Examining Influences of Pharmacists’ Communication With Consumers About Antibiotics

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A national study was conducted of community pharmacists to examine influences on their communication with consumers about antibiotics and antibiotic resistance. The objective was twofold: to explore the nature of barriers that might be changed to allow pharmacists greater participation in educational campaigns, and to discover which variables would best predict communication using a modification of the Theory of Reasoned Action model. Whereas most pharmacists agreed that their role in educating patients is important, they also noted several barriers prevent them from engaging in campaigns, such as time constraints, lack of educational materials, and fear of harming relations with physicians. Pharmacists’ discussion about antibiotics in general was predicted primarily by attitudes about their role and efficacy, by their autonomy, and by enabling measures—such as pamphlets—that would better aid them in participating in a judicious antibiotic use campaign. Discussion about resistance was predicted by attitudes and enabling measures.

Pharmacists have been key players in communicating health information to consumers as their role during the 20th century shifted from dispensing chemist to health counselor and educator (Denham & Barnett, 1998; O’Laughlin, Masson, Dery, & Fagnan, 1999). This role was mandated by legislation as well as patient expectations: The Omnibus Reconciliation Act of 1990 required pharmacists to provide one-on-one counseling about prescription medication to patients receiving government aid, and most states have since adopted regulations requiring prescrip-

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1Researchers have used the terms consumers, clients, and patients to refer to publics that receive prescriptions and advice from pharmacists. The terms are used here interchangeably.
tion counseling to all consumers (Nightingale, 1995; Pendergast, Kimberlin, Berardo, & McKenzie, 1995). Moreover, consumers have turned frequently to pharmacists for advice, and judge pharmacists as highly trustworthy (Adamick et al., 1986; Barden, Dowell, Schwartz, & Lackey, 1998; Gibbs, Waters, & George, 1989; McAneny & Saad, 1997; Penna, 1987).

Pharmacists, therefore, have forged a key link in the communication network that contributes to consumers’ knowledge and behaviors about overall health care (Anderson-Harper, Berger, & Noel, 1992). They are trusted, they are knowledgeable, and they are accessible (Lambert, 1996; Morris, 1982; Stratton & Stewart, 1991). Moreover, pharmacists have been willing to take active roles in providing health information and resources to their clients by participating in campaigns and interventions.

This study was driven by concern over rising rates of antibiotic resistance in the United States, according to the Centers for Disease Control and Prevention (CDC; Morbidity and Mortality Weekly Report, 1996). The CDC hoped to enlist pharmacists in the judicious antibiotic use campaign in concert with an educational campaign designed to improve physician diagnoses of upper respiratory tract infections. In order to embrace pharmacists as partners in the campaign, however, planners needed to know more about them: their work habits and education, attitudes and knowledge about antibiotic resistance, and the nature of their conversations with patients about antibiotics.

Because participation in any voluntary campaign is a function of attitudes and behaviors, it was critical to examine how such elements influence pharmacists in the context of a theoretical framework. To that end, the current study used the Theory of Reasoned Action (TRA), which employs attitudes, norms, and control as predictors of behavior (Ajzen & Fishbein, 1980).

Our study entailed a survey of community pharmacists in 1996 and 1997, in which demographics, communication patterns, attitudes, social and subjective norms, perceived control, media use, knowledge, and barriers were examined. The study incorporated a modified version of the TRA using interpersonal antibiotic discussion as the behavior studied, and the previous elements as predictors of discussion. The study did not attempt to explain all contributing variables to interpersonal communication, but focused on a group of personal and organizational variables that have been described in the literature as salient predictors of behavior. Our reasoning was that if we could pinpoint the impact of certain elements on discussion, we would equip campaign planners with information to help engage pharmacists.

LITERATURE REVIEW

The literature review is presented in several parts: the first describes antibiotic resistance, followed by a review of research that explores (a) the TRA, (b) pharma-
EXAMINING INFLUENCES OF PHARMACISTS

PHARMACISTS' participation in health campaigns, (c) pharmacists' attitudes, barriers, and normative roles that affect communication, (d) their mass media use patterns and knowledge, and (e) interpersonal communication.

ANTIBIOTIC RESISTANCE

Three principal factors contribute to antibiotic resistance: consumption of unnecessary antibiotics, imprudent prescribing of antibiotics, and perceived patient expectations (Barden et al., 1998; Bauchner, Pelton, & Klein, 1999; Hamm, Hicks, & Bemben, 1996; Mangione-Smith, McGlynn, Elliott, Krogstad, & Brook, 1999; Ong, DeHaes, Hoos, & Lammes, 1995; Trinkhaus, 1991). Antimicrobials—or, antibiotics—are medicines that disable or destroy bacteria, discovered accidentally by Alexander Fleming in 1928, who found that a fungus he called penicillin could wipe out a type of staphylococcus. Howard Florey's and Ernst Chain's research on antibiotics in the 1930s and 1940s made penicillin available to World War II soldiers, and the use of antimicrobials to treat bacterial infections became de rigueur (Parshall, 1998). Researchers noticed that some bacteria were resistant to penicillin, and concluded that resistant strains become more prevalent when antibiotic drugs wipe out weaker bacteria. Thus, when one takes antibiotics, weak bacteria are killed but resistant bacteria may thrive.

