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Newborn Screening Follow-up; Approved Guideline

This guideline describes the basic principles, scope, and range of follow-up activities within the newborn screening system.

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Newborn Screening Follow-up; Approved Guideline

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Abstract

Newborn screening for congenital conditions is a public health system composed of screening, follow-up, diagnosis management, evaluation, and education. As part of the system, follow-up activities play an essential role in facilitating early diagnosis and intervention for affected newborns. Clinical and Laboratory Standards Institute document I/LA27-A—*Newborn Screening Follow-up; Approved Guideline* describes the basic principles, scope, and range of follow-up activities within the newborn screening system. It is intended for use by those involved in any aspect of follow-up, including healthcare providers, parents, and others concerned with the health and welfare of newborns.

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(Formerly NCCLS)

Contents

Abstract	i
Committee Membership.....	iii
Foreword.....	vii
1 Scope.....	1
2 Definitions	1
2.1 Abbreviations and Acronyms	2
3 General Considerations Impacting Newborn Screening Follow-up	3
3.1 The Overall System	3
3.2 The Role of Follow-up in the System	3
3.3 Participants in the Follow-up System	3
3.4 Laws and Rules	5
3.5 Funding	5
3.6 External Advice	5
4 Follow-up System Continuum	5
4.1 Follow-up Continuum Flowchart.....	5
4.2 Short-term Follow-up	6
4.3 Long-term Follow-up.....	11
4.4 Quality Assurance and Evaluation.....	11
References.....	12
Additional References.....	13
Summary of Consensus/Delegate Comments and Subcommittee Responses	14
The Quality System Approach.....	18
Related CLSI/NCCLS Publications	19

Foreword

Newborn screening is an essential public health activity that strives to screen every newborn for a variety of congenital conditions, which if not detected and managed early, can result in significant morbidity and mortality. It is one of the most successful population-based screening programs ever implemented. Screening tests separate newborns who probably have a condition from those who probably do not. Screening is not intended to be diagnostic and newborns identified with suspicious findings must undergo further testing and clinical evaluation.

Effective newborn screening systems provide the infrastructure for universal access and rapid follow-up. Properly constructed, they facilitate timely intervention for affected newborns whose life and health may be at risk. Systems for newborn hearing screening (NHS) and dried blood spot (DBS) screening are comprised of six parts: screening, follow-up, diagnosis, management, evaluation, and education.¹ Parents/legal guardians and families, obstetric and pediatric health professionals, audiologists, birthing facilities, public health newborn screening programs, laboratories, and other providers involved in the care of newborns should partner to ensure that the system functions effectively. The public health newborn screening program refers to the administrative entity responsible for development, implementation, and oversight of policy and procedures within the screening system, where this exists.

These guidelines provide a reference for developing and providing follow-up services within a newborn screening system. They are specifically focused on NHS and DBS screening, but applicable to other types of universal newborn screening. The primary function of follow-up services within the newborn screening system is to locate newborns with screening results that are “out of range” or “invalid,” in order to determine if a newborn has a screened condition, and for affected newborns, to facilitate prompt treatment and referral for subspecialty care and support services.

It is estimated that three newborns in 1000 will be affected with hearing loss and approximately one newborn in 800 will be affected with a metabolic, endocrine, or hematologic disorder detectable by DBS screening.^{2,3} This equates to an estimate of one newborn per 250 births who is at serious risk of physical and/or developmental disabilities, or even death, as a result of his/her condition. Because there are genetic components to most of the conditions included in newborn screening, birth prevalence rates may vary depending on the screened population. Technological advances will continue to enable programs to screen for increasing numbers of conditions in the future. This guideline provides reference information to ensure that appropriate follow-up occurs.

The need to include follow-up services in the newborn screening system originated with the realization that simply reporting “out-of-range” or “invalid” screen results did not ensure appropriate or timely treatment for affected newborns.⁴⁻⁶ Rapid, efficient, and effective follow-up is critical to ensure that newborns needing further testing are evaluated quickly. Within newborn screening systems, effective follow-up, often provided by nurses or genetic counselors, facilitates actions to ensure that the newborn is located and receives timely confirmatory testing that leads to a rapid diagnosis (not affected or affected). Further, it ensures that affected newborns receive prompt and appropriate referral for subspecialty care and support services.

