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Global nuclear weapons inventories, 1945–2010

As Russia and the United States continue to reduce their Cold War arsenals, global inventories of nuclear weapons will continue to decline. Yet eight of the nine nuclear states continue to produce new or modernized nuclear weapons.

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EXCESSIVE SECRECY PROHIBITS THE PUBLIC FROM KNOWING the exact number of nuclear weapons in the world. Nuclear weapon states shield details about their arsenals and generally have only imprecise knowledge about the size and composition of other countries' inventories; this creates uncertainty, mistrust, and misunderstandings. More transparency would alleviate this, and in fact, Britain, France, and the United States have recently taken steps to provide additional nuclear data to the public.

We estimate that the world's nine nuclear weapon states possess nearly 22,400 intact nuclear warheads. The vast majority of these weapons—approximately 95 percent—are in the U.S. and Russian arsenals. Nearly 8,000 warheads—nearly one-third of the worldwide total—are operational to some degree (not necessarily fully operational) and ready to launch on relatively short notice. We estimate that approximately 1,880 warheads are on different levels of alert: Russia, 960 warheads; United States, 810; France, 64; and Britain, 48.

The stockpiles of the nations that are not recognized as nuclear weapon states under the Nuclear Non-Proliferation Treaty—Israel, India, Pakistan, and North Korea—are minuscule in comparison with those of Russia and the United States and are especially difficult to estimate. India and Pakistan have a combined total of approximately 150 nuclear warheads, just a few more than what is carried on a single U.S. Trident submarine. Though Israel has not acknowledged it possesses nuclear weapons, the U.S. intelligence community estimates that it has an arsenal of approximately 80 warheads. North Korea remains a mystery, but it may have enough

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fissile material for nine warheads.

We calculate that more than 128,000 nuclear warheads were built since 1945, all but 2 percent by the United States (55 percent) and the Soviet Union/Russia (43 percent). After peaking in 1986, global nuclear weapon levels have declined, as illustrated in the figure “Total Nuclear Weapons Worldwide, 1945–2010.” Since the end of the Cold War, more and more warheads in the U.S. 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 U.S. and Russian governments have pledged that a

NUCLEAR WEAPONS INVENTORIES, 2010

COUNTRY	STRATEGIC ¹	NONSTRATEGIC	OPERATIONAL	TOTAL INVENTORY
Russia	2,600	2,050	4,650	12,000 ²
United States	1,968	500 ³	2,468	9,400 ⁴
France	300	–	~300	300 ⁵
China	180	?	~180	240 ⁶
Britain	225	–	<160	225 ⁷
Israel	60–80	–	–	60–80
Pakistan	70–90	–	–	70–90
India	60–80	–	–	60–80
North Korea ⁸	–	–	–	<10
TOTAL⁹	~5,500	~2,550	~7,700	~22,400

1. Warheads belonging to Israel, Pakistan, India, and North Korea are considered strategic; only some (if any) may be fully operational. Both Pakistan and India are increasing their arsenals.

2. Only about 2,050 of Russia's 5,390 nonstrategic warheads (down from 15,000 in 1991) are believed to be in some form of operational status. The estimate for the size and composition of the total Russian inventory comes with considerable uncertainty. Perhaps as many 3,000 of the weapons listed may be awaiting dismantlement. Russia dismantles an estimated average of 1,000 retired warheads per year.

3. Of the 500 nonstrategic U.S. warheads, approximately 200 are deployed in Europe.

4. This number includes warheads that have been retired but are not part of the Defense Department stockpile listed in the table on pages 81 and 82.

5. France may have a small inventory of spare warheads, but it holds no reserve warheads, unlike the United States and Russia. As per Sarkozy's 2008 statement, the French arsenal is expected to shrink slightly.

6. Many "strategic" warheads are for regional use. The status of a Chinese nonstrategic nuclear arsenal is uncertain, and China's deployed warheads are not thought to be fully operational (that is, mated with delivery systems). China holds additional warheads in storage, for a total stockpile of approximately 240 warheads.

