Report of the First Annual Hawaii Asthma Research Consortium

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The first Hawaii Asthma Research Consortium was held on 7 May 2001 at Tripler Army Medical Center. Researchers investigating asthma-related problems and program directors of asthma projects were solicited statewide to present their projects. Ten lecturers focused on research and asthma projects in Hawaii in 20-minute presentations. An informal ten-minute discussion followed each presentation to encourage audience questions about the project and to discuss possible collaboration efforts between institutions. The institutions that were represented include: American Lung Association-Hawaii, Kaiser Permanente Center for Health Research Hawaii, Kapiolani Medical Center, Tripler Army Medical Center, University of Hawaii at Manoa, and Waianae Coast Comprehensive Health Center.

Introduction

COL Ernest Takafuji, Tripler AMC

Presenters and attendees were thanked for their interest in the consortium. An interest to combine resources to better address asthma research in Hawaii was expressed.

Asthma in Hawaii: What are the Questions?

COL Charles Callahan, DO, Tripler AMC

How many people with asthma are there in Hawaii? Using the 2000 State population census report and a national asthma prevalence model the number of people with asthma in Hawaii was estimated at 101,000. Using a similar model 27,800 people were estimated to have mild intermittent asthma, 26,800 to have mild persistent, 45,400 have moderate, and 1,100 have severe asthma. This estimate puts over 73,000 people in Hawaii in need of chronic "controller" therapy.

How much does asthma cost in Hawaii? Cost estimates ranged from 127 to 296 million dollars per year and include both direct and indirect costs. The asthma admission rate for children has significantly decreased from 3.2/1000 in 1996 to 1.3/1000 in 2000 ($p<0.01$) at Tripler Army Medical Center (TAMC). This decrease is thought to be due to the focused asthma education provided to patients and health care providers using National Heart, Lung, and Blood Institute (NHLBI) Guidelines and increased patient access to a pediatric pulmonologist. Asthma education was primarily provided at TAMC via a pediatric asthma education service titled Military Community Asthma Program that was initiated in 1997 using a multi-disciplinary team that consisted of a pediatric nurse case manager, a clinical pharmacist, pulmonologists, and allergists.

Do primary care physicians use guidelines? In a survey of 244 primary care physicians in Chicago 88% reported that they had heard of The National Asthma Education and Prevention Program (NAEPP), 55% used spirometry in initial evaluation, 47% follow peak flows in patient, 24% referred for formal asthma education, and 48% provided written treatment plans.

Do asthma specialists adhere to guidelines? A survey of 113 allergists and pulmonologists revealed that 86% used inhaled corticosteroids in children less than 5 years old, 71% of patients with moderate/severe asthma received written asthma treatment and management plans (78% of allergists, 59% of pulmonologists), and patient home peak flow monitoring was utilized in 80% of patients of allergists and 58% of pulmonologists.

Which patients know about asthma? In an asthma survey of 568 Chicago residents women had more correct responses than men and younger respondents scored higher than older ones. Other factors that influenced scores of the survey were higher educational level, racial differences, zip code and income.

Why gather together? The purpose of meeting today is to determine what questions are being answered, or need to be answered, what resources are available in the community, and what funds are available. Other relevant issues include the advantages of partnerships and deciding where do we need to go from here.

Electronic Children's Hospital of the Pacific (ECHO-Pac): Asthma Intervention Initiative

COL Charles Callahan, DO and Francis Malone, MD , Tripler AMC

ECHO-Pac is a transpacific teleconsultation project for pediatricians from sites in Guam, Okinawa, Korea, and Japan to subspecialists in Hawaii. Asthma management was used as a model to demonstrate the effectiveness and cost-efficiency of the telemedicine consulta-

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tion service. It is a web-based, store and forward consultation system. The consultant has a combination of free text and pull down menus to complete the history and physical, and demographic sections. There is also the capability to attach radiographs (if indicated), spirometry and a video clip of the patient's metered-dose inhaler (MDI) + spacer technique. The completed consult is reviewed by a pediatric pulmonologist and feedback given to the referring provider via the e-mail option built into ECHO-Pac. Of the 28 patients enrolled: one patient had mild intermittent, nine had mild persistent, fifteen had moderate persistent, and three had severe persistent. Patients are seen at pre-assigned intervals (initiation, 2, 6- weeks, 3-, 6-, and 12-months). At each visit an assessment of skills and knowledge is performed and a personalized asthma action plan is distributed to the family. Quality of life surveys are performed by the patients virtually via the web site at all visits except for the 2-week visit and a satisfaction survey is performed at the last visit. Outcome data are in the process of being analyzed.

