Preventing Language Deprivation Syndrome in Deaf and Hard of Hearing Children: A Proposed Focused Intervention in Philadelphia's 19144 Zip Code

by Lindsey Hoffman

Background

Introduction

Language deprivation syndrome (LDS) is a neurodevelopmental disorder caused by lack of language access during a child's critical period for language development—from birth to age five (Hall et al., 2017). This disorder is prominent in Deaf and Hard of Hearing (DHH) children (Hall et al., 2019). Approximately two to three out of 1,000 children in the United States are born with hearing loss before the acquisition of language, but less than 6% have access to sign language in early childhood (National Institute on Deafness and Other Communication Disorders [NIDCD], 2024a; Murray et al., 2019). Limited access to language that has developed through natural progression can result in developmental delays, language dysfluency, knowledge deficits, and difficulty regulating thinking, mood, and behavior (Hall et al., 2017). Exposing a DHH child to a language rich environment is the best way to prevent and treat LDS (Glickman & Hall, 2018). Early intervention services have great potential to improve health outcomes for DHH children because the earlier a child receives services, the greater the chance they will achieve language fluency (Humphries et al., 2016). Addressing a lack of sign language exposure for Deaf children could improve their social, emotional, and cognitive developmental trajectories.

Overview

Language deprivation syndrome is a behavioral health condition in which a person has been barred from full access to natural language. Lack of access to a natural communication system can interfere with developmentally appropriate language acquisition (National Association of the Deaf [NAD], n.d.-b). About two to three out of 1,000 children in the United States are born with hearing loss before the acquisition of language, and 90% of these children are born into hearing families (NIDCD, 2024a). Of these Deaf children, less than 8% communicate with fluent sign language at home (Hall et al., 2017). In the United States, about 1 in every 14 children, or 7%, have a developmental language disorder (NIDCD, 2024b). Language acquisition is most critical during the first three years of life. If a child does not achieve fluency in a natural language by age five, they are at risk of language deprivation (Humphries et al., 2016). Language deprivation is rare among hearing children, affecting largely Deaf and Hard of Hearing children (Hall et al., 2019).

Oralist and auditory approaches to language for Deaf children can negatively affect their developmental trajectories (Murray et al., 2019). Language deprivation affects the development of neuro-linguistic structures in the brain during the critical period, when there is high brain plasticity (Hall, 2017). This can result in developmental delays, mental health comorbidities, limited health literacy, low quality of life, and a higher risk for trauma (Hall, 2017). Being excluded from social interactions because there is no easy mode of communication likely leads to delays in cognitive and social-emotional development for DHH children (NAD, n.d.-b).

Developing LDS is impacted by non-changeable, behavioral, and environmental factors. Age raises the risk: a child needs language fluency by age five (Humphries et al., 2016). Family dynamic raises the risk: 90% of DHH children are born into hearing families (Spellun & Kushalnagar, 2018). The choices parents make for their child also raise the risk. Families often decide to use a spoken language only approach with Deaf children (NAD, n.d.-b). This neglects the possible benefits of signed and spoken language bilingualism (Hall & Hecht, 2024). Failure to expose a Deaf child to sign language during the critical period of language acquisition can result in long-term language deprivation (Hall et al., 2017).

The medical approach to deafness also increases the risk of developing language deprivation syndrome. Medical professionals do not receive education on language acquisition for Deaf children and therefore often view deafness as a hearing impairment (Hall, 2017). The standard medical intervention uses only hearing aids and cochlear implants to address hearing loss, and professionals sometimes advise against using sign language before cochlear implantation (Murray et al., 2019; Hall, 2017). Medical and educational policies are often created without the input of Deaf individuals, limiting language access for this population (Hall et al., 2017).

Symptoms of LDS include language dysfluency and knowledge deficits. Language dysfluency occurs when a person's natural language is not fluent, resulting in limited vocabulary and lack of syntax (Hall et al., 2017). Someone with LDS may also struggle to learn new words, understand directions, and use complex sentences (NIDCD, 2023). They may experience general knowledge deficits due to inaccessible environmental information (Hall et al., 2017). On a population level, Deaf children are typically one to two standard deviations below their monolingual hearing peers on cognitive tests (Hall, 2020). Language deprivation is often misdiagnosed because it is difficult to distinguish between a problem with the child's cognition and a problem with the child's environment, including access to language (Hall, 2020). Symptoms of language deprivation can be misunderstood as sign language interfering with spoken language (Hall, 2017).

LDS often coincides with disruptions in thinking, mood, or behavior. Language abilities are linked to emotional problems and behavior issues, as well as psychiatric disorders (Hall et al., 2017). Mental health difficulties are elevated in the Deaf population, with clinicians viewing language dysfluency as a symptom for mental health disorders (Hall, 2017).

