



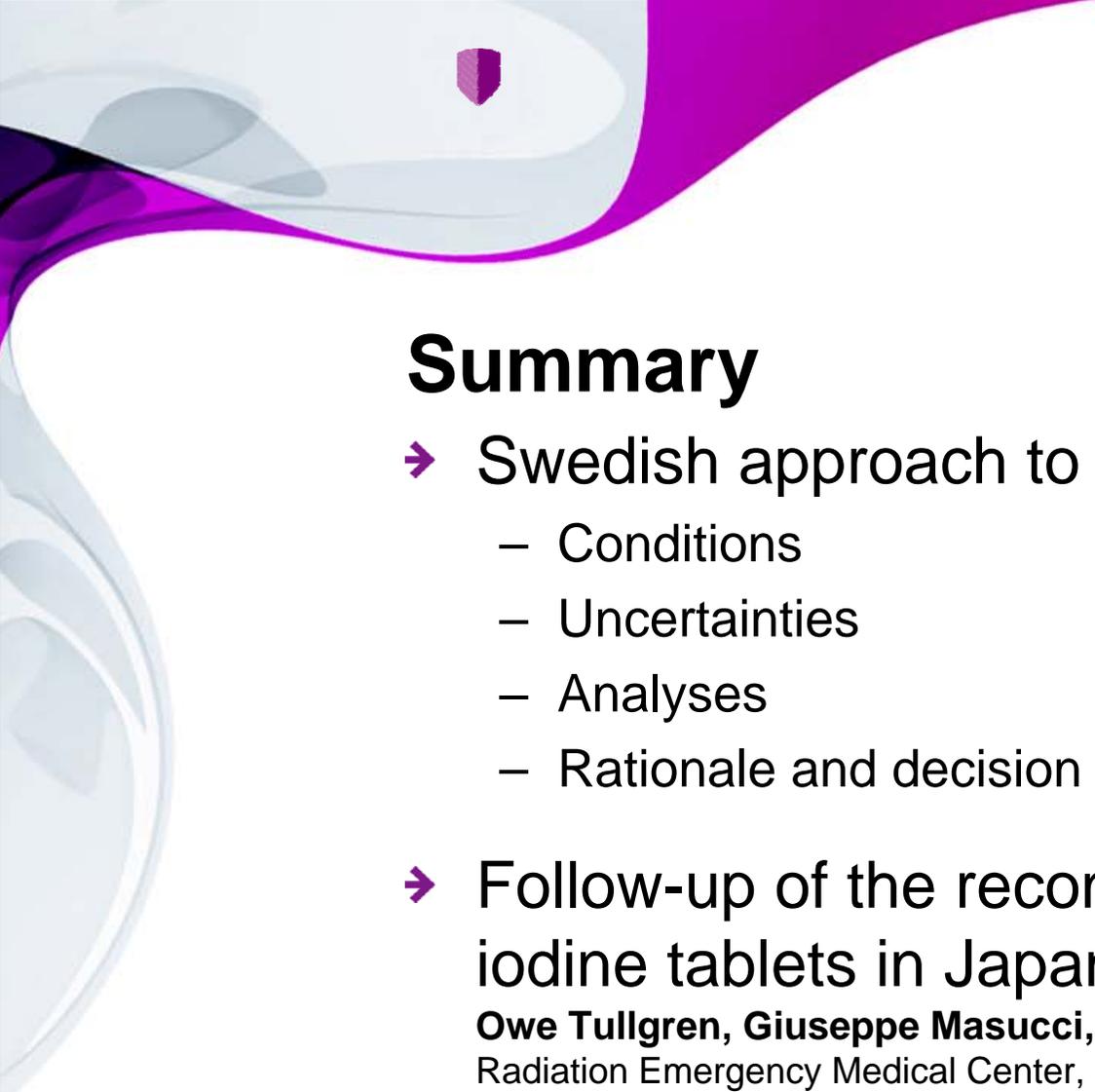
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Swedish Radiation Safety Authority

Iodine Prophylaxis – approach in Sweden and follow-up study in Japan

Lynn Hubbard

Emergency Preparedness and Response



Summary

- Swedish approach to iodine blocking
 - Conditions
 - Uncertainties
 - Analyses
 - Rationale and decision

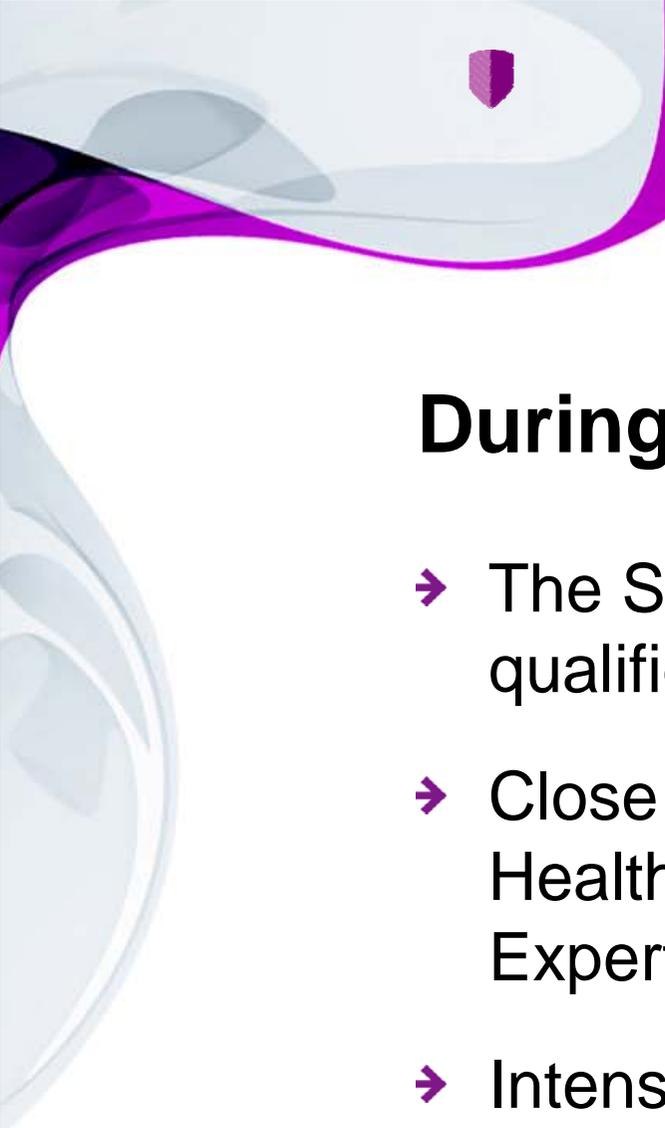
- Follow-up of the recommendation regarding iodine tablets in Japan, March 2011

Owe Tullgren, Giuseppe Masucci, Yvonne Brandberg, Leif Stenke

Radiation Emergency Medical Center, Karolinska Institutet and

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Swedish Radiation Safety Authority

