This program option would allow for proper disposal of their medications. Because the successful implementation of a permanent disposal program is constrained by regulatory and institutional barriers, we have outlined a range of end-user disposal program options. The options presented below are ordered from the most recommended and ideal option, but also the most difficult to implement program, to the option that is least ideal, but still fulfills the objective of implementing a permanent disposal program.

Option A: Apply for a DEA exemption for drop-off box collection at pharmacies. This program option would allow for permanent drop-off box collection of both controlled and non-controlled medications. The boxes would be located at pharmacies and serviced by a reverse distributor.

Option B: Collection at police stations. Another solution for a permanent collection program that includes controlled substances is collection at police stations; police are allowed to take-back controlled substances from end-users, and no DEA exemption would be required. We recommend that the County of Santa Barbara approach law enforcement officials to gauge their willingness to participate in a drug collection program.

Option C: Collection of non-controlled medication at hazardous waste facilities. Although hazardous waste facilities are not authorized to collect controlled substances, they can collect non-controlled medications for hazardous waste incineration. This service should be prominently advertised within the community.

Option D: Special collection events. If none of the other options can be implemented, Santa Barbara County should hold special collection events at a minimum. Although less than ideal because they are not as convenient as a permanent disposal program, collection events would allow residents to get rid of their unwanted medications and have the added benefit of educating consumers about the environmental and safety issues associated with pharmaceutical disposal.

3. A permanent collection program is recommended to ensure that residents have an effective and legal way to properly dispose of their medications.
Disposal programs that are currently being considered by the research and decision-making community include:

- permanent collection boxes at pharmacies or police stations,
- mail-back programs,
- periodic collection events.

Another option is a drug recycling program. California law authorizes counties to collect unused, unexpired pharmaceuticals from nursing homes, wholesalers, and manufacturers and redistribute them to low-income residents.

**Methodology**

Two surveys were conducted to determine disposal practices of institutions and end-users in Santa Barbara County. For the institutions, a 15-question telephone survey was conducted by the authors. Institutions included in this study were pharmacies, hospitals, nursing homes, and hospices in Santa Barbara County. These institutions were surveyed because they handle a large volume of pharmaceuticals and may be a major source of pharmaceuticals in the environment. In addition, institutions are a source of information and education to the public, and it is important to gauge the response of this contact. Survey questions were both open-ended and categorical and covered the following topics:

- current disposal practices,
- contact with the public,
- likelihood to supply/support a recycling program,
- likelihood to support a disposal program for the public.

A five-question end-user survey was conducted to gain insight into residents’ medicine use, disposal habits, awareness of pharmaceuticals in surface water, and willingness to participate in a disposal program. A contingent valuation (CV) question was also included to determine the value of a disposal program through people’s willingness-to-pay (WTP). The questions were part of the Central Coast Survey, an annual survey of Ventura and Santa Barbara County residents conducted by the UCSB Social Science Survey Center. The CV question was a referendum format and asked whether the respondent would be willing to pay a surcharge per prescription to fund a disposal program. A surcharge amount was randomly drawn for each respondent, and amounts ranged from $0.05 to $2.50.

**Institutional Survey**

In total, 116 facilities were contacted, 87 of which were usable for our study; 42 responses were obtained for a total response rate of 48 percent. Most of the responses were from pharmacies (29 out of 42); thus, the data primarily represent the pharmacies.

The majority of institutions contract with reverse distributors to dispose of unused medications. A reverse distributor is a service that arranges for the return of unwanted pharmaceuticals to manufacturers for credit or for the destruction or disposal of non-creditable products. Few institutions use the trash or drain as disposal methods. This indicates that institutions, particularly pharmacies, should be properly educated about current best disposal practices to provide accurate information to the public.

As mentioned previously, one of the potential policy options is a drug recycling program. However, this study found that most institutions in Santa Barbara County would not have unused, unexpired medications to donate to a drug recycling program. When asked if the facility would have medications that could be donated, 33 of 40 institutions (82.5 percent) answered “no.” Most institutions dispose of less than 5 percent of their stock, and the majority of the medications they dispose of are expired, which are unsuitable for a recycling program. This implies that there is not likely to be a consistent supply of usable medications to support a drug recycling program.

Responses reveal that the majority of institutions are genuinely concerned about pharmaceutical contamination, which is manifested in a shared sentiment of cooperation among the respondents. This finding is encouraging and signals that if the County government were to implement a disposal program, the institutions would support the move. Respondents were asked whether they would house a drop-off box for an end-user disposal program. Many of the pharmacies said they would; conversely, only one hospital would consider installing a drop-off box. “Maybe” was the second most-common answer among pharmacies; many said they would have to ask their corporate headquarters. Pharmacies may be the best location to collect unwanted medications from end-users.

When asked which entity should take responsibility to address the pharmaceutical disposal issue, many respondents said that a collective effort is needed, and “government” was the most common response. This finding suggests the local government will likely need to instigate the movement toward establishing policy solutions.

**End-User Survey**

In total, 1,005 responses were obtained from residents in Santa Barbara and Ventura Counties. There is no significant difference between the data from each county, so the data were combined for this analysis.

The most common responses for typical pharmaceutical disposal practices are trash (45 percent), toilet/drain (28 percent), and store at home (12 percent). These results are the opposite of the disposal practices of institutions, which rarely use the trash, toilet, or drain as disposal methods.

A majority of the respondents (54 percent) are not aware that medicinal compounds have been found in treated wastewater and surface waters, indicating that education on the issue, with recommended alternative disposal methods, may be beneficial. An education or advertising campaign may help move people’s disposal habits away from the trash, toilet, and sink. Respondents also show a strong willingness to participate in a drug disposal program, with 79 percent of respondents indicating that they would be very likely or somewhat likely to return their medicines to their pharmacy.

The CV data were used to estimate a logit model that predicts the probability of a “yes” response based on the surcharge amount and other predictive variables. Consistent with economic theory, we find that demand decreases as the given bid amount increases. Figure 3 shows this result, as the probability of a “yes” response decreases with an increase in surcharge amount. The WTP for a disposal program is also influenced significantly by age. The effect is in the expected direction, with older respondents, who tend to buy more prescriptions, having a lower WTP. Gender, political party, and ethnicity also influence WTP, with women, democrats, and...