In-Home Telemonitoring of Children with Asthma

Debora Chan, PharmD and COL Charles Callahan, DO, Tripler AMC

The purpose of Telemedicine In-Home Monitoring Evaluation-Pilot (TIME-P) project is to demonstrate the feasibility of in-home asthma monitoring for children with persistent asthma. Study objectives are to demonstrate the feasibility of in-home asthma monitoring for children with persistent asthma using Internet-based store and forward technology and to evaluate software, hardware, and cameras of commercially available computer systems.

All patients will be loaned identical computers, video cameras, and provided Internet access. Patients will videotape peak flow meter readings prior to medication use and metered dose inhaler use two times a week. This information will be recorded and forwarded to the clinical pharmacist case manager for review and response. All patients will be followed in-person in the Pediatric Clinic at intake, 2-, 6-weeks, 3- and 6-months after enrollment. The pharmacist will provide asthma education to five patients in-person in the Pediatric Clinic during their follow-up visits. The remaining five patients will receive their asthma follow-up education visits via the web site at the same intervals.

A variety of different outcome parameters will be assessed. These include measurements of adherence and disease control. Treatment regimen adherence was assessed by several aspects of therapeutic and diagnostic monitoring. Therapeutic monitoring includes controller medication use (by computerized prescription refill record) and adherence and technique score from the dry powder inhaler (DPI) or metered-dose inhaler (MDI) + spacer video. Diagnostic monitoring includes asthma symptom diary completion, adherence to video taping of peak flow use two times a week, and peak flow technique scores. Disease control measures include: peak flow values (percent of personal best), utilization of services (ED visits, hospitalizations, unscheduled acute clinic visits), rescue therapy use (beta-agonist use and refills, and steroid bursts), symptom control (symptom free days and diary symptom score).

TIME-P will serve as the first step for a larger trial of Internet case management of children with asthma. This project is supported by a grant from U.S. Army Medical Research Activity.

Asthma Programs in Our Community

Gregg Kishaba, American Lung Association-Hawaii

The Windward Oahu Asthma Coalition (WOAC) was first established in 1999 to improve asthma awareness among the windward community. WOAC was established as a result of efforts by the State Health Planning and Development Agency's data-driven health priorities for Windward Oahu. The main goal of the coalition is to improve the health of asthmatic windward-area school aged children (5-12 years old) through collaborative private-public agency program implementation, promotion and outcomes measurement. Meetings are held every second Monday of the month at 5:30 p.m. at the Castle Medical Center Auditorium.

Hanocare is an asthma management program of the Queens Physician Group, which is led by Carl Hallenborg, MD. The first meeting was held on January 13, 1998. Hanocare follows the National Heart, Lung, and Blood Institute treatment guidelines for the treatment of asthma and focuses on familiarizing physicians with these guidelines and provides ongoing continuous medical education programs. Hanocare also focuses on patient education programs. Last year Hanocare offered statewide spirometry testing and pulmonary function testing of high school seniors. The program was conducted at 12 high schools statewide in an effort to collect baseline PFT's in Hawaii.

Partners Against Asthma (PAA) was established in November 2001. The goal of the coalition is to reduce the negative consequences of asthma among Hawaii's children from birth to 12 years of age. The coalition is made up of four work teams: Data/Evaluation, Educational Materials, Educational Outreach, and Educational Training. The Advisory Council meets quarterly while the Working Teams meet monthly. The objectives of PAA include to: increase the early identification of childhood asthma through family education, particularly among the families of children who are poor and of Hawaiian heritage; reduce the severity of asthmatic episodes and its impact on overall child well being through the promotion of disease management education; and improve the data collection and reporting system relating to asthma among Hawaii's children.

Dyson Project: Asthma in Community Pediatrics

Kara Yamamoto, MD, University of Hawaii School of Medicine

The Dyson initiative is a five year grant awarded to the University of Hawaii School of Medicine's Department of Pediatrics under principal investigators Louise Iwaishi, MD and D. Christian Derauf, MD. The initiative allows for further development of the residency training curriculum in community pediatrics in the areas of: child welfare, mental health, children with special health care needs, school health and early childhood. The goals of the project are to equip pediatric residents with the tools and knowledge to become future professionals committed to improving the health of children in their community, expose pediatric residents to their communities using local community resources, provide didactic and experiential opportunities in advocacy and assessment of community goals, strengths and needs, develop meaningful partnerships between academic departments of pediatrics with community-based organizations in their regions, and enhance pediatric training through interdisciplinary collaborations with other schools and university departments.

