

Effective Smoking Prevention and Cessation Programs for Adolescent Girls: A Proposed Human Ecological Framework for International Program Design

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Abstract : This paper focuses on the current internationally published literature on adolescent girls smoking prevention and cessation programs. Published literature on prevention and cessation programs that have been developed for and used with girls, especially those with published effectiveness data are reviewed separately. Using relevant literature and the results of a recent Delphi Study identifying program components experts cited as most effective for female smoking prevention, a human ecological framework for designing programs for female adolescents will be proposed. Areas for further research will also be identified.

Key Words : adolescent females, smoking prevention, smoking cessation, human ecological framework

Cigarette smoking continues to be a major health concern in the U.S. (Botvin, Griffin, Diaz, Miller, & Ifill-Williams, 1999) and internationally (Juon, Nam & Shin, 1995; Choe, Kiting, Lin, Podhisita, Raymundo & Thapa, 2001) and adolescents are at particular risk. Nearly 9 out of 10 current adult smokers (89%) started their habit before age 19 (Lantz, Jacobson, & Warner, 2001). Adolescent females in the U.S. who smoke are steadily increasing while smoking among males is decreasing (Gold, 1995). A recent study of the youth tobacco epidemic in Asia (Choe *et al.*, 2001) found smoking prevalence for adolescent males highest in Indonesia, Thailand, Taiwan, the Philippines and Nepal. Prevalence among adolescent females in these countries remained low due primarily to less permissive parental attitudes about females. However, in Taiwan, for example, the female adolescent smoking rate is accelerating with a trend upward

similar to that of American adolescents (USDHHS, 1994). Changing demographics with the number of adolescents and young adults doubling in nearly every country of Asia and the growing number of young women living away from their parents to pursue education or a career may change the international patterns of smoking risk behavior for females. For example, although fewer women worldwide smoke than men, the number of women smokers has been increasing for some time, particularly in developing countries. Recent increases in smoking prevalence by women have been reported in Cambodia, Malaysia and Bangladesh and women's smoking rates are already higher than men's in five countries: the Cook Islands, Nauru, Norway, Papua New Guinea and Sweden (Thun & Silva, 2003). The significant health risk of tobacco smoking is a global issue and especially for female adolescents.

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Surveys now indicate that girls in the U.S. are using some substances, such as cigarettes, at a rate equal to boys, and that boys and girls report different reasons for smoking, raising questions about the effectiveness of gender neutral interventions. A study of Korean adolescents' smoking behavior by Kim in 2005 also found significant differences between male and female adolescents in smoking experience and current smoking status indicating a different approach for prevention and cessation programs based on gender. This differential approach to prevention and cessation programs for females recognizes that the health consequences of smoking are especially severe for females with smoking cited as the leading cause of preventable disease and death (USDHHS, 2001). Further, adolescent females who smoke are more likely to have respiratory symptoms and illnesses, and the severity of these illnesses is likely to be higher (Barry, 2001). They have decreased fitness and may suffer retarded lung growth. "Lung cancer is now the leading cause of cancer death among U.S. women...about 90 percent of all lung cancer deaths among women who continue to smoke are attributable to smoking" according to the Surgeon General's report on Women and Smoking (USDHHS, 2001; p. 2).

A number of promising smoking prevention and cessation programs have emerged in the past 20 years as the risk of tobacco use has become clearer worldwide. Recently more emphasis has been on preventing smoking from early on in life due to adult smokers in every country generally beginning to smoke as adolescents (DHHS, 1994). Research finds that up to 67% of teen smokers report having tried to quit or intend to quit at some point (Sussman, Dent, Nezami, Stacy, Burton, & Flay, 1998; Burt & Peterson, 1998). Quitting smoking may be more difficult for females than it is for males (Perkins, 2001). Much of the programming used with teens, however, has been developed for adults. Very few of those borrowed programs have been rigorously evaluated for teens and even fewer differentiate between genders (Houston, Kolbe, & Eriksen, 1998).

