Chronic kidney disease and the aging population

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"Youth, which is forgiven everything, forgives itself nothing: age, which forgives itself everything, is forgiven nothing."
George Bernard Shaw

The proportion of older people in the general population is steadily increasing worldwide, with the most rapid growth in low- and middle-income countries.[1] This demographic change is to be celebrated, because it is the consequence of socioeconomic development and better life expectancy. However, population aging also has important implications for society, in diverse areas including health systems, labor markets, public policy, social programs, and family dynamics.[2] A successful response to the aging population will require capitalizing on the opportunities that this transition offers, as well as effectively addressing its challenges.

Chronic kidney disease (CKD) is an important public health problem that is characterized by poor health outcomes and very high healthcare costs. CKD is a major risk multiplier in patients with diabetes, hypertension, heart disease, and stroke, all of which are key causes of death and disability in older people.[3] Since the prevalence of CKD is higher in older people, the health impact of population aging will depend in part on how the kidney community responds.

13 March 2014 will mark the celebration of the ninth World Kidney Day (WKD), an annual event jointly sponsored by the International Society of Nephrology and the International Federation of Kidney Foundations. Since its inception in 2006, WKD has become the most successful effort to raise awareness among policymakers and the general public about the importance of kidney disease. The topic for WKD 2014 is CKD in older people. This article reviews the key links between kidney function, age, health, and illness and discusses the implications of the aging population for the care of people with CKD.

Epidemiology of aging

The key drivers of population aging are socioeconomic development and increasing prosperity, which result in lower perinatal, infant, and childhood mortality; lower risk of death in early adulthood due to accidents and unsafe living conditions; and improving survival of middle-aged and older people with chronic disease. The resulting increases in life expectancy (together with the lower birth rates that typically accompany socioeconomic development) mean that older people account for a larger proportion of the general population.[1] The extent of the resulting changes in population characteristics can be startling, especially for developing countries (Figure 1).

In contrast to the situation even two generations ago, people can expect to live for many years after the usual retirement age. For example, men and women aged 65 years in the United Kingdom in 2030 can expect to live until age 88 and 91 years, respectively.[4] Predicted life expectancy for today's children is controversial, but experts estimate that 50% of UK children born in 2007 will live to at least 103 years.[4] Although it is clear that people are living longer, it is uncertain how much of the increased life expectancy will translate into years of good health. These demographic changes have dramatic potential implications for conditions such as CKD, whose prevalence increases with age.

CKD is common in older people and its prevalence increases in parallel with age

It has been known for decades that estimated glomerular filtration rate (eGFR) declines in parallel with age.[5] The prevalence of CKD among females in the Chinese general population increases from 7.4% among those aged 18–39 years to 18.0% and 24.2% among those aged 60–69 and 70 years, respectively.[6] Relative increases in the prevalence of CKD with age are equally striking for populations in the United States, Canada, and Europe,[7–9] although there are between-country differences in the absolute prevalence.

At older ages, an increased proportion of prevalent CKD cases has low eGFR alone (as compared

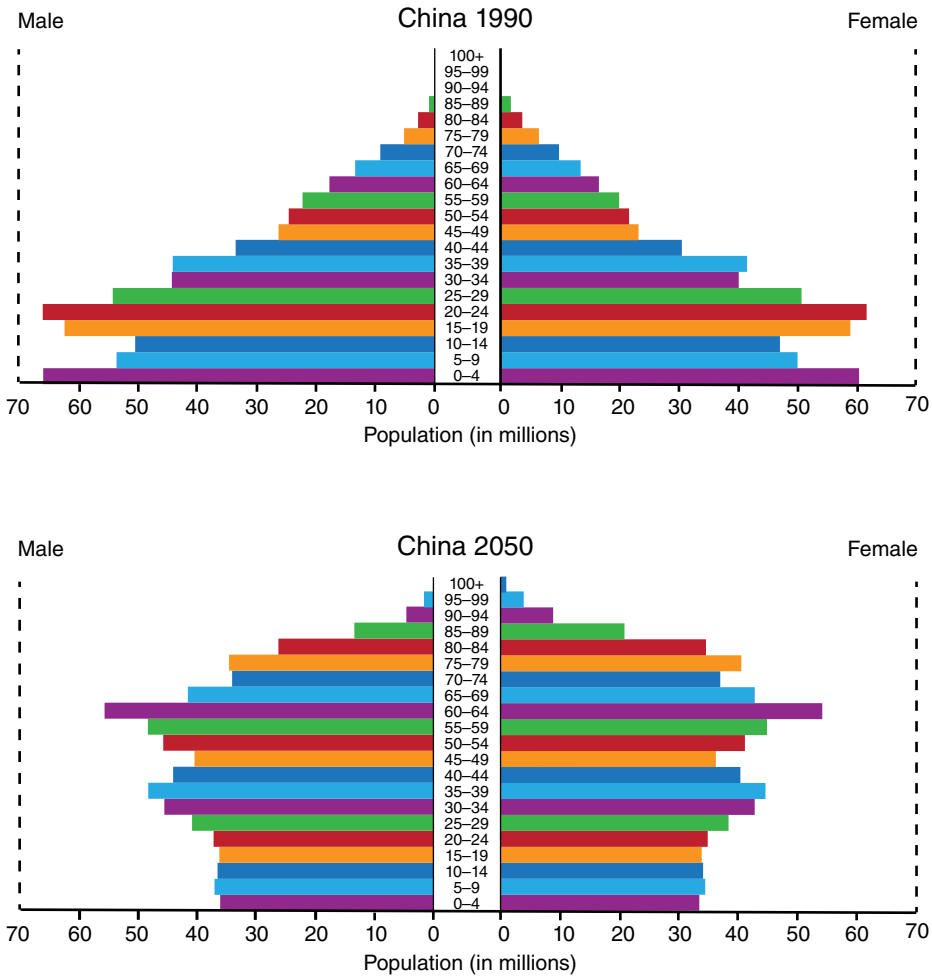

Figure 1 | Changing age distribution in the general population of China, 1990–2050.

with albuminuria alone, or both low eGFR and albuminuria).[10] Although this might suggest that many older people with CKD can expect lower rates of kidney function loss, available data are inconclusive, and current knowledge does not allow clinicians to reliably distinguish between those whose CKD will and will not progress.

As for other age groups, the incidence of dialysis-dependent kidney failure has steadily increased among older people over the past few decades: in the United States, a 57% age-adjusted increase in the number of incident octogenarians and nonagenarians was noted between 1996 and 2003 alone.[11] Despite this increase, patients aged >80 years are still less likely to initiate dialysis than those aged 75–79 years, although a large recent study suggested that the risk of developing very low eGFR (<15 ml/min/1.73 m^2) is similar for older and younger adults.[12] It is uncertain whether this discrepancy is due to between-age differences in the true rate of progressive kidney function loss, the risk of death due to competing causes, patient views about dialysis, or physician practices.[12,13] Regardless of the explanation, the aging population will likely lead to continued increases in the number of older people with severe CKD.

CKD is harmful but treatable if patients at risk are identified

Like younger people, older people with advanced CKD are at increased risk of death, kidney failure, myocardial infarction, and stroke compared with otherwise similar people with normal or mildly reduced eGFR.[14,15] Although death is by far the most common of these adverse outcomes, this does not mean that older patients with clinically relevant CKD cannot benefit from timely specialist referral.

With appropriate management, patients with advanced CKD (regardless of age) may benefit from slower loss of kidney function (potentially preventing kidney failure), better control of metabolic consequences such as acidosis, anemia, and hyperphosphatemia, lower risk of cardiovascular events, and (for those who are interested in renal