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Pandemic Influenza Preparedness in North Carolina

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health policy
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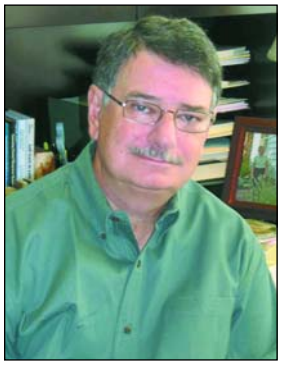
Special Letter from the Publishers of the *North Carolina Medical Journal*

To the readers of the *North Carolina Medical Journal*:



Gordon H. DeFriese, PhD

This issue marks a significant transition in the leadership of the *North Carolina Medical Journal*. Gordon H. DeFriese, PhD, served as the Editor-in-Chief of the *NCMJ* since 2002. Gordon brought the *Journal* under publication of the North Carolina Institute of Medicine (NC IOM) during a time when its future was uncertain. His ambition was to expand and enhance the *Journal* to meet the need for health policy discussions in the state of North Carolina. Through Gordon's passionate dedication, he gathered financial and editorial support for the *Journal*, which became the state's leading avenue for disseminating health information and health policy solutions.

Under Gordon's leadership, the *Journal* highlighted timely and critical health policy issues such as the epidemic of childhood obesity, the need for direct care workers in long-term care, medical malpractice, quality of health care, and access to dental care. Gordon's nurturing of the *Journal* honored its long history, dating back to 1849, by strengthening its value to physicians and giving more exposure to important health policy issues beyond the physician community. Today, the *Journal* is distributed to more than 30,000 readers across the state and the nation including physicians, nurses, dentists, pharmacists, physician assistants, hospital and health care facilities administrators and leaders, other health professionals, health policy makers, and business and community leaders.

The *Journal's* success is a testament to Gordon's vision, energy, and service to improving the health of North Carolina's citizens. Although Gordon's work will continue in various other roles, he has retired from his position as Editor-in-Chief of the *North Carolina Medical Journal*. His tireless work and commitment strengthened the *Journal's* foundation so that its impact on the state will be ongoing.

Beginning with this issue, we are excited that Thomas C. Ricketts III, PhD, MPH, has agreed to serve as the Editor-in-Chief and carry on Gordon's valuable work. Tom, a professor in the School of Public Health and Deputy Director of Policy Analysis at the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill, has also dedicated his career to improving the health of North Carolinians, as well as underserved populations throughout the country. He is an expert on health care topics including access, quality of care, rural health, workforce, and technology. His work is well respected by health care leaders throughout the nation and world, enabling him to bring national and international expertise to North Carolina issues. Tom's previous experience as editor of two national health journals provides new skills and perspectives that will allow him to place his own personal touch on the *Journal*.

With our sincerest thanks and gratitude for Gordon's work and a very warm welcome in anticipation of the direction of the *Journal* under Tom's leadership,

Pam Silberman, JD, DrPH
President and CEO, NC IOM
Co-Publisher, NCMJ

Eugene W. Cochrane, Jr.
President, The Duke Endowment
Co-Publisher, NCMJ

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POLICY FORUM

Pandemic Influenza Preparedness in North Carolina

COMMENTARIES

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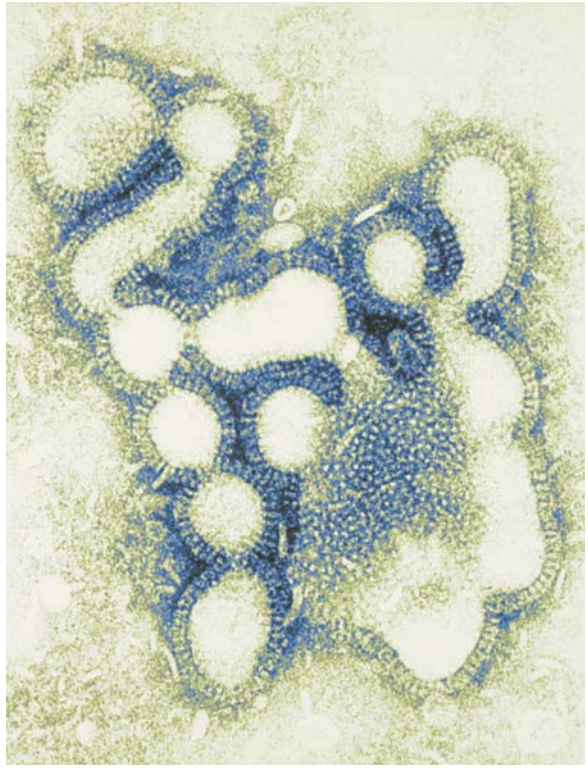

About the Cover:
Influenza Virus at 295,000 Magnification

Tarheel Footprints in Health Care

Recognizing unusual and often unsung contributions of individual citizens who have made health care for North Carolinians more accessible and of higher quality

Kathleen Colville, MSW, MPH
Public Health Preparedness Coordinator, Alamance County Health Department

Kathleen Colville, MSW, MPH

Public health leaders are specifically charged with promoting and protecting the overall health and well-being of the population during emergencies. When an influenza pandemic arrives, it will be up to the state and local public health agencies and partner organizations to coordinate a public health response to help reduce morbidity, mortality, and social disruption. Local health departments have hired preparedness and response coordinators to prepare for natural or manmade disasters.

As a Public Health Preparedness Coordinator, Kathleen Colville, MSW, MPH, has taken the lead in coordinating the development of Alamance County's pandemic influenza plan. She convenes a community steering committee, provides training to community groups, health care providers, and health department staff, negotiates agreements with other agencies regarding roles and responsibilities during an influenza pandemic, and provides regional leadership through planning drills and exercises. These efforts will better enable Alamance County and North Carolina to respond to an influenza pandemic event when it occurs.

Ms. Colville has distinguished herself by working particularly on preparedness for marginalized populations and has been awarded several grants to reach out to low-income communities to address the unique challenges faced by these communities in the wake of a disaster. She has increased her own skills by volunteering in Florida after the devastating hurricanes in that state and by learning how to use geographic information systems to better survey and assess needs following catastrophic events. She also has learned to apply this technology to typical public health activities, such as community assessment. Dorothy Cilenti, Health Director at the Alamance County Health Department, noted that, "Kathy is a valued asset to the entire community in Alamance County, and as a result of her dedication and professionalism, we are better able to quickly respond to widespread disease or disaster."

Kathleen Colville came to her position in August 2005 after completing Master degrees in Social Work and Public Health at the University of North Carolina at Chapel Hill. She was named a North Carolina Schweitzer Fellow for the 2004-05 academic year for her service project conducting a community needs assessment in response to the elevated number of domestic violence homicides in Alamance County.

Marcy Green, Health Education Supervisor at the Alamance County Health Department, had these comments about Ms.Colville,"I think the number one quality of a Preparedness Coordinator is the ability to work well with different types of people as well as the ability to form strong relationships with community agencies. Kathy's personality and competence have been vital to building a strong relationship with our emergency management partners." Chip Ferguson, Director of Emergency Management at the Burlington Police Department, reiterated this idea. He described Ms. Coleville as a true asset to the police department because of her tireless work to bring public health into the realm of public safety, a collaboration that previously did not exist. Ms. Green concluded, "If Alamance County were to face a small or large disaster, I feel much better knowing that we have Kathy has a leader in this area."

For her efforts and accomplishments in preparing Alamance County for an influenza pandemic, the Editors of the *North Carolina Medical Journal* are pleased to recognize Kathleen Colville, and all preparedness and response coordinators around the state, for their contributions to the health and safety of all North Carolinians.

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The Journal seeks papers that convey the results of original research. We are especially interested in publishing research papers that have relevance to the health of the people of our state.

An editor reviews all papers received and those of sufficient quality are peer-reviewed. As with any journal of merit, only papers of high quality will be published. Papers printed in the Journal are indexed in the National Library of Medicine's MEDLINE public database.

We generally accept two types of manuscripts for review: (1) original clinical or health services research contributions and (2) systematic reviews (both regardless of specific topic).

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North Carolina MEDICAL JOURNAL

Relationship between Nephrologist Care and Progression of Chronic Kidney Disease

Lori A. Orlando, MD, MHS; William F. Owen, MD; and David B. Matchar, MD

Abstract

Background: *Since chronic kidney disease (CKD) affects 11% of the United States population, and its incidence is rising, experts recommend early referral to nephrologists in the hope that it may delay the onset of end-stage disease and improve survival. However, limitations in the capacity of currently practicing nephrologists may prevent widespread early referral.*

Objective: *To examine the relationship between disease progression and timing of nephrology referral.*

Study Design and Data Collection: *We retrospectively identified 1,553 veterans at the Durham, North Carolina VA hospital between January 1998 and December 1999 who had CKD, defined as two outpatient serum creatinines ≥ 1.4 mg/dL at least three months apart. Our endpoint was a composite of progression to the next CKD stage or death. We compared the time to the composite endpoint for each CKD stage and for early CKD (stages 1-3) to advanced CKD (stages 4 and 5) using a Cox proportional hazards model for two groups: those with primary care only (PCP-only) and those with primary and nephrology care (nephrology).*

Results: *Ninety-two percent had hypertension, 52% diabetes, 49% coronary artery disease, and 89% proteinuria. Angiotensin-converting enzyme inhibitors and anti-lipid medications were used by 52% and 39%, respectively. The median number of days spent in each CKD stage and the proportion of each groups reaching the composite endpoint are—stage 1: 1,149 days, 68% of the PCP-only group and 73% of the nephrology group; stage 2: 1,206 days, 60% and 65%; stage 3: 1,158 days, 69% and 63%; and stage 4: 794 days, 86% and 72%. Adjusted survival curves for the composite endpoint were similar between the two groups for CKD stages 1 (HR 1.08 for nephrology versus PCP-only) and 2 (HR 1.20); however for CKD stages 3 (HR 0.80, $p < 0.05$) and 4 (HR 0.75, $p < 0.05$), the nephrology group gained 316, 215, and 120 more days of progression-free survival, respectively.*

Limitations: *The major limitation is difficulty accounting for unmeasured bias in specialty referrals. We were unable to analyze stage 5-to-dialysis due to the small number of individuals with the outcome.*

Conclusion: *Our data suggest that an appropriate time for nephrology comanagement of patients with CKD may be stage 3; however, prospective studies are needed to clarify the role and timing of nephrology referral.*

Keywords: *chronic kidney disease, provider, kidney disease*

Background

Chronic kidney disease (CKD) affects 11% of the United States population, about 20 million people.[1] Improving the management of CKD has been shown to increase survival in those with CKD, delay the development of end-stage renal disease (ESRD), and improve morbidity and mortality once ESRD develops.[2] Slowing the rate of progression and delaying ESRD are now more important than ever as the incidence of CKD and ESRD is increasing, in large part due to the increasing prevalence of CKD risk factors such as the aging of the population, hypertension, and diabetes mellitus.[3] This is true at both the national and state level. For example, in 2003 the point prevalence of ESRD in North Carolina was 14,635 with an incidence of 3,207—this makes us one of the top ten states for prevalence and incidence. Even more concerning, the prevalence increased 280% in the ten years between 1993 and 2003, slightly higher than the national average of 250%.[4]

ESRD accounts for $20 billion per year in Medicare expenditures. With the increase in its incidence, expenditures are

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projected to reach $42 billion per year by 2010.[5] Given concerns over the rising impact of CKD on the health of the general population and increasing expenditures for dialysis care, researchers have begun to investigate the impact of care in the pre-ESRD period on ESRD outcomes. Several of these studies have suggested that nephrology referral early in the pre-ESRD course may improve the morbidity and mortality on dialysis.[6] These studies, while methodologically limited by dichotomizing and varying the definition of early referral (from one month to one year predialysis), and the use of dialysis populations (not generalizable to predialysis populations), provided preliminary evidence in favor of early referral to sub-specialists.

Based upon these preliminary studies, experts have recommended early referral to nephrologists for all CKD patients. However, widespread implementation has been limited by the disparity between the capacity of currently practicing nephrologists and the number of CKD patients.[7] Since this disparity exists and the preliminary studies were methodologically limited, researchers have begun to investigate in more detail the impact and timing of nephrology care on renal-related outcomes.

In view of the conundrum between an inadequate number of subspecialists to deliver care and uncertainty about when their intervention may be of the greatest benefit, we examined the relationship between the severity of CKD, the presence of subspecialty care, and progression of CKD in a pre-ESRD population.

Methods

We performed a retrospective observational database study of 1,553 veterans with CKD at the Durham, North Carolina Veterans Administration Hospital (VA). Our primary objective was to identify whether care provided by a nephrologist increases the time spent in any chronic kidney disease stage (ie, slows progression). The Durham VA Internal Review Board (IRB) approved this study.

We identified subjects by searching the local VA laboratory database for patients with serum creatinine concentrations measured between January 1, 1998 and December 31, 1999. Patients with two values ≥ 1.4 mg/dL, the upper limit of normal for our laboratory, during outpatient lab visits at least three months apart were included in the study. Patients were excluded if they were not followed in our primary care or nephrology clinics or if renal replacement therapy was initiated within 90 days of the first identified serum creatinine measurement.

Measures

For every subject in the cohort, we obtained all serum creatinine, calcium, phosphorus, albumin, hemoglobin, low density lipoprotein (LDL), hemoglobin A1C (HgA1c), and urine protein quantification values in the laboratory database between the inclusion date and December 31, 2004. Creatinine measurements were converted into an estimated glomerular filtration rate (GFR) using the modified Modification by Diet of Renal Disease Study formula (GFR= exp[5.228 - 1.154 x ln(Scr) - 0.203 x ln(age) - 0.299 (if female) - 0.192 (if black)])[8] and assigned a CKD stage using the Kidney Disease Outcomes Quality Initiative (KDOQI) CKD staging guidelines.[9] Specifically, stage 1 = GFR ≥ 90 mL/min with proteinuria, stage 2 = GFR < 90 mL/min and ≥ 60 mL/min with proteinura, stage 3 = GFR < 60 mL/min and ≥ 30 mL/min, stage 4 = GFR < 30 mL/min and ≥ 15 mL/min, and stage 5 = GFR < 15 mL/min or renal replacement therapy. The values for calcium, phosphorous, albumin, hemoglobin, HgA1c, and LDL were each averaged over three-month periods during follow-up. CKD-related complications included hypocalcemia (serum calcium < 8.5 mg/dL), hyperphosphatemia (serum phosphorus > 4.5 mg/dL), hypoalbuminemia (serum albumin < 4 g/dL), and anemia (serum hemoglobin < 12 mg/dL), and were defined here according to the Renal Physicians Association's and KDOQI evidence-based guidelines.[10] Complications were considered present if ≥ 50% of the averages exceeded the recommended goal. HgA1c (goal ≤ 7.0%), LDL (goal ≤ 100mg/dL), and blood pressure values (goal ≤ 135/85mmHg), also defined according to the above guidelines, were handled in the same manner. We used this method in order to evaluate the relationship between chronic exposure to CKD-related complications and/or poorly controlled comorbidities and long-term outcomes, such as disease progression and death.

We obtained data from the local pharmacy database on angiotensin converting enzyme inhibitors (ACEIs), angiotensin 2 receptor blockers (ARBs), erythropoietin, and lipid lowering agents prescribed during the study period. Prescriptions from the VA pharmacy are generally considered to be excellent indicators of medication usage since most veterans do not obtain drugs outside of the VA pharmacy and, due to the copay, do not request refills for medications not being taken. Medications were only included in the analysis if they were prescribed for at least six months.

We also collected data for the study period from the national inpatient and outpatient VA databases maintained in Austin, Texas. Data collected included demographics, comorbid conditions, blood pressure, and resource use (number of clinic visits and hospitalizations). These databases are a cumulative index of admissions and discharges from all United States VA medical centers and have been validated for reliability.[11] Comorbid conditions, including the presence of diabetes mellitus, hypertension, left ventricular hypertrophy (LVH), coronary artery disease (CAD), and current tobacco use, were identified using ICD-9 codes, while patient encounters with primary care physicians or nephrologists, clinic visits, and hospitalizations were identified using clinic and provider encounter codes. Race was categorized as white versus nonwhite. The CKD stage at first visit to nephrology was defined as the stage at initiation of nephrology care. Initiation of renal replacement therapy was identified by using ICD-9 and clinic codes from all three (local, national inpatient, and national outpatient) sources, as well as chart reviews of all patients with at least one GFR < 31 mL/min. Death was identified using the national VA benefits database maintained in Austin.

Analysis

The date of the first GFR within the cohort identification period (January 1, 1998 and December 31, 1999) for each patient was identified as the index date (time 0). The date of each subsequent GFR was used to calculate the number of days from the index date in order to construct a time course of GFR and CKD stage for each patient. In an effort to reduce the effect of regression to the mean and laboratory imprecision, we identified the index GFR as the average GFR for the three months prior to index date and we assumed that an individual remained in their current CKD stage until two measurements at least three weeks apart were either both higher or both lower than the previous stage. When this occurred, a new stage was assigned based upon the GFR at the time of the first of the two measurements.

In order to assess the effect of nephrology care on CKD course, we created two groups: PCP-only and PCP with nephrology (nephrology). Individuals who had nephrology clinic visits were assigned to the nephrology group, whereas those followed by a primary care physician only were assigned to the PCP-only group. Baseline characteristics were compared between these two groups using the Student's T-test for continuous variables and the Mantel-Haenszel chi-square for categorical variables.

Survival curves were constructed using all patients in a given stage to determine the time spent in each stage (ie, from stage 1 to 2, stage 2 to 3, stage 3 to 4, etc.), and the time from pre-advanced CKD, stages 1-3, to advanced CKD (ACKD), stages 4 and 5. The time spent in a given stage was defined as the time period between the very first assignment to that stage and a composite endpoint of either first assignment to a higher stage or death. If neither endpoint was reached then patients were censored at the time of their last follow-up. If an individual advanced more than one stage between measurements, then the time to the endpoint was defined as one half of the interval observed. Since many patients progressed through several CKD stages, a single individual may be represented in more than one survival curve.

We used a Kaplan-Meier survival curve to calculate the unadjusted progression-free survival time for each stage and a Cox Proportional Hazards model to compare the adjusted and unadjusted progression-free survival times between the nephrology and PCP-only groups for each stage. The adjusted model included age in years, race (white versus nonwhite), ACEI (use versus non-use), ACEI started during the analyzed stage, Anti-lipid agents (use versus non-use), uncontrolled diabetes (versus controlled diabetes—as defined in the measures section for HgbA1c > 7%), current tobacco use (versus noncurrent or no use), and diabetes (versus no diabetes), hypertension (versus no hypertension), cardiovascular disease (versus no cardiovascular disease), or proteinuria (versus no proteinuria). We excluded measures of control (other than diabetes) from the model because we were limited in the number of covariates we could analyze by the frequency of the outcome. We also excluded CKD-related complications and resource use because we could not distinguish between cause and effect with our study design. Only individuals followed by a nephrologist during the stage being analyzed were assigned to the nephrology group, and only those taking a medication during the specified stage were assigned the medication. Since ACEIs may acutely decrease and then stabilize GFR, we created an indicator variable for those who initiated an ACEI during the analyzed stage (ACEI started during stage) in order to distinguish between its short-term and long-term effects.

We incorporated the propensity to be seen by a nephrologist into our model in order to account for potential bias in patients referred to subspecialists. These continuous scores, which represent the probability that an individual received nephrology care based upon modeled characteristics, are incorporated into the Cox Proportional Hazards model as a covariate to balance observed characteristics between the two groups. We calculated a propensity score[12] for the probability of receiving nephrology care using a logistic regression model adjusted for age (in years), race (nonwhite versus white), diabetes (versus no diabetes), hypertension (versus no hypertension), cardiovascular disease (versus no cardiovascular disease), ACEI use (versus non-use), anti-lipid medication use (versus non-use), hypocalcemia (present versus not present), hyperphosphatemia (present versus not present), anemia (present versus not present), number of hospitalizations, and rate of progression prior to nephrology care (average change in GFR prior to first visit).

Table 1.
Characteristics of the Study Cohort and the Two Subgroups at Baseline

	Total	Nephrology	PCP-only	p-value
Number	1,553	456	1,097	
Age (range)	70 (26-98)	68.7	70.3	0.01
Nonwhite race (%)	32%	33%	32%	0.77
Diabetes (%)	52%	58%	49%	0.002
Hypertension (%)	92%	98%	90%	< 0.001
Proteinuria (%)	89%	75%	58%	< 0.001
Current Tobacco use (%)	21%	21%	21%	1.0
Coronary Artery Disease (%)	49%	56%	57%	0.49
Left ventricular hypertrophy (%)	3%	3%	3%	1.0
Hyperlipidemia (%)	24%	25%	24%	0.60
Average stage at cohort entry	1.3	1.6	1.1	< 0.001

Results

The baseline characteristics for our cohort and the two subgroups, PCP-only and nephrology, are reported in Table 1. Follow-up characteristics, including disease management and the development of CKD-related complications, are reported in

Table 2. Our cohort was composed of mostly elderly individuals. All were male and 33% were nonwhite. More than 90% had hypertension, 50% had diabetes and coronary artery disease, 50% used ACEIs, and 39% used anti-lipid medications. Only 3% used erythropoietin and less than 1% used ARBs, which reflects limitations on access to these two classes of drugs at our VA. The average stage at entry into the cohort was very early (1.3), and the average stage for referral was also early (1.6). When comparing those followed by nephrologists to those followed only by a PCP, individuals in the PCP-only group were older and were less likely to have diabetes, hypertension, hypoalbuminemia, or hyperphosphatemia. Management of diabetes, hypertension, and hyperlipidemia were similar between the PCP-only and nephrology groups and both groups had a similar number of days of follow-up, 1,310 for the nephrology group and 1,285 for the PCP-only group. Of the cohort of 1,553 individuals, only 133 (8%) were lost to follow-up.

The outcomes of the survival and Cox proportional hazard analyses are presented in Tables 3 and 4 and the curves derived from Cox proportional hazard analysis for each stage are depicted in Figure 1. These show that individuals spent a median of 3.2 years per stage in stages 1, 2, and 3, but only 2.1 years in stages 4-5. There was no difference between the PCP-only and nephrology groups for the unadjusted time spent in stage 1 or stage 2; but for stages 3 through 5 and early to advanced CKD, those in the nephrology group spent 316, 251, 120, and 55 more days, respectively, in each stage than those in the PCP-only group. Of those who reached the composite endpoint, more individuals in stage 1 progressed to the next stage than died, an equal number progressed as died in stage 2, and more progressed than died during stages 3 through 5. At each stage, proportionally fewer individuals in the PCP-only group progressed to the next CKD stage, but more died, than in the nephrology group.

The hazard ratio, an estimate of the relative risk for each covariate, is shown in Table 4. For the stage 4 to 5 model we only incorporated age, race, ACEI use, and anti-lipid medication use because the small number of outcomes limited the number of covariates that could be included in the model. All other models were analyzed with all the prespecified covariates. Nephrology care at stages 3 and 4 and during early CKD improved survival (adjusted HR 0.80, 0.75, and 0.91, respectively). ACEIs transiently reduce GFR as signified by a hazard ratio of greater than 1 for the ACEI started during stage variable; however, long-term they are protective and reduce the rate of progression by almost 40% for stages 1-3 and for pre-ACKD to ACKD. Lipid-lowering agents appear to be protective, whereas diabetes appears to be harmful. Both effects were present across all the stages analyzed. In addition, proteinuria appears to predict a more rapid disease course for pre-ACKD to ACKD. We did not perform the Cox Proportional Hazards analysis for the stage 5 to ESRD group because of its small size, and we excluded comorbid conditions from the stage 4 to 5 analysis because the small number of individuals who reached the endpoint limited the number of covariates that could be analyzed.

Table 2.
Characteristics of Management and CKD-related Complications during Follow-up of the Study Cohort and the Two Subgroups

	Total	Nephrology	PCP-only	p-value
Number	1,553	456	1,097	
Days of follow-up (mean)	1,296	1,310	1,285	0.30
Hospitalizations, mean (range)*	2.6 (0-28)	2.8	2.5	0.03
Clinic visits, mean (range)*	141 (7-1,412)	170	129	< 0.001
Lipid lowering agent (%)	39%	43%	38%	0.58
ACEI (%)	52%	51%	52%	0.07
Blood pressure < 135/85(%)#	37%	41%	36%	0.06
HgA1c < 7% (%)#	39%	38%	40%	0.10
LDL < 100 mg/dL (%)#	33%	32%	36%	0.06
Calcium < 8.5 mg/dL (%)#	6%	6%	6%	0.82
Albumin < 4 g/dL (%)#	50%	59%	49%	< 0.001
Hemoglobin < 12 mg/dL (%)#	9%	10%	9%	0.63
Phosphorus > 4.5 mg/dL (%)#	6%	9%	5%	0.006

ACEI=angiotensin converting enzyme inhibitor; HgA1c=hemoglobin A1c; LDL=low density lipoprotein

*This is the average and range of the total number of visits during the follow-up period per patient.

Individual values for each patient were averaged over three-month periods during follow-up. If ≥ 50% of the averages exceeded the recommended goal then the patient was considered uncontrolled. Table reports % of patients who are uncontrolled.

Legend: Medication use is presented as the proportion of the group using the medication for at least six months during the study period. The management of diabetes, hypertension, and hyperlipidemia as well as the complications of CKD are presented as the proportion with 50% or more of their three-month averages outside of the recommended values.

Discussion

Our findings suggest that nephrologists' involvement in the care of individuals with CKD is associated with a prolonged course of early CKD and delayed onset of ESRD. Individuals who were followed by a nephrologist in addition to their PCP spent significantly more time in CKD stages 3-5 than those followed only by their primary care providers. This finding lends support to current recommendations for initiation of care by a subspecialist and suggests that referrals may be most beneficial around stage 3.

While our study suggests that the addition of nephrology care around stage 3 may play an important role in prolonging disease course, it does not provide an explanation for why this occurs. In order to gain some insight, we evaluated the management of comorbidities and the presence of chronic CKD-related

Table 3.
Results of the Unadjusted Survival Analyses

	Stage 1 to 2	Stage 2 to 3	Stage 3 to 4	Stage 4 to 5	Stage 5 to ESRD	Pre-ACKD to ACKD
Total Cohort (#)	1,217	887	416	86	26	1,530
CKD progression # (%)	583 (48%)	276 (31%)	70 (17%)	21 (24%)	6 (23%)	94 (6%)
died # (%)	255 (21%)	273 (31%)	205 (49%)	45 (52%)	7 (27%)	701 (46%)
composite endpoint # (%)	838 (69%)	549 (62%)	275 (66%)	66 (78%)	13 (50%)	750 (49%)
Median days spent in stage	1,149	1,206	1,158	794	709	1,961
PCP-only vs Nephrology p-value	0.41	0.32	< 0.001	0.03	NA	< 0.001
PCP-only group #	995	624	209	28	6	1,090
CKD progression # (%)	445 (45%)	156 (25%)	14 (7%)	4 (14%)	1 (17%)	27 (2%)
died # (%)	231 (23%)	217 (35%)	131 (63%)	20 (71%)	2 (33%)	509 (47%)
composite endpoint # (%)	676 (68%)	376 (60%)	145 (69%)	24 (86%)	3 (50%)	536 (49%)
median days spent in stage	1,168	1,247	895	558	655	1,936
Nephrology group #	222	263	207	58	20	440
CKD progression # (%)	138 (62%)	120 (46%)	56 (27%)	17 (29%)	5 (25%)	67 (15%)
died # (%)	24 (11%)	53 (20%)	74 (36%)	25 (43%)	5 (25%)	147 (34%)
composite endpoint # (%)	162 (73%)	173 (65%)	130 (63%)	42 (72%)	10 (50%)	214 (49%)
median days spent in stage	1,127	1,100	1,211	834	776	1,991

Legend: The number with composite endpoint is the number of individuals who either died or had CKD progression. The unadjusted median time to endpoint is the median time to either disease progression or death for that stage.

