



February 5, 2007

The American College of Medical Genetics (ACMG) is a professional medical specialty association that represents the board certified clinical and laboratory geneticists in the United States. Our members are among those who have developed the field of medical geneticists since the late 1960s when clinical applications of genetic information were in their infancy. Medical geneticists have long appreciated that the information underlying the field is vast and that most practitioners have limited training and experience with genetic diseases. As such, our focus has been on how electronic health information systems can be used for both point-of-care education and as decision support tools.

The ACMG is also responsible for the direction of the National Coordinating Center (NCC) for Regional Genetics and Newborn Screening Collaborative Groups (RCs), a system developed by the Maternal and Child Health Bureau (MCHB) of the Health Resources and Services Administration (HRSA).

As a field developed around rare diseases, medical geneticists have practiced personalized medicine for decades. To a large extent, medical geneticists personalize their services around the patient and the family since both may be needed to understand the implications of genetic issues in the individual.

Both ACMG and the NCC have a number of programs in development that involve the development and use of health information systems to improve the development of knowledge and the improvement of care for patients.

### **Concepts on anticipated approaches for the use of EHR and population- and community-based health care system databases for longitudinal data collection**

Our activities in this area relate to both public health applications and to private health care delivery. In the area of newborn screening which is the predominant public health program utilizing personalized health care, the needs are multiple. These programs typically involve multiple provider groups including the primary care medical home, the specialty care providers from genetics, pediatric endocrinology and hematology, and the State public health system. This disparate set of players have had historically limited direct communication. There are conditions such as congenital hypothyroidism that are sufficiently common to have a well established knowledge base such that primary care providers are more likely to be positioned to deliver care to a large number of rare and complex conditions that may present as medical emergencies. A distinguishing feature of these programs is that infants are identified through testing because they are otherwise not apparent to providers. Further, they have conditions with significant burden to the patient unless treated. For many of the conditions, the speed with which treatment is initiated is

a determinant of outcome. As such, systems that facilitate the ability of private providers to ensure that screening has occurred through the State system are an important feature. Further, diagnostic confirmation often occurs through specialists who report results to referring providers who often secondarily report to State programs. A critical need that is not fully addressed is that of information systems through which these various providers can link to State programs to ensure that screening has occurred when seeing an infant for the first time are important. Clearly, information systems can greatly reduce the complexity of communications across this triad of providers.

The combined urgency of the medical conditions identified in NBS, the rareness of the diseases, and the complex management issues are such that primary care providers are often ill-equipped to manage these patients. The ACMG and the NCC have developed a full range of intermediate guidance materials that assist the providers in appropriately responding to the notification that a screen positive infant is to be scheduled for an appointment. Hard copy materials amenable to an EHR format have been developed for this purpose. Health care delivery systems with EHR capacities have integrated these into their EHR systems to serve as point-of-care educational tools and decision support tools. Those lacking EHR capabilities receive these materials with the test results from the State laboratories. These are one of many examples of how educational content integrated into EHRs can assist providers. These materials can be seen at <http://www.acmg.net/disclaimer-ACT.asp>.

An additional use of EHRs related to NBS programs involves their need to monitor outcomes of those identified through screening as a quality assurance tool for their programs. Because most conditions screened in NBS programs are rare, it is important to be able to aggregate data about as many patients as possible to obtain sufficient statistical power for the types of analyses that are needed. Complicating the task is the fact that patients are often managed collaboratively between primary care providers and specialists. This requires that data be collected and centralized to be useful in care delivery and QA programs.

Genetic diseases ascertained outside of NBS programs face many of the issues faced by those in NBS programs. Over 95% of the genetic tests for heritable traits are for very rare diseases, many with even rarer molecular subtypes. It is also expected that similar issues will be faced in common diseases which will have multiple but less strong genetic influences combining with environmental factors that will lead to variability among patients with the disease. It seems unlikely that sufficiently large populations of patients can be aggregated to provide the statistical power needed to understand natural histories or to provide the baseline from which clinical trials would occur. It will be critical that we develop appropriate national systems through which quality assured clinical information can be collected to inform our understanding of these diseases. Such information will ultimately be critical to public health decision-making.

In order to develop these capacities, the ACMG and the NCC continue to develop intermediate practice guidance materials that facilitate the ability of nongenetic providers to deliver care. They are also working directly with NICHD/NIH to develop long-term

follow-up and data collection programs for these patients. Simultaneously, we are working with NICHD to develop similar capabilities for all genetic diseases. Models ranging from those of the national cancer cooperative groups that can quality assure the data being collected and analyzed to more open structures such as the Cancer Biomedical Informatic Grid (caBIG) are being assessed in a series of meetings being funded by NCIHD and HRSA.

**Anticipated applications of genomic-based clinical testing in medical decision-making, safety assessment and risk management.**

Applications of genetic information are arising in both specialty settings and primary care. Although rare disease related services will likely continue to be managed by either specialist or in collaborative management with primary care providers, there are some applications that will require other provider groups to be on the front lines. Pharmacogenetic applications are among these. As the clinical utility of these tests is demonstrated, the need for support tools to allow test results to be interpreted in the context of the patients own clinical and other information will be important.

Biospecimen repositories of genetic disease patients are ubiquitous. State programs often retain dried blood spot cards on newborns that are valuable resources for understanding the prevalence of various genetic sequences in the general population. Disease support groups, academic groups and others also are developing repositories. It will be important that electronic mechanism that link these together be developed rather than continue them as separate entities or to reinvent them. The recent creation of the National Newborn Screening Translational Research Network (NBSRN) by NICHD will utilize NBS laboratories to pilot test new genetic screening tests that might be used in NBS programs. The availability of dried blood spot filter papers will provide the resource through which incidence in subpopulations of both various molecular changes are learned. The availability of large numbers of patients will provide the critical resource for fully powered clinical trials. Further, well developed clinical information systems can supplant the need for industry to be primarily responsible for phase 4 surveillance of patients that is often required by FDA for rare disease treatments.

Laboratory and clinical language standardization remain as significant impediments to moving clinical information about genetic diseases into electronic systems. These conditions, though costly to individuals and families, tend to not be major consumers of health care funds. Hence, they are often overlooked until more financially critical areas addressed.

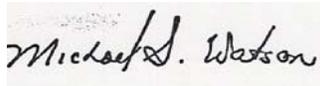
Disease registries are becoming increasingly important as resources to facilitate the ability of the broader medical research community to become involved with the diseases. The ACMG and the NCC are developing a program through which prospective cohorts of patients from genetic clinics and NBS programs are to be created. These will be converted into both broader disease registries and as resources for clinical investigation. It is expected that these will be developed as minimal data set resources with additional

information residing with physicians caring for patients. These individuals will be the link to the patients and their clinical information.

Well curated clinical information of patients being treated for genetic diseases, whether from NBS programs or from clinical services, will be critical. However, the multisystem nature of these diseases and the multidisciplinary group of providers involved points to the need for EHRs for these patients to bridge the gaps between groups who rarely interact outside of their local institutions.

We welcome the opportunity to comment on our activities involving EHRs. We would be glad to provide any additional information about the programs discussed if needed.

Sincerely,

A handwritten signature in black ink on a light-colored background. The signature reads "Michael S. Watson" in a cursive script.

Michael S., Watson, PhD, FACAMG  
Executive Director, ACMG  
Director, National Coordinating Center  
[Adjunct Professor of Pediatrics, Washington University]