



Progress and Perspectives of Environmental Health Research in NIER, Korea

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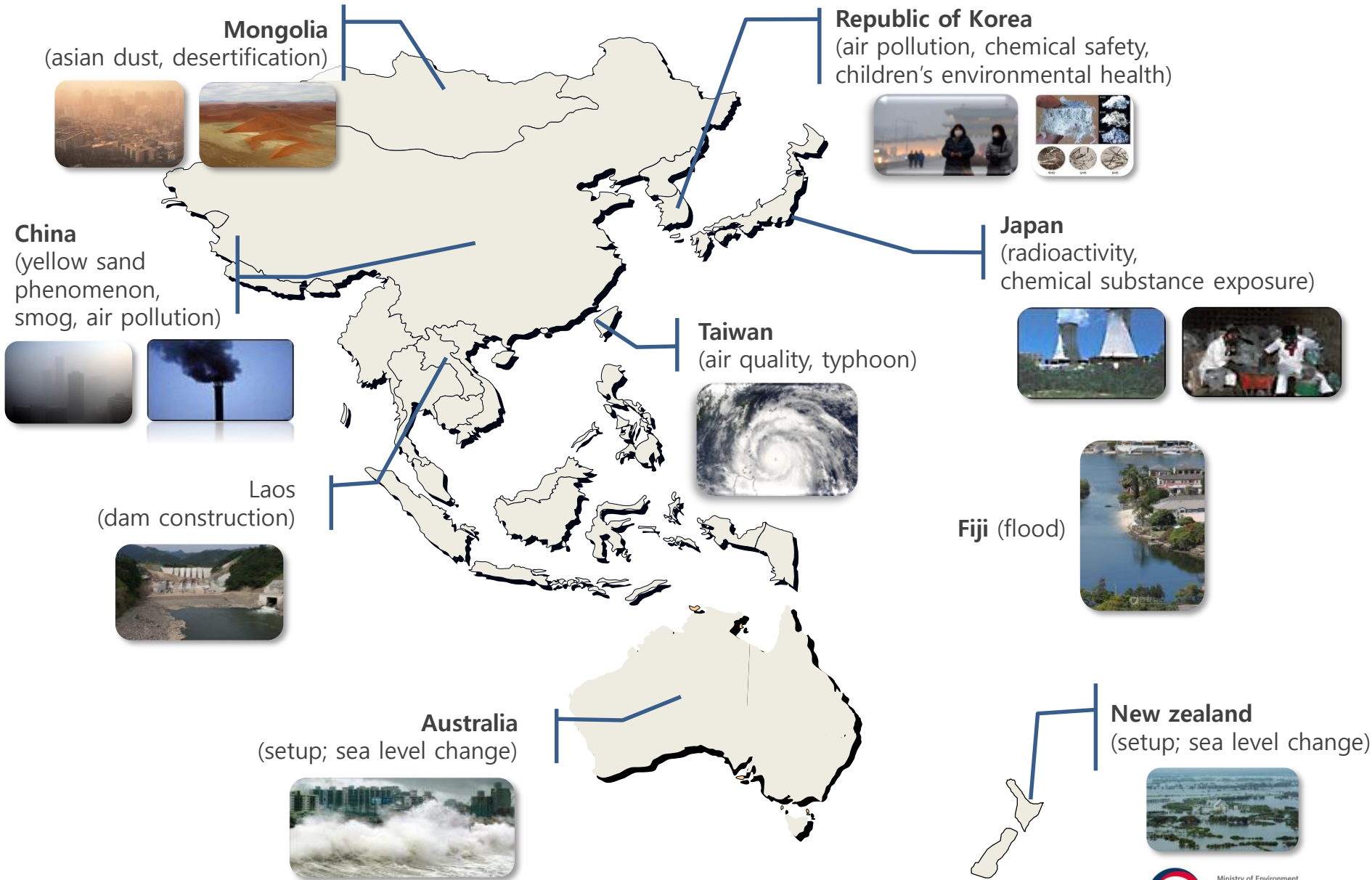
01

Environmental Health Issues

- **Major Environmental Health Issues in Asia-Pacific countries**
- **Emerging Issues in Environmental Health**
- **Needs of Environmental Health Policies**



Major Environmental Health Issues in Asia-Pacific Countries



Emerging Issues in Environmental Health



Global / Regional

- Air pollution
- Chemical safety
- Children's health
- Climate change
- Diesel exhaust particles
- Electromagnetic fields
- Industrial development
- Ionizing radiation
- Unsafe water
- Wastes

Developing Country

- Air pollution
- Chemical safety
- Children's health
- Disaster
- Industrial development
- Unsafe water
- Wastes

Developed Country

- Aging
- Asbestos
- Chemical safety
- Children's health
- Climate change
- Electromagnetic fields
- Nano-tech. products

Korea

- Air pollution
- Aging
- Asbestos / Radon
- Chemical safety
- Children's health
- Climate change
- Diesel exhaust particles
- Electromagnetic fields
- Light / Noise
- Trans-boundary air pollution



The causes of the problems in environmental health

- Developing country : lack of human, financial and technical resources
- Developed country : mass production, use of high-technology, quality of life

Needs of Environmental Health Policies



Exposure to Environmental Pollutants and Harmful Chemical Substances

Fine dust (Respiratory disease)



Growth hormone like substance (Sexual precocity)

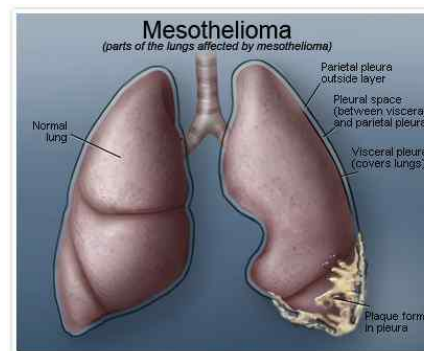


www.nytimes.com; 2006.10.16

Humidifier disinfectant (Lung damage)



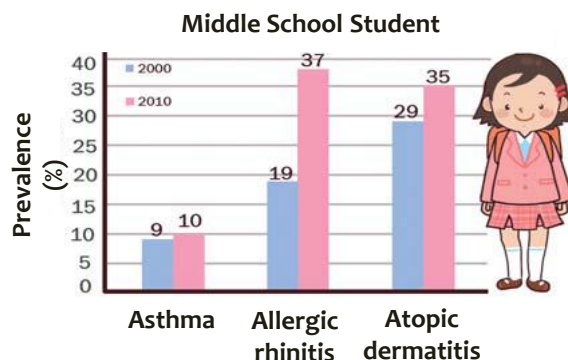
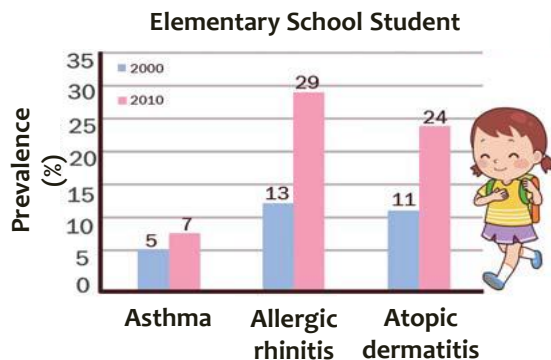
Asbestos (Mesothelioma)



Needs of Environmental Health Policies



- Ever-growing demand for the prevention of **environmental diseases**



▲ Prevalence and outbreak of allergic diseases

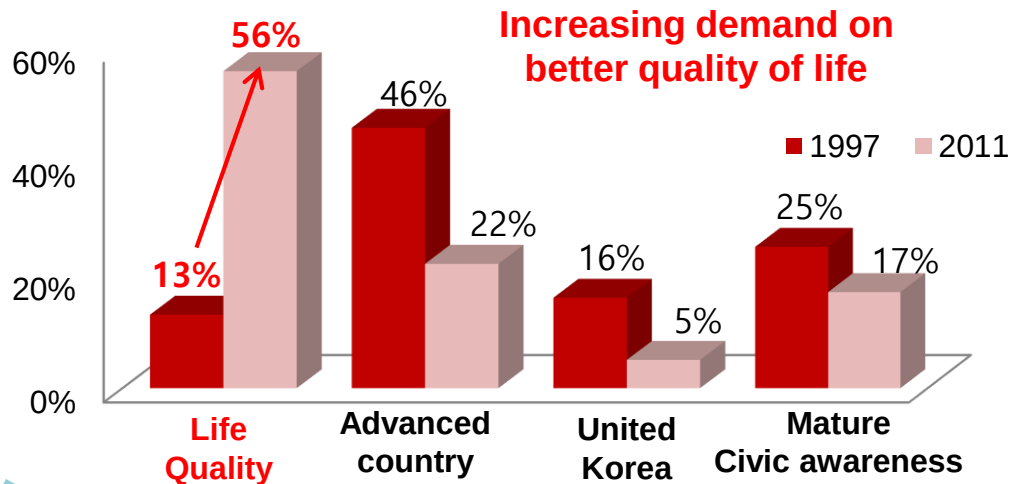
(Source : Prevalence of allergic diseases in Korean children and adolescents, 2010)

