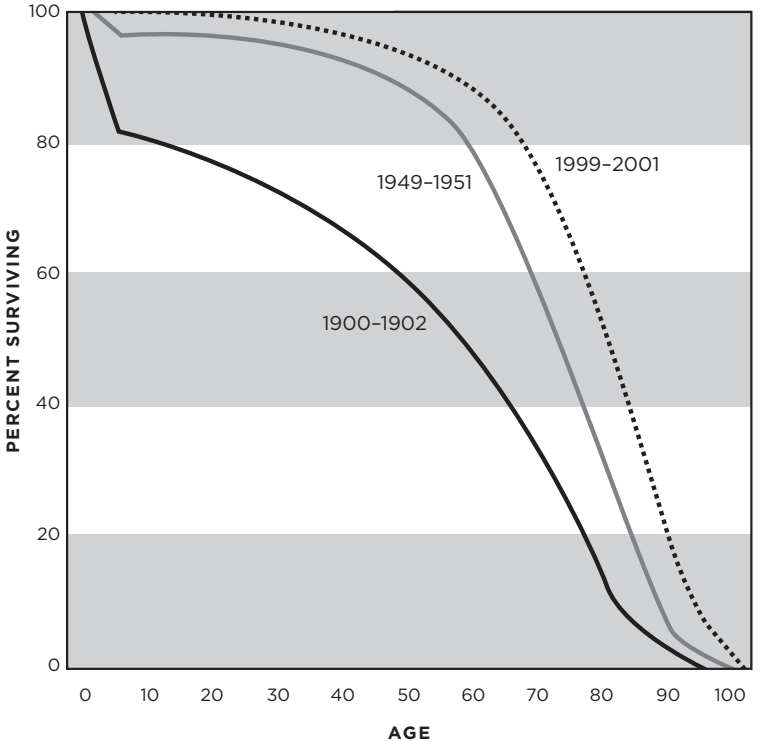

Figure 1. Changes in U.S. longevity rates during the twentieth century. The survival curves over the twentieth century have become increasingly rectangular. This trend is obvious and dramatic prior to 1950. More and more, we are likely to become octogenarians, at which point the curves are increasingly vertical. (U.S. Public Health Service, *National Vital Statistic Reports*, vol. 57, no. 1, August 5, 2008)

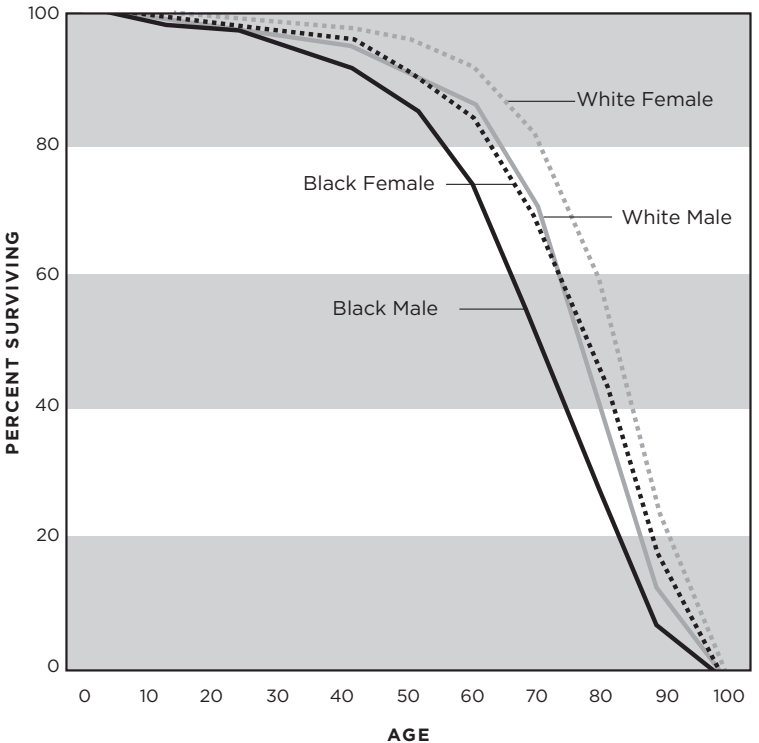

Figure 2. Gender and racial disparities in U.S. longevity rates. The analysis of the 1999–2001 data illustrated in Figure 1 discerns impressive gender and racial disparities, illustrated here. (U.S. Public Health Service, *National Vital Statistic Reports*, vol. 57, no. 1, August 5, 2008)