Tailored DHH special education programs cost the U.S. $11,006 per child, or $652 million in total, during 1999-2000 (Centers for Disease Control and Prevention [CDC], 2024). In 2019, non-hearing health care costs for DHH children globally were $12.9 billion. This does not include the cost of CIs or hearing aids (McDaid et al., 2021). Educational support for children with hearing loss cost $27 billion globally, and quality of life lost for children equated to $23.7 billion (McDaid et al., 2021).

Epidemiology

In the United States, about 2 to 3 out of every 1,000 children are born with hearing loss (NIDCD, 2024a). In the year 2020, 6,000 U.S. children were diagnosed with permanent hearing loss, or about 1.8 out of every 1,000 infants who were screened (CDC, 2024).

According to the National Health Interview Survey (NHIS), about 0.6% of children ages 3-17 in the U.S. have moderate to profound hearing loss (CDC, 2024). Of the Deaf children in the United States, less than 6% have access to sign language in early childhood, with less than 8% of Deaf children communicating with fluent sign language at home (Murray et al., 2019; Hall et al., 2017). As much as 90% of Deaf children are born into hearing families who do not know sign language (Spellun & Kushalnagar, 2018). One in every fourteen children, or about 7%, has a developmental language disorder (NIDCD, 2024b). Sign language is often not used as the primary language in educational settings: only 1-2% of DHH children experience education with sign language as the language of instruction (Hall et al., 2019).

In the U.S., 0.5% of the population under 5 years has a hearing difficulty (United States Census Bureau, n.d.-e). The prevalence of language deprivation is greater in Black, Indigenous, and Persons of Color (BIPOC) communities (NAD, n.d.-b). Of 303 families surveyed by the National Center for Hearing Assessment and Management, 49% reported using only listening and spoken language (LSL), 17% reported using LSL with some signs, 14% reported using signed and spoken language, 12% reported using mostly cued speech, 3% reported using mostly signing with some speech, and 3% reported using sign language only (Hall, 2020). In 2020, 64.03% of Deaf students aged 5-21 years old received support services in a regular classroom for 80% or more of the day (Individuals with Disabilities Education Act [IDEA], 2022).

In Pennsylvania, 0.4% of the population under 5 years has a hearing difficulty, and 0.4% of the population under 5 years in Philadelphia County has the same status (United States Census Bureau, n.d.-c; United States Census Bureau, n.d.-d). According to the 2013-2014 regional and national summary from Gallaudet University, 27.7% of all DHH children surveyed in the Northeast received education with

spoken language only, 26.5% with spoken language with cues, 23.7% with sign language only, and 17.7% with sign supported spoken language (Office of Research Support and International Affairs [ORSIA], 2014). This same summary states that 30.7% of families in the Northeast use sign language at home, but 65.2% do not (ORSIA, 2014).

Prevention

To reduce the risk of developing language deprivation syndrome, children must be exposed to a natural language at the earliest point in their development (Hall et al., 2019). This begins with screening newborns for hearing loss. Upon diagnosis of hearing loss, professionals must connect the family with appropriate early intervention services, including but not limited to family counseling, speech-language pathology services, audiology services, sign language services, occupational therapy, and assistive technology devices (NAD, n.d.-a). For these services to be effective, families should be given balanced information to make informed decisions, as well as be introduced to Deaf adults (NAD, n.d.-b). Connecting with Deaf individuals exposes the family to Deaf culture and helps address current gaps in the early intervention process (NAD, n.d.-b). In healthcare settings, professionals should educate parents on the benefits of using sign language for spoken language development. They should also monitor both signed and spoken language milestones, properly counseling families whose child is not meeting them (Hall & Hecht, 2024). Parents, whether fluent or not, should sign with their child at home. This can foster good communication and in turn positive family relationships (Humphries et al., 2016). Parents should not wait to expose their child to accessible language because early exposure means a greater chance of reducing the risk of LDS (Humphries et al., 2016).

The Convention on the Rights of Persons with Disabilities includes Articles 9, 21, 24, and 30 related to promoting access to language and preventing language deprivation. The articles state, respectively, sign language interpreters must be provided in health-care settings, governments should promote sign language as part of freedom of expression, children have a right to education in a language-rich environment, and the government provides early intervention services (Murray et al., 2019). There are two accessibility laws related to free appropriate public education: section 504 of the Rehabilitation Act and part B of the Individuals with Disabilities Education Act (IDEA). Under these policies, DHH children are entitled to accessible education through an individualized education program (IEP) (Office for Civil Rights [OCR], 2024).

