



BCG Vaccine Revised NIAC Guidelines

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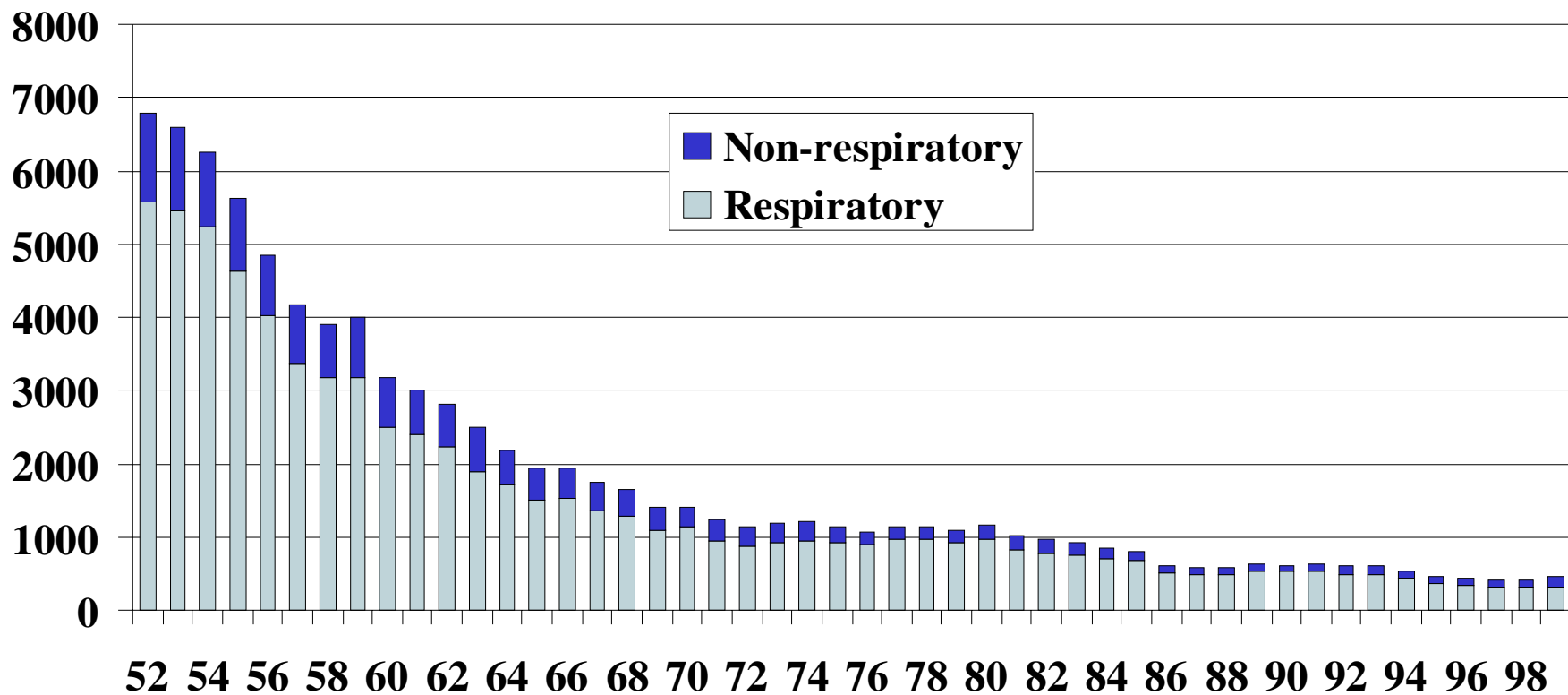


Overview

- Epidemiology of TB in Ireland
- Universal neonatal BCG vaccine
 - Why continue in Ireland ?
- Changes in NIAC guidance re BCG vaccine
 - Administration
 - Indications
 - Contraindications
 - Interactions

