Bioterrorism Risk Assessment: Japanese Perspectives

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The Landscape of Risks in Japan

(Source: a picture taken by Kousaku Maeda, after the Hanshin Awaji Earthquake in Japan in 1995)

A Comparison of Risk: Approximate Number of Casualties in the Population of 100,000 Per Cause/ Year

- Cancer: 250
- Heart disease: 127
- Cerebrovascular disease: 102
- Pneumonia: 76
- Suicide: 24
- Senile decay（老衰）: 19
- Kidney failure: 15
- Liver disease: 13
- Diabetes: 10
- Traffic accidents: 9.0
- Aortic aneurysm/ dissection（大動脈瘤・解離）: 8.5
- Accidental choking: 6.9
- Tumbling/fall: 5.1
- Hypertensive disease（高血圧性疾患）: 4.5
- Death by drowning: 4.4
- Hernia/ Intestinal obstruction（腸閉塞）: 4.0
- Hepatitis C: 3.7

(Source: Kazuya Nakayauchi, *Risuku no Monosashi* (A Measurement of Risk) (NHK Books, Tokyo: 2006)

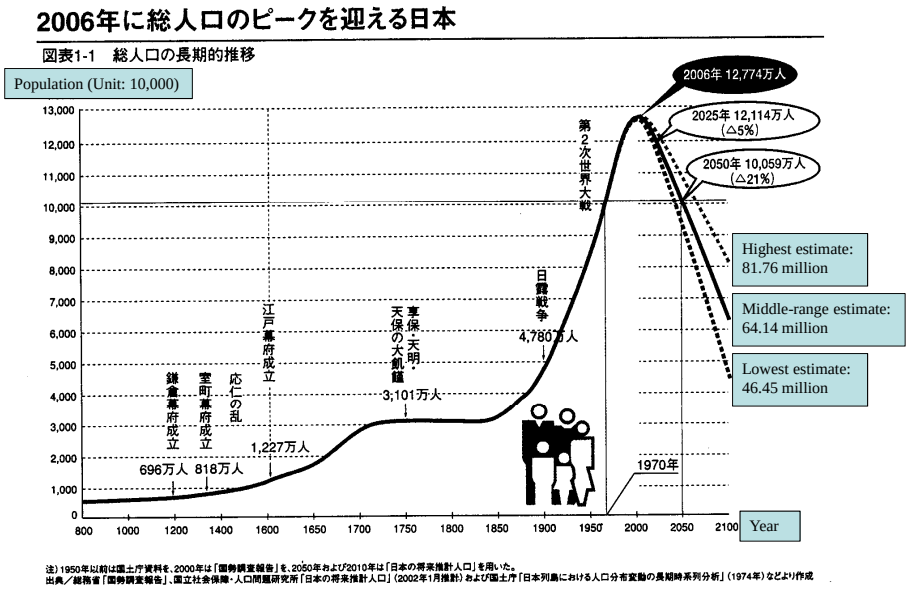
A Comparison of Risk: Approximate Number of Casualties in the Population of 100,000 Per Cause / Year (cont.)

- Stomach/ duodenal ulcer（胃潰瘍・十二指腸潰瘍）: 2.7
- Asthma: 2.6
- Parkinson's disease: 2.6
- Tuberculosis: 1.8
- Fire: 1.7
- Alzheimer's disease: 1.4
- Drowning accident: 0.7
- Hepatitis B: 0.66
- Influenza: 0.55
- Murder: 0.52
- Shipwreck accident: 0.14
- Natural disaster: 0.10
- Accident inside the railway crossing: 0.09
- HIV: 0.04
- Airplane accident: 0.013
- Thunder lightening: 0.002

➢ TOTAL: 815

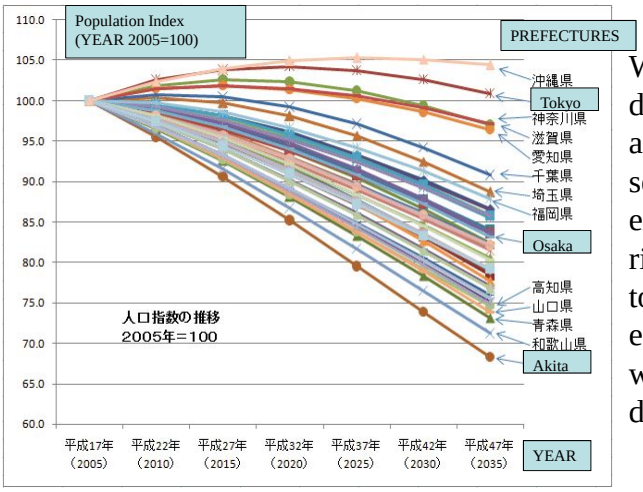
(Source: Kazuya Nakayauchi, *Risuku no Monosashi* (A Measurement of Risk) (NHK Books, Tokyo: 2006)

The Peak of the Population Increase was 2006…



（Source：The National Institute of Population and Social Security Research）

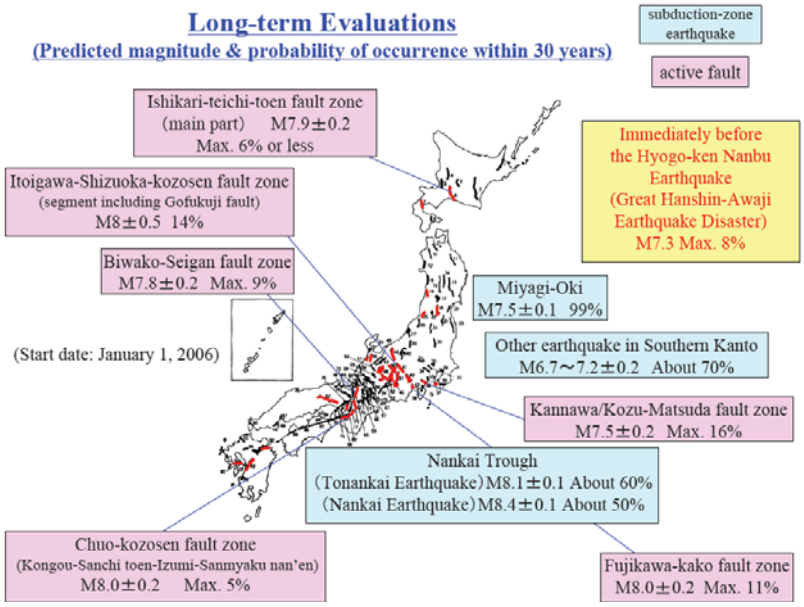
Risk Associated with the Rapidly Aging Society



With the population decrease and the rapid aging of the society, several prefectures are expected to face the risk of scarce resource to sustain respective economy and society within the next few decades.

Source：Itaru Yasui, Nikkei Ecolomy, February 27, 2008.

