

## Assault and abuse of health care workers in a large teaching hospital

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**Objectives:** To determine the nature, extent and costs of injuries to health care workers caused by physical abuse.

**Design:** Retrospective study.

**Setting:** Large acute and tertiary care teaching hospital in Winnipeg.

**Participants:** All health care workers at the hospital who filed reports of abuse-related injuries and of verbal abuse and threatening behaviour from Apr. 1, 1991, to Mar. 31, 1993.

**Outcome measures:** Frequency of physical and verbal abuse of hospital personnel according to job category, type of injury, hours of staff time lost and estimates of costs compensated for abuse-related injuries.

**Results:** Of the 242 reported abuse-related injuries 194 (80.2%) occurred among the nursing personnel. The nurses in the medical units filed most (33.1%) of the reports. Although the psychiatric nurses filed fewer reports (35 [14.5%]) they had the highest rate of injuries per 100 000 paid hours among the nursing staff. Not surprisingly, the security officers were at highest risk, 53.5% having reported an abuse-related injury for a rate of 16.8 such injuries per 100 000 paid hours. Male staff members had a higher injury rate than their female counterparts in all occupational groups. Bruising or crushing was the most frequent type of injury (in 126 cases); the next most frequent were cuts and lacerations (in 47) and human bites and exposures to blood or body fluids (in 23). However, the 36 sprains and strains resulted in the largest amount of time lost. In all, over 8000 hours were lost due to abuse-related injuries, and over \$76 000 was paid in workers' compensation benefits. Concurrently, 646 incidents of verbal abuse and threatening behaviour were reported. Only three abuse-related injuries and two incidents of verbal abuse were reported by physicians.

**Conclusions:** Abuse-related injuries to health care workers in an urban hospital are prevalent, serious and can be costly in terms of time off work and compensation. Underreporting is likely, especially among physicians.

**Objectifs :** Déterminer la nature, l'étendue et les coûts des blessures causées par la violence physique à l'égard des travailleurs de la santé.

**Conception :** Étude rétrospective.

**Contexte :** Grand hôpital d'enseignement, de soins de courte durée et de soins tertiaires de Winnipeg.

**Participants :** Tous les travailleurs de la santé de l'hôpital qui ont rapporté avoir subi des blessures causées par la violence ou avoir été la cible de violence verbale ou de menaces entre le 1<sup>er</sup> avril 1991 et le 31 mars 1993.

**Mesures des résultats :** Fréquence des agressions physiques et verbales subies par le personnel hospitalier selon la catégorie d'emploi, le type de blessure, les heures de travail perdues

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par le personnel et l'estimation des coûts des indemnités versées à la suite de blessures causées par la violence.

**Résultats :** Les membres du personnel infirmier ont été victimes de 194 (80,2 %) des 242 cas signalés de blessures causées par la violence. Les infirmières des services médicaux ont produit le pourcentage le plus élevé (33,1 %) des rapports. Même si les infirmières en psychiatrie ont produit moins de rapports (35 [14,5 %]), ce sont elles qui ont subi le plus de blessures par 100 000 heures de travail rémunérées au personnel infirmier. Il n'est pas étonnant de constater que les agents de sécurité sont les plus à risque : 53,5 % ont signalé une blessure causée par la violence, pour un taux de 16,8 blessures de cette nature par 100 000 heures de travail rémunérées. Parmi les membres du personnel, le taux de blessures a été plus élevé chez les hommes que chez les femmes dans toutes les catégories d'emploi. Les contusions ou les écrasements représentent le type de blessure le plus fréquent (126 cas), suivis des coupures et lacérations (47), et des morsures et expositions au sang ou aux liquides organiques (23). Ce sont toutefois les 36 entorses et foulures qui ont fait perdre le plus de temps de travail. Au total, il s'est perdu plus de 8 000 heures à la suite de blessures liées à la violence et l'on a payé plus de 76 000 \$ en prestations d'accidents du travail. Par ailleurs, on a signalé 646 cas de violence verbale et de menaces. Les médecins n'ont signalé que trois blessures causées par la violence et deux incidents de violence verbale.

**Conclusions :** Les blessures causées par la violence dont sont victimes les travailleurs de la santé dans un hôpital urbain sont nombreuses, sérieuses et peuvent coûter cher en congés et en indemnités. Il est peu probable que ces cas ne soient pas suffisamment signalés, particulièrement chez les médecins.