Skin disease

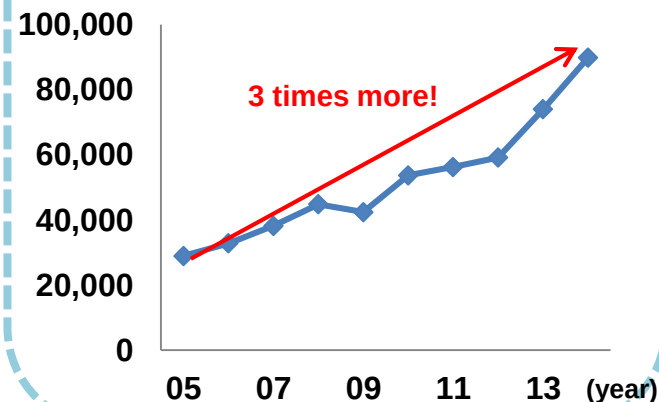


- **Continuously growing demand for better quality of life** with increasing incomes

• National Goal of Korea



Complaints of Noise pollution has increased over last 10 years



02

Environmental Health Frameworks

- **Environmental Policy Paradigm Shift**
- **Significance of Environmental Health Policy**
- **Overview of Environmental Health Policy**
- **Environmental Health Act**
- **National Environmental Health Action Plan**



Environmental Policy Paradigm Shift



- Increased Public Awareness and public expectation of environmental policy
- : Wide spread of LOHAS (Lifestyles of Health and Sustainability)

Environmental Medium-based

View-point :
Air, Water, Soil, etc



- Approach:
Case - Based
- Policy:
Expansion of facilities

Receptor-based

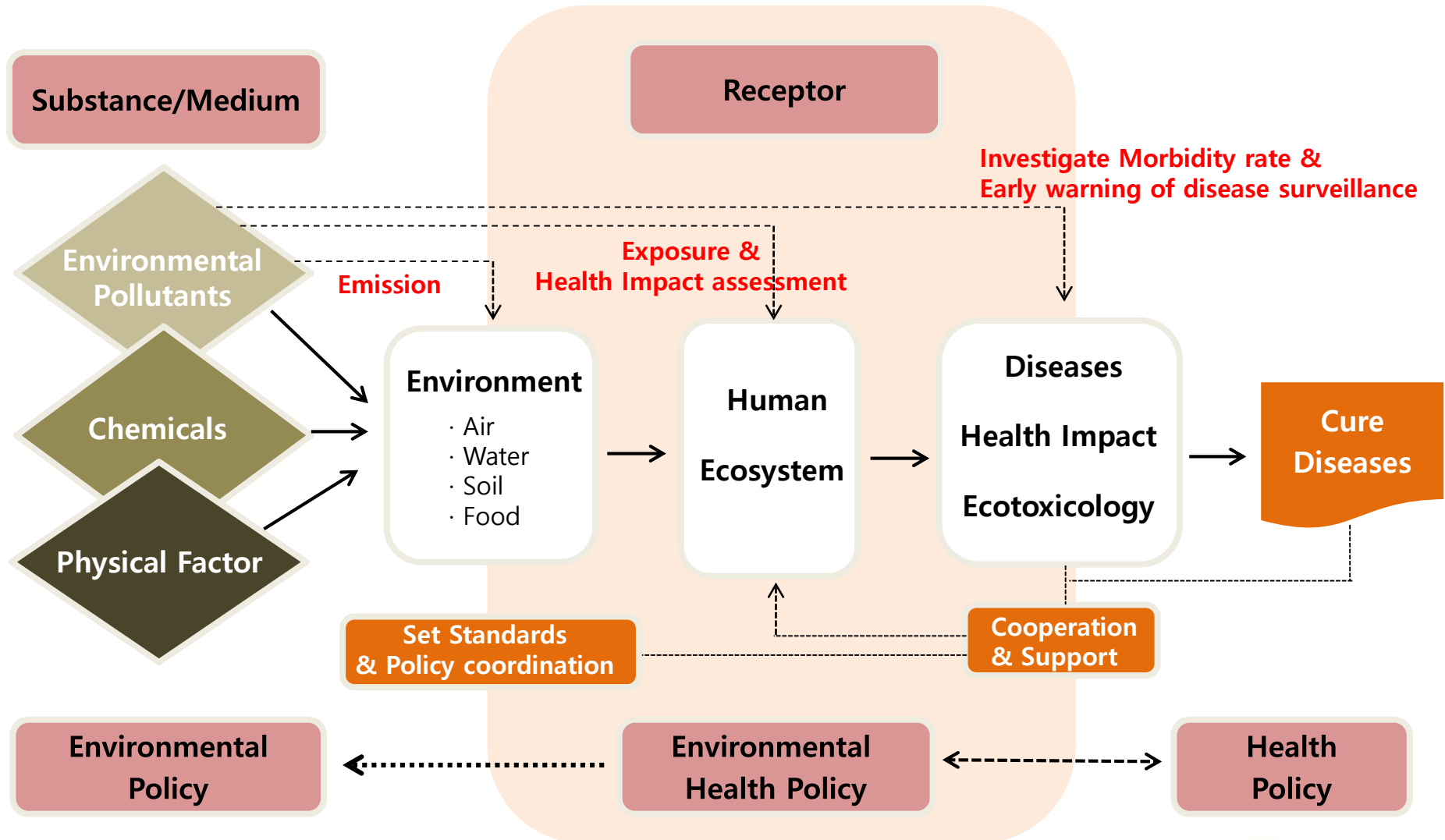
View-point :
Receptor



- Approach:
Integral & Strategic
- Policy:
Surveillance,
Risk Assessment

“Paradigm Shift”

- **Establishment of receptor-based Environmental Health Policy by linking medium-based Environmental Policy and Health Policy**



Overview of Environmental Health Policy (based on date of enactment)



Chemicals Control Act (Mar.18, '14)

***Amendment of Toxic Chemicals control act (Feb. 2. '91)**

- Chemical hazard assessment
- Designation of restricted/forbidden substances
- Preventing/Responding to chemical accidents

Act on Registration and Evaluation, etc. of Chemicals. (May 27. '13)

- Registration and evaluation of chemicals
- Management of information on chemical hazard

Persistent Organic Pollutants Control Act (Jan. 27. '08)

- Establishing environmental standards of POPs
- Banning/restricting production, import/export and use of POPs

Act on Liability for Environmental Damage and Relief Thereof (Dec. 31. '14)

- Providing the victims of Environmental damage with prompt and unbiased relief by establishing an effective system of relief from damage



Environmental Health Act (Mar. 22. '08)

- Comprehensive environmental health plan
- Prevention of environment-related health risks

Noise and Vibration Control Act (Feb.2. '91)

- Regulation of noise and vibration from construction sites, road traffic and indoor sources
- Noise level labeling for construction equipments

Indoor Air Quality Control in Public Use Facilities, etc, Act (May 30. '03)

- Management of indoor air quality in multi-use facilities
- Management of indoor air pollutants

