




Health surveillance strategies for long-term exposure after a nuclear or radiological accident

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A partnership of:

 "la Caixa" Foundation

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Pompeu Fabra
Barcelona

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de Catalunya



FUNDACIÓN
RAMÓN ARECES

Most research generally on **direct somatic health** effects of radiation exposures but ...

- Clear indications that *accident, remediation situation and dosimetric and health surveillance have an impact on health:*
 - Stress of affected populations –
 - Uncertainties: health effects ... conflicting information
 - Relocation – loss of home, social relations, work, control on one's life
 - Contamination levels of milk, food, water, outside ?????



Photos –
National Geographic, Nollet 2014

Photos courtesy
F. Mettler

Health impact of accidents, response, remediation and surveillance

- Morbidity: serious mental health impact, obesity, ..
- Mortality
 - relocation and hospital closure in evacuated areas of Fukushima prefecture
 - accidents related to substance abuse and depression (Chernobyl liquidators, ...)
 - mortality from cardiovascular and alcohol related diseases (Russian men, life expectancy)
 - suicides (Chernobyl liquidators, adolescents ...)

- SHAMISEN:

Nuclear **E**mergency **S**ituations - **I**mprovement of **M**edical **A**nd **H**ealth **S**urveillance

- Build upon lessons learned from experiences of populations affected by Chernobyl, Fukushima and other radiation accidents
- To develop recommendations for medical and health surveillance of populations affected by previous and future radiation accidents.

Expected outcome



- Recommendations for health surveillance and medical follow-up of affected populations, with particular attention to:
 - Dose assessment supporting
 - emergency response, including evacuation
 - clinical decision making in the aftermath and
 - long-term follow-up of populations;
 - Improvement of living conditions of affected populations,
 - responding to their needs and
 - engaging them in surveillance programmes
 - while avoiding generation of unnecessary anxiety;

Expected outcome

- If and where feasible (in particular in Chernobyl), improvement of estimates of radiation-induced risk
 - for radiation protection and
 - for communication with affected populations,



List of participating organisations

ISGlobal	Fundació Instituto de Salut Global de Barcelona
EPN	Centre d'étude sur l'Evaluation de la Protection dans le domaine Nucléaire
NMBU	Norwegian University of Life Sciences
UNEW	Newcastle University
IRSN	Institut de radioprotection et de Sûreté Nucléaire
IARC	International Agency for Research on Cancer
ISS	Istituto Superiore de Sanita
NIRS	National Institute of Radiological Sciences
WIV-ISP	Belgian Scientific Institute of Public Health
InVS	Institut de Veille Sanitaire
UAB	Universidad Autónoma de Barcelona
NRPA	Norwegian Radiation Protection Authority
BfS	Bundesamt für Strahlenschutz
EURADOS	European Radiation Dosimetry platform
NERIS	European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery
Uhiroshima	Hiroshima University
Unagasaki	Nagasaki University
FMU	Fukushima Medical University

List of experts

- External experts
 - Key actors of the follow-up and screening of populations exposed as a result of Chernobyl in Belarus, Russia and Ukraine
 - In emergency response, psychology, philosophy, psychiatry and ethics

Dimitry Bazyka, Ukraine.

Bjørn Hoffman, Norway

Evelyn Bromet, USA.

Sergey Igumnov, Belarus.

Andrey Bushmanov, Russia

Viktor Ivanov, Russia.

Zhanat Carr, WHO

Alexander Rozhko, Belarus.

