

1 **B6: Reducing PVC in Facilities with Vulnerable Populations**
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5 KEYWORDS: PVC, Vinyl, PVC Additives, Dioxin, Phthalates, Children’s Health
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7 OVERRIDING CONCERN: Exposures to chemicals released from PVC products during use are poorly
8 understood and pose avoidable public health risks for which many cost effective alternatives exist.
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11 RELATIONSHIP TO EXISTING POLICIES:
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13 The proposed policy resolution updates and complements – but does not replace – the following existing
14 Association policies:
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16
17 Policy # 9304 (1993) – Recognizing and Addressing the Environmental and Occupational Health
18 Problems Posed by Chlorinated Organic Chemicals.
19

20 Policy # 9607 (1996) – Prevention of Dioxin Generation from PVC Plastic Use by Health Care Facilities.

21 Policy # 20009 (2000) – Support for International Action to Eliminate Persistent Organic Pollutants.
22

23 Policy # 200010 (2000) – Creating Healthier School Facilities.
24

25 Policy # 200011 (2000) – The Precautionary Principle and Children’s Health.
26

27 Policy # 200012 (2000) – Reducing the Rising Rates of Asthma.
28

29 Policy # 200077 (2007) – Calling on the US Congress to Restructure the Toxics Substances Control Act
30 of 1976.
31

32 The American Public Health Association has established prior policy in regards to children’s
33 environmental health and healthy schools,¹ chlorinated chemicals,² persistent organic pollutants,³
34 chemicals policy,⁴ prevention of dioxin generated by health care facilities due to their use of PVC, or
35 polyvinyl chloride plastic,⁵ and reducing the rising rates of asthma in children.⁶ APHA policy also
36 provides the scientific foundation for why children through development are more vulnerable to harm
37 from toxic chemical exposures.⁷
38

39 This policy builds on the public health approaches embodied in these existing policies to prevent public
40 health risk and disease by reducing potentially harmful exposures, especially to children – in this case by
41 avoiding exposure to PVC. PVC, or “vinyl,” is a synthetic thermoplastic polymer⁸ that is used in a wide
42 range of products, helping make it one of the largest commodity plastics in production today. Nearly 15
43 billion pounds are produced annually in the U.S.⁹ PVC is widely used in homes, schools, nursing homes,
44 public housing and other facilities with vulnerable populations where it is commonly found in flooring,

1 carpeting, roofing, wall coverings, and toys, as well as in office supplies such as computers and other
2 electronic devices, 3-ring binders, paperclips, food wrap, lunch boxes, backpacks, and raingear.^{10,11}

3
4 **PVC Additives.** Despite its ubiquity in the marketplace, the public remains largely unaware of the public
5 health and environmental risks posed by PVC at all stages of its lifecycle (from production to disposal).
6 PVC used in consumer products is not a pure material. Chemicals are added, that can make up as much as
7 40 to 60% of a product,¹¹ to change its properties to meet different consumer needs.¹²⁻¹⁵ But these
8 additives have toxic characteristics and moreover are unintentionally released in indoor settings posing
9 avoidable risks to infants, children and other vulnerable populations. In addition, school-age children
10 behave in ways that will increase their exposure to PVC additives in products, including putting plastic
11 products in their mouths and spending a lot of time on the floor and ground, where they can ingest
12 chemical residues from toys, containers, dirt and dust on a regular basis.¹⁶

13
14 Common PVC additives include stabilizers such as lead, cadmium, and organotins, plasticizers such as
15 phthalates, and fillers.¹²⁻¹⁵ Phthalates, which are the most common additive, and other additives are not
16 bound to the PVC¹⁷ making it easy for these substances to migrate out of the product. Testing has
17 identified phthalates in ambient air¹⁸⁻²⁰ and dust²¹ where it can be inhaled by children, teachers,
18 administrators, and janitorial staff. Phthalates have been found in 97 percent of people tested including
19 new born infants.^{22, 23} The highest levels were in children ages 6 to 11, and in women.²²

20
21 **Phthalates and Asthma.** A number of studies have found associations between phthalates emitted from
22 PVC building products and an increased risk of asthma and allergies, especially in children.²⁴⁻³⁰ APHA
23 Resolution #200012 has previously recognized that childhood asthma is an important predictor of asthma
24 over a lifetime and that children are known to be more exposed and susceptible to a number of
25 environmental factors known to be associated with asthma."⁶ This resolution builds on this existing
26 policy to address the potential impact on asthma rates from exposure to phthalates in facilities with
27 vulnerable populations.

