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Preventive medicine and screening in the elderly: Working guidelines

■ ABSTRACT

Preventive medicine is an attractive concept, but is insufficiently studied and emphasized, especially regarding the elderly. This working guideline for prevention and screening of common health problems of the elderly is based on existing recommendations and takes into account the continuing controversies and gaps in knowledge and research.

■ KEY POINTS

The elderly have the same risk factors as younger age groups and are far more likely to develop heart disease. Risk factor reduction, even if relatively less effective in the elderly, still has a significant role in reducing morbidity and mortality.

Preventive measures are appropriate for elderly patients who have a reasonable quality and quantity of life remaining and who are candidates for treatment or surgery if, for example, an early cancer is found.

Evidence-based screening for cardiovascular risk factors centers on blood pressure and cholesterol. Little data support the value of physical examination or noninvasive testing in detecting asymptomatic treatable cardiac disease.

Recent studies, including the 4S trial, provided the first proof that cholesterol-lowering treatment (with statins) reduces cardiac morbidity and mortality in older as well as younger patients.

ALTHOUGH PREVENTING the development and progression of illness is an appealing notion, few methods have been studied sufficiently to engender confidence in their efficacy and cost-effectiveness. This is especially true regarding the elderly. The elderly shoulder the greatest burden of preventable illness, but unfortunately geriatrics-specific research is inadequate. Existing prevention and screening recommendations¹⁻⁶ vary widely, with only a few publications specific to the elderly.⁷⁻¹⁰

To provide working guidelines for clinical practice, this article synthesizes the important recommendations, issues, studies, and gaps in knowledge and research on preventive medicine and screening in the elderly (TABLE 1). It is a snapshot of a moving target, however, as new research and recommendations in preventive medicine are evolving continually.¹¹

Ultimately, practitioners and patients must decide for themselves which screening guidelines to follow, based on individual circumstances, judgment, values, and preferences.

■ CONSIDER THE SOURCE OF GUIDELINES FOR PREVENTION AND SCREENING

Two task forces have provided a comprehensive, evidence-based approach to prevention and screening and a system for evaluating recommendations: the Canadian Task Force on the Periodic Health Examination¹ and the US Preventive Services Task Force (USPSTF).⁴ Their recommendations are the most widely quoted and respected. The USPSTF organized methods into two major categories according to purpose (screening, and

TABLE 1

Summary of recommendations for screening and prevention in older adults

SCREENING TEST*	GRADE OF EVIDENCE†	RECOMMENDATION	SOURCE‡	CLASSIFICATION OF RECOMMENDATION§
Blood pressure measurement	I	At every exam, at least every 1-2 years	USPSTF, ⁴ AHA ³⁶	A
Physician breast exam	I	Every year after age 40	ACS, ² USPSTF ⁴	A
Mammogram	I	Every year after age 40	ACS ²	A
		Every 1-2 years from ages 50-69	USPSTF ⁴	A
		Continue every 1-3 years at ages 70-85	AGS, ¹⁹ USPSTF ⁴	C after age 69
Pelvic exam and Pap smear	II	Every 2-3 years after 3 negative yearly exams; decrease or discontinue after age 65-69	ACS, ² USPSTF, ⁴ CTF, ¹ AGS ²⁴	A C after age 65
Cholesterol level	I-III	Every 5 years	NCEP, ^{41,70} ACP, ⁴³ USPSTF ⁴	A B, C after age 65
Rectal exam, fecal occult blood test	II	Every year after age 50	ACS, ^{2,69} Gastro ²⁷	B
Sigmoidoscopy	II	Every 5 years after age 50, or colonoscopy/barium enema every 10 years	ACS, ^{2,69} Gastro ²⁷	B
Test or inquire about hearing	III	Periodically	Various	C
Examine mouth, lymph nodes, testes, skin, heart, lungs	III	Every year	ACS, ² AHA ³⁶	C
Glucose level	III	Periodically in high-risk groups Every 3 years starting at age 45	USPSTF ⁴ ADA ⁴⁵	C C
Thyroid-stimulating hormone level	III	Every 5 years for women age 50 and older	ACP, ⁴⁹ USPSTF ⁴	C
Electrocardiogram	III	Periodically after age 40-50	AHA ³⁶	C
Vision and glaucoma screening	III	Periodically by eye specialist after age 65	USPSTF ⁴	C
Assess mental and functional status	III	As needed; be alert for decline	USPSTF ⁴	C
Bone mineral density	III	If needed for treatment decision	USPSTF ⁴	C
Prostate exam and PSA	III	Annually after age 50	ACS, ^{2,29}	C
		Not routinely recommended after age 70 [¶]	USPSTF, ⁴ ACP ³⁰	D
Chest roentgenogram	III	Not routinely recommended [¶]	USPSTF ⁴	D