Most prevention and cessation programs are developed from the point of view of gender-neutrality or have been developed with boys in mind due to the previously higher prevalence rates of substance use among boys (National Center on Addiction and Substance Abuse, 2003). According to the Surgeon General, more investigation is needed into what factors lead to more effective prevention and cessation programming for girls (USDHHS, 2001). Botvin and colleagues (1999) also stated that, "research on adolescent girls is important because of their recent trend toward increased cigarette smoking, and because of the dual risk of cigarette smoking for women and their children" (p. 140). The authors go on to assert that, "smoking prevention research on adolescent girls is needed because etiologic studies have found gender differences in susceptibility to social influences, level of social skills, reliance on smoking as a coping strategy, and concerns related to weight, body image, self-esteem, and the way women are portrayed in the media" (Botvin *et al.*, 1999; p. 140). This paper focuses on the current published literature on adolescent girls smoking prevention and cessation programs with an emphasis on the U.S. due to the sparse literature found internationally. We will review published literature on prevention and cessation programs that have been developed for and used with girls, especially those with published effectiveness data.

Because prevention and cessation programs have slightly different approaches, we will review them separately. Using relevant literature and the results of a recent Delphi Study identifying program components experts cited as most effective for female smoking prevention, a human ecological framework for designing programs for female adolescents will be proposed. Areas for further research will also be identified.

I. Smoking Prevention Programs for Adolescent Girls

The past few years have seen a small increase of

published literature in the U.S. on the issues of gender and drug use prevention (Amaro, Blake, Schwartz, & Flinchbaugh, 2001). While drug use prevalence rates have historically been higher for boys than girls, recent sources suggest that a gender gap no longer exists among U.S. teens 12-17 (SAMHSA, 2000a; 2000b). In the 1998 National Household Survey there were no significant differences in the percentage of U.S. boys and girls who reported using tobacco in the past month (SAMHSA, 2000b). Male smoking rates internationally remain higher than female rates with predictions in several countries for rising prevalence in the future (USDHHS, 1994).

There are documented gender differences in risk and protective factors internationally. According to Amaro and her colleagues (2001), many recent studies indicate that certain risk factors are more prevalent for girls' smoking than boys' smoking such as: negative self-image or self-esteem (Crockett & Petersen, 1993; Crump, Lillie-Blanton, & Anthony, 1997); weight concerns and dieting (Camp, Klesges, & Relyea, 1993; French & Perry, 1996); eating disorders (Thompson, Wonderlich, Crosby, & Mitchell, 1999; Watts & Ellis, 1993); physical and sexual abuse (Cole & Putnam, 1992; Sarigiani *et al.*, 1999); early onset of puberty (Tschann *et al.*, 1994); anxiety disorder (Rohde, Lewinsohn, & Seeley, 1996); depressive disorder (Kandel & Davies, 1982); and boyfriend's reported drug use (Amaro & Zukerman, 1990). The authors also note protective factors that some studies report are more important for girls such as: consistent discipline, parental support, and parental disapproval (Marshall & Chassin, 2000; Juon, Nam & Shin, 1995) and self control (Simons-Morton, Crump, *et al.*, 1999).

Research indicates girls and boys may smoke for different reasons. Girls, for instance, report smoking in order to feel more rebellious, socially advanced, confident, sexually experienced, and to obtain approval from peers, while boys report smoking as a way to cope with social insecurity (Best, Brown, Cameron, Manske, & Santi, 1995). There are also reported differences among girls and boys to sensitivity to

nicotine (Grunberg, Winders, & Wewers, 1991) as well as differences in sensitivity to substances associated with phase of menstrual cycle (Lukas *et al.*, 1996). Sussman and his colleagues found that adolescent females may have more problems quitting than their male counterparts due to their avoidance of nicotine withdrawal and their use of cigarettes to regulate their affective states (Sussman *et al.*, 1998). Because of these and other trends, some authors question the effectiveness of national prevention programs that are combined for boys and girls, and they are urging researchers to investigate approaches for intervention that give attention to factors specific to girls (Amaro *et al.*, 2001).

