The Impact of Smoke-Free Legislation on Population Health in North Carolina

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Since the first Surgeon General's report documented the health impact of smoking 50 years ago, North Carolina has made much progress in reducing tobacco use. This article focuses on tobacco-related policies and legislation that have contributed to this progress and discusses measures that could be taken to further reduce tobacco use.

This year is the 50th anniversary of the first Surgeon General's report on smoking and health. A report marking that anniversary, which was released in January 2014 [1], notes that in the 50 years since the first report, more than 20 million Americans have died because of smoking. Most of these deaths were premature deaths of people who began smoking at a very young age (12–14 years, on average), became addicted, and suffered a tobacco-attributable illness as an adult. However, 2.5 million smoking-related deaths occurred in nonsmokers who became ill and died from breathing other people's smoke [1]. The 2014 report also documents new findings about tobacco use and its negative impact on health, and it adds to the list of diseases that have been determined to have smoking as a causal factor, which now includes diabetes, colon cancer, and liver cancer. The report also adds exposure to secondhand smoke as a known cause of stroke.

In 2013 the adult smoking rate in North Carolina was 20.2% [2]. In 2012, the most recent year for which comparisons across the states are available, the prevalence of cigarette smoking among adults across all 50 states and the District of Columbia ranged from 10.6% to 28.3%, and North Carolina ranked 34th with a rate of 20.9% [3]. North Carolina's smoking rate has declined somewhat over the past decade, but not as much as in states that have implemented comprehensive tobacco prevention and control programs, including legislation making all workplaces smoke-free and taxes on cigarettes and other tobacco products that are high enough to increase their price significantly. The Centers for Disease Control and Prevention (CDC) estimates that, with the inclusion of the additional causes of morbidity and mortality attributable to smoking documented by the Surgeon General's 2014 report [1], North Carolina's annual health care costs related to smoking are $3.8 billion; this figure does not include productivity losses [4]. This figure also does not include North Carolina's annual health care costs due to exposure to secondhand smoke, which have been conservatively estimated to be $293.3 million in 2009 inflation-adjusted dollars [5].

The Tobacco Prevention and Control Branch of the North Carolina Division of Public Health works with state, local, and national partners on the CDC's 4 goals for tobacco prevention and control: prevent tobacco use initiation among young people, eliminate exposure to secondhand smoke, promote tobacco cessation and help tobacco users who want to quit, and eliminate tobacco-attributable health disparities.

Impact of Legislation on Preventing Youth Tobacco Use

In 2000 the North Carolina General Assembly passed legislation stating that 25% of the amount the state receives each year from the Tobacco Master Settlement Agreement would be invested in the Health and Wellness Trust Fund; this fund supports programs and partnerships that address access, prevention, education, and research that help improve the health of all North Carolinians [6]. Annual funding for tobacco prevention and cessation subsequently ranged from about $6 million to about $18 million during the period 2002–2011 [7]. These funds were used to carry out evidence-based interventions, including state and community programs aiming to make all North Carolina school campuses 100% tobacco-free. Mass media campaigns were combined with community tobacco prevention activities in which youth were involved in educating their peers, empowering them to not use tobacco, and working to change social norms about tobacco. On April 1, 2009, the federal cigarette tax increased from 39 cents to $1.01 per pack; this intervention has proved effective both in preventing youth tobacco use and in helping tobacco users to quit [8].

The investment of Master Settlement Agreement funds and the use of evidence-based interventions resulted in successes in tobacco use prevention, especially among young people. Data from the North Carolina Youth Tobacco Survey

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show that smoking among high school students in the state dropped from 27.3% in 2003 to 13.5% in 2013, and smoking among middle school students dropped from 9.3% to 2.5% during the same interval [9, 10]. Unfortunately, legislation enacted during the 2011 North Carolina General Assembly abolished the Health and Wellness Trust Fund and reverted the Tobacco Master Settlement Agreement funds to the General Fund [11]. The 2013 Youth Tobacco Survey shows that while smoking rates continue to decline among North Carolina middle school students and high school students, the decline in overall tobacco use among those students has stalled since 2011 [10], largely because a greater number of students now report using emerging tobacco products, such as e-cigarettes and hookahs (see Figure 1).

