

latent fingerprint of a child, which is higher in fatty acid content than that of an adult, evaporates much quicker than the print of an adult. This is an area that requires further research. A controlled study that investigates the difference in the disappearance rate of the prints of children vs. adults is needed. The results would have implications for law enforcement personnel and forensic scientists.

## MATERIALS AND METHODS

A consent form was prepared following federal guidelines for the use of humans in experimentation (45CRF46) along with an introductory letter to be given to subjects and their parents/guardians. Following the approval of the Institutional Review Board, potential subjects were contacted using a non-probability sampling technique. Children under the age of 10 and adults over the age of 24 were invited to participate. Adolescents were excluded from the study because of the literature suggesting that a change in chemical secretion occurs during adolescence. Written informed consent was obtained from all adult subjects and from the parents/guardians of all child subjects.

Following consultation with the local FBI forensic lab and the Rochester Police Department, the researcher learned the technique of lifting latent fingerprints at the Rochester Police Department. Fingerprints were then obtained using the following technique. Each subject wiped his hands on a dry paper towel. This procedure was instituted to control for possible contamination of food, dirt, occupational or work-related substances, etc. that could alter the prints of adults vs. children. In order to control the pressure exerted, the researcher then assisted each subject in pressing one of his fingers firmly onto a clean glass slide. Each subject pressed four different fingers on four different slides. The researcher wore vinyl gloves during the procedure to avoid leaving her own prints on the slides. The slides were labeled with the

subject's identification number. A written record was made assigning subjects an identification number with the subject's age and gender. No names or other identifying characteristics were collected on subjects. The subject's age and gender did not appear on the slide. All slides were stored together in a slide tray in an oven with an internal temperature of 100-120 degrees Fahrenheit (64.5-76 degrees Centigrade). Prints were lifted on days 1, 3, 5, & 7 (day 1 being the day the prints were made on the slides) using standard techniques for lifting latent prints. The researcher wore vinyl gloves during the procedure to prevent contaminating the slide. Because of the possible untoward health effects of accidentally inhaling the powder while dusting multiple prints in a short period of time, the researcher also wore a lab coat and mask for protection (as suggested by the regional FBI laboratory). Latent prints were taped to white index cards and each card was labeled with the subject's identification number and the day of the print. Because it is known that a small percentage of people do not leave much in the way of a latent print, prints were lifted on the evening of the first day for all subjects. This would also insure that adequate pressure had been exerted by both the children and adults. If a print could not be obtained on the first day, the subject was eliminated from the study.

In analyzing the prints, the four fingerprint cards of each individual subject were compared using a magnifying glass. If a minimum of 25 ridges of a print were no longer discernable, the print was considered smudged or inadequate and the day (day 3, 5, or 7) was recorded in the record book next to the subject's identification. By only the subject's identification number being present on the slide and index card, the researcher was unaware of the age of the subject while examining the print and making a decision regarding its presence, thus eliminating any researcher bias in the interpretation of the data. To confirm the researcher's judgment and eliminate any researcher bias, all cards were also reviewed by an independent retired police

detective who was unaware of the subject's age and the researcher's decisions regarding the clarity or disappearance (fewer than 25 ridges) of the print. The police detective's decisions were independent of the researchers. If there was any disagreement, the police detective's judgement regarding the presence or absence of a clear print prevailed.

## RESULTS

Fifty adults participated in the study. The ages of the adults ranged from 24-54 years of age. Three were eliminated because a clear latent fingerprint was not present on any of the slides on the first day. The remaining forty-seven adults had clear prints on the first day. Of the 47 adult prints, all could still be lifted on days three and five; none were smudged or inadequate. On day seven, 4 (8.51%) of the adult prints were no longer clearly visible, but were smudged, no longer showing clear ridges and with portions of the print gone. (See figure 1.)

Fifty children participated in the study. Their ages ranged from 2-10 years of age. All 50 had clear latent prints on the first day of the study and remained in the study. On day three, 10 (20%) of the 50 subjects had prints that were no longer clear, but were smudged or inadequate. On day five, 27 (54%) of the 50 children's prints were smudged and no longer complete. Finally, on day seven, 38 (76%) of the 50 children's prints were smudged and no longer clear or complete. (See figure 2.)

The difference between the two groups of subjects was statistically significant on all days on which measurements were made. On day three, 20% of the children's prints were inadequate compared to 0% of the adults' prints ( $X^2 = 10.49$ ,  $df = 1$ ,  $p < .01$ ). On day five, 54% of the children's prints were inadequate compared to 0% of the adults' prints ( $X^2 = 35.20$ ,  $df = 1$ ,  $p < .001$ ). Finally, on day seven, 76% of the children's prints were inadequate compared to 8.51% of the adults' prints ( $X^2 = 44.94$ ,  $df = 1$ ,  $p < .001$ ).