The Role of Vaccines in the Control of Influenza

by David A. Halvorson, DVM, ACPV
University of Minnesota

The Minnesota cooperative program for the control of avian influenza is based on two basic principles: first one must know where AI is, and second one must know what to do. Knowing where it is is determined by surveillance; knowing what to do is determined by experience, scientific data and common sense. The Minnesota program aims at keeping disease out and keeping disease in.

The flock owner’s cooperation is essential to the control of any disease, and we at all times must have his economic interest at heart in order to foster and maintain that cooperation. Failure to use a tool that protects his economic interest will destroy that cooperation and may even foster active resistance to official programs. One of the tools to aid in the control of influenza is vaccination. Vaccination helps keep disease out of a noninfected flock and helps keep disease in, in the unlikely event that a vaccinated flock gets infected.

Considerations that influence decisions on vaccination have been discussed by Beard. Briefly, in the case of outbreaks caused by LPAI viruses (more than 90% of viruses detected), vaccination has been allowed using inactivated vaccines administered individually. When vaccination is practiced, serological surveillance is impeded and viral infection (continued on page 2)

Broiler Performance Data (Region)
Live Production Cost

<table>
<thead>
<tr>
<th></th>
<th>SW</th>
<th>Midwest</th>
<th>Southeast</th>
<th>Mid-Atlantic</th>
<th>S-Central</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed cost/ton w/o color</td>
<td>155.45</td>
<td>151.38</td>
<td>162.43</td>
<td>163.47</td>
<td>157.20</td>
</tr>
<tr>
<td>Feed cost/lb meat</td>
<td>14.90</td>
<td>14.71</td>
<td>15.90</td>
<td>16.48</td>
<td>16.09</td>
</tr>
<tr>
<td>Days to 4.6 lbs</td>
<td>46</td>
<td>45</td>
<td>45</td>
<td>44</td>
<td>45</td>
</tr>
<tr>
<td>Med. cost/ton</td>
<td>2.71</td>
<td>2.83</td>
<td>3.51</td>
<td>3.46</td>
<td>2.79</td>
</tr>
<tr>
<td>Chick cost/lb</td>
<td>4.20</td>
<td>4.07</td>
<td>4.14</td>
<td>4.03</td>
<td>3.92</td>
</tr>
<tr>
<td>Vac—Med cost/lb</td>
<td>0.06</td>
<td>0.06</td>
<td>0.09</td>
<td>0.08</td>
<td>0.11</td>
</tr>
<tr>
<td>WB &amp; 1/2 parts condemn. cost/lb</td>
<td>0.23</td>
<td>0.38</td>
<td>0.34</td>
<td>0.36</td>
<td>0.36</td>
</tr>
<tr>
<td>% mortality</td>
<td>4.58</td>
<td>5.81</td>
<td>5.05</td>
<td>4.87</td>
<td>6.28</td>
</tr>
<tr>
<td>Sq. Ft. @ placement</td>
<td>0.76</td>
<td>0.73</td>
<td>0.76</td>
<td>0.74</td>
<td>0.83</td>
</tr>
<tr>
<td>Lbs./Sq.Ft.</td>
<td>6.22</td>
<td>6.82</td>
<td>6.55</td>
<td>6.95</td>
<td>6.84</td>
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<tr>
<td>Down time (days)</td>
<td>18</td>
<td>12</td>
<td>13</td>
<td>15</td>
<td>13</td>
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</tbody>
</table>

Data for week ending 03/28/98.
The Role of Vaccines in the Control of Influenza
(continued from page 1)

and maintenance can occur in the absence of disease. To counter this, it is important in a vaccinated flock to maintain nonvaccinated sentinel birds, which are periodically sampled for antibody. Vaccinated flocks cannot be assumed to be AI virus-free, but vaccine use reduces the population of susceptible poultry and reduces the amount of virus shed in experimentally vaccinated and challenged birds. Vaccinated birds should be identified and monitored until sold.

There are additional considerations that ought to influence the decision on vaccination.

- **There is no government indemnity program for Low Pathogenic Avian Influenza (LPAI).** Without such a program, certain parts of the industry are more prone to disastrous effects of LPAI than others. Farmers with egg production birds, with very young chicks or poultis or with meat birds within two weeks of market age are at the greatest economic risk. If there is industry pressure to voluntarily kill an AI sero-positive flock, a producer may delay reporting or may be motivated to sell a sick flock.

- **Each industry (broiler, layer, and turkey) is different;** control methods may also be different.

