

EU-MenNet:

How to get the needed information for public health action

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and the EU-MenNet partners

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Bacterial meningitis and meningococcal disease



WHO defined bacterial meningitis a serious threat to global health

estimated 171 000 deaths worldwide per year



**DECISION 2119/98/EC
European Parliament and Council**

**priority for epidemiological surveillance
and control**

EMGM

European Monitoring Group on Meningococci

First Meeting 14th/15th May 1993, Graz, Austria

Delegates from 23 European States

- o National Reference Laboratories
- o Epidemiologists
- o Clinicians
- o Basic researchers



EMGM

European Monitoring Group on Meningococci

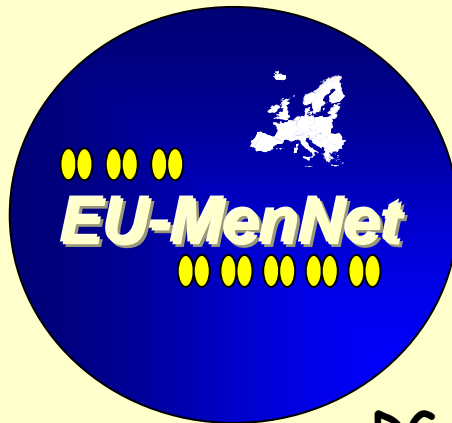
- o Pan-European surveillance
including standardisation of data collection
- o Standardisation of methods for strain characterisation
- o Creation of external quality assurance schemes
- o Improvements in the public health management
- o Creation of European resources for genotypic strain characterisation

EMGM

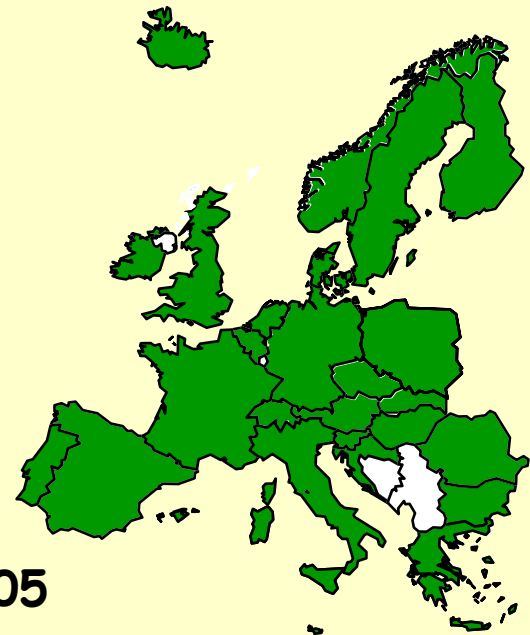
European Monitoring Group on Meningococci



DG V, 1999-2006

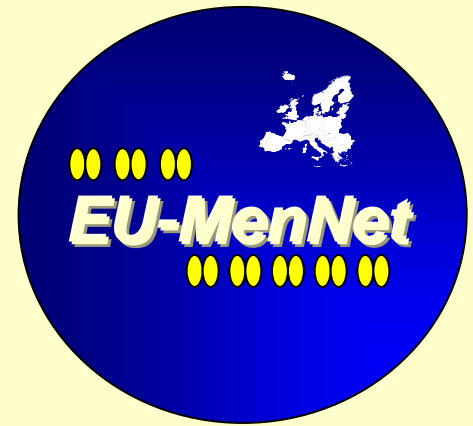


DG XII, 2001-2005



Task 1:

Building a European infrastructure for research and surveillance of meningococcal disease



- implementation of standardised nucleotide sequence-based typing and detection methods
- construction of an electronic co-ordinating and information system for surveillance of meningococcal disease
- establishment of quality assurance systems for non-culture based typing and detection methods and antibiotic resistance testing
- dissemination of infrastructure and training

Task 2:

Exploitation of the infrastructure in answering central questions concerning the spread of meningococcal disease in Europe

- meningococcal carriage
- definition of hyperinvasive, hypervirulent and apathogenic lineages
- genetic basis, emergence and spread of antibiotic resistant strains