Evidence continued to mount that antibiotic resistance is due, in part, to the unnecessary use of antibiotics—that is, taking antibiotics for viral illnesses such as colds or flu (Schwartz, Mainus, & Marcy, 1998). Researchers estimated in 1992 that about 50 million courses of unnecessary antibiotics were given to children with cold or flu symptoms (Dowell & Schwartz, 1997; Dowell, Schwartz, & Phillips, 1998; Reichler et al., 1992).

In short, antibiotic resistance has continued to increase, and one estimate is that 40% of pneumococcal infections in some communities are resistant to some antibiotics (Spake, 1999). This has resulted in the necessity for more powerful and expensive antibiotics, which may need to be taken intravenously. In some rare cases, bacteria resist all known cures.

THEORY OF REASONED ACTION

The TRA was proposed by Martin Fishbein and Icek Ajzen in the 1970s, and postulated that behavior (or behavioral intentions) can be predicted by attitudes, norms
and perceived control over the behavior (Ajzen & Fishbein, 1980). The theory framed a variety of empirical studies that have predicted such behaviors as recycling (Corraliza, 2000), voluntarism (Grube & Piliavin, 2000), aggression (Welsh & Gordon, 1991), and enrolling in distance education courses (Becker & Gibson, 1998). Scholars of health and risk communication have found the theory useful for predicting such behaviors as fruit and vegetable consumption (Anderson et al., 1998), mammography participation (Montano & Taplin, 1991), immunization (Prislin, Dyer, Blakely, & Johnson, 1998), alcohol abstinence (Ulrich, 1990), and protective sexual behavior (McAlister et al., 2000).

The theory is appealing in its parsimony. The main elements, however—attitudes, norms, control, and behavior—are conceptually and operationally complex. Attitudes, for example, may be conceptualized as general or specific, deeply held or superficial, a function of affect or cognition, and so on. While one pair of TRA researchers defined attitudes as a disposition toward a behavior (good–bad, costly–inexpensive, etc.), others examined general values and beliefs (Cordano & Frieze, 2000; Corraliza, 2000). Norms—often interchangeable with roles—have been conceptualized in one dimension as the perception of how we feel others judge us (subjective social norms). The norm construct has also encompassed a personal element, framed as either generalized self-perception or more specific role perception (Becker & Gibson, 1998; Grube & Piliavin, 2000).

Another component of the model, perceived behavioral control, has been interpreted by some researchers as quite similar—and even overlapping—with constructs such as self-efficacy (general and specific), locus of control, and self-esteem (for a discussion, see Coleman, 1993; Sherer, 1982; Sherman et al., 1982; Stanley & Murphy, 1997). For the most part, control is defined as the ability to carry out a behavior successfully, but, like attitudes, control has been operationalized as specific behavior and as generalized control.

Some researchers have found mass media use a significant predictor in the TRA model, arguing that early adopters of certain behaviors are active media consumers (Venkatesh & Brown, 2001; Williams & Flora, 1995). Knowledge—often linked with mass media and interpersonal communication—has been incorporated as a predictor variable with limited success: Researchers at the Stanford Five-City Project reported that Hispanics who engaged in healthy behaviors were more knowledgeable about cardiovascular risks, whereas nutrition scholars contended that nutrition knowledge failed to predict dietary behavior (Nayga, 1997). Yet, knowledge clearly is associated with certain types of behaviors, prompting one research team to note: “major lifestyle practices that influence health-related behavior weigh heavily when knowledge is increased” (Meillier & Lund, 1997, p. 217).

Others have pointed out that obstacles and perceived barriers to behavior are critical components of the TRA equation. Such obstacles have captured a range from cultural to structural barriers, including taboos in verbal discourse to poor transmission of information (Anderson et al., 1998; Cordano & Frieze, 2000;
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Pharmacists

Turning to pharmacists specifically, the TRA can be instructive in understanding the impact of demographics, attitudes, norms, control, media use, knowledge, and barriers on behavior within the context of participation in a health campaign. Overall, pharmacists' attitudes about campaigns have appeared enthusiastic, judging from scholarly and professional publications. Pharmacists have traveled well beyond the role of druggist, and many embrace what has been labeled "pharmaceutical care," the new paradigm of active engagement in health prevention and maintenance (Conlan, 2000a; Ukens, 1998a). Services beyond dispensing medicines (such as specializing in a particular disease program—like diabetes) are offered by a majority of chain pharmacies. One 2000 national survey reported that 72% of chain executives said they planned to increase their involvement in providing services beyond dispensing (Conlan, 2000b). In a survey of Alabama pharmacists, researchers found pharmacists' attitudes favorable about being part of an HIV/AIDS awareness campaign, with 90% saying they were willing to distribute pamphlets to consumers (Binkley, Waller, Potts, & Bronstein, 1995). Moreover, pharmacists' involvement in campaigns has had a positive impact on encouraging healthy attitudes and behaviors: they have successfully promoted skin cancer prevention (Mayer et al., 1998), educated consumers about HIV/AIDS (Binkley et al., 1995), improved health of asthma patients (Narhi, Airaksinen, Tanskanen, & Erlund, 2000), counseled clients on smoking cessation (Williams, Newsom, & Brock,
The movement from dispensing to counseling has altered their traditional role, bringing with it new demands. Pharmacists face increased workloads, constraints on their time, and few resources for communicating information (De Young, 1996). Moreover, their feelings of control—strained as a result of new demands—may impact campaign participation. Using a parallel example, physicians cited lack of autonomy as a primary reason for changing jobs (“Dealing with job,” Greene, 2001). Several researchers concluded that pharmacists who feel efficacious about their role are more likely to engage in communication with consumers, a critical component of most health campaigns (Anderson-Harper et al., 1992; De Young, 1996; Kirking, 1984). Pharmacists note that helping people is the best part of their job, but 93% are concerned over workload issues, and most agree (84%) that the new role of “pharmaceutical care” is the proper direction for the pharmacist, but are reluctant to give up their role as dispensing chemist (Ukens, 1998a).