TABLE 1

Canadian Data on All-Cause Mortality as a Function of BMI

BMI	Adjusted Relative Risk (95% Confidence Interval)
<18.5	1.89 (1.36–2.64)
18.5 to <20.0	1.23 (0.86–1.76)
20.0 to <22.5	1.18 (0.98–1.44)
22.5 to <25.0	1.00
25.0 to <27.5	0.93 (0.77–1.12)
27.5 to <30.0	0.87 (0.69–1.10)
30.0 to <32.5	1.08 (0.80–1.85)
32.5 to <35.0	0.92 (0.67–1.26)
35 or greater	148 (1.06–2.06)

TABLE 2

Excess Deaths as a Percentage of All Deaths (95% Confidence Interval) Based on the Combined NHANES I, II, and III Data Sets

Causes of Death	Underweight (BMI <18.5)	Normal (BMI 18.5 to <25)	Overweight (BMI 25 to <30)	Obese (BMI ≥30)
Balanced Follow-up				
CVD*	1.0 (0.0–2.0)	0 (Reference)	−2.0 (−5.9–1.9)	9.4 (6.0–12.9)
Cancer	0.8 (−0.4–1.9)	0 (Reference)	−2.5 (−8.1–3.1)	2.7 (−2.5–7.9)
Other	3.6 (1.9–5.4)	0 (Reference)	−11.8 (−16.3–7.3)	−0.1 (−4.5–4.4)
Total Followup				
CVD	0.5 (−0.2–1.1)	0 (Reference)	2.4 (−0.7–5.5)	13.1 (10.2–15.9)
Cancer	0.3 (−0.4–1.0)	0 (Reference)	1.2 (−3.3–5.8)	2.8 (−1.4–7.0)
Other	2.6 (1.3–3.8)	0 (Reference)	−7.6 (−11.0–4.1)	3.9 (−0.1–7.9)

*CVD = Cardiovascular causes of death

Source: Table adapted from K. M. Flegal, B. I. Graubard, D. F. Williamson, and M. H. Gail, Cause-specific excess deaths associated with underweight, overweight, and obesity, *Journal of the American Medical Association* 2007; 298: 2028–37.

