

GASTROENTERIT YAPAN VIRUSLARDA YENİLİKLER

salih türkoğlu

Bakteri kökenli olmayan gastroenteritlerin
ve ishallerin çoğunluğunda etken
viruslar

başta bebekler ve küçük çocuklar olmak
üzere, tüm dünyada

Güney Amerika ve Asya'nın bazı
bölgelerinde her yıl 3 milyon kişi
gastroenteritten ölmekte

Bu bölgelerde çocukların her yıl 60
günleri ishalleri

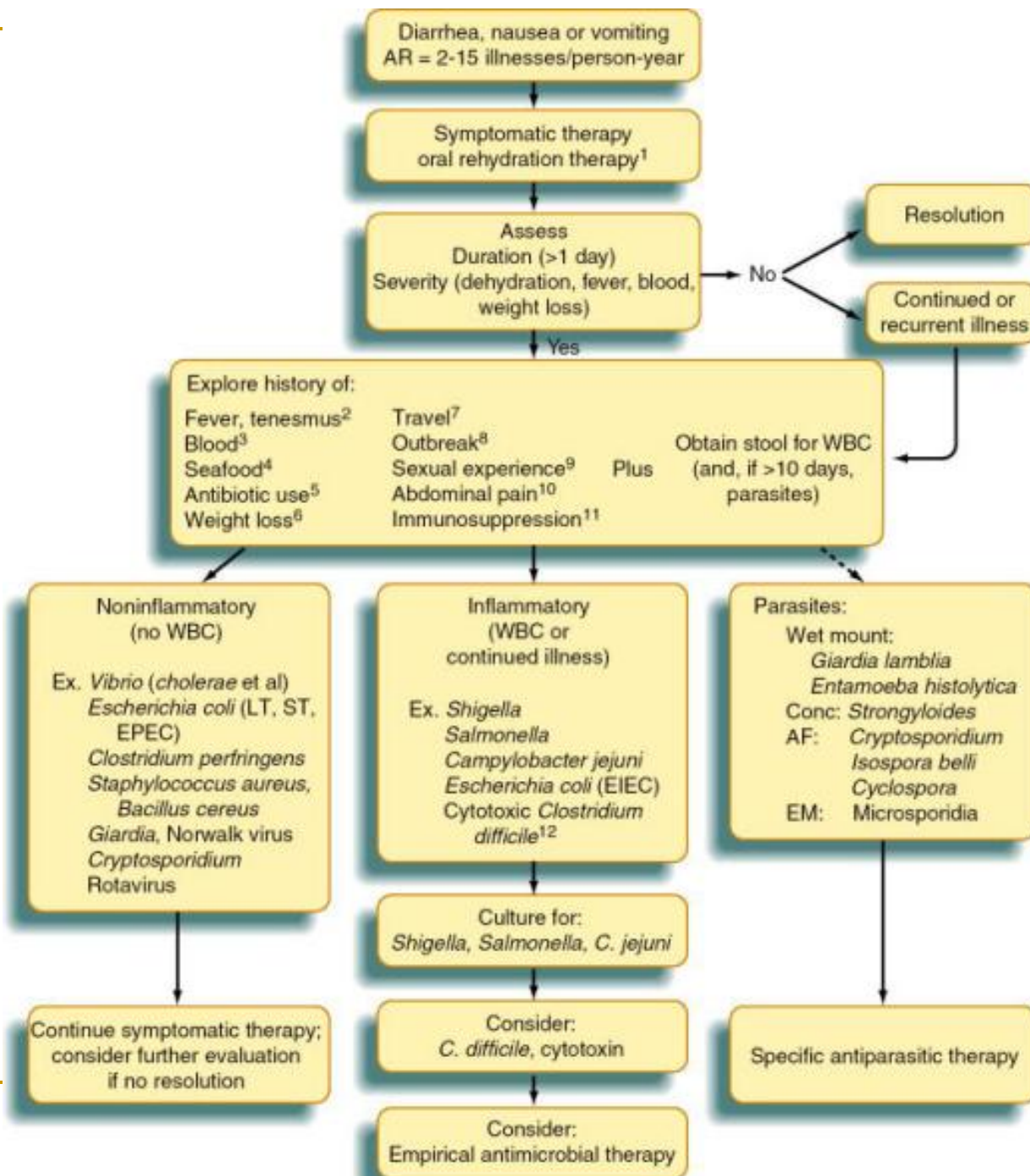


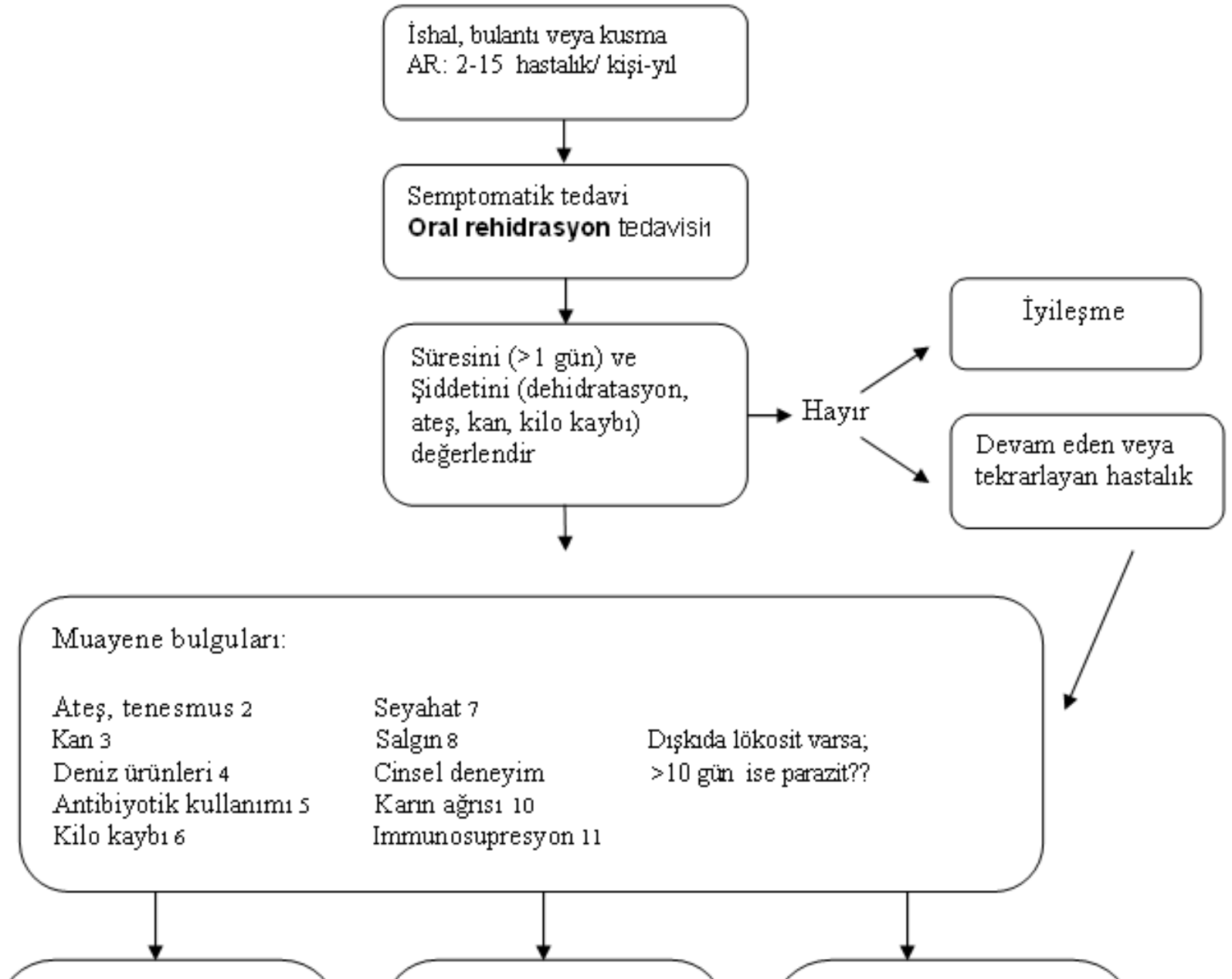
beslenmeleri ve gelişimleri üzerinde çok
önemli olumsuz etki

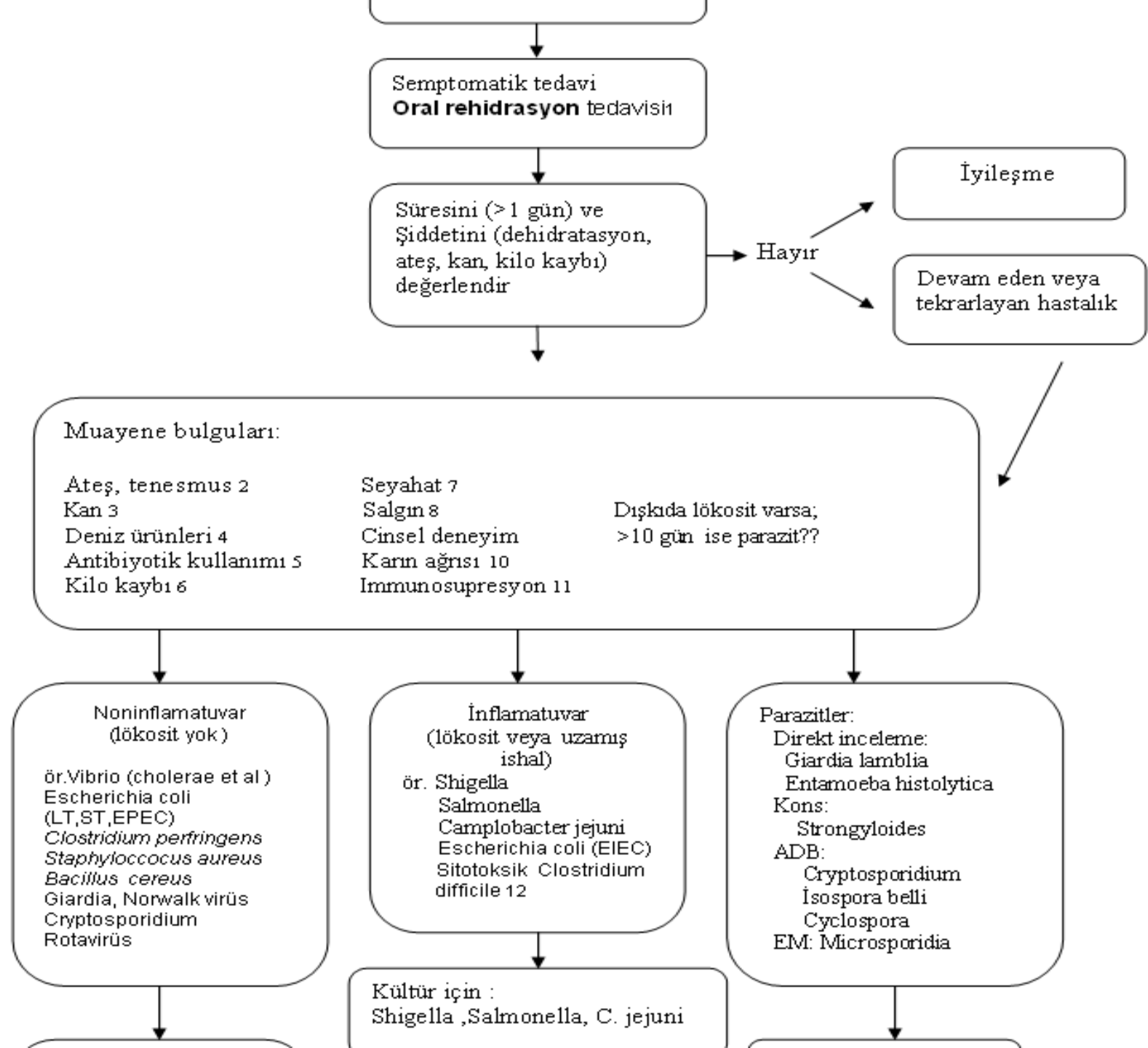
viral gastroenteritler klinik olarak diğer etkenler ile olanlardan ayırt edilemezler