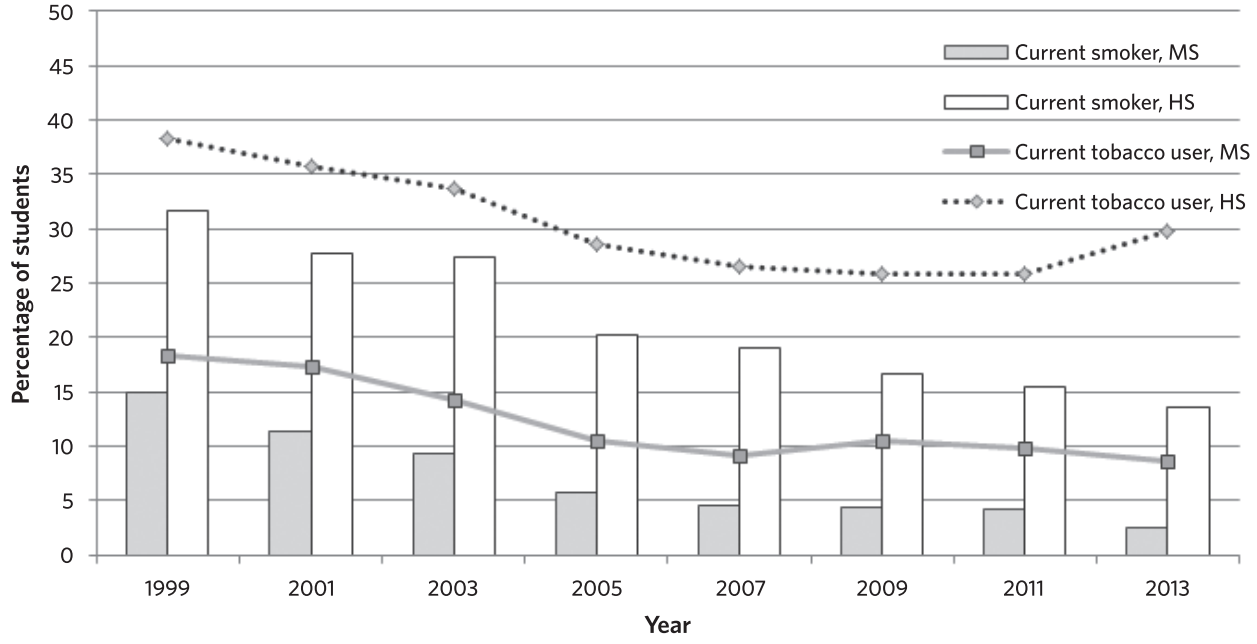
Incremental Legislative and Policy Changes Making Smoke-Free Settings the Norm

North Carolina has made incremental changes through policy and legislation to eliminate exposure to secondhand smoke and to make smoke-free (and in many cases tobacco-free) settings the new norm. Table 1 summarizes the progress the state has made in implementing tobacco-free policies in hospitals, state-operated health care facilities, prisons, community colleges, and public schools [12-17]. An emerging trend is for multiunit housing to go smoke-free in all indoor settings and in outdoor settings that could expose nonsmokers to secondhand smoke. This trend is being driven by evidence showing that going smoke-free can yield cost savings [18]. In addition, the trend is facilitated by North Carolina's tobacco cessation service, QuitlineNC, and

TABLE 1.
Progress in Implementing Tobacco-Free Campus Policies in North Carolina

Hospitals	All 127 acute care hospitals in the state have had a tobacco-free campus policy since 2009 [12].
State-operated health care facilities	In 2014 the Division of State-Operated Healthcare Facilities implemented tobacco-free campus policies in all 14 of its facilities that treat adults and children with mental illness, developmental disabilities, or substance use disorders [13].
Prisons	Since 2010 state law has prohibited any person from using tobacco products inside or on the grounds of a state correctional facility; there may be an exception for authorized religious purposes [14].
Community colleges	Community colleges may prohibit smoking or all use of tobacco products in their buildings and on their campuses [15]. As of July 2014, 35 of 58 community colleges in the state had tobacco-free campuses [16].
Public schools, kindergarten through 12th grade	Since 2008 state law has required local boards of education to prohibit the use of tobacco at all times in school buildings, in school facilities, on school campuses, in or on any other property owned by the local school administrative unit, and at school-sponsored events at other locations when in the presence of students or school personnel [17].