Follow-up activities can be divided into two broad categories: short-term and long-term follow-up. Successful follow-up requires coordinated efforts of dedicated follow-up personnel within the newborn screening program working with system partners, including parents, birthing facilities, primary care providers, appropriate subspecialty care providers, early intervention programs, public health resources, and laboratory professionals.

The aim of short-term follow-up (STFU) is to locate newborns with screening results that are “out of range” or “invalid,” in order to determine if a newborn has a screened condition, and for affected

newborns, to facilitate prompt treatment and referral for subspecialty care and support services. STFU ends with diagnosis and documentation of treatment (if applicable) and referral information.

Long-term follow-up (LTFU) allows for the evaluation of the benefits resulting from newborn screening throughout the life of an individual. These benefits may impact the individual, the family, and/or society. Evaluation requires periodic assessment of indicators that are measurable, functional, and appropriate to the condition detected. LTFU may include facilitation of care coordination services to ensure that the needs of the affected newborn/individual and family are met.

The quality of follow-up services directly impacts the lives of families with newborns. This document outlines the role of follow-up services within a newborn screening system, and provides guidance for developing and maintaining effective follow-up services. Efforts have been made to reach consensus among a representative group of newborn screening stakeholders, and they seek to describe best practices for newborn screening follow-up. It is anticipated that these guidelines will require periodic review and update, as screening expands and follow-up activities are required to meet increased needs.

Key Words

Community/public health resources, dried blood spot screening, long-term follow-up, newborn hearing screening, newborn screening, population screening, quality assurance, short-term follow-up

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1 Scope

Newborn screening is a system comprised of screening, follow-up, diagnosis, management, evaluation, and education. Follow-up is essential to ensure valid screening results are known for every eligible newborn, that all out-of-range results are followed to definitive diagnosis and appropriate clinical management, and that long-term outcome data are collected for program assessment and quality assurance. The primary goal of this guideline is to improve the quality of follow-up services for newborns screened through public health newborn screening programs. The quality of follow-up services directly impacts the health of newborns and families. This provides guidance for effective follow-up to ensure timely identification and treatment of affected newborns.

This guideline is limited to follow-up activities associated with invalid and out-of-range test results within a newborn screening system. It is not intended to address other components of the overall newborn screening system, such as screening, confirmatory testing, education, treatment, or system evaluation practices outside of follow-up.

This guideline is intended to be used globally by public health officials and those who are involved in any aspect of follow-up within newborn screening systems, including maternity healthcare providers, hospital personnel, newborn healthcare providers, pediatric subspecialty providers (e.g., hematology, endocrinology, metabolism, pulmonology, genetics, and audiology), parents and families, other providers involved with the care of newborns, public health personnel, confirmatory clinical laboratories, and newborn screening program personnel.

2 Definitions

confirmatory/diagnostic test – test to prove or disprove the presence of a specific condition identified by screening tests (for dried blood spot screening, this testing is from a specimen other than the screening specimen).

false negative – “in-range” result in an affected newborn; **NOTE:** For more information, refer to Section 4.2.2.5.

false positive – “out-of-range” result in an unaffected newborn.

follow-up – actions taken to ensure that a newborn whose screening test results are “out-of-range” or “invalid” receives appropriate further tests and evaluation in a timely fashion; and actions taken to ensure that the newborn screening system can evaluate the effectiveness of screening.

in-range result – screening result that is within the expected range of testing results established for a particular condition.

intervention – specific newborn screening follow-up activity (e.g., clinical assessment, medical management) targeted at improving health and/or developmental outcomes of an affected newborn.

invalid screen – inability to complete the screening process according to established criteria, such as unsuitable specimen or test, no specimen or test, or incomplete information.

long-term follow-up (LTFU) – actions commencing after confirmed diagnosis in an affected individual to ensure the screening program can evaluate the effectiveness of the program that may include the

Related CLSI/NCCLS Publications*

- LA4-A4** **Blood Collection on Filter Paper for Newborn Screening Programs; Approved Standard—Fourth Edition (2003).** This document addresses the issues associated with specimen collection, the filter paper collection device, and the transfer of blood onto filter paper, and provides uniform techniques for collecting the best possible specimen for use in newborn screening programs. Also available in video format (LA4-A4-V).

* Proposed-level documents are being advanced through the Clinical and Laboratory Standards Institute consensus process; therefore, readers should refer to the most current editions.