- During an AI outbreak, the **lack of a vaccine** or permission to use an existing vaccine **provides** the egg producer with incentive to expose replacement pullets or replacement breeders to AI prior to the onset of production. A grower may also similarly be motivated to expose growing birds well before slaughter date to reduce potential losses associated with airsacculitis condemnations at the processing plant. Intentional exposure is rumored to have occurred in Minnesota and Mexico.

- **Effective vaccine use will reduce the number of susceptible poultry.** It has been shown that vaccination reduced the number of infected birds and quantity of virus shed after experimental challenge.

- **Chances are great that an outbreak of AI is due to LPAI rather than Highly Pathogenic Avian Influenza (HPAI).** If all possible tools are going to be used in LPAI outbreaks, then there is rationale for early vaccine use.

- **There have been no reported cases of vaccine failure in the field.** In fact, the Utah experience is an example of the effectiveness of AI vaccine when used early in a LPAI outbreak.

- **Inactivated influenza vaccines have had wide but limited use in the turkeys.**

There is a role for vaccination against LPAI including H5 and H7. The use of the **conditional license** by the USDA, the controlled use of the vaccine by **state regulations**, priority setting dependent on **risk: benefit analysis**, and **cost** of vaccination all contribute to preventing widespread use of vaccination as a primary method to control AI. In Minnesota, vaccine use has rarely included 5% of the turkey population and more often involves about 1% of Minnesota's turkeys.

**Concerns Expressed by the USDA**

- **Vaccination will not protect against infection or shedding.** Laboratory results have shown that vaccination greatly reduces shedding of virus in experimentally challenged birds. Field results have not shown vaccine to increase the risk of undetected infection; in fact, field experience has indicated vaccine greatly enhances a control program.

- **Vaccination crews are a risk for spreading disease.** This is true, but debeaking crews, moving crews and depopulation crews are also a risk. This risk must be managed.

- **Interference with AGP test and epidemiology.** The AGP test was effectively used during the 1983-84 outbreak to monitor for the presence of antibodies. Monitoring based on the AGP test assured that there were no infected flocks remaining in the quarantine area at the end of the eradication effort. Whole virus vaccines elicit antibodies that react with the AGP test and are indistinguishable from antibodies from the field virus. Non-vaccinated sentinel flockmates can and should be left in the flocks. These sentinels can be serologically monitored periodically.

- **Vaccination will not protect against transmission.** This is a theory based on detection of virus in experimentally challenged birds. It has no basis in fact and there have been no failures of vaccine used in the field. Influenza virus requires a dense, susceptible population in order to be successful. Serologically positive birds are not associated with AI transmission.

- **Use of vaccine sends the wrong message.** It is the responsibility of the USDA to send the message that we are eliminating LPAI with all the means at our disposal.

(continued on page 3)
Conclusion

In spite of concerns, inactivated AI vaccines have contributed successfully to preventing morbidity, mortality and egg production loss reducing economic loss and controlling the spread of disease. Contrary to the prevailing attitude that vaccines are a last resort, there is rationale and evidence to support their immediate use in helping to stop a LPAI outbreak.

A New Era Calls for a New Commitment

In light of the H5N1 avian influenza virus pathogenic for humans, both the turkey industry and the chicken industry will now have to do more to prevent and control influenza. It is now essential to do everything possible to prevent and control outbreaks of influenza. For turkey producers that will require eliminating range production, keeping turkeys in totally confined bird proof buildings and otherwise preventing introduction of the virus. If flocks get infected, half-hearted measures will not be sufficient. Aggressive measures will be more important than ever before to prevent spread.

For broiler and egg producers, it is no longer acceptable to sit by and continuously expose their flocks to the influenza in the live bird markets. This exposure must be terminated, either by eliminating the virus in the live bird markets or by controlling the contact between industry and the live bird markets. In addition, the chicken (broiler) industry must wake up to the need to use every possible tool to control avian influenza in turkeys or egg layers. Just because measures are dramatic does not necessarily mean they will be successful in controlling this disease.

Finally it is time to recognize that the turkey industry, using controlled vaccination, has been more successful controlling influenza than the chicken industry. It is also time for the USDA to take a leadership role in this issue of vaccination for low pathogenic influenza. The current USDA position preventing vaccination allows the circulation of low path virus in our poultry while scores of our government people wring their hands. This situation is nothing less than preposterous! If international concerns over exports prevent the U.S. from adequately fighting a disease such as influenza, then it is time to work on an international basis to correct the situation.

It is up to everyone to do what it takes to prevent influenza. Standing by while influenza cycles through our industry is inexcusable.