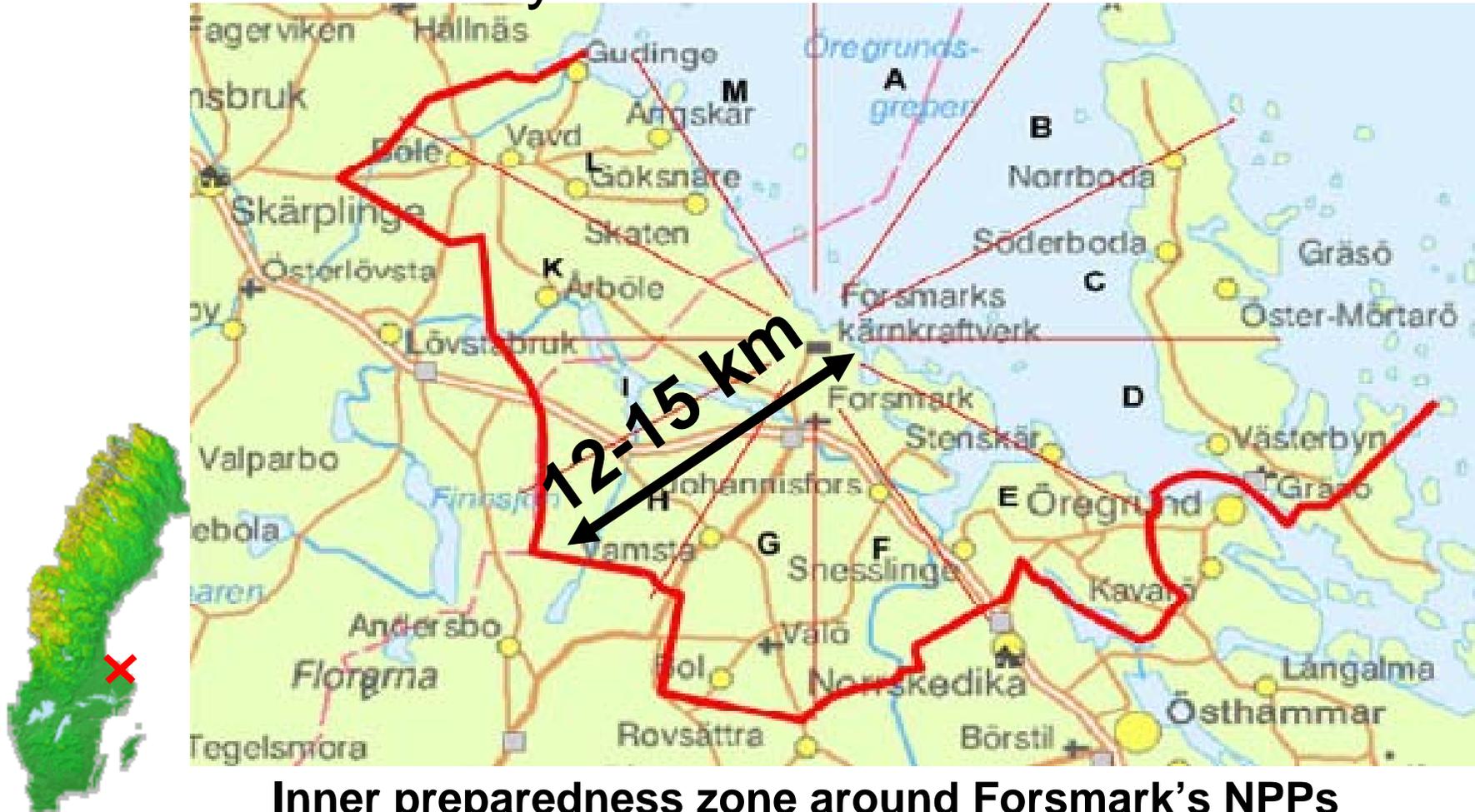


During the Fukushima event:

- The Swedish Radiation Safety Authority gave qualified advice to the Ministry of Foreign Affairs
- Close cooperation with the National Board of Health and Welfare and their Nuclear Medicine Expert Group
- Intensive demand for information

