usage has occurred. Asbestos has been banned by Sweden, Norway, Denmark, the Netherlands, Finland, Germany, Italy, Belgium, France, Austria, Poland, and Saudi Arabia.

I. THE COLLEGIUM RAMAZZINI

The Collegium Ramazzini is an international academic society that examines critical issues in occupational and environmental medicine. The Collegium is dedicated to the prevention of disease and the promotion of health. The Collegium derives its name from Bernardino Ramazzini, the father of occupational medicine, a professor of medicine of the Universities of Modena and Padua in the late 1600s and the early 1700s. The Collegium is comprised of 180 physicians and scientists from 30 countries, each of whom is elected to membership. The Collegium is independent of commercial interests.

II. BACKGROUND

The health consequences of the use of asbestos in contemporary industrial society have been amply documented in the world scientific literature. The toll of illnesses and deaths among asbestos workers in mining, construction, and heavy industry is well known. The pioneering work of British, South African, and Italian investigators (Doll, 1955; Wagner, Sleggs and Marchand, 1960; Vigliani, Mottura and Maranzana, 1964) laid the foundation for the definitive investigations by Irving J. Selikoff and his colleagues on insulation workers in the United States. Selikoff's monumental studies showed, first, the greatly increased mortality experience of insulation workers (Selikoff, Hammond and Churg, 1964), and later, the synergistic relationship between tobacco smoking and asbestos work (Selikoff, Hammond and Churg, 1969). Men who were followed more than 20 years from first onset of exposure sustained excessive risks of lung cancer and mesothelioma, as well as risks of other neoplasias (Selikoff and Seidman, 1991). These risks affect not only asbestos workers, but their families and neighbours (from material on clothing or plant emissions), users of products that contain asbestos, and the public at large.

Asbestos is a general term applied to certain fibrous minerals long popular for their thermal resistance, tensile strength, and acoustic insulation. Asbestos minerals are divided into two large groups: serpentine and amphibole. There is only one type of asbestos derived from serpentine minerals, chrysotile, also known as white asbestos. Amphibole minerals include five asbestos species: amosite, crocidolite, tremolite, anthophyllite, and actinolite. Two of these are the most commercially valuable forms: amosite, or brown asbestos, and crocidolite, or blue asbestos. The other amphibole minerals are of little commercial importance.

All forms of asbestos cause asbestosis, a progressive fibrotic disease of the lungs. All can cause lung cancer and malignant mesothelioma (IPCS, 1988; Dement, Brown and Okun, 1994). Asbestos has been declared a proven human carcinogen by the US Environmental Protection Agency (EPA) and by the International Agency for Research on Cancer of the World Health Organization (EPA, 1986; IARC, 1987). Early indications that chrysotile might be less dangerous than other forms of asbestos have not held up (UNEP, ILO, WHO, 1998). The preponderance of scientific evidence to date demonstrates that chrysotile too causes cancer, including lung cancer and mesothelioma (Smith and Wright, 1996; Stayner,

Dankovic and Lemen, 1996). Canadian chrysotile that is amphibole-free is still associated with mesotheliomas (Frank, Dodson and Williams, 1998).

A leading asbestos researcher, Julian Peto, and his colleagues predict that deaths from mesothelioma among men in Western Europe will increase from just over 5,000 in 1998 to about 9,000 by the year 2018. In Western Europe alone, past asbestos exposure will cause a quarter of a million deaths from mesothelioma over the next 35 years. The number of lung cancer deaths caused by asbestos is at least equal to the number of mesotheliomas, suggesting that there will be more than half a million asbestos cancer deaths in Western Europe over the next 35 years (Peto *et al*., 1999). In Sweden, Jarvholm has reported that the number of deaths caused each year by malignant mesothelioma is greater than the number of deaths caused in that country by all workplace injuries (Jarvholm, Englund and Albin, 1999).

III. THE NEED FOR A BAN

An immediate, international ban on the mining and use of asbestos is necessary because the risks cannot be controlled by technology or by regulation of work practices. The strictest occupational exposure limits in the world for chrysotile asbestos (0.1 f/cc) are estimated to be associated with lifetime risks of 5/1,000 for lung cancer and 2/1,000 for asbestosis (Stayner *et al*., 1997). These exposure limits can be technically achieved in the United States and in a few other highly industrialized countries, but the residual risks still are too high to be acceptable. In newly industrializing countries engaged in mining, manufacturing and construction, asbestos exposures are often much higher, and the potential for epidemics of asbestos disease is greatly increased (Giannasi and Thebaud-Mony, 1997; Ismerov, Flovskaya and Kovalevskiy, 1998).

Scientists and responsible authorities in countries still allowing the use of asbestos should have no illusions that “controlled use” of asbestos is a realistic alternative to a ban. Moreover, even the best workplace controls cannot prevent occupational and environmental exposures to products in use or to waste. Environmental exposure from the continued use of asbestos still is a serious problem. A recent study of women residing in communities in Canadian asbestos mining areas found a sevenfold increase in the mortality rate from pleural cancer (Camus, Siemiatycki and Meek, 1998). Large quantities of asbestos remain as a legacy of past construction practices in many thousands of schools, homes, and commercial buildings in developed countries, and are now accumulating in thousands of communities in developing countries.