Table 4.
Adjusted Hazard Ratios (with 95% confidence intervals) from the Cox Proportional Hazards Analysis

	Stage 1 to 2	Stage 2 to 3	Stage 3 to 4	Stage 4 to 5	Pre-ACKD to ACKD
Nephrology vs PCP-only	1.08 (0.91,1.29)	1.20 (0.99,1.45)	0.80 (0.61,0.90)*	0.75 (0.45,0.89)*	0.91 (0.76,0.99)*
Age per 1 year	1 (1.00,1.01)	1.01 (1.01,1.02)	1 (0.98,1.01)	1.02 (1.00,1.04)	1 (1.00,1.01)
Nonwhite vs White Race	0.71 (0.62,0.83)*	0.89 (0.73,1.08)	1.11 (0.83,1.44)	1.24 (0.70,2.10)	0.82 (0.69,0.96)*
ACEI use	1.1 (0.91,1.31)	0.62 (0.51,0.74)*	0.68 (0.56,0.98)*	0.96 (0.56,1.64)	0.53 (0.45,0.63)
ACEI started during stage	0.73 (0.61,0.88)*	1.13 (0.93,1.37)	1.03 (0.77,1.42)	2.14 (0.89,4.58)	NA
Anti-lipid agents use	0.64 (0.55,0.75)*	0.57 (0.45,0.71)*	0.54 (0.40,0.70)*	0.71 (0.39,1.38)	0.46 (0.38,0.54)*
Diabetes	1.32 (1.13,1.55)*	1.18 (0.97,1.43)	1.13 (0.86,1.50)	NA	1.31 (1.10,1.56)*
Hypertension	0.8 (0.66,1.35)	0.93 (0.72,1.57)	0.91 (0.77,1.53)	NA	0.85 (0.78,1.01)
Current Tobacco use	1 (0.82,1.13)	0.79 (0.63,1.00)	0.92 (0.69,1.30)	NA	0.84 (0.70,1.02)
Coronary Artery Disease	1.35 (1.14,1.61)*	1.52 (1.23,1.93)*	0.86 (0.64,1.17)	NA	1.54 (1.27,1.88)*
HgA1c > 7%	1.14 (0.91,1.43)	1.28 (1.01,1.63)*	1.53 (1.08,2.11)*	NA	1.33 (1.04,1.62)*
Positive Urine Protein	1 (1.00,1.00)	1 (1.00,1.00)	1.12 (0.91,1.15)	NA	1.46 (1.26,1.74)*

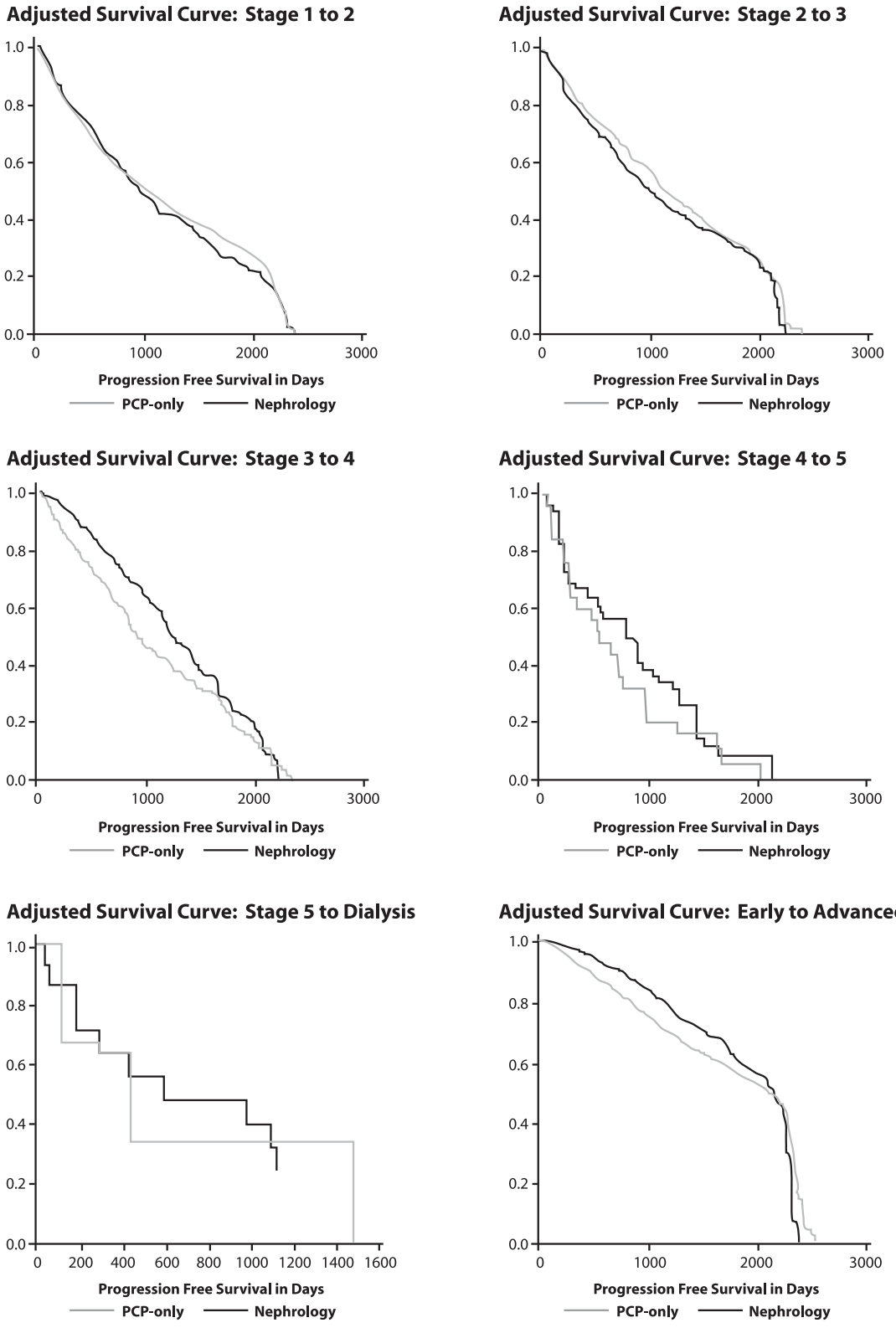
*$p < 0.05$

ACEI = angiotensin converting enzyme inhibitor; HgA1c= hemoglobin A1c

Legend: Hazard ratios > 1 indicate an increased risk of reaching the composite endpoint (death or CKD progression), whereas a hazard ratio < 1 indicates a reduced risk of reaching the composite endpoint. A value of 1 reflects no association between the covariate and the endpoint.

complications between the two groups during follow-up. Both the PCP-only and nephrology groups provided similar levels of control for diabetes, hypertension, hyperlipidemia, hypercalcemia, and anemia; however chronic hyperphosphatemia and hypoalbuminemia were more common in the PCP-only group. In addition, there was greater use of ACEIs in the nephrology group; however, the 1% absolute difference is not clinically significant. It is not possible to distinguish between cause and effect

Figure 1.
Adjusted Kaplan Meier Survival Curves



Legend: Graphs the survival curve (ie, time to the composite endpoint of death or CKD progression) for the nephrology (solid line) and PCP-only (dashed line) groups during each stage. The x-axis represents the time in days, and the y-axis reflects the proportion of the group that has not reached the endpoint. The curves display the proportion of the initial group that has not reached the endpoint over time. The median time for the group to reach the endpoint is reflected by the time point on the x-axis that corresponds with 0.5 on the y-axis.

with our study design; however, these findings are suggestive, and because nephrologists in practice will not be able to expand their capacity to accommodate all stage 3, 4, and 5 patients (almost nine million individuals), it is imperative that we perform well-designed prospective studies to further investigate the answer to these questions.

Similar to the results of a recently published study,[13] we found that mortality was profound, particularly at higher CKD stages. Only at stages 1 and 2 did fewer individuals die than progress, despite the fact that the percentage of individuals reaching the composite endpoint remained relatively similar across all stages (values for stage 4 and 5 are imprecise due to the few individuals in these two groups). When comparing the nephrology group to the PCP-only group across all stages, fewer individuals in the PCP-only group progressed to a higher stage; however more individuals died. This relationship may be related to a lower referral rate for individuals with comorbidities conferring an increased risk of death, such as cancer. The limitations of our data prevent us from examining this association in more detail.

Previous studies evaluating the impact of nephrology care on renal-related outcomes have focused upon the association between the morbidity and mortality of dialysis and the patterns of pre-ESRD care.[14,15] These retrospective studies consistently found that individuals referred to a nephrologist early had less morbidity and mortality than those referred late, however early referral was dichotomized (ie, before or after a prespecified cut-off time), the definition varied (one month to one year predialysis), and the findings were not generalizable to pre-ESRD populations. This is the first study to evaluate a CKD population in various stages of disease over an extended follow-up time. By performing a study to investigate the impact of nephrology care at each CKD stage, we were able to more closely assess the impact of a nephrologist on mortality and progression in those with pre-ESRD who receive medical care by primary care physicians. This is an important distinction since the impact of recommending early referral will be limited to those already receiving medical care. It will not affect those who receive no pre-ESRD medical care.

The retrospective design of our study raises the possibility that the difference in outcomes between the two groups may have been related to unmeasured variables or bias in patients referred to nephrologists. We attempted to account for this possibility by using a propensity score to adjust the analysis. Propensity scores are able to improve upon statistical analysis in potentially biased populations, but they are still subject to the problems of unmeasured bias. The average stage at referral, 1.6, is quite low, indicating that most patients seen by subspecialists were referred during their earliest stages and that crossover between the nephrology and PCP-only groups at later stages was limited. The study design also prevented us from controlling loss to follow-up; however, only 133 of the original 1,553 individuals transferred out of the system, and there was excellent long-term follow up, averaging 3.5 years.

The population we studied limits the generalizability of our results to other veterans since VA populations may be different than non-VA populations and the patterns of care may also be different. In particular, patients tend to have more comorbidities with more severe disease. Referrals may take longer and follow-up by subspecialists may not be as close as in other systems. In addition, we were unable to determine if an individual received care from a non-VA nephrologist or if they received medications outside of the VA, although both are uncommon in our experience. To address this concern, we performed an informal survey of primary care providers at the Durham VA and a limited chart review for 50 patients in each group. The informal survey found that providers believed only 1-2% of their patients may obtain additional care outside of the VA and that less than 1% obtained medications outside the VA. The chart review did not identify any patients with either care or medications from outside the VA.

Our study suggests that the addition of subspecialty care to standard care by a PCP around CKD stage 3 may improve outcomes. However, well-designed prospective studies should be performed to further clarify the role and timing of nephrologist care in the management of patients with CKD. If the relationship is supported by additional studies, the reason for the phenomenon could have important clinical and health policy implications. If it is attributable to care that requires nephrology training or is otherwise only feasible in the context of a nephrology practice, then we will need to train more nephrologists. However, if some or all of the effect can be attributed to activities that can be incorporated into PCP practice, then PCPs will need to become more adept at these activities. **NCMJ**

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Attitudes about Tobacco Policies among North Carolina Parents

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Abstract

Background: *While tobacco use reduction remains a major public health goal, little evidence exists on how citizens in North Carolina view policy issues related to tobacco control. This research examines attitudes toward tobacco policies among North Carolina parents.*

Methods: *Randomly selected North Carolina adults with a child living in his or her household were invited to participate in the Child Health Assessment and Monitoring Program (CHAMP) telephone survey. A sample of 3,973 parents or guardians was interviewed in 2005. Support for tobacco prevention and policies was analyzed by demographic characteristics.*

Results: *Of the 86% of initial respondents who were eligible to participate, 83% completed the 2005 CHAMP survey. Most parents in North Carolina (90.1%) support stronger policies for tobacco prevention. Parents also strongly support restrictions on tobacco in schools (85.6%) and recreational areas and fast food restaurants (83.9%). While many parents report being well prepared to talk to their children about smoking (97.6%) and report talking about the dangers of smoking monthly (84.7%), few report that their child currently smokes (3.9% of high school students and 0.6% of middle school students).*

Limitations: *Because the CHAMP survey is telephone-based, the results are limited to North Carolina parents who have a land-line telephone.*

Conclusions: *Despite the state's historical ties to tobacco, the overwhelming majority of North Carolina parents are in favor of stronger efforts at tobacco use prevention, including increased policy measures. These results suggest that prevention efforts should be expanded and that policy makers who take a stronger stance against tobacco will most likely receive broad support by North Carolina parents.*

Keywords: *parents, tobacco control, smoking restrictions, media campaigns*

Introduction

Smoking is the leading cause of preventable death in the United States and is attributable to over 400,000 deaths each year.[1] In North Carolina, it accounts for more than 11,500 deaths a year at a cost of $1.9 billion in direct medical expenditures.[2] In 2002, North Carolina's Medicaid costs associated with smoking were estimated to be more than $940 million.[3] According to recent survey research conducted by the North Carolina State Center for Health Statistics, 22.6% of North Carolina residents over the age of 18 are current smokers, giving the state a higher adult smoking rate than two thirds of states nationwide.[4]

In an effort to combat death and disease attributable to cigarette

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smoking, the Centers for Disease Control and Prevention (CDC) recommends that each state establish a comprehensive tobacco control program.[5] Comprehensive programs should not only encourage youth and adults to quit, but they should also focus on youth prevention of tobacco use and eliminating exposure to secondhand smoke. Policy research shows that for every 10% increase in the price of cigarettes, a 3 to 5% decrease in cigarette consumption occurs among adults and even higher reductions in consumption are seen among youth;[5] mass media anti-smoking campaigns can reduce the number of teens smoking across the country;[6] and enacting 100% tobacco free school policies can significantly reduce environmental exposure to secondhand smoke in the school setting.[7] Despite the evidence supporting these (and similar) efforts across the United States, significant barriers exist to tobacco prevention, including preemption (state laws encouraged by the tobacco industry that prevent strong local regulations) and lack of funds to sustain tobacco-prevention programs.[5]

Stakeholders in tobacco farming and production also inhibit policy measures, particularly in tobacco-producing states.[8] Despite significant declines, North Carolina remains the largest tobacco-producing state in the country, employing approximately 13,000 people in tobacco-related jobs, including 4,100 tobacco farmers.[9] While the economic impact of tobacco farming in North Carolina has declined significantly, the impact from tobacco manufacturing remains substantial, representing over one half of all United States tobacco manufacturing activity.[9] It is no surprise then, that North Carolina policy makers have traditionally not supported strong regulations on tobacco use.[8] For example, in 1993 the North Carolina legislature passed a "preemption" law that required state-controlled buildings to have 20% of the indoor space allocated for smoking and eliminated the ability of local governments to ban smoking in most public places.[3] Until recently, North Carolina ranked 50th in the country in its tobacco excise tax rate.[10]

Within the last few years, support for the tobacco industry among policy makers in North Carolina has begun to decline, resulting in stronger support for state tobacco control policies. Legislation to raise the state tobacco excise tax from 5¢ to 30¢ passed the North Carolina legislature in 2005, with an additional increase of 5¢ taking effect in July 2006.[10] Within the last two years public health advocates successfully expanded the number of venues with the ability to eliminate tobacco use (ie, schools, health departments, hospitals, social service agencies, and the General Assembly).[11] Perhaps the most significant example of the state's changing atmosphere is the decision to invest state tobacco settlement money into the prevention of tobacco use by adolescents.[2] From 2003 to 2004, the state, through its Health and Wellness Trust Fund, invested $6.2 million in its teen tobacco use prevention and cessation programs, with an increased investment to $15 million in 2005-2006. While this investment is far less than the CDC recommends for comprehensive state programs, the investment did move North Carolina from near the bottom nationally in state spending on tobacco control to near the middle within a short period of time.

Little data exists about the attitudes that North Carolina citizens have toward tobacco policies and regulation. A recent North Carolina public opinion poll found that almost two thirds of those interviewed supported a statewide ban on smoking in public places, suggesting that the attitudes of many citizens may have shifted even more strongly than that of policy makers.[12] This study provides insight into how a random sample of approximately 4,000 North Carolina parents who have children under the age of 18 feel about various tobacco-related policy issues.

Methods

This study uses data from the 2005 Child Health Assessment and Monitoring Program (CHAMP) survey conducted by the North Carolina State Center for Health Statistics (SCHS). The CHAMP survey is a follow-up to the North Carolina Behavioral Risk Factor Surveillance System (BRFSS), a random, telephone survey of noninstitutionalized adults 18 years of age and older. Telephone numbers are generated from a computer in groups of 100 consecutive phone numbers that contain at least one published household telephone number. The telephone number groups are then assigned to two strata: (1) high density or listed numbers and (2) low density or unlisted numbers. The listed numbers are sampled at a higher rate than unlisted numbers in an effort to lower cost and improve interviewer efficiency. Data collection for the BRFSS is ongoing throughout the year, with interviews conducted 7 days per week at varying times of the day.

While the BRFSS is a national surveillance system, the CHAMP survey is unique to North Carolina. The CHAMP survey allows all adult respondents in North Carolina who completed the BRFSS survey and have children living in their household to participate in a supplemental survey. One child in each household was randomly selected through a computerized randomization procedure and the adult identified during the BRFSS interview as most knowledgeable about the health of the selected child was interviewed in the follow-up CHAMP survey. Approximately one week after completion of the BRFSS interview, an SCHS interviewer would begin to attempt to contact the household for the CHAMP survey. During the 2005 data collection period, 86% of BRFSS households agreed to participate in the CHAMP survey, with 83% of those households completing the survey. The final CHAMP sample size was 3,973 North Carolina parents or guardians.

The purpose of the CHAMP survey is to measure the health characteristics of North Carolina children, ages 0 to 17. The survey measures a wide variety of health-related topics affecting children and parents, including breast feeding, early childhood development, access to health care, oral health, mental health, physical health, nutrition, physical activity, family involvement, and parent opinion on topics such as tobacco and childhood obesity. The majority of questions on the CHAMP survey originate from pre-existing telephone surveys from the National Center for Health Statistics.

The data presented in this report are population-weighted

responses to the tobacco-related questions, with corresponding 95% confidence intervals. The use of weighted data adjusts the results of the sample to better represent the entire population of North Carolina. Adjustments are made to account for the unequal probabilities of selection due to the disproportionate sampling method and due to people living in households with different numbers of residential telephone numbers and different numbers of children in the home, as well as unequal nonresponse rates among different demographic groups. The tobacco-related questions on the CHAMP survey reflect opinions about policy measures and initiatives that are currently being debated on a local and state level, as well as questions assessing parental knowledge of their child's cigarette use.

Results

The demographics of the parents who answered the tobacco-related questions showed that approximately 11% were male, 71% were white, and 32% of households had at least one college graduate living in the home.[a]

Parents were asked about their children's smoking behavior and their own efforts to educate their children about the ill effects of smoking. When asked about whether or not their child had ever smoked cigarettes, 16.9% (95%, CI 14.2 to 20.0) of parents of high school aged students responded that their child had ever smoked, and only 3.9% (95%, CI 2.37 to 5.44) reported that their children currently smoked cigarettes. Parents of middle school students responded that 5.1% (95%, CI 3.4 to 7.5) of their children had ever smoked cigarettes, and only 0.6% (95%, CI 0.0 to 1.5) reported that their children currently smoked. Parents reported that they were well prepared to talk to their children about the dangers of tobacco use, with 97.6% (95%, CI 96.9 to 98.1) responding that they felt well prepared to talk to their children about ways to reduce their children's chances of smoking. A similarly high percentage, 84.7%, (95%, CI 82.7 to 86.6) reported talking to their children at least once a month about the dangers of tobacco use.

Parents in this survey were also asked to give their opinions on various tobacco policies and initiatives in North Carolina (see Table 1). Parents reported that they were strongly in favor of making tobacco use prevention more of a priority in the state, with 90.1% (95%, CI 88.8 to 91.2) of North Carolina parents surveyed responding that it was very important for the state to take additional actions to prevent and reduce tobacco use among North Carolina youth. One such action, making their child's school 100% tobacco free, was strongly supported by 85.6% (95%, CI 84.3 to 86.9) of parents. Similarly, 83.9% (95%, CI 82.5 to 85.3) of the parents strongly supported making all indoor recreational areas and fast food restaurants tobacco free. An increase in the state excise tax on cigarettes, as a way to reduce youth tobacco use, was strongly supported by 67.2% (95%, CI 65.4 to 69.0) of the parents surveyed, with only 12.7% (95%, CI 11.4 to 14.0) of the parents reporting that they did not support any increase in the state excise tax on cigarettes. While there was some variability across demographic categories, the majority of parents, regardless of the highest level of education in the household or age or race of their child, supported these policy measures (see Table 1).

Results from the CHAMP survey revealed that 58.4% (95%, CI 38.9 to 44.2) of the parents said they had seen or heard about the state-funded Tobacco.Reality.Unfiltered. (TRU) tobacco prevention media campaign at least once. Approximately one third, 36.0% (95%, CI 33.4 to 38.6), of the parents surveyed reported hearing about or seeing the campaign at least three times in the past year (see Figure 1).

Discussion

In North Carolina and neighboring states, for most of the latter half of the 20th century, economic ties to tobacco farming and the tobacco industry have limited the extent of many public health initiatives against tobacco.[8,13-15] In the last few years, coincident with the declining influence of the tobacco industry, policy makers have begun to take stronger stances on tobacco regulation with legislative gains occurring in many areas of the country, even in historically strong tobacco-producing regions.[11,13,14] One study in a tobacco-producing state found that citizens in the state were more likely to support restrictions on smoking in public places than legislators.[15] Support for stronger tobacco regulation occurs at the same time as support grows for helping tobacco farmers diversify away from tobacco farming. In one national sample, 57% of respondents supported government involvement in helping tobacco farmers try new farming ventures.[16]

While North Carolina is still the nation's largest producer of tobacco, the results of this survey indicate that parents in the state have strong opinions about tobacco and its health effects. Although it is reassuring to know that over 8 out of 10 parents state that they talk about the dangers of tobacco use with their children on a monthly basis, North Carolina parents appear to dramatically underestimate or are unaware of the likelihood of their own children's use of cigarettes. Published surveys of North Carolina youth document that 5.8% of middle school students and 20.3% of high school students currently smoke cigarettes, rates much higher than that reported by parents in the CHAMP survey.[17,18] Previous research has indicated that parents do underestimate their children's cigarette use.[19,20] It is likely that if parents were more aware of their children's smoking behavior, support for tobacco prevention policy measures would be even higher than that reported in the CHAMP survey. Further research would also be useful to assess parental estimates about their child's use of other types of tobacco products, including spit tobacco (chewing tobacco or snuff). Currently, the CHAMP survey only assesses cigarette use. Since the children of the parents surveyed were not interviewed, additional studies are needed to explore the relationship between reports of

a Demographics vary slightly across questions due to skip patterns in the survey or respondent's refusal to answer.

Table 1.
Support Among North Carolina Parents for Strengthening Tobacco-Related Policies Affecting Youth

	How important do you think it is for North Carolina to take additional actions to prevent and reduce tobacco use among our youth?	*To what degree do you support a 100% tobacco free policy in your child's school?*	*To what degree do you support a tobacco free policy in indoor recreational areas and fast food restaurants?*	*To what degree would you support increasing the tax on cigarettes in North Carolina to reduce youth access*
	% very important (95% CI)	**% strongly support (95% CI)**	**% strongly support (95% CI)**	**% strongly support (95% CI)**
Total	90.1% (88.8 – 91.2%)	85.6% (84.3 – 86.9%)	83.9% (82.5 – 85.3%)	67.2% (65.4 – 69.0%)
Gender of child				
Male	90.2% (88.4 – 91.7%)	85.5% (83.5 – 87.3%)	83.7% (81.6– 85.6%)	67.1% (64.5 – 69.6%)
Female	90.0% (88.1 – 91.5%)	85.8% (83.8 - 87.6%)	84.2% (82.1 – 86.1%)	67.4% (64.7 – 69.9%)
Age groups				
Under 5	89.7% (87.2 – 91.8%)	88.5% (86.0 – 90.6%)	86.6% (83.9 – 88.9%)	66.9% (63.3 – 70.4%)
5 – 10	89.9% (87.7 – 91.8%)	84.9% (82.3 – 87.2%)	84.3% (81.7 – 86.6%)	70.2% (67.0 – 73.2%)
11 – 13	90.9% (87.7 – 93.4%)	85.9% (82.3 – 88.8%)	83.5% (79.9 – 86.6%)	66.9% (62.4 – 71.1%)
14 – 17	90.0% (87.4 – 92.1%)	83.1% (80.0 – 85.8%)	80.5% (77.3 – 83.4%)	63.4% (59.5 – 67.0%)
Race of child				
White	88.7% (87.2 – 90.2%)	84.7% (83.0 – 86.3%)	83.9% (82.2 – 85.5%)	64.9% (62.7 – 67.1%)
Black	92.3% (89.8 – 94.3%)	86.7% (83.6 – 89.2%)	84.0% (80.7 – 86.8%)	70.0% (66.0 – 73.7%)
Other	93.6% (89.8 – 96.0%)	89.8% (85.4 – 93.0%)	83.7% (78.7 – 87.7%)	77.7% (72.3 – 82.4%)
Highest education achieved in household				
Less than high school	93.2% (88.7 – 96.0%)	85.8% (79.7 – 90.3%)	82.3% (76.0 – 87.3%)	73.0% (66.0 – 79.0%)
High school	89.2% (86.3 – 91.5%)	82.7% (79.5 – 85.5%)	78.8% (75.3 – 81.9%)	58.9% (54.9 – 62.8%)
Some college	91.5% (89.2 – 93.4%)	81.2% (78.1 – 84.0%)	78.8% (75.6 – 81.7%)	61.2% (57.4 – 64.8%)
College graduate	89.1% (87.1 – 90.8%)	89.5% (87.6 – 91.1%)	89.6% (87.7 – 91.2%)	73.8% (71.2 – 76.3%)

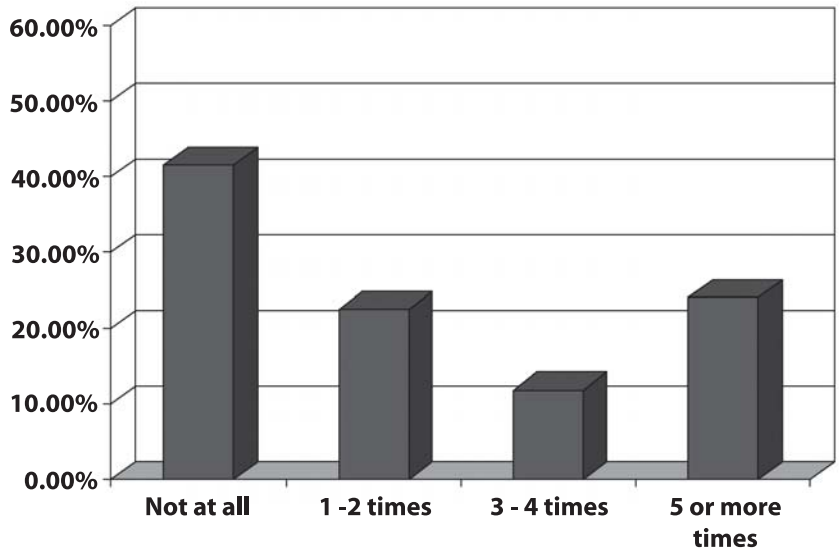
parental awareness of their children's smoking behavior and children's actual smoking behaviors.