The European Meningococcal MLST Centre

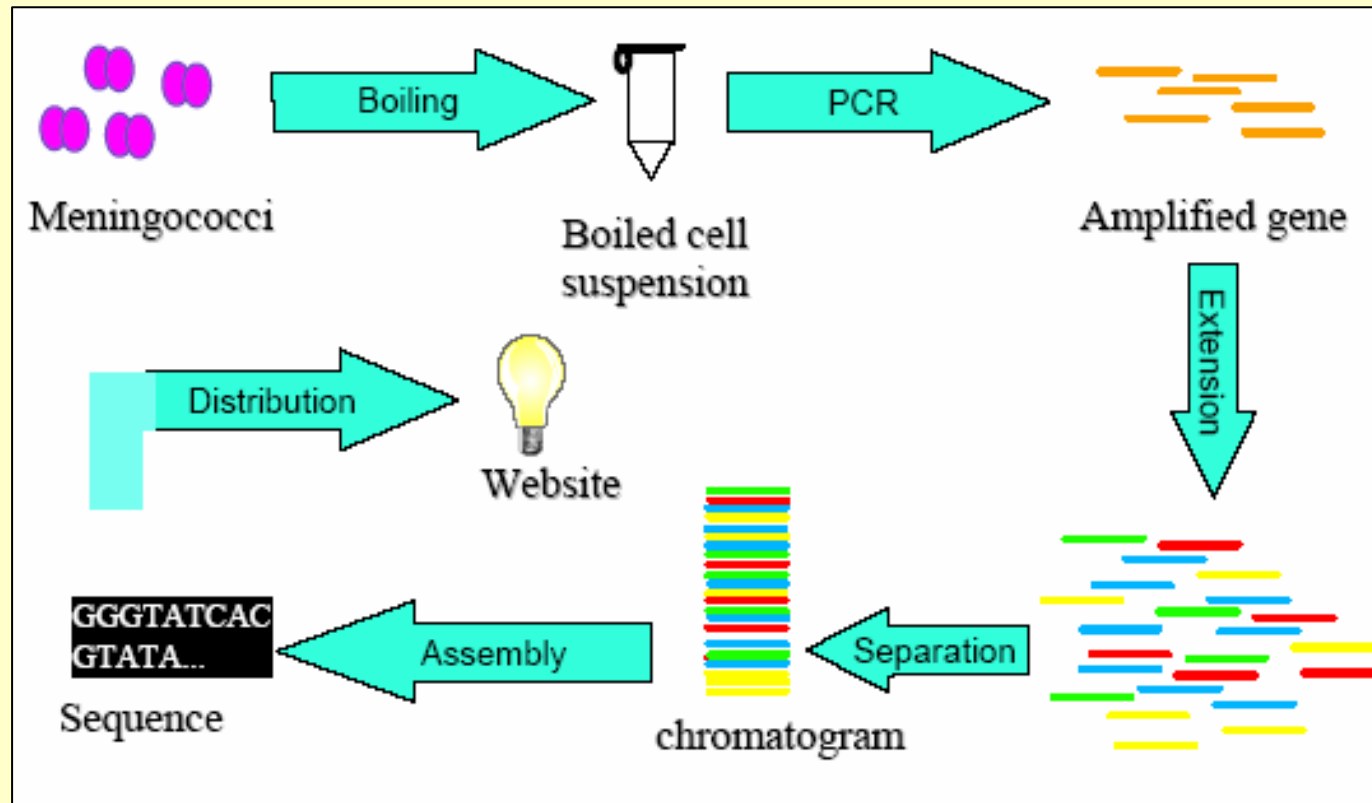


Martin Maiden
Keith Jolley

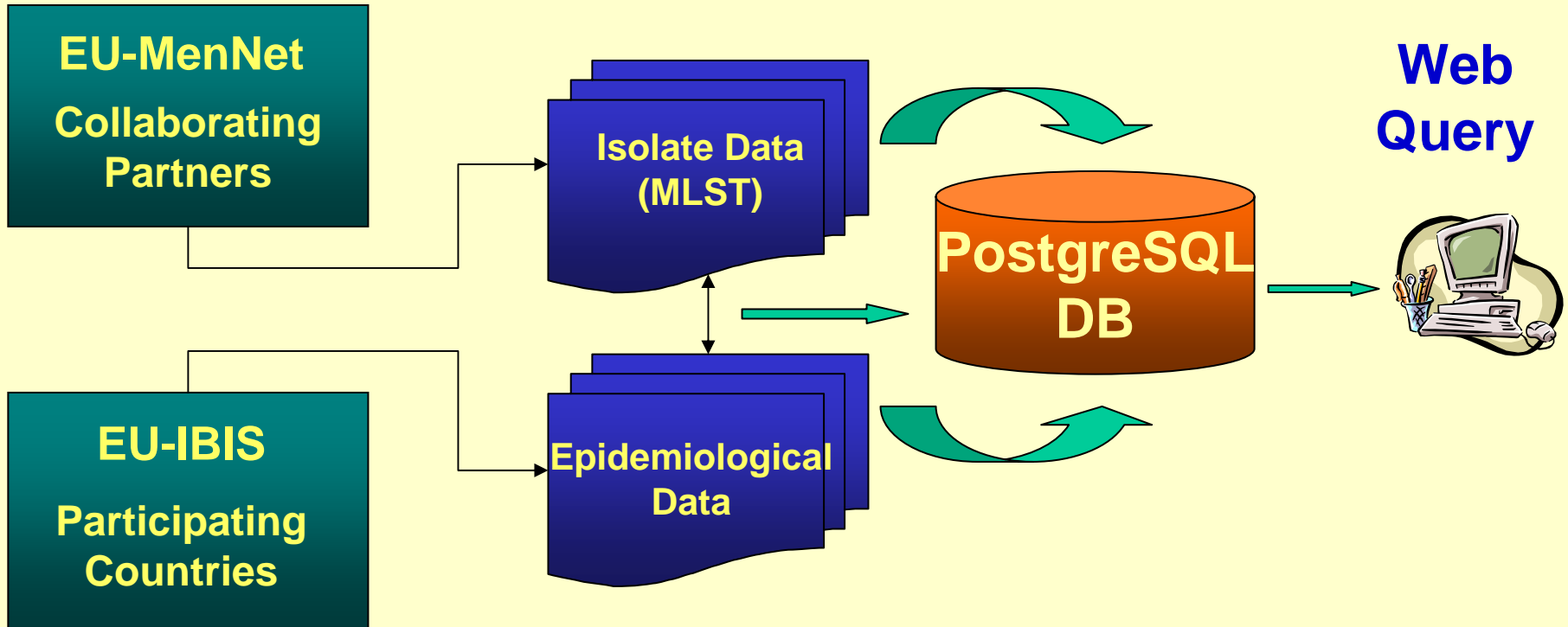
The European Meningococcal MLST Centre



Martin Maiden
Keith Jolley



Enhanced Meningococcal Surveillance System



Dissemination of infrastructure and training

■ **Workshop 1 - Sept 2002 Oxford (laboratory/computer based)**

- Philosophy of MLST
- Laboratory protocols - practical
- High throughput sequencing
