The Ag Animal Veterinarian’s Information Environment

Information Management and Environmental Scanning for Ag Animal Veterinarians

- **What are your clients seeing (and may expect you to have seen)?**
- **What are additional service opportunities now? Emerging service opportunities?**
- **How do you determine what you need now? What you are going to need?**
- **How do you identify what you need? How do you find it when you need it?**

Profession is in the midst of a rapid information environment transition:

- From scarcity (my generation) to excess (your generation)
- From difficult access (aging shelved textbooks, piled unread journals) to 24/7 access
- From access limited to profession (information asymmetry) to accessible by everyone (leveling)
- Increasing number of sources but increasing proportion of less “vetted” sources
- From “push provision” on as published basis determined by source (publisher) to “pull acquisition” on as needed basis
- From limited personal computing capability to powerful personal technology enabling massive searching, analytical, and communication capability
- From individual desk top computers to cloud computing accessed with handheld devices
- From sparse personal contact network to rich social networking
- From printed text with limited images to included digital images, video, CD ROMs, and datasets
- From having a strong memory being important to having strong analytical, critical thinking, and synthesizing skills being important

**B2B food supply veterinary medicine compared to B2C domestic pet veterinary medicine:**

- Client is part of value chain with differing values across supply chain steps to ultimate consumer rather than the client being the consumer
- Requirement for short (liquidity) and long term (solvency) business sustainability makes economic considerations generally more important
- Because clients are producing human foodstuffs, often at large scale, local, state and federal government agencies are much more directly involved

**Additional factors impact herd focused compared to individual-focused veterinary medicine:**

- Livestock operations can generate large amounts of operation-specific production and reproduction data that ag practitioners have the opportunity to analyze and convert to information as a component of their services
- Other academic disciplines (e.g., agricultural engineering, animal scientists, range management) publish papers in their literature that are relevant to problems falling within the services of ag practitioners

**Consequences:**

- Tools emerging to manage information in evolving digital environment
- Opportunity for increasing information transfer across food production chain
- Increasing speed of change as a consequence of more rapid information flow
- Increasing depth needed in “step out of the truck” knowledge and skills, decreasing depth needed in the rare stuff that can be looked up when needed (but curriculum is still in the scarcity era)

**Threats and Opportunities:**

- Static print sources outdate even more rapidly than historically
- Classic condensed sources (textbooks) are disappearing in established but narrow critical areas (e.g., applied genetic selection) and not appearing in emerging areas (e.g, on-farm application of digital technology)
● Electronic sources are searchable, available 24/7, but often ephemeral
● Increasing requirement for critical evaluation, particularly of non-refereed sources
  ○ Opportunity to do that for clients who are targets of much information for sales purposes
● Increasing opportunity to generate farm-specific empirical evidence from client herds
  ○ Increasing opportunity to do on-farm comparative studies
● Increasing flow and transparency of economic information
● Clients are bombarded with information by those selling something or from sources supported by those selling something.
● Clients begin expecting service providers to have an on-line presence and potential clients begin using the Internet to identify potential service providers
● Increasing digitization of product quality down to individual animal level and traceback through the food production system
● Consumers increasingly expect farm level information on foodstuffs traceable through food chain companies
● Entities in the value chain may impose requirements on clients, such as animal welfare standards, may require audits of those requirements, and may drop clients without recourse

Knowledge and Information:
● Livestock operations are embedded in a complex environment involving biological, economic, managerial, natural (e.g., weather), and regulatory systems (agroecology)
● Livestock operations depend on input supply chains and product marketing chains at risk of disruption from local and remote environmental and economic factors and requiring risk management (e.g., hedging, insurance)
● Ag segment is information-rich environment compared to other branches of profession
  ○ Allied academic disciplines - e.g., J Agric Engr Res, Range Ecol Mgmt
● Information varies widely in quality; apparent applicability is often inverse to quality
  ○ Emergence of "evidence-based veterinary medicine"
● Empirical information - quantitative evidence obtained by measurement or counting using observation or experiment rather than by reasoning or feeling
● Causal explanation - how something works
● Causal reasoning - the ability to generate explanations for things using knowledge
● Causal knowledge - the information you know about how the world works. Causal knowledge is organized around explanations and is always related to particular why questions. Because many factors are involved, the same event may have different explanations depending on the factors active in a particular situation
● Causal knowledge is nested. Whenever an explanation is given, it is always possible to ask why again and to give an explanation at a more specific level. One approach for getting to the root cause of an event is asking “5 Whys”
● Steps: awareness > located or generated > analyzed and evaluated > summarized > used in causal reasoning

