<文献 No. １２>

対象ツール：Disability-adjusted life years (DALYs) and cost of illness (COI)

文献タイトル／公表年月日：Risk Ranking for Foodborne Microbial Hazards in New Zealand: Burden of Disease Estimates／2009 年

筆者名：Robin J. Lake, Peter J. Creassey, Donald M. Campbell, and Elisabeth Oakley

国・機関、依頼元	New Zealand Food Safety Authority
ツール開発の目的	国家の食品安全管理における優先順位を明確な基準に従って設定するため、特定の病原菌による疾病および後遺症による金銭的負担を推測する。 対象使用者：政策決定者
ランキング対象	Six microbial illnesses（Campylobacteriosis etc.）
アプローチ方法（選択肢）	□　チェックリスト方式 □　スコアリング、ウェイト付け □　Decision tree ■　モデル（確率論的アプローチ） □　その他（　　　）
リスク判定対象（選択肢）	□　ポイント数、チェック数 □　レベル分け（優先度、重要度等） □　汚染レベル □　感染者数 □　発症者数 □　患者数 □　死者数 ■　DALYs または類似した指標（pseudo DALYs 等） □　その他（　　　）
必要なデータセット	Incidence(cases per year), The number of years of life lost due to mortality (YLD), The number of years lived with disability, weighted with a factor between zero to one for the severity of the disability (YLL), Cost of illness (COI), Proportion of disease due to foodborne transmission
工夫点	デルファイ法（専門家グループなどが持つ直観的意見や経験的判断を、反復型アンケートを用いて組織的に集約・洗練する意見収束技法）により Proportion of disease due to foodborne transmission を推測。

●アブストラクト

Priority setting for food safety management at a national level requires risks to be ranked according to defined criteria. In this study, two approaches (disability-adjusted life years (DALYs) and cost of illness (COI)) were used to generate estimates of the burden of disease for certain potentially foodborne diseases (campylobacteriosis, salmonellosis, listeriosis (invasive, perinatal, and nonperinatal), infection with Shiga toxin-producing Escherichia coli (STEC), yersiniosis, and norovirus infection) and their sequelae in New Zealand. A modified Delphi approach was used to estimate the food-attributable proportion for these diseases. The two approaches gave a similar ranking for the selected diseases, with campylobacteriosis and its sequelae accounting for the greatest proportion of the overall burden of disease by far.

●アプローチ方法が分かる図表等

Table I. Disability-Adjusted Life Years (DALYs) Estimates for Major Potentially Foodborne Infectious Intestinal Diseases in New Zealand

Disease	Incidence (Cases per Year)	YLD	YLL	DALYs
Campylobacteriosis and sequelae				
Gastroenteritis	123,000 (86,000–177,000)	508 (438–571)	30 (3–114)	
GBS	28 (24–32)	186 (31–432)	18 (2–82)	
ReA	3,200 (2,300–4,200)	290 (206–388)		
IBD	49 (36–64)	535 (376–709)		
Total		1,520 (990–1,990)	48 (9–156)	1,568 (1,030–2,060)
Salmonellosis and sequelae				
Gastroenteritis	16,800 (5,100–32,200)	66 (46–94)	46 (3–185)	
ReA	365 (162–631)	27 (12–50)		
IBD	4 (1–8)	47 (4–104)		
Total		140 (87–196)	46 (3–189)	186 (108–340)
Listeriosis (perinatal)				
Total		0.5 (0.2–1.0)	228 (119–358)	229 (199–359)
Listeriosis (nonperinatal)				
Total		5 (4–7)	21 (3–57)	26 (8–62)
STEC infection and sequelae				
Gastroenteritis	340 (169–744)	1.0 (0.5–2)	33 (0–170)	
HUS	10 (3–19)	0.5 (0.1–0.9)	26 (0–152)	
ESRD	1.2 (0–4)	16.6 (0–50)	14 (0–77)	
Total		18 (0.9–52)	73 (0–248)	91 (1–271)
Yersiniosis and sequelae				
Gastroenteritis	7,900 (5,500–10,900)	57 (14–115)	29 (3–71)	
ReA	80 (45–122)	7 (4–11)		
Total		64 (21–122)	29 (3–70)	93 (37–161)
Norovirus infection				
Gastroenteritis	403,000 (51,000–1,200,000)	530 (100–1,370)	6 (1–14)	
Total		530 (100–1,370)	6 (1–14)	536 (104–1,350)

Note: Mean (2.5 and 97.5 percentiles). GBS = Guillain-Barré syndrome; ReA = reactive arthritis; IBD = inflammatory bowel disease; HUS = hemolytic uremic syndrome; ESRD = end-stage renal disease.

Table II. Cost of Illness (COI) Estimates for Major Foodborne Infectious Intestinal Diseases in New Zealand

	Cost Components ($000,000)				
Disease	DHC	DNHC	INHC	COI ($000,000)*	Cost per Case ($)*
Campylobacteriosis and sequelae	7.8 (7.1–8.9)	0.61 (0.53–0.73)	124 (92–163)	134 (101–172)	600 (350–939)
Salmonellosis and sequelae	0.78 (0.66–0.95)	0.06 (0.04–0.09)	3.8 (2.5–5.7)	4.8 (3.4–6.8)	220 (90–550)
Listeriosis (perinatal)	0.02 (0.0–0.06)	<0.001	2.7 (0.8–5.8)	2.7 (0.8–5.8)	380,000 (110,000–690,000)
Listeriosis (nonperinatal)	0.2 (0.1–0.3)	<0.001	0.1 (0.02–0.4)	0.3 (0.1–0.6)	14,000 (7,000–28,000)
STEC infection and sequelae	2.0 (0.1–7.2)	0.1 (0.002–0.6)	1.8 (0.04–5.0)	4.0 (1.5–12.0)	4,400 (190–13,200)
Yersiniosis and sequelae	0.22 (0.2–0.25)	0.02 (0.02–0.03)	2.2 (1.5–3.2)	2.4 (1.7–3.5)	190 (120–300)
Norovirus infection	1.2 (0.3–4.3)	0.1 (0.02–0.5)	6.3 (1.5–23)	7.6 (1.9–27)	50 (8–220)

