COMMUNICABLE DISEASE CONTROL STRATEGY for MALTA
Report prepared by Committee on Communicable Disease Control Strategy on behalf of the Health Division.

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FOREWORD

It is a privilege to have been invited to write the Foreword to this report entitled *Strategy for the Control of Communicable Diseases in Malta*.

In the final third of the twentieth century it was widely believed that infectious diseases had been virtually eliminated from the industrialised world. Britain, as Shakespeare had put it in Richard II, was a ‘fortress built by nature for herself against infection’, a statement that could have equally been applied to Malta, being a similar island state.

The exponential increase in worldwide travel, population movements (legal or illegal) forced or voluntary urbanisation; changes in human behaviour; the collapse of public health infrastructure (e.g. in the former USSR) and antimicrobial resistance have radically altered this comfortable and self-congratulatory concept.

Conversely, ‘emerging and re-emerging diseases’ have become standard nomenclature in the medical literature. Indeed, the World Health Organisation created a new division entitled in this way. Relatively novel infectious diseases such as Lassa fever, Ebola virus haemorrhagic fever, Marburg virus, Legionnaires’ disease, Lyme disease, methicillin-resistant *Staphylococcus aureus*, Human Immunodeficiency Virus (HIV), new variant Creutzfeldt-Jacob Disease (VCJD), Severe Acquired Respiratory Syndrome (SARS) and Avian Flu have, combined with widespread antimicrobial drug resistance and re-emerging diseases such as tuberculosis and diphtheria, alerted health authorities to the constant danger of infection and the vital importance of ‘active’ surveillance.

The prevention of infectious diseases has been declared a high priority in America and Europe, enhanced even further by the threat of bioterrorism.

The publication of this report is therefore very timely, emphasizing as it effectively does, that the three elements of surveillance, prevention and control should ideally operate together in an *integrated* manner if communicable disease problems are to be managed effectively.

The authors are to be congratulated for producing this impressive and comprehensive report.

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ACKNOWLEDGEMENTS

The Communicable Disease Control Strategy Committee was appointed by the Director General Health, Dr. Ray Busuttil to prepare a report on the Strategy for the control Communicable Diseases in Malta.

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Mr. John Attard Kingswell, Manager Health Inspector
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SUMMARY

Communicable diseases remain one of the highest priorities for public health both nationally and internationally. Major public health problems in Malta today include food-borne diseases, blood borne diseases (such as Hepatitis C and HIV/AIDS), sexually transmissible diseases, meningococcal disease and vaccine preventable diseases.

Effective surveillance is fundamental to the prevention and control of communicable diseases. Surveillance is carried out by the Disease Surveillance Unit within the Department of Public Health and provides a mechanism for the co-ordination of national communicable disease surveillance activities in co-operation with the clinical and laboratory services. There is, however, a need to strengthen the co-ordination and planning of surveillance activities at the national level and to develop a strategic plan for responding to the priority public health problems identified.

The proposed National Communicable Diseases Control Strategy is an initiative of the Health Division. Its aim is to reduce the social and economic impact of communicable diseases on the Maltese population. The Strategy emphasises the need for the co-ordination of national surveillance for the planning and prioritisation of interventions, the optimal use of laboratory science in communicable disease management and the availability of an effective response capacity for outbreaks of national significance. An outline of specific control strategies for the identified priority diseases to be targeted for control is given.
INTRODUCTION

Communicable diseases are those illnesses that are caused by specific infectious agents or their toxic products. Disease may occur as a result of transmission of an infectious agent or its products directly from an infected source to a susceptible host, or indirectly through an intermediate host or vector.

Disease can also result from shifts in the balance of a person’s normal commensal microbial populations, allowing either existing endogenous microbes or exogenous pathogens to proliferate and cause disease. However, not everyone exposed to such infectious agents necessarily develops disease.

If exposure occurs and whether it results in disease depend on a wide range of individual, lifestyle, cultural, socio-economic and temporal factors.

During the 1960s and 1970s it was widely held that it would be possible to eliminate the communicable disease burden in industrialised countries. In the days following World War II, it was believed that humans were winning the centuries-long war against infectious microbes. Life-threatening bacterial diseases, such as tuberculosis and typhoid fever could be treated by antibiotics. Dreaded diseases of childhood such as poliomyelitis, whooping cough, and diphtheria could be conquered by vaccination. Coupled with the earlier improvements in urban sanitation and water quality, vaccines and antibiotics dramatically lowered the reported incidence of infectious diseases. Thus, it became possible to imagine a world in which infectious pathogens would no longer prey upon humanity.

However, this belief has been challenged over the past two decades with the re-emergence of diseases that were once thought to be controlled and the emergence of new diseases. Today more than one-third of all deaths worldwide are due to communicable diseases, including two-thirds of deaths for all persons less than 40 years of age. Indeed, communicable diseases remain a global problem in a constant state of flux, with many factors influencing the risk to human health from infectious disease, including global travel and trade, the impact of technology, environmental change, human behaviour and microbial adaptation.

All communicable diseases are potentially preventable in some way, either by eliminating the source, addressing environmental factors (such as hygiene and overcrowding) or from preventative measures, such as vaccination.

Control of communicable diseases is a major public issue that the Government has a responsibility to address. Elimination, prevention and control of communicable diseases will bring great social and financial benefits, both in terms of health service provision and through increasing productivity. The health of the nation is dependent on the effectiveness of its public health programmes as well as the effectiveness of health service delivery.
PART 1.

Situation of communicable diseases in Malta in 2003

Autoimmune Deficiency Syndrome (AIDS)/Human Immunodeficiency Virus (HIV)

Worldwide, WHO estimates that during 2002 there were approximately 36.1 million cases infected with (AIDS)/HIV while 3.1 million deaths occurred during the same year.

In Malta, between 1986 and 2003, there were 55 reported cases of AIDS, of which 48 are known to be dead (87%). The reported incidence and death rates have fallen in recent years since a significant number of cases in the beginning of the epidemic were haemophiliacs who had received contaminated blood products. Screening of blood and blood products is now a routine practice and hence there have been no further cases of AIDS associated with blood transfusions in Malta.

Table 1. Number of notified cases and deaths due to AIDS in Maltese residents during 1986 – end 2003

<table>
<thead>
<tr>
<th>Year</th>
<th>Mid-Year Population of Malta</th>
<th>Notifications</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>348372</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>1987</td>
<td>350914</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1988</td>
<td>354532</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>1989</td>
<td>358188</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1990</td>
<td>360048</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1991</td>
<td>363844</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>1992</td>
<td>367618</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1993</td>
<td>371308</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>1994</td>
<td>374797</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>1995</td>
<td>377418</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1996</td>
<td>379904</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>1997</td>
<td>382790</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1998</td>
<td>385286</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>1999</td>
<td>387578</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2000</td>
<td>390087</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2001</td>
<td>393028</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2002</td>
<td>395968</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2003</td>
<td>397971</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>55</td>
<td>48</td>
</tr>
</tbody>
</table>
By the end of 2003 there were 210 positive HIV tests to have ever been reported in Malta. A person with HIV infection can appear perfectly healthy for many years following exposure to the virus and during this time can infect other people. The principal ways in which HIV is known to be transmitted are through sexual intercourse with an infected person without a condom; sharing of drug injecting equipment and from an HIV-infected mother to her child around the time of birth. In Malta the main mode of transmission is sexual.

Table 2. Reported Cases of AIDS by transmission category 1985-2003

<table>
<thead>
<tr>
<th>Transmission category</th>
<th>Residents of Malta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homo/Bisexual men</td>
<td>31</td>
</tr>
<tr>
<td>Haemophiliacs/ Coagulation disorders</td>
<td>13</td>
</tr>
<tr>
<td>Heterosexual contact</td>
<td>6</td>
</tr>
<tr>
<td>Homo/Bisexual Contact</td>
<td>1</td>
</tr>
<tr>
<td>Mother to child (abroad)</td>
<td>1</td>
</tr>
<tr>
<td>Injecting drug users</td>
<td>0</td>
</tr>
<tr>
<td>Other/ Undetermined</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
</tr>
</tbody>
</table>
Issues to be considered in AIDS/HIV are:

- Many persons do not come for testing so the burden of illness may be bigger than that estimated. Additionally, those infected persons yet unaware of their illness may continue to spread the disease. A strategy to overcome prejudice is through education and to promote voluntary testing and counselling for HIV infection.

- From a survey on HIV knowledge and behaviour of young Maltese conducted in a local nightclub in 1994, it was found that, despite 90% of those questioned knowing that it was possible to contract HIV through unprotected sex, 36% of sexually active men questioned never used a condom. (Fowler C, 1994). Since this study dates back while, is not representative of the population, the current situation is unclear hence further surveys are indicated.

- There is currently no cure for HIV infection nor a vaccine that can protect against it. Treatment with anti-HIV drugs is allowing people with HIV to live longer, healthier lives and has reduced the number of deaths from HIV infection. Globally however, the number of reported HIV cases is increasing each year. Coupled with improved life expectancy, this means the number of people living with HIV infection is growing.

- Although there were no reported cases of HIV transmission by drug sharing to date in Malta, this practice should be considered as a high risk group.

- Continued impetus is needed to avoid mother-to-child transmission. One should consider screening for HIV in pregnant women.
**BRUCELLOSIS**

Since 1990, there has been only one major outbreak in the human population between 1994 and 1996 which affected 225 cases. There have been no further cases of brucellosis in humans during the past 4 years, despite the fact that animal cases of brucellosis sporadically occur. This reflects the importance of strict monitoring and early effective control in animals.

*Figure 2 Reported incidence of sporadic Brucellosis cases in Malta 1990-2004*
FOOD BORNE ILLNESS/INFECTIOUS INTESTINAL ILLNESS

Food borne illnesses are a major public health problem worldwide. They are not only significant in terms of morbidity and mortality with associated costs. They also have significant implications on the food industry and trade. As more de-regulation of the food industry occurs, putting the onus on the manufacturer, surveillance of food borne illness will become increasingly important to monitor the effectiveness of quality assurance programmes.

The two principal sources of food borne illness notifications in Malta are:

Disease surveillance – this is based on official notifications to the Disease Surveillance Unit (DSU). Mainly, these include those from general practitioners and from hospital physicians. Occasionally, deaths attributed to food borne illness are also notified to the DSU through the Department of Health Information, which processes all death certificates.

Laboratory Surveillance - this is based on laboratory reports submitted from the microbiology laboratory of the Department of Pathology at St.Luke’s Hospital and private medical diagnostic laboratories.

Salmonella (other than typhi and paratyphi)

In all there were 193 Salmonella cases during 2003. Of these, 79 were classified as individual cases. The majority of these individual cases (50.6%) affected children aged less than 4 years while a further 26% affected those aged 5-20 years. Additionally, there were eleven outbreaks affecting a further 114 persons.

During the same year, there was a marked seasonality in the number of cases reported with a peak in September.

Salmonella enteritidis accounted for 48% of the cases and Salmonella typhimurium for 29% during 2003. Other serotypes which are less common accounted for the other cases as seen in Figure 3. Salmonella enteritidis was responsible for nine of the eleven outbreak cases.
After a peak high in 1994, the rate of reported incidence of Salmonellosis diminished gradually until 2001, thereafter rising gradually. It is difficult to determine if this reflects a true difference in reported incidence or simply reflects differences in ascertainment or increased notification among doctors.

Households (30%), followed by takeaways by take-away (27%) were identified as the commonest sources of the salmonella outbreaks during 2003.
Salmonella remains an important enteric pathogen. Analysis of the serotyping reveals that in 2003, *Salmonella enteritidis* was the predominant species followed by *Salmonella typhimurium*. This mirrors the trend seen in the UK and much of the rest of Europe.

**CAMPYLOBACTEROSIS**

Infection due to Campylobacter species is a common cause of bacterial gastrointestinal illness. Although in Malta the trend is slowly up-going, unlike other European countries, the numbers of cases are still lower than those for salmonellosis.

There were 48 individual cases of Campylobacter cases during 2003.

There were also five separate outbreaks affecting a total of 11 cases. From the notifications, the crude reported incidence of campylobacterosis is seen to be increasing over the years. See Figure 6. The total number of individual cases in 2003 was 48 compared to 31 in 2003, 24 in 2001 and 17 in 2000.
Campylobacter jejuni is the predominant species accounting for 68% of the individual cases. Campylobacter jejuni was responsible for four of the five Campylobacter outbreaks.

Campylobacter is known to have a well-characterized seasonal distribution in Europe with a peak in summer.

The majority of outbreaks originated from restaurant sources although the number of outbreaks was few.
Figure 7. Source of Campylobacter Outbreak Cases in Malta for 2003

Sources of Campylobacter Outbreaks

VEROCYTOTOXIGERIC E.COLI (0157:H7)

During 2003, there was only one case of E.Coli 0157:H7 as compared to 2002 when five individual cases of E.Coli 0157 were reported. On investigation of these cases, no relationship was found between them. A number of food items were suspected in all these cases, but as they were sporadic, it was impossible to link them epidemiologically. Testing of suspected food sources revealed no positive isolates. The age groups affected by E.coli 0157:H7 were children (1-5 years) and young adults (25-45 years). Figure 8, below shows the trend of reported incidence rates for E.coli cases (all types).
Since the cases notified in Malta during 2002 were sporadic it was difficult to identify the implicated sources. Studies undertaken worldwide have revealed a range of modes of transmission of this organism including food, water, environmental and animal to person spread. Person-to-person transmission has also been demonstrated.

