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## Likely Impact of the COVID-19 Pandemic on Newborn Hearing Screening and Follow-up Services in the United States in 2020

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### Abstract

This perspective aims to highlight aspects of the Early Hearing Detection and Intervention (EHDI) newborn hearing screening and follow-up processes that were impacted by the COVID-19 pandemic and considers factors that likely impacted follow-up after failing newborn hearing screening among infants born in the United States during 2020. Efforts to minimize the potential impact of missed or delayed identification of hearing loss in infants and young children will also be discussed to help guide future program improvement activities.

### Keywords

COVID-19; Newborn Hearing Screening

The Early Hearing Detection and Intervention (EHDI) Act (S. 652, PL 115–71) authorizes the Health Resources and Services Administration (HRSA) and the Centers for Disease Control and Prevention (CDC) to support EHDI activities at state and territorial levels to help ensure infants receive recommended services according to established national benchmarks (i.e., hearing screening before one month of age, diagnosis before three months of age, and enrollment in early intervention before six months of age (JCIH, 2019). Late identification of a child as deaf or hard of hearing (DHH) can adversely affect their ability

to develop communication, language, cognitive, and social skills (Morton & Nance, 2006; Vohr, 2003). In March 2020, the United States declared a national emergency in response to the COVID-19 pandemic (Executive Office of the President, 2020).

Jurisdictional EHDI programs faced new challenges in helping families navigate the process of screening, diagnosis, and entry into intervention programs. Nationwide, performance in meeting EHDI benchmarks in 2020 declined compared to previous years, as indicated by the results from the CDC annual Hearing Screening and Follow-up Survey (HSFS; CDC, n.d.).

This perspective aims to highlight aspects of the EHDI system that were likely impacted by the COVID-19 pandemic and identify factors that likely impacted follow-up after failing newborn hearing screening for infants born in the United States during 2020. Efforts made by EHDI programs and federal partners to help mitigate the potential impact of missed or delayed identification of hearing loss will also be addressed.

## **EHDI Services During COVID-19**

The percent of infants born in 2020 meeting the benchmark of being screened before one month of age remained high at 95% compared to the two previous years (range: 94%–96%; Figure 1). The high screening rate during the pandemic suggests that the in-hospital newborn screening remained a standard of newborn care. Among infants screened, the percent of infants who did not pass their most recent hearing screen increased from 1.6% for the 2018 birth cohort to 2.0% for the 2020 birth cohort (Table 1). An increase of 0.4% in the final refer rate translates into approximately 12,000 additional infants in need of a diagnostic evaluation by an audiologist. There was also an increase in the number of infants not receiving a hearing screen due to medical reasons in the 2020 birth cohort (approximately 3,300 in 2018 and 2019 to 4,500 in 2020; CDC, n.d.). This 36% increase likely reflects updated HSFS guidance that newborns who did not receive a newborn hearing screening because the mother or child had COVID-19 should be reported as “not screened due to medical reasons.”

Among infants needing a diagnostic evaluation, a noticeable decrease in the percent meeting the benchmark of diagnosis before three months of age was documented. A little over one third (36.4%) of infants born in 2020, who failed their final hearing screen completed a diagnostic evaluation before three months of age. Whereas nearly half (2018: 49.5% and 2019: 49.1%) met this benchmark the previous years (Figure 1). Although there was no notable change in the average percent of families declining audiological diagnostic services, nationally the rate of lost to follow-up/lost to documentation (LFU/LTD) for diagnosis increased from 25.9% among 2018 births to 29.9% among 2020 births (Figure 2). The higher LFU/LTD rate, coupled with an increased number of referrals, means that more babies born during the first year of the pandemic who failed their newborn hearing screen were lost to the EHDI system and likely did not receive timely follow-up services.

Decreases in enrollment into intervention were also noted among 2020 births. Enrollment into intervention for infants with diagnosed hearing loss before the benchmark of 6 months of age declined from 46.7% among 2018 births to 44.5% among 2020 births

(Figure 1). Refusal rates of intervention slightly increased from 9.2% (2018 and 2019) to 9.7% (2020; Table 1). Additionally, the LFU/LTD rate of intervention among infants with permanent hearing loss increased from 17.7% (2018) to 19.5% (2020; Figure 2). The nearly 2.0 percentage point difference represents 116 infants with permanent hearing loss not receiving, or not documented to be enrolled in, intervention services.