What program design gives these factors priority? According to Guthrie and Flinchbaugh (2001), gender-specific programs are distinctly or exclusively designed for one gender. Gender-appropriate programs are ones that recognize the importance of the program for one gender or the other. They assert that a gender-specific substance abuse program for females should follow the benchmarks established by the Valentine Foundation (1990). Those benchmarks include: (a) the program space should be physically and emotionally safe and removed from the attention of boys; (b) guidance by peers and adult women in an emotionally safe, comforting, challenging, and nurturing way; (c) opportunities to develop relationships of trust and interdependence with girls their age, older girls, and adult women; (d) tapping girls' cultural strengths, focusing on their risk factors; (e) comprehensive content; (f) opportunities to create positive changes that benefit girls on the individual, peer, and community levels; (g) providing girls an active voice in program design, implementation, and evaluation; (h) becoming financially stable to give girls time to integrate the benefits of the program into her life; and (i) active recruitment of families, peers, communities, and schools in the development and critique of the program.

The Valentine Foundation criteria reinforce the belief that behavior is influenced by a host of factors

both internal and external to the individual. Ecological theory (Bronfenbrenner, 1979, 1986), developmental contextualism (Lerner, 1991, 1995), and risk and protective factor theory (Bogenschneider, 1996), all support the notion of an interactive effect between the individual and his or her multiple environments. This involvement of multiple environments is also noted above as criteria of the Valentine Foundation. An ecological program design provides the theoretical rationale for developing prevention and cessation programs that incorporate multiple influences on adolescent smoking behaviors. Do prevention programs designed for girls using these criteria exist and have they been evaluated?

1. Prevention programs with effectiveness data

In a systematic search of the published literature from 1990 to 2002, few U.S. or international programs designed specifically for girls were found and none were found that incorporated all the Valentine Foundation criteria and an ecological approach. Rigorously evaluated prevention programs for girls were also small in number.

The National Center on Addiction and Substance Abuse (CASA, 2003) reviewed U.S. prevention programs designed to address the needs of girls and reported on three: Project Chrysalis, Friendly PEERsuasion, and Girl Power. There was no published outcome data for Girl Power, a national media campaign. The small sample size and lack of follow up over time made evaluations of Friendly PEERsuasion difficult to interpret. However, Project Chrysalis did employ a more rigorous evaluation (Brown & Black, 2001) that demonstrated effectiveness in preventing the initiation of tobacco use. The target population was girls in grades 9 through 12 with histories of physical, sexual, and emotional abuse. This school-based, voluntary program utilized support groups, case management services, rewards for attendance at support group meetings, educational sessions, and

physical challenge and self-defense training. This program comes closest to meeting the Valentine Foundation criteria referenced earlier.

Guthrie and Flinchbaugh (2001) published one of the most comprehensive reviews on gender-specific prevention programs. They reported on the 1994 CASA funding of 25 grants to develop gender-specific substance abuse prevention programs for female adolescents. These Female Adolescent Initiative grants covered a wide range of racial/ethnic populations in varying geographic locations and urban, suburban, and rural settings. Although informative, many of the program results were non significant or equivocal primarily due to small sample sizes. Nonetheless, selected risk factors such as self-esteem/self worth, self-efficacy, and relational bonding with family, school, and adult mentors addressed in the intervention groups were found in the more effective program designs. These programs need to be replicated with larger population-based samples of girls assigned randomly into either intervention or comparison groups to get a true picture of effectiveness.

A follow-up study of a school-based smoking prevention intervention found that “the approach previously found to be effective among white youth significantly reduced smoking initiation and escalation among urban minority girls” (Botvin *et al.*, 1999; p.139). The prevention program the researchers used was the Life Skills Training program. The evaluation showed empirical support for the effectiveness of this smoking prevention program for inner-city minority girls in the 7th and 8th grades. Findings indicate that the 7th grade, non-smoking program participants were less likely to initiate smoking at follow-up (end of 8th grade) compared to the control group girls. Researchers concluded that significant program effects on smoking intentions, knowledge of smoking, perceived adult and peer smoking norms, drug refusal skills, and risk taking had an impact on the positive results found among the experimental group of girls. In addition, intervention group members who were experimental smokers were less likely than control group girls to increase to

