

A New Model for Adolescent Preventive Services

By David M N Paperny, MD, FAAP

Abstract

Context: Preventive screening and counseling of adolescents is time-intensive and is usually done by clinicians who currently provide far fewer preventive services than guidelines suggest.

Objective: Create a clinically effective, cost-efficient, replicable program to screen and counsel adolescents.

Design: The Adolescent Preventive Services (APS) Program was designed to screen youth (aged 13-24 years) for health-compromising behaviors and emotional problems and to provide health education using interactive computer software and youthful health educators.

Main Outcome Measures: Demographics of participants, health problems identified at appointments, and length and outcome of sessions were noted in pilot evaluation and in compilation of data for the four-year KP Honolulu experience. In the pilot evaluation, APS Program visits were compared to standard clinician visits for frequency of health problems identified, guidance delivered, level of patient satisfaction, and cost.

Results: Significantly more health problems were identified ($p < .05$) and more anticipatory guidance on several high-risk behaviors was given during APS Program visits than during clinician visits. After start up (at a cost of about \$6700), visits each cost about \$35 compared with \$75 for a standard clinician visit. More patients (71%-74%) preferred an APS Program visit to a standard clinician visit.

Conclusion: The APS Program provides comprehensive screening and individualized health education for health-compromising behaviors and emotional problems in adolescents and has better outcome for lower per-visit cost than the conventional clinician-based office visits. This program model, which could easily be modified for delivery of adult preventive services, deserves expansion throughout the KP health system.

Introduction

The major health threats to teens and young adults are psychological problems and health-risk behaviors, not biomedical diseases.¹⁻⁶ At Kaiser Permanente (KP), behaviors that begin during adolescence and continue through

adulthood lead to a large proportion of health care costs for adolescents as well as for patients with chronic disease and cause many premature deaths.⁷ These behaviors are contributory factors in about half of health care costs and in about half of the prema-

ture deaths in the United States.⁸

Unfortunately, most one-on-one health risk screening and education by primary care providers is costly, time-intensive, inefficient, and—worst of all—often ineffective. The availability of Adolescent Clinics sometimes resolves these problems, but staff at most pediatric and medical clinics face several barriers to rapport and to active participation in frank discussion about sensitive issues.

Current pediatric standards de-emphasize screening adolescents for uncommon biomedical problems in favor of screening for health-risk behaviors and counseling about healthier choices.⁹ The long-term effectiveness of providing comprehensive preventive services to improve adolescent health is not yet known. However, preliminary data from an ongoing study conducted jointly by KP in Northern California and University of California San Francisco (UCSF)¹⁰ suggest that 5% to 7% long-term behavioral improvement is attainable by counseling and health education alone; that is, by the conventional approach of simply

providing specific advice without tracking and follow-up components. Similarly designed smoking cessation programs had 5% to 20%

efficacy for secondary prevention.¹¹ Some researchers and clinicians believe that even 5% to 7% success in behavioral change and risk reduction will have profound effects on the lives of adolescents, and we believe that much higher success is attainable.^{12,13}

Available data suggest that clinicians currently provide far fewer preventive services¹⁴⁻¹⁶ than recent guidelines recommend.¹⁷⁻¹⁹ Barriers to providing comprehensive preventive health care to adolescents include *environmental factors*, such as reimbursement issues, professional salaries, and time constraints;²⁰ *clinician factors*, such as training, skills, confidence, and attitudes;²⁰ and *patient factors*, such as cost, convenience, and perceived need for services. Our current KP health system is well suited to treating biomedical disease, but new paradigms are needed to overcome

these barriers to comprehensive preventive services for adolescents and to enhance the preventive and health promotion services received by members of our health maintenance organization.

We designed an innovative model to deliver comprehensive preventive services to adolescents, a model that uses youthful nonmedical personnel

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(near-peer counselors) to perform risk assessment and intervention and that places physicians and nurses in supervisory and planning roles. Here we describe the clinical effectiveness, feasibility, acceptability, and cost-effectiveness of our program in the KP Hawaii Region to demonstrate the efficacy and reproducibility of an approach that combines paraprofessional educators working with nurses (and supervised by physicians) and using computer technology as the prime mechanism for gathering information. Our model could easily be modified for delivery of preventive services to adults.



