

# Infezioni da Norovirus (NoV)

## causa principale delle gastroenteriti acute (AGE)

caratteristiche microbiologiche principali

- virus ad RNA famiglia Calicivirus
- genogruppi (GI e GII)
- persistenza nell'ambiente

**sorgente umana** (riscontrati anche in animali ma non è stata dimostrata la trasmissibilità animale-uomo e uomo-animale)

**serbatoio** → acqua, suolo, reflui

vie/modalità di trasmissione

- fecale-orale/oro-fecale (indiretta) contaminazione alimenti/stoviglie/utensili/piani di lavoro/fomites (più frequente in ristorazione collettiva - navi da crociera)
- aerosol (diretta) stretto contatto che si verifica in contesti specifici (casa di riposo/cura per anziani, reparti ospedalieri, asili)

**patologia tipica di ambienti confinati e comunitari**

# Infezioni da Norovirus (NoV)

caratteristiche della patologia

- popolazione sana → gastroenterite acuta (AGE) autolimitante e benigna vomito, diarrea, febbre, nausea, dolori addominali (simil influenzali)
- popolazione a rischio → anziani e soggetti con patologie (disidratazione)

relazione dose/effetto e dose/risposta

→ bassi livelli 10 – 100 particelle virali infettanti

# Infezioni da Norovirus (NoV)

alimenti principali coinvolti in eventi epidemici

gli alimenti possono essere potenzialmente contaminati  
nelle differenti fasi dei processi di produzione

## produzione primaria

- coltivazione (irrigazione/fertilizzazione/fertirrigazione con reflui/liquami umani) e raccolta
  - frutta e vegetali (soprattutto frutti di bosco, raccolti manualmente)
- allevamento/stabulazione molluschi (<https://www.izslt.it/i-molluschi/>)

## produzione secondaria

- preparazione/manipolazione
- alimenti manipolati: panini, alimenti RTE (ready-to-eat), prodotti manipolati e non scaldati prima del consumo, prodotti ortofrutticoli di IV gamma

# Gamme alimentari (riferimento al tipo di lavorazione o di conservazione)

**I<sup>a</sup> gamma** prodotti freschi o deperibili, nessun trattamento di conservazione



**II<sup>a</sup> gamma** prodotti conservati in vetro o lattine, trattamenti di conservazione (pastorizzazione o sterilizzazione)

**III<sup>a</sup> gamma** alimenti surgelati e congelati, trattamento di conservazione



**IV<sup>a</sup> gamma** prodotti ortofrutticoli di pronto consumo frutta/verdura lavati, asciugati, tagliati, confezionati in vaschette o in sacchetti di plastica in atmosfera controllata o modificata

**V<sup>a</sup> gamma** prodotti ortofrutticoli pronti per essere consumati previa cottura dopo una prima lavorazione preliminare (selezione, lavaggio, taglio, pelatura) vengono precotti, sterilizzati e confezionati sottovuoto o cotti al vapore, grigliati o lessati e confezionati in atmosfera protettiva



**in Italia si parla maggiormente di IV e V gamma in riferimento ai prodotti ortofrutticoli mentre in Europa si utilizzano i termini alimenti ready-to-eat (IV) e ready-to-heat (V) per gli alimenti in genere**



## In Germania\*



... nei mesi di settembre-ottobre 2012 si sono registrati 10950 casi di gastroenterite  
→ osservata correlazione tra consumo di composti a base di fragole congelate e l'epidemia



i composti a base di fragole congelate sono risultati contaminati da NoV

L'indagine epidemiologica ha ricostruito che la contaminazione delle fragole è stata determinata dall'utilizzo di acque di irrigazione contaminate da liquame umano

\*Mäde, D., Trübner, K., Neubert, E., Höhne, M., & Johne, R. (2013). Detection and Typing of Norovirus from Frozen Strawberries Involved in a Large-Scale Gastroenteritis Outbreak in Germany (Euro Surveill). *Environmental virology*, 5(3), 162–168. Advance online publication. <https://doi.org/10.1007/s12560-013-9118-0>