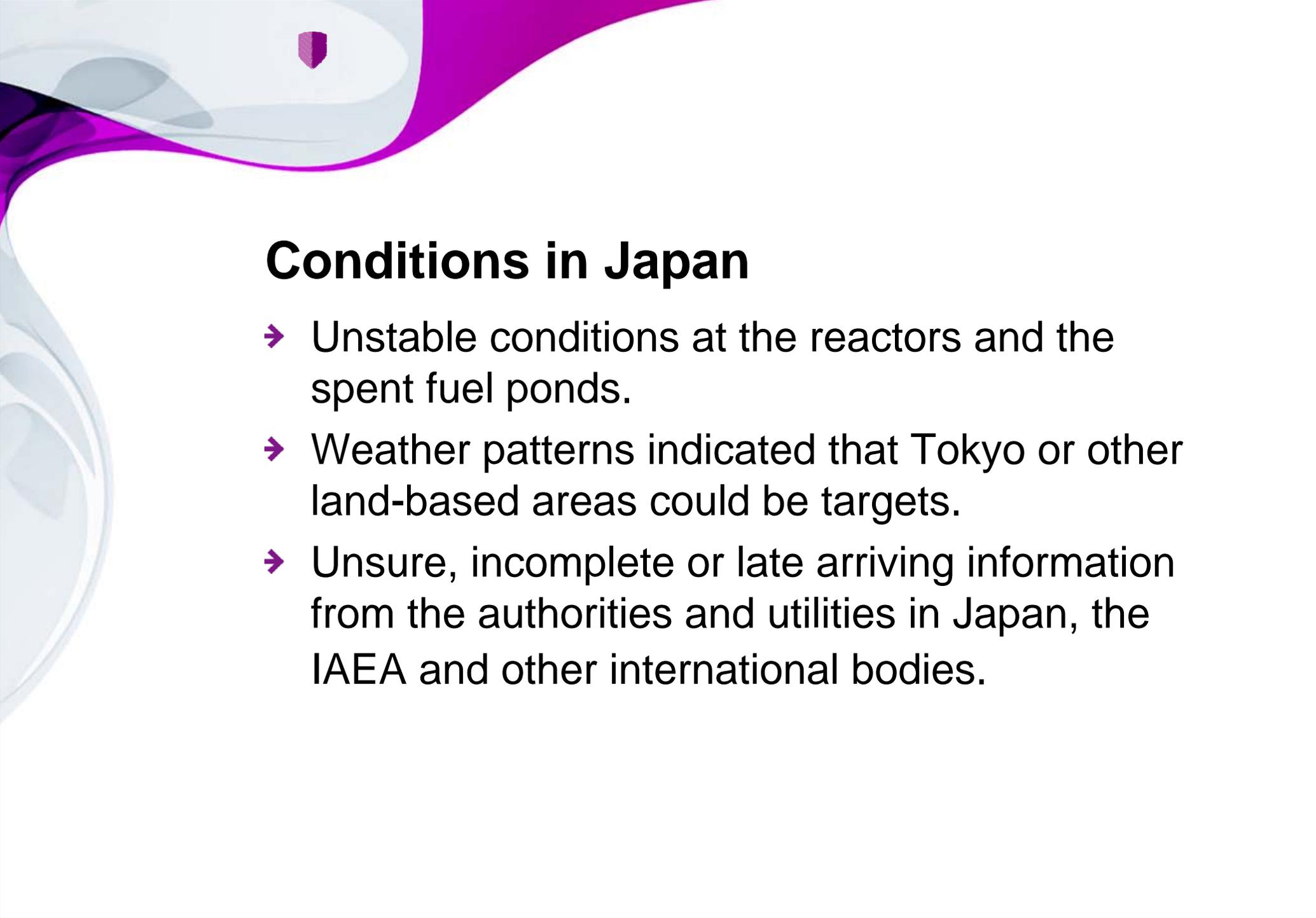


Policy in Sweden



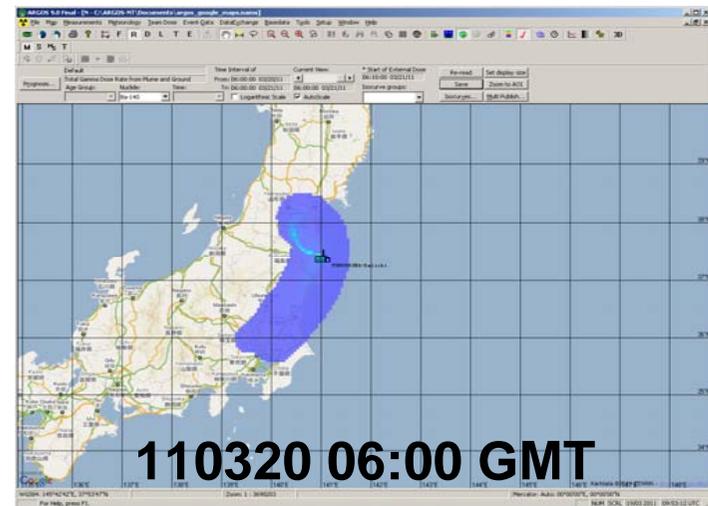
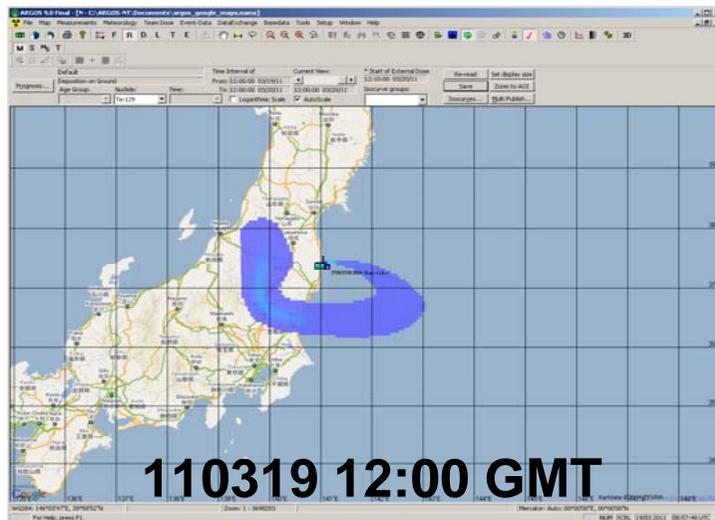
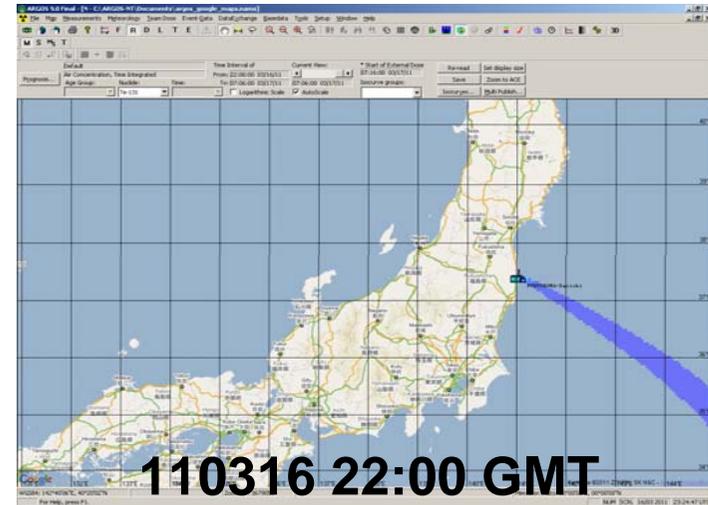
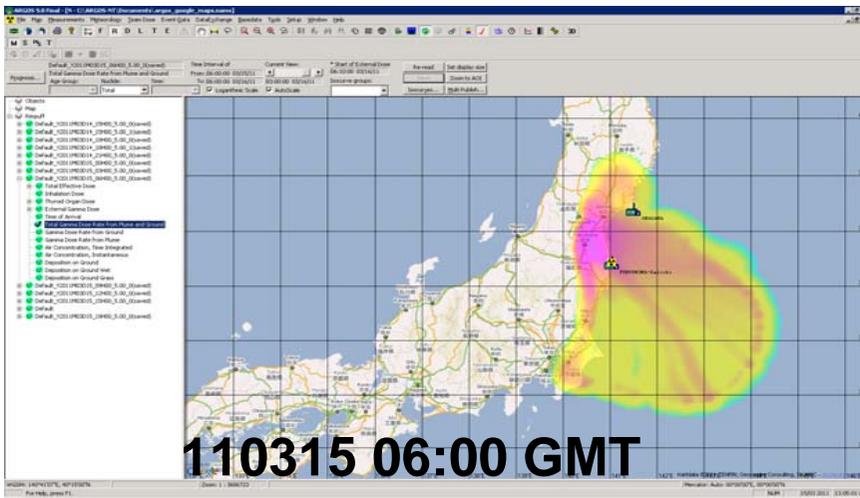
Inner preparedness zone around Forsmark's NPPs

Stable iodine tablets are distributed to all households in the inner preparedness zones around Sweden's NPPs.