Figure 1. Photograph shows computer workstation and headphones as used by patients in the Adolescent Preventive Services Program.

Adolescent Preventive Services Program Design

We designed a low-cost, replicable program to provide comprehensive preventive screening for health-compromising behaviors and emotional problems and to provide individualized computer-assisted health education to youth aged 13 to 24 years. The

objective of this program was to improve the health and emotional well-being of adolescents.

Our Adolescent Preventive Services (APS) Program heavily uses computer technology. Patients complete confidential, computerized health assessments using a computer that is outfitted with headphones (Figure 1). The patient hears an audio recording of each onscreen question through the headphones; literacy and language barriers are thus resolved. Patients respond to questions using a touchscreen or a keyboard. The interactive and branching software program conducts a directed history on the basis of responses to specific panels of questions, thus interviewing a patient much as a clinician would. The specialized health screening and education software incorporates generally accepted pediatric screening guidelines and was developed and refined over the course of more than a decade at KP Hawaii.²¹⁻²³

The computerized interview process usually takes about 15 minutes. Some patients may be asked as few as 50 screening questions and others may be asked more than 350 questions if they provide responses that require in-depth exploration (Table 1). The program internally validates certain responses for consistency and reconfirms crucial branch point questions, a strategy that maximizes the specificity of the computerized interview.

After completing the computerized interview process, patients receive individualized, interactive multimedia medical advice and anticipatory guidance on the basis of their responses. Advice and

A. Suicide Risk Status

Current Mental State

- a) Are you mostly happy with the way things are going for you these days?
- b) During the past three months, have you often been sad or unhappy?
- c) During the past four weeks, have you often felt hopeless?
- d) Have you been to a counselor for help with problems?
- e) During the past four weeks, how often have you felt really down, or like you have nothing to look forward to?
- f) Is there an adult you can easily talk to about your problems?
- g) Is there an adult (OR someone) you would turn to for help if you were really upset?

B. Sexual Health

Sexual Abuse Risk Assessment

- a) Has anyone ever touched your sex organs or other private parts, when you didn't want them to?
- b) Do you still often see or now live with the person who did this?
- c) Has anyone ever tried to force you to have sex when you didn't want to?
- d) Do you still often see or now live with the person who did this?
- e) Has anyone ever forced you to have sex?
- f) Has this happened in the last six months?

Table 1. Examples of questions asked during the computerized interview process in the Adolescent Preventive Services Program.

guidance may be delivered in the form of any of 60 videoclips automatically selected to match the patient's needs, and the person on the recorded presentation is of the same sex and ethnicity as the patient. At times, health education games convey important points in an entertaining and nondidactic manner. For example, "The Baby Game!" addresses parenting desires and needs; and "Romance!" covers sexual behavior and provides information on abstinence, responsible sexual decision making, and contraception.²⁴

Printed material includes a patient-specific behavioral health risk summary with personalized health advice and recommendations; referrals to resources for patient-appropriate services that include local telephone num-

bers, KP resource numbers, and national toll-free 800 numbers; and referrals to the Kaiser HealthPhone (1-800-33-ASK-ME) for prerecorded messages about relevant health topics. Finally, the computer prints a prioritized problem list for review by a health educator.

University students, who more easily than older adults are able to establish rapport with adolescents, were trained as health educators for the APS Program using a standardized curriculum (Table 2). After completing the computerized as-

essment and viewing the educational presentations, each adolescent meets with a health educator for a scheduled 20-minute session that reinforces the automated educational

... health education games convey important points in an entertaining and nondidactic manner.

messages and addresses problems that require counseling, referral, or both; a Brief Negotiation approach is used.²⁵ Subsequently, the health educator reviews each patient encounter with a nurse, who then does any indicated further evaluation and counseling, performs indicated physical assessments, and makes referrals for medical or counseling services. To support the primary care providers, health educators later perform the crucial tasks of tracking and managing cases of patients at high risk.