- Sequence assembly
- Introduction to MLST database software

■ **Workshop 2 - Sept 2003 Lanzarote (computer based)**

- Philosophy of MLST
- UK carriage study sequencing strategies
- High throughput sequence assembly - practical
- MLST Database design - practical
- Introduction to Bio-Linux

■ **Workshop 3 - Feb 2005 Wuerzburg (computer based)**

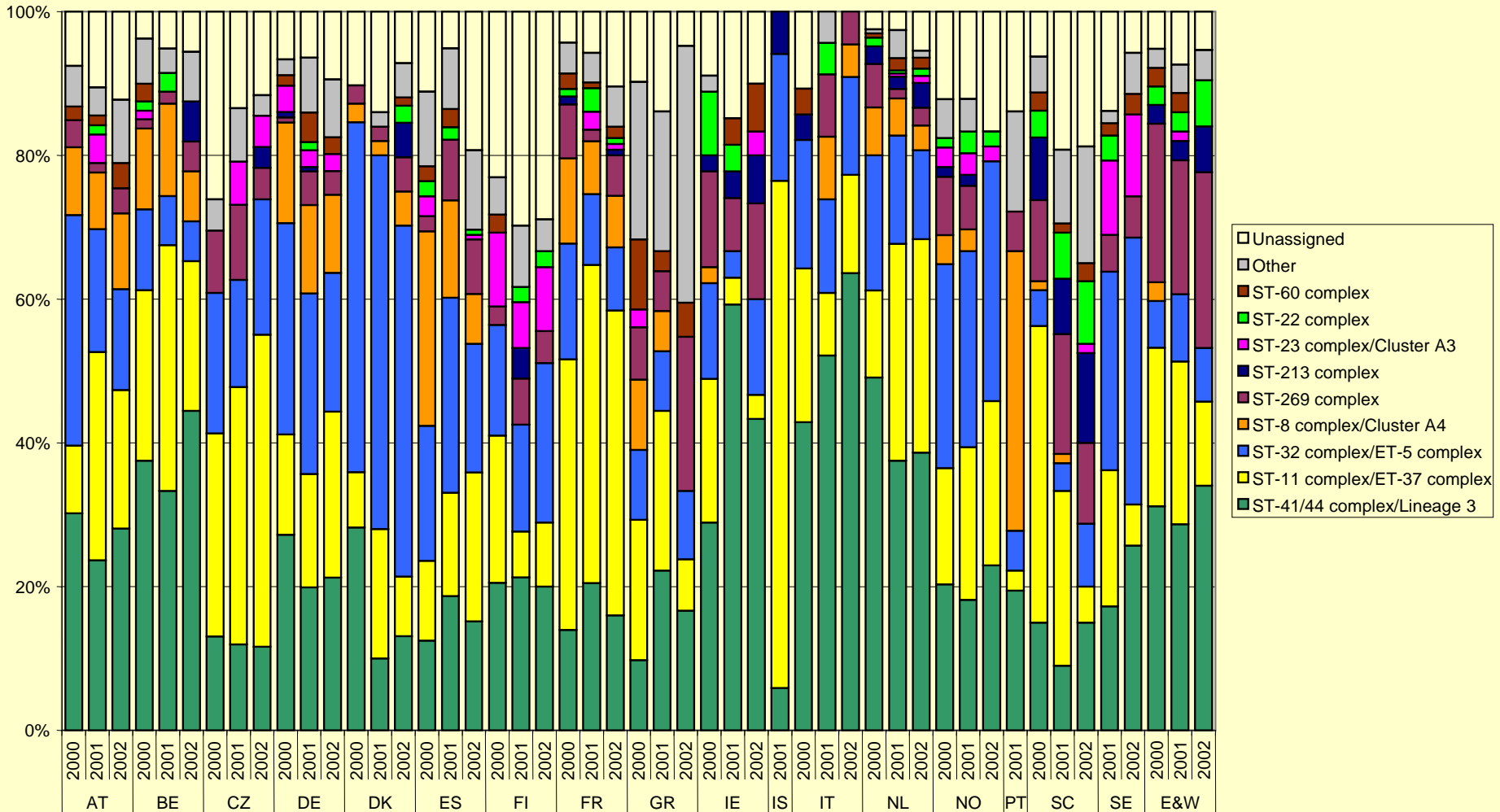
- Advanced use of the MLST database software
- Bio-Linux