monthly smokers by the end of the 8th grade. The authors note that part of the success of the intervention was that the program helped correct perceived norms about peer and adult tobacco use prevalence, increased refusal skills, and increased knowledge of the consequences of smoking. The authors also believe that their results provide moderate support for the notion that the modified version of the Life Skills Training program works with adolescent girls. They indicate that the program might be further enhanced for girls with additional emphasis on social influence factors, self image, and media analysis skills. Some of the strengths of this study include the sample size, random assignment of groups, the use of well established survey instruments, and data collection protocols used effectively in prior studies. They suggest that future research needs to explore variations that will improve the effectiveness of this program with teen girls.

Another study with documented effectiveness data investigated the use of mass media as a smoking prevention tool for adolescent girls and included a large sample of 5,458 students in grades 4 through 6 who were followed for four years (Worden, Flynn, Solomon, Secker-Walker, Badger, & Carpenter, 1996). The mass media messages were created especially for girls and results showed that media targeting techniques resulted in high levels of message appeal and exposure consistent with effects on mediating variables. They also found a 40% lower weekly smoking prevalence for the girls when they were in grades 8-10 if they received the media and school interventions compared to only school intervention. Those changes in smoking prevalence also were maintained in grades 10-12. Authors suggest that the mass media intervention for girls is effective in changing using behaviors and could have a significant positive impact on future smoking among girls and women. The authors point out that it is also good for “reaching clearly defined groups on a broad scale through channels that are particularly well suited to influence young people at risk for smoking and other

harmful behaviors” (p. 466).

While no gender specific prevention programs for females were found in a search of the literature outside of the U.S., a meta-analysis of the effects of smoking prevention programs in Korea (Park, 2004) supported continued use of socially influential programs and active/interactive methods for smoking prevention programs. This same article recommended that smoking prevention programs should consider adopting more effective programs.

It is clear from this search of the literature that if we are to be successful in reaching adolescent females, we need more prevention programs designed specifically to address the unique risk factors for girls. A model using the Valentine Foundation criteria that incorporates a rigorous evaluation design with large population samples, random assignment to groups, reliable survey instruments, and thorough data collection protocols, a media campaign and follow-up data would be a step in the right direction.

II. Smoking Cessation Programs for Adolescent Girls

Smoking cessation is beneficial at all ages, although women who stop smoking at younger ages experience relatively greater benefits (Office of the Surgeon General, 2001). Smoking cessation programs have typically been focused on adults, though recently more energy has gone into developing effective programs for adolescents, as well. In fact, an entire special issue of the American Journal of Health Behavior (2003) was recently devoted to what we do and don't know about youth tobacco cessation. The overall conclusion is that there is a dearth of evidence regarding effective treatment for youth tobacco users, including programs designed for females. This special issue raises few questions about whether different approaches to cessation are needed based on youth characteristics such as gender (Backinger, McDonaold, Ossip-Klein, Colby, Maule, *et al.*, 2003).

Cessation programs for youth may include population-based interventions such as policies to reduce exposure to secondhand smoke, price increases, and mass media campaigns. Programs may also include individual-level interventions such as behavioral counseling or pharmacological treatments. Behavioral approaches may be delivered face-to-face in groups such as school-based programs, community-based programs, hospital in-patient and out-patient programs, through telephone counseling and quit-lines, or through computer-based interactive programs. FDA- approved nicotine replacement therapies include various forms of over-the-counter or prescription replacements for nicotine and bupropion-SR, an antidepressant medication approved for use as a smoking cessation aid. These smoking cessation aids have some success, and some have even shown that they can double the usual smoking quit rates achieved through self-help programs (Dempsey & Benowitz, in press).

What follows is a review of the published literature on a few of the cessation programs being used in the U.S. for female adolescents. A search of the literature internationally found no studies of female specific cessation programs. Dr. Chung Yui Lee (2001) found Korean society with only fragmented smoking cessation programs for all ages and facing great difficulties in developing more comprehensive programs. As a participant in the Fulbright New Century Scholars Program she is studying a comparison of health promotion strategies for smoking between the U.S. and Korea. A study of the effectiveness of a smoking cessation program for adolescents in general (Kim, Nam, & Lee, 2004) recommended involving peers and families of adolescents who smoke when planning cessation programs to enhance social support. This recommendation further supports the ecological model described earlier.

