



# A New Spin: Adapting SpinDx to Enhance Biosurveillance in Low-Resource Environments

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## Problem

Lack of standardized, sustainable, global biosurveillance systems

Inconsistencies in key disciplines impairs modern biosurveillance initiatives

Lack standardized data collection



Laboratories are poorly equipped with limited access to reagents



Laboratory diagnosticians are unable to critically analyze samples



- Clinicians cannot detect and diagnose infectious diseases clinically
- Are unable to collect the most appropriate diagnostic sample

## Approach

### Identifying targets

- Collect reliable surveillance data on USDA and HHS select agents
- Include common human and animal diseases to enhance sustainability

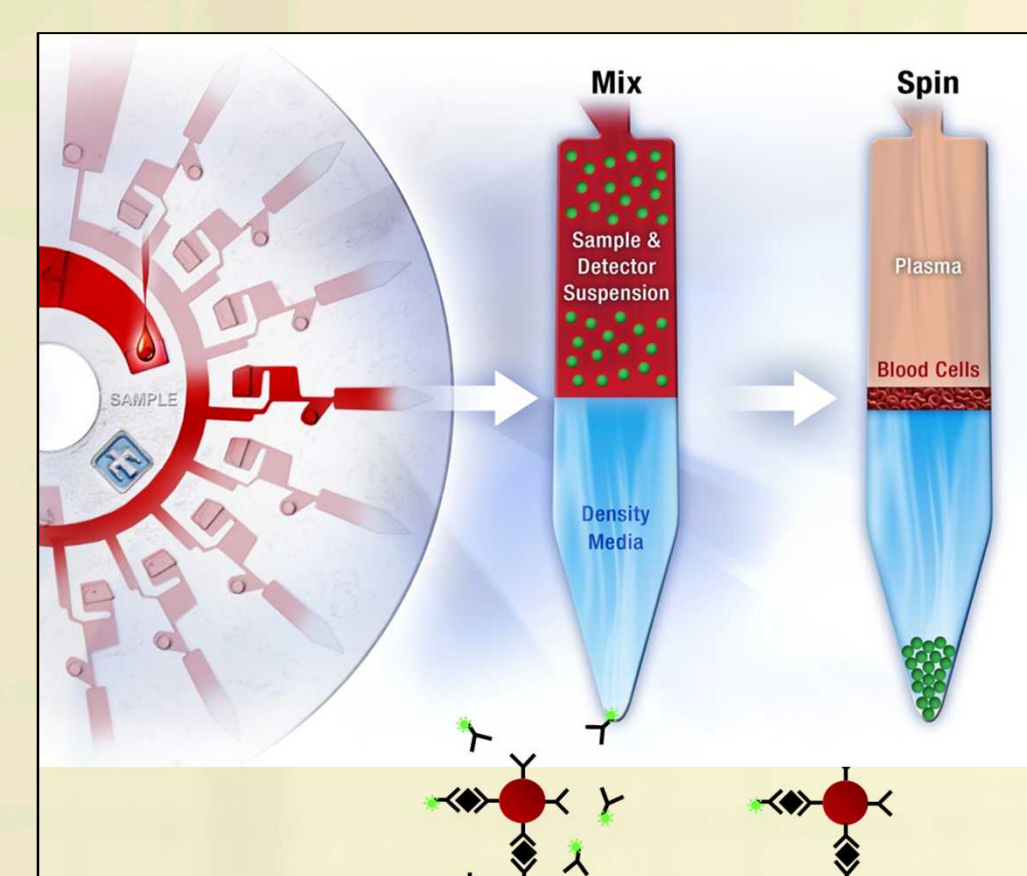
Oral Erosions	Pneumo-enteritis Syndrome
Foot and mouth disease virus	Pestes des Petits Ruminants virus
Alcelaphine herpesvirus-1	Foot and mouth disease virus
Bovine Viral Diarrhea virus	Mycoplasma mycoides capricolum
Infectious bovine rhinotracheitis virus	Sheep and goat pox viruses
Lumpy skin disease virus	Pasteurella hemolytica
Bluetongue virus	Bluetongue virus

### Oral erosions syndromic panel

	Blood (single)	Serum (single)	Blood (multi)	Serum (multi)
BVDV	100 pg/mL	108 pg/mL	110 pg/mL	125 pg/mL
Blue tongue	44 pg/mL	41 pg/mL	49 pg/mL	48 pg/mL
PPRV	8 pg/mL	4 pg/mL	10 pg/mL	10 pg/mL
FMDV	900 pg/mL	955 pg/mL	844 pg/mL	890 pg/mL
Pastuerella	5 copies	3 copies	5 copies	4 copies
Mycoplasma	15 copies	8 copies	21 copies	11 copies

For multiplexed assays, background for antigen tests is 100 ng/mL of irrelevant proteins and background for molecular tests is 1 ug of irrelevant nucleic acids

### Underlying technology



SpinDx uses a novel sedimentation approach to conduct bead-based sandwich immunoassays.

