# Current Status of Epidemiological Survey and Study on Residents of Radioactivity Contaminated Buildings in Taiwan

Commissioned Research Project

Department of Radiation Protection

31 May, 2012

# Request background

- Buildings constructed with $^{60}$Co-contaminated rebar were first identified in Taipei, Taiwan in July 1992.
- The contamination is suspected to have inadvertently discarded $^{60}$Co-containing material, which was recycled with scrap metal that had been melted during steel-making process in 1982.
- By 2002, over 1,600 housing units contaminated with radioactive rebar at different levels were identified. All the buildings were constructed from 1982 to 1984.
- Many families had been exposed to excessive $\gamma$ -radiation for 1-20 years, mostly about 10 years.
- To date, over 9,000 health exams for residents exposed to over 5mSv in any single year during residence have been completed.
- This project conducted the health exams data for an epidemiology study on the effects of prolonged low-dose exposure.

# Objectives and Scoping

- Phase 1 – to assess the dose response effect and build a health risk assessment model, by
  - integrating residents' demographics, health and risk awareness;
  - completing a hematological survey and analysis;
  - examining the relationship between radiation dose and health; and
  - estimating long-term trends in cancer prevalence.

- Phase 2 – to modify the health risk assessment model by controlling the confounding factors in cancer onset
  - questionnaires were obtained for analyzing the confounding factors, including record of daily activities, occupancy history, demographic data, occupational exposure, international flight records, personal habits and medical radiation exposure.

# Assessment of Exposure for Individuals - analysis variables

- Improvement on the building construction based on the contamination level
- Dose assessment for residents based on the housing layouts and occupancy histories.

**Improvement measures:**

- adding a lead shielding; or
- replacing the steel reinforcement; or
- removing the building; or
- purchased by the AEC

**Significant variables:**

- date of initial occupation
- date of improvement
- date of detection
- half life of $^{60}Co$
- dose rates before and after the improvement
- occupancy factors

# Sampling of Phase 1

Exposure group (RCB residents)
- ＜5 mSv/y
- ≧5 mSv/y

Control group (General population)
demographic data obtained from the DGBAS
- 0 mSv/y

**Radiation dose** → **Health Effect**

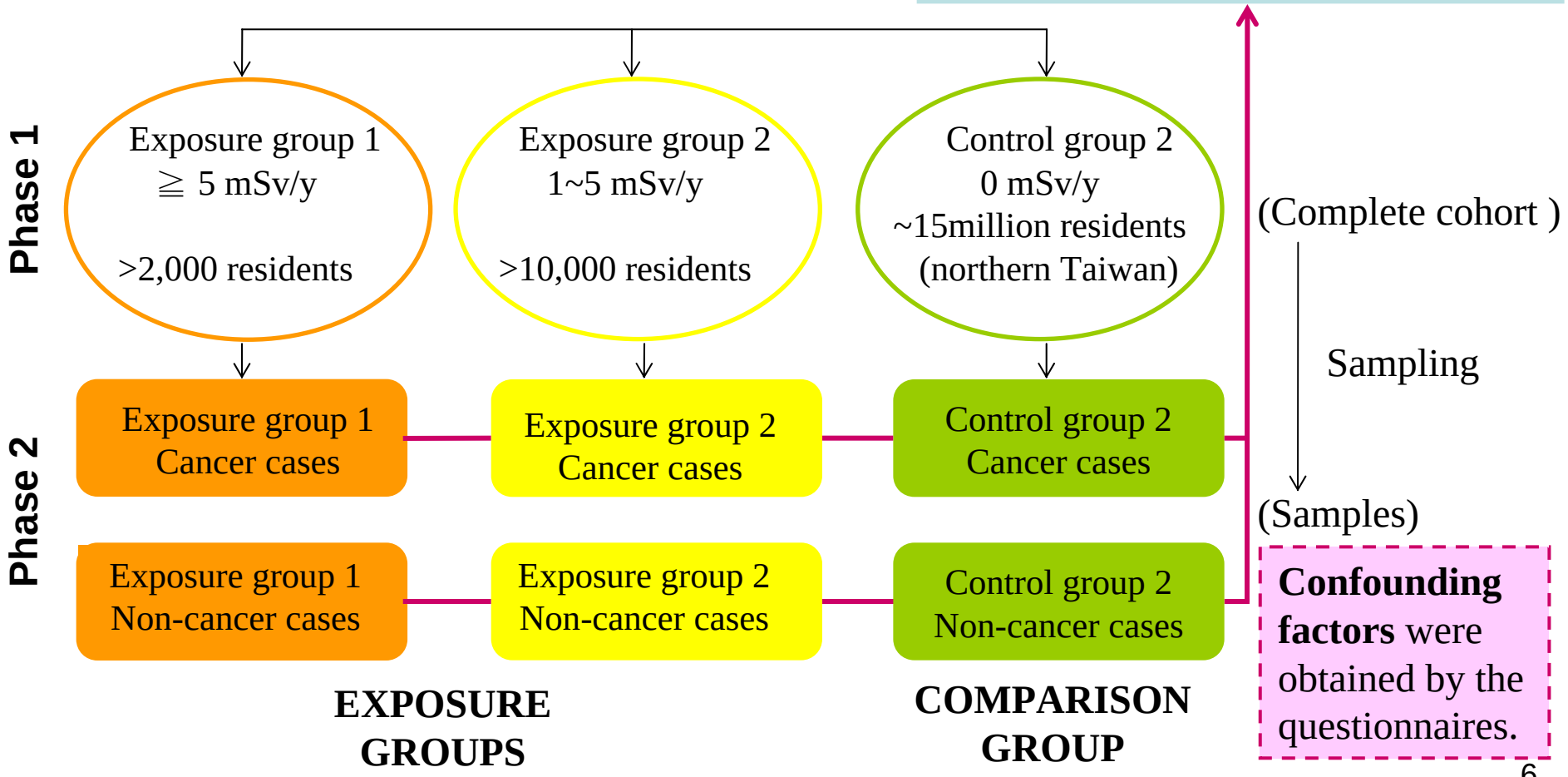
**Cancer**
Chronic disease
Procreation status
Growth and development
Life quality

The exposure databases were merged with the DOH's
- NHRI database (health insurance research)
- Death Causes database
- Cancer registration files

⌖ without controlling confounding factors

# Sampling of Phase 2

Questionnaire surveys of Phase 2 were obtained from the three health examination hospitals.




**Confounding factors** were obtained by the questionnaires.

# Anticipating

- The study will be the first of its kind in the world and offer tremendous research value, by taking a look at how long-term radiation exposure in the residents of radio-contaminated buildings relates to health effects.

- Hopefully through such an inter-disciplinary integration of health physics, epidemiology and biological statistics, an appropriate epidemiological study approach will be established for assessing the relationship between radiation dose and health effects. Not only will the data assist the administrative agencies in making decisions but allow for recommendations to be made on the long-term healthcare of residents in radio-contaminated buildings.

Thanks for your attention !