The impact on pediatric resident training in the area of chronic

illness/CSHCN was identified as acquiring knowledge and skills necessary for comprehensive, interdisciplinary, and culturally effective primary care management for these children in the community setting both home and school. Management would include technical needs, e.g. tracheostomy and gastrostomy, interacting with important community based organizations and services they provide, gaining experience in assessing the needs of the community, and working with organizations and other health care professionals in the community.

Medically fragile children who may be technologically dependent (PICU, NICU), children with chronic illness in the ambulatory setting (asthma, rheumatic disease), and premature infants are potential beneficiaries of the program. Resident training experiences such as attending supervised home visits and rural outreach clinics, family-based interactions for identifying needs and challenges, developing culturally effective management and discharge plans with interdisciplinary team (includes hospital and community providers), presenting didactic sessions and writing handouts on specific management issues or conditions are coordinated by the faculty. The Community Based Organization (CBO) based training experiences include: home and school visits with public health nurse, assisting with coordination of care and communication with the child's primary care physician and other care providers in the community, and accessing specific resources in cross-cultural effectiveness for help with specific families. Asthma specific community based training experiences include: assessing school/community health center needs in asthma screening and education, providing educational program for CBO and the community, assisting with coordination of care and communication with the child's primary care physician and other care providers in the community, and developing culturally effective educational materials for families.

The value and benefits of the program are linkage of CBO to primary care providers and specialists, enhanced coordination and access to care, educative consultation, facilitated and coordinated linkages to other CBOs. The impact on child health were described as improved interdisciplinary coordination of care and communication in the community, increased support for CBOs, increased access to care for families, improved outcomes for all children with special needs/chronic illness, provide skilled and knowledgeable PCPs, maximize efforts of interdisciplinary, culturally competent approaches.

Clinical and Economic Outcomes (CEO): Asthma Management

George Underwood, MD, Tripler AMC

In the fall of 2000, the Clinical Economics Outcome (CEO) web-based computer program became available to the practitioners at Tripler Army Medical Center. This is a web-based interface to a Microsoft SQL Server data warehouse. The CEO is populated with data from Tripler Army Medical Center's major medical information system, the Composite Health Care System, and the Ambulatory Data System record of ICD9 and CPT4 coded outpatient visits. The specific capability for coding of patients with asthma by severity, performance of spirometry and analysis of medication use is made possible through these systems. In May 2001, the capability to generate provider specific reports was established. Sample reports presented include the ability for the Primary Care Manager (PCM) to quickly pull up a list of their asthmatic patients (based upon the patient's problem list), the identification of their persistent asthmatic patients who are not on controller medications, which of their patients have not had asthma education, and the cost of the standard asthma medications. PCMs can also look at the medication refill compliance of their patients. In addition, the Department Chief can review the data for all the PCMs within their clinics.

Genetics of Asthma in Hawaii

Elizabeth Tam, MD, University of Hawaii

Genetic determinants of asthma in Hawaii were evaluated by characterizing subjects and their families with asthma. Ethnicity of study population, ethnic distribution in Hawaii, skin test reactivity, serum tryptic activity, circulating eosinophils, bronchial obstruction at baseline, bronchial reactivity, and IgE level for asthma and non-asthma patients were reported.

Genetic determinants of asthma were also evaluated by studying genetic markers previously associated with asthma traits. Human airway epithelium and fibrosis were described as modulation by airway inflammatory proteases processes which include: inflammatory proteases hydrolyze collagen type IV and other proteins of the basement membrane, modulation of CGRP-mediated epithelial proliferation, and promoting lung and airway fibroblast proliferation and collagen deposition.

Immunogenetic diseases provide a mentoring milieu and support for hypothesis-driven projects which examine immunologic conditions that disproportionately affect Pacific Islanders; such as, asthma, systemic lupus erythematosus, and acute rheumatic fever. Also of consideration in Hawaii are the respiratory effects of volcanic air pollution. Future study efforts will develop community research infrastructure, estimate chronic exposure of school children using archival air monitoring data, historical weather patterns, volcano emission rates, and concentration of PM2.5 and SO2. Endpoints include cross-sectional analysis of school children and a longitudinal study of school children to determine differences in lung growth rates

The Progression from Allergic Inflammation to Airway Remodeling in Asthma

Claude Jourdan-Lesaux, PhD, University of Hawaii

The progression from allergy to airway remodeling begins with acute inflammation, then progresses to chronic inflammation, and finally to remodeling of the airways. The goals of the research are to identify immunologic mediators and genetic determinants of susceptibility in asthma and to identify extracellular matrix protein gene response, analyze fibrotic response, and characterize potential apoptotic effect in airway remodeling. Preliminary data suggests that symptoms of allergy are determined by skin test and IgE levels while symptoms of asthma are of obstructive and hyper responsiveness.