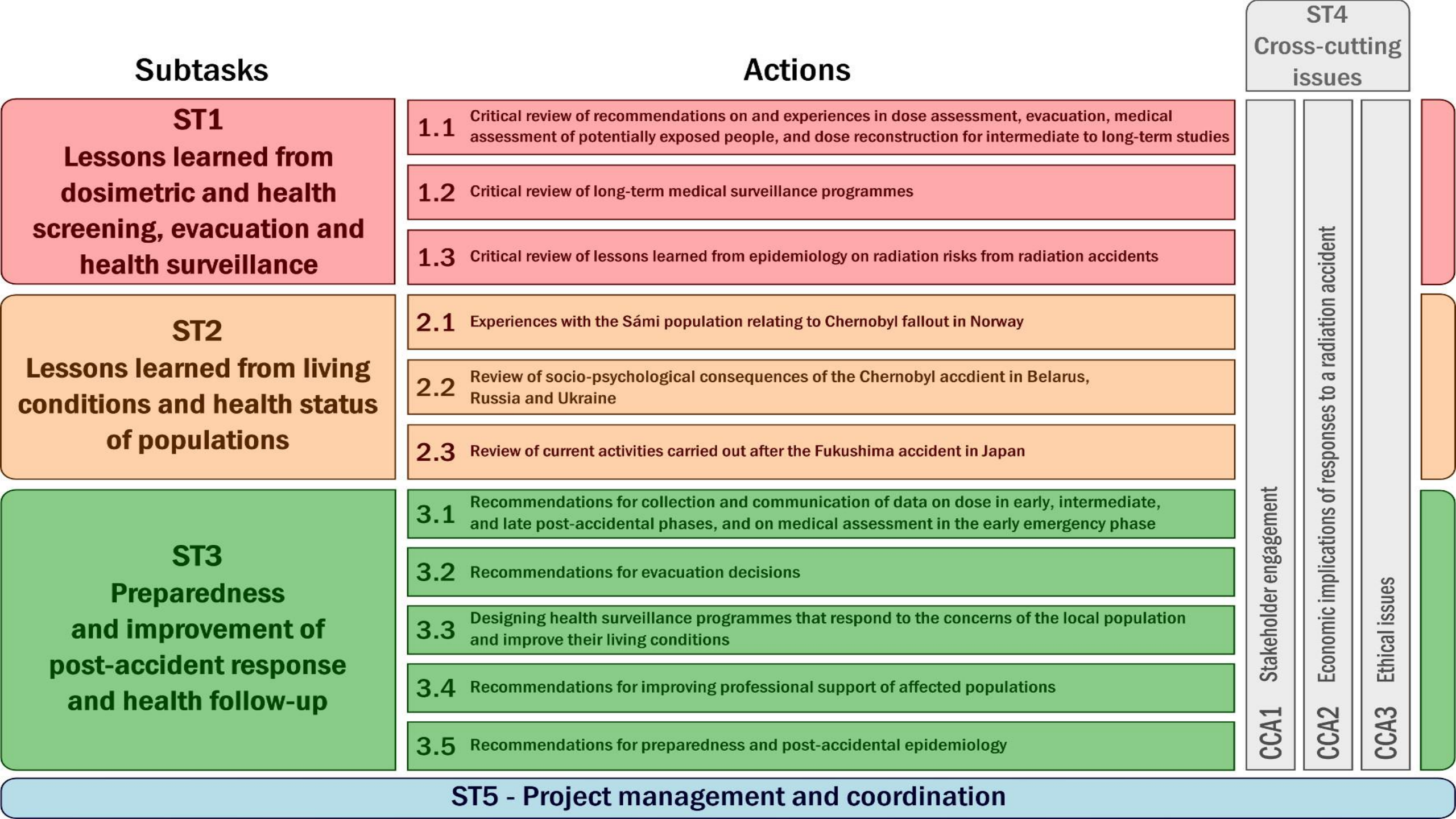
Bernd Grosche, Germany

Geraldine Thomas, UK

Johan Havenaar, Netherlands

Mykola Tronko, Ukraine

And colleagues



Stakeholder Consultation

(Web and Paris Stakeholder
Workshop 24th March 2017)

*Recommendations and procedures for preparedness and health surveillance
of populations affected by a radiation accident*

Summary

Background

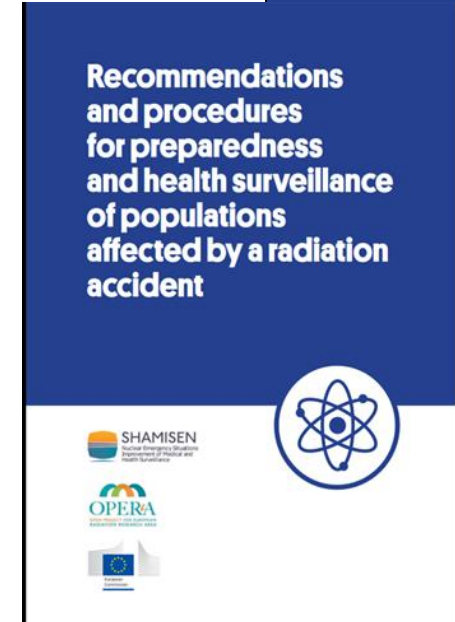
The EU SHAMISEN project started in December 2015, with the goal of producing a set of recommendations that would contribute to health surveillance and related communication



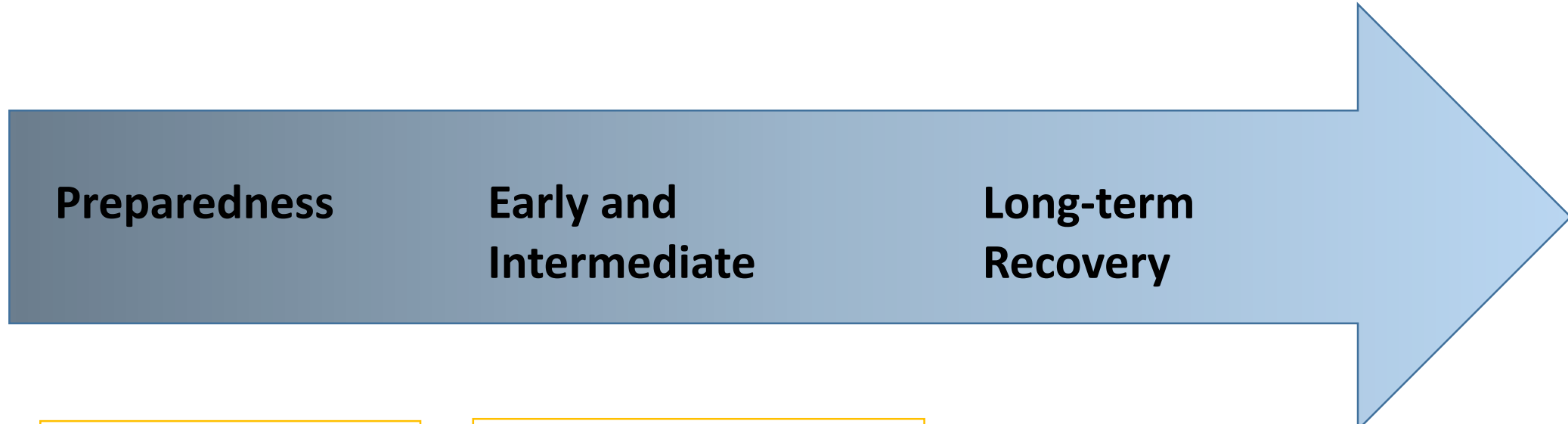
Shamisen Recommendations

- Background and introduction
 - 28 Recommendations
 - Why
 - How
 - Who
- Drawing from cases and lessons learnt in ST1, ST2, ST4
- Authorities, academics, research institutes, NGOs, local stakeholders ...
- Supporting material (References, Tables)

放射線事故への備えと、その影響を受けた人々の健康調査に関する勧告及び施策



Structure: Accident Phases



Continuous cycle of planning, organizing, training, exercising, equipping, evaluating and taking corrective action

Emergency response: coordination and management of resources
Early: initial phase of radiation hazard resulting in an emergency exposure situation
Intermediate: radiation level is no longer increasing

Activities of populations: adjust to the prevailing radiation situation.
Focus: recovery of the affected areas and long-term rehabilitation of living conditions of the populations

Scope

- Cover health surveillance, epidemiological studies, dose reconstruction, evacuation and training of health personnel and other actors involved in liaising with affected populations.

