Study says overworked private-practice Quebec FPs must change way they practise

It's a bird. It's a plane. No, it's superdoc. A just-released study from the Fédération des médecins omnipraticiens du Québec says that changes to the province's health care system are creating superhuman expectations of overworked, isolated GPs in private practice. It's no surprise, says FMOQ President Rénald Dutil, that FPs in private practice are becoming morose and discouraged.

They currently provide 80% of primary care in the province, and they are assuming more and more clinical responsibilities because of hospital closures and Quebec's new emphasis on outpatient care ("virage ambulatoire"). Yet there is little infrastructure in place to support these doctors.

"Patients are gravely ill, but nonetheless they are being cared for by doctors in private practice, many of whom are working solo," says Dutil. In addition, the fact that 558 Quebec FPs recently opted for early retirement has left thousands of patients without physicians and has increased the workload for the ones who are left. As well, young physicians now entering the field, many of whom are women, do not want to work the long hours of their predecessors.

FMOQ President Dr. Rénald Dutil answers question during press conference

But those aren't the only areas of concern. Dr. Michel L'Heureux, the study author, says that with an aging population of "baby boomers" who increasingly act like "informed consumers," family doctors will have to change their overall approach.

What to do? L'Heureux and his team have issued a set of "strategic guidelines," which propose that FPs change the way they work and allocate their time instead of trying to do more with less. Suggested changes include practising family medicine as part of a "family medicine network" as opposed to practising in individual offices. Que-

(Continued on page 1464)

New McMaster health program overrun with applicants

A new honours health sciences program at McMaster University has proved so popular that the cut-off marks for applicants will be a minimum of 90%, program administrator Teresa Boyd says. The course will be launched with 80 students in September. More than 1400 students applied for entry, with almost 400 applicants making it their first choice.

The new program will employ the same problem-based-learning format that McMaster's medical school made famous. The course is interdisciplinary, but students will have to take several "hard science" courses, including 2 biology and 2 chemistry courses in the first year. The course goal is to "provide students with a solid knowledge base in health-related sciences, as well as the skills needed to critically evaluate and synthesize health-related information."

Boyd said graduates will have 3 career options. Some will choose a professional career such as medicine, while others will enter graduate school and pursue careers such as health administration. The final group will start work immediately, in areas such as pharmaceutical sales. — *Patrick Sullivan*, CMAJ

Blood collecting resumes in Newfoundland community

Canadian Blood Services will start accepting blood from residents of a rural area of Newfoundland that was once known for high rates of HIV infection. The move comes because the rates are now in line with those in the rest of Canada.

In 1995, the Canadian Red Cross stopped holding blood donor clinics in Conception Bay North, a string of small communities about an hour's drive from St. John's, because the area's HIV infection rate was higher than in the rest of the province and in many parts of the country. In a catchment area with 30 000 residents, 54 people were discovered to be HIV positive. Health officials connected many of the new cases to 1 man, who had infected multiple sexual partners.

"The Red Cross' concern was that it had no idea how many women were infected or at what stage of the disease they were in," says Dr. Karl Misik, medical director with Canadian Blood Services in St. John's, the organization that now manages the blood supply. "Plus, they may have infected others with the virus."

Since then, the centre has conducted annual reviews of the data for Conception Bay North and concluded that the rate of infection there is now similar to rates in the rest of Canada. At the same time, there has been marked improvement in HIV testing. Current tests can detect HIV in the blood within approximately 21 days of infection. New tests, to be introduced in June, will reduce that period to 6 to 11 days.

The people of Conception Bay North were upset when the clinics were cancelled, saying it stigmatized their communities and left a negative impression about the area throughout the province and the country. "We tried to get the people in Conception Bay North to understand that it was for safety reasons," says Misik. "I think we've overcome this hurdle by explaining that."

In fact, service groups like the Kiwanis Club have responded positively to the news that the clinics will resume and are eager to get to work organizing them. The first clinics were slated to open in March. — *Beth Ryan*, St. John's

A new type of FP

(Continued from page 1463)

bec FPs have also been advised to formulate a mission statement and business plan, keep pace with new information technologies and assess the satisfaction of the "clientele." The 8 recommendations are strongly worded —"henceforth, the family physician who works in a private practice must" is one example — and they are rooted in the bottom-line directives of management consulting.