prevention and counseling) (TABLE 1). Notably, the USPSTF also emphasizes that physicians should counsel patients to follow healthy lifestyles, to help them gain the benefits without incurring unnecessary medical expenses or risks.

As TABLE 1 indicates, the conservative, evidence-based, government-sponsored task force recommendations sometimes differ significantly from those of advocacy groups such as the American Cancer Society (ACS), probably due to conflicting studies and philosophies.¹²



PREVENTIVE INTERVENTION	GRADE OF EVIDENCE [†]	RECOMMENDATION	SOURCE [‡]	CLASSIFICATION OF RECOMMENDATION [§]
Encourage exercise	I-II	Aerobic and resistance exercise	USPSTF, ⁴ AHA ³⁶ as tolerated	A
Tetanus-diphtheria vaccine	I-II	Primary series once, booster every 10 years	ACP, ⁶⁷ USPSTF ⁴	A
Influenza vaccine	I-II	Every year after age 65 or if chronically ill Every year after age 50	ACP, ⁶⁷ USPSTF ⁴ AAFP ⁶⁸	B
Pneumococcal vaccine	I-II	At least once after age 65 or if chronically ill	ACP, ⁶⁷ USPSTF ⁴	B
Calcium	II	800-1,500 mg/day	Various	B
Estrogen or selective estrogen receptor modulator (SERM)	II	Postmenopausal women	Various	B
Aspirin	I-II	80-325 mg/day in middle-aged and older men	Various	C

*Screening recommendations for asymptomatic individuals; specific clinical circumstances may necessitate different testing and treatment schedules; screening for occult disease may not be necessary or appropriate for the oldest old (approximately age 85 and older) and others with limited quality and quantity of life

[†]Grade of evidence, US and Canadian task force systems

- I = Evidence from randomized trials
- II = Evidence from non-randomized or retrospective studies
- III = Expert opinions or other considerations

[‡]Source

- AAFP: American Academy of Family Physicians, <http://www.aafp/clinical.org>
- ACP: American College of Physicians, <http://www.acponline.org>
- ACS: American Cancer Society, <http://www.cancer.org/guide/guidchec.html>
- ADA: American Diabetes Association, <http://www.diabetes.org>
- AGS: American Geriatrics Society, <http://www.americangeriatrics.org>
- AHA: American Heart Association, <http://www.americanheart/scientific/statements.org>
- AHCPR: Agency for Health Care Policy and Research, <http://www.ahcpr.gov>
- CTF: Canadian Task Force on the Periodic Health Examination, <http://www.ctfphe.org>
- Gastro: Consortium of American Gastroenterological Association and others
- NCEP: National Cholesterol Education Program, <http://www.nhlbi.nih.gov/guidelines/cholesterol/atp.txt>
- USPSTF: US Preventive Services Task Force, <http://158.72.20.10/pubs/guidecps>

[§]Classification of recommendations

- A = Good evidence to support recommendation
- B = Fair evidence to support recommendation
- C = Poor evidence, but recommendations may be made based on expert opinion or other policy considerations
- D = Fair evidence to reject recommendation
- E = Good evidence to reject recommendation

^{||}Medicare covers annual screenings, per Balanced Budget Act of 1997

[¶]Not recommended for routine prevention or screening in asymptomatic persons, but may be useful when clinically indicated

ADAPTED FROM REFERENCE 7 AND REFERENCE 11, WITH PERMISSION.

■ HOW FEASIBLE ARE PREVENTION AND SCREENING IN THE ELDERLY?

It can be argued that illness in the elderly might be too well established, or that the elderly person's life expectancy is too limited

for prevention to be feasible. Nonetheless, it can be feasible to try to control risk factors and screen for incipient treatable disease in the elderly. The elderly are heterogeneous, ranging from healthy, employed 65-year-olds to demented centenarians in nursing homes.

