

Voluntary Health Registry of French Nationals after the Great East Japan Earthquake, Tsunami, and Fukushima Daiichi Nuclear Power Plant Accident: Methods, Results, Implications, and Feedback

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Abbreviations:

ASN: French Nuclear Safety Authority
CODIRPA: Steering Committee for the management of the post-accident phase in the event of nuclear accident or a radiological emergency situation
InVS: French Institute for Public Health Surveillance
IRSN: French Institute for Radiological Protection and Nuclear Safety
MoFA: Ministry of Foreign Affairs
MoH: Ministry of Health
RRR: Rapid Response Registry

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Abstract

Introduction: The 11th of March 2011, a magnitude 9.0 earthquake struck alongside the north-east coast of Honshu Island, Japan, causing a tsunami and a major nuclear accident. The French Institute for Public Health Surveillance (InVS) set up, within one week after the triple catastrophe, an Internet-based registry for French nationals who were in Japan at the time of the disasters. In this string of disasters, in this context of uncertainties about the nuclear risks, the aim of this registry was to facilitate the: (1) realization of further epidemiologic studies, if needed; and (2) contact of people if a medical follow-up was needed. The purpose of this report was to describe how the health registry was set up, what it was used for, and to discuss further utilization and improvements to health registries after disasters.

Methods: The conception of the questionnaire to register French nationals was based on a form developed as part of the Steering Committee for the management of the post-accident phase in the event of nuclear accident or a radiological emergency situation (CODIRPA) work. The questionnaire was available online.

Results: The main objective was achieved since it was theoretically possible to contact again the 1,089 persons who completed the form. According to the data collected on their space-time budget, to the result of internal contamination measured by the French Institute for Radiological Protection and Nuclear Safety (IRSN) and dosimetric expertise published by the World Health Organization (WHO), it was not suitable to conduct an epidemiologic follow-up of adverse effects of exposure to ionizing radiations among them. However, this registry was used to launch a qualitative study on exposure to stress and psychosocial impact of the Great East Japan Earthquake on French nationals who were in Japan in March 2011.

Conclusion: Setting a registry after a disaster is a very important step in managing the various consequences of a disaster. This experience showed that it is quickly feasible and does not raise adverse side effects in involved people.

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Introduction

The 11th of March 2011, a magnitude 9.0 earthquake struck alongside the north-east coast of Honshu Island, Japan, causing a tsunami and a major nuclear accident.

In 2005, the French Nuclear Safety Authority (ASN; Montrouge, France) set up the Steering Committee for the management of the post-accident phase in the event of nuclear accident or a radiological emergency situation (CODIRPA) and put it in charge of drafting the related policy elements. One recommendation of the CODIRPA was to start, just after the disaster, the implementation of a registry of the population involved.¹

In compliance with this recommendation, reinforced by a specific recommendation of the High Council for Public Health,² the French Institute for Public Health Surveillance (InVS; Saint-Maurice, France) set up, within one week after the triple catastrophe, an Internet-based registry for French nationals who were in Japan at the time of the disasters. The InVS is a public health agency that is responsible for surveillance and alert in all domains of public health in France. In this string of disasters, in a context of uncertainties about the nuclear risks, the aim of the registry was to facilitate the: (1) realization of further epidemiologic studies, if needed; and (2) contact of people if a medical follow-up was needed.

The purpose of this report was to describe how the health registry was set up, what it was used for, and to discuss further utilization and improvements to health registries after disasters.

Methods

The decision for launching a health registry after the Tohoku earthquake was made early. It was based on three main criteria: (1) The number of the French people potentially exposed: according to the French Ministry of Foreign Affairs (MoFA; Paris, France), approximately 10,000 nationals were in Japan on the 11th of March 2011; (2) The association of a severe earthquake with hundreds of aftershocks, a heavily destructive tsunami, and the nuclear accident which was still in progress; and (3) Uncertainties about radiological exposure through air, water, and food.

The conception of the questionnaire to register French nationals was based on a form developed as part of the CODIRPA work. It took one week to build the final version because of multiple roundtrips between the Ministry of Health (MoH; Paris, France), the Cabinet, the ASN, and the InVS. Finally, by the end of the 18th of March 2011, the questionnaire was available online on the web site of the InVS.

