# Summary & PowerPoint

**Food Safety Disruptors - Emerging Technologies and the Baking Industry**

Regulations and customer requirements are moving targets that cause greater complexity in defining what is considered successful food safety. Emerging technologies like Blockchain and IoT solutions can help hold other departments and companies accountable, thus ensuring food safe product and ingredients.

Blockchain is a new and powerful tool for traceability. Blockchain can be used for tracing specific batches as they move through the production process. While it is currently used in the Produce and Seafood industries, it's use in bakeries and other grain based industries has not yet been proven. Where does the technology currently stand and where is it heading?

How suitable is IoT for baking environments? IoT is a proven means of providing real time data for immediate decision making. IoT is simple, low cost, and provides immediate results that are useful across all departments.

Ultimately, these emerging technologies have the power to completely transform traditional Food Safety.

**Learning Objectives**

- Define Food Safety Success in a New Era

- Understand how Blockchain Fits into Bakeries

- Decide IoT's Place in their Food Safety Program

**Presenter**
Robert Burgh, Nexcor Food Safety Technologies

**Presentation Time**
Monday, February 25, 2019
2:10 pm - 2:45 pm

**Session**
Breakout 1

# Food Safety Disruptors
## Emerging Technologies
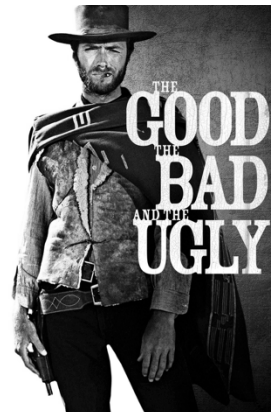## & the Baking Industry

Robert Burgh

President

Nexcor Food Safety Technologies

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# Food Safety Disruptors

- **The Good:** Useful Technologies and Protocols
- **The Bad:** Getting Compliance Buy-In from Everyone in the Company
- **The Ugly:** Misunderstanding, Poor Science, Transparency Gone Wrong

DISRUPTOR | definition in the Cambridge English Dictionary
https://dictionary.cambridge.org/us/dictionary/english/disruptor ▼
**disruptor**. noun [ C ] uk /dɪsˈrʌp.tə ʳ/ us /-t̬ɚ/ a person or thing that prevents something, especially a system, process, or event, from continuing as usual or as expected: endocrine/hormone **disruptors**.

# Defining Food Safety
# in a New Era

- Food Safety has changed significantly in the past 2-3 decades
- Regulations
- Current Practices and Trends
- Customers and Social Media
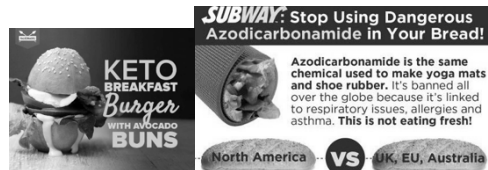- Technological Innovations



# The State of Food Safety:
# Outside Pushbacks

What is "Food Safe"?

**Regulations**

**Social Media**

**Burnt Seeds = Insects**
**Old Dough = A Mouse or Droppings**

**Consumer Perceptions**

# The State of Food Safety:
# Outside Pushbacks

## Increased regulations and outside requirements

- Document what didn't used to require documenting
- Allergens – Who tracks them past "make-up"? (Its coming)
- Sesame Seeds – Future allergen   (~300,000 people in USA)



Yin + Yangster by Laura Yang

**Seven Principles of HACCP**
1. Conduct Hazards Analysis
2. Determine the Critical Control Points
3. Establish Critical Limits
4. Establish Monitoring System
5. Establish Corrective Action
6. Establish Verification Procedures
7. Establish Documentation

Raghavendra Adiga

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# The State of Food Safety:
# Outside Pushbacks

## Social Media

- Increased scrutiny
- Uninformed have impactful opinions
  - "Pink Slime"
  - I've Been Poisoned . Com
  - "1 in 10 young adults wants to see dihydrogen monoxide banned from foods and beverages."
  - Scope and causes of actual outbreaks

# Then vs. Now

## Jack in the Box (1992):
Consequences –
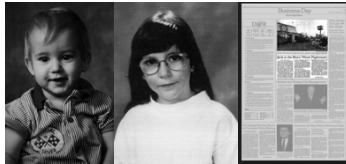


- Children experienced brain damage, coma, hemorrhaging, and death.
- National attention until newspapers and local stations stopped running the story.
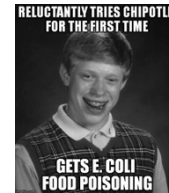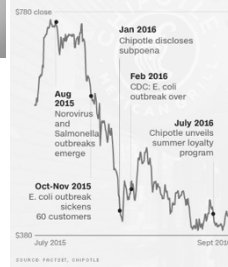- People died

## Chipotle: (2015)
Consequences –

- No deaths



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# The State of Food Safety:
# Inside Pushbacks

Loss of Talent, Decreased Stability
- The age of people retiring from the jobs they started at is ending.
  - Trained people are hard to come by
  - After training people are hard to keep



Only One Skilled Trade Worker Is Entering The Workforce For Every Three That Are Retiring Or Leaving
(U.S. Department of Commerce).