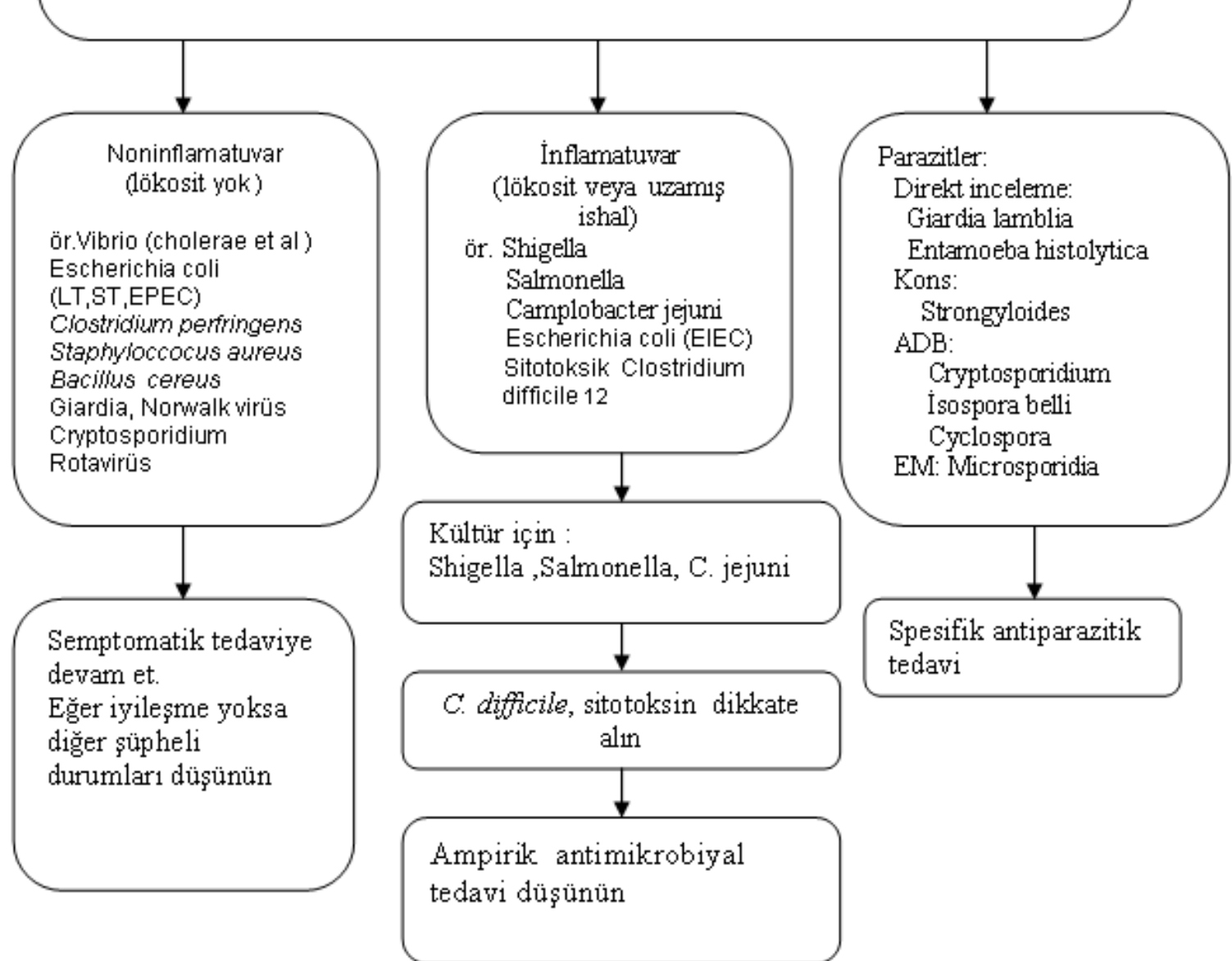
-
- dışkı-ağız bulaşmasının genel kurallarına uygun olarak bulaşırlar
 - Genellikle bu viruslar hücre kültüründe üretilemezler
-

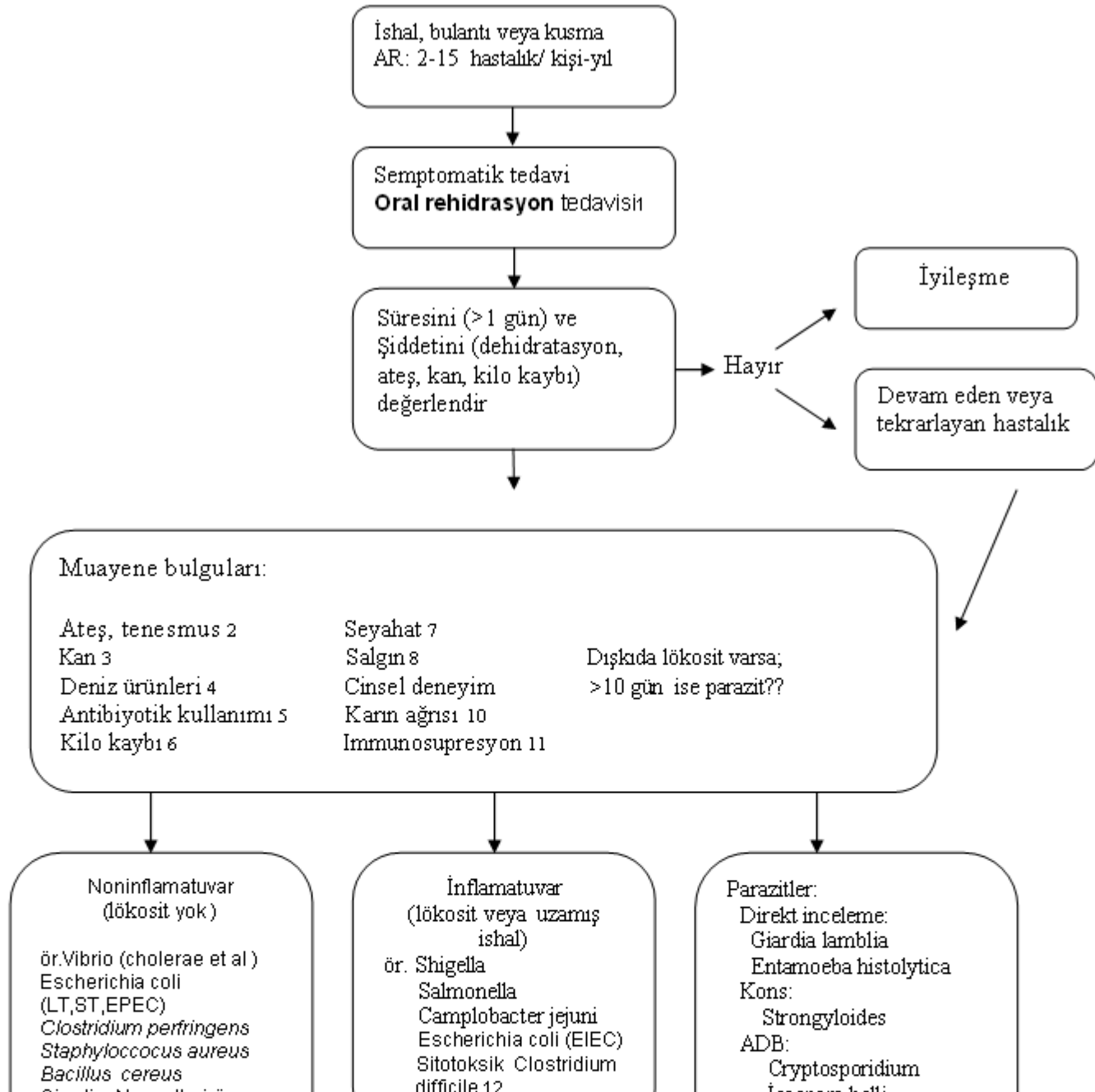
-
- Moleküler klonlamadan başlayarak, PCR gibi moleküler yöntemlerin yaygınlaşması ile bu virusların tanılarında büyük ilerlemeler kaydedilmiş ve bilinmeyen birçok özellikleri ortaya çıkarılabilmektedir
-











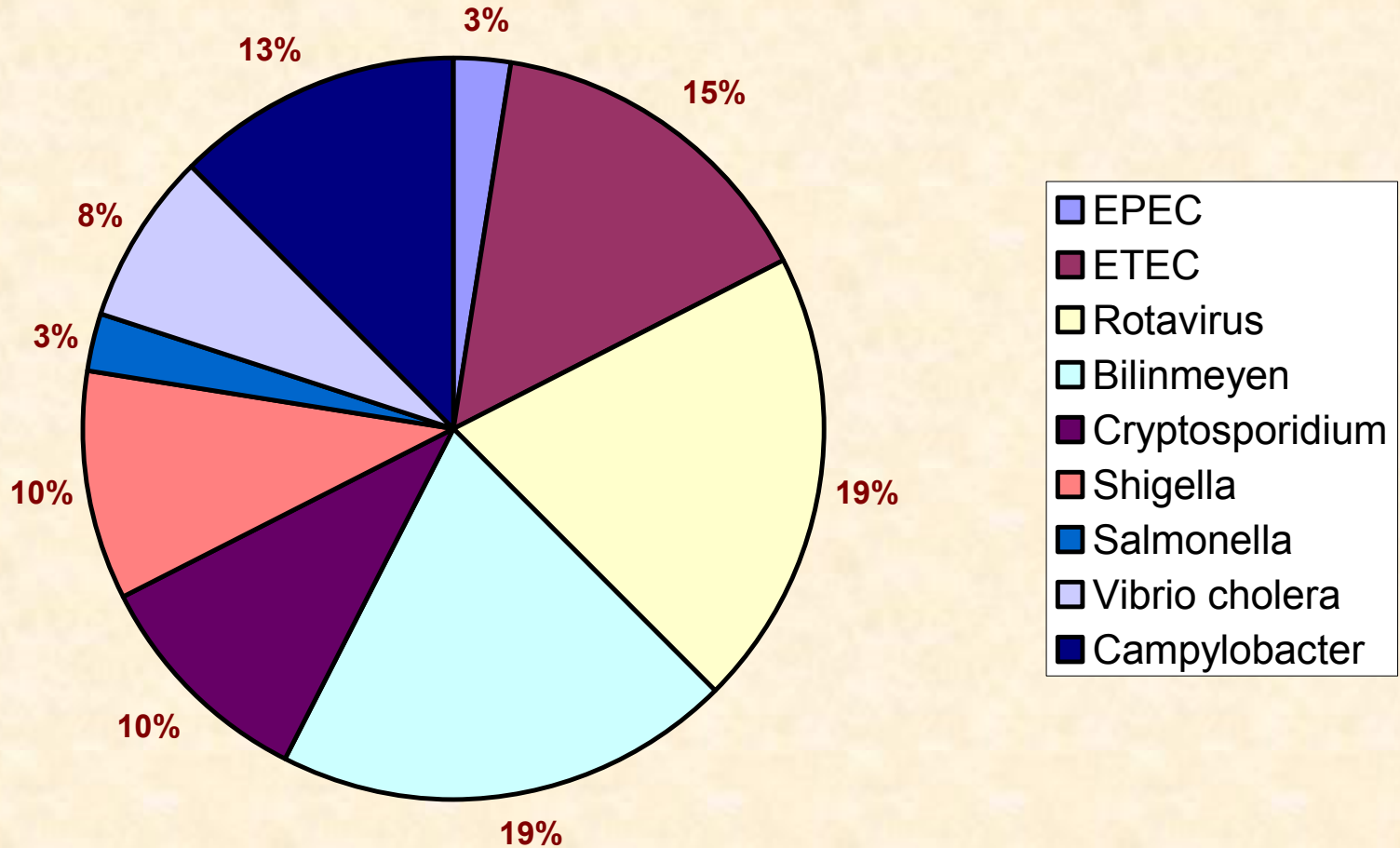
İshalin infeksiyöz etkenleri

Başlangıç Kaynak		
Besin zehirlenmesi (besinde önceden oluşan toksin ile)		
<i>Staphylococcus aureus</i>	1-6 saat	Krema, et, kümes hayvanı eti
<i>Clostridium perfringens</i>	8-20 saat	Tekrar ısıtılmış et
<i>Clostridium botulinum</i>	12-36 saat	Konserve besin
<i>Bacillus cereus</i>	1-20 saat	Tekrar ısıtılmış besinler
Barsak infeksiyonları		
Rotavirus	2-5 gün	Temas
Norovirus	1-2 gün	Temas (fokal-oral; dışkı-ağız)
Salmonella	1-2 gün	Yumurta
<i>Clostridium difficile</i>	1-2 gün	Fokal-oral
Shigella	1-4 gün	Fokal-oral
Campylobacter	1-4 gün	kümes hayvanı, evcil hayvanlar
<i>Vibrio cholerae</i>	2 gün	Fokal-oral
<i>Escherichia coli</i>	1-4 gün	Besin
<i>Yersinia enterocolitica</i>	günler-haftalar	Ev hayvanı (örn. köpekler)
<i>Giardia lamblia</i>	1-2 hafta	Kontamine su
<i>Entamoeba histolytica</i>	günler-haftalar	
<i>Cryptosporidium</i>	günler-haftalar	Fokal-oral, fırsatçı (örn AIDS'te)
<i>Isospora belli</i>		

Viral Gastroenteritler

- Bu viruslar
 - ❑ rotaviruslar başta olmak üzere,
 - ❑ kalisiviruslar
 - ❑ adenoviruslar
 - ❑ koronavirüsler
 - ❑ astroviruslar
 - ❑ diğer

Az gelişmiş ülkelerdeki çocuklarda ishale yol açan mikroorganizmalar ve oranları



Reoviruslar/Reoviridae

■ Orthoreoviruslar

- ❑ memeli reovirusları, reoviruslar
- ❑ İnsanda belirtisiz infeksiyona yol açarlar

