



Issue Brief IV:

The Value of Prevention & Wellness

“PREVENTION” HAS GRABBED A NUMBER OF HEADLINES in the recent health care reform debate, primarily because advocates claim it will reduce costs and enhance quality. Other researchers say more widespread prevention measures will have a minimal impact, if any, on spending. *This Issue Brief provides an overview of prevention categories, approaches to and methods of evaluation, selected research literature on value, and settings for prevention application.*

PREVENTION POTENTIAL

Well over 90% of the national health budget is spent treating diseases and complications, and 75% is related to chronic—and to some extent preventable—conditions such as diabetes and heart disease.¹ A good example is obesity. Obesity is a contributing factor to diabetes, heart disease, several types of cancer and other diseases and now accounts for 9.1% of all medical spending, or about \$147 billion, half of which is paid for by taxpayers through Medicare and Medicaid. About 34% of American adults, or more than 72 million, are obese, up from 23% in 1994. Obese people spent 42% more than people of normal weight on medical costs in 2006, a difference of \$1,429.^{2,3} Consequently, preventing obesity could create large health spending savings. Many Americans have one or more other unhealthy (and preventable) lifestyle risk factors, such as smoking, lack of exercise, and excess stress, all which add significantly to total health spending. Bringing preven-

tion approaches to these at-risk populations could produce significant benefits, but researchers disagree on how large the health spending savings might be.

TYPES OF PREVENTION

Careful definition of the various sub-categories within prevention will enhance understanding and debate, and promote successful policy-making. One such categorization is shown in the matrix below. Based on Nico Pronk’s work in “Population Health Management at the Worksite,” this matrix provides a comprehensive definition of the levels of prevention discussed in today’s marketplace⁴. This Issue Brief will emphasize Primary prevention, with some discussion of Primordial prevention, (e.g. community wellness) and Secondary prevention (e.g. screenings). A subsequent Issue Brief will more exhaustively address Secondary and Tertiary prevention in the context of disease and care management programs. Primary, Secondary, or Tertiary interventions occurring in a physician’s office,

hospital or other health care setting are often referred to as clinical prevention.

Definitional clarity is important because often value and cost-effectiveness calculations on one type of preventive intervention have been extrapolated to all preventive measures, when the nature of the interventions and value calculations may be very different. Population disease screenings, for example, are often cited for the proposition that preventive services do not save money. Screenings, such as mammographies or colonoscopies, are Secondary preventions not intended to prevent disease but rather detect the presence of disease at an early state. Because these screening interventions typically must search a relatively large population to identify a few individuals with a disease who are then treated at some cost, they seldom can reduce overall health spending and should not be generalized to other preventive interventions. True Primary prevention

programs, such as vaccination or smoking cessation, which keep individuals from getting disease, have demonstrated positive cost savings. Workplace or other wellness programs are typically largely Primary prevention, with features such as health education and coaching and diet, exercise and stress reduction modules, with some Secondary screening prevention aspects, such as health risk assessments and biometric testing. The research on wellness program value is in its infancy, and the cost-saving calculation can be difficult. But because these programs are mostly Primary prevention, they should produce cost savings. Policymakers should bear in mind that each type of prevention intervention needs to be examined separately to determine its value. It would likely be erroneous, for example, to assume that wellness programs would not reduce health costs because most screening interventions do not.

The table below outlines 4 levels of prevention, including definition, goals and targets.

LEVEL OF PREVENTION	DEFINITION	GOAL	TARGET	SAMPLE SERVICES
PRIMORDIAL	Addresses underlying conditions that may lead individuals or populations to become exposed to causative factors for disease. Intended to prevent the occurrence of risk factors in the population	Address social and environmental conditions that create health damaging exposures and susceptibilities	Total population and/or subgroups of particular interest	Community bike paths, Smoking Bans, Food Content Laws
PRIMARY	Controls causes and risk factors that lead to disease	Limit the incidence of disease through reducing risks	Total population, specific subgroups, or individuals at high risk for a particular condition	Vaccination, Health Education, Weight Management
SECONDARY	Intended to cure patients and reduce the more serious consequences of disease through early diagnosis and treatment. Directed at time between disease onset and treatment	Reduce prevalence of disease	Subgroups at increased risk and established patients	Mammograms, Colonoscopy, HRA's
TERTIARY	Addresses existing disease state, an important aspect of therapeutic and rehabilitative medicine	Reduce, mitigate or limit the progress or exacerbations of diagnosed disease	Established patients	Diabetes disease management programs

Source: Proch, Nico, "Population Health Management at the Workplace," ACSM's Workplace Health Handbook.

