

Historical annual reformulations of the influenza vaccine

Since 1999, the World Health Organization has issued **annual recommendations for influenza vaccine formulations**. One reformulation of the influenza vaccine is for the Northern Hemisphere, and the other is for the Southern Hemisphere.^[1] Both recommendations are trivalent, i.e. featuring three strains.

Since the 2012–13 season, the WHO recommendations have also included the formulation of an annual quadrivalent vaccine, featuring an additional B-strain.

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Northern Hemisphere recommended strains

The following is a list of WHO recommended strains for the Northern Hemisphere influenza season.

NH winter season	H1N1	H3N2	B-strain	additional B-strain for QIV
November 1998–April 1999 ^[2]	A/Beijing/262/95(H1N1)-like virus	A/Sydney/5/97(H3N2)-like virus	B/Beijing/184/93-like virus	N/A
November 1999–April 2000 ^[3]	A/Beijing/262/95 (H1N1)-like virus	A/Sydney/5/97 (H3N2)-like virus	B/Beijing/184/93-like virus or B/Shangdong/7/97-like virus	N/A
2000–2001 ^[4]	A/New Caledonia/20/99 (H1N1)-like virus	A/Moscow/10/99 (H3N2)-like virus	B/Beijing/184/93-like virus	N/A
2001–2002 ^[5]	A/New Caledonia/20/99(H1N1)-like virus	A/Moscow/10/99(H3N2)-like virus	B/Sichuan/379/99-like virus	N/A
2002–2003 ^[6]	A/New Caledonia/20/99(H1N1)-like virus	A/Moscow/10/99(H3N2)-like virus	B/Hong Kong/330/2001-like virus	N/A
2003–2004 ^[7]	A/New Caledonia/20/99(H1N1)-like virus	A/Moscow/10/99(H3N2)-like virus	B/Hong Kong/330/2001-like virus	N/A
2004–2005 ^[8]	A/New Caledonia/20/99(H1N1)-like virus	A/Fujian/411/2002(H3N2)-like virus	B/Shanghai/361/2002-like virus	N/A
2005–2006 ^[9]	A/New Caledonia/20/99(H1N1)-like virus	A/California/7/2004(H3N2)-like virus	B/Shanghai/361/2002-like virus	N/A
2006–2007 ^[10]	A/New Caledonia/20/99(H1N1)-like	A/Wisconsin/67/2005 (H3N2)-like virus	B/Malaysia/2506/2004-like virus	N/A
2007–2008 ^[11]	A/Solomon Islands/3/2006 (H1N1)-like virus	A/Wisconsin/67/2005 (H3N2)-like virus	B/Malaysia/2506/2004-like virus	N/A
2008–2009 ^[12]	A/Brisbane/59/2007 (H1N1)-like virus	A/Brisbane/10/2007 (H3N2)-like virus	B/Florida/4/2006-like virus	N/A
2009–2010 ^[13]	A/Brisbane/59/2007 (H1N1)-like virus	A/Brisbane/10/2007 (H3N2)-like virus	B/Brisbane/60/2008-like virus	N/A
2010–2011 ^[14]	A/California/7/2009 (H1N1)-like virus	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	N/A
2011–2012 ^[15]	A/California/7/2009 (H1N1)-like virus	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	N/A
2012–2013 ^[16]	A/California/7/2009 (H1N1)pdm09 ^[note 1] -like virus ^[17]	A/Victoria/361/2011 (H3N2)-like virus	B/Wisconsin/1/2010-like virus	B/Brisbane/60/2008-like virus
2013–2014 ^[18]	A/California/7/2009 (H1N1)pdm09 ^[note 1] -like virus	A(H3N2) virus antigenically like the cell-propagated prototype virus A/Victoria/361/2011 ^[note 2]	B/Massachusetts/2/2012-like virus	B/Brisbane/60/2008-like virus
2014–2015 ^[19]	A/California/7/2009 (H1N1)pdm09 ^[note 1] -like	A/Texas/50/2012 (H3N2)-like virus ^[note 3]	B/Massachusetts/2/2012-like virus	B/Brisbane/60/2008-like virus

	virus			
2015–2016 ^[20]	A/California/7/2009 (H1N1)pdm09 ^[note 1] -like virus	A/Switzerland/9715293/2013 (H3N2)-like virus	B/Phuket/3073/2013-like virus	B/Brisbane/60/2008-like virus
2016–2017 ^[21]	A/California/7/2009 (H1N1)pdm09 ^[note 1] -like virus	A/Hong Kong/4801/2014 (H3N2)-like virus	B/Brisbane/60/2008-like virus	B/Phuket/3073/2013-like virus
2017–2018 ^[22]	A/Michigan/45/2015 (H1N1)pdm09 ^[note 1] -like virus ^[23]	A/Hong Kong/4801/2014 (H3N2)-like virus	B/Brisbane/60/2008-like virus	B/Phuket/3073/2013-like virus
2018–2019 ^[24]	A/Michigan/45/2015 (H1N1)pdm09 ^[note 1] -like virus	A/Singapore/INFIMH-16-0019/2016 (H3N2)-like virus	B/Colorado/06/2017-like virus (B/Victoria/2/87 lineage)	B/Phuket/3073/2013-like virus (B/Yamagata/16/88 lineage)

Southern hemisphere recommended strains

The following is a list of WHO recommended strains for the southern hemisphere influenza season.

