

PB-225 517

ENHANCING THE EFFECTIVENESS OF ALLIED
HEALTH WORKERS

David M. Paige, et al

Johns Hopkins University
Baltimore, Maryland

March 1972

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

BIBLIOGRAPHIC DATA SHEET	1. Report No. 61P.6953072-P142	2.	PB 225 517/2 ⁿ No.	
	4. Title and Subtitle "ENHANCING THE EFFECTIVENESS OF ALLIED HEALTH WORKERS"		5. Report Date MARCH 1972	6.
7. Author(s) GEORGE G. GRAHAM ET AL	9. Performing Organization Name and Address John Hopkins University Baltimore, Md. 21218		8. Performing Organization Rept. No.	10. Project/Task/Work Unit No. 931-11-574-1/1
12. Sponsoring Organization Name and Address Department of State Agency for International Development Washington, D.C. 20523		11. Contract/Grant No. AID/csd-1939		13. Type of Report & Period Covered RESEARCH PAPER
15. Supplementary Notes		14.		
16. Abstracts <p>In summary the authors have attempted to utilize their nurse practitioners in the most effective fashion, attempting to screen out those youngsters who do not fall naturally within the purview of the nurse practitioner by predetermined aberrations of temperature, height, weight, or vital signs. Further, the use of assigning weights and scoring the physical findings facilitates decision-making on the part of the nurse. Seventy-six per cent of all children presenting for care were able to be routed to the nurse. She was able to render primary care to 83% of those children and successfully handle the scheduled follow-up visits in the majority of cases. In addition to the curative services rendered, the nurse was able to provide preventive services to a majority of the patients. This triage and routing system also expedites the flow of patients between nurse and physician, minimizes writing and the need for sophisticated terminology on the part of the nurse, increases acceptance of patients referred to the medical staff, and serves as an easy basis for routine data gathering, monitoring, and evaluation of the program.</p>				
Reproduced by NATIONAL TECHNICAL INFORMATION SERVICE U.S. Department of Commerce Springfield VA 22151				
17b. Identifiers/Open-Ended Terms				
17c. COSATI Field/Group 610		19. Security Class (This Report) UNCLASSIFIED		
18. Availability Statement i		20. Security Class (This Page) UNCLASSIFIED		21. No. of Pages 6
				22. Price \$3.00-145

339073

Reprinted from the March, 1972 American Journal of Public Health

Initial triage is carried out by a health aide using observation and scoring of objective clinical findings, and the patient is referred either to a physician or a nurse pediatric practitioner. Further decisions are made by the nurse practitioner. Evaluation of 1,500 patient visits indicates the value of this system.

Enhancing the Effectiveness of Allied Health Workers

Introduction

The concept and use of health auxiliaries in developing societies has been advanced by Taylor,¹ King² and others.^{3,4} In the United States, Silver,⁵ Stead,⁶ Connelly,⁷ Yankauer,⁸ and others,^{9,10} have pointed out the need for more effective utilization of non-physician personnel to deliver primary medical care. Silver's Colorado program^{11,12} has served as a model for the development and training of pediatric nurse practitioners, and the experience of Shiff, et al.¹³ with pediatric nurse practitioners has underscored their utility in a clinic setting.

We are currently utilizing a pediatric nurse practitioner in the delivery of primary medical care in our clinic in Lima, Peru. The clinic is a small ambulatory station, located in a slum area on the periphery of Lima; and is under the aegis of The Johns Hopkins University.

The medical care delivered prior to the initiation of this project was episodic, with little continuity of care, or attention directed toward comprehensive health. This was in part due to the strain put upon the clinic by the large numbers of children seeking attention as well as a dearth of qualified personnel. Daily competition existed among the parents to obtain a pediatrician's service. This often resulted in an excessively long waiting period. There was an obvious need for increased services, comprehensive care, and a more effective utilization of clinic personnel.

An attempt was made to develop a program of maximum quality and efficiency at minimal cost, effectively utilizing each health worker.

These expanded clinical services, which placed a premium on diagnostic accuracy, complemented by an integration of curative and preventive services effectuated through more appropriate patient routing was achieved by pre-physician screening based on observation and scoring of objective clinical findings.

This was accomplished by the use of a screening and scoring system designed to utilize more effectively the time of the non-medical personnel, maximize the number of patients that can be handled in quality fashion by such a program, facilitate the flow of patients to the nurse practitioner and between the nurse and physician, enhance communications between the two groups, and serve as an easy basis for routine data gathering and monitoring of this particular program.

David M. Paige, M.D., M.P.H.; Eduardo Leonardo, M.D.;
Eve Roberts, B.A.; and George G. Graham, M.D.