Earthquakes Viewed As the Hazard with the Largest Risk



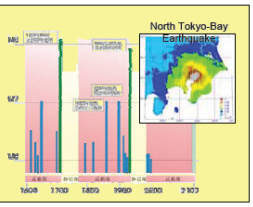
Source: *Earthquake and Disaster-Reduction Research Division, Ministry of Education, Culture, Sports, Science and Technology (MEXT), Government of Japan*, November2006

Special Project on Disaster Prevention & Mitigation for Earthquake under Metropolitan Area

Earthquake under metropolitan area

Pressing earthquake & Huge loss

- Probability (M7 earthquake): around 70% within 30 years
- Estimation of damage (North Tokyo-Bay earthquake)
  Max 11,000 casualties & 112 trillion yen of economic loss



"Special Project on Disaster Prevention & Mitigation for Earthquake under Metropolitan Area"

1. Survey of Plate Structure & Model Characterization
2. Aseismic Evaluation & Research of Keeping Function
3. Development of Real-time Disaster Prevention System

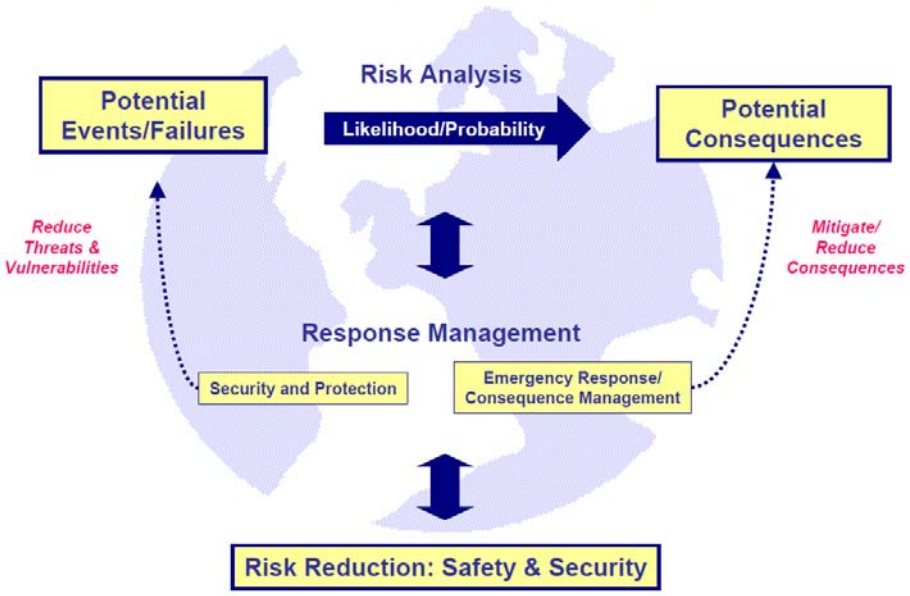
・Analysis of whole image of earthquake under metropolitan area
・Drastic reduction of the loss by earthquakes

Source: *Earthquake and Disaster-Reduction Research Division, Ministry of Education, Culture, Sports, Science and Technology (MEXT), Government of Japan*, November2006

Terrorism Risk Assessment

Source of this section: E. D. Jones, Lawrence Livermore National Laboratory, "Research on the Theoretical/Policy Framework of Assessing the Threat and Vulnerability in Society", March, 2005, Presented at the RISTEX Seminar, commissioned by the RISTEX.

Risk and Response Management



Analysis of Historical Patterns and Trends

- Recently, LLNL performed analyses of historical patterns (1968-2004) and possible trends concerning, among other things, mortality and morbidity risks imposed by terrorism
  - Bogen and Jones, 2005. *Risks from worldwide terrorism: Mortality and morbidity patterns and trends.* UCRL-TR-209429, LLNL.
  - Also, *Risks of mortality and morbidity from worldwide terrorism: 1968-2004.* Submitted to Risk Analysis.
- Used publicly accessible data sets managed by RAND and MIPT (Memorial Institute for Prevention of Terrorism)
- Terrorism: non-state acts of violence calculated to create an atmosphere of fear and alarm to influence actions not otherwise taken, generally directed against civilian targets with political or publicity motives.

Aggregate worldwide terror data reflect predictable consequence patterns

Consequence magnitudes of worldwide terrorist events over the last half century follow a pattern predicted well by a Generalized Extreme Value (GEV) model

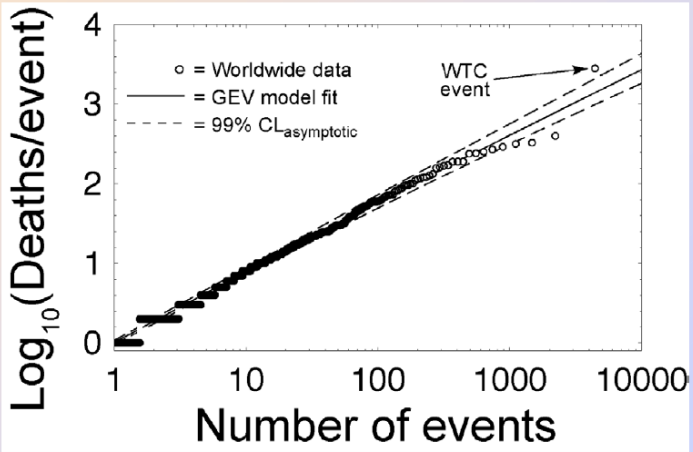
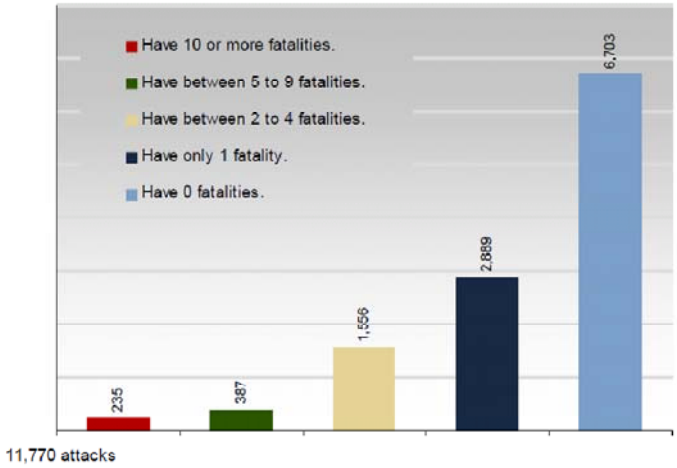
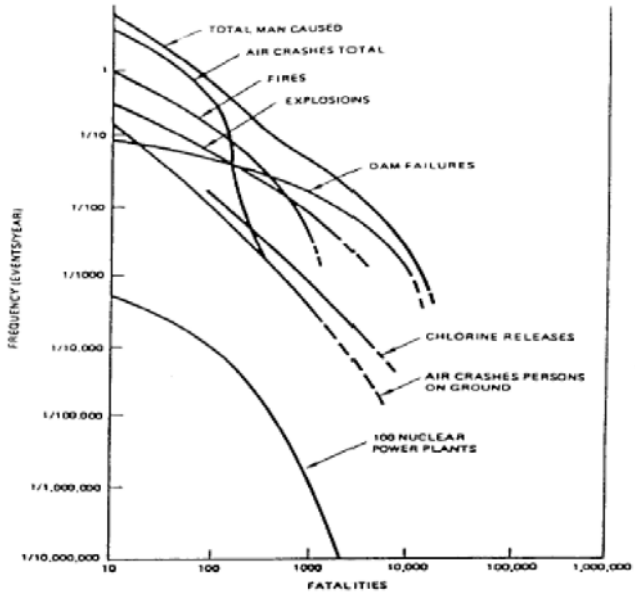


Chart 13 - Attacks Grouped by Fatality Range



Source: 2008 Report on Terrorism, US National Counter Terrorism Center

Frequency of Fatalities Due to Man-Caused Events

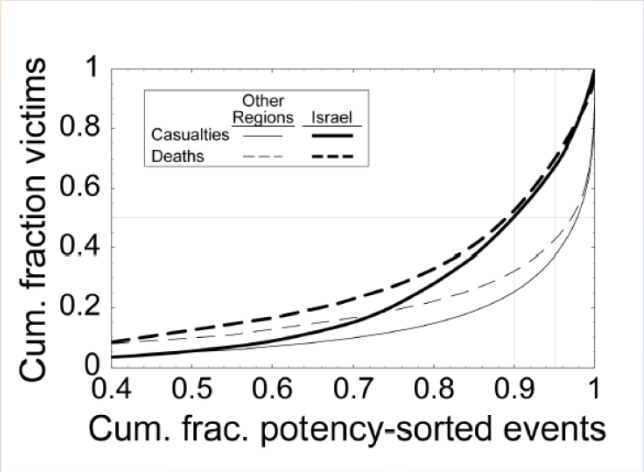


Examples of fat tail distributions

- Power outages, forest fires
- Air traffic cascading congestion events
- Meteor impacts, earthquakes
- Deaths and dollars lost due to man-made disasters
- Deaths and dollars lost due to natural disasters
- Ecosystem and specie extinction events?
- Variations in stock prices and federal budgets
- All of these involve frequencies of "events"