On Oct. 14, 1993, at approximately 11 pm, a 32-year-old man arrived at the Emergency Department of Winnipeg's Health Sciences Centre (HSC), a large teaching hospital in the downtown core. He had suffered a back injury in 1988 and had had back pain ever since. He had presented to the Emergency Department 2 weeks previously and had been sent home. During the second visit, after the usual wait of 1 to 2 hours, he was examined and found to be fit to return home and was given advice and minimal intervention. As the physician turned to leave, the patient, without warning, lunged at him, grabbed his collar and wrestled him to the ground. Four security officers and several other staff members were required to pull him from the physician. The patient had no history of violence but was apparently perturbed by the lack of aggressive management. Fortunately no weapons were involved, and no serious injury ensued.

Abuse of health care workers is not uncommon. Three emergency physicians were recently shot in Los Angeles, with evidence that long waits and an inability to obtain needed services were contributing factors.<sup>1</sup> A recent siege at a Utah hospital resulted in the death of a nurse and a 17-hour hostage taking in the maternity ward.<sup>2</sup> In other reports 42% to 100% of nurses, psychiatrists and other therapists in US psychiatric facilities experienced at least one assault during their careers.<sup>3-6</sup> A study of staff abuse in comparable general hospitals in Amsterdam and Tel Aviv<sup>7</sup> found that 15% and 45% respectively of the staff members had been assaulted at least once; the difference in rates was attributed to the socioeconomic and cultural conditions in the two countries. Lavoie and associates,<sup>8</sup> investigating the incidence of violence in the emergency departments of 127 large teaching hospitals, reported that in 43% at least one

physical attack on a staff member occurred per month; 7% of these resulted in death.

Violence in the emergency department often shifts into the hospital when the patient is admitted, the result being violence in not only psychiatric units but also medical units, surgical units, maternity wards and even pediatric units.<sup>9</sup> With the increasing presence of weapons in hospitals and massive funding cuts potentially threatening the availability of services, Canadian health care workers may well face the same threats as their American and Israeli counterparts.

Staff abuse takes its toll both directly, in monetary costs, and indirectly, in diverted health care resources and decreased staff morale. For example, Liss and McCaskell<sup>10</sup> found that over \$850 000 was paid from 1987 to 1989 by the Ontario Workers' Compensation Board to nurses who were victims of abusive injuries. Additional costs may result from security and post-traumatic counselling, facility or equipment repair, training and support services for the unit involved, modified duty, and reduction of work productivity and quality of care because of decreased staff morale. Poster and Ryan,<sup>6</sup> for example, found that cognitive, emotional and physical sequelae may continue long after the victim returns to work.

In the United States many studies have implicated staffing patterns as contributors to violence. For example, in two studies staff shortages and cuts in the number of trained staff increased the incidence of violence.<sup>11,12</sup> Long waits for services and an inability to obtain desired services have also been implicated.<sup>1</sup> Other risk factors include the early discharge of patients with acute and chronic mental illnesses without adequate outpatient treatment and services.<sup>1</sup>

The greater aggression toward physicians than toward nurses in the Israeli hospital was attributed by Van

Londen and associates<sup>7</sup> to a general perception that physicians "overestimate their knowledge, demand too much money for their assistance, and neglect the care of the poor." In the same study the authors described a vicious circle in which practising physicians are underpaid and overworked; they thus become irritable, which generates discontent in patients, who react verbally or with physical violence, which in turn leads to increased irritability of the physicians.<sup>7</sup> Sloane<sup>13</sup> commented that the behaviour of Canadian physicians is increasingly coming under scrutiny and attack, both from patients and from public institutions. Sloane attributed this to the perception that physicians are not living up to the standards expected of them, which in turn exposes physicians to impossible demands and even abuse from those they are trying to help. Sloane felt that physicians may, as a result, become defensive, withdraw from patient care or reassert their own needs and thus offend or provoke their patients. Indeed, the recent Medical Post National Survey of Canadian Doctors<sup>14</sup> confirms that physicians perceive an erosion of their stature in the eyes of the public, betrayal by other health care workers and growing stress.

This study focuses on abuse-related physical injuries

to staff members at a large urban hospital. It was undertaken to determine the nature and extent of injuries caused by abuse, to quantify the time lost from work and the cost of these injuries and to identify the areas and occupational groups at greatest risk. No such study has been previously conducted in a Canadian general hospital.