*Based on a discount rate of 3.5%.
Note: Mean (2.5 and 97.5 percentiles). STEC = Shiga toxin-producing *Escherichia coli*; DHC = direct health care costs; DNHC = direct non-health-care costs; INHC = indirect non-health-care costs.

Table III. Proportion of Disease Due to Foodborne Transmission in New Zealand—Summary of Expert Opinion, May 2005

Disease	Mean Expert Estimate (Range)			Simulated Mean (95% CI)
	Minimum (%)	Most Likely (%)	Maximum (%)	
Campylobacteriosis	37.1 (10–60)	57.5 (30–80)	69.6 (40–90)	56.2 (26–82)
Salmonellosis	45.4 (10–70)	60.7 (20–80)	68.9 (30–90)	59.6 (18–83)
Listeriosis	78.4 (40–100)	84.9 (50–100)	92.1 (60–100)	85.0 (48–100)
STEC infection	27.0 (5–80)	39.6 (5–95)	51.4 (15–99)	39.5 (6–95)
Yersiniosis	41.5 (20–80)	56.2 (40–90)	70.8 (50–100)	56.2 (32–92)
Norovirus infection	27.9 (5–50)	39.6 (10–60)	48.9 (15–80)	39.2 (8–64)

Table IV. Food-Attributable DALYs and Cost of Illness for Major Potentially Foodborne Bacterial Diseases and Their Sequelae in New Zealand

Disease	Food-Attributable DALYs Mean (2.5 and 97.5 Percentiles)	Food-Attributable COI ($NZ 000,000) Mean (2.5 and 97.5 Percentiles)
Campylobacteriosis and sequelae	880 (550–1,240)	74 (51–102)
Salmonellosis and sequelae	111 (53–201)	2.8 (1.9–4.0)
Listeriosis (perinatal)	195 (101–307)	2.3 (0.7–4.8)
Listeriosis (nonperinatal)	22 (7–54)	0.2 (0.1–0.5)
STEC infection and sequelae	35 (0.4–109)	1.6 (0.06–4.8)
Yersiniosis and sequelae	52 (21–93)	1.4 (0.9–2.0)
Norovirus infection and sequelae	210 (41–546)	3.0 (0.7–11)
Total	1,510 (740–2,780)	86 (61–115)

DALYs = disability-adjusted life years; COI = cost of illness.

<文献No. １３>

対象ツール：Food Risk Evaluation Engine

文献タイトル／公表年月日：Introductory Workshop on the Web‐Based Tool to Evaluate Food Risk ／2008年10月24日

筆者名：Greg Paoli（Decisionalysis Risk Consultants, Inc.）

国・機関、依頼元	アメリカ、FDA
ツール開発の目的	政策担当者が簡便に食品リスク評価を行えるようにすること。
ランキング対象	食品の種類×ハザードの種類
アプローチ方法（選択肢）	□ チェックリスト方式 □ スコアリング、ウェイト付け □ Decision tree ■ モデル（確率論的アプローチ） □ その他（　　　　）
リスク判定対象（選択肢）	□ ポイント数、チェック数 □ レベル分け（優先度、重要度等） □ 汚染レベル □ 感染者数 □ 発症者数 □ 患者数 □ 死者数 ■ DALYsまたは類似した指標（pseudo DALYs等） □ その他（　　　）
必要なデータセット	食品生産、製造工程での基礎データ（単位量あたりの食品の汚染率、生産・製造工程での微生物増減パラメーター、対象となる感受性人ログループの平均体重、平均喫食量、病状の継続期間や死亡率など）
工夫点	食品とハザード（例：レタスと大腸菌）の組み合わせを選択し、つづけて食品生産製造工程での基礎データを入力していくことで、最終的な食品リスクがDALYsとして算出されるプログラム。 各食品やハザードに合わせて使用するモデルを変更できるようになっており、パラメーターの微調整も可能。

