



The Mattress Matters

Protecting Babies from
Toxic Chemicals While They Sleep

November 2011

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Acknowledgements

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This report was made possible through the generous support of the New York Community Trust, the ECO Initiative of the Tides Foundation, and individual donors.

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The information in this report is intended to provide information about materials used in crib mattresses as reported by the companies via their websites and through email and telephone communications made to Clean and Healthy New York in Spring 2011. We do not recommend or reject any specific mattress manufacturer or product. Our survey of manufacturers covers a representative majority of crib mattress manufacturers selling their products in the U.S. market. However, we make no claim that our survey was exhaustive. Any oversights were entirely unintentional and do not represent discrimination by the authors. Further, we make no claim that a specific chemical or material of concern as identified in this report will cause a specific health outcome for a child. The information in this report is intended solely as an educational tool, to provide parents with useful information to consider in their decision-making process. We also hope it encourages companies to become more transparent in their disclosures of the chemicals and processes used to manufacture their products and to seek discontinuance of the use of toxic chemicals.

Note: This report has been revised to correct an editing error present in the initial release. A statement regarding Nook organic mattresses' organic content has been removed from page 15. The accurate description of Nook's use of organic material continues to be reflected in the chart in Appendix II. Further, this report has been revised to clarify on page 11 the pros and cons of coir and on pages 4 and 16 that Vivetique and White Lotus require a doctor's prescription for crib mattresses without both chemicals of concern and allergens.

Design: David Gerratt/NonprofitDesign.com

Executive Summary

Toxic chemicals are everywhere in modern life: building materials, shampoos, furniture, and clothing. Parents are learning to not assume products on store shelves are safe. Sadly, toxic chemicals even turn up in the materials used to make crib mattresses.

Infant mattresses are intended to provide a safe, comfortable sleeping surface, and they all have the same basic overall structure: 1) the core, 2) padding, 3) flame retardant material and chemicals, and 4) a cover or “ticking,” which may also have chemicals added to make it waterproof. Available crib mattress options range from those made almost entirely of petroleum-based products using chemicals of concern to others made of natural fibers like wool or cotton.

We surveyed 28 mattress makers that produced a total of 190 models of standard US (69 x 131 cm) crib mattresses. They are all available at stores or online. We gathered information via websites, emails, and direct phone calls.

We sought to find out just what crib mattresses are made of, and how willing manufacturers are to provide this information.

We discovered that the marketplace is shifting towards less toxic materials in response to consumer demand. Some of these shifts have resulted in safer products, while some have been minor tweaks that represents a thin “green” veneer over conventional materials.

- 72% of surveyed mattress models use one or more chemicals of concern identified in this report, such as antimony, vinyl, polyurethane, and other volatile organic compounds.
- 40% use vinyl coverings.
- 22% use proprietary formulas for waterproofers, flame retardants or antibacterials, keeping potential health impacts secret.
- 20% of surveyed mattresses offer some “green” components but do not take meaningful steps to ensure products are free of toxic chemicals.

The good news is that 20% of mattresses avoid chemicals of concern, and an additional 8% also avoid potential allergens.



Crib mattress may contain chemicals of concern in any of the four layers. For example:

- Some flame retardants are made with antimony, which is also a contaminant of polyester. Long-term inhalation of low levels is linked to eye irritation and heart and lung problems.¹
- Vinyl, used as a waterproof cover, relies on many toxic chemicals throughout its production, including cancer-causing chemicals², asthma triggers, and developmental toxins.³
- Polyurethane foam, also appearing as “memory foam” or “soy foam,” is made with a potentially cancer-causing chemical, and may emit harmful “VOCs”—volatile organic compounds⁴—in the home. VOCs can also be found in synthetic latex foam. VOCs can irritate eyes, nose and throat, cause headaches and some cause cancer.⁵
- Companies that use proprietary chemicals, or refuse to disclose chemical use, make it impossible to determine potential health threats. In the absence of disclosure, we assume they may cause harm.

Only Soaring Heart Natural Bed Company and Naturepedic fully disclosed on their website all chemicals and materials used. Upon email or phone request, 24 of the remaining 26 companies were willing to provide some information. However, 39% of manufacturers refused to fully disclose materials they used. Most often, they failed to provide information about how they make mattresses flame resistant, waterproof, or antimicrobial.

We found three companies that focus on making some or all of their crib mattresses without both chemicals of concern and allergens:

- Vivetique
- White Lotus
- Naturepedic

Vivetique and White Lotus require a doctor's prescription for crib mattresses without both chemicals of concern and allergens. Custom mattresses from other manufacturers may be available by request, but are not included in those surveyed.

The following companies have focused on making all of their crib mattress models without chemicals of concern, but use some materials that may be allergenic:

- Land and Sky
- Natural Mat
- Organic Mattresses, Inc.
- Pure Rest
- Savvy Rest
- Shepherd's Dream
- Sleeptek
- Soaring Heart Natural Bed Company
- Suite Sleep
- Vivetique (other models)
- White Lotus (other models)

Of the 16 remaining companies using one or more chemical of concern, the following companies offer no “green” models, and directly refused to provide some information:

- Dream on Me
- Foundations

Recommendations

The market is changing, but a lot must be done to adopt both safer chemicals and full transparency. Consumers should use the information in this report to find the safest mattress that meets their family's needs. Companies must take action to ensure all of their crib mattresses are inherently safe and must fully disclose the materials they use to make them. And policymakers must act to strengthen the Toxic Substances Control Act to make sure toxic chemicals are moved out of our marketplace.

Good regulations can help to spur innovation by requiring companies to meet a growing market demand for safer products. This will not only increase businesses' profitability and help to create more jobs, but also contribute to a healthier society as we build a stronger economy.

More than a quarter of the mattresses surveyed were made without chemicals of concern but nearly three-quarters of them contained suspect or dangerous chemicals.

Introduction

Toxic chemicals are everywhere in daily life: it is hard to get out of bed, get dressed, clean your house or wash your body without encountering them.

Research over the last 50 years has linked toxic chemicals to serious illnesses, including cancer, allergies, infertility and other reproductive problems, obesity, heart disease, autoimmune disorders like diabetes and lupus, autism, and learning and developmental disabilities. Our outdated federal chemical laws do not protect us. We are left with homes, daycare centers, schools, places of worship, workplaces and communities full of chemical-laden products.

Product testing has revealed a wide range of chemicals in children's products. For example, a 2005 study, *The Right Start: The Need to Eliminate Toxic Chemicals from Baby Products*,⁸ tested a variety of baby products for toxic flame retardants and a group of hormone-disrupting chemicals known as phthalates. Many of the products tested contained the chemicals of concern.

Increased news coverage of toxic chemicals in products has raised parents' concern about the safety of their children's products. One survey of 637 adults in the US found that two-thirds of those surveyed were 'very' or 'extremely' concerned about the health and safety of the products they buy and more than three-quarters of retail salespersons surveyed have had customers who ask for 'natural,' 'organic,' or 'environmentally friendly' mattresses.⁶

Safe products are especially important to protect growing and developing infants and children, who are much more vulnerable to chemical exposure than adults.⁷ Babies sleep up to 16 hours a day, bringing their faces within inches of mattresses for long periods of time, so materials used to make mattresses must be safe for young bodies.