Triage System

If, in the progressive course of history taking, recording of vital signs, measurement of height and weight, and physical examination of the patient, any aberration is revealed that is consistent with pre-established guidelines, this will be sufficient to have the patient passed on for care by the physician (Figure 1).

Health Aide

Initial contact with the patient is made by the health aide prior to his being seen by the nurse; she has the option based on certain findings to automatically and immediately reroute the patient for definitive care by the physician. As seen in Figure 2, the decision is predicated on the basis of objectively determined easily measured parameters. This includes body temperature, heart rate, respiratory rate, height, weight or a predetermined grade given to the weight:height ratio. As an example, when a patient enters the clinic, temperature is taken. If the temperature is elevated above 38°, the guideline mandates that this patient be referred to the physician.

Nurse Practitioner

Having passed this initial phase, the patient is routed to the nurse practitioner who elicits and notes a chief complaint, signs, and symptoms; and commences a physical examination. To facilitate decision-making on the part of the nurse, economize her time, as well as movement of patients between nurse and physician, the following scoring system for the patient's physical examination has been devised. It is one of scoring and weighting the gravity of the findings, which may be sufficient to give the patient a score which automatically refers this particular patient to the physician.

As can be seen in Figure 3, three columns are present, each carrying a numeral: 0, 1, or 3. Under the heading 0, the column basically consists of normal, or relatively normal, findings consistent with minor to

Figure 1—Patient Flow

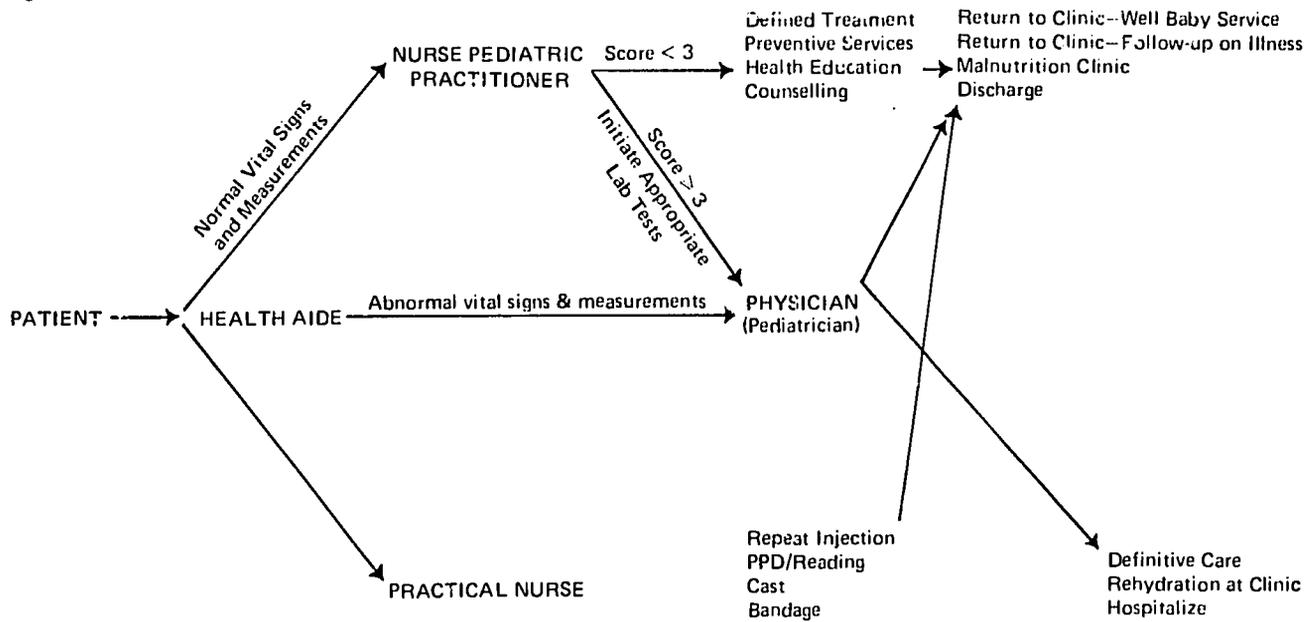


Figure 2—The health aide is responsible for determining the vital signs and anthropometric measurements on all pediatric patients. She may initiate an independent action predicated on the above value.