The questionnaire was divided in five sections: (1) information about the filling in of the questionnaire; (2) identity and contact; (3) the different cities and corresponding dates where people travelled from the beginning of the catastrophe to the day of the filling in of the questionnaire; (4) information about protective measures to the nuclear risk (iodine intake and sheltering); and (5) a space provided for remarks. It was available online using Voozoo (EpiConcept; Paris, France), which is a web-based platform for creating surveys and information systems for public health. Modifications were made to the basic version to automatically attribute an ID and a password to each person who registered in order to add or complete information afterwards. The questionnaire was also available in PDF format to be filled out by hand and sent by fax, mail, or email to the InVS.

Information about this questionnaire was made through an announcement on the web site of the InVS and two wire stories published by French news agencies (Agence de Presse Médicale [APM] and Agence France-Presse [AFP]) on March 18 and on March 21. These wire stories were republished into several magazines and newspapers afterwards. Emails were also sent to French nationals registered to the French embassy in Japan and living north of Tokyo. An email was sent to health professionals in France who subscribed to the mailing list "DGS-urgent," a service from the MoH that delivers warning messages related to emergency health threats. Information about the questionnaire was also available on the web sites of the ASN, the MoH, the MoFA, and the French Institute for Radiological Protection and Nuclear Safety (IRSN; Fontenay-aux-Roses, France).

Information gathered was individual and nominative. The data collection was declared and registered under number 341194 v 42 to the French regulatory authority (Commission nationale de l'informatique et des libertés; Paris, France). This authorization allows the InVS to implement studies that present public health stakes in emergency.

Results

Although it was asked to fill one questionnaire per person, 1,089 persons, representing 1,198 people, filled out the form. The results presented here are for the 1,089 respondents who filled in the questionnaire.

The main objective, to be able to contact persons again, was achieved since although it was not possible to contact by email 55 persons (5.1%; 22 missing values and 33 incorrect email addresses), these persons were reachable by postal mail. Nine hundred ninety-eight respondents (91.6%) gave at least one phone number.

The mean age was 32 years (SD = 13; range, 0-74). Sixty-one percent were men. Among the 890 people who were in Japan the day of the disaster (14 missing values), 502 (56%) left the country within one week (31 missing values). At the time of answering the questionnaire, 249 persons had chosen to stay in Japan and 185 others had arrived between the 11th and the 31st of March. The duration of the stay in Japan was different among French nationals, from decades to only a few days.

Approximately 450 people left messages in the section devoted to remarks at the end of the questionnaire. These remarks were either declarations about their space-time budget in Japan, about relatives being with them, or direct questions about radioprotection, health risks, or a description of their situations and the issues they were facing (choosing between stay or leave, having a child going school and eating potentially contaminated food at school, and others). When possible, a direct answer was given either by mail or phone, and if the question was beyond missions of the InVS, the person was advised to contact, as appropriate, the MoFA, the MoH, the IRSN, or the ASN. Furthermore, main concerns about the nuclear risks were transmitted to the IRSN, which helped build a relevant FAQ.

This registry was launched while the scale of the nuclear accident was still unpredictable. At last, there was no need for specific medical intervention on the French nationals who were in Japan on March 2011. Later, a letter was sent to the 1,089 French nationals who registered to announce to them that, according to the data collected on their space-time budget, to the result of internal contamination measured by the IRSN and dosimetric expertise published by the World Health Organization (WHO; Geneva, Switzerland),³ it was not suitable to conduct an epidemiologic follow-up of adverse effects of exposure to ionizing radiations among them.

In this letter, it was announced that – as exposure to psychological stressors were dramatic in their sequences, diversity, length, and accumulation – a few of them were to be asked to take part in a qualitative study. This work, carried out with psychiatrists specialized in traumatic impacts, aimed to: (1) get a better understanding of the nature and sources of stressors and their interactions; (2) have a glance of life-course and people's feelings since the disaster struck; and (3) identify the needs of information and support during the catastrophe and its aftermath. The results of this study are available on the InVS web site.⁴

Discussion

This is the first web-based registry created one week after a disaster worldwide for health purposes (and not only for epidemiological issues).