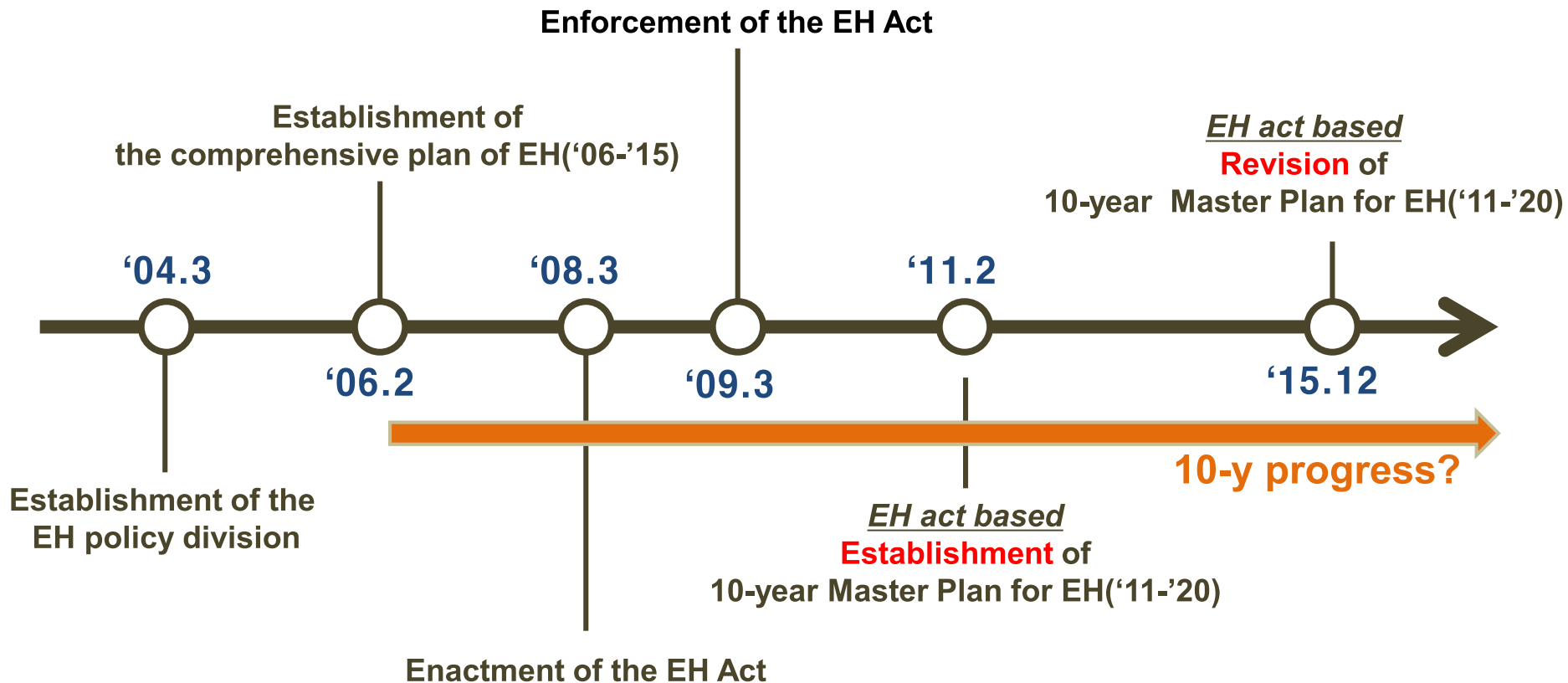
Asbestos Injury Relief Act (Mar. 22. '10) Asbestos Safety Management Act (Apr. 28. '11)

- Support for medical care expenses and living allowances
- Master plans for Management of Asbestos

Light Pollution Protection Act (Feb.1. '12)

- Prevention of light pollution
- Setting permissible radiation limit

Overview of Environmental Health Policy





6 Chapters, 33 Articles

General Provisions

- Purpose · Definition · Scope of Application · Responsibilities of State
- Environmental Health Mater Plan · Environmental Health Council

Risk Assessment, etc

- Risk Assessment & Control of Environmentally Hazardous Factors
- Addition & Assessment of Health Impact Items

Prevention and Control of Environment Related Harm to Damage

- Basic Investigation of National Environmental Health
- Epidemiological investigation of Environment-related Harm to Health
- Petition of Health Impact Assessment

Health Protection Of Children

- Risk Control for Children's Activity Zone
- Control of Hazardous Substances for Use by Children
- Provision of Information on Risk to Children

Supplementary Provisions

- Designation & Operation of Environmental Health Center
- Reporting & Inspection

Penal Provision

- Penal Provisions · Fines for Negligence



8 Chapters, 54 Articles

General Provisions

- Purpose · Definition · Scope of Application · Duties of State · Duties of Business Entry
- Basic Plan · Chemical Substance Evaluation Committee

Registration Of Chemical Substance

- Registration of Chemical Substance · Exemption from Registration of chemical Substance
- Measure, etc. for Non-Performance of the Duty of Registration
- Materials to be Submitted for Application for the Registration of Chemical Substance

Hazard Examination & Risk Evaluation of Chemical

- Hazard Examination · Hazard Evaluation, etc. · Designation of Toxic Substance
- Designation, etc. of Testing Institutions · Risk Evaluation

Designation and Change Of Substances subject To Authorization

- Designation of Substance Subject to Authorization
- Designation, etc. of Restricted Substance or Prohibited Substance

Provision of Information on Chemical

- Provision of information on chemical substances
- Provision of information on Downstream User, etc.

Management of Product of Concern over risk

- Declaration of Product containing hazardous Chemical Substance
- Risk evaluation, etc. of Product
- Provision of Information on chemical Substance Contained in Product

Supplementary Rules

- Application for Registration by Appointee by Overseas Manufacturer and Producer
- Establishment and Operation of information processing System for chemical Substances

Penal Provision

- Penal Provisions · Joint Penal Provisions · Fines for Negligence

National Environmental Health Action Plan



10- Year Master Plan for Environmental Health('11~'20)

Vision

Safety and Healthy Society, free from the Environmental Risk and the Threat of Environmental Disease

Goal

**Precautionary Principle
Protection of Vulnerable Population**

**Receptor-based Policy
Right to Know**

Laying Foundation for Environmental Health

- Enhancing Legislative & Institutional Framework
- Developing Base Technologies for R&D
- Creating a Website to Provide Environmental Health Information & Data

Prevention & Management of Environmental Disease

- Comprehensive Action on Environmental Risk Factors Management
- National Environmental Health Bio-monitoring
- Conducting Health Impact Assessment on Vulnerable Groups
- Investigation on the Health Impact on Residents in Areas of Environmental Concern

Health Impact Reduction by Upgrading Risk Management

- Surveying/Managing Circulated & Emitted Amounts to Give Management Priorities to Chemicals
- Active Responding to Latest Trend in Global Policy on Chemicals
- Better Framework to Safely Assess and Manage the Environmental Hazards

Executive Strategy

03

Practices and Works in Environmental Health

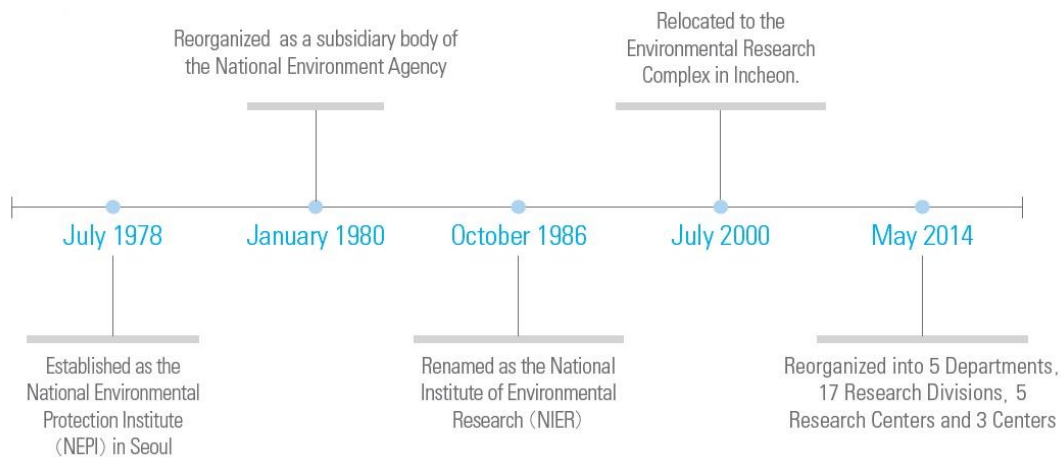
- **Introduction of NIER**
- **Environmental Health Research in NIER**
- **Practices and Works in NIER**



Introduction of NIER



History



Introduction of NIER



Organization

President

Research Support Division

Research Strategy & Planning Division

Environmental Health Research Department

- Environmental Health Research Division
- Risk Assessment Division
- Chemicals Registration & Evaluation Team
- Chemicals Research Division
- Biosafety Research Team

Water Environment Research Department

- Water Pollution Load Management Research Division
- Water Environmental Engineering Research Division
- Water Quality Control Center
- Watershed Ecology Research Team

Environmental Infrastructure Research Department

- Indoor Environment & Noise Research Division
- Water Supply & Sewerage Research Division
- Environmental Measurement & Analysis Center
- Soil & Groundwater Research Team

Climate & Air Quality Research Department

- Air Quality Research Division
- Climate Change Research Division
- Atmospheric Engineering Research Division

Environmental Resources Research Department

- Resource Recirculation Research Division
- Waste to Energy Research Division
- Nature Conservation Research Division
- Nature Assessment Research Team

