Physician Practice in the Management of Patients with Uncomplicated Myocardial Infarction: Changes in the Past Decade

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SUMMARY  To determine changes in the patterns of care between 1970 and 1980 for patients with uncomplicated acute myocardial infarction, questionnaires were sent to almost 6000 physicians in 1979 and responses were compared with those of a similar survey taken in 1970. Almost all physicians in 1979 reported the availability and use of an intensive care/coronary care unit facility with continuous electrocardiographic monitoring. Progressive-care facilities are also becoming more widely available. The median length of hospitalization has decreased markedly. Early ambulation and an earlier return to work are more common. There is a high level of informal patient and patient-family counseling about myocardial infarction and its management, both during and after hospitalization, and wider use of educational materials. Most physicians continue to recommend progressive physical activity after hospitalization.

The routine prescription of anticoagulant therapy during hospitalization has declined, while prescription of prophylactic antiarrhythmic agents has increased. Nitrate drugs and tranquilizers are routinely prescribed by a large percentage of physicians for their patients with uncomplicated myocardial infarction.

Use of standard exercise tests has increased among all physician specialties. The treadmill test is most often used, and testing is typically done 6 weeks after infarction. A significant increase in the availability of and familiarity with exercise testing is characteristic of all medical specialties.

Symptoms of new chest pain and palpitations are now considered important enough to warrant the recommendation to report immediately to an emergency room. Other current findings include the routine use of coronary angiography by a large percentage of physicians to evaluate the need for surgical intervention, and the routine posthospitalization prescription by only a small percentage of physicians of aspirin and of nitrate drugs for patients with uncomplicated myocardial infarction.

IN 1970, PHYSICIAN PRACTICE in the management of patients with uncomplicated acute myocardial infarction (MI) was assessed by a questionnaire that was mailed to a systematic sample of physicians in private practice in the United States, selected on an nth name basis from a zip code–ordered list. Almost a decade later, the identical questionnaire was used again to compare components of practice. New questions were added to assess contemporary aspects of care of the patient with myocardial infarction.*

The current questionnaire was mailed to approximately 1500 members of each of four specialty areas: general practitioners, family practitioners, internists and cardiologists, for a total of 5979 questionnaires. The initial mailing was supplemented by two follow-up mailings to increase the response rate. A total of 3183 physicians (53%) responded to the questionnaire between June and October 1979. Of the responses, 2531 were usable: 1129 from physicians in general or family practice, 740 from internists and 662 from cardiologists. Most unusable responses were from retired physicians or those not treating patients with MI.

The responses to the three mailings were similar within each physician specialty and therefore were combined. The geographic distribution of responses by physician category was compared with that of the U.S. physician population and found to be within expectation. Because family practice became recognized as a specialty in 1969, data from physicians indicating their specialty as general practice and family practice in 1979 were combined for comparison with the
general practice category of 1970. The present survey was similar in numbers in each specialty to that conducted in 1970, when 1200 questionnaires each were sent to general practitioners, internists and cardiologists and resulted in 2491 responses (69%). Of the responses, 2206 were usable: 562 from general practitioners, 857 from internists and 787 from cardiologists. The decrease in the rate of response to the questionnaire between 1970 and 1979 parallels that reported in other U.S. survey research publications; for home interviews of the general public, it was 80–81% in the 1960s, compared with 60–61% in a 1974 report.

Data were collected in categorical form rather than as continuous quantitative data in both surveys (0, 1–10, 11–25 and so on). Medians were estimated by interpolation.

Patient Caseload

The physicians who responded to the current questionnaire had managed about 74,000 patients with acute MI during the prior 12 months. The general practitioners and family physicians managed a median of 11 MI patients during the year, the internists 18 patients, and the cardiologists 57 patients.