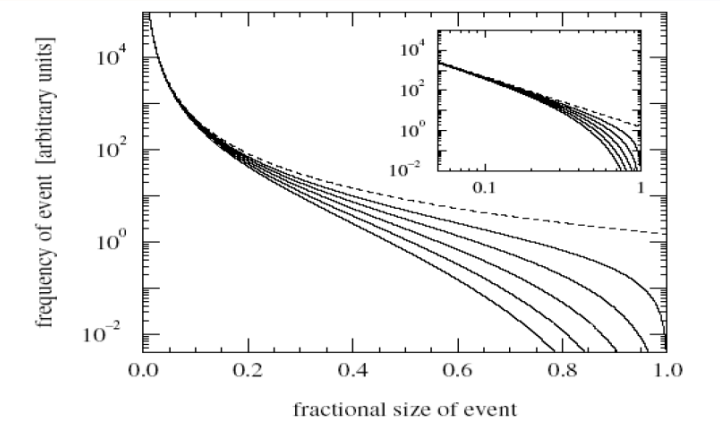
Extreme value distributions have most losses in a fraction of the events

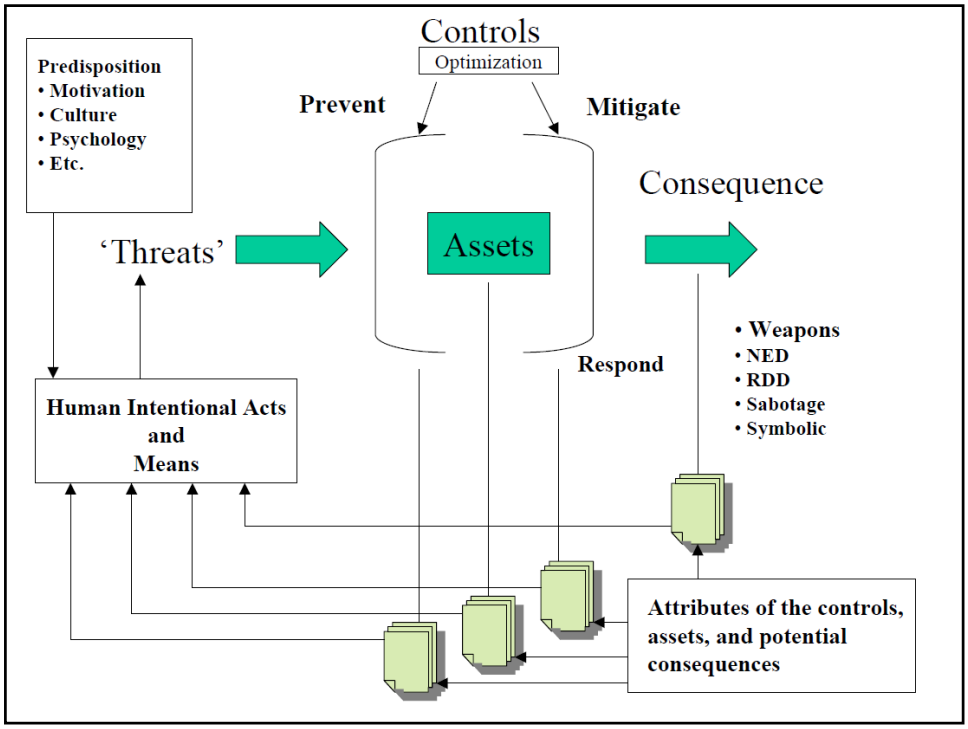
The solid curve at right, for example, shows that ~2% of all adverse events outside Israel caused ~50% of all casualties in those areas

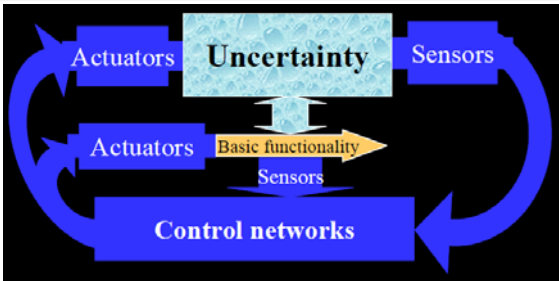


Extreme events can be moderated by resource allocation strategies

Model demonstration of attenuation of extreme events by maximizing a family of expected, monotonically decreasing, loss utility functionals (insert: same data on log-log scales)







Control, Communications, Computing

- Sense data
- Communications:
  - Information: Focus on what is surprising in data
  - Reliably store or transmit information
- Control
  - Extract what is *useful* (not merely surprising)
  - Compute decisions from *useful* information
  - Take appropriate action

How Long the 2001 Attack on the World Trade Center Remains the *Black Swan*?

- Will the "*small Black Swans*" emerge?
  - What is the likelihood of the terrorism incidents with a larger casualty level occurring more frequently in the future?
  - How about the likelihood of terrorists acquiring WMD or some other weapons to achieve mass casualty materialize in the future?

A Suicide Attack Plot by A Japanese National

- In June 2007, Yoshihiro Terasawa was arrested for manufacturing and possessing TATP in the amount of 92.5g.
- Prosecutor's opening statement: Terasawa was "thinking about detonating the explosives on a commuter train on Seibu Railway Co.'s Shinjuku Line, …after reading about a method for manufacturing the explosives on the Internet."
- Prosecutors alleged that Terasawa was dissatisfied about not having a stable job and came to envy people with steady employment. They said he came up with the idea of making explosives after reading on the Internet about the deadly 2005 suicide bombings in London.

✓ Disaffected individual's <u>suicide wish converted into a suicide plot</u>, through provocation by the Internet information.

A Japanese Individual Arrested for Having Produced Various Explosive Devises, Arrested in Nagoya City, in February 2008

- A Japanese individual (37 years old) was arrested for having produced various explosive devises, including about 3 kilograms of military-grade TNT and others.
- He produced all of these explosive devises using commercially available chemicals, by reading various books and information about explosives that are publicly available.
- Reportedly, he was obsessed with the end-of-the-world cult belief.
- He failed to be graduated from a high-school.

Japan's Approach on Bioterrorism Risk Assessment

Japan's Approach on Counter-Bioterrorism

- Given the significant budget constrain, together with the relatively low perception of the bioterrorism risk in general, the Japanese government primarily focus on *Crisis Management* than *Biodefense*.
  - *Risk assessment for what?*: Even if the bioterrorism assessment could be conducted thoroughly, it is difficult to expect a major change in resource allocation for counter-bioterrorism.
  - *"Deterrence by Denial"*: Instead, Japan primarily focus on instituting preventive measures, strengthening surveillance system, and improving coordination among stakeholders. Thus, a number of exercises on counter-bioterrorism have taken place in various parts of Japan.
  - *Experience-based response*: compiling the lessons learned information from the past case studies.

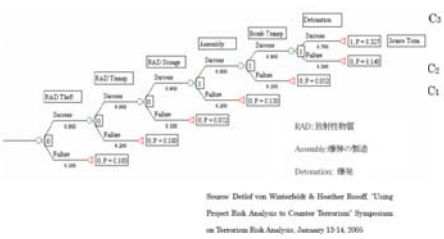
✓ Japan's counter-bioterrorism posture can be described as primarily being aimed at enabling "detect to treat" rather than "detect to warn".