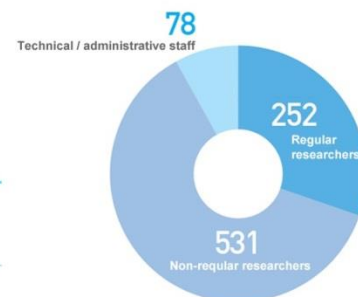
Transportation Pollution Research Center

Four Rivers Environment Research Centers

As of July 2016, 861 people are working for NIER

Total 861

Regular researchers	252
Non-regular researchers	531
Technical/Administrative staff	78





Environmental Health Research Division

Bio-safety Research Team



Risk Assessment Division

Chemicals Research Division

Chemicals Registration & Evaluation Team

Environmental Health Research Division

- Conduct studies on the public health, health of residents in areas of environmental concern and the environmental impacts on vulnerable people
- Develop the environmental health statistics, working to prevent environmental diseases and hazard factors and cope with the pending environmental issues

Risk Assessment Research Division

- Risk assessment of chemicals under-national management, high production volume chemicals and drugs
- Toxicity test and development of new tests involving less animals
- Responding to global regulations by studying the safety of environmentally sensitive chemicals including nanomaterial

Chemicals Research Division

- Monitor POPs, pharmaceuticals, heavy metals and methyl mercury in the environment and assess the harmful substances in children's product
- Study areas include emergency management, environmental effects of chemical accidents, offering the emergency information
- Providing the institutes with techniques and training against chemical accidents

Biosafety Research Team

- Developing wildlife disease surveillance and research studies to benefit wildlife and ecosystem health
- Diagnosing, monitoring and epidemiologic investigation on emerging diseases mediated by wildlife such as HPAI, SFTS, Flavi-viruses

Chemicals Registration and Evaluation Team

- Assess the risk of chemicals to designate toxic substance, operate chemical information system and study the measures to cut chemical emission
- Engaged in CHS, a global system for chemical classification and mark, and support in establishing the domestic laws and regulations to take the nation's evaluation level to REACH



1. Korean National Environmental Health Survey (KoNEHS)



► 1st stage of KoNEHS

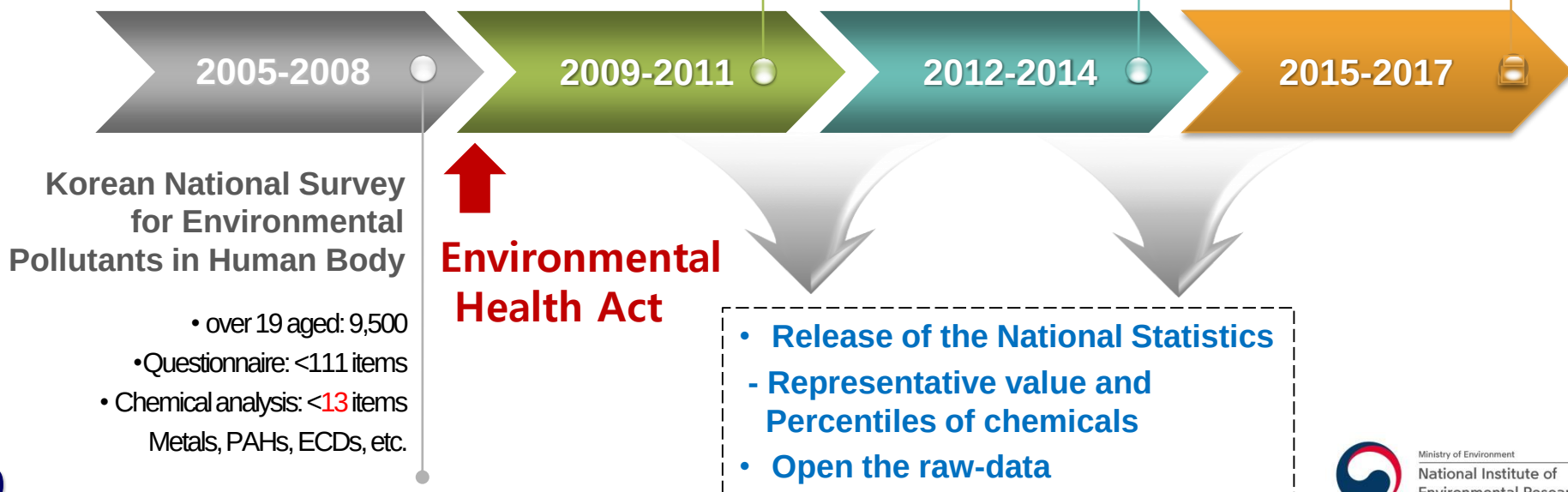
- over **19** aged: 6,311
- Questionnaire: 146 items
- Chemicals analysis: **16** items
Metals (5), PAHs (2), Cotinine, ECDs (2), Pesticides (1), VOCs (5)

► 2nd stage of KoNEHS

- over **19** aged: 6,478
- Questionnaire: 142 items
- Clinical exams: 19 items
- Chemicals analysis: **21** items
Metals (3), PAHs (4), Cotinine, ECDs (7), Pesticides (1), VOCs (5)

► 3rd stage of KoNEHS

- over **3** aged: 5,523
- Questionnaires: 148 items
- Clinical exams: 16 items
- Chemical analysis: **26** items
Metals (3), PAHs (4), Cotinine, ECDs (15), Pesticides (1), VOCs (2)





1. Korean National Environmental Health Survey (KoNEHS)

Poster (Korean version)

당신은 우리나라 국민 10,000명을 대표 합니다

국민환경보건 기초조사

조사기간
2015.8~2017.12

조사대상
전 국민 대표로
어린이·청소년·성인
총 5,500명

조사내용
환경노출관련 설문조사
신체계측 및 16종 임상검사
환경오염물질 26종 농도 분석

www.nier.go.kr
www.envhealth.go.kr
*본 조사는 환경보건법 제14조에 따른 법정조사입니다.

환경부·국립환경과학원

Questionnaire (Korean version)

전 국민 환경오염물질 노출 수준 조사 국민환경보건 기초조사 BABY [영유아용 설문지]

전 국민 환경오염물질 노출 수준 조사 국민환경보건 기초조사 CHILDREN [초등학생용 설문지]

전 국민 환경오염물질 노출 수준 조사 국민환경보건 기초조사 TEENAGER [중·고등학생용 설문지]

전 국민 환경오염물질 노출 수준 조사 국민환경보건 기초조사 ADULT [성인용 설문지]

가 구 공 통 설 문 (성인용)

1. 거주지 특성

1. 현재 살고 계신 집에서 생활 개월 수 (초기이주인 경우)는 어느 정도입니까?
 1) 1년 미만 () 2) 1년 ~ 3년 미만 () 3) 3년 ~ 5년 미만 () 4) 5년 이상 ()

2. 현재 살고 계신 집의 면적은 얼마입니까?
 1) 100㎡ 이하 () 2) 100㎡ 이상 200㎡ 이하 () 3) 200㎡ 이상 300㎡ 이하 () 4) 300㎡ 이상 ()

3. 1. 별 특성이 있습니까?
 1) 일반 아파트 () 2) 빌라 () 3) 단독주택 () 4) 기타 ()

5. 조도와 생활환경은 어느 정도라고 생각하십니까?
 1) 매우 좋다 () 2) 좋다 () 3) 보통이다 () 4) 나쁘다 () 5) 매우 나쁘다 ()

2. 실내 환경

3. 현재 살고 계신 집의 거주 형태는 어떤가요?
 1) 단독주택 () 2) 연립주택/다세대주택 () 3) 기타 ()

4. 현재 살고 계신 집은 어느 정도 깨끗하십니까?
 1) 매우 깨끗하다 () 2) 깨끗하다 () 3) 보통이다 () 4) 나쁘다 () 5) 매우 나쁘다 ()

5. 현재 살고 계신 집의 주요 생활 환경에 사용되고 있는 물질은 무엇입니까? (한 개 이상 선택)

3-1. 난방	3-2. 냉방설비	3-3. 취사설비
1) 없음	1) 가스(가스, LNG)	1) 가스(가스, LNG)
2) 연탄()	2) 에어컨	2) 연탄()
3) 연탄()	3) 에어컨, 연탄	3) 연탄, 연탄
4) 기타 ()	4) 기타 ()	4) 기타 ()
5) 기타 ()	5) 기타 ()	5) 기타 ()

6. 현재 살고 계신 집의 주요 생활 환경에 사용되고 있는 물질은 무엇입니까? (한 개 이상 선택)

6-1. 난방	6-2. 냉방설비	6-3. 취사설비
1) 없음	1) 가스(가스, LNG)	1) 가스(가스, LNG)
2) 연탄()	2) 에어컨	2) 연탄()
3) 연탄()	3) 에어컨, 연탄	3) 연탄, 연탄
4) 기타 ()	4) 기타 ()	4) 기타 ()
5) 기타 ()	5) 기타 ()	5) 기타 ()