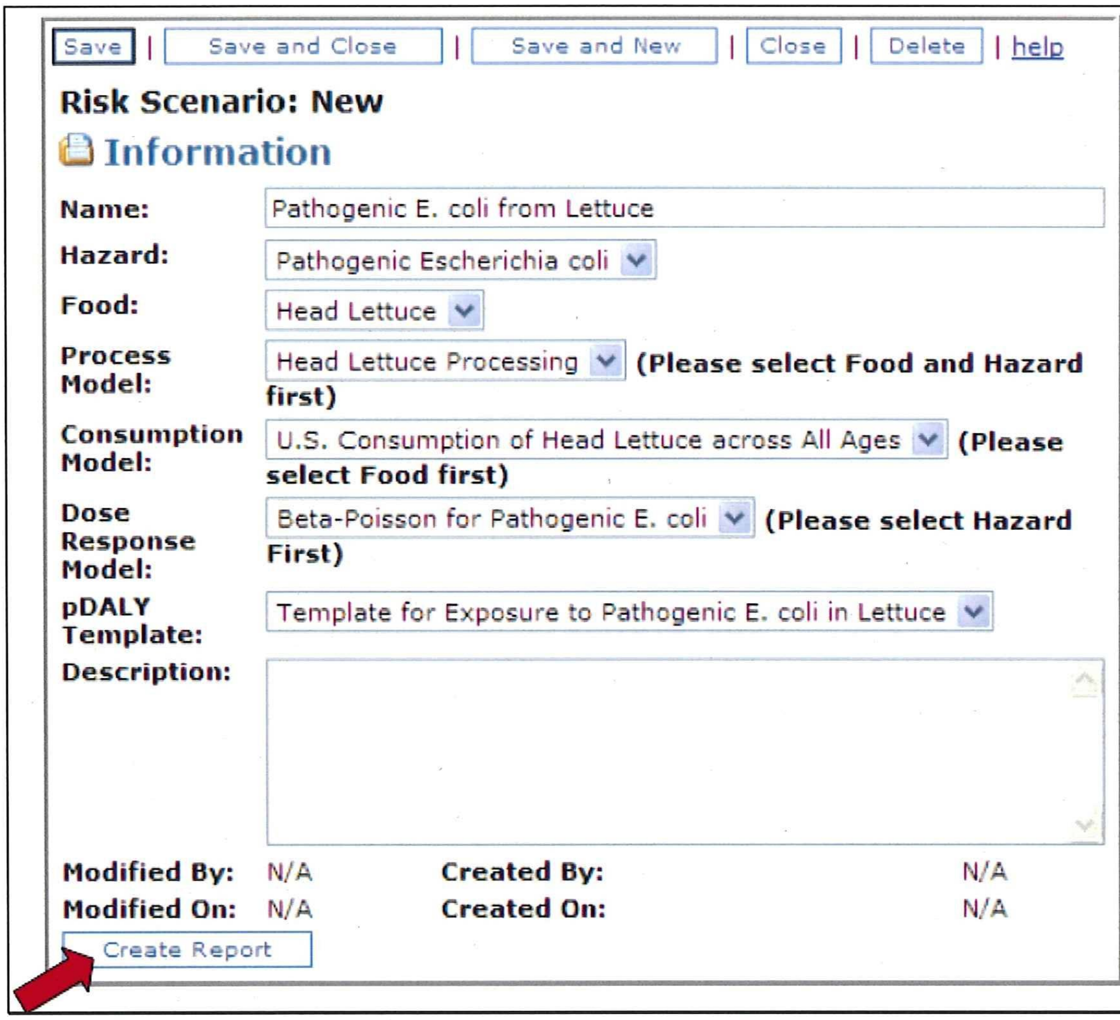
●アブストラクト

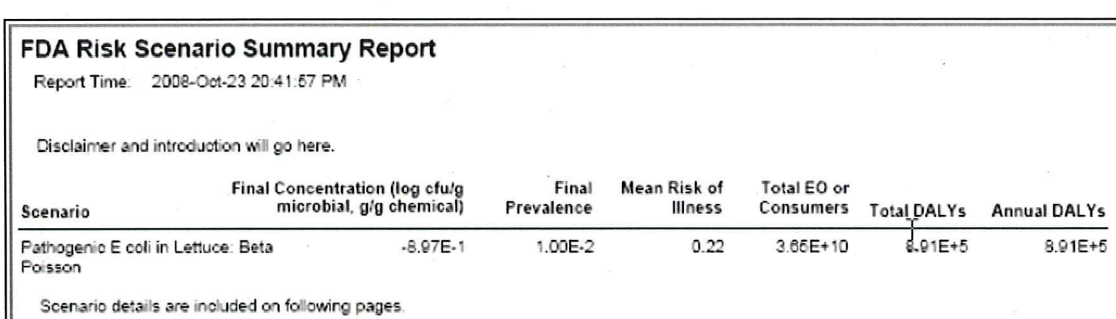
Introduction to the Workshop

This tool is intended to be used by those who have a responsibility for, or involvement with, food safety. It has been designed to simplify the process of comparing different types of risks in foods, and evaluate the impact of the various elements that affect these risks. The quality of the risk estimate produced by this tool depends on the accuracy and validity of the assumptions and values contained in the definitions entered by the user, and this should be kept in mind when comparing ranks of different scenarios. These definitions are easily edited should better data become available.

The workshop participants will first build a single scenario from beginning to end to become familiar with the features of the tool. Next each participant will vary one or more elements of the first scenario to illustrate the sensitivity of the result to thee different factors. Following this, participants will employ the "Share Repository" feature in order to access the work of one or two other participants, as well as be invited to access a more-populated repository to explore ranking possibilities. Finally (time allowing) participants will have the opportunity to build a model for the hazard-food combination of their choice.

●アプローチ方法が分かる図表等





FDA Risk Scenario Summary Report

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Scenario	Final Concentration (log cfu/g microbial, g/g chemical)	Final Prevalence	Mean Risk of Illness	Total EO or Consumers	Total DALYs	Annual DALYs
Pathogenic E coli in Lettuce: Beta Poisson	-8.97E-1	1.00E-2	0.22	3.65E+10	8.91E+5	8.91E+5

Scenario details are included on following pages.