The CHAMP data indicate that parental opinions extend from its effects on their own children to statewide public policy. Parents indicate strong support for policy makers to take increased steps to regulate tobacco products, decrease exposure to secondhand smoke, and spend more funds to accomplish both. These policy actions include increasing the state's tobacco excise tax, adopting regulatory measures for 100% tobacco-free schools, and adopting regulatory measures for 100% smoke-free environments in restaurants and recreational facilities. Strong support for policy actions was shown across the board and did not depend on the highest level of education in the household, race, or age of child.

This data, combined with results from a recent statewide poll, support the conclusion that citizens in the state are increasingly likely to demand more attention be paid to decreasing involuntary exposure to secondhand smoke.[12] One recent study of seventh and eighth graders in North Carolina public schools found that 15% of the asthma cases reported were caused by exposure to secondhand smoke.[21] A positive development is that in the last two years an increasing amount of North Carolina public school districts have adopted 100% tobacco-free school policies.[7] With the United States Surgeon General recently reporting that there is no safe level of exposure to secondhand smoke, the complete elimination of exposure to secondhand smoke in schools and public venues is a justified concern of all parents.[22] While statewide legislation can achieve significant reductions in secondhand smoke exposure, in North Carolina, the state's preemptive smoking law needs to be repealed in addition to policy makers adopting a comprehensive measure.[22,23]

North Carolina policy makers have already decided to invest significant resources into youth tobacco use prevention and cessation through the North Carolina Health and Wellness Trust Fund and its teen tobacco programs.[24] A major component of that program is a statewide media campaign, *Tobacco.Reality.Unfiltered.* or TRU. The CHAMP data indicate that parents have tuned in to this statewide television campaign to prevent youth tobacco use. The TRU campaign began television advertisements targeting youth across the state in 2004 and features real stories from North Carolina youth about

Figure 1.
How frequently in the last year have you heard about or seen the North Carolina *Tobacco.Reality.Unfiltered.* (TRU) media campaign?



tobacco experiences, illnesses, and diseases of their loved ones. While the campaign is directed at youth, the stories featured in the ads are also the stories known by North Carolina parents. The CHAMP survey suggests that the ads do reach parents, and thus, the ads may have a positive effect on parental attitudes against tobacco use by their children. Future research could assess the degree to which the TRU campaign may affect adult as well as youth tobacco attitudes.

A couple of limitations to the data and analysis exist. Despite parents reporting that they were strongly in favor of increased policy measures for tobacco prevention, these questions were asked in isolation. It is possible that if parents were asked to compare the priority for tobacco prevention to other policy issues in the state, the results may be different. It is also possible that parents' smoking status may be related to support for policy measures. Unfortunately, the data collection methods of the BRFSS and CHAMP surveys prohibit this relationship from being explored. While smoking status is assessed on the BRFSS, there is no guarantee that the person who responded to the BRFSS survey is the same person who participated in the CHAMP survey as the person most knowledgeable about their child's health. A final limitation is one common to all telephone surveys—the pool of respondents is limited to only those who have a land-line telephone. Even though the telephone numbers are randomly selected and the data is weighted to represent all North Carolina parents, there are some limits to its generalizability as a result.

While this is the first CHAMP survey of parental attitudes of tobacco policies in North Carolina, its findings clearly indicate that most North Carolina parents have moved beyond traditional pro-tobacco attitudes and are in favor of tobacco use prevention for their children and increased policy measures for the state. Current parental attitudes about tobacco suggest that policy makers who take a stronger stance against tobacco use will likely receive broad parental support in the state. **NCMJ**

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Appendix A. Questions Used in Analysis

Parent Opinon

1. How important do you think it is for North Carolina to take additional actions to prevent and reduce tobacco use among our youth? Very important / Somewhat important / Not at all important
2. To what degree do you support a tobacco free policy in your child's school so that no one, not students, nor teachers, staff or visitors, could smoke or use other tobacco products on the school grounds at any time? Strongly support / Moderately support / Do not support
3. To what degree do you support a tobacco free policy in indoor recreational areas (skating rinks, bowling alleys) and fast food restaurants where your child plays, works or eats? Strongly support / Moderately support / Do not support
4. To what degree do you support increasing the tax on cigarettes in North Carolina to reduce youth access to tobacco in our state? Strongly support / Moderately support / Little support / Don't support
5. Do you feel well prepared to talk with (CHILD) about reducing the chances of smoking? Yes / No / Don't know or Not Sure

Tobacco Indicators

1. How often have you discussed the dangers of tobacco use with (CHILD) in the last 12 months? Once a day / Once a week / Once a month / Once a year / Don't know or not sure / Never
2. To your knowledge, has (CHILD) ever smoked cigarettes? Yes / No / Don't know or not sure
3. To your knowledge, does (CHILD) currently smoke cigarettes? Yes / No / Don't know or not sure
4. How frequently in the last year have you heard about or seen (on TV, from your children, or in other media) the North Carolina *Tobacco.Reality.Unfiltered.* (TRU) media campaign directed to preventing tobacco use among youth? Not at all / Once or twice in the last year / Three or four times / Five times or more / Don't know or not sure

Patient Attitudes toward Screening

Denise E. Bonds, MD, MPH; Shellie D. Ellis, MA; Erin Weeks; Peter Lichstein, MD; Kim Burke; and Chris Posey

Abstract

Background: *Physician organizations recommend screening for health care behaviors. Despite these recommendations, health care providers worry that questions on sensitive topics may not be accepted by their patients. To determine if there is a relationship between health care screening by providers and acceptance of that screening by patients, a survey of female patients was analyzed.*

Method: *Two telephone surveys were conducted two years apart. Each was a cross-sectional sample of female patients over the age of 18 years who had been seen by their primary care provider (PCP) in the previous 12 months. Patients were asked if they had been screened for eight different health behaviors (exercise, smoking, use of alcohol or drugs, excessive stress, sexual functioning concerns, safety or violence in the home, guns in the home) in the past year. They were also asked about their attitudes toward screening for those behaviors by health care providers. Odds ratios were calculated for patients who both agreed that screening should occur and reported having been screened in the last year.*

Results: *3,175 women were surveyed. There was high acceptance of routine screening for exercise (75%), smoking (72%), alcohol/drugs (68%), and stress (62%), but less for sexual functioning (40%), safety/violence (40%), or guns (23%). There was a higher likelihood of agreeing with routine screening if the patient reported having been screened in the past year: exercise (OR 2.3, 95% CI 1.8-2.9), smoking (OR 1.6, 95% CI 1.3-1.9), alcohol/drugs (OR 2.3, 95% CI 1.9-2.7), stress (OR 1.7, 95% CI 1.4-1.9), sexual functioning (OR 2.7, 95% CI 2.2-3.4), safety/violence (OR 3.4, 95% CI 2.8-4.2), and guns (OR 4.4, 95% CI 3.4-5.8).*

Limitations: *Only women in established relationships with primary care providers were surveyed. The cross-sectional nature of the survey prevents determination of the causality of the relationship.*

Conclusion: *Women who had been screened for a health behavior had greater acceptance of routine screening for that behavior. Although further research is needed to determine the casual relationship, providers should not worry about offending their patients when screening for sensitive health behaviors.*

Introduction

Physician organizations recommend screening patients for risky health behaviors to reduce morbidity and mortality and to increase quality of life. Behaviors such as smoking, alcohol and drug use, and sedentary lifestyle have been strongly associated with increased morbidity and mortality.[1,2] Evidence suggests that routine screening with appropriate follow-up counseling can improve health outcomes.[3,4] Although there is less evidence for routine screening for other health behaviors or risks, such as guns in the home[5] and domestic violence,[6] many professional societies advocate for their incorporation into routine clinical practice on other grounds.[7]

Despite the evidence and encouragement to conduct screening, rates vary by physician specialty, physician gender, health behavior, and patient race.[8-15] Multiple factors have been shown to contribute to this variability. Studies have shown that physicians' perception of the ease of the intervention, the intervention's potential to

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improve health outcomes, the health care providers' personal beliefs or practices, and their acceptance and comfort in asking about sensitive topics all influence screening rates.[8,12,13,15-24] Moreover, patients may have varying attitudes toward screening.[25,26]

Researchers have not fully elucidated the relationship between patient attitudes and provider practice. Health care providers may be less likely to screen if they sense disapproval or discomfort from their patients on particular health subjects. This reluctance to screen for fear of offending has been best documented in the literature with regard to screening for domestic violence.[27] With the increasing shift in the delivery of health care toward a consumer-oriented model and an emphasis on patient satisfaction as a measure of health care quality, providers may avoid asking questions on topics they view as sensitive to avoid lowering patient satisfaction. This fear may result in decreased health care quality if providers miss an opportunity to provide appropriate referral and assistance to patients, thus reducing the effectiveness of the patient-provider relationship. Conversely, patients' attitudes toward questions on sensitive topics may change with routine screening due to normalization of the behavior as a health risk. Patient satisfaction with and trust in their health care provider may increase as providers explore topics that patients did not link with their medical condition but may ultimately impact their health or quality of life. To determine if routine screening was associated with increased patient acceptance, we analyzed patient survey data from Providers Asking About ViolencE (Project PAAVE), a practice-based intervention to increase screening for domestic violence.

Methods

Project PAAVE was designed to increase the rate of screening for domestic violence by primary care providers. For this study, primary care providers were defined as academic or community-based internal medicine, family medicine, or obstetrics and gynecology practices with at least two providers. PAAVE was a multi-modality intervention conducted in western North Carolina that included both standardized educational sessions at the beginning and throughout the 18-month intervention period and components customized to the needs of participating practices. The intervention was evaluated through a pre/post telephone survey of female patients seen within the last 12 months at the practice. To protect women who were in violent situations, the question on screening for violence in the home was embedded in a larger questionnaire. This report utilizes the data collected in the additional questions asked of patients. The study was reviewed and approved by the Institutional Review Board at Wake Forest University School of Medicine.

Survey

A previously validated survey was used.[28-30] This survey was developed for use in the federally supported Women's Health Centers of Excellence and has been tested in over 1,000 female patients with an alpha of 0.95 for the measure of comprehensiveness of care that include the screening questions used in this analysis.[30] Patients were asked about their experiences being screened for particular health behaviors/risk factors, their medical utilization patterns, and other demographic information. Smoking, the use of alcohol or drugs, exercise, a gun in the home, concerns about safety or violence at home, family or relationship concerns, sexual functioning, and stress management were the health behaviors/risk factors included in the survey. Response options were "Yes," "No," and "Don't know." Patient demographic factors included age, marital status (married or marriage-like relationship versus not married), race (white, nonwhite), income (less than $25,000, $25,001 to $50,000, $50,001 to $75,000, greater than $75,001), and medical insurance (any, none). Medical utilization questions included the number of visits for any type of health care in the previous year, type of provider seen (family or general practitioner, internist, gynecologist, physician assistant, or nurse practitioner), and the gender of the health care provider.

To ascertain patient attitudes about the types of screening questions asked by health care providers, eight additional questions were added to the survey. The attitude questions mirrored the health behaviors/risk factors already included in the survey. Patients were asked if they thought providers *should* ask patients about smoking, use of alcohol and drugs, exercise, guns in the home, concerns about safety or violence in the home, sexual functioning concerns, and if they are under excessive stress. Four options were provided: "Yes, at every visit;" "Yes, once a year;" "Yes, if there is a reason;" and "No." We defined routine screening as screening that occurred regardless of a whether the condition is clinically apparent. For the purpose of these analyses, we defined acceptance of routine screening as either the response "Yes, at every visit" or "Yes, once a year."

Patients

Each clinic was asked to supply a list of at least 400 female patients who had been seen in the last year. One clinic was unable to compile a list of 400 patients, so all patients on its list were called. To be eligible for the survey, the patient had to be over the age of 18 years, speak English (due to lack of bilingual staff), be able to understand and respond to questions, and have been seen in the clinic in the previous 12 months. The training of the health care providers occurred during September 2002 to November 2002. Women interviewed at baseline were randomly sampled from women with a visit to any one of the participating health care providers between September 2001 and August 2002. Those women interviewed for the follow-up were drawn from a new pool of women who visited a health care provider between July 2003 and June 2004. Although it was possible for a patient to appear on both lists and participate in both surveys, no attempt was made to track patients between the two surveys. Patients were selected for inclusion using a random number table, then contacted by telephone and asked to participate. At least three attempts at different times of the day were made to contact the participant. If a selected patient was not reached or refused, the next consecutive patient was attempted. This sequence was continued until 100

completed surveys were obtained from each clinic at each point in time (baseline and follow-up; total from each clinic n = 200).

Statistical Analysis

Analyses were performed using STATA version 8.0 (Stata Corp, College Station, TX). Each survey (baseline and follow-up) was analyzed separately and then the data sets were combined. Generalized estimating equations were used to account for the effect of clustering by clinic site. The unadjusted effect of recent screening for the health behavior on acceptance of each specific health behavior was examined (eg, recent screening for exercise on odds ratio of agreeing with routine screening for exercise). We then adjusted for patient and practice characteristics. Specifically, we modeled the odds ratio of agreeing with routine screening as a function of having been screened in the past year after adjusting for age, marital status, race, income, insurance, PCP gender, PCP type, number of visits, and clustering by clinic. Possible variation by survey year was accounted for by inclusion of a variable for survey time in all models.

Results

Practices

Seventy-nine practices were contacted by mail or phone during the three-month recruitment period. Seventeen academic (n = 5) and community-based (n = 12) primary care practices were recruited, among them four internal medicine, 11 family, and two obstetric and gynecology practices. Two practices are excluded from our analysis. One practice dropped out after the initial training session and one closed shortly after the study began (both community-based family practices).

Patients

Approximately 6,000 patient names at each time point were randomly selected for inclusion in the study (pre: 6,319; post: 5,967). Only three attempts (one each in the morning, afternoon, and evening) were made to reach each participant; thus a large number of potential participants were contacted but not reached. (pre: 3,962 - 62%; post: 3,718 - 62%). Six hundred and fifteen patients (pre: 310; post: 305) were reached but did not meet inclusion criteria due to reasons including inability to understand questions, male gender, age less than 18 years, no clinic visit in the previous year, and inability to speak English. Eight hundred and thirteen (pre: 403; post: 410) were reached but refused to participate. The resulting number of women included in the analyses described in this paper is 3,175 (pre: 1,534; post 1,641, overall response rate 26%). No information is available on the non-responders. The median age was 48 years, about one third stated they were of non-white race, and half said they were married or living with a partner (see Table 1). Nearly half reported their income was less than $25,000 per year and nearly all had some type of insurance. Most participants stated they were seeing a family medicine physician, and more than half of the health care providers were female. The mean number of visits to any health care provider was 7.7.

Survey Results

When participants were asked whether physicians should screen for particular health behaviors or concerns, most agreed that physicians should routinely ask about exercise, smoking, use of drugs or alcohol, and if they are under excessive stress (see Table 2). Fewer participants felt that health care providers should routinely screen for sexual functioning concerns, safety or violence in the home, and guns in the home. Respondents did feel that sexual functioning and safety and violence in the home were questions that should be asked if the provider had a reason. Most respondents felt that physicians should not ask about guns in the home.

When asked about previous health behavior screening by their primary care provider in the past year, most recalled having been asked about exercise, smoking, use of drugs or alcohol, and the level of stress in their lives (see Table 2). Fewer stated their physicians had discussed sexual functioning concerns or safety and violence in the home. Only 7% of participants recalled having a discussion about guns in the home. Previous health behavior screening was highly associated with participants' attitudes toward screening in all seven areas (see Table 3).

Table 1.
Description of Sample Population

	N = 3,175[a] % (N)
Age (mean)	48 years (SD 17 years)
Nonwhite race	35%
Married/living with partner	51%
Income	
< $25,000	49%
$25,000 - $50,000	26%
$50,001 - $75,000	14%
> $75,000	11%
Working full or part time	42%
Any health insurance	90%
PCP[b] type	
Family Medicine	62%
Internal Medicine	18%
Obstetrics/Gynecology	8%
Midlevel	8%
Other	4%
Female PCP	51%
Number of visits in last year (mean)[c]	7.7 (SD 10)

[a] Some participants opted not to answer all questions (age n = 10, race n = 81, marriage status n = 22, income n = 571, work status n = 18, health insurance n = 3, PCP type n = 226, PCP gender n = 88, visits n = 76. The percentages in the table are of those that responded.

[b] Primary care provider

[c] To any health care provider

Table 2.
Attitude toward Health Care Screening and Rates of Screening in the Past 12 months

Screening Question:	Yes, at every visit			Yes, once a year			Yes, if there is a reason			No			Participant asked in past year[d]		
	Pre	Post	Both	Pre	Post	Both	Pre	Post	Both	Pre	Post	Both	Pre	Post	Both
Health care providers should ask their patients if they…															
Exercise	48%	48%	48%	29%	25%	27%	20%	23%	21%	4%	4%	4%	72%	71%	72%
Smoke	37%	48%	43%	34%	25%	29%	26%	24%	25%	3%	3%	3%	56%	69%	63%
Use alcohol or drugs	43%	43%	43%	28%	21%	25%	26%	30%	28%	2%	5%	4%	41%	60%	50%
Are under excessive stress	44%	45%	45%	19%	12%	16%	35%	39%	37%	2%	3%	3%	42%	38%	40%
Have sexual functioning concerns	16%	18%	17%	22%	24%	23%	41%	40%	41%	21%	18%	20%	21%	23%	22%
Have concerns about safety or violence in the home	20%	27%	23%	17%	15%	16%	49%	45%	47%	14%	13%	14%	16%	26%	21%
Have a gun in the home	11%	11%	11%	12%	12%	12%	24%	25%	24%	53%	53%	53%	6%	8%	7%

[d] Answered "Yes" to the question "In the past 12 months has a doctor or other health professional discussed with you…?"

Those participants that recalled having been screened for a particular health behavior in the previous year were more likely to agree that health care providers should screen for that health behavior at either every visit or at least once a year. For example, those participants who had been screened for exercise in the last year were more likely to answer "Yes, at every visit" or "Yes, once a year" to the question "Should health care providers ask their patients if they exercise?" This association was stronger for those issues that had relatively low level of acceptance for routine screening: sexual functioning concerns, safety or violence in the home, and guns in the home. The association remained after adjustment for patient demographics (age, marital status, race, income, insurance), provider characteristics (gender, specialty), number of visits, clustering by clinic, and survey year (see Table 3). When the response "Yes, if there is a reason" was excluded and the analyses rerun, the association of previous screening with acceptance of screening was even stronger, particularly for the three most controversial questions: sexual functioning concerns (adjusted OR 5.8, 95% CI 3.5-9.4), concerns about safety or violence in the home (adjusted OR 5.6, 95% CI 3.9-8.1), and guns in the home (adjusted OR 6.5, 95% CI 4.7-9.1).

When the characteristics of participants who answered "No" to the questions about whether physicians should screen were examined, these individuals were generally older, less likely to be married, more likely to state their income was less than $25,000 a year, less likely to be working, and reported having more visits to a health care provider. However, in statistical analysis, most of these differences were not significant (data not shown). Only three participants responded "No" to all "should health care providers screen" questions, and 187 responded "No" to the three most controversial questions of screening for sexual functioning concerns, safety or violence in the home, and guns in the home. When the demographic and socio-economic characteristics of these 187 were compared to the remaining participants, no significant differences were seen (data not shown).

Discussion

We found a positive relationship between self report of previous screening and patient attitudes toward screening in this large sample of female patients receiving care in western North Carolina primary care clinics. This relationship was especially strong between those health behaviors that could be considered sensitive, such as sexual functioning and violence in the home. We also found that more patients felt they should be screened than were actually screened for all health behaviors included. This finding is especially significant in light of the importance of routine health screening.[31]

There may be several reasons for the relationship we found. It is possible that the act of asking screening questions increases acceptance through provision of information. Providers may normalize the question ("Violence affects many of my patients, so now I routinely ask all patients") such that patients view screening as a routine part of their health care. A reverse relationship is also possible. Patients may seek out health care providers who support their beliefs on health care. However, there is limited evidence that patients change providers[32,33] and, for those who do, it is unclear that screening behaviors would be a motivator for doing so[32,34-35] or that patients would have access to sufficient information to be able to do so.[32,36,37] Similarly, health care providers may screen for particular behaviors because they perceive that such screening would be accepted and expected by particular patients. Finally, it is possible that

our results reflect a recall bias. Patients with greater acceptance of screening may preferentially remember being asked those questions by their health care providers.

Although we found good acceptance among the participants for screening for certain health behaviors including screening for tobacco and alcohol use, other screening questions such as guns in the home, safety and violence in the home, and sexual functioning had less support. The evidence supporting improved health care outcomes with screening for these items is mixed. While the United States Preventive Services Task Force (USPSTF) did give screening for firearms in the home a "B" recommendation in its 1996 review, meaning there is fair evidence supporting its use and it is recommended that clinicians provide the service to eligible patients, it has since stated that this recommendation needs updating.[5] Health care provider screening for domestic violence received only an "I" recommendation,[6] meaning there was insufficient evidence to determine the net benefit of the service or to recommend for or against routinely providing it. The USPSTF has not reviewed the effectiveness of screening for sexual functioning. Given our findings of lower patient acceptance for these behaviors and the lack of evidence supporting improved patient outcomes, screening for these behaviors may not represent optimal use of patient or provider time. However, our finding of higher rates of acceptance among patients who had been screened should reassure providers that if they do choose to screen, their patient will accept that screening.

This study is unique in the breadth of health behaviors patients were asked about and the size of the sample. Previous studies have focused on one type of health behavior, such as screening for guns[18,38] or safety or violence in the home.[39-43] Results of these limited surveys have been mixed, with some studies demonstrating patients' strong support for routine screening for safety and violence in the home[39,40] and other studies showing less support.[38-44] To date, there have been no other studies that have examined the relationship of previous screening to attitudes toward screening. Our ability to include survey data from two time points also supports the strength of the relationship. Even when the survey time point was included in the model, the odds ratio showed little change.

While this study includes a variety of health behaviors and large sample size, it is limited by the geographic location of the sample. All survey participants were obtained from western North Carolina. The responses given may not be representative of the general population in the United States. Additionally, we only surveyed women and only those in established relationships with primary care providers. Men and individuals who do not have ongoing health care relationships may have differing views. We are unable to tell if the same patient was interviewed at both time points, thus some patients may have been included in both. Additionally, our response rate was low. Nevertheless, the sample size is large (more than 3,000 individuals) and represents a broad range of ages and socioeconomic status. Due to survey length, only one question about each health behavior was included, and we did not ask if the patient personally engaged in the health behavior. Additionally, we relied on participant self-report about previous screening. Previous studies have demonstrated that patient recall has high specificity when compared to direct observation, but variable sensitivity with better recall for counseling on smoking cessation and lower recall for increasing physical activity.[45,46] Further questions exploring the reasons for their answers would assist in the interpretation of the results.

This study provides a valuable contribution to the understanding of health behavior screening. We found a significant association of previous screening with a positive attitude toward routine screening. This relationship was especially strong for those health behaviors that had lower rates of acceptance among patients. Further research is needed in different populations and to determine the causality of the association. We know that health care providers can have a powerful influence on health

Table 3.
Odds Ratios of Agreeing with Routine Screening for a Particular Health Behavior if the Participant Had Been Screened for the Behavior in the Past Year

Screening Question	Unadjusted OR[e] 95% CI			Adjusted OR[f] 95% CI		
	Pre	Post	Both	Pre	Post	Both
Exercise	2.2 (1.6-2.9)	2.3 (1.8-2.9)	2.2 (1.9-2.5)	2.7 (1.8-4.0)	2.5 (1.8-3.4)	2.3 (1.8-2.9)
Smoke	1.5 (1.2-2.0)	2.0 (1.6-2.6)	1.7 (1.5-2.0)	1.4 (1.0-1.8)	1.9 (1.4-2.5)	1.6 (1.3-1.9)
Use alcohol or drugs	1.8 (1.3-2.4)	2.7 (2.0-3.6)	2.0 (1.7-2.4)	2.2 (1.7-2.8)	2.4 (1.7-3.4)	2.3 (1.9-2.7)
Are under excessive stress	1.6 (1.3-2.0)	1.9 (1.5-2.4)	1.7 (1.5-1.9)	1.8 (1.3-2.5)	1.5 (1.2-2.1)	1.7 (1.4-1.9)
Have sexual functioning concerns	2.8 (2.2-3.6)	3.1 (2.6-3.7)	2.7 (2.3-3.2)	2.6 (1.9-3.8)	2.9 (2.2-3.7)	2.7 (2.2-3.4)
Have concerns about safety or violence in the home	4.4 (3.1-6.1)	3.8 (2.7-5.3)	3.4 (2.8-4.2)	3.9 (3.1-5.0)	3.8 (2.6-5.6)	3.4 (2.8-4.2)
Have a gun in the home	6.0 (4.1-8.8)	4.9 (3.9-6.3)	4.9 (4.0-6.0)	5.3 (3.4-8.3)	4.2 (3.0-5.9)	4.4 (3.4-5.8)

[e] Respondents with missing data are not included in the analysis for which the variable is missing.
[f] Adjusted for patient demographics (age, marital status, race, income, insurance), provider characteristics (PCP gender, PCP type), number of visits, clustering by clinic, and time of survey.

behaviors. If our finding is substantiated, it provides evidence that health care providers can also affect patients' attitudes regarding what healthy behaviors are. **NCMJ**

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POLICY FORUM

Pandemic Influenza Preparedness in North Carolina

"Deciding who should have priority to receive limited resources during an influenza pandemic will be among the most difficult ethical dilemmas facing government officials, policy makers, and health care providers."