7. 현재 살고 계신 집의 주요 생활 환경에 사용되고 있는 물질은 무엇입니까? (한 개 이상 선택)

7-1. 난방	7-2. 냉방설비	7-3. 취사설비
1) 없음	1) 가스(가스, LNG)	1) 가스(가스, LNG)
2) 연탄()	2) 에어컨	2) 연탄()
3) 연탄()	3) 에어컨, 연탄	3) 연탄, 연탄
4) 기타 ()	4) 기타 ()	4) 기타 ()
5) 기타 ()	5) 기타 ()	5) 기타 ()

8. 현재 살고 계신 집의 주요 생활 환경에 사용되고 있는 물질은 무엇입니까? (한 개 이상 선택)

8-1. 난방	8-2. 냉방설비	8-3. 취사설비
1) 없음	1) 가스(가스, LNG)	1) 가스(가스, LNG)
2) 연탄()	2) 에어컨	2) 연탄()
3) 연탄()	3) 에어컨, 연탄	3) 연탄, 연탄
4) 기타 ()	4) 기타 ()	4) 기타 ()
5) 기타 ()	5) 기타 ()	5) 기타 ()



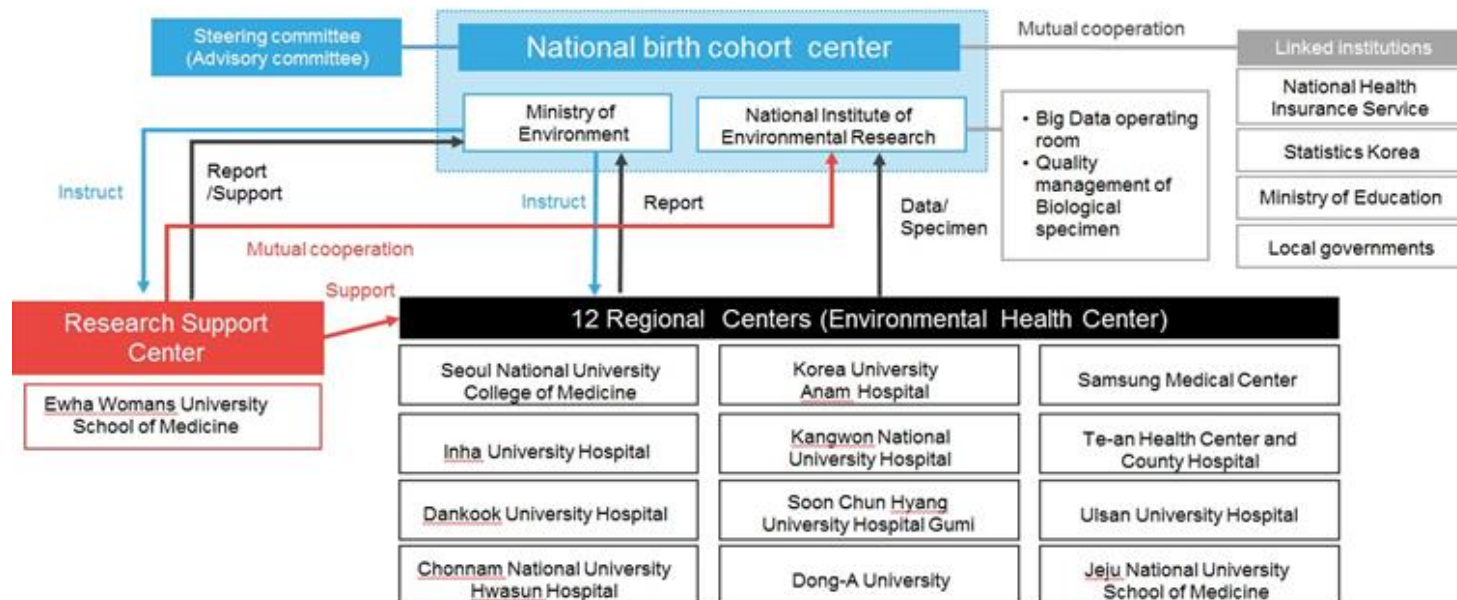
2. Korean CHildren's Environmental Health Study (Ko-CHENS)

Study Design

- Long-term prospective birth cohort study (2015-2036)
- Recruit **100,000** pregnant women
- Two approaches for data collection; **Main study** and **Core study**
- Follow-up from prenatal period to 18 years of age by using biological samples and questionnaires



Study Organization





2. Korean Children's Environmental Health Study (Ko-CHENS)

Main Study
| 32 Recruiting Agencies |

Core Study
| 27 Recruiting Agencies |





3. Environmental Health Impact Assessment on Population near Industrial Complexes

- **1,137** Industrial Complexes are running in Korea (2016)

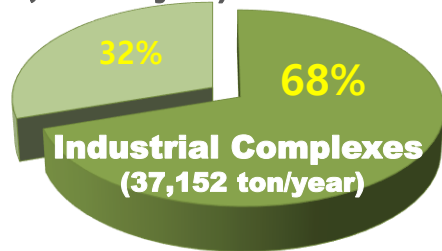
Classification	National IC	General IC	Total
Numbers	41	1,096	1,137

(Source : Korea Industrial Complex corporation, 2016)



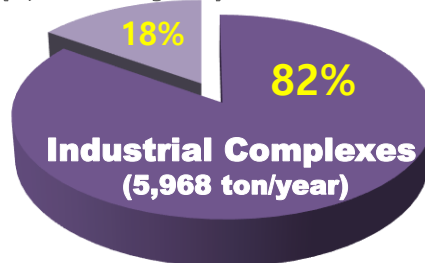
- **70%** of the total **chemicals** released to atmosphere are from Industrial Complexes (2014)

Other areas
(17,109 ton/year)



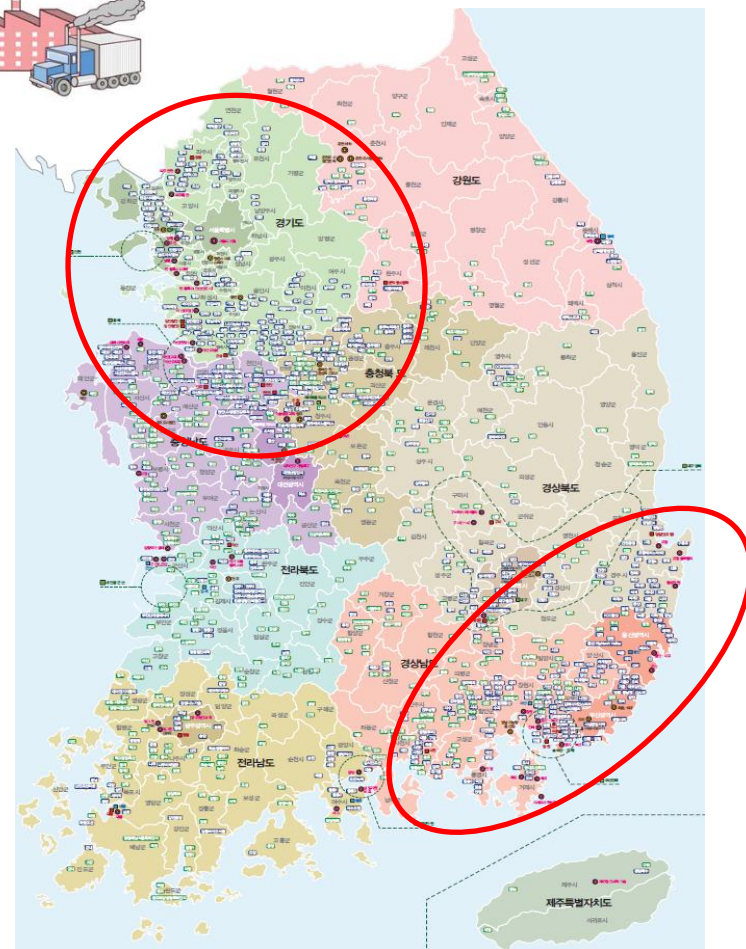
Total chemical release
(54,261 ton/year)

Other areas
(1,341 ton/year)



Total carcinogen release
(7,309 ton/year)

(Source : Pollutant Release and Transfer Registers Information System, 2014)





