Microbial Genomic Sequencing in Public Health Laboratories

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Division of Food Safety

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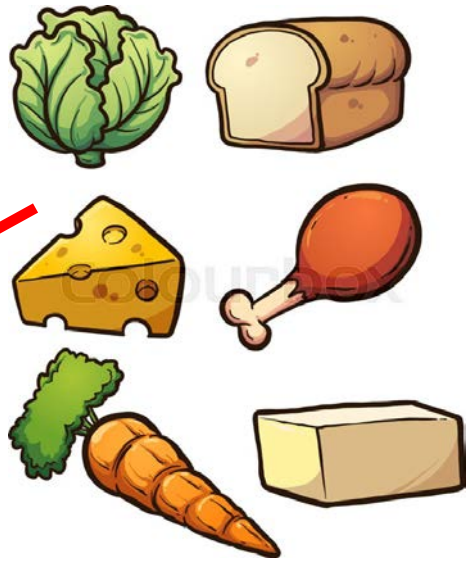
Agnostic Sample Origins

Clinical Samples

Pathogens



Food Samples

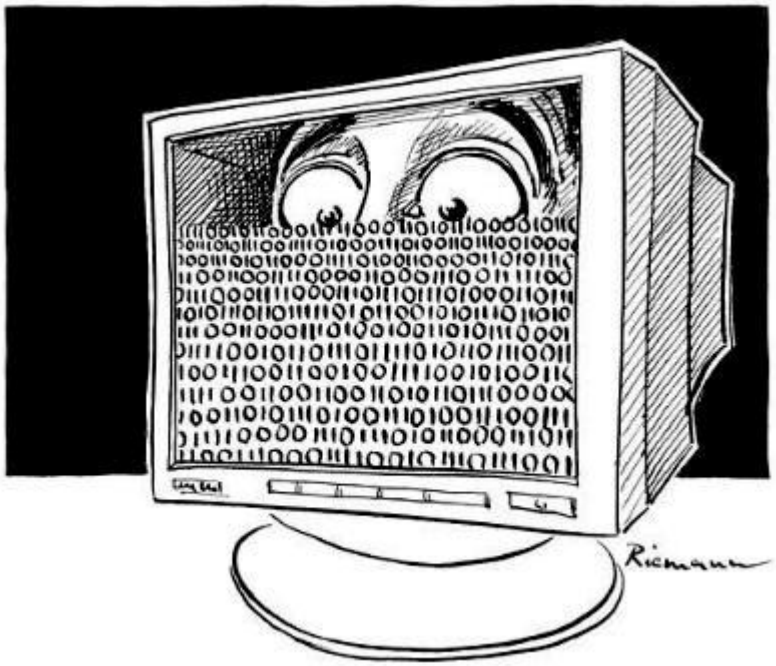
Environmental Samples

Obtaining The Sequence

- **Cultures vs Culture Independence**
  - Culture Dependence = Strain Subtyping
  - Culture Independence = Sample Screening
- **Molecular Biology Training**
  - Technique Driven Laboratory Protocols
  - Troubleshooting Expertise
- **Reducing Time Requirements**
  - Automated Sample Preparation
  - Efficient Sample Batching

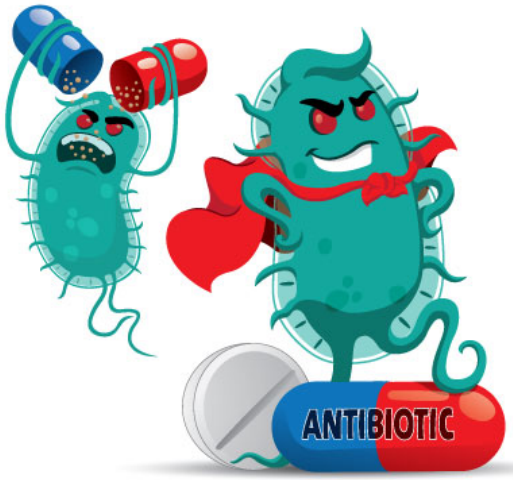
Data Management

- **Effective Data Management**
  - Large file sizes
  - Consistent Naming Schemes
  - Centralized Storage
  - Back-up Redundancy
- **Analysis Expertise**
  - Complex Workflows
  - Computational Proficiency
  - Automation