The Language Equity and Acquisition for Deaf Kids (LEAD-K) bill also aims to reduce language deprivation and promote school readiness in DHH children through American Sign Language (ASL) and English (Johnson, 2018). This state legislation was first introduced in 2016, and 23 states have passed LEAD-K legislation as of 2022 (Johnson, 2018; Registry of Interpreters for the Deaf [RID], 2022). In Kansas, the bill requires a language assessment program that monitors and tracks language milestones for DHH children from birth to 8 years old (Johnson, 2018). Based on these milestones, families can be connected to supportive services and make informed decisions about their child's development. Pennsylvania is not among the 23 states that have implemented LEAD-K legislation, but it still offers early intervention services for any child diagnosed with hearing loss under the Early Hearing Detection and Intervention (EHDI) program. Developmental milestones in Pennsylvania are monitored by professionals on the following teams: multidisciplinary evaluation, Individualized Family Service Plan, and Individualized Education Program (Campanini, 2021).

Screening and Diagnosis

Of newborns in the U.S., 98% are screened for hearing loss within the first month of life (NIDCD, 2024c). Screening newborns before leaving the hospital is known as Early Hearing Detection and Intervention (EHDI) (American Speech-Language-Hearing Association [ASHA], n.d.-b). The screening tests include otoacoustic emissions (OAE) tests and auditory brain stem response (ABR) tests. If a child is diagnosed with hearing loss, they can then be enrolled in early intervention services as soon as possible (NIDCD, 2024c). To test for a developmental language disorder, speech-language pathologists observe the child, survey parents and teachers, assess the child's learning ability, and analyze standardized tests of the child's language performance (NIDCD, 2023). Professionals use language sampling and

naturalistic observation in free play, conversation, or storytelling. To test language abilities on standardized assessments, clinicians use norm-referenced tests—comparing the child to other test takers—or criterion-referenced tests—comparing the child's performance to predetermined standards (ASHA, n.d.-a).

Diagnostic criteria proposed by Neil S. Glickman for language deprivation include the following: a child is born with a level of hearing loss in which they cannot understand oral language, the child is not exposed to sign language, and the child acquires language dysfluency in his or her natural language (Hall et al., 2017). Dysfluency in sign language means limited vocabulary, communicating in phrases rather than full sentences, little grammatical structure, and a lack of spatial location and movement. A person also demonstrates LDS if he or she shows behavioral, social, and emotional issues from childhood but does not have a co-occurring psychiatric disorder. As an adult, the person experiences knowledge deficits and difficulties in interpersonal relationships (Hall et al., 2017). Currently, LDS would be classified as a neurodevelopmental disorder under the DSM-5 (Glickman & Hall, 2018).

Limited access to natural language has the potential to cause permanent brain changes for a child. This can result in developmental delays, mental health comorbidities, limited health literacy, low quality of life, and a higher risk for trauma (Hall, 2017). A late diagnosis can manifest as limited educational achievement and difficulty forming interpersonal relationships (NAD, n.d.-b). Someone diagnosed late with LDS can struggle with the concept of time, cause-and-effect, conversational skills, abstract ideas, learning, and emotional regulation (Glickman & Hall, 2018). LDS can result in over-utilization of emergency room and urgent care services among Deaf individuals because of communication barriers. It can also impact treatment adherence, disease management, and patient-provider communication (NAD, n.d.-c).

Treatment

The best treatment strategy for LDS is to immerse the child in a language rich environment (Glickman & Hall, 2018). Children need not only language exposure—which is the presence of language in the child's environment—but also language access—which means the child receives and understands the language input (Hall, 2020). It is imperative that families work with speech-language-pathologists and other clinicians to help their child expand their vocabulary, acquire grammatical structure, develop social communication skills, and organize information (NIDCD, 2023). Education or family therapy can improve conditions for children with LDS by improving understanding of the language disorder. LDS is separate from deafness itself, mental health disorders, or personality characteristics (Glickman & Hall, 2018). Hearing aids and cochlear implants can also treat hearing loss, but they should be paired with intervention services to improve language outcomes among DHH children (Rosenbaum & Simon, 2016). The earlier a child receives intervention services, the greater the chance they will achieve language fluency. The most effective early intervention services are delivered before the child is 6 months old (Humphries et al., 2016). Language therapy and other treatments do not cure language disorders, but they improve function in areas where families identify goals for their child (Rosenbaum & Simon, 2016).

Conclusion

Language deprivation syndrome affects the developmental potential of Deaf and Hard of Hearing children across the United States. Less than 6% of Deaf children in the U.S. are exposed to sign language in early childhood (Murray et al., 2019). With LDS, children experience language dysfluency, knowledge deficits, and delays in social and cognitive development. Behavioral and environmental influences affect the developmental choices made for Deaf children by parents and medical professionals. Although prevalent throughout the United States, LDS is preventable. Parents, unknowingly, often choose one language modality for their child, but failure to expose a Deaf child to sign language can result in long-term language deprivation (Hall & Hecht, 2024; Hall et al., 2017). Early exposure to a language-rich environment in which a child has language access is the ideal strategy to prevent LDS. Each DHH child deserves to learn and grow in the same capacity as their hearing peers – with full access

to a natural language. Population characteristics, community observations, and potential community partners are described in the community needs assessment.

