ここでハザードがHACCPによって相対的に減少するシナリオを考える．それがカンピロバクター属菌とサルモネラ属菌の両方に独立に効くことを想定し，そこから得られる費用対効果を数値解析によって検討した．

（倫理面への配慮）

本研究は2次データと数理モデルを利用した理論疫学研究であり，個人情報を扱う倫理面への配慮を必要としない．

C．研究結果

図3にカンピロバクター属菌単独でHACCPの費用対効果を検討した結果を示す．横軸に平行な点線が増分費用効果比の閾値として使用した1生存年あたり500万円である．HACCPによる増分費用効果比を1つの疾患単独で検討したとき，HACCPによる感染ハザードの相対的減少のごく一部の範囲においてのみHACCPが費用対効果に優れているものと結論される．

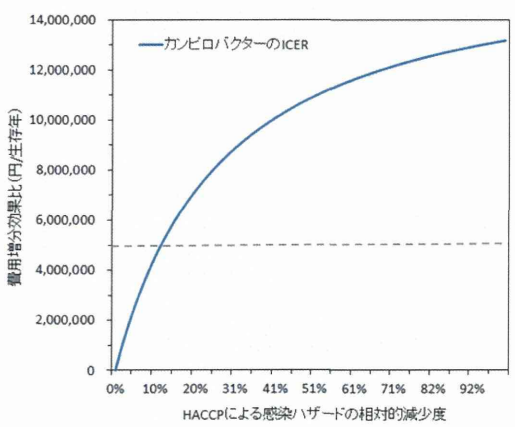

図3．カンピロバクター属菌について単独で検討した増分費用効果比

しかし，HACCPは病原体に特異的でなく，複数の感染症に独立に波及するものと期待される．ここでカンピロバクター単独でなく，カンピロバクター属菌およびサルモネラ属菌の両方の増分費用効果比を検討した結果を以下の図4に示す．閾値を利用すると，ハザードの相対的減少度のほとんどにおいてHACCPは費用対効果に優れていると結論される．

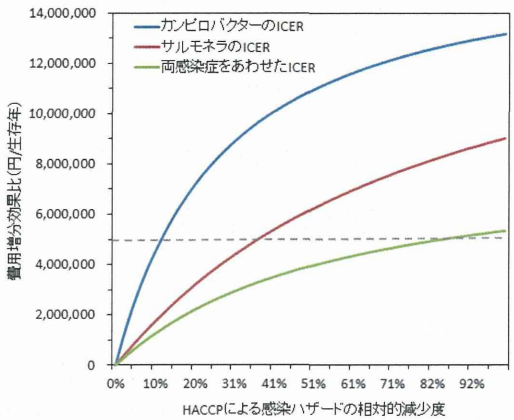

図4．カンピロバクター属菌とサルモネラ属菌の両方に独立にHACCPが作用すると仮定した場合の増分費用効果比

D．考察

予備的検討の結果，カンピロバクター属菌単独あるいはサルモネラ属菌単独の対策では十分な費用対効果を達成することが困難であるが，HACCPは病原体特異的に作用するものでなく2つ以上の食品由来疾病に同時に作用する可能性が期待され，その場合には十分に費用対効果に優れた結果が得られるものと期待された．これはHACCPに限らず次亜塩素酸ソーダによる消毒など，病原体に非特異的である一方で一定以上の効果が期待できる感染症対策の全てに当てはまる．政策判断としての費用対効果を検討する場合にはその作用が独立である限りは対象疾病の全てを考慮すべきであるものと考えられた．

今後，HACCPにおける1つひとつの過

程の定量化あるいは 1 種類の消毒薬の効果などに焦点を絞って統計学的推定に着手することが必要と考えられた.

E．結論

これまでの調査に基づく DALYs 推定値を活用することによって，食品由来疾患の疾病負荷を異なる疾病間で比較し，個々の予防策について，その費用対効果も含めて検討することを目的に今年度から政策評価モデリングの構想を開始した．具体的事例として食肉への HACCP 導入による細菌性食中毒の予防効果の推定ならびに費用対効果の推定研究を開始した．予備的検討の結果，カンピロバクター属菌単独あるいはサルモネラ属菌単独の対策では十分な費用対効果を達成することが困難であるが，HACCP は病原体特異的に作用するものでなく 2 つ以上の食品由来疾病に同時に作用する可能性が期待され，その場合には十分に費用対効果に優れた結果が得られるものと期待された.