# The State of Food Safety: Inside Pushbacks

What is the purpose of your company?  TO MAKE MONEY

- **Poor Communication** across Departments and Job Roles
  - Importance of setting and following protocols
  - Resources required for protocols
  - Consequences:
    - of poorly defined protocols
    - of not following protocols
  - Inconsistent Enforcement
  - Lack of "Buy-In"



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# The State of Food Safety: Inside Pushbacks

- Not Understood by the C-Suite
- Food Safety is not considered by most lean transformation teams
- Assumption that Food Safety does not make money
- Assumption that Food Safety is an all or nothing approach
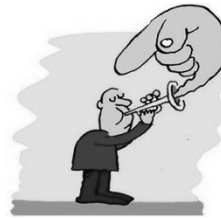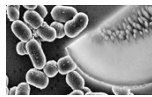
 = Food Safety     Food Safety =

# The Good Disruptors

Moving Food Safety Forward:

- Communication
- KPIs (Key Performance Indicators)
- Technologies
  - Record Keeping and Execution
  - IoT (Internet of Things)
  - Blockchain

# Communicating Risk Mitigation

- What are the Risks? What causes them?
- What is needed to mitigate the Risks? (This cannot be based on wild estimates)
- Teach all departments to *value* Food Safety the same

*Food Safety and Maintenance are needless costs! No value!*

*I **never** miss an oil change for my car! Duh!*

## Approaching KPIs

- Simple is best – as few KPIs that can get the job done
    - Definitions that are short and clear
    - Measurements that match actions and requirements
- Prioritize:
    - Risk Mitigation
    - Continuous Improvement
    - Resource Planning
- The KPIs must be as auditable as everything else in the Food Safety plan
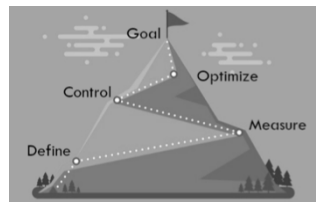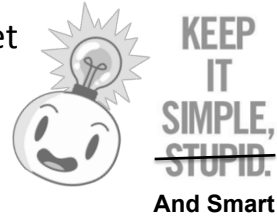
## Risk Mitigation: Use KPIs to Demonstrate…

Plant Actions to Reduce Complaints

- Being Proactive
- Training (just because you can't see it doesn't mean its not there)
- Execution of Food Safety Plan
- Verification and Validation of Food Safety Plan
- Continuous Improvement
- Employee Empowerment
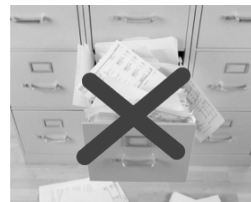
# Technological Innovations

Blockchain:

- Why is it so important?
- What does it take to fit into Food Safety and Baking?

By design, a blockchain is resistant to modification of the data. It is "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way"
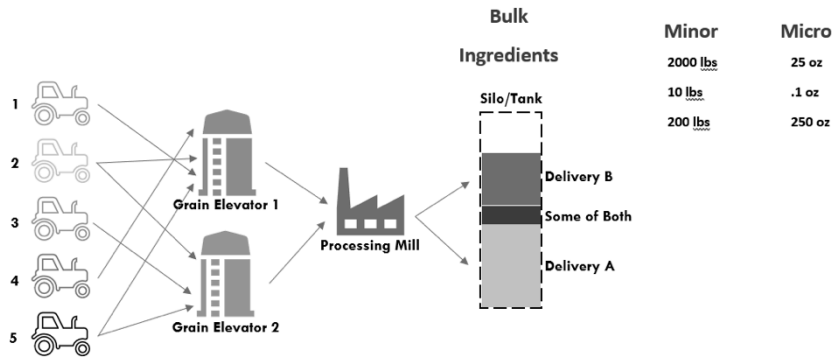https://en.wikipedia.org/wiki/Blockchain



# Blockchain

Blockchain in Practice  - Tuna Fish

- From boat to catch to processing to package
- "An RFID Tag is attached to each fish when it is brought on board"

# Blockchain

Blockchain in Practice: Bakery



# Blockchain

How to use Blockchain in Bakeries

Issues to Overcome:

- "Lot vs Batch"
- Mixing of "Lots"
- Bulk vs Minor vs Micro Lots
- Clean "Lot Breaks"

| Example Whole Wheat Bread |
| --- |
| Whole Wheat Flour |
| Water |
| Sugar |
| Oil |
| Wheat Gluten |
| Molasses |
| Cultured Whole Wheat |
| Salt |
| Yeast |
| Vinegar |