Pilot APS Program Evaluation

Our initial feasibility study and cost analysis of the APS Program included a comparative evaluation of health problems identified, guidance delivered, and patient satisfaction.²⁶ Eleven pilot APS Program sessions had 258 adolescent participants. Informed consent was obtained from each participant, and this study was approved by the Interhospital Research Committee and Institutional Review Board of Kaiser Foundation Hospitals, Honolulu, Hawaii.

Methods

APS Program appointments were offered at 11 sites by mobile clinical teams. Sessions were offered at nontraditional sites including secondary schools, university health service facilities, shopping malls, and after-hours or weekend clinics. Appointments were booked 1 to 30 days in advance by calling a KP appointment center; one visit was scheduled for every ten minutes. Privacy was provided during the visit, both when patients interacted with the computer and later when patients met with the health

educator and nurse. Adolescents completed an automated health assessment using software on a laptop computer that had headphones and a printer attached. For this pilot project, 12 university students at the graduate level in social work, nursing, or health education were trained using a standardized curriculum (Table 2) to provide health counseling to patients on the basis of the results from the computerized assessment. For each APS Program session, a team of two health educators, one medical assistant, and one specially trained registered nurse traveled to the site. The medical assistant registered patients and measured and recorded biometrics.

As previously described, each patient completed a computerized health risk assessment, viewed individualized multimedia presentations of medical advice and anticipatory guidance, met with the health educator for reinforcement of advice and brief negotiation, and, if indicated, received further evaluation or counseling from a registered nurse. During the pilot study, patients who needed pelvic examination, vaccination, or laboratory tests were referred to their regular primary care provider or to the appropriate laboratory.

To compare the two approaches—our new approach and conventional adolescent preventive practices—I conducted a retrospective medical record review of preventive visits to 16 pediatricians and family practitioners at KP clinics by 250 adolescents and compared these to records of adolescents of comparable age, sex, ethnicity, and geographic distribution seen in the APS Program. The physicians

all used structured forms (ie, checklists) for documentation of preventive services. Medical records were abstracted to determine the health problems identified and the health counseling provided during preventive visits to physicians. APS Program data about health problems identified and health counseling provided were obtained by review of computer-generated problem lists, health educators' and nurses' case records, and patients' exit questionnaires. Standard physi-

cian office visits were compared with APS Program visits by effectiveness of identifying health problems and of providing health counseling. The χ^2 test for independence was used to compare frequency at which health problems were identified and counseling about health problems was provided for each group.

Results of Pilot Evaluation

A mean of 23 adolescents attended each of the 11 pilot sessions. Of the 264 patients sched-

Table 2. Standard Health Educator Training Curriculum
<p>Day 1 (five hours) Adolescent tasks and psychosocial growth and development Communicating with adolescents Health promotion, prevention, anticipatory guidance, empowerment Motivational interviewing, brief negotiation intervention, behavior change</p>
<p>Day 2 (five hours) Advanced communication and interview skills Evaluation of suicide, sex abuse, substance abuse Risk assessment and prioritization Automated health assessment, prevention protocols Site process demonstration: client flow, supervision, documentation, referral</p>
<p>Home study (one week) Interpreting printed descriptors of risk behaviors Applying and prioritizing high-risk problem lists Computer program practice Anticipatory guidance content reading Adolescent sexuality video</p>
<p>Day 3 (five hours) Prioritized high-risk cases: flow process, supervision, referral, documentation Demonstration scenarios, practice, and competency evaluation practicums</p> <ol style="list-style-type: none"> 1. Validation of current risks/problem list (interview practice) 2. Counseling based on priority list and anticipatory guidance (role play) 3. Present issues to RN and do case management plans (role play) 4. Documentation, and present referrals and action steps to adolescent (role play) <p>Final program logistics</p>

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uled for appointments, only 29 (11%) did not show up, and many open appointments were subsequently filled by accompanying friends or walk-in participants. The 258 participants were aged 12.9 to 24.9 years (mean 17 years); 70% were between 14 and 21 years old; and 56% were female. Only 17% of patients were accompanied by a parent. Each visit lasted a mean of 45 minutes (range 22-82 min), and 90% of visits were completed within one hour.

Participants spent a mean of 21 minutes completing the automated health assessment and viewing interactive multimedia. Discussions with a health educator lasted a mean of 15 minutes (range 3-30 min). Case review between the nurse and the health educator lasted a mean of two minutes. One third (36%) of the participants required further evaluation and counseling by the nurse and these encounters lasted a mean of eight minutes (range 0-28 min); only 15% of participants required a complete physical examination.

