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The Nanny State Attack on BPA in Baby Bottles:

Oregon and Beyond

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During the past several years, a chemical used to make baby bottles and other plastic products has been making headlines as news stories and activists suggest that it can put infants at risk. Activist groups like the Oregon Environmental Council, Environment Oregon, and the Environmental Working Group claim that this chemical, Bisphenol A (BPA), is "toxic" and could cause cancer, heart problems, reproductive problems, diabetes, obesity and a number of other ailments.[1] These groups and their political allies are pushing legislation to ban certain uses of this product in Oregon and around the nation, and the issue is expected to emerge during the 2010 session of the Oregon Legislature.

Oregon lawmakers should be wary of these anti-BPA proposals. As the following shows, scientific evidence indicates that the risks of BPA are negligible. It is also clear that BPA has a wide range of valuable uses that will be in jeopardy should these proposals move forward. Moreover, BPA has a 50-year record of safe use. Less-tested or inferior alternatives may increase hazards for consumers and are likely to come at higher prices.

WHAT IS BPA?

Bisphenol A is a chemical intermediary used in the manufacturing of certain products, including polycarbonate plastics and epoxy resins. These plastics are used in a variety of products: baby bottles, five-gallon water jugs used in water coolers, medical equipment, sports safety equipment, cell phones and other consumer electronics, household appliances, and many other products. The resins are used for industrial flooring, adhesives, primers, coatings, and computer components. Its applications for food packaging and containers, particularly uses for water cooler jugs, canned foods, and baby bottles, have been the focus of much debate.

BPA makes polycarbonate plastics exceptionally strong and resistant to breakage and to relatively high heat. It is remarkably durable and easily sterilized, making it well suited for reuse and recycling. In contrast, glass can break easily before reaching recycling facilities and mix with other glass, ceramics, and other items. Mixed broken glass is difficult to recycle and often discarded. Glass breakage also poses obvious safety risks and increases the potential for significant food waste.

The transparency of polycarbonate plastics offers unique benefits over non-transparent plastics. Transparency has value for such things as safety goggles or in settings, such as in hospitals, where it is valuable to have a clear view of contents in various containers. In addition, it is also relatively lightweight in comparison to alternatives like metal or glass, a characteristic that offers important safety attributes for individuals who must lift polycarbonate products during shipping and stocking products as well as for consumers. The lightweight material also demands less fuel to transport, saving energy and money.

BPA is also used to make resins and coatings that are suitable for application to a wide range of surfaces at a wide range of temperatures. As a result, it helps prevent corrosion and increase product durability.

Specific applications of BPA-related products include:

Safety products. Polycarbonate plastics are valuable for safety goggles, break-resistant lenses, helmets, kneepads, and a wide variety of sporting goods.

Public health products in the food industry. When used to make coatings for canned foods and beverages, plastics prevent food from bacterial and rust-related contamination – a critical public health need. It also reduces food spoilage, maintains food quality and taste, and extends food shelf life.

Medical devices. One chemist representing the medical division of Bayer Corporation notes the importance of polycarbonate plastics in providing good medical treatment: "Possessing a broad range of physical properties that enable it to replace glass or metal in many products, polycarbonate offers an unusual combination of strength, rigidity, and toughness that helps prevent potentially life-threatening material failures. In addition, it provides glasslike clarity, a critical characteristic for clinical and diagnostic settings in which visibility of tissues, blood, and other fluids is required."[2] For these reasons, it is used in devices to help kidney dialysis patients, cardiac surgery products, surgical instruments, connection components to transport fluids to and from patients, and many other vital applications.

Sanitary water distribution and recycling. When used to make five-gallon water jugs, BPA has important public health and environmental benefits. The bottles offer sanitary transport of bulk supplies of bottled water, which is particularly necessary in locations where tap water is compromised or where quality is low in terms of taste. In addition, the durability of this product means that few of these bottles ever enter a landfill. These bottles are reused, on average, 35 to 50 times and then are recycled. They actually represent a private-sector recycling success story.

Environmental applications. BPA is also used in a variety of environmental products. For example, resins are used in "green building" products including solar panels, skylights, walls, and windows,[3] and numerous other building components.