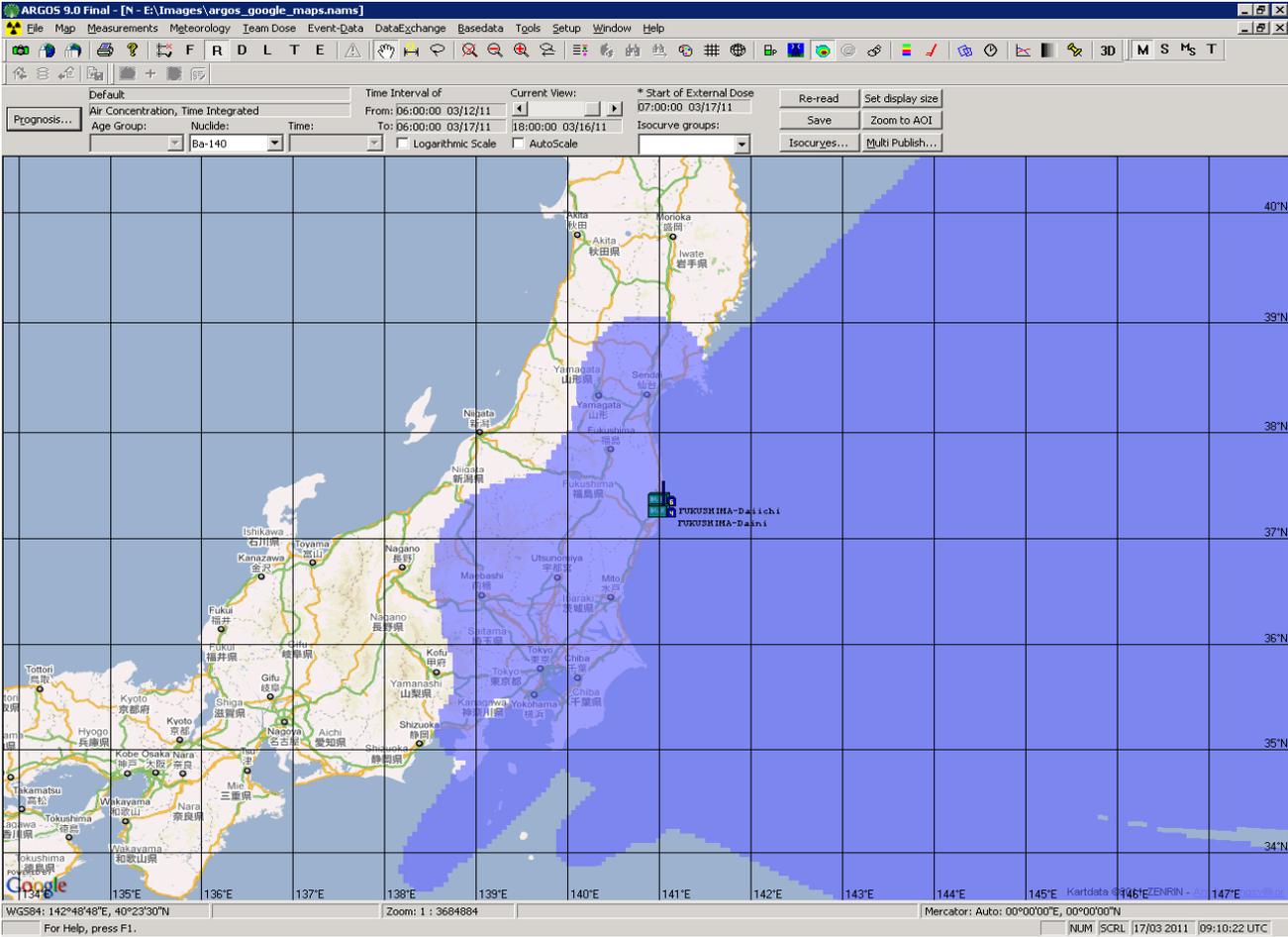
Conditions in Japan

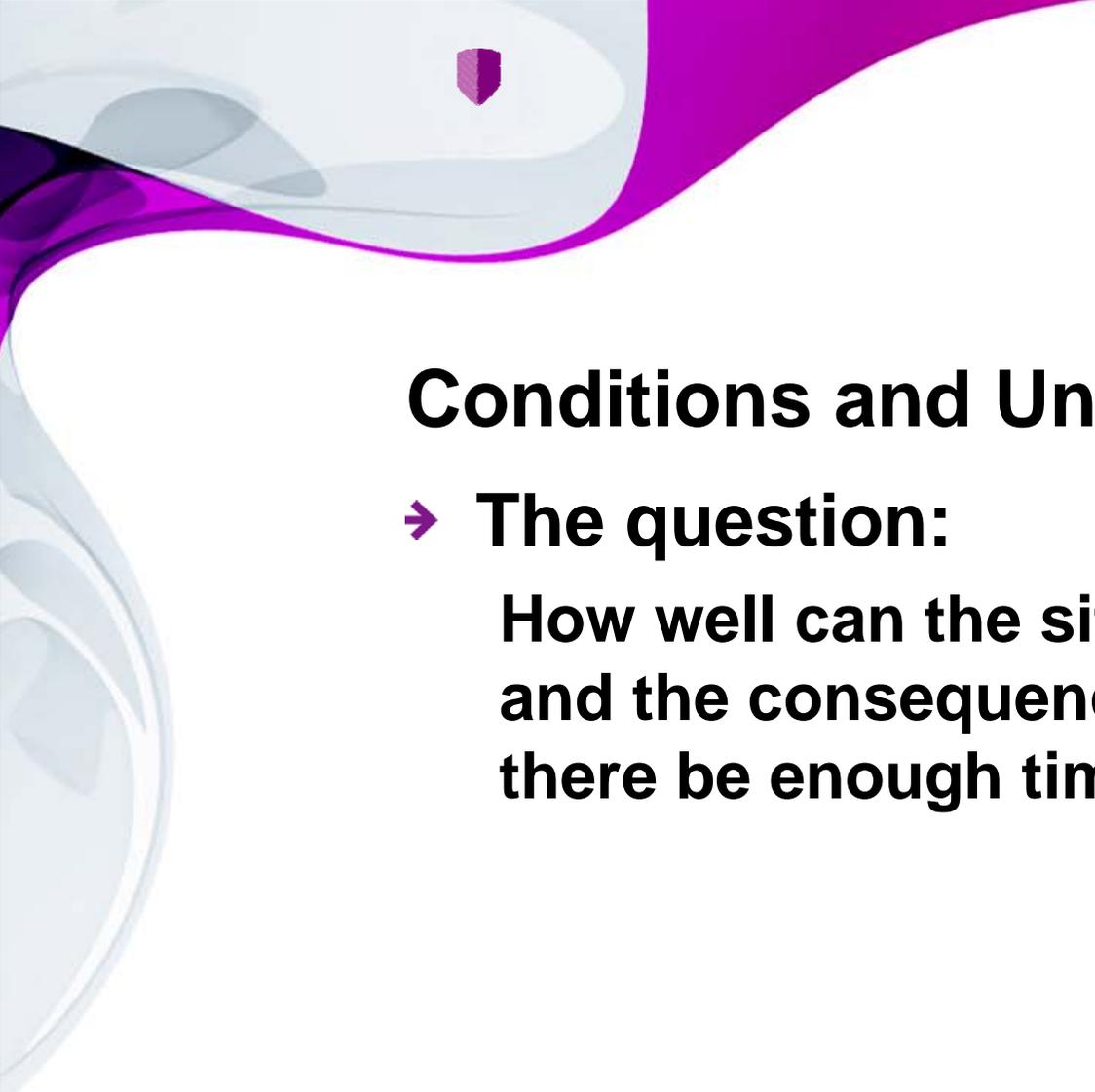
- Unstable conditions at the reactors and the spent fuel ponds.
- Weather patterns indicated that Tokyo or other land-based areas could be targets.
- Unsure, incomplete or late arriving information from the authorities and utilities in Japan, the IAEA and other international bodies.



