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## Baseline

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## The duration of acute health problems in people involved with the cleanup operation of the Hebei Spirit oil spill

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### ABSTRACT

The authors investigated the duration of health problems of people involved with cleanup efforts for the Hebei Spirit oil spill, which occurred in December 2007 in Taean County, South Korea. The study identified risk factors correlated with the continuation of symptoms. Approximately one year after the accident, 442 people who had participated in the cleanup operation were examined. Data regarding demographic information, risk factors, and the continuation and duration of any symptoms were obtained. Eye symptoms (9.7 months), headaches (8.4 months), skin symptoms (8.3 months), and neuro-vestibular symptoms (6.9 months) had a relatively longer duration than did back pain (1.8 months) or respiratory symptoms (2.1 months). In particular, the remission of headaches had a negative correlation with female gender (HR 0.57, 0.34–0.95, 95% CI), and remission of eye symptoms had a negative correlation with the total hours of daily participation in the cleanup operation (HR 0.24, 0.06–0.95, 95% CI).

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On December 7, 2007, the Hebei Spirit oil spill occurred on the Yellow Sea Coast of Taean County, South Korea. The Hebei Spirit, a crude oil carrier, collided with a crane barge, and 12,547 kl of crude oil leaked into the sea. The devastating result was the contamination of 167 km of coastline from the gulf of Garorim to the coast of Anmyeon-eup in Taean. This was the worst oil spill ever occurring in South Korea. Approximately 13,978 ha of fisheries or fish farms were damaged, and 15 swimming beaches were contaminated. It is estimated that a total of 563,761 people, including 103,351 nearby residents, joined the cleanup operation, which lasted several months ([National Emergency Management Agency of Korea, 2007](http://www.nema.go.kr)).

Because of its immense effect on an ecosystem, any major oil spill draws worldwide attention and becomes an important case for study. Several health-related articles were published following

the Exxon Valdez oil spills in Alaska in 1989, covering topics ranging from the mental health effects to the physical symptoms of people impacted by the spill ([Ha et al., 2008](#)). Regarding the accidents of Braer, Erika, and the Tasman Spirit, there have been studies about acute symptoms lasting less than one month ([Campbell et al., 1993](#); [Crum, 1993](#); [Foster et al., 1995](#); [Cole et al., 1997](#); [Baars, 2002](#); [Janjua et al., 2006](#); [Meo et al., 2008](#)).

In response to the Prestige oil spill that occurred in Spain in 2002, [Rodriguez-Trigo et al. \(2010\)](#) conducted research on local fishermen. By measuring respiratory symptoms along with exhaled biomarkers according to exposure, they were able to demonstrate that there was a relation between involvement in the cleanup operation and persistence of respiratory symptoms. [Sabucedo et al. \(2010\)](#) conducted a survey one year after the incident and were able to draw two conclusions: (1) the greater the intensity of the exposure, the worse the mental health; and (2) women and fishermen experienced higher levels of pain. Most of these, however, are only cross-sectional studies or descriptive studies. Among existing studies, one conducted by [Crum](#) was a follow-up study, but the subjects of the study were children residing within

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a 5 km radius of the accident and who were never directly exposed to crude oil from the spill. The study by Crum (1993) investigated lung functions with PTF, but no observations were made or recorded about coexisting symptoms.

Shortly after the Hebei Spirit oil spill, we administered surveys on acute health problems related to the cleanup operation. Our study showed that the frequency and potency of exposure to oil are strongly correlated with a higher occurrence of physical symptoms, such as back pain and skin lesions (Sim et al., 2010). Studies by Campbell et al. (1993) and Janjua et al. (2006) have shown similar results.

The current study reflects the continuous observation of the health of residents in proximity to the spill, as well as the people involved in cleanup efforts, after the initial survey. We analyse herein how acute physical symptoms suffered by the participants in the cleanup efforts for the Hebei Spirit oil spill changed after one year. In addition, we further identify whether there are risk factors correlated with the continuance of physical symptoms.

This research is a prospective, observational study performed in conjunction with the regular volunteer medical service program of Samsung Medical Center around the site of contamination from the Hebei Spirit oil spill. The current study is a second study undertaken by the same institute on the same region. Data was collected for 2 months, from January to February 2009, one year after the spill. This study was approved by the Institutional Review Board of Samsung Medical Center.