INTRODUCTION

Policy Forum:
Pandemic Influenza Preparedness in North Carolina

Concern about the potential for an influenza pandemic has been at the top of the nation's agenda since 2004. In November 2005, President Bush introduced the *National Strategy for Pandemic Influenza*, which outlines how the federal government plans to prepare, detect, and respond to a pandemic. It describes the various roles of the federal, state, and local governments, private and international partners, and individual citizens during a pandemic. Congress has supported preparations for an influenza pandemic through appropriations since fiscal year (FY) 2004. Congress has approved over $6.1 billion in emergency supplemental appropriations to support flu pandemic preparedness and research. The bulk of that funding was provided to the United States Department of Health and Human Services (HHS), which will manage the federal public health and medical response during a pandemic.

The *Pandemic Influenza Plan* will guide the HHS response to an influenza pandemic at the national level. It focuses on developing infrastructure for vaccine production capacity, stockpiling antiviral drugs and other medical supplies, ensuring the capacity of public health to detect and respond to a potential pandemic, monitoring disease spread, coordinating federal, state, and local preparation, and enhancing outreach and communications planning. The North Carolina Division of Public Health will lead the influenza pandemic response at the state level. It has developed the *NC Pandemic Influenza Plan*, which it will use to coordinate activities during an influenza pandemic. The article by Jeffrey Engel, MD, in this issue of the Journal describes the potential consequences of an influenza pandemic and the state's planned response to the crisis.

A moderate influenza pandemic in North Carolina is expected to impact over three million people, with 1.6 million doctor visits, 35,000 hospitalizations, and 8,000 deaths. It is projected that more than 40% of the state's workforce would be out of work due to illness or caring for an ill family member. Such a widespread epidemic would have a huge impact on the state's economy, local businesses, and individuals' lives. In this issue of the *North Carolina Medical Journal*, we are focusing our attention on the impact an influenza pandemic will have on a number of different communities in North Carolina, including industry, faith, health care, and the underserved, and how those communities can prepare for such an emergency. Commentaries present the issues faith communities will face and the important role they can play in guiding the responses of their congregations, the models critical industries have used to develop pandemic influenza business plans, and the perspectives of private and public health providers who will be called to serve during a pandemic. Other commentaries highlight the need to understand the differences between quarantine, isolation, and social distancing and examine public health's authority to implement such measures, the importance of including representatives from underserved communities in the planning processes to avoid discrimination and bias during the pandemic, and the preparations that are being made outside of public health to prepare for the emergency.

Finally, this issue features the work of the NC Division of Public Health and NC Institute of Medicine Task Force on Ethics and Pandemic Influenza Planning. The Task Force was convened to assist the Division of Public Health in developing an ethical framework for evaluating ethical dilemmas that are likely to arise during an influenza pandemic, such as requirements that workers in critical industry perform despite increased risks of contracting the virus and the reciprocal benefits they are owed for such hazards; restrictions on individual rights due to isolation, quarantine, or social distancing measures instituted to limit the spread of disease; and prioritization of limited health care resources such as vaccines and antivirals.

We hope this issue of the *Journal* will help inform North Carolina communities and providers of the potential for an influenza pandemic, the steps being taken at the state and local levels to prepare for such an emergency, and what individuals and organizations can do to prepare themselves.

Thomas C. Ricketts, III, PhD
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Pandemic Influenza:
The Critical Issues and North Carolina's Preparedness Plan

Jeffrey P. Engel, MD

A Brief Primer

Influenza pandemics have been recorded throughout human history, on average occurring three times in a century, with ten in the last 300 years. Influenza pandemics are simultaneous worldwide epidemics and occur when a new influenza virus evolves that infects humans, is spread efficiently from person-to-person, and because of no prior immunity causes severe disease and death. Between pandemics, called the inter-pandemic period, the milder seasonal influenza (also known as the "flu") exists in the wintertime months in populations living outside of the tropical zones, whereas in the tropics, influenza is a year-around disease. Seasonal viruses are adapted pandemic strains that have weakened mainly due to developed immunity in the human population.

Influenza is characterized by the abrupt onset of fever, chills, muscle pain, and joint pain, followed within hours by respiratory symptoms including cough and congestion. It is a disease primarily of the upper respiratory tract, which in uncomplicated cases resolves in about a week. Complications include bronchitis, pneumonia (both primary viral and secondary bacterial), heart inflammation (myocarditis), and brain inflammation (encephalitis); death can result from any of these complications. In a typical season in the United States, 36,000 people die of influenza, deaths occurring chiefly among infants and the elderly.

The type A influenza virus is unique among viruses because it allows for genetic recombination to occur by the exchange of any or all of its eight gene segments of two different influenza virus strains. Additionally, the influenza virus can mutate and gradually adapt to new environments. Such recombination and adaptation in type A influenza viruses are the cause of pandemics.

Type A virus subtypes are named by the viral surface proteins, hemagglutinin (HA) and neuraminidase (NA), which elicit an immune response, and thus, comprise major components of the influenza vaccine. In nature, 16 HA and 9 NA proteins exist; however, the human pandemic and seasonal viruses have contained only the subtypes, H1, 2, or 3 and N1, 2, or 3.

The Animal-Human Interface: Zoonotic Influenza

Only type A influenza virus is capable of infecting a broad host range, primarily water fowl and shore birds. Wild water fowl usually harbor type A influenza in their digestive tract and have no symptoms. Spread to other susceptible hosts, usually related species like domestic poultry, happens directly with species intermingling or indirectly via contact with contaminated surface water because type A influenza virus can survive in fresh water for days to weeks.

Type A influenza virus is a type of infectious disease that is transmittable under natural conditions from vertebrate animals to

"The impact of a pandemic or any disaster is proportional to how prepared individuals and society are. Preparedness is a shared responsibility that requires local, state, and federal public health systems to form a robust response network."

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humans, also called "zoonosis." Zoonoses are usually sporadic; however, they are also the origins of epidemics and pandemics. If a human is exposed to an infectious agent from another animal, an infection results if the person is susceptible. Disease may range from asymptomatic to severe, resulting in immunity and recovery or death. An epidemic or pandemic erupts when the disease microorganism adapts via genetic mutation to the new human host and becomes capable of human-to-human transmission. Notorious examples of recent zoonotic-origin pandemics include the human immunodeficiency virus (HIV), the cause of AIDS (from chimpanzees in West Africa),[1] and the severe acute respiratory syndrome (SARS)-coronovirus (from bats in Southeast Asia).[2]

Type A influenza viruses are often the source of sporadic zoonotic infections, most often from avian, or bird, viruses. Humans are exposed to avian influenza viruses in developing countries across Eurasia and Africa due to animal husbandry practices that involve close contact with diseased or dead domestic fowl, especially ducks and chickens. In developed countries, zoonotic influenza infections have occurred in commercial poultry workers managing infected flocks.

Not all zoonotic influenza cases are of avian origin. In 1976, several soldiers at Fort Dix, New Jersey developed infections, some fatal, from a type A swine influenza virus. It is unknown how these individuals were exposed to a swine virus; however, this cluster led some scientists and policy makers to the false conclusion that this was the harbinger of the next pandemic. It was from this event that the infamous "Swine Flu" vaccination program emanated.

Contemporary methods in the study of human viruses provide information about influenza viruses dating back to 1889. The four pandemics between 1889 and 1968 were of avian origin, and they differed only in the number of avian influenza genes present in the pandemic strain (Table 1).

Table 1.
Hypothesized evolution of pandemic influenza A viruses[3]

Pandemic	Subtype	Avian Genes
1889	H2N2	?
1918 "Spanish"	H1N1	8
1957 "Asian"	H2N2	3 (PB1,* HA, NA)
1968 "Hong Kong"	H3N2	2 (PB1, HA)

* PB1 is a viral gene encoding a replication enzyme

H5N1: The Next Pandemic?

In the last 50 years, the science of influenza has made many great strides. In addition to the molecular study of the virus, worldwide human and animal surveillance and the study of population health have greatly expanded. The World Health Organization (WHO) has devoted huge resources to influenza monitoring and study. WHO coordinates the global influenza laboratory surveillance network that characterizes circulating human seasonal virus strains. This information is used to determine the annual human vaccine.

Through this global network, human disease due to avian influenza strain H5N1 was first reported in Hong Kong in 1997. Because this was an avian strain capable of causing severe infections in humans (six of 18 cases reported were fatal), WHO increased the pandemic alert level to Phase 3 (Table 2). Virtually all Hong Kong chickens were slaughtered in an attempt to eradicate the virus. This appeared to have been successful because no further clusters of H5N1 in people or domestic poultry were reported for several years. However, beginning in December of 2003, outbreaks in poultry and humans were reported in Vietnam and Thailand, and through 2006 human reports have increased across Eurasia and Africa with an alarming 60% case-fatality rate (Figure 1).

Table 2.
WHO Pandemic Phases

Period	Phase	Event
Interpandemic	1	No new subtype in humans
	2	No new subtype in humans, animal subtype poses risk
Pandemic alert	3	Human infections with new subtype, no human-to-human spread
	4	Small clusters of limited human-to-human spread
	5	Larger human clusters, but spread still localized
Pandemic	6	Increased and sustained transmission in the general population

H5N1 is currently widespread in wild and domestic birds in Eurasia and Africa with sporadic and often fatal cases in humans. It has notched up the WHO pandemic alert system to Phase 3 since 1997 and satisfies all but one important property of a pandemic-causing influenza virus (Figure 2). Will H5N1 mutate and become capable of efficient human-to-human transmission?

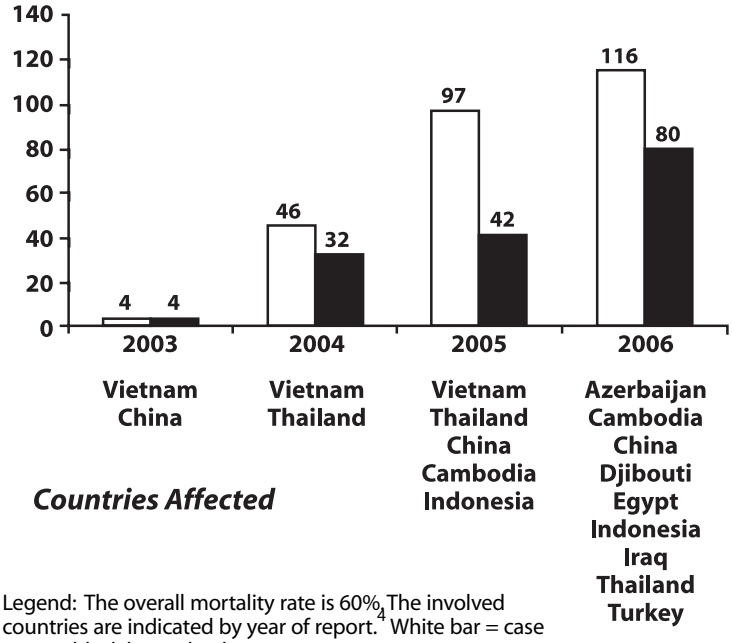
The Present Threat: When, Not If

If we know that pandemics are of avian origin and that they occur cyclically, on average three times in a century, then the question is when will the next avian influenza virus emerge that will cause the next pandemic? Certainly, H5N1 is the leading candidate. In regards to preparation, several subquestions can be generated that assist planning for the next pandemic:

- When will the virus arrive and spread?
- How much time from its source to arrival in the United States or North Carolina?
- What will the principal age and other risk groups be?
- How many will be affected?
- What will be the morbidity?
- What will be the mortality?

In terms of transmission dynamics or spread, nothing is more concerning to an epidemiologist than a community respiratory

Figure 1.
Epidemiological Curve of Reported H5N1 Human Cases by Reporting Country, 2003-2006."



Legend: The overall mortality rate is 60%.[4] The involved countries are indicated by year of report. White bar = case counts, black bar = deaths.

virus. Transmitted through respiratory droplets from a cough or a sneeze, or direct contact from a person's hands, these viruses can literally spread like wildfire through a susceptible population. The basic reproductive number, R_0, pronounced "R-zero" or "R-naught," is the expected number of people a contagious person could infect during the infectious period.[6] An R_0 greater than 1 ($R_0 > 1$) results in a self-sustaining outbreak until there are no more exposed susceptible people. In prevaccination days, a community respiratory virus like mumps with a short incubation period and an $R_0 = 6$ would literally burn through a school-age population.

Influenza virus with an incubation period of 1-5 days and $R_0 = 3$ moves quickly through a community as well. With seasonal influenza, however, R_0 is proportionately reduced by population immunity. For example, if half of the population is immune (from natural infection or vaccination) in a given season, $R_0 = 1.5$.[6] In a pandemic, however, potentially everyone is susceptible and, at least in the beginning, there will be no vaccine, thus the wildfire analogy.

Worse Case Scenario: A Syndemic

It behooves planners to assume the worst, and for pandemic influenza, that would be a 1918 "Spanish flu"-like pandemic. Worldwide, the second epidemic wave (there were three waves) of the Spanish flu, caused by an H1N1 subtype, swept across the globe with amazing speed and destruction. In its wake, 50 million people died; in the United States the death toll was 500,000 during the later summer and fall of 1918. Equally disturbing were the high attack and mortality rates that occurred in previously well people in the second and third decade of life, quite unusual for influenza that usually kills the very young and very old.

Historical accounts of young adult victims of the Spanish flu revealed a rapid death due to respiratory failure. People were well one day and dead the next, with facial cyanosis (blue discoloration from lack of oxygen) and a rapid breathing pattern occurring in the hours before death (a condition we now call the acute respiratory distress syndrome or ARDS). Examination of diseased lung tissue showed air sac damage from viral pneumonia. The body's response to the pneumonia caused leaks in the air sacs, drowning the victims (non-cardiogenic pulmonary edema).

In preparing for the next pandemic, it would be helpful to understand why the Spanish flu was so catastrophic. Certainly one reason was the virus itself. The second wave virus has been reconstructed from 1918 victims' lung tissue (both from exhumed remains frozen in the Alaskan tundra and lung tissue preserved from an autopsy sample).[7] The reconstructed 1918 virus was found to be highly lethal in the mouse model following intranasal infection. Genetic sequencing revealed it to be a zoonotic type A influenza virus strain whose entire genetic makeup was from a mutated bird strain. This truly novel virus adapted to the new human host acquiring the capability, through evolution, to spread efficiently from person-to-person.

However, in understanding the calamity of 1918, a separate analysis of the social milieu is required, specifically exploring the agents of human activity existing at the time. Historian and author John M. Barry carefully chronicles the global situation in 1918, particularly as the United States prepared for World War I.[8] Barry's meticulous research of influenza death records and outbreaks associated with massive troop deployments, staging, and overcrowding is compelling. Epidemics in Boston and Philadelphia were traced to ill troops arriving from overseas and

Figure 2.
Checklist of Pandemic Properties of Avian Influenza Type A/H5N1[5]

- ☑ Widespread prevalence in migratory birds; broad host range
- ☑ Continued outbreaks among domestic poultry
- ☑ Mammalian infection (cats, pigs, etc.) lethal
- ☑ Virus is evolving
- ☑ Sporadic human cases
  - – Most in young and healthy
  - – Case-fatality 60%
  - – Rare person-to-person transmission
- ☐ Sustained and rapid person-to-person transmission

an overcrowded patriotic street parade, respectively. Many more examples are cited and all are consistent with massive human crowding and/or movement in the presence of a virulent respiratory virus. In epidemiologic terms, in some settings (barracks, troop ships, etc.), a virus reproductive number (R_0) of 5 or higher was common. Thus, the sociologic and biologic conditions in 1918 formed the perfect storm, a syndemic.

A syndemic is defined as "two or more afflictions, interacting synergistically, contributing to excess burden of disease in a population."[9] The term was first used by anthropologist Merrill Singer describing the HIV epidemic among the urban poor in the United States: the SAVA syndemic, for substance abuse, violence and AIDS.[10] He described a new virulent infectious virus, HIV also of zoonotic origins,[1] which spread efficiently by needle sharing intravenous drug abuse and unprotected sexual behavior that wrecked havoc among the poor, particularly in urban minority communities in the United States.

For 21st century pandemic influenza planning, then, I argue that to prevent a 1918-like scenario, we must do syndemic planning. Taking examples from recent natural disasters, such as the 1995 Chicago heat wave that killed 700 elderly people in a week,[11] the 2005 tsunami in Indonesia, Hurricane Katrina in New Orleans, or the SAVA syndemic, the common lesson learned is that the natural disaster impact, whether in a developing nation or the United States, is greatly multiplied by crowding and poverty. In 1918, the global population was 1.8 billion; today it is 6.5 billion, 2.7 billion (42%) living in moderate to extreme poverty as measured by income less than $2/day.[12]

The syndemic model predicts that the next influenza pandemic will be catastrophic in countries such as India and China where 36% of the world population lives, many in poverty and in crowded urban areas. Although these sociologic conditions exist in some areas in the United States and North Carolina, more worrisome in developed countries are the equally vulnerable including those without health insurance or who are underinsured; those who lack the capacity to access information due to illiteracy, low English-speaking skills, and other forms of social isolation; and finally, select special populations such as the homeless, institutionalized, and the underserved mentally ill.

If a 1918-like influenza virus causes the next pandemic, how our nation and state mitigate the impact will depend on pandemic and syndemic prevention. To accomplish this, at the national, state, and local level, public health is leading the planning efforts for the health care sector, government, and society.

Summary of North Carolina's Pandemic Influenza Preparedness Efforts

The fundamental objective of pandemic influenza planning is to save lives. To be successful, all corners of society must plan, including individuals and families, business and industry, schools and universities, and state and local government. These overarching plans, referred to as pandemic implementation strategies, are underway or complete in many sectors, but beyond the scope of this review. Here, I will highlight the critical components of *North Carolina's Public Health Pandemic Influenza Plan*.[13]

Quenching

In public health, prevention is the key, thus a critical strategy is the early detection of initial outbreaks and rapid containment of the disease where it emerges, a process known as quenching.[14] Through global and national collaboration with the WHO and the Centers for Disease Control and Prevention (CDC), once an influenza pandemic is declared somewhere in the world, the North Carolina Division of Public Health (DPH) will enhance frontline detection and response and rapid laboratory diagnosis. The early cases in North Carolina will likely be among travelers to regions where person-to-person transmission is ongoing.

In WHO pandemic phases 4, 5, and early 6, international travel advisories will be issued by federal authorities. DPH will notify health care providers of the situation and explain how to suspect and manage patients who may be manifesting pandemic influenza symptoms. Suspect patients shall be reported immediately to local or state public health agencies (North Carolina General Statute 130A-135), isolated (NCGS 130A-145),[15] and treated with antiviral medication pending laboratory confirmation. The North Carolina State Laboratory for Public Health will activate three regional labs in Charlotte, Asheville, and Greenville, as well as the core facility in Raleigh, to rapidly (within hours) process clinical specimens (nasopharyngeal swabs) for detection of the pandemic strain. These labs will not attempt to cultivate pandemic viruses because of the biosafety hazard; cultural confirmation will be done solely by the CDC in Atlanta, Georgia.

The goal of quenching is for public health and other response agencies to aggressively keep the $R_0 < 1$. Once a suspected patient has been reported to public health agencies, active surveillance will begin to identify close contacts (eg, airplane passengers, household and workplace contacts). If an index case is presumptively confirmed by the labs, symptomatic contacts will be isolated and referred for medical evaluation and asymptomatic contacts will be quarantined for 10 days (or the maximum incubation period) from the time of last contact to a case. Based on what is known about the contagiousness and virulence of the pandemic virus, quarantined people may be offered antiviral prophylaxis at no cost from a federal or state stockpile. Antiviral prophylaxis of exposed contacts in quarantine may be the single most effective strategy in preventing a full-blown pandemic, an $R_0 > 1$.

Isolation and quarantine are restrictions of movement and/or action of the sick (isolation) and the well but exposed (quarantine). An effective quenching plan requires rapid active surveillance and diagnosis, treatment or post-exposure prophylaxis with antivirals, and enforcement of isolation and quarantine. During the 2003 SARS response in North Carolina confirmation of a single case led to the isolation of three persons and the quarantine of 30 others. All affected people complied with local public health authorities, law enforcement was not necessary, and the spread was contained.

WHO Phase 6: Widespread Pandemic in North Carolina

Planning assumptions identify a point in time when quenching fails or is no longer feasible. This may happen if there are multiple simultaneous outbreaks across the state, a local jurisdiction's capacity to quench is overwhelmed and there are no state or federal assets available to assist, or supplies of antiviral medications are depleted leaving enough only to treat the sickest. To decrease illness and death, the strategy at such a point will be to slow the spread and buy time until an influenza pandemic vaccine is available. To accomplish this, countermeasures known as nonpharmaceutical and pharmaceutical interventions will be used.

NonPharmaceutical Interventions

The nonpharmaceutical intervention for preventing or slowing a pandemic is the physical separation of people. This is accomplished in fundamentally two ways: personal protective equipment for those who must be close to the sick (health care workers, first responders) and social distancing and hygiene. The worst-case scenario is that 50% or more of those who become ill will seek medical care. The number of hospitalizations and deaths will depend on the virulence of the pandemic virus and Table 3 projects these numbers based upon the experiences of the moderate and severe pandemics of 1957 and 1918. Depending on severity, health care medical surge plans must scale accordingly, the largest challenge being the maintenance of adequate staffing. To provide for the safety of those on the frontline, occupational health protection through infection control is a critical planning component. In hospitals, respiratory droplet and airborne precautions that are part of everyday activity will be essential during a pandemic. For routine patient care, properly donned and doffed eye protection and a plain surgical mask are adequate along with hand washing with soap and water before and after patient contact. For higher risk contact where infectious aerosols are more likely to be generated (eg, airway suctioning, resuscitation, bronchoscopy), a fit-tested N-95 respirator is required. In the community, there is no evidence that personal protective equipment, such as the donning of masks by well people, will prevent transmission of influenza. Hence, stockpiling masks or respirators outside of the health care setting is not recommended and is not part of the *NC Pandemic Influenza Plan*.

Table 3.
Impact of an Influenza Pandemic in North Carolina*

Characteristic	Moderate (1957-like)	Severe (1918-like)
Illness	3,000,000	3,000,000
Outpatients	1,600,000	1,600,000
Hospitalized	35,000	300,000
Deaths	8,000	65,000

* Numbers based on NC population = 9,000,000; 35% attack rate (CDC FluAid 2.0)

The broader community containment strategy will rely on social distancing interventions. In WHO Phase 6 for a moderate to severe pandemic, at some threshold a state of emergency will be declared where so-called mass quarantine will be utilized. Mass gatherings including entertainment venues like sporting events and theaters will be canceled or closed, religious services will be discouraged or prohibited, nonessential workers will be told to remain at home, and schools and universities will be closed. In 1918, the city of St. Louis implemented these measures and succeeded in reducing influenza-related mortality. Indeed, government may not need to impose these measures because individuals are likely to self-quarantine if the pandemic is bad enough.

The societal disruptions will be immense, but can be lessened by cross-sector preparation. Continuity of operations planning is the core of the national implementation strategy and is essential for critical industries such as utilities, businesses, educational institutions, and government.

Pharmaceutical Interventions

Pharmaceutical interventions refer to the specific countermeasures for prevention and treatment of influenza A infections: antiviral medications and vaccines. The planning assumption for antivirals is that they will be effective in the treatment and prevention of pandemic influenza. Although clinical trials will be difficult to conduct against the current H5N1 threat, there is accumulating evidence that these drugs will have broad-spectrum activity against pandemic influenza.[16] The current federal government guideline calls for the stockpiling of enough antiviral medications to treat 25% of the population, roughly two million five-day courses for North Carolina. The stockpiling challenges lie in accumulating an adequate supply to meet the need, establishing rationing criteria until the supply is adequate, and extending the shelf-life beyond five years.

Assuming the antiviral medications are found to be life-saving and the supply is inadequate at the time of the pandemic, then difficult rationing decisions will have to be made. To ensure fairness and equity and to assist frontline providers, the *NC Pandemic Influenza Plan* aligns with the federal tier groups to receive antiviral treatment in the event of suspected influenza illness only.[17] The top five tier priority groups to receive treatment are hospitalized patients, health care workers and emergency medical technicians, high-risk outpatients including the immunocompromised and pregnant women, public health responders (eg, vaccinators, vaccine and antiviral manufacturers, government decision makers) including public safety (police, fire, and corrections), and increased risk outpatients (children 12-23 months, adults aged 65 years and above, and people with chronic medical conditions). To reiterate, this rationing scheme is for treatment only, it is assumed during a widespread WHO phase 6 event, there will not be enough medication for prevention.

The second pharmaceutical intervention is a pandemic vaccine, which can abort the pandemic once available for the

entire population. The planning assumption, however, is that it will probably take a year or more to scale up production to immunize everyone. Further, because the population will be naïve to the pandemic virus, a booster shot will be required one month after the priming dose. Thus, once again, rationing of the first supplies of the pandemic vaccine is a planning component aligning with federal tier groups.[17] In Tier 1, there are four subtiers who will get the vaccine first:

1) Vaccine and antiviral manufacturers, essential medical and public health workers;
2) High-risk persons (> 65 years old, medical co-morbidities)
3) Pregnant women, household contacts of severely immuno-compromised, household contacts of children < 6 months old;
4) Public health emergency response workers, key government leaders.

Syndemic Prevention: Preparedness and Communication

Ultimately, how North Carolina responds to a severe influenza pandemic will depend upon countermeasures applied equitably to all who reside in the state. Since human beings are the vector and reservoir of the disease, neglecting or limiting resources to any sector of society (outside of established rationing protocols) does not make any epidemiologic sense. In addition, it is unrealistic to believe that society can mitigate the syndemic conditions of crowding, poverty, and the needs of special populations in advance of a rapidly moving pandemic wave. How do we approach this daunting challenge?

The impact of a pandemic or any disaster is proportional to how prepared individuals and society are. Preparedness is a shared responsibility that requires local, state, and federal public health systems to form a robust response network. Implementation strategies must build international and domestic, animal and human health, and public and private sector partnerships. Health, security, and economic protection are at stake, and all these risks should be managed cooperatively.

Syndemic prevention will rely on our ability to reach those outside of traditional networks, and to accomplish this, clear communication channels must be established to the public using trusted messengers. Health disparities during a disaster are preventable if people are prepared with accurate and timely information. How well public health is able to coordinate consistent messages, encourage people to take action steps to prepare now, and provide updates when new information becomes available will determine how we weather the perfect storm. **NCMJ**

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Ethical Guidelines for an Influenza Pandemic

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The major challenge facing public health officials is that they do not know when the next pandemic influenza will occur or how severe it will be. History indicates there are approximately three pandemics each century. Since the last outbreak of pandemic influenza occurred in Hong Kong in 1968-1969, many experts suggest that we are overdue for another influenza pandemic. They warn that it is not a question of *if* but *when* the next influenza pandemic will arrive.