Corrosion prevention. BPA-related resins are used not only to prevent corrosion and bacterial development in food cans, but also to protect many other things – including cars, bicycles, and components of homes – from corrosion. The resins are also used in a variety of industrial applications. Thus, it reduces the waste and costs associated with more conventional repairs and replacements.

Consumer products. BPA-related products enhance our lives by making possible a host of products that protect consumer goods or that compose them. Polycarbonate plastics are used for CD cases, cell phones, cameras, hairdryers, computers, televisions, automobile parts, appliances, and many more items.

OREGON LEGISLATION AND BEYOND

The Children's Safe Products Act of 2009 (HB 2367) was introduced in the Oregon House of Representatives in 2009.[4] It would have regulated chemicals in children's toys, including BPA. But activist groups like the Oregon Environmental Council and Environment Oregon are also pushing legislation that focuses on BPA in food products and containers, such as baby bottles and canned goods – proposals that are likely to appear on the 2010 legislative agenda.[5]

The issue also has gained traction around the nation, with several states and localities having passed laws on the topic, including: Minnesota (effective January 1, 2010), Connecticut (effective October 1, 2011), Chicago (effective January 31, 2010), and Suffolk County, New York (effective June 2009). A proposal to ban BPA use for baby bottles, sippy cups, and cans containing infant food products failed in the California State Assembly last summer, but it is expected to reemerge as an issue there in 2010. Legislation also has been introduced in Hawaii, Illinois, Maryland, Massachusetts, Michigan, Missouri, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Texas, Vermont, and Washington State.

At the federal level, Sen. Charles Schumer (D-NY) introduced an anti-BPA bill, called the BPA-Free Kids Act of 2009 (S. 753), that would ban BPA in containers used for children under three, excluding metal cans. In the House, Rep. Edward Markey (D-Mass.) introduced the Ban Poisonous Additives Act (HR 1523), an extreme proposal to ban BPA in *all* food-contact containers. Neither bill has reached the floor for a vote yet.

The only national government to enact a BPA ban is Canada, which banned its use for making baby bottles. However, it issued the ban after its own scientific review of BPA could find no risks associated with existing exposures through consumer products. Health Canada noted in a statement: "The scientists concluded in this assessment that Bisphenol A exposure to newborns and infants is below levels that cause effects; however, due to the uncertainty raised in some studies relating to the potential effects of low levels of Bisphenol A, the Government of Canada is taking action to enhance the protection of infants and young children."[6]

The real reason for the move can be gleaned from this comment from Canadian Environment Minister John Baird: "Many Canadians, especially mothers of babies and small children in my own constituency of Ottawa West-Nepean, have expressed their concern to me about the risks of Bisphenol A in baby bottles." Hence, the government felt the (political) need to regulate because media and activist hype created unwarranted fears among parents.

NEGLIBLE RISK

In wide use for over 50 years, BPA has been extensively studied for potential impacts on human health. Some studies report no linkages between BPA and health effects. Others allege potential links between BPA and cancer, and others suggest that BPA can produce "endocrine mimicking" effects. Some have even claimed a link between BPA and obesity.

This large body of research has failed to find a strong relationship between current consumer exposures to BPA and health effects. Yet the issue continues to get considerable media coverage as environmental activist groups and sensationalist news reports allege that BPA poses serious public health threats which warrant increased regulations and bans. Washington State Rep. Mary Lou Dickerson said in March 2009: "BPA is a dangerous chemical that should never get anywhere near a baby or young child's lips.…Imagine giving a baby a bottle laced with a cancer-causing chemical."[7] Such comments may spark fear and garner press coverage for lawmakers, but they have little ground in reality. The real issue is whether children, or any other subset of the population, are ever exposed to levels high enough to pose problems. The data indicate that they are not, as detailed below.

Exposures. The best science tells us that risks associated with various substances are related to the dose and duration of exposure. High exposures to certain substances over decades can pose significant cancer risks. Different substances will have effects at different exposure levels, but the basic rule for all is that risk decreases with declining exposure level. At trace-level doses, risks are negligible. This is good news because humans are constantly exposed to thousands of trace chemicals every day, from man-made chemicals to naturally occurring ones.