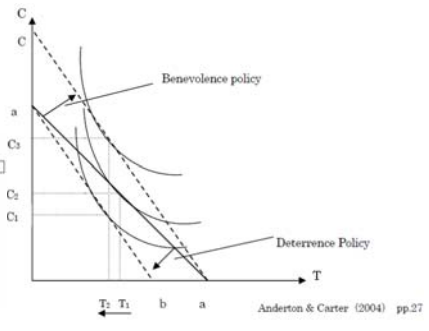
Japan's Approach on Bioterrorism Risk Assessment

- Japan's approach on bioterrorism risk assessment has not been targeted to conduct an "end-to-end" risk assessment. It is intended to aim at a narrow, specific risk assessment.
  - Microbiological Risk Assessment of Bioterrorism Agents in the context of Underlying Diseases (Prof. Keiko Kawamoto, Obihiro University of Agriculture & Veterinary Medicine)
  - Water sanitation standard, Safety standard for chemical residue in food, etc.

Japan's Approach on Bioterrorism Risk Assessment

- There are some existing work on "end-to-end" assessment of economic impact of bioterrorism incident. However, such academic attempt still remains at the stage of comparative study of theoretical franeworks:
  - Economic Analysis on the Issue of Bio-terrorism Preparedness: Concept and Model (Prof. Fumiaki Yasukawa, Doshisha University)
    - Risk analyses model
    - Microeconomic analyses:
      - Rational choice model
      - Game-theoretic model





Anderton & Carter (2004) pp.27

Japan's Approach on Bioterrorism Risk Assessment

- A simulation model for the optimal vaccination of the population in the event of smallpox and pandemic new flu outbreaks.
  - Tabletop Exercises against Bioterrorism by Smallpox and Pandemic by new flu via Agent Based Social Simulation by SOARS (Spot Oriented Agent Role Simulator) :"*Toward Program & Project Management for Pandemic Protection",* by Prof. **Hiroshi Deguchi,** *Senior Visiting Scientist, Economic and Social Research Institute, Cabinet Office, Government of Japan.*

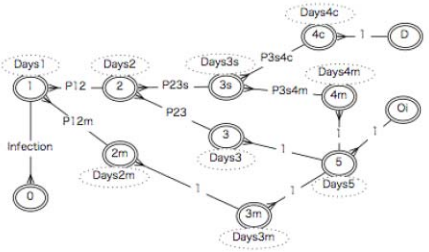


Fig. 2 Pathological transition general model

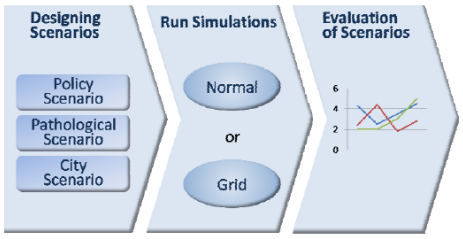


Fig. 1 Outline of simulation epidemiology

Public Perception of the Biological Risks Matter

- The risk tolerance level of the Japanese public is very low, in general.
  - Public perceptions of the risk have significantly affected and complicated the risk landscape and risk management, in the past.
  - Quite often, the public risk perception has been different significantly from the outcomes of the scientific risk assessment works by the professional.
  - Also the public perception of the biological risks have been complicated by the diverging views among the professional experts.

Public Perception of the Biological Risks Matter

- Primary variable determining the public trust in the crisis managers:
  - Professional expertise and knowledge of crisis managers
  - Perceived sincerity of the character of the crisis managers
  - Salient value similarity between the public and crisis managers

(Source: Kazuya Nakayauchi, *Risuku no Monosashi* (A Measurement of Risk) (NHK Books, Tokyo: 2006)

Hoax! Copy Cats!

- In Japan, after the real incidents of CB terrorism/crimes, a number of hoax and copy cat incidents followed, which consumed a significant portion of resources for crisis/consequence management.
- These collateral incidents caused significant economic and social impacts, perhaps more seriously than the real incidents alone.
- It is very hard to assess the risk of hoax/copy-cat incidents, in advance.

Lessons Learned from Case Studies of CB Incidents in Japan

Food Safety and Security

Food Poisoning

- In Japan, there are about 30,000-40,000 patients of food poisoning annually.
  - In 2006, over 70% of food-poisoning cases were caused by Norovirus. There were 6 major outbreaks where more than 500 patients suffered from norovirus respectively.
  - In 2007, due to an outbreak of Vibrio parahaemolyticus, 620 patients were reported in 9 prefectures across the country of Japan. The contamination source was salted squid.
  - Infection of Listeria: 83 patients per year
- In 2006, the cases of about 30% of food poisoning were unknown.
- According to a study group of the Ministry of Health and Labour Affairs, the actual number of patients far exceeded the reported number of patients.

(Source: Yomiuri Shimbun Shoku Shocku Shuzaihan, *Shoku Shocku* (Food Shock) (Chuo Koron sha, Tokyo: 2009)

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2000 Milk and Yogurt Poisoning Incidents

- In June 2000, due to the problems of sanitation of the milk production lines of the Yukijirushi Corporation's factory, 14,780 people have expressed symptom of food poisoning. Subsequently, Staphylococcus aureus were found in the contaminated milk and yogurt products.

Food Safety and Security

- Issues of the chemical contamination of imported foods are significantly affecting the public confidence in the Japanese government.

Is the Chinese Food Most Dangerous?

- Violation of the quantity of pesticide and antibiotics in food:
  - Vietnam: 0.35%
  - India: 0.28%
  - The US: 0.12%
  - China: 0.09%

✓ However, the food import from China constitutes about 60% of Japan's entire food import, and thus, the Chinese food is generally perceived as the most dangerous imported food in the world.

(Source: Yomiuri Shimbun Shoku Shocku Shuzaihan, *Shoku Shocku* (Food Shock) (Chuo Koron sha, Tokyo: 2009)

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BSE

- Japan restricts the import of US beef, in order to sooth down the public's concern over the BSE by easting US beef.
  - Failure of risk management/communication by the Japanese authority generated the public's distrust in the Japanese government's risk assessment.
  - Some of the US senior officials' statements about the scientific risk assessment of US beef may have failed to prompt the Japanese public to buy US beef, but rather probably resulted in keeping the Japanese public sustaining further distance from the US beef.
  - For the Japanese public, the US beef is only one of the many sources of protein. There are many other options available. The public may not have considered the risk seriously, but instead, easily turned to other option to avoid the burden of the complicated risk calculation.

(Source: Kazuya Nakayauchi, *Risuku no Monosashi* (A Measurement of Risk) (NHK Books, Tokyo: 2006)

Intentional Contamination

Biocrimes in Japan

- Before the Second World War, two biocrimes were recorded. For both cases, the perpetrators were medical doctors, and their motives were personal one.
  - In the first case, Teisaburo Takahashi, an otorhinolaryngologist, committed a series of biocrimes by giving confectioneries or appetizer contaminated by Salmonella typhi that he had cultivated to seven individuals, between 1935 and 1936, causing several deaths and injuries.
  - In the second case, Dr. Kikuko Hirose gave confectionary contaminated by S. typhi, S. paratyphi A and B to her former husband in 1939, resulting in twelve people felt ill and one death.
- After the Second World War, a medical doctor named Mitsuru Suzuki was arrested by the police for suspected injuries utilizing S. typhi and Shigella sonnei, in 1966.

(Source: Masaaki Sugishima, "Biocrimes in Japan" in M. Sugishima ed., *A Comprehensive Study on Bioterorism*, Legal Research Institute Monograph, Asahi University, Japan: 2003).