Public demand for safer products has resulted in many companies offering products that are either truly safer or are merely marketed as such. Government bodies—ranging from cities, counties and states to the U.S. Congress and international treaties—have also responded, by addressing chemicals one, two, or a few at a time. For example, Congress banned certain phthalates in children's products, but left others in use. This woefully inadequate approach only addresses small pieces of a much more complex problem.

There are over 80,000 registered chemicals in commerce in the US. When the law meant to regulate them, the Toxic Substances Control Act (TSCA), was passed in 1976, 62,000 chemicals in use at the time were "grandfathered in" and were not tested for safety. Only about 200 have been well-

tested for health effects or toxicity since then, and only five chemicals have been banned. Not a single chemical has been banned under TSCA in over 20 years.

This report provides an overview of the crib mattress market, to make it easier for parents and loved ones to choose the mattress that best meets their child's needs. We surveyed 28 crib mattress manufacturers and investigated the use of chemicals and materials in crib mattresses, and whether manufacturers were willing to disclose what they use. This report offers insight into the current state of the crib mattress market, and identifies sensible market and policy solutions for safer products.

Searching for a Healthy Mattress: One Mom's Story

"Expecting our first child, I went on a search for a basic natural crib mattress and little did I know it would turn into a full investigation into what crib mattresses are made of and what's secretly inside. I found out that buying one off the store rack isn't easy or possible, as many stores don't sell natural or organic mattresses and companies do not disclose how their mattresses are waterproof or treated to be fire resistant (mandated by law).

So I contacted them, some replied back, others didn't and I learned that just because a company calls their mattresses "organic" or "eco" doesn't make it so. Most have a plastic poly lining inside for waterproofing and are treated with chemicals such as boric acid, antimony and phosphorus for fire resistance. Some use natural "Soy foam," sometimes made from GMO soy and a petrochemical mixture.

I ended up frustrated and realized that to purchase a truly natural or organic mattress, I would have to find one made with only organic cotton, organic wool (naturally fire resistant) and not treated with any waterproofing materials (I can use a wool puddle pad). Thankfully, I found a few companies out there making these mattresses in the U.S. and abroad. It cost a bit more, but well worth my state of mind and my baby's health."

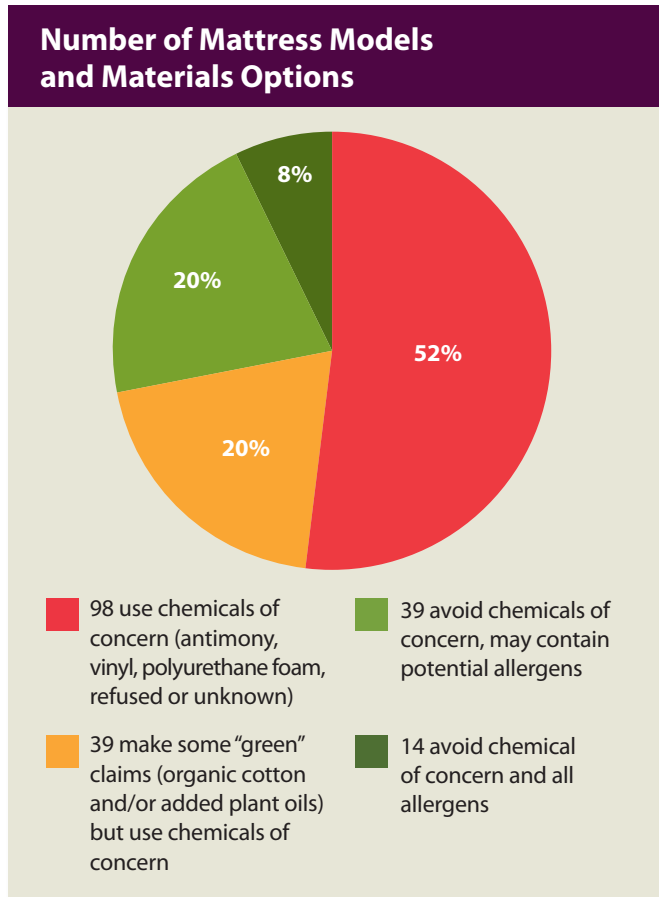
— Sue Lappan, mother of one, Hamilton, NY

The Mattress Marketplace

The U.S. marketplace for standard sized crib mattresses was comprised of 28 manufacturers and a total of 190 specific models available on their websites at the time of our review.⁹

Overall, our survey revealed significant response to public demand for less-toxic products. 48% of the products (92 models) have some claim of environmental or health benefit. These are indicated as the green or yellow wedges on the pie chart on this page. More than a quarter of the mattresses on the market (53 models or 28%) avoid chemicals of concern identified in this report. These are the green wedges of the pie chart. Among them, 14 models from three manufacturers (8%) avoid both chemicals of concern and allergens. These make up the dark green wedge of the pie chart.

Troubling for the shopper, however, is the vast majority (72%) of mattress models that still contain at least one chemical of concern. A significant percentage of these models incorporate small changes, like thin layers of organic cotton or use of soybean oil as part of polyurethane foam, and use these changes to market those mattresses as “greener” or healthier. Our survey found 20% (39 models) of the mattresses for sale making such small changes and big claims. Companies that have multiple mattresses for sale, such as Kolcraft (which also makes mattresses for Sealy and Contours), LA Baby and La Jobi (Serta), market



one or two mattress models this way. Of this category of mattress makers, only Colgate offers a crib mattress that avoids chemicals of concern.

40% —or 76 models— are made with vinyl coverings. In at least one case (Sealy Naturalis), the organic cotton layer is surrounded by a vinyl cover. Da Vinci Décor has four mattress models (Emily, Luna, Starbrite II, and Twilight) that contain two chemicals of highest concern, vinyl and antimony, and they only gave proprietary commercial names (not chemical-specific names) for their antibacterial additive.

For more information about our methods, see Appendix I. For detailed information about what materials each manufacturer uses and how much chemical information they provided, see Appendix II. For mattress manufacturer contact information, see Appendix III.

What Mattress Makers Reveal

The only way to know whether a product is safe is for manufacturers to disclose all of the materials they use. This is not currently the case. Manufacturer and retailer websites provided more information than product packaging, often listing all textiles used, but even the information on their websites may be incomplete. Responses to direct emails or web form submissions were the most effective in obtaining detailed answers. We called some manufacturers to get more information.

The amount of disclosure varied greatly. All mattress descriptions specifically named at least one material component, but only Soaring Heart Natural Bed Company and Naturepedic provided all of the relevant information on their websites. The remaining 26 manufacturers required from one to five direct requests for more information.

The answer provided least often was the type of flame retardant. Methods were clearly described on the individual product website by only eight manufacturers: DaVinci Décor, LA Baby, Land and Sky, Naturepedic, Shepherd’s Dream, Sleeptek, Soaring Heart Natural Bed Company, and Vivetique. Seven companies—AFG Baby Furniture, Dream on Me, Flexus, Foundations, Jeffco Fibres, Kolcraft, and Simmons Kids—did not disclose their methods for achieving fire safety.

Smaller companies offering fewer, more specialty mattress models were most likely to provide all requested information and were generally the most responsive. Concerns that information disclosure might help competitors were most often cited as the reason for limited transparency, especially by larger companies.