E.coli 0157 is an emerging pathogen and has the potential for global public health concern.

**UNSPECIFIED FOOD BORNE ILLNESS**

For the majority of sporadic cases of food-borne illness, the aetiological agent remained unknown (*unspecified*). There were 158 individual cases and 31 separate outbreaks affecting a total of 130 cases.
Figure 9. Reported incidence of sporadic Unspecified Food borne Illness cases in Malta 1990-2004

Unspecified food poisoning

Figure 10. Trends of sporadic food borne illness, Malta 1992-2004
Food borne illness is a major public health issue since:

- Globally there is an increasing trend in food borne illness.
- The burden caused by food borne illness is high.
- Since cases are linked to warm weather, the number of cases is expected to increase as global temperatures increase.
- Eating habits change. People are increasingly eating foods prepared outside the home.
- Mass food production requires the introduction of new technologies with attendant risks.
- New food production methods have included changes in agricultural practice. Intensive rearing of food animals can lead to rapid spread of infection between animals.
- With an increasing number of elderly people in the population, and increasing cases of immunocompromised persons (AIDS, steroid treatment, anti cancer treatments, transplant patients), the population is more vulnerable to the effects of food borne illness.
- Food borne illness has an effect on the resources of patient and hospital alike and also an impact on industry, trade and tourism.

**CONSUMER AWARENESS**

A local study on consumer awareness to salmonellosis showed that persons who were affected by salmonellosis had greater awareness to food borne illness than those who did not. (C. Gauci, 2000). Hence, awareness amongst consumers as to the effects of this disease needs to be enhanced as part of the control of food borne illness.

**INFECTION INTESTINAL ILLNESS**

Apart from food borne illness, which is directly related to the consumption of contaminated food or water, a number of diarrhoeal diseases of infectious origin are prevalent in the community. Monitoring of all cases of infectious intestinal illness is hence on-going process.

Under-reporting of infectious intestinal disease is well recognized by the public health community. A population-based study performed in the United Kingdom documented that infectious intestinal disease occurs in 1 in 5 people each year of which only 1 in 6 present to their general practitioner. The actual number of notified cases is much lower than this (Wheeler JG et al, 1999) This problem of under-reporting compromises the quality of surveillance data.

Describing and quantifying under-reporting may assist in strengthening the surveillance system by
- Identifying where and how cases are lost along the surveillance chain
- Finding ways to reduce loss of data and
- Developing correction factors to compensate for a known magnitude of under reporting.
HEPATITIS B

It is estimated by WHO that more than 2 billion persons (including 350 million who are chronically infected) have been infected with HBV. Each year about a million persons die as a result of HBV infections worldwide and over 4 million new acute clinical cases occur. Only a small proportion of acute hepatitis B virus infection may be clinically recognised; less than 10% of children and 30–50% of adults with acute Hepatitis B virus (HBV) infection will have icteric diseases.

In Europe the carrier rate varies between < 0.1% to 7%.

Table 3. Carrier rate of Hepatitis B

<table>
<thead>
<tr>
<th>Region</th>
<th>Carrier Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northwest Europe (e.g.: Scandinavia and U.K.)</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>Midwest Europe (e.g.: France and Germany)</td>
<td>0.1 – 0.5%</td>
</tr>
<tr>
<td>South western Europe (e.g.: Greece and Italy)</td>
<td>1.0 – 5.0%</td>
</tr>
<tr>
<td>Eastern Europe (Bulgaria and Romania)</td>
<td>2.0 – 7.0%</td>
</tr>
<tr>
<td>Central Asian Republics and the Caucasus</td>
<td>&gt; 7%</td>
</tr>
</tbody>
</table>

(Grosheide et al, 1996)

Estimates of the prevalence of Hepatitis B for the Maltese population, in a study held in 2002, gives an overall true proportion of 0.032% and 1.86% (Khamis A., Barbara C.). Hence Malta is considered as a low endemic area since the prevalence is less than 2%. Comparing Malta with other neighbouring countries (e.g.: Greece and Italy) the prevalence for Hepatitis B is more or less the same.

An estimate of the prevalence in Malta, according to age groups in Table 4.

Table 4. Prevalence of Hepatitis B according to age groups in Malta

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Prevalence</th>
<th>95% Confidence Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25 years</td>
<td>0.4%</td>
<td>(0-1%)</td>
</tr>
<tr>
<td>25-50 years</td>
<td>1.9%</td>
<td>(0.2-3.4%)</td>
</tr>
<tr>
<td>&gt;50 years</td>
<td>0.5%</td>
<td>(0-15%)</td>
</tr>
</tbody>
</table>

(Khamis A., Barbara C., 2002)

The prevalence of Hepatitis B is also lower in the younger age group 0-9 years as compared to the older age groups. The reason is the due to universal vaccination policy for children.
Young adults exhibit the highest prevalence for hepatitis B as compared to other age groups. This age pattern in the local situation is very similar to those found in Turkey and Sweden.

The reported incidence rate of acute Hepatitis B over recent years in Malta is downward.

**Figure 11. Reported incidence of sporadic Hepatitis B cases in Malta 1990-2004**

Although Malta has low endemicity, the effects of Hepatitis B are severe:

**Acute Hepatitis B**

- requires hospital admission
- may be severe, leading to acute hepatic necrosis
- has a case fatality rate of about 1%

**Chronic Hepatitis B**

- Occurs in 90% of infants infected at birth, 20-50% of children infected at 1-5 years of age, and 1-10% infected as older children and adults.
- Results in 15-25% of cases dying prematurely
- may lead to liver damage and cirrhosis
- is responsible for 80% of cases of hepatocellular carcinoma
HEPATITIS C

Approximately 3% of the global population is infected with HCV representing approximately 170 million persons worldwide. (Global epidemiology of HCV infection. 2002)

In Malta, the reported incidence of acute Hepatitis C, a notifiable disease, is on the decline.

**Figure 12. Reported incidence of sporadic Acute Hepatitis C cases in Malta 1997-2004**

A study was performed in 1994, to establish the prevalence of Hepatitis C virus in Maltese injecting drug users attending a treatment facility. 55.6% of the participants tested for anti-HCV were positive. (M Camilleri, 1994)

Epidemiological studies are required to:

- Detect outbreaks of HCV infection
- Assess the burden of disease an infection
- Identify and follow up infected persons
- Monitor disease trends
- Develop, implement, and evaluate disease prevention programmes
- Provide guidance for allocation of resources
Such studies may be:

- Cohort or prospective studies (direct measure of risk)
- Case-control studies (indirect estimate of risk)
- Cross sectional or prevalence studies (population based/ selected groups)

Hepatitis C is the most blood-borne communicable disease which has been given attention. The main mode of transmission is from re-use of injecting equipment by intravenous drug users.

HCV has tremendous implications:

- High global prevalence of 3% - 170 million globally
- Chronic infection occurs in 2.3 % - 129 million globally
- Deaths per year amount to 0.4% - 476,000 globally
- Case fatality of 7-10%
- Carrier state in 80% of HCV infected patients
- Liver cirrhosis in 20-35% of cases
- Hepatocellular carcinoma in 1-4 % of cases
- Hep C virus combines with other viruses e.g. HBV, HIV, Herpes zoster modifying the natural course of disease
- Can cause extrahepatic manifestations
- The costs of treating chronic HCV may be considerable
- Liver transplants may be required in decompensated cirrhosis (needs to be performed abroad)
- No vaccine is available in the foreseeable future. Hence we have to rely on primary prevention of newly infected persons is essential. Additional, secondary prevention of transmission from known infected persons to others and the tertiary prevention of the consequences of chronic HCV infection are also important steps in disease control.

A report on the prevention of Hepatitis C in Malta was drawn up in 1994. (Falzon D, 1994) the following points were drawn up:

Most known Hepatitis C cases have followed transfusions of blood or blood products or had exposure through sharing in intravenous drug use. Sporadic cases with no evident risk factors may have been infected by non-sterile surgical instrumentation.

A high percentage of intravenous drug users have been found to be anti-HCV positive at voluntary testing. Sedqa's Substance Misuse Treatment Unit offers its services to over 600 opiate dependent individuals of whom about 65 percent were injecting drug users (IDU) in the year 2002. (Policy and Services Development Division–Sedqa). In a series of 190 patients tested for Hepatitis C Virus (HCV) antibodies and attending Sedqa's Substance Misuse Treatment Unit 52 percent tested positive. Between 1994 (when a diagnostic test became available) until the end of the year 2003, 1220 patients had been tested for HCV antibodies at SMTU. 488 (40%) tested positive. Current understanding of the HCV virus would predict
that of the 488 positive patients, up to 390 will remain carriers for HCV while about 78 will develop chronic liver disease, cirrhosis and possibly hepatocellular carcinoma. Most of these individuals will be in their adulthood when problems would become noticeable. The cost of treating patients with these complications could be phenomenal but might be manageable if prevented or reduced. In the “Final Consensus Statement” of the Consensus Conference on Hepatitis C held in April 2004 it was stated that any effort to prevent “transmission or disease progression is crucial”.

From data from SMTU, Sedqa, a high seroprevalence has also been noted in local prison mates in all cases amongst persons with concomitant drug problems.

Hepatitis C seropositivity has also been noted in individuals transfused before routine screening of blood and products started in Malta

Hepatitis C is an occupational hazard for health care workers and transmission has been documented mostly following sharps injuries though not in Malta.
**INFLUENZA**

Influenza viruses have a particular ability to change. Gradually each year changes in its structure enable the influenza virus to cause annual cycles of infection. However, from time to time, a more dramatic change occurs when one strain of the virus incorporates genetic material from another, creating a new strain with the potential to cause widespread illness in an unprepared population. Worldwide epidemics (pandemics) of influenza occurred in 1918-19, 1957-58, and 1968-69. The first of these pandemics, the Spanish Flu, killed more people than died during the whole of the First World War.

In Malta, during the 1999-2000 winter seasons through reports from a team of three private general practitioners (GPs) made an attempt to study the influenza season in Malta. Influenza A antibodies were elevated in more that one third of the patients tested during this surveillance. (Falzon D et al. 2000)

During the 2002-2003 influenza season, a number of general practitioners became sentinel sites for notifying cases of influenza seen in their practice. A standardised form to collect clinical data was provided to all general practitioners. The reports from the GP were collected weekly, entered on computer and analysed at the Disease Surveillance Unit, the surveillance co-ordination centre.

The following definition for a case of influenza-like illness (ILI) was used:

A sudden onset of disease, cough, fever $> 38 \, ^\circ \text{C}$, muscular pain and/or headache. This case definition was the one recommended by European Community Network. (Comm Decision 2119/98/EC, 2002)

The reporting extended throughout the influenza season - from week 40 of 2002 to week 20 of the following year (October to May) regularly. The GPs sent data on cases seen in their practice during the previous week.

During the following season, the sentinel system continued and the GPs started to collect virological data as well. Hence, each GP will be collecting both swabs and clinical data from the patients.

A committee has been set-up to develop a plan in relation to any future influenza pandemic preparation.
LEGIONNAIRE'S DISEASE

Technology has an impact on infectious diseases. Air conditioners are beneficial and part and parcel of today’s modern technology. However they carry certain risks to health. A previously unrecognised organism, *Legionella pneumophila* is known to cause legionnaires’ disease. In Malta, we have seen a number of cases of Legionnaires’ disease diagnosed and confirmed by urinary antigen testing over the past few years. The reported incidence peaked in 2000 and subsequently diminished with no cases being notified in 2002. However the European Working Group for Legionella Infections (EWGLI) reported a cluster of 2 cases in tourists acquiring the disease during their stay in Malta in February 2002 and January 2003.

*Figure 13. Reported incidence of sporadic Legionnaires’ disease cases in Malta 1990-2004*

![Legionellosis graph](image)

Although the reported incidence rate is low, constant vigilance for this disease is required since the condition may adversely affect tourism in Malta, which is the main source of income during the summer season.

There needs to be stringent health and safety regulations to minimise the risk to human health from *Legionella*- contaminated water systems. The Health Division has issued a code of practice for the prevention of Legionella for hotels. However, all types of water systems need to be considered including:

- Hot and cold systems - tanks, pipes, showers
- Air-conditioning cooling towers
- Evaporative condensers
- Humidifiers
- Whirlpool spas
- Decorative fountains
LEISHMANIASIS

Cutaneous Leishmaniasis

The reported incidence of cutaneous leishmaniasis peaked in 1998 when 26 cases were reported having an incidence of $6.89 \times 10^{-8}$ per 1,000 population. Of these 26 cases, 13 cases (50%) (incidence of $4.47 \times 10^{-7}$) originated in Gozo. After this time the reported incidence was on the decline.