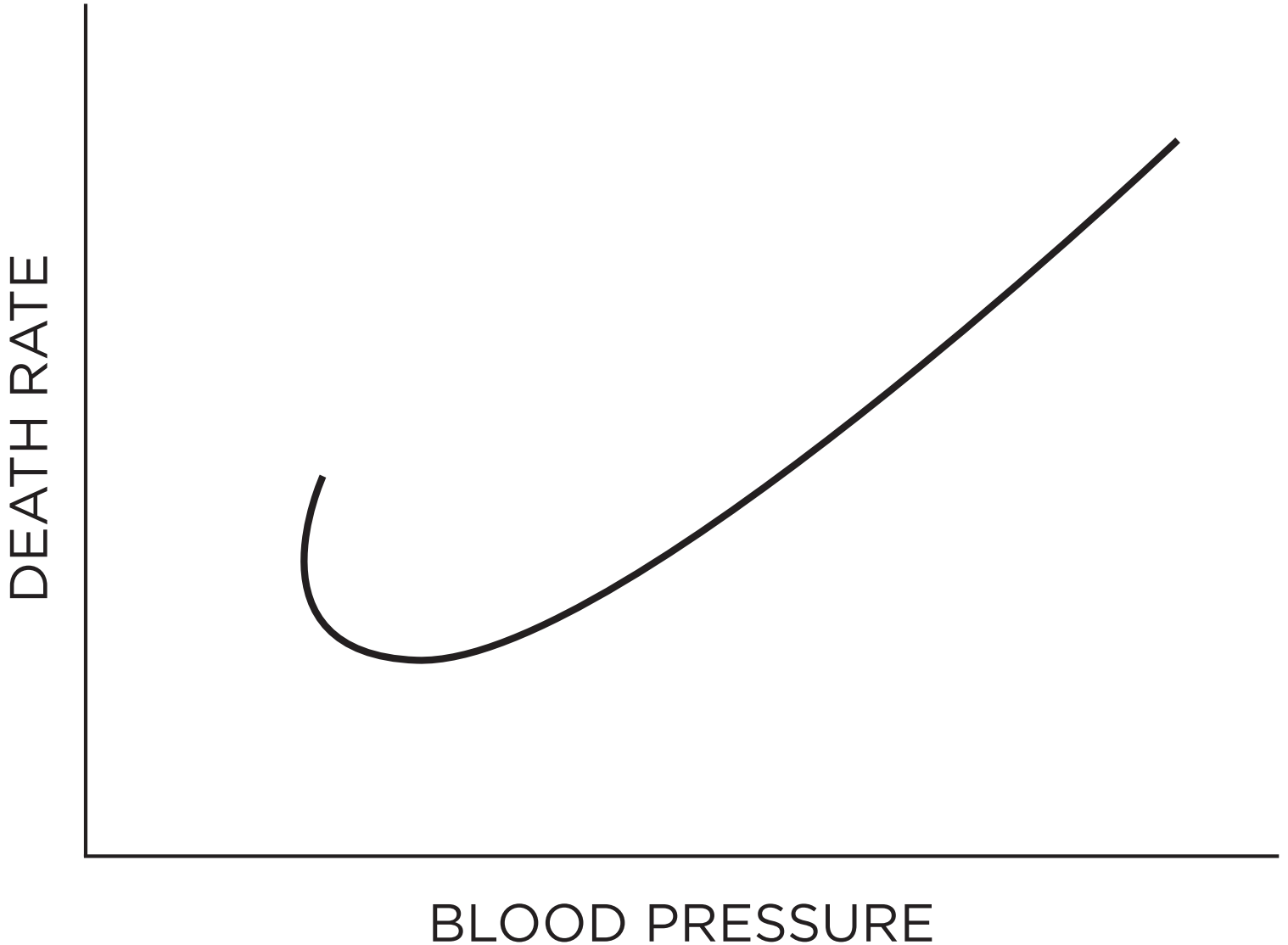
DEATH RATE
BLOOD PRESSURE

TABLE 3

Risks and Benefits of Mammography Screening

Benefit: Chance of Dying from Breast Cancer	
No screening	5.3/1,000
Screening	4.6/1,000
Harms of Screening:	
False positive requiring biopsy	50–200/1,000
Overdiagnosis	1–7/1,000

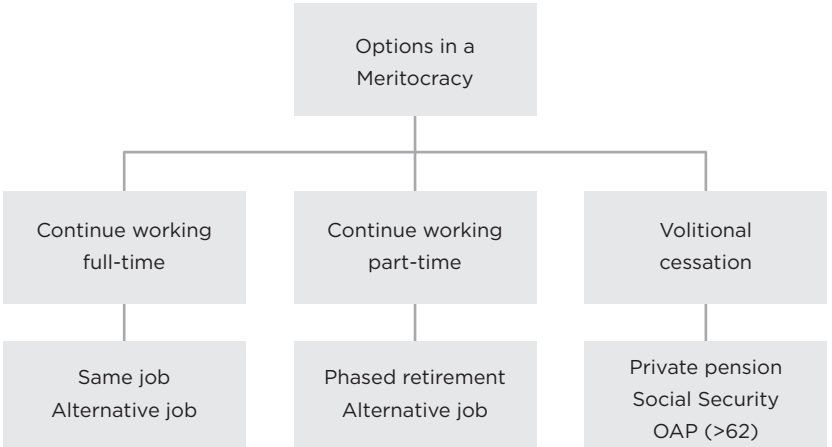

Figure 3. Options for the aged worker in a meritocracy.

