Swine Diagnostic Data Standardization Project

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Investigators and Institutions

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$716,000; 15 month, Infrastructure Development Project
Funded via Swine Health Information Center & USDA
Commenced fully in July 2016

* Dr. Martin is providing the primary technical guidance and support to this project. Mike is a nationally recognized leader and expert in veterinary diagnostic informatics and HL-7 messaging.
Objective

*Establish and adopt* universally recognized *diagnostic data standards and systems of electronic messaging* necessary for *transcending* inter-laboratory *connectivity* and the next generation of *web-based swine health information management tools* for both non-program disease and program disease applications.
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VDL Case Reports

VDL Specific Lab Information Management Systems

*Electronic Packages of Results from VDL Records

Any number of Database Applications
• Read
• Archive
• Analyze
• Summarize

End User

*Focus = Electronic Packages of Results from VDL Records
• Built-for-Purpose (Ability to Contain Information Needed)
• Standardized (Identifiers, Codes, Order & Nomenclature)

Human Readable File

Electronic Data
Why Needed?

• Standardization necessary to make swine veterinary diagnostic records (results) truly fit for the digital era

• Enhances utility in any number of database applications
  • Electronic packages of VDL results are the same regardless of source

• Aggregate, search, transmit, analyze, or summarize information
  • Operation specific, practice/system specific, regional, national
  • Routine management, continuity of business, or emergency response
End User

- Animal information management technologies for agriculture agency
  - State or Federal

- Private enterprise
  - Vet clinics, production systems, multi-entity area regional swine health monitoring efforts

- Academic study/research purposes
Diagnostic Information Standards

- Human Diagnostics → long existed & extensively used
- Veterinary Diagnostics → limited to finite number of reportable disease applications

**Good News:**
- Structure for universal standards exists
  - LOINC (Logical Observation Identifiers Names & Codes)
  - OIDs (Object Identifiers)
  - SNOMED Codes (Systemized Nomenclature of Medicine)
  - HL-7 (Health Level 7) Message Structure
- NAHLN labs have experience using such standards
- Maintenance is relatively minimal once established and being used on routine basis

**Bad News:**
- Not broadly developed or used in veterinary diagnostic medicine
- ↑ Upfront work (Informed, Built for Purpose, Highly Collaborative Development & Implementation)
How Can Labs Communicate Results?

• **LOINC**
  - Logical Observation Identifier Names and Codes
  - Common language for clinical and laboratory observations
  - Labs can map local tests to a LOINC which allows a third-system to recognize and aggregate test data

• **Health Level 7 (HL7)**
  - HL7 is a standard used to message data electronically
  - Standards provide a framework for exchange, integration, sharing and retrieval of electronic information
  - Allows for interlab communication
Scope of this Project

• **Standardizing All Results Reported in Electronic VDL Record**
  • Nomenclature, Order, & Components Included
  • Built For Purpose VDL Record (Inclusive)

• **Submission Level Identifiers**
  • Submitter, Clinic, Owner, Site, Farm Type, Flow, Lot, Reason for Test, etc.

• **Animal or Sample Level Identifiers**
  • ID #, Age, Location, Parity, etc.

• **Test Results**
  • Components included in results for each assay/evaluation conducted
  • Swine Dx Only
Methods & Deliverables

- Define a complete list of submission/animal level identifiers, diagnostic assays, test results and analytical/interpretive summary reports
  - Tier I
    - Submission/premises/animal level identifiers and infectious disease test type
  - Tier II
    - Swine associated analytical test results
  - Tier III
    - Swine disease investigation interpretive summary reports and conclusions
Tiers I, II & III

• Tier I
  • Submission, premises, and animal identifiers
  • Reason for test, vaccination status, etc
  • Nucleic acid, antigen, or agent assays
  • Antibody detection assays
  • Genetic sequencing assays

• Tier II
  • Antimicrobial susceptibility tests, minerals, vitamins, toxins, drugs, nutrients, and blood chemistries

• Tier III
  • Histopathological descriptions, diagnostician summary comments, diagnostic codes
Deliverables

1. Universally recognized *electronic message schema* that is comprehensive enough for both non-program and program disease applications.

2. Well-vetted *formulary of registered LOINCs* for the full-complement of diagnostic assays, test results, and interpretations commonly used in swine diagnostic medicine.

3. Demonstrate capabilities to *proficiently synthesize and electronically message* the full-spectrum of swine diagnostic data for either premises-specific or aggregate data health monitoring applications.
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Interstate Construction, 1958

Current Day

Developing infrastructure to help harness the capabilities that the digital age will have to offer for years to come
Acknowledgement
Project Participants

• Clemson University
  • Mike Martin

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  • Rodger Main
  • Marisa Rotolo
  • Bret Crim
  • Leticia Linhares
  • Kate Mueller

• KSU VDL
  • Gary Anderson
  • Eric Herrman
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  • John Greseth

• UMN VDL
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  • Mary Thurn
  • Jerry Torrison

• USDA
  • Todd Bleifuss
  • Christie Loiacono
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