Possible Affected Area

110312 06:00 GMT – 110317 06:00 GMT

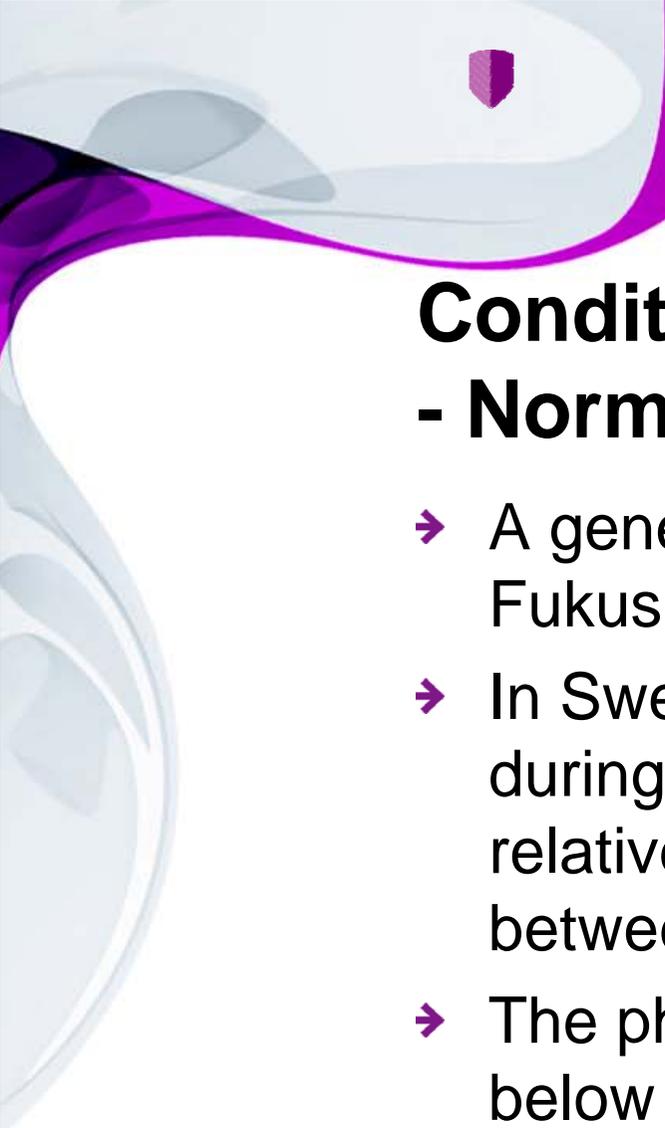




Conditions and Uncertainties

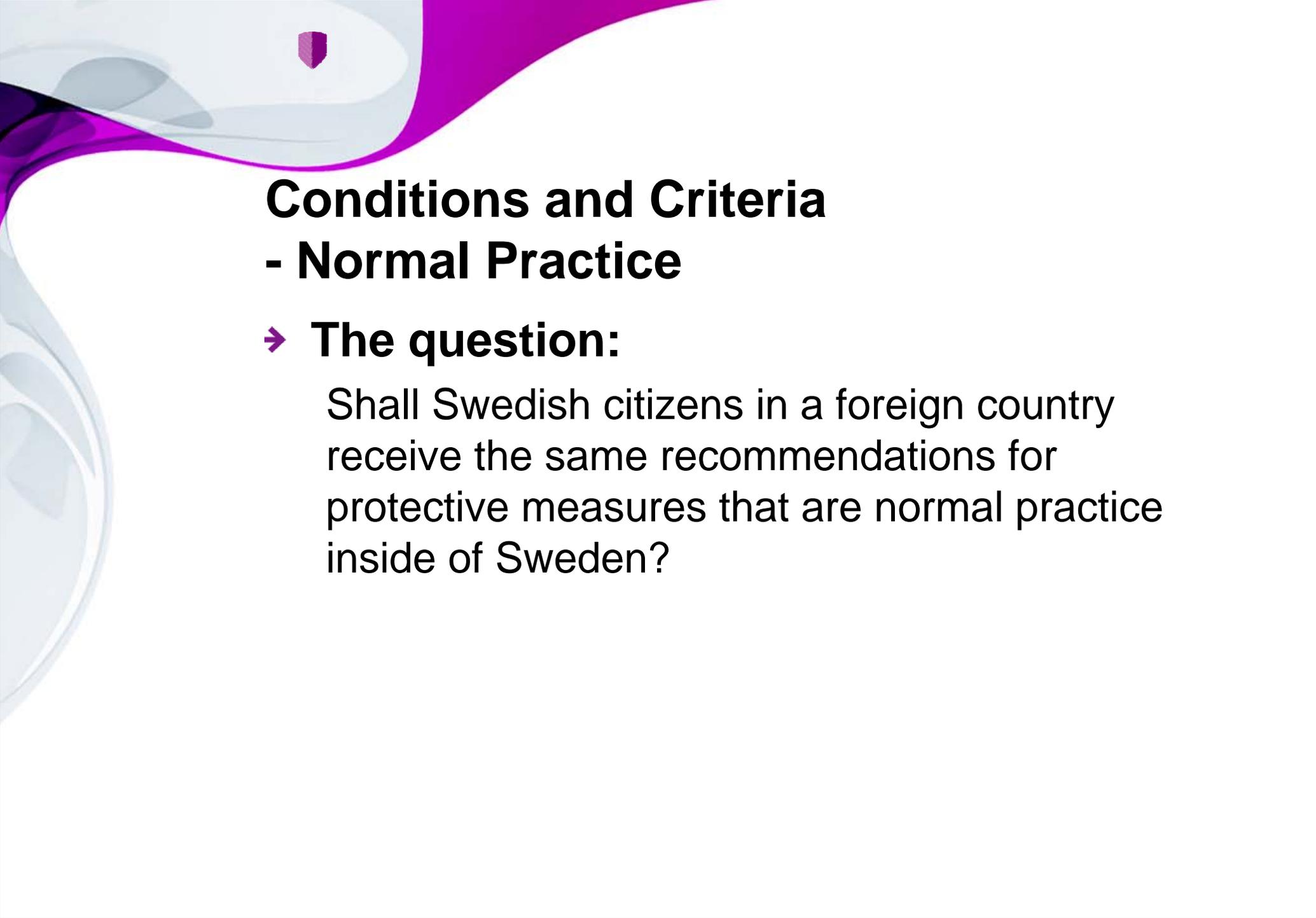
➤ **The question:**

How well can the situation be characterized and the consequences determined, and will there be enough time to act?



Conditions and Criteria - Normal Practice

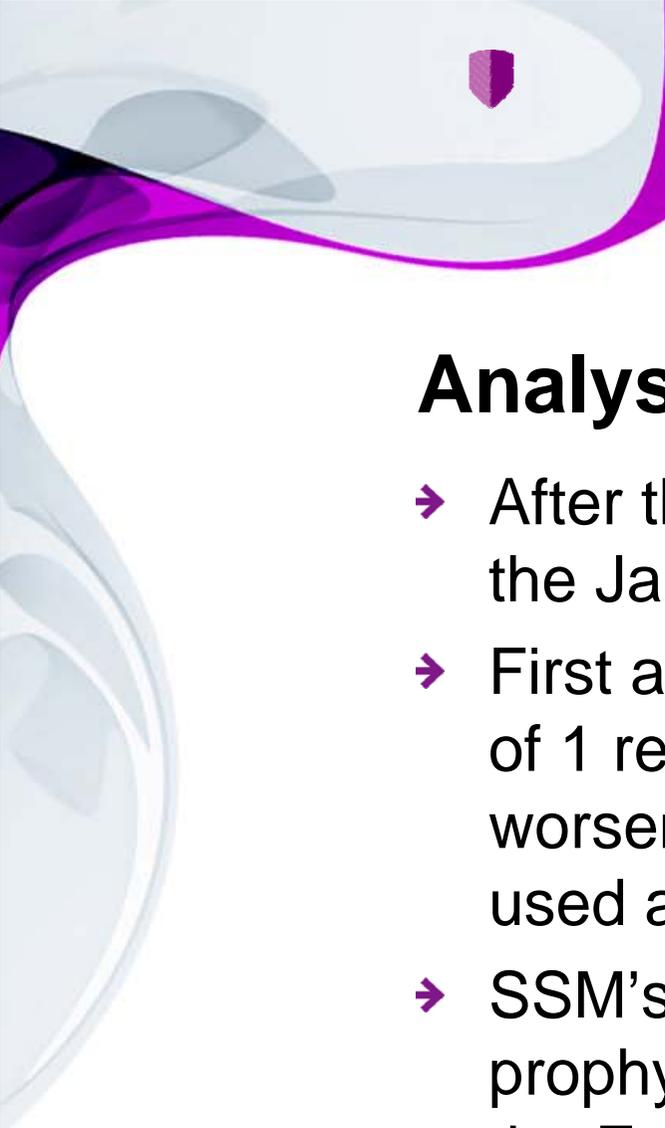
- A general emergency was declared at the Fukushima power plants.
- In Sweden – iodine prophylaxis is recommended during a general emergency. Iodine tablets are relatively safe, and Sweden differentiates between planning and response.
- The philosophy of radiation protection – optimize below the reference level



Conditions and Criteria - Normal Practice

➤ The question:

Shall Swedish citizens in a foreign country receive the same recommendations for protective measures that are normal practice inside of Sweden?



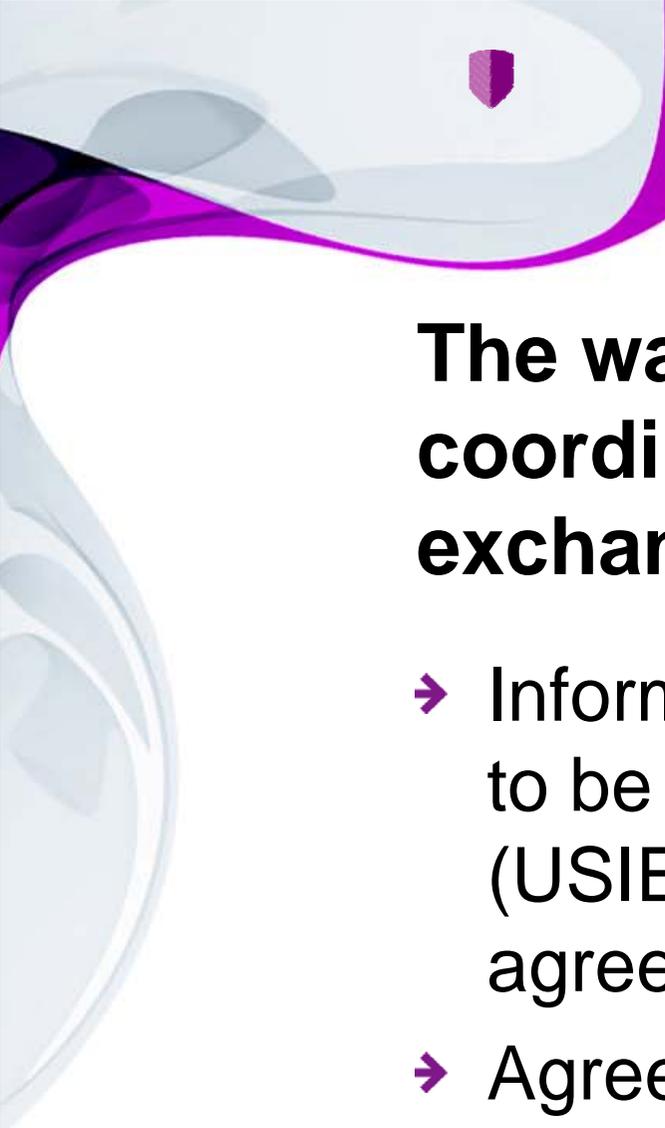
Analyses and Rationale

- After the 15th of March, Sweden complemented the Japanese government recommendations.
- First analysis used an iodine source of 0,1% - 1% of 1 reactor inventory: 30 km. As the situation worsened, 10% (80 km) and 30% (250 km) was used as the source term.
- SSM's worst-case predictions showed that iodine prophylaxis would be justified out to 250 km from the Fukushima NPP's.



