U.S. FOOD & DRUG ADMINISTRATION

Human Foods Program

GenomeTrakr: Foodborne Pathogen Surveillance and Economic Return on Investment

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U.S. Food and Drug Administration

Human Foods Program

GenomeTrakr Meeting

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Study Goals

GOALS

- Provide updated WGS cost-benefit model for U.S. public health labs
- Develop a tool to assist labs in quantifying the economic value of their WGS activities

BACKGROUND

Alleweldt et al. (2021): cost-benefit of WGS in Europe & the Americas

- Costs = equipment, supplies, and staff time for WGS analysis
- Benefits = economic value of avoided illnesses & deaths

Study Methodology

COST SIDE

Cost elements: Equipment, consumables, and staff time dedicated to WGS.

Pathogens covered: *Salmonella enterica, Listeria monocytogenes,* STEC (*E. coli*)

Samples covered: Food, food production, environment, animals

Study period: 12-months (July 2024 – July 2025)

Data source: 23 labs in the GenomeTrakr network (18 state & university, 5 FDA)

Scaled to the network: Costs from the 23 reporting labs used to estimate total annual WGS costs across all 36 domestic GT labs

BENEFIT SIDE

How many illnesses does genomic surveillance avert?

Brown et al. (2021): 6.09 illnesses avoided for every 1000 isolates sequenced

What does each illness cost?

Hoffmann et al. (2025), per-illness health burden:

Listeria monocytogenes	**$2.5M**
Salmonella enterica	**$16.6K**
STEC (*E.coli*)	**$7K**

Results: Cost–Benefit

870
Estimated annual illnesses averted

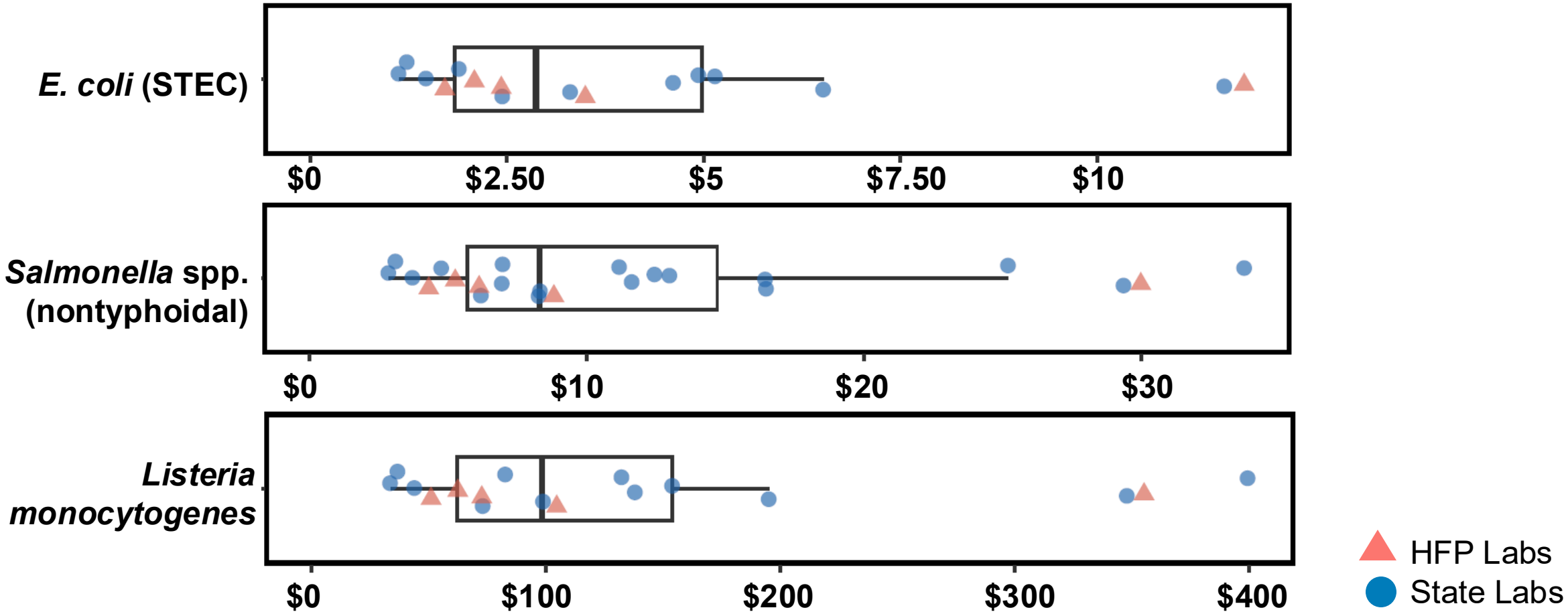
$53.7M
Estimated annual health costs averted