F．健康危険情報

なし

G．研究発表

1．論文発表

なし（本分担研究は初年度である）

2．学会発表

なし（本分担研究は初年度である）

H．知的財産権の出願・登録状況
（予定を含む）

1．特許取得

なし

2．実用新案登録

なし

3．その他

なし

Ⅳ章

参考資料１

Japan Pilot Studies for FERG Country Study

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Japan Pilot Studies for FERG Country Study

12 Apr 2013, FERG 5 Meeting, WHO
Fumiko KASUGA, Ph.D.
National Institute of Health Sciences
MHLW, JAPAN

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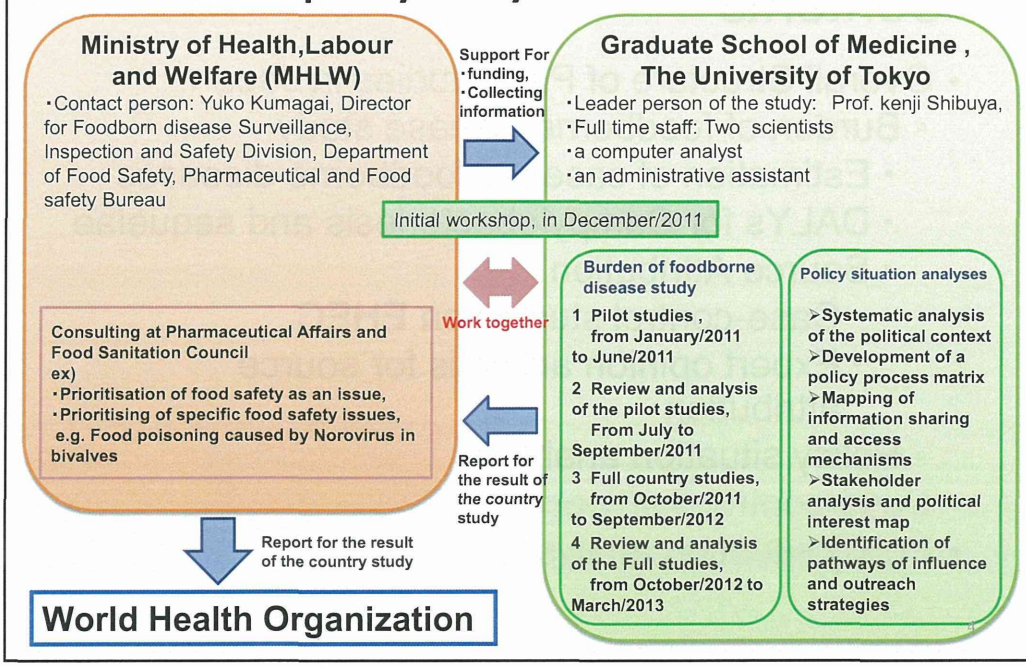
Contents

- Overall Structure of Pilot Studies in Japan
  - Burden of foodborne disease study
    - Estimation of cases of foodborne diseases
    - DALYs for Campylobacteriosis and sequelae
    - Source Attribution
      - Case-control studies on EHEC
      - Expert opinion analysis for source attribution
  - Policy situation analyses
- Case-control study on EHEC
- Policy situation analyses

History

- **Oct. 2010**: Expression of Interest (EOI) submitted by Director General, Food Safety Department, MHLW to participate in FERG pilot foodborne diseases burden study and policy situation analysis
  - Principal investigator: Kenji Shibuya, Professor and Chair, Department of Global Health Policy, Graduate School of Medicine, The University of Tokyo
- **Apr. 2011**: Prof. Shibuya has started a research funded by Health and Labour Sciences Research Grants, MHLW
- **Nov. 2011**: FERG Country studies kick-off meeting in Tirana, Albania
- **Mar. 2012**: First report by Prof. Shibuya
- **Mar. 2013**: Second report by Prof. Shibuya