There were also suggestions for the FMOQ itself. The federation is supposed to foster the family medicine networks, provide tools and guidebooks to help doctors run their practices, and investigate alternatives to the current fee-for-service system. "How can we encourage doctors to follow their patients in an ongoing way," says L'Heureux, "while their costs are growing and their fees haven't increased in years? The individual doctor is not superman." — *Susan Pinker*, Montreal

Vague child protection law puts onus on physician to report

Ontario physicians and other health professionals now have a large but ambiguous responsibility to report not only children who "suffer abuse" but also cases in which a child is "in need of protection." New child protection legislation, which was approved in May 1999, aims to prevent children from falling through the cracks of the child protection system, says Toronto lawyer Tracey Tremayne-Lloyd, an expert in health law at Tremayne Lloyd Partners. A child "in need of protection" is one whose best interests, protection and well-being are not being sustained.

The legislation will undoubtedly lead to more reporting and awareness — a good thing, says Tremayne-Lloyd — but it also puts physicians in a vulnerable legal position. They are now legally liable for failing to report cases, and penalties include fines of up to $1000 and imprisonment for up to a year. The new legislation also allows children to sue physicians for failing to protect them. And since the limitation period for starting legal action does not begin until the child has turned 18, the physician's potential liability and exposure extends for years.

It puts physicians in an awkward situation, says Tremayne-Lloyd. "If physicians act precipitously, it can create conflict with the family and destroy the patient–physician relationship. But, if they don't act, they could be fined and then sued for damages."

There have been no charges under the legislation, but Tremayne-Lloyd says it's only a matter of time. She also believes that other provinces will adopt similar legislation. She says physicians should err on the side of caution, arguing that it is better to make 2 or 3 mistakes than to let a case slip by.

Tremayne-Lloyd acknowledges there will likely be some frivolous claims "but there are a lot of children out there suffering in situations where people in authority do nothing." — *Barbara Sibbald*, CMAJ

Nova Scotia launches assault on assault

In addition to asking patients where it hurts, doctors and nurses in emergency rooms, hospital admitting centres and clinics throughout Nova Scotia will now be asking if they have been "hit, kicked or punched by your partner or somebody else" in the past year.

This assault on assault is part of a new provincial department of health policy. "This project certainly demonstrates the health care sector's support for family violence prevention and our commitment to achieving zero tolerance toward violence," says Health Minister Jamie Muir.

Data point to a need for action. It is estimated that about 25% of all Canadian women are abused, and Statistics Canada says the figure is even higher for Nova Scotia — 32%. Although not all victims of abuse are female, the vast majority are, and many — 27%, according to the literature — end up in an emergency room for treatment of some problem.

"If a women comes in with an ingrown toenail, she still has a 27% chance of having been abused or being in an abusive relationship," explains Dr. Sam Campbell, an emergency room physician at the Queen Elizabeth II Health Sciences Centre in Halifax. "That emergency department visit might be our only chance to catch her and try to intervene in her particular situation."

It appears that many women currently slip through the cracks. Last year at the QE II only 68 patients, 2 of whom were men, were referred for help as a result of abuse. "This represents 0.18% of the female patient load that the literature suggests we should be identifying," notes Campbell.

Although it is up to each hospital and health care facility to develop its own screening policies and processes, the Department of Health will spend $25 000 on a training program to ensure that health care professionals are asking the right questions in the right way. — *Donalee Moulton*, Halifax

CMA Online passes the million mark

March provided 3 reasons for *CMA Online* to celebrate. Not only did the Internet service mark its fifth birthday, but it also passed 2 milestones. "March marked the first time we surpassed 1 million page views [1 007 419] in a month, and it also marked the third consecutive month that we had more than 100 000 user sessions," said Ann Bolster, the CMA's associate director, online services. "It's a nice way to celebrate the anniversary."

www.cma.ca/cmaj

Quebec the breeding ground for many New Brunswick MDs

Twelve medical students will say *au revoir* to Quebec's Université de Sherbrooke this year — as they have done in varying numbers for the last 19 years — and head home to New Brunswick to do their residency in family medicine. This one-of-a-kind residency program, launched with a single student in 1981, is designed to help recruit and retain francophone FPs in New Brunswick.

And the need for them has never been greater, says Dr. Michel Landry, director of family medicine for the province's francophone teaching program. New Brunswick has an anglophone physician:patient ratio of 1:559 patients, but the ratio for francophone physicians is 1:838.

New Brunswick, which has no medical school, buys 20 seats at Dalhousie's medical school each year and another 20 at 3 Quebec schools, at least 15 of which must be at the Université de Sherbrooke. When the Sherbrooke graduates are ready to move on to their residencies, New Brunswick opens its doors to 12 of them.

