

Case study carbon monoxide



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Children's Health and the Environment

CHEST Training Package for the Health Sector

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Case study 1

Mrs. Laura Jones is a 33 year old homemaker. She and her husband Pete, 35 years old, live in a small city. She has an degree in accounting, while her husband has a Masters degree in Business Administration. They are no smokers.

In 1995, they bought a house in a suburban area. The home was built in 1958. It was inspected and major appliances in the home were guaranteed for 5 years. The home has three bedrooms, a livingroom, a spare room and a glassed in back porch. It is heated by a forced-air, natural gas furnace in the basement. Hot water is provided by a gas-fired water heater, also in the basement. The house has been painted outside and inside in the weeks beofre they moved into the house.

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- Beginning in the autumn of 1995, Laura Jones began having headaches and feeling very tired. Her two children, Lilian (12 years of age) and Eric (9 years of age), and her husband Pete occasionally awoke in the morning with headaches, dizziness, and nausea. They believed that they all had a touch of "flu" or had eaten bad food.
- Mrs. Jones continued to feel "out of it" for the remainder of 1995 and into the spring of 1996. Her physician, Dr. Whitewash, gave her a "physical", obtaining chest X-rays, blood for complete CBC, and samples for a Pap smear test. He found nothing wrong, saying that "flu" has been going around.

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During the summer of 1996, Mrs. Jones and the whole family felt much better, although she and the children continued to have frequent headaches and to feel slightly fatigued. They felt better when they went away for vacation for two weeks.

In October, 1996, Laura Jones again began to have frequent severe headaches and to become extremely fatigued. She was becoming so lethargic that she could not accomplish her normal housework. She was forgetting tasks, and finding it increasingly difficult to maintain the family checkbook. She was also feeling depressed and defeated in her daily life.

On visits to Dr. Whitewash she was told that there was nothing wrong with her. He said her perceived state was psychosomatic, that she should seek counseling with a psychiatrist

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- By spring 1997, the Jones' children Lilian and Eric, previously excellent students, were on academic probation at school. Lilian, a 7th grader, was in danger of failing and being held back a year. Eric was now getting C's and D's in her classes in elementary school and her teachers were concerned. Mr. Jones, who all his life had been an ambitious and successful employee at a national insurance company, believed he now was in danger of being fired.

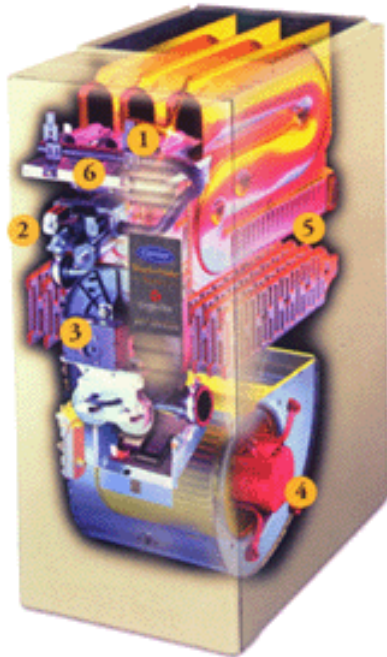
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- ❑ The Jones family contracted a firm to have a fourth bedroom added during the summer of 1997. Because the old furnace in the home was the original unit and would not be adequate to heat the new larger house, the contractor installed a new one. In doing so, he discovered that the heat exchanger in the old furnace was badly rusted through, that the near horizontal run of flue pipe to the chimney was also rusted through, and that the old brick chimney was oversize, unlined, and partially blocked near the top.
- ❑ Upon learning of these problems, Mr. Jones asked that the old furnace be fired up and measurements of CO made by the gas company. With the family safely outside, CO levels in the house were observed to attain 176 ppm after one hour.

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- ❑ The family then went to see Dr. Whitewash, who drew blood for measurement of carboxyhemoglobin. COHb levels came back at between 0.5% and 1.4%. The physician, not familiar with the effects of the gas, told them that since the CO was now out of their bodies, they would be well again.
- ❑ Mrs. Jones continued to suffer from severe headaches, fatigue, depression, and irritability. She also continued to have cognitive and memory problems, and began to develop muscle and joint pain, to have Tinnitus, and to have various visual problems. Mr. Jones continued to find it difficult to do his job. He could not make decisions (loss of executive functioning) and lost track of details in his work. The children continued to struggle academically and socially - cognitive testing at school suggested recent significant declines in I.Q. in both children.

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As of early 1999, the Jones family is attempting to recover from the health problems caused by their old, leaking furnace. They have been seen by a number of health professionals with varying results: neurologists, toxicologists, and neuropsychologists. To the Jones', it appears that few people in the medical community have much understanding of the longterm health effects of chronic CO exposure. They have retained legal counsel and are discussing options which might lead to compensation from responsible parties. Fortuitously, they have kept the old furnace, flue and other parts as evidence.

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What points does this Case Illustrate?

- Have a thorough inspection when you buy a house, especially an older house.
- The multiple symptoms reported (headache, dizziness, nausea) should have increased suspicion of CO poisoning.
- Similar symptoms in several people should also increase suspicion of CO poisoning.
- A CO detector should have been purchased and installed in home.
- The physician should have been strongly encouraged to promptly order COHb tests.
- Furnace and "gas" inspectors should always test for CO.
- Fatigue and lethargy combined with headache are strong indicators of CO presence.

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What points does this Case Illustrate?

- ❑ While the leaking furnace, flue ducts and faulty chimney were discovered by chance, Mr. Jones did the right thing to immediately have the house tested for CO.
- ❑ Blood samples for COHb measurement were taken way too late, ie. they must be done within 2-4 hrs. after leaving the site of the poisoning).
- ❑ The residual effects elicited by all members of the Jones family are consistent with chronic CO poisoning.
- ❑ The health effects of the CO poisoning continue at least 1-1/2 years after the CO poisoning was discovered/ended.

This paper was produced for a meeting organized by Health & Consumer Protection DG and represents the views of its author on the subject. These views have not been adopted or in any way approved by the Commission and should not be relied upon as a statement of the Commission's or Health & Consumer Protection DG's views. The European Commission does not guarantee the accuracy of the data included in this paper, nor does it accept responsibility for any use made thereof.