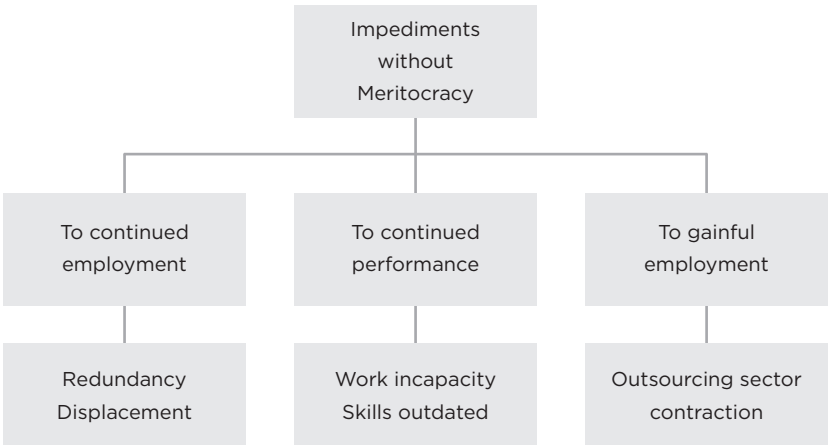

Figure 4. Impediments for the aged worker without a meritocracy.

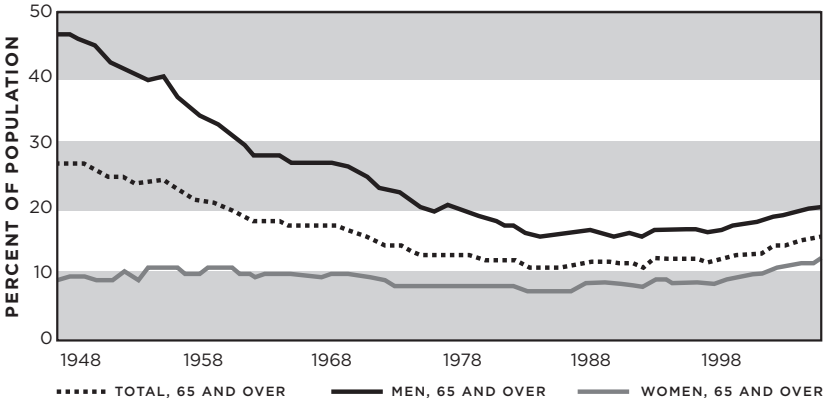

Figure 5. Labor force participation rate of workers age sixty-five and over, 1948–2007. The trend toward maintaining gainful employment after age sixty-five started to escalate before the recession of 2008. There is no doubt that the need to maintain gainful employment has been escalating ever since. We will learn before long whether the availability of employment is keeping pace and whether the employment options are sustaining. (Source: U.S. Bureau of Labor Statistics)