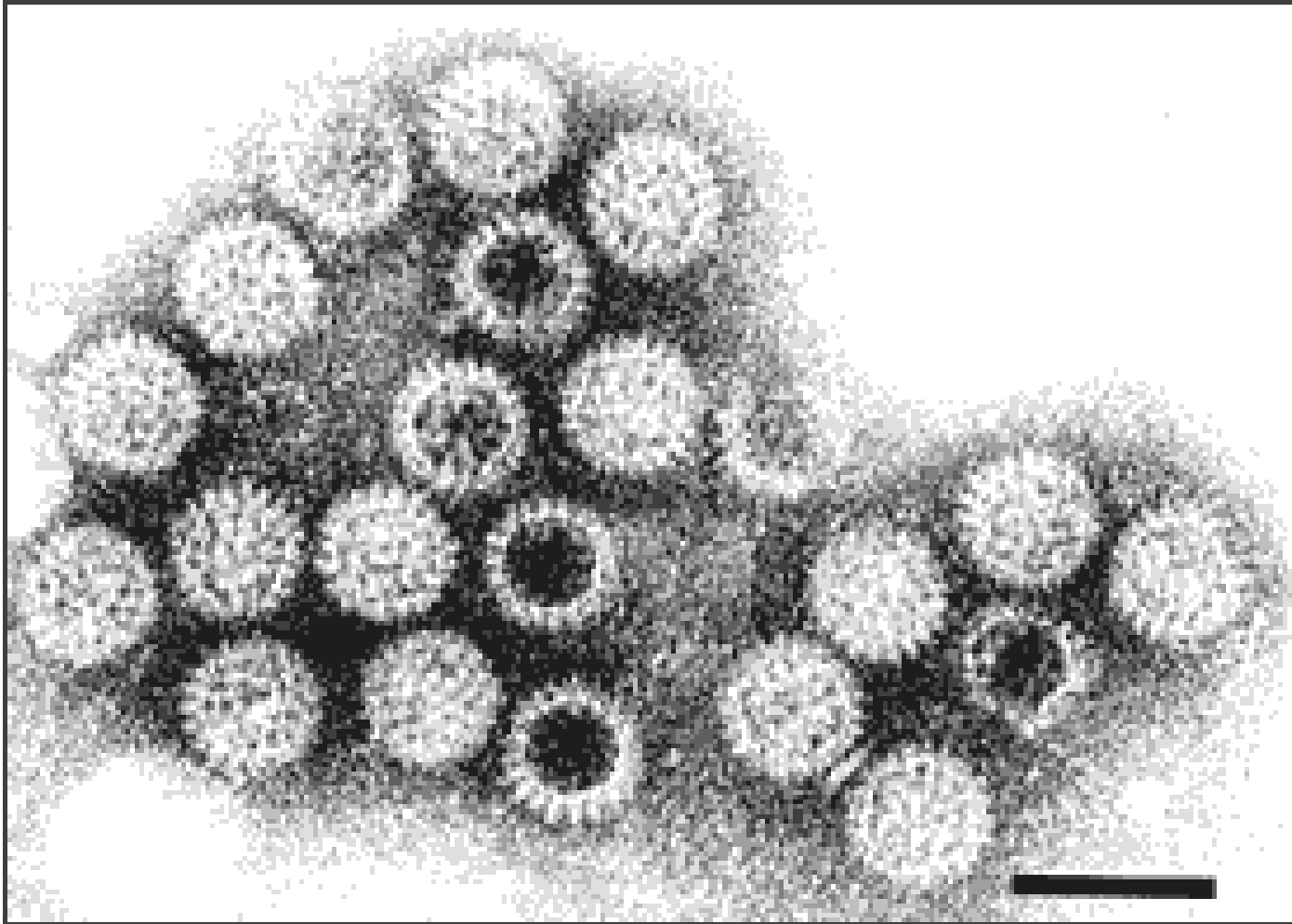
■ Rotaviruslar

- ❑ İnsanda infantil gastroenterit
 - ❑ Çok yaygın
-

Rotaviruslar/Yapı & replikasyon

- *rota* → Latince'den → tekerlek → ☺
elektron mikroskop görünüşü
- dsRNA → segmentli → 10-11 segment
- “segmentlerin reassortmanı” → hibrid virüslara yol açıyor

Elektron Mikroskobunda Rotavirus



Rotavirüsler

- Bebeklerde ishal
 - Birçok memeli hayvan ve kuşlarda
 - Viryon oda ısısında “stabil” ve dirençli
 - Deterjanlara
 - Değişen pH (3-10 arası)
 - Donma-çözünme
-

Rotaviruslar

- Serotipler
 - (VP7, VP4),
 - gruplar
 - (VP6)(A-G), altgruplar var
 - insanda: Group A, B, C
-

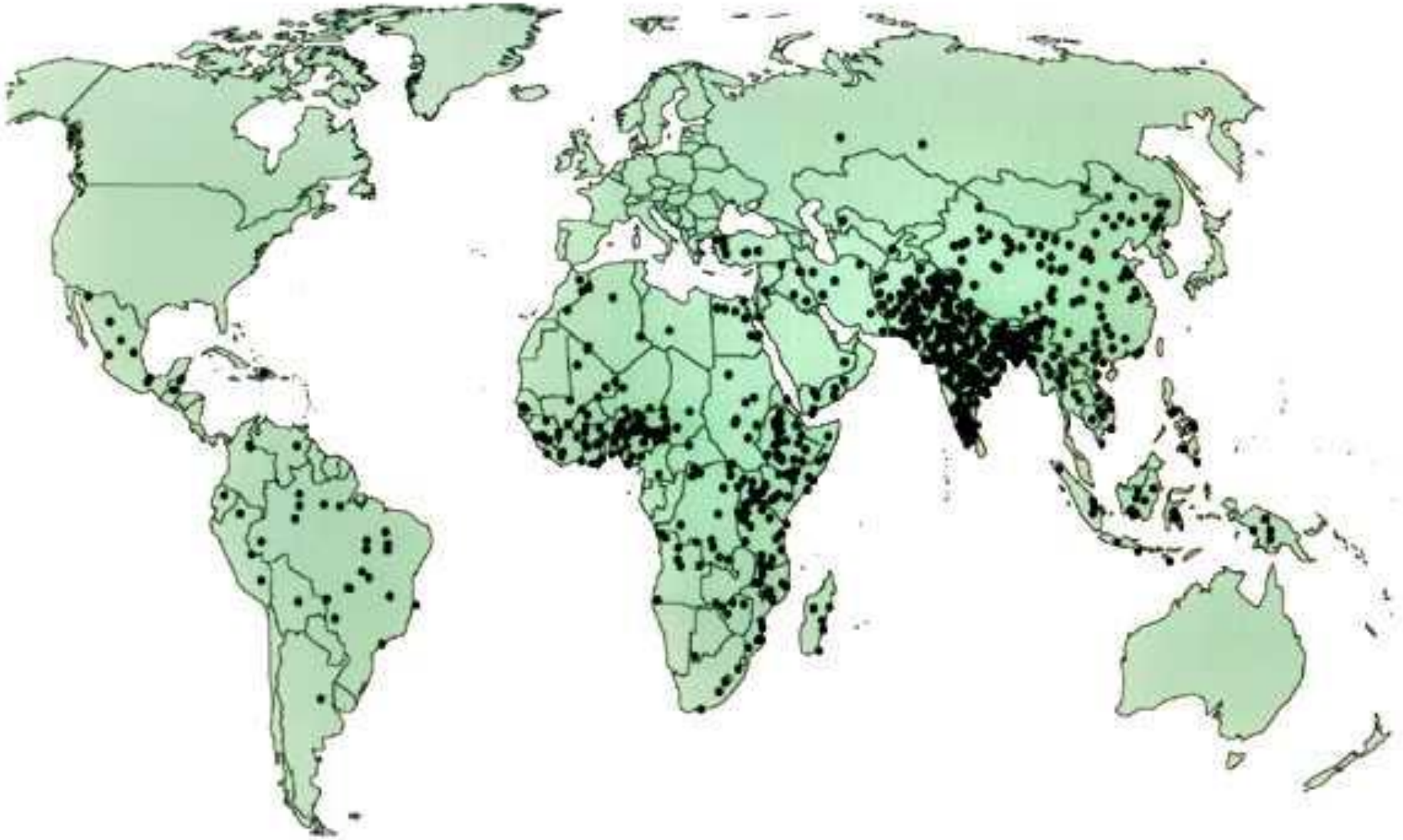
Rotaviruslar/Hastalık mekanizmaları

- yayılma:
 - fekal-oral,
 - solunum yolu: olası
- 10 virus partikülü yutulması → infeksiyon
- Sitolitik ve barsak epiteline toksin etkisi benzeri etki
 - Elektrolit kaybı ve
 - suyun geri emilememesi
- 24 ay altı bebeklerde çok önemli
 - Erişkinde belirtisiz

Rotaviruslar/epidemiyoloji

- Tüm dünyada küçük çocuklarda ishale yol açan mikroorganizmaların en önemlilerinden biri
 - 18 000 000 ishal/yıl
 - 600-800 000 ölüm/yıl

Yılda 800 000 ölüm



Korunma, kontrol ve tedavi

- Rotavirusla yaşamın çok erken döneminde karşılaşılır
 - Her yerde çok yaygın bulunmaları kontrol edilmelerini güçleştirir
 - “hospitalize” edilen hastalar izole edilmelidir
 - Özgül antiviral tedavi yoktur
 - Hastalığa ve ölüme yol açan dehidratasyon ve elektrolit dengesizliğidir
 - Tedavi : Destekleyici
-

Korunma, kontrol ve tedavi

- Birincil öncelik: AŞI
- A.B.D.'de kullanılan aşı
 - ROTATEQ

RotaTeq®
(Rotavirus Vaccine,
Live, Oral, Pentavalent)

 **MERCK & CO., INC.**
Whitehouse Station, NJ 08889, USA

RotaTeq®
[Rotavirus Vaccine, Live, Oral, Pentavalent]

DESCRIPTION

RotaTeq® is a live, oral pentavalent vaccine that contains five live, oral pentavalent rotavirus strains. The parent strains of the reassortants were isolated from rotaviruses that express one of the outer capsid proteins (G1, G2, G3, G4, or G5) and the other outer capsid protein (P2) from the reassortant.

“Reasortan” rotavirus aşısı

RotaTeq®
(Rotavirus Vaccine,
Live, Oral, Pentavalent)

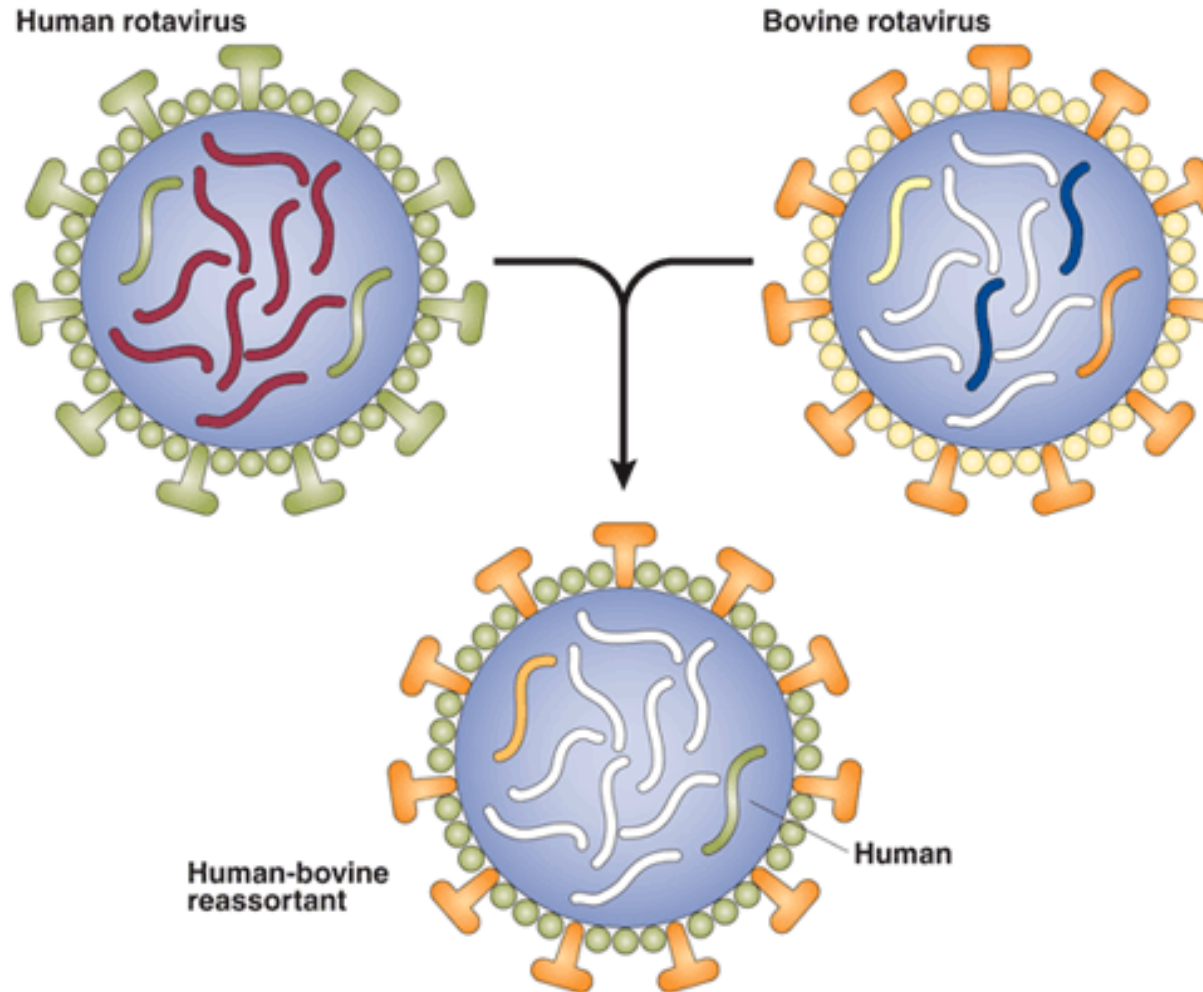


Figure 1. Rotavirus reassortant to generate oral live virus vaccine.

RotaTeq is a polyvalent vaccine consisting of five human-bovine reassortants: four G serotypes (G1, G2, G3, G4) representing 80% of the G strains circulating worldwide, and one P serotype representing >75% of the P strains circulating worldwide.