Community Needs Assessment

Introduction

This program will address language deprivation syndrome (LDS) in Deaf and Hard of Hearing (DHH) children under five years of age. The area for the intervention is zip code 19144, which is located in Northwest Philadelphia, specifically the Germantown area. Two possible intervention sites include Pennsylvania School for the Deaf (PSD), located at 100 West School House Lane, or Joseph E. Coleman Northwest Regional Library, located at 68 West Chelten Avenue. Both potential partners are located in Philadelphia, Pennsylvania 19144.

Quantitative Data

Population

The 19144 zip code is comprised of 47,454 people. Among this population, there are 22,422 males, making up 47.2% of the residents, and 25,032 females, making up 52.8% of the residents (United States Census Bureau, n.d.-a). Males tend to have a higher prevalence and higher risk for developmental language disorders, as much as three times the risk compared to females (Chilosi et al., 2023).

Race and Ethnicity

Out of the total number of people living in 19144, 18.1% identified as White, 73.4% identified as Black or African American, 0.4% identified as American Indian and Alaska Native, 2.0% identified as Asian, 0.0% identified as Native Hawaiian or Other Pacific Islander, 1.2% identified as some other race, and 4.9% identified as two or more races. People of any race that identified as of Hispanic or Latino origin made up 4.2% of the 19144 population. Sixteen-point-nine percent identified as White alone and not of Hispanic or Latino origin (United States Census Bureau, n.d.-i). The prevalence of language deprivation syndrome is greater in Black, Indigenous, and Persons of Color communities (NAD, n.d.-b).

Age

In 19144, children under five years old made up 7.3% of the population. Children five to nine years old made up 5.5%, children ten to 14 years old made up 6.3%, and children 15-19 years old made up 6.5%. Adults 20-39 years old made up 33.5% of the population, the largest of all the groups. Those 40-59 made up 10.9%, those 60-79 years made up 16.8%, and those 80 years and older made up 3.2% (United States Census Bureau, n.d.-a). Language deprivation syndrome begins in childhood from birth to age five when children are without language access during this critical period of development (Hall et al., 2017).

Languages

For the population five years and over, 40,766 speak only English. This constitutes 92.7% of the zip code's population. The other 3,212 (7.3%) speak a language other than English. Among this group 3.0% speak Spanish, 1.7% speak other Indo-European languages, 1.3% speak Asian and Pacific Island languages, and 1.3% speak other languages (United States Census Bureau, n.d.-h). About 35% of DHH children are surrounded by languages other than English and ASL at home. Families who speak languages other than those two are at risk of receiving limited information from providers in healthcare settings (NAD, n.d.-b).

Educational Attainment

For the population 18-24 years old in the 19144 zip code, 10.3% are less than high school graduates, 28.1% are high school graduates or equivalent, 41.7% have some college or an associate's degree, and 20.0% have a bachelor's degree or higher. For the population 25 years and over, 89.5% are high school graduates or higher, and 33.5% have a bachelor's degree or higher (United States Census Bureau, n.d.-g). There is an education gap among Deaf and hearing people in both high school and college. In 2017, 83.7% of U.S. Deaf adults completed high school, compared to 89.4% of hearing adults. There is a 15.2% education gap in bachelor's degrees among the two populations—18.8% of Deaf people versus 34% of hearing people have completed this degree in the United States (Garberoglio et al., 2019).

Income

In 19144, those 15 years and over with an individual income of $1 to $9,999 made up 17.3% of the population. Those with an income of $10,000 to

$24,999 made up 24.7% of the population, those with an income of $25,000 to $34,999 made up 10.9%, those with an income of $35,000 to $49,999 made up 10.0%, and those with an income of $50,000 to $74,999 made up 11.9%. Twelve percent of this zip code 15 years and over had an income of $75,000 or more. The median income for 19144 is $26,434 (Untied States Census Bureau, n.d.-i). In the past 12 months, 29.8% of children were living in households below poverty level, and 58.7% of children were living in households with Supplemental Security Income (SSI), cash public assistance income, or Food Stamp/SNAP benefits (United States Census Bureau, n.d.-b). Income is an important factor determining SSI for children with disabilities. Children younger than 18 with a medical condition can qualify for SSI if their income and resources, or their family members' income and resources, meet the eligibility criteria. For children who are not blind, they cannot be making more than $1,550 a month to qualify (Social Security Administration, 2024).

Children Characteristics

For the population three to 17 years old in households, 7,611 are enrolled in school and 1,160 are not. Among the 7,611 children, 67.7% are enrolled in public school and 32.3% are enrolled in private school (United States Census Bureau, n.d.-b). Instructional methods for DHH children in schools differ. According to the 2013-2014 regional and national summary from Gallaudet University, 33.3% of all DHH children surveyed in the United States receive instruction in a special school, 47.5% in a general education program with hearing students, 23.6% in a self-contained classroom in a general education setting, 14.8% in a resource room, and 4.2% at home (ORSIA, 2014). Only 1-2% of DHH children experience education with sign language as the language of instruction (Hall et al., 2019).