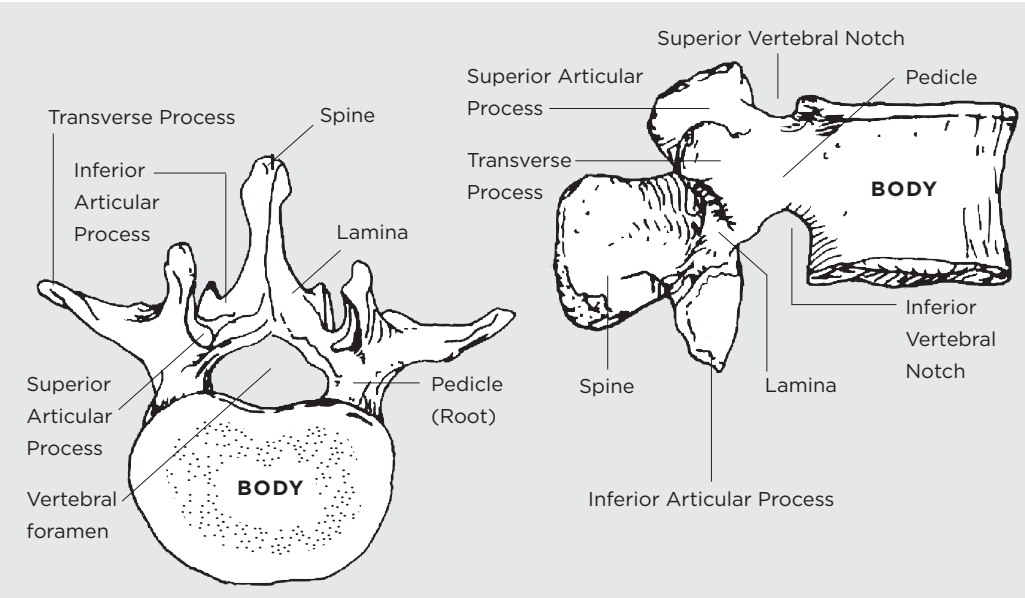

Figure 6. These diagrams offer some of the anatomical detail that underlies Mrs. K.'s fragility fracture. The perspective in the left-hand drawing is looking down the spine from the skull at a vertebra. The spinal canal (vertebral foramen) is obvious, as are the structures that delineate this space. The vertebral bodies and the discs between them are the floor of the canal, the pedicles are the walls, and the posterior elements are the roof.

The diagram on the right correlates with Frame B of Figure 7, the side view. You can see the spine, or spinous process, of the spine protruding back from the posterior elements. You can also see structures in the posterior elements protruding up, toward the head, and down to form joints with the adjacent vertebrae that allow motion and contribute to the stability of the spinal column.

However, the weight-bearing function of the spine largely belongs to the column of vertebral bodies and the discs between them. The vertebral body is bone. The outer rim is dense bone; the center is a filigree of bone. As we age, the depth of the rim tends to shrink. However, more dramatically, the lacework that makes up the filigree in the center becomes composed less and less of bone, with each element itself growing thinner. The vertebral body becomes more fragile, with a tendency to collapse in the center, taking on the shape of the vertebral bodies of many fish; or it may collapse opposite the spinous process, taking on a wedge shape.

TABLE 4

Principal Results of the Australian Randomized Sham-Controlled Trial of Vertebroplasty (All Figures Percentages)

	ONE WEEK		ONE MONTH	
Perceived Pain	**Vertebroplasty**	**Sham**	**Vertebroplasty**	**Sham**
Better	16	35	34	24
No change	70	62	60	53
Worse	14	3	6	24

Mrs. K. was one of about a third of patients who are helped by undergoing a "procedure" rather than from vertebroplasty.

Source: R. Buchbinder, R. H. Osborne, P. R. Ebeling, et al., A randomized trial of vertebroplasty for painful osteoporotic vertebral fractures, *New England Journal of Medicine* 2009; 361: 557–68.

TABLE 5

Principal Results of the HORIZON Trial of Zoledronic Acid

Outcome	Zoledronic Acid (%)	Placebo (%)	Relative Risk Reduction (%)	Number Needed to Treat to Help One Person
Vertebral fracture	3.3	11	70	14
Hip fracture	1.4	2.5	41	98
Nonvertebral fracture	8.0	11	25	38
Any clinical fracture	8.4	14	33	24
Stroke	2.3	2.3	1.4	—
			Relative Risk Increase (%)	**Number Needed to Treat to Harm One Person**
Any adverse event	95.5	93.9	1.7	62
Serious atrial fibrillation	1.3	0.5	149	129

TABLE 6

Meta-Analysis of Trials of Vitamin D Supplementation to Prevent Fragility Fractures in Well People over Age Sixty-Five

