



DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of the Secretary
Washington, D.C. 20201

The Honorable Tammy Baldwin
Chair
Subcommittee on Labor, Health and Human
Services, Education, and Related Agencies
Committee on Appropriations
United States Senate
Washington, DC 20510

The Honorable Shelley Capito
Ranking Member
Subcommittee on Labor, Health and Human
Services, Education, and Related Agencies
Committee on Appropriations
United States Senate
Washington, DC 20510

The Honorable Robert Aderholt
Chair
Subcommittee on Labor, Health and Human
Services, Education, and Related Agencies
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

The Honorable Rosa DeLauro
Ranking Member
Subcommittee on Labor, Health and Human
Services, Education, and Related Agencies
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Chairs and Ranking Members:

I am pleased to transmit this report prepared by the Office on Women's Health, as requested by the House Report, which accompanied the Consolidated Appropriations Act, 2021. The enclosed title is, "Diaper Need and Health." If you or your staff have any questions about this report, please contact Clarisse Saunders in the Office of the Assistant Secretary for Financial Resources, at (202) 381-7713.

Sincerely,

Robert Gordon
Assistant Secretary for Financial Resources

Enclosure

Diaper Need and Health: A Report to Congress

A Report to the House Committee on Appropriations



U.S. Department of Health and Human Services
Office of the Secretary
Office on Women's Health

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Executive Summary

Diaper Need and Health: A Report to Congress

This report focuses on diaper availability, diaper need, and outcomes associated with health and healthcare access as requested of the Department of Health and Human Services in the report to accompany H.R. 7614 (H.R. Rep. No. 116-450) for Fiscal Year 2021. The connection between diaper need and health is an emerging issue, and diaper need has increased during the COVID-19 pandemic. This report includes a review of research literature and analysis of health-related quantitative and qualitative data.

Existing research links diaper need to several maternal and child health conditions, including maternal stress and depression, infant sleep issues, infant or child urinary tract infections, and diaper dermatitis (diaper rash). Studies also suggest links to eczema and economic factors such as lost income and wages.

Diaper need is an increasingly recognized social driver of health among families with young children, with one-third of U.S. families reporting diaper need. While Medicaid covers diapers for children with special healthcare needs, broader coverage of diapers for lower-income families is not currently available. More research is needed on costs, causes, and outcomes as well as program performance data to identify effective mechanisms to reduce diaper need, such as diaper distribution networks, preventative healthcare, and pediatric and postpartum care. There is currently no specific estimate of costs to the healthcare system due to preventable conditions associated with insufficient supply of diapers.

Diaper Need and Health

I. Overview

As requested by Congress, the HHS Office on Women’s Health (OWH) prepared the following report, which focuses on diaper availability, diaper need, and outcomes associated with health and healthcare access. The connection between diaper need and health is an emerging area of research, and diaper need has increased since the COVID-19 pandemic. The following questions guided the report.

Question #1: Estimate the number of health conditions caused by an insufficient supply of diapers.

Question #2: Estimate the cost to our healthcare system of preventable conditions related to an insufficient supply of diapers.

Question #3: Estimate the number of diapers that would be required to prevent many of the conditions from occurring.

To answer these questions, the research methodology included a review of the literature and analysis of diaper need and health-related quantitative data and qualitative data. Data for this report include peer-reviewed published data, unpublished survey data, and emerging data from ongoing research.

What is Diaper Need and Diaper Access?

Diaper need is defined as the “difference between the numbers of diapers infants require to stay clean and comfortable less the amount of diapers a family can afford without cutting back on other basic essentials.”¹ Diapers are a form of a *material basic need*—which refers to the insufficient access to necessary goods or resources, including items such as food, shelter, and clothing—that impacts health and economic mobility.

¹ Porter, S., & Steefel, L. (2015). Diaper need: A change for better health. *Pediatric Nursing*, 41(3), 141–144. <https://pubmed.ncbi.nlm.nih.gov/26201173/>

The average family with a child in diapers uses 6.3 diapers a day, while infants may need nearly twice as many diapers to avoid health issues, such as diaper dermatitis (inflammation of the skin in the diaper area and is commonly referred to as “diaper rash”).² Typically, parents, family, and/or caregivers need diapers for the first three years of a child’s life. One U.S. study found that the ages at which 50% of the children were predicted to be toilet trained—and no longer in need of diapers—were 35 months for girls and 39 months for boys.³