Capacity for conducting burden of disease and policy analysis assessments



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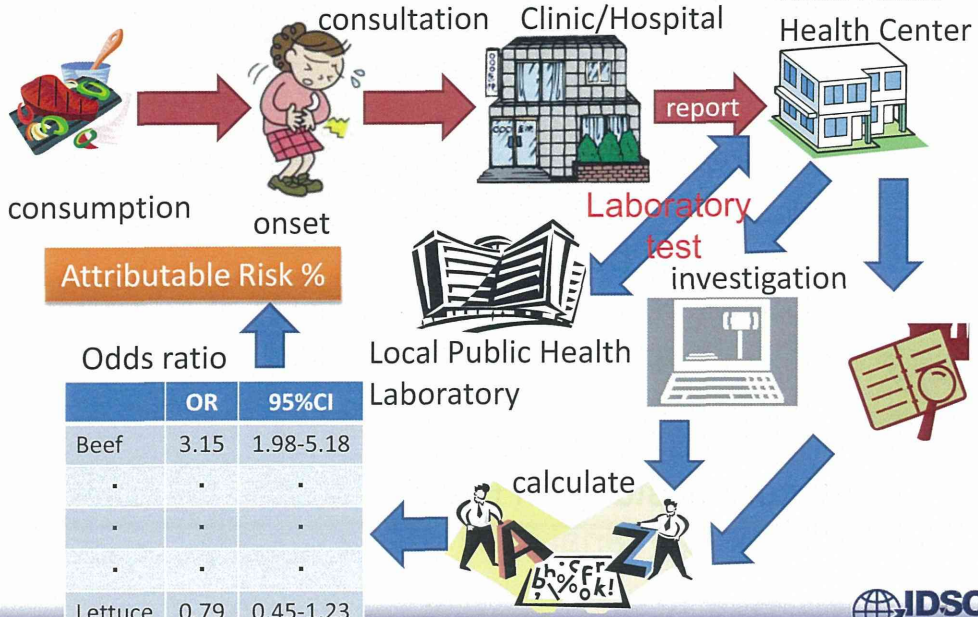
Materials and Methods

- Study design: Matched Case-Control study
- Subjects: eight local governments areas
  - Case:
    - Presenting with at least one acute gastroenteritis symptom (diarrhea, bloody stool, abdominal pain, vomiting) and with the STEC O157 (possible outbreak-related cases: excluded)
  - Control:
    - Matched area, sex and age group from source population
    - Randomly selected five control per case
- Data collection: used standardized questionnaire (Items: characteristics, consumed food, exposed environment and contacted with animal)
  - Case: interviewed by local Public Health center officer
  - Control: internet investigation (response rate: 67.3%)
- Statistical analysis: conditional logistic regression

NIID National Institute of Infectious Diseases
Infectious Disease Surveillance Center

Flow of this investigation



	OR	95%CI
Beef	3.15	1.98-5.18
.	.	.
.	.	.
.	.	.
Lettuce	0.79	0.45-1.23

IDSC Infectious Disease Surveillance Center

NIID National Institute of Infectious Diseases
Infectious Disease Surveillance Center

Calculation of PAR%

	Consume/Case		Consume/Control		aOR	PAR%
	N	%	N	%		
2010年						
Raw beef liver	10/53	18.9	7/345	2.0	9.8	16.9
Raw/uncooked beef	18/53	34.0	52/344	15.1	9.4	30.3
Well cooked ground organ beef	7/46	15.2	15/212	7.1	1.5	4.9
2012						
Raw beef liver	0/65	0.0	0/269	0.0	NC[a)]	NA[C)]
Raw/uncooked beef	4/63	6.3	8/256	3.1	NC[b)]	NA
Well cooked beef	36/60	60.0	102/234	43.6	1.7	25.7
Well cooked beef ofal	8/65	12.3	13/269	4.8	4.4	2.5

a) NC: Not Available to calculate crude Odds Ratio
b) NC: Not Entered the calculation for Multiple Logistic Regression
c) NA: Not Available to calculate PAR%