The majority, however, are between these extremes, which makes decision-making difficult.

Preventive measures are appropriate for elderly patients who have a reasonable quality and quantity of life remaining and who are candidates for treatment or surgery if, for example, an early cancer is found. (Studies are needed to specifically address the value of primary and secondary prevention in the elderly in different settings and age ranges.)

We propose an age cutoff of approximately 85 years for most types of prevention and screening, since at this age the average person has a life expectancy of just 5 to 7 years and an active life expectancy of just 3 to 5 years—probably too little time for preventive interventions which take several years to achieve benefit.^{7,13,14} Any age limit must of course vary with individual preferences and circumstances, and does not apply to interventions with immediate or short-term benefit, such as vaccination.

■ LEVELS OF PREVENTION

In a sense, all medicine is preventive, since we are always trying to prevent disease from developing, progressing, harming, or killing the patient. To make the concept of preventive medicine sensible and practical, however, we must delimit and define the types of medical services customarily labeled “prevention.”

- **Primary prevention** aims to prevent disease from *occurring*, such as vaccination to prevent infections, use of aspirin or statins to prevent first heart attacks, or counseling patients to diet and exercise to reduce the risk of obesity or diabetes.
- **Secondary prevention** aims to prevent disease from *developing or progressing* beyond an asymptomatic stage and is usually equated with screening and early detection, such as mammography to detect breast cancer. The term secondary prevention also refers to treatments that prevent *recurrence* of disease, such as use of aspirin to prevent recurrent myocardial infarction.
- **Tertiary prevention** aims to prevent *further complications* from established disease.

■ CANCER SCREENING

Two thirds of deaths in the United States are due to cancer and cardiovascular disease.¹⁵ Thus, interventions aimed at preventing these conditions offer the greatest promise. Cancer screening is the most common form of screening discussed in preventive medicine guidelines. Most interest centers on breast, cervical, colon, and prostate cancers.

Since the elderly have the highest incidence and mortality rates from cancer—and they also tend to be underscreened—continuing attention to prevention and screening would seem appropriate. However, it must again be emphasized that most studies of cancer screening have not included older age groups; therefore, some doubt remains about the value of cancer screening in the elderly, particularly in the very old and frail because of their limited life expectancy.

Breast cancer

The ACS² recommends that women over age 40 have a clinical breast exam and mammogram annually, with no upper age limit. However, the USPSTF⁴ recommends a mammogram every 1 to 2 years from age 50 to 75, after which an annual clinical breast exam should be sufficient. Although the utility of the clinical breast exam alone is not well proven, it may even be a more useful screening test in women over age 70 because architectural changes in the breast make lump detection easier in this group.¹⁶ Controlled trials of breast cancer screening have been done only on women 40 to 75.^{17,18} Thus, strictly speaking, the available studies only support the USPSTF's firm, evidence-based Class A recommendation of mammography screening up to age 75.

It is assumed but unproven that older women should benefit similarly. Thus I agree with the American Geriatrics Society's recommendation that mammography be offered to healthy elderly women who are surgical candidates, at least every 2 to 3 years until about age 85.¹⁹

It should be noted that Medicare now covers annual mammograms for the elderly, although annual exams in this group are probably excessive.

Upper age limits do not apply to vaccinations

Cervical cancer

Most data are from retrospective studies, which show the incidence and mortality have been declining since screening programs were begun.²⁰ The ACS and several other groups promulgated consensus guidelines stating that after three or more consecutive normal annual exams, the Pap smear may be performed less frequently at the discretion of the physician,²¹ implying that older women who have received adequate previous screening may be able to decrease or discontinue screenings. Cervical cancer is felt to grow slowly, and there are no studies specifically showing a benefit to screening the elderly. Nevertheless, abnormal findings are still found in elderly women, especially if they haven't been screened regularly in the past.²²

Thus, I support the guidelines of the USPSTF,⁴ the Canadian²³ Task Force, and the American Geriatrics Society,²⁴ which recommend Pap screenings every 1 to 3 years up to age 65 to 70, after which screening can cease if Pap tests have been consistently normal. If the patient has not had regular normal screenings, which is common in the elderly, the same policy should be followed (every 1 to 3 years until three normal Pap tests are recorded).

