In-depth Evaluation of set of 5 national R&D programs for human infectious diseases:

Example of S&T policy evaluation in Korea

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R&D Program evaluation system in Korea

- Evaluation system for Korea’s national R&D Program

**Cycle of R&D Program**
- Design & Plan
- Execution
- Diffusion

**Evaluation System**
- Technology Assessment
- Integrated assessment for Financial Programs (R&D)
- Summative Evaluation
- Follow-up Evaluation

**Feedback**
- Go/No Go
- Adjustment of Program, Budget Increment/Cut
- Reward, Policy reflection
Outline of in-depth evaluation

• Purpose of evaluation:
  1) Improvement of effectiveness of budget investment on R&D
  2) Preemptive response for major social issues related to R&D
  3) Improvement of R&D program in progress by each department
     (such as R&D promotion system, solution for better achievement)

• There are two types of evaluation subject:
  (1) Single program or sub-program
  (2) Horizontal program group consists of several programs or sub-programs
  :In-depth evaluation of 5 Programs related to “human infectious diseases” were performed in 2015-2016(as a horizontal group)

• High degree of freedom for using various analytical tools and evaluation methodology(survey, quantitative measurement, AHP, focus group interview, etc.)
In-depth evaluation in Korea(2)

- **Based on Acts**
  - Framework Act on Science and Technology (article 12)
  - Act on Performance Evaluation and Management of National Research and Development Program, etc. (article 7-1)

- **Subjects of in-depth evaluation**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Consideration of Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large scale budget &amp; Long history</td>
<td>➢ older than 5 years, more than $10 million.</td>
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<tr>
<td></td>
<td>➢ need to improve efficiently based on performance.</td>
</tr>
<tr>
<td>Necessary coordination or linkage between programs</td>
<td>➢ need to coordinate or connect between others due to conducting similar target, objectives, etc. to other programs.</td>
</tr>
<tr>
<td>Conduct with many central administrative agencies</td>
<td>➢ need to check the plan including contents and collaboration between agencies.</td>
</tr>
<tr>
<td>Association with a national or social issue</td>
<td>➢ need to check corresponding with current S&amp;T policy issue.</td>
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<tr>
<td></td>
<td>➢ need to act to the social issue.</td>
</tr>
<tr>
<td>Others</td>
<td>➢ graded “poor” or “very poor” from self-meta evaluation at intermediate stage.</td>
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<td></td>
<td>➢ criticized by National Assembly / The Board of Audit and Inspection of Korea.</td>
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In-depth evaluation in Korea(3)

- In-depth evaluation includes a view of Relevance, Effectiveness, Efficiency, Systemicity

<table>
<thead>
<tr>
<th>Classification</th>
<th>Aspects of Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevance</td>
<td>- Is the program necessarily performed by the government fund?</td>
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<tr>
<td></td>
<td>- Is the performance objectives appropriate?</td>
</tr>
<tr>
<td></td>
<td>- Is the program developed by S&amp;T trends or current S&amp;T policy?</td>
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<tr>
<td>Effectiveness</td>
<td>- Does the program produce excellent results?</td>
</tr>
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<td></td>
<td>- Is the performance enough compared to performance goal?</td>
</tr>
<tr>
<td></td>
<td>- Does the program contribute the targeting R&amp;D community?</td>
</tr>
<tr>
<td>Efficiency</td>
<td>- Is the performance enough in consideration of cost, time, etc.?</td>
</tr>
<tr>
<td>Systemicity</td>
<td>- Is the performance management appropriate?</td>
</tr>
<tr>
<td></td>
<td>- Is the program required to coordinate or connect with other programs?</td>
</tr>
<tr>
<td></td>
<td>- Is the program implemented by a plan?</td>
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<td></td>
<td>- Is the sub-program including projects well organized by the objectives?</td>
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In-depth evaluation in Korea

**System for in-depth evaluation**

- **Main agent of evaluation**: MSIP, Ministry of Science, ICT and Future Planning
- **Management & Support**: KISTEP, Korea Institute of S&T Evaluation and Planning

- **General Coordination Committee**
  - **Selection of target, Coordination of results**
  - **Review of each Program(s)**

- **Subcommittees**
Evaluation of horizontal R&D program group which is related with human infectious disease
# Selected R&D program for human infectious diseases