The research is supported by Hawaii Community Foundation Medical Funds, Clinical Research Center, National Institutes of Health (Research Centers in Minority Institutions Program, Selective Research Excellence in Biomedicine and Health), and the American Lung Association.

Community-Based Asthma Management

Sheila Beckham, RD, MPH, Waianae Coast Comprehensive Health Center

The Waianae Coast Comprehensive Health Center (WCCHC), located on the rural leeward coast on the island of Oahu, implemented a community-based asthma management project that improved health care utilization patterns and quality of life among asthmatic children between the ages of 3 and 14 years.

The WCCHC is the largest service provider to Native Hawaiians in the State, where the prevalence of asthma exceeds State rates. During 2000, 806 children under 14 years of age presented at WCCHC for medical care with a diagnosis of asthma. Seventy-four percent of these children were Medicaid/Medicaid Managed Care (QUEST), or uninsured. A review of utilization patterns among those managed care patients that incurred the most charges and most encounters over a period of 1 year revealed that less than 5% of total patients were responsible for 25% of the charges. Children with asthma represented a high percentage of these utilizers. The WCCHC piloted an integrated community-based asthma management project in an effort to reduce inappropriate medical utilization and improve quality of life, targeting 50 children between 3 and 14 years of age diagnosed with asthma. The objectives were to develop an electronic identification and tracking system, coordinating asthma management through team care, and obtaining consensus for evidence-based clinical decision guidelines among providers. The asthma management project was implemented primarily by community health workers through home visitation. During the home visit an assessment was made of the environment, knowledge, and self-management skills. Individual prevention and management education was provided during multiple visits.

After the first year of the project, emergency department utilization among the children participating in the project decreased from 57 to 11 visits. Total asthma related visits decreased from 83 prior to educational intervention to 20 after at least one educational encounter. Total asthma-related charges dropped, with 81% incurred prior to educational intervention and 19% after an educational encounter (46% of these charges were incurred by two individuals). Ninety-six percent reported fewer daytime symptoms and 72% fewer nighttime symptoms as a result of participation in the program.

The project has been well received and is being used as a model in a number of other community-based asthma projects and is supported by a grant from Hawaii Medical Service Association (HMSA) Foundation.

Asthma Demonstration Projects

Rodney Boychuk, Kapiolani Medical Center

Prior attempts in 1993 at collaborative approach to pediatric asthma management and problem identification in Hawaii were presented. Research funding possibilities with Robert Wood Johnson Foundation for managing pediatric asthma were discussed. Several published studies from Hawaii researchers were provided. The focus of these research projects was in pediatric patients with asthma receiving treatment in the emergency department. Study topics included: effect of environmental factors and/or dispensing of home nebulizers on asthma outcomes and problem identification via pulse oximetry in wheezing children.

Shared Decision-Making and Asthma Outcomes

Abstract submitted by Thomas M. Vogt, MD, MPH, Kaiser Permanente Center for Health Research Hawaii

Only about half of patients with persistent asthma adhere to prescribed long-term controller medications. One way the improve this record is to involve patients more in decisions about their treatment. This study is a 5-year project to develop and evaluate the effectiveness of a new model of clinician-patient interaction, shared decision-making, in improving outcomes in adults aged 18-70 years with suboptimally controlled, mild to moderate persistent asthma. The shared decision-making model will be compared in a randomized, controlled clinical trial to a model based on national asthma guidelines, and to usual care. Primary outcomes will be asthma control, adherence, symptom-free days, lung function, dispensing of asthma medications, satisfaction with asthma care, asthma-related costs, and total asthma-related health care utilization.

The project, directed by Sonia Buist, MD of the Oregon Health Sciences Center, will be carried out in three clinical sites–Kaiser Permanente Hawaii (T. Vogt, MD, Principle Investigator (PI), Christine Fukui, MD, Co-PI), Northwest Kaiser Permanente, Portland, OR (S. Buist, MD, PI), and Northern California Kaiser Permanente (S. Wilson, PhD, PI).

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