Analyses and Rationale

- Consultation with the Nuclear Medicine Expert Group through the National Board of Health and Welfare on risks with iodine prophylaxis.
- **The question:**
Can a reasonable worst case prediction be produced and which response to the worst case prediction is justified?
- Iodine tablets with information were distributed to Swedish citizens in Japan on Sunday, March 20.



The way forward: harmonization, coordination and information exchange

- Information exchange regarding measures to be taken, e.g., through IAEA's ENAC (USIE), EU's ECURIE or through regional agreements (Urgent Mail)
- Agreement on and coordination of protective measures (difficult task) – ultimately national decisions



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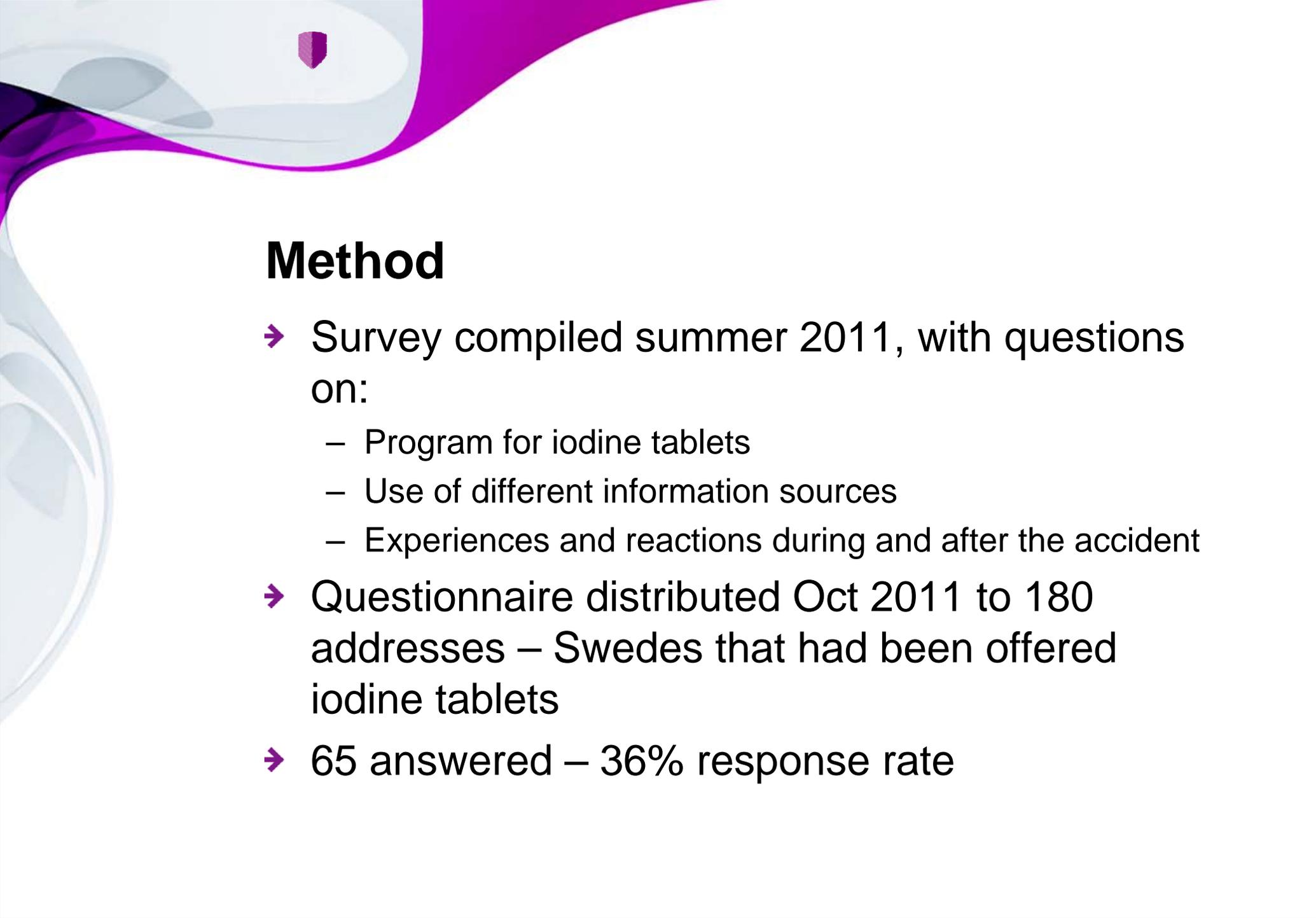
Follow-up of the distribution of iodine tablets in Japan, March 2011

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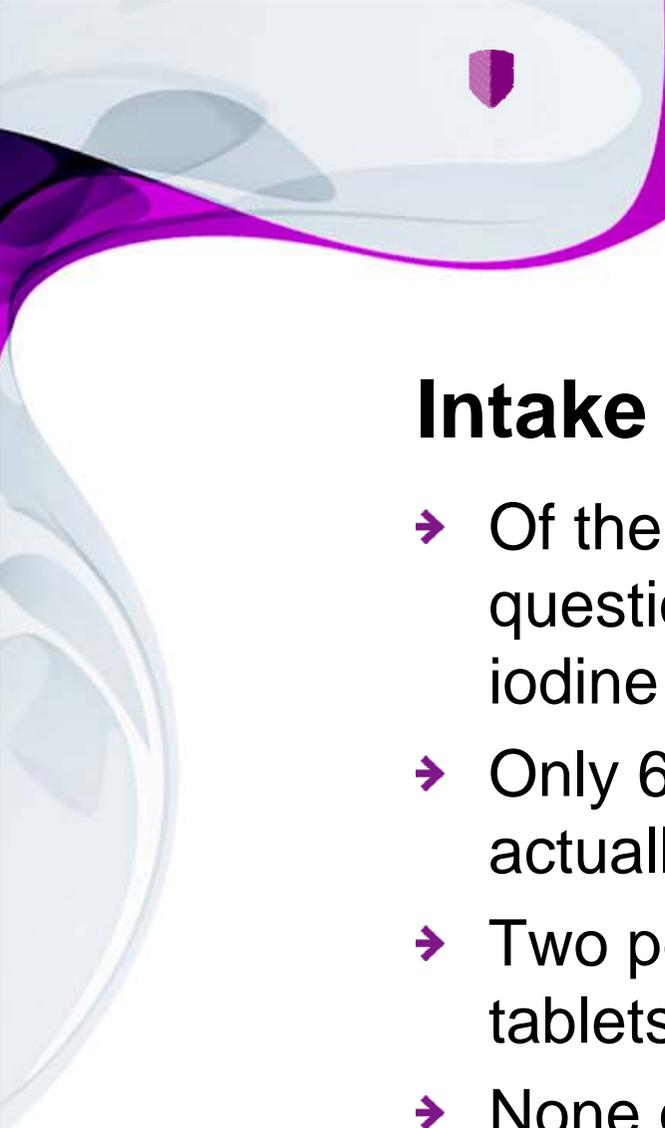
Robert Finck, Jan Johansson, Lynn Hubbard