28
29 **Phthalates and Reproductive Toxicity.** Numerous studies, including an expert panel of the U.S.
30 National Toxicology Program,³¹ have found that phthalates are linked to a variety of reproductive
31 problems.^{20, 32-36} Other adverse health effects include altered liver³⁷ and kidney function,³⁸ and respiratory
32 problems in children.^{39, 40}

33
34 **Metal Additives.** Metal stabilizers are used in PVC to prevent degradation from heat during processing

1 and from exposure to ultraviolet light during the useful life of a product.^{12-15,41} They include lead,
2 cadmium, zinc, and the organotins. These metals leach out of PVC products.⁴²⁻⁴⁹ Lead is a known cause
3 of neurodevelopmental problems.⁵⁰ Cadmium causes cancer and kidney damage.⁵¹ Organotin stabilizers,
4 which were introduced to replace lead and cadmium, also leach from PVC products⁴³⁻⁴⁵ and can affect the
5 central nervous system, skin, liver, immune system and reproductive system.⁵²⁻⁵⁷

6
7 In addition to direct exposures that threaten children and other vulnerable populations, the public is also at
8 risk from exposure to toxic chemicals released by PVC during other periods of its lifecycle - during
9 production and disposal. PVC products are primarily made from vinyl chloride monomer.¹¹⁻¹⁵ Vinyl
10 chloride causes a rare form of liver cancer, and damages the liver and central nervous system⁵⁸ and is
11 considered a human carcinogen.^{59, 60}

12
13 **Environmental Justice.** The chemical plants where PVC is manufactured are often located in or near
14 low-income neighborhoods and communities of color. Mossville, LA is a historic African American
15 community surrounded by five PVC production facilities that release vinyl chloride, ethylene chloride,
16 and dioxins, a highly toxic group of chemicals.⁶¹ Testing by ATSDR found fish, vegetables, and fruit in
17 the area contaminated with dioxin.⁶² Some residents had more than three times the national average of
18 dioxins in their blood.⁶³ Residents reportedly were two to three times more likely to suffer a variety of
19 adverse health problems including respiratory and nervous system disorders.⁶⁴ The impact on the
20 communities near facilities that produce PVC is a major environmental justice concern.

21
22 **PVC Disposal.** Disposal of PVC products pose additional public health and environmental risks. When
23 PVC materials are burned, the metals present as additives are released. In addition, dioxins are formed.⁶⁵
24 APHA Resolution #9607 has previously recognized that dioxins are formed by the disposal of chlorinated
25 compounds, such as PVC, and that they “are released into the environment during combustion of
26 chlorinated plastic products.”⁵ The most toxic form of dioxin, TCDD, is a potent cancer-causing agent
27 and is considered a human carcinogen.^{66,67} Dioxins also cause a wide range of non-cancer effects
28 including reproductive, developmental, immunological, and endocrine effects in both animals and
29 humans.⁶⁸

30
31 APHA Resolution #9304 has previously recognized that chlorine-containing compounds such as PVC
32 “pose public health risks involving the workplace, consumer products, and the general environment” and
33 that the elimination of these compounds from “certain manufacturing processes, products, and uses may
34 be the most cost-effective and health protective way to reduce health and environmental exposures to

1 chlorinated organic compounds.”² The International Joint Commission, a joint body established by the
2 United States and Canada, similarly recommended that “Parties, in consultation with industry and other
3 affected interests, develop timetables to sunset the use of chlorine and chlorine-containing compounds as
4 industrial feedstocks...”⁶⁹

5
6 **Alternatives to PVC.** Primary prevention of exposure to these toxic additives, especially of children,
7 could be easily accomplished by replacing PVC with safer readily available products and materials. For
8 example, vinyl flooring can be replaced by linoleum, vinyl roofing by thermoplastic polyolefin (TPO),
9 and vinyl siding and windows by aluminum.⁷⁰ Researchers at Tufts University found that vinyl flooring
10 may be cheaper up front than other alternatives, but over the life of a product, PVC costs more due to the
11 increased cleaning costs needed to maintain the flooring. The total cost over 20 years was estimated at
12 \$1,048 for Armstrong solid vinyl flooring compared to \$805 for Armstrong linoleum.⁷⁰ These researchers
13 found that alternatives providing equal or better performance are available for almost every use of PVC;
14 some are cost-competitive, while others cost slightly more than vinyl.⁷⁰⁻⁷² Furthermore, replacing PVC
15 with safer alternatives will likely not result in job loss according to one analysis.⁷² Instead workers will go
16 from fabricating PVC products to fabricating the same products from other materials.

