

**HJR**

**20**



## C&RA Committee Referral File

HJR 20 was heard and passed with individual recommendations on 3-3-09

No changes were made to this resolution in this Committee

(page 1591), the second sentence should have begun with "Subtypes and sub-subtypes."

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## Shifts to and from Daylight Saving Time and Incidence of Myocardial Infarction

**TO THE EDITOR:** More than 1.5 billion men and women are exposed to the transitions involved in daylight saving time: turning clocks forward by an hour in the spring and backward by an hour in the autumn. These transitions can disrupt chronobiologic rhythms and influence the duration and quality of sleep, and the effect lasts for several days after the shifts.<sup>1,2</sup>

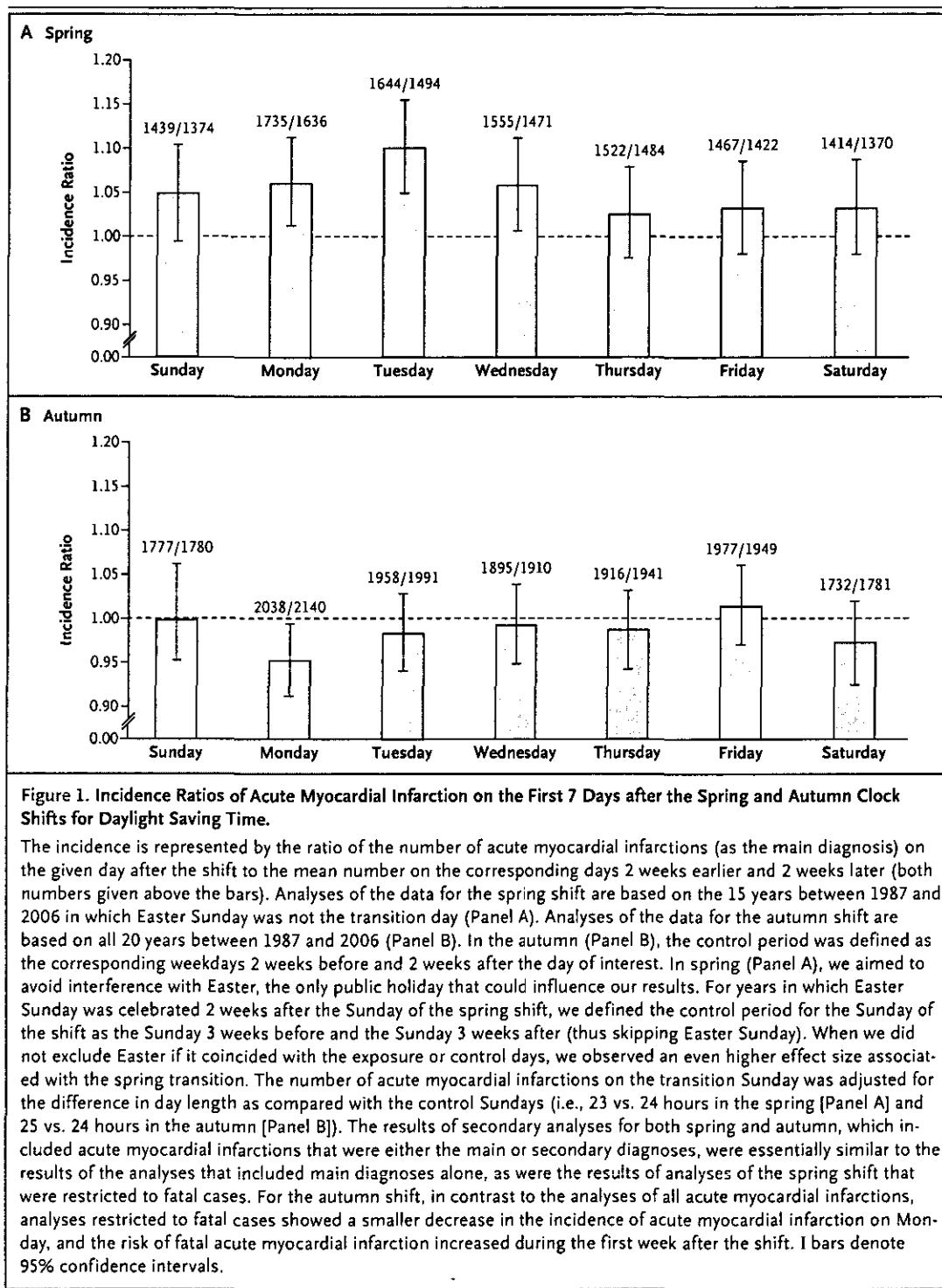
We examined the influence of these transitions on the incidence of acute myocardial infarction. To calculate the incidence ratio, we compared the incidence of acute myocardial infarction during each of the first 7 days after the spring or autumn transition and the mean of the incidences on the corresponding weekdays 2 weeks before and 2 weeks after the day of interest. For example, for the Tuesday after the transition, we would have divided the incidence on that Tuesday by the mean of the incidence on the Tuesday 2 weeks earlier and the incidence on the Tuesday 2 weeks later. We used data from the Swedish registry of acute myocardial infarction, which provides high-quality information on all acute myocardial infarctions in the country since 1987. The incidence ratios, as measures of relative risk, and exact 95% confidence intervals were calculated.