Vital signs and measurements	Rerouting value	Patient referred to
Temperature	>38° C.	Physician
Respiratory rate	Age related; guidelines prepared	Physician
Heart rate		
Head circumference	± 2 s.d.	Physician
Weight	1° Malnutrition	Nurse pediatric Practitioner
	2° Malnutrition	Nurse pediatric practitioner/physician (malnutrition clinic)
Height	3° Malnutrition	Hospitalize
Grade (value assigned to weight:height ratio)	Grade 1, 2 or 3	As above

moderate aberrations of the particular system being examined. Under column 3, one finds the severe physical findings of the particular organ system under question. A score of 3 or more received by any patient mandates that this patient be seen by the physician.

It is obvious that any patient who presents with a finding which appears in column 3 is automatically referred to the physician. As an example, the patient with rigid neck, or retractions of the chest, or rigid abdomen, is automatically referred to the physician. Those patients, with 3 or more findings which appear in column 1, will also be passed on to the physician. Thus a patient presenting with a constellation of irritable appearance, cervical nodes, or questionable lung findings will be referred to the physician. Those patients with less than 3 positive findings

Figure 3—Paramedical Patient Screening and Scoring Form

CLINICA NINO JESUS
Ciudad de Dios

Name: _____ Date: _____ No: _____
 Zone: _____ Date of Birth: _____ Age: _____

VITAL SIGNS & MEASUREMENTS: SIGNS & SYMPTOMS:

Temperature _____	Fever _____	Convulsion _____
Respiratory Rate _____	Diarrhea _____	Dehydration _____
Heart Rate _____	Cough _____	Dysuria, Freq. _____
Head Circumference _____	Vomiting _____	Won't Sleep _____
Height _____	Headache _____	Catarrh _____
Weight _____	Poor Appetite _____	Skin Problem _____
Grade _____		

Chief Complaint: _____
 Past History: _____

Physical Exam:	0	1	3
Appearance	Alert <input type="checkbox"/>	Irritable <input type="checkbox"/>	Very Irritable <input type="checkbox"/>
Eyes	Normal <input type="checkbox"/>	Drawn <input type="checkbox"/>	Sunken <input type="checkbox"/>
Tympanic Membrane	Normal <input type="checkbox"/>	Congested <input type="checkbox"/>	Dull or draining <input type="checkbox"/>
Nose	Clear <input type="checkbox"/>	Purulent Discharge <input type="checkbox"/>	
Throat	Normal <input type="checkbox"/>	Red <input type="checkbox"/>	Exudate <input type="checkbox"/>
Neck	Flexible <input type="checkbox"/>	Nodes <input type="checkbox"/>	Rigid <input type="checkbox"/>
Chest	Normal <input type="checkbox"/>	Questionable <input type="checkbox"/>	Retraction <input type="checkbox"/>
Lungs	Clear <input type="checkbox"/>	Transmitted Sounds <input type="checkbox"/>	Noisy <input type="checkbox"/>
Heart	Normal <input type="checkbox"/>	Murmur <input type="checkbox"/>	Abnormal <input type="checkbox"/>
Abdomen	Soft <input type="checkbox"/>	Organomegaly <input type="checkbox"/>	Rigid <input type="checkbox"/>
Hernia	Absent <input type="checkbox"/>	Umbilical <input type="checkbox"/>	Spleen palpated <input type="checkbox"/>
		Inguinal <input type="checkbox"/>	Irreducible <input type="checkbox"/>
Neurologic	Normal <input type="checkbox"/>	Questionable <input type="checkbox"/>	Abnormal <input type="checkbox"/>
Orthopedic	Normal <input type="checkbox"/>	Questionable <input type="checkbox"/>	Abnormal <input type="checkbox"/>
Skin	Normal <input type="checkbox"/>	Eruption <input type="checkbox"/>	Dehydration <input type="checkbox"/>

DX: _____ FX: _____ Return to Clinic: _____
 _____ 3 or more points, refer to physician

Immunizations: DPT: 1 2 3 B Measles: _____ PPD: _____
 Polio: 1 2 3 B Smallpox: _____

in column 1 or with a score of less than 3, will be cared for by the nurse.

Other restraining factors are set forth in a manual that has been prepared for the nurse to work with. The decision to include the fourteen systems for examination, as well as the emphasis of specific disease profiles within the system was based on a rigorous systematic review of

past utilization and diagnostic categories of the pediatric population being served.

Evaluation

Evaluation of 1,188 patient visits in this two-tier triage system indicates that approximately twice as many children are being effectively cared for in a quality fashion since the initiation of the program. A sample of the patient visits which were monitored over a six-month period indicates that 24% of the patients presenting for medical services and screened by the health aide had some aberration of their vital signs or anthropometrics necessitating immediate routing to the physician; the remaining 76% had normal measurements and were routed to the nurse pediatric practitioner. The nurse elicited additional historical information and undertook the physical examination of the child.