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Presented at the 47th Annual New England Poultry Health Conference

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Broiler Performance Data (Company)

<table>
<thead>
<tr>
<th>Live Production Cost</th>
<th>Average Co.</th>
<th>Top 25%</th>
<th>Top 5 Co’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed cost/ton w/ or color</td>
<td>160.05</td>
<td>154.92</td>
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<tr>
<td>Feed cost/lb meat</td>
<td>15.75</td>
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<tr>
<td>Days to 4.6 lbs</td>
<td>45</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Med. cost/ton</td>
<td>3.17</td>
<td>2.34</td>
<td>2.15</td>
</tr>
<tr>
<td>Chick cost/lb</td>
<td>4.20</td>
<td>3.95</td>
<td>4.08</td>
</tr>
<tr>
<td>Vac-Med. cost/lb</td>
<td>0.08</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>WB &amp; 1/2 parts condemnations cost/lb</td>
<td>0.32</td>
<td>0.21</td>
<td>0.19</td>
</tr>
<tr>
<td>% Mortality</td>
<td>5.17</td>
<td>4.49</td>
<td>3.66</td>
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<tr>
<td>Sq. Ft. @ placement</td>
<td>0.76</td>
<td>0.74</td>
<td>0.72</td>
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<tr>
<td>Lbs/Sq. Ft.</td>
<td>6.59</td>
<td>6.55</td>
<td>6.53</td>
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<tr>
<td>Down time (days)</td>
<td>14</td>
<td>14</td>
<td>12</td>
</tr>
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</table>

Broiler Whole Bird Condemnation (Region)

<table>
<thead>
<tr>
<th>SW</th>
<th>Mid-West</th>
<th>S. East</th>
<th>Mid-Atlantic</th>
<th>S. Central</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Septox</td>
<td>0.336</td>
<td>0.653</td>
<td>0.247</td>
<td>0.409</td>
</tr>
<tr>
<td>% Airsac</td>
<td>0.118</td>
<td>0.145</td>
<td>0.373</td>
<td>0.228</td>
</tr>
<tr>
<td>% I.P.</td>
<td>0.065</td>
<td>0.173</td>
<td>0.194</td>
<td>0.341</td>
</tr>
<tr>
<td>% Leukosis</td>
<td>0.012</td>
<td>0.021</td>
<td>0.035</td>
<td>0.061</td>
</tr>
<tr>
<td>% Bruise</td>
<td>0.010</td>
<td>0.014</td>
<td>0.020</td>
<td>0.016</td>
</tr>
<tr>
<td>% Other</td>
<td>0.017</td>
<td>0.015</td>
<td>0.085</td>
<td>0.025</td>
</tr>
<tr>
<td>% Total</td>
<td>0.557</td>
<td>1.022</td>
<td>0.954</td>
<td>1.081</td>
</tr>
<tr>
<td>% 1/2 parts condemnations.</td>
<td>0.375</td>
<td>0.512</td>
<td>0.396</td>
<td>0.379</td>
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</tbody>
</table>

Data for week ending 03/28/98.

Data for week ending 03/28/98.
Excerpts from the latest National Agricultural Statistics Service USDA Reports

"Broiler Hatchery" and "Chicken and Eggs" (NASS)

Broiler Eggs Set In 15 Selected States Up 2 Percent

According to the National Agricultural Statistics Service (NASS) commercial hatcheries in the 15-state weekly program set 174 million eggs in incubators the week ending March 21, 1998. This was up 2 percent from the eggs set the corresponding week a year earlier. Average hatchability for chicks hatched during the week was 82 percent.

Broiler Chicks Placed Up 1 Percent

NASS reports broiler growers in the 15-state weekly program placed 143 million chicks for meat production during the week ending March 21, 1998. Placements were up 1 percent from the comparable week in 1997. Cumulative placements from January 4, 1998, through March 21, 1998 were 1.52 billion, up slightly from the same period a year earlier.

February Egg Production Up 3 Percent

U.S. egg production totaled 6.07 billion during February 1998, up 3 percent from the 5.90 billion produced in 1997. Production included 5.12 billion table eggs and 950 million hatching eggs, of which 893 million were broiler-type and 57.0 million were egg-type. The total average number layers during February 1998 averaged 312 million, up 3 percent from the total average number of layers during February 1997. February egg production per 100 layers was 1,946 eggs, up slightly from February 1997.