Health registries were set up after some catastrophes worldwide. However, except after the Oklahoma bombings (Oklahoma City, Oklahoma USA; 1995)^{5,6} and the Enschede fireworks disaster (Enschede, Netherlands; 2000)⁷ where registries were set up within the first week following the disaster, such registries were created several weeks (Three Mile Island nuclear accident; Pennsylvania USA; 1979^{5,8}) or years (9/11 attack, New York USA, 2001; or Bhopal disaster, India, 1984⁵) following the event.

This registry was launched one week after the beginning of the disaster. It can be considered as a correct latency regarding the bias of memory, especially for the space-time budget in the few hours or days following the catastrophe. Nevertheless, some people were still registering months after the disaster. This short delay was made possible by the fact that this action was part of a national guideline report (CODIRPA).¹ The questionnaire proposed to the French nationals was very slightly different from the one of the CODIRPA. The one-week delay was necessary to obtain agreement from other stakeholders, such as the MoFA, the MoH, and the ASN.

To implement health registries after disasters worldwide, protocols and tools were created in recent years. The Agency for Toxic Substances and Disease Registry (ADTSR; Atlanta, Georgia USA) developed a framework for a registry after an emergency event called the Rapid Response Registry (RRR).⁹ The RRR is used currently by at least 22 state health departments in their state-wide disaster preparedness. Based on previous experiences, Public Health England (United Kingdom) recently developed a decision framework for establishing a health registry following a major incident¹⁰ and an epidemiological protocol for a health protection registry in England.¹¹

In the context of nuclear accident, collecting information allowing exposure assessment to ionizing radiation while it is still available is an emergency of crucial importance for potential future follow-up. With regard to exposure to external dose rate, the use of a questionnaire on space-time budget while the memory is still reliable is an important tool for external dose assessment. The results of this registry show that this challenge is reachable. Joint to anthroporadiometric measures of the internal doses, such behavior questionnaires will be very useful to refine the global doses received by a person soon after the passage of radioactive plumes. Such integrated information was lacking for Japanese authorities when they launched their epidemiological follow-up program more than six months after the event.¹² Actions for registering persons and measuring their contamination soon after an accident were added in the French National Nuclear accident response plan.¹³

Setting a registry after a disaster is a very important step in managing the various consequences of a disaster. This experience showed that it is quickly feasible and does not raise adverse side effects in involved people. In order to attenuate efficiently the

health and social burden of a disaster, this registering has to be made and shared among public stakeholders and could facilitate:

- Gathering of families;
- Sheltering and relocation policy;
- The follow-up of injured people within the health care system;
- The realization, on time, of internal contamination measures;
- The setting up of a medical follow-up;
- The development of epidemiologic studies;
- The provision of social assistance; and
- Compensation.

Limitations

Exhaustiveness was not achieved since only 10% of the estimated number of French nationals registered. This could be due to the difficulty to promote and make a wide communication about this registry because, despite feedback of previous disasters^{5,8,14} and recommendations of the CODIRPA, some of the actors involved in the crisis management in France were reluctant to promote this registry. One of the main issues motivating such reluctance was that participating in a registry could scare people. Further study showed that people were preoccupied by the disasters and feedback from those who responded showed that the registry was well received.⁴

This registry was Internet-based. The lack of Internet connectivity may have affected access to the registry for those in high-impact, disaster-zone regions. In order to improve exhaustiveness, more possibilities to fulfill the form should be given (eg, toll free number and availability of a paper questionnaire in strategic places) and registering people should also be done by others stakeholders (rescue team, anthroporadiometric measures team, or head of a collectivity in the disaster area).

Missing a complete list of the French people present in Japan from the 11th of March 2011, including some socio-demographic information, it was not possible to formally assess the representativeness.

Conclusion

This action is written in the French official nuclear plan response.¹³ More procedures and tools still have to be built to enhance the completeness of the population registered. As the usefulness of such a registry goes far beyond health purpose, the registry has to be built including all the public stakeholders that could benefit in terms of efficiency from such a database after a disaster (rescue teams, firemen, social services, medical staff, and policemen).

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