Diaper need is experienced by many families. In one study, 27.5% of mothers reported diaper need.⁴ Part of diaper need is related to cost. The annual cost of diapers is roughly \$1,000 per child and the cost of diapers is often greater for families with lower incomes or in rural areas.⁵ This is almost 5.5% of a lower income household of two, defined by the 2022 HHS poverty threshold as \$18,310 in the contiguous U.S.⁶ In rural areas or without public transport, many families rely on local convenience stores instead of buying in bulk from retail stores that may be harder to access. Thus, the material basic need for diapers is likely unmet for millions of low-income families in the U.S. The percentage of families claiming diaper need has been estimated consistently to hover at 36%, including data derived from nationally representative surveys.^{7 8}

Some low-income families receive government assistance; however, benefits do not reduce diaper need. For example, those who qualify for programs such as Special Supplemental

² Porter, S., & Steefel, L. (2015). Diaper need: A change for better health. *Pediatric Nursing*, 41(3), 141–144. <https://pubmed.ncbi.nlm.nih.gov/26201173/>

³ Schum, T. R., McAuliffe, T. L., Simms, M. D., Walter, J. A., Lewis, M., & Pupp, R. (2001). Factors associated with toilet training in the 1990s. *Ambulatory Pediatrics*, 1(2), 79–86. [https://doi.org/10.1367/1539-4409\(2001\)0012.0.CO;2](https://doi.org/10.1367/1539-4409(2001)0012.0.CO;2)

⁴ Smith, M. V., Kruse, A., Weir, A., & Goldblum, J. (2013). Diaper need and its impact on child health. *Pediatrics*, 132(2), 253–259. <https://doi.org/10.1542/peds.2013-0597>

⁵ Jana, L.A. & Shu, J.(2022). “Buying Diapers”. *Healthy Children.org*. American Academy of Pediatrics, May 17, 2021. <https://www.healthychildren.org/English/ages-stages/baby/diapers-clothing/Pages/Buying-Diapers.aspx>

⁶ Notice. "Annual Update of the HHS Poverty Guidelines, U.S. President. Notice." *Federal Register* 87, no. 14 (January 21, 2022): 3315-3316., <https://www.govinfo.gov/app/details/FR-2022-01-21/2022-01166>.

⁷ Sobowale K, Clayton A, Smith MV. Diaper Need Is Associated with Pediatric Care Use: An Analysis of a Nationally Representative Sample of Parents of Young Children. *J Pediatr*. 2021. <https://www.healthychildren.org/English/ages-stages/baby/diapers-clothing/Pages/Buying-Diapers.aspx>.

⁸ Raver, C., Letourneau, N., Scott, J., & D'Agostino, H. (2010). *Huggies Every Little Bottom Study: Diaper need in the U.S. and Canada*. Huggies. <https://nationaldiaperbanknetwork.org/wpcontent/uploads/2019/02/Diaper-Need-in-the-US-and-Canada.pdf>

Nutrition Program for Women, Infants, and Children (WIC) or Supplemental Nutrition Assistance Program (SNAP) are unable to use government assistance programs to purchase diapers because diapers are not a covered item. Diaper need has been documented in the WIC program in recent survey data from Vermont. Of 501 recently enrolled WIC households in Vermont, 32.5% reported diaper need and those respondents were at a significantly higher risk for food insecurity than households that did not report diaper need.⁹ A study in Massachusetts documented diaper need at 36%, also related to food insecurity.¹⁰ In a 2021 study of families with young children in the northeastern U.S., 87.6% of 129 caregivers reported food insecurity and 39.5% reported diaper need. Families with food insecurity were 4.24 times more likely to experience diaper need compared to those with food security.¹¹

Diaper need is alleviated in part by diaper banks - community-based, nonprofit organizations that collect and distribute donated diapers to families. The National Diaper Bank Network (NDBN) is a nonprofit organization with a nationwide network of over 225 diaper banks that provide supplies to meet material basic needs. The NDBN offers technical assistance and support to diaper banks that are developing or expanding services. The nonprofit also houses research and policy resources related to diapers and other material basic needs.¹² However, while diaper banks are a valuable community resource, research indicates that they are not able to meet all needs. A national survey of 262 diaper banks in 2016 showed that the percentage of children with diaper need who received diaper bank assistance ranged from 0% to 16% per month. This is contrasted with data showing that 77% of family clients had annual incomes at or below 200% of the Federal poverty line.¹³ These data pre-date the COVID-19 pandemic.