Criteria for depth of knowledge and skills needed:
● Causal knowledge - sufficient to be able to teach the components and steps explaining the event in an understandable fashion to the intelligent but inexperienced
  ○ Problem - Not recognizing causal knowledge gaps and fuzzy vocabulary that result in IOED "Illusion of explanatory depth." To detect, write down each step of a causal explanation of
how something works, writing ‘gap’ for steps that you don’t know
  ○ See Smart Thinking (Amazon), The Five Elements of Effective Thinking (Amazon)

● Skills - Sufficient to be able to perform the skill while talking to a client
  ○ Problems - stopping practice before automaticity is required, not performing deliberate practice, and not revisiting skills with sufficient frequency to prevent loss from disuse

Information and Data Sources:

● farm-specific:
  ○ production accounting systems
  ○ reports from allied industry services (e.g., milk quality services, diagnostic labs, feed testing)
  ○ generic tools - spreadsheets

● off-farm:
  ○ livestock industry organizations
  ○ professional organizations
  ○ academic
  ○ government - results of government funded studies are required to be freely available
  ○ allied industry
    ■ technical reports, “grey literature”
    ■ write many trade press articles
  ○ economic

On-farm Source Examples:

● production accounting systems:
  ○ CCHMS (Cow/Calf Health Management Services) Traceback
  ○ CowCalf5
  ○ CHAPS2000 (cow herd appraisal software - cow-calf)
  ○ Valley Ag Software DairyComp 305
  ○ DHIA Plus
  ○ DRMS (Dairy Record Management Systems) PCDART

● generic tools:
  ○ Excel - know it!
  ○ Google docs - spreadsheet - wiki
  ○ Apache OpenOffice - open source equivalent of Microsoft Office - wiki
  ○ Libre Office - opens source equivalent of Microsoft Office - wiki
  ○ R - powerful open source statistical analysis and plotting program (Quick-R, Cookbook for R) - wiki
  ○ SMath Studio - MathCAD-like mathl notebook program - wiki

Off-farm Source Examples:

● Consumer information and market research examples:
  ○ Beef Checkoff Research - Market Research
  ○ Center for Food Integrity
    ■ 2012 Consumer Trust in the Food System Research - pdf
  ○ Food Insight
    ■ survey research
  ○ Food Safety News
  ○ IBIS - Beef Cattle Report
  ○ National Grocers Association - research
○ National Restaurant Association - research
○ NCBA Market Research
○ The Food Institute
○ U Conn Food Marketing Policy Center
○ U Minn Food Industry Center
  ■ books and journal articles
○ USFRA Food Dialogues

● Trade industry examples:
  ○ Traditional producer magazines - Drover’s Journal, Farm Journal, Hoard’s Dairyman, Dairy Herd Management, Progressive Dairyman, Progressive Cattleman, Top Producer, Beef, Beef Today
  ○ Websites:
    ■ AgWeb
    ■ Drover’s Cattle Network
    ■ DairyHerd Network
    ■ Feedlot
    ■ Hoard’s Dairyman
    ■ Progressive Dairyman / Progressive Cattleman / Progressive Forage Grower
  ○ Species specific hybrids:
    ■ The Cattle Site
    ■ The Pig Site

○ Warning - because most of these are “free to qualified” and are advertiser supported, many of the articles are ghost written by people selling something but not disclosing that fact