The incidence of acute myocardial infarction was significantly increased for the first 3 weekdays after the transition to daylight saving time in the spring (Fig. 1A). The incidence ratio for the first week after the spring shift, calculated as the incidence for all 7 days divided by the mean of the weekly incidences 2 weeks before and 2 weeks after, was 1.051 (95% confidence interval [CI], 1.032 to 1.071). In contrast, after the transition out of daylight saving time in the autumn, only the first weekday was affected significantly (Fig. 1B); the incidence ratio for the whole week was 0.985 (95% CI, 0.969 to 1.002).

The effect of the spring transition to daylight saving time on the incidence of acute myocardial infarction was somewhat more pronounced in women than in men, and the autumn effect was more pronounced in men than in women. The separate analyses of the 1987–1996 and 1997–2006 periods yielded essentially the same results as those for the whole 1987–2006 period. The effects of transitions were consistently more pronounced for people under 65 years of age than for those 65 years of age or older.

The most plausible explanation for our findings is the adverse effect of sleep deprivation on cardiovascular health. According to experimental studies, this adverse effect includes the predominance of sympathetic activity and an increase in proinflammatory cytokine levels.<sup>3,4</sup> Our data suggest that vulnerable people might benefit from avoiding sudden changes in their biologic rhythms.

It has been postulated that people in Western societies are chronically sleep deprived, since the average sleep duration decreased from 9.0 to 7.5 hours during the 20th century.<sup>4</sup> Therefore, it is important to examine whether we can achieve beneficial effects with prolonged sleep. The finding that the possibility of additional sleep seems to be protective on the first workday after the autumn shift is intriguing. Monday is the day of the week associated with the highest risk of acute myocardial infarction, with the mental stress of starting a new workweek and the increase in activity suggested as an explanation.<sup>5</sup> Our results raise the possibility that there is another, sleep-related component in the excess incidence of acute myocardial infarction on Monday. Sleep-diary studies suggest that bedtimes and wake-up times are usually later on weekend days than on weekdays; the earlier wake-up times on the first workday of the week and the consequent minor sleep deprivation



vation can be hypothesized to have an adverse cardiovascular effect in some people. This effect would be less pronounced with the transition out of daylight saving time, since it allows for additional sleep. Studies are warranted to examine the

possibility that a more stable weekly pattern of waking up in the morning and going to sleep at night or a somewhat later wake-up time on Monday might prevent some acute myocardial infarctions.

CORRESPONDENCE

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# NATIONAL GEOGRAPHIC NEWS

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## Extended Daylight Saving Time Not an Energy Saver?

Brian Handwerk  
for [National Geographic News](#)

March 7, 2008

On Sunday people in the [United States](#) will roll their clocks forward an hour at 2 a.m. and begin the country's second consecutive year of extended daylight saving time.

The change, adopted into law last year, was touted as a way to save energy. But some studies suggest the move actually has consumers using more power—and paying bigger energy bills.