3. Environmental Health Impact Assessment on Population near **Industrial Complexes**

Environmental Health Surveillance in **National Industrial Complexes(NICs)**

- 8 NICs : Ulsan, Sihwa, Banwol, Pohang, Gwangyang, Yeosu, Cheongju, Daesan
 - Period : 2009 ~
 - Type of Industry : Steel manufacturing, Petrochemical, Electronic, etc.
- (1) Measurement of Hazardous Air Pollutants(HAPs) : PM_{2.5}, PAHs, Pb, Cd, etc.
 - (2) Biological Monitoring : **300 people in one NIC** (Biological sampling & questionnaire)
 - (3) National Database Analysis : 3 kinds of DB
 - : Standardized Mortality Rates, Standardized Hospital Visit Ratio, Standardized Cancer Incidence Rates



Environmental Health Assessment in **General Industrial Complexes(GICs)**

- Selection of **Prior 56 GICs** : Gumi, Incheon, Changwon, etc.
 - Period : 2011 ~ 2020
 - Type of Industry : Machinery, Electronics, Textile, etc.
- (1) Measurement and Risk assessment of Air Pollutants : PM₁₀, VOCs, etc.
 - (2) Biological Monitoring (Biological sampling & questionnaire)
 - (3) National Database Analysis : 3 kinds of DB
 - : Standardized Mortality Rates, Standardized Hospital Visit Ratio, Standardized Cancer Incidence Rates





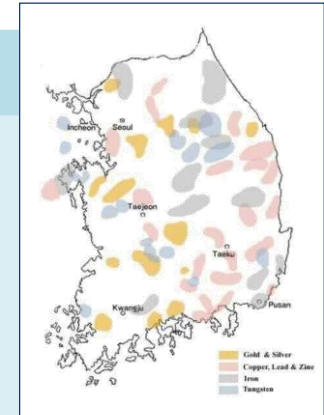
4. Environmental Health Survey on residents near **Abandoned Metal Mines**

Backgrounds & Implementation Status

- **Pre-Environmental health assessment on 358 abandoned metal mines ('07)**

⇒ Divide three groups by survey priorities (below)

Group	A (1st)	B(2nd)	C (Normal)
Subject	39 mines	108 mines	211 mines



- **1st survey ('08-'11) : 38 mine area, 7,461 participants (case group 4,636, control group 2,825)**
- **2nd survey ('13-'17) : 62 mine area, 2,750 participants (not survey control group)**

Management system for Abandoned Metal Mines

(1) **Monitoring** on residents living near abandoned mines

- Analysis of heavy metals in biological samples (blood & urine)

(2) **Post management** targeting those with exposure levels above the standard

- Analysis of heavy metals in biological samples (blood & urine)
- Analysis of heavy metals in soil, water, crop near mines

(3) **Establishment of a systematic database** for abandoned metal mines



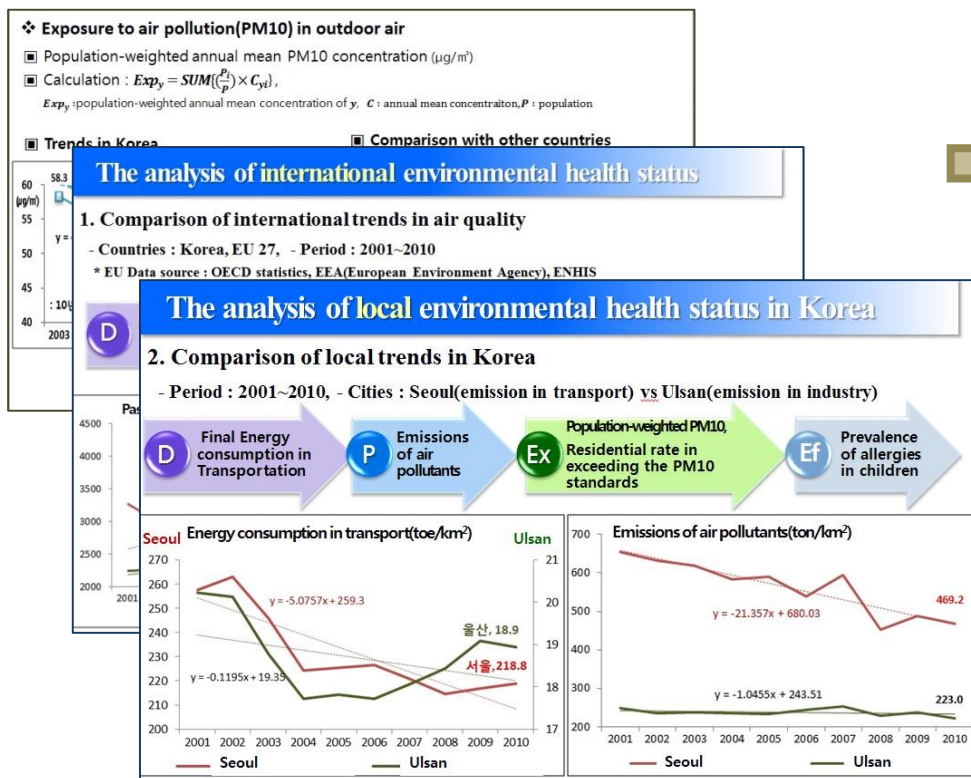


5. National and Local scale Environmental Health Indicators(EHIs)

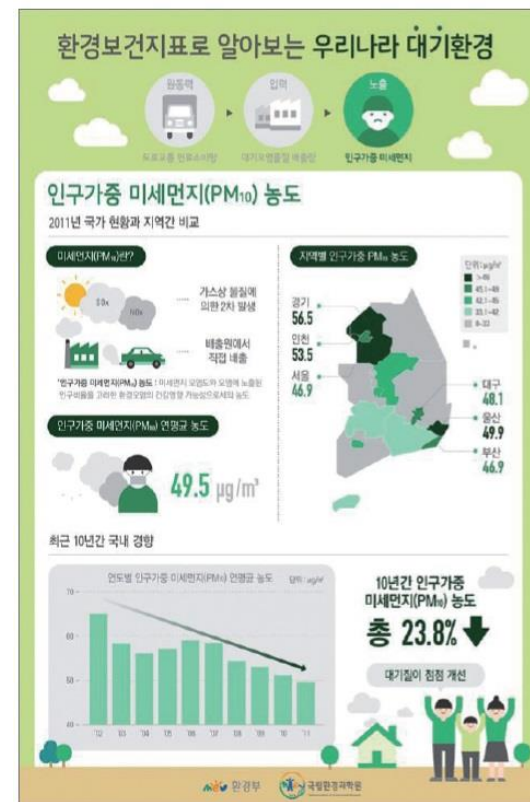
Purpose

- Develop the EHIs to monitor environmental health status and trends in Korea
- Assess environmental health on a local and national scale with EHIs

Example of EHI



<EHI infographic>





6. Protection of the Children's Health

Risk Management of Children's Activity Area

- Expanding targets applied to environmental safety control standard in children's activity areas (110,000 spots until 2018)
- Introduction of verification inspection systems for newly-built and extended facilities (Sep. 25, 2014)
- Enlarging safety inspection business in children's activity areas



Guideline for eco-friendly and safe areas

- How to comply with environmental safety control standards and create pleasant activity areas using eco-friendly materials