- **Evacuation**

- **Health surveillance**

- **Epidemiology**

- **Dose assessment**

- **Communication and Training**

- Do not address all aspects of emergency preparedness
- Generic enough to be applied in different countries, recognising that cultural differences will be important
- Provide advice on what type of tools and protocols are needed rather than the tools themselves
- Do not specify absolute doses/levels for implementation of actions

R2. Recognise the difference between health/medical surveillance and epidemiology

R3. Encourage a health surveillance strategy that targets the overall well-being of populations

R4. Ensure that health surveillance respects the autonomy and dignity of affected populations

R5. Review, and if needed improve, existing health monitoring systems for epidemiological surveillance

R6. Adapt dosimetry and individual exposure monitoring to the situation

R7. Build a radiation protection culture

放射線事故への備え
と、その影響を受けた

人々の健康調査に関する
勧告及び施策

	Preparedness	Early and Intermediate	Long-term
Evacuation	R9. Plan sheltering, evacuation and stable iodine distribution protocols	R15. Optimise timing and support for sheltering and evacuation	R22. Have plans for lifting of evacuation orders as soon as possible
Communication and Training	R8. Establish early response and communication protocols R10. Prepare and facilitate training and education material and resources R13. Foster participation of stakeholders and communities in emergency and health surveillance planning	R14. Ensure prompt sharing of accurate and reliable information	R21. Build networks of experts – local facilitators – population R23. Consider the preferences of people living in affected areas R28. Foster long-term participation of affected populations and communities
Dosimetry	R12. Prepare action frameworks focused on dose assessment for workers and populations	R17. Collect and store all radiation-related dosimetry data R18. Provide support to populations who wish to make their own measurements	R19. Continue dose assessment for workers and affected population R20. Continue dose measurement support to populations
Health surveillance		R16. Create a common roster of affected populations	R24. Expand support of populations to take into account economic and social upheavals R25. Launch systematic health screening based on appropriate justification and design
Epidemiology	R11. Prepare frameworks and checklists for epidemiological protocols	R16. Create a common roster of affected populations	R26. Clarify objectives and expected results of epidemiological studies R27. Ensure long-term sustainability of follow-up of populations at risk



Recommendations and procedures for preparedness and health surveillance of populations affected by a radiation accident



<http://radiation.isgl-obal.org/index.php/en/shamisen-home>



R3

Encourage a health surveillance strategy that targets the overall well-being of populations and not only addresses radiation effects, but also psychosocial and socio-economic impacts induced by the consequences of a nuclear accident.

WHY

According to the WHO, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948). One of the most important lessons learnt from previous accidents is that the negative consequences and potential benefits of health surveillance go beyond the direct impacts of radiation exposure. These include psychosocial and health impacts caused by stress and anxiety, or by emergency evacuation, as well as socio-economic, cultural and other societal impacts, such as access to community areas, or safeguarding traditional practices and lifestyles. The long-lasting societal and economical disturbances can also be linked to a range of lifestyle-related diseases among the exposed populations. Failure to capture the full impacts of surveillance means that an efficient surveillance strategy cannot be readily identified.

HOW

A **multidisciplinary approach** to health surveillance is needed to identify, measure, assess and alleviate psychosocial and other indirect health impacts of socio-economic and social upheavals of the consequences of the accident (*see also R24*). It should include the participation of psychologists, mental health specialists, sociologists, health economists, radiation protection experts, epidemiologists, general physicians and other stakeholders able to take into account the **concerns and expectations of local populations**. Since the revitalisation of community welfare is a particularly important consideration, and often challenged by mistrust of authorities, the participation of **local health practitioners and actors** should be especially encouraged.

WHO

Health authorities, medical professionals, academic and other research centres, local citizens.

GENERAL PRINCIPLES



Consider the overall well-being of the population (including the psychological, social and economic impact).



Engage the general public and other stakeholders



Respect the autonomy and dignity of affected populations



BEFORE



Train medical personnel and other professionals



Establish/improve disease registries



Plan early response and communication protocols



Establish sheltering and evacuation protocols



DURING



Provide timely and reliable communication on the accident and the risks



Provide sheltering advice and support



Balance radiation exposure risk with other health risks before evacuating



Collect and store the minimum information from affected populations to facilitate follow-up



AFTER



Offer health screening to the population, with adequate information and counseling



Launch public health studies only if informative and sustainable over time

Support and engage the affected populations:



Listen to their needs and worries

Support them in making their own dose measurements



Help them make informed decisions, including whether and when to return to their homes

一般原則



人々の全体的な幸福を考慮。
(精神的、社会的、経済的
な影響も考慮に含む)



住民と専門家の
交流。



被災者の自立性
と尊厳の重視



準備



医療従事者と関連
する専門家へのト
レーニング



疾病登録の確立
(もしくは、改善)



早期対応とコミュ
ニケーション手順
の計画



避難と屋内退避の
手順の確立



被災直後



事故とリスクに関す
る迅速で信頼のある
コミュニケーション
の提供



屋内退避のアドバイ
スとサポートの提供



避難前に放射線被ば
くのリスクと他のリ
スクのバランスの考慮



迅速なフォローアッ
プのため被災者から
の最小限の情報を集約



復興期



適切な情報と相談窓口によ
る人々への健康スクリー
ニングの提供



長期間の情報共有と継続性
を持った公衆衛生的な研究
を立ち上げる

被災者へのサポートと交流:



被災者の心配事と
ニーズを聴く

被災者独自の線量測定を
サポート



どのように、いつ地元にも
戻れるかを含めた効果的な
議論の補助

A1.2: Critical review of long-term medical (health) surveillance programmes after Chernobyl and Fukushima – Overall objective

To provide a set of lessons learned from medical surveillance on physical and mental health of populations exposed to fallout from the Chernobyl and Fukushima accidents



ST3: Recommendations for designing long-term health surveillance programs

A1.2: Critical review of long-term medical (health) surveillance programmes after Chernobyl and Fukushima – Questions to be answered

What is/was the goal of the health surveillance programmes:

- ❖ to improve general health of the affected populations?
- ❖ to prevent/reduce impact of accident and occurrence of radiation or accident related health effects?
- ❖ or both?

Chernobyl Follow-Up

- Directive of the Ministry of Public Health of the USSR in 1987:
 - creation of an "**All-Union Distributed Registry**" located in Obninsk, Russian Federation,
 - **comprehensive registration and follow-up system for persons most affected by the accident throughout the former USSR.**
- The directive identified four groups of subjects (groups of "primary registration") for whom registration and follow-up was mandatory:
 - "**liquidators**" or recovery operation workers (**600-800 000**)
 - **subjects evacuated** from the most contaminated territories (**300 000**)
 - persons living in "**strict control zones**" (**250-300 000**)
 - **children of the above individuals.**