Viral Gastroenteritler/Diğer etkenler

- kalisiviruslar
- adenoviruslar
- Koronavirüsler
- astroviruslar

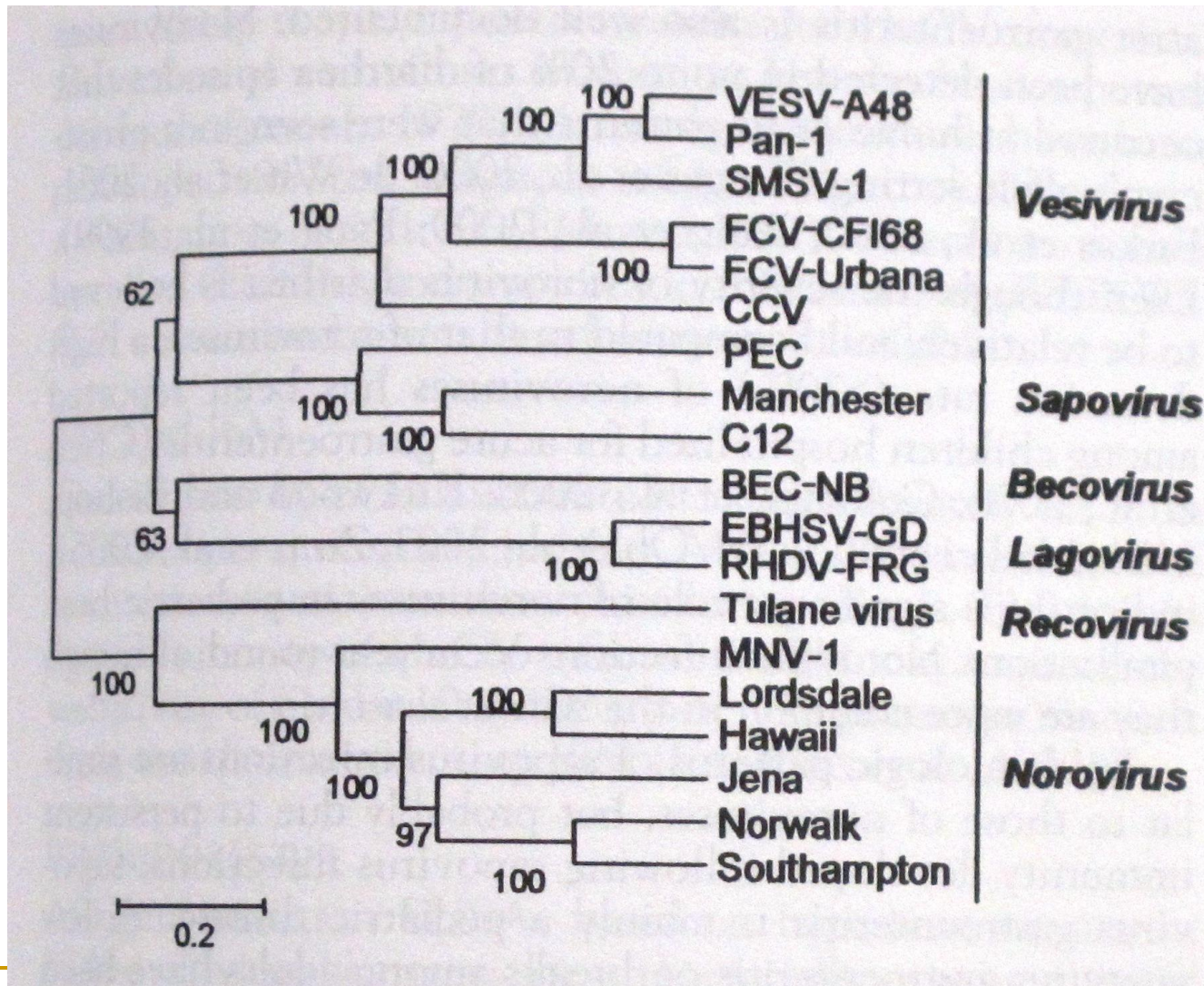
Caliciviruslar / *Caliciviridae*

- Noroviruslar (eskiden, “Norwalk-like” viruslar)
- Sapoviruslar (eskiden, “Sapporo-like” viruslar)

HuCVs → “human caliciviruses”

- Küçük-yuvarlak-zarfsız-”positive-sens”
ssRNA
-

Caliciviruslar/ *Caliciviridae*



Norwalk virusu

- 1929'da Zahorsky:
 - “Hyperemesis hemis”
 - “winter vomiting disease”
 - 1972'de Kapikian
 - Norwalk V
-

Caliciviruslar/ *Caliciviridae*

- Noroviruslar

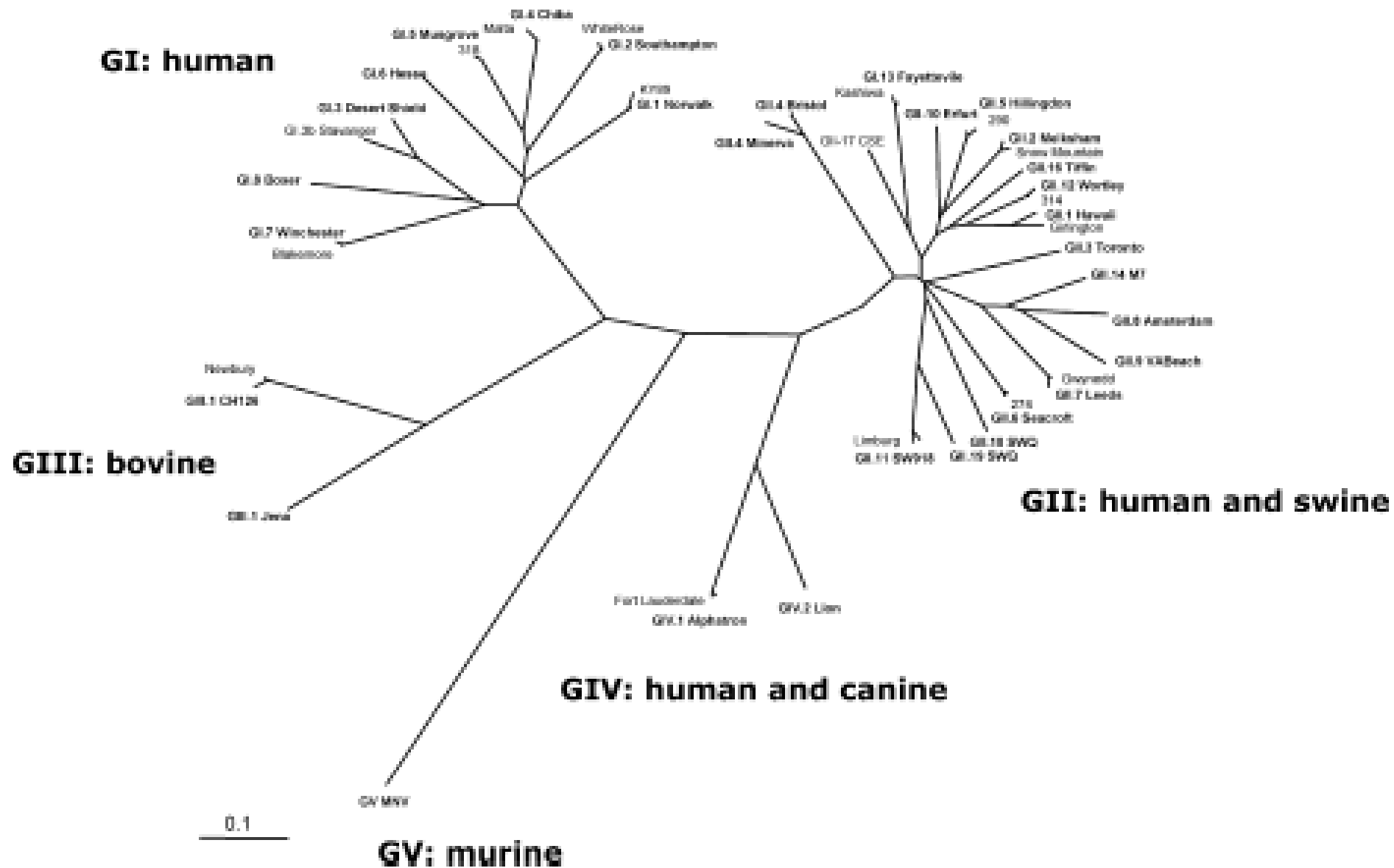
- 5 genogrup

- GG I
 - GG II
 - GG III
 - GG IV
 - GG V

- 25 genotip

- Örnek :

GG I/1 (genogrup I/genotip1: prototip Norwalk virusu)



Noroviruslar

- Çok bulaşıcı
- Çevreye “dirençli”
- **“Gelişmiş ve gelişmemiş ülkelerde, tüm yaşlarda bakteriyel olmayan akut viral gastroenteritin en önemli nedeni”**

Noroviruslar

- Büyük salgınlar
 - Hastaneler
 - Eğitim kurumları
 - Yaşlı bakım evleri
 - Kışlalar
 - Büyük yolcu gemileri
- Toplumların %70-90'ı, >5 yaş, seropozitif

Norovirus

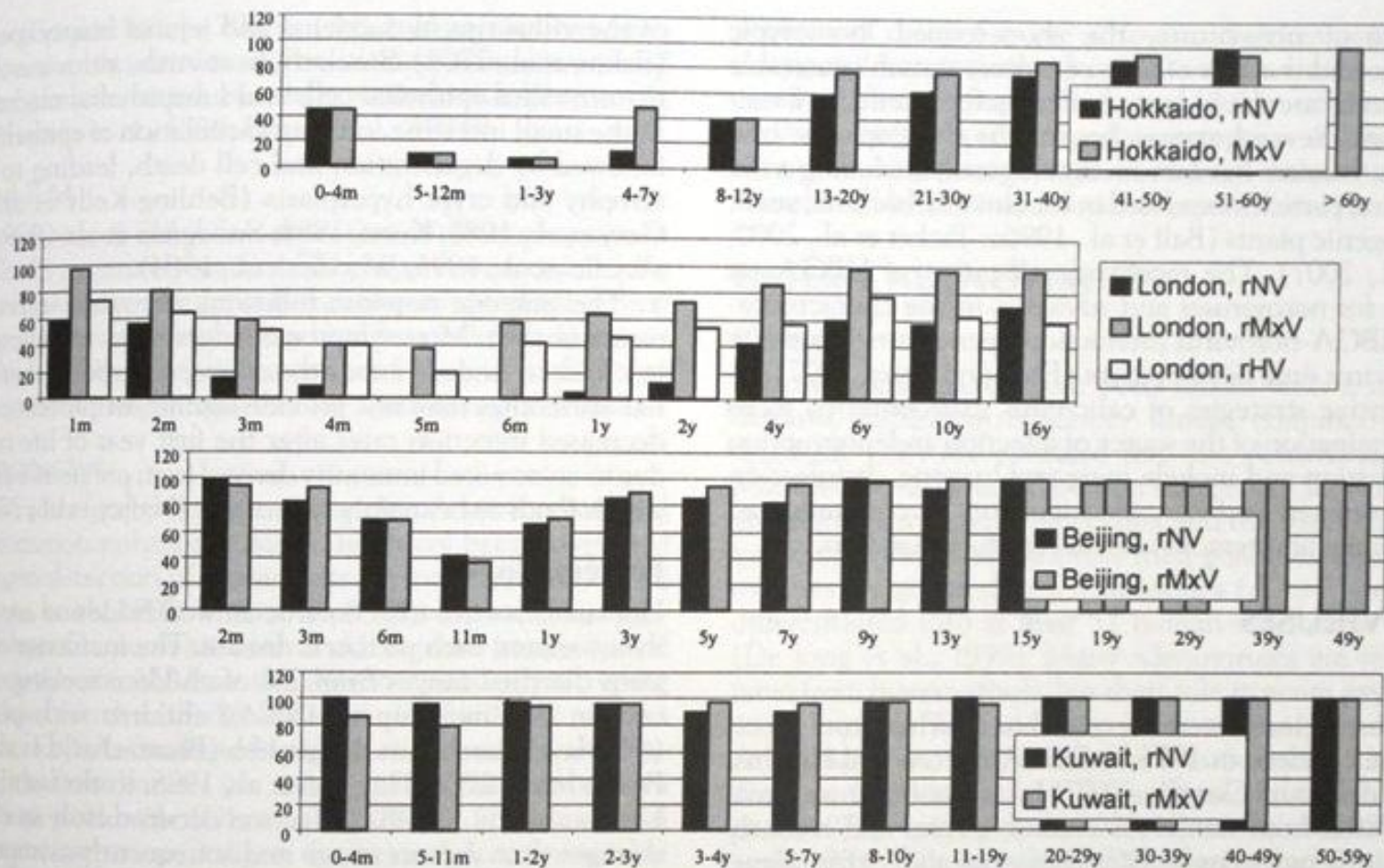


FIGURE 4 Antibody prevalence by age to noroviruses in Japan, United Kingdom, China, and Kuwait measured by antibody detection ELISAs utilizing recombinant norovirus virus-like particles (Jing et al., 2000). rNV, Norwalk (GGI/1); rMx, Mexico (GGII/3); rHV, Hawaii (GGII/1); m, months; y, years.