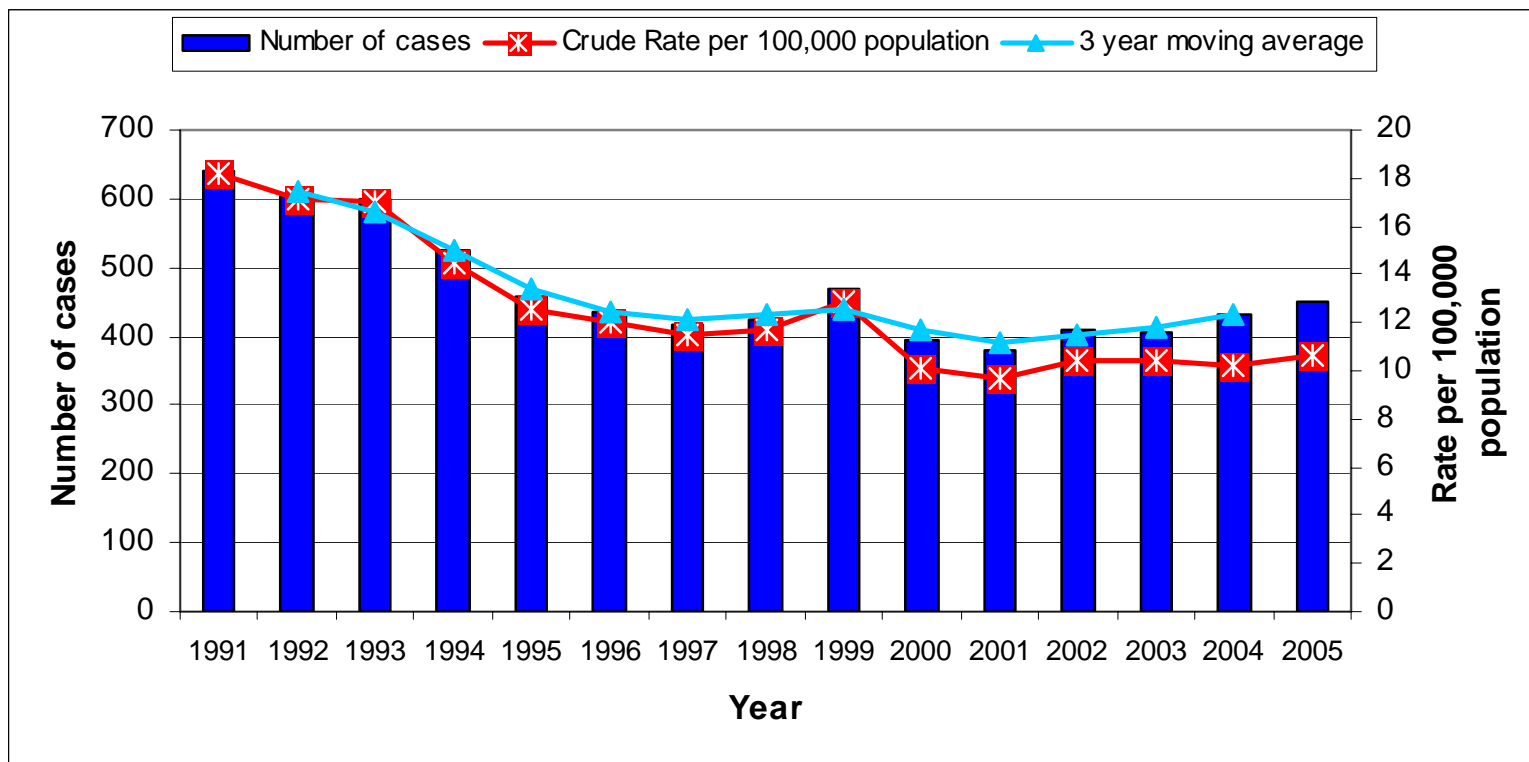


National Notifications in Ireland Dept. of Health Statistics 1952-1998





National TB notifications, rate & 3 year moving average 1991-2005

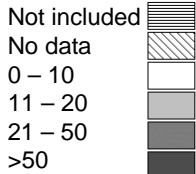


(*2006 data are provisional)