SH winter season	H1N1	H3N2	B-strain	additional B-strain for QIV
1999 ^[25]	A/Beijing/262/95(H1N1)-like virus	A/Sydney/5/97(H3N2)-like virus	B/Beijing/184/93-like virus	N/A
May–October 2000 ^[26]	A/New Caledonia/20/99 (H1N1)-like virus	A/Moscow/10/99 (H3N2)-like virus	B/Beijing/184/93-like virus or B/Shangdong/7/97-like virus	N/A
May–October 2001 ^[27]	A/New Caledonia/20/99 (H1N1)-like virus	A/Moscow/10/99 (H3N2)-like virus	B/Sichuan/379/99-like virus	N/A
2002 ^[28]	A/New Caledonia/20/99(H1N1)-like virus	A/Moscow/10/99(H3N2)-like virus	B/Sichuan/379/99-like virus	N/A
2003 ^[29]	A/New Caledonia/20/99(H1N1)-like virus	A/Moscow/10/99(H3N2)-like virus	B/Hong Kong/330/2001-like virus	N/A
2004 ^[30]	A/New Caledonia/20/99(H1N1)-like virus	A/Fujian/411/2002(H3N2) -like virus	B/Hong Kong/330/2001-like virus	N/A
2005 ^[31]	A/New Caledonia/20/99(H1N1)-like virus	A/Wellington/1/2004(H3N2)-like virus	B/Shanghai/361/2002-like virus	N/A
2006 ^[32]	A/New Caledonia/20/99(H1N1)-like virus	A/California/7/2004(H3N2)-like virus	B/Malaysia/2506/2004-like virus	N/A
2007 ^[33]	A/New Caledonia/20/99(H1N1)-like	A/Wisconsin/67/2005 (H3N2)-like virus	B/Malaysia/2506/2004-like virus	N/A
2008 ^[34]	A/Solomon Islands/3/2006 (H1N1)-like virus	A/Brisbane/10/2007 (H3N2)-like virus	B/Florida/4/2006-like virus	N/A
2009 ^[35]	A/Brisbane/59/2007 (H1N1)-like virus	A/Brisbane/10/2007 (H3N2)-like virus	B/Florida/4/2006-like virus	N/A
2010 ^[36]	A/California/7/2009 (H1N1)-like virus	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	N/A
2011 ^[37]	A/California/7/2009 (H1N1)-like virus	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	N/A
2012 ^[38]	A/California/7/2009 (H1N1)pdm09 ^[note 1] -like virus ^[17]	A/Perth/16/2009 (H3N2)-like virus	B/Brisbane/60/2008-like virus	N/A
2013 ^[39]	A/California/7/2009 (H1N1)pdm09-like virus	A/Victoria/361/2011 (H3N2)-like virus	B/Wisconsin/1/2010-like virus	B/Brisbane/60/2008-like virus
2014 ^[40]	A/California/7/2009 (H1N1)pdm09-like virus	A/Texas/50/2012 (H3N2)-like virus ^[note 3]	B/Massachusetts/2/2012-like virus	B/Brisbane/60/2008-like virus
2015 ^[41]	A/California/7/2009 (H1N1)pdm09-like virus	A/Switzerland/9715293/2013 (H3N2)-like virus	B/Phuket/3073/2013-like virus	B/Brisbane/60/2008-like virus
2016 ^[42]	A/California/7/2009 (H1N1)pdm09-like virus	A/Hong Kong/4801/2014 (H3N2)-like virus	B/Brisbane/60/2008-like virus	B/Phuket/3073/2013-like virus
2017 ^[43]	A/Michigan/45/2015	A/Hong Kong/4801/2014	B/Brisbane/60/2008-like	B/Phuket/3073/2013-

	(H1N1)pdm09-like virus ^[23]	(H3N2)-like virus	virus	like virus
2018 ^[44]	A/Michigan/45/2015 (H1N1)pdm09-like virus	A/Singapore/INFIMH-16-0019/2016 (H3N2)-like virus	B/Phuket/3073/2013-like virus	B/Brisbane/60/2008-like virus

Notes

1. (H1N1)pdm09 is newer nomenclature for the 2009 pandemic H1N1 virus, not a different strain.
2. It is recommended that A/Texas/50/2012 is used as the A(H3N2) vaccine component because of antigenic changes in earlier A/Victoria/361/2011-like vaccine viruses (such as IVR-165) resulting from adaptation to propagation in eggs.
3. A/Texas/50/2012 is an A(H3N2) virus that following adaptation to growth in eggs has maintained antigenic properties similar to the majority of recently circulating cell-propagated A(H3N2) viruses including A/Victoria/361/2011

See also

- 2009 flu pandemic vaccine

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