SPMC JHCS

PROGRAM PROFILE

Newborn Screening Center - Mindanao

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Newborn screening (NBS) facilitates the early diagnosis and management of congenital metabolic disorders that, if left untreated, may lead to mental retardation or death. Successful medical interventions can bring about normal growth and development of individuals with these disorders.[1]

Introduced by the Newborn Screening Study Group in 1996, NBS became a routine procedure for newborns in the country through the enactment of Republic Act 9288, or the Newborn Screening Act of 2004,[1] with the DOH as the lead implementing agency. The law mandates that all birthing and health facilities must offer NBS, in effect making the procedure accessible to all. The law further stipulates that these birthing and health facilities should be given NBS services and support, thus newborn screening centers (NSCs) were created and located strategically throughout the Philippines. An NSC is a facility equipped with a NBS laboratory that complies with the standards established by the National Institutes of Health - Philippines and provides all required laboratory tests and recall/follow up programs for newborns with heritable diseases.[1] Currently, there are seven NSCs in the country.

The Newborn Screening Center-Mindanao (NSC-Mindanao), the third NBS center to be built in the country, was established at Southern Philippines Medical Center (SPMC; formerly Davao Medical Center) in 2009 under the stewardship of Dr. Leopoldo J. Vega, then SPMC Chief of Hospital. Headed by Dr. Conchita G. Abarquez, NSC-Mindanao acquired its DOH accreditation and started operations in the same year of its establishment.

The NSC-Mindanao started with a workforce of 11 staff, consisting of a full-time unit head, a pathologist as laboratory manager, a program manager, three medical technologists, a follow-up nurse, an encoder, an accountant, an administrative officer and an information technology staff. NSC-Mindanao initially performed screening tests for five disorders, namely, congenital hypothyroidism, congenital adrenal hyperplasia, galactosemia, phenylketonuria, and glucose-6-phosphate dehydrogenase deficiency. In its first year of operation in 2009, NSC-Mindanao received and tested 4,187 NBS samples. Screening for maple syrup urine disease was added to the original five tests in 2012. Presently, NSC-Mindanao caters to 1,859 NBS facilities in the six administrative regions in Mindanao—Zamboanga Peninsula (Region IX), Northern Mindanao (Region X), Davao (Region XI), Soccsksargen (Region XII), Caraga (Region XIII), and the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM).

As of 2022, NSC-Mindanao employs a workforce of 47 staff,[2] consisting of a unit head, a laboratory head, a follow-up head, a laboratory manager, a program manager, 13 medical technologists, three nurse genetic counselors, two follow-up nurses, three project development officers (one medical technologist and two nurses), four nurse demo/encoders, one certified public accountant, two information technology staff, and 14 administrative support staff. All medical personnel are licensed and have completed training on their respective fields of expertise.

The NSC-Mindanao laboratory is equipped with modern and top-of-the-line laboratory equipment for NBS. It uses fully-automated neonatal screening platforms, such as AutoDELFIA automated fluoroimmunoassay machines and Genetic Screening Processor machines, for testing endocrine disorders and cystic fibrosis. The center also has several tandem mass spectrometry machines, such as Xevo TQD and TQD Acuity, for screening metabolic disorders, and high-performance liquid chromatography machines for screening hemoglobinopathies.

Presently, under the Expanded Newborn Screening Program, NSC-Mindanao tests for 29 panel disorders, including galactosemia, glucose-6-phosphate dehydrogenase deficiency, cystic fibrosis, and biotinidase deficiency, as well as specific endocrine disorders, amino acid disorders, fatty acid disorders, organic acid disorders, urea cycle defects, and hemoglobinopathies.

As NBS is essentially a battery of screening tests, positive results need to be confirmed either through repeat collection or various confirmatory tests. Patients with

one or more positive test results are recalled by the NSC, the respective health facilities where they were screened, or by their respective DOH regional Centers for Health Development (CHDs), either for repeat specimen collection or for confirmatory testing. The NSC-Mindanao Follow-up Team —composed of the Unit Head, the Follow-up Head and five Follow-up Nurses— manages the care of patients with confirmed disorders. The center handles the short-term follow-up of the patients, and provides free medicines and medical supplements to indigent patients. The Newborn Screening Continuity Clinics in SPMC, Cotabato Regional Medical Center, Northern Mindanao Medical Center, and Zamboanga City Medical Center, handle the long-term follow-up of patients with confirmed disorders in Mindanao.[3] NSC-Mindanao also provides genetic counseling to patients with confirmed disorders and to their families. A clinical geneticist and three duly-qualified genetic counselor nurses carry out the counseling sessions.

NSC-Mindanao, in coordination with the DOH CHDs, also provides NBS training and technical assistance to the NBS facilities. The center also conducts NBS program review and evaluation of these facilities to ensure that their NBS services are always available and at par with set standards, and regularly holds activities to increase public awareness on NBS. To enhance patient support, NSC-Mindanao organizes and participates in public fora and support group sessions among parents of patients with confirmed disorders.

NSC-Mindanao undergoes an annual external audit, performed by the University of the Philippines Manila Newborn Screening Reference Center, the DOH technical arm for the NBS program. The audit ensures that the center's laboratory complies with the set quality standards and assurance program for NSCs. NSC-Mindanao has also engaged the External Quality Assurance (EQA) program of Taiwan's Preventive Medicine Foundation as third-party internal quality control for the center's G6PD quantitative tests. NSC-Mindanao also follows the Centers for Disease Control and Prevention's Newborn Screening Quality Assurance Program for its Expanded Newborn Screening tests, ensuring that the results generated are accurate and reliable. NSC-Mindanao also renews its DOH accreditation every three years.

NSC-Mindanao is applying for ISO 15189 Certification for Medical Laboratories and hopes to obtain it by 2023. NSC-Mindanao also anticipates the opening of another NBS center in Cagayan De Oro City. The new NSC will be housed at the Northern Mindanao Medical Center, its host hospital, and will cater to the NBS services and support needs of birthing and health facilities in Region IX, Region X, and BARMM.

NSC-Mindanao and the entire NBS program as a whole have been facing several operational challenges. Persuading birthing and health facilities to consistently screen newborn babies at the ideal age has been a demanding task for the center. Timing is essential to successful NBS. Timely screening will lead to timely medical management, which in turn affects the clinical outcomes of patients with confirmed disorders. Ideally, newborns should be screened within 24 to 48 hours after birth, but many birthing and health facilities perform the screening only on, or even beyond, the 5th day from birth. Arranging for a short specimen transit time has also been challenging for the entire NBS system. Transit time should be within two days upon collection, but NSC-Mindanao still receives specimens beyond five days from collection.[1] Nationally, the NBS program has yet to achieve its target of 100% NBS coverage. This has been more challenging since the start of the COVID-19 pandemic. For 2021, the NBS program achieved 70% national coverage.

Thirteen years after its establishment, NSC-Mindanao has grown exponentially and has become one of the NSCs, if not the NSC, with the widest coverage of NBS in the country. It is committed to fulfill its important contribution to health care, and it will continue the expansion and improvement of the quality of its NBS services in the years to come.

Contributors
SMG and CGA contributed to the conceptualization of this article. All authors wrote the original draft, performed the subsequent revisions, approved the final version, and agreed to be accountable for all aspects of this report.

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