The North Carolina Department of Health and Human Services, Division of Public Health (DPH) will have the responsibility of coordinating the public health response to an influenza pandemic. The goal of the public health response will be to reduce morbidity, mortality, and social disruption. In order to carry out its *North Carolina Pandemic Influenza Response Plan*,[1] DPH will need the assistance of health care workers and workers in other critical industries, such as public safety, food, and transportation. Certain individuals will need to work, despite risks of infection, to ensure that society can continue to function during the pandemic. To prevent the spread of disease, DPH may need to pursue social distancing strategies, such as quarantine, isolation, or closing of schools, which may at times conflict with individuals' civil liberties. In addition, DPH will be responsible for allocating scarce resources, such as vaccinations and/or antiviral medications. An outbreak of pandemic influenza will pose many ethical dilemmas (Table 1).

During an influenza pandemic, it is likely there will not be enough time to discuss publicly the ethical tradeoffs inherent in critical decisions. It is impossible to anticipate all the critical decisions that may need to be made during an outbreak. Therefore, it is important to identify the ethical principles that should be considered when faced with difficult choices. Developing an ethical blueprint that incorporates public input in advance of a pandemic and later applying these recommendations during the crisis will help assure the public that decision makers are making reasoned responses to the crisis. Public acceptance of the ethical framework will increase the likelihood that society maintains order during the emergency.

DPH determined the need to develop an ethical framework from which to base implementation of its Pandemic Influenza Response Plan and asked the North Carolina Institute of Medicine (NC IOM) to help in this effort. The NC IOM convened a task force to explore some of the ethical issues the state may face during an influenza pandemic and to consider the rights and responsibilities of private organizations and individuals. The Task Force was comprised of different stakeholder groups including representatives of (1) public health and safety, (2) other governmental agencies, (3) health care providers,

Table 1.
Ethical Dilemmas that May Arise During Pandemic Influenza

Scenario 1: Nancy has been a nurse in an orthopedist's office for 10 years. She heard the local hospital needs nurses to take care of pandemic influenza patients. Nancy wants to help, but she is concerned that she is unfamiliar with the type of care flu patients will require. She also is worried she might catch the flu and bring it home to her family. Does Nancy have a responsibility to work? What responsibility does society or the hospital owe to Nancy and her family to minimize the threat of infection?

Scenario 2: Bill is a cook at a diner and gets paid by the hour. During the height of the pandemic, the government has asked that people stay home from work for two weeks in order to prevent the spread of disease. Bill wants to stay home, but he needs his wages to pay his rent and he is afraid his boss will find someone else to do his job. If Bill responds to a governmental request that nonessential workers remain at home, what responsibility does government have to assure that his basic subsistence needs are met?

Scenario 3: The state has defined priority populations for pandemic influenza vaccinations, but the local health department does not have enough vaccines to cover everybody who falls into the priority populations. How should the health department allocate the limited vaccines among different priority populations?

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(4) business and industry, (5) the faith community, (6) advocacy groups, and (7) ethicists. In addition, NC IOM partnered with DPH and the Old North State Medical Society to host four regional forums in order to obtain public input into these difficult ethical decisions.

The Task Force weighed different ethical considerations in developing its framework, including (1) the need to ensure accountability, (2) equitable treatment among similarly situated individuals, (3) proportionality of actions, and (4) inclusiveness and timeliness in decision making. Government must act as the public steward, operate in a transparent fashion, and make decisions that are reasonable and responsive in order to garner the public's trust. It is important to foster cooperation and collaboration among different governmental agencies, the public and private sectors, and private citizens. The Task Force developed an ethical framework for guiding decision making in the following areas: responsibilities of and to health care workers and other critical workers, the balance between the rights of individuals and protection of the public, and prioritization and utilization of limited resources. The Task Force's report will be available shortly at www.nciom.org.

"...experts suggest that we are overdue for another influenza pandemic. They warn that it is not a question of if but when the next influenza pandemic will arrive."

Responsibilities of and to Health Care Workers and Other Critical Workers

An influenza pandemic would have widespread, significant effects on North Carolina's workforce. During an influenza pandemic, 40% of workers may be out ill, creating challenges for businesses and organizations to maintain normal operations. However, critical industries, such as food, utilities, and transportation, will need to continue functioning to provide society's essential goods and services during a pandemic.[2]

North Carolina's critical industries have experience maintaining essential functions during natural disasters, such as hurricanes and ice storms. However, an influenza pandemic would place unprecedented stresses on the ability of industries to function due to its duration, likely limited outside support, lack of workers, and risk of secondary infection. An influenza pandemic may consist of multiple waves lasting eight weeks or longer; in contrast, the immediate impact of many natural disasters is shorter in duration. Also, natural disasters often impact only a limited area, allowing other communities to provide support to the impacted area. In contrast, a pandemic likely will impact most, if not all, of the state and country, limiting the availability of outside support. Further, it may be difficult to find sufficient workers in general. During a pandemic, many workers may become infected with the virus and, as a consequence, will be unable to work. A pandemic also will lead to high absenteeism because workers may fear contracting the flu and may need to take care of sick family members. Thus, North Carolina's critical industries are likely to face unprecedented challenges in the event of a particularly virulent pandemic.

An influenza pandemic in North Carolina would be especially hard on the health care system. The health care system would face tremendous challenges in providing appropriate care for thousands of patients with acute, life-threatening infections, as well as continuing to provide care to others who are ill or injured. North Carolina might experience as many as 1.6 million doctors visits and 29,000 hospitalizations during one wave (ie, 8-12 weeks) of a moderate pandemic, although the numbers could be eight times higher in the event of a particularly virulent pandemic (Table 2).

Table 2.
Impact of Regular Flu versus Projected Impact of Pandemic Flu in North Carolina

	Regular Flu	Moderate Pandemic Flu
Doctor visits	750,000	1.6 million
Hospitalizations	6,000	35,000
Deaths	1,100	7,900

To get industries thinking about operational issues that could arise during an influenza pandemic, the Task Force recommended that **employers and contractors design business continuity plans to prepare for events such as a pandemic.** Plans should identify those positions that are critical to the continued operation of the industry and determine whether jobs need to be performed on-site or can be adequately performed off-site. Workers who would be required to work should be made aware of the expectation to work during events such as an influenza pandemic upon hiring or upon the adoption of the plan. Employers and contractors should specify the supports that will be available to the critical workers to enable them to work, as well as the sanctions that will be enforced if critical workers fail to show up for work during a time of crisis.

Despite the difficulties that will arise during an influenza pandemic, critical industries will need to continue providing their essential goods and services during an influenza pandemic. Workers in critical industries should acknowledge a responsibility to continue to work in times of crisis so that essential goods and services are provided to maintain the functioning of society. In general, the enhanced obligation to work during a crisis stems from three main responsibilities: professional, employment, and general human responsibilities to care for others (Table 3). Health care professionals have an added obligation to provide

Table 3.
Responsibilities of Critical Workers to Work

Professional Responsibilities: Licensed professionals in critical industries have a professional obligation that results from their choice of profession. This obligation is based largely upon the special expertise of licensed professionals, the unique roles granted by reason of licensure, and the authority to self-regulate the profession.
Employment Responsibilities: In return for their salary, employees are expected to meet their job responsibilities and to support the work of the organization. Society has an expectation that critical industries will continue to function in the event of a public health emergency. Businesses can only operate with sufficient staffing. Thus, workers who have chosen to work in a critical industry are assuming a heightened responsibility to continue to work even during times of crisis. In addition, employees may have a formal contractual obligation that specifies their duty to work during emergencies.
Human Responsibilities: The welfare of everyone in the community is enhanced when all its members recognize their moral responsibility to assist each other in times of great need.

care because of their professional license and because their ability to provide care is greater than that of the public. By freely choosing that profession, health care personnel have assumed an ethical obligation to act in the best interests of the ill and to assume a proportional share of the risks to which their professions and/or employment setting expose them. As a result of these obligations, the Task Force recommended that **workers in critical industries have an ethical responsibility to perform their regular employment duties during an influenza pandemic *and* to assume new responsibilities for which they are trained, as long as their actions will not lead to greater harm than the failure to act.** Although workers in critical industries may have enhanced obligations to work during a crisis, the Task Force also agreed that their responsibility to work must be balanced against other considerations, including their own safety and their responsibility to care for family members who are ill.

Critical industry employers and contractors, as well as government, have a reciprocal responsibility to protect and support workers to enable them to continue working during an influenza pandemic. Depending on the nature of the influenza virus, certain workers in critical industries may face disproportionate health risks. Workers may be asked to work longer hours or under more stressful work conditions than generally allowed. If critical organizations are short-staffed because of increased demand, worker illnesses, or absenteeism, other workers may be called upon to provide services outside their normal scope of work. The Task Force determined that **government and employers have a reciprocal responsibility to ensure that workers are protected from pandemic influenza-related harm and liability to the extent possible.** For example, workers in critical industries at increased risk of infection should receive priority for available personal protective equipment, vaccinations, antiviral drugs, and other nonmedical control measures. All critical workers should receive behavioral health services and other goods or services needed to enable them to work. In addition, employers have a responsibility to ensure that workers are appropriately trained to fulfill the tasks assigned to them during a crisis. Government should also provide health care personnel and organizations with qualified immunity from liability, in order to encourage health care professionals to work under less than ideal conditions (eg, limited resources, lack of health care professionals, the need to assume new responsibilities).

Balancing the Rights of the Individual and the Need to Protect the Public

Public health leaders are specifically charged with promoting, protecting, and improving the overall health and well-being of the population during emergencies. In a pandemic, public health officials may need to implement measures to limit illness and death or to slow the progress of the epidemic that could conflict with personal liberties and individual privacy. These measures include isolation, quarantine, or other forms of social distancing. Public health officials may require individuals with the influenza virus or who have been exposed to the influenza virus to remain at home, in temporary housing, or in a health care facility to prevent the spread of the disease to others. Isolation and quarantine are most effective in the early stages of an influenza pandemic when few people have been infected. Government should ensure that people who are subject to isolation or quarantine have their basic necessities met. To accomplish this, the Task Force recommended that **all levels of government ensure that individuals who are affected by isolation or quarantine orders receive needed assistance in accessing resources to meet their basic needs while they are subject to restrictions.**

Other types of social distancing measures may be necessary once the influenza virus is more widespread. The goal of social distancing measures is to reduce contact with potentially infected individuals. Such measures may include, but are not limited to, closing schools or day care centers and asking churches to suspend their normal services. Social distancing measures may also include voluntary requests that employees stay home or work off-site and that people take care of sick family members at home, rather than bring them to overcrowded health care facilities. For the individuals and families involved, restrictions on personal liberties can pose significant difficulties, such as loss of income and social support. Business and industry may be affected by the loss of workers or other sources of income.

Safeguards are needed to ensure that infringements on personal liberties are proportional to the need and are applied equitably to all similarly situated individuals. Thus, the Task Force recommended that **government leaders implement restrictions on personal liberties deemed likely to be effective to limit illness and mortality in the context of a pandemic, but limit these measures to the least restrictive alternative reasonably necessary to protect the public.**

Every attempt should be made to ensure the public is aware of the need for pandemic-related restrictions of individual liberties. Informing the public about the reasoning behind these social distancing measures likely will improve compliance. The Task Force recommended that **the North Carolina Department of Health and Human Services partner with local health departments to develop a public outreach campaign, ensuring that the public is well-informed of the potential need to use community mitigation efforts or to prioritize the use of limited resources.** During a pandemic, it will be critically important that accurate health information be conveyed to the public in a timely manner to minimize the spread of misinformation or panic. Thus, the Task Force recommended that **the Governor's Office, in conjunction with the North Carolina Department of Health and Human Services and Crime Control and Public Safety, develop a coordinated communications plan to ensure that the public obtains timely, accurate, and continuous information about the influenza pandemic.**

Prioritization and Utilization of Limited Resources

In crisis situations, citizens often look to the government to manage the allocation of essential limited resources. Many essential resources are likely to be limited in the event of an influenza pandemic. In particular, there will be a sudden increase in demand for medical supplies, such as personal protective equipment, vaccines, antivirals, and hospital beds. These demands, as well as the large numbers of ill persons, will stretch the health care system's limits. Furthermore, large numbers of the population may be ill at any given time during the pandemic, making it difficult to maintain the normal functioning of many critical industries. As a result, there may be insufficient supplies of food, fewer essential services provided, and restrictions on certain utilities. Deciding who should have priority to receive limited resources during an influenza pandemic will be among the most difficult ethical dilemmas facing government officials, policy makers, and health care providers. These allocation decisions should be based on widely accepted, reasonable criteria. The Task Force also recognized the importance of individual responsibility for pandemic influenza planning, recommending that **individuals reserve supplies and have plans to care for family members during a pandemic.**

The priority given to the allocation of certain preventive resources (ie, primary prevention), such as vaccines, may not be the same as the priority that should be given to the allocation of limited health care resources needed for a patient who is already sick (ie, secondary treatment), such as ventilators or hospital beds. One way to conceptualize the allocation decisions is to classify medical resources as either *pharmaceutical* or *nonpharmaceutical*. Given this framework, the Task Force recommended a prioritization system recognizing different goals for different resources (Table 4). To the extent possible, individuals who do not make the priority list for life-sustaining care should be provided palliative care.

Nonpharmaceutical primary prevention resources will be critical in the early stages of a pandemic when vaccines are not yet available. Personal protective equipment and other nonpharmaceutical prevention resources may be the only way to minimize the likelihood of contracting the virus. As a result, the Task Force recommended that these limited resources be first allocated to health care workers or other critical workers who are at increased risk of contracting the disease and to private individuals who are at increased risk of spreading the disease. Once vaccines are available, the Task Force agreed that priority should be given to health care workers or other critical workers who are at increased risk of contracting the disease. The Task Force recommended that priority for antivirals be given to those at highest risk of dying if they get sick and to critical workers so they can recover and return to work. Priority for curative resources should be given to those most likely to benefit.

To avoid the appearance of nepotism or favoritism, the Task Force recommended that **disease control and medical decisions be based on clinical factors, the epidemiology of the spread of disease, and assuring the functioning of society.** Decisions about which people to treat and what services to provide during an influenza pandemic *should not be made* based on socio-economic or other factors unrelated to these criteria.

Table 4.
Goals to Guide the Allocation of Limited Health Care Resources

	Primary Prevention	Secondary Treatment
Nonpharmaceutical Intervention	Examples: personal protective equipment	Examples: ventilators, hospital beds
	Goals: assuring functioning of society and minimizing the spread of disease	Primary goal: minimizing illness, hospitalizations, and deaths
Pharmaceutical Intervention	Examples: vaccines	Examples: antivirals, antibiotics
	Primary goal: assuring the functioning of society	Priority goal: minimizing illness, hospitalizations, and deaths
	Secondary goal: minimizing the spread of the disease	Secondary goal: assuring the functioning of society

Conclusion

In major emergencies, decisions have to be made in a timely manner under high stress conditions and often in the face of incomplete information. This is the situation the state will most likely confront in the event of an influenza pandemic. Decisions by the federal government, state agencies, health care professionals, emergency management responders, and other critical institutions will need to be coordinated and will directly affect large numbers of residents. Under such conditions it will be important to have a set of ethical principles that serve as the blueprint to the coordinated response.

The work of the NC IOM/DPH Task Force on Ethics and Pandemic Influenza Planning encouraged stakeholders from a variety of groups to consider and discuss the ethical dilemmas that are likely to arise in the event of an influenza pandemic. Advance notice of these dilemmas may help people adjust to and prepare for the difficult decisions that may affect them later. However, the unpredictable nature of influenza pandemics requires that individuals, industries, and governmental entities continue to examine and adapt their roles in influenza pandemic preparation. **NCMJ**

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Pandemic Flu:
Why Faith Groups Must Care

J. George Reed

It's not time to panic, but it is time to plan. In 1918-1919, Spanish flu spread around the world. In the United States, more than 500,000 people died. Most health professionals agree that the world will face another flu pandemic at some point in the future. It could be H5N1, the strain of avian flu currently spreading around the world in birds, or it might be some later flu. But it will come.

Put aside for now the question of whether it's this bird flu and it hits relatively soon or another strain of flu many years hence. I want you to think about the potential impact of a pandemic.

One of the things that distinguishes flu pandemic from regular flu is that people will have little or no immunity to it. Health care systems could be overloaded and medical supplies will be in short supply. A flu disaster would be unlike a natural disaster. First, the area impacted would be much wider. North Carolina wouldn't be sending volunteers to Louisiana, nor would we be receiving help from other states. Second, the duration of the disaster itself, not just the response, would be much longer. A pandemic could come in waves over 12 to 18 months. There could be bans on travel, closings of schools, cancellation of events, and disruption of businesses.

Estimates are that as much as 20% of the population could get the flu and as many as 40% of workers might stay home at its peak because they are sick, a family member is sick, or they don't want to risk exposure. Think of the impact these absences would have on a community's infrastructure: utilities, water purification systems, food supplies and preparation (including transportation of food to groceries and restaurants), trash pickup, public transportation, medical care, and availability of prescription drugs.

An influenza pandemic, whenever it comes, will also disrupt church life and raise serious questions for churches and their leaders. Consider the potential impact on regular worship services; communion/Eucharist; hospital visits by clergy and laity; funerals, grief counseling, and other pastoral care; committee meetings and other church gatherings; child-care centers, soup kitchens, food pantries, and free clinics; national and international meetings; and missions trips.

"So, what should the faith community be doing? Our first step is still to get flu pandemic on our radar screens."

And, some of the hard questions for churches:

- What is the duty of clergy regarding parishioners sick or hospitalized with the flu: to visit them as a sign of God's presence or to not visit so as not to spread the flu?
- In deciding whether to cancel activities, should the church act more quickly in order to set the example in preventing the spread of disease or less quickly because of the importance of gathering to worship during a crisis? Should parishioners help others, but risk spreading flu?
- Who makes decisions about canceling services or altering communion? Would a congregation follow a public health recommendation to limit services or wait until it was mandatory?
- Are there essential services within the church that must be continued during a pandemic?

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Also, think about some of the justice issues involved:

- Would lower-paid workers (support staff at hospitals, for example) be required to show up for work while higher-paid workers could stay home and telecommute? What happens to hourly-wage workers if businesses must close?
- In a time of greater rationing of health care, would poor people get to see a doctor, be admitted to a hospital, have use of a ventilator? How would limited supplies of vaccines and antivirals be allocated?
- What would happen to poor people who didn't have the resources to stockpile food and water, if those delivery systems were affected?

So, what should the faith community be doing? Our first step is still to get flu pandemic on our radar screens. Early last year, one state's council of churches asked bishops and other leaders about meeting with health officials to discuss a flu pandemic. Only two out of more than twenty expressed any interest. We all have a lot on our plates, but as one public health person pointed out, "If we try to make plans during the crisis, we're not planning, we're improvising."

Second, we must be at the table in the development of contingency plans. The state's public health and emergency planning agencies are hard at work and looking for community allies across the state.

Third, we must have firm plans for our congregations and judicatories. What supplies should be stocked now, or with the first news of the spread of flu among humans?

What can be done to help families make plans? The federal government has established checklists for a variety of groups, including faith communities. See them at www.pandemicflu.gov.

Fourth, we must be well enough involved and informed to be a voice for moral and ethical decision making, helping to balance the community's needs with our calling to treat all of God's children equally. In the event of a pandemic, we should also use our credibility in the community to be a source of good and true information.

Let me be clear: As of this writing the H5N1 avian flu has not been found in North or South America, even in birds. It has shown up in only about 274 humans worldwide (though more than half of them have died).[1] Almost all of the human cases were caught from birds, not other humans. The risk is if H5N1 mutates in a way that enables it to be transferred easily among humans. Then, because we have virtually no immunity, the world would have a pandemic, one that could spread rapidly around our interconnected globe.

The difficulty in raising these questions is that no one wants to spread panic. I feel a bit like Chicken Little ("The sky is falling") in writing this. But we are better prepared to deal with a crisis if we are informed and have made careful plans. Otherwise we could find ourselves improvising in the midst of a worldwide health disaster. **NCMJ**

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Shall We Gather By the River? Yes… No… Maybe So…

Paul L. Anderson

Many years ago, I would look into a black and white television and watch Andy Griffith sing while he sat on the front porch with Aunt Bee, Barney, and other characters from this timeless television show. Since then, many things have drastically changed in our world. We all have digital high definition means of viewing the historic television. Most of us are streaming television shows and or other visuals through our handheld, state-of-the-art multimedia devices.

Numerous facets of our lives have changed, while other things almost remain the same. The classic example is the manner in which faith groups worship their concept of God. The three basic faith groups that consider themselves monotheistic, Judaism, Christianity, and Islam, are still "gathering by the river" when they come together to worship. It is that sense of gathering that is essential to their "life giving stream," or the faith that carries them through the good times and bad. It is through the practice of fellowship, or sharing our faith with one other, we believe that we are "fellowshipping with the Devine—God."

My faith tradition is based upon the concept of gathering together. I am a Christian. It is the basic Christian belief that whenever two or three people are gathered in the name of Jesus, God's presence is manifest through the Holy Spirit. It is through fellowship with other believers that true worship of God occurs. This fundamental practice would drastically be altered if a flu pandemic invades our society.

An influenza pandemic would alter the entire context of the Christian faith and most other faith groups. The concept of a gathered assembly is predominant through all of Christianity. It starts when a child is born and continues through life cycles culminating with end of life rituals.

When a child is born, the Christian community awaits the day the child is blessed or baptized, or attains the blessings of God and the community in a service of worship. The parents, grandparents, aunts, uncles, and family friends all gather at the place of worship to witness this rite of entrance into the culture and receive blessings of both God and "the church," the gathered assembly. It is during this service that the child is either blessed or baptized by the priest or the pastor. This practice is essential in the belief structure of Christians. If this practice is omitted or deleted, the faith of parents and children is somewhat uncertain. This is similar for many other life cycle faith events. Would a flu pandemic eliminate the visitation of priest and laity to the hospitalized? Should the many acts of mercy such as soup kitchens, homeless shelters, and safe havens for the abused and fragile be dismissed? The religious community needs to ask itself the question of how will we justify not risking our lives for the benefit of others, which is the true essence of self sacrifice.

An influenza pandemic would interrupt the entire ritual of the gathered assembly, from birth to last rites in burial. Whenever the Christian community is not gathering, is it in willful disobedience to one of its commands by God? Most religious leaders have yet to engage in this meaning dialogue because it will completely shake the foundations of organized religious systems as we know them today.

The question is: How will the religious community manage a flu pandemic and maintain true faithfulness to the Holy Book? I am not sure how this flu pandemic will modify the view of God's requirements in acts of mercy and justice. Shall we gather at the river since our ultimate quest is to be with God? If our ultimate quest is to be God, do we continue as we have in the past and accept death as fate? This is the true essence of the real question.

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Eliminating Injustice Toward Disadvantaged Populations During an Influenza Pandemic

By George L. Saunders III, MD; Thea Monet, MAEd

In the spirit of its founders, A.M. Moore, M.T. Pope, L.A. Scruggs, and J. Williams, Old North State Medical Society (ONSMS) has dedicated itself to equity in health care, equal opportunity for black medical professionals, and equal care for minorities, including blacks, and very poor patients. The organization, which represents the interests of more that 1,200 minority physicians in North Carolina and thousands of patients from all walks of life, has been a voice for those without means for 120 years. In many instances, its members have provided health care when few or no other options were available. For members of Old North State Medical Society, finding ways to improve access to appropriate health care has required bringing truth to the phrase "with justice for all." Finding ways to infuse *justice* into protecting the health and wellbeing of those most easily overlooked, deliberately untouched and ignored, minimally regarded, and likewise treated has been one of our greatest challenges. ONSMS has not wavered in its commitment of "assuring equity in the delivery of health care to all people."

"Can there be justice for all in the midst of a flu pandemic outbreak?"

Today, we are asked very necessary and important questions including:

- What might be done to eliminate injustice toward disadvantaged populations during an influenza pandemic?
- What policies and plans need to be in effect to ensure that those with limited incomes have what they need to stay healthy during a flu pandemic?
- What will happen to people and families who cannot stockpile food and water in preparation for a pandemic and the thousands of North Carolina children receiving their best or perhaps only meals through free breakfast and lunch provided at schools? When a flu pandemic emerges and schools close, what will they do?

We do not have all the answers, however, there are cornerstones for preparedness that can strengthen us despite racial, ethnic, educational, health, and financial disparities. First, a pre-emptive action leading to promoting justice for the disadvantaged during an influenza pandemic involves gathering together the grassroots leaders of diverse racial, ethnic, economically stratified, disenfranchised, vulnerable, underserved, and underrepresented groups. Community physicians, pastors, community action program workers, local business leaders, particularly those providing personal care to residents like barbers, beauticians, and elder leaders, are key to any meaningful efforts to raise awareness about a pandemic crisis. They are also potentially the most valued teachers. Assessing their perceptions and expectations of community needs during an influenza pandemic represents a first step in the process of winning their long-term commitment to support local community preparation for flu pandemic preparedness. Engaging leaders who will be respected, followed, trusted, and favored by local community members will be integral to the best possible decision making or planning for and with communities across the state. Self-determination and determination in the interest of one's community engenders internal strengths. That strength will increase potential for compliance with rules of the day. Nothing can be more defeating than feeling helpless to provide assistance and guidance in a situation during a period of panic and absence of confidence in favorable outcomes.

Building bridges that forge partnerships and alliances between grassroots leaders, government, and public and private resource providers is a second key for enabling preparedness and eliminating injustice. Communities have to understand the inherent challenges posed during a pandemic long before it arrives. How vaccine is distributed, how ventilators are assigned, where priority is placed and where it is not are issues

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that should be shared with the community. Understanding the implications of these shortages enables fuller response and commitment to behavior that protects against and minimizes further spread of disease. When community leaders understand the challenges that await us during an influenza pandemic, they can actively promote preparedness and cautious behavior through their organizations' activities and venues. This action can save lives during an outbreak. Community leaders can also couple preparedness messages with other health improvement messages that remind us of the importance of vaccinations and getting medical care early for oneself and loved ones.

A pivotal key in eliminating injustice toward members of underserved communities is having community leaders and health organization leaders collaborate with one another and increase community representation on committees, panels, task forces, and planning groups tasked with setting guidelines that will prepare us for the challenge that lies ahead. Involvement in policy development can increase community access to the array of resources that will be needed during the influenza. The goal is to keep people fed, protected, and informed about where to turn and what to do next to minimize the threat of further contamination. By getting individual and families, especially those who are historically undeserved and discriminated against through this event safely, we reduce health disparities that can occur during a pandemic.

Reducing injustice involves developing protocols for resource distribution that reflect knowledge of the needs of special populations. Acknowledging intent to be fair and equitable in providing resources to communities will reduce the incidence of real and perceived instances of injustice. Public discussion about potential for injustice toward disadvantaged populations, whether on radio, television, or in the newspapers, will greatly deter injustice. Public buy-in on limiting and reporting any evidence of injustice in the treatment of people can also have a positive effect. Statements from public officials announcing how important it is to exercise just and equitable distribution of resources and services during an influenza pandemic can also curtail injustice. All off this becomes a cornerstone to getting us through the emergency because many people of color feel a heighten sense of distrust in public response systems, government, and the established rules of the day. The justified memories of unequal treatment in all areas of life may dominate.

