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## RESEARCH COMMUNICATION

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# The Role of the Human Dry Dock in Smoking Cessation in Japan

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### Abstract

The human dry dock, a Japanese system of detailed health check-ups for middle-aged and elderly people was originally set up for the purpose of secondary prevention, but it is now expected to increasingly play a role in primary prevention. A series of our studies of smoking cessation in the human dry dock setting showed that the abstinence rate increased from 5-6% for non-advised smokers to 9-10% for those who were advised. Thoracic CT screening participants were found to be more likely to quit smoking. It can be estimated that an additional seventy thousand male smokers would quit smoking every year if advice on smoking cessation was routinely given in every dock in Japan.

*Asian Pacific J Cancer Prev*, 1, 209-211

**Key Words:** human dry dock, smoking cessation, health education, health check-up, thoracic CT

### Introduction

The “human dry dock,” a system of detailed health check-ups for middle-aged and elderly people, was started in the 1950’s in Japan. The name stemmed from the dry dock in which a ship is periodically examined. Participants in a human dry dock spent a few days in a hospital in the early days, but recently most participants spend only a half-day in the outpatient section. A standard human dry dock features anamnesis and a survey of lifestyle, a physical examination, blood pressure measurement, serum and urine examination, a chest X-ray, barium gastrography, abdominal ultrasonography and other tests. Recently, thoracic CT screening for lung cancer was introduced among the docks. The fee is paid by participants themselves or supported (fully or partially) by their employers or medical insurers. Human dry docks are located throughout Japan. Currently, many large private and quasi-public hospitals have a dock section, and many independent medical facilities specializing in health check-ups have also been established. It was recently reported that around 4.2 million males and 2.4 million females

were examined in 1271 of the 2600 member facilities of the Japan Hospital Association during 1998 (Japan Hospital Association, 1999).

The human dry dock was originally expected to play a role in “secondary prevention,” i.e., in screening for potential diseases. In addition, it should contribute to “primary prevention,” i.e., health education to modify participants’ lifestyle in order to avoid chronic diseases. Participants fear a potential disease, but this fear must be transformed into motivation to modify their lifestyle.

The smoking rate is still more than 50% among male adults in Japan (Ministry of Health and Welfare, Japan, 1999). It is generally believed that smokers quit smoking when they have a disease. Our study for behavioral models among Japanese showed that smoking was associated with vulnerability to illness, but not the internal Health Locus of Control, which gives the sense that people can control their health condition by their efforts (Ozasa et al., 1995). Therefore, smoking is an appropriate target in a human dry dock setting because the fear smokers possess can be changed into motivation to quit smoking.

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## Efficacy of support to quit smoking in a human dry dock setting

We carried out three smoking cessation trials for smokers in the human dry dock of Kyoto First Red Cross Hospital. The first randomized controlled trial was conducted in 1988. The intervention consisted of showing photographs depicting the health hazards of smoking with a recorded explanation of conventional knowledge. Six months later, the abstinence rate was 8.9% in the intervention group (169 male smokers) and 5.9% in controls (187 male smokers), but the difference was not significant. However, for light smokers whose smoking index was less than 400, the rate were 22.2% (10/45) and 2.3% (1/42), respectively, which was highly significant (Ozasa et al., 1991).

In the second randomized controlled trial (1991), the intervention group was given an approximately two-minute smoking cessation instruction by physicians, then they answered a quiz concerning tobacco, chose their own behavioral goals and were handed a leaflet on how to quit smoking. The intervention was focused on advising behavioral change among smokers. One year later, the abstinence rate was 10.1% in the intervention group (426 male smokers) and 5.3% in the controls (413 male smokers), showing a significant difference (Higashi et al., 1995). Five years later, the abstinence rate was still higher in the intervention group (16.1%) than in the controls (13.1%), although some subjects started smoking again whereas others quit smoking in both groups during the interval period. Participants who frequently visited the dock tended to quit smoking (Nakazawa et al., 1998).

The latest study was conducted for participants who had a thoracic CT screening in the dock (1995). Fifty-nine male and two female smokers were examined for breath carbon monoxide and counseled to quit smoking by physicians according to the method based on cognitive behavioral therapy (intervention group). One female and fifty-eight male smokers, who participated during a different period near the intervention group recruitment, were observed as controls. One year later the abstinence rate was 18.8% in the former group and 15.1% in the latter (no significant difference). However, both rates were higher than in the former studies. Heavy smokers tended to quit smoking in this trial compared to previously used smoking cessation instructions. This may be because the participants in the thoracic CT screening had more interest in their health and that heavy smokers often have abnormal findings on thoracic CT, such as emphysema, bronchial changes and coronary arteriosclerosis as well as a high concentration of breath carbon monoxide. Urinary cotinine is measured for ongoing education. Moreover, introducing a thoracic CT screening increased the number of quitters in a conventional dock setting (Shigeta et al., 1999, and own unpublished data).

Among 4.2 million male participants in Japanese docks, at least 40% are estimated to be smokers. This rate may be lower than that in the general population because smokers have less interest in their health. If smoking cessation were

to be advised in every dock, potentially an additional four percent (i.e., around seventy thousand male smokers) would quit smoking every year.

## Conclusions

Advising smoking cessation in a human dry dock setting made the abstinence rate increase from 5-6% for non-advised smokers to 9-10% for those who were advised. Thoracic CT screening participants are more likely to quit smoking. The impact will be great if smoking cessation is advised in every dock. It is essential that instructors learn behavioral sciences and psychological methods to educate smokers to quit. The human dry dock can play a role of primary prevention as well as secondary prevention, and this additional value will be important for management of docks in the future.

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Personal Profile: **Kotaro Ozasa**

Kotaro Ozasa was born in Kyoto, Japan, in 1956. After graduating from Kyoto Prefectural University of Medicine (KPUM), he was trained for respiratory medicine for several years and has been engaged in epidemiology and community health. He obtained D. M. Sc. at the postgraduate course of KPUM in 1989. He was a staff of the Department of Preventive Medicine, KUPM, and the Director of Sonobe

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