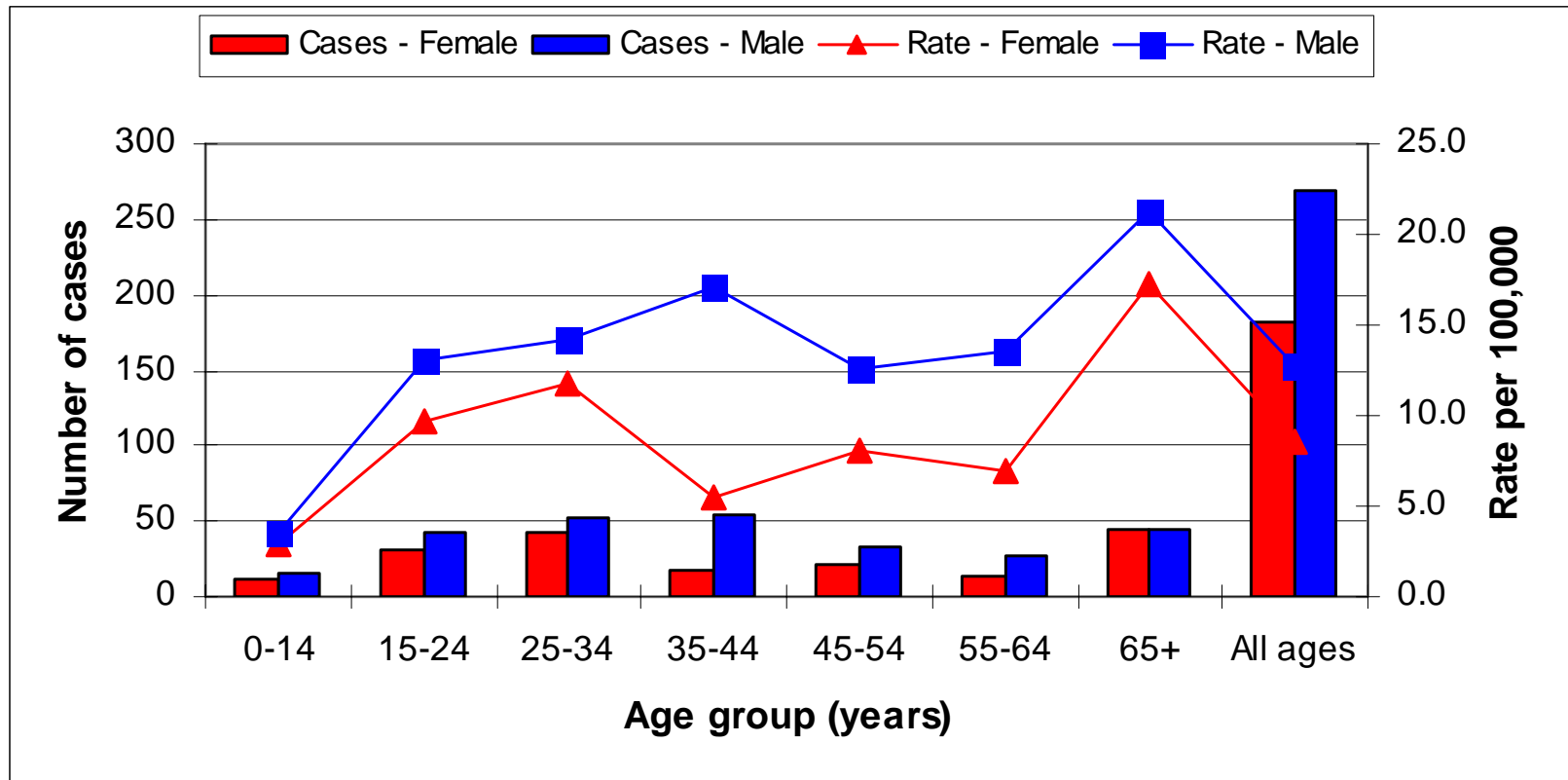
Tuberculosis notification rates per 100,000 population, WHO European region, 2005

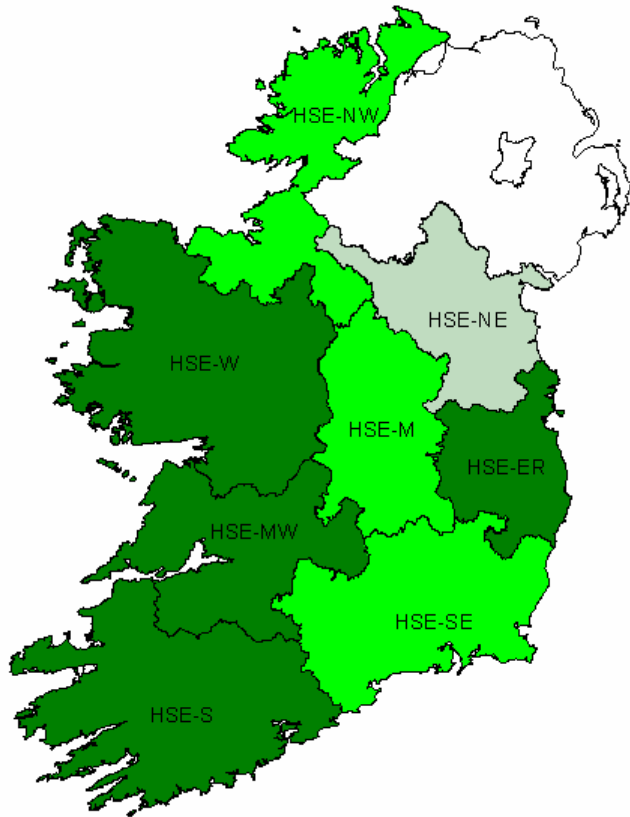
Rate per 100,000 population



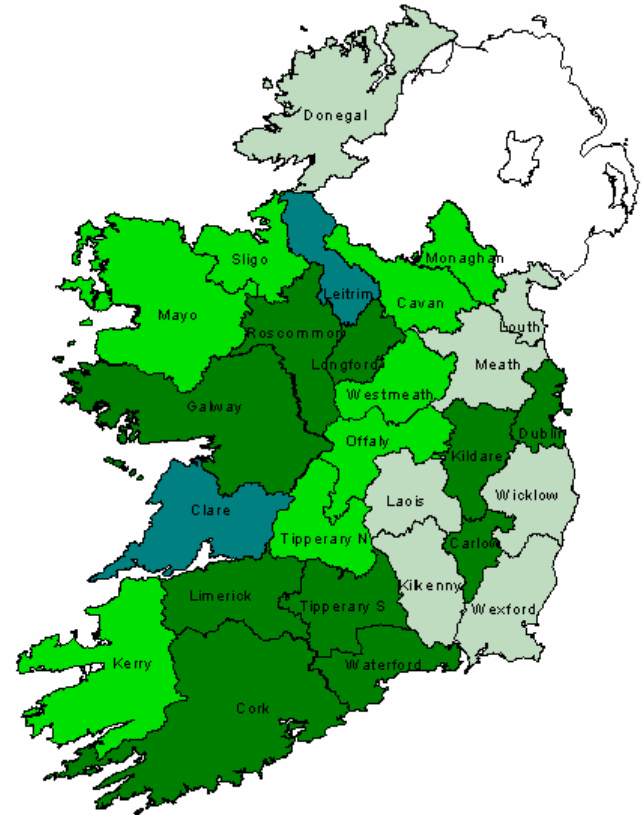
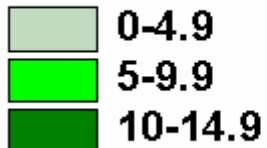