In the 1970 survey, general practitioners reported managing a median of 13 MI patients during the year, internists 22 patients, and cardiologists 44 patients. The general and family practitioners thus managed comparable numbers of patients in both survey periods; internists, however, currently reported fewer patients (p < 0.01), and cardiologists reported more patients (p < 0.01). Extrapolation of the reported MI patient care distribution from the present survey to all U.S. physicians in private practice would indicate that they managed about 1.93 million patients with MI over the prior 12 months. This represents about 590,000 patients with MI cared for by general and family practitioners, 1 million by internists, and 340,000 by cardiologists. Current incidence estimates used by the American Heart Association and the National Heart, Lung, and Blood Institute approximate 1.5 million patients with MI per year.4-5 Treatment of a single patient could have been reported by more than one physician in the present survey. The questionnaire attempted to minimize this by asking “patients whose management you controlled.” These data indicate that MI is becoming a disease of subspecialty practice; the more than 30% of all patients with MI managed by general and family practitioners is markedly less than the 53% reported in 1970. Forty-eight percent of the general and family practitioners responding to this survey managed fewer than one patient with MI per month, and 88% managed fewer than two patients with uncomplicated MI each month. MI thus appears as a relatively infrequent presenting problem to the individual general or family practitioner, although this large group of physicians still cares for a substantial percentage of patients with infarction.

Classification of Myocardial Infarction

In the current survey, 53% of patients with MI had their hospital course classified as uncomplicated by all medical specialties (p < 0.01). In 1970, almost 45% of patients were classified by the respondents as having a mild or uncomplicated infarction, i.e., without serious or recurrent arrhythmias, shock, persistent or recurrent chest pain or congestive heart failure.

Hospitalization Practices and Patterns

More than 96% of physicians in all medical specialties routinely hospitalized patients with uncomplicated MI, a slight increase for all categories since the initial survey. Specifically, only 40 (3.5%) family and general practitioners, 14 (1.9%) internists, and 7 (1.1%) of cardiologists reported that they did not routinely hospitalize patients with uncomplicated infarction; further analysis was not done because the numbers were not large enough to be meaningful. Also, intensive care unit (ICU) or coronary care unit (CCU) facilities are available both in rural and in metropolitan communities, to almost all physicians reporting. This represents little change in availability for internists and cardiologists, but a significant (p < 0.01) increase for the family and general practitioners, from 84% to 97%. Continuous electrocardiographic monitoring was almost always available in facilities designated as ICUs or CCUs by all physician specialties in both survey periods. However, all physician specialties show an increase (p < 0.01) in their use of the available ICU or CCU facilities for all patients. This constituted an increase from 80–94% for general and family practitioners, 90–98% for internists, and 91–99% for cardiologists. A corresponding decrease was seen in the use of ICUs only for “selected patients.”

A significant (p < 0.01) increase in the availability of progressive-care facilities was also reported by all physician specialties, from 32–65% for general and family practitioners, 32–77% for internists, and 33–81% for cardiologists. Continuous electrocardiographic monitoring was also characteristic of progressive-care facilities. All physicians reported an increase in their use of progressive-care facilities for patients with uncomplicated MI. However, the difference was significant (p < 0.01) only for the cardiologists.

Hospital Stay

The median length of total hospital stay as reported by all specialty groups decreased markedly, from an average of 21 days in 1970 to 14 days in 1979. The ICU/CCU stay was correspondingly reduced, from 4½ to 3½ days; in the intermediate or progressive care stay, from 6 to 4½ days; and in the duration of stay in general-care areas.

Components of Care During the Hospitalization (table 1)

Questions in both survey periods were worded “usually prescribe for your uncomplicated MI pa-
tients." The covering letter asked physicians to respond "in terms of how you most often or usually treat patients who have had an uncomplicated MI (that is, not complicated by serious or recurrent arrhythmia, persistent pain, shock or congestive heart failure)." The differences can be considered to reflect changing opinions as to the value of certain therapeutic regimens. There was a significant \( p < 0.01 \) decline in the use of anticoagulants by all physician specialties. Both internists and cardiologists, but not the general and family practitioners, reported a significant \( p < 0.01 \) increase in the use of prophylactic antiarrhythmic agents. Sodium-restricted diets were ordered more often by physicians in all specialties, but the use of fat-restricted diets and calorie-restricted diets decreased. No change was evident in the advice to restrict or stop smoking, as this was recommended by over 95% of physicians in both surveys.