## Methods

HSC policy requires that all staff injuries be reported promptly to the Department of Occupational and Environmental Medicine on standardized forms. Information, gathered into a database, includes the demographic characteristics of the injured worker (e.g., job classification, department), the type of injury (e.g., sprain or strain, exposure to blood or body fluid), the nature of injury (e.g., lifting or transferring patient, fall, needlestick injury) and the body part injured. When an injury results in time lost from work, forms for the Manitoba Workers' Compensation Board are completed by the injured worker, the attending physician and the Human Resources Department. The compensation board sends each employer in the province a monthly state-

Table 1: Number and rate of injuries caused by physical abuse of health care workers at the Health Sciences Centre, Winnipeg, from Apr. 1, 1991, to Mar. 31, 1993, by portfolio\* and department

Portfolio; department	Total no. of paid hours	Total no. (and %) of injuries	No. of injuries per 100 000 paid hours
<b>Medical</b>			
Pediatrics-EEG†	12 247	2 (0.8)	16.3
Radiology	608 631	1 (0.4)	0.2
<i>Subtotal</i>	<i>620 878</i>	<i>3 (1.2)</i>	<i>0.5</i>
<b>Nursing</b>			
Ambulatory care	542 516	1 (0.4)	0.2
Children's Hospital	1 741 929	22 (9.1)	1.3
Medicine	1 889 022	80 (33.1)	4.2
Psychiatry	541 022	35 (14.5)	6.5
Surgery	2 000 380	53 (21.9)	2.6
Women's Hospital	1 167 983	1 (0.4)	0.1
Other‡	310 786	2 (0.8)	0.6
<i>Subtotal</i>	<i>8 193 638</i>	<i>194 (80.2)</i>	<i>2.4</i>
<b>Operations</b>			
Dietary services	1 068 221	2 (0.8)	0.2
Housekeeping	950 326	4 (1.7)	0.4
Materials handling	611 315	2 (0.8)	0.3
Occupational therapy	188 993	1 (0.4)	0.5
Physiotherapy	370 267	2 (0.8)	0.5
Respiratory technology	195 170	2 (0.8)	1.0
Security	184 858	31 (12.8)	16.8
Social work	174 291	1 (0.4)	0.6
<i>Subtotal</i>	<i>3 743 441</i>	<i>45 (18.6)</i>	<i>1.2</i>
<b>Total</b>	<b>12 557 957</b>	<b>242 (100.0)</b>	<b>1.9</b>

\*The hospital is divided administratively into three portfolios: medical (physicians, medical scientists and support staff in medical departments), nursing (ward staff and majority of nurses) and operations (staff providing support services [e.g., dietary staff, housekeeping staff, maintenance workers and security personnel]).

†EEG = electroencephalography.

‡Includes nursing students and educational personnel.

ment of the time lost and costs associated with each claim. The costs include wage-loss payments, rehabilitation costs and payments for medical aid (including fees for physicians' services, physiotherapy and radiology). The HSC's Department of Occupational and Environmental Medicine links this monthly statement with its internal database so that time lost and costs can be tracked by the variables described above.

An abuse-related injury is defined as one that results from actions intended to cause physical or emotional harm. Thus, an injury incurred by a nurse while trying to lift an uncooperative patient would not be considered an abuse-related injury, but an injury incurred when a combative patient kicks a staff member would be.

At the time of the study the HSC had been administratively separated into portfolios. All physicians, medical scientists and support staff members in medical departments (including the laboratories) fell under the domain of the medical portfolio. The ward staff and most of the nurses were in the nursing portfolio. Support services, including dietary staff, housekeeping staff, maintenance workers and security personnel, were in the

operations portfolio. Smaller portfolios consisted of human resource personnel, finance staff and planning personnel. The nursing portfolio was the largest and had the most elaborate administrative mechanisms, which included the routine reporting to nursing management of all "incidents" involving personnel in that portfolio or patients in their care, regardless of whether an actual injury resulted.

All reports of injuries submitted to the Department of Occupational and Environmental Medicine from Apr. 1, 1991, to Mar. 31, 1993, that were coded as having been caused by abuse were reviewed. All workers' compensation costs and lost work days compensated by the Workers' Compensation Board were enumerated. Sick days taken or time taken for counselling during paid work hours were not included. Expenses incurred by the Department of Occupational and Environmental Medicine or other health care and management personnel in follow-up to these injuries were also excluded from the analysis.