We had more difficulty obtaining information from companies that had numerous models similar or identical to those of other companies.

COMPANY DISCLOSURE		
Company Names	Disclosed Components	Information not provided
Soaring Heart Natural Bed Company Naturepedic	Full disclosure on website	None
Colgate Mattress Atlanta IKEA LA Baby La Jobi Land and Sky Natural Mat Organic Mattresses, Inc. Pure Rest Organics Savvy Rest Shepherd’s Dream Sleeptek Strobel Suite Sleep Vivetique White Lotus	Full Disclosure upon request (one or more phone calls or emails)	None
DaVinci Décor Moonlight Slumber Natura World Nook	Disclosed components	Used proprietary names for water-proofoers, and/or antibacterial methods.
AFG Baby Furniture Dream on Me Foundations Jeffco Fibres Kolcraft Simmons Kids	Provided some information	Refused to provide information about flame retardants, waterproofoers, and/or antibacterial methods.
Flexus	None	Refused to answer our questions.

In researching this report, our inquiries spurred at least two companies to disclose more information online. Da Vinci Décor, one of the top six U.S. crib mattress manufacturers, now provides information on product websites about flame retardants, textile composition, waterproofing and antibacterial treatments for all five of their crib mattresses. Savvy Rest added a full page with in-depth information about flame retardants.









SUMMARY OF MATTRESS MATERIALS					
Names	Available cores	Cover materials	Possible allergens	Flame retardants	Chemicals of concern
Land and Sky	L		L		
Natural Mat	L		L		
Naturepedic	PE	PE			
Organic Mattresses, Inc.	L		L		
Pure Rest	L		L		
Savvy Rest	L		L		
Shepherd's Dream					
Sleeptek	L		L		
Soaring Heart	L		L		
Suite Sleep	L		L		
Vivetique	L		L		
White Lotus					
Colgate	F	PE	L		
Natura World*	L F		L		
DaVinci Décor*	F				
IKEA	F				
LA Baby	F L		L		
LaJobi	F				
Moonlight Slumber*	F				
Nook*	L F		L		
Strobel	L F		L		
AFG					
Dream on Me	F				
Foundations	F				
Flexus					
Jeffco Fibres	L F		L		
Kolcraft	F				
Simmons Kids	F				

* Company did not disclose commercial formulas










SUMMARY OF MATTRESS MATERIALS KEY

Materials

-  Coir
-  Cotton
-  Foam
-  Natural latex
-  Polyethylene
-  Spring
-  Wool
-  Other

Chemicals of Concern

-  Antibacterial
-  Commercial waterproofer
-  Nanoparticles used as water-proofing and/or antibacterial
-  Polyurethane
-  Synthetic latex
-  Unknown
-  Vinyl

Flame Retardants

-  Hydrated silica, wool*
 -  Boric acid, fiberglass*
 -  Antimony, phosphate/nitrogen compounds*
-
-  All without chemicals of concern
 -  1+ without chemicals of concern
 -  Provided information but use chemicals of concern
 -  Refused information and used chemicals of concern

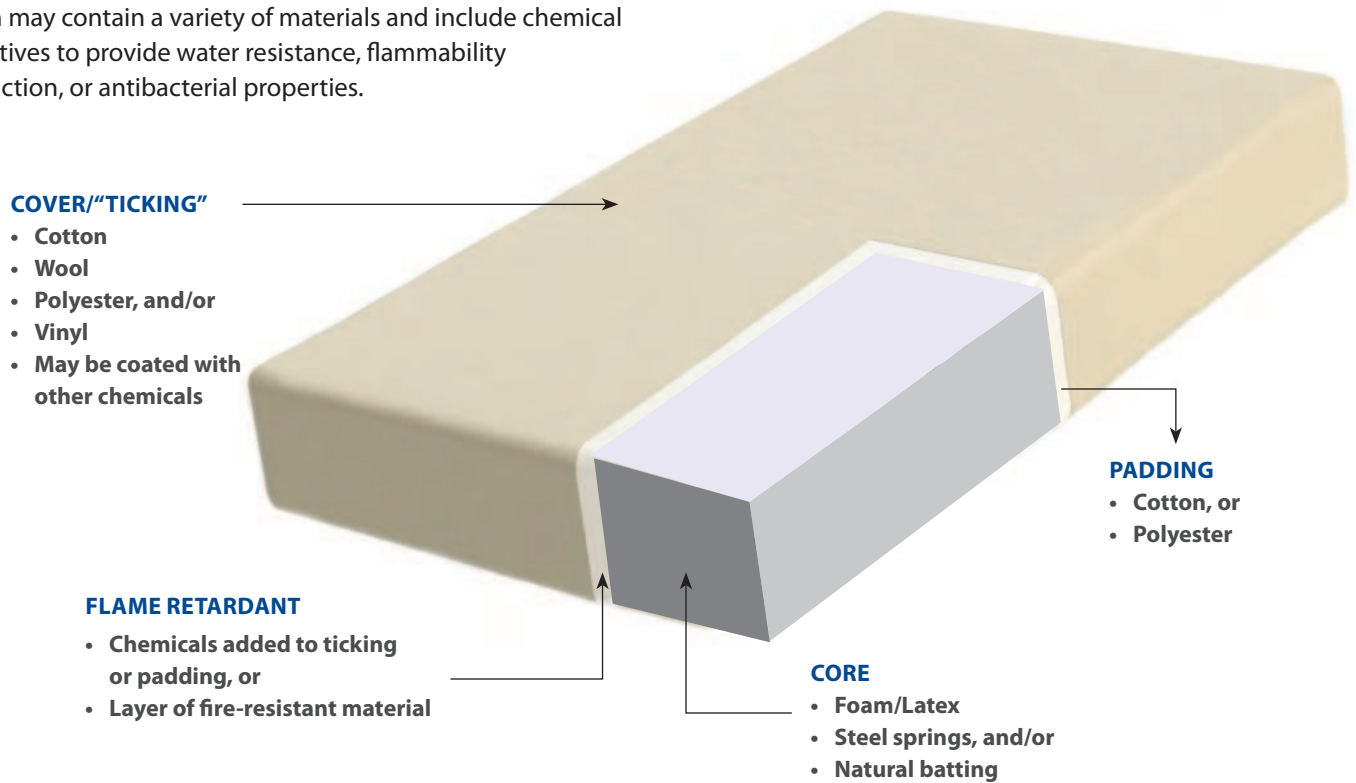
Foam = Polyurethane foam, synthetic or blended latex

* Either/ or, see end table for details.

What's in a Mattress?

The Pros and Cons of Material Choices

Crib mattresses are composed of a structural core, a middle layer of padding, flame retardant materials, and ticking (cover). Each may contain a variety of materials and include chemical additives to provide water resistance, flammability reduction, or antibacterial properties.



CORE: INTERNAL STRUCTURE

The core provides the structure for the mattress.

Safer core materials include innerspring coils, certified organic cotton and wool.

Metal

INNERSPRING COIL

Steel wires shaped into coils.

Pro: Non-toxic, can be recycled.

Con: Mining required.

Foam and Latex

POLYURETHANE FOAM

Made from petroleum and widely used in baby care products.

Pro: Inexpensive, lightweight.