Concerns arise when exposure to a specific chemical reaches levels that cause adverse reactions, either acute effects (i.e., poisoning) from extremely high doses or long-term effects (i.e., cancer) from relatively high doses over several decades. Accordingly, U.S. regulators assess at which level certain chemicals might trigger a response and set targets to keep human exposures below levels of concern, usually hundreds if not thousands of times lower than the lowest level that could have an adverse effect.

The U.S. Environmental Protection Agency (EPA) set such targets for BPA relying on dosing studies with rodents. It determined that the exposure level for BPA in animals at which there was no observed effect is 50 mg/kg body weight/day. It then assumed the risk to humans would be much higher and estimates that a safe human dose is 0.05 mg/kg exposures for humans per day.

Fortunately, human exposure to BPA through food and other consumer products is far below those levels. A peer-reviewed analysis by Michael A. Kamrin, published in *Medscape General Medicine*, assesses the best available data on consumer exposure to BPA. It reveals that consumers are most likely exposed to BPA at levels that are 100 to 1,000 times lower than the EPA's estimated safe exposure levels.[8] He notes further that the research on BPA also shows that the exposure levels per body weight are similar for adults and children, which indicates that infant exposure is not significantly higher. Moreover, the risk to humans is probably much lower than these estimates suggest because humans metabolize BPA faster and better than do rodents.

Endocrine Science. The Environmental Working Group dubs BPA "a potent endocrine-disrupting chemical" that regulators should ban.[9] Yet, the science does not support such alarmist claims.[10]

Scientific research identifies BPA as "weakly estrogenic" – hardly potent – and such effects are observed at levels far higher than existing consumer exposure levels.[11] But even safe, natural food products, like soy, have such attributes. A broader understanding of this issue helps place it in perspective.

Humans are regularly exposed to such chemicals, both manmade and natural. Again, dose level is a critical element. Humans are regularly exposed to estrogen-mimicking compounds produced by plants – so-called phytoestrogens – in our everyday diet. Phytoestrogens, for example, are found in all legumes, with a particularly high level found in soy.

The impact of weakly estrogenic synthetic substances like BPA is insignificant compared to human exposures to naturally occurring phytoestrogens in the human diet. According to data from a 1999 National Academy of Sciences study, exposure to natural phytoestrogens is 100,000 to 1 million times higher than exposure to estrogen-mimicking substances found in BPA.[12] "Given the huge relative disparity between the exposure to phytoestrogens as compared to BPA concentrations, the risk of BPA in consumer products appears to be about the same as tablespoon of soy milk," notes researcher Jonathan Tolman.[13] We have little to fear from soy milk, so we have even less to fear from BPA and similar synthetic compounds.

Research does indicate that BPA, like soy, can bind to estrogen receptors on the human body. At high levels (probably quite high), this attribute in theory could produce hormone-related effects, such as early sexual development in females. Yet, such impacts have not been observed in humans exposed to BPA at existing exposures from consumer products. Effects have been observed in rodents that were exposed to very high levels of BPA via injections and, in some cases, among animals that were orally fed high levels of the chemical.

RODENT TESTS

Most of the concerns about BPA are related to findings from rodent tests alleging a link between this substance and various potential health problems from obesity to cancer.[14] However, regulatory bodies have found these findings unreliable for a variety of reasons including:

- In many studies, the animals were exposed to levels far above existing human exposures.
- These studies fail to account for interspecies differences.
- Exposure routes were different: The animals were injected with BPA, while humans ingested it.

Exposure disparities. As noted, the dose level in many rodent studies is excessive – far beyond human exposure levels. In fact, even healthy foods from carrots to celery produce cancer in rodents when administered in high doses.[15] Fortunately, BPA exposures from consumer products are extremely low and highly unlikely to pose public health impacts.