In their first year, the residents spend 6 months in rotation at local hospitals and 6 months at the family medicine clinic in Dieppe, a private clinic run by 10 physicians, who oversee the residents. In their second year the new doctors spend 3 months in rotation, 3 months in the clinic and the rest of the year in another family medicine setting in a francophone community such as Bathurst or Edmundston. "The residents learn the type of practice they will be doing later on," notes Landry. "They feel at ease to come back and work here."

They certainly do. Of the doctors who do their residency in New Brunswick, 91% return to practise there; of NB students who do their residency in Quebec, only 53% return to practise in the province.

Despite the success of the residency program, Canada's only officially bilingual province remains critically short of francophone physicians. Landry and his colleagues have proposed an increase in the number of residents in the special program. "To meet the demand for [francophone] family physicians in New Brunswick we need 15 extra students a year. We're working very hard putting lots of pressure on the government to see the number of seats grow. We've asked for 5 extra seats next year. We'll ask for 5 more the year after that." — *Donalee Moulton*, Halifax

Too many sick infants, not enough nurses

There was no room at the inn for some East Coast babies in March when the Maritimes' only intensive care unit for critically ill newborns was forced to examine whether it could admit any new patients on a case-by-case basis. In 3 instances, the IWK Grace Health Centre in Halifax sent infants to hospitals in New Brunswick and Montreal, and one high-risk pregnant mother was also sent to a hospital outside the province.

Rick Nurse, the hospital's president and CEO, says demand for the Special Care Nursery is often unpredictable due to the complexity of care and the prolonged length of stay for some of the tiny patients. "However, this [March] was an exceptional circumstance — the IWK Grace has never before experienced such a high level of critical care patient activity in this unit."

The special nursery can accommodate 40 infants. Usually 5 to 12 of them are getting breathing assistance from a ventilator and require one-on-one nursing care. In March, however, at least 15 infants needed a ventilator and another 18 women were at risk of early labour. It was the lack of specialized nursing care — and not a shortage of hospital beds — that forced the IWK Grace to send patients elsewhere.

Heather Henderson, president of the Nova Scotia Nurses Union, said the province is currently experiencing a severe shortage of nurses, especially in specialty areas. She estimates that 650 more nurses are needed in the province.

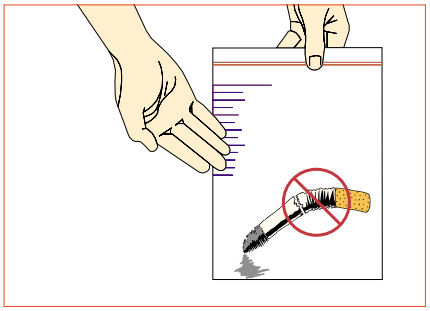
Nurse admits that the hospital does not know whether demand for the services provided by the special nursery was a "blip" or an indication of an ongoing requirement. Health Minister Jamie Muir says the situation was a "blip," and the hospital will receive no more money for additional nurses. — *Donalee Moulton*, Halifax

Bleak AIDS news from South Africa

The *South African Medical Journal* says the AIDS situation in that country is so grim that life expectancy will probably plunge from 64 to 47 years during the next 12 years. Unlike Canada, where the number of AIDS cases is declining, South Africa is being attacked by the disease at all levels.

The *SAMJ* says 200 HIV-infected babies are being born in the country every day; roughly 3 million South Africans — 1 in 10 — are infected with the virus. The South African Department of Health says the country has "failed dismally in controlling the spread of HIV/AIDS in our country. It is disconcerting that of the 20 million cases of HIV infection in sub-Saharan Africa, 2.8 million come from this country, even though the epidemic here started later than in other parts of Africa." — *Patrick Sullivan*, CMAJ

Physicians fight for access to tobacco info, hope to show criminal negligence



A group representing 500 antismoking physicians wants access to thousands of tobacco industry documents to help it "make sense of the science" and contribute to evidence that may lead to criminal charges against the companies.

As the British Columbia and Ontario governments sought to win civil suits against tobacco manufacturers, Physicians For a Smoke-Free Canada filed a suit Mar. 1 under the Freedom of Information Act to gain access to documents the BC government had gathered. The case should be resolved within 90 days, says executive director Cynthia Callard.

Ultimately, the physician group wants to use the information to assess whether the companies had a "wanton disregard for human health and safety," says Callard. If so, criminal charges could be the next step.

The BC government launched a suit against 3 Canadian tobacco companies in November 1998 over the cost of treating smokers. It alleges the industry knew smoking was harmful but didn't tell the public. The case was dismissed because BC laws prohibit the province from suing multinational companies. That legislation may be altered so the suit can proceed. The BC lawsuit follows a multibillion-dollar settlement in the US, under which 27 million pages of tobacco industry documents were released.