# Ricerca di NoV in campioni di frutti di bosco\*

Table 2: Occurrence of Norovirus in berry fruits

Sampling place	Commodity	Sampling country	Number of samples analysed	Number of samples where Norovirus detected	% of positive samples	95 % CI <sup>(a)</sup>	Numbers in positive samples	Reference
Processing company	Raspberries <sup>(b)</sup>	Belgium	10	4	40.0	[15.3,69.6]	2.45 – 3.7 log genome equivalents per 10 g	(Stals et al., 2011)
Processing company	Strawberries <sup>(c)</sup>	Belgium	20	6	30.0	[13.6,51.7]	2.29 – 4.1 log genome equivalents per 10 g	(Stals et al., 2011)
Food companies	Raspberries (n = 142) and strawberries (n = 8)	France	150	10	6.7	[3.5,11.5]	2.4 – 5.8 log genome equivalents g <sup>-1</sup>	(Baert et al., 2011)
Retail	Fresh raspberries	4 European countries	60	0	0	[0,4.1]	NA	(Maunula et al., 2013)
Retail	Frozen raspberries	4 European countries	39	0	0	[0,6.2]	NA	(Maunula et al., 2013)
Retail	Fresh strawberries	4 European countries	21	0	0	[0,11.1]	NA	(Maunula et al., 2013)
Catering	Frozen raspberries *	Finland	14	2	14.3	[3.1,38.5]	ND	(Sarvikivi et al., 2012)
Catering	Frozen raspberries *	Finland	3	3	100	[46.4,100]	ND	(Maunula et al., 2009b)
Wholesaler	Frozen raspberries *	Finland	2	0	0	[0,66.7]	ND	(Maunula et al., 2009b)
Catering	Frozen raspberries *	Sweden	1	1	100	[14.7,100]	ND	(Le Guyader et al., 2004)
Catering	Frozen strawberries	Germany	11	7	63.6	[34.8,86.3]	ND	(Mäde et al., 2013)

ND = not detected

NA = not applicable

\* Samples taken as part of outbreak investigation.

(a): The credible interval was calculated using a Bayesian approach and taking as prior beta (1/2,1/2) (Micconnet et al., 2005)

(b): frozen, unpublished data

(c): fresh, unpublished data



# contaminazione degli alimenti da NoV

**suolo**



**acqua**



**raccolta e/o contaminazione crociata  
e/o confezionamento**





# buone pratiche pre e post-coltura

## Good Agricultural Practices (GAP)

- attrezzature pulite
- tipologia di irrigazione e fertilizzazione



## Good Hygiene Practices (GHP)

- igiene personale
- buono stato di salute

## Good Manufacturing Practices (GMP)

- selezione e smistamento dei frutti
- contaminazione crociata





# Infezioni da Norovirus (NoV)

## Raccomandazioni ad operatori del settore alimentare (OSA)

- norme igieniche di base (lavarsi le mani dopo avere utilizza i servizi igienici)
- se l'operatore soffre di disturbi gastrointestinali
  - deve assentarsi dal lavoro
  - attuare in maniera assoluta le norme igieniche di base

## Raccomandazioni ad operatori settore sanitario (OSS) e assistenziale (OSA)

- tra un paziente e l'altro lavare accuratamente le mani – utensili /superfici /cucina / l'area di preparazione alimenti deve subire disinfezione

## Raccomandazioni a popolazione generale (consumatori)

- cottura alimenti quando possibile
- effettuare comunque un lavaggio degli alimenti IV gamma prima del consumo
- acquisto di alimenti «tracciati/cerificati»
- applicare norme di igiene di base
- lavare le mani dopo avere manipolato alimenti crudi

## **Recommendations for primary production**

- Good growing practices should be strictly observed in order to reduce the risk of contaminating raw materials (shellfish, fruits and vegetables) by potentially contaminated irrigation or sea water.
- The influence of weather events (heavy rain causing overflow of lift stations and sewage plants) on the pollution of water resources should be taken into account and preventive action plans should be set up to ensure their protection.
- In shellfish growing areas, this hazard should be taken into account in vulnerability profile studies and special attention should be paid to preventing contamination of water and to ensuring the traceability of produce. Local warning systems should be set up to give producers real-time information on any event likely to degrade water quality.



## **Recommendations to operators**

- Kitchen staff or anyone else involved in handling foods, especially those intended to be eaten raw or lightly cooked, should be made aware of the risk of faecal-oral transmission and food hygiene measures. Personnel must be aware of the importance of not handling food if presenting symptoms of gastroenteritis.
- Compliance with cleaning and disinfection procedures and the conscientious choice of raw materials (origin, area of production, risk of viral contamination, etc.) contribute to better control of viral risk.
- Furthermore, it should be noted that European regulations include the obligation for certain categories of shellfish to undergo heat treatment.

## **Recommendations to consumers**

- **Personal and collective hygiene remains the basis for primary prevention. It is absolutely necessary to wash hands thoroughly after using the toilet and before preparing or eating food.**
- **People infected with noroviruses must not handle food.**
- **Avoid consuming shellfish that do not come from authorised and inspected areas of production, unless they have been thoroughly cooked.**



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**189 NOTIFICATIONS**

Ref.	Category	Type	Subject	Date	Origin	Notifying	Class.	Decision	
<span>↓</span> <span>↑</span>	<span>↓</span> <span>↑</span>	<span>↓</span> <span>↑</span>	<span>↓</span> <span>↑</span>	<span>↓</span> <span>↑</span>		<span>↓</span> <span>↑</span>	<span>↓</span> <span>↑</span>	<span>↓</span> <span>↑</span>	
2024.2287	Bivalve molluscs and products...	food	Norovirus in oysters from France	25 MAR 2024		Belgium	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2024.2271	Bivalve molluscs and products...	food	Norovirus in oysters from France	22 MAR 2024		Belgium	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2024.2251	Bivalve molluscs and products...	food	Norovirus in chilled oysters from France	22 MAR 2024		Belgium	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2024.2184	Bivalve molluscs and products...	food	Norovirus in ostriche provenienti dalla Francia/Norovirus in oysters from France	21 MAR 2024		Italy	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1937	Crustaceans and products thereof	food	Norovirus in oysters from France	14 MAR 2024		Norway	alert notification	<b>serious</b>	<a href="#">Details &gt;&gt;</a>

