schools throughout the state.

Three-quarters of the sample reported no thoughts of or attempts at suicide. About 11 percent cited serious suicidal thoughts, more than 6 percent acknowledged making a specific plan to kill themselves, and 7.5 percent reported making a suicide attempt.

Most suicide attempters reported formulating a plan to kill themselves rather than acting impulsively, the researchers say.

Cigarette smoking and use of alcohol and illicit drugs increased among those reporting suicide thoughts or attempts, the team reports. But teens who cited the most aggressive behavior stood the greatest chance of thinking about, planning for, or attempting suicide. This link remained after statistically controlling for alcohol and illicit drug use, race, and gender.

Aggressive teenagers may prove more likely to act on suicidal thoughts and plans when depressed, frustrated, or scared, Garrison's team suggests. However, they lack data on symptoms of depression among the students.

The South Carolina findings suggest that suicide prevention efforts should concentrate not only on depressed teens, but on highly aggressive and alcohol-abusing adolescents, Shaffer argues.

—B. Bower

Detecting an electromagnetic vacuum force

The electromagnetic force, which binds electrons to atomic nuclei, can have such distinctive effects in different situations that physicists have often given these effects special labels. Manifestations of the electromagnetic force range from the van der Waals forces of attraction between molecules and atoms to the postulated Casimir-Polder interaction between a neutral atom and an electrically conducting plate.

Now, researchers have for the first time obtained experimental evidence clearly demonstrating the existence of the elusive Casimir-Polder force. Edward A. Hinds and his co-workers at Yale University report their findings in the Feb. 1 PHYSICAL REVIEW LETTERS.

The Casimir-Polder interaction arises out of a quantum effect associated with fluctuations of electromagnetic fields in a vacuum. In 1948, H.B. Casimir and D. Polder proposed that such vacuum fluctuations would cause an observable attraction between an isolated, neutral atom and a flat, conductive plate.

Though extremely small, this attractive force would be the dominant influence when plate and atom are separated by distances much greater than an atomic diameter. At such distances, the time it takes for an electromagnetic field (or photon) to travel back and forth between atom and plate becomes significant. Known as retardation, this phenomenon affects how atom and plate interact with each other.

To detect the Casimir-Polder force, Hinds and his colleagues studied the deflection of sodium atoms traveling down the gap between two nearly parallel plates coated with gold. In the absence of other interactions, the sodium atoms would experience a Casimir-Polder force that pushes them sideways toward the plates as they move along the gap.

To detect such a minuscule effect, the researchers had to be particularly careful to avoid contamination of the gold film, which could give rise to stray electrical fields. Such fields would cause effects obscuring any attraction that could be attributed to the Casimir-Polder force.

The experiment "was a lot harder to do than it looks," says graduate student Charles I. Sukenik, a member of the Yale team.

The measurements reveal the presence of an atom-plate interaction that clearly fits a Casimir-Polder force much better than it does a van der Waals force. "Our results confirm the magnitude of the [Casimir-Polder] force and the distance dependence predicted by quantum electrodynamics," the researchers conclude.

"It's a really elegant experiment, beautifully carried out," comments Stephen R. Lundeen of the University of Notre Dame (Ind.).

Lundeen and his co-workers have attempted to detect the Casimir-Polder interaction in a different type of experiment. They studied transitions from one energy level to another in a helium atom in which one electron has been excited so that it tends to remain much farther from the helium nucleus than it would in its ground state. "We wanted to do a high-precision test on a microscopic scale," Lundeen says.

These experiments yielded the most precise measurements yet of energy levels to which the Casimir-Polder force makes a discernible contribution. However, the researchers found a minute but significant and puzzling discrepancy between their experimental results and theoretical calculations—based on quantum electrodynamics — of what those energy levels should be.

"We're seeing a vast difference from the energy levels that would exist in the helium atom if there were no retardation," Lundeen says. "But we have a clean experimental result that is in rather dramatic disagreement with the best available calculations."

Whether the Casimir-Polder force plays any role in this discrepancy remains unsettled. "It'll be interesting to see how this matter gets resolved," Lundeen says.

—I. Peterson

Valdez spill leaves lasting oil impacts

On March 24, 1989, the *Exxon Valdez* supertanker ran aground in Alaska's Prince William Sound. Ruptured holds released a fifth of the vessel's oil — some 10.8 million gallons of Prudhoe Bay crude. Over three years, Exxon, the state, and the federal government coordinated a $2.5 billion cleanup—sometimes involving 10,000 workers.

At an oil-spill symposium in Anchorage, Alaska, last week, scientists reported that both the pollution and its cleanup took a heavy toll on south central Alaska's marine ecosystems. And though many plants and animals are recovering, notable exceptions exist. The meeting marked the first general release of government-funded research on effects of the *Valdez* spill, observes Bruce A. Wright of the National Marine Fisheries Service in Auke Bay, Alaska, a coordinator of spill-damage assessment research.

Federal law requires that state and federal agencies name "trustees" to establish public claims against firms that damage natural resources. Trustees managing the case against Exxon prohibited their researchers from discussing spill effects prior to court approval, on Oct. 1, 1991, of a $900 million settlement from the Irving, Texas-based Exxon Co. USA. Planning for this meeting began just after that, Wright says.

No one knows exactly how much *Exxon Valdez* oil ended where. The National Oceanic and Atmospheric Administration (NOAA) is attempting to "reconstruct" the oil's trajectory and estimate its removal by plugging both weather data and observations from spill sites into sophisticated computer models.

Preliminary analyses indicate that 20 percent of the oil evaporated — 8 percent on day one alone, according to Douglas A. Wolfe, chief scientist of NOAA's ocean assessments division in Rockville, Md. He says another 50 percent probably degraded on beaches, in the water, and within tidal sediments; an estimated 12 percent now lies in deep (nonbeach) sediments, and some 3 percent remains on intertidal shores, usually as tarry deposits.

Mechanical water skimmers removed some 8 percent of the oil. Wolfe estimates that cleanup crews recovered 6 percent more from sand and sediment or dispersed this oil into the water, where less than 1 percent remains.

"Skimming was operation heartbreak . . . [because] not a lot of oil was picked up," recalls Coast Guard Vice Admiral Clyde E. Robbins, who served as the cleanup's initial, federal on-scene coordinator. Cleaning heavily oiled shorelines proved a more visible success, he says. Hot-water washing and treat-