FOOD SAFETY
ENSURING A STRONG SURVEILLANCE SYSTEM

UNMET NEEDS

• **Surveillance:** PulseNet is a national laboratory-based surveillance system that utilizes DNA fingerprinting of bacteria to detect clusters of foodborne disease. PulseNet prevents over 270,000 illnesses annually and saves greater than a half a billion dollars in medical costs and lost productivity every year. Continued resources are needed to ensure that public health laboratories can perform specialized testing to support this critical network.

• **New Technology:** Sustained funding is critical for implementation of new technologies, such as whole genome sequencing (WGS), in public health laboratories. Modern technology has the ability to replace costly and inefficient traditional methods and more quickly and efficiently identify outbreaks. In conjunction with food industry actions, such efforts can lower rates of human illness.

• **Accreditation:** Accreditation attests to the competency and credibility of both laboratory staff and the test results they generate. Acquiring and maintaining laboratory accreditation requires extensive commitments of time and money. Laboratory customers often require accreditation to a recognized standard such as ISO 17025 and government laboratories must be prepared to meet this need.

BACKGROUND

The US Centers for Disease Control and Prevention (CDC) estimates that foodborne disease causes approximately 48 million illnesses (1 in 6 Americans) annually, accounting for 128,000 hospitalizations and 3,000 deaths in the US.¹

Public health laboratories perform specialized testing on tens of thousands of foodborne pathogens from sick people, detect and respond to foodborne outbreaks, and test food for pathogens, chemicals and other contaminants that can threaten our health.

PulseNet, the national laboratory-based surveillance system for foodborne pathogens, prevents an estimated 270,000 illnesses every year from the three most common causes of foodborne illness: *Salmonella, E. coli O157* and *Listeria monocytogenes*.

A recent economic evaluation of PulseNet activities from 1994 to 2009 shows the exceptional cost-effectiveness of this network.² PulseNet costs public health agencies $7.3 million annually, but it provides an economic benefit about 70 times greater than its cost by quickly identifying problems in the food supply that would not otherwise be recognized. This fast detection of problems leads to prompt actions to stop foodborne outbreaks, prevent additional illnesses, and save lives. As a result, an estimated $507 million is saved every year in medical costs and lost productivity.

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PULSENET AT WORK
In 2016, PulseNet celebrated its 20th anniversary. For two decades, the network has been the premiere early warning system for foodborne disease outbreaks. PulseNet continues to expand in scope and utility by engaging a broad set of partners, by targeting emerging pathogens, by modernizing to use WGS and by including strains from animal and produce commodities. For example:

- PulseNet was critical in identifying a *Listeria monocytogenes* outbreak associated with prepackaged caramel apples.
- WGS testing revealed that *Listeria* found in the apple-packing facility was highly related to the outbreak strain identified in the case patients.
- If all public health laboratories been using WGS technology at the start of the outbreak, the scope and source of the caramel apple outbreak would have been identified faster.

PulseNet relies on bacterial isolates obtained by culturing the disease-causing pathogen. Without these isolates, linking related cases of human illnesses becomes nearly impossible. A rising number of physicians are choosing culture-independent diagnostic tests (CIDT) for their patients. CIDTs are attractive to physicians in that they provide rapid results and may be less costly. However, the public health impact of CIDT implementation without reflex culture includes:

- No ability for PulseNet to detect outbreaks.
- Increased costs of foodborne outbreak investigations.
- Reduced antibiotic resistance monitoring (AMR initiative), negatively affecting patient treatment and enabling drug-resistant bacteria to spread.
- Diminished ability to attribute pathogens to food commodities, e.g., *E. coli* to ground beef.

MONITORING OUR FOOD SUPPLY
Laboratory accreditation has been identified as a critical element for ensuring the integrity and accuracy of food testing results. Benefits of laboratory accreditation include increased laboratory capacity and enhanced technical capabilities, less re-testing resulting in lowered costs and fully actionable results. All of the above will lead to earlier identification of and regulatory response to adulterants in the nation’s food supply. An increase in the number of accredited governmental laboratories and broader acceptance of laboratory data will advance the goal of a nationally integrated food safety system.

Accreditation had a direct impact on public health action in South Carolina:

- As part of routine food surveillance activities, the South Carolina Department of Health and Environmental Control (DHEC) began testing frozen dessert products for *Salmonella* and *Listeria*.
- DHEC detected two positive results for *Listeria monocytogenes* in retail ice cream samples.
- Collaboration with the state in which the product was manufactured quickly established a link between outbreak cases and the positive ice cream samples, resulting in a recall of a well-known ice cream brand.
- The outbreak involved 10 illnesses, including three deaths; however, early detection of the outbreak source prevented countless additional illnesses and likely saved lives.

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