

Baby Care Products: Possible Sources of Infant Phthalate Exposure

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FROM ABSTRACT

OBJECTIVES.

Phthalates are man-made chemicals found in personal care and other products.

Recent studies suggest that some phthalates can alter human male reproductive development, but sources of infant exposure have not been well characterized.

We investigated the relationship between phthalate metabolite concentrations in infant urine and maternal reported use of dermally applied infant care products.

METHODS.

We measured 9 phthalate metabolites in 163 infants who were born in 2000–2005. An infant was considered to have been exposed to any infant care product that the mother reported using on her infant within 24 hours of urine collection.

RESULTS.

In most (81%) infants, more than 7 phthalate metabolites were above the limit of detection.

[Exposure to baby lotions, baby powders, and baby shampoos were predictive of urinary metabolite concentrations].

Phthalate exposure scores increased with number of products used.

Most associations were stronger in younger infants.

CONCLUSIONS.

Phthalate exposure is widespread and variable in infants.

Infant exposure to lotion, powder, and shampoo were significantly associated with increased urinary concentrations of phthalates, and associations increased with the number of products used.

This association was strongest in young infants, who may be more vulnerable to developmental and reproductive toxicity of phthalates given their immature metabolic system capability and increased dosage per unit body surface area.

THESE AUTHORS ALSO NOTE

“Phthalates are synthetic, man-made chemicals of increasing public importance because of potential toxic effects to the developing endocrine and reproductive systems.”

Phthalates are used in the manufacturing of a wide variety of industrial and common household products.

Phthalate chemicals are found in plastic products such as children's toys, lubricants, infant care products, chemical stabilizers in cosmetics, personal care products, and polyvinyl chloride tubing.

“Phthalates are not chemically bound to these products and are therefore continuously released into the air or through leaching into liquids, leading to exposure through ingestion, dermal transfer, and inhalation.”

“Children are uniquely vulnerable to phthalate exposures given their hand-to-mouth behaviors, floor play, and developing nervous and reproductive systems.”

Recent data suggest that some phthalates can adversely affect human male reproductive function.

Phthalates are known developmental and reproductive toxicants.

Human studies support adverse effects of phthalates on male reproductive function.

Phthalates are associated with sperm DNA damage in male adults and has widespread effects on endocrine and reproductive systems.

Phthalate exposure through breast milk is associated with abnormal reproductive hormone levels in 3-month-old infants, “suggesting that early human exposures may have an adverse impact on endocrine homeostasis.”

Phthalate concentrations are higher in young children.

“Of particular concern for children is sucking and playing with plastic toys and child care products that are used directly on the skin.”

“Phthalates have also been found in food products and are thought to be contaminants that enter the food supply during processing and packaging.”

These authors explored the relationship between infant/toddler urine phthalate metabolite concentration and mother's use of dermally applied infant care products.

Phthalate metabolite measurements were performed on urine collected from a wet diaper.

RESULTS

These authors analyzed 163 individual infant urine samples for 9 phthalate metabolites.

“All samples contained at least 1 phthalate above the limit of detection, and more than 7 urinary phthalate metabolites were above the limit of detection in more than 80% of infants.”

94% of mothers reported use of various infant care products in the 24 hours before urine collection.

Almost all mothers reported using infant wipes.

Infant shampoo was used by 54%.

Use of baby powders, lotions, and diaper creams were reported less frequently.

Mothers' use of baby lotion was associated with an 80% increase phthalate concentrations.

Infant powder use was associated with a 60% increase in phthalate concentrations.

Infant shampoo use was associated with a 40% increase in phthalate concentrations.

These authors “did not observe any significant associations between hours of plastic toy pacifier use and any phthalate metabolite concentrations.” However, they caution that this finding may be the result of their research methodology rather than an indication that pacifiers are phthalate safe.

DISCUSSION

Mothers' use of infant lotion, infant powder, and shampoo was significantly associated with higher phthalate metabolite urinary concentrations.

Phthalate concentrations increased with the number of products used.

This study shows that dermal exposure is an important route of exposure for some phthalates, particularly for young infants.

