

Long-chain fatty acid oxidation disorders: A review of newborn screening around the globe for LC-FAOD

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Background: Long-chain fatty acid oxidation disorders (LC-FAOD) are rare inborn errors of metabolism leading to serious consequences due to inability to utilize fat as a source of energy. Early detection by newborn screening (NBS) significantly decreases morbidity and mortality.

Methods: A review of global NBS for LC-FAOD subtypes CACT, CPT I, CPT II, LCHAD, TFP (also known as MTP) & VLCAD was compiled in 2024 from online resources and publications with expert author views. Current NBS methodology cannot differentiate among some LC-FAOD subtypes; additional subtypes may be detected but are not reported.

Results: Asia/Oceania: Australia, Japan, New Zealand and Taiwan screen for all 6 LC-FAOD. Philippines. Singapore, Thailand and Vietnam screen for 5, and South Korea screens for LCHAD. Pilot NBS programs in China include LC-FAOD.

Europe: Ten countries screen for all 6 LC-FAOD and >10 countries screen for ≥ 1 LC-FAOD. Eleven countries do not support LC-FAOD NBS.

Latin America: No country performs universal screening for all LC-FAOD. In 2 Brazilian states, NBS includes LC-FAOD. Costa Rica screens for 3 and Uruguay pilots 3 LC-FAOD. Colombia and Mexico have limited pilots.

Middle East, Africa: Saudi Arabia screens for VLCAD; Qatar and Israel screen for 5. UAE screens all 6 LC-FAOD. Kuwait and Lebanon NBS includes 3 LC-FAOD.

US & Canada: All US states, DC, and 1 territory screen for VLCAD, LCHAD and TFP; >80% include NBS for CPT I, CPT II & CACT. All Canadian provinces and territories screen for VLCAD, LCHAD and TFP; CPT I, CPT II, and CACT are included in NBS programs in 70% of provinces and 20% of territories.

Conclusions: NBS for LC-FAOD enables early diagnosis and treatment and significantly improves clinical outcomes in patients. Discrepancies exist in NBS for LC-FAOD worldwide. Given incomplete NBS, clinical signs and symptoms later in life warrant suspicion for LC-FAOD.