## Factors Influencing EHDI

Plausible reasons for the reductions in follow-up diagnosis and access to services among infants who screened positive for possible hearing loss in 2020 can be found when considering both internal and external factors that impacted EHDI during COVID-19. In May 2020, HRSA convened a listening session co-hosted by the National Center for Hearing Assessment and Management (NCHAM) and the Association of Public Health Laboratories (APHL). The purpose of this meeting was to discuss possible solutions to the challenges faced for newborn hearing and dried blood spot screening, and to understand families' experiences from screening through follow-up (APHL, n.d.). Barriers identified during the listening session included staffing shortages, facility closures, limited hours for out-patient procedures, families sick or quarantining, and parental hesitancy to return for follow-up services. As with many systems of care, the impact of COVID-19 touched every part of the EHDI system from screening to diagnosis and enrollment into intervention.

Typically, the newborn receives a first hearing screen between 18 and 24 hours after birth in the hospital and then a secondary screen before discharge, if the newborn did not pass the first screen. However, during the COVID-19 pandemic the duration of maternal/newborn stays in the hospital after delivery were often reduced (Greene et al., 2020). A shorter maternal/newborn stay may have impacted hospitals' ability to perform a second screen, which should be conducted at 6 hours after the first screen when necessary (JCIH, 2019). Staff at hospitals were also often diverted to assist with overflow of patients affected by COVID-19, potentially leaving less experienced or different staff to perform the hearing screens. Both short hospital stay and staffing issues combined could play a role in the observed higher refer rate (2.0%) during the pandemic, compared to the previous two years (Table 1). Lastly, some hospitals did not perform hearing screens on newborns of mothers who tested positive for COVID-19. This would increase the number of infants who required additional follow-up and tracking for hearing screening and/or evaluation services by EHDI programs.

As noted above, there was an increase in the number of infants who were LFU/LTD from screening to diagnosis in 2020. Underlying reasons for this increase in LFU/LTD and the resulting decline in the overall meeting of EHDI benchmarks include a reduction of services among pediatric diagnostic audiology facilities, inability of parents to locate childcare for siblings that could not attend appointments due to COVID-19 protocols, concerns of seeking healthcare due to COVID-19 exposure risk, and families having to quarantine due to exposure to COVID-19. Although healthcare was considered an essential service, some audiology facilities were required by the state or opted to cancel several weeks' worth of patient appointments when *stay at home* orders were initially put in place throughout the United States (Kornak, 2020). Limited availability of pediatric audiology services

in some areas (e.g., rural) was already an issue pre-2020 and likely became more of a challenge during COVID-19. Although the expanded use of telehealth for audiology during the pandemic helped address the issue, families of infants needing diagnostic evaluation would still have had to travel to a location with the appropriate equipment so that an aide/technician could place the necessary electrodes for testing on the infant for the audiologist to remotely conduct the necessary test(s) from their office. Additionally, many audiology providers reduced the overall number of patients seen to allow for spacing of patients and increased disinfecting protocols (Kornak, 2020). Despite the additional measures providers were taking to reduce transmission of COVID-19 in healthcare facilities, many families still opted to delay healthcare (Czeisler et al., 2020). As of June 30, 2020, an estimated 41% of U.S. adults reported having delayed or avoided medical care during the pandemic due to concerns about COVID-19 (Czeisler et al., 2020).

Although the percentage of children enrolled in intervention programs did not decline dramatically during 2020 proportionately, the ability of intervention programs to conduct assessments and services virtually may have helped minimize disruptions in services and any impact on benchmark performance compared to previous years. However, offering virtual only intervention may have negatively impacted communities (e.g., rural) that do not have access to high-speed internet even if it may have helped address the issue of limited transportation already present before the pandemic (Ekezue et al., 2021). Due to limitations of aggregated data reported through the HSFS, communities most impacted could not be determined.

EHDI programs generally operate within the jurisdiction's public health agency, which was usually the same agency that led the COVID-19 response. Many jurisdictions deployed EHDI staff to Public Health Emergency Teams, which led to less time for EHDI staff to provide care coordination for infants and families. Epidemiological support, necessary for EHDI programs to monitor and analyze performance, could also have been limited and delayed if epidemiologists were diverted to provide immediate and ongoing needs for COVID-19 surveillance activities. A fully functioning and up-to-date EHDI Information System (EHDI-IS) is essential to EHDI programs and their ability to perform tracking and surveillance. During the pandemic, building, enhancing, and maintaining a new module/database to support COVID-19 surveillance was often a top priority. Consequently, previously planned maintenance and enhancements for EHDI-IS were often deferred, causing further disruptions to EHDI program activities.