These studies are not definitive and have been subject to criticism for problems associated with methodology and consistency. The European Union (EU) assessment notes: "The Panel considered that low-dose effects of BPA in rodents have not been demonstrated in a robust and reproducible way, such that they could be used as pivotal studies for risk assessment."[16] Similarly a U.S. National Toxicology Program study also explained the problems with relying on these studies to draw conclusions:

> These "low" dose findings in laboratory animals have proven to be controversial for a variety of reasons including concern for insufficient replication by independent investigators, questions on the suitability of various experimental approaches, relevance of the specific animal model used for evaluating potential human risks, and incomplete understanding or agreement on the potential adverse nature of reported effects.[17]

Interspecies differences. The risk of BPA is probably even lower than the EPA estimates of 50 mg/kg body weight per day because humans are less sensitive to BPA than are the lab animals that were used to set the standard. Humans tolerate far higher doses than animals because the human body more easily breaks down BPA and passes it out via urination. Indeed, we see this effect with many substances.

For example, humans can consume moderate doses of Ibuprofen, chocolate, or grapes without ill effect. But these substances are toxic to the family dog, which lacks the same capacity to metabolize them. Such interspecies differences highlight the limitations of animal studies. In the case of BPA, we use animal studies to set standards, but we should remain aware that the science indicates that the effects on humans are different.

For this reason, BPA is not only less toxic; it is less likely to pose endocrine-related effects. The human body quickly breaks down BPA into substances that do not bind with estrogen. The EU study reports:

> [T]he species differences in toxicokinetics, whereby BPA as parent compound is less bioavailable in humans than in rodents, raise considerable doubts about the relevance of any low-dose observations in rodents for humans. The likely high sensitivity of the mouse to estrogens raises further doubts about the value of that particular species as a model for risk assessment of BPA in humans.[18]

Exposure routes. Many studies rely on injection of BPA in high concentrations into rodents rather than feeding them the substance. This approach is of limited relevance to human exposures, which occur via trace amounts in our diets. However, there are some studies suggesting that rodents have suffered health effects from exposures to BPA at levels equivalent to current estimated human exposures.

HUMAN DATA

Absent a compelling body of evidence from rodent studies, activists have turned to human studies that they say show the dangers of BPA. However, these studies are limited and have been unable to produce conclusions about BPA impacts on humans. The National Toxicology Program report notes:

> Drawing firm conclusions about potential reproductive or developmental effects of Bisphenol A in humans from these studies is difficult because of factors such as small sample size, cross-sectional design, lack of large variations in exposure, or lack of adjustment for potential confounders. However, the NTP Expert Panel on Bisphenol A (2) concluded that several studies collectively suggest hormonal effects of Bisphenol A exposure (24, 92, 97) including one in occupationally exposed male workers likely exposed through multiple routes including inhalation (24).
>
> The NTP concurs with findings of the recent evaluations (2, 3) that while these studies may suggest directions for future research, there is currently insufficient evidence to determine if Bisphenol A causes or does not cause reproductive toxicity in exposed adults. There is also insufficient evidence in humans to determine if Bisphenol A does or does not cause developmental toxicity when exposure occurs prenatally or during infancy and childhood.[19]

In other words, studies have been unable to establish a significant risk to humans even where humans were exposed to relatively high levels in occupational settings. The risks to consumers are much lower.

Since the release of the report, there have been several other studies on BPA that have made news. In September 2008, the *Journal of the American Medical Association* published a study that alleged to find higher levels of heart disease and diabetes among individuals who also had relatively higher levels of BPA in their urine than did other study participants.[20] It took existing data collected in the National Health and Nutrition Examination Survey 2003-2004 of 1,455 adults aged 18 to 74 years. It included both health information and a one-time measurement of BPA levels in urine. The statistical model then found an association between those individuals with a high BPA measurement and the incidence of heart disease and diabetes. Such associations can result simply from a statistical accident.

The study suffers from far more serious flaws that render the findings highly unreliable.[21] The measurement of BPA for each individual occurred at just one point in time. It is not fair to assume individuals with the highest levels at one moment will have the highest levels all of the time. The level of BPA will vary depending on a variety of factors. Individuals with high rates in this study might only have them because they recently had exposure from a canned good within a few minutes or hours before the test, not because they have more exposure overall than anybody else in the study. Absent any information on actual exposure levels over many years or decades, the study simply does not have the data necessary to determine which individuals actually have higher exposure levels. This flaw renders the study largely useless for drawing any conclusions.