⁹ Belarmino, E.H., Malinowski, A., & Flynn, K. "Diaper Need Is Associated with Risk for Food Insecurity in a Statewide Sample of Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)." *Preventive medicine reports* 22 (2021): 101332–101332. Web.

¹⁰ Belarmino, E.H., et al. "Diaper Need During the COVID-19 Pandemic Associated with Poverty, Food Insecurity, and Chronic Illness: An Analysis of a Representative State Sample of Caretakers with Young Children." *Health equity* 6.1 (2022): 15–158.

¹¹ Shaffer, E., et al. "Diaper Need as a Measure of Material Hardship During COVID-19." *Nursing research (New York)* 71.2 (2022): 90–95. Web.

¹² <https://nationaldiaperbanknetwork.org/>

¹³ Massengale, Kelley E.C. et al. "Diaper Need Met Among Low-Income US Children Younger Than 4 Years in 2016." *American journal of public health (1971)* 110.1 (2020): 106–108. Web.

Data about the impact of the COVID-19 pandemic on diaper need is preliminary but indicate a sharp increase in diaper need. For example, one nonprofit organization in North Carolina reported a 300-400% increase in requests for diapers in early 2020.¹⁴ A nonprofit in Georgia also reported a 167% increase in requests for diapers during the pandemic.¹⁵ A 2020 inventory indicated that the more than 225 NDBN member sites distributed on average 86% more diapers in 2020 than in 2019 due to the increased diaper need resulting from the COVID-19 pandemic. Some programs reported increases of 200%, 400%, and up to 800% compared to 2019.¹⁶ An online survey in early 2021, during the height of the COVID-19 pandemic, documented diaper need in 76% of 129 caregivers of children ages three and under.¹⁷ This is confirmed through preliminary data from a sample of caregivers whose children received diapers from 15 diaper banks across the U.S.¹⁸ The preliminary data suggest that 76% of families surveyed in July through October 2021 accessed a local diaper bank for the first time during the pandemic. Of these families, 75% of households had at least one adult who was currently working. Qualitative data suggest the increase in diaper need is due to the impact of underemployment and unemployment on a subsample of low-income female caregivers, and the decreased availability of diapers in certain communities across the U.S. More research is needed to answer questions regarding the magnitude of the impact that diaper need has on family health and community health. Low-income families pay the highest prices when shopping for food or household necessities. A dissertation explored retail options available to Durham, North Carolina families purchasing diapers in low-income

¹⁴ Wu, R. Organizations Help Families Scrambling to Find Diapers . . . Spectrum News1. January 18, 2022.

<https://spectrumlocalnews.com/nc/charlotte/news/2020/05/06/organizations-help-families-scrambling-to-find-diapers>.

¹⁵ Lucas, L. Local nonprofit helps families find diapers as economic, supply-chain issues continue. 11 Alive. October 13, 2021. <https://www.11alive.com/article/features/helping-mamas-nonprofit/85-112e5c03-6a99-49d1-b4fb-111d068f069a>.

¹⁶ Goldblum, J. (2021) [Unpublished raw data], National Diaper Bank Network National Economic Impact Study. https://nationaldiaperbanknetwork.org/economic-impact-study/?gclid=Cj0KCQjwhqaVBhCxAARIsAHK1tiMYGvgRDmWIRgIGsJLUd5rX9QzH_ef84_OAYz_K5ytwWAqtpMh-KjgaAgiOEALw_wcB. Retrieved October 2021.

¹⁷ Shaffer, Emma et al. "Diaper Need as a Measure of Material Hardship During COVID-19." *Nursing research (New York)* 71.2 (2022): 90–95. Web.

¹⁸ Massengale KEC, (in progress). National Diaper Bank National Economic Impact Study [study in progress:], [Unpublished data set], National Diaper Bank Network National Economic Impact Study. https://nationaldiaperbanknetwork.org/economic-impact-study/?gclid=Cj0KCQjwhqaVBhCxAARIsAHK1tiMYGvgRDmWIRgIGsJLUd5rX9QzH_ef84_OAYz_K5ytwWAqtpMh-KjgaAgiOEALw_wcB. Retrieved November 2021.