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Biocrimes in Japan

- Nabari Wine Poisoning Incident in 1961
  - At a party among the farmers in Nabari City, 5 people died and 12 injured after drinking wine contaminated by organophosphorus *pesticides.*
- Paraquat Serial Murder Incidents in 1985
  - 12 people died after taking drinks contaminated by Paraquat, herbicide, in varios prefectures across Japan.

(Source: Tomoaki Imamura, Shokuhin Tero ni Dou Sonaeruka? (How to Prepare for Food Terrorism?)(Nihon Seikatsu Kyodo Kumiai Rengokai, Tokyo: 2008).

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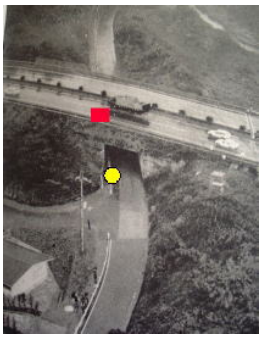
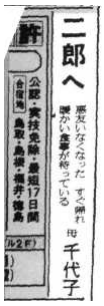
The Gulico-Morinaga Case

- The Glico-Morinaga case was a series of extortion cases in Japan, primarily directed at more than 6 Japanese industrial confectionaries, including Ezaki Glico Corp. and Morinaga Corp. between 1984-85, by an unknown group called “A Phantom with 21 Faces” who threatened to contaminate the companies’ products with arsenic poison.

- After only a few confectionary products contaminated with arsenic poisoning were found in convenience stores, all of the company’s products were removed from the store shelves, placing the company on the brink of bankrupt.

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The Gulico-Morinaga Case (cont.)

- The perpetrators abducted the Gulico company’s president, and later, sent a tablet of industrial Sodium cyanide (青酸ソーダ) and 3 pieces of confectionary products contaminated with sodium cyanide. The Gulico corporation lost about 30billion yen at that time.

- Later, the same perpetrators threatened the Morinaga Corporation, and placed in a convenience store a candy can of Morinaga Corporation make which was contaminated by 0.18g of sodium cyanide. In total, 13 confectionary products contaminated by the sodium cyanide were found between October 7-13, 1984.

- Subsequently, they threatened food distribution companies not to sell the Morinaga Corporation’s products. The Morinaga Corporation lost about 23 billion yen in sale compared to previous year.

- In 1984 alone, 31 cases of the copy cat incidents to imitate the Gulico-Morinaga case, where individuals threatened the confectionary companies to contaminate the products, occurred. It became a social phenomena to threaten these companies.

Assassination of a Technical Researcher at the University of Tokyo in 1991

- In February 1991, a technical researcher in the animal test facility of the University of Tokyo was assassinated by his colleague who poisoned the researcher by contaminating his drink with thallium acetate in December 1990.
- These two researchers were known to have had personal discord frequently.
- Similarly, in 2006, there was an attempt to murder mother by thallium by a high-school girl in 2006.

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Lessons from the 1998 Wakayama Curry and Rice Arsenic Poisoning Incident

On July 25, 1998, at a local community's festival someone got mixed arsenic with curry and rice. 4 people were killed and 58 victims were occurred. Initially food poisoning, secondary cyanide poisoning was suspected, finally arsenic poisoning was confirmed 8 days later. Prompt and accurate analyzing of cause materials became public concern.

A presentation material by Prof. Tetsu Okumura, MD, PhD
Department of Crisis Management Medicine on CBRNE Threats, Saga University

Chemical Incidents after the 1998 Wakayama Curry and Rice Arsenic Poisoning Incident

- Just within 5 months after the the 1998 Wakayama Curry and Rice Arsenic Poisoning Incident, more than 30 cases of incidents using poison occurred in Japan.
  - Ex.: Sodium azide contamination incidents in Niigata, Mie, Aichi, and Kyoto prefectures.

➢ In Japan, primary toxic substances used in intentional chemical incidents are arsenic compounds, sodium cyanide, and sodium azide.

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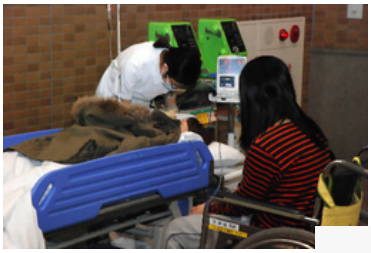
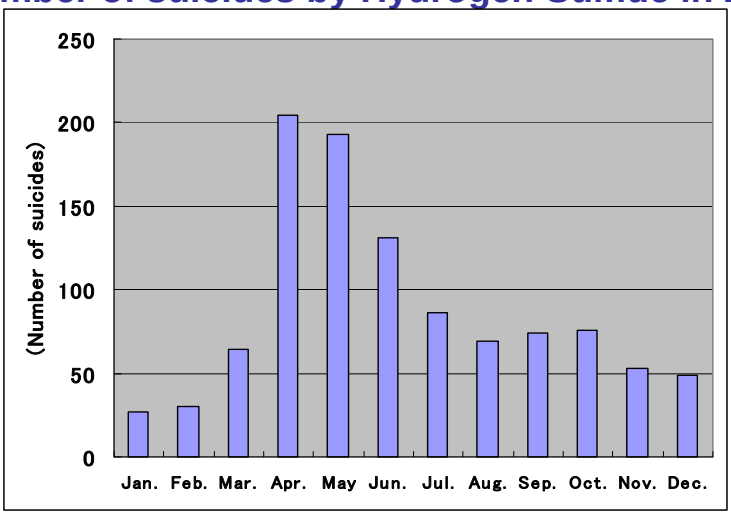
Chemical Incidents



A Surge in the Number of Detergent-Suicide Cases

- The number of suicide cases using homemade hydrogen sulfide suddenly rose, after the information about how to produce hydrogen sulfide using commercially available chemicals became available on the internet.
- There were also attempts to kill other persons using homemade hydrogen sulfide.

Number of suicides by Hydrogen Sulfide in 2008



The National Police Agency reported, total:1,056 people (In 2007: 29 people)

Presentation material by Yumiko Kuroki, Ph.D., Kaoru Iida, and Toshiharu Yoshioka, M.D. Ph.D., Japan poison Information Center

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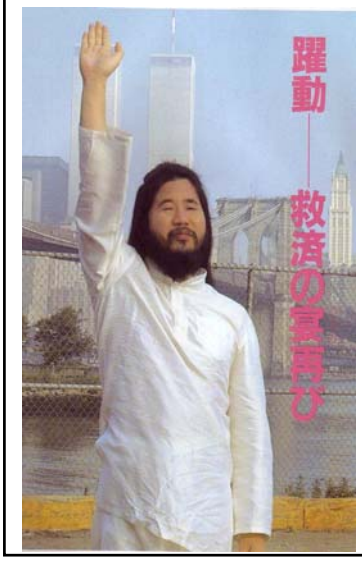
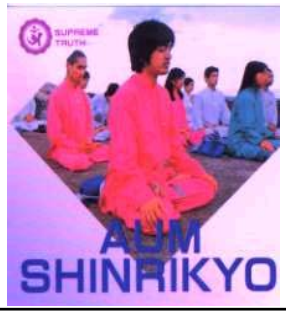
The Aum Shinrikyo's WMD Terrorist Attacks





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The Aum Shinrikyo's BW Programs

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Chronology of the Aum's BW Programs

- Around in April 1990, Aum planned to disperse bacteria botulinum by balloon, which was not carried out because of the delay of the cultivation of the bacteria.
- In May 1990, Aum dispersed what they believed to be "bacteria botulinum" from a car window with electric fan, targeting at the US military base in Yokosuka, areas surrounding the Imperial Palace, a headquarter of Soka Gakkai (a rival religious organization), and Kasumigaseki area.
- In July 1990, Aum dispersed materials what they believed to be "bacteria botulinum" water reservoir in the mountain.
- In May 1993, Aum planned to disperse anthrax targeting at the wedding ceremonial parade of the imperial family.