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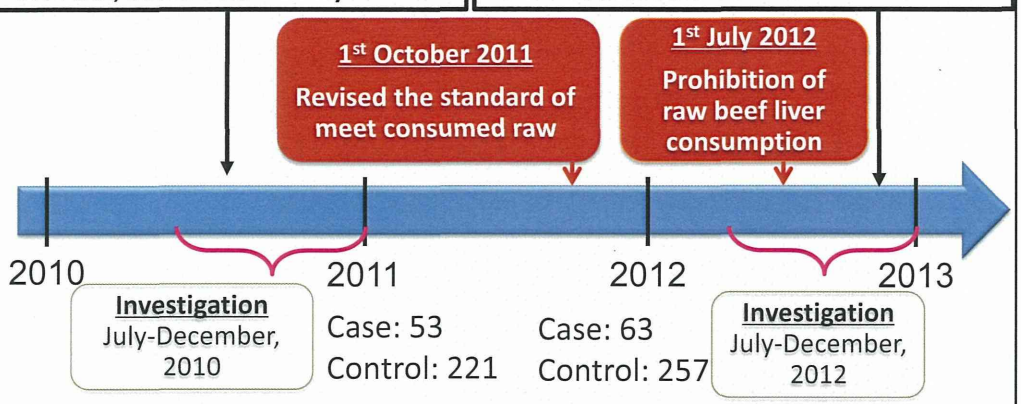
To make a comparison between before and after countermeasures for raw/uncooked beef and raw beef liver

- Raw/uncooked beef (PAR% [a]: 16.9%)
  OR=13.3, 95%CI: 4.4-39.8
- Raw beef liver (PAR% 30.3%)
  OR=28.2, 95%CI: 3.0-infinity

- Raw/uncooked beef (PAR%: Not available)
  OR=1.6, 95%CI: 0.4-6.9
- Raw beef liver (PAR%: Not available)
  OR: Not available



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NIID National Institute of Infectious Diseases | Infectious Disease Surveillance Center

Discussion

- Raw/uncooked beef and raw beef liver
  - Before countermeasures: significantly attributable risk
  - After countermeasures:
    - Risk of Raw/uncooked beef consumption: decreased
    - Raw beef liver: no consumed cases and control

  →Results: suggested successful the counter measures
- Raw beef consumption: risk factor for STEC O157
- Surveillance: Number of STEC O157 decreased after the countermeasure
- Limitation: Case-control study may have recall bias; Selection bias for control, because of internet user
- Conclusion: countermeasures successful for reduction of cases related to raw meat and liver consumption

IDSC Infectious Disease Surveillance Center

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Policy Situation Analysis of the Japanese Food Safety System