neighborhoods.^{19 20} In June 2018, 63 retailers selling 2,460 diaper products were visited by researchers in 29 Durham County census tracts with a median household income $\leq 200\%$ of the poverty guideline. Census tracts were deemed as “priority areas for hygiene product access” when they were characterized as 1) low-income and 2) low access with no retailer selling the most common child diaper sizes. Next, researchers calculated bus routes to determine the accessibility of the retailer with the lowest prices and greatest selection. Researchers compared neighborhood characteristics of priority areas to all other county census tracts. Nearly half (n=13) of the census tracts in the sample met the criteria for priority areas. Families living in priority areas were statistically more likely to identify as Black, face challenges affording housing costs, have homes or automobiles in need of repair, experience neighborhood violence, and have less educational attainment. There was a correlation between low-income census tract locations with diminished access to retail stores that carry diapers and higher poverty rates, crime, housing insecurity, and limited educational attainment. Low-income families paid the highest diaper prices, leaving less money for other needs. Researchers concluded that families needed local access to diapers via diaper banks or affordable retail options and that addressing diaper need is important for achieving health equity.

In March 2022, Congress responded to widespread diaper need by appropriating \$10 million for diapers and diapering supplies for low income families to the HHS Administration of Children and Families (ACF). With that funding, the Office of Community Services (OCS), in partnership with the ACF Office of Planning, Evaluation, and Research (OPRE), launched the first ever federally funded diaper assistance program – the Diaper Distribution Demonstration and Research Pilot,¹ also known as the [Diaper Distribution Pilot](#). This program provides funding to expand existing diaper distribution services through a robust network of community partners that provide anti-poverty services. In addition to providing diapers, grant recipients and their partners, including Community Action Agencies, social service agencies, and diaper banks will connect families to economic mobility and family support services such as job training, educational support, Early Head Start, housing services, and more.

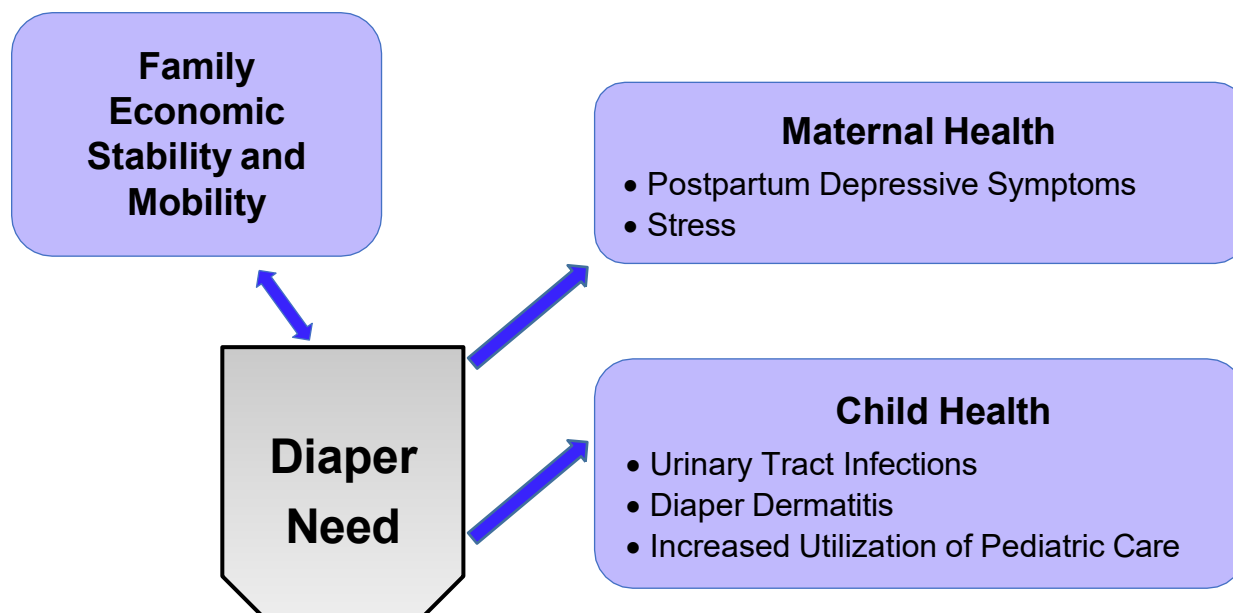
¹⁹ Massengale KEC, (2018). Understanding Diaper Need in Under-Resourced Communities: A Durham County, North Carolina Case Study. The University of North Carolina at Greensboro ProQuest Dissertations Publishing.

