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**Abstract**

The authors calculate that some 125,000 nuclear warheads have been built since 1945, about 97 percent of them by the United States and the Soviet Union and Russia. The nine nations with nuclear weapons now possess more than 10,000 nuclear warheads in their military stockpiles, the authors estimate, with several thousand additional US and Russian retired warheads in storage, awaiting dismantlement. The nuclear stockpiles of China, as well as Pakistan, India, Israel, and North Korea, are minuscule in comparison with the US and Russian arsenals, but more difficult to estimate. Still, the authors believe that China's nuclear weapons stockpile has surpassed Great Britain's. Although the total number of nuclear warheads in the world is decreasing because of US and Russian reductions, all the nations with nuclear weapons continue to modernize or upgrade their nuclear arsenals.

**Keywords**

nuclear arsenals, nuclear inventories, nuclear stockpiles, nuclear weapons, warheads

Excessive secrecy prevents the public from knowing the exact number of nuclear weapons in the world. Although the United States, Russia, Britain, and France have taken steps to increase the transparency of their nuclear stockpiles—both past and present—China, Pakistan, India, Israel, and North Korea continue to refuse to provide basic information about their arsenals. Moreover, an unfortunate new trend is emerging, in that countries that previously provided estimates of the other nations' nuclear forces have curtailed their release of such information. Secrecy creates uncertainty, mistrust, and misunderstandings. Increased transparency would alleviate this potentially dangerous situation.

We estimate that, combined, the nine nations with nuclear weapons possess more than 10,000 nuclear warheads in their military stockpiles. In addition, several thousand US and Russian retired (but still intact) warheads are in storage, awaiting dismantlement. If the military stockpiles and the retired warheads are counted together, we estimate that the worldwide inventory includes more than 17,000 warheads. The overwhelming portion of that inventory consists of US and Russian warheads, which account for more than 90 percent of all warheads in the world.

Approximately 4,400 warheads—nearly half of all stockpiled warheads—are deployed on missiles or at bases with operational launchers. Of these, we estimate that roughly 1,800 US and Russian warheads are on high alert atop long-range ballistic missiles that are ready to launch 5 to 15 minutes after receiving an order.

Overall, today's warhead inventories are considerably lower than the Cold War peak of more than 70,000 warheads in the mid-1980s, but the level is still high, considering that the Cold War ended more than 20 years ago. The United States and Russia continue to retain nuclear arsenals that are 10 to 20 times greater than any other state's. If the trend over time is followed, the US and Russian arsenals (and to a lesser extent those of France and Britain) will continue to decline, but at a slower pace than during the past two decades.

As for China, Pakistan, India, Israel, and North Korea, these nations have nuclear stockpiles that are minuscule in comparison with those of Russia and the United States, but more difficult to estimate. Even so, all of these countries (with the possible exception of North Korea) have sufficient numbers of warheads and delivery systems to inflict enormous destruction over significant ranges with catastrophic humanitarian and climatic consequences in their regions and beyond.

Moreover, in contrast with the United States, Russia, France, and Great Britain, the stockpiles of China, Pakistan, India, and possibly of Israel and North Korea, are likely to increase, although at a much slower pace than prevailed during the US–Soviet arms race of the Cold War. It is uncertain how quickly and by how much these countries intend to increase their stockpiles, but none of them is likely to reach parity with US and Russian stockpile levels for the next several decades—even with additional arms reduction agreements between Washington and Moscow.

Still, we estimate that China's nuclear weapons stockpile has surpassed Great Britain's and could possibly approach the size of the French stockpile by the end of the decade, depending on how many new nuclear submarines and