1. Cessation programs with effectiveness data

Very little research has been published on the

development and effectiveness of smoking cessation programs for youth, and even less on girls. No studies were found that incorporated the entire Valentine criteria and an ecological approach to program design although one U.S. program, (NOT) came close. According to CASA (2003), cessation programs that include social support from peers and family are more likely to be helpful to girls. This recommendation follows a similar finding by Kim, Nam, & Lee in 2004 referenced earlier. In addition, addressing weight concerns as they relate to quitting smoking is very important for girls and young women. The same protective and risk factors considered in preventing smoking behavior in females are operative in ceasing smoking behavior. The authors state that there is "an urgent need for more research aimed at developing and evaluating substance abuse treatment programs that are effective for girls and young women" (CASA, p.83).

One West Virginia (WV) study of the implementation of a school-based smoking cessation program reveals important suggestions for gender-sensitive tobacco-free programming for adolescents (Dino, Horn, Goldcamp, Kemp-Rye, Westrate, & Monaco, 2001). After a community needs assessment conducted at the county and school levels, program partners decided to modify the Minnesota's Tobacco Free Teens (TFT) program for WV teens based on what they learned from an extensive literature review and the results of the pilot test.

This program was piloted tested with same gender groups and facilitators consisting of 29 students in the treatment group and five in the control group (Dino *et al.*, 2001). The average daily cigarette use among all students was 21 cigarettes per day at baseline. Smoking behavior was measured by self report and expired air carbon monoxide. Results of the pilot test showed that, four months after the intervention, 44% of boys and 14% of girls were smoke free while all of the girls in the control group smoked the same amount. All of the teens who did not quit at least reduced their cigarette intake, but boys reduced their intake at a higher rate than the girls. Outcomes of the pilot test showed a need

for a completely new curriculum designed to be more gender sensitive and highly prescribed, with an emphasis on stress management, building self-esteem, and dealing with friends and family members who smoke. Follow-up sessions were deemed necessary for added support after the initial program was completed. Finally, the need for a detailed facilitator manual was recommended.

Results of the program development stage of this project showed that stakeholders wanted a program with a developmental emphasis as well as social and coping skills, assertiveness and refusal skills, issues around advertising, dealing with family, and peer pressure (Dino *et al.*, 2001). Enhancing teen motivation to join and stay was crucial. Both the content and process of delivering the program was important as well as gender issues. The literature review revealed that girls report worse withdrawal symptoms, less confidence, and more depression during quit attempts than males. Therefore a gender-sensitivity element was deemed necessary. They also discovered that teens use smoking to deal with stress and feelings, so stress management was another important aspect to include. With all of the results in, program partners opted to institute the American Lung Association's (ALA) "Not On Tobacco" (NOT) program. NOT is a voluntary, school-based program for 14-19 year old regular smokers. The program was comprised of 10 weekly sessions followed by four booster sessions and was taught to gender-separate groups with same gender facilitators in each group. One unusual aspect of the program was that it took a total health approach to smoking cessation for teens. A feasibility study was conducted in WV and in Florida, and results showed significant improvement of not smoking for those who got the new intervention compared to another intervention.

Outcomes of the new NOT program in this WV program show quit rates of between 20%-30% (Dino *et al.*, 2001). More than 65% of those who did not quit reduced their use on weekdays, and 75% reduced their smoking on weekend. Teens also reported unexpected

benefits to their fitness, wellness, nutrition, coping skills, school attendance, grades, self esteem, and stress management.

Another team of researchers conducted an efficacy study of NOT, this time in the state of Florida (Dino *et al.*, 2001). The researchers matched the NOT intervention with a brief intervention in 40 schools with a total of 627 students. Results show that smoking cessation and reduction from the NOT program schools was significantly better than the brief intervention. NOT was more effective than the brief intervention for girls compared to boys. Results indicate that NOT is effective for helping adolescents quit smoking.