Con: Burns easily, may contain toxic chemicals including volatile organic compounds (VOCs) and toxic flame retardants. Chemicals used to make polyurethane can pose

health problems. Catalysts and additives may also be toxic. VOCs come out of materials and into the air, which can make concentrations of VOCs up to 10 times higher indoors than outdoors.¹¹ VOCs used to make polyurethane foam are not revealed, but they commonly include isocyanates and toluene which can cause asthma, and may cause cancer.¹⁰ VOCs can irritate the eye, nose, and throat, cause headaches, loss of coordination, and nausea, and damage the liver, kidney, and central nervous system. Some VOCs may cause cancer, after prolonged exposure. Some companies certify that the final product emits low or no EPA listed VOCs.¹²

VISCO-ELASTIC FOAM

Known as memory foam, made from polyurethane.

Pro: Molds to the sleeper's shape (for toddlers only).

Con: Same as polyurethane foam.¹³ See above.

“SOY” OR “PLANT-BASED” FOAM

Polyurethane foam with a low percentage (between 5%–20%) of plants like soy and castor bean oil replacing petroleum-based inputs.

Pro: Apparent reduction in petroleum.

Con: Same as polyurethane foam. See above. Soybeans are energy-intensive, and may be grown with harmful pesticides or genetically modified. See “Avoiding Greenwashing” below.

NATURAL LATEX

Processed from sap of the rubber tree. Clay or other unlabeled ingredients may be added.

Pro: Naturally anti-bacterial.

Con: The proteins in natural latex can trigger rare but serious allergic reactions when inhaled. Those born with spina bifida are more prone to this allergy. How latex in mattresses is covered may affect its ability to become airborne and pose a threat. VOCs may be added during processing—ask if latex is VOC-free.

SYNTHETIC LATEX

Made from two petroleum-based compounds, styrene and butadiene. May be mixed with natural latex to create “blended latex.”

Pro: Synthetic latex is not an allergen.

Con: Added volatile organic compounds (VOCs) and base chemicals styrene and butadiene pose health risks. Styrene and butadiene are VOCs. Styrene may cause cancer, affect liver function, irritate the eyes and impair motor skills.¹⁴

Butadiene is known to cause cancer, harm the nervous system, and irritate eyes and skin.¹⁵

POLYETHYLENE FOAM

Low-density, food grade polyethylene.

Pro: Low toxicity, if tested to ensure absence of contaminants. Lightweight.

Con: Petroleum-based.

Natural Materials**COTTON**

A natural fiber, made into densely packed batting.

Pro: Natural material.

Con: Non-organic cotton may use pesticides in production; boric acid may be added for fire retardancy (see flame retardants below).

WOOL

Usually from sheep, it is processed to create dense batting. Interior wool is unlikely to cause skin irritation.

Pro: Naturally flame resistant.

Con: Contact with wool can cause skin irritation. Rarely, some people are allergic to lanolin, the waxy substance on the wool fibers.

COIR

Fiber from coconut husks (the fruit of the palm tree) is washed, processed, and twisted into fibrous mats.

Pro: Natural material.

Con: Latex, an allergen, is usually used to bind the coir fibers together. The latex is often unlabeled.

INTERIOR PADDING

Interior padding is wrapped around the core and can be made of many of the same materials: cotton, wool, or polyester. See other sections for details. **Safer padding includes certified organic cotton and wool.**

FLAME RETARDANTS

The crib mattresses must meet federal flammability standards. Manufacturers frequently add chemical flame retardants to linings or padding. These additives are not bound to the material (foam, batting, fabric) and are released.

Safer flame retardants include hydrated silica and wool.

ANTIMONY

Heavy metal-based, it is embedded in vinyl (which has a toxic manufacturing process).

Pro: Slows (but doesn’t stop) burning.

Con: A toxic heavy metal. Air exposure can lead to eye, heart, and lung problems. Other possible worker health impacts include liver and kidney damage.¹⁶

BORIC ACID

Also called borate powder, it is usually added to interior fabric.

Pro: Relatively low hazard profile.

Con: Boric acid can cause eye and respiratory irritation.¹⁷

HALOGENATED FLAME RETARDANTS (HFRS)

Synthetic chemicals with bromine or chlorine are added to foam or fabric.

Pro: Slows (but doesn’t stop) burning.

Con: Linked to many severe, lifelong health problems. One HFR, decaBDE, is a possible human carcinogen,¹⁸ and the broader group of PBDEs may delay puberty and reproductive development,¹⁹ disrupt thyroid hormones,²⁰

and neurobehavioral changes²¹ Other HFRs are linked to cancer, such as TDCPP, which is mutagenic²² (alters DNA). TCEP is potentially cancer causing, and has been demonstrated to harm sperm and their mobility, even across two generations.²³ Both may harm brain and nerve function.²⁴ These chemicals take a very long time to break down and are found in household dust and human breast milk.^{25, 26, 27}

HYDRATED SILICA

Very similar to sand and quartz. Can be used in a fabric or plastic layer just below the cover to retard fire.

Pro: Chemically inert and non-toxic.

Con: Powdered form is a minor respiratory irritant.

WOOL

Neither fur nor hair, wool has tiny scales that give it both its insulating and irritating properties. When densely woven or packed, it meets federal flammability standards for crib mattresses.

Pro: Natural material.

Con: Contact with wool can cause skin irritation. In rare cases, people may be allergic to lanolin, the waxy substance on the wool fibers. Some companies may add chemicals like boric acid to increase fire resistance; ask manufacturers about this.



COVER (TICKING)

The exterior cover envelops the mattress core and provides a comfortable sleeping surface. Waterproofing and antibacterial chemicals may be used in this layer, as may some flame retardant chemicals. Moonlight Slumber refers to “medical grade” fabric. Be advised that there is no such thing. **Safer cover materials include certified organic cotton and wool.**

COTTON

It may be treated with waterproofing and or antibacterial chemicals, or may be untreated.

Pro: A soft, breathable fabric.

Con: Non-organic cotton may use pesticides; may include antibacterial chemicals and other toxics.

WOOL

Wool can be used as batting and as a fabric cover.

Pro: Naturally water repellent and flame resistant.

Con: Fibers can irritate skin, avoidable if sheet is used.

In rare cases, people may be allergic to lanolin.

POLYESTER

A large set of synthetic chemicals with similar structures; polyethylene is commonly called polyester when use in fabric form. It can be made waterproof.

Pro: A less-toxic plastic.

Con: Petroleum product that may contain hidden additives and contaminants, like antimony.

VINYL

This plastic is often found on the cheapest mattresses. Toxic chemicals are necessary for production, and they often leach out during use.

Pro: Waterproof, bacteria-resistant.

Con: Production of vinyl relies on toxic chemicals at every stage. Input chemicals can cause cancer. Additives including phthalates and heavy metals are necessary to make vinyl retain color or stay rigid or flexible. Phthalates can trigger asthma and allergies,^{28, 29} disrupt hormones, such as reducing levels of testosterone, and are linked to genital defects including male feminization.³⁰ They can also alter child behavior.^{32, 33, 34, 35} Exposure to phthalate mixtures can be even more harmful than exposure to one phthalate. Heavy metals like lead may pose many risks. For example, lead affects every organ in the body, causing lowered I.Q., learning disabilities, mental retardation, poor impulse control and reduced memory retention.³⁶ Dioxin, which causes cancer and birth defects and harms the developing brain,



is released during production and when vinyl waste is incinerated.