- Report by Prof. Taichi Ono to MHLW through Prof. Shibuya

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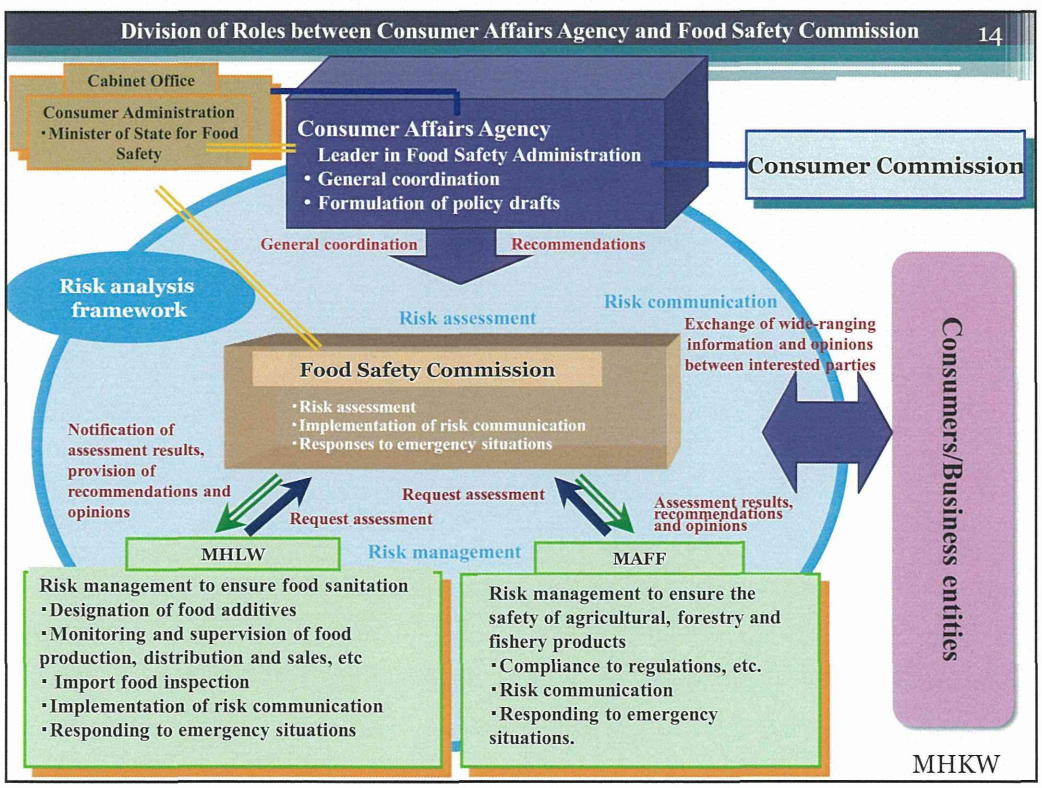
1. Outline of the Japanese Food Safety System

1.1 Overall framework under Food Safety Basic Law
- 1.1.1. Outline of the Food Safety Basic Law (FSBL)
- 1.1.2. Food Safety Commission (FSC) (See Chart 1-3)
- 1.1.3. Risk Assessment conducted by FSC (See Chart 1-4)
- 1.1.4. Risk Communication conducted by FSC
- 1.1.5. Evaluation of the FSC and FSBL

1.2. Food Sanitation Law and Food Sanitation Administration
- 1.2.1. Outline of the Food Sanitation Law (FSL)
  - 1.2.1.1. Specifications and standards under FSL (Chart 1-5)
  - 1.2.1.2. Inspection and guidance under FSL
  - 1.2.1.3. Regulations against facilities under FSL
  - 1.2.1.4. Regulation against personnel under FSL
  - 1.2.1.5. Measures against food poisoning outbreak (Chart 1-6)
  - 1.2.1.6. Measures securing imported food safety
  - 1.2.1.7. Food Labeling
  - 1.2.1.8. Risk Communication by MHLW
  - 1.2.1.9. Penal Provisions
- 1.2.2. Food Sanitation Administration
  - 1.2.2.1. Overview of the food sanitation administration (See Chart 1-6)



Acknowledgements

- Research supervisor: Prof. Kenji Shibuya
  - Burden of foodborne disease study
    - Estimation of cases of foodborne diseases: Kunihiro Kubota, Hiroshi Amanuma
    - DALYs for Campylobacteriosis and sequelae: Erika Ota, Yoshika Momose, Toshiro Ohnishi, Yuko Kumagai, Nayu Ikeda
    - Source Attribution
      - Case-control studies on EHEC: Yuichiro Yahata, Tamano Matsui, Tomimasa Sunagawa, Nobuhiko Okabe
      - Expert opinion analysis for source attribution: Erika Ota, Yoshika Momose, Toshiro Ohnishi, Yuko Kumagai
  - Policy situation analyses: Taichi Ono, Shoji Miyagawa
- MHLW, Japan
- WHO

参考資料２

Calculation of DALYs for Campylobacteriosis and its sequela in Japan

Calculation of DALYs for Campylobacteriosis and its sequela in Japan

Yuko Kumagai, Erika Ota, Yoshika Momose,
Toshiro Onishi, Kenji Shibuya, Fumiko Kasuga

12th, April 2013, FERG, WHO

Erika Ota, PhD
Department of global health policy,
Graduate School of Medicine ,
The University of Tokyo

1

Background

- Useful for the process of policy-making and taking decisions, and for enhancing the consumers' understanding of food safety administration.
- Extrapolated to groups of population having similar dietary habits in other Asian countries.
- Codex Regional Committees prioritise work programmes according to GBD information.