The documents the BC government is withholding come from the UK-based Imperial Tobacco Ltd., which manufactures 70% of cigarettes smoked in Canada. The parent company, British American Tobacco Co. Ltd., agreed to release the documents, but they can only be accessed in person in Guildford, England — a trip the physician group could afford to take only once.

The province says releasing the documents may interfere with the conduct of its court case, but Callard is concerned the papers may never come to light if the government settles out of court. She says many of the documents concern progress reports from tobacco research laboratories in Montreal.

The physician's group posted the documents it gathered from the UK depository at **www.tobaccopapers.org**. Health Canada documents from the same repository are at **www.cctc.ca/ncth/guildford**. — *Barbara Sibbald*, CMAJ

Public Health

Indoor moulds and human health

Epidemiology

Stachybotrys atra (also called *S. chartarum* and *S. alternans*) is a dark-coloured fungus that grows well on damp materials that have a high cellulose concentration, such as straw, grass, sawdust and lumber. Its toxin can produce skin and mucous membrane irritation, lymphocytic depletion and hemorrhagic syndrome in farm animals.[1] The question of whether it also produces hemorrhagic effects in humans was raised in 1994 when a cluster of 8 cases involving infants in Cleveland who developed idiopathic pulmonary hemosiderosis was noted.[2] Preliminary results of a case–control study indicated that hemorrhage was associated with major household water damage during the 6 months before illness and increased levels of measurable household fungi, including the mould *Stachybotrys* (odds ratio 1.6, 95% confidence interval 1.0–30.8).[3]

Despite the researchers' caution that further study was needed to determine causality, the alarming suggestion that exposure to this fungus might be fatal led to the rapid closure and cleanup of contaminated buildings, including portable classrooms in Ontario.[4]

It now appears that the health risks posed by *Stachybotrys* may not be as hazardous as initially perceived. In March 2000 the Centers for Disease Control and Prevention (CDC) in Atlanta released the results of 2 separate reviews of the Cleveland investigation.[5] The reviewers concluded that the association between cases of pulmonary hemorrhage in infants in Cleveland and household water damage or exposure to *S. atra* was not adequately substantiated by scientific evidence. The cause of acute idiopathic pulmonary hemorrhage is unresolved; the CDC recommends further surveillance and improved assessment of environmental exposure to moulds and fungi.

These shortcomings demonstrate the methodologic difficulties involved in assessing the health effects of indoor moulds. Fungi and actinomycetes cause a variety of illnesses because of their direct infection of human tissue. These conditions are well known. The indirect nonspecific illnesses caused by these organisms are less clear and more difficult to demonstrate. Possible pathologic mechanisms for the indirect (noninfectious) causes include immune-mediated (hypersensitivity pneumonitis), toxic (mucosal irritation) and carcinogenic (aflatoxin) mechanisms. An expert panel has recently reviewed the evidence supporting causal relationships between certain fungi and a variety of these types of health effects.[6] People with diabetes, immunosuppression or atopy are apparently susceptible populations, as well as infants.

Clinical management

In this case an indirect effect (pulmonary hemosiderosis) was suspected to have been caused by *S. atra*. What should a physician do when confronted with a case of hemoptysis in a child with no known source of bleeding? Idiopathic pulmonary hemosiderosis is similar to Goodpasture's syndrome. It is characterized by bouts of clinical or subclinical pulmonary hemorrhage, but without the renal involvement typical of Goodpasture's. Children are mainly affected; most have iron-deficiency anemia and during bleeding episodes may have fever, hyperbilirubinemia and reticulocytosis.[7] To facilitate diagnosis and reporting, the CDC is developing a standard case definition. In the interim, such cases might be reported directly to the CDC and its assistance sought regarding further investigations.

Recognizing patients in the office whose nonspecific respiratory and systemic symptoms might be related to indoor mould exposure can be challenging. Knowing which populations are at risk and knowing how to take an environmental exposure history can be helpful.