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2024.1886	Bivalve molluscs and products...	food	Norovirus in oysters from France	13 MAR 2024		Finland	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1831	Bivalve molluscs and products...	food	Norovirus in oysters from The Netherlands	12 MAR 2024		Belgium	information notification for attention	<b>serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1829	Bivalve molluscs and products...	food	Norovirus in oysters	12 MAR 2024		Finland	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1791	Fruits and vegetables	food	Norovirus GII in Goma Wakame (antipasto giapponese di alghe congelato) origine Taiwan//Norovirus GII in Goma Wakame (Japanese frozen seaweed appetizer) origin Taiwan	11 MAR 2024		Italy	information notification for attention	<b>serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1780	Bivalve molluscs and products...	food	Norovirus in oysters from France	11 MAR 2024		Finland	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1730	Bivalve molluscs and products...	food	Norovirus in chilled oysters from the Netherlands	8 MAR 2024		Belgium	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1717	Bivalve molluscs and products...	food	Presence of Norovirus in oysters from France	8 MAR 2024		Italy	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>



## 20 NOTIFICATIONS



Ref.	Category	Type	Subject	Date	Origin	Notifying	Class.	Decision	
↓ ↑	↓ ↑	↓ ↑	↓ ↑	↓ ↑		↓ ↑	↓ ↑	↓ ↑	
2024.1791	Fruits and vegetables	food	Norovirus GII in Goma Wakame (antipasto giapponese di alghe congelato) origine Taiwan//Norovirus GII in Goma Wakame (Japanese frozen seaweed appetizer) origin Taiwan	11 MAR 2024		Italy	information notification for attention	<b>serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1715	Fruits and vegetables	food	Presenza di Norovirus GII in Mirtilli surgelati Presence of Norovirus GII in frozen blueberries	8 MAR 2024		Italy	alert notification	<b>serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1582	Fruits and vegetables	food	Norovirus in insalata di alga marina congelata Norovirus in frozen seaweed salad	5 MAR 2024		Italy	information notification for attention	<b>serious</b>	<a href="#">Details &gt;&gt;</a>
2024.1313	Fruits and vegetables	food	Presence of Norovirus GII genome in ready-to-cook frozen blackberries (blackbarries) from Serbia	26 FEB 2024		Italy	alert notification	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2024.0793	Fruits and vegetables	food	Norovirus in Frozen Giant American Blueberries from Poland	5 FEB 2024		Italy	alert notification	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2023.6951	Fruits and vegetables	food	Norovirus in sprouts from Belgium	12 OCT 2023	---	Luxembourg	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>

2023.0891	Fruits and vegetables	food	Presence of Norovirus GII in lettuce produced in Italy with raw material from Spain	7 FEB 2023		Italy	information notification for attention	<b>potentially serious</b>	<a href="#">Details &gt;&gt;</a>
2022.7485	Fruits and vegetables	food	Presence of norovirus RNA (genotype GII) detected in frozen strawberries from Egypt	21 DEC 2022		Slovakia	alert notification	<b>serious</b>	<a href="#">Details &gt;&gt;</a>
2022.4686	Fruits and vegetables	food	Norovirus group II detected in frozen raspberries from France	11 AUG 2022		France	alert notification	undecided	<a href="#">Details &gt;&gt;</a>
2021.5773	Fruits and vegetables	food	Presence of norovirus GII in IV range salads	26 OCT 2021		Italy	information notification for attention	<b>serious</b>	<a href="#">Details &gt;&gt;</a>
2021.4145	Fruits and vegetables	food	Foodborne outbreak suspected to be caused by norovirus in frozen berries	4 AUG 2021		Switzerland	alert notification	<b>serious</b>	<a href="#">Details &gt;&gt;</a>
2021.1903	Fruits and vegetables	food	Norovirus in frozen raspberries	16 APR 2021		France	alert notification	undecided	<a href="#">Details &gt;&gt;</a>
2020.5801	Fruits and vegetables	food	Norovirus GI in raspberries	16 DEC 2020		Czech Republic	alert notification	undecided	<a href="#">Details &gt;&gt;</a>
2020.5073	Fruits and vegetables	food	Norovirus in frozen forest fruits from Italy	17 NOV 2020		Italy	information notification for attention	undecided	<a href="#">Details &gt;&gt;</a>
2020.3700	Fruits and vegetables	food	Norovirus in red currants	10 SEP 2020		Belgium	alert notification	undecided	<a href="#">Details &gt;&gt;</a>
	Fruits and		Norovirus RNA in berry mixture from	24 AUG			alert		