FIGURE 1.
Percentages of Middle School (MS) and High School (HS) Students Who Reported Being Current Cigarette Smokers[a] or Current Tobacco Users[b], 1999–2013



[a]Current cigarette smokers are those who reported having smoked a cigarette within the past 30 days.
[b]Current tobacco users are those who reported having used any tobacco product within the past 30 days. Beginning in 2011, students were asked not just about their use of cigarettes, cigars, pipes, and smokeless tobacco, but also about their use of emerging tobacco products, including electronic cigarettes, clove cigars, dissolvable tobacco products, flavored cigarettes, flavored little cigars, hookahs (water pipes), roll-your-own cigarettes, and snus. Data on use of emerging tobacco products prior to 2011 is not available.
Source: North Carolina Youth Tobacco Survey, 1999–2013 [10].

Adopting a Tobacco-Free Campus Policy at a Substance Abuse Treatment Center

Ben Gregory

The Walter B. Jones Alcohol and Drug Abuse Treatment Center (ADATC) in Greenville is a 66-bed inpatient psychiatric hospital operated by the North Carolina Division of State-Operated Healthcare Facilities, and it specializes in the treatment of patients with co-occurring substance abuse and mental health problems. Five years ago, the leadership team at Walter B. Jones ADATC accepted an invitation from the North Carolina Department of Health and Human Services (DHHS) to participate in a pilot program that would involve making the campus tobacco-free; under the new policy, both staff members and patients would be prohibited from using any tobacco products.

In making this transition, an important consideration was that a tobacco-free environment would have a direct impact on the men and women who are admitted to the center for treatment. A 2000 study by Lasser and colleagues [1] analyzed result of a national survey and found that 44.3% of all cigarettes smoked by survey respondents were consumed by individuals who had had a mental health disorder within the past month, and 41% of those with past-month mental illness were current smokers. Indeed, smoking rates among patients at the Walter B. Jones ADATC can be as high as 75%—more than triple the overall smoking rate for adults in North Carolina, which is currently 20.2% [2].

A major concern in adopting a tobacco-free campus was that a majority of our patients are smokers, and we would be requiring them to quit using tobacco for the length of their hospitalization. This was a considerable change for facilities such as ours, where tobacco use has often been viewed as a lesser problem compared to alcohol or illegal drug abuse. However, smoking kills more people than alcohol or other drugs, and this is true even among clients being treated for substance abuse [3, 4].

Thus the medical staff at the Walter B. Jones ADATC prepared for an uphill battle with the center's patients. Prior to admission, the center notified patients that tobacco products were no longer allowed on campus. The ADATC has voluntary admissions, yet there was no substantial change in the number of patients admitted. The first couple of months were a challenge for the clinical staff; they not only had to add tobacco cessation counseling to their regular workload, but they also had to promote compliance with the new policy. Clear communication from staff members about the policy and the offer of assistance with tobacco cessation were keys to increasing compliance. Although some patients were concerned or even resistant to the new policy, the majority of patients who used tobacco products took this as an opportunity to see how successful they could be with tobacco cessation treatment.

Staff also adapted to the change. The ADATC made arrangements with the North Carolina Tobacco Prevention and Control Branch (which is part of DHHS) to provide nicotine replacement therapy for patients, and the Tobacco Prevention and Control Branch worked with the center's medical staff to adopt new tobacco cessation treatment protocols for inpatients. We learned through experience that the center's patients preferred face-to-face counseling about tobacco addiction during their stay, rather than using the state's toll-free telephone counseling service,

is supported by technical assistance from local public health departments.

North Carolina's Smoke-Free Restaurant and Bars Law

On January 2, 2010, the enclosed areas of North Carolina bars and restaurants became smoke-free. The Act to Prohibit Smoking in Certain Public Places and Certain Places of Employment, often referred to as the North Carolina Smoke-Free Restaurants and Bars Law, was passed by the North Carolina General Assembly and signed into law in May 2009 [19]. The purpose of the law is to protect the health of employees and customers of restaurants and bars from the serious health risks related to exposure to secondhand smoke. Under the law, smoking is also prohibited in most enclosed areas of lodging establishments—such as hotels, motels, and inns—if the establishment prepares and serves food or drink. The only exceptions are that lodging establishments may designate up to 20% of their guest rooms as smoking rooms, and smoking is permitted in cigar bars and nonprofit private clubs if those establishments meet specific legal requirements.