METRICS FOR VALUING PREVENTION

There are two primary sources of value for prevention and wellness programs. The first is health outcomes, measured in terms of getting and keeping people in good health. Measurement of most health outcomes is relatively simple in concept—does the intervention leave an individual or a population in better health, with less or later disease development? Almost all preventive interventions create better health outcomes. An intervention which results in worse health outcomes should not be done, regardless of the financial implications. In most cases, basic clinical parameters—weight and blood pressure for example—can be used to assess improvement in health. However, there is complexity in determining how much improvement in an individual’s overall state of health has occurred as a result of some preventive measures.

The second source of value is financial, basically a calculation of the net total of the cost of the intervention, additional health spending caused by the intervention and health spending avoided by the intervention. The calculation of this net number, often referred to as return on investment (ROI), appears straightforward, but there can be debate over measuring the components and about the time frame to use for assessing cost consequences. Further complexity can be added to financial value calculations by attempting to understand the price of future health services and the reduction of future spending to present value or by consideration of non-health spending factors such as workplace productivity, disability payments and social security

outflows. An intervention which produces net cost savings would likely be performed, assuming it also produced some positive improvement in health.

In the case where there is net additional health spending caused by an intervention, however, significant controversy arises around deciding whether the intervention is worth doing. The primary measure currently used for this latter decision is the Quality Adjusted Life Year (QALY).

“An intervention which produced net cost savings would likely be performed...”

QALY is a difficult but important concept and the following discussion is simplified.⁵ The QALY method is in essence an attempt to measure health improvement by assigning a value to a state of health over a period of time and measuring the difference an intervention causes in that value. Perfect health is a one, so each year of perfect health gets a value of one assigned to it. Being dead is a zero. In between is a value judgment which researchers have tried to make by using utility methods to understand people’s choices in real life. For example, a time trade-off utility method might look at how many years of constant pain a person would give up to have a certain number of years in perfect health. If a person would give up eight years of pain for two in perfect health, his or her overall state of health during the ten years would be two-tenths. Researchers have also created other utility methods to identify how people would value certain health states. The QALY value of an interven-

CALCULATING FINANCIAL VALUE

A	Cost of Intervention
+ B	Additional Health Spending from Intervention
- C	Health Spending Avoided By Intervention
<hr/>	
= D	Net Additional Spending or Spending Avoided
+/- E	Non-Health Care Costs/Savings Resulting from Intervention
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= F	Net Total Savings/Additional Costs

If D or F is positive, i.e. the intervention adds to cost, judgment is needed on whether the health outcome is worth the cost, utilizing QALY or other method.

The table above details the components in determining the net total savings or costs of interventions.

tion is the QALY value (calculated by the time trade-off or other utility method) of the state of health that an intervention puts a person in, minus the QALY state before the intervention. So, for example, if prior to a preventive intervention a patient's QALY state was 2 and the patient then undergoes a preventive intervention such as a wellness program, which results in the patient having ten years in a health state valued at six-tenths, the intervention would have

a benefit of 4 QALYs. $[(0.6 \times 10) - (0.2 \times 10)]$. QALY is not a financial measure in itself, but you can find the cost of a QALY created by an intervention by taking the total net cost of the intervention, calculated as described above, and dividing by the number of additional QALYs. If the wellness program in the example above had a net cost of \$4000, each QALY would have cost \$1000. If the wellness program were cost saving, the QALYs would essentially be free.