Source: a summary of court testimonies in Masaaki Sugishima, "Nihon no Baio Hanzai (Biocrimes in Japan)", in Sugishima ed., Baiotero no Houkatsuteki Kenkyu (A Comprehensive Study of Bioterrorism) (2003: Asahi University Publication); and excerpts of court testimonies.

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Chronology of the Aum's BW Programs

- From June through July 1993, Aum dispersed anthrax from its headquarter in Tokyo.
- In July 1993, Aum dispersed anthrax by car nearby the headquarter of Kanagawa prefectural government and Imperial Palace, which failed.
- In November 1993, Aum dispersed sarin and "bacteria botulinum" from car, targeting at the headquarter of Soka Gakkai.
- In June 1994, Aum imported a helicopter with the purpose to arm it with bacterial weapon, which was not carried out because the Japanese Ministry of Transportation did not grant approval for flying the helicopter.

Source: a summary of court testimonies in Masaaki Sugishima, "Nihon no Baio Hanzai (Biocrimes in Japan)", in Sugishima ed., Baiotero no Houkatsuteki Kenkyu (A Comprehensive Study of Bioterrorism) (2003: Asahi University Publication); and excerpts of court testimonies.

52

Chronology of the Aum's BW Programs

- In November 1994, the Aum planned to kill Taro Takimoto, a lawyer who was warning about the Aum's CW program, by injecting botulinum toxin, which was not carried out. (9-p.229)
- In March 1995, an attaché case with a spraying devise was found in the Kasumigaseki metro station. The plan was to use it to disperse "bacteria botulinum" in aerosolized form.

Source: a summary of court testimonies in Masaaki Sugishima, "Nihon no Baio Hanzai (Biocrimes in Japan)", in Sugishima ed., Baiotero no Houkatsuteki Kenkyu (A Comprehensive Study of Bioterrorism) (2003: Asahi University Publication); and excerpts of court testimonies.

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Characteristics of the Aum's BW Programs

- The BW programs miserably failed, which is believed by many experts to be the results of the inability of Endo.
- The Asahara referred to these biological weapons in his speeches publicly.
- The Aum targeted at the Japanese government institutions, the Imperial Families, the US military base, a rival religious organization, and the public in general.
- The Aum came back to the same targets even after failed once.

The Aum Shinrikyo's CW Programs

55

Matsumoto Sarin Gas Attack
June 27, 1994

8 residents died, 274 people injured

Animated descriptions of the internal structure of the car used for the dispersal of sarin gas, produced by the former Aum member who engaged in CW program. (Source: Kanariya-no Kai)

56

Assassination of a Defector with VX (Osaka, Japan, Dec. 12, 1994)

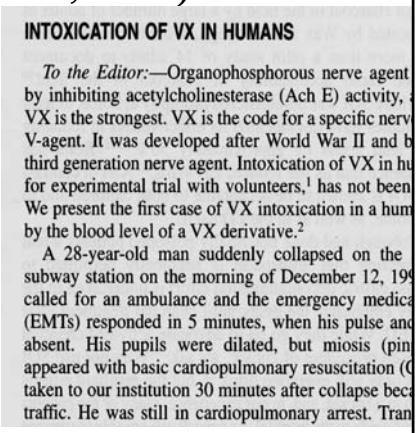
1995年(平成7年) 7月22日 土曜日 毎日

VXガス分解物検出

大阪で死亡の

オウム本格

(Report on Mainichi Shimbun, 1995/07/22)


INTOXICATION OF VX IN HUMANS

To the Editor:—Organophosphorous nerve agent
by inhibiting acetylcholinesterase (Ach E) activity,
VX is the strongest. VX is the code for a specific nerv
V-agent. It was developed after World War II and b
third generation nerve agent. Intoxication of VX in hu
for experimental trial with volunteers,[1] has not been
We present the first case of VX intoxication in a hum
by the blood level of a VX derivative.[2]

A 28-year-old man suddenly collapsed on the
subway station on the morning of December 12, 199
called for an ambulance and the emergency medica
(EMTs) responded in 5 minutes, when his pulse and
absent. His pupils were dilated, but miosis (pin
appeared with basic cardiopulmonary resuscitation (C
taken to our institution 30 minutes after collapse beca
traffic. He was still in cardiopulmonary arrest. Tran

(F. Morimoto, et. Al. Am J Emerg Med 17:493-494, 1999)

Source: Presentation material by Dr. Takeshi Shimazu, University of Osaka

57

Murder Attempts Using Chemical Weapons

- Aum tried to assasinate Ms. Shouko Egawa , an influential critic of Aum Shinrikyo, by phosgene.
- Aum tried to kill Mr. Ryuhou Ohkawa, a leader of another religious organization, by VX.
- Aum tried to kill Mr. Taro Takimoto, a lawyer representing the families of the parents of Aum members and influential critic, by sarin.
- Aum also tried to kill 2 other individuals (Mr. Hiroyuki Nagaoka, and Mr. Noboru Mizuno) by VX.

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Aum's Other CW Programs

- Masami Tsuchiya, Aum's CW project leader, produced other chemical weapons:
  - Soman
  - Yperite
  - Hydrocyanic acid gas
    - Aum placed 2 bags which contained 2 chemicals to produce Hydrocyanic acid gas (sodium cyanide and dilute sulfuric acid) in the rest room nearby Sbinjuku station, one of the most crowded stations in Japan, twice.
- Also, Aum attempted to produce Dioxin believing that it would cause a large number of casualties.

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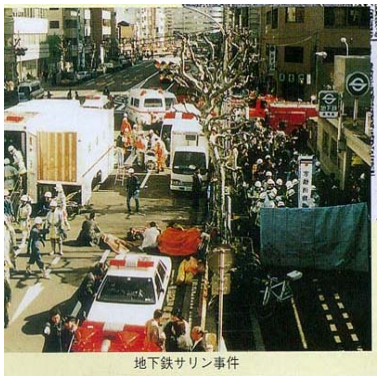
Tokyo Subway Sarin Gas Attacks, March 20, 1995



（Source：National Police Agency)

60

Characteristics of Sarin

- Purity of Sarin: approximately 35%
- Approximately 3 kg (6-7 litter) of sarin was used in 5 metro train cars. Sarin liquid was divided into 11 plastic bags.
  - 200 - 600 g Sarin dispersed in one train
  - LCt_{50}: 150 mg min/m^3
  - Volatility: 23,000 mg/m^3
  - Volume of one train - 200 m^3
- Decontamination was conducted using Sodium Carbonate by the Japan Ground Self Defense Force.
- On site detection: M8 Paper and Gas detection devise only.

Source: presentations by and interviews of Dr. Yasuo Seto, National Research Institute of Police Science, and LTC K.Nakamura, Chemical School Japan Ground Self-Defense Force.

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Lessons Learned from the Aum Shinrikyo Terrorism

Lessons Learned

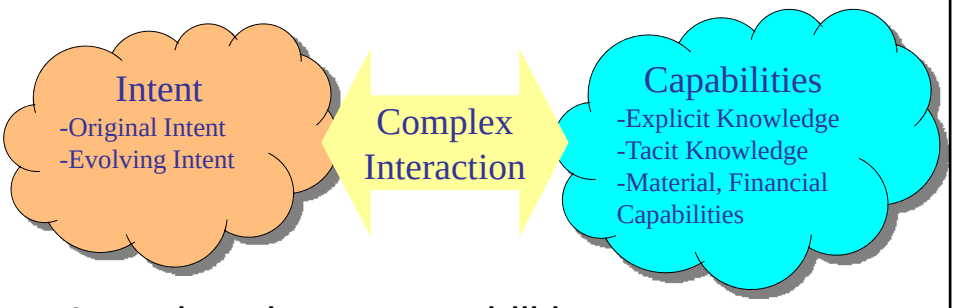
- As the Aum advanced their weapon programs, their messages began to carry violent messages. When a cult or a violent extremism organization began to talk about specific types of weapons, the government may be better advised to analyze them seriously.