All communities need information about the potential for an influenza pandemic and the need to prepare in advance for such an emergency. Early outreach is important because avenues of communication with public health and government may be limited. It is suggested that caution be used to avoid inciting panic in the general public. However, people must be informed and aware. Therefore, selecting community leaders to provide such messages will likely minimize premature panic.

Community leaders need the benefit of early training and support. They will be integral to squashing rumors, preventing stereotyping, and restoring a sense of order if communication breaks down.

Can there be justice for all in the midst of a flu pandemic outbreak? Neither children, the disabled, those who cannot stockpile food, those who do not speak English, nor the elderly should be hungry; nor should they have unequal access to treatment during a flu pandemic. Treatment, prophylaxis, and basic needs (ie, food, shelter) should be provided in a nondiscriminatory fashion. The following guidelines will help prevent disparities during a flu pandemic.

- Make all resources available on the basis of a distribution plan that permits fair distribution to all. The disenfranchised and people of color should have an opportunity to contribute to the distribution plan. It is imperative that their voices be heard from the beginning of the planning process and that they understand the resource limitations that will exist during this crisis.
- Develop a process to immediately correct misallocation of any resource(s). Ensure that the public can witness and validate the correction(s). This includes eliminating any known obstacles and developing distribution formulas that adjust for social disparities, financial and economic disparities, mental health disparities, and primary health disparities.
- Prepare culturally relevant materials to educate the broader public about this situation and techniques for reducing its impact. All materials should be current and easy to read and understand. They should also emphasize issues important to disadvantaged individuals and those with preexisting health conditions.
- Encourage public health departments to invite community leaders to the planning tables to share in local discussions on protocol development and to provide feedback from their community's perspective.
- Invite every community organization, public and private, to assist in planning for and meeting the actual and anticipated needs of disadvantaged populations in their communities. Make every possible effort to identify available resources for use during a crisis and see that community leaders have ways to access resource providers.
- Engage community members to assist others in identifying instances of prejudicial thinking, biased behavior, and acts of unfair distribution. Provide them with information about reporting such instances through the appropriate channels in time for effective interventions.

Combining our strengths, pulling together, and preparing based on these guidelines will help prevent disproportionate challenges to disadvantaged populations. However, we must recognize that such injustices will still occur and we must identify and rectify such problems.

An example of such uniting and recognition is the collaborative work of the North Carolina Division of Public Health (DPH), Old North State Medical Society, and a number of community organizations. Those organizations include the National Association for the Advancement of Colored People (NAACP), North Carolina Commission of Indian Affairs, El Pueblo, the Mexican Consulate, Alliance of Black Elected Officials, North Carolina Institute for Economic Development, North Carolina General Baptist State Convention, Webb Patterson Inc, JMG

Marketing, Brad Thompson and Associates, NC Mutual Life Insurance Company, and numerous other community-based public, nonprofit, and private organizations. These organizations have a steadfast interest in uplifting the community and protecting its members in every possible kind of way. Our collective interest brought us together to plan for these issues.

The Old North State Medical Society and DPH are partnering through a contractual relationship to guide the development of statewide strategies to reach vulnerable populations, as mandated in the funding guidance. They will implement a health disparities prevention project focusing on flu pandemic planning, preparedness, and response in African American, American Indian and Hispanic/Latino communities. Furthermore, ONSMS will bring to bear the leadership, vision, perspectives, knowledge, skills, abilities, and commitment of the state's African American medical community to assist the Division of Public Health in assuring that African American, American Indian, and Hispanic/Latino communities in North Carolina are reached in the event of a flu pandemic and that the communities are not disproportionately or adversely affected by the outbreak.

This action gives promise for achieving justice for all through the aforementioned guidelines. It also directly responds to the need for the development of culturally relevant documents and culturally appropriate involvement of minority communities in disaster planning, preparedness, and recovery, as recommended by the August 2005 report prepared by the National Center for Disaster Preparedness.

The partnership between DPH and the ONSMS is establishing a Disparities Prevention Advisory Committee and developing an action plan to promote, facilitate, and implement at least four pilot projects that address flu pandemic planning, preparedness, and response in African American, American Indian, and Hispanic/Latino communities. The partnership will also identify barriers to and facilitators for communicating flu pandemic-related risks to African American, American Indian, and Hispanic/Latino communities and link and facilitate communication and interaction between key leaders in those communities and public health leaders who are engaged in flu pandemic planning.

This work will also involve conducting three events in the African American, American Indian, and Hispanic/Latino communities. Feedback from these events will enhance public health's understanding of how to meet community needs in the event of a flu pandemic. The final report from this collaboration will include recommendations for next steps in preparing for and responding to the needs of racial and ethnic minority communities during a flu pandemic.

Ensuring fair and equitable distribution of resources or "justice for all' is possible when people are educated about the facts, included in developing protocols and response plans, while respecting and valuing those affected as problems arise. The answers to the primary questions reside in the continuing commitment of leaders across the spectrum to collaborate in the interest of full and equitable distribution of goods and services during an influenza pandemic. **NCMJ**

Manufacturing a Flu Vaccine

Marguerite Donoghue Baxter, RN, MSN

Vaccines are considered the most cost-effective public health intervention, saving millions of lives every year by preventing major human diseases. The new Novartis Vaccine and Diagnostics Division is on the vanguard of vaccine development to prevent seasonal flu and, potentially, also pandemic influenza. New research techniques and manufacturing technologies have sparked a revival and strong double-digit growth in this sector of the pharmaceuticals industry, as well as provide life-saving intervention for people most at risk for preventable viruses.

Despite availability of safe and effective vaccines, seasonal influenza causes millions of infections and kills an estimated 250,000 people worldwide every year. Health authorities in many countries are preparing to increase coverage rates for seasonal flu vaccine to comply with a recommendation from the World Health Organization (WHO) to reach 75% coverage of at-risk groups—the elderly and people with chronic diseases—by 2010. The United States is leading the way, recommending seasonal flu vaccinations for all Americans over the age of 50, children from the age of two months to five years, and other at-risk groups, including health care workers.

During the 20th century, there were three pandemics, or simultaneous worldwide epidemics of influenza. The 1918 "Spanish flu" killed more than 20 million people. Subsequent pandemics in 1957 and 1968 were less severe but also killed millions around the globe. It is the concern about future pandemic influenza that has mobilized health regulators to encourage manufacturers to improve the development and production of vaccines in advance of an outbreak. As such, production capacity is expected to rise sharply by 2009—yet the WHO acknowledges that the projected rise in capacity for seasonal flu vaccine will not reach levels sufficient to serve the worldwide population in case of a pandemic. Newer technologies, however, can help boost production and availability of the necessary vaccines.

Cell Culture-Based Influenza Vaccines

Cell culture-derived influenza vaccines (commonly referred to as "flu cell culture" vaccines) use modern biotechnology cell cultures rather than chicken eggs for primary production. Current egg-derived vaccine production requires several months of logistics for ordering and receiving eggs. This lead-time can hinder the response to unanticipated demands such as the discovery of pandemic strains, production failures, and seasonal influenza virus strain changes. In contrast, flu cell culture production enables flexible, faster start-up of vaccine manufacturing, and is independent of the availability of eggs, providing a particularly important advantage in the event of an influenza pandemic.

Also, cell culture vaccines are noninferior to the traditional alternatives. In one large-scale Phase III study conducted in Poland during the 2004-2005 influenza season, cell culture-derived influenza vaccine was shown to be as effective as egg-based vaccines in provoking an immune response (immunogenicity) against influenza.

"Despite availability of safe and effective vaccines, seasonal influenza causes millions of infections and kills an estimated 250,000 people worldwide every year."

Dispensing with eggs in production also promises benefits to people who are allergic to eggs. Currently, strains of seed virus used in seasonal influenza vaccine are selected partly because of their ability to grow well in eggs. This egg adaptation will not be needed with cell culture-based influenza vaccines, which could translate into better efficacy of seasonal vaccines by more closely

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matching the vaccine with the influenza strain in circulation.

In July, 2006, Novartis announced plans to build the first cell culture-derived influenza vaccine manufacturing plant in the United States at a new site in Holly Springs, North Carolina. In parallel, Novartis is making additional investments to expand capacity for flu cell culture vaccine production in Marburg, Germany. Novartis Vaccines submitted the first application for a flu cell culture vaccine to European regulators in June of last year, following successful completion of Phase III clinical studies. In the United States, clinical trials of the cell culture influenza vaccine began in 2005 and are ongoing.

The United States government offered key support for the new technology when the Department of Health and Human Services (HHS) awarded Novartis a contract of up to $220 million to support development and manufacture of cell culture-derived influenza vaccine in the United States. The contract is part of a larger HHS initiative to expand domestic infrastructure for influenza vaccines, as well as ensure domestic capacity to produce 600 million doses of pandemic influenza vaccine within six months of a pandemic declaration. Part of the HHS contract will support planning and equipment for the new cell culture-based influenza vaccine manufacturing plant in North Carolina.

Pandemic Preparedness

Cell culture technology represents a potentially critical tool to boost production capacity, and thereby help to reduce the current gap between potential vaccine demand and supply anticipated during an influenza pandemic. The WHO's latest action plan for a global influenza pandemic warns that potential vaccine supply today is "several billion doses short of the amount needed to provide protection to the global population."

A new influenza strain, known as H5N1, is spreading through bird populations in Asia, Africa, and Europe. Only 244 human cases have been recorded so far, but, chillingly, the fatality rate has been more than 50%. Though avian flu remains primarily an animal disease, if the virus develops the capacity for sustained, efficient human-to-human transmission, it could spread quickly around the globe.

In 1999, Novartis Vaccines was the first manufacturer to successfully test an experimental vaccine against a variant of the H5N1 influenza virus following the initial outbreak of avian flu in Hong Kong. Ironically, because the H5N1 strain that caused the outbreak was lethal to the egg cells that are needed in egg-based production, Novartis Vaccines was forced to use a closely related H5N3 strain to produce its vaccine.

That initial H5 vaccine also included a proprietary adjuvant called MF59. An adjuvant is a substance added to a vaccine to boost the body's immune response against the vaccine's active constituent, called the antigen. In 2003, a follow-up study showed that the adjuvanted H5 vaccine also offered cross-protection against H5N1 strains that have circulated across Asia since the initial Hong Kong outbreak.

Importantly, the use of an adjuvant could provide effective protection at lower doses than nonadjuvanted vaccines, potentially enhancing production capacity and supply in the event of a pandemic. The WHO has proposed clinical studies of H5N1 vaccines, including MF59 and other adjuvants with a proven safety record in humans, as part of its global pandemic action plan.

The Novartis cell culture-based pandemic vaccine is still in preclinical development but clinical trials are expected to begin this year. In Europe, Novartis was one of several vaccine producers in 2006 to file "mock-up," or stand-by, registrations for a pandemic vaccine that would enable companies to begin production immediately if the WHO declares a pandemic. Novartis has also submitted a dossier to the European Medicines Agency for a H5N1 prepandemic vaccine that could be sold freely to private individuals and companies, in addition to governments and other payors.

Meanwhile, Novartis Vaccines has received orders from the United States and United Kingdom to supply prepandemic H5N1 avian influenza vaccine—in some cases containing MF59 adjuvant—for national stockpiles.

Conclusion

Cell culture-based influenza vaccines provide greater reliability, faster production, and more accurate viral strain matching. As health agencies prepare for potential pandemics of influenza, new strains of seasonal influenza and avian influenza, this cutting edge technology will be of critical importance to the health of at-risk populations. **NCMJ**

Likely Ethical, Legal, and Professional Challenges Physicians will Face During an Influenza Pandemic

Janelle A. Rhyne, MD

Health care workers are some of the most integral front-line responders during natural and biological disasters. As such, they often face serious risks to their health and well-being. Many physicians volunteer to assist during crises because they recognize the value of their skills to the needs at hand. However, other physicians are reluctant to expose themselves, and by extension, their families, to such risks. In preparing for a public health crisis like an influenza pandemic, it is important to take steps to eliminate or minimize the risks physicians will incur if they choose to assist with serving the needs of the population.

Events of recent years provide examples of inadequate measures to properly minimize risks to physicians. The outcomes of these situations illustrate the importance of preparedness for public health emergencies and natural disasters. In 2005, Hurricane Katrina hit the Gulf Coast Region and in its aftermath, 6,000 physicians left the area. This led to a need for additional medical personnel to travel to the region to assist with the injured and deceased. Furthermore, many of those who left have yet to return and some have no plans to do so.[1] Now, much of the region has a shortage of providers, which may adversely affect reconstruction efforts.

The 2003 Severe Acute Respiratory Syndrome (SARS) outbreak in Canada offers another example of risks to health care professionals and the challenges faced in minimizing their risks. Forty-three percent of those falling prey to SARS were health care workers with a case fatality rate of about 15%.[2] As a result, staffing at Canadian facilities treating SARS patients became a problem because many providers did not want to expose themselves to danger. In addition to the health risks, 49% of SARS health care workers reported social stigmatization and 31% reported ostracism by family members.[3] Regardless of these physical, social, and emotional challenges, failure to report to work resulted in permanent dismissal of hospital staff. As a result, many health care workers voluntarily left the profession for new careers rather than expose themselves and their families to risks associated with caring for patients with potentially lethal infectious diseases.

Ensuring a positive work environment for physicians is important because a recent analysis published in *Health Affairs* projected a shortage of physicians that will grow even worse within the next fifteen years.[4] Therefore, developing a plan to minimize the stresses that could affect physicians during a public health crisis is more critical than ever. Furthermore, it is important to remember that practicing physicians and other health care workers are not the only ones providing services during an emergency. Medical students, interns, residents, and other training health care professionals provide emergency assistance and are the future caregivers. In addition, the health care workers themselves are not the only ones at risk when they expose themselves to potential infections. Many health care workers are concerned about the safety of their families in the event that they were to become infected. Therefore, society needs to safeguard

"...medical professional associations and societies support the safety of physicians, but also assert an ethical obligation and responsibility to work during a public health crisis despite personal risks."

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families as well as physicians and medical trainees.

In preparing for a public health crisis, it is important to understand the ethical and professional standards that guide physicians in their practices. Current North Carolina Medical Board policies and regulations only address the obligations of a physician to an established patient. The Board does not assert an ethical requirement for a physician to accept a new patient or treat or care for anyone. In its policy statement entitled "Termination of the Physician-Patient Relationship," the Board "recognizes the physician's right to choose patients and to terminate the professional relationship when he or she believes it is best to do so."

Several national professional societies addressed ethical imperatives to provide care after the September 11, 2001 terrorists attacks by adopting policy statements that focus on the medical professional's duty to care in a public health emergency. The American Medical Association (AMA) Policy E-9.067 Physician Obligation in Disaster Preparedness and Response says:

> National, regional and local responses to epidemics, terrorist attacks, and other disasters require extensive involvement of physicians. Because of their commitment to care for the sick and injured, individual physicians have an obligation to provide urgent medical care during disasters. This ethical obligation holds even in the face of greater than usual risks to their own safety, health, or life. The physician workforce, however, is not an unlimited resource; therefore, when participating in disaster responses, physicians should balance immediate benefits to individual patients with ability to care for patients in the future.

The AMA Ethics Manual statement H-140.873 says: "Front-line physicians have an increased ethical obligation to avail themselves of safe and effective protective and preventive measures (for example, influenza vaccine)."

The American College of Physicians (ACP) Ethics Manual addresses medical risk to physician and patient and the responsibility to work with the following statements:

> Traditionally, the ethical imperative for physicians to provide care has overridden the risk to the treating physician, even during epidemics. In recent decades, with better control of such risks, physicians have practiced medicine in the absence of risk as a prominent concern. However, potential occupational exposures such as HIV, multidrug-resistant tuberculosis, severe acute respiratory syndrome, and viral hepatitis necessitate reaffirmation of the ethical imperative. Physicians should evaluate their risk for becoming infected with pathogens, both in their personal lives and in the workplace, and implement appropriate precautions. Because the diseases mentioned above may be transmitted from patient to physician and because they pose significant risks to the physician's health, some physicians may be tempted to avoid care of infected patients. Physicians and health care organizations are obligated to provide competent and humane care to all patients, regardless of their illness. Physicians can and should expect their workplace to provide appropriate means to limit occupational exposure through rigorous application of infection control methods. The denial of appropriate care to a class of patients for any reason, including disease state is unethical.

According to these statements, medical professional associations and societies support the safety of physicians, but also assert an ethical obligation and responsibility to work during a public health crisis despite personal risks. The preeminence of the AMA and the ACP notwithstanding, the ethical imperatives to work they elucidate do not bind physicians who may, in good conscience, believe otherwise.

Nonetheless, whatever obligations physicians may have, surely the public has reciprocal obligations. If, for the public good, society expects physicians to voluntarily expose themselves to potentially lethal risks, what ought society provide physicians in return?

The following suggested remedies address some of the concerns that may contribute to a physician's reluctance to provide care in a health crisis situation such as an influenza pandemic.

1 Establish liability immunity for good faith medical treatment and triage[a] judgments.
2 Provide antiviral medications and vaccinations for physicians and their families.
3 Provide personal protective equipment such as masks, gloves, gowns, etc.
4 Provide community support services (ie, health services, food, and supplies) for physicians' families in the event of extended absence from home.
5 Suspend Health Insurance Portability and Accountability Act (HIPAA) regulations enforcement in cases of necessary and/or inadvertent violations in a crisis situation.
6 Provide a compensatory program modeled on workman's compensation for physicians who die or become disabled as a consequence of providing care in a pandemic.

The development of policies by our legislature to ensure the safety of our practicing physicians and physicians in training will benefit the present and future care of patients in North Carolina. If, however, reciprocal obligations to physicians are

a The American College of Emergency Physicians Policy on triage states that "when the number of patients and severity of their injuries overpower existing resources, triage decisions must classify patients according to both their need and their likelihood of survival. The overriding principle should be to focus health care resources on those patients most likely to benefit who have a reasonable probability of survival."

not acknowledged, failure to do so may adversely affect physicians' decisions to continue practicing medicine and it may dissuade others from becoming physicians in the first place. **NCMJ**

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Roles of Hospitals During an Influenza Pandemic

Barb Bisset, PhD, MS, MPH, RN, EMT

With most area hospitals operating at about 95% to over 100% capacity on any given day, it's evident that a flu pandemic will quickly overwhelm our ability to treat the thousands of patients who will surely stream toward the nearest emergency room.

Plans are being made now to cope with this potentially explosive threat. If worst-case projections were to materialize, Wake County could have as many as 225,000 residents in varying degrees of illness during a pandemic. In addition to readying our facilities and professional staff, the highest priorities are to prepare people to care for themselves and others at home, and to work with community partners to pool resources.

"We know that, logically, the first place people will turn to is their nearest hospital, but realistically, it will be impossible for any health care facility to expect to manage the huge influx of patients," says WakeMed Health & Hospitals CEO William K. Atkinson, PhD. "We see our leadership role as putting into place now a wide range of plans, including in-house preparation and training, and a vital network of community partnerships and public education. The absolute key to our success will be collaboration with other community partners."

Like most hospitals, WakeMed is approaching its organizational planning on five levels:

- ***Individual and personal preparedness*** – Informing the public that individuals will need to assume a great deal of responsibility for their own care or for that of their loved ones.
- ***Employee preparedness*** – Helping staff work through their own logistics to ensure they can be at work. This includes thinking through childcare options if daycares and schools are closed and taking other steps to put their personal lives in order.
- ***Organizational preparedness*** – Organizing the hospital system, at the executive level, to clearly understand necessary actions to be taken at both the community level (in coordination with other area hospitals) and within its own organization (eg, implementing the Hospital Incident Command System).
- Departmental preparedness – Educating each department within the hospital about how it specifically fits into the institution's bigger plan, such as considering every employee as essential and knowing that job duties may change rapidly as needed. For instance, we should expect that one person might take on tasks that are handled by many people on a normal day (eg, drawing blood, delivering food, emptying trash) in order to reduce the risk of exposure to affected patients.
- ***Planning with key community partners*** – Coordinating with other hospitals, home health agencies, the county's public health department, and emergency responders such as fire and police departments and emergency medical services. In addition to local partners, we need to understand what the state is doing and how the state fits into federal plans.

"If worst-case projections were to materialize, Wake County could have as many as 225,000 residents in varying degrees of illness during a pandemic."

Finally, the most difficult part of planning involves grappling with the inevitable ethical quagmires that await us in deciding who gets treated and how. How do we determine the sufficient level of care without lowering quality of care? Who will get respirators and limited medicine? Currently, many of society's health care efforts are directed at the elderly. This will, in all likelihood, not be the case when resources and treatment options are severely restricted.

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Special Challenges Faced by Hospitals

As Dr. Atkinson noted, people are likely to turn first to the nearest emergency room. Hospitals need to be prepared to deal with large numbers of people at once because many people will likely fall ill within a relatively short time span. Hospitals should also be prepared for the fact that ill people are likely to be in panic mode or close to it. This will require having traffic control and security measures in place to ensure safety of both personnel and patients.

Once patients are inside our doors, we need guidelines for triage decision making, with an emphasis on saving the most lives. Subsequent decisions will revolve around who gets treated, and then *how* they get treated. For those who are turned away, will we be prepared to arm them with information and possibly supplies that will help them cope?

When patients are admitted, another range of issues needs to be addressed, such as authority to use sufficient standards of care that may be different from the normal levels, maintaining a healthy, hygienic environment, and doing our best to minimize the risk of exposure to the caregivers. In addition to ensuring proper quarantine procedures and protective equipment for staff, we need to allow for staff rotation to prevent burnout, and provide stress management programs to help staff cope with the emotional aspects of such an overwhelming event.

Additionally, hospitals need to make sure other contingency plans are in place, including figuring out how to sustain core business activities over several weeks, mapping how financial issues related to reimbursement will be handled, and determining how to respond to interruptions in service, such as sanitation, water, or power. We must anticipate shortages, including in personnel (assuming various degrees of absenteeism) and supplies (because of the very real probability of disruption in deliveries due to suppliers' own absenteeism issues).

One of the most critical aspects of dealing with a pandemic—and one of the biggest challenges—will be both internal and external communications. From an internal standpoint, we need to anticipate employee fear and anxiety and be prepared to respond to rumors and misinformation quickly, calmly, and factually. WakeMed already has in place an "E-Notify System" for key response teams, allowing us to quickly alert needed personnel.

Externally, we will need to disseminate timely and accurate information to the community, including the status of our response and consistent messages about when and where to seek care. It will be critically important that all responding agencies coordinate their information efforts with community partners by using a Joint Information Center (JIC), with a single spokesperson for the JIC or from each agency. This will reduce confusion and present a more cohesive approach to the public.

Another challenge will be helping families, particularly those from out of town, obtain information about friends and family members they are unable to reach. As part of the planning process, decisions should be made about how to handle these calls and all communications, including designating a public spokesperson for the hospital who will represent us at a JIC if one is established.

Public Policy Options Needed

In the spirit of collaboration and preparedness, a flu pandemic drill was held in February 2006, bringing together 250 individuals from 36 agencies across the region. Wake County's hospitals participated (WakeMed Raleigh Campus, WakeMed Cary Hospital, Rex Healthcare, and Duke Health Raleigh Hospital), as did state health officials, Wake County Human Services, Wake County Emergency Medical Services, and a number of representatives from law enforcement, municipal governments, and nonprofit agencies.

Separately, the North Carolina Hospital Association created a Disaster Roundtable in response to the September 11th attacks that resulted in mutual aid agreements signed by all eligible North Carolina hospitals in 2004. These agreements address the sharing of resources, including staff, and provide a good foundation for any mass casualty disaster.

While these efforts are beginning to address the public policy issues raised by a flu pandemic, many remain. Wake County's Community Health Director Gibbie Harris sees the thorniest issues as the ethical dilemma of who gets treated, and how? "Everybody is really struggling to even have a conversation about this, because it's so difficult and it's so huge," she said. "We know there will not be enough respirators, enough hospital beds, enough medicine. Whether we are going to be able to get to a place in this country where we make some public policy decisions on this remains to be seen. If we can't, then the decisions are left to organizations or, when you get right down to it, to individual doctors."

Some decisions over who receives care will be performed initially by the 9-1-1 emergency response centers. In Wake County, callers are evaluated and placed in one of five categories. This same approach can be used in a pandemic to make preliminary decisions about who is even transported to a hospital or another care facility says Wake County Emergency Medical Services (EMS) Medical Director Brent Myers, MD, MPH.

Another public policy issue under consideration is the role of community health providers in a pandemic. For instance, public health departments could serve as a bridge for hospitals by establishing alternate care facilities that can serve those who are not the most critically ill but are unable to care for themselves at home. Harris believes all communities should explore possible alternative care venues as part of the planning process and then work out agreements that establish roles and sharing of supplies and other resources. "The key is to look in your county or your region, and collaborate and consolidate resources as part of your planning process, knowing that you will need more capacity than hospitals can provide and knowing there will be people who need different levels of care," she said.

An innovative example of planning ahead and using resources wisely is the approach taken by Wake County EMS. Currently, all EMS personnel are trained to give shots. Even though a specific vaccine would likely not be available, having this skill available adds value to the health care sector. "We know we need to protect our workforce and keep them well enough to come to work," says Dr. Myers. "So today, we are all

able to administer vaccinations, and we practice annually with flu shots. If a vaccine is available before or during a pandemic, we will be able to step up and help."

Dr. Myers says his agency learned lessons shared by the Toronto EMS during the February 2003 SARS outbreak, and recommended that others use those lessons as a basis for planning. "Putting certain protocols into place early, such as what type of protective gear should be worn, provides EMS personnel with the confidence that their own risk of exposure will be minimized," he says. "Our own responders need to know that we will modify some procedures as needed or outline the steps they should take to reduce their own chance of infection, and that will increase our chances that they will come to work when and where we need them."

He echoes advice about forming partnerships now and modifying existing plans rather than starting from scratch. "The number one key is to make sure that you sit across the table and talked with your public health representatives," he says. "Often, we operate in different spheres, but you have a lot of catching up to do if you are sitting down for the first time in a crisis situation."

Conclusion

As is the case with any emergency planning, the key to preparing for a flu pandemic is to think through all of the "what if" scenarios and get plans in place now for future use. The day the first wave of flu patients presents to your emergency room is *not* the day to begin planning how best to handle it. The large number of resources available through the federal and state governments are a good place to start. They provide guiding principles and checklists, such as a United States Health and Human Services' booklet on bioterrorism and other public health emergencies, called *Altered Standards of Care in Mass Casualty Events*.[1]

In addition, exploring potential collaborations with partners takes time, so reaching out to other area hospitals, public health departments, and nonprofits is a good way to form working partnerships. Deciding which resources can be pooled, including personnel, and drawing up legal or other formal agreements ahead of time can make for much more efficient operations later.

Also, it's important to draft a plan in advance that can be shared with your organization and the general public, so that everyone has a clear understanding of what to expect, where to go, and who to call for information. If you do not have plans in draft stages, please make this a priority for your organization. If you have plans well underway or in place, congratulations! Let's hope that you will never need to use them. **NCMJ**

Contributions from Kim Gazella.