Colorectal cancer

Although the ACS² had long recommended an annual digital rectal exam for all persons over age 50, as well as sigmoidoscopy every 3 to 5 years, the USPSTF and the Canadian Task Force originally rated this screening recommendation a noncommittal Class C due to lack of firm evidence that such screening reduces mortality. New data, however, support the efficacy of both fecal occult blood testing and sigmoidoscopy in reducing mortality from colorectal cancers.^{25,26} Consequently, the following new guideline—now rated Class B—has been adopted by the ACS, several gastroenterologic societies, the Agency for Health Care Policy Research, and the USPSTF: annual fecal occult blood test plus digital rectal exam and sigmoidoscopy every 5 years, or a colonoscopy or barium enema every 10 years, starting at age 50.²⁷

I agree with this guideline but find much resistance from patients and logistical difficul-

ties in implementing it.

Since sigmoidoscopic screening has been covered by Medicare and is being done more commonly, colorectal cancer detection rates have been improving (although there has been an increase in the rate of cancer of the right side of the colon, which is not visualized by sigmoidoscopy).²⁸ It is clear that screening examination of the entire colon by colonoscopy is more complete, but this method remains difficult to implement due to limited resources and limited patient acceptance.

Prostate cancer

The object of the most controversy in cancer screening is prostate cancer. The ACS continues to recommend annual digital examination of the prostate and prostate-specific antigen (PSA) testing in all men over age 50 with a life expectancy of at least 10 years.²⁹

I side more with the American College of Physicians and the USPSTF, which advise *against* routine PSA screening, especially in elderly men over age 70 (a Class D recommendation), citing a continued lack of evidence that such screening reduces mortality and the high morbidity of most modalities of prostate cancer treatment.^{4,30} However, some evidence that PSA screening may improve prognosis and survival is beginning to appear and if confirmed would better support aggressive screening.³¹

■ CARDIOVASCULAR DISEASE SCREENING

To prevent cardiovascular disease we need to screen for and treat risk factors, as well as encourage a heart-healthy lifestyle (diet, exercise, smoking avoidance, risk factor reduction, etc) for all persons.^{32,33} The elderly are subject to the same risk factors as younger age groups and in fact are far more likely to develop heart disease, indicating that risk factor reduction, even if relatively less effective in the elderly, still has a significant role in reducing morbidity and mortality.^{34,35}

The American Heart Association suggests a "cardiovascular examination and risk factor evaluation" every 5 years³⁶; however, little data support the value of physical examination or noninvasive testing in detecting

Most studies of cancer screening have not included older age groups

asymptomatic treatable cardiac disease. Evidence-based screening for cardiovascular risk factors centers on blood pressure and cholesterol.

Blood pressure

Regular blood pressure screening is strongly recommended, garnering a Class A recommendation from both the USPSTF⁴ and the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI),³⁷ which recommend measuring blood pressure at all physician visits, and at least every 2 years. Multiple trials supporting the value of hypertension treatment in reducing cardiovascular and cerebrovascular disease include some that focus on the elderly.^{38,39} The increased prevalence and cardiac risk of hypertension in the elderly justifies even more rigorous attention, though the value of treatment in the very old is unproven.⁴⁰

The JNC VI report states: "The goal of treatment in older patients should be the same as in younger persons (to below 140/90 if at all possible), although an interim goal of systolic pressure below 160 mm Hg may be necessary in those patients with marked hypertension."

Cholesterol

Despite numerous recent reports supporting cholesterol screening and treatment in the general adult population, geriatric guidelines remain poorly defined. The National Cholesterol Education Program (NCEP) Adult Treatment Panel⁴¹ did not break down recommendations by age, but recently reaffirmed the applicability of its guidelines to the elderly.⁴² The USPSTF⁴ and the American College of Physicians⁴³ suggest that periodic cholesterol measurement is most important for middle-aged men, who are the subjects of most available research. The recommendation to test cholesterol levels in adults about every 5 years is rated A, and the recommendation to screen those age 65 and older every 5 years is rated C.

Nevertheless, some studies indicate cholesterol is an independent risk factor for heart disease in men up to at least 84 years and in women up to 74 years. I agree with the experts who conclude that even if the relative risk and efficacy of treatment may be less in the elder-

ly, the higher baseline risk of heart disease might still allow some benefit of treatment, at least in the healthier "young-old."³⁵ Recent studies including the 4S trial⁴⁴ provided the first proof that cholesterol-lowering treatment (with statins) reduces cardiac morbidity and mortality in older as well as in younger patients.