- Many cults or violent extremism organizations need external enemy in order to solidify internal cohesion. They try to invoke fears among their members that they are under attack by an external force. Here, the United States is often described as the primary enemy. The level of the organization's obsession with the US conspiracy theory could be one indicator about the organization's obsession with violence. Better seriously analyze the context under which the conspiracy theory is conveyed to the members within such organizations.

Lessons Learned

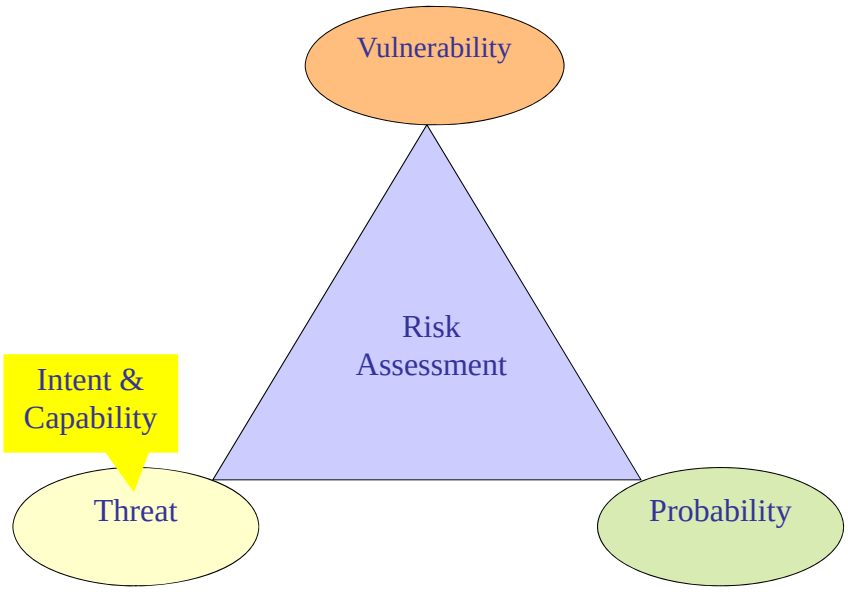
- Aum Shinrikyo incident highlighted the importance of addressing the "dual-use" challenges through a variety of measures, including:
  - Educating the young scientists with social norm
  - Improving the management of research program at universities
    - There seem to be those young scientists who feel frustration by the authoritative structure of academic research program.

Dynamism between Intent and Capabilities



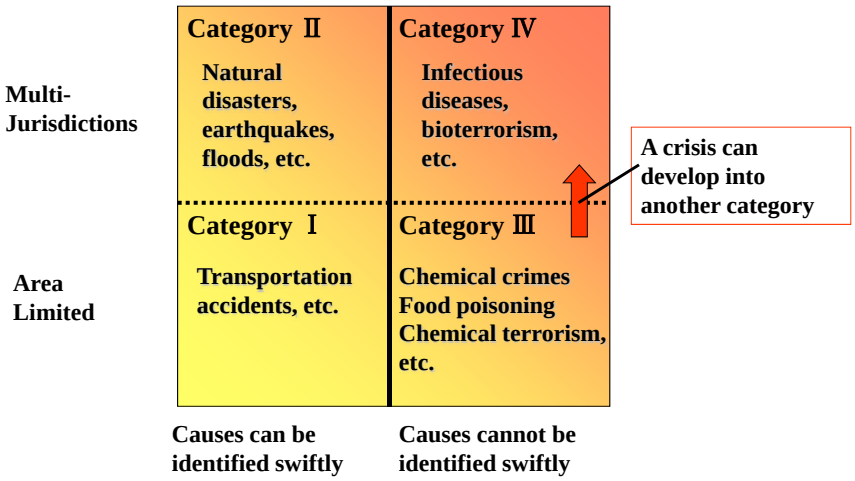
- Intention shapes capabilities.
- Capabilities also shape/alter intention.

Conceptual Framework for Risk Assessment



Prevention and Mitigation Strategy for CB Incidents in Japan

Categories of the Hazardous Incidents



（Source: Kazuaki Koriyama, an advisor to Kitakyushu City on crisis management）

Laws Concerning Infectious Disease Surveillance

- Infectious Disease Control Law (Law Concerning the Prevention of Infectious Diseases and Medical Care for Patients of Infections)
  - Enacted in April 1999, abrogating the Communicable Disease Prevention Law, the Venereal Disease Prevention Law and the AIDS Prevention Law, and amended in November 2003
  - Revised in 2008 May, Creating new category "Pandemic influenza and relevant infection.
- Food Sanitation Law
  - enacted in 1948
  - Covering food poisonings

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Effort to Prevent Food Terrorism

- Development of *A Check List to Prevent Intentional Food Contamination at Food Production Factories*.

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Effort to Develop an Educational Module

- National Defense Medical College (NDMC) and the University of Bradford in the United Kingdom have decided to jointly produce a web-based resource which can be used by other universities around the world to develop courses for their students. The material on the website will cover such issues as:
  - the threat of biological warfare and biological terrorism and the international regime totally prohibiting such weapons;
  - the dual-use dilemma and the responsibilities of life scientists;
  - national implementation of the BTWC; and
  - the building of an effective web of prevention.

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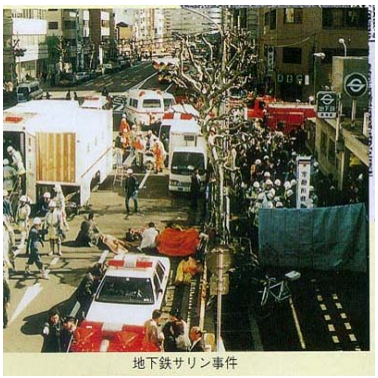
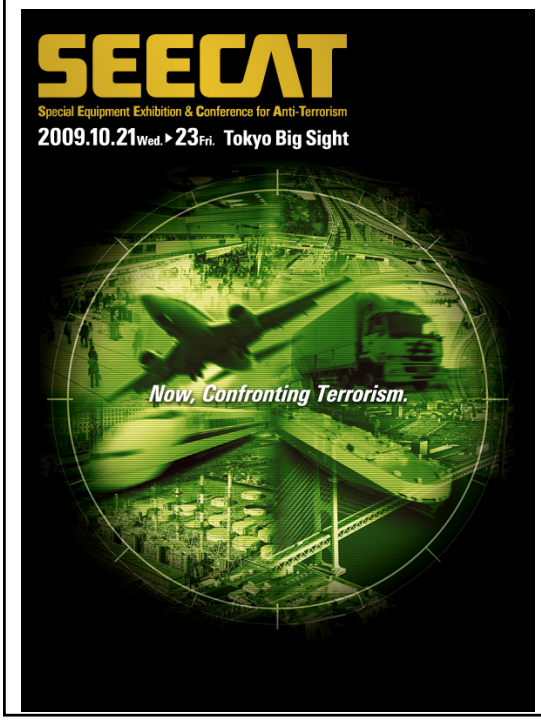
Research and Development of Counter-Measures



（Source：National Police Agency)

72



Special Equipment Exhibition & Conference for Counter-Terrorism Tokyo, Japan

http://www.seecat.biz/english/index.html

73

Examples of Policies and Programs on Science and Technology for Safe and Secure Society, Funded by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT)

（Source：the information in this section is cited from the website of the Japanese Ministry of Education, Science and Technology as well as associated documents by the MEXT.）

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"Science & Technology for a Safe & Secure Society Project"

FY2008 Budget : 625 mil JPY
FY2009 Budget : 538 mil JPY

Basic concept based on the 3rd "Science & Technology Basic Plan"

- Attainment of "S&T to be supported by public and to benefit society"
- Attainment of innovation through R&D process, aiming to create social values such as ensuring safety and security of society, not only pursuing economic values

This PJ aims to contribute to ensuring national security and the safety of citizens by promoting R&D regarding important issues. In doing so, the PJ also aim to establish centers of S&T for a Safe and Secure Society, and develop a network of researchers specialized in safety and security.