²⁰ Massengale KEC, Jones MA, Liao J, Park C. Priority areas for hygiene product access: Low-income neighborhoods with limited retail access to the basic need of diapers. Manuscript under peer review for publication. Data shared via personal communication with Dr. Megan Smith, contractor for this report.

II. Research on Diaper Need and Health

Existing research on diaper need has described connections with maternal and child health conditions (**Figure 1**).

Figure 1: Diagram of Diaper Need and Connections with Maternal and Child Health Conditions



Question #1: Estimate the number of health conditions caused by an insufficient supply of diapers.

Existing research links diaper need to several maternal and child health conditions, including maternal stress, infant sleep issues, infant or child urinary tract infections, and diaper dermatitis. Research data also suggest associations or potential links to eczema and social determinants of health such as lost income and wages that result from the economic impacts to families of diaper need. Research is highlighted below.

Maternal mental health

Diaper need may be associated with the presence of maternal depressive symptoms. In one study, women who reported mental health need were more likely to report diaper need compared to women who did not report mental health need.²¹ Both maternal depression and

21 Smith, M. V., Kruse, A., Weir, A., & Goldblum, J. (2013). Diaper need and its impact on child health. *Pediatrics*, 132(2), 253–259. <https://doi.org/10.1542/peds.2013-0597>

material hardship have been linked to negative health outcomes for children in families impacted by a lack of material basic needs and high levels of maternal depression and stress. Maternal depression is a risk factor for poor child developmental outcomes.^{22 23}

Infant and child urinary tract infections and diaper dermatitis

Diaper dermatitis is inflammation of the skin in the diaper area and is referred to as “diaper rash.” It is a common condition in babies and toddlers, affecting between 10% and 17% of infants.²⁴ Not changing a child’s diaper as often as needed is associated with an increased risk of diaper dermatitis. A yeast or candida infection may occur if the diaper dermatitis is not treated for several days.²⁵ One study found that diaper need is associated with increased pediatric healthcare visits for diaper dermatitis and urinary tract infections.²⁶ In this study, a cross-sectional analysis using nationally representative survey data collected from a web-based panel from July through August 2021 examined 981 parents of children between 0 and 3 years of age in the U.S. (response rate, 94%). Survey weighting for differential probabilities of selection and nonresponse was used to estimate the prevalence of diaper need and to perform multivariable logistic regression to examine the association between parent-reported diaper need and visits to the pediatrician for diaper rash or urinary tract infections within the past 12 months. Overall, an estimated 36% of parents reported diaper need. Experiencing diaper need and visiting organizations such as diaper banks to receive diapers were associated with diaper dermatitis and urinary tract infection visits.

²² Murray, L., & Cooper, P. J. (1997). Effects of postnatal depression on infant development. *Archives of disease in childhood*, 77(2), 99-101

²³ Campbell, S. B., Morgan-Lopez, A. A., Cox, M. J., & McLoyd, V. C. (2009). A latent class analysis of maternal depressive symptoms over 12 years and offspring adjustment in adolescence. *Journal of abnormal psychology*, 118(3), 479.

²⁴ Iliam L. Weston, Alfred T. Lane, Joseph G. Morelli, Chapter 4 - Dermatitis, Editor(s): William L. Weston, Alfred T. Lane, Joseph G. Morelli, *Color Textbook of Pediatric Dermatology (Fourth Edition)*, Mosby, 2007, Pages 39-60.

²⁵ Scheinfeld N. Diaper dermatitis: a review and brief survey of eruptions of the diaper area. *Am J Clin Dermatol*. 2005;6(5):273-81.

²⁶ Sobowale K, Clayton A, Smith MV. Diaper Need Is Associated with Pediatric Care Use: An Analysis of a Nationally Representative Sample of Parents of Young Children. *J Pediatr*. 2021.

In an ongoing study, the NDBN interviewed diaper bank recipients from July to October 2021.²⁷ Parents, families, and caregivers were interviewed when they came to participating diaper banks to receive diaper bank products for their children. In a sample of 664 children who received diaper bank products from 15 NDBN diaper banks, children were significantly less likely to experience diaper rash after receiving diapers from a diaper bank. Among children who experienced diaper rash, the average number of times a child had diaper rash decreased after receiving diaper bank products. Specifically, there were 3.5 cases of diaper rash before receiving diaper bank services compared to 3.0 cases of diaper rash after receiving diaper bank services.

