

Information topic	Details
Indicator name	High-risk human-disease competent vectors/ pests present at the New Zealand border
Domain and topic	Border Health
Indicator definition and units	Annual frequency of high-risk pests intercepted at New Zealand's border
Data source	A database of all recorded suspected mosquito interceptions and incursions by the National Mosquito Surveillance Programme was provided by New Zealand BioSecure Entomology Laboratory (NZ Biosecure 2018)
Methodology	<ul style="list-style-type: none"> - Data were extracted from the NZ BioSecure database for a 10 year period: 2008-2017. - Data extraction included: date of interception, Public Health Unit (PHU) region, address discovered, insect species, species classification status (exotic species not introduced in New Zealand, exotic introduced species of likely overseas origin i.e. recently re-imported, local mosquito, non-mosquito), origin of insect, further details of interception location (e.g. 'container of melons').
Time period and time scale	<ul style="list-style-type: none"> - Annual; from 2008 onwards. - Seasonal variation in interceptions was not determined due to bi-annual differences in the frequency of sampling in the National Mosquito Surveillance Programme (sampling increases during warmer months). - Time trends: A 10 year time period was examined to determine a baseline of trends since a comparable New Zealand-based analysis was reported. A 5 year time period is recommended hereafter.
Spatial coverage	National
Measures of frequency	<ul style="list-style-type: none"> - Annual*¹ interceptions by: <ul style="list-style-type: none"> o species classification status (excluding those classified as 'local'), o region (and District Health Board) intercepted, o country of insect origin, o mode of travel (air or sea*²), and o location intercepted (e.g. zone or cargo type). - Annual frequency of specific mosquito species intercepted <p>*¹ where numbers were very small, data were presented as pooled summaries across years for subgroup analyses.</p> <p>*² Where suspected mosquitoes were captured in/near cargo, and the associated address was not that of an air or sea port (i.e. usually a transitional facility), mode of travel was assumed to be sea. Over 99% of imported goods to New Zealand are transported by sea (Statistics NZ 2018).</p>

<p>Limitations of indicator</p>	<ul style="list-style-type: none"> - At present, annual numbers of recorded interceptions of suspected mosquitoes at the New Zealand border are low, which makes temporal trend analysis difficult. - NZ BioSecure noted a gradual improvement in programme quality over the past 10 years which is likely to have created sampling error for statistical analysis during this period. - However, annual frequency monitoring remains an important indicator, particularly in view of potential future trends. It is possible that mosquito interceptions at the New Zealand border may increase in coming years due to increasing global pressures, including globalisation and climate change, and the rapid international spread of high-risk mosquito vectors and associated diseases in recent years (Roth et al 2014).
<p>Limitations of data source</p>	<ul style="list-style-type: none"> - A key limitation is the element of judgement which comes into the decisions made by the border surveillance teams as to whether a non-mosquito or exotic mosquito species already introduced in New Zealand travelled from overseas or was inadvertently captured from a local source. There is potential for bias in this judgement - although this may have decreased with improvements in surveillance programme quality over time. Therefore, annual variation in the total number of suspected mosquito interceptions of probable overseas origin were not calculated for the baseline 10 year period examined. - Annual variation in numbers of exotic mosquito species not known to be introduced to New Zealand were not analysed alone due to small annual numbers, increasing the likelihood of type one error in the results. - This data source only includes suspected mosquito intercepts – other pests intercepted by the Ministry for Primary Industries (MPI) at the border were not included due to limitations with this dataset. Utilisation of the MPI dataset should be re-explored in future.
<p>Created by</p>	<p>Environmental Health Indicators New Zealand, Centre for Public Health Research, Massey University, Wellington</p>
<p>Related indicators</p>	<ul style="list-style-type: none"> - Exotic notifiable infectious diseases in New Zealand of priority border health concern - Overseas infectious diseases of priority concern to New Zealand - Human-disease competent vectors/pests introduced to New Zealand
<p>For more information</p>	<p>New Zealand BioSecure Entomology Laboratory. Exotic Mosquitos: http://www.smsl.co.nz/NZBEL/Exotic+Mosquitoes.html (accessed May 2018)</p>
<p>References</p>	<ul style="list-style-type: none"> - New Zealand BioSecure Entomology Laboratory (NZ BioSecure). (2018). Mosquito interceptions dataset. Southern Monitoring Services Limited. (Personal communication, 2018).

	<ul style="list-style-type: none">- Roth A, Mercier A, Lepers C, Hoy D, Duituturaga S, Benyon E, et al. (2014). Concurrent outbreaks of dengue, chikungunya and zika virus infections - an unprecedented epidemic wave of mosquito-borne viruses in the Pacific 2012-2014. <i>Eurosurveillance</i> 19(41): 20929- Statistics New Zealand (2018). Infoshare: <i>Overseas cargo statistics: Total imports by New Zealand port (Annual-Jun)</i>. URL: www.stats.govt.nz (accessed June 2018).
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