Only the 1979 survey included questions about other drugs routinely used for patients with uncomplicated MI during the hospitalization. Antihypertensive drugs (for patients with hypertension) were prescribed essentially uniformly during the hospitalization by 82–86% of all specialty groups. Tranquilizer prescription was also common, reported by 71% of general and family practitioners, 70% of internists, and 60% of cardiologists. The prescription of nitrate drugs was similarly comparable among the specialties, reported as routine for patients with uncomplicated infarction by 57–60% of all three practice groups. Beta-adrenergic blocking agents were also prescribed comparably by 32–38% of the various physician specialties for their patients with uncomplicated MI. Antidepressant agents and digitalis were rarely ordered routinely.

According to the current survey a cholesterol-restricted diet was prescribed by 60% of family and general practitioners, 58% of internists, and 68% of cardiologists; the increased prescription of a cholesterol-restricted diet by the cardiologists was significant \( p < 0.01 \).

**Patient-Family Education During the Hospitalization**

In both surveys, the physician was asked to identify the type of counseling usually given to patients with uncomplicated MI before discharge from the hospital. All physician specialties described a similar high level (96–99%) of routine in-hospital counseling and education of patients about diet, smoking cessation, resumption of sexual activity and return to work. There was a consistent, although nonsignificant, trend toward counseling of the patient and family together rather than patient counseling alone.

An addition on the 1979 questionnaire was designed to identify whether a formal teaching program was available in the hospital and whether education only of the patient or both patient and family counseling was usual. For dietary counseling, the responses were uniform among the specialties, with over 60% of each group advising both the patient and the family, but not in the context of a formal hospital program. Over half of each specialty group informally counseled both the patient and the family about cessation of smoking. Most other components of counseling were directed only to the patient, also on an informal basis. In general, little education and counseling appears to be conducted as a formal hospital program.

**Educational Materials for the Patients (table 2)**

The current survey also identified a significant \( p < 0.01 \) increase in the use of patient educational materials by all three practice groups. However, the use of government-prepared materials and American Heart Association materials decreased among all specialty groups. Among those using educational materials in 1979, more than 50% of each physician specialty group reported using hospital-prepared
materials, while approximately 20% reported using commercially prepared materials. (Corresponding questions were not included on the 1970 survey.)

Activity Recommendations During and After the Hospitalization

All physician specialties reported earlier ambulation of patients and earlier return to specific activities, such as self-care, walking in the room and walking down the hall. Patients also were described as returning to work earlier. Patients at desk or machine jobs returned to work at 8½ weeks after infarction in 1970 and at 7 weeks after infarction in 1979; to customary housework at 8½ weeks in 1970 and 6½ weeks in 1979; to work involving extremes of temperature at 13 weeks in 1970 and 12 weeks in 1979; and to heavy manual labor at 17 weeks after infarction in 1970 and 13 weeks in 1979.

Physicians were asked to identify which clinical or laboratory measurements they usually depended upon as a guide to recommendations for activity, clinical management, and vocational planning for patients with uncomplicated myocardial infarction. Among the guidelines used to recommend resumption of physical activity, 97% of all specialty groups cited clinical judgment, with tolerance to walking cited by 92%. The guidelines were not mutually exclusive. Standard exercise tests served as a guideline for 59% of family and general practitioners and internists and 83% of cardiologists. Radionuclide myocardial imaging was used as a guideline by 5–12% of all physicians; echocardiography by 6–13%; and ambulatory ECG monitoring by 22% of general and family practitioners, 29% of internists, and 49% of cardiologists.

Exercise Testing (table 3)

Compared with the 1970 questionnaire, there was a significant (p < 0.01) increase in the use of standard exercise tests by all physician specialties. The treadmill was the most common apparatus, used by 80% of general and family practitioners, 83% of internists, and 93% of cardiologists. Bicycle ergometer tests were used by fewer than 7% of physicians; 12% of general practitioners, 8% of internists, and 2% of cardiologists used the Master two-step test. Standard exercise tests, when performed, are done so uniformly by all physician groups at about 6 weeks after infarction.

The current questionnaire identified an increase in the availability of and familiarity with standard exercise tests for all medical specialties. Among those not using exercise tests, patient safety remained a concern of about 30% of family and general practitioners as well as internists, essentially unchanged from the 1970 questionnaire. However, there was a significant decrease in concern about patient safety during exercise testing among cardiologists. Significantly fewer respondents in all physician categories did not consider exercise testing helpful.