● Producer association examples:
  ○ National Pork Producers
  ○ NCBA - National Cattlemen’s Beef Association
  ○ American Angus Association
  ○ American Sheep Industry Association

● Industry association examples:
  ○ Annual proceedings:
    ■ BIF - Beef Improvement Federation
    ■ Range Beef Cow Symposium
    ■ USAHA - US Animal Health Association (where stakeholders establish regulatory policy)
    ■ WCDS - Western Canadian Dairy Seminar
    ■ Western Dairy Management Conference

● USDA Agricultural Research Service examples:
  ○ Applied research sites (location map) produce considerable “grey literature” as well as refereed scientific papers
    ■ Fort Keogh Livestock and Range Research Laboratory, Miles City, MT
    ■ Range and Meadow Forage Management Research, Burns, OR
    ■ Roman L. Hruska US Meat Animal Research Center, Clay Center, NB
    ■ Forage & Range Lab, Poisonous Plant Research Lab, Logan, UT
    ■ US Dairy Forage Research Center, Madison, WI

● Unique independent but important groups
  ○ AOAC - Association of Analytical Chemists - laboratory standards

● Economic examples:
  ○ Producers expect veterinarians to know critical input and output prices - hay by grade, corn, diesel fuel, hauling costs, replacement stock, cull animals, feeder calves, fat cattle, beef by
grade, and trends in those prices

- **Drovers quotes and charts**
- **CBOT** - Chicago Board of Trade
  - commodity prices
- **USDA**
  - **AMS** - Agricultural Marketing Service
    - Feedstuffs reports
    - Livestock, Grain, and Hay market reports
  - **ERS** - Economic Research Service
    - Amber Waves, Farm Economy
  - NASS - agricultural prices

**Professional examples:**
- Professional societies - AABP, AVC, NMC, SFT,
  - Annual meeting proceedings - application focused material
  - List serves - identification and discussion of current problems faced by practitioners

**Federal regulatory examples:**
- **FDA**
  - Animal & Veterinary - Compliance and Enforcement (drugs)
    - FDA Green Book of Approved Animal Drug Products
  - NCIMS PMO (pasteurized milk ordinance)
- **EPA** - NPDES - CAFOs
- **OSHA** - Agricultural Operations
- **USDA**
  - AMS Grading, Certification, and Verification
  - APHIS animal health - veterinary biologics - licensed products
  - APHIS animal welfare
  - APHIS import & export regulations
  - FSIS inspection regulations

**International regulatory examples:**
- **OIE** - World Organization for Animal Health - international trade requirements
  - OIE Manual of Diagnostics Tests and Vaccines for Terrestrial Animals
  - OIE Terrestrial Animal Health Code

**Scientific examples:**
- **ADSA** - American Dairy Science Association
- **American Association of Animal Science**
- **National Academies of Science, Engineering and Medicine**
  - Agriculture - source of NRC’s for horses, small ruminant, swine
    - Nutrient Requirements of Dairy Cattle
    - Nutrient Requirements of Beef Cattle
    - Diagnosis and Control of Johne’s Disease

**State Extension Service examples:**
- **WSU Extension**
  - Animals
- **University of Idaho**
  - Animal Science
  - Farm & Ranch Management
- **MWPS** - Midwest Plan Service
  - livestock housing and equipment handbooks
- manure management
- ventilation

○ MSU Extension
  - Animal and Range Sciences Extension Service/
  - Crops & Livestock

○ Utah State Cooperative Extension
  - Agriculture

○ U Maryland
  - Maryland Small Ruminant Page

○ University of Wyoming Cooperative Extension

- Hybrid examples:
  ○ USAHA - US Animal Health Association - (annual meeting where stakeholders develop animal health regulatory policy) - daily animal health news alerts
  ○ CAST - Council for Agricultural Science and Technology

- New media examples:
  ○ Agrimoney
  ○ Agweb blogs
  ○ AllTop agriculture rural
  ○ The Beef Blog (Purdue Animal Sciences) - aggregator