The European Meningococcal MLST Centre

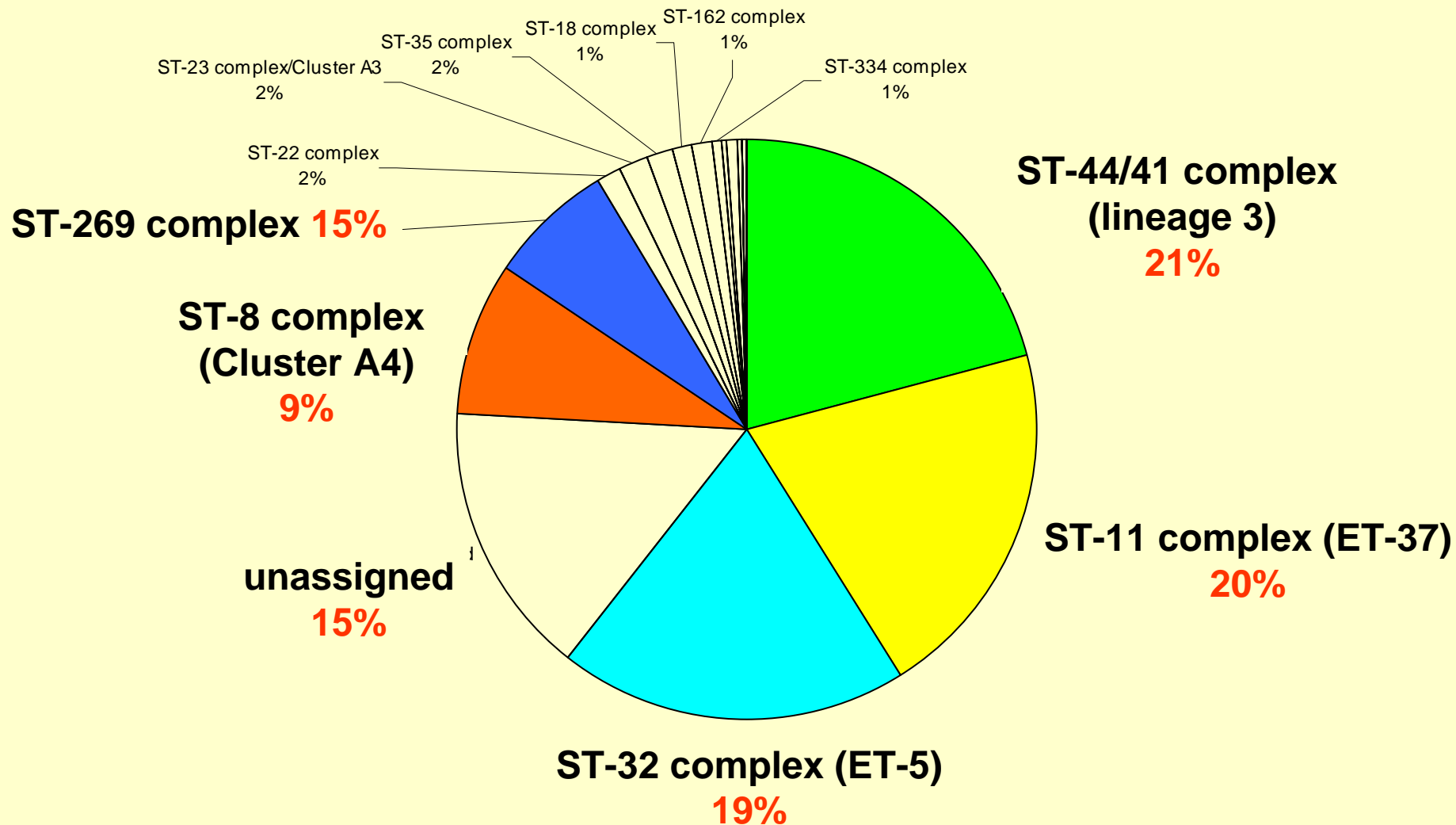
- Survey of meningococcal disease in Europe 2000-2002, for each year:
 - England and Wales, every 10th isolate;
 - Countries with more than 80 isolates, every third isolate;
 - Countries with fewer than 80 isolates, all isolates.
- Countries submitted either boiled cell suspensions or data.
- Data on a total of 4072 isolates deposited on <http://neisseria.org/nm/emgm/emmc>.
- Over half these records linked to EU-IBIS data.