The North Carolina Tobacco Prevention and Control Branch used the CDC's *Evaluation Toolkit for Smoke-free Policies* [20] to evaluate the impact of the law. Figure 2 summarizes some the findings of this evaluation [21]. Data from the North Carolina Behavioral Risk Factor Surveillance System (BRFSS) show that the percentage of North Carolina workers reporting that they had been exposed to secondhand smoke at work in the past 7 days decreased from 14.6% in 2008 to 7.8% in 2010 [22], the first year after the law went in effect. (Due to changes in the methodology of BRFSS, 2011 and 2012 data on this measure cannot be compared with data from previous years.) The law making the state's restaurants and bars smoke-free contributed to this reduction in secondhand smoke exposure among workers.

QuitlineNC. In addition to counseling, educational groups were formed that focused on nicotine addiction and the medical impact of tobacco use. In the end, patients came to realize that they could stop smoking, at least for a few days. Although some patients continued to feel that they should be allowed to smoke, many others welcomed the tobacco-free environment and planned to remain tobacco-free when they returned home.

QuitlineNC has played an important role in helping patients remain tobacco-free during their transition back into the community. When patients are discharged, they are informed that they can call QuitlineNC (1-800-QuitNow) for ongoing counseling and nicotine replacement therapy. Over a 2-year period from June 2010 through May 2012, QuitlineNC shipped nicotine replacement therapy in bulk to 926 tobacco users for use during their stay at the ADATC, and during that same period QuitlineNC provided services to 101 patients after their discharge from the center. The majority of patients served by the ADATC are connected with Alcoholics Anonymous or Narcotics Anonymous after discharge from the facility, and QuitlineNC is now also part of the discharge protocol.

The Walter B. Jones ADATC compared patient behavioral outcomes before and after implementation of the tobacco-free campus policy; pre-implementation surveys conducted from December 2009 through March 2010 were compared with post-implementation surveys conducted from October 2010 through December 2010. This assessment found that the implementation of a tobacco-free campus had no effect on elopements, assaults, injuries, or the use of restraints. Reports of contraband increased during the month of implementation; following an emphasis on facility policy and procedures, however, instances of contraband fell to below-average rates. There was also a sustained reduction in verbal assaults, which is consistent with reports from other behavioral health facilities that have implemented tobacco-free campuses.

After the success of the pilot program at the Walter B. Jones Center and that of a similar pilot program at Broughton Hospital, the North Carolina Commission for Mental Health, Developmental Disabilities, and Substance Abuse Services amended a rule requiring state-operated health care facilities to provide smoking areas for patients. As of July 1, 2014, the Division of State-Operated Healthcare Facilities implemented tobacco-free campus policies in all state health care facilities that treat adults and children with mental illness, developmental disabilities, and substance use disorders. This change will help reduce the disparately high rates of tobacco use in this high-risk North Carolina population. NCMJ