Prevention

The best way to prevent mould growth is to keep all material in homes as clean and dry as possible using adequate ventilation. Surfaces where moisture collects frequently can be cleaned with a baking soda solution one day and vinegar the next to keep moulds at bay. In areas where flooding has occurred, prompt cleaning of walls with water mixed with chlorine bleach, diluted 4 parts water to 1 part bleach, can prevent mould growth.[8]

Further information is available from the Canadian Mortgage and Housing Corporation. It offers a wide range of housing-related information, including clean-up procedures for mould in houses (800 668-2642; **www.cmhc-schl.gc.ca**). In addition, the College of Family Physicians of Ontario has developed an Environment and Health Peer Presenter Program (**www.cfpc.ca/ocfp/cme/ehcpeer.html**). — *Erica Weir*, CMAJ

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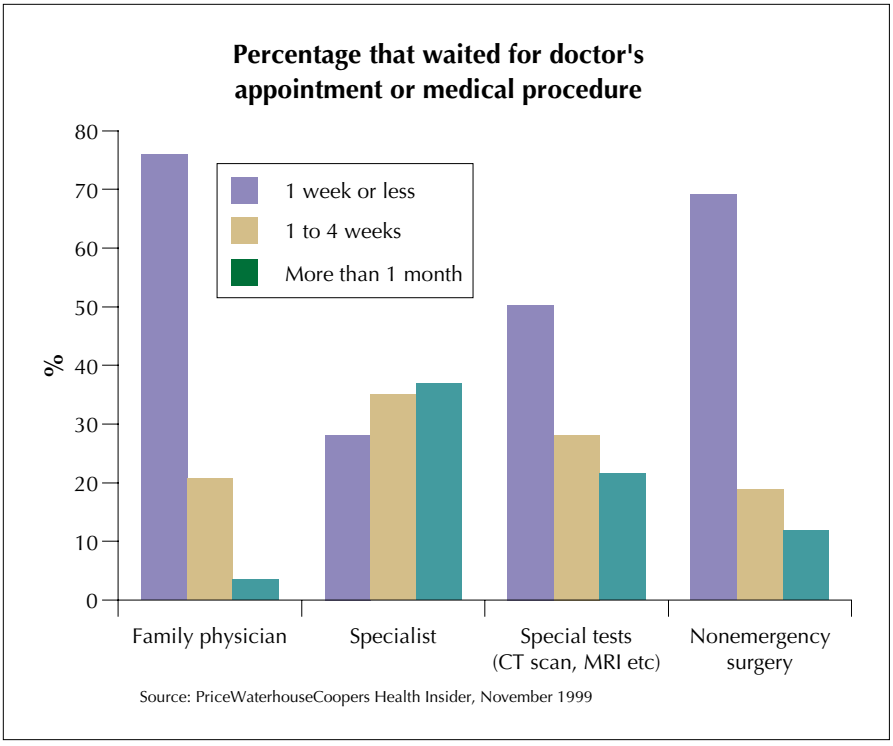
Pulse

Patients appear to be patient, survey finds

PriceWaterhouseCoopers recently asked a representative sample of Canadians how long they had waited to see a doctor or to have a medical procedure performed. Waiting times were shortest for appointments with general practitioners and family physicians, with most respondents (75.9%) waiting a week or less, and only 3.5% waiting longer than a month. Waiting times were also fairly short for nonemergency surgery or other surgical procedures, with 69.2% of respondents waiting no longer than a week, and only 11.9% waiting more than a month.



Among those who had special medical tests, 50.3% waited a week or less and 21.6% waited longer than a month. Waiting times were longest for appointments with specialists, with only 28.1% of respondents waiting a week or less, while more than one-third (36.9%) waited more than a month.

Although more than half of the respondents (52.3%) said waiting times for medical services are longer compared with 5 years ago, the majority (90.3%) stated current waiting times for GP/FPs are acceptable. Most of the respondents also said that longer waiting times to see specialists and for special medical tests (such as CT or MRI scans) were acceptable (83% and 86%).

One-quarter (25.1%) identified access to specialists as the medical service most in need of shorter waiting times, while 18.4% said waiting times for special medical tests could make that claim. Only 9.9% said they needed quicker access to GP/FPs. The survey was released in October and involved medical contacts made by patients in the previous year. — *Shelley Martin*, CMA, **martis@cma.ca**

Access to effective TB treatment a human right, countries declare

Multidrug-resistant strains of tuberculosis have already cost cities like New York and countries like Russia hundreds of lives and more than $1 billion each, and these strains will continue to emerge unless countries act quickly to strengthen their control over the disease, the World Health Organization says.

A new report from WHO and the International Union against TB and Lung Disease indicates that resistance to at least 1 TB drug has increased by 50% in both Denmark and Germany since 1996, and doubled in New Zealand. In all 3 countries, foreign-born TB patients are nearly twice as likely as native-born patients to be harbouring a drug-resistant strain.

"Improved screening of immigrants will not solve this problem," said Dr. Arata Kochi, director of the Stop TB Initiative. "The only safeguard for wealthy countries is to help countries with poorly functioning TB-control programs to fix the problem immediately by helping them strengthen their programs."