Attitudes about role are also influenced by perceptions others embrace. Lay publics rank pharmacists as quite trustworthy: 17% of consumers surveyed in 1978 trusted their druggist as much as their physician, while, in 1998, 46% trusted their pharmacist and doctor equally (Ukens, 1999). Physicians, however, have mixed reactions to pharmacists’ increased involvement in patient care. Whereas some physicians have favored expanded pharmacist involvement, their proviso is that pharmacists should be prevented from prescribing medicines or conducting any activities that infringe on the physician’s role. In one survey of doctors in Utah, researchers found that doctors preferred pharmacists counseling patients and monitoring drug use, but were less favorable about them helping patients manage adverse drug reactions or suggesting drug regimen alterations (Bradshaw & Doucette, 1998).

Another barrier pharmacists face in campaign participation may be lack of understanding or knowledge about the importance of antibiotic resistance in community health. Certainly a long-held belief is that if pharmacists were knowledgeable about the impact of antibiotic resistance and how it occurs and can be stemmed, then they would be more sanguine about participating in a campaign. The information about resistance might be gleaned interpersonally, or from continuing education courses, popular media or scholarly journals. Although few researchers have specifically studied pharmacists’ media use habits, they may use mass media in ways similar to physicians, who typically use scientific journals, textbooks, and conversations with colleagues and specialists to make decisions (Beltramini & Sirsi, 1992). Seeking and using information may also be a function of the level of involvement by the viewer or reader. In other words, individuals who are more involved in an issue are more likely to be attentive to mass mediated information and are, as a consequence, more knowledgeable (Stamm & Dube, 1994). But knowledge is seldom the sine qua non of behavior. Smokers, for example, are knowl-
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edgeable about the effects of smoking but continue puffing nonetheless. Researcher cannot necessarily assume that "correct" knowledge will result in "correct" behavior. Still, some scholars have contended that information and knowledge are important components that should be included in the TRA model (Fisher & Fisher, 1998, but see also Bailie, Bassett-Smith, & Broughton, 2000). The working assumption is that pharmaceutists who are knowledgeable about resistance and who frequently consume information over mediated channels would communicate this to their clients.

Pharmacist's communication with consumers overall has risen over the last two decades, according to survey researchers: 30% of consumers in a 1978 survey said their pharmacists were "always available to answer questions and tell people how to take their medications," whereas the number increased to 50% in a 1998 survey (Ukens, 1999, p. 21). Moreover, two thirds of respondents in the 1998 survey said pharmacists were "doing a good job" conveying information orally. But conversations between pharmacists and consumers have been found to be superficial, suggesting a lack of thorough discussion of drugs and health (De Young, 1996). A field study of pharmacists reported that if patients did not request information or appeared uninterested, pharmacists offered little verbal information (Schommer & Wiederholt, 1995). Pharmacists in New York (60%) said they did not have enough time to meet OBRA regulations (Ukens, 1998b).

In summary, the literature has suggested that pharmacists are not only willing to participate in health education campaigns, but they concur that the role of counselor is important. Others' judgments of them may influence their beliefs and actions, as do feelings of autonomy and control. Moreover, pharmacists note they face numerous barriers in daily travail, from excessive workloads to corporate policies, which doubtless affect behavior. And while communicating with patients seems on the rise, the nature of the discussion may be cursory, and some clients may be ignored.

Armed with this information, the following hypotheses (H) were created to address the relationship of behavior to attitudes, norms, control, media use, knowledge, and barriers.

**RESEARCH QUESTIONS AND HYPOTHESES**

Using the TRA as a framework, the study was designed to explore which elements were most likely to influence pharmacists' communication about antibiotics. The study then proposed the following hypotheses.

**H1:** Attitudes will be associated with discussion of antibiotics.

**H2:** Positive judgment of pharmacists' roles (personal norm) will be associated with discussion of antibiotics.
H3: Positive judgment of others’ expectations (social norm) will be associated with discussion of antibiotics.
H4: Control will be associated with discussion of antibiotics.
H5: Media use will be associated with discussion of antibiotics.
H6: Knowledge will be associated with discussion of antibiotics.
H7: Perception of barriers will be associated with discussion of antibiotics.
H8: Attitudes, norms, control, media use, knowledge, barriers, and control will contribute significantly to the variance on interpersonal communication (after accounting for the effect of demographics).