It is important again to note that the concept of QALYs or any other valuing method for a state of health is not particularly relevant when an intervention produces net savings. It is only when there is a net cost that the judgment about the value relative to the cost of the intervention really has to be made. The need for this judgment is exacerbated when someone other than the patient is paying for the intervention and any subsequent added health costs, because there is not typically unlimited funding. The most extreme cases are generally found in new drug interventions, not in prevention. Al-

though it is purely a matter of judgment, researchers tend to view interventions with a QALY cost of \$50-75,000 or less as worth doing. The QALY concept is widely used in policymaking outside the United States. Britain's National Institute for Clinical Excellence, for example, uses the method in deciding whether to recommend coverage for drugs, procedures and prevention measures. While researchers utilize QALY in the United States, it is rarely directly invoked in connection with a coverage or payment decision. The US Preventive Services Task Force does utilize QALY-like measures as part of its guideline-setting process for preventive interventions.⁶

Preventive interventions can be evaluated through a number of research methods.⁷ The gold standard is a prospective, randomized clinical trial of the intervention, but these trials are often not feasible due to ethical or cost considerations. Retrospective comparative analyses can often provide credible information. Researchers frequently use modeling to ascertain the likely cost impacts of an intervention. The strength of a study's finding on the value of a specific intervention will depend on the type of study. Studies looking at the value of preventive measures may be conducted by government agencies, academic researchers or vendors of prevention products or services.

STUDIES OF SPECIFIC PREVENTIVE INTERVENTIONS

The next sections of this Issue Brief will examine research on the value of specific interventions, including community-based prevention programs, screenings, immunizations and similar interventions, workplace wellness campaigns and public payer prevention activities. Several researchers have undertaken surveys cumulating preventive intervention studies

and these meta-analyses can give a good perspective on value across a variety of types of interventions.

The Robert Wood Johnson Foundation, for example, conducted a review of clinical preventive measures, aggregating research that others had published on some of the most common and commonly advocated Primary and Secondary clinical interventions. One of the strengths of this work, which its authors

The charts below give examples of some interventions evaluated in this meta-study and their cost effectiveness.

called a “synthesis,” is that it reviews the assumptions and methods of each of the meta-studies it discusses. The paper asks, “what information is available?” and “what are the strengths and weaknesses of this information?” rather than just simply repeating results. It also recommends ways of improving cost-effectiveness reviews and suggests that a more systematic evaluation of preventive interventions could help policy-makers use health care resources effectively.

The authors find that a substantial number of preventive measures are described as cost saving by more than one of the literature reviews. The Robert Wood Johnson survey indicates that immunizations, a Primary prevention measure, generally are cost saving or have low net costs. Health promotion and wellness program-like interventions are most often cost-saving. Screenings, a Secondary prevention intervention, usually have a net cost, often relatively high.

Another recent meta-study analyzed 1500 cost effectiveness ratios derived from studies published between 2000 and 2005 and found that only 20% of the preventive interventions studied actually saved money.⁸

This survey indicates that screening is rarely cost-saving, but can be cost-effective depending on how often it is conducted. For example, screening for cervical cancer is cost-effective compared to no screening when done every three to five years, but becomes more expensive at a steep rate if frequency increases. Annual screening (compared to a baseline of screening every two years) costs more than \$3 million per QALY.⁹ It can be hard to get an accurate picture of costs and benefits of screening, because it is impossible to know exactly how much it would cost to treat patients whose dis-

COST-EFFECTIVENESS OF SELECTED PREVENTIVE MEASURES AND TREATMENTS FOR EXISTING CONDITIONS (2006 DOLLARS)	
Intervention	Cost-Effectiveness Ratio
PREVENTIVE MEASURES	
Haemophilus influenzae type b vaccination of toddlers	Cost-saving
One-time colonoscopy screening for colorectal cancer in men 60-64 years old	Cost-saving
Newborn screening for medium-chain acyl-coenzyme-A dehydrogenase deficiency	\$160/QALY
High-intensity smoking-relapse prevention program, as compared with a low-intensity program	\$190/QALY
Intensive tobacco-use prevention program for seventh and eight-graders	\$23,000/QALY
Screening all 65-year olds for diabetes compared with screening 65-year-olds with hypertension for diabetes	\$590,000/QALY
Antibiotic prophylaxis (amoxicillin) for children with moderate cardiac lesions who are undergoing urinary catheterization	Increases cost and worsens health
TREATMENTS FOR EXISTING CONDITIONS	
Cognitive-behavioral family intervention for patients with Alzheimer's disease	Cost-saving
Cochlear implants in profoundly deaf children	Cost-saving
Combination antiretroviral therapy for HIV-infected patients	\$29,000/QALY
Liver transplantation in patients with primary sclerosing cholangitis	\$41,000/QALY
Implantation of cardioverter-defibrillators in appropriate populations, as compared with medical management alone	\$52,000/QALY
Left ventricular assist device, as compared with optimal medical management, in patients with heart failure who are not candidates for transplantation	\$900,000/QALY
Surgery in 70-year-old men with a new diagnosis of prostate cancer, as compared with watchful waiting	Increases cost and worsens health

ease is caught in a later stage, instead of earlier through screening. Also, individuals whose disease is caught at an earlier stage may end up surviving longer, and may or may not experience a relapse, making lifetime medical costs difficult to predict.