All layers in the U.S. on March 1, 1998, totaled 313 million, up 3 percent from a year ago. The 313 million layers consisted of 256 million layers producing table or commercial type eggs, 54.6 million layers producing broiler-type hatching eggs, and 2.68 million layers producing egg-type hatching eggs. Rate of lay per day on March 1, 1998, averaged 69.6 eggs per 100 layers, down fractionally from the 69.9 a year ago.

Laying flocks in the 30 major egg production States produced 5.76 billion eggs during February, up 3 percent from February 1997. The average number of layers during February, at 295 million, was up 2 percent from a year earlier.

Individual State estimates are available for the 30 major egg producing States. These States are listed on page 8 of this release and account for approximately 95 percent of the total U.S. egg production. Production for the other States are grouped into an "Other States" category and combined with the 30 States published individually to obtain a U.S. estimate. Individual State estimates' for "Other States" are available annually in the "Layers and Egg Production" report.

Egg-Type Chicks Hatched Down 2 Percent

Egg-type chicks hatched during February totaled 34.6 million, down 2 percent from February 1997. Eggs in incubators totaled 34.6 million on March 1, 1998, up 4 percent from a year ago.

Domestic placements of egg-type pullet chicks for future hatchery supply flocks by leading breeders totaled 239,000 during February 1998, up 9 percent from the 219,000 of February, 1997.

Broiler Hatch Up 2 Percent

The February 1998 hatch of broiler-type chicks, at 645 million, was up 2 percent from February of the previous year. There were 608 million eggs in incubators on March 1, 1998, up 3 percent from a year earlier.

Leading breeders placed 6.26 million broiler-type pullet chicks for future domestic hatchery supply flocks during February 1998, up 6 percent from February 1997.
Georgia Veterinary Medical Association
Annual Meeting
Jekyll Island, Georgia
June 19-20, 1998

Hotels:
Holiday Inn 1-912-635-3311
Jekyll Club 1-912-635-2600
Villas on the Sea 1-912-635-2521
Clarion Resort Buccaneer 1-912-635-2261

For further information, please call GVMA
(770) 416-1633 or (770) 416-9095

<table>
<thead>
<tr>
<th></th>
<th>Average Co.</th>
<th>Top 25%</th>
<th>Top 5 Co.'s</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Septox</td>
<td>0.335</td>
<td>0.288</td>
<td>0.306</td>
</tr>
<tr>
<td>% Airsac</td>
<td>0.237</td>
<td>0.111</td>
<td>0.076</td>
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<tr>
<td>% I.P.</td>
<td>0.216</td>
<td>0.075</td>
<td>0.070</td>
</tr>
<tr>
<td>% Leukosis</td>
<td>0.030</td>
<td>0.013</td>
<td>0.040</td>
</tr>
<tr>
<td>% Bruise</td>
<td>0.015</td>
<td>0.030</td>
<td>0.032</td>
</tr>
<tr>
<td>% Other</td>
<td>0.041</td>
<td>0.015</td>
<td>0.016</td>
</tr>
<tr>
<td>% Total</td>
<td>0.873</td>
<td>0.512</td>
<td>0.520</td>
</tr>
<tr>
<td>% 1/2 parts condemnations</td>
<td>0.397</td>
<td>0.322</td>
<td>0.252</td>
</tr>
</tbody>
</table>

Data for week ending 03/28/98.
Meetings, Seminars and Conventions

1998
April

April 6-8: Federal Food Regulatory Conference, Crystal City Marriott Hotel, Arlington, VA. Contact: Prime Label Consultants, P.O. Box 15240, Washington, D.C. 20003. Phone (202) 543-0698 or 800-766-LABL.

April 7-8: Arkansas Poultry Symposium, Holiday Inn, Springdale, AR. Contact: Judy Kimbrell, Arkansas Poultry Federation, P.O. Box 1446, Little Rock, AR 72203. Phone (501) 375-8131.


April 9-11: 26th Annual Midwest Poultry Federation Convention, Minneapolis Convention Center, Minneapolis, MN. Contact: Lara Ginsburg, Phone (612) 646-4553. Fax (612) 646-4554.

April 16: Texas Commercial Egg Clinic, College Station Conference Center, College Station, TX. Contact: Dr. John Carey, Texas A&M University, College Station, TX 77843-2472. Phone (409) 845-4319.


April 16-19: Georgia Poultry Federation Annual Meeting, Brasstown Valley Resort, Young Harris, GA. Contact: GPF, P.O. Box 783, Gainesville GA 30503. Phone (770) 532-0473.