**Figure 14. Reported incidence of sporadic Cutaneous Leishmaniasis cases in Malta 1990-2004**

Cutaneous Leishmaniasis is primarily a disease of the young, the vast majority of patients being children 2-6 years of age at diagnosis. During the period February 1982 and February 1985, 13 cases of primary cutaneous leishmaniasis were diagnosed and localised to a small coastal area of Gozo in the villages of Qala, Nadur and Ghajnsielem. (Briffa V, 1985)

Visceral Leishmaniasis

The reported incidence rate of notified cases of visceral leishmaniasis has been low over the past 10 years.
There is a clear association between the prevalence of the infection in dogs and man. In the Maltese Islands, the domestic dog is the only reservoir of infection and there is no evidence that other mammals such as rats are involved. (Fenech FF, 1997) In a door-to-door survey of dogs residing in 5 villages in Gozo, prevalence of canine leishmaniasis was estimated at 18.5% (Amato Gauci AJ, 1990)

Control of leishmaniasis is important since it is a condition for which effective control of leishmaniasis should be possible by

- Early diagnosis and treatment of infection in local dogs
- Educational measures to the public to avoid sand fly infested areas
- Educational measures to avoid sand fly bites e.g. use of repellent skin lotion
- Elimination of breeding places for sand flies
- Appropriate use of insecticides
MENINGOCOCCAL DISEASE

Meningococcal disease (MD) has become a public health concern in Malta since 1996 when there was a steady increase in the reported incidence of the disease until 2000. From a reported incidence of 0.8 per 100,000 cases in 1994, the reported incidence reached 8.2 per 100,000 in 2000. This is the highest rate reported for Malta since 1942. A public health strategy was at that point set up in order to:

- Conduct active surveillance of cases in hospitals for the early detection of suspected cases
- Enhance communication with the public and general practitioners since early recognition and immediate treatment is known to save lives. Circulars were sent to doctors and patient information leaflets were distributed.

The reported incidence rate dropped after the year 2000 to reach a rate of 3.5 per 100,000 in 2002. During 2003, the reported rate was 4.27 per 100,000. Of the 17 cases which occurred in 2003, the main clinical diagnosis of four cases was meningitis; septicaemia occurred in eight cases and five cases had both meningitis and septicaemia.

Figure 16. Reported incidence of sporadic Meningococcal cases in Malta 1990-2004

Although the reported incidence rate declined between 2000 and 2002, case fatality rate remained substantial for 2002. There were three deaths directly caused by meningococcal disease in the year 2002, with an overall case fatality rate of 21.43%—higher than the average rate of 7-10% in other developed countries. There were no deaths from this cause in 2003.
Table 4. Case fatality rate of meningococcal disease in Malta 1997-2003

<table>
<thead>
<tr>
<th>Year</th>
<th>No of cases of MD</th>
<th>No of deaths related to MD</th>
<th>Case fatality rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997-1998</td>
<td>45</td>
<td>8</td>
<td>19.4</td>
</tr>
<tr>
<td>1999-2000</td>
<td>55</td>
<td>8</td>
<td>15.6</td>
</tr>
<tr>
<td>2001-2002</td>
<td>36</td>
<td>4</td>
<td>13.0</td>
</tr>
<tr>
<td>2003</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Apart from deaths, other complications of meningococcal disease may develop which may have debilitating effects on the survivor. For example, some cases may need amputation of fingers/toes which may lead to an added burden for the affected person and their families.

Contacts of cases of suspected meningococcal disease are given antibiotic prophylaxis to decrease the prevalence of nasopharyngeal carriage of N. meningitides in the community. Although the numbers of contacts are usually few, the cost of treatment is borne by the Health Division, as is the cost of treatment of cases in hospital.

The illness also causes high emotional concern in contacts of cases and parents of the young.

From the information available on serogrouping during the last few years, serogroup B was responsible for the majority of the identifiable cases where N meningitidis was cultured. During 2002, of the 14 notified cases, N. meningitidis was cultured in 8 cases (57%). Of these, serogroup B accounted for 6 cases (75%) and serogroup C for two cases (25%). There were no cases of serogroup W-135 or serogroup D.

Vaccines available for meningococcal meningitis are:

- Bivalent for Serotype A+ C
- Quadrivalent for serotypes A, C, Y, W135

The absence of an effective Group B vaccine (research still ongoing) is a serious gap in the public health weaponry to combat meningococcal disease particularly for the local scene.

Reducing the reported incidence and the impact (fatalities, complications) of meningococcal disease is therefore a current priority for Malta.
Key factors in the control of MD include

- Constant enhanced surveillance
- Verification of causative organism
- Identification of serogroup
- Early availability of vaccine against Group B meningococcal disease
- Prompt treatment of cases
- Awareness by lay and professional people

Where a vaccine is available, its introduction has been demonstrated to be beneficial. In England, Group C causes the majority of cases of meningococcal disease. With the availability of the new conjugate Group C meningococcal vaccine, an immunisation programme was launched in the year 2000. The result was a dramatic reduction of notified cases in the Group C meningococcal disease by a total of 86% during this year from the notified cases. (PHLS CDSC & Meningocccal Reference Unit, 2002).
NEW AND EMERGING DISEASES

The threat of apparently new or previously unrecognised infections is ever present. Since the early 1970s at least 30 previously unknown infectious diseases have become prominent for which there is no fully effective treatment.

Some examples are included in Table 5.

Table 5. New or emerging diseases

<table>
<thead>
<tr>
<th>Year</th>
<th>Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>SARS Virus</td>
</tr>
<tr>
<td>1999</td>
<td>Nipah Virus, West Nile virus</td>
</tr>
<tr>
<td>1997</td>
<td>H5N1 (Avian Flu)</td>
</tr>
<tr>
<td>1996</td>
<td>nCJD, Australian bat lyssavirus</td>
</tr>
<tr>
<td>1995</td>
<td>HHV8 (Kaposi sarcoma virus)</td>
</tr>
<tr>
<td>1994</td>
<td>Sabia Virus, Hendra virus</td>
</tr>
<tr>
<td>1993</td>
<td>Hantavirus pulmonary syndrome</td>
</tr>
<tr>
<td>1992</td>
<td>Vibrio cholerae 0139</td>
</tr>
<tr>
<td>1991</td>
<td>Guanarito virus</td>
</tr>
<tr>
<td>1989</td>
<td>Hepatitis C</td>
</tr>
<tr>
<td>1988</td>
<td>Hepatitis E, Human herpesvirus 6</td>
</tr>
<tr>
<td>1983</td>
<td>HIV</td>
</tr>
<tr>
<td>1982</td>
<td>Eschericia coli 0157:H7</td>
</tr>
<tr>
<td>1980</td>
<td>Human T-lymphotropic virus</td>
</tr>
<tr>
<td>1977</td>
<td>Campylobacter jejuni</td>
</tr>
<tr>
<td>1976</td>
<td>Cryptosporidium parvum, Legionnaires’ disease, Ebola</td>
</tr>
</tbody>
</table>

Modern demographic and environmental conditions that favour the spread of infectious diseases include:

- Global travel
- Globalisation of the food supplies and centralised processing of food
- Population growth increased urbanisation and crowding
- Population movements due to civil wars, famines, and other man made or natural disasters
- Irrigation, deforestation, and reforestation projects that alter the habitats of disease-carrying insects and animals
- Human behaviours, such as intravenous drug use and other risk behaviour
- Increased use of antimicrobial agents and pesticides, hastening the development of resistance
- Increased human contact with tropical rain forests and other wilderness habitats that are reservoirs for insects and animals. These harbour unknown infectious agents.
- Under-investment in or complacent attitudes to public health control measures for communicable diseases e.g. interruption of effective vaccination programmes

Given the nature of the micro-organisms that cause infection, the pattern of human behaviour and changes to the environment, further newly emergent infectious diseases are inevitable. Infectious diseases recognise no international boundaries, so that a newly emergent disease in another part of the world must be assessed as a potential threat to Malta.

The re-introduction of exotic diseases to Malta is another source of emerging infections. Examples of such diseases include typhoid. A high proportion of such diseases are linked to returning travellers, such as malaria, hepatitis A and shigellosis.

The emergence of bio-terrorism as a potential threat is another route by which new diseases could be introduced. A number of agents that may be used include anthrax, botulism, bubonic plague, smallpox and tularemia. These agents, together with those responsible for the viral haemorrhagic fevers, are considered to be the highest priority group because:

- they can easily be disseminated or transmitted from person to person
- they cause high mortality
- they have potential for major public health impact
- they might cause public panic and social disruption
- they require special action for public health preparedness.
SEXUALLY TRANSMITTED DISEASES

Due to the persistent stigma surrounding these conditions, accurate reporting remains a problem. GPs still see the majority of cases and rarely notify STI conditions to the public health authorities. Most of the STI statistics are those presented by the Genitourinary Clinic (GU) and the Gynaecology Department which probably represent only the tip of the iceberg.

The type of STIs diagnosed at the GU clinic during 2003 is shown in Figure 17.

![Figure 17. Cases presented to GU Clinic during 2003](image)

HIV counselling and testing was carried out in 60% of presented cases. The UK National Sexual Health and HIV strategy has set up standards for the uptake of HIV testing in GU clinics. The targets for 2004 and 2007 are 40% and 60% respectively. The conditions seen are many and varied as one would expect from a GU Clinic which is not exclusively for the detection of the STIs. (Figure 19). This diversity is exemplified by a breakdown of the “miscellaneous” group, dermatological conditions and balanitis (Tables 6-8).

<table>
<thead>
<tr>
<th>Condition</th>
<th>No of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. varicoceles</td>
<td>21</td>
</tr>
<tr>
<td>2. venerophobia</td>
<td>19</td>
</tr>
<tr>
<td>3. diabetes mellitus</td>
<td>16</td>
</tr>
<tr>
<td>4. neisseria meningitidis (Throat)</td>
<td>14</td>
</tr>
<tr>
<td>5. acute epididymitis</td>
<td>10</td>
</tr>
<tr>
<td>6. vestibulitis</td>
<td>9</td>
</tr>
<tr>
<td>7. UTI</td>
<td>7</td>
</tr>
<tr>
<td>8. alcohol abuse</td>
<td>7</td>
</tr>
<tr>
<td>9. chronic prostatitis</td>
<td>6</td>
</tr>
<tr>
<td>10. erectile dysfunction</td>
<td>5</td>
</tr>
<tr>
<td>11. haemorrhoids</td>
<td>5</td>
</tr>
<tr>
<td>12. epididymal cysts</td>
<td>4</td>
</tr>
<tr>
<td>13. lymphoceleles</td>
<td>4</td>
</tr>
<tr>
<td>14. Peyronie’s</td>
<td>3</td>
</tr>
<tr>
<td>15. haemorrhoids</td>
<td>3</td>
</tr>
<tr>
<td>16. renal colic</td>
<td>2</td>
</tr>
<tr>
<td>17. hernia</td>
<td>2</td>
</tr>
<tr>
<td>18. haemospermia</td>
<td>2</td>
</tr>
<tr>
<td>19. prolactinoma</td>
<td>1</td>
</tr>
<tr>
<td>20. Reiter’s</td>
<td>1</td>
</tr>
<tr>
<td>21. ca testicle</td>
<td>1</td>
</tr>
<tr>
<td>22. Crohn’s disease</td>
<td>1</td>
</tr>
<tr>
<td>23. haemochromatosis/haemosiderosis</td>
<td>1</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Condition</th>
<th>No of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. tinea cruris</td>
<td>52</td>
</tr>
<tr>
<td>2. lichen simplex</td>
<td>37</td>
</tr>
<tr>
<td>3. lichen sclerosis</td>
<td>14</td>
</tr>
<tr>
<td>4. normal variants.</td>
<td>12</td>
</tr>
<tr>
<td>a. pearly penile papules</td>
<td>8</td>
</tr>
<tr>
<td>b. angiokeratomas</td>
<td>2</td>
</tr>
<tr>
<td>c. sebaceous cysts</td>
<td>2</td>
</tr>
<tr>
<td>5. Seborrhoeic dermatitis</td>
<td>11</td>
</tr>
<tr>
<td>6. lichen planus</td>
<td>6</td>
</tr>
<tr>
<td>7. psoriasis</td>
<td>5</td>
</tr>
<tr>
<td>8. tinea versicolor</td>
<td>4</td>
</tr>
<tr>
<td>9. abscesses</td>
<td>3</td>
</tr>
<tr>
<td>10. acne</td>
<td>2</td>
</tr>
<tr>
<td>11. naevi</td>
<td>2</td>
</tr>
<tr>
<td>12. hidradenitis suppurativa</td>
<td>2</td>
</tr>
<tr>
<td>13. irritant dermatitis</td>
<td>2</td>
</tr>
<tr>
<td>14. furunculosis</td>
<td>1</td>
</tr>
<tr>
<td>15. parasitosis</td>
<td>1</td>
</tr>
<tr>
<td>16. herpes zoster</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 7. Causes of balanitis in cases presenting at GU clinic during 2003.

<table>
<thead>
<tr>
<th>Condition</th>
<th>No of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. candida</td>
<td>69</td>
</tr>
<tr>
<td>2. non-specific</td>
<td>23</td>
</tr>
<tr>
<td>3. smegma</td>
<td>17</td>
</tr>
<tr>
<td>4. lichen sclerosis</td>
<td>13</td>
</tr>
<tr>
<td>5. psoriasis</td>
<td>7</td>
</tr>
</tbody>
</table>
6. circinate 6
7. plasma cell 5
8. lichen planus 3
9. hpv 3
10. irritant dermatitis 2
11. podophyllotoxin burn 1
12. trauma 1
13. drug (metronidazole) reaction 1
14. streptococcal 1
15. anaerobic 1
16. unrecorded 5

Figure 18. Other conditions diagnosed with Ano-genital warts in cases presenting to GU clinic

Ano-genital warts are very common, and present to different specialists. These are sexually acquired in the majority of cases and many patients will have other concurrent STIs. Therefore, all new presentations need a full GU screen. Simply treating the warts is not enough. Figure 18 illustrates the multiple pathology in the 304 cases of ano-genital warts that presented to the clinic during 2003. These conditions would otherwise have been missed.