## Implications for Practice, Policy, and Future Research

This article highlights disruptions to the provision of EHDI services nationwide during the first year of the COVID-19 pandemic. To help address these disruptions and ensure all infants and young children received recommended services, jurisdictional EHDI programs and providers initiated new strategies to adapt to the context of the pandemic to preserve the ability to serve children and families. Strategies included developing specific guidance for establishing newborn hearing screening and follow-up as an essential service not to be delayed due to COVID-19, increasing the use of telehealth to provide intervention services

(Anckner & Frew, 2022), and upgrading their EHDI-IS to improve the timeliness of referrals and better support child find activities.

Moving forward, EHDI programs can consider reaching out to primary care physicians about the importance of knowing the status of newborn hearing screen results on infants born in 2020 and beyond. Primary care doctors can also encourage families to complete recommended diagnostic audiological examinations and seek evaluation for enrollment into intervention programs if concerns about hearing or other core areas of development are present. EHDI programs can continue and expand collaborations with other agencies and programs to engage families needing follow-up services. The use of existing EHDI-IS can support efforts to identify children in need of services. In addition, although the pandemic moved into a second year in 2021 and likely continued to impact the timely provision and receipt of services, jurisdictional EHDI programs and healthcare providers have continued to actively support and work with families to navigate the EHDI process. CDC, along with other federal and national partners, recognize the unique challenges posed by COVID-19 pandemic for jurisdictional EHDI programs and healthcare providers. Although the COVID-19 pandemic impacted the receipt and timeliness of some EHDI services, over 6,000 infants with permanent hearing loss born in 2020 were nonetheless successfully identified early through newborn screening. The near universal hearing screening of newborns represents an important public health prevention program that is withstanding the many pressures of the COVID-19 pandemic. Families and professionals can continue to work together to ensure that all the infants and toddlers with signs of hearing loss receive the diagnostic and intervention services they need.

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## Disclosures:

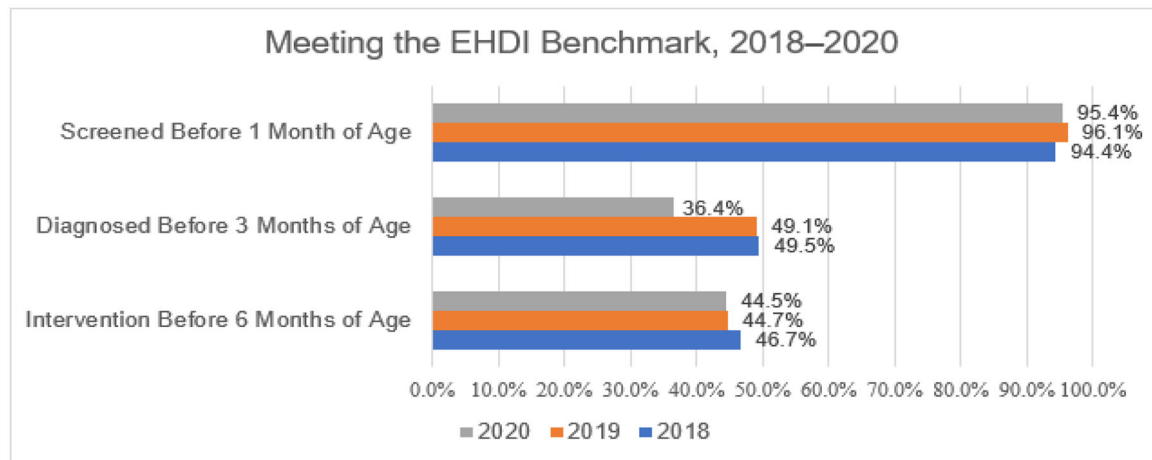
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## Acronyms:

<b>CDC</b>	Centers for Disease Control and Prevention
<b>DHH</b>	deaf or hard of hearing
<b>EHDI</b>	Early Hearing Detection and Intervention
<b>EHDI-IS</b>	Early Hearing Detection and Intervention-Information System
<b>HRSA</b>	Health Resources and Services Administration
<b>HSFS</b>	Hearing Screening and Follow-up
<b>LFU/LTD</b>	lost to follow-up/lost to documentation