Disability Characteristics

In the 19144 zip code, 3.3% of the total civilian noninstitutionalized population is characterized as having a hearing difficulty. Out of the 3,474 people under five years old, 74 have a hearing difficulty, or 2.1% of the total, compared to 0.5% of all U.S. children under five with a hearing difficulty and 0.4% of all children under five in Pennsylvania with a hearing difficulty (United States Census Bureau, n.d.-f; United States Census Bureau, n.d.-e; United States Census Bureau, n.d.-c). In Philadelphia County, 0.4% of the population under five years old has a hearing difficulty (United States Census Bureau, n.d.-d). Language access is most crucial for this age group because if they do not achieve language fluency by five years old, they are at risk of language deprivation (Humphries et al., 2016).

Qualitative Data

Community Location

Zip code 19144 of the Germantown area is located in Philadelphia, Pennsylvania. It is mainly bound by Chew Avenue to the Northeast, Roberts Avenue to the Southeast, Wissahickon Avenue to the Southwest, and Johnson Street to the Northwest. East Germantown is located to the Northeast, the Broad Street Line is located to the East, East Falls and Wissahickon are located to the Southwest, and Northwest Philadelphia is located to the Northwest. The main road within this community is Germantown Avenue (see Appendix A). A community visit was conducted on October 26 at one in the afternoon and lasted about one hour. The following criteria were evaluated: community resources, health care facilities, social cohesion, active community groups, transportation options, and state of housing.

Community Observations

Germantown has various community resources available for children and families. Much of the neighborhood is developed for commercial or residential purposes, but it includes Blue Bell Park, which is a large green space connected to Wissahickon Valley Park. Other outdoor areas typically include playgrounds and softball or soccer fields, including Cloverly Park, Fernhill Park, a softball field off Church Lane, Mallery Playground in Carpenter Park, and Morton Playground. Most of these green spaces are surrounded by fences. The zip code included about four recreation or community centers that advertised social gatherings and workout classes. They were located close to outdoor green spaces or parks. The neighborhood has many childcare facilities and one free library: Joseph E. Coleman Northwest Regional Library. Other than the community centers, churches appeared to be a

main place for people to congregate. The zip code has about six churches spread throughout the neighborhood.

The 19144 zip code incorporates several health care facilities but very few specialists for Deaf and Hard of Hearing (DHH) children. Health Center 9, which is one of the Philadelphia Department of Public Health's city health centers is located within this zip code, close to the Germantown Southeastern Pennsylvania Transportation Authority (SEPTA) station. There is one rehabilitation and nursing center, a few additional general medical clinics and offices, and several home healthcare services. The healthcare services offered in this area seem to be tailored to an older population, but there are several family practice physician offices. There is a pediatric and adolescent medicine center located near the intersection of West School House Lane and Greene Street, across from PSD. This school is located on West School House Lane in Germantown, and they offer audiological services, speech therapy, occupational therapy, and physical therapy at their location (Pennsylvania School for the Deaf [PSD], n.d.-c).

On a sunny Saturday in Germantown, social cohesion was noticeable in the neighborhood. Along the main road that runs through the 19144 zip code, Germantown Avenue, there were many people around. Some were driving cars, some were walking alone, and others were in small groups, going into and out of stores, restaurants, fast food establishments, and mini marts. Around Greene Street and Armat Street, there was a community event happening, which hosted many families in the area. Children were dressed up in Halloween costumes, there were hayrides, there was music playing, and there were many different vendors. The 19144 zip code also has many churches and religious establishments, which bring groups of people together. Some individuals, families, and children were spending time outside in parks, including Vernon Park, located centrally in the neighborhood.

Germantown has several active community groups, but few were visible upon visiting the community. One noticeable one was Germantown Community Fridge, a few blocks from Vernon Park by the Maplewood Mall. This organization offers free food to the community to help fight hunger and food insecurity (Germantown Community Fridges, n.d.). Other active community groups that primarily use Facebook to connect are Germantown Philadelphia Parents and Families Group and Northwest Philadelphia Parents Meeting. The former offers a space for families to share day care resources, kid-friendly events, and ask questions; the latter allows parents to find tutoring help, playgroups, and events (Germantown United Community Development Corporation, n.d.). Along with academics, PSD engages in community outreach. They collaborate with local, regional, and national organizations to promote their students and connect the surrounding Deaf and hearing communities (PSD, n.d.-b).