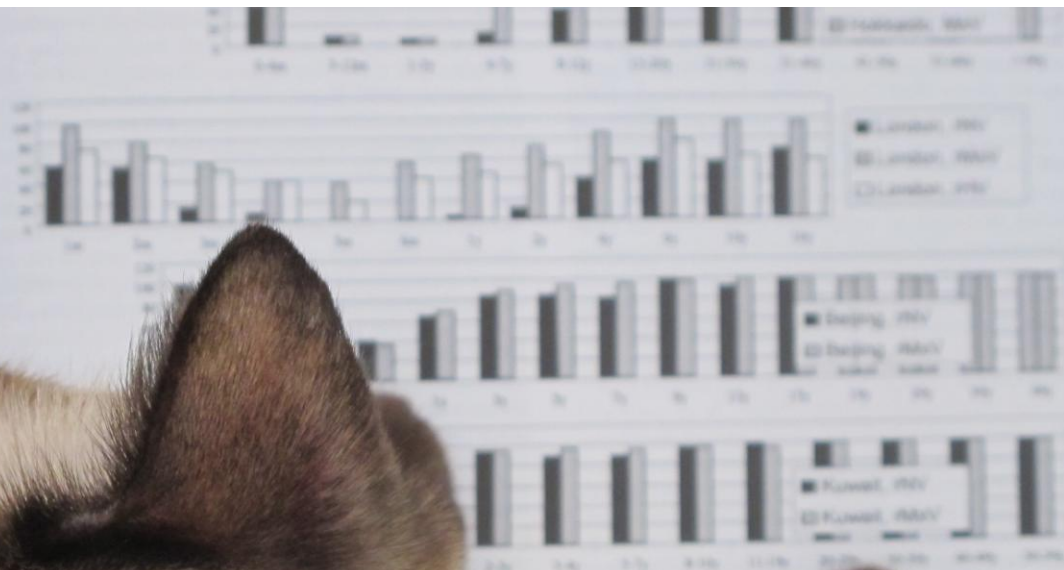
identified as a zoonotic disease in reservoirs of human infection, providing evidence for zoonotic transmission.

It is the most important gastroenteritis for all ages and countries. The major problem is their ability to cause large outbreaks. 82% of the nonbacterial gastroenteritis (Farkas et al., 2006; Satake et al., 2007). Such outbreaks are often associated with consumption of shellfish, military ships, military ships, contaminated food, or water as a source of infection.

99% Farkas et al., 2006; Satake et al., 2007). In 2006, 75% of the cases were attributed to norovirus. The spectrum of these infections is of the acute B group.

uses in norovirus infection. The most common cause of acute gastroenteritis is norovirus. It is a non-enveloped, single-stranded RNA virus. The virus is highly contagious and can be spread through person-to-person contact, contact with contaminated surfaces, or consumption of contaminated food or water. The virus is also found in the environment, particularly in shellfish. The virus is highly resistant to environmental conditions and can survive for up to 2 years in the environment. The virus is highly contagious and can be spread through person-to-person contact, contact with contaminated surfaces, or consumption of contaminated food or water. The virus is also found in the environment, particularly in shellfish. The virus is highly resistant to environmental conditions and can survive for up to 2 years in the environment.

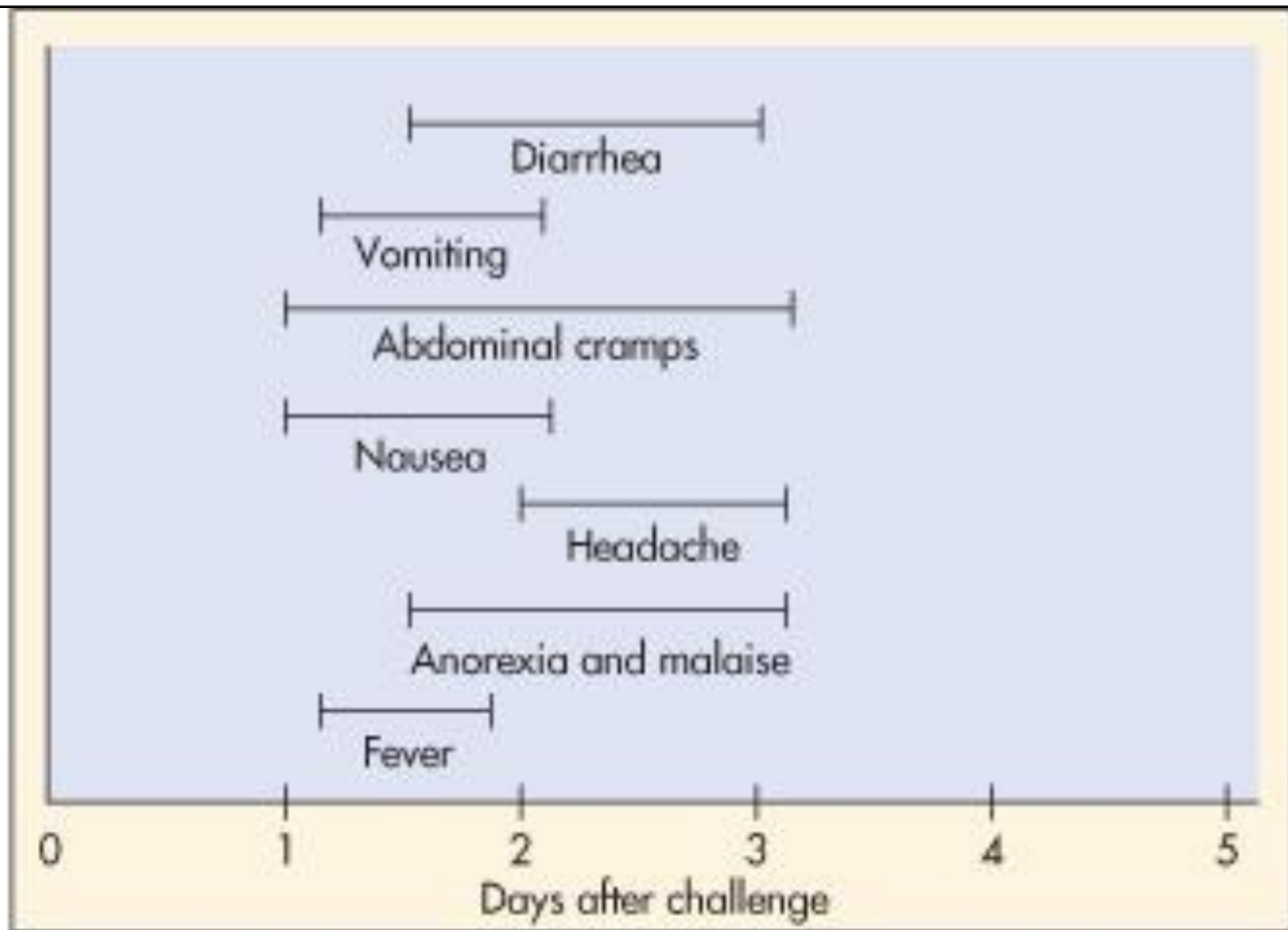
norovirus infections are similar to those of rotavirus infections.



to norovirus in Japan, United Kingdom, and Mexico (OCH) (Satake et al., 2007).

When the blood sample is collected, usually from the finger, it can be used to detect the virus (Jung et al., 2007).

For clinical and epidemiological studies, the most sensitive and specific genetic detection method is the design of primers targeting the conserved region of the viral genome. Highly sensitive and specific primers have been designed for the detection of norovirus (Kageura et al., 2002; Farkas et al., 2006; Satake et al., 2007). The use of these primers allows for the detection of norovirus in a variety of samples, including stool, urine, and blood.



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Figure 58-3 Response to ingestion of Norwalk virus. Symptoms vary in severity.

Noroviruslar ve insan kan grupları ilişkisi

“Bazı norovirus tipleri ve kan grupları (ABO, Lewis ve sekretuvar) arasında “spesifik” ilişki var”

Noroviruslar ve insan kan grupları ilişkisi

- 8 farklı reseptör bağlanma paterni
- Prototip “Norwalk” virusu paterni:
 - A ve O Ag’leri ve daha az, B Ag’ne bağlanma
- Bağlanma paterni ve klinik infeksiyon arasında tam korelasyon
- İnsan norovirusları; hayvan kan grubu Ag’i ilişkisi de var..
- Zoonoz???

İngiltere'de Norovirus salgını

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3.30pm GMT update

Vomiting virus closes hospital wards

David Batty and agencies

guardian.co.uk, Friday January 4 2008

[Article history](#)

Dozens of hospital wards across the UK have been forced to close due to outbreaks of a winter vomiting virus.

The ward closures come amid the worst outbreak of the bug, which causes vomiting and diarrhoea, in five years.

More than two million people across the UK have contracted the norovirus this

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The ward closures come amid the worst outbreak of the bug, which causes vomiting and diarrhoea, in five years.

More than two million people across the UK have contracted the norovirus this winter with around 100,000 people a week catching the bug, according to doctors.

Infections are predicted to peak this month, with the Royal College of GPs predicting up to 200,000 new cases per week as children return to school and pass on the bug to their parents.

İngiltere'de Norovirus salgını

Norovirus outbreak closes wards

Four wards have now been completely closed at a Dorset hospital after confirmed cases of the Norovirus.

The Royal Bournemouth Hospital is also restricting visiting on all wards to next of kin only.

Two wards were temporarily closed on 15 November after an outbreak of vomiting and diarrhoea.



Four wards have been closed for the "protection of patients"

In a statement, The Royal Bournemouth and Christchurch

İngiltere'de Norovirus salgını



Norovirus outbreak affects two hospitals

Thu, February 28 2008

By Reporter, newburytoday.co.uk

Email: newburytoday@newburynews.co.uk

Phone: 01635 564631

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THE Royal Berkshire Hospital imposes restricted admissions to five of its wards

THE Royal Berkshire Hospital in Reading has imposed restricted admissions to five of its wards following incidents of diarrhoea and vomiting sparking fears of a new Norovirus outbreak.

New patients will not be admitted onto the five wards until the viruses have been cleared up.

NHS

**HEART of
ENGLAND**
NHS Foundation Trust

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Good Hope Hospital



Good Hope Hospital

Rectory Road,
Sutton Coldfield,
Birmingham,
B75 7RR

General enquiries telephone

Good Hope Hospital serves the
part of south east Staffordshire
Tamworth. The catchment popu

Categorized | **Good Hope Hospital**

Major norovirus outbreak update – Good Hope visiting arrangements

Posted on 11 March 2010. Tags: [Good Hope Hospital](#), [norovirus](#), [visiting times](#)

(Please note that this does not affect Heartlands or Solihull Hospitals)

As of March 11th, 2010, Wards 7, 9, 14 and 18 are still currently closed to all visitors. Patients on all other wards are now allowed 1 visitor per day.

News Shopper

UPDATE - HEALTH: Norovirus outbreak shuts down PRUH

2:00pm Thursday 18th February 2010

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By [Robert Fisk](#) »

PRINCESS Royal University Hospital services have been shut down because of the continuing norovirus outbreak.

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PRINCESS Royal University Hospital services have been shut down because of the continuing norovirus outbreak.

Inpatient admissions, planned surgery, accident and emergency services and the Urgent Care Centre are all affected.

And no visitors are allowed at the Farnborough hospital except in the cases of parents visiting children, partners accompanying expectant mothers and close relatives of critically ill patients.

“the winter vomiting bug”

- Eight hospital wards in Lothian have been closed on account of an outbreak of norovirus, the winter vomiting bug.
 - The health board claimed that till now 14 patients were showing symptoms of the seasonal bug. There were 532 confirmed cases of norovirus in Scotland at the end of December, compared with 133 in December 2008.
 - Meanwhile, three wards at Dumfries Infirmary were reopened after an outbreak affected more than 100 patients there.
-

Norovirus outbreak at an international scout jamboree in the Netherlands, July-August 2004: **international alert**



Europe's leading journal on infectious disease epidemiology, prevention and control

- 250 hasta/4500 katılımcı
- Ülkeler
 - Belçika, U K, Almanya, Ukrayna, Sırbistan, Kosova, **Turkey**, A.B.D., Avustralya, Hong Kong, Indonezya, Pakistan, Cezayir, Tunus, Nijerya, Kenya

Hollanda'da Uluslararası İzci Festivalinde Norovirus Salgını, Temmuz-Ağustos 2004 : uluslararası uyarı

- 250 hasta/4500 katılımcı
 - Ülkeler
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22.05.2008 21:40:00

Aksaray'daki norovirüs tehlikesi sürüyor

 HABER

Yazı b



Aksaray Valisi Sebati Buyuran, ishal, kusma ve karın ağrısı ve belli bir yükselişten sonra iniş geçeceğini, ancak bunun belli devam edeceğini, birden bire kesilmeyeceğini söyledi.

Türkiye`de ilk norovirüs salgını

Sağlık Bakanlığı, Aksaray"da 8 bin 500 kişiyi yatağa düşüren hastalığın, "Türkiye"deki ilk norovirüs salgını olduğunu" açıkladı. Bakanlığın bir iyi bir de kötü haberi var. Önce kötü haber: İnsandan insana bulaşmaya başlayan virüs bir süre daha etkisini sürdürecektir. İyi haberse ilde suya bağlı tifo ya da kolera salgını riski olmaması.

Sağlık Bakanlığı Müsteşar Yardımcısı Turan Buzgan, "Bizim suyumuzda hiçbir sorun yok" diyen Aksaray Belediye Başkanı Nevzat Palta"yı, ismini anmaksızın düzeltti. Tüm açıklamalarının delillere dayandığını söyleyen Buzgan, "Bakanlığın söylediğinin aksine şeyler ifade etmenin doğru olmadığını" vurguladı. Peki Bakanlık, salgına dair ne sonuca vardı?

Epidemiology and Infection Cambridge University Press
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doi:10.1017/S0950268808000630

Original Papers

Outbreaks of noroviral gastroenteritis in Florida, 2006–2007

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^{a4} Bureau of Community Environmental Health, Division of Environmental Health, Florida Department

SUMMARY

Noroviruses are an important cause of sporadic cases and outbreaks of acute gastroenteritis. During 2006–2007, we conducted a statewide survey to characterize norovirus outbreak activity in Florida. We identified 39 of Florida's 67 counties. About 44% of outbreaks were laboratory confirmed as norovirus and 10% of outbreaks were classified as foodborne. The median number of ill persons per outbreak was 15. Outbreak activity in Florida was widespread, persistent, and consistent with increased activity observed in other parts of the United States.