Finally, TRA researchers suggested that attitude toward performing successful behavior is the most powerful predictor, and, therefore, the following was proposed:

H9: Attitudes will explain the greatest proportional variance on interpersonal communication.

METHODS

The sample of pharmacists was obtained from the American Pharmaceutical Association (APhA). Taken from a list of 12,000 pharmacists in the APhA category of “community pharmacists,” the sample omitted pharmacists who work in universities, research settings, and so forth. At least 350 respondents were judged necessary to detect statistically significant differences among the independent variables at 80% power within a confidence interval of 95% (Dean et al., 1995). Because the objective was to obtain at least a 55% response rate, 621 names were selected randomly using a systematic (computerized) sampling method (every nth entry). Pilot surveys were administered to eight pharmacists to field-test questions before the questionnaires were finalized. Initial questionnaires and cover letters were mailed in late 1996, with follow-ups mailed in early 1997. Approximately three weeks after the initial mailing, non-respondents were sent a second questionnaire and reminder note. Three weeks later a final reminder letter was sent to non-respondents. In all, 375 questionnaires were returned for a response rate of 60%. Data were analyzed using the SPSS–PC statistical software program.

RESULTS

Demographics and Work Environment

Of the 375 pharmacists in the study, 155 were women (43%) and 206 were men (57%; 14 respondents did not identify their sex). Most (85%) had earned a Bachelor
of Science degree; 11% held a Doctor of Pharmacy degree. Half (52%) of the pharmacists were born before 1955 and were age 42 or older at the time of the survey.

The typical workweek for pharmacists was 40.78 hr ($SD = 11.5$), and the average number of years in practice was 18 ($SD = 12.4$). Pharmacists filled an average of 126 prescriptions a day ($SD = 75.6$) and estimated, on average, that 22% of these prescriptions were for antibiotics. Pharmacists averaged the amount of time spent on daily tasks, and their mean responses were: 53.7% ($SD = 19.48$) of their time was spent dispensing medicine, 21.42% ($SD = 12.38$) counseling consumers, 13.16% ($SD = 12.38$) performing administrative duties, 9.77% ($SD = 8.33$) talking with other health professionals, and 4.97% ($SD = 10.49$) performing miscellaneous tasks.3,4

Forty-three percent of the respondents worked in an independent setting, 46% worked in a chain pharmacy (of those, 40% worked in a chain with seven stores or more, and 6% worked in chain pharmacies with fewer than seven stores), 3% worked in hospital outpatient pharmacies, 2% worked in managed care, and 3% worked in other settings.

### INDEPENDENT VARIABLES

#### Attitudes, Norms, and Control

Several questions were designed to measure pharmacists' general and specific attitudes about counseling patients and the pharmacist role. The first series included four Likert-type questions (five-part, ranging from 1 = strongly disagree to 5 = strongly agree) about their attitudes educating patients and whether they felt (a) prepared and (b) comfortable taking part in an educational campaign about antibiotic resistance. Most said they felt prepared: 52% agreed somewhat and 24% of those, 40% worked in a chain with seven stores or more, and 6% worked in chain pharmacies with fewer than seven stores), 3% worked in hospital outpatient pharmacies, 2% worked in managed care, and 3% worked in other settings.

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agreed strongly. Similarly, 46% agreed somewhat that they were comfortable counseling patients and 36% agreed strongly.

Most agreed that the pharmacist’s role includes educating clients about resistance: 37% agreed strongly and 44% agreed somewhat. In response to the question about whether the pharmacist’s role in antibiotic education is important in changing behavior 37% strongly agreed and 43% agreed somewhat.

To measure control, pharmacists were asked to estimate their degree of autonomy giving advice to patients (on a four-part scale ranging from 0 = none to 4 = a great deal). Most (82%) felt they had a great deal of autonomy. Fourteen percent said some and 4% said little or none.

**Media Use**

Pharmacists were asked how frequently (on a four-part scale) they used media channels to learn about health and science. Respondents read pharmacy trade magazines the most: about 33% read most articles whereas 58% read some (and 9% read few). The least-used channel was the Internet: only 5% used the Internet or e-mail daily—but note that percentage most likely has risen since the data were collected. Respondents were also asked how much they trusted each medium (on a four-part scale ranging from 0 = no trust to 4 = a great deal of trust). The most trusted medium was the pharmacy trade journals; general interest magazines garnered the least trust. Trust variables served as a weight for the media frequency variables. A grand media index labeled Media Use was created with the media use and trust variables, and was found to be sufficiently reliable and internally consistent ($\alpha = .77$).