Of 258 subjects, 254 (98%) had one or more risk behaviors identified. The mean number of risk behaviors identified was 3.2 (SD = 2.3; range 0-11) per adolescent. We referred 15% of participants for reproductive health services and 18% for personal counseling services.

The educator-nurse teams identified and documented risk behaviors and health problems significantly more often than did physicians practicing in traditional settings during preventive visits (three behaviors per visit versus <1 behavior per visit; $p < .05$) (Table 3). The preventive screening teams also gave significantly more anticipatory guidance

about sexual behavior, drug avoidance, and alcohol avoidance than did physicians.

The total cost per comprehensive computer-assisted preventive visit was \$33.74. Initial training included two hours by the project director, 13 hours by a nurse-instructor, and 15 hours for each of the ten health educator trainees. For this project, each of the ten graduate students received \$7 per hour and the nurse-instructor received \$21 per hour. Thus, the

initial training budget was \$1778.75. The two laptop computers with printers cost about \$2500 each. Salary costs for pilot clinical sessions included the nurse and two educators, excluding the optional medical assistant. Thus, total salary costs were \$43.75 per hour including fringe benefits. The total personnel cost for the 11 four-hour sessions was \$1925. Start-up costs for training and equipment totaled \$6779.

Patient feedback by written

questionnaire showed that most adolescents (71%) liked the computer-assisted visits, 3% did not, and 26% were undecided. Most (60%) preferred the alternative sites (schools, University Student Health Center, shopping centers, after-hours or weekend clinics), compared with traditional medical settings (2%), and 38% were undecided. Nearly all adolescents (92%) felt that the amount of time spent with the health educators and the nurse was appropriate. In ad-

Table 3. Frequency of identifying and providing counseling for specific health issues and of providing selected anticipatory guidance during Adolescent Preventive Services Program visits compared with standard physician-based clinic visits^a

Health issue	APS Program visit (N = 258)	Clinician visit (N = 250)	p-value
Identified and counseling provided:			
Affective issues or suicide risk	16	8	0.02
Not using seat belt	14	4	0.001
Driving under the influence ^b or riding with driver under the influence	15	7	0.01
Sexual activity or contraception	36	22	0.01
Use of alcohol	18	10	0.02
Physical or sexual abuse	6	1	0.01
Not using helmet	43	25	0.003
Stress	45	31	0.02
Assertiveness or communication skills	14	4	0.0005
Family issues	29	13	0.0004
Violence exposure	17	7	0.002
Gun carrying	2	0.4	ns
Drug use	3	2	ns
Use of marijuana	3	2	ns
Use of cigarettes	7	8	ns
Exercise or physical fitness	52	49	ns
Diet and nutrition	12	11	ns
School problems	13	12	ns
Anticipatory guidance provided:			
Sexual activity, sexually transmitted diseases, or contraception	21	13	0.04
Alcohol avoidance	14	7	0.02
Drug avoidance	15	8	0.05
Use of cigarettes	7	6	ns
Injury prevention	9	8	ns
Diet and physical fitness	13	13	ns

^aFrequency is expressed as percentage of total visits for which identification and counseling or anticipatory guidance on the specific issue was documented.

^bof drugs or alcohol.

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dition, health educators noted that only 3% of adolescents exhibited discomfort while discussing sensitive issues during the visits.

To estimate the adolescents' recall of the counseling provided during these visits, I compared the problems identified and counseling provided, as documented by the health educators and nurse, with the adolescents' reports of what they discussed during these visits. On exit survey, adolescents recalled 81% of the documented discussions about identified problems and 64% of the documented anticipatory guidance.

Four-year Program Experience

This APS Program was implemented in KP Hawaii in mid-1999 and has functioned well for four years as a successful low-cost strategy to provide comprehensive preventive health services to large numbers of adolescents.

