Catheter infections: Tripled death risk

Some 7.5 million Americans undergo bladder catheterization, a common hospital procedure, every year. A half-million of them will acquire urinary tract infections from the catheters. And these half-million are three times more likely to die than are catheterized hospital patients who do not develop urinary tract infections, according to a study reported in the Sept. 9 NEW ENGLAND JOURNAL OF MEDICINE. The study was conducted by Richard Platt of the New England Deaconess Hospital in Boston and colleagues.

"It is a provocative finding," declares Robert Haley, director of the Hospital Infections Program of the Centers for Disease Control in Atlanta. "If true, it would really change the way we look at hospital urinary tract infections. In the past the problem hasn't seemed to be nearly as great."

"I think the results are not surprising," asserts John Burke, a physician with the University of Utah School of Medicine in Salt Lake City who has been studying catheter-caused urinary tract infections. "They verify what has been arrived at by other methods of estimation for many years. I think they underscore the importance of urinary tract infections."

Adds Timothy Townsend, a hospital epidemiologist with the Johns Hopkins Medical Institutions in Baltimore: "I think it tells us something we had kind of suspected before, that putting a catheter in a person carries a risk."

Platt and his colleagues followed the medical fate of nearly 1,500 catheterized hospital patients to see how many developed urinary tract infections and how many deaths could be attributed to these infections. They found that of the 1,500 patients, 131 acquired urinary infections, of whom 25 died prior to hospital discharge. When confounding variables—age, severity and type of illness, duration of catheterization, blood chemistry and person inserting the catheter—were omitted, 12 of the 25 appeared to have died from catheter-caused urinary infections. Further analysis revealed that a catheter-caused urinary infection triples a catheterized hospital patient's chances of dying. A threefold increase isn't very significant for a hospital patient who has a small chance of dying in the first place, Platt explained to SCIENCE NEWS, but it is for a patient who is already in grave health.

A critical question about the study results, however, is whether catheter-caused urinary tract infections truly lead to death or only happen to be present in patients who die from the illnesses for which they were hospitalized in the first place. "It is possible," Platt and his colleagues admit, "that infection was confounded with causal factors that either didn't enter the analysis or did enter the model but were inaccurately measured." Haley too is not totally convinced that the influence of preexisting illness on the results was completely ruled out. Townsend, in contrast, is. "I think the conclusions drawn from the data are reasonable," he says.

"But the real issue that remains unresolved," Burke contends, "and one that has to be settled by further study is whether efforts to identify high risk patients and to prevent infections in them in turn results in a reduced mortality rate." Platt and his team are now undertaking such a study.

—J.A. Treichel

Asbestos debt threat—who will pay?

Manville Corp., the nation's largest producer of asbestos, claims that results of an epidemiological study completed in August compelled the firm to file for Chapter 11 under the Bankruptcy Code. The company is reeling under "the largest tort litigation explosion ever witnessed," its senior vice president told a House subcommittee on labor standards Sept. 9. Earl Parker testified that only by filing now could Manville ensure that asbestos-disease claimants receive the money owed them in coming decades. But there are some who question whether Manville is really as altruistic as Parker's claim would suggest. In every way, the Manville debacle presents a strange case in terms of both bankruptcy law and science policy.

If one takes Parker at his word, Manville's predicament stems from the inability of science to yield the unassailable data that his firm would have needed to determine disease risks and that its insurers now need to determine the precise onset of long-latency diseases associated with asbestos exposure. Others counter that Manville is reaping fruit borne in decades of fraud. All these issues have recently been thrown at the courts for sorting out.

Manville is not the model bankruptcy petitioner. "You take a look at almost any bankruptcy proceeding," explains Charles Vihon, a bankruptcy-law consultant in Cape Elizabeth, Maine, "and what you're talking about is the need to get money. But that's not what's involved at Manville. Manville's current operations are quite successful. It only projects that sometime in the future it will have a massive liability which [could] eat up its assets."