●その他の参考文献

Introductory Tutorial on iRisk: a Web-Based Tool to Evaluate Food Risk／Greg Paoli, Emma Hartnett, Todd Ruthman, Margaret Wilson

＜文献 No. １４＞

対象ツール：Foodborne Illness Risk Ranking Model (FIRRM)

文献タイトル／公表年月日：Identifying the Most Significant Microbiological Foodborne Hazards to Public Health: A New Risk Ranking Model／2004 年 9 月

筆者名：Michael B. Batz, Sandra A. Hoffmann, Alan J. Krupnick, J. Glenn Morris, Diane M. Sherman, Michael R. Taylor, Jody S. Tick

国・機関、依頼元	Food Safety Research Consortium
ツール開発の目的	Risk based food safety system の導入促進のため、より精度の高いリスクランキングツールを開発する。政策担当者向け。
ランキング対象	推定罹患件数、推定入院者数、推定死亡者数、経済的影響、QALYs (loss of quality adjusted life years)
アプローチ方法（選択肢）	□ チェックリスト方式 □ スコアリング、ウェイト付け □ Decision tree ■ モデル（確率論的アプローチ） □ その他（　　　）
リスク判定対象（選択肢）	□ ポイント数、チェック数 □ レベル分け（優先度、重要度等） □ 汚染レベル □ 感染者数 ■ 発症者数 ■ 患者数 ■ 死者数 □ DALYs または類似した指標（pseudo DALYs 等） ■ その他（economic cost, QALYs）
必要なデータセット	Incidence annual number of cases, hospitalizations, and deaths from 28 foodborne pathogens Evaluation of health impacts Pathogen-specific food attribution percentage Outbreak data, expert elicitation
工夫点	3.Pathogen-specific food attribution percentage については正確なデータソースがないため、アウトブレイクのデータや、専門家の意見を聞いて埋めた。また、統計上の不確実性については対処しきれていないところもあり、今後の課題としている。

●アブストラクト

In order to help facilitate a risk-based food safety system, we developed the Foodborne Illness Risk Ranking Model (FIRRM), a Decision making tool that quantifies and compares the relative burden to society of 28 foodborne pathogens. FIRRM estimates the annual number of cases, hospitalizations, and fatalities caused by each foodborne pathogen, subsequently estimates the economic costs and QALY losses of these illnesses, and, lastly, attributes these pathogen-specific illnesses and costs to categories of food vehicles, based on outbreak data and expert judgment. The model ranks pathogen-food combinations according to five measures of societal burden. FIRRM incorporates probabilistic uncertainty within a Monte Carlo simulation framework and produces confidence intervals and statistics for all outputs. Gaps in data, most importantly in regards to food attribution and the statistical uncertainty of incidence estimates, currently limit the utility of the model. Once we address these and other problems, however, FIRRM will be a robust and useful Decision making tool.

●アプローチ方法が分かる図表等

Table 5: Rankings of Pathogen-Food Combination by Measures of Public Health Burden, Sorted by Hospitalizations, Using Default Model Settings[a]

Pathogen-Food Combination	Hospital-izations	Cases	Deaths	Cost[b]	QALY[b]
Salmonella nontyphoidal / Egg dishes	1	10	3	3	1
Norovirus / Molluscan shellfish	2	1	19	N.A.	N.A.
Norovirus / Multi-ingredient salads	3	2	24	N.A.	N.A.
Norovirus / Produce dishes	4	3	25	N.A.	N.A.
Campylobacter / Vegetables	5	6	12	4	4
Toxoplasma gondii / Unattributable food	6	25	1	N.A.	N.A.
Campylobacter / Milk	7	9	20	5	5
Norovirus / Fruits	8	4	33	N.A.	N.A.
Campylobacter / Chicken	9	12	28	7	6
Norovirus / Vegetables	10	5	38	N.A.	N.A.
Campylobacter / Produce dishes	11	17	34	8	9
Salmonella nontyphoidal / Vegetables	12	28	6	9	8
Listeria monocytogenes / Luncheon/other meats	13	160	2	1	2
Norovirus / Bakery	14	7	41	N.A.	N.A.
E. coli nonO157 STEC / Unattributable food	15	60	13	N.A.	N.A.

[a] Mean annual foodborne estimates for the United States, attributed to food sub-categories using outbreak data. The food category "Unattributable food" implies that there were not enough outbreaks of that pathogen in the outbreak dataset to attribute illnesses to food categories.

[b] Economic valuation and QALY loss are currently estimated in FIRRM only for four pathogens and therefore rankings by dollars and QALYs are "Not Available (N.A.)" for *Norovirus*, *Toxoplasma gondii*, and *E. coli* non-O157 STEC.

＜文献 No. １５＞

対象ツール：simple, spread-based, food safety risk assessment tool

文献タイトル：A simple, spread-based, food safety risk assessment tool

公表年月日：2002 年

筆者名：Thomas Ross, John Sumner

国・機関、依頼元	オーストラリア・タスマニア大学（Centre for Food Safety and Quality）、Australia's Dairy Research and Development Corporation, SafeFood NSW and Seafood Services Australia
ツール開発の目的	・Australia's Dairy Research and Development Corporation, SafeFood NSW and Seafood Services Australia の食品安全リスク評価のため ・公衆衛生学的なリスクの指標を算出するため ・様々な食品の食中毒を起こすリスクをスクリーニングし、より厳正なリスク評価を必要とする食品を判別するため ・食品の製造・加工・流通の過程において注意を払うべき危険因子を明確にするため
ランキング対象	食中毒を引き起こす危険因子に曝露する確率×その食品による食中毒の被害の規模×曝露の頻度やレベルによる食中毒被害の深刻度と確率
アプローチ方法（選択肢）	□ チェックリスト方式 □ スコアリング、ウェイト付け □ Decision tree ■ モデル（確率論的アプローチ） □ その他（　　　）
リスク判定対象（選択肢）	■ ポイント数、チェック数 □ レベル分け（優先度、重要度等） □ 汚染レベル □ 感染者数 □ 発症者数 □ 患者数 □ 死者数 □ DALYs または類似した指標（pseudo DALYs 等） □ その他（　　　）
必要なデータセット	・食中毒被害の深刻度 ・食事に含まれる危険因子の量により疾病が発症する可能性