**Knowledge About Resistance**

Several knowledge questions were asked to assess depth of understanding of antibiotics and resistance with the reasoning that knowledge may guide pharmacists’ behavior. Respondents were asked whether antibiotics should be given for an array of problems: cold, flu, strep throat, sore throat, and cough. Answer choices were never, sometimes, or always, and “correct” judgments were based on CDC recommendations. Other knowledge questions included the efficacy of the antibiotic amoxicillin and a vignette question to assess whether a child with cold-like symptoms required antibiotics. A series of true–false statements contained facts about antibiotics, including whether germs are becoming resistant, causes of resistance, how long pills should be taken, whether a runny nose required antibiotics, and whether antibiotics are appropriate for colds. About half of the pharmacists agreed that antibiotics are inappropriate for colds and flu: 54% agreed that antibiotics should never be given for colds, and 50% said they should never be given for flu. Twelve knowledge questions were grouped into an additive scale, with higher
somewhat that they were comfortable educating clients about resistance. In response to the question, antibiotic education is important in changing somewhat. to estimate their degree of autonomy, a four-part scale ranging from 0 = none to 4 = a great deal of autonomy. Fourteen percent of respondents read pharmacy trade magazines whereas 58% read some (and 9% Internet: only 5% used the Internet or likely has risen since the data were such they trusted each medium (on a scale ranging from 0 = none to 4 = a great deal of trust). The most trusted: general interest magazines garnered as a weight for the media frequency Use was created with the media use sufficiently reliable and internally consistent scores reflecting correct answers. The scale had an acceptable measure of internal consistency (α = .72).

Barriers and Enablers

Respondents were asked what barriers might prevent them and what factors would assist them in participating in a judicious antibiotic use campaign. Concern over relationships with physicians was the most frequently cited concern: 45% agreed that taking part in the campaign might harm relations with doctors. Other barriers included time constraints (60% agreed); uncertainty about how to educate patients (29%); lack of familiarity with judicious antibiotic use (16%); problems with store policy or approval (15%); and concern over losing revenue (9%).

Another set of questions asked pharmacists what factors might enable them to participate in a campaign, such as availability of pamphlets and endorsement of the project by key groups. Most agreed they would participate if: pamphlets were available (72% agreed), bosses were supportive (91%), physicians were supportive (80%), professional group (APhA) was supportive (68%), and if resistant antibiotic education were offered (82%).

A factor analysis was used as a confirmatory device to be assured that the constructs grouped into categories of attitudes, role, norms, control, and barriers. The 16 variables were subjected to a factor analysis using varimax rotation and principal component analysis. The best conceptual fit was four factors with eigenvalues greater than one, accounting for 49% of the variance. A Pearson’s correlation revealed no relationship (r = .00) between the four factors.

The factor groupings made theoretical sense, but some of the constructs aligned together rather than separately. For example, attitudes and roles combined in the first factor and were labeled attitudes. The factor included measures of pharmacists’ normative role (whether pharmacists are important in educating clients), expectations of behavioral success (whether they can help change behavior), and feeling prepared and feeling comfortable counseling clients about antibiotic resistance.

Four factors loaded together under the heading enablers, and included items that would assist pharmacists to participate in a campaign—if they received support from physicians, APhA, and their employer, and if they had antibiotic resistance education.

The third factor, limits, included four variables respondents said would constrain them from participating in the campaign: lack of time, uncertainty about educating patients, unfamiliar with antibiotic use, and lack of materials.

The final factor—autonomy—reflected issues that related to the pharmacist’s control within the organization. The four variables included degree of autonomy,

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5Totals exceed 100 because respondents could check more than one category.
6Totals exceed 100 because respondents could check more than one category.
concern over revenue loss, concern over relations with physicians, and concern over store policy (negative relationship).

DEPENDENT VARIABLE

Interpersonal Communication

Four questions asked respondents to estimate the percentage of time they spent talking with consumers about antibiotics with the premise this reflects future willingness to participate in a judicious antibiotic use campaign. They were most likely to talk about completing the entire course: the mean response was 80% \((SD = 23)\) of the time. The mean response for discussing side effects was 69% \((SD = 31.7)\) of the time. Drug interactions were discussed 50% \((SD = 34.2)\) of the time. Respondents discussed antibiotic resistance on average 24% \((SD = 28)\) of the time. The four variables were grouped into an additive index labeled discussion. These variables grouped reliably and were internally consistent \((\alpha = .76)\). The second dependent variable was the single measure of how frequently pharmacists specifically discussed antibiotic resistance and was labeled resistance discussion.

In light of the argument that pharmacists' ability and willingness to talk with consumers is key to carrying out a successful judicious antibiotic use campaign, the premise was that those who currently engage in discussion about antibiotics are more likely to be ideal subjects to participate in a campaign. Therefore it made sense to employ the two discussion behaviors as the dependent variables.

The next task was to discover whether the independent variables significantly predicted discussion about overall antibiotic use, and if these variables responded differently when used to predict specific discussion of resistance.