Note that this survey again finds that many preventive interventions cause net cost increases although some, generally Primary ones, such as childhood immunizations, smoking cessation, and aspirin prophylaxis in high risk groups, may actually save money outright.^{10, 11}

Another study conducted by researchers from the American Heart Association simulated the effect of instituting 11 population-wide preventive measures aimed at combating cardiovascular disease and presented a different conclusion. In this case, while significantly fewer heart attacks and strokes occurred, the program would cost about 10 times as much as it would save over a 30-year period. The only prevention strategy that saved money over 30 years was smoking cessation.¹² One of the important takeaways from the AHA study is the need to identify or target the audience for preventive measures – population-wide application may be unnecessarily expensive and not deliver any more benefits.

“Specificity in the programs paid off, as cost trends were lowest for participants who completed health risk assessments...”

This survey of the literature suggests that successful and cost-saving prevention programs tend to share certain characteristics: the cost of the intervention is relatively small; the disease or condition

being prevented has high costs; and the population most likely to benefit can be easily identified and targeted, reducing waste and maximizing benefit and efficiency.

WORKPLACE PREVENTION PROGRAMS

Health promotion programs focused on wellness first emerged and began to gain ground in the 1970s. The workplace has been a natural site for many of these endeavors, because of employers' primary role in providing health coverage and because 65% of the American population can be reached through a worksite. Workplace health promotion activities usually have multiple Primary and Secondary prevention elements, such as health risk assessments, biometric and other screenings, and health education and coaching, often for employee-specific disease risk.¹³ Employers tend to utilize an ROI approach to valuing a wellness program, generally look at the overall effect of the program, not that of each of its elements, and usually demand relatively quick paybacks, within two or three years. They are not interested in concepts like QALY, because they will only accept absolute cost savings over the time period measured. Employers, however, increasingly include in their calculation of value not just health spending, but also increased productivity, lowered disability payments and decreased absenteeism.¹⁴ A recent survey indicated a dramatic rise in the number of companies taking action to promote wellness. From 2008 to 2009 the percent of companies with some form of a wellness program jumped from 51% to 80%, a 57% increase year-over-year.¹⁵

Surveys of worksite wellness programs reveal that even small changes at the individual level can be substantial at the population level. A review of health pro-

motion programs found an average \$3.50 to \$1 savings-to-cost ratio in reduced absenteeism and health care costs¹⁶, while a separate review of worksite health promotion programs found an average 27% reduction in sick leave absenteeism, a 26% reduction in health costs, and an average 32% reduction in workers' compensation and disability management claims costs.¹⁷ Specificity in the programs paid off, as cost trends were lowest for participants who completed health risk assessments and participated in follow-up targeted interventions. Additionally, integrated workplace care and pharmacy resulted in medication adherence almost 10% higher and fewer adverse clinical outcomes.¹⁸ High participation rates, integration into operations, tailoring programs to the needs of specific populations, rigorous evaluation of outcomes, and effective communication are all important aspects for designing a successful worksite health program.¹⁹

Dow Chemical is an example of a firm that has committed significant resources to addressing the workplace health situation. Almost 65% of Dow Chemical's US work force had one or more of the surveyed chronic conditions, and the total cost of these conditions was estimated to be 10.7% of total labor costs for Dow in the U.S. Work impairment, or "presenteeism" alone was 6.8%.²⁰ A related study analyzed Dow's health care costs and wellness program expenses and determined that Dow would need to reduce the studied risks of its employee population by only 0.17% per year or 1.7% over 10 years to make the program worthwhile and break even on expenses.²¹

While further rigorous research on the value of wellness programs is needed, the early results appear positive and it is unlikely that employers would continue to increase adoption and use of these

preventive programs if they were not cost-saving.