Cases and rates of TB by age and sex: 2005

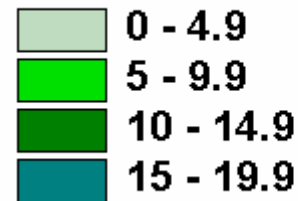




ASIR per 100,000 population

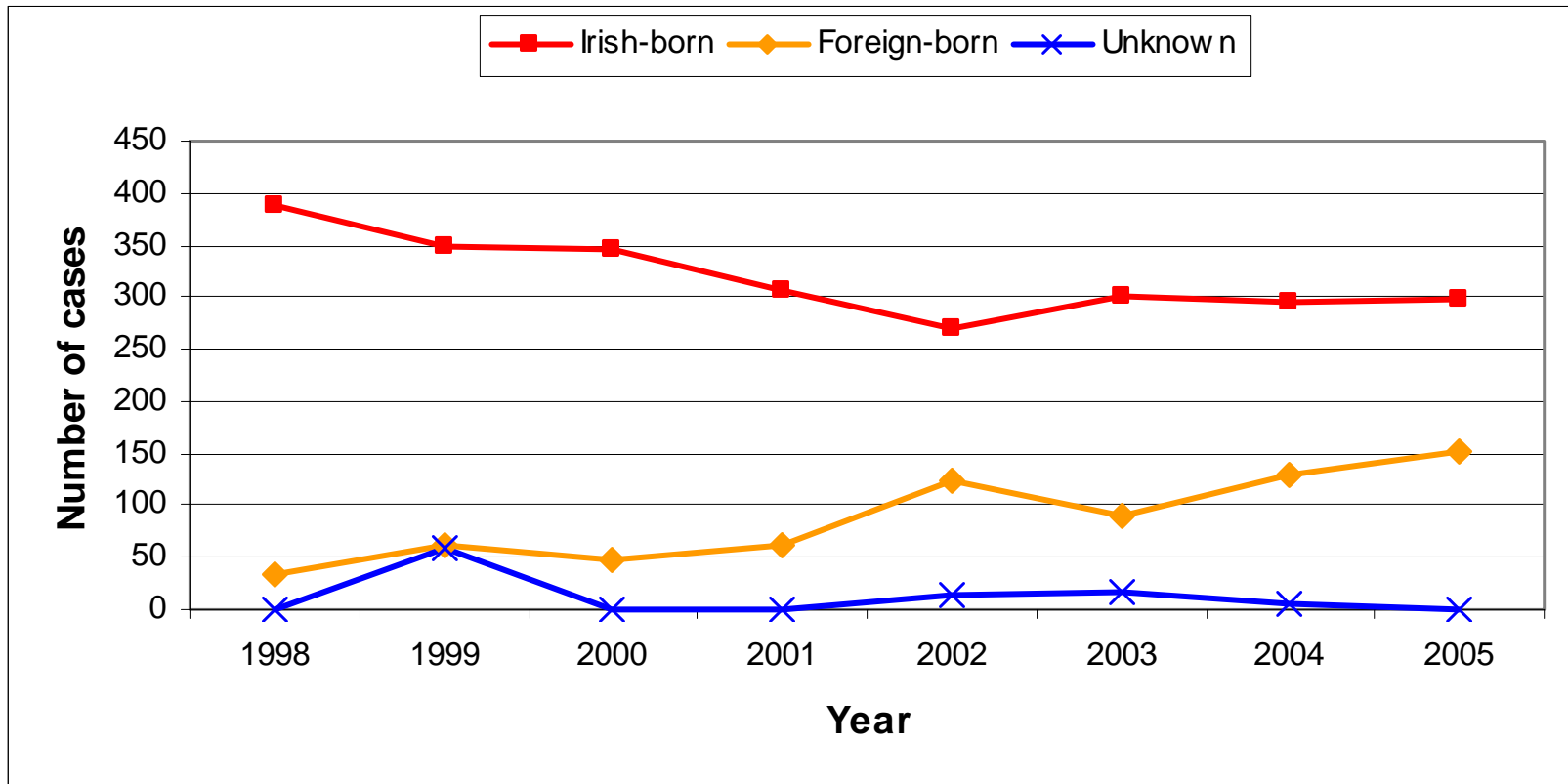


ASIR per 100,000 population



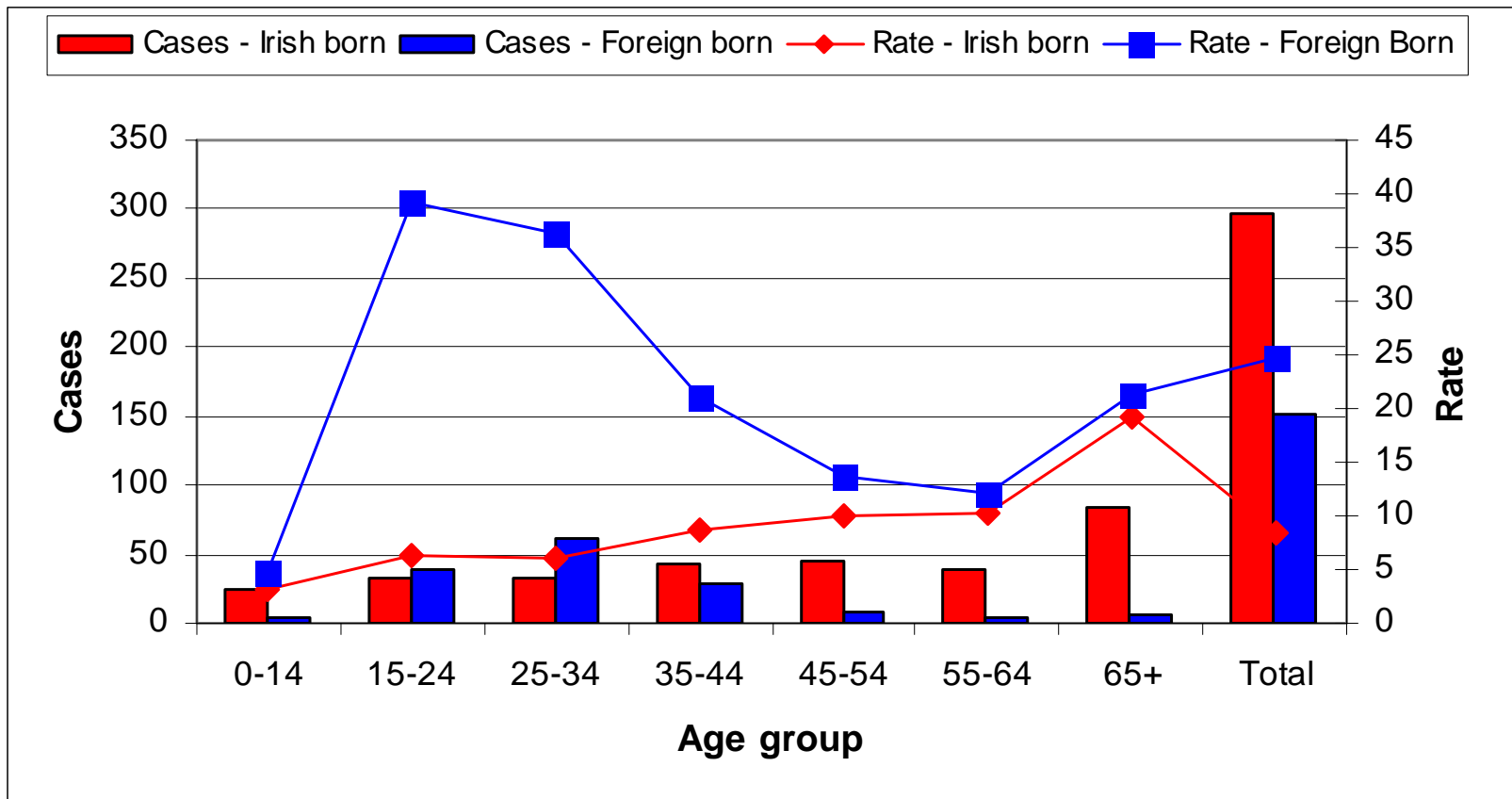


TB cases by geographic origin, 1998-2005





TB cases and rates by age group and geographic origin: 2005





IUATLD Criteria (1)

Moving to a selective BCG programme

- Well functioning TB control programme
- Reliable surveillance system over the previous five or more years
 - Rates by age and gender
 - Emphasis on rates for TB meningitis and Pulmonary Sputum Smear Positive Cases
- Consideration given to the possibility of an increase in TB incidence due to HIV/AIDS situation
 - Yes



IUATLD Criteria (2)

- **Average annual rate of SSP Pulmonary TB cases should be 5/100,000 or less in the previous 3 years:**
 - 2005: 3.3/100,000
 - 2004: 3.5/100,00
 - 2003: 3.7/100,00
- **Average annual rate of TB meningitis in children under 5 years of age should be less than one case per 10 million general population over the previous five years**
 - Between 2000 and 2005 there were three cases in children under 5 years in a population of approximately 5 million