Many cars drive through the neighborhood on Germantown Avenue, but there are also various public transportation options utilized by community members. SEPTA Regional Rail has about six train stations in this neighborhood, including Wayne Junction, which is a major transportation hub for the area. Bus 23 travels down Germantown Avenue from Chestnut Hill to 11th Market in Center City (Southeastern Pennsylvania Transportation Authority [SEPTA], n.d.-a). Bus 26 travels East on Chelton Avenue from Chelton Avenue Station to Frankford Transportation Center (SEPTA, n.d.-b). Bus 65 travels Southbound from Germantown-Chelten to 69th Street Transportation Center (SEPTA, n.d.-c). Fares for the SEPTA buses range from $2 to $2.50, depending on the form of payment. Fares for the SEPTA Regional Rail range from $3.75 to $10. Children under twelve ride for free on both modes of transportation with a fare-paying adult (SEPTA, n.d.-d). The Regional Rail stations in 19144 primarily feature the Chestnut Hill East Line and the Chestnut Hill West Line, which both connect to stations in Center City.

The state of housing varies throughout the 19144 zip code and can affect the environment in which a child grows up in. Southwest by School House Lane and Wissahickon Avenue, there are several high-rise luxury apartment buildings. In the center of the zip code, around Germantown Avenue and West Chelten Avenue, most of the residences are apartments located above stores, if there is any housing at all. East by LaSalle University, there are more high-rise apartment complexes. The rest of the zip code features a mix of single-family homes and

rowhomes, with a majority being the latter. Most had clean streets and maintained lawns, but some had uneven sidewalks, damaged siding, and litter. The area in the middle of the 19144 zip code, around Germantown Avenue, contains mostly commercial properties, with more residential homes residing on the outskirts.

Potential Community Partners

Potential community partners in the 19144 zip code include Pennsylvania School for the Deaf (PSD) and Joseph E. Coleman Northwest Regional Library. PSD is located at 100 West School House Lane and serves the DHH population of Southeastern Pennsylvania (PSD, n.d.-a). The school already has many community services in place to serve this population and their families, including educational outreach, family support, parent support, and American Sign Language classes (PSD, n.d.-b). Joseph E. Coleman Northwest Regional Library is located at 68 West Chelten Avenue. This potential partner offers meeting spaces with a reservation, public restrooms, Wi-Fi, and story times appropriate for young children (Free Library of Philadelphia, n.d.). The library could serve as a neutral location for trainings, workshops, and support groups.

Conclusion

Language deprivation syndrome occurs in Deaf children who do not have access to language from birth to age five (Hall et al., 2017). In the 19144 zip code, 2.1% of the 3,474 individuals under five years old had a hearing difficulty, compared to 0.4% of children under five in Pennsylvania with a hearing difficulty (United States Census Bureau, n.d.-f; United States Census Bureau, n.d.-c). In the community, 73.4% identified as Black or African American, and rates of language deprivation are higher among people of color (NAD, n.d.-b). One potential community partner, Pennsylvania School for the Deaf, already has connections with the Southeastern Pennsylvania Deaf community and engages in educational outreach, making it an ideal place to hold an intervention to benefit those in the 19144 zip code.

References

American Speech-Language-Hearing Association. (n.d.-a). *Assessment tools, techniques, and data sources.* https://www.asha.org/practice-portal/resources/assessment-tools-techniques-and-data-sources/

American Speech-Language-Hearing Association. (n.d.-b). *Early hearing detection and intervention (EHDI).* https://www.asha.org/advocacy/early-hearing-detection-and-intervention/

Campanini, T. (2021, November 29). *Announcement EI 21-03.* Pennsylvania Office of Child Development and Early Learning: Bureau of Early Intervention Services and Family Supports. https://www.education.pa.gov/Documents/

Centers for Disease Control and Prevention. (2024, May 15). *Data and statistics about hearing loss in children.* https://www.cdc.gov/hearing-loss-children/data/index.html

Chilosi, A. M., Brovedani, P., Cipriani, P., & Casalini, C. (2023). Sex differences in early language delay and in developmental language disorder. *Journal of Neuroscience Research, 101*(5), 654-667. doi: 10.1002/jnr.24976

Free Library of Philadelphia. (n.d.). Joseph E. Coleman Northwest Regional Library. https://libwww.freelibrary.org/locations/joseph-e-coleman-northwest-regional-library

Garberoglio, C. L., Palmer, J. L., Cawthon, S., & Sales, A. (2019). *Deaf people and educational attainment in the United States: 2019.* U.S. Department of Education, Office of Special Education Programs, National Deaf Center on Postsecondary Outcomes. https://nationaldeafcenter.org/wp-content/uploads/2022/11/Deaf-People-and-Educational-Attainment-in-the-United-States_-2019.pdf

Germantown Community Fridges. (n.d.). *What we do.* https://www.germantowncommunityfridge.com/

Germantown United Community Development Corporation. (n.d.). Germantown community connections. https://germantownunitedcdc.org/community-resource-hub/