Swedish Radiation Safety Authority, Stockholm



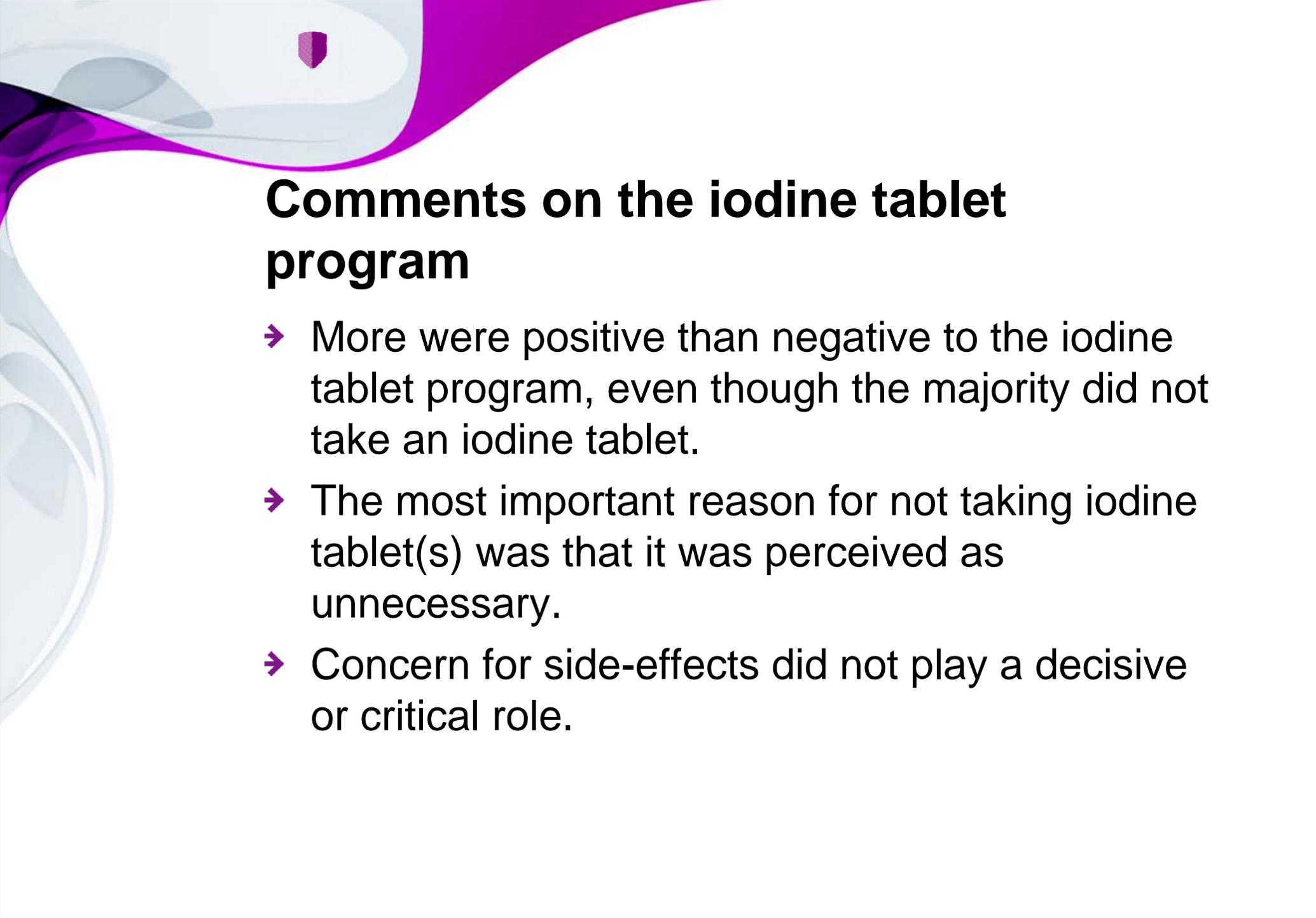
Method

- ➔ Survey compiled summer 2011, with questions on:
 - Program for iodine tablets
 - Use of different information sources
 - Experiences and reactions during and after the accident
- ➔ Questionnaire distributed Oct 2011 to 180 addresses – Swedes that had been offered iodine tablets
- ➔ 65 answered – 36% response rate



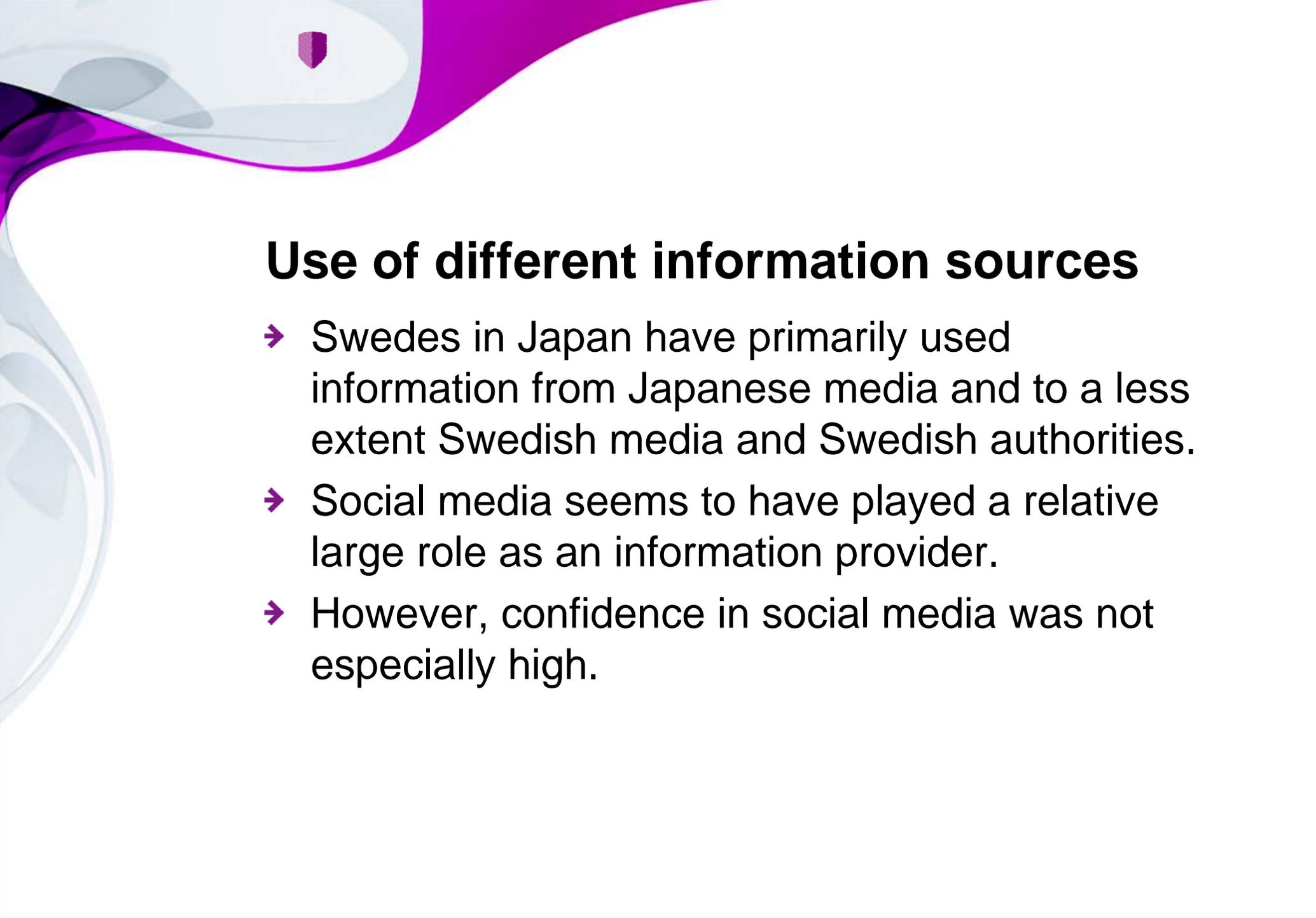
Intake of iodine tablets

- Of the 65 persons that answered the questionnaire, 35 had been recommended to take iodine tablets.
- Only 6 persons (17%) answered that they had actually taken iodine tablets.
- Two persons took 1 tablet, two persons took three tablets and two persons took four or more tablets.
- None of the persons answered that they had experienced any form of side effects.