Another recent study alleges a link between BPA and sexual dysfunction in men. It interviewed 634 factory workers in China who had been exposed to relatively high levels of BPA. The workers were questioned about sexual dysfunctions of which they might suffer. It also surveyed a control group not exposed to BPA at those levels. The study found that the exposed workers were four times more likely to have such problems, and the article suggests that BPA may the cause.

One might think from reading the news headlines or from listening to environmental activists that this study has settled the issue about BPA's endocrine effects on humans. “This study should serve as a wake-up call to Americans, nearly all of whom have measurable levels of BPA in their bodies,” an activist with the Environmental Working Group told reporters.[22]

In reality, the study has limited value for a variety of reasons. The most obvious is the exposure level. The exposure levels of the workers is upwards of 50 times U.S. consumer exposures, and probably much higher in many cases. In addition, BPA exposure levels were estimated based on a number of factors and easily could be far higher than estimated by the researchers who may have their own research biases. Moreover, workplace safety standards are probably not enforced as rigorously in China as they are in United States. Accordingly, the high exposures in China do not necessarily reveal all that much about risks associated with the trace level exposures that are common in the United States.

Second, much of the exposure to BPA among the workers resulted from inhalation, not consumption in the diet. This is very important. When ingested, the human body metabolizes and passes BPA, preventing it from interfering with endocrine systems. Accordingly, dietary exposures are very different and pose a much lower risk.

Less obvious – but equally, if not more, important – are problems associated with this type of research survey. First, there are many potential confounding factors which the study cannot address fully. Indeed, the workers are exposed to many other things in common. It is very difficult to exclude the possibility that the cause of the effects had nothing to do with BPA, although researchers did attempt to impose some controls. For example, what if workers in these plants have more stress than the individuals in the control group? How would one measure that factor? In fact, stress is a leading cause of such problems, which makes it a more likely explanation for such differences.

Another problem relates to the interview process. Workers might express greater concerns about health issues because they know they are participating in a research study related to their work environment, which includes exposure to a host of chemicals. And they were asked to gauge some very vague, subjective, and difficult-to-measure feelings, including "reduced sexual desire" and "reduced satisfaction with sex life." The control group, without any such connection, may downplay any such personal dysfunctions because they are not aware that they are part of any obvious subset of individuals who might have a unique reason to suffer these problems. Absent some potential reason outside their control, most men probably do not want to report such problems.

Finally, accidental associations between variables occur regularly in such studies. That is why scientific conclusions are almost never drawn from one study. Many times the findings of the first study are overturned by the failure to reproduce such results in many others. Accordingly, this study has not settled the issue and has not dramatically altered the research on this topic.

Absent any strong data showing actual effects associated with trace BPA exposures in the human diet, some activists have devised studies that do not even bother to make associations. Instead, they try to indict the substance *based on exposure alone*. For example, the Environmental Working Group produced a paper that measures BPA levels in human urine.[23] But such measurements actually support the fact that BPA is having little impact since it passes through the body quickly.

Moreover, the mere presence of any chemical BPA in human urine, blood, or body fat does not mean there is a public health problem. At every point in human history, the body has been exposed to, contained, or passed chemicals from a variety of environmental sources – natural and made-made. Stone-age hunter-gatherers were sure to have more chemical byproducts of burning wood for fuel, while people living today are likely to have industrial chemicals associated with urban living. The issue is not whether the chemicals derive from primitive lifestyles or modern ones; the issue is the risk level. Substances that are toxic at one level often have no impact at trace levels.