HYPOTHESIS TESTING

The first \(H\) was supported: the attitudes factor was significantly associated with Discussion \((r = .22, p = .000)\) and with resistance discussion \((r = .27, p = .000)\). The expectation was that personal norms \((H2)\), social norms \((H3)\), and control \((H4)\) would be associated with discussion. Recall, however, that the attitudes factor incorporated the normative role, which was associated with discussion, in support of \(H2\). The social role questions aligned with the autonomy factor, which was positively correlated with Discussion \((r = .14, p = .008)\) but not with antibiotic discussion \((r = -0.02, p = .652)\), offering only partial support for \(H3\) and \(H4\). \(H5\) proposed that media use would be associated with discussion about antibiotics, but no

A minimum alpha level of .05 was used to make judgments about statistical significance.
Discussion as the Dependent Variable

When discussion was employed as the dependent variable, the independent variables predicted 14% of the overall variance.

The first block, demographic and organizational variables, accounted for about 8% of the variance on discussion. The standardized betas show the proportional influence of each independent variable. Significant predictors included prescriptions written per day (negative; \( \beta = -.169, p = .001 \)), non-chain pharmacy (\( \beta = .139, p = .011 \)), and hours worked per day (\( \beta = .116, p = .023 \)). Years in practice and antibiotic prescriptions written were insignificant predictors. Knowledge was entered as the second block but added little to the variance on discussion (\( \beta = .030, p = .559 \)). Media use (third block) failed to mediate the effect of knowledge and added little predictive power (\( \beta = -.010, p = .846 \)). Attitudes added to greatest proportion to the variance as hypothesized (\( \beta = .197, p = .000 \)), and had a slight but insignificant moderating effect on hours worked and non-chain pharmacy.

In the final block, the enabling and autonomy factors significantly added to the overall variance, but the Limits factor offered little predictive power (\( \beta = .048, p = \)).

Significant relationships were found with the media use index and discussion (\( r = .01, p = .814 \)) or with resistance discussion (\( r = -.03, p = .562 \)).

Knowledge was not associated with discussion of antibiotics (discussion, \( r = .01, p = .892 \); resistance discussion, \( r = -.08, p = .103 \)), contrary to H6. The limits and enablers factors were not correlated at statistical significance with the discussion variables, offering no support for H7: limits (with discussion, \( r = .04, p = .494 \); resistance discussion, \( r = -.02, p = .763 \)) and enablers (with discussion, \( r = .10, p = .055 \); resistance discussion, \( r = .08, p = .122 \)).

The remaining Hs concerned the predictive ability of the independent variables on discussion, thus requiring regression analyses. Two hierarchical regressions were employed with discussion as the dependent variable in one, and resistance discussion as the dependent variable in the other.

Independent variables were entered in the following steps. Block 1 included demographic and organizational variables; Block 2 was knowledge; Block 3, media use index; Block 4, attitudes; and Block 5, enablers, autonomy, and limits. The ordering of blocks in this manner allowed the investigator to examine the influence of each group of variables on the dependent variable. The method also showed the influences of key variables after statistically controlling for the variance of such predictors as demographics (Moy, Pfau, & Kahlor, 1999; Serovich, Brucker, & Kimberly, 2000). And finally, the method demonstrated the mediating effect of a succeeding block on the preceding block.

Discussions of future willingness to engage in discussion about antibiotics are important as indicators of future willingness to discuss judicious antibiotic use. Therefore, it made sense that knowledge and attitude variables were significantly associated with discussion. These variables significantly predicted the percentage of time pharmacists spent discussing antibiotics with the premise this reflects future willingness to engage in discussion about antibiotics. They were most consistent (\( \alpha = .76 \)). The second block, media use index, also added to the variance on discussion (\( r = -.03, p = .562 \)). The third block, attitudes, added to the variance on discussion (\( r = -.08, p = .103 \)).

The fourth block, ability and willingness to talk with patients, added to the variance on discussion (\( r = -.02, p = .763 \)). The fifth block, enablers, autonomy, and limits, added to the variance on discussion (\( r = -.02, p = .763 \)). The sixth block, enabling and autonomy factors, added to the variance on discussion (\( r = .08, p = .122 \)). The seventh block, limits, added to the variance on discussion (\( r = -.02, p = .763 \)). The eighth block, media use, added to the variance on discussion (\( r = -.03, p = .562 \)). The ninth block, attitudes, added to the variance on discussion (\( r = -.02, p = .763 \)). The tenth block, ability and willingness to talk with patients, added to the variance on discussion (\( r = -.02, p = .763 \)). The eleventh block, enabling and autonomy factors, added to the variance on discussion (\( r = -.02, p = .763 \)). The twelfth block, limits, added to the variance on discussion (\( r = -.02, p = .763 \)).