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All Politics, Pandemics, and Plans are Local

John Morrow, MD, MPH

As the threat of a flu pandemic becomes more of a possibility with each passing month, local health departments are busy preparing local flu pandemic plans. Local health departments tasked with the mission of protecting the public health have taken the lead in local preparedness for such an event. This is a daunting task.

North Carolina's local health departments were originally established in the early 1900s to help deal with significant communicable disease threats like typhoid, yellow fever, and tuberculosis. As these diseases were controlled with interventions such as improved sanitation, vaccines, and antibiotics, the infrastructure and funding support for these communicable disease programs drastically deteriorated. Most current local health department staff members have never dealt with a large, serious local epidemic of a communicable disease, and none have dealt with a true pandemic. This situation is analogous to a fire station that has not fought a fire in a very long time. With only limited state and federal government support, local public health departments have struggled to maintain or rebuild their epidemiology functions.

"During a pandemic, simple things like cough etiquette, hand washing, and social distancing can make the difference between life and death."

Federal bioterrorism funding provided to state public health departments since September 11, 2001 has somewhat improved this situation because the processes and interventions for bioterrorism are similar to those for other emerging infectious diseases of natural origin like a flu pandemic. Furthermore, North Carolina laws have been strengthened to help state and local departments deal with serious communicable disease threats. Also, local health department staff members have been trained in incident command system (ICS). The ICS emergency structure, initially developed by the United States Forest Service to fight fires, is now used by all types of emergency responders during various incidents or disasters. For example, both hurricane Ernesto and the *Tall Ships* event in Morehead City used ICS in 2006. This system allows all emergency responders to speak the same language and to read from the same page when a crisis occurs.

The newest challenge for local health departments is to slow the onset and progression of an influenza pandemic within their communities until a vaccine is available. Although many in our society may expect a solution for pandemic problems to come from space-age science labs far away or from the Centers for Disease Control and Prevention, the truth is that the most powerful interventions will likely be basic sanitation methods that have proven themselves for thousands of years. During a pandemic, simple things like cough etiquette, hand washing, and social distancing can make the difference between life and death. Educating people with this critical information expeditiously and in an easily understandable format is one of our greatest challenges today. These interventions will be most effective if the behaviors are well ingrained among the population *before* the pandemic arrives.

North Carolina prides itself as being one of the best prepared states for disasters. Much of this confidence is attributable to the state's extensive experience responding to hurricanes and other weather-related events. However, unlike a weather event, a pandemic will likely impact the entire state simultaneously and be much longer in duration (eg, 12–18 months). Unlike a hurricane or similar local disaster, the cavalry is not coming to save the day during a pandemic. It will be left up to the local communities to sustain themselves and care for their families and neighbors for an extended period of time.

The most valuable lesson that I learned as a local health

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director from Hurricane Floyd is that, in a time of crisis, most people will do what you ask them to and even more. Although laws may exist for enforcing social distancing measures, it is unlikely that they will actually be enforced on the local level during such a crisis. However, I believe the public will self-enforce most of these public health interventions. People will respond to the public messages they receive. Therefore, it is critical that public information come from a trusted source and be accurate.

A bigger public health problem during a pandemic will be controlling limited assets that will be in high demand when many people fall ill. Included in this list will be hospital beds, ventilators, and antiviral medications. We will need to distribute these fairly and in an open manner. This is where local boards of health can be helpful. Local boards of health exist in every county and serve as the policy-making body for the health departments. In the setting of a pandemic (or any other public health crisis), the local Board of Health (BOH) can be a critical component to maintaining social order and in the continuation of local government operations. The eleven member BOH is appointed by the County Commission and is composed of seven professional members representing medicine, nursing, pharmacy, dentistry, optometry, veterinary medicine, and engineering. Three additional at-large members and one representative from the County Board of Commissioners fill the remaining seats. During a pandemic, this board can help reassure a skeptical public that limited services and supplies like vaccines and antiviral medications are distributed in a fair and equitable fashion. The Board of Health can help ensure an objective and nonpartisan review of these very acute and complicated public health problems and can also help to insulate elected officials from these potentially volatile issues. The other advantage the Board of Health has is that, unlike ordinances passed by the County Board of Commissioners, the rules approved by the Board of Health have jurisdiction for the whole county, including all of its municipalities. Infectious diseases like influenza have no respect for political boundaries, thus our public health interventions must also not be restricted by these.

The types of interventions that will be necessary will depend upon which pandemic phase we are in. For instance, if the initial cases of a flu pandemic present themselves in a North Carolina county, as in World Health Organization (WHO) phase 4,[1] then isolation, quarantine, and antiviral treatment and prophylaxis may all need to be quickly instituted. On the other hand, if our counties are not affected until late in the pandemic (WHO phase 6[2]), then isolation and quarantine may be of little use and the supply of antiviral medications will likely not be sufficient for all those in need. Guidance from the World Health Organization, Centers for Disease Control and Prevention, and North Carolina Division of Public Health will likely be adjusted throughout the pandemic as we learn more about the virus and its transmission and treatment.

Local pandemic plans must be flexible enough to quickly adjust to these different scenarios. These plans should be designed by a multidisciplinary team including representatives from local governments, businesses, hospitals, schools, religious groups, and volunteer and other community organizations. These plans must be cross-checked with other agency and entity plans to make sure that resources are not planned to be in two or more places at the same time, and to make sure that roles and procedures are clear to everyone involved. The plans need to be agreed to and signed by the major partners and should be updated annually. They should also be exercised on a regular basis to identify what works well and what doesn't. As we witnessed with hurricane Katrina, it doesn't matter how well the federal and state plans are written if they cannot be effectively implemented on the local level.

In facing this challenge of preparing for the next pandemic influenza, we must prepare ourselves, our families, our workplaces, and our communities. Effective preparation efforts are already under way, but certainly much more can be done to help every community feel ready. Our goal in the east is to be as well prepared for a pandemic as we are for a hurricane. I just hope and pray that the pandemic and hurricane don't happen at the same time." **NCMJ**

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Pandemic Influenza and the Law:
Isolation, Quarantine, and Other Legal Tools for Containing Outbreaks

Jill Moore, JD, MPH

Today, governments, health care providers, businesses, and others are developing plans to respond to an influenza pandemic. These plans may discuss isolation or quarantine, or use related terms such as social distancing. But what do they mean by those terms?

The words isolation and quarantine, in particular, are used different ways by different people. For a physician, the word isolation may suggest precautions that are taken against the spread of infection, or a particular place in a health care facility where people with infectious diseases are treated. For the general public, the words may conjure up images of what I call the "TV movie of the week" form of isolation or quarantine: a home with a red-lettered sign on the door, a subdivision surrounded by a chain-link fence, or roadblocks manned by armed law enforcement officers. But for the public health system, isolation and quarantine are simply two of the legal tools available to control the spread of communicable disease. In North Carolina, these tools are part of a comprehensive legal framework for communicable disease that includes:

- laws that allow the public health system to detect communicable disease within the population,
- laws requiring public health agencies to investigate cases and outbreaks of communicable disease, and
- laws that specify—and require individuals to comply with—communicable disease control measures, which may include isolation or quarantine.

The varying common-sense and professional understandings of terms such as isolation and quarantine are good for the purposes they serve, but they may conflict with how the terms are defined in law—and it is the legal definitions that both authorize and constrain how these strategies may actually be used in an outbreak. It is therefore important for anyone involved in pandemic preparedness to understand the legal meaning of isolation and quarantine, and also the broader legal framework in which they are used.

The Framework: Legal Authority to Control Communicable Disease

The individuals and agencies that make up North Carolina's public health system—including the state health director and division of public health, local health directors and the health departments they administer, and the seven Public Health Regional Surveillance Teams (PHRSTs)—would likely be the first to identify and respond to a disease outbreak. North Carolina laws give the public health system specific duties during an outbreak, as well as specific powers to help it perform those duties.

"North Carolina laws give the public health system specific duties during an outbreak, as well as specific powers to help it perform those duties."

The starting point for communicable disease control is to be aware that a disease exists in a population—thus, one of the duties of a public health system is to detect disease. One of the ways public health meets that duty is by requiring certain diseases to be reported. North Carolina law presently requires physicians and specified others to report known or suspected cases of communicable diseases or conditions that have been declared "reportable" by the state's Commission for Health Services.[1] The list of reportable communicable diseases and

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conditions is dynamic and has grown rapidly in recent years, so that it now includes over 70 diseases and conditions. Novel influenza viruses are a recent addition to the list—known or suspected cases must be reported to the local health department immediately.[2]

In addition to this routine reporting, another state law authorizes the state health director to temporarily require health care providers to make reports of conditions that are not on the list.[3] The idea behind this law was to allow the public health system to act rapidly to detect an emerging illness or syndrome. State law also supports disease detection by authorizing public health to obtain access to medical information so that it can carry out public health surveillance.[4]

When a communicable disease or condition is detected, whether through the receipt of a disease report or a surveillance system, the public health system's duty to investigate is triggered.[5] Again, state law gives public health specific legal powers to help it meet this duty. Both state and local public health officials are authorized to obtain access to medical and other confidential records that may be relevant to a case or an outbreak. Health care providers are required by state law to make medical and other records available to public health officials in these circumstances.[6,a] Investigations may also include interviewing ill or exposed people, collecting specimens for laboratory analysis, and identifying others who may be ill or exposed.

By carrying out its duties of detection and investigation, the public health system lays the foundation for its ultimate duty: controlling the spread of the communicable disease. Supporting this duty is a state law that requires all persons in North Carolina to comply with communicable disease control measures—that is, the steps individuals, their health care providers, or the public health system must take to control the spread of disease.[7]

Communicable disease control measures are disease-specific and cover a wide range of strategies. In the event of an influenza pandemic, how will public health officials decide which control measures are appropriate? They should look first to guidelines and recommended actions issued by the Centers for Disease Control and Prevention (CDC). North Carolina law specifies that CDC guidelines will be the source of control measures when they are available,[8] and it is expected that CDC will issue guidelines during a pandemic. If for some reason it does not, the law also permits public health officials to devise their own control measures that are reasonable and meet certain guidelines depending on the disease's route of transmission (airborne, bloodborne, etc).

Because CDC guidelines are the primary source for control measures, and because those are likely to evolve in an emerging illness event, public health officials cannot know for certain what the control measures for an outbreak of a novel influenza virus will be. However, it is expected that the control measures would include at least:

- Immunization, if an effective vaccine is available
- Use of antiviral medications, if effective and available
- Isolation of infected individuals
- Quarantine of exposed individuals

In addition, public health officials will likely urge individuals and communities to embrace social distancing strategies, such as avoiding unnecessary outings.[b]

The Definitions: Isolation and Quarantine in the Law

The main distinction between isolation and quarantine is that isolation is a control measure applied to sick people, whereas quarantine is applied to people who might get sick—usually because they have been exposed to an infected person. North Carolina's legal definitions begin with this fundamental notion, but then they take it a bit further. State law defines "isolation authority" as the authority to limit the freedom of movement or the freedom of action of a person who is infected with, or is reasonably suspected of being infected with, a communicable disease or condition.[9] "Quarantine authority" includes the authority to limit the freedom of movement or the freedom of action of a person who has been, or is reasonably suspected of having been, exposed to a communicable disease or condition.[10] Either a local health director or the state health director may exercise isolation or quarantine authority.[11]

The definitions of isolation and quarantine authority refer to limiting either a person's "freedom of movement" or "freedom of action," and several North Carolina laws make important distinctions between orders based on which freedom they limit. For example, the law that authorizes health directors to order isolation or quarantine provides that orders limiting freedom of movement expire after 30 days unless they are extended by a court—even if the subject of the order is still a threat to the public health.[12] The same limit does not apply to orders limiting freedom of action. It is therefore critical for public health professionals to understand when they are limiting freedom of movement and when they are limiting freedom of action—but no law defines these terms. However, the definitions can be inferred from longstanding public health practice.

An order limiting freedom of movement essentially prohibits

a Health care providers sometimes worry that providing access to records with individually identifiable health information violates the federal HIPAA privacy rule, but the privacy rule explicitly states that providers may comply with state laws that require the disclosure of such information. (45 CFR. 164.512(a).)

b As this commentary was going to press, the Centers for Disease Control and Prevention released *Interim Pre-pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States* (Feb. 2007), available on the Internet at http://www.pandemicflu.gov/plan/community/community_mitigation.pdf. The document states that it is "highly unlikely" an effective vaccine will be available in a pandemic and recommends control strategies that include isolation of the ill, quarantine of the exposed, and use of social distancing strategies such as school closures and cancellations of large public gatherings.

an individual from going somewhere. It may confine the person to a particular place, such as his home or a health care facility, or it may prohibit the person from entering a particular place. For example, a person with active infectious tuberculosis may be required to remain at home until laboratory tests reveal he or she is no longer infected, or an unimmunized child may be required to stay home from school for the duration of a measles outbreak. In contrast, an order limiting freedom of action restrains a person's behavior, but not her ability to move about freely in society. For example, a person taking medication for tuberculosis that is no longer in the active infectious stage may be ordered to participate in directly observed therapy. This is a limit on freedom of action.

Thus, in North Carolina, an order requiring a person to be physically separated from the public would be called an "isolation order" (for an infected person) or a "quarantine order" (for an exposed person). But an order simply directing a person to comply with control measures that do not include physical separation would also be called an isolation or quarantine order. This counterintuitive use of the terms isolation and quarantine can be tricky even for public health professionals, but it is important to understand. Health care providers and patients who receive isolation or quarantine orders need to know what is actually being required of them.

During the Pandemic: Isolation, Quarantine, and Other Forms of Social Distancing

During an outbreak of influenza, an isolation or quarantine order might limit either freedom of movement or freedom of action—but it seems most likely that the isolation and quarantine authority would be used primarily to separate ill or exposed people from the general public. It also seems likely that isolation and quarantine would be used early in an outbreak in an effort to contain it as quickly as possible, but these strategies may well be abandoned if widespread illness affects a community. There is some question about whether public health officials would have the legal authority to order a television movie-style isolation or quarantine—but of greater importance, such measures are widely considered to be both impracticable and likely ineffective.

In contrast, isolation or quarantine orders that are directed to individuals, or groups of individuals with a common exposure (such as the passengers and crew of an airplane carrying an ill person), are clearly within public health's legal authority and may play an important role in preventing widespread community illness, depending on how the outbreak unfolds. Indeed, North Carolina used isolation and quarantine in this fashion during the severe acute respiratory syndrome (SARS) outbreak of 2003. Although only one person's infection was ultimately confirmed to be SARS, several people were isolated because they were suspected of being infected, and several dozen were quarantined because they were exposed to one of the isolated people.

There is, of course, no guarantee that an outbreak of novel influenza would be as limited as SARS was in North Carolina, and there are good reasons to believe that it would not. If an outbreak becomes widespread in the community, it is likely that isolation and quarantine would become less important than other forms of social distancing. Social distancing could happen spontaneously, if members of the worried well population elect to stay home. It could also occur voluntarily in response to the urging of public health officials to avoid unnecessary outings. There are also various governmental actors who have the legal authority to compel different types of social distancing. North Carolina local governments can adopt ordinances that permit them to take a number of actions in emergencies, including restricting the movement of people.[13] The Governor has the authority to declare a state of disaster and may, with the consent of the Council of State, prevent people from congregating in public places.[14] School boards can close schools and, to answer one of the questions I am most frequently asked: if the universities do not do it on their own, state or local officials could probably cancel the Carolina-Duke game, or at least prevent the public from attending. Although everyone hopes it does not come to that, the legal authority is there to be exercised if necessary. **NCMJ**

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2 NC Admin Code, Title 10A, sec. 41A.0101 (2006).
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6 NC Gen Stat. 130A-144(b) (LexisNexis 2005).
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9 NC Gen Stat. 130A-2(3a) (LexisNexis 2005).
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Business Preparation for an Influenza Pandemic

Jon Kerin

In fall 2005, the Department of Homeland Security identified the electric industry as a key component of the national infrastructure and requested that utilities, including Progress Energy, prepare an emergency response plan for a pandemic.

While our company has experience with and continually refines its plans to respond to hurricanes, ice storms, and other natural disasters, putting together our flu pandemic plan proved to be a long process and forced us to address issues that had not arisen in storm situations.

For example, natural disasters destroy infrastructure. Our employees pull together to ensure our customers get service restored as soon as possible. Many employees stop doing their regular daily jobs and take on specific storm jobs to ensure we can meet our customers' needs quickly.

In planning for a flu pandemic, though, the scenario is much different. Rather than destroying infrastructure, a pandemic has much more human impact and little if any effect on infrastructure. A flu pandemic incident is outside of our experience. Instead of bringing our employees together, as we are used to in storm events, a flu pandemic could push our employees apart, with many being unable to come to work.

Whatever the effects of such an occurrence, it is critical that electric utilities and other industries, such as banking and transportation, be prepared to continue providing society's essential needs during a pandemic.

Progress Energy took a hard look at its emergency and business continuity plans and determined that we needed to start fresh in looking at our pandemic plan. We learned some very important lessons during this process, and we believe we have developed a robust, comprehensive plan that will ensure we take care of our customers and our employees.

Involve Everyone

We formed a Pandemic Working Group, made up of departments throughout the company, including:

- Health & safety
- Power plant operations (nuclear and fossil)
- Transmission
- Distribution
- Supply chain
- Information technology & telecommunications
- Corporate communications
- Human resources
- System planning
- Customer service
- Accounting
- Security

This group met frequently for many months to develop our corporate-wide flu pandemic plan along with plans for their individual departments. Having this many groups involved helped us identify enterprise-wide gaps and develop solutions for our company as a whole.

"And we decided we shouldn't wait until a threat was imminent—we wanted to educate our employees now about a pandemic and what they could do to prepare themselves and their families."

Jon Kerin is Director of Health & Safety Services at Progress Energy Service Company, LLC and was responsible for developing the company's comprehensive flu pandemic plan. Mr. Kerin can be reached at jon.kerin@pgnmail.com or 401 S. Wilmington Street, PEB 4A, Raleigh, NC 27601.

Break Down Plan by Phases

Progress Energy chose to use the North American Electric Reliability Council's pandemic phases to guide our planning; this structure is different from the World Health Organization's six levels of pandemic alert phases. We then identified key steps for the company to take in each phase. These steps are outlined in Table 1. These steps are by no means an exhaustive list, but rather a look at the action items that the entire company needs to undertake in each phase.

Table 1.
Key Company Steps, by Pandemic Phase

Pandemic Phase	Status of Pandemic	Key Company steps
Phase 1: Pandemic Alert	Governments, owners, and operators are notified a pandemic is possible and preparedness plans should be reviewed and updated.	• Provide information to employees • Develop a list of health-related inventory items • Identify essential staffing needs and identify personnel to meet those needs (assuming a 35% to 40% absentee rate), including backups for key personnel • Develop and update the company's meeting policy • Develop and update the company staff travel policy • Identify augmented workforce requirements • Modify Human Resources policies associated with working from home, remaining sequestered at a job site, and absenteeism • Identify critical operation supplies • Implement an enterprise-wide hand-washing campaign • Develop a training plan for backups • Ensure business continuity plans have been revised to incorporate pandemic plans • Perform a self-assessment
Phase 2: Pre-Pandemic	Localized outbreaks of the disease are occurring with human-to-human transmission. Governments and electricity sector entities begin to assign resources, prepare staffing, and implement contingency plans. Begin an information distribution program to promote appropriate responses by employees.	• Periodically test and verify preparedness plans and procedures via a simulation exercise, tabletop exercise, or process walk through • Develop and update workforce deployment policies regarding teams and crews working together and the potential need to keep employees separated • Set up telecommuting capabilities for identified personnel • Stock up on water, beverages, and food • Consider the need and conditions for more extreme measures, such as sequestering on-site critical staff
Phase 3: Pandemic Outbreak	General outbreaks of the disease across borders and continents. Implement response plans.	• Activate Crisis Management Center • Notify employees • Implement the protocol for telecommuting • Notify all staff on site to leave their full name, employee ID, and after-hours contact numbers • Provide each workstation with disinfection supplies • Close noncritical common areas • Assess the need to vacate all noncritical staff from facilities • Sequester on-site critical staff, as needed
Phase 4: Maximum Disruption	High absentee rates would occur (35%) and fatalities would begin to impact workforce. This phase could last for several months.	• Analyze/reevaluate staffing levels • Analyze/reevaluate supplier effectiveness
Phase 5: Prolonged Recovery	Recovery will be slow. Altered business conditions will be prevalent. This phase will last at least three months and possibly up to six months.	• Deactivate Crisis Management Center • Implement business continuity plan and business resumption plans • Communicate with personnel and departments not addressed in resumption plans • Return to normal business operations

Employees are Customers, Too

Time and time again in our discussions, the planning group found itself not only talking about how to maintain reliable electric service, but also how our company should take care of its employees in a pandemic.

We looked for nontraditional communications channels, so we could make sure our employees had the information they would need during a pandemic. We had detailed conversations about Human Resources policies and how those might change, going as far as to write new policies to have ready in the event of a pandemic.

And we decided we shouldn't wait until a threat was imminent —we wanted to educate our employees *now* about a pandemic and what they could do to prepare themselves and their families. Using our company's daily electronic newsletter, we began sharing information about a pandemic and providing preparation checklists. We also published questions and answers and linked our employees to the Federal government's pandemic Web site (www.pandemicflu.gov) and the United States Centers for Disease Control and Prevention.

Be Realistic

We often found ourselves in many "what if" conversations during our planning, all of which helped us to address some key issues. However, it is important to recognize that a company plan cannot include every step to handle every possible contingency. Instead, we are realistic about the limitations of a written plan and use it as a higher-level guide that can be used in many different situations.

Challenge One Another

While we did not have any formal "challenge sessions" during our planning, Progress Energy's pandemic planning team frequently engaged in tough debates about the number of critical employees, whether sequestering employees would be necessary, and if and when supplies should be purchased. As is often the case in hypothetical situations, there were no right or wrong answers, but each department was able to further refine their plans based on these tough questions.

Test and Refine Your Plan

Finally, plans are only as good as the last time they were tested and updated. We have already held one company-wide drill to test our pandemic plan, and we plan to continue these drills in the future.

Providing critical services like electricity will be a challenge in a pandemic situation, but we believe our experience with other disasters and our comprehensive planning process will help us meet the needs of our employees and our customers if a pandemic ever occurs. **NCMJ**

Pandemic Influenza:
The Consequences beyond Public Health

Major General Gerald A. Rudisill, Jr. (ARNG Ret.)

Nearly everyone who has lived in North Carolina during the past ten years has some experience responding to a natural disaster. The many hurricanes, floods, tornadoes, and snow and ice storms that hit the state in the past decade have tested our ability to respond to emergencies in virtually every corner of the state. Those experiences may prove invaluable if there is an influenza pandemic. No one knows exactly how a flu pandemic would impact our lives or how long it would last. However, such an epidemic would greatly challenge the emergency response capacity of our state—and country—and stretch our resources in ways never experienced before.

Most weather-related disasters that impact North Carolina have a warning period. The disaster is usually of short to moderate duration, and the aftermath's impact on facilities, infrastructure, crops, animals, and people is somewhat predictable. Technological disasters such as transportation accidents, hazardous materials events, and fixed nuclear facility accidents would likely impact people suddenly with little warning, but would only directly affect people and property relatively near the incident. An influenza pandemic would be an entirely different type of disaster. It would impact large percentages of the population over long periods of time and require innovative, immediate, and continual responses.

Aside from the staggering impacts to public health, the potential impacts of an influenza pandemic on manpower levels and critical systems could be tremendous. As people are affected, the workforce supply would be reduced, whereas demand for goods and services would rise. The impact would be not only local, but global in nature. Consider this: as the flu spreads, providers of essential services such as food, transportation, fuel, medicine, utilities, and banking could be devastated by manpower shortages reaching 40%. Attempts to prevent the spread of flu through the implementation of social distancing measures could further reduce the workforce, thus reducing production and supply. It is conceivable that the services we take for granted such as electricity, potable water, sanitation, and natural gas could cease. Social interaction would also be curtailed because social distancing measures would limit participation in faith communities, civic groups, sports, and public entertainment activities.

"It is conceivable that the services we take for granted such as electricity, potable water, sanitation, and natural gas could cease."

The workforce challenges facing health care agencies would be no different. Furthermore, while some businesses can expect to see a decline in activity during a pandemic emergency, health care institutions will experience an overwhelming increase in demand for services.

The North Carolina Department of Crime Control and Public Safety is the state agency charged with coordinating disaster response among local, state, and federal governments. The State Emergency Response Team (SERT) is an arm of state government that is comprised of more than 40 state agencies, nonprofits, and volunteer organizations that work as a team to mobilize the state's assets to support local governments and affected citizens. It is this group that assesses and responds to local community or regional health, safety, utility, transportation, food, and housing needs following any man-made or natural disaster.

Maj. Gen. Gerald A. (Rudy) Rudisill, Jr. (ARNG Ret.), is Deputy Secretary of the North Carolina Department of Crime Control and Public Safety. The Department's mission is to improve the quality of life for North Carolinians by reducing crime and enhancing public safety. It coordinates the state response to emergencies and directs relief efforts to disaster victims. Deputy Secretary Rudisill was a member of the NC Division of Public Health and NC Institute of Medicine Task Force on Ethics and Pandemic Influenza Planning. He can be reached at grudisill@nccrimecontrol.org or 4701 Mail Service Center, Raleigh, NC 27699-4701.

Bad News of the Past may Mean Good News for the Future

Fortunately, years of experience responding to numerous hurricanes, floods, ice storms, and other severe weather events have provided North Carolina with a solid foundation for any ongoing response necessitated by an influenza pandemic. For natural disasters, the SERT frequently activates 24 to 48 hours before a disaster and remains operational long enough to respond to the immediate needs of the disaster victims. Depending on the nature of the event, the group can be working around the clock for several days to several weeks. Following Hurricane Floyd in 1999, the SERT was activated for more than five months while the state recovered from devastating floods. During that same time, the SERT also responded to the January 2000 blizzard that dumped nearly two feet of snow in central North Carolina. In the past decade, the SERT has been activated more than 50 times in response to hurricanes, ice storms, blizzards, tornadoes, and chemical explosions.

Those incidents provided the SERT numerous opportunities to work with dozens of agencies and hundreds of communities. That experience and those relationships will be vital during an influenza pandemic. In such an event, the SERT would likely be activated for weeks and possibly months. Representatives from the North Carolina Division of Public Health (DPH) would serve as technical advisors to the SERT leadership and the governor. DPH would help develop strategies to protect the public, predict future impacts, and make recommendations for protective action. The governor, SERT, and DPH leaders, in coordination with local governments, would then implement any recommended actions.

Coordination and collaboration at the local level will be imperative. A flu pandemic would cross state boundaries, thus greatly reducing the ability of the Federal Emergency Management Agency (FEMA) to support North Carolina. Assistance from many of the other traditional government and private support organizations, such as the National Guard, Red Cross, Salvation Army, and faith groups, could also be very limited due to the widespread nature of a flu crisis.