■ OTHER LABORATORY SCREENINGS

A judicious approach to laboratory screening should be preferred to multichannel laboratory testing, which may yield a number of false-positive, borderline, or questionably significant abnormalities. In addition to cholesterol screening, two conditions are of sufficient prevalence and importance to justify consideration of routine testing even in asymptomatic persons: diabetes and thyroid disease.

Diabetes

The USPSTF⁴ did not strongly advise screening asymptomatic adults for diabetes (Class C recommendation) because of the dearth of evidence that early treatment of type 2 diabetes is beneficial. However, newer guidelines from the American Diabetes Association recommend screening all adults over age 45 with a fasting plasma glucose every 3 years, with normal now defined as less than 126 mg/dL.⁴⁵ Although strong evidence exists for the value of tight control in reducing complications mainly in younger insulin-dependent diabetic persons, the emerging consensus of expert opinion appears to be that similar benefits will accrue for those with non-insulin-dependent diabetes, at least in the younger, less frail elderly. Numerous new agents are available to assist with glycemic control, offering the hope of better prevention of diabetic complications.^{46,47}

It is also noted, under the category of prevention and counseling, that studies indicate that a greater level of physical activity is associated with a reduction in risk of type 2 diabetes,⁴⁸ and this offers promise for primary prevention as well.

Thyroid abnormalities

Some authorities recommend periodic screening of all older adults for hypothyroidism or

**In the elderly,
risk reduction is
less effective
but still
worthwhile**

hyperthyroidism due to an increased prevalence of subtle thyroid abnormalities in older patients, including asymptomatic suppressed or elevated thyroid-stimulating hormone (TSH). Conceivably, early treatment could prevent clinical thyroid disease from developing. However, little research supports the cost-effectiveness of TSH screening; thus, the C recommendation by the USPSTF, which suggested, as did the American College of Physicians, that it may be prudent to screen periodically for hypothyroidism in women over 50, especially those with possible symptoms.^{4,49} I support this recommendation, recognizing that controlled trials are needed to confirm the benefit of this approach.

■ OSTEOPOROSIS

Osteoporosis prevention may be categorized as either prophylaxis and counseling (primary prevention) or screening (secondary prevention). Virtually all postmenopausal women are at risk of osteoporotic fractures and should be counseled to consider prophylactic measures such as a diet adequate in calcium and vitamin D, exercise, and use of hormone replacement therapy or newer agents for osteoporosis (eg, alendronate, raloxifene).^{50,51}

Alternatively, a selective approach may be used: offer bone density screening such as dual-energy x-ray absorptiometry (DXA) to all postmenopausal women, and counsel and treat those who prove to have significant osteopenia or osteoporosis, or who need the test results to guide a decision about initiation of therapy (USPSTF Class C recommendation).

Medicare now pays for bone mineral density screening tests every 2 years, based on the Balanced Budget Amendment of 1997. I support offering screening to postmenopausal women at this interval.

It should be noted that osteoporosis, although usually presented as a problem primarily of white women, also occurs in men and women of all races.^{52,53}

■ VISION AND HEARING

Vision screening for older adults may be reasonable because undetected eye problems may

be more common in the elderly and may impair safety and functioning. The USPSTF⁴ recommends visual acuity screening in the elderly, and suggests it may be preferable to refer elderly patients to an ophthalmologist for periodic eye evaluation and glaucoma examinations (Class C recommendation).

Hearing loss, like visual loss, is very common in the elderly and obviously may interfere with safety and quality of life. Thus, some authorities suggest routine screening and diagnostic tests such as audiography. The USPSTF suggests it is reasonable to test for or at least inquire about hearing problems and to offer referrals and assistive devices. This Class C recommendation is based more on expert opinion than on evidence.

■ COGNITIVE AND FUNCTIONAL IMPAIRMENT

Although formal systematic screening for geriatric cognitive and functional impairment has been suggested,⁵⁴ appropriate diagnostic and treatment methods are lacking, unfortunately. Recent trials of functional status screening have shown disappointingly little benefit.⁵⁵ Reversible dementia is less common than once hoped, and treatment remains unsatisfactory, notwithstanding recent highly publicized and controversial reports⁵⁶ that some agents (estrogens, nonsteroidal anti-inflammatory drugs, vitamin E, and ginkgo biloba) may reduce the incidence or progression of dementia. It is hoped that in the future we will be able to identify patients with early dementia or genetic risk factors who might benefit from further studies or therapies.