A second smoking cessation program designed with girls in mind and reporting outcome data was a program for pregnant adolescents called Teen Fresh Start with Buddy. This program relies on peer support and adult modeling. Program components include experiential learning activities, individual sessions with a nurse, social activities and immediate rewards such as gifts and refreshments. Evaluation data reported by Albrect, Payne, Stone & Reynolds (1998) found no statistically significant results due in part to the small sample size and high dropout rate.

The results of yet another study of the effectiveness of a teen smoking cessation program was published by Sussman, Dent, & Lichtman (2001). This eight-session school-based program was designed to be enjoyable and motivating for the California alternative school students studied (Sussman *at el.*, 2001). Project EX was shown to be effective in helping 17% of the 335 smoking teens to quit compared to only 8% of the control group members. This study also provided some insight into effective recruitment efforts. They recruited 34% of the school's smokers into the cessation clinics using both direct (presentations) and indirect (flyers) recruitment methods. The authors point out that having in-school clinics available is an effective form of recruitment needing minimal effort. Another possibility is having cessation programs included for all students as part of their regular health class so that all smokers

will be exposed to the material. Unfortunately only half of the students recruited for this study remained in the program through the entire course of the program. The authors recommend providing class credit, raffles, money, or other incentives to stay in the program until the end.

A published report outlined some of the findings regarding the use of smoking cessation medications in pregnant and adolescent female smokers (Dempsey & Benowitz, in press). These include products such as gum, patches, inhalers, nasal spray, and bupropion (Fiore *et al.*, 1996 in Barry, 2001). Dempsey & Benowitz (in press) reported that using nicotine replacement medications to aid smoking cessation programs for pregnant females is likely to outweigh the risks of smoking on the fetus, though others add that pregnant smokers should be encouraged to try to quit first without using nicotine replacement therapy (Fiore *et al.*, 1996 in Barry, 2001). Dempsey & Benowitz (in press) add that nicotine replacement therapy has not been demonstrated efficacious in clinical trials of girls or pregnant females, though there is no current evidence that nicotine replacement therapy or bupropion is harmful for adolescents (Barry, 2001). While the use of nicotine replacement therapy in adolescent girls is in its infancy, it may be one of the ways adolescent girls choose to stop smoking now and in the future.

Governmental efforts in the U.S. also weigh in on program effectiveness. Because smoking prevalence for Medicaid beneficiaries in the late 1990's was significantly higher than in the general population (35% vs. 24%), experts assume the same is true among Medicaid-eligible adolescents even though no published research exists to confirm this (Orleans, 2000 in Barry, 2001). States in the U.S. provide limited smoking cessation programming for children and adolescents called the Early and Periodic, Screening Diagnostic, and Treatment program (Westmoreland, 2001 in Barry, 2001). No evaluations have been published on this program to date.

III. A Human Ecological Framework for Designing Prevention and Cessation Programs for Girls

It is clear from the review of literature on designing and evaluating effective prevention and cessation program for girls that we are in need of a research-based framework for effective design and rigorous criteria for evaluating effectiveness. What do prevention experts believe are the ideal components of a model smoking prevention program? Davis, Piercy, Meszaros, Huebner, Shettler, & Matheson (2004) used a multi-wave Delphi methodology to contact 12 knowledgeable substance abuse professionals to gain consensus on the ideal components. Items meeting the criteria set for inclusion were: interactive teaching methods, weight control skills, involvement of parents, involvement of adolescents in curriculum development, media campaign, policy activities, and policies addressing reduction in tobacco use. The panelists generally acknowledged differential risk factors for females, however, more empirical research on gender-specific programming is needed before prevention experts are ready to agree on clear and specific program components and practices for adolescent females. Criteria identified by the panelists, plus the Valentine Foundation criteria and an ecological approach, do give us a start in better understanding of effective program design.