An international ban on mining and use of asbestos is necessary because country-by-country actions have shifted rather than eliminated the health risks of asbestos. The asbestos industry has a powerful influence over many countries. Even in the United States, the asbestos industry succeeded in 1991 in overturning the EPA’s recommended ban and phase-out of asbestos by a technical ruling in the courts. Canada, Russia, and other asbestos-exporting countries have developed major markets in the newly industrializing nations. Conditions of current asbestos use in developing countries now resemble those that existed in the industrialized countries before the dangers of asbestos were widely recognized.

The commercial tactics of the asbestos industry are very similar to those of the tobacco industry. In the absence of international sanctions, losses resulting from reduced cigarette consumption in the developed countries are offset by heavy selling to the Third World. In similar fashion, the developed world has responded to the asbestos health catastrophe with a progressive ban on the use of asbestos. In response, the asbestos industry is progressively transferring its commercial activities and the health hazards to the Third World.

Multinational asbestos corporations present a deplorable history of international exploitation. These firms opened large and profitable internal and export markets in Brazil, elsewhere in South America, and in India, Thailand, Nigeria, Angola, Mexico, Uruguay, and Argentina. Brazil is now the fifth largest producer and consumer of asbestos in the world, after Russia, Canada, Kazakstan, and China (Harington and McGlashan, 1998). While asbestos use in the United States amounts to less than 100 g per citizen per year, asbestos use in Brazil averages more than 1,000 g per citizen per year. In the third-world countries, use of asbestos has been increasing at an annual rate of about 7 percent.

IV. CONCLUSION

The grave health hazards of asbestos are entirely preventable. The health risks of asbestos exposure are not acceptable in either industrially developed or newly industrializing nations. Moreover, suitable, safer substitutes for asbestos are available. An immediate worldwide ban on the production and use of asbestos is long overdue, fully justified and absolutely necessary.

References

Camus M., Siemiatycki J., and Meek B.: Nonoccupational exposure to chrysotile asbestos and the risk of lung cancer. N. Engl. J. Med., **338**, 1565-1571, 1998.

Dement J.M., Brown D.P., and Okun A.: Follow-up study of chrysotile asbestos textile workers: cohort mortality and case-control analyses. Am. J. Ind. Med., **26**, 431-437, 1994.

Doll R.: Mortality from lung cancer in asbestos workers. Br. J. Ind. Med., **12**, 81-86, 1955.

Environmental Protection Agency: Airborne asbestos health assessment update. EPA/6000/8-84/003E, EPA, Washington, D.C., June 1986.

Frank A.L., Dodson R.F., and Williams M.G.: Carcinogenic implications of the lack of tremolite in UICC reference chrysotile. Am. J. Ind. Med., **34**, 314-317, 1998.

Giannasi F., and Thebaud-Mony A.: Occupational exposures to asbestos in Brazil. Int. J. Occup. Environ. Health, **3**, 150-157, 1997.

Harington J.S., and McGlashan N.D.: South African asbestos: production, exports, and destinations, 1959-1993. Am. J. Ind. Med., **33**, 321-326, 1998.

International Agency for Research on Cancer: IARC monographs on the evaluation of carcinogenic risks to humans. Suppl. 7, 106-116. IARC, Lyon, 1987.

International Programme on Chemical Safety: Environmental health criteria 77: Man-made mineral fibres. World Health Organization, Geneva, 1988.

Izmerov N., Flovskaya L., and Kovalevskiy E.: Working with asbestos in Russia (letter). Castleman B.I. (reply). Int. J. Occup. Envir. Health, **4**, 59-61, 1998.

Jarvholm B., Englund A., and Albin M.: Pleural mesothelioma in Sweden: an analysis of the incidence according to the use of asbestos. Occup. Environ. Med., **56**, 110-113, 1999.

Peto J., Decarli A., La Vecchia C., *et al*.: The European mesothelioma epidemic. Br. J. Cancer, **79**, 566-572, 1999.

Selikoff I.J., Hammond E.C., and Churg J.: Asbestos exposure and neoplasia. JAMA, **188**, 22-26, 1964.

Selikoff I.J., Hammond E.C., and Churg J.: Mortality experiences of asbestos insulation workers, 1943-1968. In: H.A. Shapiro, Pneumoconiosis. Proceedings of the International Conference, 180-186. Oxford University Press, Johannesburg, Cape Town, 1969.

Selikoff I.J., and Seidman H.: Asbestos-associated deaths among insulation workers in the United States and Canada, 1967-1987. Ann. NY Acad. Sci., **643**, 1-14, 1991.

Smith A.H., and Wright C.C.: Chrysotile asbestos is the main cause of pleural mesothelioma. Am. J. Ind. Med., **30**, 252-266, 1996.

Stayner L.T., Dankovic D.A., and Lemen R.A.: Occupational exposure to chrysotile asbestos and cancer risk: a review of the amphibole hypothesis. Am. J. Public Health, **86**, 179-186, 1996.

Stayner L., Smith R., Bailer J., *et al*.: Exposure-response analysis of risk of respiratory disease associated with occupational exposure to chrysotile asbestos. Occup. Environ. Med., **54**, 646-652, 1997.

UNEP, ILO, WHO: Chrysotile asbestos. Environmental Health Criteria 203. World Health Organization, Geneva, 1998.

Vigliani E.C., Mottura G., and Maranzana P.: Association of pulmonary tumors with asbestos in Piedmont and Lombardy. Ann. NY Acad. Sci., **132**, 558-574, 1964.

Wagner J.C., Sleggs C.A., and Marchand P.: Diffuse pleural mesothelioma and asbestos exposure in the North Cape Province. Br. J. Ind. Med., **17**, 260-271, 1960.