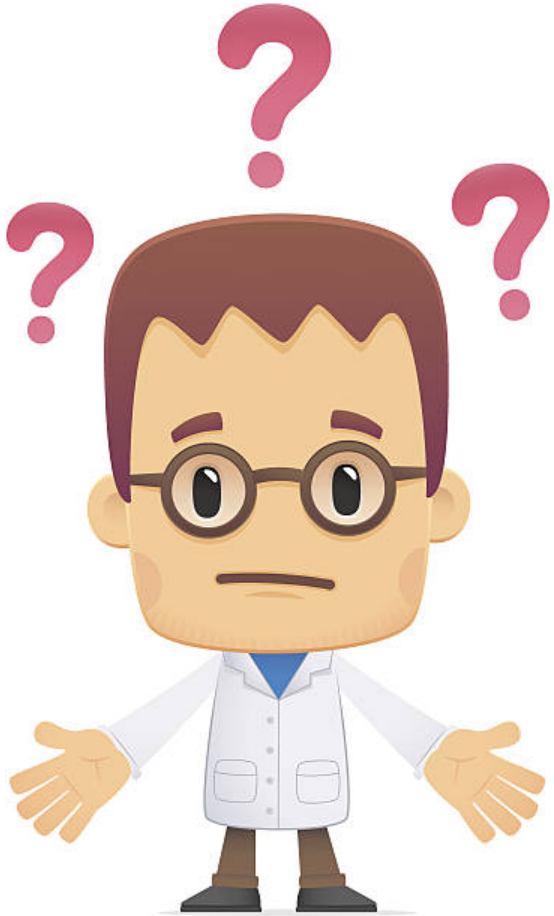
Replacing The Bench

- **Culture Independent Screening**
  - Species Identification
- **Serotyping**
- **Pathogenicity Detection**
- **Antimicrobial Resistance**
- ***In silico* PCR**
- **Outbreak Detection**



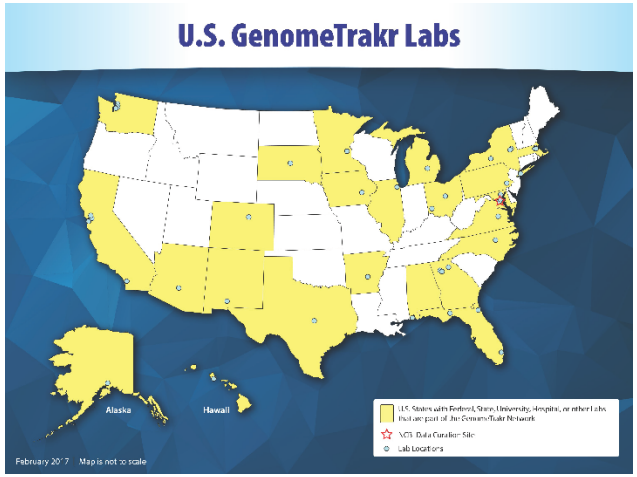
Dearth of Experience

- **Interpretation of Results**
  - Easy Reports
- **Analytical Expertise**
  - Bioinformatics
- **Universally Accepted Workflows**
  - Uniformity across networks
- **ISO 17025 Accredited Methods**
  - Wet-lab and Analysis Separate?



National Networks

- **GenomeTrakr (FDA)**
  - Food and Environmental
  - Independent Analysis Protocols
- **PulseNet (CDC)**
  - Clinical
  - BioNumerics
- **Harmonization**
  - Working Toward Same Goal



20 years of PulseNet USA
1996 - 2016