We initially focused on members who were in midadolescence because teens in that age group more frequently engage in high-risk behaviors than do adolescents in other age groups. The program was promoted to KP members beginning when they were 14 years old, the age of consent for sexual health care in Hawaii. We first mailed letters to teens explaining the need for an annual health appraisal, then mailed a separate letter to parents. We called their homes to schedule appointments, which were held at several convenient locations. Registration fees for the visit were eliminated and a variety of incentives such as movie tickets and prizes were offered to teens who came to KP clinic facilities.

We analyzed data from numerous APS Program sessions pro-

Table 4. Health issues identified for participants in the four-year experience of the Adolescent Preventive Services Program

Health issue	Percentage of patients with problem identified
Affect issues	14
Suicidal ideation	9
Family issues	31
Alcohol abuse	19
Marijuana abuse	6
Other drug abuse	2
Driving under the influence ^a	5
Riding with driver under the influence ^{a,b}	9
Recent sexual activity	26 ^c
Helmet non-use	46
Seatbelt non-use or unsafe driving	40
Tobacco use	10
Exercise need, academic problems, or other	15

^a of drugs or alcohol.

^b driver was usually the father.

^c of these patients, 52% engaged in high-risk sexual activity.

vided by the team, both at KP facilities and at public locations, for a mean of 650 adolescent patients per year (2600 patients).

Analysis of Four-year Program Experience

Although we reconfirmed each appointment, the percentage of patients who did not show up ranged from 10% to 30% and often depended on the sociodemographic makeup of the patient population and locale served. Receiving a physical examination to quickly obtain clearance to play sports was a major motivator to make and keep appointments in the fall.

Visit length continued to last a mean of 48 minutes; patients spent about 20 minutes completing the automated health assessment and viewing interactive multimedia and spent 15 to 20 minutes with the health educator. A team of two health educators, a medical assistant, and a nurse provided preventive care (and physical examination as appropriate) to three to four patients

per hour at a total per-visit cost of about \$35 compared with the \$75 per-visit cost for a standard clinician office visit for physical examination. Results of exit survey indicated that 74% of adolescents preferred an APS Program visit to a standard clinician office visit and 92% felt that the amount of visit time spent (about an hour) was acceptable.

During the first four years of operation, most of the 2600 patients seen were 14 to 17 years old, and 49% were female. Vaccination and physical examination were provided more often during these four years than during the pilot evaluation period. Of the 2600 patients, 75% received physical examinations, two thirds of which were routine examinations required for adolescents participating in sports; and 27% received vaccination, usually combined tetanus/diph-

theria vaccine, hepatitis B vaccine, or both, and frequently PPD (tuberculin) skin test as well.

Responses from a satisfaction survey of every patient who interacted with the health educator showed that 56% of patients liked the interaction, 2% did not like the interaction, and 42% had no opinion; and that 91% of patients felt the amount of time spent with the health educator was just right, 8% felt it was too long, and 1% felt it was too short.

Health risks that were identified at computerized sessions and verified by interview during the four-year study are summarized in Table 4. The automated problem lists were 96% accurate as verified by health educator's interview, and fewer than 2% of health risks that were identified by the educator did not appear on the automated problem list.

Patients who attended APS Program sessions in KP clinic facilities had health-related behaviors or emotional problems of relatively lower risk than did patients who participated at schools or at other public venues. Our members who were at highest risk rarely came to KP clinic facilities for sessions. Extended case management and tracking were needed

for the 4% of adolescents who had ongoing high-risk health behaviors, or who did not adhere to referral plans, or who required ongoing advocacy and support.

Conclusion

In this study, we showed that a newly designed preventive screening program for adoles-

This new concept of computer-based screening for adolescents deserves expansion throughout the KP health system ...

cents which uses a computer-based approach combined with youthful health educators is both superior in outcome and lower in cost than the conventional clinician-based approach used in most pediatric and medical clinics. This new concept of computer-based screening for adolescents deserves expansion throughout the KP health system and could easily be modified for delivery of preventive services to adults. ♦

Related publication: Paperny DM, Hedberg VA. Computer-assisted health counselor visits: a low-cost model for comprehensive adolescent preventive services. Arch Pediatr Adolesc Med 1999 Jan;153(1):63-7.

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Making Things Easier

By trying to make things easier for their children,
parents can make things much harder for them.

— Mardy Grothe, b 1942, psychologist and author