Coronary Angiography

The current questionnaire sought information about the use of coronary angiography to evaluate the need for bypass surgery for patients after uncomplicated MI. The questions arbitrarily divided patients into two categories using age 45 years as the dividing point. More than 50% of the cardiologists and about one-third of the family and general practitioners and internists routinely recommended coronary angiography for patients younger than age 45 years after an uncomplicated MI. Over 50% of both general and family practitioners and internists, and one-third of the cardiologists also recommended coronary angiography only when the response to an exercise test was abnormal. For patients age 45 years and older, two-thirds of the physicians recommended angiography only when the exercise test was abnormal; it was less frequently routinely advised for all patients age 45 years and older with an uncomplicated clinical course (12% of general and family practitioners, 10% of internists, and 17% of cardiologists).

Posthospital Components of Care (table 4)

Posthospitalization medication and diet prescription data by medical specialty revealed patterns of

### Table 2. Use of Patient Education Materials (Percent of Responding Physicians)

<table>
<thead>
<tr>
<th></th>
<th>1970</th>
<th>1979</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family/general practice</td>
<td>43.1</td>
<td>60.7</td>
</tr>
<tr>
<td>Internal medicine</td>
<td>41.8</td>
<td>62.6</td>
</tr>
<tr>
<td>Cardiology</td>
<td>48.5</td>
<td>75.5</td>
</tr>
</tbody>
</table>

### Table 3. Use of Exercise Tests to Guide Activity Recommendations for Patients with Uncomplicated Myocardial Infarction (Percent of Responding Physicians)

<table>
<thead>
<tr>
<th></th>
<th>Family/general practice</th>
<th>Internal medicine</th>
<th>Cardiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use exercise tests</td>
<td>19.6</td>
<td>59.0</td>
<td>12.3</td>
</tr>
<tr>
<td>Reasons for not using exercise tests,* percent of nonusers:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not considered more helpful than clinical evaluation</td>
<td>54.6</td>
<td>40.0</td>
<td>73.0</td>
</tr>
<tr>
<td>Concern for patient safety</td>
<td>27.0</td>
<td>28.3</td>
<td>35.6</td>
</tr>
<tr>
<td>Lack of equipment</td>
<td>35.4</td>
<td>25.3</td>
<td>18.1</td>
</tr>
<tr>
<td>Unfamiliarity with tests</td>
<td>17.7</td>
<td>10.8</td>
<td>6.9</td>
</tr>
</tbody>
</table>

*Several physicians reported more than one reason.
Table 4. Regimens Routinely Prescribed After the Hospitalization for Patients with Uncomplicated Myocardial Infarction (Percent of Responding Physicians)

<table>
<thead>
<tr>
<th></th>
<th>Family/general practice</th>
<th>Internal medicine</th>
<th>Cardiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>50.3</td>
<td>46.2</td>
<td>40.5</td>
</tr>
<tr>
<td>Sulfinpyrazone</td>
<td>10.1</td>
<td>10.9</td>
<td>16.0</td>
</tr>
<tr>
<td>Persantine</td>
<td>17.3</td>
<td>15.4</td>
<td>13.4</td>
</tr>
<tr>
<td>Antihypertensive drugs (for hypertensive patients)</td>
<td>86.7</td>
<td>87.2</td>
<td>90.0</td>
</tr>
<tr>
<td>Nitrate drugs</td>
<td>59.7</td>
<td>58.9</td>
<td>59.2</td>
</tr>
<tr>
<td>Beta-adrenergic blocking drugs</td>
<td>32.4</td>
<td>35.4</td>
<td>38.7</td>
</tr>
<tr>
<td>Tranquilizers</td>
<td>37.0</td>
<td>30.9</td>
<td>20.5</td>
</tr>
<tr>
<td>Prophylactic antiarrhythmic agents</td>
<td>9.9</td>
<td>8.1</td>
<td>4.5</td>
</tr>
<tr>
<td>Digitalis</td>
<td>15.1</td>
<td>8.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Full-dose anticoagulant drugs</td>
<td>13.6</td>
<td>10.4</td>
<td>6.0</td>
</tr>
<tr>
<td>Antidepressant drugs</td>
<td>8.2</td>
<td>4.7</td>
<td>1.5</td>
</tr>
<tr>
<td>Low-dose heparin</td>
<td>1.6</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Calorie-restricted diet</td>
<td>73.6</td>
<td>73.1</td>
<td>70.1</td>
</tr>
<tr>
<td>Cholesterol-restricted diet</td>
<td>71.9</td>
<td>67.8</td>
<td>76.7</td>
</tr>
<tr>
<td>Fat-restricted diet</td>
<td>58.8</td>
<td>56.9</td>
<td>65.9</td>
</tr>
<tr>
<td>Sodium-restricted diet</td>
<td>62.3</td>
<td>48.5</td>
<td>36.6</td>
</tr>
<tr>
<td>Stop smoking</td>
<td>96.1</td>
<td>96.9</td>
<td>97.3</td>
</tr>
</tbody>
</table>