PUBLIC PAYER PREVENTION PROGRAMS

The publicly-funded health insurers, such as the Medicaid and Medicare programs, are a natural locus for prevention and wellness campaigns. The fee-for-service Medicare program has added more preventive health benefits over time, and now covers many types of disease screening for certain beneficiaries. The Medicare Improvement and Patient Protection Act of 2008 gave the Department of Health and Human Services the authority to add clinical preventive services that received high ratings from the U.S. Preventive Services Task Force in Medicare's national coverage determinations.²² Fee-for-service Medicare, however, has done little in the way of wellness programs. Medicare Advantage plans, on the other hand, do generally provide wellness and other preventive services as part of a Medicare Advantage plan. Medicare Advantage beneficiaries were more likely than traditional FFS Medicare beneficiaries to receive needed preventive services.²³ Medicaid managed care plans similarly usually provide extensive preventive and wellness benefits.

Many argue that prevention and wellness activities merely postpone death and introduce new costs as the patient ages, thereby not producing savings for Medicare. However the aim of prevention as described by Stephen Woolf is to shorten the time a patient is sick or disabled before death – also known as "compression of morbidity." James Lubitz and others have shown that elderly people who are in good health at age 70 live nearly three years more than their peers who have poor health, but the cumulative Medicare spending is no more than for those who die sooner.²⁴

A more recent study showed that healthy people who live to an old age may actually cost the system less than unhealthy ones who die more quickly. This study calculated the savings that would accrue to Medicare if people entered the program in better health and with reduced risk factors for chronic illness. Using an actuarial model based on Medicare population data to calculate savings estimates for varying scenarios of risk reduction, the study concluded that using prevention and wellness programs to improve population health so that 65% (up from 54%) of entering 65-year olds are in good health could save \$1.1 trillion over the lifetime of the entire entering cohort, even with the increased spending associated with longer lives. A more aggressive scenario positing a combination of pre- and post-Medicare health promotion, prevention and wellness initiatives leading to 75% of seniors entering in good health and reducing risk increases by 50% could save \$142.8 billion annually or \$1.4 trillion over the next 10 years.²⁵

In general, to date, the fee-for-service Medicare and Medicaid programs have done little to expand preventive and

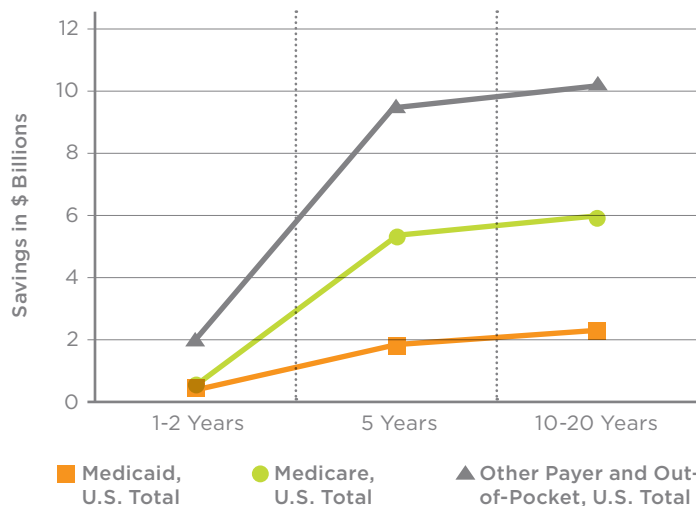
wellness services for enrollees and are likely not obtaining savings they might accrue from such programs.

COMMUNITY-BASED PRIMORDIAL PREVENTION

Community-based prevention programs are generally considered Primordial prevention and include efforts to improve nutrition, increase physical activity and decrease tobacco use. Their value can be assessed in a manner similar to other preventive interventions, by identifying impacts on health outcomes and net cost effects. A study developed by the Trust for America's Health surveyed successful existing programs and concluded that investing as little as \$10 per person per year in similar programs across the country could produce significant ROI within 5 to 10 years and yield net savings in health costs of nearly \$18 billion/year in 10-20 years. The savings from these programs would accrue to payers, with Medicare seeing \$487million/year in its first one to two years and up to \$5.2 billion annually within 5 years. Medicaid could save \$370 million a years at the program's inception and up to \$1.9 billion annually within 5 years. Private insurers and individuals also stand to save; over \$2 billion annually in the early years and over \$9 billion per year within 5 years.²⁶ These numbers represent medical cost savings alone, and do not include increased productivity and reduced absenteeism that are corollary effects of improved health.