The decrease in the incidence of diaper rash after receiving diaper bank products represents significant savings to the healthcare system. Prior to receiving diaper bank products, parents, families, and/or caregivers reported 49 visits to a pediatrician or doctor's office, three visits to an urgent care facility, four visits to a hospital emergency room, and two hospital admissions for diaper rash. After receiving diaper bank products, visits to health care providers declined. Parents, families, and/or caregivers reported 23 visits to a pediatrician or doctor's office, one visit each to urgent care and an emergency room, and one hospital admission. In the same sample, among families who reported their child had experienced a urinary tract infection, children were three times less likely to experience a urinary tract infection after receiving diaper bank products (16 cases reported prior to receiving products compared to five after). While the sample size is small and these data are self-reported, the analysis suggests a trend toward reduction of urinary tract infection with receipt of diapers. Notably, most children received healthcare coverage from Medicaid or similar government assistance plan (83%) or had no health insurance (9%). Although these results are from early in the study and with smaller sample sizes, they suggest an association between diaper need and incidence of diaper dermatitis and urinary tract infections.

²⁷ Massengale KEC, (in progress). National Diaper Bank National Economic Impact Study [study in progress:], [Unpublished data set], National Diaper Bank Network National Economic Impact Study. https://nationaldiaperbanknetwork.org/economic-impact-study/?gclid=Cj0KCQjwhqaVBhCxARIsAHK1tiMYGvqRDmWIRglGsLUd5rX9QzH_ef84_OAYz_K5ytvWAqtpMh-KjgaAgiOEALw_wcB. Retrieved November 2021.

An economic impact study of diaper provision by the Diaper Bank of Connecticut found that the incidence of diaper rash declined 33% (from 627 to 420) among children whose families received supplies of clean diapers, and babies experienced 77% fewer days of diaper rash.²⁸ Although not causal, this study is a glimpse into areas where diaper distribution efforts could be tested to determine long-term impacts on child health.

Links to economic drivers of health

The links between maternal and child health and income or wealth are clear and well-established. Data demonstrate that as income increases, health status also improves in terms of cardiovascular outcomes, birth outcomes, child social-emotional development, academic achievement, and overall chronic diseases such as diabetes and asthma.^{7 8} Conversely, the experience of financial hardship on parents negatively affects the health of children in low-income families. Results from interventions to increase family income, such as cash transfers or earned income tax and child credits, also show improvements in maternal and child health.²⁹ This is largely because there is more spending directed at child-focused and health-promoting goods and services, such as transportation to healthcare appointments, healthcare co-pays, books and toys, clothes, and diapers.³⁰

The economic impact study of diaper bank recipients found that 51% of all adults living in households receiving diapers are employed, with 32% of employed adults working a total of 30 hours per week in one or more jobs.³¹ Parents, families, and/or caregivers who are employed may be required to buy more than a week's supply of diapers to leave their child at a childcare

²⁸ Carstensen F, Gunther P, Better Health for Children and Increased Opportunities for Families the social and economic impacts of the diaper bank of Connecticut, Connecticut Center for Economic Analysis, 2018. Available at <https://docs.google.com/viewerng/viewer?url=https://ccea.uconn.edu/wp-content/uploads/sites/968/2018/05/Better-Health-for-Children-the-Social-and-Economic-Impacts-of-the-Diaper-Bank-of-Connecticut-1.pdf&hl=en>

²⁹ Raver, C., Letourneau, N., Scott, J., & D'Agostino, H. (2010). Huggies Every Little Bottom Study: Diaper need in the U.S. and Canada. Huggies. <https://nationaldiaperbanknetwork.org/wpcontent/uploads/2019/02/Diaper-Need-in-the-US-and-Canada.pdf>

³⁰ Raver, C., Letourneau, N., Scott, J., & D'Agostino, H. (2010). Huggies Every Little Bottom Study: Diaper need in the U.S. and Canada. Huggies. <https://nationaldiaperbanknetwork.org/wpcontent/uploads/2019/02/Diaper-Need-in-the-US-and-Canada.pdf>