Only 1979 data were available.

Routine use in patients after an uncomplicated MI. Aspirin prescription was routinely ordered by almost half of all practice groups. Sulfinpyrazone was routinely prescribed by about 10% each of general and family practitioners and internists, and by 16% of cardiologists; there was a slightly higher routine prescription of Persantine. The results of the Aspirin Myocardial Infarction Study, the Persantine-Aspirin Reinfarction Study and sulfinpyrazone clinical trials had not been reported at the time of the survey. Antihypertensive drugs were prescribed for hypertensive patients by almost 90% of all specialty groups. Nitrate drugs were ordered routinely by almost 60% of all specialty groups, and β-adrenergic blocking drugs by about one-third. Tranquilizers were routinely prescribed by about one-third of general and family practitioners and internists, and by 21% of cardiologists. Prophylactic antiarrhythmic agents were ordered by 5–10% of physicians; and digitalis was also prescribed routinely by a small fraction of physicians. Full-dose anticoagulants and antidepressant drugs were rarely prescribed routinely by any physician group. Only about 1% routinely prescribed low-dose heparin.

About 70% of all physician groups in the 1979 survey recommended a calorie- or cholesterol-restricted diet. A fat-restricted diet was prescribed by about 60% of all practice groups, and there was considerable variation in dietary sodium restriction. Almost 97% of all physician groups recommended that patients stop smoking. Corresponding data were not collected in the 1970 survey.

Physicians were asked to identify the type of counseling usually given or prescribed for uncomplicated MI patients before their discharge from the hospital. Over 95% of all physician specialties reported posthospitalization counseling regarding diet, smoking cessation, return to sexual activity and return to work. Most counseling was for both the patient and family, as opposed to the patient only, especially among cardiologists.

Posthospital Physical Activity

A large number of physicians in all categories in both surveys (93–95%) recommended progressive physical activity on return home. In the current survey only, the type of physical activity program recommended was ascertained and was essentially uniform among physician groups. The categories listed, which were not mutually exclusive, were physician-supervised programs; YMCA, community center programs, etc.; nonsupervised home exercise programs; or other (to be specified). About 45% of physicians recommended physician-supervised programs and 45% recommended home exercise programs. YMCA programs were advised by 10–20% of the physician groups and other programs by a slightly smaller number. Several physicians reported recommending more than one type of program, depending on the patients' characteristics and the proximity of the program.

Response to Symptoms (table 5)

There was a marked change between the two surveys in the usual instructions which physicians gave to patients after infarction if they developed new or more severe chest pain or an irregularity of the heart beat. Significantly (p < 0.01) fewer recommended that the patient "make an appointment" or "report to office" compared with the 1970 survey, and signifi-
significantly \((p < 0.01)\) more recommended that the patient "report to the emergency room." The recommendation of a trial of nitroglycerin decreased in all specialty groups.

**Return to Work**

General and family practitioners reported 85% of previously employed patients younger than age 65 years returned to work in 1970 and 83% did so in 1979. Modest declines in return to work were also reported by internists, from 89% to 84%, and by cardiologists, 88% to 79%.

**Discussion**

The results of the present survey should be interpreted with the same caution as is warranted for other studies with 40–60% usable response rates. Different respondents may have variably interpreted pivotal descriptors such as "usually," "uncomplicated MI," "serious or recurrent" arrhythmias, and what constitutes counseling. These data also reflect the physicians' self-description of their practices rather than actual documentation.