Norovirus salgınları

Florida, 2006-2007

- Temmuz 2006-Haziran 2007 arasında
 - 257 norovirus gastroenteriti
 - 39 şehirde
 - %44'ü laboratuvarca doğrulanmış (norovirus)
 - %63'ü bakım evlerinde
 - %10'u besinle ilişkilendirilmiş
 - 7880 kişi hastalanmış

(Accepted March 13 2008)

2006-2007; Norovirus



ABD (Norovirus Activity ---United States, 2006--2007)

FIGURE. Percentage of emergency department visits for nausea, vomiting, or diarrhea, by surveillance week and month — Boston, Massachusetts, July 2004–April 2007

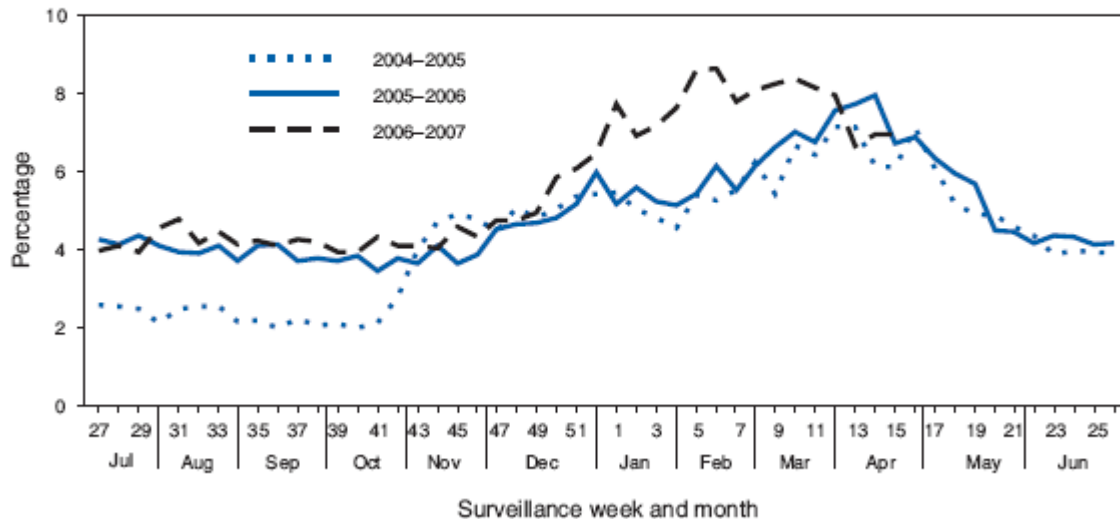
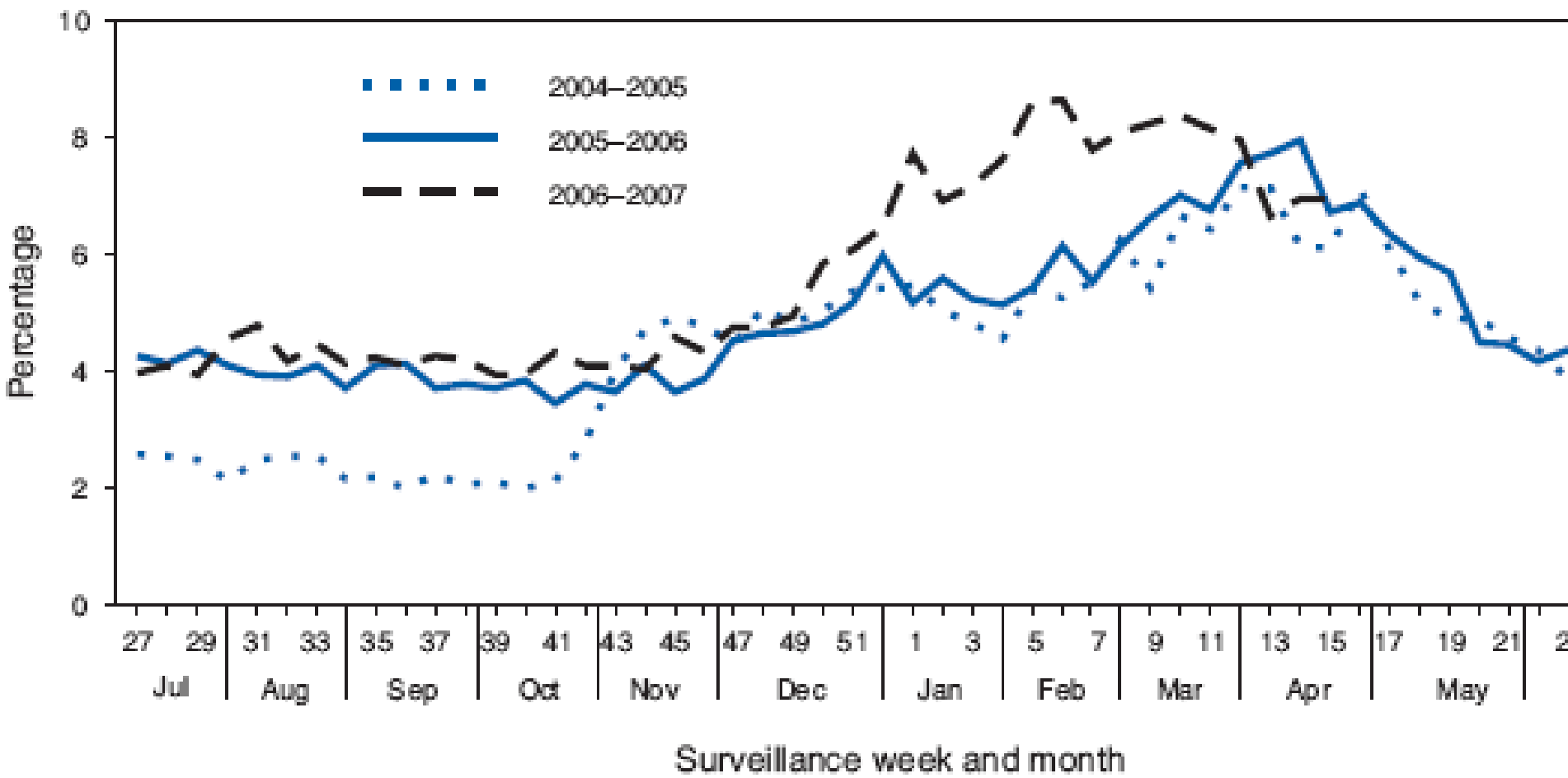


FIGURE. Percentage of emergency department visits for nausea, vomit, or diarrhea, by surveillance week and month — Boston, Massachusetts, July 2004–April 2007



Nasıl/Neden salgın yapıyor?

- Düşük infeksiyöz doz : <10 virus partikülü
- Belirtiler geçtikten sonra virus atılımının uzun süre devam etmesi
- Virusun direnci
 - Yüksek klor konsantrasyonları
 - Donma
 - 60 dereceye kadar ısı
- “reinfeksiyonlar”
 - Uzun süreli bağışıklık yok
 - “çapraz direnç” az

Norovirus salgını tanısı...

- Etkilenen kişilerin yarısında kusma olması
- Ortalama inkübasyon döneminin 24-48 saat olması
- Hastalık süresinin ortalama 12-60 saat olması
- Dışkı kültürlerinde herhangi bir bakteriyel patojenin bulunmaması

“Durumunda salgın >%80 NOROVIRUS”

Başka viruslar

- “Coronavirus”lar
 - Toroviruslar
 - Aichi virusu
 - Picobirnaviruslar
-

Sapoviruslar

- Çok bulaşıcı
 - Çevreye “dirençli”
 - Daha çok çocuklarda (Erişkinlerde de infeksiyon yok değil)
-

Bir Yaş Altı Çocuklarda Rotavirüs Gastroenteriti

İlke Özahi İpek, Cem Paketçi, Abdulkadir Bozaykut, Lale Seren

Zeynep Kamil Kadın Ve Çocuk Hastalıkları Eğitim Ve Araştırma Hastanesi, İstanbul

Adres:Çamlık Mah. Semerkant Bul. Gülistan Evleri No: 34/5 Aydos Pendik İstanbul – Türkiye

Elazıę Yöresinde Çocuklarda Akut Enfeksiyöz Kış İshalleri

Kaan Demirören¹, Saadet Demirören², Mehmet Cudi Ekingen³

¹Özel Çaęrı Tıp Merkezi Çocuk Sağlığı ve Hastalıkları Klinięi, Elazıę

²Elazıę Eğitim ve Arařtırma Hastanesi Çocuk Sağlığı ve Hastalıkları Klinięi, Elazıę

³Elazıę Eğitim ve Arařtırma Hastanesi Mikrobiyoloji Bölümü, Elazıę

Detection of Rotavirus and Enteric Adenovirus Antigens in Outpatients with Gastroenteritis

Ayaktan İzlenen Gastroenteritli Hastalarda Rotavirüs ve Enterik Adenovirüs Antijenlerinin Araştırılması

Abbas YOUSEFI RAD, MD,^a
Ayşegül GÖZALAN, MD^b

ABSTRACT Objective: One of the most important reasons of mortality, especially in childhood infectious diarrheas. As their epidemiology is not well known in Turkey, the aim of this study characterize the distribution of gastroenteritis caused by rotavirus and adenovirus by age group.

BİR YENİDOĞAN YOĞUN BAKIM ÜNİTESİNDE NOZOKOMİYAL ENFEKSİYONLAR VE KLEBSIELLA SORUNU *NASOCOMIAL INFECTIONS IN A NEONATAL INTENSIVE CARE UNIT AND TROUBLE WITH KLEBSIELLA*

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Prevalence of Microorganisms in Patients Presented with Gastroenteritis to the Emergency Department

Acil servise başvuran gastroenteritli hastalarda etken mikroorganizmaların prevalansı

Türkiye Acil Tıp Dergisi - *Turk J Emerg Med* 2008;8(3):114-120

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Malatya İshal Salgını (2005): Retrospektif İnceleme¹

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AKUT GASTROENTERİTLİ OLGULARIN DIŞKI ÖRNEKLERİNDE BAZI BAKTERİ VE VİRÜSLERİN ARAŞTIRILMASI*,**

Vesile YAZICI*, Berna GÜLTEKİN**, Neriman AYDIN**, Yusuf Ziya ARAL***,
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ACİL SERVİSE BAŞVURAN BEŞ YAŞ ALTINDAKİ ÇOCUKLARDA YAZ DÖNEMİ İSHALLERİNİN SOSYODEMOGRAFİK DAĞILIMI

SOCIO-DEMOGRAPHIC DISTRIBUTION OF SUMMER SEASON DIARREHEA IN CHILDREN BELOW 5 YEARS WHO WERE TAKEN TO THE EMERGENCY SERVICE

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Tablo 3: Değişik çalışmalarda ishelli çocuk olgularda bildirilen rotavirüs ve adenovirüs pozitiflik oranları.

Çalışma	Rotavirüs pozitifliği (%)	Adenovirüs pozitifliği (%)	Yapıldığı il
Nazik ve ark (5)	20.6	-	İstanbul
Biçer ve ark (6)	32	16.2	İstanbul
Öğünç ve ark. (7)	6,8	-	Antalya
Öner ve ark (8)	24.3	-	Edirne
Ekşi ve ark (9)	27.5	-	Gaziantep
Kükner ve ark (10)	25.5	-	Ankara
Topkaya ve ark. (11)	14	44	İstanbul
Karadağ ve ark (12)	36.8	-	Ankara
Yaman ve ark (13)	20.39	-	Adana
Tünger ve ark. (14)	17.4	7.2	Manisa
Bulut ve ark (15)	21	-	Malatya
Gül ve ark (16)	25.7	4.7	K. Maraş
Elazığ Yöresinde Çocuklarda Akut Enfeksiyöz Kış İshalleri	26.5	14.7	Elazığ

TÜRKİYE'DE 2008 YILINDA ORTAYA ÇIKAN İLK NOROVİRUS SALGINININ LABORATUVAR SONUÇLARININ DEĞERLENDİRİLMESİ

EVALUATION OF LABORATORY DIAGNOSIS OF THE FIRST NOROVIRUS OUTBREAK IN TURKEY IN 2008

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Tablo 1. Norovirus Antijen ve Nükleik Asit Pozitifliğinin Şehirlere Göre Dağılımı

Şehirler (toplam örnek sayısı)	NoV antijen-ELISA Pozitif Sayı (%)	NoV gerçek zamanlı PCR Pozitif Sayı (%)
Aksaray (n= 7)	4 (57)	5 (71)
Şereflikoçhisar (n= 4)	1 (25)	1 (25)
Kırşehir (n= 25)	7 (28)	6* (40)
Adana (n= 14)	1 (7)	1 (7)
Toplam (n= 50)	13 (26)	13* (33)

Tablo II. Norovirus Antijen ve Nükleik Asit Sonuçları ile Genotiplerin Şehir ve Olgulara Göre Dağılımı

Şehirler	Olgu no	NoV antijen-ELISA (Ridascreen)	NoV gerçek zamanlı PCR (Roche)	NoV genotipi
Aksaray	1	+	+	GI
	2	+	+	GI
	3	+	+	GII
	4	-	+	GI
	5	-	+	GI
Adana	6	+	+	GI
Şereflikoçhisar	7	+	+	GI
Kırşehir	8	+	+	GI
	9	+	+	GII
	10	+	+	GI
	11	-	+	GI
	12	-	+	GII
	13	-	+	GII

Norovirus seasonality and the potential impact of climate change

J. Rohayem

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Progress in understanding norovirus epidemiology