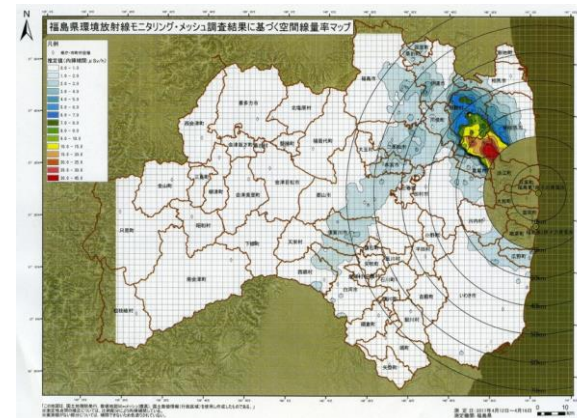
The Chernobyl Registries

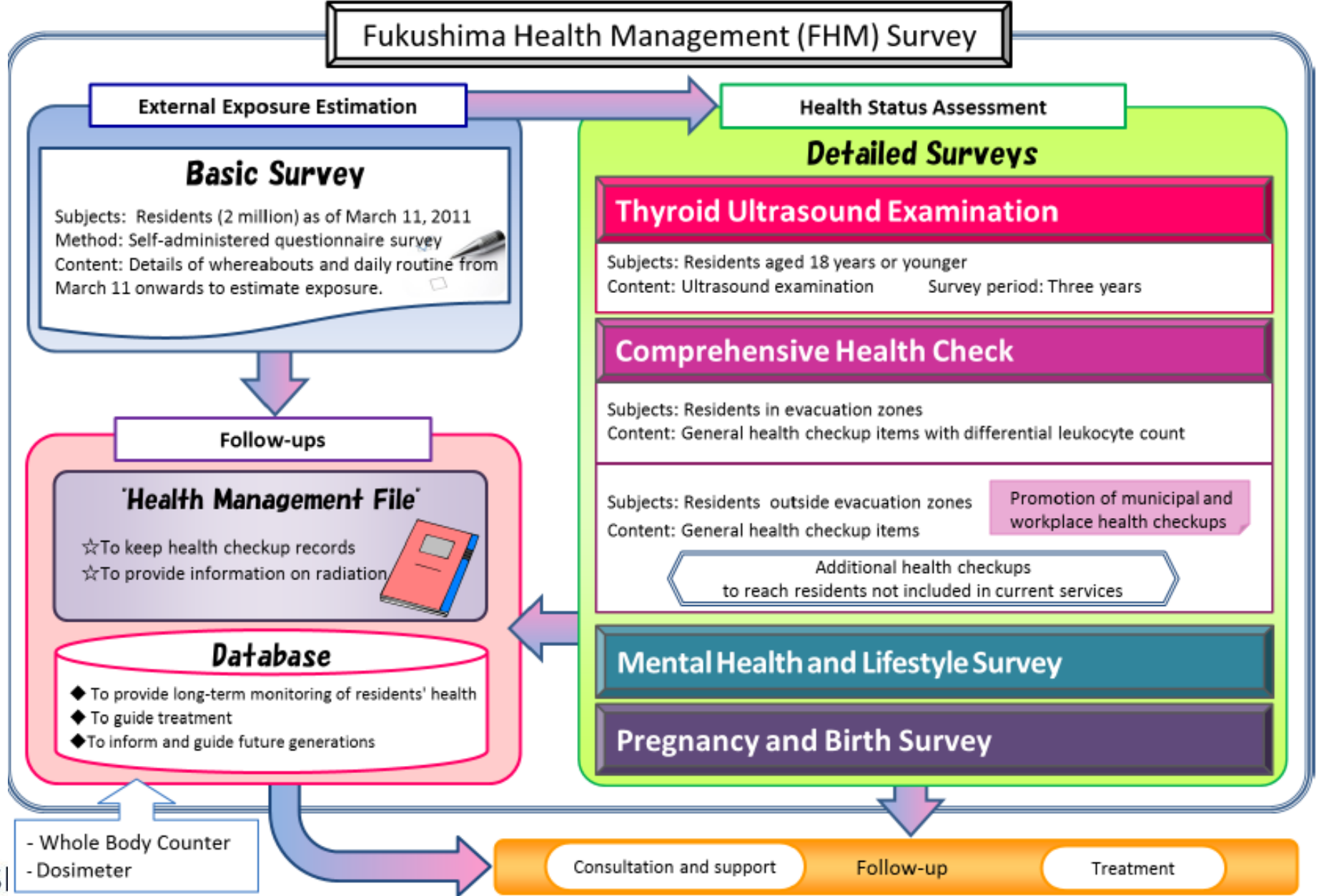
- **Original plan**
 - Annual visits of all subjects with over 10 different specialists
 - Registration of health data from local polyclinics and hospitals
 - *Proposal was too ambitious and was not supported*
- **Current status**
 - a Registry exists in each New Independent State
 - completeness of follow-up is **low** and **selective**
 - accuracy of information on diseases, residences, etc – doubtful
 - absence of dose estimates and when available accuracy doubtful

... but it does provide a roster of exposed populations

Follow-up of populations exposed from Fukushima

- **Workers**
 - RERF – on-site (TEPCO) workers – NEW study ... started in 2014
 - REA – on and off site workers - underway
- **General population - Fukushima Medical University –**
 - a basic survey medical sheet for all the residents
 - further examination of target populations.





Dosimetry

- Individual dose now estimated for 565,484 persons (*97% of respondents*) residents who responded to the Basic survey (*response rate 27.5%*)
- Individual dose estimate reported to each participant by FMU – “aspect of health care service”
- Dose distribution
 - 62% <1 mSv; 94% < 2; 99.7% < 3; 99.8% < 5 mSv
 - Maximum: 66 mSv; Mean: 0.9 mSv

ETHICS

“Medical/health surveillance/screening raises a number of ethical issues and challenges, many of which are of direct relevance to screening and health surveillance after radiation accidents”.

Biomedical
Ethics

Radiation
Protection

Public Health
Ethics

Biomedical Ethical Principles

- **Respect for autonomy** (a norm of respecting the free-will and decision-making capacities of self-governing persons)
- **Nonmaleficence** (a norm of avoiding the causation of harm)
- **Beneficence** (a group of norms for providing benefits)
- **Justice** (a group of norms for distributing benefits, risks and costs fairly)

Beauchamps and Childress, 1979



- Why me ?

- Stigma, discrimination
- Stress
- Distrust when surveillance stops or message is reassuring



To screen or not to screen ?
And whom ?
Those are the questions ...



- Why not me / my children ?