	2000	2001	2002	Total
Austria	53	76	57	186
Belgium	79	117	72	268
Czech R.	46	67	69	182
Denmark	39	50	84	173
England & Wales	77	150	81	308
Finland	39	47	45	131
France	93	22	125	340
Germany	42	36	42	119
Iceland		17		17
Ireland	46	27	30	103
Italy	20	23	17	62
Netherlands	139	223	197	559
Norway	74	66	48	188
Portugal		36		36
Scotland	80	78	80	238
Spain	144	118	145	407
Sweden		58	35	93

Clonal complexes distribution in Europe 2000-2002, by country



Distribution of clonal complexes Europe 2000-2002

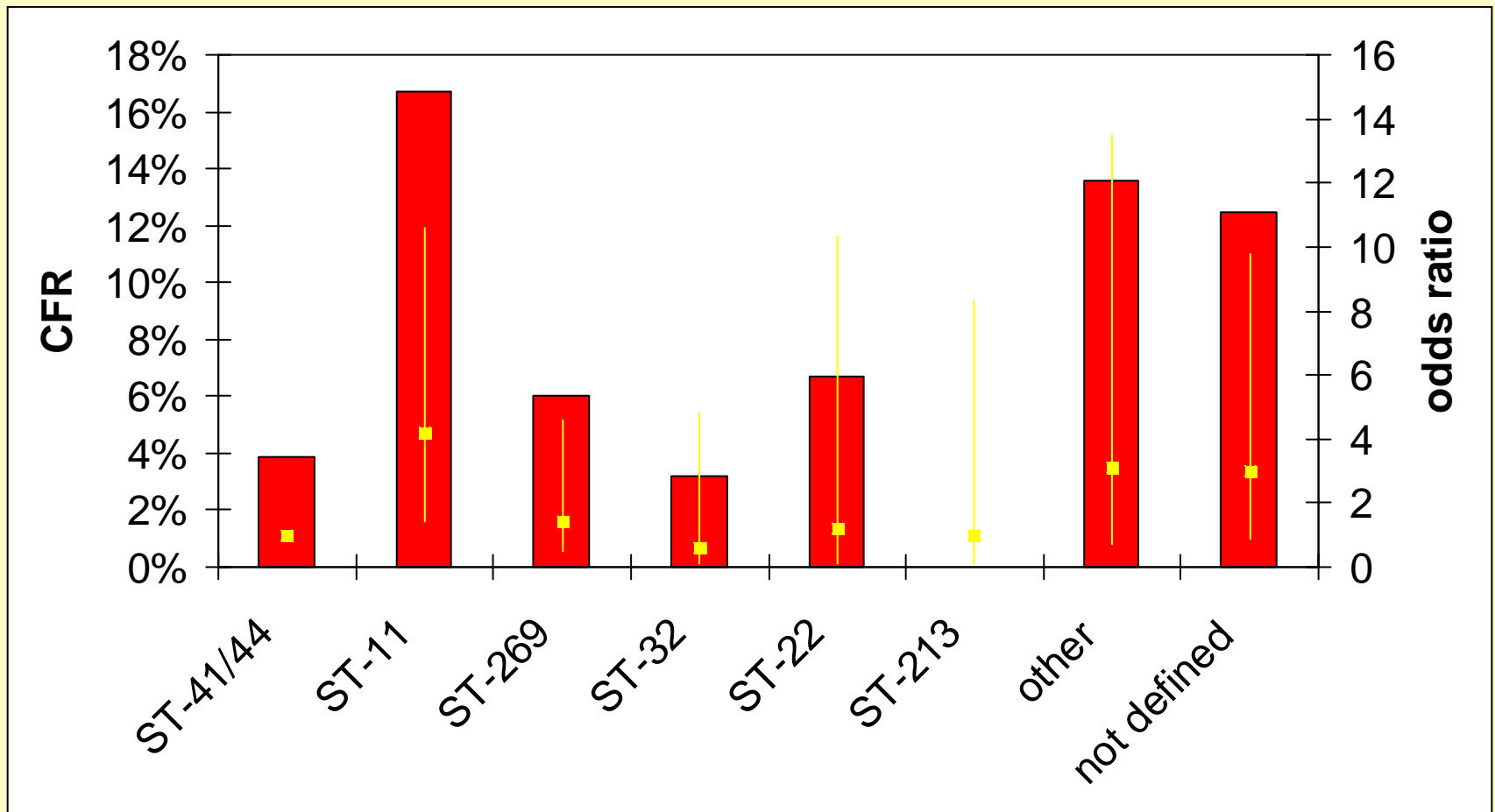


What is the significance of MLST in public health?