³¹ Carstensen F, Gunther P, Better Health for Children and Increased Opportunities for Families the social and economic impacts of the diaper bank of Connecticut, Connecticut Center for Economic Analysis, 2018. Available at <https://docs.google.com/viewerng/viewer?url=https://ccea.uconn.edu/wp-content/uploads/sites/968/2018/05/Better-Health-for-Children-the-Social-and-Economic-Impacts-of-the-Diaper-Bank-of-Connecticut-1.pdf&hl=en>

provider or childcare program. Although Federal Head Start and Early Head Start require sites to provide diapers, it is unclear how often sites provide diapers to families in need.³² Due to the fact that families have purchased more than a week's supply of diapers to leave their child at a childcare center, diaper need is linked to workforce participation and, in some cases, educational attainment for adult parents. One in three (33%) recipient households rely on childcare an average of 4.5 days per week. The dominant reason parents rely on childcare is to go to work: 75% chose work as the sole reason and another 20% cited work as one of multiple reasons. The economic impact study examined this relationship and found that childcare provides the opportunity for families to go to work, and without diapers, parents miss work.³³ Specifically, the study reported that more than half (56%) of parents using childcare missed work because of an inadequate supply of diapers. Parents unable to access childcare because of a lack of diapers missed work or school on average four days per month.

Receiving diapers also aids parents' completion of their educational programs. The data from the economic impact study of 2,960 households found that completing educational programs improves diaper recipients' annual earnings potential by nearly \$10,000, on average.³⁴ The economic modeling with this study predicted that successful completion of their educational program would increase the expected wage and salary base of students by a total of \$1,825,638, across all U.S. diaper recipient households. Similarly, personal income increased 11 times for every dollar invested in diaper assistance. For every \$10,000 of aid from a diaper bank, total current personal income increased by \$114,000 in 2016, with increases of \$296,000 expected by 2031. The \$500,000 of assistance provided by the NDBN resulted in a total increase in estimated personal income among diaper recipient households of \$5.8 million in 2016 with gradual increases estimated at \$17.6 million in 2031.

³² Head Start Program Performance Standards and Other Regulations. Washington, D.C.: U.S. Dept. of Health and Human Services, Administration for Children and Families, Head Start Bureau, 2000. <https://eclkc.ohs.acf.hhs.gov/policy/45-cfr-chap-xiii/1302-42-child-health-status-care>.

³³ Carstensen F, Gunther P, Better Health for Children and Increased Opportunities for Families the social and economic impacts of The Diaper Bank of Connecticut, Connecticut Center for Economic Analysis, 2018. Available at <https://docs.google.com/viewerng/viewer?url=https://ccea.uconn.edu/wp-content/uploads/sites/968/2018/05/Better-Health-for-Children-the-Social-and-Economic-Impacts-of-the-Diaper-Bank-of-Connecticut-1.pdf&hl=en>

³⁴ Carstensen, F., Gunther, P. (2018) Better Health for Children. and Increased Opportunities for Families the social and economic impacts of the diaper bank of Connecticut. University of Connecticut. <https://ccea.uconn.edu/2018/05/05/better-health-of-children-the-social-and-economic-impacts-of-the-connecticut-diaper-bank/>. Retrieved June 2022.

Question #2: Estimate the cost to our healthcare system of preventable conditions related to an insufficient supply of diapers.

There is no known research describing an economic cost to the healthcare system that results from preventable conditions related to an insufficient supply of diapers. However, certain state Medicaid agencies estimated that between \$20-\$35 million a year in Medicaid costs are related to diaper-related urinary tract infections and dermatitis in low-income families.³⁵ In the economic impact study, the authors estimated that providing diapers to families eliminates \$4.3 million in medical costs in Connecticut due to reductions in both incidences and days of diaper rash. Savings in health costs were calculated to be the result of improved health of children attributable to greater diaper availability. More rapid health recoveries through participation in the Diaper Bank of Connecticut and related activities lowered medical costs through fewer visits to pediatricians and the purchase of fewer drugs. The study valued forgone visits to pediatricians at \$99 per visit, and drug treatments (including over-the-counter drugs) at \$20 each. Using these values to estimate avoided medical costs, study authors calculated annual estimates of \$4,287,208, or an average of \$1,448 per household. The impacts differed by geographic location in Connecticut.³⁶

In addition to pediatric visits, it would be important to consider healthcare visits related to maternal depression, as postpartum depressive symptoms have been found to be associated with diaper need. A 2019 analysis performed by Mathematica Policy Research estimated the national financial costs of perinatal mood and anxiety disorders.³⁷ When following the mothers and children from pregnancy through five years postpartum, the total societal cost was

³⁵ Goldblum, J. (2021) [Unpublished raw data], National Diaper Bank Network. Retrieved October 2021.