TB Meningitis: Cumulative Incidence 1998-2005

HSE area	Cases 1998 to 2005	Cumulative incidence rate per 100,000	95% CI
HSE E	18	1.28	0.7 - 1.9
HSE M	0	0.00	0 - 0
HSE MW	3	0.88	-0.1 - 1.9
HSE NE	6	1.74	0.3 - 3.1
HSE NW	2	0.90	-0.3 - 2.2
HSE SE	2	0.47	-0.2 - 1.1
HSE S	16	2.76	1.4 - 4.1
HSE W	3	0.79	-0.1 - 1.7
Ireland	50	1.28	0.9 - 1.6



TB meningitis cases 2005

HSE Area	Age group (years)	History of BCG	Culture Status
HSE SE	65+	Unknown	Negative
HSE E	55-64	Unknown	Positive
HSE S	25-34	Unknown	Unknown
HSE S	25-34	Yes	Unknown
HSE MW	15-24	Yes	Negative
HSE S	15-24	No	Unknown
HSE S	15-24	Unknown	Negative
HSE E	0-14	Yes	Negative
HSE S	0-14	No	Negative

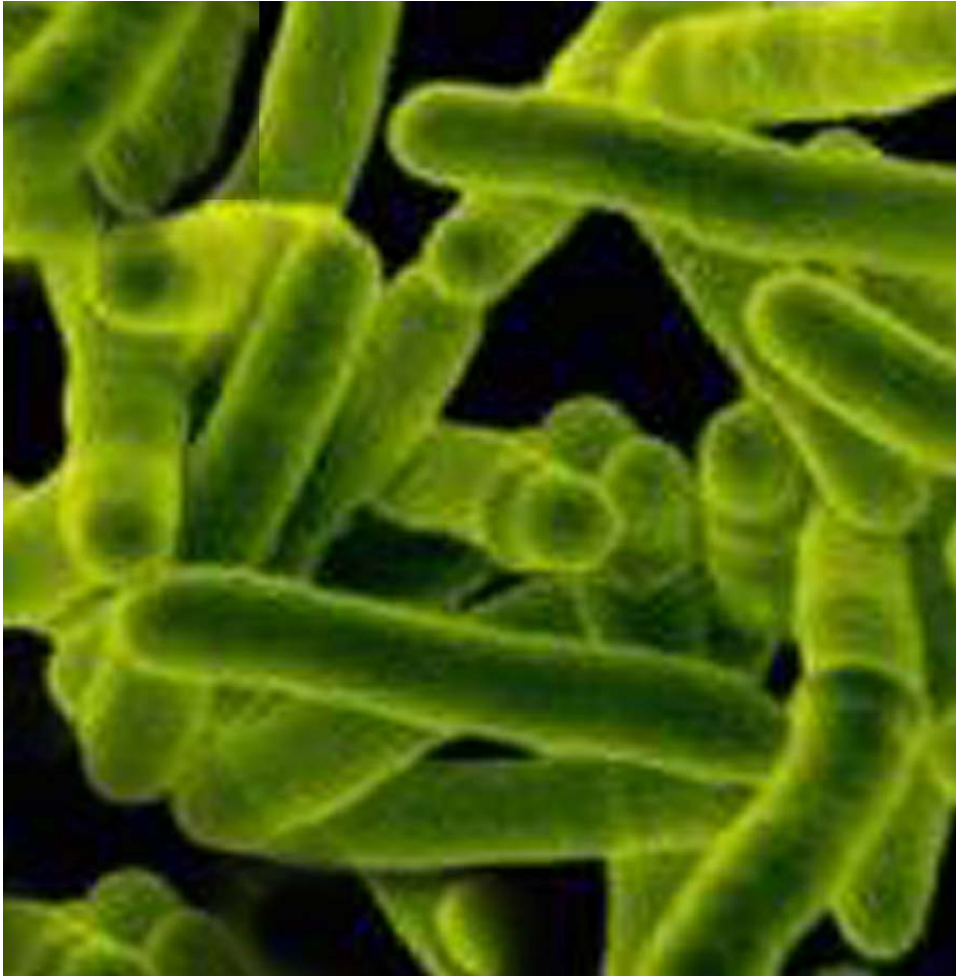


National TB Advisory Committee Decision

**Continue Universal Neonatal
Programme**



BCG Vaccine (1)





Tuberculosis

- Transmission
 - Droplet spread
 - Increased infectivity if sputum smear positive or laryngeal
- Clinical Manifestation
 - Pulmonary (60-70%)
 - Extrapulmonary
 - Fever, cough, malaise, weight loss, night sweats
- TB disease and Latent TB infection



BCG Vaccine (2)

- Bacille Calmette Guerin
 - Live attenuated vaccine derived from *Mycobacterium Bovis*
 - Most effective against TB meningitis and miliary TB
- BCG SSI vaccine used in Ireland since 2002
 - Contains Danish Strain 1331.
- Does not contain thiomersal or any other preservatives



Efficacy of BCG Vaccine (1)

- Protection from the vaccine lasts approximately 15 years
- Most effective against TB meningitis and miliary TB
 - Two meta-analysis demonstrated 70-80% effectiveness
- Few data on the protection offered by BCG vaccine when given to adults (16 years and older)
 - Virtually no data for persons aged over 35 years



Efficacy of BCG Vaccine (2)

- BCG is not recommended for persons over 16 years of age unless the risk of exposure is high as follows:
 - new entrants where the annual rates of TB are $> 40/100,000$ and
 - those at occupational risk
 - in which case BCG is given to those aged 35 years and younger **except** in the case of HCWs when it is given at any age.