- Administrative border
- Discrimination
- Stress
- Distrust



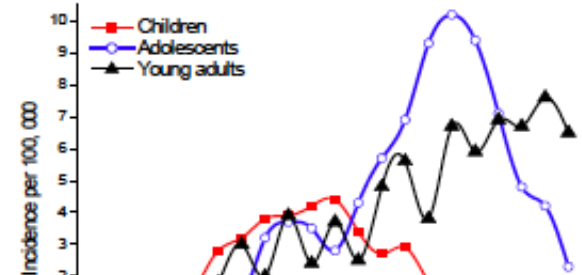
Principles of systematic screening

WHO

- Purpose
 - detect early abnormality (pre-malignant changes/early malignancy)
 - preventive strategies or treatment that will improve health outcome
- But ...
 - Early detection of abnormality/cancer doesn't always improve health (*eg Pap for cervical cancer, PSA for prostate*)
- The potential benefits must outweigh any potential harms – **ETHICS !**
- There must be **strong evidence**, that a screening program is
 - **EFFECTIVE** in reducing mortality from cancer.
 - **COST-EFFECTIVE**

Post-Chernobyl Thyroid cancer

- Increase in thyroid cancer in young people observed in Belarus, Ukraine and Russia starting in 1991 –
w.o ultrasound and varying degrees of screening intensity
- Mainly papillary thyroid cancer / very good prognosis
 - Related to incorporation of radioactive iodine (milk consumption) and potentiated by iodine deficiency
- In Belarus, peak of childhood thyroid cancer incidence – 1995-96
 - 50-60 cases/year in 2 000 000
 - average dose 150 mGy (600 Gomel)
 - Hundreds of children more than 10 Gy



If doses are much less

- Are criteria met to justify screening ???
 - Fukushima
 - Doses 10-100 times less
 - No iodine deficiency
 - How many radiation induced cases can we expect in 300,000 children ?
- Are we doing more good than harm ? Is it ethical? Is it cost-efficient ?