The thirteenth block, media use, added to the variance on discussion (\( r = -.03, p = .562 \)). The fourteenth block, attitudes, added to the variance on discussion (\( r = -.02, p = .763 \)). The fifteenth block, ability and willingness to talk with patients, added to the variance on discussion (\( r = -.02, p = .763 \)). The sixteenth block, enabling and autonomy factors, added to the variance on discussion (\( r = -.02, p = .763 \)). The seventeenth block, limits, added to the variance on discussion (\( r = -.02, p = .763 \)). The eighteenth block, media use, added to the variance on discussion (\( r = -.03, p = .562 \)). The nineteenth block, attitudes, added to the variance on discussion (\( r = -.02, p = .763 \)). The twentieth block, ability and willingness to talk with patients, added to the variance on discussion (\( r = -.02, p = .763 \)). The twenty-first block, enabling and autonomy factors, added to the variance on discussion (\( r = -.02, p = .763 \)). The twenty-second block, limits, added to the variance on discussion (\( r = -.02, p = .763 \)). The twenty-third block, media use, added to the variance on discussion (\( r = -.03, p = .562 \)). The twenty-fourth block, attitudes, added to the variance on discussion (\( r = -.02, p = .763 \)). The twenty-fifth block, ability and willingness to talk with patients, added to the variance on discussion (\( r = -.02, p = .763 \)). The twenty-sixth block, enabling and autonomy factors, added to the variance on discussion (\( r = -.02, p = .763 \)). The twenty-seventh block, limits, added to the variance on discussion (\( r = -.02, p = .763 \)).
Proportionally enabling and autonomy had the same weighted effect ($\beta = .116, p = .020$).

Moreover, inclusion of the enabling, autonomy, and limits factors did not diminish the effect of attitudes, prescriptions filled or hours worked. The beta for non-chain pharmacy shifted slightly from .115 in the preceding block to .103. Of note is that the addition of the autonomy and enabling factors in the equation diminished the effect of knowledge from the previous beta of .023 to .001.

Resistance Discussion as the Dependent Variable

Turning to predictors of resistance discussion, the demographic variables accounted for 6% of the initial variance. Significant predictors included years in practice ($\beta = .154, p = .006$), hours worked ($\beta = .119, p = .020$), and non-chain pharmacy ($\beta = .108, p = .048$).

Knowledge (second block) and media use (third block) offered no significant predictive power on resistance discussion. Attitudes however, added a significant increase—6.5%—to the overall variance ($\beta = .260, p = .000$). In the final block, enabling added significantly to the variance as hypothesized ($\beta = .097, p = .051$), but the autonomy factor added little ($\beta = -.042, p = .395$). Finally, the limits factor did not significantly contribute to the variance on resistance discussion ($\beta = -.014, p = .782$).

To summarize, the attitudes and enabling factors significantly contributed to the variance on resistance discussion, in partial support of H8. However, knowledge, media use, and Limits offered no significant predictive power, contrary to H8. Although autonomy contributed to overall discussion, the factor was not predictive of resistance discussion. Finally, attitudes accounted for the greatest proportional variance on discussion and resistance discussion in support of H9. Of note is that some demographic variables, even when their effects were statistically controlled, continued to contribute to the variance on the dependent variables despite the inclusion of other variables. Prescriptions filled (negative), hours worked, and non-chain pharmacy were significant predictors of discussion, while hours worked, years in practice, and number of antibiotic prescriptions filled significantly predicted resistance discussion.

DISCUSSION

An objective of the study was to learn what elements might limit or engage pharmacists' willingness to participate in a judicious antibiotic use campaign. This is important for health communicators, public relations practitioners, and others interested in the role pharmacists play in influencing consumer awareness, attitudes,
had the same weighted effect ($\beta = 0.01$, $p < .05$), and limits factors did not differ or limit hours worked. The beta for 5 in the preceding block to .103. Of enabling factors in the equation differed from previous beta of .023 to .001.

**Table 1**

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Independent Variables</th>
<th>$B$</th>
<th>$\beta$</th>
<th>$R^2$ Change</th>
<th>$R^2$</th>
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<tbody>
<tr>
<td>Block 1 demographics</td>
<td>Antibiotics per day</td>
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<td>.073</td>
<td>.078</td>
<td>.078</td>
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<tr>
<td></td>
<td>Perscriptions per day</td>
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<td>.077**</td>
<td>.078</td>
<td>.078</td>
</tr>
<tr>
<td></td>
<td>Years in practice</td>
<td>.003</td>
<td>.037</td>
<td></td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Hours worked</td>
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<td>.106*</td>
<td></td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Chain pharmacy</td>
<td>.103</td>
<td>.103</td>
<td>.078</td>
<td>.078</td>
</tr>
<tr>
<td>Block 2 knowledge</td>
<td>Block 1 demographics</td>
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<td>-.001</td>
<td>.000</td>
<td>.000</td>
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<td>Block 3 media use</td>
<td>Block 1 demographics</td>
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<td>-.038</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Block 4 attitude</td>
<td>Block 1 demographics</td>
<td>.199</td>
<td>.199***</td>
<td>.037</td>
<td>.116</td>
</tr>
<tr>
<td>Block 5</td>
<td>Enabling</td>
<td>.116</td>
<td>.116*</td>
<td>.028</td>
<td>.144</td>
</tr>
<tr>
<td></td>
<td>Autonomy</td>
<td>.116</td>
<td>.116*</td>
<td></td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>Limits</td>
<td>.047</td>
<td>.048</td>
<td></td>
<td>.138</td>
</tr>
</tbody>
</table>

| Resistance discussion | Block 1 demographics | .236 | .105*  | .059        | .059 |
|                       | Antibiotics per day   | .009 | -.026  | .003        | .062 |
|                       | Perscriptions per day | .362 | .156** | .000        | .062 |
|                       | Hours worked          | .276 | .111*  | .065        | .127 |
|                       | Chain pharmacy        | .877 | .067   |             | .059 |
| Block 2 knowledge     | Block 1 demographics   | -.743 | -.062  | .003        | .062 |
| Block 3 media use     | Block 1 demographics   | -.345 | -.012  | .000        | .062 |
| Block 4 attitude      | Block 1 demographics   | .7277 | .259** | .065        | .127 |
| Block 5               | Enabling              | 2.727 | .097*  |             | .138 |
|                       | Autonomy              | -1.186 | -.042 |             | .138 |
|                       | Limits                | -.380 | -.014  | .011        | .138 |