~31:1
Benefit-to-cost ratio

Pathogen	Illnesses Averted per yr.	Health Costs Averted per yr.	Benefit-to-Cost Ratio
STEC *(E. coli)*	274	$2.0 million	~4:1
Salmonella spp. (nontyphoidal)	579	$9.7 million	~12:1
Listeria monocytogenes	17	$42.1 million	~101:1
TOTAL (per year)	**870**	**$53.7 million**	**~31:1**

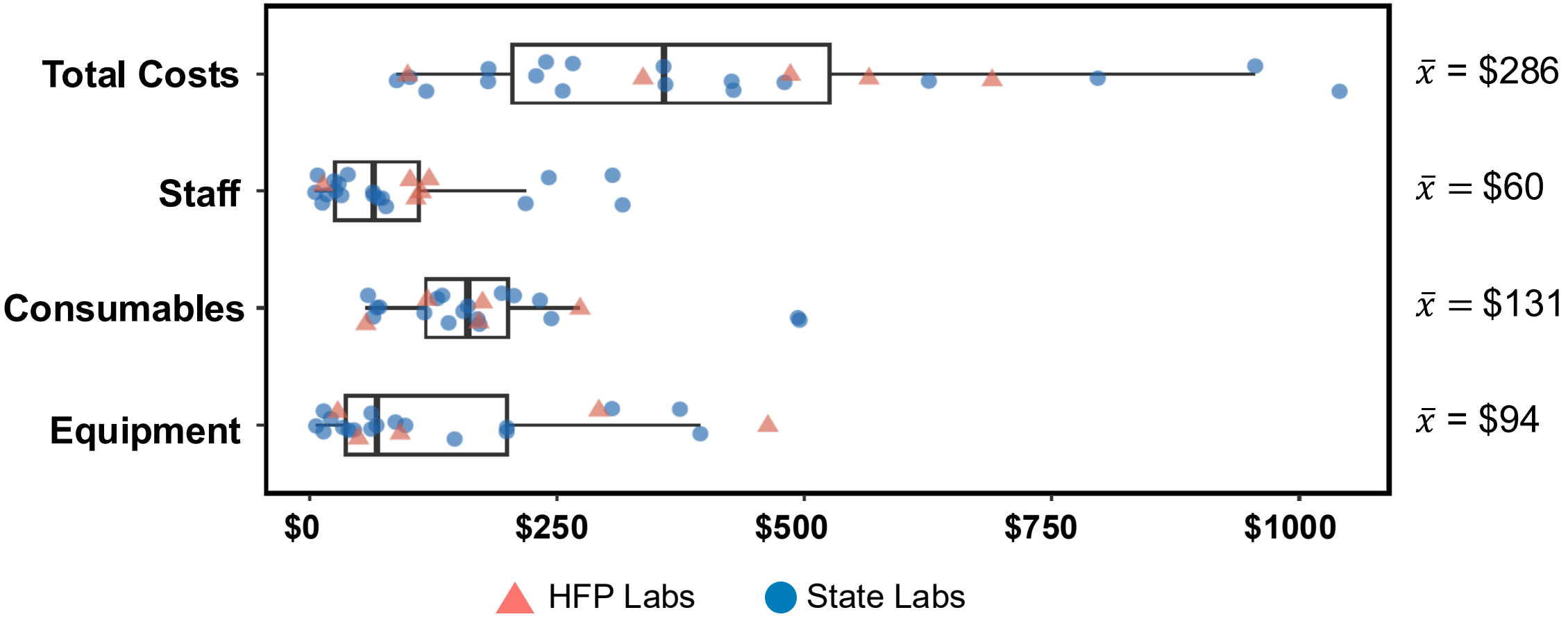
Results: Cost–Benefit (detail)

Health impact costs averted per $1 spent on WGS:



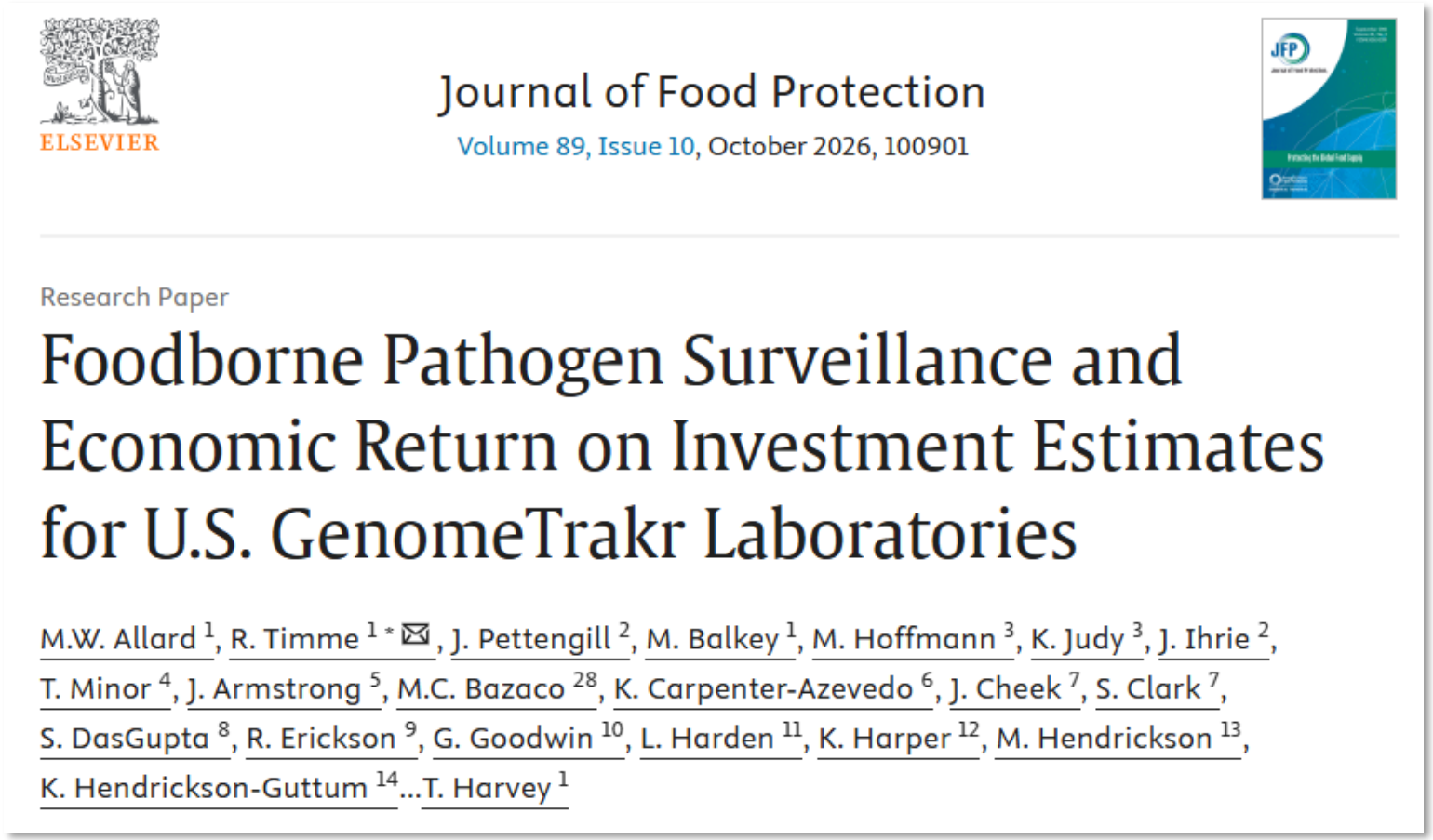
Results: WGS Costs (detail)

WGS analytical costs per sample (from 23 participating labs):