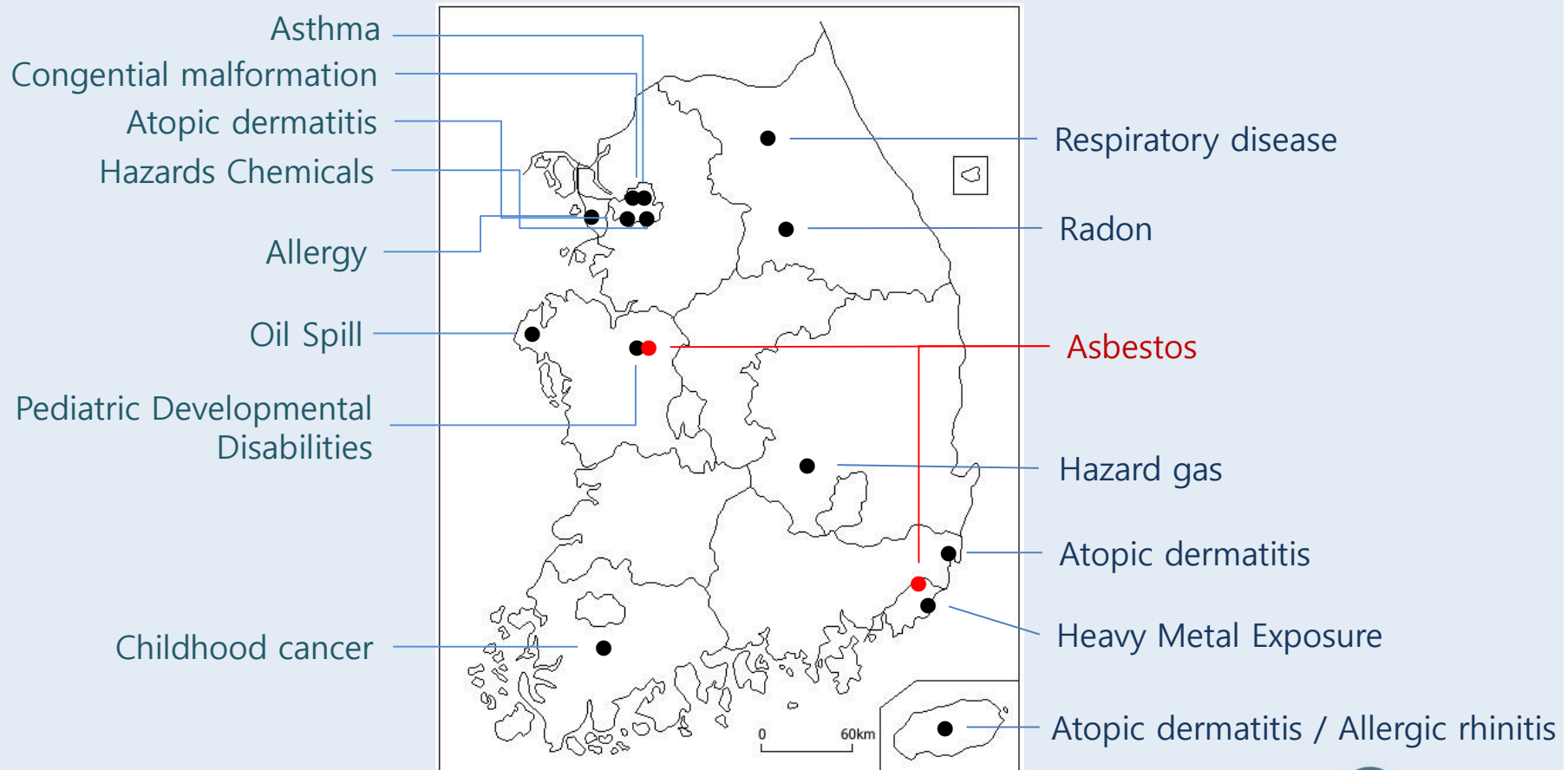


29



Environmental Health Centers [16 hospitals]

- Support the prevention of environmental diseases
- Research the correlation between environmental factors and diseases





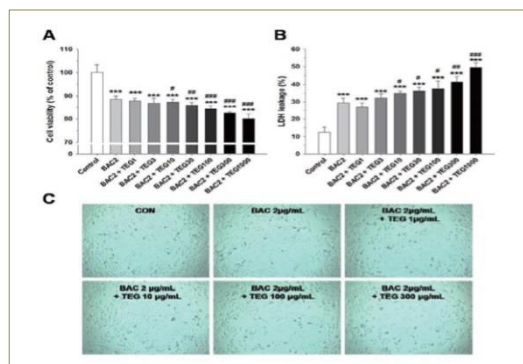
7. Risk assessment of harmful substances contained in household chemical products

- Inhalation toxicity test for a mixture of hazardous chemicals contained in products
=> Mixture of hazardous chemicals triggered more oxidative damage in cells than a single chemical
- Establish the Regulations on Chemical Products of Concern
- Build a Methodology of Risk Assessment by developing exposure factors
- Develop a screening exposure assessment model (MiRiAm) for consumer products

Equipment
for an inhalation toxicity test



Study on lung cell toxicity
of chemical mixtures



Risk assessment system
(MiRiAm)





8. Framework establishment for nano-safety assessment

Exposure assessment approach for nanomaterials and nano-containing products

- Ecotoxicity study using fish, marsh snails and wild celeries
- Develop inhalation exposure scenario and toxic reference values of nano-products

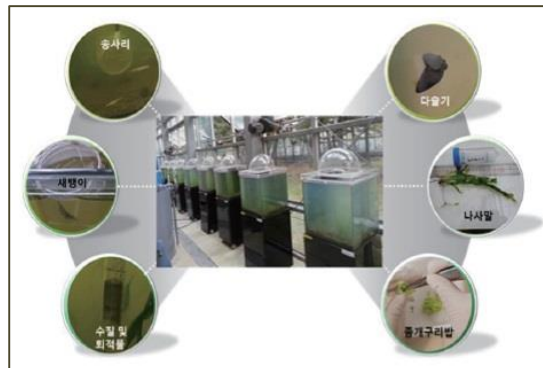
Stronger international cooperation for harmonized test guidelines

- Support OECD Sponsorship program for testing of manufactured nanomaterials (2009~2012)
- Participate international cooperative projects
(e.g. EU-led TGs development for nano regulation ; NaNOREG) (2015 ~ present)
- Nanosafety information system (<http://nano.nier.go.kr>)

Experiment of eco-toxicity test



Establishment of microecosystem simulating freshwater environments



Nano safety assessment report

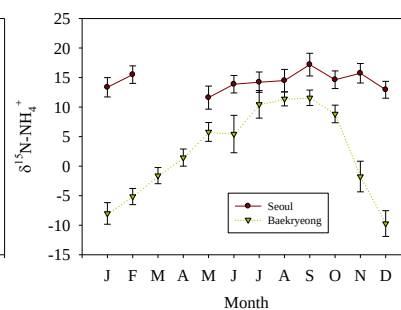
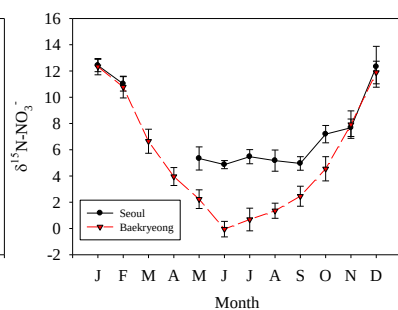
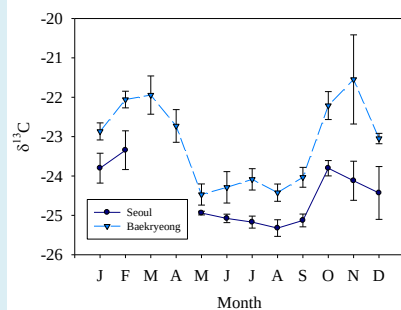




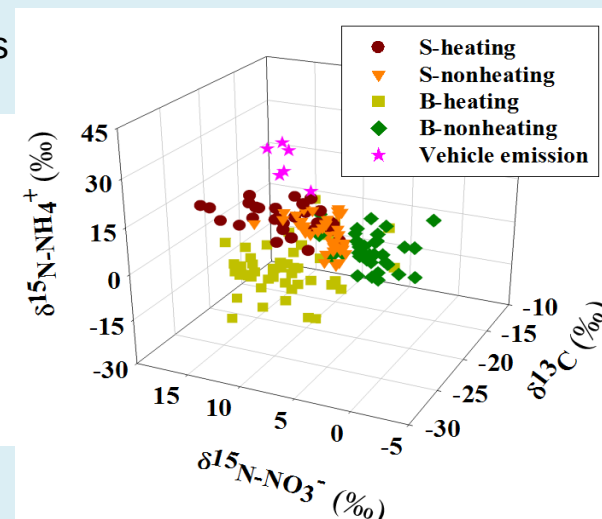
9. Trace-driven research on environmental pollution sources

Research on pollutant source tracing using stable isotopes

- Investigated C, NO_3^- , NH_4^+ , Pb contributing sources in $\text{PM}_{2.5}$ in Seoul & Baengnyeong Island using multi- stable isotope analysis approach
- Isotopic compositions showed significant differences between $\text{PM}_{2.5}$ samples in **winter heating** seasons and **non-heating** seasons.
 - Seoul: **coal combustion's patterns + vehicle emission's patterns** in heating seasons (Oct, 14-Feb)
vehicle emission's patterns in non-heating seasons (May-Oct.14)
 - Baengnyeong : **coal combustion's patterns** in heating seasons
marine emission's patterns in non-heating seasons



< Monthly variations of $\delta^{13}\text{C}$, $\delta^{15}\text{N-NO}_3^-$, $\delta^{15}\text{N-NH}_4^+$ in $\text{PM}_{2.5}$ from Seoul and Baengnyeong during January 2014 to February 2016 >



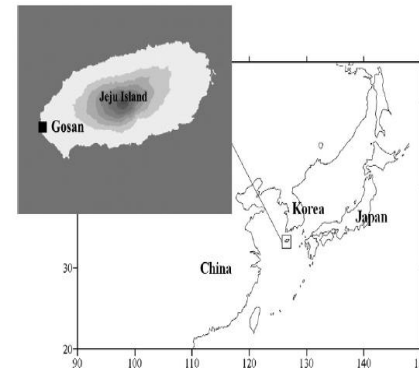
※ Stable isotopes : Isotopes of the same elements whose nuclei contain the same number of protons but different numbers of neutrons