Note. $n = 375$.  
*p < .05. **p < .01. ***p < .001.

and behavior. Moreover, pharmacists are being called upon to take expanded duties beyond dispensing medicines, and their concerns and opinions are valuable.

By examining their current communication with consumers about antibiotics and resistance, the hope was to pinpoint factors that are associated with interpersonal communication. The findings suggest that interpersonal discussion is a complex process for pharmacists, and is influenced by a number of elements, including personality characteristics, such as efficacy, and organizational constraints, such as hours worked. And although attitudes are critical in the TRA model, and served as the weightiest predictors in the study, attitudes are not the sole predictors of communication behavior. Overall, a small portion of the variance on discussion was explained in the equations—about 14%. The linear model arising from the TRA may
not be the best fit for examining influences on communication patterns in the current context.

An examination of the predictor variables points to the salience of personal characteristics: Pharmacists who are the most independent and autonomous, and who have a positive sense of their efficacy and of their role, seem best primed to carry out campaigns. These are the attributes best captured in the attitudes factor, which contributed the greatest proportional variance on discussion. At the same time, working in a chain pharmacy and filling a large portion of prescriptions inhibit antibiotic discussion.

Questions strategists should address are: Can these factors be tweaked in the target audience to enhance quality conversations about health care? Can campaign planners instill autonomy or alter key attitudes among pharmacists? Campaign planners typically rely on mass mediated messages to convey information to audiences, believing that correct behaviors will ensue once knowledge is gained. But information alone—and having “correct” knowledge—did not predict pharmacists’ discussion of resistance with their clients. In fact, high knowledge of antibiotics and resistance contributed little to the variance on interpersonal discussion. And although campaign strategists can supply pharmacies materials, such as brochures or flyers, this may not impact actual interpersonal discussion.

Practically speaking, one of the greatest barriers is the demand of time on the pharmacist, who, on average, completes 126 prescriptions in an 8-hr day. That means pharmacists personally fill one prescription every 4 min. Moreover, pharmacists already spend a portion of their time talking with clients, and the expectation is that they will spend more time in future counseling patients. Yet pharmacists’ time is at a premium. Demands on the pharmacist to take a more active role in counseling patients may be unrealistic, and campaign planners should heed the finding that the pharmacist’s day is already full. Note that the number of prescriptions filled each day was a significant (negative) predictor of overall discussion.

Another area that should be addressed is the difference in attitudes, autonomy, and perceptions of barriers held by independent pharmacists and chain pharmacists. Results suggest, for example, that those who work in a chain setting actually talk less. Researchers should ask why this is, particularly in view that the number of chain pharmacies in the United States is growing in tandem with the shortage of pharmacists. The National Association of Chain Drug Stores estimates that the shortage of pharmacists has more than doubled in the past 2 years, from 2,670 to 7,000 (Frederick, 2000). And pharmacists filled a record number—2.9 billion—of prescriptions in 2000, a 7.5% increase from the previous year (Rx Drugs, 2001).

Another important finding is that some pharmacists feel poorly equipped to be part of a campaign. Some are unsure how to educate patients. By providing written materials and generating support from physicians and employers, barriers pharmacists face may be reduced, but such enabling tactics offer only a small contribution: Clearly pharmacists need more than pamphlets, and it may be helpful to shore up
pharmacists' beliefs in the importance of their role in communicating health information to patients. Moreover, role efficacy is a crucial component of any successful behavior, and pharmacists who are expected to carry out new or different behaviors (such as discussing antibiotic resistance) require efficacy to succeed in that role.

Clearly pharmacists view themselves as important sources of health information and are primed to impart messages to their clients. The health communication network is already in place, and the key is to ensure that pharmacists are empowered with the skills and materials to inform consumers.

Limitations

Readers should be mindful that the sample of pharmacists in the study may differ in their views from other practitioners—the list is only 60% of a sample of community pharmacists obtained from the APhA. Moreover, the information gleaned in the study arises from self-reported behaviors, which may not necessarily represent accurately pharmacists' activities. The items that were included in the study—attitudes, norms, control, media use, knowledge, and barriers—reveal a less than robust picture of the influences on communication, which beg researchers to examine other items that might better account for interpersonal discussion. In the future, researchers should conduct more field studies to observe patient-pharmacist discussion and to obtain a more qualitative picture of communication patterns (see Schommer & Wiederholt, 1995).

Bearing the limitations in mind, the study offers insight into the community pharmacist's activities, concerns, and judgments about their role, while testing the efficacy of a modified version of the TRA in a campaign context.

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