The ideal time to incorporate evaluation is when programs are being designed. In order to assess relative efficacy of interventions with different program orientations, evaluation criteria must be determined. The five criteria used by Bruvold (1993) represent some of the most important considerations. These include: the use of appropriate comparison groups; the use of appropriate pretest, posttest, and follow-up assessments; the control of research attrition; the validity of dependent variable assessment; and the use of statistical procedures appropriate for program evaluation research. If more prevention and cessation programs consistently used this set of criteria we would

be better able to determine the effectiveness of interventions.

A preliminary model incorporating research-based factors addressing female adolescent needs and rigorous evaluation would include the following components from the Valentine Foundation:

(a) the program space should be physically and emotionally safe and removed from the attention of boys; (b) guidance by peers and adult women in an emotionally safe, comforting, challenging, and nurturing way; (c) opportunities to develop relationships of trust and interdependence with girls their age, older girls, and adult women; (d) tapping girls' cultural strengths, focusing on their risk factors; (e) comprehensive content; (f) opportunities to create positive changes that benefit girls on the individual, peer, and community levels; (g) providing girls an active voice in program design, implementation, and evaluation; (h) becoming financially stable to give girls time to integrate the benefits of the program into her life; and (i) active recruitment of families, peers, communities, and schools in the development and critique of the program.

The ecological approach of individual, peer, family, community, and schools is an essential design feature. In addition, incorporating the results from the Delphi Study of experts in the prevention field would add: interactive teaching methods, weight control skills, involvement of parents (referenced in the Valentine Foundation criteria), involvement of adolescents in curriculum development (referenced in the Valentine Foundation), a media campaign, and policies addressing reduction in tobacco use. These criteria and approach would be applicable internationally but the cultural context must be considered as specific programs are designed for females. For instance, Juon, Nam & Shin (1995) found gender differences in regard to influence of Korean families. Their findings show that adolescent boys are more likely to smoke when family members, particularly mothers, smoke. This was not true for the girls in their study. The type of school program was also inversely related to both

boys' and girls' smoking. The coeducational program was a risk factor for boys but a protective factor for girls given that the cultural expectation for girls is that smoking by females in Korea is unacceptable.

To be certain the developed program was rigorously evaluated, Bruvold's criteria (1993) for program evaluation would also be an integral part of the overall design. These criteria include: an experimental design with appropriate comparison groups; the use of pretest, posttest, and follow-up assessment; the control of research attrition; the validity of dependent variable assessment; and the use of statistical procedures appropriate for program evaluation research.

We are a long way from programs designed and evaluated with these criteria that also incorporate cultural sensitivity. However, to make progress in understanding effective programs for female smoking prevention and cessation internationally, these criteria give us a good research-based framework for ecological design and evaluation with effectiveness data.

IV. Conclusions and Further Research Needs

Published articles reviewing effective prevention and cessation programs for female adolescents are scarce in the literature in the U.S. and practically nonexistent internationally. Even more scarce are the actual gender-sensitive programs developed with female risk and protective research results in mind. There continues to be a gap in understanding the possible need for gender-specific prevention and cessation program development among many professionals most directly involved in designing and evaluating smoking programs for youth. It is clear we need more gender-specific programs developed and evaluated to determine effectiveness.

An ecological program design that is culturally sensitive, incorporating attention to the protective and risk factors known to influence girls and a rigorous

evaluation model, is offered for discussion and refinement. Given the global increase in female smoking behavior, more attention must be paid to both prevention and cessation efforts. Programs designed with this model in mind have the potential to build the evidence base we need to both prevent cigarette smoking among female adolescents and help the ones who wish to quit smoking.

To be successful, we must increase both public and private financial support for research into female adolescent smoking behavior. We also need to increase our research efforts to routinely explore gender differences in all studies related to youth smoking behavior. A promising project, funded by the Robert Wood Johnson Foundation, is underway at the University of Illinois. The Helping Young Smokers Quit project (2004) is a 4-year, 2-phase project directed by Susan J. Curry and promises to produce a comprehensive picture of both what currently exists and the components needed for effective cessation programs. By using an ecological model for program development and scientifically evaluating the effectiveness of prevention and treatment programs for girls and young women, we will close the gaps in understanding that currently exist.

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