- Targeted courses and programs: (note the speakers and the resources used)
  ○ CSU on-line:
    - B.S. Agricultural Business
    - M. Agr. Integrated Resource Management
  ○ High Plains Ranch Practicum: Providing ranchers a systems approach to decision making in the complex and exciting business of ranching
  ○ King Ranch Institute for Range Management - M.S., certificate - publications
  ○ Noble Foundation
  ○ Ranching for Profit
  ○ Ranch Management (TCU)

- Traditional print sources
  ○ Textbooks
  ○ Textbook chapters - see list

Information Environment Media Structure:

Traditional Print
- textbooks

Hybrid - available in both print and electronic media
- trade press
- scientific journals
- conference proceedings
- Review series - Veterinary Clinics of NA: Food Animal Practice

Electronic linkers, aggregators, indexes
- Literature databases - PubMed, Web of Science
  - WSU Griffin
  - Cornell Consultant

- Aggregators
  - Science Digest
- Agriculture and food
  - Domestic livestock
- **Beef Blog**
- global
  - ProMED - Program for Monitoring Emerging Diseases - internet human, plant, and animal disease reporting
- government
  - Environment monitoring - NOAA satellite, Drought Monitor, USGS river
    - Boise Weather Satellite
    - Drought Monitor
    - National Incident Information Center
    - NOAA graphical forecast -
    - USGS Daily Streamflow
    - Vaisala Lightning (non-government)
  - Economic
  - Regulatory
- indexes
  - index mundi - commodities - agricultural
- selected blogs
  - aggregators
    - AllTop
    - The Beef Blog (Purdue)
    - Economics Roundtable
    - Finance Roundtable
  - experts
    - Agricultural Law
    - Greg Mankiw's Blog (Harvard economist)
    - Robert Rapier R-Squared Energy Blog - thinkers
    - Muck and Mystery
  - farm and ranch blog list
  - consumer:
    - Civil Eats
    - Food Politics (Marion Nestle)
    - Grist
    - Marler Blog (food poisoning outbreaks and litigation)
    - Mommy blog list
    - US Food Policy

**Personal Information Management:**
- Information analysis and synthesis
  - Google documents - 24/7 access from any connected computer
- Literature search engines - [WSU libraries]
  - PubMed
  - Web of Science - awesome for find things through the citation trees
- Personal literature management with cloud storage, pdf marking, and database searching
  - reference management software comparison [wiki]
  - Mendeley - [wiki]
  - Readcube - [wiki]
Information Generation and Evaluation:

Information evaluation:
- evidence-based veterinary medicine - EBVMA
  - CONSORT - Consolidated standards of reporting trials
  - REFLECT - Reporting guidelines for randomized controlled trials for livestock and food safety
  - STARD - Standards for the reporting of diagnostic accuracy studies
- Guidelines for Assessing Professional Information

Between farm examples:
- Swine Graphics, Webster City, IA (Dr. Al Leman)
- Dr. John Day, Jerome, ID, dairy practitioner
- DHIA - large database but declining herd participation

On-farm:
- Herd monitoring and Information analysis handout - pdf
- On-farm studies: Methods for design, execution, and analysis (Intro to Clinical Research)
- production evaluation
  - comparison - between groups, over time
- Data analysis and presentation - statistics and graphics
  - books:
    - Statistics II for Dummies, 2009 - ISBN 0470466464
    - on-line texts
  - software for data analysis, graphics and presentation:
    - Excel with the Analysis Toolpak
    - The R Project for Statistical Computing
    - OpenOffice spreadsheet (power?)
    - Google Documents spreadsheet (power?)
    - Analytical capability built into production accounting software - e.g., DairyComp 305, PigCHAMP,
  - Be careful of spreadsheet errors

Selected on-line resource collections of mine:
- Epidemiology and Biostatistics
- On-farm studies: Methods for design, execution and analysis
- Outbreak investigation resources
- Bovine Paratuberculosis
- Food Labeling
  - Certification programs
- International Veterinary Work