To this end, 20 countries attending the Ministerial Conference on TB and Sustainable Development, held in Amsterdam Mar. 24, declared that global access to effective TB treatment is a human right and a government's responsibility. This means that countries must provide anti-TB drugs, unhindered access to TB treatment, effective means of delivering treatment and affordable medicine for peo-

On the Net

Hints for MEDLINE searching

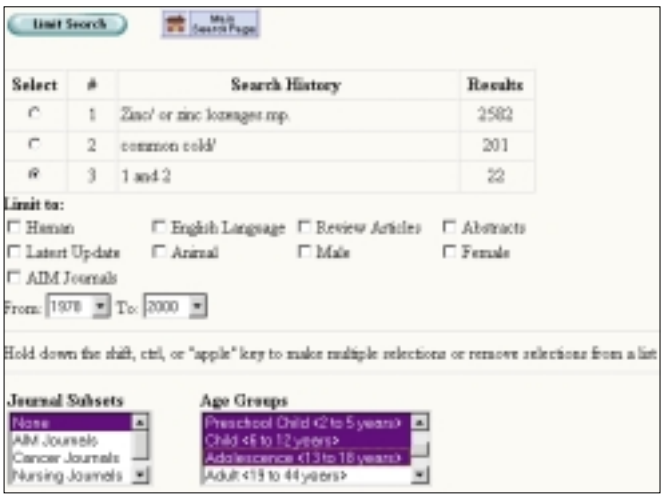
Although many OSLER (Ovid Search: Link to Electronic Resources) users called or sent emails with questions about our recent contest (see Another contest from your friends at OSLER, *CMAJ* 2000;162[2]:251), we received fewer entries than expected.

Perhaps the question was too challenging for those new to MEDLINE searching. Was sending the answer by email the difficult part? If the step-by-step solution provided below still seems mysterious, please contact me for some telephone training on OSLER commands, limits and functions.

This year's challenge was: Is there any evidence that zinc lozenges shorten the duration and severity of the common cold in children? That question contained 2 concepts, **zinc lozenges** and **common cold**, plus an **age limitation** that reduced the results to studies involving children.

Successful searching requires an analysis of the question before moving to the keyboard. Begin by typing **zinc lozenges** into the keyword box. When the Ovid mapping screen appears, select **zinc** as well as **zinc lozenges.mp**. This method, searching by both MeSH heading and text words, is certain to pick up anything on the topic. Once the results have been obtained, perform the next search using the MeSH term **common cold**.

Combine the results of the searches by typing '1 and 2' into the keyword box. The results each contain the concepts **zinc** and **common cold**. Have a quick look at the citations by clicking on the "display" link in the search history box. Since they look useful, the next step is to limit the search to children. Click on the Limits icon in the Ovid Toolbar. When the Limits screen appears, you will see your search history with buttons beside each search statement. Scroll to the Age Groups box. Using the down arrow, find the groups representing childhood and adolescence. Hold down the Ctrl key as you click on these, to ensure that all appropriate age



groups are selected. Click the Limit Search button at the top left. When the Limit function is complete, 2 relevant references will have been found. Neither reports that zinc lozenges shorten the duration of symptoms, so it is necessary to expand the years searched. Select the Change Database icon and run the search again in MEDLINE 1966-2000. This retrieves 5 references; the abstract for one of them reports the finding being sought.

To send references by email, select them, then scroll to the Citation Manager at the bottom of the Titles Display page. Choose the Citation plus abstract fields, include the search history, then select the Email function in the right column. Add your address to the screen that appears, then click on Send Mail.

Send questions or comments to **cmalibrary@sympatico.ca**. — *Deidre Green*, CMA

ple who develop drug-resistant TB. They also identified the need for stronger, faster-acting drugs and an effective vaccine.

As an initial step, all 20 countries agreed to use the WHO's DOTS system (directly observed treatment — short course) with the aim of detecting 70% of all infectious cases by 2005. DOTS combines 5 elements — political commitment, microscopy services, drug supplies, surveillance and monitoring systems, and use of highly efficacious regimes — with direct observation of the patient while the drug is being taken; direct observation means that problems with patient compliance are all but eliminated. It produces cure rates of up to 95% in even the poorest countries and is ranked as one of the "most cost-effective of all health interventions" by the World Bank. A 6-month supply of drugs for DOTS treatment costs as low as US$11 per patient in some parts of the world.