Hendrik Wolff, an environmental economist at the University of Washington in Seattle, is skeptical of the purported savings.

Wolff and colleague Ryan Kellogg studied [Australian](#) power-use data surrounding the 2000 Sydney Olympics, when parts of the country extended daylight saving time to accommodate the games.

The pair compared energy use in the state of Victoria, which adopted daylight saving time earlier than normal, to South Australia, which did not.

"Basically if people wake up early in the morning and go to bed earlier, they do save artificial illumination at night and reduce electricity consumption in the evening," Wolff said.

"Our study confirmed that effect. But we also found that more electricity is consumed in the morning. In the end, these two effects wash each other out."

Wolff stresses that it's difficult to determine how increased daylight saving time affected energy use across the U.S. last year. But he's inclined to reject the government's pre-change projections of modest energy savings.

### Lights Out, But Bills Up

In 2007 the [U.S. Congress](#) passed a bill mandating that daylight saving time begin on the second Sunday in March and end on the first Sunday in November, creating an extra month of earlier mornings.

The U.S. Department of Energy is now sorting through the variables that drive power use—from weather patterns to the proliferation of high-definition televisions—to determine the yearlong impact of extended daylight saving time. (Related photos: [sunrises and sunsets](#).)

Meanwhile the quirky chronology of [Indiana's](#) daylight saving time history allowed Matthew Kotchen, an economist at the University of California, Santa Barbara, to measure the time change's energy impact in that state.

No federal rule mandates that states or even individual counties observe daylight saving time, so for years only 15 of Indiana's 92 counties made the time switch.

When the entire state adopted daylight saving time in spring 2006, Kotchen and colleague Laura Grant were able to observe changes in energy use in homes throughout southern Indiana over a three-year period.

Their finding was clear: The switch to daylight saving time cost Indiana homeowners dearly on their electric bills.

"Just in the state of Indiana, it turns out to be almost seven million dollars a year in increased residential electricity bills," Kotchen said. "And that's at a far lower price for electricity than the national average."

The study found that daylight saving time did save on lighting use but that heating and air-conditioning use more than offset any gains.

"At least in southern Indiana, and probably in other places that have a similar climate, it's resulting in an increase in residential electricity consumption. Our estimates range between one and four percent."

But Kotchen cautions about applying results from Indiana to the entire nation.

For example, "we really don't know what's happening in California, Florida, or Texas," he said.

Steve Nadel, executive director of the nonprofit American Council for an Energy-Efficient Economy, noted that people will have to wait and see whether extended daylight saving time saves energy—and if so, in which parts of the country.

He also stressed that electricity-use patterns have changed significantly since the 1970s, when studies were done that suggested modest energy gains from the time shift.

"I would say certainly since the 1970s there's a lot more use of air conditioning," he said.

UCSB's Kotchen added that "in places where you have to use a lot of air conditioning {daylight saving time} may have a detrimental effect for the same reason that we [see] in Indiana, but it's difficult to say."

### Impacts Beyond Energy

Massachusetts Democrat Ed Markey was one of the co-sponsors of the bill that mandated daylight saving time begin on the second Sunday in March and end on the first Sunday in November.

Jessica Schafer, press secretary in Congressman Markey's office, said she hasn't seen any hard data about energy savings since the switch.

"We've always said that the energy savings from this would be small compared to other changes you could make, but every little bit counts."

Other effects have been easier to identify, she said.

"People walk up to [Congressman Markey] and tell him what they think," she said. "By and large it's been positive. People feel that it's very family friendly."

That's because the shifting schedule allows most people to be more active during actual daylight hours—daylight saving time is about more than just saving energy.

"Added to the other reasons—increased traffic safety, increased leisure time, reduced crime—all told, I think the benefits are significant and meaningful."

Such social benefits may be even harder to quantify than energy savings. If they do exist, however, they may outweigh the original reason for the change.

"There are lots of reasons we might want to have daylight saving time," UCSB's Kotchen said.

"But the notion that it's an energy-saving policy—as people have been suggesting for at least 200 years—is not necessarily the case."

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