

P106 | Reproductive and Respiratory Hazards Associated with Different Nail Salon Services

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Nail salon exposures are complex and can vary depending on the types of manicures performed and the products used. Previous exposure assessments have focused on acrylic manicures or general salon spaces, without considering the differences in product formulations from different services. The objective of this study was to assess respiratory and reproductive hazards generated during four different nail services (gel, dip, traditional lacquer, and acrylic manicures) using controlled laboratory studies. Volatile organic compound (VOC) exposures to 22 individual compounds were measured in the breathing zone using a direct-reading FTIR (Gasmeter, Inc.) during simulated manicures in an exposure chamber. Three brands were assessed for each manicure type to evaluate differences in chemical formulations across manufacturers. Four replicates for each type of manicure and brand were conducted for a total of 48 trials. VOCs varied significantly between the different types of manicures. Acrylic manicures had higher concentrations of butyl and ethyl acrylate compared to other types, while isopropanol concentrations were highest for gel, dip, and lacquer manicures. Acrylic manicures also had higher exposures to formaldehyde [geometric mean (GM) = 0.17 ppm] compared to dip (GM = 0.01 ppm), gel (GM = 0.004 ppm), and lacquer (GM = 0.002 ppm) manicures. However, benzene exposures were higher for gel and dip manicures (GM = 0.18 and 0.16 ppm, respectively) compared to acrylic manicures (GM = 0.04 ppm). During acrylic and dip manicures, peak exposures for formaldehyde (GM = 0.9 and 0.2 ppm, respectively) exceeded the NIOSH short-term exposure limit (STEL) of 0.1 ppm. Acrolein and 1,3-butadiene also had peak exposures (GM = 2 and 6.3 ppm, respectively) that surpassed the STELs of 0.3 and 5 ppm during acrylic manicures. For gel and lacquer manicures, only peak acrolein exposures exceeded the STEL of 0.3 ppm. The elevated short-term exposures suggest a need for direct-reading exposure measurements capable of capturing peak exposures. This study provides valuable insights into the respiratory and reproductive hazards faced by workers in nail salons during different types of manicure services and emphasizes the importance conducting task-based exposure assessments to better understand the health risks associated with these salon procedures.

P107 | Fetal Skeletal Examination: Single (Alizarin Red S) or Double (Alcian Blue and Alizarin Red S) Staining?

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Under the ICH S5 (R3) (2020) guidance it is clear (i.e., not mentioned) that fetuses should be prepared for skeletal examination using single Alizarin Red S only. This is the current default for pharmaceuticals and has been unquestioned by regulators for decades. For chemicals, biocides, and pesticides, regulatory guidance is a little more ambiguous. Both OECD 414 (2018) and US EPA (1998) test guidelines specifically reference double (Alcian Blue and Alizarin Red S) staining methods and examination of "bone and preferably cartilage" is included in the OPPTS 870.3700 (1998) test guidelines. This vagueness has led to a significant divergence of approach by companies conducting or sponsoring Embryo-Foetal (EFD) or Pre-Natal Developmental Toxicity (PNDT) studies ranging from no formal cartilage examination or a cursory examination of easily visible cartilage e.g., costal cartilage to the current gold standard of a full examination of double stained fetuses. There have been no regulatory concerns or clarification of this matter. If single staining is considered appropriate for pharmaceuticals, why should we bother for chemicals, biocides, and pesticides? Double staining is considered to be time-consuming, expensive, and unnecessary, or should we be conducting the most comprehensive examination available?

P108 | A Keyword-Based Approach for the Identification and Classification of Mechanistic Evidence for Placental Toxicity Following Exposure to Polychlorinated Biphenyls

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Polychlorinated biphenyls (PCBs) comprise a class of 209 congeners that were banned in the US in 1979, though human exposure still occurs due to their environmental persistence. An extensive body of literature describes associations between PCB exposure and decreased offspring weight/growth and increased offspring mortality. However, mechanistic information to support the biological plausibility of these associations has not been comprehensively reviewed. One of the challenges in evaluating potentially relevant mechanistic evidence is the vastness of the PCBs literature database (~70,000 studies identified by EPA). Given the integral role of placental function in both offspring growth and survival, a targeted, keyword-based classification approach was developed to expedite the identification, analysis, and prioritization of mechanistic literature supporting biological plausibility of adverse developmental outcomes resulting from placental toxicity following PCB exposure. A list of 67 keyword entities relevant to placental health (e.g., trophoblasts, preeclampsia, JEG-3) was developed by subject matter experts and further refined using controlled ontologies (e.g., Unified Medical Language System). The keyword entities were searched against EPA's PCB literature database, which resulted in the identification of 859 studies. Title and abstract screening was conducted in DistillerSR software

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