Dose and Route of Administration (1)

- Can be given at the same time as:
 - Killed vaccines e.g. DTaP/IPV/Hib or Men C.
 - Another live vaccine
 - No need to delay primary immunisations
- If not given at the same time as another live vaccine
 - Allow an interval of 4 weeks between the two live vaccines
- No further vaccine should be given in the arm used for BCG vaccination for **at least three months**
 - Risk of regional lymphadenitis



Dose and Route of Administration (2)

- **Infants under 12 months of age**
 - 0.05ml by intradermal injection of reconstituted vaccine at one site
- **Adults and children 12 months and over**
 - 0.1ml by intradermal injection of reconstituted vaccine at one site
- **Subjects who give a previous history of BCG**
 - Repeat BCG vaccination is not recommended
 - Seek expert advice if considering re-immunisation
 - Only immunised if they are tuberculin negative and there is no characteristic scar or documented evidence of BCG vaccine.





Indications (1)

- Newborn babies
- Unvaccinated children aged 1 to 15 years (those with no documented evidence of BCG or without a documented BCG scar)
 - Children aged 3 months to less than 6 years who are not in an at-risk environment do not need a Mantoux test prior to receiving BCG
 - Children in at-risk environments **should have** a Mantoux Test prior to BCG vaccine
 - **Children in at-risk environments include those:**
 - Who are contacts of a pulmonary TB case,
 - Who are from areas with TB rates $> 40/100,000$ or whose parents are from such areas
 - With household contacts who belong to an at-risk group for TB



Indications (2)

- **Unvaccinated Mantoux negative immigrants**
 - with a history of ever living in a country with an incidence of TB > 40/100,000
and
 - are aged less than 16 years
or
 - Aged 16-35 years who ever lived in sub-saharan Africa or a country with an incidence of TB > 500/100,000



Indications (3)

- Unvaccinated mantoux negative contacts of active respiratory TB cases aged 35 years and under
- Children under five years of age in contact with a SSP Pulmonary TB case should be referred to a CT clinic for investigation and immunised with BCG as indicated
- Members of special at-risk groups e.g. travellers
- Unvaccinated Mantoux negative persons under 16 years of age intending to live with local people in high incidence countries for more than one month



Indications (4)

- All HCWs who are previously unvaccinated and Mantoux or IGRA negative and
 - will have contact with patients or clinical materials **OR**
 - Laboratory staff who will have contact with patients, clinical materials or derived isolates

Should be offered BCG irrespective of age



Indications (5)

- **Other Occupational Risk Groups**
 - Veterinary laboratory staff who handle animal species known to be susceptible to TB
 - Abattoir workers who handle animal species, carcasses and products known to be susceptible to TB
 - Agricultural Officers and Veterinary Inspectors may require BCG vaccine based on individual risk assessment
 - Prison staff working directly with prisoners
 - Staff of facilities for the elderly
 - Staff of hostels for homeless people and facilities accommodating refugees and asylum seekers.

Offer BCG if Mantoux or IGRA negative and previously unvaccinated in those aged 35 years and under



Contraindications (1)

- Neonates in a household where an active TB case is suspected or confirmed
- Those receiving systemic corticosteroid therapy (other than as replacement) or other immunosuppressive treatment including x-irradiation
 - Inhaled steroids are not a contraindication
- Those suffering from blood dyscrasias, lymphoma or malignant neoplasms involving bone marrow or the lymphoreticular system or with gamma globulin deficiency or abnormality
- Those with pyrexia $\geq 38^{\circ}\text{C}$



Contraindications (2)

- Those with a family history of primary immunodeficiency e.g. Inherited SCID, Chronic Granulomatous Disease until evaluation is complete
- Those with generalised infected dermatosis
 - The effect of BCG may be exaggerated in these patients and a more generalised infection is possible
 - If the person has eczema, chose a vaccination site free from skin lesions.
 - **Eczema is not a contraindication**
- Those who are pregnant.
 - **Breast feeding is not a contraindication**
- Those who are Mantoux or IGRA positive
- Those who have a confirmed anaphylactic reaction to a component of the vaccine



BCG vaccine and HIV

- BCG is **absolutely** contraindicated in symptomatic HIV positive individuals
- Lack of knowledge of the mother's HIV status should not delay BCG vaccination



Immunisation Reaction (1)

- **90-95% of recipients of BCG vaccine get**
 - Induration at the injection site followed by a local lesion
 - This starts as a papule 2 or more weeks after vaccination
 - May ulcerate and will slowly subside over several weeks or months to leave a small flat scar
 - It may include enlargement of a regional lymph node to less than 1cm