2

Aim

- To develop a risk prioritization framework using DALYs calculation for foodborne diseases in Japan.

-Campylobacter spp.

-Salmonella spp.

-EHEC

3

Methods

1) Estimation of foodborne illness:
   - Incident rate
   - Mortality rate
   - Age distribution
   - Duration of illness
   - Disability weight

2) Calculation of DALYs

3) Uncertainty analysis

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Data sources

Estimation of foodborne illness	Data sources
Incidence rate	patients survey (sporadic cases)
	food poisoning statistics (outbreak cases)
	telephone survey
	experts elicitation (source attribution)
	systematic reviews (sequelae: GBS, ReA, IBD)
Mortality rate	the vital statistics of Japan
	experts elicitation (source attribution)
	systematic reviews (sequelae: GBS, ReA, IBD)
Age distribution	food poisoning statistics
Duration of illness	overseas studies (Netherlands)
Disability weight	overseas studies (Netherlands)

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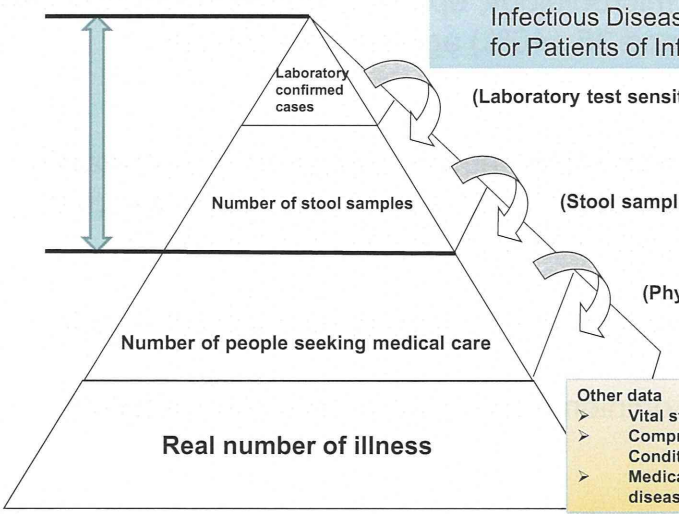
Existing situation of Foodborne diseases statistics

- Patient survey by MHLW

Cases are reported partially.

- Food poisoning statistics based on the Food Sanitation Law
- Infectious disease statistics based on the Law Concerning Prevention of Infectious Diseases and Medical Care for Patients of Infections



(Laboratory test sensitivity rate, coverage)

(Stool sampling rete)

(Physician consultation rate)

Other data
- Vital statistics by the MHLW
- Comprehensive Survey of living Conditions by the MHWL
- Medical expenses are surveyed for each disease and injury category