"I am optimistic about the prospects for success," said Dr. Donna Shalala, secretary of health and human services in the US. Between 1982 and 1992, the number of TB cases in New York City tripled. Nearly 4000 people developed the disease in 1992, and one-third of them would not respond to one or more of the usual medicines. More than 500 of these patients eventually died. Shalala emphasized the need to "fight epidemics globally to protect people locally." — *Barbara Sibbald*, CMAJ

Research Update

Inside inflammation: newly discovered receptors are key players in painful conditions

A new mechanism for the excitation of sensory nerves, which play a role in inflammation, has been discovered by researchers at the University of Calgary, in collaboration with colleagues in the US, Italy and the UK (*Nat Med* 2000;6[2]:134-5). The discovery could lead to new treatments for inflammatory conditions.

The researchers discovered that proteases released from sensory cells involved in the inflammatory process activate a newly discovered class of receptors, proteinase activated receptors 2 (PAR2), that are located on sensory neurons. The findings suggest that substances that can block the PAR2 receptors may eventually become new anti-inflammatory drugs. "This direction has yet to be explored; we will now try to study the role of these receptors in the process of inflammation and pain in models of conditions like colitis," says Morley Hollenberg, professor of pharmacology and therapeutics at the University of Calgary. "The novel thing about our work is the involvement of the nervous system."

An editorial in the *British Medical Journal* (*BMJ* 2000;320:331) describes how the US researchers explored the role of tryptase in the inflammatory process. They looked at the interaction of tryptase with PAR2 receptors when mast cells in the vicinity of sensory nerve endings degranulate. "we wanted to establish whether the mast cells were talking to neurons via tryptase," commented Nigel Bunnett of the University of California. The experiments confirmed "that PAR2 receptors on sensory nerves are critical to the inflammatory process."

Ultimately, new anti-inflammatory drugs based on these findings could benefit patients with conditions such as arthritis, inflammatory bowel disease and migraine headaches, but Hollenberg says human trials are a long way off. At this stage, he said, "the work has raised the visibility of this receptor as a target for companies to develop drugs. Companies have been interested in developing drugs to target the PAR1 system, but as yet they have not targeted the PAR2 system."

For Hollenberg, who has worked on the project since 1991, a key aspect of the discovery has been "the coming together of people with unique expertise," none of whom could have completed the research alone. — *Heather Kent*, Vancouver

Monitoring measles key to predicting epidemics

The dramatic changes in epidemic patterns that occur in large cities can be predicted using a remarkably simple mathematical model, says David Earn, a professor of applied mathematics at McMaster University, Hamilton, Ont. (*Science* 2000;287:667-70).

After studying 20th-century measles epidemics in London, Liverpool, New York and Baltimore, Earn and collaborators from Cambridge University and the University of Florida concluded that changes in epidemic patterns previously thought to be "chaotic" or "noise-driven," in the mathematical sense, could be predicted using just birth and vaccination data.

"Measles epidemics range from similar outbreaks every year [annual epidemics], to large or small outbreaks in alternate years [biennial epidemics], to very irregular outbreaks of varying size [irregular epidemics]," Earn says. "In some places there are also records of 3-year cycles."

During the past century, epidemic patterns have changed noticeably. For example, some annual epidemics have shifted to biennial, and biennial epidemics have become irregular.

Earn believes that his paper is the first to indicate the influence of changing birth rates in such transitions.

"The research reported in the current paper allows us to explain transitions in epidemic patterns that have occurred in the past, and to predict transitions in the future. These transitions were not previously thought to be predictable. Since we have revealed a certain type of predictability about the epidemic patterns, we have renewed hope that it may be possible to design better vaccination strategies — strategies that are more likely to lead to eradication of diseases such as measles," Earn says. The new mathematical model is applicable to other diseases with short latency and infectious periods, he told *CMAJ*. "The approach could be used for diseases such as mumps, rubella, chickenpox and whooping cough. It would not apply to influenza or HIV."

However, Earn's elegant model is by no means the last word on the subject, says Sir Robert May, chief scientific adviser to the UK government, in a commentary in the same issue of *Science*.

"Much relevant work remains to be done in teasing apart the social, genetic, age-related, and other complications that are smoothed out in the usual mass-action assumption," May says. — *David Helwig*, London

Turning off the "master switch" for cancer

Researchers at the British Columbia Cancer Agency (BCCA) have made a major breakthrough with the discovery of a "master switch" that can turn off tumour growth in several common types of cancer. The findings could result in promising new treatments for cancer (*Proc Natl Acad Sci USA* 2000;97[7]:3207-12).

Dr. Shoukat Dedhar, a senior scientist at the agency, and his colleagues at Vancouver's Kinetek Pharmaceuticals have found a connection between a key tumour suppressor gene called *PTEN* and the integrin-linked kinase (ILK) protein, which plays a major role in the growth of cancer cells.