**Figure 1.** Estimated worldwide nuclear warheads, 2013

| COUNTRY | DEPLOYED WARHEADS[a] | STOCKPILED WARHEADS | RETIRED WARHEADS | TOTAL INVENTORY |
|---|---|---|---|---|
| United States | 2,150[b] | 4,650 | ~3,000 | ~7,700 |
| Russia | 1,800 | 4,480 | ~4,000 | ~8,500 |
| United Kingdom | 160[c] | 225 | – | 225 |
| France | 290[d] | 300 | – | 300 |
| China | – | 250 | few | 250 |
| India | – | 110 | – | 110 |
| Pakistan | – | 120 | – | 120 |
| Israel | – | 80 | – | 80 |
| North Korea | – | n/a | – | n/a |
| **TOTAL** | **~4,400** | **~10,200** | **~7,000** | **~17,200** |

a Deployed warheads are defined as warheads that are on missiles or at bases with operational launchers.
b This includes nearly 200 non-strategic bombs deployed in Europe.
c Of these 160 "operationally available" warheads, 48 are normally deployed on one nuclear submarine at sea.
d Of these, one or two submarines with about 80 warheads are normally deployed at sea.

intercontinental ballistic missiles (ICBMs) China produces and deploys. Similarly, at their current pace, we estimate that the size of the Pakistani and Indian stockpiles could surpass Britain's by the mid-2020s, especially because Britain has declared it will continue to decrease its stockpile.

One factor could significantly influence these trends: a decision by China and India to equip some of their ballistic missiles with multiple independently targetable reentry vehicles (MIRVs). Indian officials have already said that a new ICBM their country is developing will be capable of carrying multiple warheads. This development, combined with increased US missile defense capabilities in the Pacific region, could motivate China to deploy MIRV-capable missiles as well.

Such moves could set off an increased and more intense nuclear arms race in Asia. The United States, Russia, and the international arms control community should discourage this competition by significantly curtailing their own MIRVed weapon systems and ballistic missile defense programs.

We calculate that more than 125,000 nuclear warheads have been built since 1945, with 53 percent of those weapons belonging to the United States, 44 percent to the Soviet Union and Russia—and only 3 percent to the other seven countries with nuclear arsenals. After peaking in 1986, global nuclear weapon levels have declined, as illustrated in Figure 2.

Since the end of the Cold War, more and more warheads in the US and Russian stockpiles have been moved from operational status to various reserve, inactive, or contingency categories. Traditionally, arms control agreements have not only failed to require the destruction of warheads, but have also ignored both nonstrategic and non-deployed warheads. The recently renegotiated and signed Strategic Arms Reduction Treaty (New START) continues this trend, although the US government has pledged that a possible future agreement with Russia should include non-deployed and nonstrategic weapons.

Although the total number of nuclear warheads in the world is decreasing due mainly to US and Russian reductions, this trend obscures two facts: All the nations with nuclear weapons continue to modernize or upgrade their nuclear arsenals, and nuclear weapons remain integral to their conception of national security. Brief summaries follow for those nine nations.

## United States

The United States possesses an estimated 7,700 intact warheads. This includes approximately 4,650 warheads in the Pentagon's stockpile: 2,150 of these weapons are considered deployed on missiles or bases with operational launchers; the other 2,500 are spares centrally stored in reserve. We estimate that the Energy Department stores approximately 3,000 intact but retired warheads that are slated for dismantlement by 2022 at the Pantex Plant near Amarillo, Texas.

Of the more than 66,500 warheads that the United States has produced since 1945, almost 59,000 have been disassembled, more than 13,000 of these since 1990. The United States has retained nearly 20,000 plutonium cores (pits) from the warheads it dismantled, storing them in igloos at the Pantex Plant in Texas. The United States also stores some 5,000 canned subassemblies (secondaries from