	・一定期間内に危険因子に曝露する確率
工夫点	・質問内容や必要なデータを精査し、リスク評価の結果得られた予測数値が、実際の調査報告に基づく数値に近づくよう調整するような補正係数をモデルから排除し、よりリスク評価の手法の透明性を高めた ・多様なユーザーのフィードバックに対応してインターフェースを改善した ・スプレッドシート形式にしたことで、よりユーザーに注意すべき危険因子を把握しやすくした

●アブストラクト

The development and use of a simple tool for food safety risk assessment is described. The tool is in spreadsheet software format and embodies established principles of food safety risk assessment, i.e., the combination of probability of exposure to a food-borne hazard, the magnitude of hazard in a food when present, and the probability and severity of outcomes that might arise from that level and frequency of exposure. The tool requires the user to select from qualitative statements and/or to provide quantitative data concerning factors that that will affect the food safety risk to a specific population, arising from a specific food product and specific hazard, during the steps from harvest to consumption. The spreadsheet converts the qualitative inputs into numerical values and combines them with the quantitative inputs in a series of mathematical and logical steps using standard spreadsheet functions. Those calculations are used to generate indices of the public health risk. Shortcomings of the approach are discussed, including the simplifications and assumptions inherent in the mathematical model, the inadequacy of data currently available, and the lack of consideration of variability and uncertainty in the inputs and outputs of the model. Possible improvements are suggested. The model underpinning the tool is a simplification of the harvest to consumption pathway, but the tool offers a quick and simple means of comparing food-borne risks from diverse products, and has utility for ranking and prioritising risks from diverse sources. It can be used to screen food-borne risks and identify those requiring more rigorous assessment. It also serves as an aid to structured problem solving and can help to focus attention on those factors in food production, processing, distribution and meal preparation that most affect food safety risk, and that may be the most appropriate targets for risk management strategies.

●アプローチ方法が分かる図表等

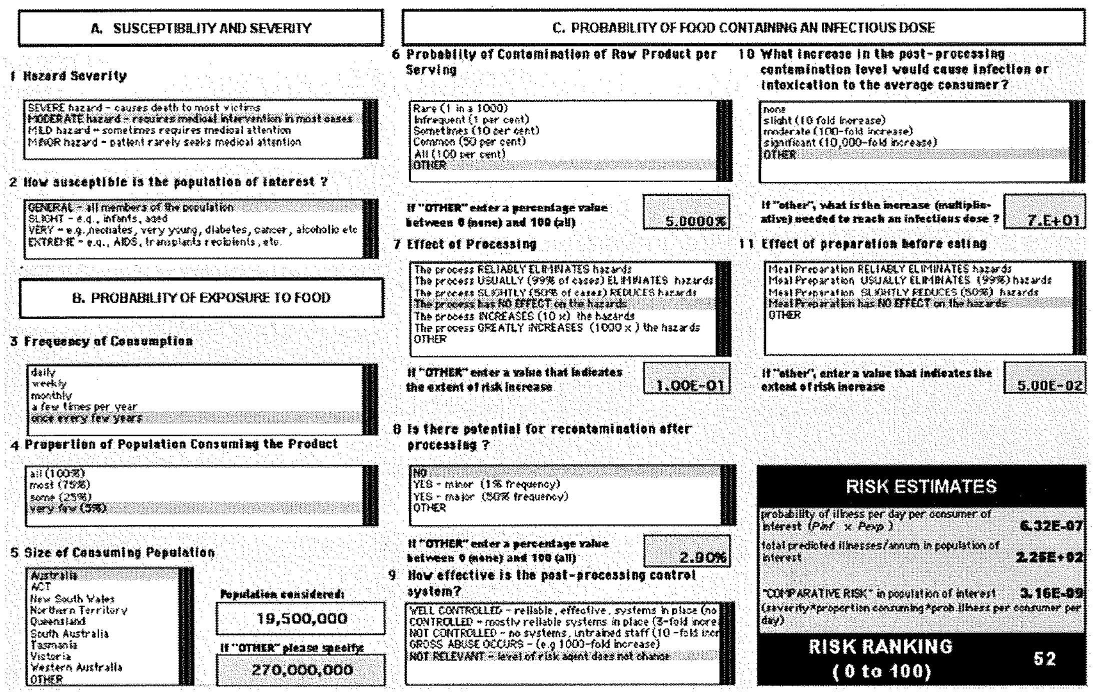


Fig. 1. User interface. The risk model user interface, using Australian populations as an example. Users mouse-click on their choice in each list box or provide numerical values as required. As choices are made and values entered, the risk estimates are automatically recalculated. The values shown are those used in Case Study 1.