For example, while most people's urine might contain traces of BPA or its metabolites, it probably also contains cyanide. According to the Agency for Toxic Substances Disease Registry (ASTDR), "Exposure to high levels of cyanide harms the brain and heart, and may cause coma and death."[24] Yet trace levels of cyanide in our urine results from eating some very healthy foods that are loaded with many beneficial anti-oxidant chemicals – such as almonds or Brussels sprouts – but contain natural traces of cyanide. Hence, low-levels of this toxic substance in our urine are still not evidence of a problem. Rather, it is evidence that trace cyanide passes through our bodies without any measurable ill effect. Thus, the benefit of eating these good foods well outweighs risks of trace chemicals they contain.

The Centers for Disease Control and Prevention noted in its report on this same topic: "Just because people have an environmental chemical their blood or urine does not mean that the chemical causes disease. The toxicity of a chemical is related to its dose or concentration in addition to a person's susceptibility."[25] A key point to remember is the fact that, although we have chemicals of modern lifestyles in our bodies, it is those lifestyles that have extended the human lifespan. In fact, humans are living longer than ever before, even as we create and use a host of chemicals.[26]

COMPREHENSIVE STUDIES AND REVIEWS

Myriad studies on BPA continue to come available, each with its own claims and limitations. However, even when studies claim to have discovered a new link, it is important to remember that no single study is likely to overturn the complete body of research. In fact, methodological problems and applicability of new studies continues to be an issue with new peer-reviewed research. Scientific panels around the world have reviewed, and continue to review, the complete body of evidence; and none report serious concerns about BPA. Instead, they affirm findings of a very low risk. Accordingly, regulatory bodies around the world have determined that the benefits of using BPA to protect our food and perform other functions outweigh any risks.

In the United States, the regulatory body in charge of BPA is the U.S. Food and Drug Administration (FDA). After a review of all the studies on the topic, the FDA released a 2008 draft risk assessment which concluded: "An adequate margin of safety exists for BPA at current levels of exposure from food contact uses." On its website the FDA notes:

> Based on our ongoing review, we believe there is a large body of evidence that indicates that FDA-regulated products containing BPA currently on the market are safe and that exposure levels to BPA from food contact materials, including for infants and children, are below those that may cause health effects….This position is consistent with two risk assessments for BPA conducted by the European Food Safety Authority (EFSA) Scientific Panel on Food Additives, Flavourings, Processing Aids and Materials in Contact with Food and the Japanese National Institute of Advanced Industrial Science and Technology. Each of these documents considered the question of a possible low-dose effect and concluded that no current health risk exists for BPA at the current exposure level."[27]

There has been some controversy regarding this FDA assessment with environmental activists maintaining that the agency relied solely on industry studies to draw its conclusions. In reality, the agency simply excluded studies that did not meet rigorous scientific standards as have other scientific review panels. The excluded studies suffered from serious defects, which limited their value in the assessment. The agency's outside peer review board offered some criticisms on such exclusions. The FDA responded to those criticisms as it continued to review the issue.[28]

In January 2010, the FDA announced that it would expand its research to address concerns raised in a 2008 report by the

U.S. National Toxicology Program (NTP). In addition, the FDA stated it would support industry efforts to remove BPA from baby bottles and other products, and it may consider regulations. This shift in perspective appears to have little to do with science than with political pressure.[29]

The findings of the NTP do not warrant much concern because the agency did not find direct evidence of problems among humans. It expressed minimal to negligible concern for almost all factors. It called for more research in one area: It expressed "some concern" (more significant findings would state "concern" or "serious concern") because some rodent studies reported BPA effects on lab animals exposed to relatively low doses of BPA. NTP reported that Bisphenol A "can cause changes in the brain and behavior" and have "effects on the prostate gland" of laboratory animals.[30] The NTP expressed concern that these impacts on rodents may indicate possible impacts on the development of children and fetuses.

