Information topic	Details
Indicator name	**High-risk insects caught at New Zealand's border**
Domain and topic	Border Health
Indicator definition and units	Annual frequency of high-risk insects intercepted at New Zealand's border.
Data source	The National Mosquito Surveillance Programme provided by the New Zealand BioSecure Entomology Laboratory.
Numerator	Counts of high-risk insects intercepted at New Zealand ports.
Denominator	No denominator was necessary for counts.
Methodology	- Data were extracted from the NZBioSecure database for the period, 2001–2022. - Interceptions are classified into four different categories: Unidentified insects, exotic mosquitoes, other mosquitoes and non-mosquito insects. See Appendix 1 for an outline of these classification criteria. - Data extraction included: interception ID, date of interception, origin or transport, Public Health Unit region, address discovered, life stage, insect species, species classification status, origin of insect (if known), further details of interception location (e.g. 'container of melons') and sample ID.
Time period and time scale	- Annual; from 2001 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: The period from 2001 onwards was examined to determine comparable baseline trends.
Population coverage	NA
Spatial Coverage	National
Measures of frequency	Annual interceptions by: - species classification (excluding 'local' interceptions) - PHU region of interception (excluding 'local' and 'potentially local' interceptions) Five-year aggregates of interception data by: - Potential country of origin - Living status (alive or dead). - Location of discovery (fruit, tyres, cargo etc).

Limitations of indicator	- At present, annual numbers of recorded interceptions of suspected mosquitoes at the border are low which makes temporal trend analysis difficult. - NZBioSecure noted a gradual improvement in programme quality over time which is likely to have created sampling error for statistical analysis over time. However, annual frequency monitoring remains an important indicator, particularly in view of potential future trends. - Data about the level of activity at seaports in New Zealand is based on the mass of goods imported from StatsNZ (Statistics NZ 2022). While this does offer information on the quantity of materials imported into specific regions it does not differentiate between types of goods.
Limitations of data source	- A key limitation is the judgement 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 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. - This data source only includes suspected mosquito interceptions – 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.
Related indicators	- Exotic diseases of concern to New Zealand. - Overseas infectious diseases of priority concern. - Mosquito-borne disease in New Zealand. - Exotic mosquito species established in New Zealand.
For more information	New Zealand BioSecure Entomology Laboratory. Exotic Mosquitos: http://www.smsl.co.nz/NZBEL/Exotic+Mosquitoes.html (accessed August 2023)
References	- New Zealand BioSecure Entomology Laboratory (NZ BioSecure). (2023). Mosquito interceptions dataset. Southern Monitoring Services Limited. (Personal communication, 2022). - 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. *Eurosurveillance* 19(41): 20929 - Statistics New Zealand (Statistics NZ). 2023. Infoshare. Overseas Cargo Statistics: Total imports by New Zealand port. (Annual-Jun). URL: www.stats.govt.nz (accessed August 2023).

Appendix 1: Classification criteria of high-risk insect interceptions

EHI Code	Name	Description (what is it?)	Definition of category
0a	Unidentifiable local	Unidentifiable insects (non-mosquito or mosquito). Specimen originates from NZ.	**Species** unidentifiable **Origin** NZ
0b	Unidentifiable exotic	Unidentifiable insects (non-mosquito or mosquito). Specimen originates from outside NZ.	**Species** unidentifiable **Origin** NOT NZ
0c	Unidentified undetermined origin	Unidentifiable insects (non-mosquito or mosquito). Specimen possibly originates from NZ or overseas country, or no country of origin listed.	**Species** unidentifiable **Origin** NZ & overseas or no origin listed
1	Exotic mosquito	Foreign mosquito species not yet established in NZ. Given this origin must be overseas.	**Species** any mosquito not established in NZ **Origin** cannot be NZ
2a	Local mosquito	Native species or foreign mosquitoes established in NZ. Specimen originates from NZ.	**Species** Native or *Culex quinquefasciatus*, *Aedes notoscriptus*, *Aedes australis* **Origin** NZ
2b	Exotic established mosquito	Foreign mosquitoes established in NZ Specimen originates from outside of NZ.	**Species** *Culex quinquefasciatus*, *Aedes notoscriptus*, *Aedes australis* **Origin** NOT NZ
2c	Mosquito of undetermined origin	Foreign mosquitoes established in NZ. Specimen possibly originates from NZ or overseas country, or no country of origin listed.	**Species** *Culex quinquefasciatus*, *Aedes notoscriptus*, *Aedes australis* **Origin** NZ & overseas or no origin listed
3a	Non-mosquito local	These are non-mosquitos. Specimen originates from in NZ	**Species** any non-mosquito **Origin** NZ
3b	Non-mosquito exotic	These are non-mosquitos. Specimen originates from outside NZ	**Species** any non-mosquito **Origin** NOT NZ
3c	Non-mosquito undetermined origin	These are non-mosquitos. Specimen possibly originates from NZ or overseas country, or no country of origin listed.	**Species** any non-mosquito **Origin** NZ & overseas or no origin listed