17 The public health risks posed by PVC’s additives and its hazardous lifecycle have been recognized by a
18 growing body of organizations. Major corporations in the electronics industry are phasing out PVC in
19 favor of readily available safer and cost-effective alternatives.⁷³ Hospitals and healthcare providers have
20 pledged to reduce or phase out PVC and/or DEHP.⁷⁴ Several governmental bodies around the U.S. and
21 world have enacted policies to reduce the purchase of products like PVC.⁷⁰ The U.S. Green Building
22 Council’s LEED program provides incentives to avoid building materials such as PVC that release
23 Persistent Bioaccumulative Toxins (PBTs) and contain phthalates.^{75,76} In addition, PVC ranked low in
24 several studies of sustainability metrics including life cycle impacts and green design principles.^{77,78}

25
26 The Vinyl Institute, American Chemistry Council and others⁷⁹ have challenged claims that releases of
27 PVC additives from consumer products and the release of toxic chemicals during the PVC lifecycle pose
28 unacceptable risks to public health and the environment. However, the evidence linking exposure of
29 vulnerable populations such as children to adverse health and environmental risks related to PVC
30 products continues to grow and is becoming more apparent to the general public who are beginning to
31 avoid PVC products when they can. While plastics including PVC may offer considerable benefits, our
32 current approaches to production, use and disposal are not sustainable and present concerns for wildlife
33 and human health.⁸⁰ A precautionary approach, such as described in APHA Resolution #200011⁷ and by

1 the President's Cancer Panel⁸¹ can reduce exposures to this avoidable public health and environmental
2 risk.

3
4 APHA Resolution #200010 recognized that "every child and school employee should have a right to an
5 environmentally safe and healthy school," that parents and school staff have a right to know about
6 environmental health hazards and threats in the school environment, and that schools should follow
7 "pollution prevention principles for infrastructure siting, construction, maintenance, and other practices
8 that reduce or eliminate children's exposures that affect health, learning, or behavior."¹ Reducing
9 exposure to PVC products is consistent with this resolution.

10
11 In light of the widespread hazards chemicals released by PVC pose to children's health due primarily to
12 the release of additives from consumer products as well as at every stage of its lifecycle, and PVC's
13 pervasiveness in schools, daycare centers, medical care facilities, nursing homes, public housing, facilities
14 for special needs and the disabled, and other facilities with vulnerable populations, **the American Public**
15 **Health Association hereby:**

- 16
17 1. Urges local, state and federal governments to educate administrators, purchasing staff,
18 employees, parents and care-givers about PVC hazards and safer alternatives in schools, daycare
19 centers, medical care facilities, nursing homes, public housing, facilities for special needs and the
20 disabled, and other facilities with vulnerable populations;
- 21 2. Urges state and federal governments to require labeling of PVC used in products, and require
22 product manufacturers that sell PVC products to schools, daycare centers, medical care facilities,
23 nursing homes, public housing, facilities for special needs and the disabled, and other facilities
24 with vulnerable populations to notify purchasers of the amount of PVC and the specific chemical
25 name of additives used in individual products. This information should be made available online
26 in a searchable database;
- 27 3. Urges state and federal governments to provide financial incentives for schools, daycare centers,
28 medical care facilities, nursing homes, public housing, facilities for special needs and the
29 disabled, and other facilities with vulnerable populations for the development, purchase and use
30 of safer alternatives to PVC in schools;
- 31 4. Urges local, state and federal governments and decision-makers to phase out the use and purchase
32 of PVC in building materials and office suppliers in schools, daycare centers, medical care
33 facilities, nursing homes, public housing, facilities for special needs and the disabled, and other
34 facilities with vulnerable populations when cost-effective alternatives are available;

- 1 5. Urges state and federal governments, in enacting such phase-outs, to consider policies that
2 alleviate short-term economic impacts on the PVC production workforce, and to also consider
3 economic benefits to workers in industries making safer alternatives; and
- 4 6. Urges the National Institute of Allergy and Infectious Diseases (NIAID) to research the link
5 between asthma and exposure to phthalates and other additives released from PVC products.

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