7. Britain currently has only 50 missiles, which together can carry a maximum of 150 warheads. Forty-eight missiles are needed to arm three nuclear-powered ballistic missile submarines (SSBNs), with a maximum of 144 warheads; only a single British SSBN is on patrol at any given time.

8. There is no publicly available evidence that North Korea has operationalized its nuclear weapons capability. A 2009 survey by the U.S. National Air and Space Intelligence Center does not credit any of North Korea's ballistic missiles with nuclear capability.

9. Numbers may not add up due to rounding and uncertainties about operational status (particularly for warheads of the four newer nuclear weapon states) and total inventories (Russia and China).

possible future agreement will include non-deployed and nonstrategic weapons.

Although the total number of nuclear warheads around the world is decreasing due mainly to U.S. and Russian reductions, this trend may obscure the fact that most nuclear weapon states continue to modernize or update their nuclear arsenals and that nuclear weapons remain integral to their national security outlooks. Brief summaries follow for the nine nuclear weapon states.

United States. The United States possesses an estimated 9,400 intact warheads. This includes approximately 5,000 warheads in the custody of the Pentagon: 2,468 of these weapons are considered operational; the other 2,600 are spares centrally stored in reserve. The Energy Department is believed to store 3,500–4,500 intact but retired warheads; these are slated for dismantlement by 2022 at the Pantex Plant near Amarillo, Texas.

Of the more than 70,000 warheads that the United States has produced since 1945, more than 60,000 have been disassembled—more than 13,000 of these since 1990. However, the United States has retained nearly 14,000 plutonium cores (pits) from its dismantled warheads, storing them at the Pantex Plant. It also stores some 5,000 canned assemblies (secondaries) at the Y-12 facility in Tennessee.

The United States is modifying existing warheads under so-called life extension programs, and the 2010 Nuclear Posture Review leaves the door open for replacement warheads in the future.¹

Russia. Russia has released very little information about the size of its stockpile, and its future plans are not known. We estimate that since 1949 the Soviet Union/Russia has produced some 55,000 nuclear warheads and that it had about 30,000 warheads in 1991 at the end of the Cold War.

Based on statements from Russian officials and U.S. assessments of Russian dismantlement rates, we estimate the number of intact Russian warheads to be approximately 12,000, of which about 4,650 are considered operational.²

Over the past two decades, two trends have emerged: Russia has been decreasing its deployed/operational forces, and at the same time it has been reducing its number of intact warheads via an ongoing dismantlement effort. The former has outpaced the latter, leaving a large backlog of warheads to be eventually taken apart.

Russia has continued to reproduce existing nuclear warhead designs, as opposed to the U.S. approach of extending the life of warheads, but production of new systems is thought to be slow.³

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 (SSBNs). According to the British government, “fewer than 160” of the warheads are operationally available, and one SSBN with “up to 48 warheads” is on patrol at any given time. A decision about upgrading the warhead is expected in the near future.

The British arsenal peaked in the 1970s at 350 warheads, and Britain is estimated to have produced approximately 1,200 warheads since 1953.

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 expects to deploy the M51 SLBM with a modified warhead on the *Terrible* SSBN this year, and it has already begun to introduce its new nuclear cruise missile, the Air-Sol Moyenne Portée-A.

China. We estimate that China has an arsenal of 240 nuclear warheads and that it has produced approximately 600 nuclear warheads since becoming a nuclear power in 1964. China’s warheads arm old liquid-fueled ballistic missiles that are being phased out as well as new solid-fuel missiles that are being introduced; China also has a small inventory of air-delivered nuclear bombs. China keeps additional warheads in storage.

The U.S. intelligence community predicts that China will increase its total number of warheads on long-range ballistic missiles from about 50 to well over 100 in the next 15 years.