Role of GU Clinic
As indicated, diverse other conditions are seen at the clinic apart from STIs. In keeping with recent recommendations for the modernization of GU services, better efficiency can be achieved by the referral of these “other conditions” to the appropriate specialist for further management. Referral needs to flow in both directions, and the clinic must be seen as a service to be used by other specialists, the gynaecologists in particular. The GU clinic is complementary to, and not in competition with, other services.
Table 9. Patients referred elsewhere from GU clinic

<table>
<thead>
<tr>
<th>Departments</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>68</td>
</tr>
<tr>
<td>Gynaecology</td>
<td>46</td>
</tr>
<tr>
<td>Medicine</td>
<td>41</td>
</tr>
<tr>
<td>Dermatology</td>
<td>41</td>
</tr>
<tr>
<td>Other (mainly Urology)</td>
<td>32</td>
</tr>
</tbody>
</table>

**Trends**

The number and type of sexually transmitted conditions discussed above represent a select group, i.e. those seen by one doctor in the clinic setting. The majority of patients are still seen by general practitioners and other specialists, gynaecologists in particular. The numbers are therefore, a significant underestimate of the true numbers in the general population. They therefore need to be interpreted with great caution. Nonetheless on grouping the classical STIs (chlamydia, gonorrhoea and syphilis) some patterns do emerge.

**Figure 19. Number of cases of syphilis and gonorrhoea seen at GU Clinic during 2000-2003**

a. **Gonorrhoea**

The number of cases diagnosed and reported is very small (3 cases in 2000, none in 2001, 4 in 2002 and 5 in 2003). Possibly gonorrhoea is a rare disease in Malta but this would be contrary to what is happening in the rest of Europe which has seen a significant increase in numbers. For example, there was an 8% increase in the U.K. in 2002.

As cited in previous GU reports, factors that probably contribute to the apparent low numbers include:

- over-prescribing of antibiotics by practitioners
• over-the-counter purchase of antibiotics by patients
• unreliable transport of swabs to the Pathology Department

b. Evident Syphilis

With the advent of AIDS and the adoption of safer sex practices, the reported incidence of syphilis decreased drastically. This state did not however, last long and syphilis has made a serious come back of epidemic proportions in Eastern Europe, but is not confined there. In 2001/2002 the UK saw a 73% reported increase of infectious syphilis in males and a 33% increase in females.

Syphilis had become a rarity in Malta. No cases were recorded over the 15 years prior to 2002, and only 3 cases were reported over the last 25 years.

Ten cases have been diagnosed since; 1 in 2002 and the 9 in 2003. Of these, 5 were early and the other 5 were late presentation. Of the late ones, 2 were considered to have had adequate treatment in the past; the other 3 had been unaware of their diagnosis (one refused treatment).

The sources of the early disease cases were prostitutes of East European origin, and in one case a tourist of undetermined nationality. Unfortunately none of these could be traced.

These cases do not constitute an epidemic but they should help to raise a high index of suspicion and test accordingly. It is still common practice, in some quarters, to screen for syphilis with a VDRL alone. This is not adequate and cases of active disease could be missed. As a minimum, screening should consist of the combination of a cardiolipin antigen together with a treponemal antibody test (e.g. VDRL+TPHA). Modern guidelines suggest that an appropriate alternative is a treponemal antigen-based EIA (enzyme-immuno assay)

c. Chlamydia.

This is the most commonly diagnosed bacterial sexually transmitted infection in the developed world and a leading cause of pelvic inflammatory disease. The numbers of diagnosed cases have steadily increased since 2000, although the test originally performed was an ELISA test with its inherent problem of a high false negative rate (as much as 40%). The numbers are therefore an underestimate.

Today’s screening method of choice is a DNA amplification test. This capability became available at St. Luke’s as from the beginning of this year, and it should improve diagnostic accuracy immeasurably.
Key observations on STIs control in Malta are:

No information on the real prevalence and burden caused by STIs especially chlamydia

Some sexually transmitted infections are leading to more serious long-term consequences that include prolonged pain and discomfort, sterility, ectopic pregnancy, liver cancer and cervical cancer

Human and social behaviour is changing in Malta

Not enough prevalence assessment and monitoring has been done to identify population subgroups at risk, monitor trends and guide funding and resource allocation

Monitoring of antimicrobial resistance

The laboratory requires to be strengthened to improve the possibility of identifying the more difficult pathogens in clinical samples
TUBERCULOSIS

Tuberculosis (TB) is currently considered a highly important international health problem. In 1993, the World Health Organisation declared tuberculosis to be a global emergency. The spread of HIV infection and in some areas, the growth of multidrug resistant strains have helped to increase its hold on Sub-Saharan Africa, the Indian subcontinent; South East Asia, Russia; some Latin American countries and, to a lesser extent, other countries of the world. HIV infection and failing public health programmes have fuelled the resurgence of TB, while drug resistance further threatens control.

According to Dr. Gro Harlem Bruntland, “an ancient disease is killing more people today than ever before. Tuberculosis, which many of us believed would disappear in our lifetime, has staged a frightening comeback.”

More people are dying of TB in the world today than at any other time in history. This figure stands at approximately three million deaths each year worldwide.

The number of cases of TB in Malta over recent years is continually on the decline. The steady decline has been largely attributed to better housing and nutrition, and then, to prevention and control measures including:

- Identifying potentially infectious people
- Treating cases effectively and as early as possible
- Tracing and treating contacts rapidly and effectively
- BCG immunisation of the population

However, during the 1990s and early 21st century, while the trend for less cases yearly was maintained for extra-pulmonary TB, the rate for pulmonary TB remained stable.

Notified cases of TB in Malta underwent a steady decline over the years 1920 to 1977. This was in parallel to improvements in housing and socio-economic conditions on the islands, with the notable exception of World War II during which the notified cases rose exponentially.
Figure 21. Reported incidence of sporadic Tuberculosis cases in Malta 1922-2004

Pulmonary Tuberculosis

Figure 22. Reported incidence of sporadic Pulmonary Tuberculosis cases in Malta 1990-2004

Pulmonary Tuberculosis
During the year 2003, there were 7 TB cases notified and confirmed. These were categorised as:

- 3 pulmonary cases in Maltese nationals
- 1 pulmonary case in a foreigner
- 1 extra-pulmonary case in Maltese national
- 2 extra-pulmonary TB in foreigners

During 2003, there were 502 illegal immigrants from high-risk countries who came to Malta. Of these there were two non-pulmonary cases of TB.

In an effort to control TB illegal immigrants coming from high-risk countries, a protocol regarding TB screening in illegal immigrants was set up by which all cases are currently screened.

The control of TB in Malta is important since:

- Although we have a low reported incidence rate, we have an influx of people coming from high-risk countries. These include illegal immigrants; people seeking employment; students and tourists.
- Although we have not had cases of TB in people co-infected with HIV, this picture may change as we continue to receive a steady flow of travellers from countries where HIV is endemic.

- An ageing population in Malta means that disease may be re-activated in older people who were exposed to TB when they were younger.

- It is projected that TB will increase by 3% worldwide up to 2005. (World Health Organisation, 2001)
The reported incidence of typhoid is down going since 1990. There were no cases reported since 1998.

*Figure 24. Reported incidence of sporadic Typhoid cases in Malta 1990-2004*
The commonest form of typhus fever encountered in Malta is murine typhus followed by tick-borne typhus. The number of reported cases of murine typhus is slowly on the decline. The tick borne typhus cases reported peaked in 1998 when surveillance for this condition was enhanced.

**Figure 25. Reported incidence of sporadic Murine Typhus cases in Malta 1990-2003**

![Graph showing incidence of sporadic Murine Typhus cases in Malta 1990-2003](image)

**Figure 26. Reported incidence of sporadic Tick borne Typhus cases in Malta 1990-2003**

![Graph showing incidence of sporadic Tick borne Typhus cases in Malta 1990-2003](image)
During the year 2003, there were 19 reported cases of murine typhus and 14 cases of tick-borne typhus. This follows the pattern of previous years by which there are usually more cases of murine typhus notified per year than of tick-borne typhus.

For tick-borne and murine typhus, there is greater preponderance towards male cases with a ratio of 9:4 cases for tick-borne and 13:6 for murine. The age and sex distribution for cases of 2003 are shown in Table 10 below.

Table 10. Age and Sex distribution of typhus cases reported in 2003

<table>
<thead>
<tr>
<th></th>
<th>Murine Typhus, 2003</th>
<th>Tick-borne Typhus, 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>0-4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5-14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15-24</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>25-34</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>35-44</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>45-54</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>55-64</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>≥65</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

The map below portrays the geographic distribution of cases for 2002 showing a higher concentration of cases towards the South East of Malta. There were also three cases in Gozo.
Diagnosis of typhus is based on:

- The clinical picture
- Response to treatment
- Weil–Felix Tests

However, Weil-Felix tests using Proteus OX-19 and Proteus OX-2 antigens are not specific and should be confirmed by more specific tests. A study was started in July 2002 in which 19 cases of typhus that were diagnosed by clinical and Weil-Felix reaction, were further analysed.

Samples of sera and where possible skin biopsies from eschars and/or rash were sent abroad for further analysis and identification of the organism. There was cross reactivity with Rickettsia species conori, slovaca, helvetica, mongolo, masilli, aeschle, felis and typhi in 10 of 17 cases. One sample cross-reacted with Q fever. (Results from biopsy sites are not available as yet.)
Control of typhus is important since the number of cases are significant and cause a burden in that many cases would require admission to hospital; entail substantial loss of work and treatment costs are significant. Changes in the environment especially climate change, can have profound effect on the reported incidence rate of typhus.

Key factors in the control of typhus include:

- Effective flea control
- Elimination of rodents
- De-ticking of dogs
- Control of stray dogs
VACCINE PREVENTABLE DISEASES

Childhood diseases such as diphtheria and poliomyelitis have been virtually eliminated in Malta. Smallpox has been eradicated worldwide and polio has been declared eradicated from Europe in the year 2002. However, other vaccine preventable diseases including measles, pertussis and chickenpox continue to occur.
The World Health Organisation’s eradication strategies rely on acute flaccid paralysis surveillance as a sufficient means of detecting wild poliovirus circulation. The surveillance programme requires that AFP cases in children under 15 years of age are reported and investigated. (World Health Assembly. Global Eradication of Poliomyelitis by the Year 2000. Geneva; World Health Organisation, 1988). Active surveillance for acute flaccid paralysis in Malta became effective in January 1998 and is still ongoing with monthly reporting to World Health Organisation.

*Figure 28. Reported poliomyelitis cases 1920-2003*

The last case of polio seen in Malta was in the 1960s. No further cases were identified since then and hence, along with the rest of Europe, polio can be said to have been eradicated in Malta.

For many years Malta has maintained a high oral poliovirus vaccine coverage, especially in the child population. Vaccination is a legal requirement which is enforced. Herd immunity is therefore considered to be high. High coverage with three doses of the poliovirus vaccine has been achieved since 1995, ranging from 94% to 96%.
Figure 29. Vaccination coverage for diphtheria, tetanus, poliomyelitis and pertussis 1992-2003.

Being an island, Malta has no borders with polio-endemic countries. However a small number of refugees and asylum seekers arrive in Malta from polio-endemic countries from time to time.

Although polio has been eliminated from Malta, key factors in the control and prevention of re-emergence include:

- Maintaining a high vaccination coverage
- Vaccinating travellers to high endemic countries
- Giving polio vaccine to persons coming from high endemic countries including tourists, refugees and persons coming to work in Malta.
- Constant surveillance
**DIPHTHERIA**

The number of cases of diphtheria in Malta had declined with no cases being reported after the 1960s.

**Figure 30. Number of notified cases of diphtheria from 1920-2003**

This reduction is due to the high herd immunity in the population. High coverage with three doses of diphtheria vaccine has been achieved since 1995 ranging from 94% to 96%.

Key factors in the control and prevention of diphtheria include:

- Maintaining a high vaccination coverage
- Vaccinating travellers to high endemic countries
- Giving diphtheria vaccine to persons coming from high endemic countries including tourists, refugees and persons coming to work in Malta.
- Constant surveillance
TETANUS

The number of cases of tetanus is on the decline with one case being reported during 2003. This case survived.

*Figure 31. Notified tetanus cases 1978-2003*

It is important that:

- A high vaccination coverage is maintained to sustain the herd immunity
- Education of the general public on the necessity for complete immunisation with tetanus toxoid; the hazards of puncture wounds; closed injuries and the potential need after injury for active and/or passive prophylaxis.
- Prophylaxis in wound management
PERTUSSIS

The reported incidence rate of pertussis is on the decline with only eleven cases being reported during 2003, four of which were a cluster. The coverage rate for pertussis is high providing high (95%) herd immunity despite the fact that vaccination against pertussis is not legally obligatory. This is because pertussis is usually given combined with diptheria and tetanus, both in the vaccination clinics and in private practice.

Figure 32. Reported incidence of sporadic Pertussis cases in Malta 1990-2004

The importance of maintaining high herd immunity is observed by looking at the effect of the whooping cough vaccine scare in the 1970s. In England, the 1974 report on Pertussis vaccine neurological reactions led to a loss of confidence in vaccine safety with a sharp reduction in coverage. Pertussis epidemics followed and it took several years to return the coverage rate to the pre-scare level. (Gangaosa EJ et al. 1998)
MEASLES

With a major campaign carried out locally between 1987 and 1990 to promote vaccination, there has been a marked reduction in the number of reported measles cases. In 2002, there were only four reported cases of measles. These were all under 6 years of age. Diagnoses were based on clinical grounds alone and all resulted in negative serology for measles.