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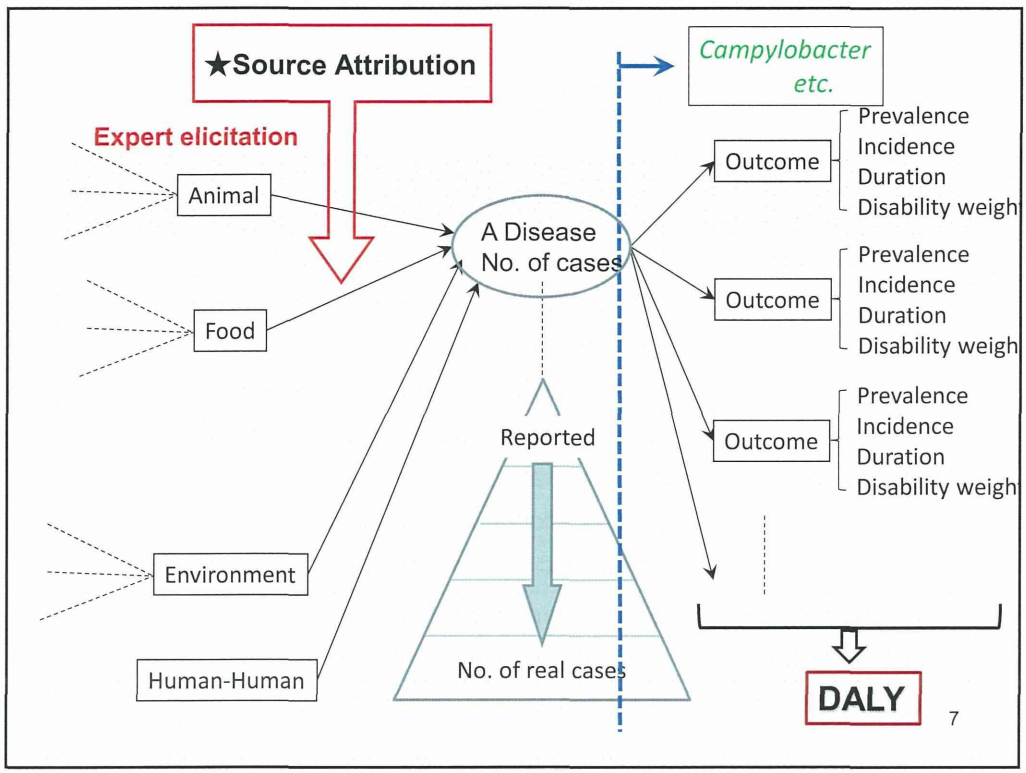

Estimation of source attribution by expert elicitation

Participants:

- Experts in microbiology, epidemiology, and food science.
- 88 invited and 35（40%) agreed to participate.

Contents:
Probability of transmission pathway assigned 90% certainty.
Attributable proportions of food in five major pathways (food , environment, human, animal, travel) for each pathogen.

Method: Questionnaire sent to experts by mail and e-mail.

Analysis: Expert opinion merged by a Bayesian statistical model

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Result: estimation of source attribution

Proportion of Disease Due to Foodborne Transmission in Japan

Pathogen	Experts	Mean fraction (%) transmitted by pathway (5th and 95th percentile)				
		Food	Environment	Human	Animal	Travel
Campylobacter spp.	14	**82.2** (78.9-85.5)	10.3 (8.6-12.1)	3.7 (2.7-4.9)	0.2 (0-0.6)	3.6 (2.6-4.7)
Salmonella spp.	16	83.6 (79.1-88.1)	2.6 (1.7-3.7)	6.0 (4.6-7.5)	3.3 (2.2-4.4)	4.5 (3.3-5.9)
Enterohemorrhagic Escherichia coli (EHEC)	20	77.2 (73.6-80.9)	4.7 (3.6-5.9)	9.0 (7.6-10.6)	8.8 (7.4-10.4)	5.5 (4.3-6.7)

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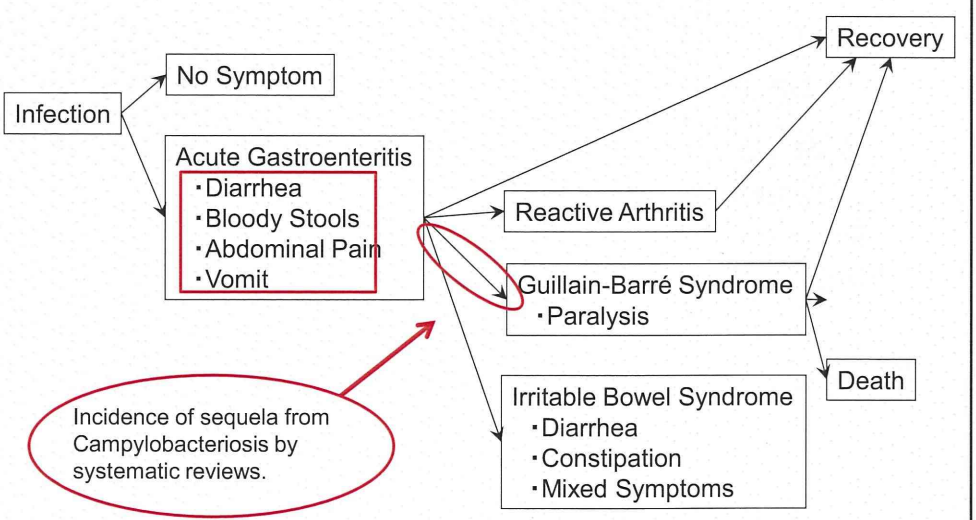
Estimation of attributable proportions for Campylobacteriosis and its sequela in Japan