WATER PROOFERS

Chemicals may be added to fabrics or sprayed on the surface. Safer water proofers include low-density polyethylene, certified organic wool. Always choose water proofers that fully disclose chemicals.

Pro: Reduce wetness penetration.

Con: See specifics below.

- **Wool:** can irritate the skin; lanolin can be allergenic.
- **Low density, food-grade polyethylene:** made from petroleum, otherwise, low-toxicity.
- **Perfluorinated compounds (PFCs):** No surveyed products reported PFC-based waterproofers, but four companies use one or more commercial formulas and do not provide complete information. For example, "Crypton Green" appears to be made with low-carbon perfluorinated compounds. Higher-carbon PFCs may affect growth and development, reproduction, and injure the liver,³⁷ especially for workers. Low-carbon PFCs are less studied.
- **Polyurethane:** Petroleum-based, toxic in production. See above.

- **Vinyl:** Petroleum-based and toxic. See above.
- **Patent-protected nano-particle-based formulas like Nano-Pel™ and NanoSphere®.** Formulations for these tiny chemicals are carefully guarded, making it hard to understand hazards. This is compounded by the ability of nano-particles to behave differently than the same materials at a larger scale. Nano-particles can penetrate the skin more readily than larger chemicals.

ANTIBACTERIAL CHEMICALS

Chemicals under trade names like Ultra-Fresh and STAPH-GUARD® are registered as pesticides with the EPA. However, these marketing names can be an aggregate for many formulations, so it is hard to find out which version is used in a particular crib mattress. EPA registration requires health and environmental testing and makes some information publicly available. Crib mattresses can be safe for children without the addition of antibacterial chemicals.

Pro: If you are concerned about bacterial growth, this may help.

Con: Antibacterial chemicals can spur growth of resistant bacteria. Hazards are unknown without formulation data.

Understanding Labels

Companies primarily tell consumers what materials are in their products through the “law label”— a tag affixed to the crib mattress, including the familiar warning: “not to be removed except by the consumer.” At least 30 states³⁸ require mattresses to indicate whether the materials are new or used, and disclose the interior contents by percentage weight.

This label was initiated by state actions starting in the early 20th century³⁹ as it became common for manufacturers to save money by using second-hand stuffing, rags, or other low quality materials as mattress filling. The federal government and individual states have since added additional requirements.

The law label is not always visible when purchasing a crib mattress. They are mostly sold off the shelf wrapped in plastic, or from an online retailer. Even when visible, the law label information doesn’t provide enough detail about chemicals or hidden allergens. More work is needed to ensure every consumer is aware of chemicals and allergens in products before they buy them.

Understanding Certifications

In the search for a crib mattress, one may encounter a variety of product certifications, each of which has its own standards and definitions of what is acceptable. Of the mattress makers we researched, 23 of 28 offer at least one crib mattress with some certified organic components or labeled as meeting voluntary standards.

There are three types of certifications: First-party certifications are made by companies themselves. These self-certifications tend to be designed to fit a product, rather than the other way around. Second party certifications are made by trade associations. These also tend to be designed to ensure eligibility of existing products. Third party certifications are developed and run by non-profit organizations or government bodies with no financial stake in the outcome. In general, third-party certifications are the most health protective and address the broadest range of concerns. They tend to evolve over time along with the trend toward safer products.

The following are common certifications, whose logos will appear on certified product packaging. Note that even reliable certifications frequently apply only to specific parts of the product, not the product as a whole.

Third-Party Certifications for Crib Mattresses



GREENGUARD:⁴⁰ Seeks to provide comprehensive protection of indoor air and thus places limits on VOCs, formaldehyde, aldehydes, phthalates, and particles. Seven companies use GREENGUARD certification. Four of these manufacturers, Colgate, Naturepedic, Organic Mattresses, Inc., and Simmons Kids, have their entire mattresses certified.



Oeko-Tex: Sets limits or forbids use of a wide range of chemicals, including toxic flame retardants, heavy metals, phthalates, perfluorinated compounds, pesticides, formaldehyde, and many others. Kolcraft, Organic Mattresses, Inc., Savvy Rest and Vivetique use Oeko-Tex certified latex foam. Oeko-Tex certifies components, not entire mattresses.



Global Organic Textile Standard (GOTS):⁴¹ This textile standard covers not only the final product but also methods and chemicals, and social criteria across the full production process. The “organic” standard applies to products made of 95% or more organic fibers. Suite Sleeps, Soaring Heart Natural Beds, Sleeptek, Organic Mattresses, Inc., Nook, Vivetique, Naturepedic, and Savvy Rest use one or more GOTS textiles in one or more models (but not necessarily all textiles or models).

Organic agricultural standards: There are a variety of standards for non-toxic pest management and fertilization, including the USDA’s,⁴² which only apply to raw materials.

Trade Association Standards



Certi-Pur:⁴³ The Alliance for Flexible Polyurethane Foam sets criteria for and runs the Certi-Pur certification, which sets some limits on VOCs, and verifies the absence of federally phased-out flame retardants (PBDEs), already-restricted phthalates, and previously-banned ozone depleters. Also confirms absence of heavy metals and formaldehyde, neither of which are used in foam production.

Company-driven Assertions



NAOMI: The “National Association of Organic Mattress Industry” was created by and is made up of only one com-

pany: Pure Rest Organics. Given that no other companies have opted to join or seek certification, this does not appear to meet criteria for an association.

Other company-specific claims may include: “certified healthy,” “eco-friendly,” and “non-toxic.”

Certification Documentation

Even reliable standards frequently only apply to specific materials or portions of the product, not the entire mattress, yet the logo is used widely. A good way to understand which components are certified and what it means is to read the actual certification document. Only eight of the companies researched provided the certificate(s) on their website: Land and Sky, Naturepedic, Organic Mattresses, Inc., Pure Rest Organics, Savvy Rest, Sleeptek, Soaring Heart Natural Bed, and Vivetique.

Avoiding Greenwashing

“Greenwashing” is a practice companies use to boost sales by providing inaccurate or misleading claims about environmental benefits (or reductions in harm) from their company and/or product.