Rates of injuries by portfolio, department, job classification and sex were obtained by linking injury data to

Table 2: Frequency, time lost and cost of reported abuse-related injuries by department and type of injury

Portfolio; department	Human bites and exposures to blood or body fluids		Cuts and lacerations		Bruising and crushing injuries		
	No. of injuries	Total cost‡, \$	No. of injuries	Total cost‡, \$	No. of injuries (and LTIs*)	Hours lost†	Total cost‡, \$
Medical							
Pediatrics - EEG	0	0	0	0	2	0	0
Radiology	0	0	0	0	0	0	0
Subtotal	0	0	0	0	2	0	0
Nursing							
Ambulatory care	0	0	0	0	0	0	0
Children's Hospital	4	91	4	0	6 (2)	60	1 747
Medicine	3	0	17	17	40 (1)	30	507
Psychiatry	4	0	3	0	17 (4)	308	3 389
Surgery	0	0	6	0	27 (2)	75	855
Women's Hospital	0	0	0	0	1	0	0
Other	2	90	6	54	15	0	317
Subtotal	13	181	36	71	107 (9)	473	6 815
Operations							
Dietary	0	0	0	0	1	0	16
Housekeeping	1	0	1	0	1	0	87
Materials handling	0	0	0	0	0	0	0
Occupational therapy	0	0	1	0	0	0	0
Physiotherapy	1	0	1	0	0	0	0
Respiratory technology	1	0	1	0	0	0	0
Security	7	229	6	164	15 (1)	15	541
Social work	0	0	1	0	0	0	0
Subtotal	10	229	11	164	17 (1)	15	644
Total	23	410	47	235	126 (10)	488	7 459

\*LTIs = lost-time injuries (the number of injuries for which workers' compensation wage-loss benefits were paid).

†The number of lost hours for which workers' compensation wage-loss benefits were paid. The number was derived by multiplying the total number of days off work by 7.5 (the average number of hours worked per day).

‡Worker's compensation benefits paid for wage replacement or medical aid costs or both.

§Includes "broken glasses" (in 7 cases), burn (1), chipped tooth (1), "slap with a rag" (1).

information from the Human Resources Department regarding hours worked according to these variables.

Although all injuries must be reported to the Department of Occupational and Environmental Medicine, not all incidents of abuse are reported; specifically, incidents that do not result in physical injury tend not to be reported. To gain an appreciation of the extent of under-reporting or of non-injury-inducing incidents (e.g., verbal abuse) all reports of abuse to the nursing and medical portfolios during the study period were also reviewed.

## Results

During the 2 years studied, most (80.2%) of the reports of abuse-related injuries were from the nursing personnel (Table 1). The nurses in the medical units accounted for 33.1% of the reports and the psychiatric nurses for 14.5%.

Given the different sizes of the various occupational groups and the hours worked by these groups (Table 1) the psychiatric nurses were at the highest risk of abuse-related injury among the nursing staff, with a

rate of 6.5 abuse-related injuries per 100 000 paid hours. In fact, 16.4% of the registered psychiatric nurses reported an abuse-related injury, as compared with 12.8%, 8.4% and 6.0% of the unit assistants, the licensed practical nurses and the registered nurses respectively. The security personnel reported only 31 (12.8%) of the abuse-related injuries, but unsurprisingly that group had the highest risk of such injury, at 16.8 per 100 000 paid hours; 53.5% of the security officers reported an abuse-related injury (data not shown).

Although abuse-related injuries were reported from 22 job categories, including respiratory, occupational and physical therapists, radiology and electroencephalography technicians, social workers and even house-keeping and dietary staff, 211 (87.2%) of the injuries were reported from 182 staff members in just 4 of the job categories. Within each category the men experienced higher rates of abuse-related injury than the women: security officers, 54.1% v. 50.0%; registered psychiatric nurses, 33.3% v. 10.2%; unit assistants, 18.0% v. 10.1%; and registered nurses, 11.3% v. 5.8%.