Thyroid screening

1.5-3 Flow chart

Diagn

Judgment
A
(A1)
(A2)
B

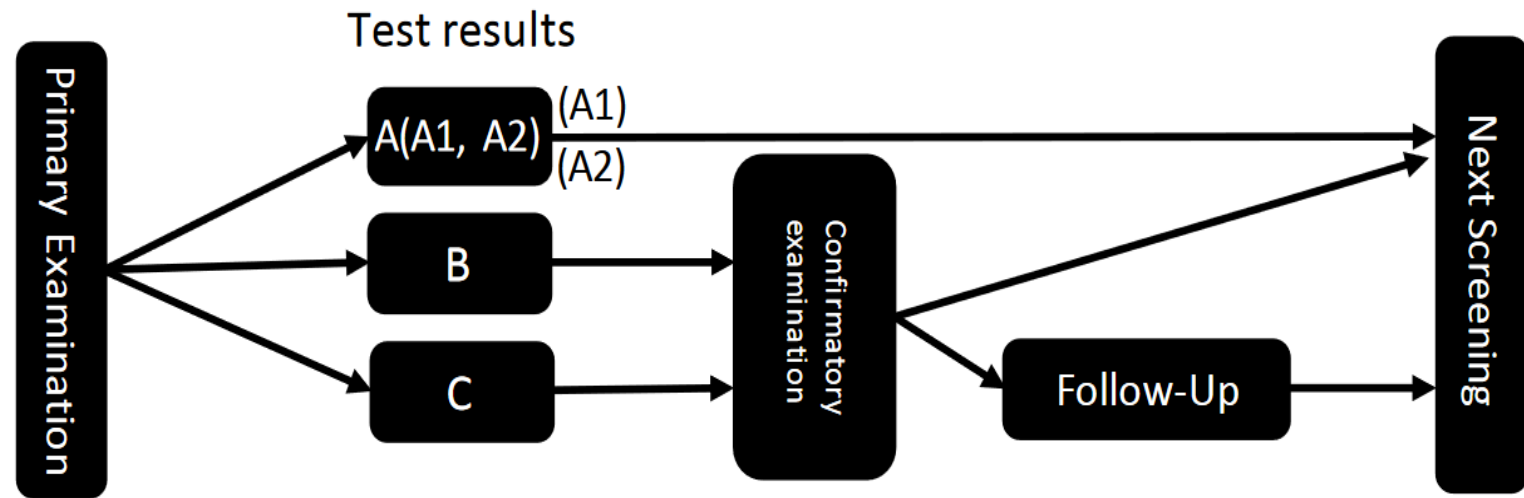


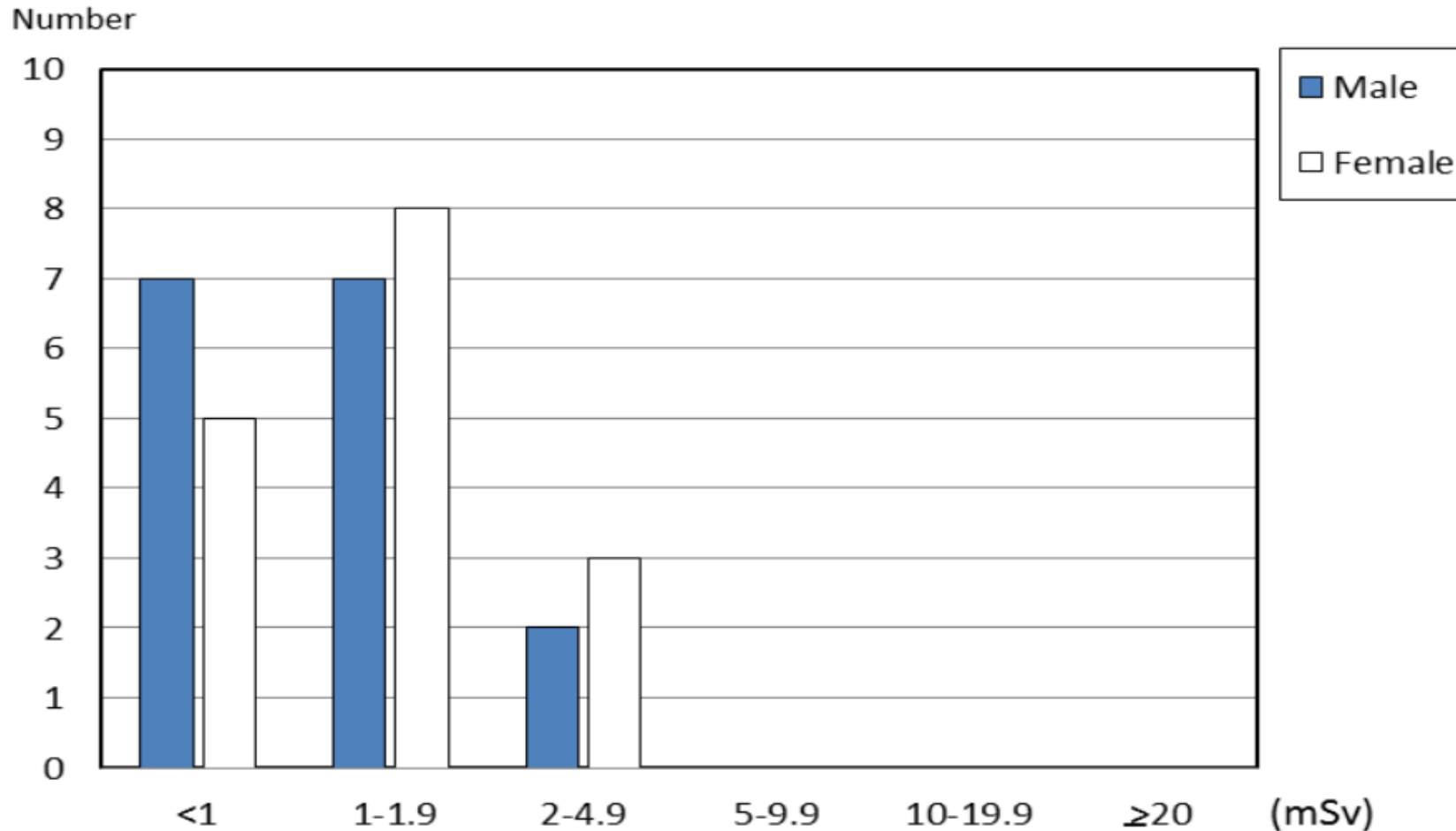
Fig.1 Flow chart

B	cyst with $\geq 20.1\text{mm}$	examination
C	Required immediately examination	Urgent confirmatory examination

Thyroid screening

<http://fmu-global.jp/?wpdmdl=1889>

Effective dose distribution in suspicious or confirmed cases of TC with dose estimation from Basic Survey



A1.2: Critical review of long-term medical (health) surveillance programmes after Chernobyl and Fukushima

Lessons learned

- Recommending long-term follow-up should be based on exposure levels sufficiently high to cause adverse health effects (keep in mind knowledge gaps at low doses)
- Long-term follow-up, particularly if it involves intense screening, can be reassuring but it can also increase anxiety
- Stopping surveillance can be detrimental – consider sustainability before starting
- Overtreatment can worsen quality of life and morbidity

A1.2: Critical review of long-term medical (health) surveillance programmes after Chernobyl and Fukushima

Lessons learned

- Population can reject/ignore the proposed monitoring or reduce participation over time
 - OK – as health surveillance is to help populations – not to do epidemiology
- Difficult to judge the effectiveness of the follow-up programmes because of the non-standardised outcome reporting, absence of outcome measure
- Missing standardised approach to assess and address mental health effects

Health surveillance/Epidemiology (Lessons learned)

- Often confusion between health surveillance and epidemiology
 - **Health/medical surveillance:** evaluate whether individuals affected by an accident suffer from some health (including psychosocial) conditions.
 - involves contact with and follow-up of affected individuals (e.g in the form of medical check-ups, questionnaire surveys)
 - basis for providing support or treatment as required – *not necessarily optimal basis for epidemiology.*

Health surveillance/ Epidemiology (Lessons learned)

- Epidemiological can have one of two objectives – **often confused**:
 - Evaluating whether the accident has impacted disease rates – “*epidemiological surveillance*” through ecological studies;
 - **Improving our knowledge** on effects of radiation and/or accident through **analytical studies** (cohort or case-control studies with individual information) where justified (*levels of doses, affected populations, power, ...*).
- Objectives of epidemiological studies were often not clear

General practical recommendations

- Ensure that information on doses and dose-rate measurements is stored and has identifiers that can be linked to the information on health effects
- Start registration as early as possible
- Before introducing surveillance measures, explain to the population:
 - the aim of the surveillance
 - what outcomes can be expected...
- Use standardised diagnostic criteria
- Combine mental health surveillance with other programmes
- Listen to the needs of affected population to tailor/modify follow-up programmes...
- Proper communication with affected population is crucial to explain risks and benefits of screening

Tailoring long-term medical follow-up

- **Define outcomes to be measured**
 - Cancer
 - Other radiation-related health effects
 - Non radiation-related health effects
- **Psycho-social follow-up** should be an integrated component of medical follow-up
 - Assessing resilience
 - Providing long-term education, training programs

Tailoring long-term medical follow-up (II)

- Identifying concurrent factors which could contribute to development of adverse health effects
- Define **scope of surveillance programme** based on
 - Assessment of exposure levels / affected areas
 - Vulnerability, e.g. *in utero* exposed, elderly
 - Severity of health condition(-s), e.g. ARS
- **Adapting to the needs and concerns of the affected population through continuous communication**

ST3.3 Key Recommendations

Successful Health Surveillance Strategies should:

- Recognise and address the positive and negative consequences of health surveillance (ST1.2, CCA2)
- Engage with affected populations in designing health surveillance programmes (ST2, CCA1)
- Provide access to and advice on use of personal dosimetry and monitoring (ST2)
- Respect autonomy, empowerment and free-choice (ST2, CCA3)
- Identify the needs, concerns and communication requirements of different groups (ST1.1, ST2)

Practical aspects to be addressed

Accountability:

- Clarification on responsibilities for screening, follow-up, funding, ...

Transparency

- Clarity on expectations and purpose of screening
- Communication strategy, including media, public health official
- Information to participants

Stakeholder Participation

- Critical for success of screening
- Health professionals, communities, parents, ...