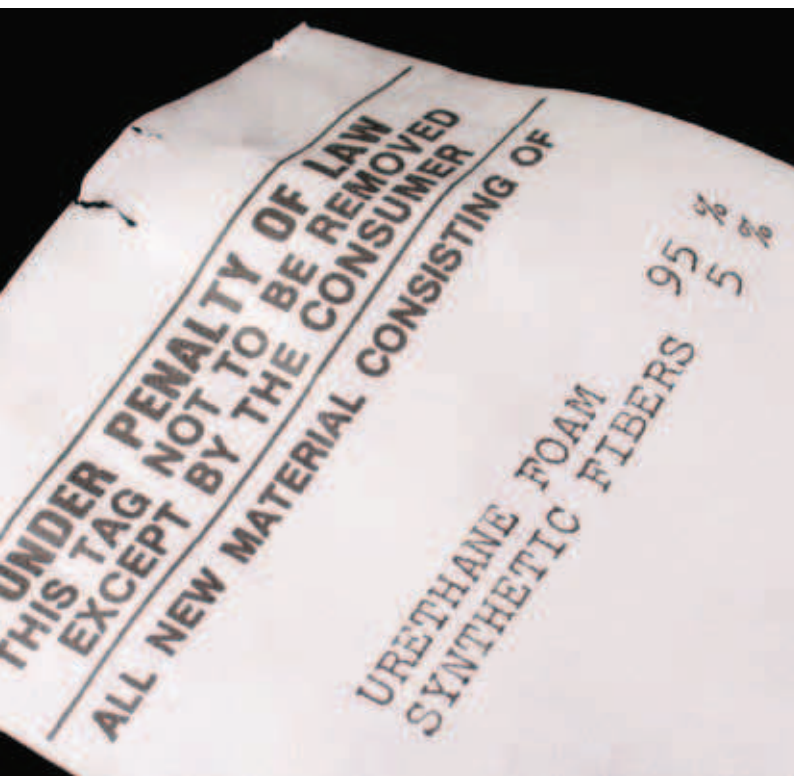
Without in-depth knowledge of certification standards, it is easy to assume that all claims are equally meaningful. Websites boasting long lists of certifications and member-

ships can give shoppers a false sense of security. An excellent reference is provided by Lifekind, an online retailer of Organic Mattresses, Inc., which explains 25 different images and logos that are used in mattress advertising.⁴⁴

Products with several “endorsements” are not always better; membership in a trade association does not guarantee any product standard, nor do logos that are created by the company instead of a third party. These images are often used to blur the lines between products that are demonstrably “greener” and healthier, with those that aren’t. Use this guide and Lifekind’s information to make the best choices for your family.

Because of the increasing demand for safer products, some manufacturers are trying to profit without changing their material use. One way they can appear to be providing safer products without, in fact, doing so is through “greenwashing.” There are three primary mechanisms of greenwashing that companies most commonly employ:

- 1) Use of in-house or trade association certification programs with weak standards, such as Certi-Pur. See above.
- 2) Meaningless claims: Broad words like “natural,” “pure,” “green,” and “eco” sound reassuring, but they have no clear definition, and can be used by anyone. For example, La Jobi’s Serta Tranquility Eco-Firm model does have internal layers of organic cotton, but the advertised “eco-friendly sleeping surface” is actually made of vinyl.
- 3) Exaggerated claims of benefits from small changes: Six manufacturers surveyed produced a foam core mattress with soy or other plant oils included in their polyurethane foam. They all failed to state the percentage of plant oil where this “benefit” was advertised. Actual percentages of plant-based oils range from only minimal to less than 20%; a far cry from claims that “foam used in this unit is created using plant based materials that replaces much of the petroleum used in normal manufacturing of foam”⁴⁵ (Colgate EcoVisco Classica) or “soy-based foam core”⁴⁶ (Sealy Soybean Foam Core Crib Mattress). More importantly, adding plant oil does not make the polyurethane foam itself less toxic.
- 4) Focus on an apparent benefit, without disclosing possible hazards: Stating a product is free from a certain chemical is a positive step, but it doesn’t tell us whether an equally toxic replacement chemical was used. Similarly, using a natural material, like wool, without disclosing all additives, does not mean flame retardant chemicals like antimony or boric acid have not also been added.



Recommendations

It is clear that businesses are responding to and benefiting from increased demand for less-toxic products. Of the manufacturers surveyed, 18 offer a product with a core of cotton, wool, coir, or natural latex.

Colgate Kids reported a “large increase” in the sales of its natural and organic mattresses in recent years and Naturepedic sales have maintained consistent double-digit growth for the past five years.

The plain act of requesting information can unlock the door for an entire company to look inside products and materials, as demonstrated by this study. Simply put, the more demand for disclosure, the more disclosure is forthcoming. This trend is consistent across several other product markets, including ingredients in personal care products and household cleaners.

An informed, empowered person can make educated choices instead of being left in the dark about product contents. But not every store has less-toxic options, and not every parent knows about possible health impacts. Voluntary market transformation that you help to drive by your informed purchases must be supplemented with policy change to completely eliminate specific chemicals from the crib mattress marketplace.

Buying a Safer Mattress

You can use the information in this report to buy the right mattress for your family. Individual purchasing choices can help move the marketplace toward safer materials and more disclosure.

The following companies have gone the farthest to both eliminate chemicals of concern and be transparent about the materials they use:

- Naturepedic
- Soaring Heart Natural Bed Company

We found three companies that focus on making crib mattresses without both chemicals of concern and allergens:

- Vivetique
- White Lotus
- Naturepedic

Vivetique and White Lotus require a doctor's prescription for crib mattresses without both chemicals of concern and allergens. Custom mattresses from other manufacturers may be available by request, but are not included in those surveyed.

The following companies have focused on making all of their crib mattress models without chemicals of concern, but use materials that may be allergenic:

- Land and Sky
- Natural Mat
- Organic Mattress Inc.
- Pure Rest
- Savvy Rest
- Shepherd's Dream
- Sleeptek
- Soaring Heart Natural Bed Company
- Suite Sleep
- Vivetique
- White Lotus

Of the remaining 16 companies using one or more chemical of concern, the following companies offer no ‘green’ models, and directly refused to provide some information:

- Dream on Me
- Foundations

“If we’re really going to make progress on the environment, we have to empower consumers to make more environmental choices. We need to inform them in practical ways and this ingredient disclosure is a very logical next step.”

– **Herbert Fisk Johnson III**, CEO of S.C. Johnson and Son
 “Telling Consumers What’s Inside” *The New York Times*, November 23, 2010.

Companies Should Act

Mattress manufacturers need to take steps to make all of their mattresses truly non-toxic. By taking these simple steps, they could ensure all babies have a good, healthy night's sleep:

- 1) Disclose all chemicals in all parts of the mattress. Full disclosure is necessary for people to know what they are buying.
- 2) Identify chemicals of concern throughout production, use, and disposal of the mattress, and develop a process for identifying safer materials.
- 3) Be transparent about the methods used for selecting materials.
- 4) Adhere to third-party certification to verify claims. Independent review is the best way to demonstrate the truth about safety claims.

Policy Solutions

Companies that make healthy products are reducing liability, preserving worker health, enhancing public image, and experiencing robust growth during difficult economic times.

The use of dangerous chemicals impacts business by raising health care costs, lowering productivity and encouraging litigation. Also, businesses that strive to offer safer alternatives are hampered by the lack of appropriate information and incentives. Encouraging companies to adopt greener chemistry and ban chemicals known to cause harm will reduce costs to many businesses and governments, and increase consumer confidence.

There is a strong business case for improving business chemical policy:

- Leveling the playing field, by requiring existing chemicals to meet the same testing requirements as new chemicals.
- Expanding markets for safer products.
- Creating a more predictable regulatory system.
- Reducing costs and risks, especially product liability (i.e., asbestos), associated with toxic chemicals in products across supply chains.
- Lowering expenses from chemically-induced employee illness and enhancing productivity from improved employee health.
- Identifying the presence of chemicals of high concern in products.
- Increasing confidence and trust among employees, consumers, and investors, leading to a more positive business environment.

- Improving transparency and communication throughout the supply chain, leading to increased confidence for downstream users and reduced risks from supply chain interruptions.
- Creating a more competitive, innovative and economically viable chemical industry in the U.S.