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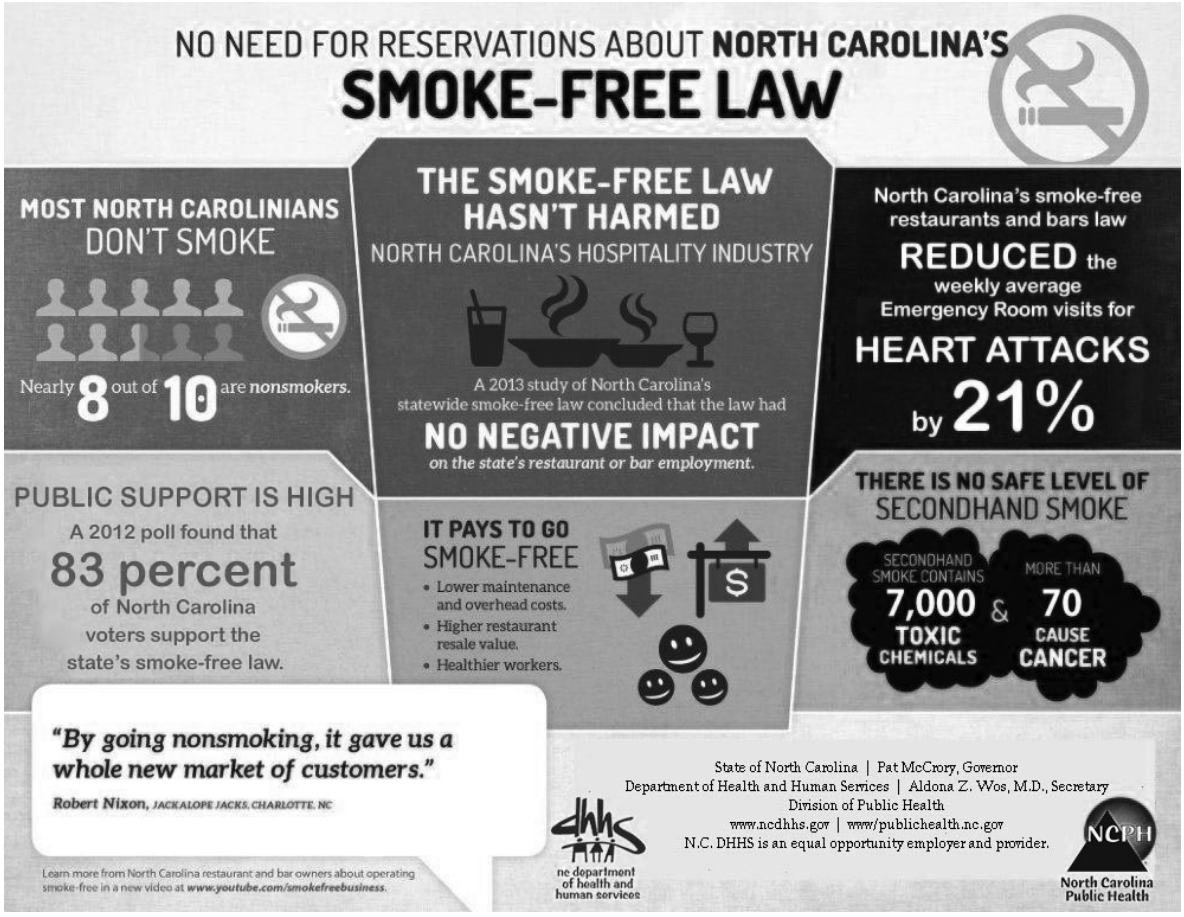
This is especially important because the workplace is a major source of secondhand smoke exposure for adults.

Secondhand smoke is a known trigger for health conditions such as asthma, stroke, and chest pain; secondhand smoke is also a major risk factor for lung cancer [1], which is the state's leading cause of cancer deaths [23]. Major studies have shown that laws that ban smoking in public places such as bars and restaurants help improve the health of workers [24-29]. Additional studies conducted in several communities, states, regions, and countries have found that implementing comprehensive laws that make all workplaces and public places smoke-free are associated with rapid, substantial, and sustained reductions in emergency department visits for asthma and hospital admissions for heart attacks; these reductions appear to be more pronounced among nonsmokers than smokers [30, 31]. In 2009 the Institute of Medicine of the National Academies published a comprehensive review of the existing literature on the relation between smoking bans and acute coronary events [32]. After a year of analysis, the 11 experts on the review committee concluded that the evidence is consistent with a causal relationship between exposure to secondhand smoke and heart attacks, and that even brief exposure to secondhand smoke can trigger a heart attack. Two separate reports [30, 31] have developed a pooled estimate that hospitalizations for heart attack could decrease by as much as 17% within 1 year of implementing a comprehensive smoking ban.

A similar analysis conducted in North Carolina [33]

FIGURE 2.
The Impact of North Carolina's Smoke-Free Restaurants and Bars Law



found that the average number of weekly emergency department visits by North Carolinians experiencing heart attacks declined by 21% during the first year after the Smoke-Free Restaurants and Bars Law was implemented in January 2010. The total number of emergency department visits with a first-listed diagnosis of heart attack also decreased from 2010 to 2012. The decline in heart attacks in North Carolina in 2010 represented an estimated annual health care cost savings of $3.3 million to $4.8 million [21]. In 2013 the North Carolina Division of Public Health found that the relative risk of visiting an emergency department for asthma decreased by 7% when comparing rates for 2008–2009, before the law was implemented, versus rates for 2010–2011, after the law went into effect [21].