India and Pakistan. Neither India nor Pakistan has released official information to the public regarding the size of their nuclear arsenals. India is estimated to have assembled 60–80 warheads and produced enough fissile material for 60–105 nuclear warheads; Pakistan is estimated to have assembled 70–90 warheads and produced fissile material for as many as 90 warheads. The majority of India’s and Pakistan’s warheads are not yet operationally deployed. Both countries are believed to be increasing their stockpiles.

Israel. In keeping with its policy of nuclear opacity, Israel has neither confirmed nor denied possession of nuclear weapons; however, the U.S. 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 2020.⁴ Israel is estimated to have produced enough fissile material sufficient for 115–190 warheads.

GLOBAL NUCLEAR WEAPONS INVENTORIES, 1945-2010

YEAR	UNITED STATES	RUSSIA	UNITED KINGDOM	FRANCE	CHINA	ISRAEL	INDIA	PAKISTAN	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	7						1,860
1955	2,422	200	14						2,636
1956	3,692	426	21						4,139
1957	5,543	660	28						6,231
1958	7,345	869	31						8,245
1959	12,298	1,060	35						13,393
1960	18,638	1,605	42						20,285
1961	22,229	2,471	70						24,770
1962	25,540	3,322	288						29,150
1963	28,133	4,238	394						32,765
1964	29,463	5,221	436	4	1				35,125
1965	31,139	6,129	436	32	5				37,741
1966	31,175	7,089	380	36	20				38,700
1967	31,255	8,339	380	36	25	2			40,037
1968	29,561	9,399	394	36	35	4			39,429
1969	27,552	10,538	433	36	50	6			38,615
1970	26,008	11,643	394	36	75	8			38,164
1971	25,830	13,092	309	45	100	11			39,387
1972	26,516	14,478	309	70	130	13			41,516
1973	27,835	15,915	387	116	150	15			44,418
1974	28,537	17,385	457	145	170	17			46,711
1975	27,519	19,055	492	188	180	20			47,454
1976	25,914	21,205	492	212	180	22			48,025
1977	25,542	23,044	492	228	180	24			49,510
1978	24,418	25,393	492	235	190	26			50,754
1979	24,138	27,935	492	235	195	29			53,024
1980	24,104	30,062	492	250	205	31			55,144
1981	23,208	32,049	492	274	225	33			56,281
1982	22,886	33,952	471	274	235	35			57,853
1983	23,305	35,804	450	279	240	38			60,116
1984	23,459	37,431	380	280	249	40			61,839
1985	23,368	39,197	422	360	243	42			63,632
1986	23,317	45,000	422	355	230	44			69,368

GLOBAL NUCLEAR WEAPONS INVENTORIES, 1945-2010, (CONTINUED)

YEAR	UNITED STATES	RUSSIA	UNITED KINGDOM	FRANCE	CHINA	ISRAEL	INDIA	PAKISTAN	TOTAL
1987	23,575	43,000	422	420	230	47			67,694
1988	23,205	41,000	422	410	240	49			65,326
1989	22,217	39,000	422	410	238	51			62,338
1990	21,392	37,000	422	505	232	53			59,604
1991	19,008	35,000	422	540	234	56			55,260
1992	13,708	33,000	422	540	234	58			47,962
1993	11,511	31,000	422	525	234	60			43,752
1994	10,979	29,000	352	510	234	62			41,137
1995	10,904	27,000	422	500	234	63			39,123
1996	11,011	25,000	422	450	234	64			37,181
1997	10,903	23,000	366	450	232	66			35,017
1998	10,732	22,500	281	450	232	68	2	3	34,268
1999	10,685	22,000	281	450	232	70	8	8	33,734
2000	10,577	21,500	281	470	232	72	14	13	33,159
2001	10,526	21,000	281	350	235	74	20	18	32,504
2002	10,457	20,000	281	350	235	76	26	23	31,448
2003	10,027	19,000	281	350	235	78	32	28	30,031
2004	8,570	18,000	281	350	235	80	38	33	27,587
2005	8,360	17,000	281	350	235	80	44	38	26,388
2006	7,853	16,000	281	350	235	80	50	43	24,892
2007	5,709	15,000	225	350	235	80	60	50	21,709
2008	5,273	14,000	225	300	235	80	70	60	20,243
2009	5,113	13,000	225	300	240	80	80	70	19,108
2010	5,000*	12,000	225	300	240	80	80	70	17,995*

* The U.S. column only includes warheads in the Defense Department stockpile, which was declassified in May 2010. Several thousand additional retired but intact warheads are awaiting dismantlement, probably 3,500-4,500 as of August 2010.