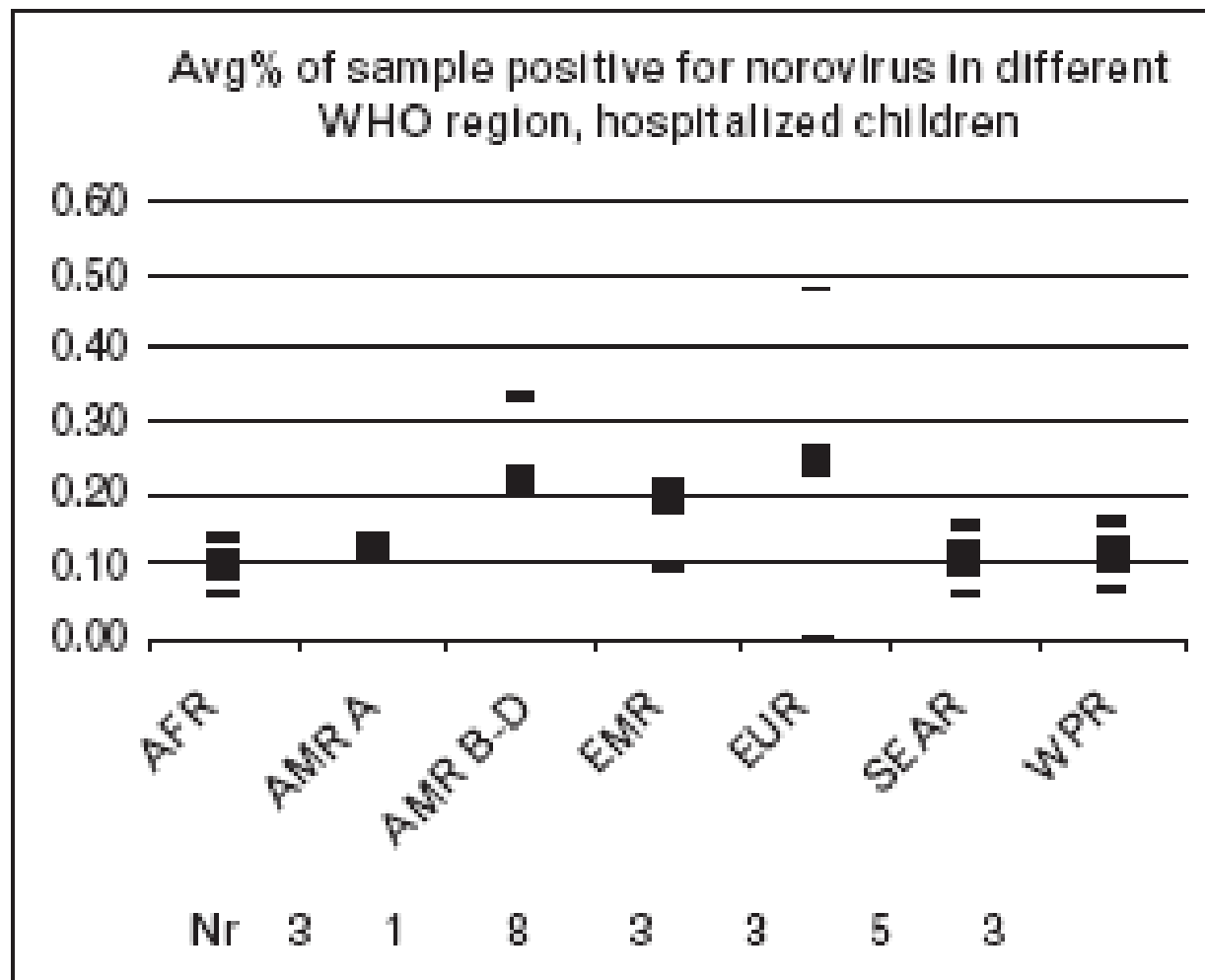
Marion Koopmans

**Current Opinion in Infectious Diseases 2008,
21:544–552**

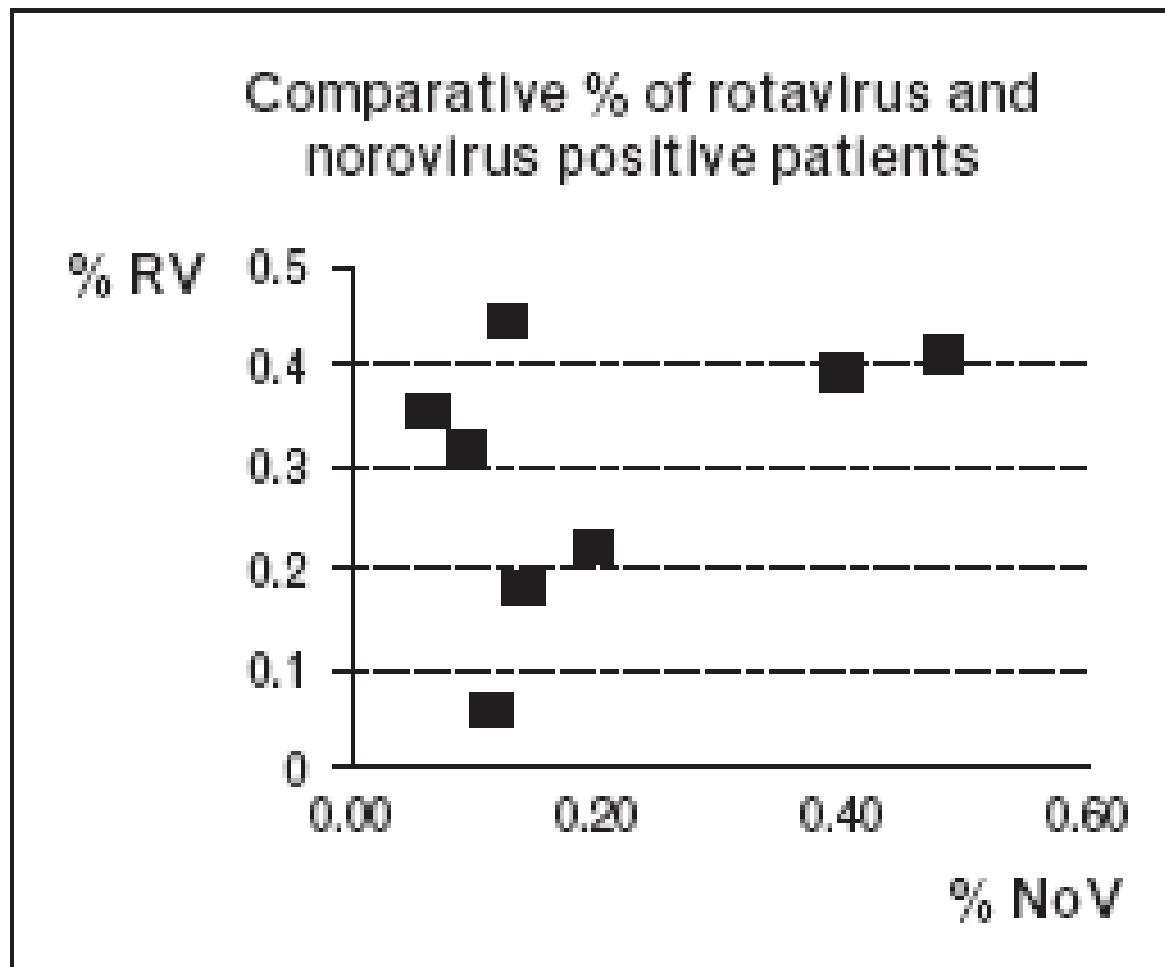
Table 1 Summary table of studies looking at norovirus prevalence in symptomatic persons by WHO region

Region	Country	Study population	N	N pos	Percentage	Period start	Period end	Method
AFR B	Madagascar	Children, hospitalized	237	14	6	May-04	May-05	PCR
AFR D	Ghana	Children, outpatient	243	23	9	Nov-05	Jan-06	PCR
AFR E	Tanzania	Children, hospitalized	270	37	14	Dec-05	Feb-06	EIA
AMR A	Canada	Children, community	1166	141	12	Jan-03	Apr-04	PCR
AMR B	Mexico	Infants 5–15 month, cc ^b	127	38	30	June-98	Aug-98	PCR
AMR B	Brazil	Children, hospitalized	117	18	15	Jan-98	May-05	PCR
AMR B	Brazil	Children, hospitalized	318	65	20	Jan-04	Dec-04	PCR
AMR B	Brazil	Children, hospitalized	68	27	40	July-04	Nov-06	PCR
AMR B	Brazil	Children, community	44	4	9	July-04	Nov-06	PCR
AMR B	Brazil	Children, hospitalized	233	34	15	May-04	Apr-05	EIA
AMR D	Nicaragua	Children, hospitalized	133	20	15	Mar-05	Feb-06	PCR
AMR D	Nicaragua	Children, community	409	45	11	Mar-05	Feb-06	PCR
EMR B	Tunisia	Children, hospitalized	252	49	19	Jan-03	June-05	PCR
EMR B	Tunisia	Children, outpatient	380	36	10	Jan-03	June-05	PCR
EMR D	Iraq	Children, hospitalized	260	78	30	Apr-05	May-05	PCR
EUR A	UK	Children, hospitalized	259	36	14	Jan-00	Dec-03	PCR
EUR A	UK	Children, cc ^a	203	18	9	Jan-00	Dec-03	PCR
EUR A	Italy	Children, hospitalized	192	92	48	Jan-04	Dec-04	PCR
EUR A	Ireland	Children, hospitalized	220	24	11	Jan-06	Mar-07	PCR
EUR B	Albania	Children, hospitalized	313	19	6	NR	NR	PCR
SEAR B	Thailand	Children, hospitalized	248	35	14	Jan-02	Dec-03	PCR
SEAR B	India	Children, hospitalized	192	24	13	Dec-05	Feb-07	PCR
SEAR D	Bangladesh	Children, hospitalized	917	41	4	Oct-04	Sep-05	PCR
SEAR D	India	Children, hospitalized	350	53	15	Dec-01	Dec-04	PCR
SEAR D	India	Children, community	673	44	7	Dec-01	Dec-04	PCR
WPR A	Japan	Children, hospitalized	515	66	13	Sep-01	Aug-03	PCR
WPR B	Korea	Children, setting?	762	114	15	Nov-05	Nov-06	PCR
WPR B	Viet Nam	Children, hospitalized	502	32	6	Dec-05	Nov-06	PCR

^aRegions, ^b cc, community cohort. Adapted with permission from (http://www.who.int/choice/demography/by_country/en/index.html).



The number of studies for which the data was summarized is listed below the X-axis. The Y-axis is the proportion of children with gastroenteritis testing positive for norovirus (median $\pm$ SD).



Data suggests that noroviruses may be as common as rotavirus as cause of illness in children. NoV, norovirus; RV, rotavirus. Original figure summarizing data from [9*,14*,17**,19**,20*,21,22*,24].

Table 2 Summary table of published outbreak reports and their key messages

Country	Setting	Source	Message	References
Australia	Restaurant	Shellfish	Multiple strains, recombination risk	[42 [*]]
Austria	Restaurant	Ill food handler	Need for communication of health risks	[43]
Austria	Hospital	Unknown	Impact new strains	[44 [*]]
Canada	Community	Oysters	Multiple strains make tracing difficult	[45]
Europe	Cruise ships	Community	Cruises as indicator for novel strains in community	[46 [*]]
Finland	Canteen	Raw vegetables	Largest food-borne outbreak Finland, no source	[47 [*]]
Italy	Resort	Shellfish or water	Need for more in depth investigations	[48]
Netherlands	Buffet	Ill food handler	Need for communication of health risks	[49]
New Zealand	Park	Shellfish	Problems of raw oysters	[50]
Scotland	Hospital	Community	Repeated introduction to ER	[51 [*]]
Sweden	Recreation	Lake water	Widespread outbreak	[52 [*]]
USA	Hospital	Unknown	Costs > \$650 000, attack rate highest in HCW	[53 ^{**}]
USA	Public pool	Pool	Maintenance failure, suggesting effect of chlorination	[54 [*]]
USA	Houseboats	Fomite	Recommendation for decontamination	[55 [*]]
USA	Shelter	Multiple	Complication in disaster refugees	[56 ^{**}]
USA	Resort	Well water	Multiple causes of diarrhea	[57 [*]]
USA	Cruise ship	Unknown	Importance of passenger behavior	[58]

ER, emergency room; HCW, healthcare workers.

Systematic Literature Review of Role of Noroviruses in Sporadic Gastroenteritis

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and Umesh D. Parashar^{*}

Table 1. Summary of studies examining prevalence of NoV in persons with severe sporadic AGE, using RT-PCR for studies >12 months' duration, community and outpatient clinics*

Ref	Country	Study duration, mos	Age group, y	No. AGE cases	No. NoV positive (single and mixed)	% NoV positive	No. mixed pathogens	% Mixed pathogens	No. control patients	% Control patients positive for NoV
(6)†	England	12†	All	2,422	871	36.0	–‡	–	2,205	16.2
(12)§	France	26	<13	414	49	11.8	27	6.5	50	0.0
(15)	Netherlands	12	All	709	114	16.1	–	–	669	5.2
(16)	Netherlands	36	All	857	43	5.0	–	–	574	1.0
(13)¶	Hong Kong	12	All	995	92	9.2	–	–	–	–
(14)	Australia	17	All	638	73	11.4	7	1.1	–	–
(33)¶	India	36	<5	500	38	7.6	5	1.0	173	4.0
(18)§¶	Chile	31	<5	274	15	5.5	–	–	–	–
(17)§	Finland	21	<2	1,477	264	17.8	13	0.9	47	0.0
(20)	Japan	12	<11	557	106	19.0	12	2.2	–	–
(21)	Japan	12	<11	402	58	14.4	–	–	–	–
(19)	Japan	12	<5	752	139	18.5	3	0.4	–	–
(34)¶#	Tunisia	15	<12	380	49	12.9	13	3.4	–	–

*NoV = norovirus; AGE = acute gastroenteritis; RT-PCR = reverse transcription-PCR; Ref = reference; – = not reported in the study; †Study was >12 months' duration; ‡No mixed pathogens detected; §Community study; ¶Outpatient clinic study; #Study was >12 months' duration.