＜文献 No. １６＞

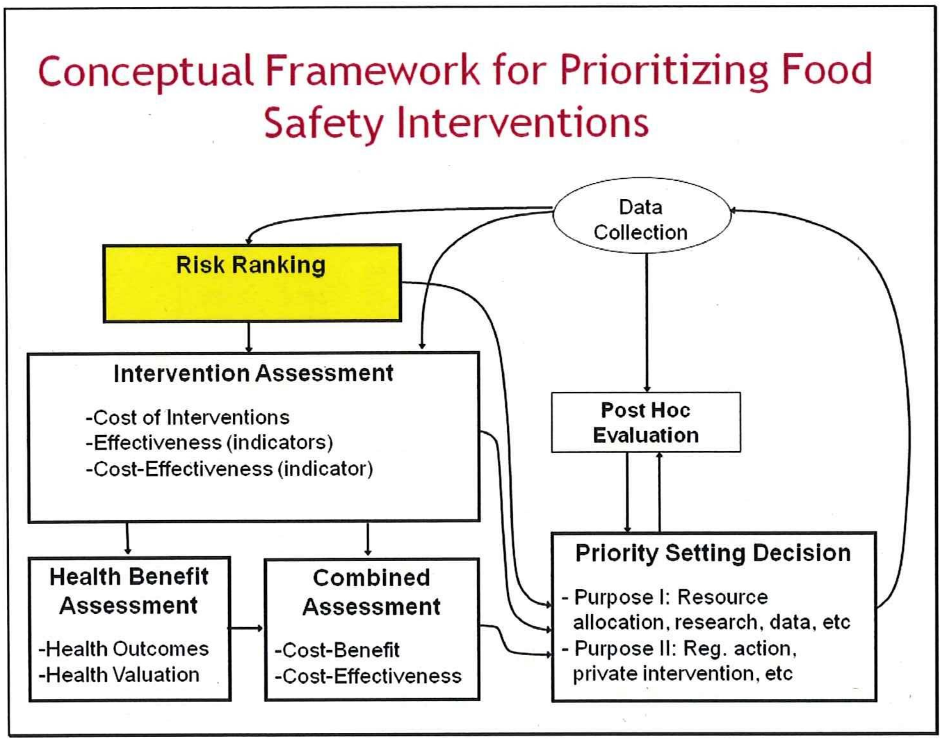
対象ツール：The Foodborne Illness Risk Ranking Model

文献タイトル／公表年月日：Ranking Pathogens in Foods for Broad Priority Setting／2005年8月18日

筆者名：Michael Batz

国・機関、依頼元	Food Safety Research Consortium
ツール開発の目的	公衆衛生上、最もリスクの高い食品を同定、優先順位付けを行う。政策担当者向け。
ランキング対象	食品-病原菌の組合せ×罹患率など健康被害の規模
アプローチ方法 （選択肢）	□ チェックリスト方式 □ スコアリング、ウェイト付け □ Decision tree ■ モデル（確率論的アプローチ） □ その他（　　　）
リスク判定対象 （選択肢）	□ ポイント数、チェック数 □ レベル分け（優先度、重要度等） □ 汚染レベル ■ 感染者数 ■ 発症者数 ■ 患者数 ■ 死者数 □ DALYsまたは類似した指標（pseudo DALYs等） ■ その他（QALY、被害額）
必要なデータセット	Incidence Estimates Health Valuation (Economic,QALY) Food Attribution (Based on outbreak dada, expert judgment, risk assessments and other data)
工夫点	不確実性はデータの拡充、不確実性分析、感度分析、重要性アセスメントにより処理した。

●アブストラクト


Conceptual Framework for Prioritizing Food Safety Interventions
Data Collection
Risk Ranking
Intervention Assessment
-Cost of Interventions
-Effectiveness (indicators)
-Cost-Effectiveness (indicator)
Post Hoc Evaluation
Health Benefit Assessment
-Health Outcomes
-Health Valuation
Combined Assessment
-Cost-Benefit
-Cost-Effectiveness
Priority Setting Decision
- Purpose I: Resource allocation, research, data, etc
- Purpose II: Reg. action, private intervention, etc

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●アプローチ方法が分かる図表等

Ranking by Dollars

	Pathogen-Food Combination	Cases	Hosps	Deaths	2001 $ (Mill)	QALY
1	Listeria monocytogenes / Luncheon - Other Meats	1,074	990	215	691.0	3,789
2	Listeria monocytogenes / Dairy - Milk	680	627	136	437.5	2,399
3	Salmonella nontyphoidal / Eggs - Egg Dishes	362,707	4,219	149	434.5	3,892
4	Campylobacter / Produce - Vegetables	488,604	2,623	26	346.6	2,165
5	Campylobacter / Dairy - Milk	380,995	2,045	20	270.2	1,688
6	Listeria monocytogenes / Luncheon - Luncheon Meats	355	327	71	228.2	1,252
7	Campylobacter / Poultry - Chicken	283,565	1,522	15	201.1	1,257
8	Campylobacter / Produce - Produce Dishes	213,764	1,148	11	151.6	947
9	Salmonella nontyphoidal / Produce - Vegetables	93,288	1,085	38	111.7	1,001
10	Listeria monocytogenes / Breads - Bakery	158	145	32	101.4	556
11	Escherichia coli O157:H7 / Beef - Ground Beef	23,838	703	20	88.5	765
12	Salmonella nontyphoidal / Poultry - Chicken	72,871	848	30	87.3	782
13	Campylobacter / Seafood - Seafood Dishes	119,243	640	6	84.6	782

These rankings are provided as an example. They are based on midpoint values and were computed in 2003 using default model settings, including a VSL of $2.2M and attribution based on outbreak data, among other assumptions. Only four pathogens are currently valued in dollar or QALY terms.