Of the patients routed to the nurse pediatric practitioner, 83% had a score below 3 which permitted the nurse to undertake primary care and responsibility of the patient. The remaining 17% had a score equal to or above 3 and were referred to the physician for definitive diagnosis and treatment; with the nurse often initiating required laboratory procedures with the referral (Figure 4).

The appropriateness of these referrals, as well as nurse practitioner-physician agreement, was determined by careful review of each patient disposition; which was carried out by an independent observer. Overall, almost 80% of the patients were routed appropriately with agreement existing between nurse and doctor as to the nature of the physical findings necessitating the referral (Figure 5).

Of the patients under care by the nurse, 9% returned unscheduled because of a worsening of their condition. The majority of these unscheduled return visits had to be ultimately routed to the physician. By contrast, the majority of those patient visits returning as scheduled to the nurse pediatric practitioner were able to receive definitive follow-up care by the nurse with assistance from the

Figure 5—Appropriateness of Nurse Pediatric Practitioner Score as well as Nurse Pediatric Practitioner:Physician Agreement

Medically indicated to see doctor and assigned to doctor	418 (35.2%)	Medically indicated to see doctor and not assigned to doctor	66 (5.5%)
Not medically indicated to see doctor but assigned to see doctor	197 (16.6%)	Not medically indicated to see doctor and not assigned to doctor	507 (42.7%)

physician. In the six-month evaluation period, there were no deaths among those treated by the nurse pediatric practitioner.

Analysis of the patient visits, to determine the extent of preventive services rendered by the nurse pediatric practitioner, revealed that in 807 of the 1,188 patient visits, some circumscribable preventive service was given. This most commonly took the form of primary immunizations, TB testing, and laboratory screening services. Approximately half of the over 150 primary immunizations started in the six-month period were complete. In addition, over 70% of the tuberculin tests placed were read and definitive follow-up was carried out in approximately half of the positive reactors. Although the follow-up program still requires much improvement, significant progress is noted as compared to the period before the utilization of the nurse practitioner (Figure 6).

Summary

In summary we have attempted to utilize our nurse practitioners in the most effective fashion, attempting to screen out those youngsters who do not fall naturally within the purview of the nurse practitioner by predetermined aberrations of temperature, height, weight, or

Figure 4—Routing of Patients to Health Aide and Nurse Pediatric Practitioner Over Six Month Period

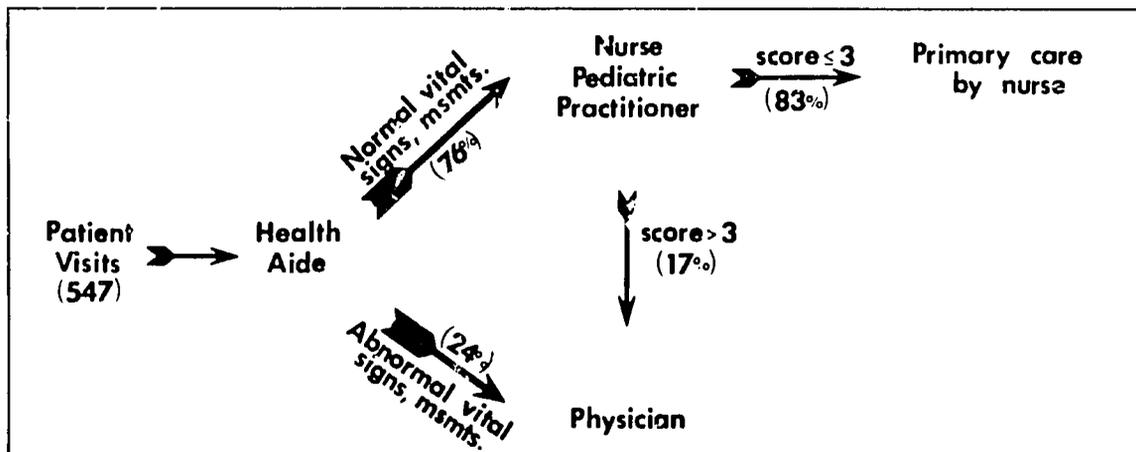
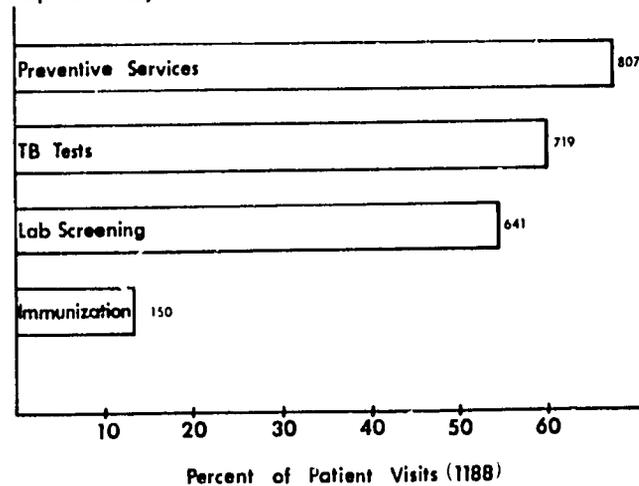