The WHO European Region has launched a programme of improved surveillance of measles with the aim of its eradication from Europe. Malta participates in this programme with monthly reporting to WHO. Measles is also one of the priority diseases selected by the European Network for European Surveillance. The Disease Surveillance Unit sends case-based reports of all notified measles on a monthly basis to the European Surveillance Network (EUVAC.NET), which deals with the surveillance of vaccine preventable diseases. The Network collaborates with the World Health Organisation in its efforts to implement strategies for measles elimination in the European Region by 2010.

Figure 33. Reported incidence of sporadic Measles cases in Malta 1990-2004

![Graph showing reported incidence of measles cases in Malta 1990-2004](image-url)
The reported incidence of mumps is also on the decline. During 2002, there were eleven cases of mumps. This is a marked reduction from the unusually high number of reported cases (386) in the year 2000. These cases were not laboratory confirmed.

*Figure 34. Reported incidence of sporadic Mumps cases in Malta 1990-2004*
Rubella notification has also declined with the introduction of vaccination. In 1995, there was a twenty-fold increase (416 cases) over the previous year. Although the episode was not laboratory-confirmed, it led to concerns about the integrity of local herd immunity to rubella.

In 1996, a cross-sectional study was performed in youths aged 14-15 years to determine the seroprevalence of rubella IgG antibodies. The study showed a high prevalence of humoral immunity against rubella amongst Maltese females in the pre-childbearing age group. However, the study could not differentiate between vaccine-induced immunity and that imparted by disease. (D. Falzon et al. 1998)

During 2002, there were two notified cases of rubella.

**Figure 35. Reported incidence of sporadic Rubella cases in Malta 1990-2004**

The coverage rate for the combined measles, mumps and rubella (MMR) vaccine was 85% in 1999. This well below what is required to ensure herd immunity. The reasons behind this relatively low coverage rate may several: one could be due to scares linking measles vaccine in-utero to Crohn’s disease (Ekbom A et al. 1996); measles vaccination to inflammatory bowel disease (Thompson NP et al. 1998) and MMR vaccination to infantile autism (Wakefield AJ et al. 1998) alternatively, this may well be due to under-reporting (Vassallo Aguis P., 1999) as many vaccines are given privately and reporting is not as good as with state vaccination.

During 2001, the coverage rate was noted to rise, peaking further by 2003.
Although the number of cases of measles, mumps and rubella are not very high, there have been outbreaks of these diseases in recent years. It is expected that these will continue to occur until community immunisation rates are high enough to provide effective herd immunity.

The control of measles, mumps and rubella requires:

- Increasing coverage rate for MMR to reach high herd immunity
- Establishing an Advisory Committee on Immunisation Policy
- Research to provide evidence for the introduction of further booster doses of MMR
Although the reported incidence rate of chickenpox cases is on the decline, it still causes a significant burden in terms of loss of school days; loss of work for parents; possible admissions (during 2003 14 cases required admission to hospital) and possible serious complications. Chickenpox disease in children is serious. However, in adults it can be more dangerous. In Malta, during 2003 there was a death in an adult which was directly related to chickenpox. In England, between 25 and 30 people die from chickenpox every year.

Figure 37. Reported incidence of sporadic Chickenpox cases in Malta 1990-2003

An effective and safe vaccine is available. However, it is not included in the national vaccination schedule and its use in the private sector is of low priority, not least because of its considerable cost. (Attard Montalto S. 2002)

One has to consider that if chickenpox is a priority disease, a decision as to whether to introduce the vaccine in the national schedule is required, based on the cost-benefit analysis.
**HERPES ZOSTER**

Similarly as for chickenpox, the reported incidence of Herpes Zoster is on the decline over the last few years. The implications of this condition is that it causes severe pain and the treatment (acyclovir) costs are very high. During 2003, there were seven admissions to hospital for Herpes zoster.

*Figure 38. Reported incidence of sporadic Herpes zoster cases in Malta 1998-2004*
There was a decrease in the cases of *Haemophilus influenzae* type B following the introduction of the vaccine since 1996. The coverage rate stands at more than 85%.

*Figure 39. Reported vaccination coverage for Hib in Malta 1992-2003*
ANTIMICROBIAL RESISTANCE

A national strategy to address the problem of antimicrobial resistance is based on the three key elements of:
1. Surveillance: to provide the information base for action
2. Prudent antibiotic use: to restrain against a rapid emergence of resistance
3. Infection control to generally limit the spread of infection, particularly antimicrobial resistant cases, thus reducing the need for antibiotics.

This Health Department established an ad-hoc National Working group on Antibiotic Use in 1999. The report of the committee preceding the NAC is available at: http://www.slh.gov.mt/pdf/antibiotic%20resistance%20report.pdf

The working group discussed and reported on the following issues:
1. Encouragement of more prudent use of antimicrobials;
2. Emphasis given to infectious diseases and antimicrobial therapy in undergraduate curricula;
3. Drug licensing system;
4. The extent of over-the-counter antibiotic sales and appropriate measures or legislation to reduce such practices;
5. Assistance that can be provided by international organisations;
6. Use of antibiotics in the veterinary field;
7. Safeguarding the effectiveness of antimicrobials on a national level.

Following the report, a multi-disciplinary National Antibiotic Committee [NAC] has subsequently been established to coordinate national initiatives, in particular, an educational campaign aimed both at the general public as well as pharmacists and doctors.

The NAC also coordinates research on the subject and spearheaded work on over-the-counter prescribing in Malta. An Antibiotic Team has also been set up in St. Luke’s Hospital. The team is working on a number of prescribing guidelines. Surgical prophylaxis guidelines have already been established and endorsed, both by the Department of Surgery, and by the Drugs and Therapeutics Committee [DTC]. They are available on the intranet and internet at: http://www.slh.gov.mt/ICUnit/icuarp1.asp

Surveillance is also undertaken on antimicrobial resistance and antibiotic consumption in hospitals. Susceptibility data of hospital isolates to different antibiotics is available on-line at: http://www.slh.gov.mt/ICUnit/icuarp.asp and updated regularly.

Malta is an active participant in 3 European projects, namely:
ESAC - European Surveillance of Antimicrobial Consumption
ARPAC- Antibiotic Resistance Prevention and Control
In addition, the Infection Control Unit has successfully submitted a proposal for ARMed, a surveillance network on antimicrobial resistance in the Mediterranean, under the International Cooperation with Mediterranean countries under 5th Framwork Programme programme of the European Union (INCO-MED FP5) and this will run for 4 years starting in 2003.
COMMUNICABLE DISEASE SERVICES IN MALTA AT 2003

Figure 40 below, delineates the interaction between the various units involved in communicable disease services:

*Fig 40. Flow chart of surveillance and communicable disease care services*
CHEST UNIT

The Chest Unit, situated within Qormi Health Centre, is responsible for the control and prevention of tuberculosis.

Tuberculosis screening is performed to:

- All contacts of Tuberculosis cases

Identified high risk groups:

- All foreigners from countries with a high reported incidence of TB (A high reported incidence is defined as one whose TB reported incidence is 25 per 100,000 or greater) seeking residency in Malta such as those applying for a work permit and their family members as well as students
- Refugees, illegal immigrants and displaced persons mostly hailing from high risk countries
- Prisoners
- Intravenous drug users
- Adopted children

Occupational screening of the following groups:

- Health care workers
- Teachers

The unit is also responsible for the surveillance of TB cases. Contacts are screened and the case is supervised with regards to treatment. Organization and supervision of anti-TB treatment is performed to make sure that the treatment regime is adhered to. This strategy is called the directly observed treatment strategy (DOTS). Data on cases of tuberculosis is sent to WHO/EuroTB and other international TB organizations.

Bacille Calmette-Guerin (BCG) vaccination falls within the responsibility of the Chest Unit. School children are often referred by the School Medical Services to the Chest Unit because of a high reaction to tuberculin testing. These are tested for TB disease and then referred to the Chest Clinic at St. Luke’s hospital for further follow-up and possible preventive treatment.
The Pathology Department consists of several laboratories and supporting units that carry out laboratory investigations for all government hospitals and clinics. The Pathology Department also carries out a limited number of tests for general practitioners as well as for private hospitals. The latter service is carried out against payment. The main laboratories are situated in the Out-Patients block of St. Luke’s Hospital and an emergency laboratory in the main building of the hospital. The lab is participating in the Leonardo Project, which is an exchange programme for young laboratory technician graduates where they can gain experience in other EU countries.

The pathology department issues its own monthly magazine in electronic format which is circulated to all Ministry of Health users via email. It also actively takes initiatives to strengthen the following areas:

- laboratory accreditation
- point of care testing
- health and safety
- quality management
- data protection
CLINICAL SERVICES (INFECTIOUS DISEASES UNIT)

The IDU is an 8 bedded unit is situated in St. Luke’s Hospital, which is the main state hospital. This unit has been functional since March 2000. It is run by the consultant in infectious diseases with the help of a dedicated group of doctors and nurses.

The Unit admits patients suffering from suspected infectious diseases on a daily basis. It houses two negative pressure rooms. Thus all patients with suspected Tuberculosis, Chickenpox and, more recently suspected SARS are managed in these negative pressure rooms. The Unit’s average occupancy rate was higher than 90% for the year 2002. The number of patients admitted during 2002 numbered 375.

The conditions managed on the Unit are varied but mainly fall under the following categories

- Gastro-intestinal infections
- Viral hepatitis
- HIV related problems
- Mycobacterial infections
- Chickenpox and Herpes Zoster
- Atypical pneumonias
- Tonsillitis
- Travel associated infections
- Rickettsial infections
- Bacterial endocarditis
- Cellulitis
- Prosthetic joint infections
- Investigation of pyrexia of unknown origin

The Unit also consults for ‘difficult’ infections all over the hospital, especially the Intensive Care Unit (ICU) and the Orthopaedic wards. Apart from in-patients, the Unit runs an out-patient Infectious Disease Clinic once a week. The out-patient clinic catered for about 300 patients during 2003.
The Disease Surveillance Unit of the Department of Public Health is the national surveillance centre for communicable diseases in Malta. This unit is also the responsible section for the control and prevention of communicable diseases. Details of patients and their disease are sent via a notification form by postal mail, fax or via synapse direct (a secure e-mail system) to the Department of Public Health on behalf of the Superintendent of Public Health.

Sixty-seven communicable diseases and conditions are statutory notifiable, including priority communicable diseases as well as syndromes such as congenital rubella and acute flaccid paralysis. Notification is mandatory by law by all physicians in both public and private sectors.

A supplementary system of reporting key infections also operates from the laboratories of the Department of Pathology at St Luke’s hospital - the main state hospital. Private medical diagnostic labs are also obliged to notify discovered positive tests for infectious diseases. The laboratories on the island serve to detect infections on a primary level. For any further investigations and confirmatory tests, clinical samples are occasionally carried out at reference laboratories overseas.

Data on reported communicable disease are entered on a Microsoft Access database and analysed.

Medical officers of the Disease Surveillance Unit investigate reported cases according to defined protocols. Any necessary environmental action is co-ordinated through health inspectors within the Health Inspectorate. This mostly involves the Food Safety Unit and the Environmental Health Unit.

Reports of outbreaks are forwarded to the Department of Public Health. A co-ordinated effort is made by medical officers and health inspectors to investigate (epidemiologically and microbiologically) and take timely control measures. Reports are usually collated at central level through faxed or original reports delivered by hand. Follow-up is conducted by the Disease Surveillance Unit officials. Most investigations deal with outbreaks of food-borne disease, particularly Salmonella, Campylobacter and unspecified causes of diarrhoea.

Reports on notified and confirmed cases are published on a weekly, monthly and annual basis.

The Disease Surveillance Unit collaborates with the following European communicable disease networks on surveillance and control as follows:

- World Health Organisation (WHO) Surveillance Programme for Control of Food borne Infections and Intoxications in Europe
- Global Eradication of Poliomyelitis
- Measles Surveillance in European Region
- CCEE Baltics Network -Measles
- Inventory of Resources for Infectious Diseases in Europe (IRIDE)
- CCASHH European Project on food and water borne disease (data from 1997- present)
- European Working Group for Legionella Infections (EWGLI)
- European Center for the Epidemiological Monitoring of AIDS (Euro HIV)
- Surveillance of Tuberculosis in Europe (Euro TB)
- Invasive Bacteria Surveillance (EU IBIS )
- European Union Vaccine Preventable Diseases Project (EUVAC-Net )
- European Influenza Surveillance Scheme (EISS)
- Salmonella, Campylobacter, E.Coli (ENTERNET)
- Surveillance of Listeria (LISTERNET)
- European Bulletin on Communicable Disease (EUROSURVEILLANCE)
- European Programme for Intervention Epidemiology (EPIET)
- Network on sexually transmitted infections (ESSTI)

Information on surveillance, reported cases and outbreaks and control is shared amongst these networks.
ENVIRONMENTAL HEALTH UNIT (EHU)

Investigation procedures for Legionella

The Disease Surveillance Unit refers Legionnaires’ disease cases to the Environmental Health Unit for investigations. Such cases may be sporadic cases diagnosed and confirmed using urinary antigen testing or cases reported from the European Working Group for Legionella Infections (EWGLI) of tourists acquiring the disease during their stay in Malta.

Once a case is referred to the EHU an investigation team is set up. This investigation team is made up of a medical doctor from the DSU, an engineer and members of staff from the EHU. An on site inspection is carried out to either the patient residence (and to the patient place of work) or to the identified hotel in the EWGLI report.