Ranking by Deaths

	Pathogen-Food Combination	Cases	Hosps	Deaths	2001 $ (Mill)	QALY
1	Toxoplasma gondii / Unattributable Food	112,500	2,500	375	--	--
2	Listeria monocytogenes / Luncheon - Other Meats	1,074	990	215	691.0	3,789
3	Salmonella nontyphoidal / Eggs - Egg Dishes	362,707	4,219	149	434.5	3,892
4	Listeria monocytogenes / Dairy - Milk	680	627	136	437.5	2,399
5	Listeria monocytogenes / Luncheon - Luncheon Meats	355	327	71	228.2	1,252
6	Salmonella nontyphoidal / Produce - Vegetables	93,288	1,085	38	111.7	1,001
7	Listeria monocytogenes / Breads - Bakery	158	145	32	101.4	556
8	Salmonella nontyphoidal / Poultry - Chicken	72,871	848	30	87.3	782
9	Salmonella nontyphoidal / Poultry - Turkey	69,342	807	28	83.1	744
10	Salmonella nontyphoidal / Poultry - Chicken Dishes	68,590	798	28	82.2	736
11	Salmonella nontyphoidal / Produce - Fruits	65,485	762	27	78.4	703
12	Escherichia coli nonO157 STEC / Unattributable Food	31,229	921	26	--	--
13	Campylobacter / Produce - Vegetables	488,604	2623	26	346.6	2,165

These rankings are provided as an example. They are based on midpoint values and were computed in 2003 using default model settings. Note that Toxoplasma and E coli STEC do not have enough outbreaks in the attribution dataset to estimate food-pathogen combinations.

＜文献 No. １７＞

対象ツール：swift Quantitative Microbiological Risk Assessment (sQMRA)

文献タイトル／公表年月日：swift Quantitative Microbiological Risk Assessment (sQMRA) model outline and manual／2006 年 12 月

筆者名：J.E.Chadon, E.G.Evers,

国・機関、依頼元	Netherlands. Food and Consumer Product Safety Authority.
ツール開発の目的	行政などのデータに基づいた食品の微生物学的リスク評価を迅速化するため、既存の QMRA ツールの簡便化を図る。
ランキング対象	記述なし
アプローチ方法（選択肢）	□ チェックリスト方式 □ スコアリング、ウェイト付け □ Decision tree ■ モデル（確率論的アプローチ） □ その他（　　）
リスク判定対象（選択肢）	□ ポイント数、チェック数 □ レベル分け（優先度、重要度等） □ 汚染レベル □ 感染者数 □ 発症者数 ■ 患者数 □ 死者数 □ DALYs または類似した指標（pseudo DALYs 等） □ その他（　　）
必要なデータセット	1. Portions consumed. 2. Portion size in gram. 3. Prevalence in retail. 4. Cfu per gram contaminated product. 5. Portions causing cross contamination. 6. Cfu's from portions to environment. 7. Cfu's from environment to ingestion. 8. (1) Portions prepared done. (2) Portions prepared half-done. 10. (3) Prepared raw. 9. (1) Cfu's surviving when prepared done. (2) Cfu's surviving when prepared half-done (3) Cfu's surviving when prepared raw. 10. ID50(number of cfu's). 11. Percent people infected who get ill.
工夫点	従来の QMRA に比べて簡略化(11 個のパラメーター)。 小売店でのコンタミはサンプルの重さ g と、1 g あたりの Cfu から％を算出。加熱処理に関しては done⇒０%, half-done⇒10%,

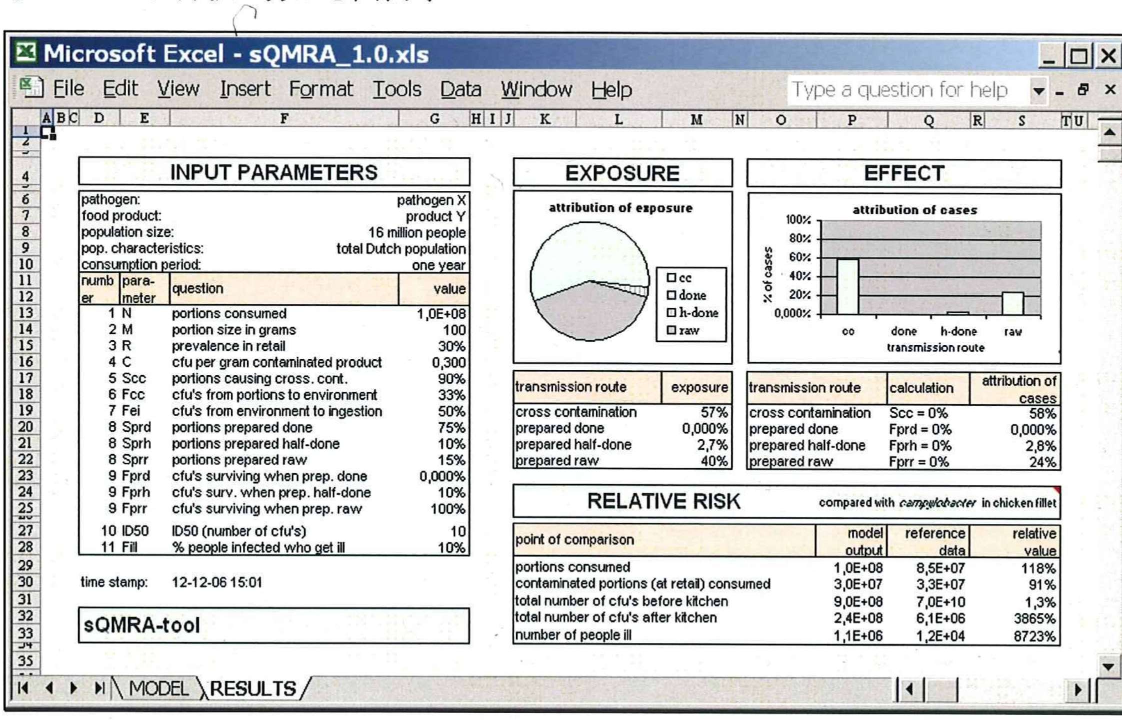
	raw⇒100%で算出。

●アブストラクト

Quantitative Microbiological Risk Assessment (QMRA) is a methodology to evaluate food related microbiological health risks. Mathematical modelling is used to describe a food production chain. These tools, together with available data, are used to calculate the presence of pathogens in a specific production chain, and the exposure to consumers. Dose-response models are used to estimate the number of illnesss.