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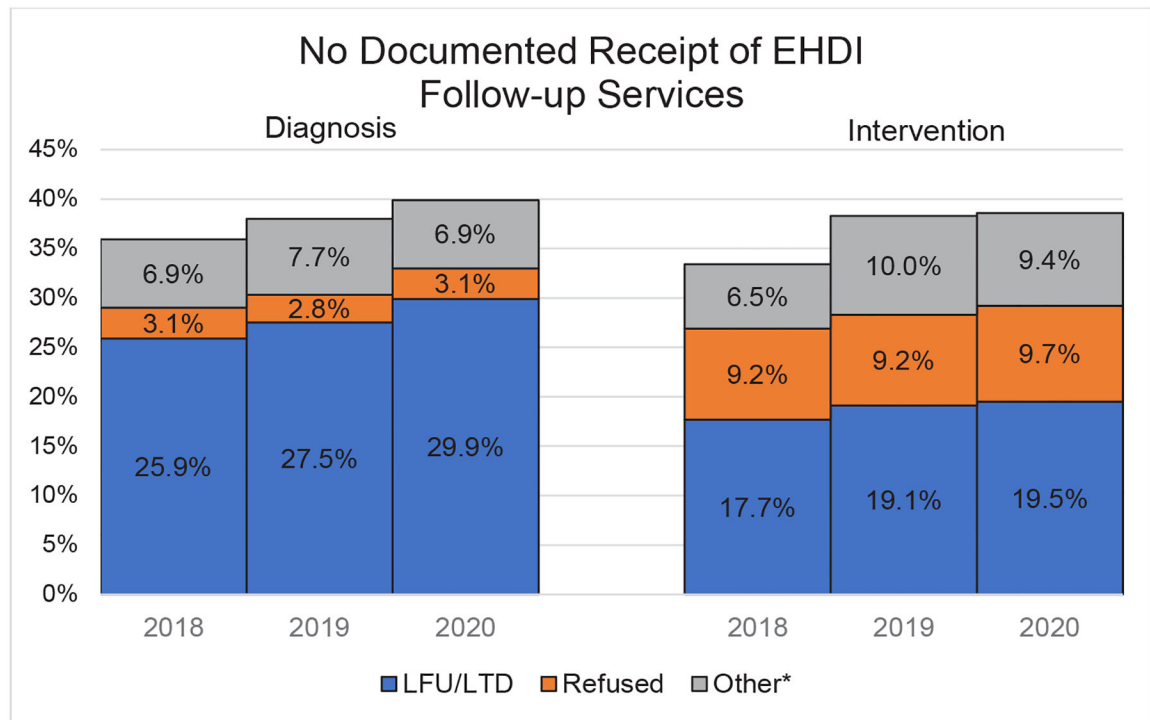


**Figure 1.**

National Average of Early Hearing Detection and Intervention (EHDI) Benchmarks: 2018–2020

**Note.** Percent Screened Before 1 Month of Age = # Total screened before 1 month of age / # Total Births \*100%; Diagnosed Before 3 Months of Age = # Total Diagnosed Before 3 Months of Age / # Total Not Pass \*100%; Percent Intervention before 6 Months = # Total Enrolled in Intervention before 6 Months of Age (Part C and Non Part C) / # Total diagnosed with Permanent hearing Loss\*100%.





**Figure 2.**

Percent of Infants Not Documented to Have Received Recommended Follow-up Early Hearing Detection and Intervention (EHDI) Services, 2018–2020

\*The Other category includes no documented diagnosis or enrollment into intervention due to reasons other than family refusal or lost to follow-up/lost to documentation (LFU/LTD; e.g., not eligible for or not referred to service, infant deceased, moved out of jurisdiction, and medical reasons).



**Table 1**  
National Early Hearing Detection and Intervention (EHDI) Summary Data 2018–2020

	2018 <sup>a</sup>	2019 <sup>**</sup>	2020 <sup>***</sup>
Total Births	3,744,815	3,604,761	3,576,050
Total Screened	3,681,776	3,545,388	3,510,821
Total/Percent <sup>d</sup> Not Pass Final Screen	60,258 (1.6%)	61,475 (1.7%)	69,989 (2.0%)
Total/Percent <sup>b</sup> Refused Diagnostic Service	1,878 (3.1%)	1,721 (2.8%)	2,138 (3.1%)
Total Permanent Hearing Loss	6,432	5,934	6,290
Total/Percent <sup>c</sup> Refused Intervention Service	590 (9.2%)	547 (9.2%)	612 (9.7%)

<sup>\*</sup> 57 Jurisdictions Reporting  
<sup>\*\*</sup> 55 Jurisdictions Reporting  
<sup>\*\*\*</sup> 56 Jurisdictions Reporting

<sup>a</sup> Percent Not pass = #Total Not Pass/# Total Screened\*100%

<sup>b</sup> Percent Refused Diagnostic Service = # Total Refused Diagnostic Service/Total Not Pass\*100%

<sup>c</sup> Percent refused Early Intervention Service = #Total Refused Intervention Service/Total Permanent Hearing Loss\* 100%