One recent dramatic assessment of the value of a community-based program looked at heart attack prevalence before and after the implementation of a public place smoking ban. Researchers found that the ban reduced prevalence of heart attacks by an average of 17% after one year, and 26% after three years. Steven Schroeder, a physician at University of

NET ANNUAL SAVINGS BY HEALTH CARE PAYERS FOR AN INVESTMENT OF \$10/PERSON



PROGRAM	TARGET	METHOD	RESULTS
Pawtucket Heart Health Program	71,000 randomly selected people	Mass media campaign, community programs	5 years in, risks for CVD and CHD decreased by 16% among members of intervention population
“Shape Up Somerville”	1st-3rd grade students at high risk for obesity	Improved school nutrition, school health curriculum, parent and community outreach, safe routes to school program	Program reduced 11lb of weight gain over 8 months for an 8 year-old child. On a population level, translates into fewer children categorized as “overweight”
New York State Healthy Neighborhoods Program	Asthma	Home visits, education about asthma, referrals and controls for asthma triggers	During two year funding cycle, average hospitalization rate (admission and ER visits) decreased by 23%

The table above presents examples of selected community-based prevention programs

California, San Francisco, characterized this reduction as “a big deal... We can make immediate public health progress if we cut exposure to second-hand smoke.”²⁷ Note that this is basically a no-cost intervention that creates a very substantial return on investment. Several other examples of community-based prevention programs are presented in the table above.

CONCLUSION

Identifying value in preventive interventions is more complex than it may appear at first glance. Defining types of intervention and tailoring value assessments to the type of intervention are important. While identifying health outcomes is fairly straightforward, determining the net total cost impact can be quite difficult and deciding whether the health outcomes are justified by the net cost impact is an essentially subjective judgment. Some preventive services have net cost savings; so those are easily justified. For other interventions, there is a net cost and in those cases concepts like QALY are used to aid in deciding whether the health outcome warrants paying the price of the intervention.

Almost every preventive intervention demonstrates a clear improvement in health status. Primordial or community-

based prevention measures are generally cost-saving, as are some Primary prevention interventions such as immunizations. Screenings most often have a net cost. Workplace wellness programs are relatively new, have multiple elements and the research on what their value is may take several years to reach maturity. Early evidence is very encouraging on the likelihood of long-run cost-trend reductions if not outright cost savings. The same is true of public payer preventive activities. The availability of telehealth, wireless monitoring, internet-based personal health records and other new technologies may further enhance preventive interventions and add to their value. Proponents of prevention and wellness programs argue that the debate about funding these services should occur in terms of value, not savings. Leading advocate Steven Woolf says, “The question of whether prevention saves money is incorrectly framed. Health care, like other goods, is not purchased to save money... the proper question for a preventive (or therapeutic) intervention is how much health the investment purchases.”²⁸ Seen in this light, prevention and wellness programs offer the opportunity to fundamentally shift Americans’ health profiles and reduce morbidity and mortality while improving quality of life. ■

End Notes

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- ⁴ Pronk, Nicolaas P. "Population Health Management at the Worksite." *ACSM's Worksite Health Handbook*. Ed. Nicolaas Pronk. Champaign, IL: Human Kinetics, 2008. pp. 2-9.
- ⁵ QALY is discussed in a recent Nature article (Cressey, Daniel. "Health Economics: Life in the Balance." <http://www.nature.com/news/2009/090916/full/461336a.html>) and more technically in (Sassi, Franco, "Calculating QALYs, comparing QALY and DALY calculations" <http://heapol.oxfordjournals.org/cgi/reprint/21/5/402>). See also footnote xix, "The cost savings and cost-effectiveness of clinical preventive care", p.4).
- ⁶ The website for the USPTF has detailed information on how decisions are made and how the costs and benefits of the various services are considered. <http://www.ahrq.gov/CLINIC/uspstfix.htm>
- ⁷ See the discussion at <http://www.ahrq.gov/clinic/uspstf08/methods/procmanual.htm>
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End Notes

(continued)

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