Glickman, N. S., & Hall, W. C. (Eds.). (2018). *Language deprivation and Deaf mental health.* Taylor and Francis. https://doi-org.libproxy.temple.edu/10.4324/9781315166728

Google. (n.d.). [Map of 19144]. Retrieved November 1, 2024, from https://www.google.com/maps/@40.0350567,-75.1844801,14z/data=!3m1!4b1!4m2!6m1!1s1axOVl-4F348OU1y_iGvJXv2zQAXF5NnQ?entry=ttu&g_ep=EgoyMDI0MTAyOS4wIKXMD-SoASAFQAw%3D%3D

Hall, M. L. (2020). The input matters: Assessing cumulative language access in Deaf and Hard of Hearing individuals and populations. *Frontiers in Psychology, 11,* 1407, doi: 10.3389/fpsyg.2020.01407

Hall, M. L., Hall, W. C., & Caselli, N. K. (2019). Deaf children need language, not (just) speech. *First Language, 39*(4), 367-395. doi: 10.1177/0142723719834102

Hall, W. C. (2017). What you don't know can hurt you: The risk of language deprivation by impairing sign language development in deaf children. *Maternal and Child Health Journal, 21*(5), 961-965. http://dx.doi.org.libproxy.temple.edu/10.1007/s10995-017-2287-y

Hall, W. C., & Hecht, J. L. (2024). Primary health-care practices for deaf children should include early incorporation of a signed language. *The Lancet.* https://doi.org/10.1016/S0140-6736(24)01564-2

Hall, W. C., Levin, L. L, & Anderson, M. L. (2017). Language deprivation syndrome: A possible neurodevelopmental disorder with sociocultural origins. *Social Psychiatry and Psychiatric Epidemiology, 52*(6), 761-776. doi: 10.1007/s00127-017-1351-7

Humphries, T., Kushalnagar, P., Mathur, G., Napoli, D. J., Padden, C., Rathmann, C., & Smith, S. (2016). Language choices for deaf infants: Advice for parents regarding sign languages. *Clinical Pediatrics, 55*(6), 513–517. doi:10.1177/0009922815616891

Individuals with Disabilities Education Act. (2022, May 23). *OSEP fast facts: Educational environments of school aged children with disabilities.* U.S. Department of Education. https://sites.ed.gov/idea/osep-fast-facts-educational-environments-school-aged-children-disabilities/

Johnson, C. D. (2018, May 1). *Language equality & acquisition for Deaf kids (LEAD-K) update May 2018.* Educational Audiology Association. https://www.edaud.org/pdf/LEAD-K-2018.pdf

McDaid, D., Park, A. L., & Chadha, S. (2021). Estimating the global costs of hearing loss. *International Journal of Audiology, 60*(3), 162–170. https://doi.org/10.1080/14992027.2021.1883197

Murray, J. J., Hall W. C., & Snoddon, K. (2019). Education and health of children with hearing loss: the necessity of signed languages. *Bulletin of the World Health Organization, 97*(10), 711-716. doi: 10.2471/BLT.19.229427

National Association of the Deaf. (n.d.-a). *Early Intervention Services.* https://www.nad.org/resources/early-intervention-for-infants-and-toddlers/information-for-parents/early-intervention-services/

National Association of the Deaf. (n.d.-b). *Implications of language deprivation for young Deaf, DeafBlind, DeafDisabled, and Hard of Hearing children.* https://www.nad.org/implications-of-language-deprivation-for-young-deaf-deafblind-deafdisabled-and-hard-of-hearing-children/

National Association of the Deaf. (n.d.-c). *Position statement on health care access for Deaf patients.* https://www.nad.org/about-us/position-statements/position-statement-on-health-care-access-for-deaf-patients/

National Institute on Deafness and Other Communication Disorders. (2024a, September 20). *Quick statistics about hearing, balance, and dizziness.* National Institutes of Health. https://www.nidcd.nih.gov/health/statistics/quick-statistics-hearing

National Institute on Deafness and Other Communication Disorders. (2024b, March 4). *Quick statistics about voice, speech, language.* National Institutes of Health. https://www.nidcd.nih.gov/health/statistics/quick-statistics-voice-speech-language#10

National Institute on Deafness and Other Communication Disorders. (2024c, June 10). *Your baby's hearing screening and next steps.* National Institutes of Health. https://www.nidcd.nih.gov/health/your-babys-hearing-screening-and-next-steps

National Institute on Deafness and Other Communication Disorders. (2023, May 8). *Developmental language disorder.* National Institutes of Health. https://www.nidcd.nih.gov/health/developmental-language-disorder

Office for Civil Rights. (2024, September 30). *Deaf students education services.* U.S. Department of Education. https://www.ed.gov/about/offices/list/ocr/docs/hq9806.html