Rising concerns about safety and fears of the unknown could spark chaos. It is imperative that all levels of government – local, state, and federal—as well as private institutions, such as health care facilities, be prepared to provide essential law enforcement and public safety services to maintain public order. Public safety systems must be planned, organized, and exercised well before an event occurs. DPH and the Division of Emergency Management each have already sponsored flu pandemic exercises and training to educate our response and recovery personnel on the potential issues that may arise and appropriate responses. Leaders throughout the state's communities should actively discuss ways to partner during an influenza pandemic to keep people connected, calm fears, and offer hope for the future.

Preparing for Pandemic

The most significant need during a flu pandemic will be for solid, steady leadership that relays critical, honest, and concise information and direction to the public throughout the developing crisis. Some of that vital information is available already. To help individuals and families prepare for all types of disasters, the Department of Crime Control and Public Safety launched an emergency preparedness website—readync.org/. The site provides basic information about what to do during floods, hurricanes, tornadoes, earthquakes, fires, winter storms, a terrorism act, or a disease outbreak. It instructs users how to prepare for evacuation, as well as what to do if they must seek shelter in their homes for an extended period of time. Information and links are included to help citizens understand what preparations the government is taking and what individuals must do to ensure their safety. For instance, to prepare for a flu pandemic outbreak, families are encouraged to stockpile enough food, bottled water, medicine, cash, and fuel for several weeks.

Community cooperation where neighbors help neighbors will be the key to weathering a pandemic outbreak. A shortage of goods will spark tendencies to control limited supplies and competition for resources could become violent, even deadly, if not properly managed from the beginning. Safety and survival will depend upon the willingness of neighborhoods and communities to come together for the common good. Government will have to establish supply lines and deliver critical resources to local receiving and distribution centers just as they would after any large disaster.

To ensure other essential government services are not disrupted, last summer Governor Easley required every state agency to prepare a Continuity of Operations Plan to guarantee ongoing operations in the event that substantial numbers of employees become incapacitated due to illness. Contingency plans must evaluate and prepare for reassignment of personnel responsibilities and for conducting business long term from remote locations. Personnel are encouraged to develop alternate family care plans for periods during which they are away performing critical functions. Those plans have been developed and will be tested through mock disaster drills in the coming months.

Hospitals, public health departments, physicians' offices, and emergency medical service providers also have been preparing for an influenza pandemic emergency for the past two years. Each hospital has a plan for providing health care during an emergency, including an alternate care facility for when the hospital is overwhelmed or otherwise unavailable. Although readiness levels can never be achieved to address every possible health care contingency, tremendous progress has been realized over the past year.

When many people consider the possibility of a disaster, they think, "It isn't going to happen here. If it does happen here, it won't be that bad. If it does happen here, and it is that bad, then the government will be here to take care of me." Unlike the response to a natural disaster, the communicable

nature of the flu pandemic may mean that the government response will not be as quick and seamless as expected.

The truth is our nation is totally dependent upon the systems we have built. Grocery stores, restaurants, gas stations, water systems, electricity, flushing toilets, television, radios, cell phones, internet, pharmacies, law enforcement, emergency management services, hospitals, fire departments, banking, and credit systems are all part of our way of life. If a flu pandemic develops as a major statewide event, and likely national and worldwide event, none of these systems could be relied upon to operate continually and consistently. Everyone will experience shortages and those who are dependent upon the luxuries in our modern life may have a more difficult time surviving.

I honestly believe the key to success lies in communities pooling existing local resources and sharing what is available. This is a foreign concept to many Americans, except in a disaster environment. Government can and must lead the population during a pandemic event. A three-tiered response involving cities and counties, the state, and federal government will be necessary despite the new and unanticipated demands placed on these systems.

No one knows what the future holds. However, as we plan for emergencies, our responsibility is to consider the possibilities, define the assets and liabilities, and plan for the deficits. Government cannot be expected to do it alone. Individuals and families must prepare themselves and communities must band together. We must all accept some responsibility and do what is necessary to ensure our safety, health, and welfare. **NCMJ**

Ethics and Avian Flu

Rosemarie Tong, PhD

Health care professionals and public health officials are gearing up for the next influenza pandemic to strike the United States. For them, it's not a question of if a pandemic will strike the United States, but when. For this reason, they are paying very close attention to the avian influenza A (H5N1) virus which has killed around 150 people so far, but has not yet mutated into a virus capable of triggering a pandemic. Should such a mutation occur, chances are that the virus would spread quickly worldwide, rapidly finding its way to United States shores where it could sicken 90 million of us and kill at least 1.9 million. The United States government is preparing for the possibility of an avian flu outbreak, but so far its preparedness plan has focused largely on the development and distribution of a vaccine and the stockpiling of antivirals. But Arthur Caplan, Director of the Center for Bioethics at the University of Pennsylvania School of Medicine, stresses that no preparedness plan is complete without addressing the ethical issues likely to confront our society during a flu pandemic. These are excruciatingly difficult moral questions that the North Carolina Division of Public Health and the North Carolina Institute of Medicine are asking *now* while there is still time to think critically, carefully, and calmly about what ethical values should guide decision makers, health care workers, workers in other critical industries, and the general public when an influenza pandemic strikes.

Consider that during the first year of a pandemic fewer than 10% of us will have access to an effective vaccine. Federal stockpiles of experimental vaccines that may or may not work may be available for more of us, but it will take months for a truly effective vaccine to be developed, manufactured, and distributed. Early in the vaccine's attack on United States shores, we will also probably lack an adequate supply of antiviral medications such as Tamiflu, which some individuals, private practices, and hospitals may already be stockpiling. To add to our concern, during the height of a pandemic, we probably won't have enough ventilators for the hundreds or thousands of patients who will desperately need them for up to 18 days if the avian flu hits their lungs with the same intensity that it hit the lungs of SARS victims a couple of years ago. We will be confronted with some difficult questions: What about the patients who are already on ventilators when the pandemic strikes? Should a ventilator be removed from a baby who hasn't been doing all that well on it and given instead to a baby with the avian flu whose survival odds look really good if he or she can get on a ventilator immediately?

"Should a ventilator be removed from a baby who hasn't been doing all that well on it and given instead to a baby with the avian flu whose survival odds look really good if he or she can get on a ventilator immediately?"

The specter of a pandemic and the reality of truly scarce resources force all of us to confront the very hard question: "Who shall live when not all can live?" This is a question that most Americans hate to ask themselves. It sounds downright unpatriotic to them. "Hey this is America! What do you mean we can't all live? Each of our lives is unique, special, valuable, important!!! We deserve whatever we need to keep on living, and don't you dare try to use any one of us as a means to serve

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the common good. The end doesn't justify the means." To which the reply must be, the rules of ethics shift during a pandemic. Under dire circumstances, the value of the common good must be weighed more heavily than the value of respecting individual rights and personal autonomy. The dread "R" word—rationing—must be uttered. There is no escaping its harsh sound. But, if we take a step back and think through the situation, rationing can be our friend. During a pandemic, it can help us maintain the value of justice, provided it is done ethically—that is, by directing scarce resources to where they will do the most good for us all, and letting everyone know why it is we have chosen a particular distribution method.

But how can we get rationing to work for us rather than against us? Lawrence O. Gostin recently articulated eight ethical options for rationing scarce health resources in a pandemic.[1] As he sees it, the relative importance of the ethical options shifts during the different stages of pandemic. The ethical options Gostin articulated include: (1) prevent new infection; (2) protect both essential medical personnel so they can care for the sick and essential scientific and pharmaceutical personnel so they can develop, make, and distribute the vaccines and antivirals we will desperately need; (3) protect other essential workers without whom our society might devolve into chaos, such as police, sanitation workers, utilities workers, food makers and distributors, bankers, communication personnel, etc.; (4) protect those with the greatest medical need; (5) save younger persons, protecting their opportunity to live a long, full life; (6) make it a priority to be sure that the typically underserved—the people who live in poor, rural, isolated and all-to-often forgotten communities—get their fair share of available resources; (7) think globally as well as nationally and regionally about flu pandemic because Asian and African lives are not less valuable than American lives and because people in many developed nations have already been devastated by HIV/AIDS, malaria, and tuberculosis; (8) make it a priority to be transparent and to secure public cooperation—for unless everyone understands the reasons behind a resource allocation plan, and is convinced that it is fair, the plan will fail miserably.

Of course, rationing scarce medical resources is not the only ethical challenge our society will confront during an influenza pandemic. When Americans are faced with the implications of isolation, quarantine, and social distancing measures, how will they react? In Canada during the SARS epidemic, people complied with restrictions on their freedom largely because their fellow citizens made it a point to meet their basic human needs. The situation was otherwise in some Asian cities where many individuals either did not understand why their movement had to be restricted and/or feared that unless they took care of themselves and their loved ones no one else would. Before long, the police entered the picture and were instructed to use deadly force if necessary.

Finally, there are all the ethical challenges that will greet medical workers and first responders during a pandemic. Can they be expected as a matter of duty to help flu victims even if doing so means risking their own lives or those of their families? Can they even be forced to do so? And if medical workers and first responders courageously accept the risks society wishes to impose upon them, what will society give them in return? How will society show its appreciation for people willing to put their lives on the line to serve the common good?

As a member of the NC Division of Public Health/NC Institute of Medicine Task Force on Ethics and Pandemic Influenza Planning, and in my role as one of its ethicists, I have come to the conclusion that as important as an ethics of justice will be during a flu pandemic, even more important will be an ethics of care. In the end, we human beings are a very vulnerable lot. We are radically dependent on each other for survival and we need to view ourselves as folks in a lifeboat in the middle of the ocean with no visible sign of rescue. If there aren't enough supplies to go around until help arrives, we can do several things: we can ask for volunteers to jump off the boat; we can start drawing straws for who gets pushed off the boat; we can have a majority vote about which lives are most dispensable; or we can look in each others' eyes and see ourselves—fearful, hopeful, and in need of compassion—and then we can start paddling together to get to shore, knowing that although we might not all make it, we didn't turn on each other in our panic. What we most need to weather a pandemic is an ethics of trust, reciprocity, and solidarity. If we have that, we will have the most precious health care resource of all. **NCMJ**

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North Carolina MEDICAL JOURNAL

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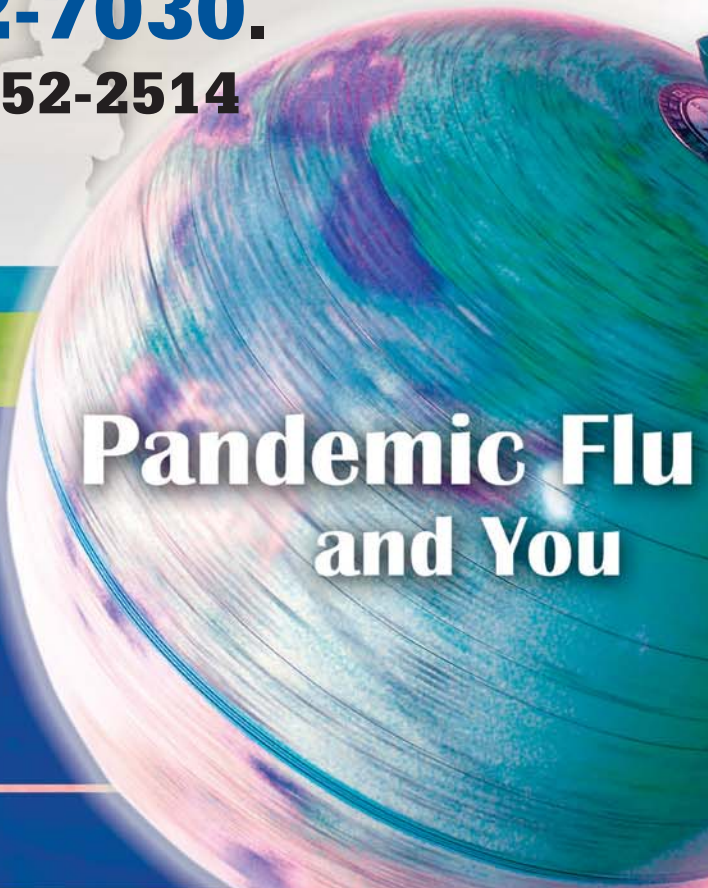

Pandemic Flu and You

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Running the Numbers

A Periodic Feature to Inform North Carolina Healthcare Professionals about Current Topics in Health Statistics

From the State Center for Health Statistics, NC Department of Health and Human Services
http://www.schs.state.nc.us/SCHS

Influenza Surveillance

For health care providers, the start of flu season is often heralded by an increased number of patients complaining of fever, cough, and aches asking the question, "Do I have the flu?" For public health departments, the onset of flu season is often heralded by calls from health care providers asking the question, "Is flu reportable?" The answer to this question is a qualified "yes."

In North Carolina, any fatal case of influenza in a child (< 18 years of age) is reportable by health care providers to the health department. In addition, any infection with a novel influenza virus, such as the current avian influenza H5N1 strain that has caused human cases in multiple countries since 2003, is also reportable. Influenza outbreaks in closed settings such as schools or long-term care facilities are also reportable. The total number of influenza cases is not reportable and neither are fatal cases of influenza in persons 18 years of age or older (other than on a death certificate).

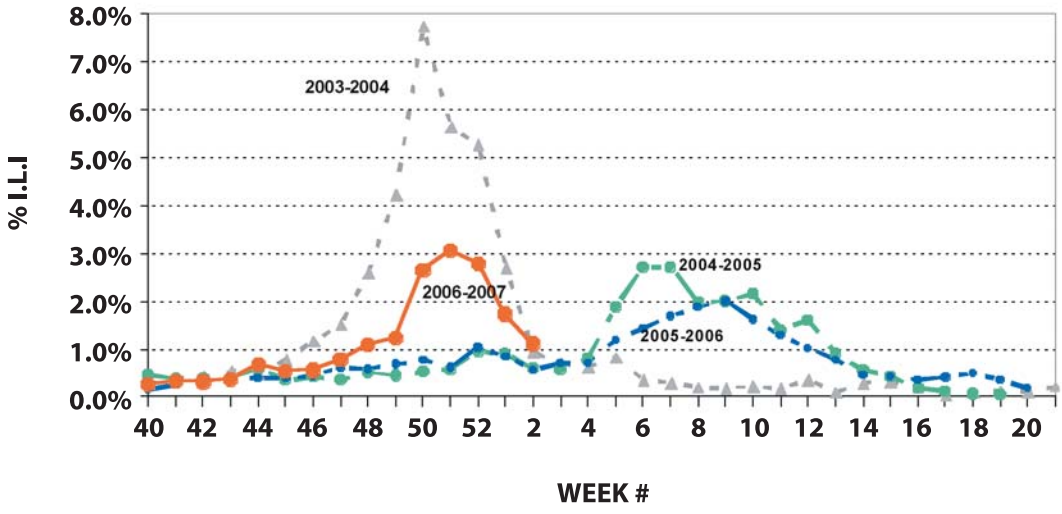
In North Carolina, routine influenza surveillance is conducted from October through May of each year. Although it does not provide a count of all influenza cases, it can be used to determine when and where influenza is circulating, the types of influenza viruses that are causing illness, and the level of influenza activity present in the state.

Disease-based surveillance is comprised of a network of voluntary providers who serve as sentinel sites for influenza activity in a variety of outpatient settings. For the 2006-2007 season, 74 providers representing 45 counties volunteered to serve as sentinel providers. Of these sentinel sites, 34 sites are private health care providers, 19 sites are county health departments, 15 sites are college and university student health centers, and 6 sites are hospital-based clinics. Sentinel providers record the number of patients they see each week with an influenza-like illness (ILI), which is defined as a fever of 100° F or greater and one respiratory symptom such as cough or sore throat. Sentinel providers also submit a count of the total number of patients seen each week. This gives a proportion of visits that are attributed to ILI on a weekly basis throughout the flu season, and enables public health officials to monitor influenza activity across the state.

Figure 1 shows data on influenza activity from the sentinel provider network over several influenza seasons. The weeks of the influenza season are assigned a number, with the start of the flu season in October represented by week #40 and the end of the flu season in early May represented by week #20. The current influenza season is shown in red. For the week ending with January 12 (week #2), approximately 1.1% of all visits to the sentinel provider sites was for an ILI. This is down from a peak of 3% in week #51. Figure 1 also illustrates that every influenza season is different, both in severity as well as timing. For example, flu activity began peaking earlier (December) in the current flu season compared with the two previous seasons in which flu activity peaked in February or March (2005-2006 shown in blue and 2004-2005 shown in green).

RTN—continued on page 75

Figure 1.
Influenza Surveillance in the Sentinel Provider Network, 2003-2004 to 2006-2007



Beginning in the 2005-2006 influenza season, disease-based influenza surveillance was also conducted in hospital emergency departments (EDs) by monitoring ILI using the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) system. NC DETECT currently monitors real-time data from 90 hospital-based emergency departments throughout the state. The system categorizes visits into syndromes in real time in order to detect unexpected cases and outbreaks earlier in their course than traditional disease-based surveillance would allow.

The case definition for ILI in hospital EDs is broader than the ILI case definition used in the sentinel provider network. Emergency department visits are grouped into syndromes by analyzing the chief complaint and, when available, the triage notes and initial ED temperature. ILI cases must include any case with the term "flu" or "influenza" or have at least one fever term and one influenza-related symptom. The hospital ED data were compared with the sentinel provider network data for the 2005-2006 flu season (Figure 2).

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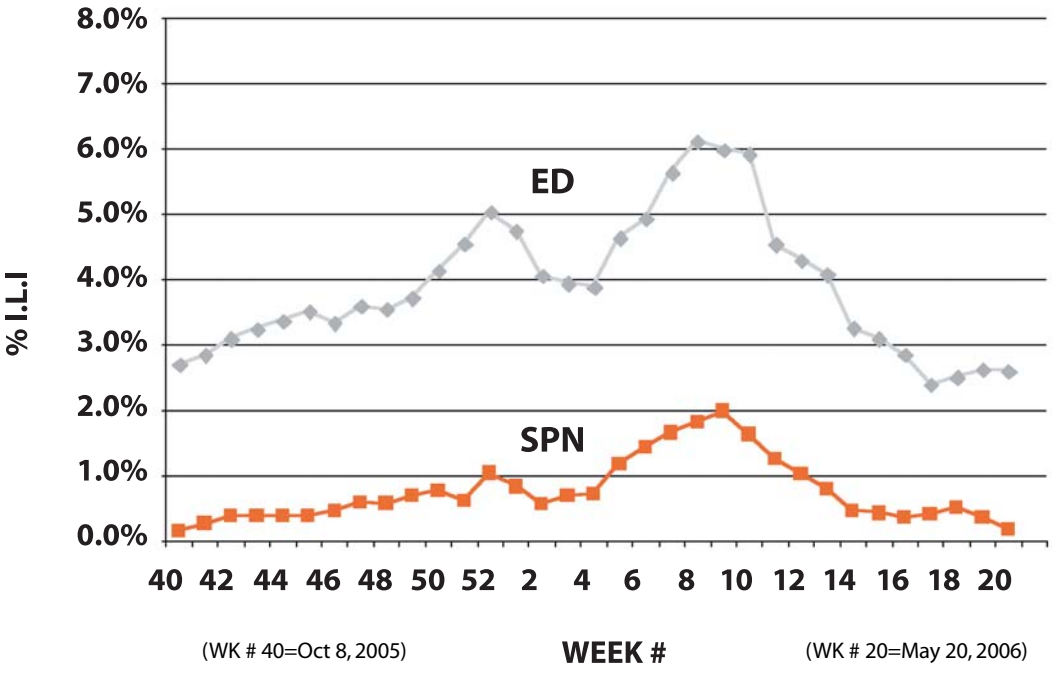
RTN—continued from page 75

Figure 2.
Influenza-Like Illness Surveillance in North Carolina, 2005-2006 Influenza Season. Comparative Trend between Two Surveillance Systems: Sentinel Provider Network (SPN) and Hospital Emergency Department (ED)



Although the patient populations, severity of illness, and case definitions for ILI are different in these two surveillance systems, it is important to note that the trends in ILI activity are well correlated. The use of NC DETECT as one method of monitoring ILI activity is validated by the existing sentinel provider network data. The trends for the first half of the 2006-2007 flu season are also well correlated.

In the event of an influenza pandemic, there will be significant challenges to influenza surveillance. Current systems of influenza surveillance will likely become overwhelmed, and flexibility will be essential in adapting current systems to meet the demands of tracking the pandemic across North Carolina. It is expected that the voluntary sentinel provider network will not be able to report weekly data regarding the percentage of visits for ILI because this data collection is still done the old-fashioned way: by hand. Syndromic surveillance for ILI in emergency departments, on the other hand, may be a viable option since these data are collected electronically as patients are being triaged through the emergency department. Another advantage of NC DETECT over the sentinel provider network is that it provides the opportunity for immediate surveillance of a new condition. This could apply to an outbreak of a novel strain of influenza in which the current case definition for ILI may need to be modified to capture cases. Expansion of NC DETECT to all hospitals in North Carolina with licensed acute care 24/7 emergency departments is underway.

Contributed by Kristina Simeonsson, MD, MSPH, and Lana Deyneka, MD, MPH
Epidemiology Section, North Carolina Division of Public Health

Worksites Need to Know How to Get Started.

To The Editors:

We congratulate the *NC Medical Journal* for addressing the important public health issue of worksite health promotion in the November/December 2006 issue. Many employers and policymakers are seeking solutions to the rising cost of healthcare and in so doing, turn to worksite wellness. Oftentimes, they wade into these waters without an understanding of what works, what resources exist, what to measure, what is considered a success, or how to even begin.

NC Prevention Partners has made the strategic decision to address worksite health promotion because it is an important way to significantly improve the health of North Carolinians. While the Healthy People 2010 goal is for 75% of businesses to establish a comprehensive worksite health promotion program, only 6.9% nationwide have done so. The majority of NC employers are not actively engaging in health promotion efforts because they simply do not know where to start.

Many of the tools and training opportunities developed by NC Prevention Partners focus on implementing policies and creating environments that can significantly influence the behavior of all employees, regardless of their health status. Establishing a solid foundation of supportive policies and environments can help keep healthy people healthy and can help reduce health risks in persons with existing disease conditions.

For the business community, the problem—rising healthcare costs—is clear, but the solutions are not. We recommend the following quick-start, low-cost, high-return health promotion strategies as the place to start.

- **Start with a prevention audit.**
  NC Prevention Partners has created a web-based Prevention Audit as part of the *Prevention 1st Challenge* (www.preventionfirstchallenge.com). The audit helps employers take a critical look at their policies and environments, and take steps to create healthy worksites.
- **Make it convenient to choose healthful options at work.**
  In Orange County, businesses participating in the Prevention 1st Challenge are making healthy snacks available in vending machines and starting walking groups. NC Prevention Partners established a worksite policy making healthy options like fresh fruit and spring water available onsite and more convenient than the soda and snack machines down the hall. For other strategies, visit www.eatsmartmovemorenc.com.
- **Go 100% tobacco-free campus wide.**
  Hospitals in North Carolina are making significant changes to eliminate exposure to secondhand smoke through the *Healthy Hospital Initiative*, a partnership between NC Prevention Partners, the NC Hospital Association and The Duke Endowment. With tools and support, North Carolina hospitals are leading the nation in establishing 100% tobacco-free campus wide policies. For more information on reducing secondhand smoke in the workplace, visit www.healthyhospital.org and www.fammed.unc.edu/enter/.
- **Purchase benefits that give employees access to proven preventive care.**
  A new publication, *A Purchaser's Guide to Clinical Preventive Services: Moving Science into Coverage*, from the National Business Group on Health (www.businessgrouphealth.org) and the Centers for Disease Control and Prevention is an excellent tool to help businesses purchase proven preventive benefits. In addition, NC Prevention Partners' Preventive Benefits Watch (www.ncpreventionpartners.org/preventivebenefits) is a web-based resource that provides policymakers and businesses the opportunity to learn about preventive benefits offered by North Carolina insurers. Using this tool can assure businesses that they are purchasing the best prevention coverage, which should be actively promoted to their employees.
- **Businesses can learn more at the April or November 2007 NC Prevention Institutes (www.ncpreventionpartners.org).**
  - Complete a Prevention Audit and begin to create healthy policies and environments.
  - Gain insight about what works from the National Business Group on Health and the Centers for Disease Control & Prevention.

NC Prevention Institute

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Spotlight on the Safety Net

A Community Collaboration

James D. Bernstein Community Health Center

In early March, local and statewide leaders gathered in Greenville, North Carolina to dedicate the James D. Bernstein Community Health Center. The center was founded on the premise that a person's health depends on much more than just access to health care. This multipurpose facility is designed to integrate professional and community educational programs, job training, and social support systems, as well as health services. These services are tailored to the unique needs of rural, low-income families.

The concept was born out of a sense of community need expressed by Pitt Partners for Health, a Healthy Carolinians partnership. Local safety net providers, agencies, and volunteer groups came together four years ago to form the Eastern Carolina Community Health Care Consortium. That group envisioned a new kind of health center to be named after Jim Bernstein, the founder of the state's and the nation's first Office of Rural Health. The land and site work was donated by E. R. Lewis Construction and the building is owned by Access East, an independent 501(c)3 organization formed by Pitt County Memorial Hospital and East Carolina University to house indigent care programs. The lease for the building is only $1 a year plus maintenance. Greene County Health Care, Inc, a federally qualified health center which has won national recognition for its innovative programs, is charged with the operation of the health component of the center including full medical and dental services. Pitt Community College is responsible for the coordination of educational programs including current courses in health information management, dental hygiene, and radiation technology. East Carolina University Brody School of Medicine operates the pharmacy, which offers 340b (lowest available costs) pricing and access to all pharmaceutical company assistance programs. The East Carolina University School of Nursing and Department of Child Development and Family Relations also provide medical and behavioral health services at the center.

Jim Bernstein, the center's namesake, was a tireless, unselfish and brilliant advocate for North Carolina's rural poor and medically underserved. His office founded the first rural health center in the state, located only twenty miles from the site of the newly dedicated Bernstein Community Health Center. That center, the Walstonburg Community Health Program, has become a part of Greene County Health Care, Inc, a network of seven clinics.

In that same spirit, those who have worked hard to bring the center into existence follow the motto by Thomas G. Irons, MD, "We will do what's right, do it well, and do it together."

Funding for capital and operational costs were generously provided by the following local, state, and national organizations: Blue Cross Blue Shield of North Carolina Foundation, Bureau of Primary Health Care Health Resources and Services Administration, The Duke Endowment, Dunn & Dalton Architects, E.R. Lewis Construction Company, Inc., Golden LEAF, Inc., Kate B. Reynolds Charitable Trust, North Carolina Office of Rural Health and Community Care, North Carolina Rural Economic Development Center, Inc., Pitt Memorial Hospital Foundation, and R.R. Miller Construction, Inc.

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For additional information contact Valerie Gilchrist, MD, Professor and Chair, Department of Family Medicine, Brody School of Medicine, East Carolina University, 600 Moye Boulevard, Brody 4N-84, Greenville, NC 27834; phone: 252-744-2592; email letchworths@ecu.edu.

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