But Parker noted that when a firm is faced with contingent liabilities (those that are probable and can be predicted), federal law requires one must "book a reserve [fund] for the liability in an amount equal to the estimated cost." With 16,500 asbestos-related health lawsuits already pending, Parker said his firm must reasonably budget at least $40,000 per case as an average settlement, or a total of $660 million "even before allowing for inflation." What tipped the balance was an epidemiological study that Alexander M. Walker of Epidemiology Resources, Inc. in Chestnut Hill, Mass., had performed for Manville. It forecast that between now and the year 2009, Manville could conservatively expect another 32,000 disease cases that could lead to litigation (see table). Together, these pending and probable cases would require a reserve fund of roughly $2 billion, Parker said, "again without any allowance for inflation." For Manville, whose net worth is $1.1 billion, "this is clearly impossible," Parker said, "even on a liquidation basis."

Parker added that Manville's failure to file for Chapter 11 now would have led to a situation where major creditors would have required that their debts be secured by Manville's assets. Asbestos-health litigants, lacking such secured status, would then be in a subordinate position to other creditors. "Our Chapter 11 filing essentially assures that *all* classes of creditors, including asbestos litigants, have equal footing," Parker said.

"My response to that is that it sounds awfully altruistic," Vihon says. "I sincerely hope they have a chance to get it challenged in court." Because most firms would not go the Chapter 11 route without firmer contingent-liability projections, Vihon suspects there are other interests at play in the Manville case.

"Manville is juggling a lot of balls in the air. The one that they want you to look at is this situation they've got themselves in with respect to the asbestos claimants. But what's really shrewd is that one of the other balls they're juggling is the political one": namely, Manville's claim that Congress should come to its aid since many of the worst asbestos-exposure cases occurred among workers at government-

Projected Asbestos Lawsuits and Their Cost

Year	Mesothelioma*	Lung Cancer*	Asbestosis*	Lawsuits	Average Cost	Total cost (millions)
Backlog 12/31/82	N/A	N/A	N/A	12,748	$40,600	$ 517.6
1982-1985	1,119	809	15,525	17,453	40,600	708.6
1986-1990	1,517	788	7,525	9,830	40,600	399.1
1991-1995	1,577	597	2,800	4,974	40,600	201.9
1996-2001	1,750	466	1,300	3,516	40,600	142.7
Total	5,963	2,660	27,150	48,521		$1,970.0

N/A — not available *number of cases

Manville Corp. & Walker data

owned shipyards or among employees of government contractors. In fact, Parker proposed a revolving superfund scheme —like the one Congress enacted to clean up abandoned hazardous-waste dumps— during his testimony.

Manville is also among nine current or former asbestos manufacturers that make up the Asbestos Compensation Coalition. The coalition is seeking congressional sponsors for a bill that would fund such a program with the federal government matching, on a dollar-for-dollar basis, the combined contribution of asbestos defendants and their insurers.

Assistant U.S. Attorney General J. Paul McGrath reported at the Sept. 9 hearing, however, that the federal government has in this administration's eyes, "No... liability to the victims of asbestos-related diseases" who were not directly employed by the government. But Rep. George Miller (D-Calif.), who chaired the hearing, has an alternate asbestos-compensation proposed plan. It would have the government administer funds paid out solely by industry and responsible employers.

Interestingly, Manville has carried insurance against potential asbestos-disease claims continuously for the past 40 years. However, says Manville's John Lonnquist, "Except for one company, all are essentialy withholding payments." Either the firms claim Manville's policies are void because Manville withheld health-effects data (something Manville vigorously denies) or they challenge when a specific victim contracted the disease for which compensation is sought. Does disease begin when the victim is first exposed or when the symptoms first appear —perhaps 40 years later? Manville's early insurers subscribe to the latter concept while its more recent insurers believe in disease onset with first exposure. For its part, Manville is suing all its insurers, asking for $5 million in punitive damages while the debate is settled. —*J. Raloff*

Polynas surrounded by ice and mystery

Last year, a team of Soviet and American scientists boarded the Soviet icebreaker *Mikhail Somov* and penetrated 300 miles into the ice of Antarctica's Weddell Sea. Their goal was to reach a transient ice-free lake, or polyna, that they hoped would form that year in the Southern Ocean ice surrounding Antarctica. Satellite images had indicated a slight thinning of the ice near that location, but a polyna did not form. The most recent polyna was first observed in the Weddell Sea in 1973 by satellites and did not freeze over until 1976.

The expedition was successful in its quest to gather a base of information about the region's chemistry and biology, and about processes that may lead to a polyna, but the stimulus for polyna formation is still unknown. "There is no way of predicting them, no way of understanding them at this time," says Arnold L. Gordon of Lamont Doherty Geological Observatory in Palisades, N.Y.