# IoT-More Than Just Sensors!

**Then:**                                **Now:**
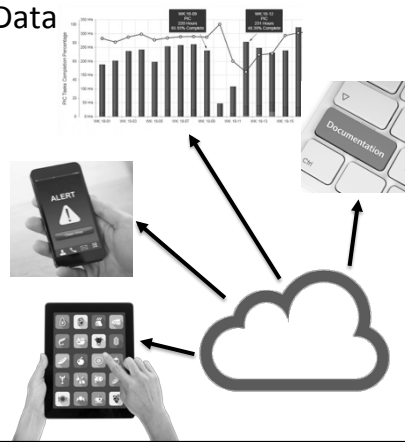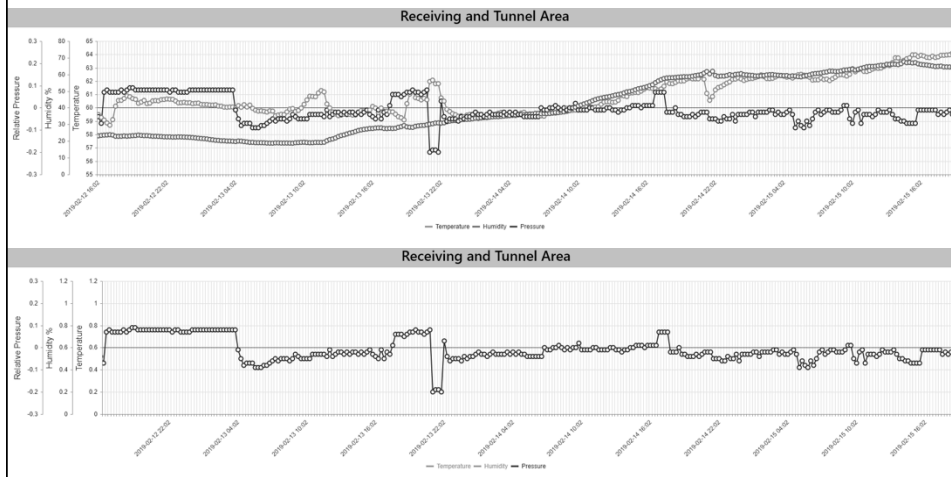


- Real-Time Data
- Real-Time Actions
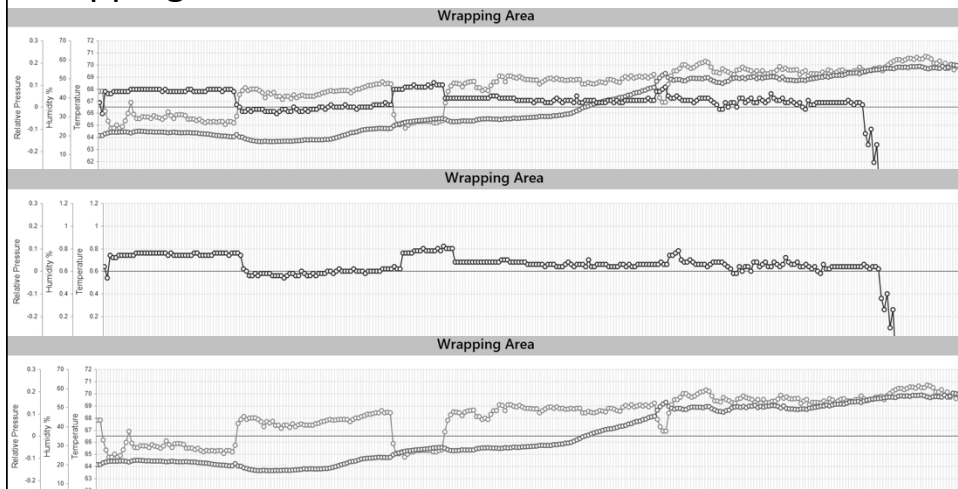
- Equipment
- Sensors
- Devices
- Anything

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# IoT-Sensors
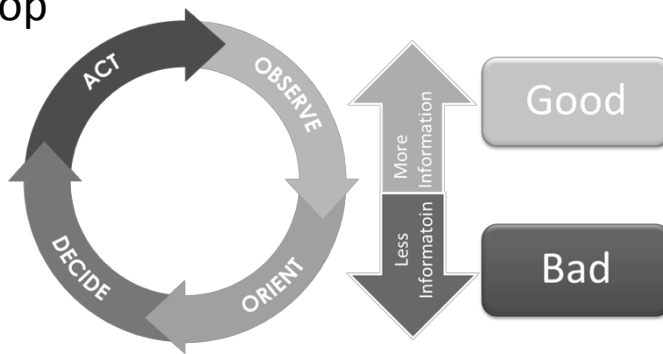
## Receiving – What Does It Mean?

# IoT-Sensors

## Wrapping – What Does It Mean?



# One Last Thought

The **OODA** Loop
- **OBSERVE**
- **ORIENT**
- **DECIDE**
- **ACT**



Food Safety for Modern Times.