This report makes clear the challenges of shopping for crib mattresses in the context of a failed federal chemical management system. In an effort to protect their residents and drive federal reform, numerous states have taken action on single chemicals such as BPA and cadmium, chemical classes such as phthalates and PBDEs, product sectors such as household cleaners and electronics, and broad reform of their state's chemical management infrastructure.

Broad reform is the solution to the toxic shell game, because legislation that restricts single chemicals does not always guarantee that the replacement chemical or product will be any safer. The use of heavy metals in children's products is a good example. In response to learning that some children's toys contained high levels of lead, some states passed laws restricting its use. It did not take long, however, to discover that some manufacturers simply substituted cadmium, another potent neurotoxin, for the lead. This cat-and-mouse game of chemical replacement continues in the absence of safer substitution requirements.

To advance the movement for safer products, policies must account for these deficiencies. The foundation of sound policy requires swift action on persistent, bioaccumulative, toxic chemicals to protect our health and environment. Requiring thorough testing of new chemicals before use will protect us from regrettable substitutions. Additionally, we need full access to information about potential health impacts of chemicals in products. Reforming the Toxic Substances Control Act in this comprehensive manner will provide incentive to create safer products and protect the public.

Conclusion

In this report, we have provided information about how mattresses are made, what hidden dangers you should avoid and how to find truly safer choices. Parents should not have to bear the burden of tracking down safe products for their children. Product makers should respond to consumer demand and make safer products. We need strong federal laws that ensure chemicals are safe for use. There is a long road to travel before all products are made without chemicals of concern. As you make choices to purchase products that protect your family, know that you are contributing to a bigger process that will ultimately protect everyone.

Resources

Finding Safer Products

Healthy Stuff

www.healthystuff.org

This website provides information about products tested for toxic chemicals, including in many children's products such as car seats, toys, jewelry and more. It is run by the Ecology Center, a Michigan-based nonprofit environmental organization that works at the local, state, and national levels for clean production, healthy communities, environmental justice, and a sustainable future.

Center for Health, Environment and Justice's PVC-Free Campaign

chej.org/campaigns/pvc

CHEJ is a national organization seeking to prevent harm to human health caused by exposure to environmental threats. Their PVC campaign works to phase out PVC, the most dangerous plastic to our health and environment. Projects include PVC-free schools and toys.

Changing Policy

Clean & Healthy New York

www.cleanhealthyny.org

CHNY advances broad policy and market changes to promote safer chemicals, a sustainable economy, and a healthier world. CHNY provides public education, engages individual companies to promote safer chemicals, and advocates for public policy that protects the health of New Yorkers.

Safer Chemicals, Healthy Families

www.saferchemicals.org

The Safer Chemicals, Healthy Families coalition of a diverse range of organizations united by their common concern about toxic chemicals in our homes, places of work, and products we use every day. SCHF is working to reform the nation's outdated chemical management policies.

SaferStates

www.saferstates.org

SaferStates is a network of diverse environmental health coalitions and organizations in states around the country. SaferStates believes that families, communities, and the environment should be protected from the devastating impacts of our society's heavy use of chemicals, and that new state and national chemical policies will contribute to the formation of a cleaner, greener economy.

Market Transformation

American Sustainable Business Council

www.asbcouncil.org

American Sustainable Business Council advances public policies that ensure a vibrant, just, and sustainable economy, by communicating to businesses, policy makers, and the media how a just and sustainable economy is good for business and good for America and by providing a platform that enables our partner networks Partners to engage their members in the public debate.

Business-NGO Workgroup for Safer Chemicals and Sustainable Materials

www.bizngo.org

The Business-NGO Working Group promotes the creation and adoption of safer chemicals and sustainable materials in a way that supports market transitions to a healthy economy, healthy environment, and healthy people. They develop guidance documents for businesses to use in transitioning to safer materials, and a forum for discussion.

APPENDIX I

Methods

Mattress Marketplace Survey

This report surveys U.S. standard size crib mattresses (69 x 131 cm). Outreach was conducted in Spring 2011. We did not survey mini, portable, and infant or starter mattresses. Several Canadian manufacturers whose products are easily available in the U.S. were also included to provide a more thorough sample of products available for purchase in the U.S. Mattress models referenced in this report are available at stores or online and are intended to provide a representative view of the market. Individual companies may make mattresses that have not been included in this report. Information provided here was obtained through product websites, emails, and direct phone calls.

Identifying Chemicals of Concern

For the purposes of this report, chemicals of concern are defined as the following, based on scientific data indicating possible human health impacts primarily from exposure routes consistent with crib mattress use, or lack of available information:

- Antimony
- Polyurethane
- Vinyl
- Materials likely to contain volatile organic compounds, like synthetic latex
- Proprietary commercial waterproofer or antibacterial formulas
- Undisclosed flame retardants, waterproofers, anti-bacterial additives or other unknown components

Our assessment of the presence of toxic chemicals and possible health impacts are based on company disclosure and peer-reviewed science. This report does not state that using a crib mattress containing chemicals of concern or allergens will definitively result in harm to a baby.

Categorizing Mattress Models

We divided the mattress models into the following four different categories:

1. Mattress models containing chemicals of concern or undisclosed components as described above.
2. Mattress models containing minor “green” component(s), but also using chemicals of concern. “Green” components used in this category are:
 - Polyurethane foam with soy or other plant oils
 - Organic cotton
3. Mattress models containing no chemicals of concern, but including possible allergens. Possible allergens identified in this report are:
 - Lanolin, which may be found on wool
 - Natural latex
4. Mattress models that do not contain any of the chemicals or allergens as named above.

APPENDIX II Detailed Chart of Mattress Properties

Company Name	Available cores											Cover material				Interior components						Added barriers				Price range					
	Metal spring	Foam			Latex			Natural		Blended cotton	Wool	Vinyl	Polyethylene	Other	Polyurethane	Vinyl	Latex	Polyethylene	Petroleum derivatives	Organic component(s)	Allergen	Flame retardant	Waterproofing	Added antibacterial	Contact method						
Polyurethane (PU)		PU with soy or plant oil	Polyethylene	Natural	Synthetic	Wool	Coir	Cotton	Horse hair																	Cotton					
AFG Baby Furniture																															
Innerspring	x										x					x					refused	Vinyl	refused	E					\$47-85		
Innerspring Organic	x										x					x					refused	Vinyl	refused	E					\$120		
Colgate Mattress Atlanta																															
Foam		x									x	x				x	x				Si	Vinyl, PE	n	P					\$100-250		
Innerspring	x										x					x	x				Si	Vinyl, PE	n	P					\$170-180		
Eco models	x	x																			Si	PE	n	P					\$150-310		
Natural I																					Si	PE	n	P					\$300-370		
Da Vinci Décor																															
All others	x										x	x				x					Ant	Vinyl	Ultra-fresh	E					\$80-120		
Willow																					Kevlar	n	n	E					\$200		
Dream on Me																															
Innerspring, Foam	x	x														x					refused	Vinyl	refused	E					\$50-140		
Visco-pedic Innerspring	x	x																			refused	Nano-tex	refused	E					\$150		
Flexus																															
Foundations	x	x																			refused	Vinyl	n	E						\$70-170	
IKEA	x	x																			P/N	n	n	E						\$35-80	
Jeffco Fibres	x	x																			refused	Vinyl	refused	E						\$99-180	