Outputs – 1

Study published in ***Journal of Food Protection***



ELSEVIER

Journal of Food Protection

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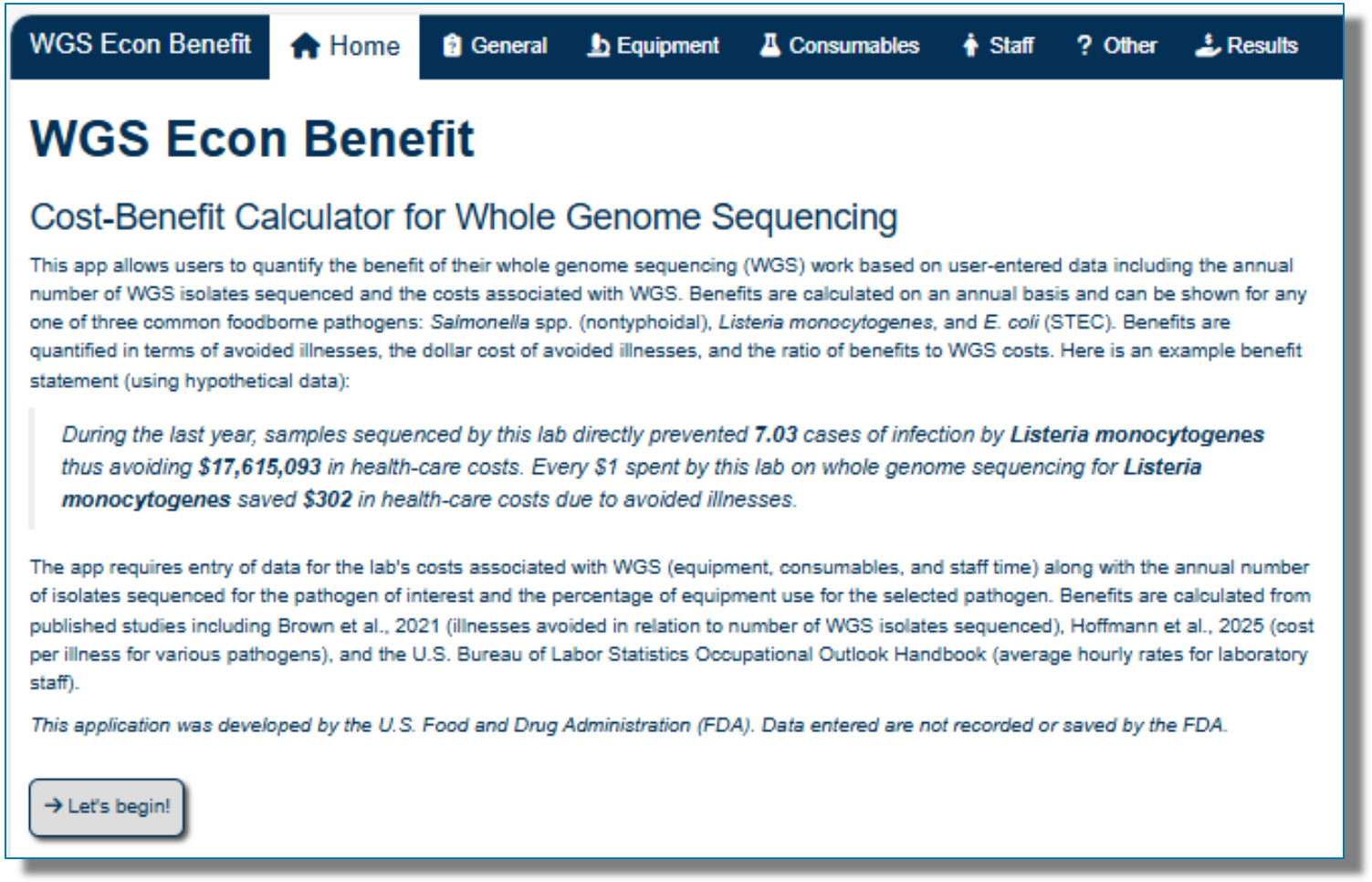
Research Paper

Foodborne Pathogen Surveillance and Economic Return on Investment Estimates for U.S. GenomeTrakr Laboratories

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Outputs – 2

Cost-benefit calculator app that labs can use to input/update their own cost data



Publicly available app

Code (GitHub)

Overview of the App

You enter:

Pathogen of interest
Salmonella spp. (nontyphoidal)
Listeria monocytogenes
STEC (*E. coli*)

No. of isolates sequenced (12 mo.)

Annual equipment costs
Annualized capital cost
Annual maintenance cost
Use rate (%) for selected pathogen

Annual consumables cost

Staff time (min./sample)
Technician staff
Professional staff
Overhead/indirect cost as % of payroll

Other costs

The app provides this output:

Pathogen selected: *Salmonella* spp. (nontyphoidal)

Benefit-to-Cost Ratio	Annual WGS Cost
6.35 to 1	**$46,836.00**

Every $1 spent by this lab on whole-genome sequencing for ***Salmonella* spp. (nontyphoidal)** during the past year saved **$6.35** in health care costs due to avoided illnesses.

During the last year, samples sequenced by this lab directly prevented **17.8** cases of infection by ***Salmonella* spp. (nontyphoidal),** thus avoiding **$297,419** in health-care costs.

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- Office of Integrated Food Safety System Partnerships

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Selected References

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