The nature of the injuries is shown in Table 2. In all

Sprains and strains			Other		Total		
No. of injuries (and LTIs*)	Hours lost†	Total cost‡, \$	No. of injuries	Total cost‡, \$	No. of injuries (and LTIs)*	Hours lost†	Total cost‡, \$
0	0	0	0	0	2	0	0
1	0	0	0	0	1	0	0
1	0	0	0	0	3	0	0
0	0	0	0	0	1	0	0
8 (1)	285	3 189	0	0	22 (3)	345	5 027
7	0	198	3	87	70 (1)	30	809
5 (1)	45	583	5	220	34 (5)	353	4 192
8 (3)	7 208	64 220	1	0	42 (5)	7 283	65 075
0	0	0	0	0	1	0	0
1	0	0	0	0	24	0	461
29 (5)	7 538	68 190	9	307	194 (14)	8 011	75 564
0	0	01	0	2	0	16	
1	0	0	0	0	4	0	87
2	0	32	0	0	2	0	32
0	0	0	0	0	1	0	0
0	0	0	0	0	2	0	0
0	0	0	0	0	2	0	0
3	0	90	0	0	31 (1)	15	1 024
0	0	0	0	0	0 1	0	0
6	0	122	1	0	45 (1)	15	1 159
36 (5)	7 538	68 311	10	307	242 (15)	8 026	76 723

three portfolios bruising and crushing injuries were the most frequently reported (126), but strains and sprains (36) resulted in the greatest time lost and total cost (over \$68 000). Fifteen of the 162 injuries resulted in over 8000 hours of compensated time loss alone.

Most (230 [95.0%]) of the reported injuries were afflicted by patients. Security officers reported five injuries and nursing personnel two injuries from abuse by visitors. Abuse by coworkers was reported by dietary staff and materials-handling workers; in no reports were physicians involved.

In addition to the 242 abuse-related injuries, there were 646 reported incidents of verbal abuse and physically threatening behaviour from patients, visitors and coworkers. The data were consistent with the injury data, in that nurses in the medical, psychiatric, surgical and pediatric units reported verbal abuse or threatening behaviour most frequently (320, 184, 69 and 46 incidents respectively). Only two of the reports filed by staff in the medical portfolio during the study period were related to verbal abuse: one was verbal abuse from a patient, the other was verbal abuse from a coworker. (The incident described in the opening paragraph of this article was never officially reported by the physician.)

## Discussion

This study constitutes the first hospital-based report of injuries caused by abuse at a Canadian general hospital. The findings confirm that abuse-related injuries are prevalent. Among the nurses such injuries were reported most frequently by those in the medical and surgical units; however, nurses in the pediatric units were also at risk, and psychiatric nurses were at greatest risk. Unit assistants and licensed practical nurses were at greater risk than registered nurses, and male nursing staff were at considerably greater risk than their female counterparts. This finding is consistent with those from previous reports.<sup>10,15</sup> Over half of the security officers at the HSC reported an abuse-related physical injury during the study period.

The consequences of abuse-related injuries were shown in this study to be serious and costly, the workers' compensation wage-loss benefits in one case alone exceeding \$65 000. Moreover, this study showed that reported physical injuries represent the "tip of the iceberg." Occupational injuries often go unreported; this is particularly true of abuse-related injuries, because the health care worker may feel that the violent act resulted from a failure to deal effectively with the patient or family. Alternatively, the health care worker may feel that this is all "part of the job" and should be accepted as such.

The underreporting strongly suggested in these data not only constitutes an obvious limitation of this study but may indicate inadequacies in the risk-management systems of the HSC. The fact that only 3 of the 242

physical injuries due to abuse and 2 of the 646 incidents of verbal abuse or threatening behaviour were reported from the medical portfolio strongly suggests a lack of reporting by the medical profession. Physicians at the HSC were poorly covered by the occupational health program, because most physicians were not "employees" of the hospital and therefore not required to observe corporate policies and procedures applicable to all other staff. This is being rectified. Ironically, although the case described in the opening paragraph was not reported by the physician involved, a nurse who witnessed the situation filed an incident report. The attitude described by van Londen and collaborators<sup>7</sup> of "What's the big deal?" may have been operant here.

This study was not designed to assess victim risk factors or perpetrator characteristics, nor was it designed to investigate post-injury morale and the myriad indirect costs associated with workplace abuse. A prospective study is needed in which every health care worker who reports an abusive incident is appropriately interviewed to obtain the necessary information. Preferably, such a study would concurrently evaluate the effectiveness of an intervention program introduced to prevent violent behaviour in health care settings and to minimize the post-traumatic sequelae that may occur. Educational campaigns would be needed as part of this effort, both to prevent abuse and to encourage reporting, and the materials would have to be presented in a manner that combats indifference and avoids victim blaming.