Yet, those concerns are drawn from rodent studies that largely have been dismissed around the world (as well as by the FDA) as not particularly relevant or adequate for drawing conclusions. The NTP report noted: "These studies in laboratory animals provide only limited evidence for adverse effects on development and more research is needed to better understand their implications for human health."[31]

It is difficult to believe that the FDA has suddenly found these studies compelling on scientific grounds. Instead, it appears the studies' limitations are now being overlooked to justify a political agenda. The FDA will now likely probably spend millions of taxpayer dollars to study this issue, but it is unlikely to find anything new. BPA has already been studied extensively and has been subject to many scientific reviews around the world. These include:

- **The European Union Risk Assessment.** The EU's risk assessment in 2006[32] found no compelling evidence of BPA-related health effects at estimated human exposure levels. In July 2008, the European Food Safety Authority reaffirmed the 2006 review.[33]

- **National Institute of Advanced Industrial Science and Technology (Japan).** This extensive study of the issue found that "the risks posed by BPA were below the levels of concern, it will be unnecessary to prohibit or restrict the use of BPA at this time."[34]

- **Health Canada:** After its review of the science, Canada's public health agency determined: "Based on the overall weight of evidence, Health Canada's Food Directorate has concluded that the current dietary exposure to BPA through food packaging uses is not expected to pose a health risk to the general population, including newborns and young children."[35]

POTENTIAL CONSEQUENCES OF BPA BANS

While lawmakers often support bans based on unscientific misinformation, rarely do they consider the potential for unintended consequences. Should they begin regulating BPA, all its benefits – ranging from recyclability, reusability, energy efficiency, and durability for protection of food and consumer products – are at risk. In addition, products introduced to perform the same functions may be more expensive, not work as well, and produce new risks.

For example, bans may reduce food safety by eliminating BPA resins used to protect the integrity of canned foods. In addition, policies that force the food industry to switch to glass would prove problematic. BPA has replaced glass containers in many cases, including glass baby bottles because the plastics are not only less expensive and lighter, and eliminate the hazards associated with glass breakage. Children are at a greater risk from broken glass than they are from BPA, particularly if they are given glass baby bottles. The FDA notes that parents who are concerned about BPA risks – risks which the agency says are not a concern – can turn to glass bottles if they wish.[36] But anyone who has ever seen a baby toss a bottle on the floor should be well aware of potential dangers, particularly if small pieces of glass are accidentally not picked up in areas where children crawl.

BPA's use in medical products is also threatened. Rep. Rosa DeLauro (D-Conn.) has called on the FDA to begin reviewing that issue while Congress began to look into regulatory measures on BPA during 2008. She remarked in a letter to the FDA: "The potential risks posed to patients by BPA leaching from medical devices, especially implantable ones, would be very significant….I strongly urge you to expand your request, and have the Science Board also assess the safety of BPA in medical devices."[37] Political pressures should not lead to the removal of BPA products without a complete understanding of the value BPA brings and the serious risks associated with arbitrarily removing valuable medical tools.

Such anti-technology, environmentalist crusades already have had an impact on medicine. For example, *New York Times* science writer Gina Kolata reported in 2002 how a crusade against mercury led hospitals to rely on less effective blood pressure equipment that did not contain mercury. Resulting misdiagnoses from the replacement products have led to inappropriate administration of medications that produced stroke for one patient and other health problems for other patients.[38]

Other plastic products might provide some alternatives; but unfortunately, many of those are under attack by the same groups targeting plastics and resins made with BPA. For example, activists also have specious campaigns to ban polyvinyl chloride plastic (PVC) products used for hospital tubing, blood bags, and other things for which they allege a host of unsubstantiated problems.[39] Even where adequate substitutes exist, they are often more expensive, which simply makes it harder for families to meet basic needs associated with putting food on the table.

CONCLUSION

Oregon legislatures should be careful before regulating BPA. Despite considerable fears raised by activist groups and the press, the science does not warrant regulations on BPA. Instead, it shows that human exposure is too low to have any measurable impact. As a result, regulatory measures to ban or limit BPA use simply promise to raise prices for consumers and could have unintended, adverse health and safety consequences.

Endnotes

1. For example, see the anti-BPA campaign pages at the Oregon Environmental Council website (http://www.oeconline.org/our-work/smart-policy/BPA) and at the Environment Oregon website (http://www.environmentoregon.org/airwater/banbpa).

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3. For example, see Norm Bonenfant, "Cellular Polycarbonate Glazing," Green Building Solutions.org, http://greenbuildingsolutions.net/s_greenbuilding/doc.asp?CID=2174&DID=9101&dowhat=&css=print.

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