APPENDIX III Mattress Company Contact Information

Company and brands	Address	City, State, Zip, Country	Phone	Website	E-mail
AFG Baby Furniture	945 S. Greenwood Ave., Suite L	Montebello, CA 90640	323-722-6268	http://www.afgbabyfurniture.com/products/afg-261-mattress	service@afgbabyfurniture.com
Colgate Mattress Atlanta	779 Fulton Terrace SE	Atlanta, GA 30316	404-681-2121	http://www.colgatekids.com/category.php?id=mattresses	info@colgatekids.com
DaVinci Décor	855 Washington Blvd.	Montebello, CA	323-728-9988	http://www.davincidecor.com/products/category/mattresses-8-pads	info@davincidecor.com
Dream on Me	170 Circle Dr. North	Piscataway, NJ 08854	877-768-5500	http://www.dreamonme.com/index.php	contact via website
Flexus	808 E. Edna Pl.	Covina, CA 91723	626-966-9801	http://www.flexuscomfort.com/mattress.php	info@flexuscomfort.com
Foundations	7001 Wooster Pike	Medina, OH 44256	866-740-0195 330-721-6854	http://www.foundations.com/crib-mattresses.html	info@foundations.com
IKEA	100 Ikea Dr.	Paramus, NJ 07652	201-843-1881	http://www.ikea.com/us/en/catalog/categories/departments/childrens_ikea/18682/	customer_care@ushelp.ikea.com
Jeffco Fibres	12 Park St.	Webster, MA 01570	800-225-7352	http://www.jeffcofibres.com/juvenile_therapeutic_crib_mattresses.htm	ccyr@jeffcofibres.com
Kolcraft: Contours, Sealy, Stearns & Foster	10832 NC Highway 211 East	Aberdeen, NC 28315	800-453-7673	http://www.kolcraft.com/products/crib-mattresses-and-pads/	customerservice@kolcraft.com
LA Baby	6039 Loukelton Street	City of Industry, CA 91744	800-584-3094	http://www.lababyco.com/mattresses.htm	info@lababyco.com
La Jobi (Serta)	257 Prospect Plains Rd.	Cranbury, NJ 08512	888-266-2848	http://www.lajobi.com/our-brands/serta.html	contact via website
Land and Sky	1401 West Bond Circle	Lincoln, NE 68521	402-470-2468	http://www.landandsky.com/products/organic.asp	customer.service@landandsky.com
Moonlight Slumber	300 Brook St.	Elgin, IL 60120	847-289-0101	http://www.moonlightslumber.com/mattresses.cfm	Info@moonlightslumber.com
Natura World	1450 W. Branch St.	Arroyo Grande, CA 93420	805-481-3100	http://www.babynatura.com/mattress	support@naturaworld.com
Natural Mat	201 Pottersville Rd.	Chester, NJ 07930	908-879-1012	http://www.naturalmatusa.com	naturalmat@kastelinternational.com
Naturepedic	16925 Park Circle Dr.	Chagrin Falls, OH 44023	800-917-3342	http://www.naturepedic.com/products.php	barry@naturepedic.com

Nook	721 S. Glasgow Ave., Unit B	Inglewood, CA 9031	310-417-8220	http://nooksleep.com/	info@nooksleep.com
Organic Mattresses, Inc.	1335 Harter R.	Yuba City, CA 95993	800-951-9196	http://www.omimattress.com/AboutOMI.php	info@omimattress.com
Pure Rest Organics	9541 Ridgehaven Ct.	San Diego, CA 92123	800-596-7450	http://www.purerest.com/ORGANIC-Crib-Infant-Mattresses	orders@ecobaby.com
Savvy Rest	4414 Ivy Commons	Charlottesville, VA 22903	866-856-4044	http://www.savvyrest.com/products/organic-crib-mattress	info@savvyrest.com
Shepherd's Dream	140 S. 11th St.	Montague, CA 96064	800-966-5540	http://www.shepherdsdream.com/p-33-organic-wool-crib-mattress.aspx	questions@shepherdsdream.com
Simmons Kids	677 Commerce Dr.	Hortonville, WI 54944	877-399-9397	www.simmonskids.com	customerassistance@simmons.com
Sleeptek	155 Colonnade Rd. South, Unit 1	Ottawa, Ontario Canada K2E 7K1	888-413-4442	http://www.sleeptek.ca/sleeptek.aspx	info@sleeptek.ca
Soaring Heart Natural Bed Company	101 Nickerson St., Suite 400	Seattle, WA 98109	877-288-1717	http://www.soaringheart.com/productDetail.cfm?topCategory=naturalbeds&CategoryID=16&ProductID=37	soaringheart@soaringheart.com
Strobel Technologies	Jeffersonville Ind. Park, 3131 Industrial Parkway	Jeffersonville, IN 47130	812-280-6000	http://www.strobel.com/crib-matts.htm	info@strobel.com
Suite Sleep	1501 Lee Hill Rd., Unit 3	Boulder, CO 80304	303-449-4150 866-753-3337	http://www.suitesleep.com/category-s/2.htm	info@suitesleep.com
Vivetique	10355 Vacco St.	So El Monte, CA 91733	800-365-6563	http://www.vivetique.com/	info@vivetique.com
White Lotus	431 Raritan Ave.	Highland Park, NJ 08904	732-828-2111	http://www.whitelotus.net/natural-crib-mattress-us-made/	sales@whitelotus.net

Endnotes

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- 2 The basic chemical used in making vinyl, called “vinyl chloride monomer” is one of just 52 known cancer causing chemicals, according to the National Toxicology Program:
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- 4 Learn more about VOCs in general here: http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=31
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- 9 These are our findings. It was our intention to survey all mattress manufacturers whose products are sold in the U.S. Additional mattress models may have come into the marketplace since our research in Spring 2011. Any exclusion of a mattress model or manufacturer is unintentional.
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- 11 EPA addresses VOCs and indoor air quality here: <http://www.epa.gov/iaq/voc.html>
- 12 Some companies use the trade association-run “Certipur” certification, which tests to ensure low VOC emissions. These products are still made with VOCs.
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The Mattress Matters



Protecting Babies from Toxic Chemicals While They Sleep

Cribs and their mattresses are meant to provide a safe, comfortable place for infants to sleep—something they do for as much as 16 hours a day. But how healthy is the mattress, and what do its material components mean for a baby's health?

This report documents both the good and the bad news about the crib mattress marketplace:

- Over a quarter of the mattresses surveyed were made without chemicals of concern, but that means nearly three quarters of them contained suspect or dangerous chemicals.
- Manufacturers have clearly responded to public demand for safer products, but in 20% of the mattresses surveyed here, the claims of environmental or health benefit appear to be more greenwashing than truly protective.
- 11 of the 28 manufacturers surveyed refused to provide specific information about at least one of the materials they use.

Using this report, parents can find safer mattresses for their children, manufacturers can learn how they can do better to provide healthy products, and policymakers can understand why changes are necessary to overhaul our chemical management system. The case of crib mattresses highlights the need for ensuring that chemicals are safe, and that product makers fully disclose the chemicals and materials they use.

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