Classic QMRA's are very time consuming due to complicated modelling and the collection of necessary data. To answer microbiological risk questions quicker, a tool is developed based on a simplified modelling approach. It is called sQMRA-tool (swift Quantitative Microbiological Risk Assessment tool) and is developed in Microsoft Excel XP. In the future, a risk assessment information system will be designed to store collected risk assessment data.

●アプローチ方法が分かる図表等



<文献 No. １８>

対象ツール：swift Quantitative Microbiological Risk Assessment (sQMRA)

文献タイトル／公表年月日：swift Quantitative Microbiological Risk Assessment (sQMRA)／2008年9月2日

筆者名：E.G.Evers, J.E.Chadon

国・機関、依頼元	Dutch Food Safety Authority
ツール開発の目的	行政などのデータに基づいた食品の微生物学的リスク評価を迅速化するため、既存のQMRAツールの簡便化を図る。
ランキング対象	Campylobacter and chicken, Salmonella and eggs, etc.
アプローチ方法（選択肢）	□ チェックリスト方式 □ スコアリング、ウェイト付け □ Decision tree ■ モデル（確率論的アプローチ）
リスク判定対象（選択肢）	□ ポイント数、チェック数 □ レベル分け（優先度、重要度等） □ 汚染レベル □ 感染者数 □ 発症者数 ■ 患者数 □ 死者数 □ DALYsまたは類似した指標（pseudo DALYs等）
必要なデータセット	1. Portions consumed. 2. Portion size in gram. 3. Prevalence in retail. 4. Cfu per gram contaminated product. 5. Portions causing cross contamination. 6. Cfu's from portions to environment. 7. Cfu's from environment to ingestion. 8. (1) Portions prepared done. (2) Portions prepared half-done. 10. (3) Prepared raw. 9. (1) Cfu's surviving when prepared done. (2) Cfu's surviving when prepared half-done (3) Cfu's surviving when prepared raw. 10. ID50(number of cfu's). 11. Percent people infected who get ill.
工夫点	従来のQMRAに比べて簡略化（11個のパラメーター、小売りから開始、推定値）

●アブストラクト

- Simplified modelling compared to full scale QMRA
  - 11 parameters
  - Starting at retail
  - Point estimates
- Preserve modelling of:
  - dose per portion
  - Cross-contamination and preparation in the kitchen
  - Dose response relationship
  - No. of human cases of illness as output
- sQMRA tool in Excel
- Risk assessment information system
- Relative risks
- Limited ability to evaluate effect of interventions

Combine or integrate with epidemiological results

●アプローチ方法が分かる図表等

INPUT PARAMETERS

pathogen:	pathogen X
food product:	product Y
population size:	16 million people
pop. characteristics:	total Dutch population
consumption period:	one year

number	parameter	question	value
1	N	portions consumed	1.0E+08
2	M	portion size in grams	100
3	Sr/+	prevalence in retail	30%
4	Cr/+	cfu per gram contaminated product	0.300
5	Scc/r	portions causing cross. cont.	90%
6	Fcc	cfu's from portions to environment	20%
7	Fei	cfu's from environment to ingestion	10%
8	Sprd/cc	portions prepared done	75%
8	Sprh/cc	portions prepared half-done	23%
8	Sprr/cc	portions prepared raw	2.0%
9	Fprd	cfu's surviving when prep. done	0%
9	Fprh	cfu's surv. when prep. half-done	1.0%
9	Fprr	cfu's surviving when prep. raw	100%
10	ID50	ID50 (number of cfu's)	200
11	Pill/inf	% people infected who get ill	10%

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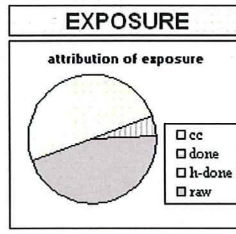
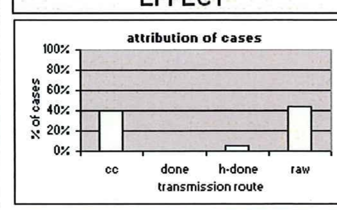
sQMRA-tool

EXPOSURE



transmission route	exposure
cross contamination	50%
prepared done	0%
prepared half-done	5.2%
prepared raw	45%

EFFECT



transmission route	calculation	attribution of cases
cross contamination	Scc/r = 0%	40%
prepared done	Fprd = 0%	0%
prepared half-done	Fprh = 0%	5.3%
prepared raw	Fprr = 0%	44%

RELATIVE RISK compared with QMRA *campylobacter* in chicken fillet

point of comparison	model output	reference data	relative value
portions consumed	1.0E+08	8.5E+07	118%
contaminated portions (at retail) consumed	3.0E+07	3.3E+07	91%
total number of cfu's before kitchen	9.0E+08	7.0E+10	1.3%
total number of cfu's after kitchen	3.3E+07	6.1E+06	535%
number of people ill	1.1E+04	1.2E+04	90%

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