10. POPs activities (Under the stockholm convention)

Korean National POPs monitoring (2008 ~ present)

- Development of analytical methods for emerging containments
- POPs monitoring at the Gosan supersite in East Asian Countries
 - Target : 23 POPs , Survey site : 171 (Air:38, Water:36, Soil:61, Sediment :36)



Information warehouse system of POPs (2008 ~ present)



<https://www.pops-asia.org:8443/login.do>

The POPs Analysis Training Program (2011 ~ present)



For Harmonization of POPs analysis methods
among East Asian Countries



11. Research on wild animal-borne zoonoses and the countermeasures

Growing demand for wildlife disease control

- 70% of zoonosis is mediated by wildlife, and becoming global problem such as HPAI, MERS, Ebola and etc.
- Globalization, population growth, landscape changes enhances the interface between wildlife and humans
- Based on **'One Health'**, the need for wildlife disease control is essential



Establishment of wildlife disease response system

- Construction of **Animal Biosafety Level 3(ABL-3)** facility
- International cooperation with National Wildlife Health Center (USA)

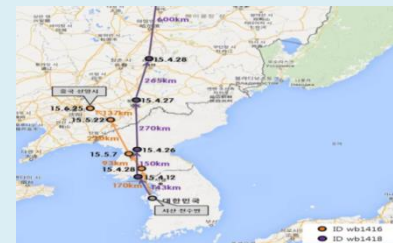




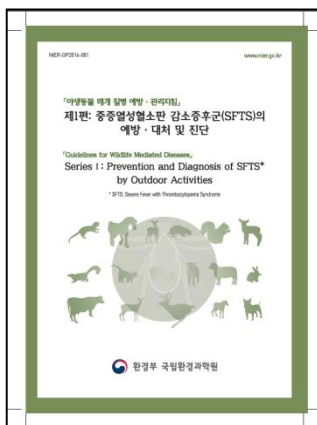
11. Research on wild animal-borne zoonoses and the countermeasures

Nationwide Wildlife disease surveillance (HPAI)

- Monitoring of **Avian Influenza virus** in wild birds
- AI virus analysis in wild birds using fecal, blood and swab samples (20,000 feces and 2,500 swab/year)
- Monitoring of movement to neighboring countries (GPS system)



Guidelines for wildlife disease prevention and management



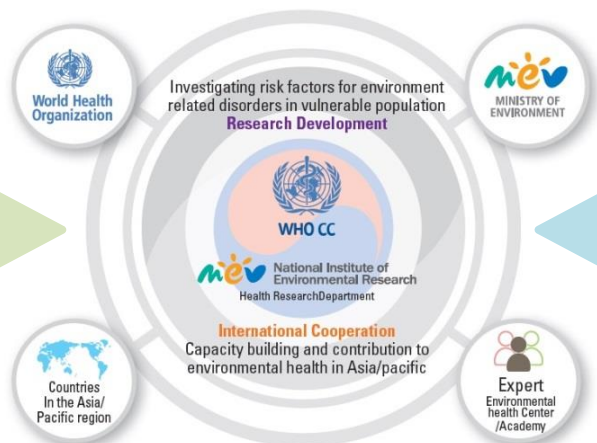


12. WHO Collaborating Centre for Vulnerable Population and Environmental Health (Jan. 2014~)

Research on environmental health of vulnerable population and international cooperation



- **Research on Health effects of Heavy metal exposure in residents living metal mines in Mongolia (Erdenet Mine) (2015-2016)**



Technology and information sharing to strengthen environmental health capacity in the Asia-Pacific region

• Training Program

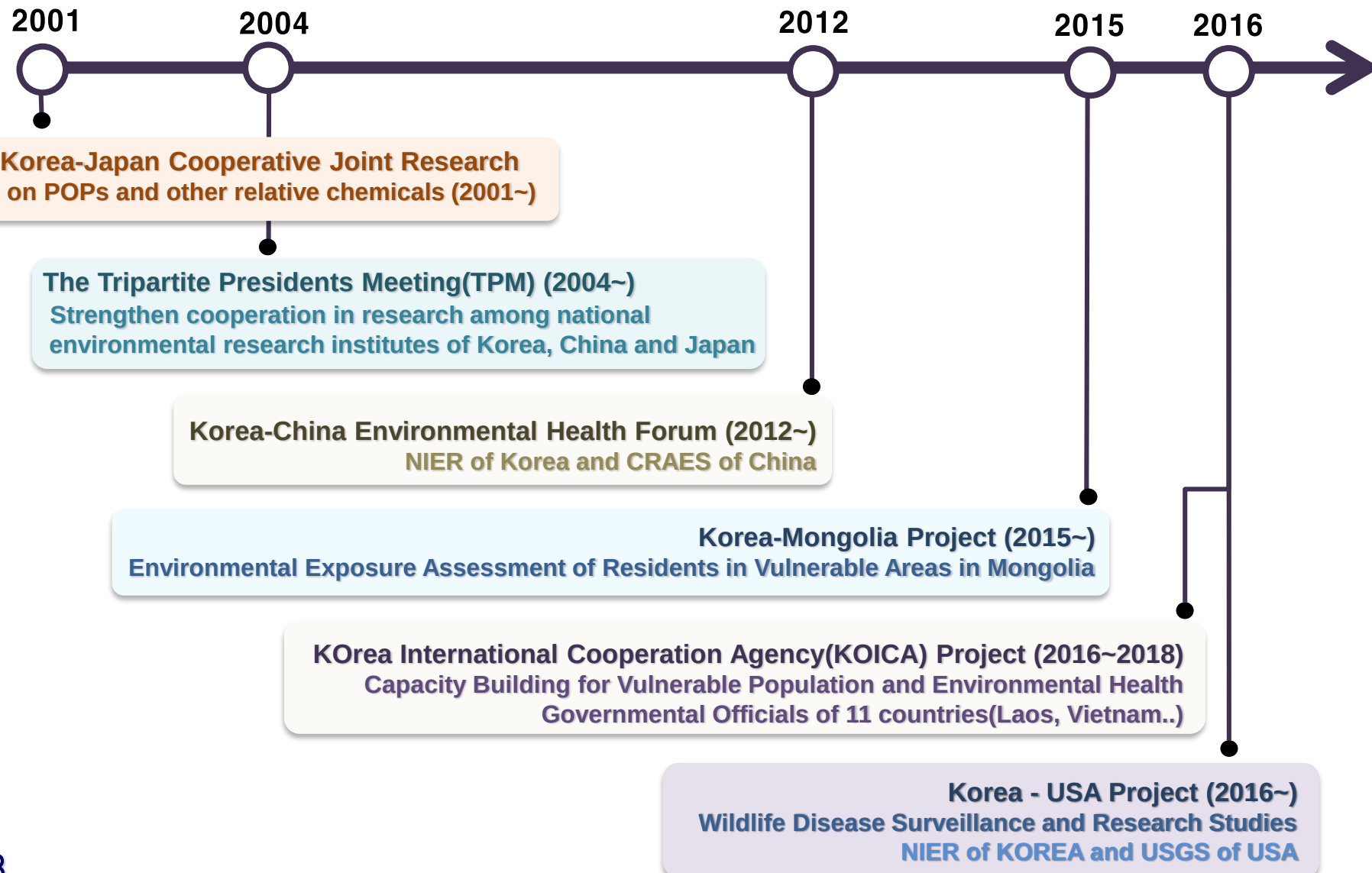


- (1) Regional Training on Health, Environment and Development (2015~)
- (2) Capacity Building for Vulnerable Population and Environmental Health (KOICA Project, 2016~2018)

- **Development & Dissemination of Environmental Health Guideline for vulnerable population**



13. International Cooperation of Environmental Health(NIER)



04

Future Works and Perspectives





Future Works and Perspectives

- **Strengthen research activities to protect the public health from harmful environmental factors ;**
-

1

• Monitoring & evaluation of the environmental health for populations vulnerable to environmental pollution

2

• Risk assessments on environmental pollutants and chemicals contained in potentially harmful products

3

• Safety assessments on materials of global concern including nanomaterials and studying relevant control measures

4

• R & D on representative values of public exposure to harmful environmental factors and environmental health indices

5

• Trace-driven research on environmental pollution sources using stable isotopes and multiple search methods

6

• Constant surveillance of avian influenza & research on wildlife diseases

7

• Bi-lateral, multi-lateral cooperation & coordination research projects at national, regional & global levels

8

• Active participation & support to OECD, UNEP and WHO activities



Thank you

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