Comments on the iodine tablet program

- More were positive than negative to the iodine tablet program, even though the majority did not take an iodine tablet.
- The most important reason for not taking iodine tablet(s) was that it was perceived as unnecessary.
- Concern for side-effects did not play a decisive or critical role.



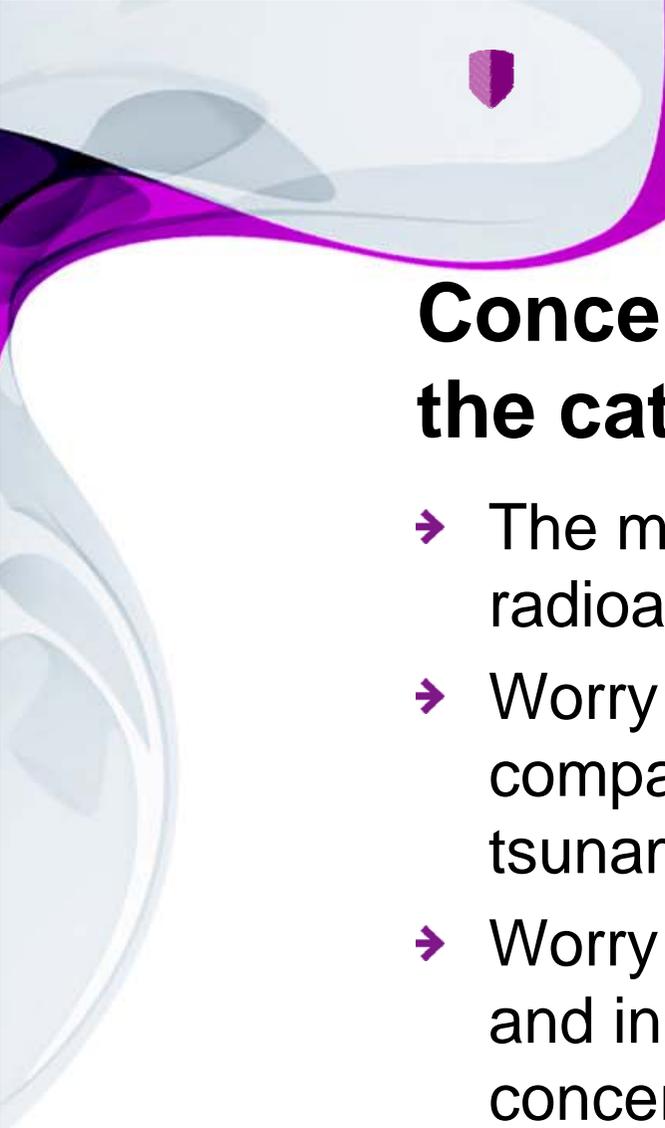
Use of different information sources

- Swedes in Japan have primarily used information from Japanese media and to a less extent Swedish media and Swedish authorities.
- Social media seems to have played a relative large role as an information provider.
- However, confidence in social media was not especially high.



Experiences and reactions

- Relative few Swedes in Japan considered leaving Japan.
- The most important reason for not leaving Japan was work or educational studies, both personally or of the partner's.
- The catastrophe caused strong reactions of concern and fear which had decreased significantly when the questionnaire was distributed in October 2011.



Concern for phenomenon related to the catastrophe

- The majority expressed some degree of worry for radioactivity in foodstuffs.
- Worry for radioactivity in foodstuffs was comparable to worry for a new earthquake or tsunami.
- Worry for radioactivity in the air, on the ground and in the drinking water was clearly lower than concern for radioactivity in foodstuffs. The majority of those that answered expressed no concern for these.

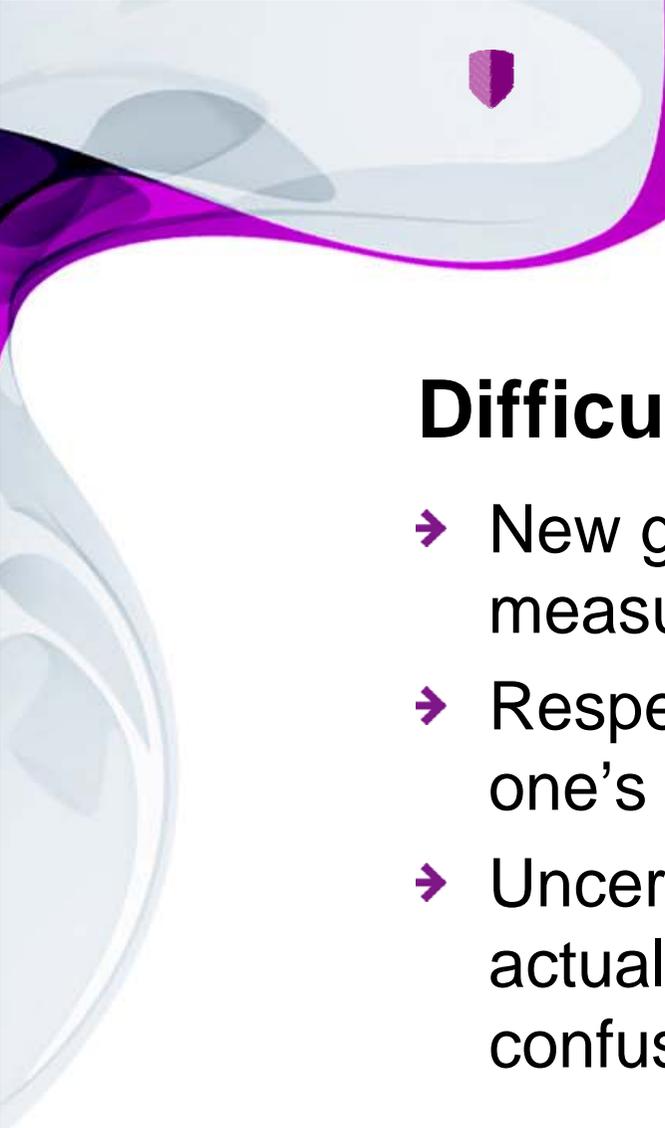


Concluding remarks



General concluding thoughts

- ➔ Most of the actions and recommendations that were taken or given by different countries were not harmonized. Countries followed their own policies.
- ➔ Each country, although acting with common goals in radiation protection, have different strategies.
- ➔ If the emergency plans of countries are not coordinated during planning, the response will never be fully coordinated.
- ➔ When an accident happens, there is no time for planning; perhaps time for coordinating time points for actions, but no time to plan.



Difficulties/contradictions

- New ground: justifying and optimizing protection measures for citizens living in a foreign country.
- Respect for the accident country – respect for one's own citizens – a balance act.
- Uncertain or unavailable information about the actual state of the reactors/fuel ponds lead to confusion.



Hindsight is always 20/20

- ➔ The distance can be discussed.
- ➔ Earlier intake of stable iodine had been better coordinated with the releases.
- ➔ That, in general, iodine blocking was justified at least out to 50 km from Fukushima Dai-ichi is difficult to deny.



Thank you for your attention

