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## Experience in Neonatal Screening: Management and Quality Assurance

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The aim of a screening program for example for congenital hypothyroidism is to enable children with this condition to be as tall and as smart as their siblings. This is only possible when the screening is considered to be a co-ordinated effort between health policy makers and funders; healthcare workers collecting samples; the laboratory testing the samples; the healthcare workers organising appropriate followup action from infants with positive test results; the laboratory performing the diagnostic tests and the paediatricians treating the diagnosed infants. Traditionally, these aspects of the screening program are not under single management and control. Therefore, political skill is needed to ensure the different elements work together to achieve the stated aims of the screening program.

Because the success of the screening program depends on the success of all the constituent parts, regular program audit must be done. This should start with audit of achievement of the aims of the program and extend to audit of the program constituents and their interrelationships.

Quality assurance of the laboratory components (screening and diagnostic) is straightforward and many countries now require ISO25 or similar accreditation, a process which audits quality assurance systems for both analytical and process elements of the laboratories. Quality assurance of the screening process is more difficult but can extend out from the laboratories in monitoring of sample collection parameters (eg % infants screened, time taken for samples to reach the laboratory) and diagnostic and treatment parameters (eg age of infant at diagnosis, age of infant when blood phenylalanine is under a specified limit). Results of these quality assessments can be considered with audit outcome results to identify problems and potential problems with the screening program in order that they can be corrected.

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## PROGRESS OF NEONATAL SCREENING PROJECT IN CHINA

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Neonatal screening is a preventive measure for every newborn. The pilot study of program for neonatal screening of congenital metabolic disease in mainland of China started in 1981, there were two screening centers at initial stage. One located at Shanghai Institute for Pediatric Research and the other located at Beijing. The screening diseases were including phenylketonuria (PKU), congenital hypothyroidism (CH), CAH, galactosemia and histidinemia. At the intermediate stage (1986-1991), the screening centers are increased to 3 centers, the screening diseases focused only for PKU and CH. From 1992 to present, the neonatal screening in China was at expanding stage, 17 screening centers are established. The incidence of PKU is 1/11,186 to 1/17,000 from different sets of data, CH is near 1/5000. No galactosemia and histidinemia have been found in 329,000 neonatal screening in Shanghai. Because China is a vast country, the economic condition is imbalance among the different regions, the neonatal screening coverage rate has only near 2%. But in metropolitan like Shanghai and Beijing, the coverage rate has reached to 90-95% in 1996.

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## THE ORGANIZATION OF THE NEONATAL SCREENING PROGRAM IN TAIWAN

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A nationwide program for neonatal screening of congenital metabolic diseases in Taiwan was started in 1984. There were two screening centers, one located at Veterans General Hospital-Taipei (VGH) and the other located at National Taiwan University Hospital. The delivery units were responsible to collect neonatal dried blood spot samples on filter paper by heel puncture, which were mailed to the screening center for testing. Five congenital metabolic diseases, namely phenylketonuria (PKU), homocystinuria (HCU), galactosemia (GAL), congenital hypothyroidism (CHT) and glucose-6-phosphate dehydrogenase (G6PD) deficiency, were screened. The cases with high positive values for PKU, HCU, GAL and CHT were referred to one of the six local referral hospitals immediately by phone and facsimile. A second sample was requested in borderline positive cases and was collected by the original sample collection system or the follow-up system, which consists of public health nurses in every county. If the result was still positive, the case was then referred to the referral hospital. Seventeen G6PD referral centers connected by fax were established in local hospitals island wide to follow up G6PD positive cases with confirmatory tests, medical care and genetic counseling. From 1984.1 to 1993.9, 838,572 newborns were screened by the VGH screening center. The dried blood samples were sent to VGH screening center from 445 delivery units, including 111 hospitals, 260 obstetric clinics, 23 midwives and 51 health stations, all over Taiwan. One case of HCU, two cases of GAL, 27 cases of PKU (1/31,000, including 22 classical PKU, 4 BH<sub>4</sub> synthesis deficient and one DHPK deficient PKU), and 401 cases of CHT (1/2,100), were confirmed. Most of them were diagnosed and treated within 3 weeks of life. The incidence of G6PD deficiency is estimated to be around 2.1% (male 3.1%, female 0.9%). The neonatal screening coverage rate in Taiwan has reached to 99% (~320,000/year) in 1995.

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## Student Health

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## HEALTH SERVICES FOR SINGAPORE STUDENTS

Authorities agree unanimously that the best time for building the foundation for better health is early in life. It follows then that one of society's largest and potentially most influential organisation that offers vast opportunities for raising the health of the individual, the family, and the community is the school. When we see the large numbers of educational institutions dotting the city and suburbs of Singapore we can also think of the limitless ways in which health personnel with the support of the educational authorities and the community, can favourably affect the health of half a million students.

The School Health Service of Singapore has been in existence since 1921 and offers one of the most comprehensive health services for students in the world. Its mission is to ensure total health for the students in order to maximise their educational and economic potential. The strategic thrusts of the service are early detection and management of health problems and risk factors of major diseases, prevention through immunisation and health education and health promotion through encouragement of healthy lifestyles and habits. These are provided through a wide range of School and Clinic based programmes and services.

The student health database was computerised in 1990 and this is an ideal platform for epidemiological surveillance and research on students, for the generation of baseline values for various parameters, as well as for ongoing monitoring and evaluation of all programmes and services.