Factors that may have influenced the increased percentage of patients cared for by subspecialists include the increase in the number of CCUs; the increase in the number of internists or cardiologists assigned to full- or part-time supervision of CCUs; and the increase in the complexity of CCU diagnostic and therapeutic technology and procedures (e.g., hemodynamic monitoring, pacing and balloon counterpulsation).

Explanations for the increased percentage of patients with uncomplicated MI in the current survey include earlier hospitalization because of more prompt patient and physician recognition of and response to chest pain; increased availability and use of cardiac serum enzyme determinations for diagnosis; earlier and more effective prophylaxis and treatment of arrhythmias, hypotension, and other complications. Comparable changes have been reported both in other countries\(^*\) and in the U.S.\(^{16}\) In the latter study, 52.3% of 1246 consecutive patients with acute MI admitted to a large community hospital were classified as having an uncomplicated MI.

Changes in the care of patients with uncomplicated MI during the past decade appear to reflect the impact of the widespread dissemination and acceptance of the results of clinical research relating to the benefits of ECG monitoring, arrhythmia control and other CCU capabilities; the safety of early ambulation; the prognostic and therapeutic value of exercise testing; the safety and value of coronary angiography and coronary bypass surgery for selected patients; and clinical trial information about various medications. The improvement in technology and its communication to physicians and other health professionals by professional education and commercial exhibits and advertisements; and the resultant increased availability of diagnostic and therapeutic (e.g., surgery) procedures are important components.

The net economic impact of these changes is difficult to assess, i.e., the savings related to earlier hospital discharge vs the costs of additional newer diagnostic and therapeutic interventions. Reduction of the hospital stay by an average of 7 days and the recommended earlier return to work represent a major saving in medical care expenditure and an increase in taxable income. However, exercise testing, ambulatory ECG recording, coronary angiography and coronary bypass surgery are expensive, and their cost-benefit ratio is more difficult to estimate.

The 1978 Hospital Inpatient-Education survey, sent to all U.S. hospitals by the American Hospital Association,\(^{11}\) reported a 65% increase from 1975 in operational inpatient education programs and hospital coordinating departments. In a survey with an 80.4% response, 72.5% of the hospitals responding (3393) had or were planning patient education programs, with heart attack among the three most frequent topics in operational adult programs; heart attack had moved from sixth to second place from 1975–1978. The current survey indicates little physician use of these apparently widely available formal programs, but a major increase in the use of hospital-prepared patient education materials, presumably from these programs.

The marked increase in exercise acceptance by and the availability of exercise facilities and programs for the public at large\(^{12}\) appears to be reflected in the physician recommendations for exercise for cardiac patients.

The net effect of current practice appears to be aimed at reducing the physical and vocational invalidism and the morbidity associated with myocardial infarction. Fries\(^{8}\) called this the "compression of morbidity," i.e., reduction of the duration of the unwell state. More people now survive and thrive after

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**Table 5.** Response to Symptoms*: Instructions to Myocardial Infarction Patients about New Chest Pain or Irregular Heartbeat After Discharge from the Hospital (Percent of Responding Physicians)

<table>
<thead>
<tr>
<th></th>
<th>Family/general practice</th>
<th>Internal medicine</th>
<th>Cardiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report to office</td>
<td>71.0</td>
<td>48.5</td>
<td>63.1</td>
</tr>
<tr>
<td>Report to emergency room</td>
<td>46.6</td>
<td>67.6</td>
<td>49.5</td>
</tr>
<tr>
<td>Take nitroglycerin</td>
<td>52.0</td>
<td>44.7</td>
<td>47.8</td>
</tr>
<tr>
<td>Make an appointment</td>
<td>14.9</td>
<td>3.9</td>
<td>13.8</td>
</tr>
</tbody>
</table>

*Several physicians reported giving more than one instruction.
an acute MI. They can work for a longer period in a relatively well state until death occurs from the underlying disease. The overall social consequences of present practice should be not only an improvement in the quality of life, but also a reduction of the economic burden of premature social security and other pension retirement and disability benefits.

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N K Wenger, H K Hellerstein, H Blackburn and S J Castranova

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