General

- R1. The fundamental ethical principle of doing more good than harm should be central to accident management
- R2. Recognise the difference between health/medical surveillance and epidemiology
- R3. Encourage a health surveillance strategy that targets the overall well-being of populations
- R4. Ensure that health surveillance respects the autonomy and dignity of affected populations
- R5. Review, and if needed improve, existing health monitoring systems for epidemiological surveillance

General

- R1. The fundamental ethical principle of doing more good than harm should be central to accident management
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- R5. Review, and if needed improve, existing health monitoring systems for epidemiological surveillance
- R6. Adapt dosimetry and individual exposure monitoring to the situation
- R7. Build a radiation protection culture

Comm and	Encourage participation of stakeholders and communities in emergency and health surveillance planning		Encourage long-term participation of affected populations and communities
Dosimetry	R12. Prepare action frameworks focused on dose assessment for workers and populations	R17. Collect and store all radiation-related data R18. Provide information to those who need it	R19. Continue dose assessment for workers and affected populations
Health surveillance		R16. Create a common roster of affected populations	
Epidemiology	R11. Prepare frameworks and checklists for epidemiological protocols	R16. Create a common roster of affected populations	R26. Clarify objectives and expected results of epidemiological studies R27. Ensure long-term sustainability of follow-up of populations at risk

“Health is a state of complete physical, mental and social wellbeing, and not only absence of disease (WHO, 1948)”

Evacuation

R9. Plan sheltering, evacuation and stable iodine distribution protocols

could be central
 epidemiology
 ill-being of pop
 of affected pop
 for epidemiolo
 on



Preparedness

Early and Intermediate

Evacuation

R15. Optimise timing and support for sheltering and evacuation

R22. Have plans for lifting of evacuation orders as soon as possible

Communication and Training

R13. Foster participation of stakeholders and communities in emergency and health surveillance planning

R21. Build networks of experts - local facilitators - population
 R23. Consider the preferences of people living in affected areas
 R28. Foster long-term participation of affected populations and communities

Entry

R12. Prepare action frameworks focused on dose assessment for

R17

R22. Have plans for lifting of evacuation orders as soon as possible



R18
 R16

R25. Launch systematic health screening based on appropriate justification and design

R16. Create a common roster of affected populations

R26. Clarify objectives and expected results of epidemiological studies
 R27. Ensure long-term sustainable follow-up of populations at

Temporary Housing
 Asahi Shimbun file photo; Satoko Kawasaki.



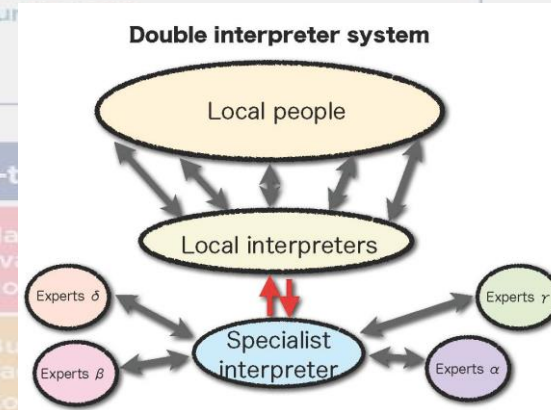


Communication and Training

- R8. Establish early response and communication protocols
- R10. Prepare and facilitate training and education material and resources
- R13. Foster participation of stakeholders and communities in emergency and health surveillance planning**

should be central to accident management
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Courtesy M. Miyasaki



Evacuation

R9. Plan sheltering, evacuation and stable iodine protocols

Communication and Training

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 R13. Foster participation of stakeholders and communities in emergency and health surveillance planning

Dosimetry

R12. Prepare action framework focused on dose assessment for workers and population

Finance

R10. Provide support for individuals who wish to participate in measurement

R16. Create a communication plan for affected populations

R16. Create a communication plan for affected populations

R14. Ensure prompt sharing of accurate and reliable information

- R21. Build networks of experts - local facilitators - population**
- R23. Consider the preferences of people living in affected areas**
- R28. Foster long-term participation of affected populations and communities**

R27. Ensure long-term sustainability of follow-up of populations at risk



Courtesy A. Goto

Dosimetry

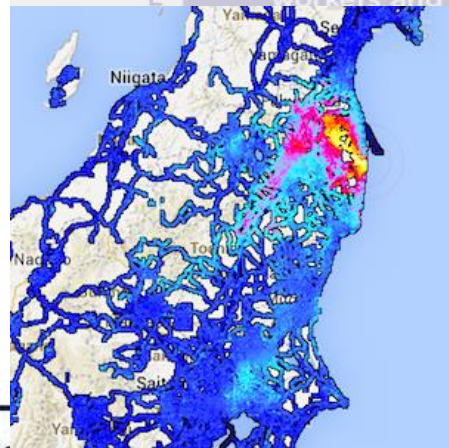
R12. Prepare action frameworks focused on dose assessment for workers and populations



D-Shuttle: courtesy M. Miyasaki
<http://www.c-technol.co.jp>

R17. Collect and store all radiation-related dosimetry data
R18. Provide support to populations who wish to make their own measurements

R19. Continue dose assessment for workers and affected population
R20. Continue dose measurement support to populations



<http://blog.safecast.org/>



SH
 Nuclear
 Improv
 Health

Health surveillance

Photo: F. Mettler



R16. Create a common roster of affected populations

Health surveillance

R25

Launch systematic health screening based on appropriate justification and design.
Do not recommend systematic thyroid cancer screening, but make it available (with appropriate counselling) to those who request it.



In Iwaki, a town south of the Fukushima nuclear plant, a doctor conducts a thyroid examination on 4-year-old Maria Sakamoto. Scientists are puzzled over a high number of thyroid abnormalities observed so soon after the accident.
© Toru Hanai/Reuters

Mystery cancers are cropping up in children in aftermath of Fukushima

By Dennis Normile | Mar. 4, 2016, 10:45 AM



Epidemiology

R11. Prepare frameworks and checklists for epidemiological protocols

Evacuation

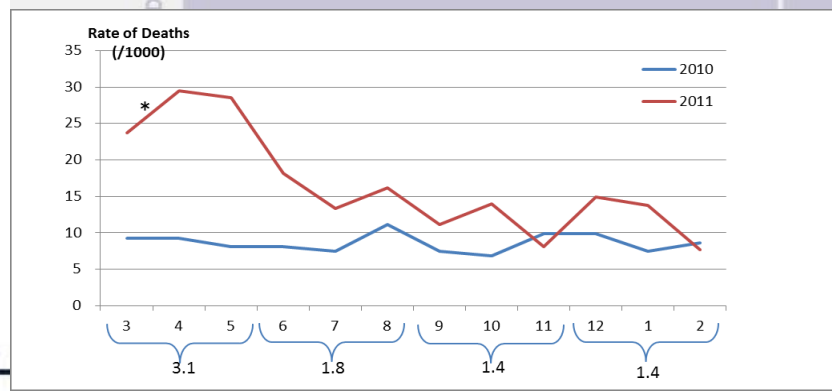
R16. Create a common roster of affected populations