ILK prevents tumour cell death, allowing tumours to grow (the "on" switch). In normal cells, the *PTEN* gene controls ILK (providing the "off" switch). However, *PTEN* is mutated or absent in 60% of all solid types of cancer. Dedhar's research indicates that ILK is hyperactive in many of these types of cancer, including prostate, breast, brain, lung and colon cancer. Using human lung, prostate and colon cancer cells, Dedhar and Kinetek's Dr. Jasbinder Sanghera have developed promising ILK-inhibiting compounds that block the formation of new blood vessels and prevent the spread of tumour cells. Experimenting with mice in which human tumours had been transplanted, as well as in human prostate cancer cells, the researchers found that ILK inhibitors induced cell death in prostate cancer cells and reduced the spread of the tumours.

"This is both amazing and exhilarating," said Dedhar. "Inhibiting ILK may not only result in inhibiting growth of the primary tumour but may also lead to reducing the subsequent spread of the tumour cells. And unlike standard chemotherapy agents, these inhibitors do not appear to kill or harm healthy cells. We now know that if we inhibit ILK, we might be able to treat tumours in novel ways. We envisage that these anti-ILK compounds may be used with low-dose conventional chemotherapy."

Dr. Victor Ling, vice-president of research at the BCCA, commented: "This is exciting news for cancer patients everywhere. A targeted therapy with fewer side effects will mean better results for those living with cancer."

Phase 1 clinical trials of ILK inhibitors are expected to start within 2 years. — *Heather Kent*, Vancouver

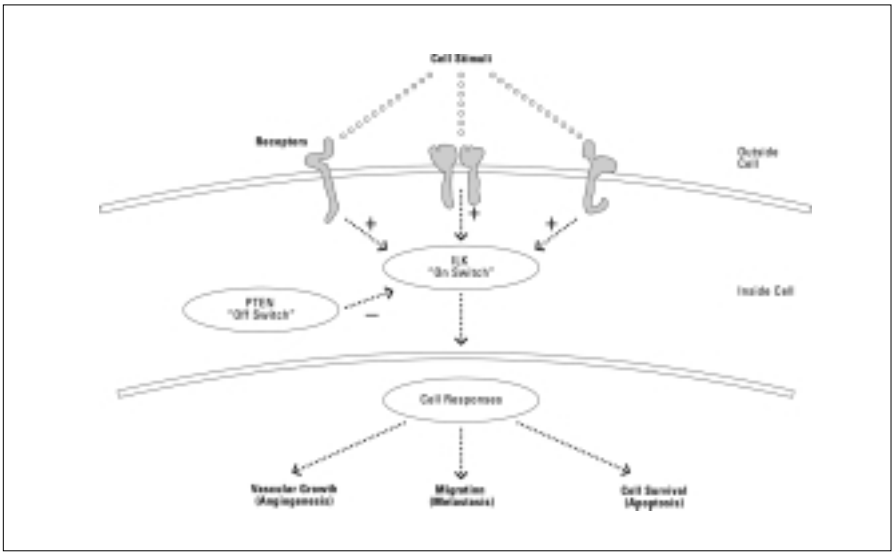


Diagram shows how ILK functions as the "on" switch within cells, inducing cell responses seen in cancer, whereas the *PTEN* gene functions as the "off" switch, preventing this process.

Briefly . . .

Virus found in patients with ALS

For the first time, researchers have found solid evidence of a viral infection in patients with amyotrophic lateral sclerosis (*Neurology* 2000;54 [1]:20-5). The cause remains unknown, but there has been speculation about the role of a persistent enteroviral infection. Now French researchers have found RNA from an enterovirus (probably echovirus 7) in 15 of 17 patients with ALS. The viral RNA was found in only 1 of 29 control subjects tested. The researchers caution that further work is required to confirm the involvement of the virus in ALS, but the finding lends weight to the theory of a viral cause.

Stems cells, high-dose chemotherapy and breast cancer

In an article published in the Apr. 13 *New England Journal of Medicine* and released early on the Internet, a large US trial has shown that stem-cell transplantation plus high-dose chemotherapy provides no more benefits than conventional chemotherapy in treating metastatic breast cancer. Two trials conducted in the late 1980s had shown excellent results in metastatic breast cancer after high-dose chemotherapy and autologous transplantation of hematopoietic stem cells, leading to great demand for the treatment. In this trial, 310 patients with a partial or complete response to induction chemotherapy were randomly assigned to either conventional chemotherapy or stem-cell transplantation plus high-dose chemotherapy. Survival after 3 years and time until disease progression did not differ significantly between the 2 groups.