- o definition of isolates as hyper-virulent
(hyper-transmissible / high CFR)

Case-fatality ratio by clonal complex

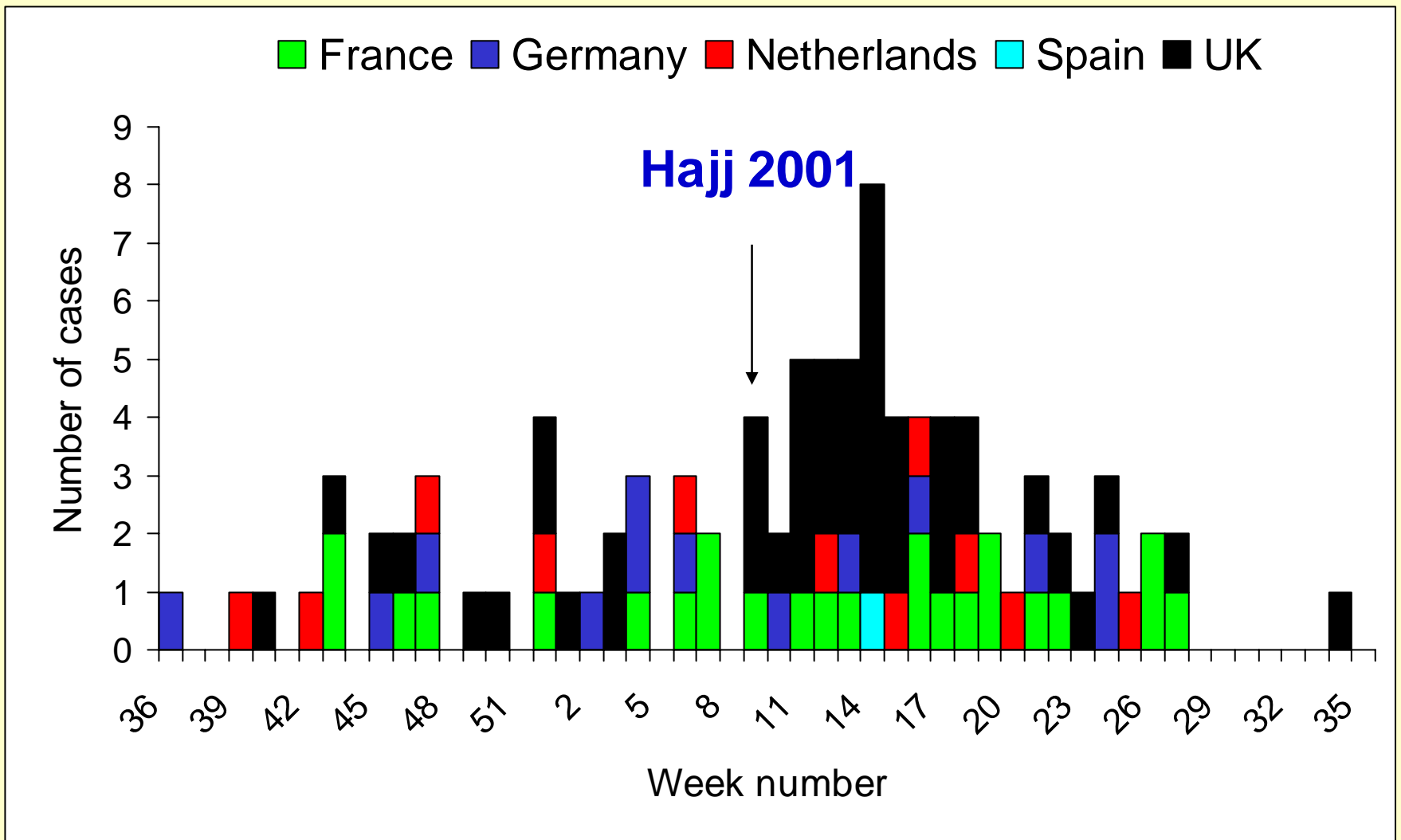
OR (95% CI) controlling for age



What is the significance of MLST in public health?