The investigation team carries out its duties in line with the recommended guidelines issued by EWGLI. In the first stages of the investigation, all relevant information is collected from either the patient him/herself or relatives or, if the case is hotel related, to a hotel from the hotel management. Normally, in cases reported through EWGLI, details of room numbers and any other locations visited by the patient within the hotel during his stay will be listed (these are collected by the health authorities of the patient country of origin).

All sites i.e. bedrooms, showers, gym, saunas, indoor/outdoor pools and any water features, etc., where the patient may have visited are inspected. All showerheads, water taps, water reservoirs, roof tanks and any other water systems are inspected for scaling; slime formation and water temperature while water samples are collected for microbiological analysis. A number of on-site chemical test monitoring is also carried out using portable monitoring equipment. The samples are then referred to the Public Health Laboratory (PHL) in the UK. Microbiological samples have to be sent abroad for the necessary analysis, as these cannot be performed at the PHL as yet.

The engineer inspects any wet cooling towers which may be available at the location. In such cases, samples of water are also collected for microbiological analysis. Also inspected are any other type of air conditioning units for any presence of stagnant water; the boiler room and the boilers. Calorifier temperatures are monitored to ensure that they are within the recommended temperatures range and the management maintenance schedule is also checked. Recommendations are given if required.

If deficiencies are noted during these investigations the management is asked to take immediate remedial action. Once the results of the water samples are received action is taken according to results obtained. Should the microbial counts be higher than the recommended levels, the management would have to perform a complete treatment of the domestic water distribution system and this has to be confirmed by a risk assessment report and sample testing collected by the management. In certain
situations areas and/or facilities of the premises would have to be closed down. Staff from the EHU continuously monitor actions being taken by the management and repeat samples are collected independently and sent once again for analysis abroad for confirmation of normal results.

**Investigation of Typhus Case**
The DSU refers cases of murine typhus to the Environmental Health Unit (EHU) for the necessary investigations. Details of the case are referred to the officer in charge of the Pest Control Section, which forms part of the EHU for the necessary investigations.

The patient or his/her relatives are contacted to collect information regarding the possible source/origin of the disease. The officer-in-charge of pest control conducts an inspection of the identified areas including the patients’ own home, place of work and any open field in the vicinity for any evidence of rat infestations.

Members of the staff from the Rodent Control Section perform rat treatment of the area. A follow-up inspection is carried out within a week following the treatment.
FOOD SAFETY UNIT (FSU)

Reports of food borne illness from the DSU are referred by phone to the Principal Health Inspector / Assistant Principal Health Inspector (Aphi) at the Food Safety Unit. A brief case history and the case number are sent from DSU to guide the investigation.

At the Food Safety Unit, registration includes recording both manually and electronically the following details:

- Date of receipt from DSU
- Date when referred to APHI/SHI/HI
- Date of inspection
- Details of food premises involved.
- Type of case
- Case number
- Name of APHI/SHI/HI performing the inspection.
- Date when referred back to DSU

The Principal Health Inspector refers the report to the health inspector who is assigned to deal with the case. A detailed inspection of the implicated premises is carried out. Samples of food, water or environmental swabs are taken during the inspection. These are referred to Evans Laboratory, Merchants Street, Valletta for analysis on same day.

Hygiene reports of implicated food premises are then vetted by the Principal Health Inspector (PHI) who gives specific instructions as required to the health inspector assigned to deal with the case.

Copies of the hygiene reports are referred to: the Disease Surveillance Unit and the licencee of implicated food premises to the Manager Health Inspector and to the regional Principal Health Inspector.

Follow-up inspections are carried out by the district health inspectors as required.
GENITOURINARY CLINIC (GU Clinic)

The Genitourinary Clinic at Boffa Hospital is responsible for the surveillance, management, diagnosis and treatment of cases of sexually transmitted infections and other related conditions.

Total Attendances
There has been a gradual increase in the total number of attendances over the last 4 years (Figure 41). There were 1283 attendances in 2003, which represents a 30% increase over 2002.

In keeping with the recommendations of the Genitourinary Medicine Modernization Group, an attempt has been made to keep follow-up patients to a minimum.

![Figure 41. Total no of attendances at GU Clinic 1999-2002](image)

Table 11. Number of new cases compared to follow ups at GU clinic.

<table>
<thead>
<tr>
<th>Year</th>
<th>New</th>
<th>Total</th>
<th>% New</th>
<th>new: fu</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>468</td>
<td>760</td>
<td>61%</td>
<td>1:1.6</td>
</tr>
<tr>
<td>2001</td>
<td>592</td>
<td>900</td>
<td>66%</td>
<td>1:1.9</td>
</tr>
<tr>
<td>2002</td>
<td>680</td>
<td>985</td>
<td>69%</td>
<td>1:1.2</td>
</tr>
<tr>
<td>2003</td>
<td>935</td>
<td>1283</td>
<td>73%</td>
<td>1:0.7</td>
</tr>
</tbody>
</table>
The largest group (45%) consists of symptom-free individuals who nonetheless feel they should get tested because of a risky sexual life style. This is a very important group, and such health seeking behaviour needs to be continuously encouraged.

**Attendance by gender**

In 2000 there was a male preponderance of 70%. The female attendance has gradually increased to 38% in 2002-2003. Traditionally female patients with genital problems consult the gynaecologist. There seems to have been an increasing acceptance on the as well as more successful partner notification.
**Distribution of cases**

Figure 42 represents the cumulative distribution by age group (2000-2003). The youngest patient was 13 years old and the oldest 82 years old. As expected, the young (13-29 years) represent a majority with 58% of the total. Teenagers, who make up perhaps the most important group in terms of vulnerability to disease (and unplanned pregnancies), make up 10.3% of the total. This group will be considered in more detail separately.

![Figure 44. Distribution of cases attending GU Clinic by age](image)

**Method of referral**

Self-referral by patients remains the preferred choice at 75% overall. Self-referral is one of the pillars on which the clinic is based, and the response rate by patients is welcome. However, the referral rate by doctors remains low, although there was a slight increase to 22% in 2003. Clearly, much more needs to be done to encourage doctors (general practitioners and specialists) to make greater use of the clinic.

One contributing factor has to be that patients are seen by appointment only. The reasons for this are the lack of personnel and the limited clinic time which has created a waiting list of some 3 weeks. This, of course, far from ideal and referring doctors may rightly feel that certain patients cannot wait so long for an appointment. However, it needs to be emphasized that all acute cases are seen with urgency after prior discussion between the referring doctor and the clinic. There are very few instances of genuinely urgent cases in venereology. Prime examples include urethral discharge in males and acute ulcers in either sex. Genital warts are never urgent.

Patients referred by Caritas (7.5% of the total) are mainly drug users undergoing rehabilitation courses at San Blas. Initially, patients were only referred for screening for HIV and Hepatitis, but are now encouraged to have a full GU screen.
Marital status.

As expected, the most representative group is single (62%). The married group remains almost constant at 26.5%. Extra-marital sex is not the only reason why this group attends.

Figure 46 is a breakdown of the married group’s admitted recent sexual contact apart from their spouse. 24.5% admit to a casual partner; 7.7% have a long term relationship apart from their husband or wife 11.5% admit to frequenting prostitutes.
Sexual orientation
The majority of patients seen at GU clinic (92%), are heterosexual. At first glance, men who have sex with men (MSM) may seem under-represented at 5.5%. However, it is the impression is that many of those who declare themselves to be bisexual are, in fact, essentially homosexual; all the sexual contacts admitted to are male with only the odd female encounter, in many cases, several years previously. If one had therefore to add the 5.5% of MSM with the 2.5% of bisexuals, it would give a more representative 8%.
Lesbians are not included as only 2 patients declared this orientation in the last 4 years.

Partners
An essential part in the management of the index patient is the attempt to identify all possibly infected partners, thus limiting the reported incidence of disease. Figure 49 is a break down of the contacts admitted to.
To be noted is the high rate of casual contacts in 34%. To this, one can add the 6% who frequent prostitutes, (a notoriously difficult group to reach), making the casual total 40%.

The regular partner category stands at 37%, but this needs to be qualified by what many patients understand by a regular partner. Relationships of only a few weeks are often described as stable. This together with the high rate of extra-marital sex in the married group as already discussed reinforces the impression that the rate of casual sex is much higher than the actual percentages suggest.

**Figure 49. Sexual contacts admitted to by patients**

The 6% prostitute rate has altered very little over the last 4 years.

**Condom use**

The consistent use of condoms remains low at 12%. 64.6% of patients never use them and 23.4% use them sometimes. These figures, taken with the high rate of casual sex, is alarming and will be discussed further.
Figure 50. Percentage use of condoms

SOCIO-ECONOMIC GROUPS

Figure 51. Socio-economic groups of patients attending GU Clinic

The Young (13-29 years)
This group needs to be analysed separately since it makes up the majority of total patients (57%) seen (figure 50). It also includes the very vulnerable teenage group.
The 13-19 year age group made up 10% of the total number of new presentations; 99% were single and 93% said they were heterosexual. Females made up 56.6%, (43.4% were males). The mode of referral is shown in figure 53.

As with the overall group, self-referral is the preferred method at 73%; 8.5% were drug-users undergoing rehabilitation programmes run by Caritas. The sexual contact was given as a regular partner in 56.5% and casual in 38.5%. Interestingly 5% denied all sexual experience.
These percentages need to be interpreted with some caution. Many, particularly the females, consider a sexual partner of even a few weeks as regular. 11.3% of the total (N=210) claim to use condoms consistently when having sex, and only 14% of the females (N=119) use any form of contraception. 17.7% use condoms occasionally, but the majority (71%) never used them (figure 55). Interestingly females made up 56.6% of the total in the teenage group, a reversal of the male preponderance shown overall. Female teenagers seem more ready to seek medical care. 15% of the female teenagers were found to be chlamydia positive. Chlamydia is one of the main pathogens and one of the commonest causes of Pelvic Inflammatory Disease and tubal infertility. The combination of high rates of casual sex and condom non–use is a serious problem which needs to be addressed energetically.
The microbiology laboratory of the Public Health Department provides microbiological advice and scientific expertise. Analysis is performed on samples of food, water and environmental samples. These samples are referred to the laboratory by health inspectors who take samples from establishments as part of routine investigation or upon requests from the DSU to investigate cases or outbreaks of food borne illness.

In addition the laboratory is also responsible for the monitoring of environmental samples such as recreational water for indicator organisms and for liaison with foreign labs for Legionella species.

The local district and port health authorities provide samples for testing. The microbiological tests performed at the microbiology - PHL include testing for indicator organisms (aerobic colony, coliform / E. coli, Enterobacteriaceae and yeasts and moulds counts) and for pathogens (Staphylococcus aureus, Bacillus cereus, Salmonella spp., Listeria spp., Campylobacter spp., Vibrio spp., Clostridia, Yersinia spp. and E.coli O157. Other tests which are not performed by the laboratory, such as Legionella testing and molecular typing for epidemiological purposes, are subcontracted to accredited laboratories in EU member states. The laboratory participates in three External Proficiency Testing Schemes (for food, water, and Salmonella typing / antibiotic susceptibility testing).

The laboratory also has the expertise to provide assistance to the Disease Surveillance Unit in the investigation of Food Borne cases, and to the health inspectorate in Hazard Analysis Critical Control Points audits of food production or manufacturing establishments. The laboratory participates regularly in a food external proficiency testing scheme in which the laboratory has to investigate samples from simulated food borne illness cases. Members of staff who have the necessary experience and qualifications in food science and technology perform interpretation and evaluation of results.
LEGISLATION

Public health measures in relation to infectious disease control in Malta are currently governed under the Medical and Kindred Professions Ordinance and the Public Health Act of the Laws of Malta. Specifically they comply with subsidiary legislation and government notices issued in relation to these laws.

Notification
It is the duty of the medical practitioner who is aware that a person is suffering from a disease listed in the Ordinance to notify the Superintendent of the case. The minister responsible for health has the power to prescribe the form of the certificate to be given by medical practitioners and specify the list of infectious diseases, as well as the power to extend the list of such diseases.

Inspection and Quarantine
The Superintendent has the power by the laws of Malta:

- of entry in a house where there is suspicion that a case of disease exists
- of restriction of movement of person suspected of disease
- to order diseased person to be isolated
- to ascertain freedom from infection
- to cause premises to be cleaned and disinfected
- of entry to any premises
- of removal of persons from infected premises
- of cleansing of a person who, or whose clothing is verminous
- of destruction or disinfection of infected bedding
- of removal to hospital of infected person
- of detention of infected person without proper lodging in hospital
- of public exposure of infected persons or things
- of prohibition of children’s attendance at school in cases of disease
- to restrain infected persons from engaging in occupations connected with food for sale
- to restrain infected persons from being conveyed in public vehicles
- of prohibiting, retention of dead bodies
- to order dead bodies to be buried
- of conveyance of corpses of persons known to have died from a communicable disease

The Superintendent also has the power to enter in any premises, ship or aircraft in order to enforce Maltese laws and regulations.
Regulations Relating to Aircraft
regulations relating to aircraft include the powers of:
- inspection of the aircraft
- examination of persons on the aircraft
- powers in respect of persons leaving aircraft (restricting movement)
- the aircraft commander is obliged to notify infectious disease
- aircraft declaration of health obligation by the commander
- detention of the aircraft
- inspection of the aircraft
- surveillance of a person from infected areas
- removal of infected person from the aircraft
- examination of persons proposing to embark on outgoing aircraft
- any person may be placed under surveillance

Other Regulations
The Minister responsible for health has the power to draft regulations for the prevention of disease based on existing laws. Medical practitioners are obliged to place themselves at the service of any persons suffering from infectious disease. The Minister has the power to make regulations with regards to ships and aircrafts for the prevention of danger arising to public health with respect to infectious diseases.