³⁶ Carstensen F, Gunther P, Better Health for Children and Increased Opportunities for Families the social and economic impacts of the diaper bank of Connecticut, Connecticut Center for Economic Analysis, 2018. Available at <https://docs.google.com/viewerng/viewer?url=https://ccea.uconn.edu/wp-content/uploads/sites/968/2018/05/Better-Health-for-Children-the-Social-and-Economic-Impacts-of-the-Diaper-Bank-of-Connecticut-1.pdf&hl=en>

³⁷ Mathematica Policy Research. (April 2019). Issue Brief: Societal Costs of Untreated Perinatal Mood and Anxiety Disorders in the United States. Available at: <https://www.mathematica.org/publications/societal-costs-of-untreated-perinatal-mood-and-anxiety-disorders-in-the-united-states>

estimated to be \$14.2 billion for births in 2017, or an average of \$32,000 in societal costs for every mother-child pair affected but not treated. Of the \$14.2 billion, about 60% of the costs were related to maternal outcomes and the remaining 40% were related to child outcomes. The most expensive components include productivity loss, absenteeism from work or unemployment, preterm birth, and maternal health expenditures (\$2.9 billion, or 20% of total costs). When comparing only medical costs of other perinatal conditions, perinatal mood and anxiety disorders cost more than \$17,000 per mother over six years, whereas postpartum hemorrhage (bleeding) and gestational diabetes (diabetes during pregnancy) each cost up to \$3,300 per mother and occur only during pregnancy and childbirth.

Question #3: Estimate the number of diapers that would be required to prevent many of the conditions from occurring.

There is no known research that determines the number of diapers needed to prevent conditions related to an insufficient supply of diapers. However, calculations of diapers and costs can be estimated using the NDBN standards for diaper need, which are 8-10 diapers a day and 0.29 cents per diaper (the cost of purchasing a diaper wholesale by a diaper bank or the NDBN).

Table 1 summarizes three scenarios when considering the number and costs of diapers. The estimates total about \$70-89 dollars per month for 8-10 diaper changes per day. For families with TANF benefits, the average 2020 TANF cash benefit for a family of three is \$486. Based on \$80 a month for diapers, diapers represent 16.47% of the total TANF benefit.

The estimated cost of meeting the total annual diaper need of 10 diaper changes per day for all families experiencing diaper need in the U.S. with children under three would be \$3,162,798,000 (three billion, one hundred sixty-two million, seven hundred ninety-eight thousand dollars).³⁸ This calculation is based on 2019 U.S. Census data of 8.3 million households with children ages 0-3, and 36% (2,988,000) of these families experiencing diaper need.

³⁸ Smith, M. Personal communication. December 9, 2021.

Table 1: Estimated Cost of Meeting Diaper Needs for a Family with Children Age Three and Under *

Diaper Changes per Day	8	9	10
Cost per Day	\$ 2.32	\$ 2.61	\$ 2.90
Cost per Year	\$ 846.80	\$ 952.65	\$ 1,058.50
Cost per Month	\$ 70.57	\$ 79.39	\$ 88.21
Ages under 3 (0+1+2)	\$ 2,540.40	\$ 2,857.95	\$ 3,175.50
Ages including 3 (0+1+2+3)	\$ 3,387.20	\$ 3,810.60	\$ 4,234.00

* Cost per diaper estimated as 0.29 cents

III. Summary and Conclusion

Additional research and evaluation are needed to determine the health impact of diaper provision and its effect on healthcare utilization. Partnerships with hospitals, Federally Qualified Health Centers (FQHCs), and community partners to distribute diapers offer strong model programs to reach additional families and foster direct connections to the healthcare system. For example, healthcare systems and pediatric locations are often trusted sources of advice and care. The ability of pediatric providers to detect and address diaper need through the provision of diapers at pediatric visits may enhance the quality of care, retention in care, and improve outcomes. The ultimate success of addressing diaper need and social determinants of health in the pediatric setting will depend on reimbursement structures that can support a comprehensive approach to addressing the root causes of healthcare inequities.

Addressing diaper need is integral to ensuring optimal health for families and children. With enough diapers, children are healthier, and parents are less stressed and better able to provide financially for their families. This report presents research on diaper need and health. Small sample sizes limit the generalizability of the results, may not be representative of the general population, and cannot substantiate casual relationships between diaper need and health or economic outcomes. However, findings in this report can be used to drive future research studies, as well as program and policy initiatives to reduce diaper need and its impacts on health and economic well-being.

IV. Acknowledgments

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