Table 2. Summary of studies that examined prevalence of NoV in persons with severe sporadic AGE, emergency department visits and hospitalizations, by using RT-PCR for >12 months*

Ref	Country	Study duration, mo	Age group, y	No. AGE cases	No. NoV positive (single and mixed)	% NoV positive	No. NoV positive (mixed)	% Mixed	No. control patients	% Controls positive for NoV
Emergency department										
(22)	Spain	12	<14	363	16	4.4	1	0.3	–	–
(18)†‡	Chile	25 and 17§	<5	248	23	9.3	–	–	80	1.3
Hospital										
(35)	Italy	12	<3	365	93	25.5	35	9.6	–	–
(23)	Malawi	12	<5	398	26	6.5	12	3.0	–	–
(24)	Vietnam	12	<15	1,339	72	5.4	0	0.0	–	–
(25)	Thailand	12	<5	105	8	7.6	–	–	–	–
(36)	Thailand	20	<5	248	35	14.1	–	–	–	–
(26)	Australia	60	<5	1,233	108	8.8	–	–	–	–
(13)‡	Hong Kong	12	All	735	123	16.7	–	–	–	–
(37)	South Korea	24	<5	962	132	13.7	18	1.9	–	–
(33)‡	India	36	<5	350	53	15.1	26	7.4	173	4.0
(27)	Germany	12	<16¶	217	45	20.7	–	–	50	4.0
(38)	Japan	24	Children	500	66	13.2	2	0.4	–	–
(18)‡	Chile	25 and 17§	<5	162	8	4.9	–	–	50	0.0
(39)	Madagascar	13	<5	237	14	5.9	0	0.0	–	–
(27)†	Peru	24	<5	233	72	30.7	56	23.9	248	11.4
(29)	Spain	12	<5	656	79	12.0	36	5.5	–	–
(30)	Australia	36	<5	360	9	2.5	–	–	–	–
(34)‡#	Tunisia	27	<12	252	61	24.2	12	4.8	–	–
(40)	Brazil	12	<5	318	65	20.4	14	4.4	–	–
(31)	South Africa	48	All	1,296	32	2.5	–	–	–	–
(41)	South Korea	12	<5	762	114	15.0	–	–	–	–
(31)	USA	24	<4	1,840	131	7.1	–	–	–	–

*Abbreviations: †, emergency department; ‡, hospital; §, 25 months; ¶, 16 years; #, 12 months.

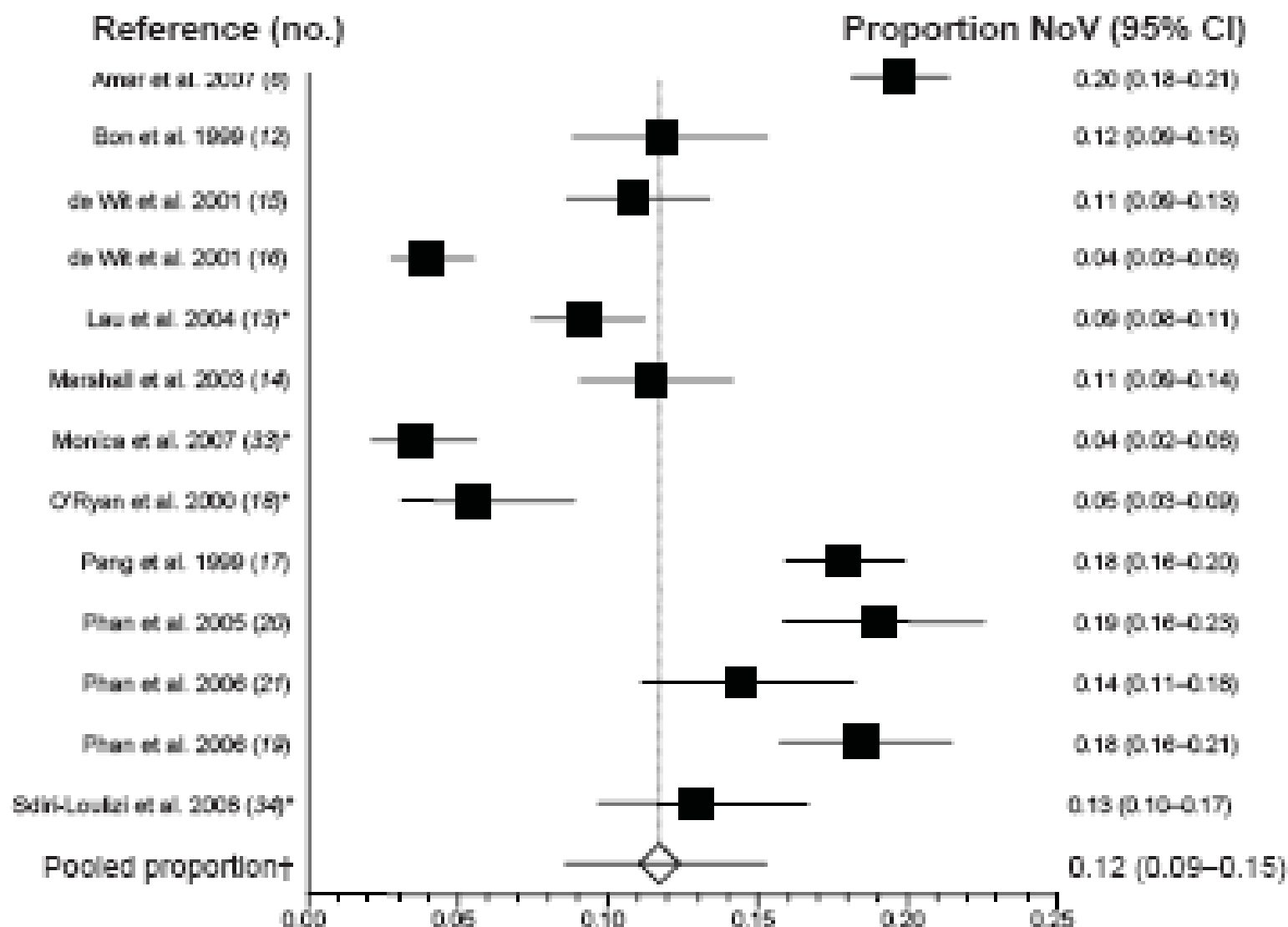


Figure 1. Summary of studies assessing proportion of norovirus (NoV)-positive fecal samples among persons with community and outpatient cases of sporadic diarrhea (all ages). *Lau et al. (13), O’Ryan et al. (18), Monica et al. (33), and Sdiri-Loulizi et al. (34) included outpatient and emergency department/hospital

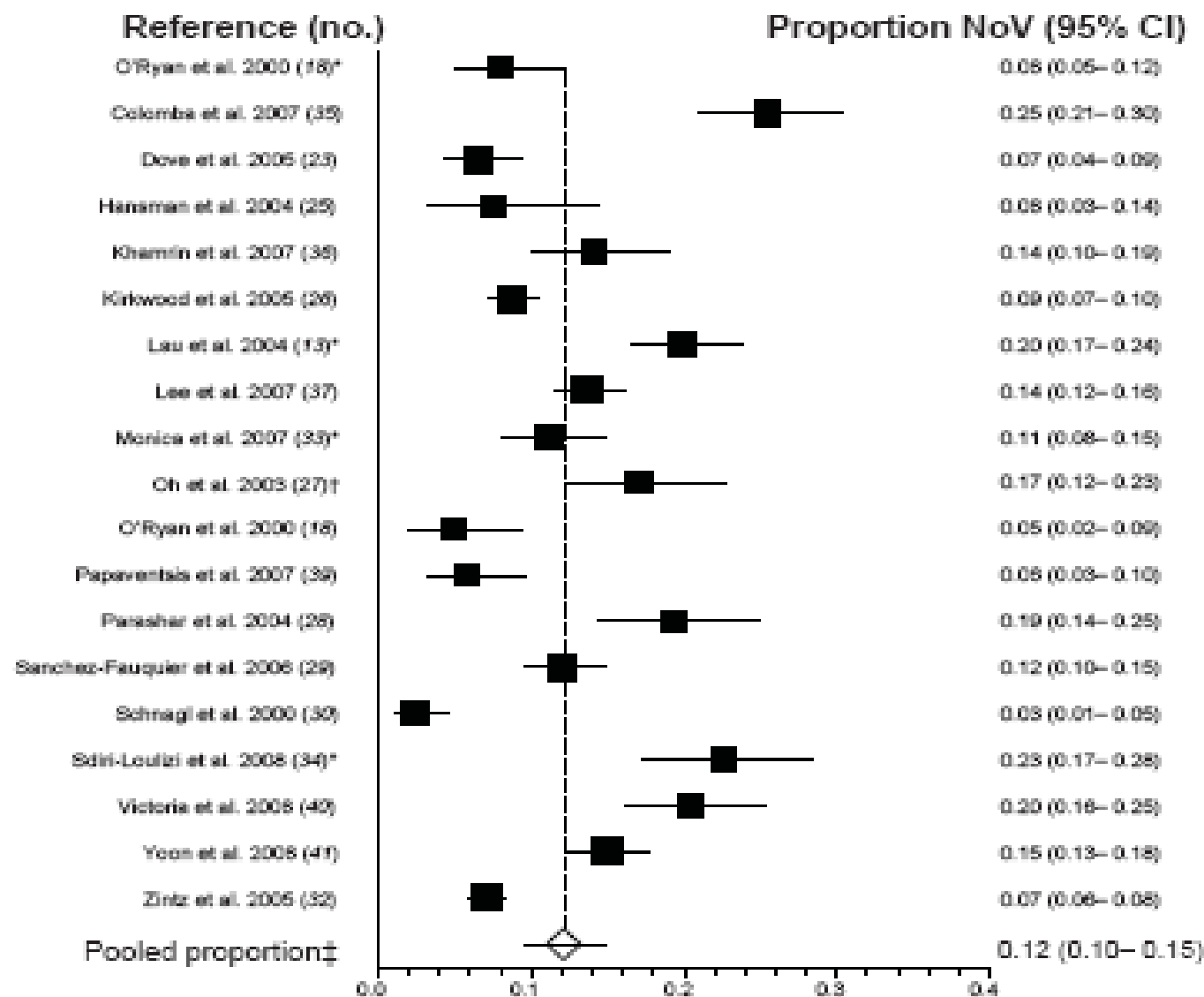


Figure 2. Summary of studies assessing proportion of norovirus (NoV)-positive fecal samples among hospitalized and emergency department cases of children <5 years of age who had sporadic diarrhea. *Lau et al. (13), O'Ryan et al. (18), Monica et al. (33), and Sdiri-Loulizi et al. (34) included outpatient and emergency department/hospital patients, but only inpatient data are included in this figure. †Oh et al. (27), 98% (213 of 217) of the case-patients were <5 years of age. ‡Pooled proportion calculated using the random effects model (DerSimonian and Laird method (StatsDirect

BOX. Recommended measures for the prevention and control of norovirus infection

1. Practice good hand hygiene.
 - Wash hands frequently with soap and water.
 - Alcohol-based sanitizing hand gels ($\geq 62\%$ ethanol content) may be used to complement hand washing with soap and water.
2. Disinfect contaminated surfaces with either of the following methods:
 - Use a chlorine bleach solution with a concentration of 1,000–5,000 ppm (1:50–1:10 dilution of household bleach [5.25%]) for hard, nonporous surfaces.
 - Use disinfectants registered as effective against norovirus by the Environmental Protection Agency (EPA)* in accordance with the manufacturers' instructions.
3. Do not return to work or school until 24–72 hours after symptoms resolve and practice good hand hygiene after returning.
4. Additional measures for outbreaks in health-care and long-term-care facilities include the following:
 - Use contact precautions for preventing gastroenteritis.
 - Avoid sharing staff members between units or facilities with affected patients and units or facilities that are not affected.

Norovirus infeksiyonundan korunmak

1. İyi el hijyeni uygulayın
 - Ellerinizi sıkı sık su ve sabun ile yıkayın
 - Buna tamamlayıcı olarak alkol bazlı el jelleri kullanabilirsiniz (>% 60 etil alkol olmalı)
2. Kontamine yüzeyler için:
 - Çamaşır suyu kullanın (sulandırım: 1/50-1/10; %5,25)
 - İlgili yasal kurumlarca “norovirus”a etkin dezenfektan markası seçin

Norovirus infeksiyonundan korunmak

3. İşe ya da okula hemen dönmeyin. Belirtiler geçtikten 24-72 saat sonra dönün. Başladıktan sonra da iyi el hijyenine dikkat edin
4. Sağlık kurumları ve benzer bakım evlerinde
 - Gastroenteriti önlemek için temas önlemleri alın
 - Hastalar ile ilgilenen personeli ayırın

Norovirus infeksiyonundan korunmak

4. Sağlık kurumları ve benzer bakım evlerinde

- Belirtileri olan hastaları gruplandırın. WC'leri ayırın
- Ziyaretçileri bilgilendirin; kurallara uyulduğunu izleyin
- Etkilenen bölümlere yeni giriş yapmayın

Teşekkür ederim