North Korea. Despite two nuclear tests and production of enough plutonium for 8-12 nuclear bombs, North Korea has yet to demonstrate that it has operationalized any weapons. The U.S. intelligence community has yet to credit North Korea's missile systems with a nuclear weapons capability, meaning that Pyongyang is not believed to be capable of delivering a nuclear warhead with a missile.

The future. As Russia and the United States continue to reduce their Cold War arsenals, global inventories of nuclear weapons will continue to decline. Yet eight of the nine nuclear weapon states continue to produce new or modernized nuclear weapons, and all nine insist that nuclear weapons are essential for their national security. Russia and the United States have recommitted to maintaining a triad of nuclear strategic forces; China is seeking to build a triad, and France and Britain have pledged to keep their nuclear

weapons. India and Pakistan are both increasing their nuclear forces and building new plutonium production reactors, which could add to their fissile material stocks. Whether Israel's nuclear arsenal remains opaque probably will depend on Iran, which appears to be as few as four and as many as 10 years away from joining the nuclear club, depending upon different estimates. ■

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NOTES

1 For more on the U.S. arsenal see Robert S. Norris and Hans M. Kristensen, "U.S. Nuclear Forces, 2010," *Bulletin of the Atomic Scientists*, May/June 2010, vol. 66, no. 3, pp. 57–71, available at <http://thebulletin.metapress.com/content/067796p218428428/fulltext.pdf>.

In May 2010, the Obama administration declassified the size and history of the Defense Department nuclear weapons stockpile. See: *Increasing Transparency in the U.S. Nuclear Weapons Stockpile*, Fact Sheet, May 3, 2010, http://www.defense.gov/npr/docs/10-05-03_Fact_Sheet_US_Nuclear_Transparency_FINAL_w_Date.pdf

2. Occasionally, statements from Russian officials give a benchmark to help calculate the levels of the Russian arsenal, but these statements generally lack details and the dates are often ambiguous. In 1993, Viktor Mikhailov, then Russia's minister of atomic energy, declared that Russia had 45,000 warheads in its stockpile in 1986. In a statement a decade later, he said that nearly half of them had been dismantled. See "Country Dismantles Nearly Half Its Nuclear Arsenal," Interfax, April 27, 1997 (transcribed by the Foreign Broadcast Information Service in FBIS-TAC-97-117, April 27, 1997). The U.S. Defense Department and Central Intelligence Agency have estimated that Russia dismantled slightly more than 1,000 warheads per year during the 1990s, though how firm those estimates were is not known.

3. For more on the Russian arsenal see Robert S. Norris and Hans M. Kristensen, "Russian Nuclear Forces, 2010," *Bulletin of the Atomic Scientists*, January/February 2010, vol. 66, no. 1, pp. 74–81, available at <http://thebulletin.metapress.com/content/4337066824700113/fulltext.pdf>.

4. See DIA, "The Decades Ahead: 1999–2020," July 1999, p. 38, reported in Rowan Scarborough, *Rumsfeld's War* (Washington, D.C.: Regnery, 2004), pp. 194–223, as cited by the Federation of American Scientists, available at <http://www.fas.org/nuke/guide/israel/nuke/>.

Robert S. Norris & Hans M. Kristensen, "Global nuclear weapons inventories, 1945–2010," *Bulletin of the Atomic Scientists*, July/August 2010, vol. 66, no. 4, pp. 77–83.

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