## Building Capacity for Biosurveillance

Multifactorial problem requires novel solution



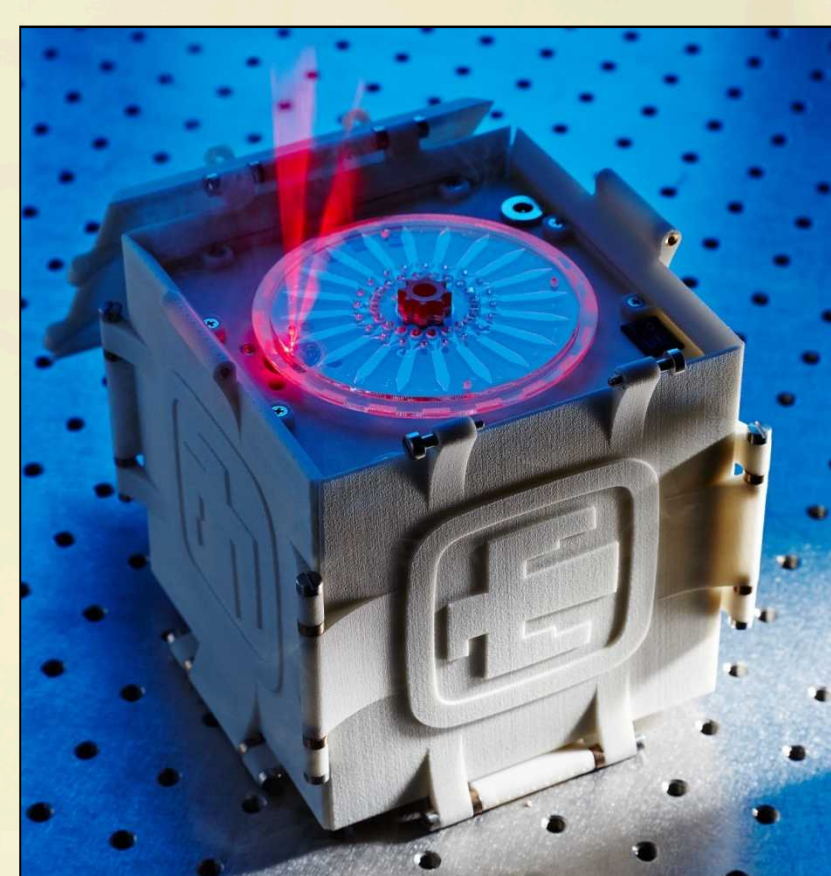
- Astute clinicians are essential to existing surveillance efforts and standardizing training for clinicians globally is cost prohibited
- Diagnosticians with the ability to integrate clinical presentation with laboratory testing are vital but require advanced training

*Must develop a solution that can circumvent the role of the clinician and augment laboratory capabilities to collect reliable infectious disease data that can feed into biosurveillance systems*

## A Sustainable Solution

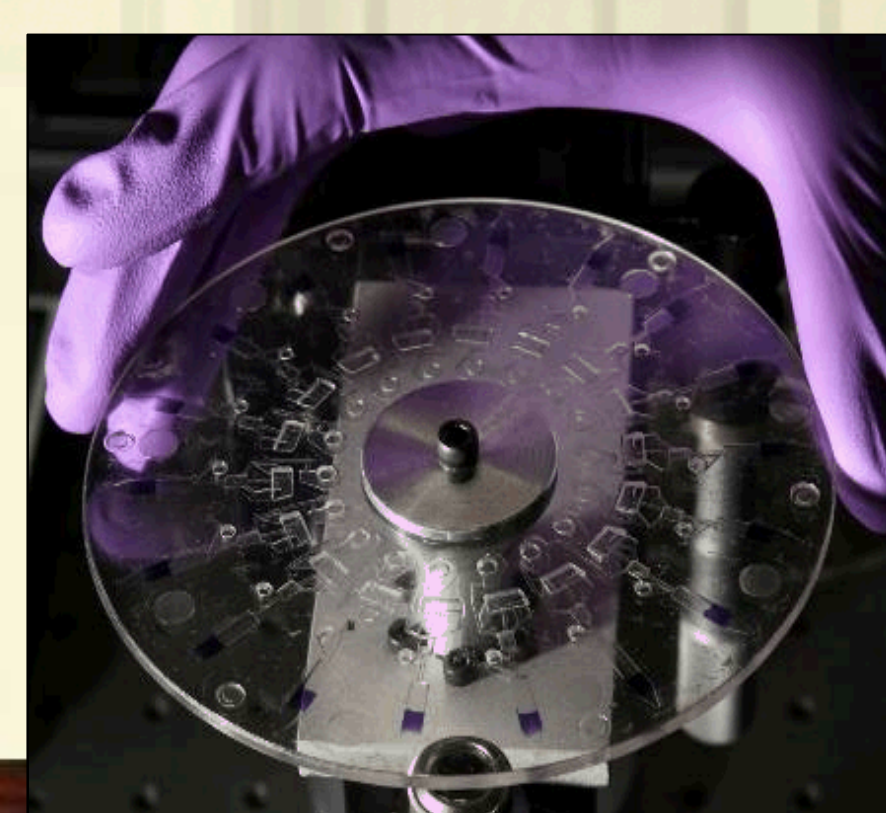
### Targeted multiplexing based on syndromes

- Most clinicians can identify clinical symptoms
- Create a laboratory based multiplex system that is targeted based on clinical symptoms



- Small size and cost (< \$1000 for the reader, <\$2 for disk)
- Analytical sensitivity (>10-100-fold better than most commercial ELISAs)
- Fast (sample-to-answer in <15 min)
- No sample prep required

A lab-on-a-disk prototype platform with the potential to run up to 64 simultaneous assays in a matter of minutes using a single drop of blood, saliva, urine, or other sample.



## Syndromic SpinDX: Global Biosurveillance Solution

*Mitigating existing, emerging, and re-emerging biological threats requires an understanding of the incidence of infectious diseases globally*

- Eliminate reliance on clinicians to provide accurate clinical diagnoses
- Simplified diagnostic sampling
- Eliminate the need for sophisticated laboratory technologies that are resource intensive
- Low cost and field deployable

*Potential to standardize data collection and provide a solution to create a comprehensive biosurveillance system*