Communication and Training

Dosimetry



Courtesy S. Yasumura



Changes in mortality rates among institutionalised elderly before and after the Fukushima accident – Yasumura et al 2016

R26. Clarify objectives and expected results of epidemiological studies

R27. Ensure long-term sustainability of follow-up of populations at risk

SHAMISEN Final Product: Dissemination and Implementation

<http://radiation.isglobal.org/index.php/en/shamisen-home>

Scientific publications: Journal special issue (e.g., Environment International)

Shamisen D3.1 (plus a stand-alone, publically available report)

Interactive infographics – SHAMISEN Website with recommendations

Press release

Press communication

放射線事故への備えと、その影響を受けた人々の健康調査に関する勧告及び

Recommendations and procedures for preparedness and health surveillance of populations affected by a radiation accident

SHAMISEN
Nuclear Emergency Situations
Improvement of Medical and Health Surveillance

OPERA
OPEN PROJECT FOR EUROPEAN
RADIATION RESEARCH AREA

European Commission

ISGlobal Barcelona Institute for Global Health

18 July 2017

Recommendations to Improve Health of Populations in Case of a Nuclear Accident

RECOMMENDATIONS TO IMPROVE HEALTH SURVEILLANCE AND LIVING CONDITIONS OF POPULATIONS IN CASE OF A NUCLEAR ACCIDENT

GENERAL PRINCIPLES

- Consider the overall well-being of the population (including the psychological, social and economic impact).
- Engage the general public and other stakeholders
- Respect the autonomy and dignity of affected populations

BEFORE DURING AFTER

Related news & events

24.07.17

Researchers from 11 Countries Agree on New Recommendations to Deal with Possible Nuclear Accidents

GENERAL PRINCIPLES



Consider the overall well-being of the population (including the psychological, social and economic impact).



Engage the general public and other stakeholders



Respect the autonomy and dignity of affected populations



BEFORE



Train medical personnel and other professionals



Establish/improve disease registries



Plan early response and communication protocols



Establish sheltering and evacuation protocols



DURING



Provide timely and reliable communication on the accident and the risks



Provide sheltering advice and support



Balance radiation exposure risk with other health risks before evacuating



Collect and store the minimum information from affected populations to facilitate follow-up



AFTER



Offer health screening to the population, with adequate information and counseling



Launch public health studies only if informative and sustainable over time

Support and engage the affected populations:

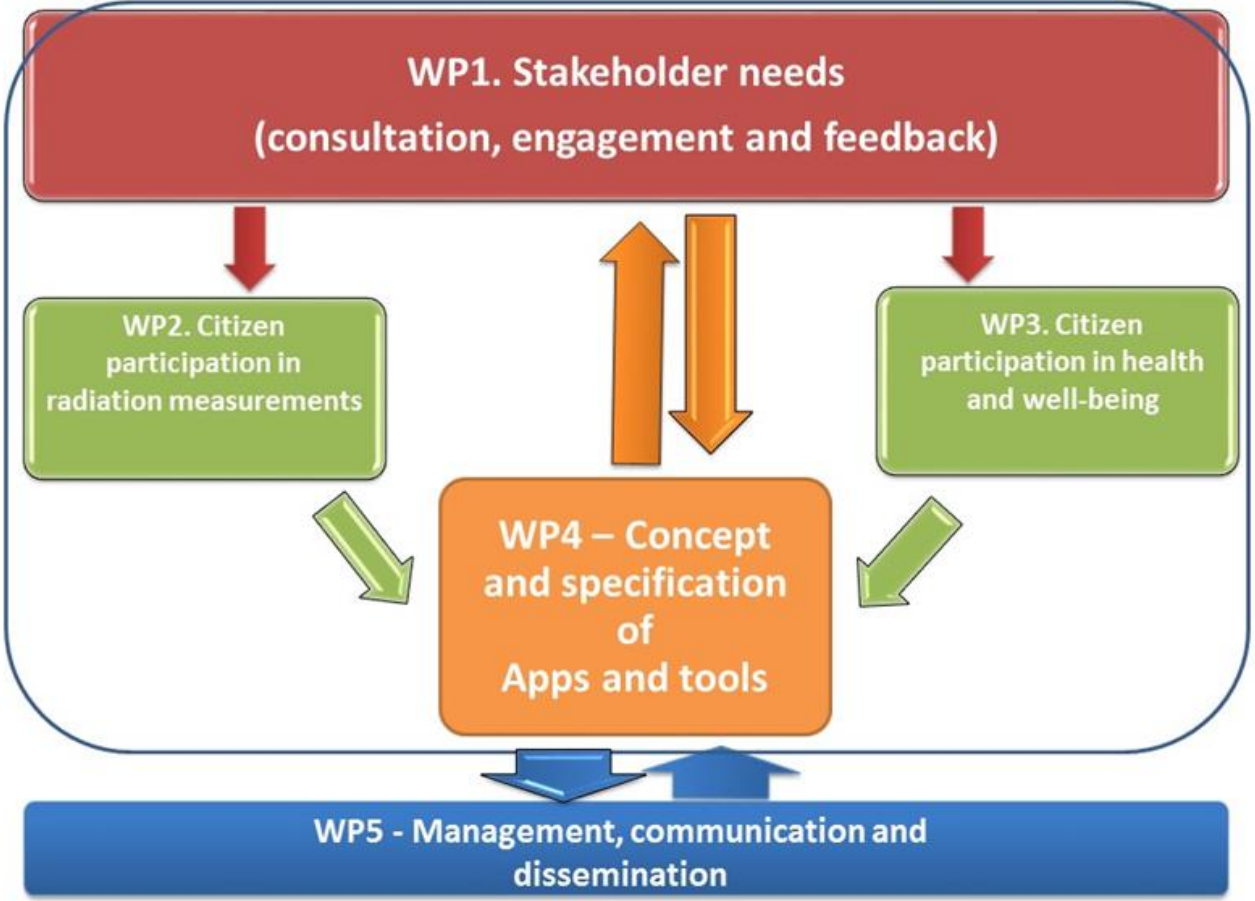


Listen to their needs and worries

Support them in making their own dose measurements



Help them make informed decisions, including whether and when to return to their homes



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