**Figure 2.** Global nuclear weapons stockpiles, 1945–2013

| YEAR | UNITED STATES* | RUSSIA* | UNITED KINGDOM | FRANCE | CHINA | ISRAEL | INDIA | PAKISTAN | NORTH KOREA | TOTAL* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1945 | 2 | | | | | | | | | 2 |
| 1946 | 9 | | | | | | | | | 9 |
| 1947 | 13 | | | | | | | | | 13 |
| 1948 | 50 | | | | | | | | | 50 |
| 1949 | 170 | 1 | | | | | | | | 171 |
| 1950 | 299 | 5 | | | | | | | | 304 |
| 1951 | 438 | 25 | | | | | | | | 463 |
| 1952 | 841 | 50 | | | | | | | | 891 |
| 1953 | 1,169 | 120 | 1 | | | | | | | 1,290 |
| 1954 | 1,703 | 150 | 5 | | | | | | | 1,858 |
| 1955 | 2,422 | 200 | 10 | | | | | | | 2,632 |
| 1956 | 3,692 | 426 | 50 | | | | | | | 4,168 |
| 1957 | 5,543 | 660 | 58 | | | | | | | 6,261 |
| 1958 | 7,345 | 863 | 60 | | | | | | | 8,268 |
| 1959 | 12,298 | 1,048 | 78 | | | | | | | 13,424 |
| 1960 | 18,638 | 1,627 | 105 | | | | | | | 20,370 |
| 1961 | 22,229 | 2,492 | 155 | | | | | | | 24,876 |
| 1962 | 25,540 | 3,346 | 211 | | | | | | | 29,097 |
| 1963 | 28,133 | 4,259 | 256 | | | | | | | 32,648 |
| 1964 | 29,463 | 5,242 | 271 | 4 | 1 | | | | | 34,981 |
| 1965 | 31,139 | 6,144 | 271 | 32 | 5 | | | | | 37,591 |
| 1966 | 31,175 | 7,091 | 281 | 36 | 20 | | | | | 38,603 |
| 1967 | 31,255 | 8,400 | 355 | 36 | 25 | 2 | | | | 40,073 |
| 1968 | 29,561 | 9,490 | 317 | 36 | 35 | 4 | | | | 39,443 |
| 1969 | 27,552 | 10,671 | 306 | 36 | 50 | 6 | | | | 38,621 |
| 1970 | 26,008 | 11,736 | 375 | 36 | 75 | 8 | | | | 38,238 |
| 1971 | 25,830 | 13,279 | 412 | 45 | 100 | 11 | | | | 39,677 |
| 1972 | 26,516 | 14,600 | 423 | 70 | 130 | 13 | | | | 41,752 |
| 1973 | 27,835 | 15,878 | 500 | 116 | 150 | 15 | | | | 44,494 |
| 1974 | 28,537 | 17,286 | 500 | 145 | 170 | 17 | a | | | 46,655 |
| 1975 | 27,519 | 19,235 | 500 | 188 | 180 | 20 | | | | 47,642 |
| 1976 | 25,914 | 22,165 | 500 | 212 | 180 | 22 | | | | 48,993 |
| 1977 | 25,542 | 24,281 | 500 | 228 | 180 | 24 | | | | 50,755 |
| 1978 | 24,418 | 26,169 | 500 | 235 | 190 | 26 | | | | 51,538 |
| 1979 | 24,138 | 28,258 | 500 | 235 | 195 | 29 | | | | 53,355 |
| 1980 | 24,104 | 30,665 | 500 | 250 | 205 | 31 | | | | 55,755 |
| 1981 | 23,208 | 32,146 | 500 | 274 | 210 | 33 | | | | 56,371 |
| 1982 | 22,886 | 33,486 | 385 | 274 | 216 | 35 | | | | 57,282 |
| 1983 | 23,305 | 35,130 | 380 | 279 | 218 | 38 | | | | 59,350 |
| 1984 | 23,459 | 36,825 | 350 | 280 | 220 | 40 | | | | 61,174 |
| 1985 | 23,368 | 38,582 | 350 | 360 | 222 | 42 | | | | 62,924 |
| 1986 | 23,317 | 40,159 | 350 | 355 | 224 | 44 | | | | 64,449 |
| 1987 | 23,575 | 38,107 | 350 | 420 | 226 | 47 | | | | 62,725 |
| 1988 | 23,205 | 36,538 | 350 | 410 | 228 | 49 | | | | 60,780 |
| 1989 | 22,217 | 35,078 | 350 | 410 | 230 | 51 | | | | 58,336 |
| 1990 | 21,392 | 32,980 | 350 | 505 | 232 | 53 | | | | 55,512 |
| 1991 | 19,008 | 29,154 | 350 | 540 | 234 | 56 | | | | 49,342 |
| 1992 | 13,708 | 26,734 | 250 | 540 | 234 | 58 | | | | 41,524 |
| 1993 | 11,511 | 24,403 | 250 | 525 | 234 | 60 | | | | 36,983 |
| 1994 | 10,979 | 21,339 | 250 | 510 | 234 | 62 | | | | 33,374 |
| 1995 | 10,904 | 18,179 | 234 | 500 | 234 | 63 | | | | 30,114 |
| 1996 | 11,011 | 15,942 | 203 | 450 | 234 | 64 | | | | 27,904 |
| 1997 | 10,903 | 15,442 | 203 | 450 | 232 | 66 | | | | 27,296 |
| 1998 | 10,732 | 14,368 | 240 | 450 | 232 | 68 | 3 | 2 | | 26,095 |
| 1999 | 10,685 | 13,188 | 240 | 450 | 232 | 70 | 8 | 8 | | 24,881 |
| 2000 | 10,577 | 12,188 | 280 | 470 | 232 | 72 | 13 | 14 | | 23,846 |
| 2001 | 10,526 | 11,152 | 280 | 350 | 235 | 74 | 18 | 20 | | 22,655 |
| 2002 | 10,457 | 10,114 | 280 | 350 | 235 | 76 | 23 | 26 | | 21,561 |
| 2003 | 10,027 | 9,076 | 280 | 350 | 235 | 78 | 28 | 32 | | 20,106 |
| 2004 | 8,570 | 8,038 | 280 | 350 | 235 | 80 | 33 | 38 | | 17,624 |
| 2005 | 8,360 | 7,000 | 280 | 350 | 235 | 80 | 38 | 44 | | 16,387 |
| 2006 | 7,853 | 6,643 | 225 | 350 | 235 | 80 | 43 | 50 | b | 15,479 |
| 2007 | 5,709 | 6,286 | 225 | 350 | 235 | 80 | 50 | 60 | | 12,995 |
| 2008 | 5,273 | 5,929 | 225 | 300 | 235 | 80 | 60 | 70 | | 12,172 |
| 2009 | 5,113 | 5,527 | 225 | 300 | 240 | 80 | 70 | 80 | b | 11,635 |
| 2010 | 4,950 | 5,215 | 225 | 300 | 240 | 80 | 80 | 90 | | 11,180 |
| 2011 | 4,763 | 4,858 | 225 | 300 | 240 | 80 | 90 | 100 | | 10,656 |
| 2012 | 4,680 | 4,500 | 225 | 300 | 240 | 80 | 100 | 110 | | 10,235 |
| 2013 | 4,650* | 4,480* | 225 | 300 | 250 | 80 | 110 | 120 | b | 10,215* |