The first survey was conducted between 7 and 14 days after the spill in eight selected working units, which were chosen based on population density and the distribution of the sites. We set up camp a different unit each day to provide medical support for the operation volunteers; the survey was conducted on the 846 people who consented to participate in the research from among the 965 subjects who visited the camp. Of the people who partici-

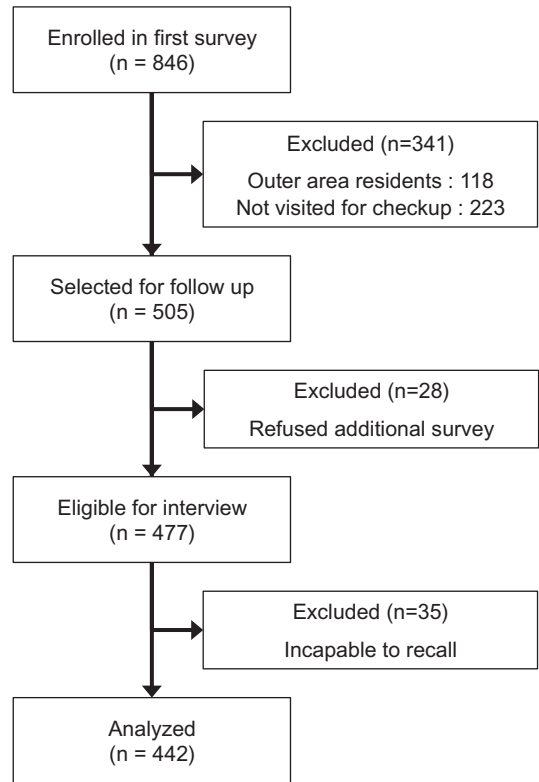


Fig. 2. The diagram shows the process of enrolment for the subjects of this study.

ated in the survey, 86.1% were local residents. Detailed descriptions of the inclusion criteria for subjects and demographic data can be found in our previous study (Sim et al., 2010).

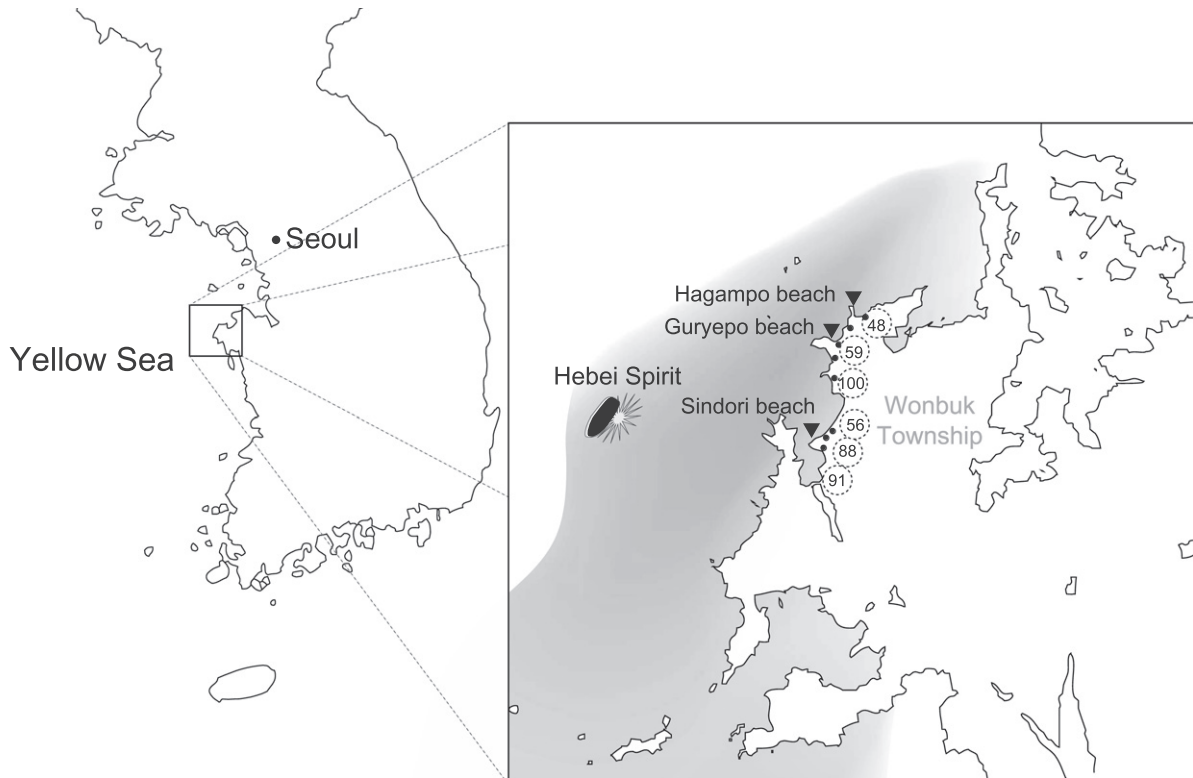


Fig. 1. The Hebei Spirit oil spill and Wonbuk Township. The black spots on the map indicate locations of eight working units where subject samplings were performed for the first survey. The dotted circles and numbers are the locations and the number of subjects enrolled in this study, respectively.

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