Figure 6—Preventive Services Rendered to the Study Population by the Nurse Pediatric Fractitioner



vital signs. Further, the use of assigning weights and scoring the physical findings facilitates decision-making on the part of the nurse. Seventy-six per cent of all children presenting for care were able to be routed to the nurse. She was able to render primary care to 83% of those children and successfully handle the scheduled follow-up visits in the majority of cases. In addition to the curative services rendered, the nurse was able to provide preventive services to a majority of the patients. This triage and routing system also expedites the flow of patients between nurse and physician, minimizes writing and the need for sophisticated terminology on the part of the nurse, increases acceptance of patients referred to the medical staff, and serves as an easy basis for routine data gathering, monitoring, and evaluation of the program.

Dr. Paige is Assistant Professor of Maternal and Child Health, Johns Hopkins University, School of Hygiene and Public Health, 615 N. Wolfe St., Baltimore, Maryland 21205. Dr. Leonardo is Pediatric Research Associate, British American Hospital, Lima, Peru. Ms. Roberts is a third-year medical student, The Johns Hopkins School of Medicine, 725 N. Wolfe St., Baltimore, Maryland, and Dr. Graham is Professor of Human Nutrition, and Associate Professor of Pediatrics, The Johns Hopkins University, School of Hygiene and Public Health, 615 N. Wolfe St., Baltimore, Maryland 21205. This paper was presented before the Maternal and Child Health Section of the American Public Health Association at the Ninety-Ninth Annual Meeting in Minneapolis, Minnesota in October, 1971.

ACKNOWLEDGMENTS

The authors wish to acknowledge the technical assistance of Mrs. Karen F. Smith, research assistant, and the support and cooperation of Miss Teresa Tejada, nurse pediatric practitioner.

This study was supported in part by Grant AM-90980 from the National Institutes of Health, and in part by Research Contract esd-2946 from the Agency for International Development, Department of State, Washington, D.C.

References

1. Taylor, C. Training Health Auxiliaries. Paper presented at East-West Center for Cultural and Technical Interchange Conference on Public Health Training and Education in Asian Countries in Honolulu, Hawaii, June 22, 1965.
2. King, M. The Auxiliary. Medical Care in Developing Countries. Oxford University Press, 1966.
3. Kissick, W. L. Health Manpower in Transition. Mil. Mem. Fund Quart. 46:53-90, Supplement (Jan., 1968).
4. Field, M. G. Health Personnel in the Soviet Union. Achievements and Problems. A.J.P.H. 56:1904-1920 (Nov., 1966).
5. Silver, G. New Types of Personnel and Changing Roles of Health Professionals. Bull. N.Y. Acad. Med., 42:1217-1225 (Dec., 1966).
6. Stead, E. A. Conserving Costly Talents. Providing Physicians New Assistants. J.A.M.A. 198:1108-1109 (Dec., 1966).
7. Connelly, J. P., et al. Health Manpower: The Problem and the National Scene. Clin. Pediat., 7:245-7 (May, 1968).
8. Yankauer, A. Allied Health Workers in Pediatrics. Pediatrics, 41:1031-2 (June, 1968).
9. Darley, W., et al. Medicine, Money, and Manpower. The Challenge to Professional Education III. Increasing Personnel. New Eng. J. Med. 276:1414-1423 (Jan., 1967).
10. Goerke, L. S. Health Manpower, A.J.P.H. 56:1189-1191 (Aug., 1966).
11. Silver, H. K., et al. A Program to Increase Health Care for Children—The Pediatric Nurse Practitioner. Pediatrics 39:756-760 (May, 1967).
12. Silver, H. K.; Ford, L. C.; and Day, L. R. The Pediatric Nurse Practitioner Program. J.A.M.A., 204:88-92 (Apr., 1968).
13. Schiff, D. D.; Fraser, C. H.; and Walters, H. L. The Pediatric Nurse Practitioner in the Office of Pediatricians in Private Practice. Pediatrics, 44:62-68 (July, 1969).