Smoke-Free Policies of Local Governments

State law [19] allows local governments to prohibit smoking in government buildings, on government grounds, and in public places. The law defines public places for this purpose as indoor areas where the public is invited or permitted inside. Thus, smoking may be prohibited in workplaces where the public is invited inside by county or municipal governments.

Since the law went into effect, the number of local governments with smoke-free policies has increased. Current data indicates that 84% of counties have written smoke-free or tobacco-free regulations for government buildings. There are currently 13 counties and 47 municipalities where government grounds are 100% smoke- and tobacco-free (unpublished data from the North Carolina Tobacco Prevention and Control Branch; July 10, 2014).

Helping Tobacco Users to Quit

Two very important components of a comprehensive strategy to improve population health through tobacco prevention and control are the promotion of tobacco cessation and the provision of evidence-based services to help tobacco users quit. QuitlineNC is an evidence-based tobacco dependency treatment program that can be reached by calling 1-800-Quit-Now (1-800-784-8669). This service is confidential and available to all North Carolina tobacco users.

Most smokers want to quit. In 2013, 60% of North Carolina smokers made a serious attempt to quit, compared with 52.6% in 2003 [34]. In 2013 the North Carolina General Assembly provided $1.2 million in recurring funds for QuitlineNC [35]. Other funds for this program are

provided by private-sector payers that want to provide evidence-based tobacco cessation assistance (including nicotine replacement therapy) to their members.

Bringing about changes in policy—for example, making restaurants, bars, workplaces, and multiunit housing smoke-free—provides a more supportive environment for tobacco users who are trying to quit. Call volume at QuitlineNC surged during the months following implementation of the law banning smoking in restaurants and bars: The program heard from 9,840 callers in 2010, compared with 5,685 callers in 2009 (unpublished data from the North Carolina Tobacco Prevention and Control Branch). Other factors besides passage of the law contributed to the increase in calls; for example, the State Health Plan, which provides health insurance coverage to state employees, began providing nicotine replacement therapy to members who used QuitlineNC and began promoting QuitlineNC through media campaigns.

Potential Population Health Impact of Future Policy Actions

Making all North Carolina workplaces tobacco-free would benefit the health of North Carolinians in 3 ways. First, it would eliminate exposure to secondhand smoke in the workplace for all North Carolinians, thereby contributing to a reduction in the morbidity and mortality resulting from such exposure. Second, combined with the provision of evidence-based tobacco cessation services, it would provide a more supportive environment for tobacco users who want to quit. And third, it would make smoke- and tobacco-free environments the new norm, which would help protect young people from tobacco addiction.

Increasing the price of cigarettes and other tobacco products through taxes is another measure that benefits population health [36]. The population health benefits of a tobacco tax increase are well documented in the experiences of other states. North Carolina's excise tax on cigarettes is currently 45 cents per pack. This tax ranks North Carolina 45th among the 50 states and the District of Columbia; the average cigarette tax nationwide is $1.54 per pack [37]. Furthermore, North Carolina taxes other tobacco products at a far lower rate than that of cigarettes. An increase of $1 in the North Carolina cigarette tax (which would still put it below the national average) would have the following annual benefits: It would generate at least $350 million in tax revenue; it would prevent 62,700 youths under the age of 18 years from starting to smoke; it would prompt 71,300 adult smokers to quit; and it would prevent 39,100 premature deaths [38]. In addition, it would save the state Medicaid program $9.62 million over a 5-year period [38].

Finally, the CDC recommends that North Carolina invest a minimum of $69.3 million per year in tobacco prevention and control [4]. Currently the total federal and state funding dedicated to tobacco prevention and control in North Carolina is $4,072,951, of which $1.2 million is state funding dedicated to QuitlineNC services (unpublished data). Tobacco tax revenues and Master Settlement Agreement funds are potential sources of support for evidence-based tobacco treatment and tobacco use prevention programs: The Master Settlement Agreement currently provides approximately $140 million annually to North Carolina, and tobacco taxes in the state generated $295,296,991 in revenue in state fiscal year 2011–2012 [4]. NCMJ

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