A polyna in the open ocean differs from coastal polynas, which may be only one percent as large and are caused by strong winds that literally blow the ice away. Until the *Somov* voyage, there were few direct observations from within the frozen ocean; most data are collected during the Austral summer when the sea is ice free. Polynas form as the sea freezes with winter's approach. For some reason, occasionally areas as large as 300,000 square kilometers do not freeze. "Polyna" is a Russian word that roughly translated means "an enclosed area of unfrozen water surrounded by ice."

"We've discounted the idea that polynas are maintained by strong winds," Gordon says, though winds may be important in a polyna's initiation. Theodore Foster of the University of California at Santa Cruz explains that the winds around the Weddell Sea move in a clockwise gyre. The wind movement and forces caused by the earth's rotation deflect surface currents away from the middle of the sea toward its edges. Then, the warm sea water present at depths of about 200 meters rises, setting up a huge convection current—a possible cue for a polyna. The wind circulation also occurs in the numerous years when there is no polyna.

The two layers of water — the cold upper layer and the warmer layer beneath —are stable, Gordon says, "but the stability is very marginal. All you have to do is increase density of the surface layer a little bit and it will overturn. That's what we feel caused the polyna. Warm water came up and melted the ice, or never allowed it to form in that particular region."

He suggests three general processes that could spur the convection associated with a polyna: a change in the circulation in the Weddell Sea, which would raise the interface between the layers to shallower depths, initiating convection; stronger winds that could blow the ice away and speed up ice formation, which also would destabilize the surface layer; and colder winters, which would cause more ice to form. Ice forms only from fresh water, thereby increasing salinity of the remaining water, and also disrupting the stability between the two layers.

Observations made during the recent trip revealed unexpected "bumps," high points on the interface between the two layers, he says. These features are warm and salty, raising the temperature and salinity of the surface layer.

Gordon coordinated the expedition with the Arctic and Antarctic Research Institute in Leningrad. The American participants were funded by the National Science Foundation. —*C. Simon*

Kitchen ecology: Cukes, spice, bugs

When Clifton E. Meloan first heard that cucumber skins can keep cockroaches away, he was sure the notion was nothing more than a "wild ... old wive's tale." A similar tale already had prompted him to begin studies of the apparent cockroach-repelling ability of bay leaves; but the cucumber idea just seemed too farfetched to pursue. Then, Meloan mentioned it to a colleague who related that he had once seen a hotel chef place cucumber slices at the corners of the kitchen's food preparation table and commented that the hotel had quite a chef, one who "even garnishes the table." Meloan's colleague was told the kitchen was expecting a visit from the city's health and sanitation department; the chef was merely using the cucumbers to keep cockroaches out of the food.

After hearing of his friend's experience, Meloan, of Kansas State University in Manhattan, decided the seemingly cockamamy cockroach-and-cucumber tale was probably worth checking out after all. Cucumber skins joined the bay leaves in the tank of about 600 cockroaches in his analytical lab. Last week, at the American Chemical Society meeting in Kansas City, Mo., Meloan reported that industry already has shown interest in the data gathered with this strange combination of laboratory tools.

First, Meloan reported, he and colleagues have shown that, at least in a laboratory test chamber, chemicals in bay leaves and cucumber skins do indeed repel cockroaches. Second, analyses have shown that the most active cockroach-repelling compound in bay leaves is "cineole," a two-ringed structure also known as "eucalyptol" in certain cough drop formulations; the most active ingredient in cucumber skins is "trans-2-noneal," a chain of nine carbons. Finally, Meloan has isolated the most active portions of each of the two compounds and now is trying to synthesize super-repellants composed of those chemical units. Some of these formulations now are being tested in the field by Aeroxon of New Rochelle, N.Y., a company that manufactures flypaper strips.

Should a particular formulation prove to be a successful cockroach repellant outside of the laboratory, it eventually could be enclosed in time-released capsules that could be attached to strips of tape, which in turn could be placed in pantries, near kitchen counters—even on the bottoms of grocery bags — to keep cockroaches away.

A repellant based on "two compounds that we eat" has obvious advantages, says Meloan. For one, it avoids the problem of spraying pesticides around food. It may also prove a more long-lasting solution than pesticides, which invoke resistant cockroach strains. —*L. Garmon*