The causes of high incidence rates of violence in health care settings are complex. Whether the data from this study represent a true increase in the incidence rate is not known. Physicians can play an important role in breaking the vicious cycle by drawing attention to abuse-related injuries as one of the consequences of reduced health care funding and by encouraging and practising nonviolent conflict resolution in dealings with patients and other health care workers. First, however, physicians must recognize the growing threat of staff abuse toward not only other members of the health care team but also the medical profession. As traditional leaders in health care provision it is time for the medical profession to become involved.

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## Conferences continued from page 1257

### May 28-June 1, 1995: 2nd International Heart Health Conference

Barcelona, Spain

Abstract deadline: Dec. 15, 1994

Official language: English

Pacifico, S.A., Enric Granados St. 44, 08008 Barcelona, Spain; tel 011-343-454-5400, fax 011-343-451-7438

### May 30-June 3, 1995: Child Health 2000: 2nd World Congress and Exposition

Vancouver

Abstract deadline: Nov. 30, 1994

Study credits available.

Child Health 2000, 113-990 Beach Ave., Vancouver, BC V6E 4M2; tel (604) 682-6008 or (800) 515-6008, fax (604) 682-6771

### May 31-June 2, 1995: 12th International Society for Quality in Health Care World Congress — Partnerships for Creating a Quality Health System: Users-Providers-Funders

St. John's

12th ISQua World Congress, Organizing Secretariat, Beclin Building, 1118 Topsail Rd., PO Box 8234, St. John's, NF A1B 3N4; tel (709) 364-7704, fax (709) 364-6460

### June 1-3, 1995: Oral-Motor Skills Workshop: the Development of Oral-Motor Skills in Children Receiving Nonoral Feedings

London, Ont.

CPRI, 600 Sanatorium Rd., London, ON N6H 3W7; tel (519) 471-2540, ext. 2074; fax (519) 641-1922

### June 20-22, 1995: International Genetic Epidemiology Society 4th Annual Meeting (in conjunction with a joint symposium with the Society for Epidemiologic Research, June 23-24)

Snowbird, Utah

Robert C. Elston, Department of Biometry and Genetics, Louisiana State University Medical Center, 1901 Perdido St., New Orleans, LA 70112; tel (504) 568-6150, fax (504) 568-8500

### July 16-20, 1995: 4th International Conference: Amsterdam '95 — Health Law and Ethics in a Global Community Amsterdam, the Netherlands

Abstract deadline: Dec. 1, 1994

American Society of Law, Medicine and Ethics,

765 Commonwealth Ave., 16th floor, Boston, MA 02215; tel (617) 262-4990, fax (617) 437-7596

### Aug. 7-11, 1995: 4th International Congress on Amino Acids Vienna, Austria

Abstract deadline: Apr. 30, 1995

Dr. Gert Lubec, Department of Paediatrics, University of Vienna, Währinger Gürtel 18, A-1090 Vienna, Austria; fax 011-431-40400-3238

### Sept. 20-25, 1995: 17th IEEE Engineering in Medicine and Biology Society Annual International Conference and 21st Canadian Medical and Biological Engineering Conference Montreal

Coplanor Congrès inc., 600-511 Place d'Armes, Montreal, PQ H2Y 2W7; tel (514) 848-1133, fax (514) 288-6469

### Sept. 21-23, 1995: 9th Annual Conference of the European Society for Philosophy of Medicine and Health Care — Medicine and Culture (cosponsored by the International Hippocratic Foundation of Kos)

Island of Kos, Greece

Prof. Spyros Marketos, Institute of the History of Medicine, University of Athens, 20 Patr. Ioakeim St., 10675 Athens, Greece, or Prof. Henk ten Have, Department of Ethics, Philosophy and History of Medicine, Faculty of Medical Sciences, Catholic University of Nijmegen, PO Box 9101, 6500 HB Nijmegen, the Netherlands

### Dec. 17-22, 1995: International Symposium on Environmental Biomonitoring and Specimen Banking (held in conjunction with the International Chemical Congress of Pacific Basin Societies, sponsored by the American Chemical Society, the Canadian Society for Chemistry, the Chemical Society of Japan, the New Zealand Institute of Chemistry and the Royal Australian Chemical Institute)

Honolulu, Hawaii

Abstract deadline: Mar. 31, 1995

K.S. Subramanian, Environmental Health Directorate, Health Canada, Tunney's Pasture, Ottawa, ON K1A 0L2; tel (613) 957-1874, fax (613) 941-4545