| Information topic | Details |
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| 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 | A database of all recorded suspected mosquito interceptions and incursions by the National Mosquito Surveillance Programme was provided by New Zealand BioSecure Entomology Laboratory (NZBioSecure 2022). |
| Numerator | Counts of high-risk insects intercepted at New Zealand ports. |
| Denominator | No denominator was necessary for counts.<br>For proportions denominators were total interceptions, excluding interceptions with missing data. Of the 107 interceptions in 2017–2021:<br>- Eight interceptions were missing "living status" and were not used in Table 1.<br>- Five interceptions were missing "mode of entry" and were not included in Tables 1 and 2. |
| Methodology | - Data were extracted from the NZBioSecure database for the period, 2001–2021.<br>- Data extraction included: interception ID, date of interception, origin or transport, Public Health Unit region, address discovered, life stage, insect species, species classification status (exotic species not introduced in New Zealand, exotic introduced species of likely overseas origin, local mosquito and non-mosquito), origin of insect, further details of interception location (e.g. 'container of melons') and sample ID. |
| Time period and time scale | - Annual; from 2001 onwards.<br>- 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).<br>- Time trends: The period from 2001 onwards was examined to determine comparable baseline trends. |
| Population coverage | NA |
| Spatial Coverage | National |
| Measures of frequency | Annual [*1] interceptions by:<br>- species classification (excluding 'local' interceptions) |

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| | - Port of entry[*2]<br>Five-year aggregates of interception data by:<br>- Mode of entry (by air or sea).<br>- Living status (alive or dead [*3]).<br>- Ports of entry[*2] (specific airports and seaports).<br>- Location of discovery (fruit, tyres, cargo etc).<br>Total data aggregate, 2001–2021, (global map) by:<br>- Overseas origin.<br>- Mode of entry (air or sea).<br><br>*1 where numbers were very small, data were aggregated by five years in order to produce accurate subgroup analyses.<br>*2 Where suspected mosquitoes were captured in/near cargo, and the associated address was not that of an air or seaport (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 2022).<br>*3 When interceptions include alive or larvae specimens, the interception is recorded as “alive”, as this is a higher priority. |
| Limitations of indicator | - At present, annual numbers of recorded interceptions of suspected mosquitoes at the border are low (roughly 20 per year), which makes temporal trend analysis difficult.<br>- NZBioSecure noted a gradual improvement in programme quality over time which is likely to have created sampling error for statistical analysis over time.<br>- 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).<br>- Data surrounding the busiest seaports in New Zealand is based on the mass of goods imported from StatsNZ (Statistic 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 element of judgement from 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 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.<br>- 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. |

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| Related indicators | - Exotic diseases of concern to New Zealand.<br>- Overseas infectious diseases of priority concern.<br>- Mosquito-borne disease in New Zealand.<br>- 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 May 2022) |
| References | - New Zealand BioSecure Entomology Laboratory (NZ BioSecure). (2022). Mosquito interceptions dataset. Southern Monitoring Services Limited. (Personal communication, 2022).<br>- 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<br>- Statistics New Zealand (Statistics NZ). 2022. Infoshare. Overseas Cargo Statistics: Total imports by New Zealand port. (Annual-Jun). URL: www.stats.govt.nz (accessed February 2022). |