Office of Research Support and International Affairs. (2014, October). *Regional and national summary report of data from the 2013-14 annual survey of Deaf and Hard of Hearing children and youth.* Gallaudet University. https://gallaudet.edu/wp-content/uploads/gcloud/gal-media/Documents/Research-Support-and-International-Affairs/Intl%20Affairs/Demographics/AS14_RegNat.pdf

Pennsylvania School for the Deaf. (n.d.-a). *About*. https://psd.org/about/

Pennsylvania School for the Deaf. (n.d.-b). *Community*. https://psd.org/community/

Pennsylvania School for the Deaf. (n.d.-c). *Services.* https://psd.org/services/

Registry of Interpreters for the Deaf. (2022, May 10). *LEAD-K position statement.* https://rid.org/lead-k-position-statement/

Rosenbaum, S., & Simon, P. (Eds.). (2016). *Speech and language disorders in children: Implications for the social security administration's supplemental security income program.* National Academies Press. doi: 10.17226/21872

Social Security Administration. (2024, March). *Benefits for children with disabilities.* https://www.ssa.gov/pubs/EN-05-10026.pdf

Southeastern Pennsylvania Transportation Authority (n.d.-a). *23: 11th Market to Chestnut Hill.* https://www.septa.org/schedules/23?directionId=1&date=2024-10-31

Southeastern Pennsylvania Transportation Authority (n.d.-b). *26: FTC to Chelten Av Station.* https://www.septa.org/schedules/26?directionId=0&date=2024-10-31

Southeastern Pennsylvania Transportation Authority (n.d.-c). *65: Germantown-Chelten to 69th St TC.* https://www.septa.org/schedules/65?directionId=0&date=2024-10-31

Southeastern Pennsylvania Transportation Authority (n.d.-d). *Fare Information.* https://wwww.septa.org/fares/

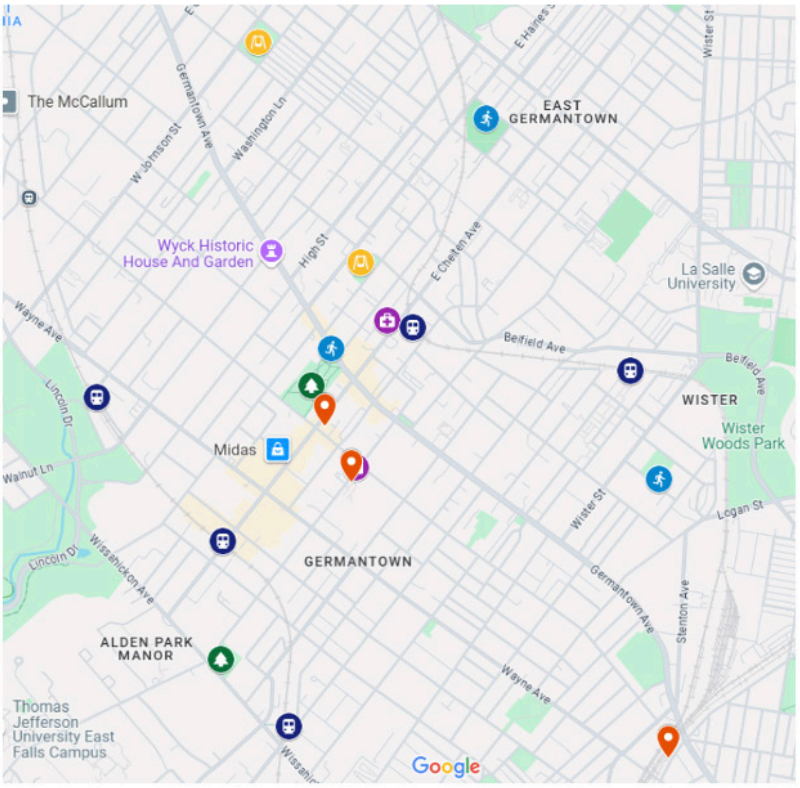
Spellun, A., & Kushalnagar, P. (2018). Sign language for Deaf infants: A key intervention for a developmental emergency. *Clinical Pediatrics, 57*(14), 1613-1615. https://doi-org.libproxy.temple.edu/10.1177/0009922818778041

United States Census Bureau. (n.d.-a). *2022 ACS 5-year estimates [Age and Sex].* (ZCTA5 19144). https://data.census.gov/table/ACSST5Y2022.

Appendix A

Map of 19144 Zip Code

- Pennsylvania School For Deaf
- Joseph E. Coleman Northwest Regional Library
- Wayne Junction
- Waterview Recreation Center
- Center In The Park
- Wister Recreation Center
- Vernon Park
- Cloverly Park
- Pediatric Adolescent Medicine
- Health Center 9
- Morton Playground
- Mallery Playground
- Queen Lane
- Chelten Avenue
- Germantown
- Wister
- Tulpehocken



(Google, n.d.)