Phthalate exposures come from multiple sources, including plastics, personal care products, and household products, and that multiple exposure routes may be involved.

Oral ingestion of phthalates occurs through food, medicines, and indirect dust ingestion.

Infants are exposed to phthalates through oral ingestion of breast milk/formula, and dermal exposure to specific infant care products.

These authors found a strong association between phthalates and infant care products that are applied dermally and "therefore conclude that this is a major source and route of exposure for infant phthalate exposure."

CONCLUSIONS

These authors found that use of infant lotion, infant powder, and infant shampoo were associated with increased infant urine phthalate metabolite concentrations.

These findings suggest that dermal exposures may contribute significantly to phthalate body burden in the infant population.

"Young infants are more vulnerable to the potential adverse effects of phthalates given their increased dosage per unit body surface area, metabolic capabilities, and developing endocrine and reproductive systems."

"In the United States, there is no requirement that products be labeled as to their phthalate content. Parents may not be able to make informed choices until manufacturers are required to list phthalate contents of products."

These authors "recommend limiting amount of infant care products used and not to apply lotions or powders unless indicated for a medical reason."

"Phthalate toxicity is of increasing importance in the scientific and public community."

KEY POINTS FROM DAN MURPHY

- 1) "Phthalates are man-made chemicals found in personal care and other products."
- 2) Phthalates can alter human male reproductive development.
- 3) Phthalate exposure is widespread in infants.

- 4) Infant exposure to lotions, powders, and shampoos are significantly associated with increased urinary concentrations of phthalates, and associations increased with the number of products used.
- 5) Young infants are more vulnerable to developmental and reproductive toxicity of phthalates because their immature metabolic system capability and because of increased exposure dosage per unit body surface area.
- 6) Phthalates are synthetic, man-made chemicals that have toxic effects to the developing endocrine and reproductive systems.
- 7) Phthalates are used in the manufacturing of a wide variety of industrial and common household products.
- 8) Phthalate chemicals are found in plastic products such as children's toys, lubricants, infant care products, chemical stabilizers in cosmetics, personal care products, and polyvinyl chloride tubing.
- 9) "Phthalates are not chemically bound to these products and are therefore continuously released into the air or through leaching into liquids, leading to exposure through ingestion, dermal transfer, and inhalation."
- 10) "Children are uniquely vulnerable to phthalate exposures given their hand-to-mouth behaviors, floor play, and developing nervous and reproductive systems."
- 11) Phthalates are associated with sperm DNA damage in male adults and has widespread effects on endocrine and reproductive systems.
- 12) Phthalate exposure through breast milk is associated with abnormal reproductive hormone levels in 3-month-old infants, "suggesting that early human exposures may have an adverse impact on endocrine homeostasis."
- 13) "Phthalates have also been found in food products and are thought to be contaminants that enter the food supply during processing and packaging."
- 14) Mothers' use of baby lotion was associated with an 80% increase in phthalate concentrations.
- 15) Infant powder use was associated with a 60% increase in infant urine phthalate concentration.
- 16) Infant shampoo use was associated with a 40% increase in infant urine phthalate concentration.
- 17) Mothers' use of infant lotion, infant powder, and shampoo was significantly associated with higher phthalate metabolite urinary concentrations.

- 18) This study shows that dermal exposure is an important route of exposure for some phthalates, particularly for young infants.
- 19) Phthalate exposures come from multiple sources, including plastics, personal care products, and household products, and that multiple exposure routes may be involved.
- 20) Oral ingestion of phthalates occurs through food, medicines, and indirect dust ingestion.
- 21) Infants are exposed to phthalates through oral ingestion of breast milk/formula, and dermal exposure to specific infant care products.
- 22) "In the United States, there is no requirement that products be labeled as to their phthalate content. Parents may not be able to make informed choices until manufacturers are required to list phthalate contents of products."
- 23) These authors "recommend limiting amount of infant care products used and not to apply lotions or powders unless indicated for a medical reason."
- 24) "Phthalate toxicity is of increasing importance in the scientific and public community."