VITAMIN D DOSE 340–380 IU/DAY
DURATION OF OBSERVATION 24–62 MONTHS

Number of Subjects	Rate of Nonvertebral Fractures (D v. Placebo)	Rate of Hip Fractures (D v. Placebo)	Relative Risk Reduction	Number Needed to Treat to Spare One an Event
9,014	12% 12%		2%	Not significant
9,014		4.5% 4.1%	9%	Not significant

VITAMIN D DOSE 482–770 IU/DAY
DURATION OF OBSERVATION 12–84 MONTHS

Number of Subjects	Rate of Nonvertebral Fractures (D v. Placebo)	Rate of Hip Fractures (D v. Placebo)	Relative Risk Reduction	Number Needed to Treat to Spare One an Event
33,265	4.4% 5.5%		20%	93
31,872		2.7% 3.2%	18%	168

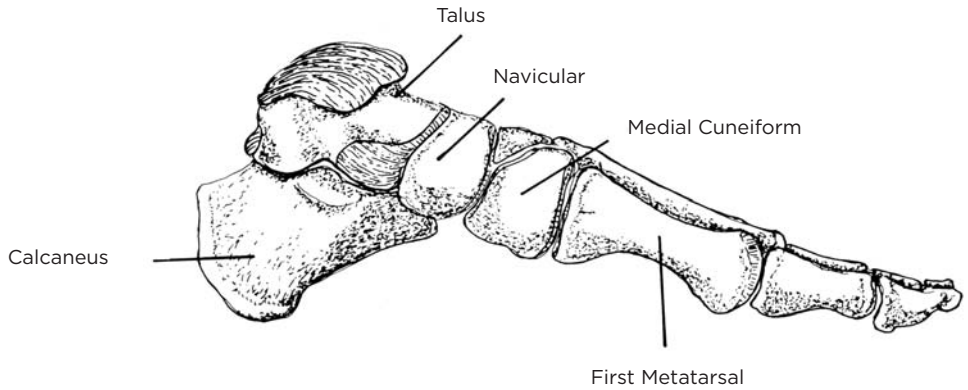

Figure 10. The big toe joint at the base of the first metatarsal bone is the first metatarsophalangeal (MTP) joint. A "bunion" is a severely osteoarthritic first MTP: the cartilage is lost; spurs form, most prominently at the inner margins of the joint; and the joint loses stability. Given the forces involved in gait, the big toe (the hallux) is pushed toward the outside (valgus), which makes the spurs more prominent and creates the hallux valgus, or bunion, deformity.

TABLE 7

Influence of APOE ε4 on the Likelihood of Progression from Minimal Cognitive Impairment to "Possible" or "Probable" Alzheimer's Disease in the Alzheimer's Disease Cooperative Study Group Trial

Volunteers	Number	Number That Progressed (%)
Total	769	212 (28)
APOE ε4 carrier	426	161 (38)
APOE ε4 absent	345	51 (15)

TABLE 8

Average Improvement in Survival from Diagnosis of Metastatic Disease through Standard Chemotherapeutic Treatments

Cancer	Standard Chemotherapeutic Treatments	Average Improvement in Survival from Diagnosis of Metastatic Disease
Lung (Non-small-cell)	First-line	About 3 months
	Second-line	About 2 months
	Second- or third-line	About 2 months
	Third- or fourth-line	<2% respond at all
Breast	Any and all treatments	Average survival has improved but drugs cannot account for this based on randomized controlled trials
Colon	Any and all treatments	From 9 to 22 months with new drugs
Prostate	First-line	About 2 months
	Second-line	No improvement in survival

TABLE 9

Disposition of Patients over Age Sixty-Five Who Were Admitted to Intensive Care Units in 2006

Patients	Number Admitted	Discharged Home (%)	Discharged to Skilled Nursing Facility (%)	Discharged to Long-Term Acute Care (%)	Died (%)
All	1,637,581	57.7	24.6	2.5	15.3
Ventilated	227,152	20.6	25.1	8.7	45.7