- o definition of isolates as hyper-virulent
(hyper-transmissible / high CFR)
- o detection of phenotypically distinct
variant isolates

Sentinel surveillance of W135 2a P1.5,1.2 European Union, Sept 2000-2001



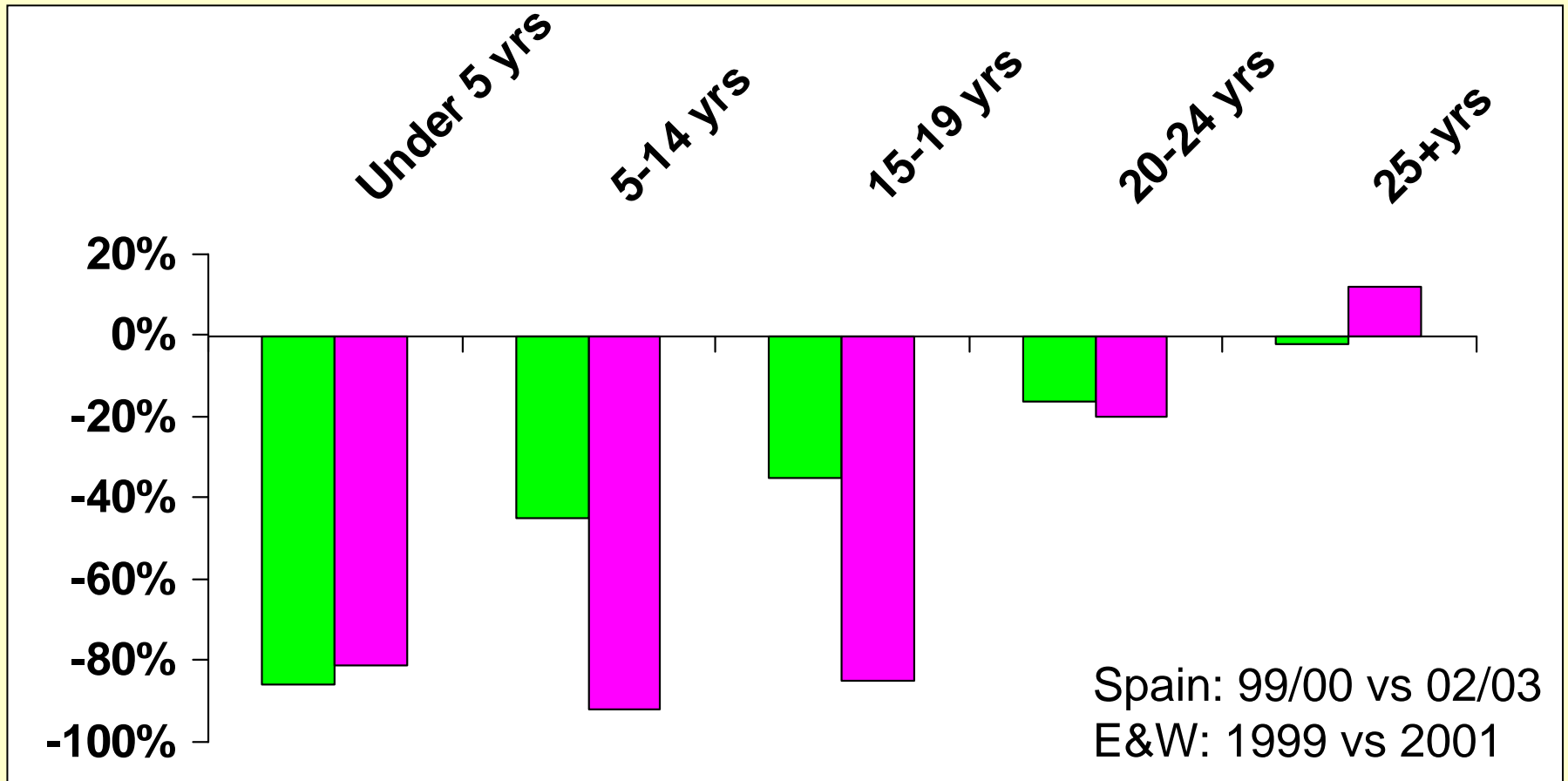
Sentinel surveillance of W135 2a P1.5,1.2 European Union, Sept 2000-2001 (EMGM, EU-IBIS)

- o emergence of phenotypically distinct variant observed
 - epidemiologically associated with Hajj
- o variant associated with high case fatality rate
- o MLST indicated strains belonged to ST-11 complex
 - same as majority of group C infections in UK
 - associated with high case fatality rate
- o changed recommendation for Hajj vaccination
- o indicated potential importance for determination of clonal complexes

What is the significance of MLST in public health?

- o definition of isolates as hyper-virulent (hyper-transmissible / high CFR)
- o detection of phenotypically distinct variant isolates
- o measurement of vaccination efficacy
- o escape of isolates by current vaccine recommendation

Change in no. of cases of serogroup C invasive disease by year 4 of vaccination programme, Spain and E&W