April 19-21: North Carolina/South Carolina Joint Turkey Federations Spring Meeting, Embassy Suites Hotel, Myrtle Beach, S.C. Contact: North Carolina Turkey Federation, 4020 Barrett Drive, Suite 102, Raleigh, N.C. 27609. Phone (919) 783-8218.


April 22: Pennsylvania Poultry Federation Fund Raising Banquet, Hershey Convention Center, Hershey, PA. Contact: Pennsylvania Poultry Federation, 500 North Progress Avenue, Harrisburg, PA 17109. Phone (717) 682-7530.

1998
May

May 4-6: American Feed Industry Assoc. (AFIA) 60th Annual Convention, Hyatt Regency, Dallas, TX. Contact: Donna Troup, AFIA, 1501 Wilson Blvd., Ste. 1100, Arlington, VA 22209. Phone (703) 524-0810.

May 7-9: Poultry Breeders of America, St. Louis, MO. Contact: U.S. Poultry & Egg Association, 1530 Cooledge Road, Tucker, GA 30084-7303. Phone (770) 493-9401.

May 9: Georgia Poultry Night of Knights, Cobb Galleria Centre, Atlanta, GA. Contact: Georgia Poultry Federation, P.O. Box 763, Gainesville, GA 30503. Phone (770) 532-0473.


May 18-21: National Egg Quality School, Columbus, OH. Contact: Dr. Kenneth Anderson, N.C. State University, Extension Poultry Science, Scott Hall, Box 7608, Raleigh, N.C. 27695-7608. Phone (919) 515-2621.

May 13-14: British Pig & Poultry Fair, Royal Agricultural Society of England, National Agricultural Centre, Stoneleigh Park Warwickshire, CV8 2LZ, UK. Phone +44 1203 866968. Fax +44 1203 533732.

May 19-21: Multi-State Poultry Feeding and Nutrition Conference, Marriott, Indianapolis, IN. Contact: Tom Robertson, Stewart Center, Purdue University, West Lafayette, IN 47907. Phone (765) 494-7220.


May 25-29: International Seminar on Poultry Pathology and Production, Georgia, Athens, GA. Sponsored by the University of Georgia and AMEVEA, the Latin American Poultry Science Association. Contact: Dr. Pedro Villagrasa, University of Georgia, Avian Medicine Dept., 953 College Station Road, Athens, GA 30605. Phone (706) 542-2676. Fax (706) 542-5630 or E-Mail: pedrov@avmed.avean.edu.


1998
June

June 4-6: Alabama Poultry & Egg Convention, Birmingham, AL. Contact: Alabama Poultry & Egg Assn., P.O. Box 240, Montgomery, AL 36101. Phone 334-265-2732.

June 4-7: 6th Asian Pacific Poultry Congress & Exhibition, Nagoia Trade & Industry Center, 6-3 Fukiage, 2-chome, Chikusei-ku, Nagoia 464, Japan. Contact: 6th APPC Secretariat, c/o Congress Corporation, Hirokoi YMD Bldg., 1-20-25 Nishiki, Nakaku, Nagoia 460, Japan. Phone +81 52 222-1297. Fax +81 52 222-4187. e-mail: shibata@congre.co.jp.

June 5-6: Arkansas Poultry Festival, Arlington Hotel, Hot Springs, AR. Contact: Judy Kimbrell, Arkansas Poultry Federation, P.O. Box 1446, Little Rock, AR 72203. Phone 501-375-8131.


June 9-12: ABIC '98 Conference, Delta Bessborough Hotel, Saskatoon, Sask. Contact: Colleen Jaeger, ABIC '98, c/o The Signature Group, 608 Duchess St., Saskatoon, Sask. S7K 0R1; signature @agle.wbn.ca.

June 9-12: Agricultural Biotechnology International Conference (ABIC), Delta Bessborough Hotel, Saskatoon, Sask. Contact: Sharon Murray, ABIC '98, c/o Signature Group, 608 Duchess St., Saskatoon, Sask. S7K 0R1; siggroup @sk.sympatico.ca, www.lights.com/~abic/

June 12-13: Delmarva Chicken Festival & Delmarva Chicken Cooking Contest, Millsboro, DE 19947-9575. Contact: Connie Parvis, Delmarva Poultry Industry, P.O. Box 47, Georgetown, DE. 19947-9575. Phone (302) 856-9037.

June 13-17: Institute of Food Technologists Annual Meeting & Food Expo, Atlanta, GA. Contact: IFT, 221 N. LaSalle St., Ste. 300, Chicago, IL 60601. Phone (312) 782-8424. Fax (312) 782-8348.