* In addition to the stockpiled warheads listed in the US and Russian columns, the two countries each have several thousand retired but still intact warheads in storage awaiting dismantlement. If those warheads are included in the count, the total worldwide inventory is more than 17,000 warheads.

a India conducted a nuclear test in 1974.

b North Korea conducted nuclear tests in 2006, 2009, and 2013, but there is no public evidence that it has yet developed a stockpile of deliverable warheads.

thermonuclear warheads) at the Y-12 facility in Oak Ridge, Tennessee.

The United States is modifying existing warheads under so-called life extension programs, and plans production of so-called interoperable warhead designs that are not in the current stockpile.[1]

## Russia

Russia has released very little information about the size of its stockpile, but based on statements from Russian officials and US assessments, we estimate that Russia currently has approximately 8,500 intact warheads. Of these, about 4,480 are in the military stockpile, with the remaining 4,000 retired warheads awaiting dismantlement. We estimate that since 1949, the Soviet Union and Russia have produced some 55,000 nuclear warheads.

Russia is in the middle of a major transformation of its nuclear posture involving the phasing out of Soviet-era missiles and submarines and the deployment of newer, but fewer, weapons to replace them. To keep some degree of parity with the larger US missile force, Russia is deploying more warheads on each of its missiles.[2]

## Britain

The current nuclear stockpile in Britain consists of about 225 warheads for delivery by Trident II submarine-launched ballistic missiles (SLBMs) aboard Vanguard-class nuclear-powered ballistic missile submarines. According to the British government, "fewer than 160" of the warheads are operationally available, and one submarine with "up to 48 warheads" is on patrol at any given time. A decision about building a replacement class of nuclear submarine is expected in the near future.