<table>
<thead>
<tr>
<th>Program</th>
<th>Ministry</th>
<th>Period</th>
<th>Budget in 2015(USD)</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio Nano Healthguard</td>
<td>Ministry of Science, ICT and Future Planning</td>
<td>‘13~’22</td>
<td>$7.2M</td>
<td>Development program for <strong>nano-based device</strong> which detect air-borne infectious materials</td>
</tr>
<tr>
<td>Infectious disease management</td>
<td>Ministry of Health &amp; Welfare</td>
<td>‘99~ongoing</td>
<td>$7.8M$</td>
<td>R&amp;D program for broad range of infectious disease by <strong>CDC</strong> of Korea</td>
</tr>
<tr>
<td>Infectious disease crisis management</td>
<td>Ministry of Health &amp; Welfare</td>
<td>‘08~’19</td>
<td>$19.0M</td>
<td>R&amp;D program which is concentrating on <strong>vaccine and medicine</strong> development by supporting pharmaceutical company &amp; biotech</td>
</tr>
<tr>
<td>Climate change related disease</td>
<td>Ministry of Health &amp; Welfare</td>
<td>‘13~ongoing</td>
<td>$2.2M</td>
<td>R&amp;D program which is supporting the research for <strong>insect-borne disease</strong></td>
</tr>
<tr>
<td>Zoonoses control technology</td>
<td>Ministry for Food, Agriculture, Forestry and Fisheries</td>
<td>‘98~ongoing</td>
<td>$2.8M</td>
<td>R&amp;D program for <strong>zoonoses</strong> (communicable disease between men and beasts)</td>
</tr>
</tbody>
</table>
Relevance & Systemicity

- Match well with government policy
- Slightly overlapped
- Problems in management of project, cooperation with other department

**Systemicity**

- Relevance of promotional system
- Relevance of development strategy

**Relevance**

- Focus Group Interview
- Data Analysis (proposal, object, etc)
- Budget Investment analysis

**Policy comparability**

Relevance for investment (portfolio)

Overlap with other programs
Relevance & Systemiciry

- Analysis of related policies
  - Mid- & long-term plan
  - Emergency correspondence system
  - Inter-government department plan
  - Etc.

- Major policy trends
  - Needs for improving infectious disease emergency response (such as Avian influenza, MERS, etc.)
  - Problems on governance (including central and local government, distribution of responsibility, cooperation with international surveillance system, medical emergency site response, etc.) were pointed out
  - Needs for breakdown of boundaries between research field, department
- Portfolio analysis
  - Target disease, research field, time, ...

- Influenza
- Drug-resistant Bacteria
- Tuberculosis
- Zoonoses
- Bioterrorism
- Chronic infectious diseases
- Insect-born
- New and unknown
- Vaccination
- Infectious disease disaster
- Common research
- Etc.
- Non-R&D
Relevance & Systemicity

- Changes for the research portfolio for human infectious disease

... Much more analysis had been done for budget profiling
Efficiency & effectiveness

<<Key result>>
- Detection kit
- Vaccine, Drug
- Clinical trial stage
- Tech.transfer
- Substances

Efficiency
- Bio Nano Health-guard
- Infectious disease management
- Infectious disease crisis management
- Climate change related disease
- Zoonoses control technology

Effectiveness
- Insufficiency of final outcome (key result)
- Unequal distribution of output

<<Productivity>> For Paper & Patent

- Analysis of R&D results (products) for each diseases
- Qualitative analysis about the result
Direction for Improvement

- Draw a improvement direction for policy

- Needs for cross-border supporting system between government ministry for human infectious disease R&D (such as NIH)
- Effective and substantial operation of multi-department funded research
- Application of disease crisis alert level to infectious disease R&D
- Reinforcement of corresponding study for new and unknown infectious diseases
- Enlargement of authority of Korea’s NIH for public and general research in preventing/control/quarantine, infra and surveillance/epidemiological research (which could not make money!)
Direction for Improvement

- Reinforcement of linkage between projects
- Solve the problem of disambiguation of development roadmap for final result
- Continuous build of negotiation system with demand government department
- Expand participation of industry

Suggestions for each program
**Direction for Improvement**

**Infectious disease management**

- Reinforcement of investment for the field of recognition (surveillance) and infra (infra, clinical stage, policy) for the infectious disease research
- Reestablishment of research goals, especially for development of public vaccine research
- Emphasis on the linkage between the program and related upstream government policy
- Flexible management of HR in NIH (of Korea) for counteract infectious disease crisis
- Participation of CDC and ‘council of multi-department R&D promotion to cope with the infectious disease crisis’ is needed for the making of scheme and selection of project

- Transfer of some project to ‘infectious disease management program’ for the unity of management

- Solve the uneven distribution of research outcome(concentrated in influenza)
Direction for Improvement

Climate change related disease

- Merge the program with ‘infectious disease management program’ for synergism
- Push ahead plan of international cooperation and joint surveillance network as they originally planned
- Expansion of surveillance target and diversification of research

Zoonoses control technology

- Independent management of human infectious disease related projects distinguished from other project
- Concentrate on “practical” research whose products could be used in the preventive site, reinforcement of linkage with industry
- Inter-department cooperation with CDC, NIH and MHW
Conclusion

- Introduction of in-depth evaluation for government-funded R&D programs in Korea
- Example of in-depth evaluation related with human infectious disease
- Draw a improvement direction for all programs, each program and policy
- The result of evaluation could be reflected in further budget adjustment
Thank you!

Suggestions and questions:

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