Immunisation
Regulations exist with regards to immunization of children. Vaccinations are compulsory against diphtheria, tetanus, and poliomyelitis at the present time or against any other disease the Minister may prescribe.
PART 2

The Strategy

The National Communicable Disease Control Strategy is an initiative of the Health Division which appointed a committee to prepare and initiate this strategy. This provides public health officials and professionals working in the field with a national framework to monitor communicable diseases as well as to plan and prioritise interventions.

*The aim of this strategy is to reduce the social and economic impact of communicable disease on the Maltese population.*

PRIORITISATION OF COMMUNICABLE DISEASES

To make the best use of limited resources available for public health, it was felt that it was essential to prioritise areas of activity to allow attention to be focused on key issues in the control of certain communicable diseases in priority over others.

The committee was set up to undertake the prioritisation exercise and develop a communicable disease control strategy for Malta. This committee included two public health physicians; a consultant in infectious diseases; consultant virologist; a veterinary surgeon and a general practitioner.

The committee used predetermined criteria and a consensus technique to define the diseases for which control strategies were to be developed. The team discussed and agreed on the set of criteria which should be used. Notifiable disease were reviewed in the first instance and a situation report on these (part one of the document) was used to assess their relative importance.

The set of 13 criteria used to assess the importance of communicable diseases were as follows:

<table>
<thead>
<tr>
<th>Disease Impact</th>
<th>Total number of cases</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Report incidence</td>
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<tr>
<td></td>
<td>Prevalence</td>
</tr>
<tr>
<td></td>
<td>Mortality Rate</td>
</tr>
<tr>
<td></td>
<td>Potential to develop disability sequelae</td>
</tr>
<tr>
<td></td>
<td>Case fatality ratio</td>
</tr>
<tr>
<td></td>
<td>Epidemic potential</td>
</tr>
<tr>
<td></td>
<td>National Target</td>
</tr>
<tr>
<td>Social/ Medical Costs</td>
<td>Years of potential life lost</td>
</tr>
<tr>
<td></td>
<td>Bed disability days</td>
</tr>
<tr>
<td></td>
<td>Physical disability</td>
</tr>
<tr>
<td>Preventability</td>
<td>Effectiveness of available treatment</td>
</tr>
</tbody>
</table>
According to these criteria, the following diseases were identified as priority for developing control strategies:

**Food Borne Illness/ Infectious Intestinal Illness:** The true frequency of infectious intestinal illness in the community is not known but it is estimated to be high. Priority diseases include Salmonella, Campylobacter, E.Coli 0157 and unspecified food borne illnesses, including viruses.

**Meningococcal disease:** Although the reported incidence of the disease is low, the mortality rate is high and the complications are potentially serious. Early detection was essential in order to decrease the complications and mortality from the disease.

**Sexually transmitted infections:** The true frequency of disease in the community is not known. Since the possible complications from STIs, including causes of infertility, can pose a high burden on society, this area was considered to be an area of concern.

**Blood-borne diseases:** Hepatitis C and HIV may pose a potential epidemic in the drug abuser addict population and case-fatality may be of concern.

**Vaccine Preventable diseases:** Vaccine-preventable diseases, including measles, mumps, rubella, pertussis and polio were considered to be priority diseases since they are preventable with the availability of free vaccines. Chickenpox is also considered to be high priority due to the burden of illness in the community.
A FOOD BORNE DISEASE CONTROL STRATEGY

Introduction
Strategies to decrease food borne illness need to encompass all sections of the community as well as all sectors of the food industry. Decreasing the reported incidence of food borne illness is expected to reduce morbidity and mortality. It will also decrease the burden on health care resources and reduce indirect costs such as those suffered by industry. A coordinated and concerted effort across all sectors, a so called “farm to fork” approach, is seen as the most effective means of reducing the overall burden of food borne illness.

These combined strategies provide an approach by which surveillance and knowledge of food borne illness can be improved in Malta. Through improved surveillance systems, the true extent of the problem can be better defined and sources of significant food borne pathogens identified. This, in turn would enable public health authorities to act more promptly in outbreak situations. It would also enable policy makers to focus policy and funding on areas of essential need. Similarly, food industry sectors would be able to identify the key factors and processes for targeting future quality control systems.

The data presented on the epidemiology of food borne illness in Malta present a snapshot in time of local food borne illness which is occurring locally. The data may be useful for determining priorities for food borne disease surveillance and enhance research and planning of future food safety programme. However, it is important to consider the limitations of the data so that the information can be appropriately interpreted. There are many barriers to full reporting on the national system. A person with food borne illness must initially present to a doctor, who in turn needs to notify this case. The doctor may request a test on the patient’s stool. In turn, the patient must then submit the stool specimen which must be appropriately tested and, if positive, it should be reported by the laboratory for the case to be known to the Disease Surveillance Unit.

The interpretation of the epidemiological association with implicated foods was very subjective during the investigation of cases so there may have been a bias towards recording or recalling the food consumed.

A STRATEGY FOR REDUCING FOOD BORNE DISEASE

Scope for improvement
There is a need for comprehensive information on food borne illness in Malta. The current surveillance system for human food borne illness has many limitations, including under-notification and a delay in the timeliness of notification.

A primary objective of the recommendations presented in this report is to address the problem of food borne diseases by developing a more conducive environment in which primary health providers; health authorities; laboratories; related industry and consumers can generate and exchange high quality information. This approach supports the philosophy that food safety is a shared responsibility. This strategy will
also identify ways to broaden current strategies which focus primarily on the hazards in food in order to encompass consideration of food borne risks to human health at all stages of the food production chain.

The recommendations focus on three main themes:

- enhancing national surveillance activities;
- suggesting areas for enhanced information collection and future research; and
- promoting behavioural and attitudinal changes to food safety by consumers, the food industry and government agencies.

A more consistent surveillance and investigation will lead to an enhanced ability to accurately assess the reported incidence and impact of food borne disease. It will also facilitate better monitoring and validation of industry-based food safety programmes. Ultimately, this information should provide sound evidence-based arguments for risk assessment, public health policy and interventions. It will also assist in determining priorities for research and public health activities.

The measures taken should address areas of the system where the greatest impact in reduction of human illness can be obtained while being cost-effective and practical to implement.

Recommendations

1. To advocate the prioritisation of food safety as an essential public health function

It is essential that food safety receives attention at the highest level of government and that funds are available for the required improvements various food safety activities carried out. (World Health Organisation, 2001)

2. Surveillance and outbreak control: Creating an early warning system for Food borne illness surveillance

- Create the infrastructure that will be able to detect and respond to outbreaks of food borne illness.
- Draw up methods to evaluate the burden of Food borne disease and ways to reduce this burden.

Under-reporting of infectious intestinal disease is well recognized by the public health community. A population-based community cohort reported study performed in the United Kingdom documented that infectious intestinal disease occurs in 1 in 5 people each year of whom only 1 in 6 presents to a general practitioner. The actual number of notified cases is much lower than this (Wheeler JG et al, 1999) This problem of under-reporting compromises the quality of surveillance data.
Describing and quantifying under-reporting may assist in strengthening the surveillance system by:

a) identifying where and how cases are lost along the surveillance chain;
b) finding ways to reduce loss of data and
c) developing correction factors to compensate for a known magnitude of under-reporting.

Strengthening the national surveillance system, in combination with other measures, should result in a marked improvement in the ability to detect, investigate and control food and water borne enteric pathogens (Lee-Ann Jaykus. 1997)

The Disease Surveillance Unit is currently performing a community prevalence study on infectious intestinal disease. The aim of this population survey is to estimate the baseline period prevalence rates of self reported infectious intestinal disease in the community and the proportion of cases which do not present to the health care system during this period, thereby quantifying under-reporting of infectious intestinal disease. The information will be used to outline a strategy with the objective of strengthening the national surveillance system. The study also aims to identify in detail which are the main pathogenic organisms causing infectious intestinal disease in the Maltese community. This includes describing the variety of main causative agents including bacteria, viruses and parasites and their modes of transmission. This information is essential to design efficient prevention policies.

3. Develop best practice guidelines for surveillance, investigation and control of food borne disease.

The Disease Surveillance Unit developed documented standard operating procedures for every disease event including Food borne illness, which is reported to the Disease Surveillance Unit. Documented operating procedures have been developed involving all stakeholders. These have a better chance of successful implementation and will generate improved communication and working relationships while strengthening operations.

Documented operating procedures developed serve as benchmarks for performance reviews, training aids and as a starting point for quality standards. In writing such procedures the following characteristics were followed:

- clear and concise - directly to the point
- complete - containing all the necessary information to perform the procedure
- objective - containing facts
- coherent - showing logical thought process and sequentially listing all steps necessary to complete the procedure.

A disease surveillance system is dependent on a clear case definition for the disease under surveillance. Case definitions are fundamental to any surveillance system since it is the formal answer to the question of what manifestations of a disease are under surveillance.
The use of a standard case definition increases the specificity of reporting and improves the comparability of the disease event reported from different sources of data and evaluation of trends. The use of EU case definitions as from 1st January 2002, standardised the definition and classification of cases, hence data can be comparable to other countries using the same case definitions. According to the Commission Decision of the 19th March 2002- Laying down of case definition for reporting communicable diseases to the community network under Decision No 2119/98/EC of the European Parliament and of the Council. 1913/2002 "The setting up of common case definition is a prerequisite even where disease-specific surveillance networks have not yet been put in place."

These documented procedures are then continually evaluated to determine their utility in regard to:

- steps being in a logical sequence;
- steps being sufficient to minimize time and maximize effectiveness and
- if document is a usable tool

Hence such documented standard operating procedures will improve the quality standards of the surveillance system in that:

- Records will be more reliable hence reports issued are of a better quality
- Data and trends can be comparable over time and with other countries across Europe using the same case definition
- Procedures will be available for periodical reviews and
- Performance will be up to standard.

4. Establishment of a national laboratory network to identify gaps in laboratory diagnosis/investigation of food borne disease, including specimen submission, and to make recommendations for improved detection.

Laboratories performing tests to isolate enteric pathogens from stool specimens form crucial links in the surveillance chain. It is known that a considerable number of stool specimens are negative for an aetiological agent and they are classified as unspecified in local statistics. The Disease Surveillance Unit is planning to perform a survey on local medical diagnostic laboratories. The aim of the survey is to understand practices in laboratories that impact on the sensitivity of finding an etiologic agent in submitted stool specimens.

It will focus on quantifying the under-reporting at the laboratory stage and examine some of the variables that influence whether a bacterial, viral or parasitic pathogen is identified in a stool specimen. Assessment of the laboratory capacity (availability, functionality, and level of sophistication) is made in order to determine the role of the laboratory at a given level of surveillance.

The study aims to provide information to facilitate the building of laboratory and epidemiology capacity to support infectious intestinal disease surveillance and explore diagnostic capabilities for infectious intestinal illnesses. By identifying means
of laboratory surveillance strengthening, the information provided can provide the basis for action.

5. Adequate funding for public health laboratory services considered important for food borne disease surveillance and/or public health management.

Public health laboratory services must be equipped for timely detection (and therefore investigation) of food borne disease outbreaks, such as those caused by Salmonella. Access is required to laboratories capable of typing organisms in a timely manner.

6. To formulate projects to determine the extent of barriers to the reporting of food borne disease and develop guidelines on sampling, testing and reporting of food borne disease to facilitate more effective public health investigations.

Aspects would include:
- assessment of patient and enteric illness;
- appropriate testing of stool samples; and
- advising public health officials to facilitate public health investigations.

The Disease Surveillance Unit is planning to perform a study among general practitioners. The main aim of the study is to assess the attitudes and awareness to the notification system by local physicians in order to identify the reasons behind under notification or delayed notification with a view to setting up a strategy aimed at reducing this problem.

The Disease Surveillance Unit has updated the list of notifiable diseases and conditions in line with the list of reportable diseases recommended in the Commission Decision of 17th July 2003 amending Decision 2000/96/EC as regards the operation of dedicated surveillance networks. This will include the notification of Campylobacteriosis, Cryptosporidiosis, Giardiasis, E. Coli Infection, Listeriosis, Salmonellosis and Shigelloses. The list has been published as a notice in the government gazette under the Public Health Act.

7. Determine how best food borne illness surveillance can be linked to food and animal health surveillance.

A major deficiency of current surveillance and outbreak control systems is the lack of co-ordination between food and animal-based surveillance and illness-based or people-based surveillance. Discussion is underway between the Disease Surveillance Unit and the Food and Veterinary Regulatory Division in order to coordinate action in cases of outbreaks in humans. However the need is felt to build stronger links between animal disease surveillance and public health authorities, thereby more effectively alerting authorities to potential public health problems.
8. Research

Research is a priority in the following areas:

- the microbiological status of food and ecology of food borne pathogens;
- the behaviour of food handlers and consumers that predispose the public to food borne disease;
- the prevalence of relevant organisms/diseases in domestic livestock and the water from which seafoods are harvested and
- the methods for reducing microbial contamination of agricultural products that enter the food supply chain

A coordinated approach to food safety research is necessary in order to give priority to that research which provides the necessary data to better manage food safety.