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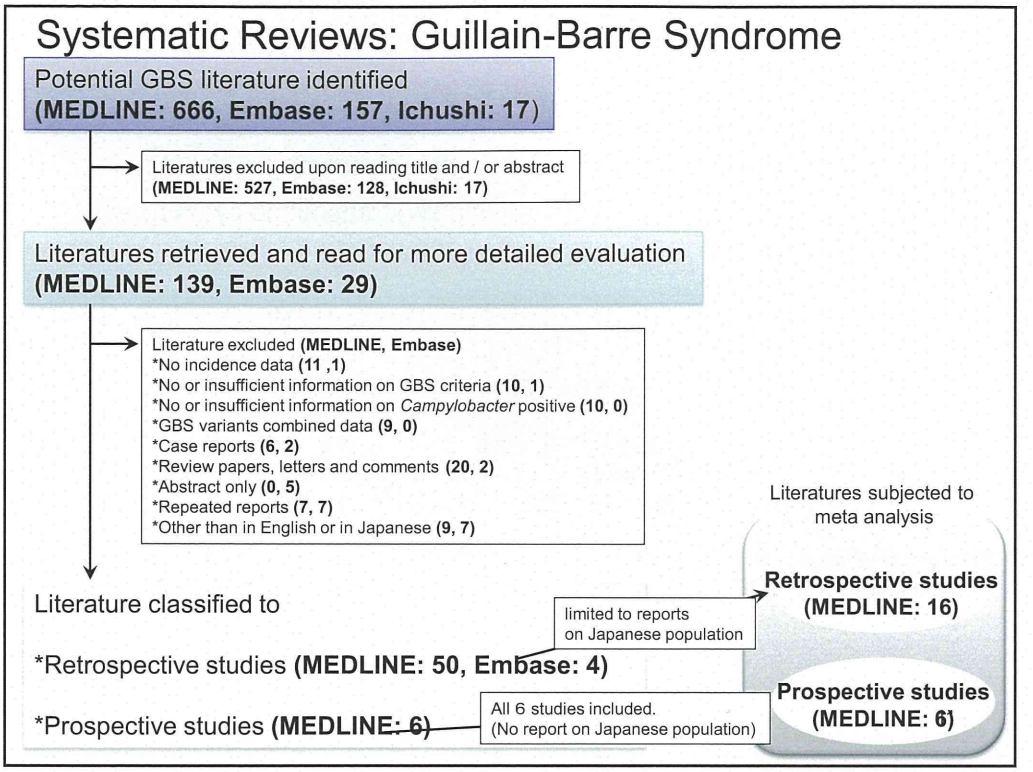

Incidence of sequela of Campylobacteriosis caused by food in Japan

Sequelae	Incidence	Fetal cases
GBS (severe)	67 (17-152)	8
GBS (mild)	318 (79-715)	0
ReA	1,445 (0-5,202)	5
IBD	74 (69-220)	0

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Age distribution

Age (years)	Male(%)	Female (%)
0-4	2.3	3.0
5-14	20.8	19.9
15-29	51.6	53.2
30-44	17.5	15.2
45-59	5.9	5.8
60-69	1.3	1.5
70-79	0.4	0.9
80+	0.2	0.5
total	100	100

From "Food Poisoning Statistics of Japan (2001-2010)

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Population in Japan by age group, 2008

Age (years)	Male	Female	Total
0-4	2,716	2,587	5,303
5-14	5,839	5,563	11,402
15-29	10,044	9,621	19,665
30-44	13,736	13,383	27,119
45-59	11,951	11,975	23,926
60-69	8,976	9,517	18,493
70-79	6,014	7,312	13,326
80+	2,909	5,656	8,565
Total	62,185	65,614	127,799

(×1,000)

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