Promotion of Major R&D

R&D for Safety and Security in a Regional Community

To call for proposals of R&D which provides innovative S&T solutions to regional social problems, utilizing knowledge in social science and human science, and taking a view of practical implementation of its products to the society.

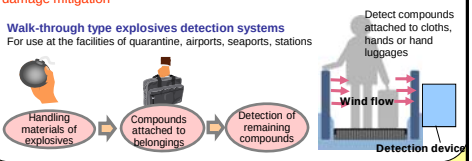
< Examples of R&D >
- R&D of Information and communication system for natural disaster prevention or crime reduction in the community
- R&D for prevention of accidents on children and elderly people.
- R&D for disease prevention and health promotion at community level .

R&D for Counter-Terrorism

To fund R&D for counter-terrorism, counter-crime and risk-crisis management, which matches the first responder's needs, and employs basic R&D results.

- Detection technology of chemical, biological agents
- Detection technology of explosives
- Simulation systems for prediction of hazardous materials distribution and damage mitigation

Walk-through type explosives detection systems
For use at the facilities of quarantine, airports, seaports, stations



Sharing Knowledge and Technologies Related to Safety and Security

Developing a network of researchers specialized in safety and security.
Collection and analysis of information on the needs of users at public organizations and of seeds in universities and research organizations.

Japan Science & Technology Agency / Core Research for Evolutional Science & Technology
Research Area "Advanced Integrated Sensing Technologies"

Mobile-type Full-automatic Multi-BWA (Biological Warfare Agents) Detection System

Research Director

Jiro Yasuda Chief, National Research Institute of Police Science

National Research Institute of Police Science
Obihiro Univ. of Agriculture and Veterinary Medicine ↔ Toshiba Co.

Research Period

FY2005～FY2008

About Research

The crime and terrorism using Biological Warfare Agents (BWA) have become a big threat for our safety and security. When incidences using BWA occur, quick detection, identification and transmission of the information are the most important to minimize individual and social damages. Our research is driving for the development of advanced unification sensing systems for BWA. The systems are the forerunner of the world. It would be able to rapidly detect and identify many kinds of BWA at once only by injection of the suspicious materials into the portable equipment.

1. Multi-agents detection

Samples
- Powders
- Foods & drinks
- Specimens etc

DNA chip

Detectable multi-agents at once

- Smallpoxvirus
- *B. anthracis*
- *Y. pestis*
- *C. burnetti*
- *Brucella*
- Ebola virus
- Marburg virus
- Lassa virus
- *F. tularensis*
- *C. botulinum* toxin

2. Mobile system

- Electrochemical detection
- All-in one
- Network

Device

- On-site detection
- Share of information at real time

3. Full-automatic

Rapid, safety, and easy detection

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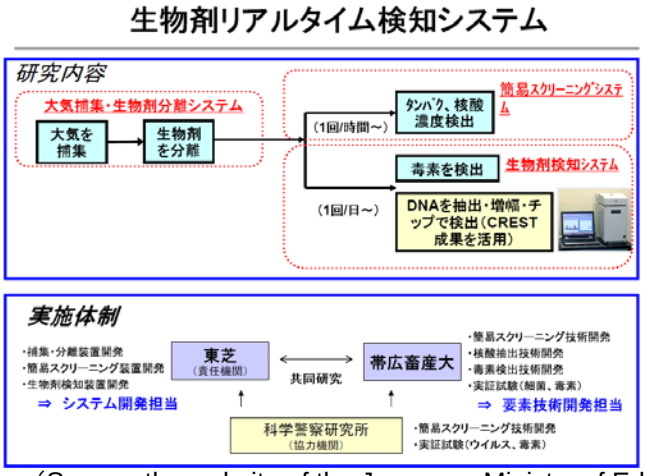
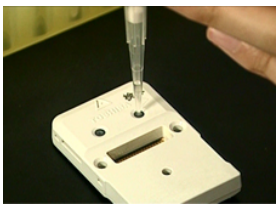
Development of Real-Time Biological Agents Detection System led by Dr. Nobuhiro Genma, Toshiba Corporation





(Source: the website of the Japanese Ministry of Education, Science and Technology; pictures of the TOSHIBA DNA chips are from the website of TOSHIBA Corporation)

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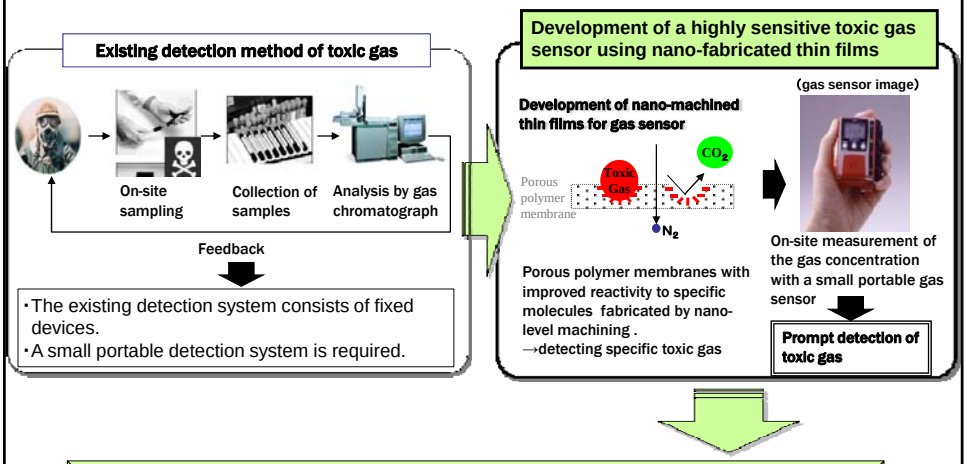
Promoting R&D of a highly sensitive gas sensor using nano-technologies developed by RIKEN Advanced Development and Supporting Center



Sensor technologies enabling the prompt on-site detection of toxic gas contribute to the building of safe and secure societies.

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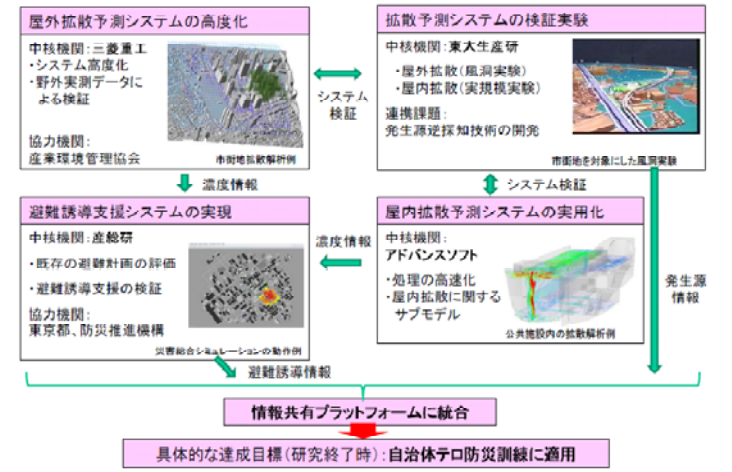

- An integrated system to predict the dispersal of hazardous CBRNE materials and to support emergency evacuation of people in the event of CBRNE terrorist attack. Research led by Prof. Shinsuke Kato, University of Tokyo.