For now, I agree with the conclusions of both the USPSTF¹ and the Canadian⁴ Task Force that the evidence does not support routine screening for dementia, but it is "reasonable for clinicians to periodically inquire about the functional status of elderly patients and remain alert to any decline" (Class C recommendation).

■ PREVENTION AND COUNSELING

Most of the focus and controversy in preventive medicine has concerned screening, early detection, and treatment. The other chief

Physician counseling to motivate patients to lose weight is underused

methods are behavioral and pharmacologic interventions, which physicians may advise for all patients or only for high-risk patients, to prevent disease from developing, progressing, or recurring. Although extensive discussion of such treatments and counseling is beyond the scope of this paper, clinicians must remember to stress interventions such as nutrition, hormone replacement, and aspirin, all of which offer promise in preventing cardiovascular disease, osteoporosis, and other health problems. For example, recent epidemiologic studies indicate a protective relationship between consumption of fruits and vegetables and ischemic stroke,⁵⁷ and between exercise and the development of diabetes.⁴⁸ A recent report from the Nurses Health Study suggests that healthy lifestyles could prevent more than 80% of coronary events!⁵⁸

Physician counseling is thought to play an important but underused role in motivating patients to lose weight.⁵⁹

Another important form of prophylaxis or primary prevention is vaccination, which is recommended for the elderly (TABLE 1).

Lifestyle

Even more so than previously, the USPSTF strongly advocates counseling patients on beneficial health practices.

It is suggested that physicians take the time to counsel patients on safe driving and use of seatbelts, and avoidance of smoking, drugs, and firearms.

Exercise must be vigorously promoted by physicians as a particularly promising intervention for improving fitness, strength, and mobility and probably for reducing falls and other causes of morbidity and mortality in the elderly.⁶⁰

In addition, clinicians caring for the elderly must appreciate that successful aging involves more than physical health. Seniors should be encouraged not only to take their medicines and follow a healthy lifestyle, but to remain mentally as well as physically active and engaged in life and the community.⁶¹ Financial and legal planning, preparation for assistance in the event of infirmity, and advance directives are all appropriate for health professionals (not necessarily physicians only) to discuss with seniors who are

wise enough to wish to prepare as completely as possible for all the vicissitudes of aging. Addressing all of these issues with older patients as part of a proactive preventive approach will improve patients' psychosocial as well as physical well-being and increase satisfaction with medical care.

Preventive drug regimens

Whether to take drugs, especially aspirin and hormones, for prophylactic purposes must be specifically considered.

Aspirin. I believe that most middle-aged to older persons should be counseled to take aspirin in prophylactic doses unless there are clear contraindications, as there is reasonably good evidence that aspirin and related drugs can significantly reduce cardiovascular and cerebrovascular events.⁶²

Hormone replacement therapy for postmenopausal women remains controversial due to the risks (cancer, deep venous thrombosis) compared with purported benefits in prevention of osteoporosis, possibly Alzheimer disease, and heart disease. Results of randomized clinical trials now underway, such as the Women's Health Initiative, are awaited and may help settle the issue. Meanwhile clinicians should be cautious in recommending and prescribing hormone replacement therapy for preventive purposes, as opposed to treatment of menopausal symptoms.^{63,64}

■ MAKE A PREVENTION CHECKLIST

The number of potentially valuable preventive measures that clinicians could offer or discuss with patients is vast and time-consuming, and research insufficiently identifies the most valuable interventions. Prevention of most diseases in the elderly remains a challenge due to the lack of research, multiple comorbidities, and questions about appropriateness.

Nevertheless, working guidelines are possible and necessary; every clinical practice should develop a checklist or reminder system to assist in implementing prevention and screening in the elderly.

Finally, it should be noted that while implementing as many as possible of the preventive measures suggested should allow more persons to reach healthy old age and live out

Every practice should have a checklist or reminder system for prevention and screening



their maximum life span, nothing has been found to alter the genetic aging process, with the possible exception of dietary restriction in experimental animals. In the future, we may

hope and dream, the ravages of aging itself may be reduced or prevented by genetic and hormonal manipulation, but at present this remains strictly speculative.^{65,66}

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