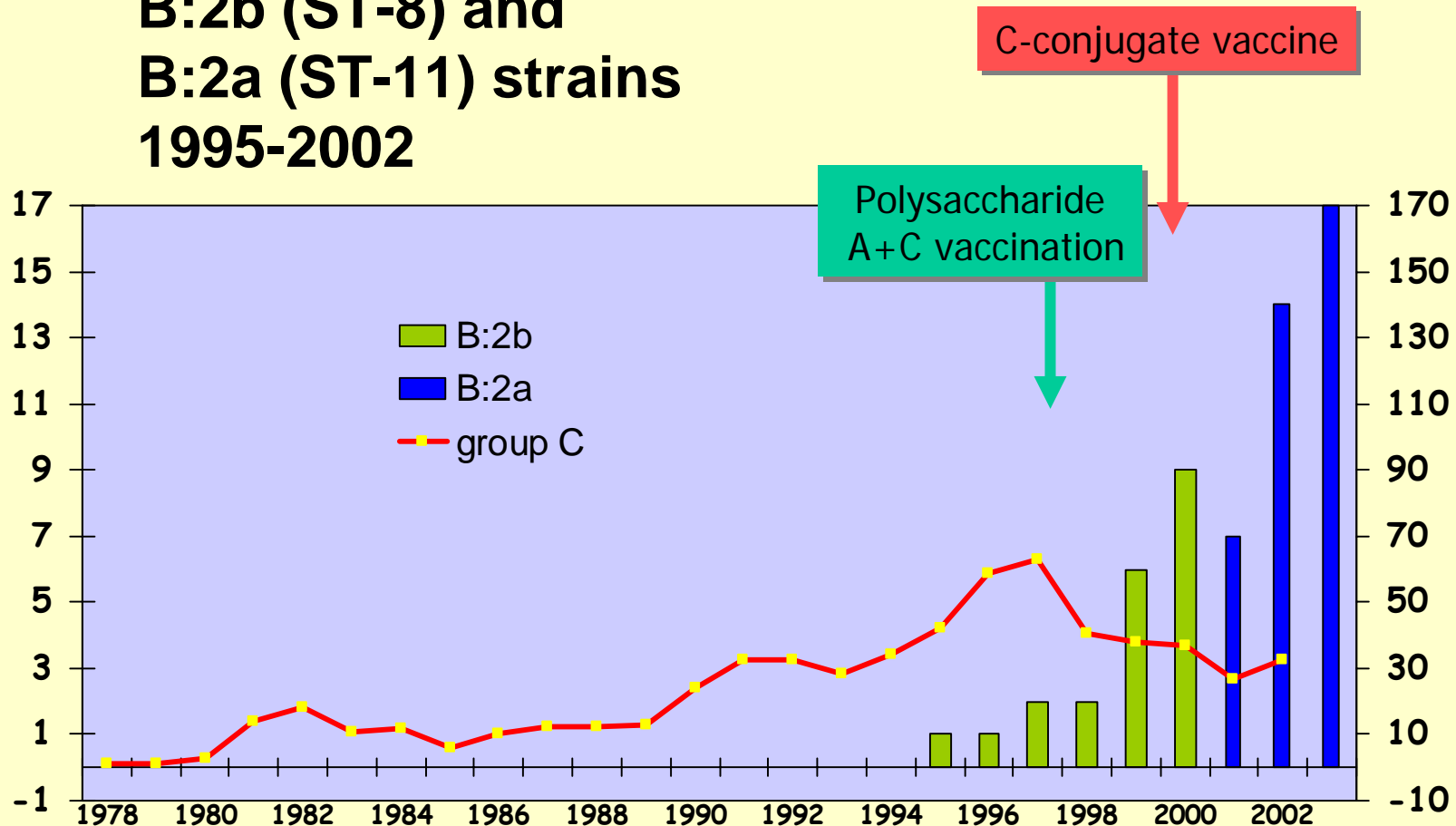
What is the significance of MLST for vaccination policy ?

Monitoring capsule switching

- o clonal complexes (ST-11; ST-8) normally express group C polysaccharide
 - can be associated with other capsules (group B/ W135)
- o pressure from group C vaccination may increase propensity for ST-11 strains to express non-vaccine preventable serogroups
 - increase in group B ST-11 strains
 - lead to increase in cases
 - high virulence, high CFR, not vaccine preventable

Possible evidence of capsule switching of meningococci in Spain

**B:2b (ST-8) and
B:2a (ST-11) strains
1995-2002**



Slide courtesy of Julio Vazquez, ISCII Madrid

Activity of the EMGM is a paradigm for successful pan-European infectious disease surveillance

- o experts define needs and built up infrastructure, which guarantees the needed information for public health action
- o latest technologies available
- o low-cost
- o political and financial independence
- o non-burocratic immediate action

Future challenges

- o Sustainment of established infrastructure
- o Distribution of knowledge, training
- o Establishment of regular QA schemes
- o Use of knowledge for improved diagnosis and public health management



EMGM -

The European Meningococcal Disease Society

- o Legal basis as nonprofit organisation
- o Action plans to sustain infrastructure and develop perspectives
- o Contact to WHO, EU, ECDC
- o Affiliation to European societies

Board: Matthias Frosch (President), Per Olcen (Vice-president),
Sigrid Heuberger (Secretary), Ed Kaczmarek (Treasurer)