Immunisation Reaction (2)

- Severe injection site reactions, large discharging ulcers, abscesses and keloid scars occur mainly due to:
 - Faulty injection technique
 - Excessive dosage
 - Vaccinating individuals who are tuberculin positive
- **Training-Imperative**



Care of the Vaccination Site

- No need to protect from getting wet during washing or bathing
- The ulcer should be encouraged to dry and abrasion (e.g. tight clothes) avoided
- If oozing occurs a temporary dry dressing may be used until a scab forms
 - Do not exclude air
- If absolutely necessary use (e.g. to allow swimming), an impervious dressing may be applied but only for a short period as it may delay healing and cause a larger scar



Adverse Reactions (1)

- **Local**
 - Local induration, pain and occasionally ulceration, enlargement of a regional lymph node greater than 1cm, abscess formation, lupoid reaction and inflammatory and suppurative adenitis
- **General**
 - Headache, fever
 - Generalised lymphadenopathy can rarely occur (< 1 in 1,500 vaccinations)
 - Anaphylactic reaction
 - Disseminated BCG complications e.g. osteitis, osteomyelitis or disseminated BCG infection (Very rare)
 - Disseminated BCG infection: 2 per million persons vaccinated



Adverse Reactions (2)





Management of Adverse Reactions (1)

- **Local adverse reactions: 1-2% of immunisations**
- **Severe local reactions should be discussed with a respiratory physician or paediatrician**
 - Ulceration > 10mm
 - Caseous lesions
 - Abscesses or drainage at the injection site
 - Regional suppurative lymphadenitis with draining sinuses
- **Treatment by draining skin lesions or chronic suppurative lymphadenitis not recommended**
 - Spontaneous resolution occurs in most cases
 - Large needle aspiration of suppurative lymph nodes may hasten resolution
 - There is little evidence to support the use of locally instilled anti-mycobacterial agents or systemic treatment of patients with persistent severe lesions



Management of Adverse Reactions (2)

- **Disseminated BCG infection** should be referred to a respiratory physician or infectious disease consultant for specialist advice and will normally require systemic anti-tuberculous treatment and mandate a detailed immunological investigation.



Interactions

- Blood or plasma transfusions, hepatitis B vaccine, hepatitis B immunoglobulin and normal immunoglobulin do not reduce the effectiveness of BCG vaccine.
- A baby who receives blood or plasma transfusions can receive BCG vaccine after the observation period for transfusion reactions has ended (24 hours)
- A baby who received hepatitis B vaccine, hepatitis B immunoglobulin and normal immunoglobulin can be vaccinated against BCG **WITHOUT DELAY**



Tuberculin Test

- MT is a screening tool for LTBI or TB disease
 - Aid to diagnosis
- Local skin reaction to PPD is used to assess an individual's sensitivity to tuberculin protein
 - The greater the reaction the greater the likelihood of LTBI or TB disease
- BCG can be given for up to **three months** after a negative Mantoux Test
- **Standard test for use in Ireland for the Mantoux test is Mantoux 2tu/0.1ml tuberculin PPD**



Tuberculin Testing prior to BCG

- **Do not give BCG to an individual with a positive Mantoux Test**
 - Unnecessary and will cause a more severe local reaction
 - Those with strongly positive Mantoux should be referred for assessment
- **TST is necessary prior to BCG for:**
 - Children between 3 months and under 6 years in an at-risk environment
 - Persons aged 6 years and older
 - Infants and children under 6 years of age with a history of ever having lived or had a prolonged stay in a country of high endemicity (> 40/100,000)
 - Those in close contact with a known TB case
 - Those with a history of TB in a household contact in the previous 5 years



Reading Mantoux Results (1)

Diameter of induration	Interpretation	Action
Less than 6mm	Negative	Previously unvaccinated individuals may be given BCG provided there are no contraindications
6mm or greater but less than 15mm	Hypersensitive to tuberculin protein. May be due to previous TB infection, BCG or exposure to atypical mycobacteria	Should not be given BCG
$\geq 15\text{mm}$	Strongly hypersensitive to tuberculin protein Suggestive of TB infection or disease	Refer for further investigation and supervision which may include preventive chemotherapy



Reading Mantoux Results (2)

- Results of MT test should be read within 48 to 72 hours
 - A valid reading can be obtained up to 96 hours
- Factors which do not affect the validity of strongly positive Mantoux tests
 - A delay in reading the test if the result is positive (6mm or greater)
 - A strongly positive Mantoux Test resulting from inadvertent subcutaneous administration



Storage of PPD

- Store PPD Mantoux tests and BCG vaccine in separate areas in the fridge to ensure that the correct product is administered
- Mantoux testing can be administered at the same time as inactivated vaccine is administered.
- Live viral vaccines can suppress the tuberculin response so testing should not be undertaken within four weeks of having received a live viral vaccine such as MMR



Acknowledgements

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Thank You