By the mid-2020s, Britain plans to reduce its stockpile to approximately 180 warheads, of which 120 will be operationally available, and 40 deployed.

New information demonstrates that the British arsenal peaked in the 1970s at approximately 500 warheads, significantly higher than previously estimated. This new information leads us to estimate that Britain has produced approximately 1,250 warheads since 1953.[3]

## France

There are approximately 300 warheads in France's nuclear stockpile, down from some 540 in 1992. In March 2008, President Nicolas Sarkozy announced that the French arsenal would be reduced to slightly fewer than 300 warheads. We estimate that France has produced more than 1,260 nuclear warheads since 1964.

France has completed deployment of the ASMP-A (Air-Sol Moyenne Portée-A) cruise missile on Mirage 2000N and Rafale fighter-bombers and has begun deployment of the M51 SLBM with a modified warhead on Triumphant-class submarines.

## China

We estimate that China has an arsenal of roughly 250 nuclear warheads and that it has produced approximately 610 nuclear warheads since becoming a nuclear power in 1964. China's warheads arm several new mobile solid-fueled missiles that are being introduced to replace old liquid-fueled ballistic missiles that are being phased out. We also estimate that China has a small inventory of air-delivered nuclear bombs. Production is probably

under way of new warheads for missiles intended to arm the new Jin-class submarine. Chinese warheads are believed to be stored in central storage facilities and not mated with launchers.[4]

The US intelligence community predicts that China will increase its total number of warheads on long-range ballistic missiles from about 50 to well in excess of 100 in the next 15 years, although this prediction has been sliding since 2001.

## India and Pakistan

Neither India nor Pakistan has released official information regarding the size of its nuclear arsenal. Pakistan is estimated to have produced 100 to 120 warheads and fissile material for more. India is estimated to have produced 90 to 110 warheads and is planning to increase its fissile material production capacity. The Indian and Pakistani warheads are not thought to be operationally deployed but in central storage. The two countries are in an arms race to deploy new weapon types and are believed to be increasing their stockpiles.[5]

## Israel

In keeping with its policy of nuclear opacity, Israel has neither confirmed nor denied possession of nuclear weapons; however, the US Defense Intelligence Agency (DIA) concluded in 1999 that Israel had produced approximately 80 warheads. The DIA projected that Israel's nuclear stockpile would only modestly increase by 2020 (Federation of American Scientists, 2007).[6] There are rumors that Israel is equipping some of its submarines with nuclear-capable cruise missiles. Israel is estimated to have produced fissile material sufficient for 115 to 190 warheads.

## North Korea

Despite three nuclear tests and production of enough plutonium for 8 to 12 nuclear bombs, North Korea has yet to demonstrate that it has operationalized any weapons. It is the conclusion of the US intelligence community that despite its efforts, "North Korea has not, however, fully developed, tested, or demonstrated the full range of capabilities necessary for a nuclear-armed missile" (Clapper, 2013: 7).

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### Notes

1. For more on the US arsenal, see Kristensen and Norris (2013a).
2. For details about the Russian nuclear arsenal, see Kristensen and Norris (2013b).
3. For more information about the British nuclear arsenal and history, see Norris and Kristensen (2013).
4. For an overview of Chinese nuclear force developments, see Kristensen and Norris (2011a).
5. For details about Indian nuclear forces, see Kristensen and Norris (2012). For Pakistani nuclear forces, see Kristensen and Norris (2011b).
6. The DIA's 1999 report, "A Primer on the Future Threat, the Decades Ahead: 1999–2020," was first reported by Rowan Scarborough in his book *Rumsfeld's War: The Untold Story of America's Anti-Terrorist Commander* (Regnery, 2004). This work is cited by the Federation of American Scientists in the assessment of Israeli nuclear weapons available at www.fas.org/nuke/guide/israel/nuke/.

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