Information currently available on the microbiological status of food comes from a variety of sources and has limitations. The health inspectorate system conducts inspections at retail outlets at random and take various food, water and environmental samples which are analysed. The Food and Veterinary Regulatory Division also samples meat and poultry and analyses them. Various surveys are performed on various types of food including seafood and poultry as part of the Sampling Programme. However, the coverage is relatively limited so the information (including quantitative data on the microbiological status of the food products) is sometimes insufficient for making appropriate policy decisions in some areas of food safety. This includes areas such as quantitative risk assessment and the setting of food standards. There is a need to have sufficient knowledge to understand the risk implied by the baseline prevalence of pathogenic micro-organisms in food products. It is necessary to learn more about the ecology of pathogens in order to design interventions to prevent food borne illness.

9. Behavioural and attitudinal changes to food safety by consumers, the food industry and government agencies.

Hazard Analysis Critical Control Points (HACCP) and other similar preventative strategies are to be supported. These should be encouraged across all sectors of the food supply chain.

There is worldwide acknowledgment by food safety scientists and experts that HACCP programs are the best defence against food borne hazards within food production establishments. This programme proposes a nationally consistent prevention-based approach to food safety in line with international trends and will incorporate the need for education and training strategies throughout all sectors of the food supply chain.

Individual companies will be required to take on an increased level of responsibility for the safety of their products. Small businesses will need government assistance in the development and monitoring of these programmes.

10. Uniform food safety legislation and standards to be adopted.

As a measure to ensure food safety, the new Food Safety Act came in force in the year 2002. This legislation gave more powers to regulators and put the onus for food safety on the operators, who should ensure a system of auto control.
However, at all times, the regulators are duty bound to safeguard public health. The Food Safety Commission has been set up, involving all competent authorities, and is responsible for the audit of food control regulators, provision of advice and the generation of policies.

A subsidiary legislation was issued in the year 2001, which regulates food premises and food handlers. All food operators are duty bound to register with the Department of Public Health to ensure compliance throughout the food chain. Another requirement is that all food handlers should be thoroughly trained in food hygiene principles commensurate with their involvement in food preparation.

11. Government and industry initiatives which increase public and industry awareness of food borne diseases

The control of food borne disease lies partially in improving food safety awareness and food practices throughout the food supply chain. Educational strategies are a critical part of the drive to reduce the reported incidence of food borne illness.

The need for educational campaigns that inform consumers and food handlers of contemporary food borne hazards, their risks and preventative methods is widely recognised.

A strategy to educate the public about food borne disease consists of the following components:

**Information sharing**: The task of educating the public about food borne illness is enormous. Hence, the work is to be done through joint initiatives and information sharing is to be encouraged.

**Consistent Messages**: If different agencies convey inconsistent educational messages, the public will get confused; a coordinated message development is therefore necessary.

**Research Based**: The aim is to base the efforts on scientific findings from the epidemiology of disease and studies of the public’s perception and behaviour.

**Target High-Risk Consumers**: Because science shows that certain consumers are more likely than others to become seriously ill from food borne illness, educational efforts must focus on those consumers who are at the highest risk.

**Work with the media**: Recognizing that one of the best educational vehicles is newspaper or television news stories, these types of media will be utilized to help convey the education messages.

**Educate all audiences**: The aim is to direct all efforts not just to consumers but also to all appropriate audiences including food handlers; health professionals; state officials; school children and childcare workers.

A number of studies have highlighted the risk factors for food borne illness at the home, including cross-contamination involving hands and inanimate surfaces. (Elizabeth Scott, 2003) Hence, key food safety campaign messages need to cover personal cleanliness, cross-contamination and temperature control within the domestic setting.
Primary production

Introduction
Primary production of food animals (livestock, poultry and aquatic animals) including inputs such as feed and water use represents one source where food safety hazards can be introduced in raw foods of animal origin. Foods and food products of animal origin are often implicated as causes of gastro-intestinal and other disease for several reasons:

- animals carry a large population of microbes in their gastrointestinal tract and contamination of raw food can occur at slaughter, during milking and at egg-laying;
- animals can harbour pathogens which are transmissible to humans upon consumption of contaminated meat, milk and other products;
- foods derived from animals provide an ideal environment for the growth of micro-organisms; and
- food of animal origin can become contaminated with pathogens from external sources such as dust and soil and through contact with rodents and other wild animals.

Many of the organisms causing disease in humans do not always, (or may only infrequently) cause overt disease in infected livestock, fish, shellfish or plants and many cannot be detected by visual inspection of food. One consequence of infection not always (or infrequently) being accompanied by disease in animals or plants is that producers can be unaware of contamination in their produce. Another consequence is that disease surveillance in livestock or fish may fail to foreshadow a human health problem.

However, health surveillance of animals remains a priority because overt disease can clearly indicate problems for public health. Formal links between public health and animal health sectors for the reporting of zoonoses may facilitate the investigation of food safety incidents and the prediction of emerging food safety problems. Accordingly, a consistent national approach to the notification of zoonoses with implications for food safety would be valuable.

On farms, risk based food safety systems can help by controlling certain hazards or ensuring that they are below an acceptable level. When they are coupled with other good production practices and other effective interventions at points further along the food continuum, risks can be reduced. Microbial hazards however, cannot be eliminated from the live animal on the farm in the same way they can through effective processing. Available epidemiological evidence from other countries indicates that the major factors contributing to food borne disease occur along the production chain, not directly from contaminated raw materials (Sockett PN.1991)

The challenge is, across the entire farm to fork continuum and within each of its segments, to identify the optimal mix of control measures to deliver the most cost-effective reduction in risk of human illness. (On Farm control of Salmonella, 2003.)

However, an effort is still made to reduce the risk at the primary production level. This relies on extensive training of personnel working in this sector.
Food safety issues differ for each of the primary production sectors. Each sector, therefore, requires different control measures.

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**Food safety by sector**

**Cattle, game, rabbit and some other red meats**

Pathogenic bacteria are the major disease-causing agents of food borne illness associated with red meat. *Campylobacter* spp. and *Salmonella* spp. are of concern for both the beef and other meat industries.

Results of surveillance programmes run in Finland, Norway and Sweden showed that Salmonella was detected in 0.31% (Finland), 0.03% (Sweden) and 0.04% (Norway) of the cattle lymph node samples collected at slaughterhouses. (Report on trends and sources of zoonotic agents in the European Union and Norway, 2001). In the UK, Salmonella infection is a major cause of morbidity and mortality in cattle and surveillance relies on laboratory submissions from vets. (Salmonella surveillance of cattle and sheep in GB, SJ Evans at Conference on Zoonotic Infections in Livestock and risk to human Health)

A study on campylobacter identified fecal carriage of potentially pathogenic campylobacter in 13.5% of cattle and 15.8% of sheep. (DG Newell. 1999)

Most attention is required at and after the abattoir stage of the meat supply chain, highlighting the importance of adequate temperature control at the abattoir; during transport and during further primary processing (boning, packaging, freezing).

A key goal is to have all enterprises, from producer to retail, operate in accordance with accredited HACCP-based QA systems.

**Pig meat**

As for other meat, the major causes of food borne disease associated with pig meat at the farm production stages are bacterial, with *E. coli, Salmonella* and *Campylobacter* species at the top of the list.

Salmonella was detected in 0.09% (Finland), 0.12% (Sweden) and none (Norway) of pig lymph node samples collected at slaughterhouses.

Salmonella was found in caeca of 23% and on the carcasses of 5.3% of pigs slaughtered in the UK. (R. Davies. 1999).

The prevalence of campylobacter carriage in pigs at slaughter in the UK was 87.1%. (DG Newell, 1999)

Yersinia enterocolitica is also present in pigs at a prevalence rate of 4-42% , depending on which part of the alimentary canal is examined according to a study done in the UK. (R W Dalziel, 1999). A HACCP-based QA system is also required from the farm to the abattoir with pig-meat. Hazards and hazard controls for microbial spoilage must be identified and incorporated into the HACCP structure.
A simulation model for the pork production chain showed that to reach an acceptable overall level of Salmonella control, each stage of the production chain has to contribute. (Van der Gaag et al, 1999) The difficulties are greater for the control of Campylobacter, which are the normal flora of food animals. (PR. Davies, 1999)

Good control measures for surveillance of salmonella in swine herds and effective control measures for the control of Salmonella in infected herds is part of the farm to fork strategy. Effective Salmonella control starts in the infected swine herds which are an effective prerequisite for producing pork of high quality. (S. Bechhhielsen, 1999)

The Food and Veterinary Regulatory Division intends to perform an abattoir monitoring programme to assess the situation of Salmonella in pigs. This will be a process of random sampling from the slaughter line. Control measures are instituted where positive results are identified.

**Poultry meat**

As is the case for red meat, pathogenic bacteria are the major disease-causing agents of food borne illness caused by poultry. Campylobacter and Salmonella are the pathogens of principal concern to the poultry industry and poultry meat is frequently contaminated with both organisms.

About 200 Salmonella serotypes are associated with food borne infections in humans. Vertical transmission from breeding flocks to commercial flocks is commonly by the two most significant serotypes, Salmonella enteritidis and Salmonella typhimurium. Horizontal transmission, that is the introduction of infection from the environment, including feed, hatchery equipment, staff movements, and contaminated farm equipment, however remains a key route of infection.

The Food and Veterinary Regulatory Division intends to perform an abattoir monitoring programme to assess the situation of Salmonella in poultry.

If Salmonella is present in broilers, it increases the risk that consumers may suffer food borne illness or acquire infections with Salmonella.

**Dairy**

Bacteria are the major disease-causing agents of food borne illness that may enter dairy products at the production stage. Salmonella species and Listeria monocytogenes are frequently isolated pathogens. Mycobacterium paratuberculosis, the cause of Johne’s disease in animals and a possible cause of Crohn’s disease in humans, is under contention. Pasteurisation of milk maintains effective control over Salmonella and L. monocytogenes but is not completely effective against M. paratuberculosis. Care needs to be taken to avoid post-processing contamination.

A legal notice was issued in 2004 (LN 130 of 2004) under the Veterinary Services Act XXIII of 2001 which has established regulations regarding milk and milk products.
**Eggs**

Eggs with intact shells have been identified as the major vehicle of transmission of *S. Enteritidis* to people in most countries. Eggs or egg products have been tested in several member states of the European Union. Results show varying contamination rates. Usually, *Salmonella enteritidis* is the denoting serovar. (Report on trends and sources of zoonotic agents in the European Union and Norway, 2001)

The issue is being addressed through on-going monitoring of breeder flocks. In the present situation, the Food and Veterinary Regulatory Division is abiding by the EU Directive 92/117/EC on Zoonotic Diseases, which involves *Salmonella* in poultry breeding, flocks. In accordance with this directive, all parent-animal flocks within broiler and table-egg production are to be tested for *S. Enteritidis* and *S. Typhimurium*. Hatcheries are to be checked every two weeks by testing fluff of eggs and meconium for *Salmonella*. Animals will be destroyed if positive samples are found.

The Food and Veterinary Regulatory Division intends to test all local flock layers by testing dust and litter samples. This programme will run over a year and positive broilers are to undergo an intensive cleaning programme and retesting.

A greater capacity for rapid investigation of outbreaks and clusters such as those caused by *S. Enteritidis* is essential.

**Seafood**

Seafood is a high risk food with respect to microbiological contamination and the seafood industry has recently begun to embrace the issue of food safety and quality. Despite the initiatives in place, as discussed below, there is a clear need for industry, scientists and regulatory authorities to evaluate seafood safety risks. Assessed microbiological risks in fin fish and crustacea are generally low at the production stage. Risks for fin fish can come from zoonotic organisms including *Vibrio* species, particularly enteropathogenic *V. parahaemolyticus*, *Clostridium perfringens* and *Cl. Botulinum*. Cross-contamination during later handling, processing and preparation constitute the major hazard and organisms such as *S. aureus*, *Salmonella* species and *E. coli* are prominent.

In contrast, the molluscan shellfish industry has several potential risk factors that operate at the growing stage and onwards. Risk is exacerbated by many shellfish products being consumed raw. Bivalve shellfish filtering matter from seawater are important vehicles for the transmission of Norwalk virus and hepatitis A virus. Rock oysters have been implicated in several incidents of food borne illness.

**Horticultural produce**

The use of contaminated water for irrigation or the use of fertilisers contaminated with pathogenic organisms can be a problem, particularly for salad vegetables which are eaten raw. Bean sprouts have been occasionally incriminated in outbreaks of salmonellosis.
Mushrooms are also products with potential food safety problems. Post-harvest rots in mushrooms have been identified as a potential microbiological food safety problem. *Salmonella* contamination can occur during the harvesting, drying and preparation of spices. ‘Fresh-cut’ product (i.e. fresh vegetables cut and packaged for quick and convenient use) and ready-to-eat salads are areas of some concern. Hazards for ready-to-eat salads come more from cross-contamination during preparation and handling rather than from agricultural production. The fresh-cut sector is developing rapidly and faces increased contamination risks compared with fresh produce because a longer shelf life is intended for the product and enclosed packages are used. These circumstances are more conducive to microbiological contamination and growth than those operating for fresh unpackaged produce. HACCP-based quality management systems have been adopted at the enterprise level to address potential food safety problem areas in the fresh-cut sector. It is expected that once well established, HACCP-based QA programs operating within processing and packaging companies will assist in reducing food borne disease from these food sources.

**Grains**
The major microbiological food safety issue for the grains industry is mycotoxin contamination. The three fungal genera producing the most important mycotoxins are *Aspergillus* (which produce aflatoxins), *Fusarium* and *Penicillium*.

As well as mycotoxins from fungal contamination of grain, other natural toxins which can contaminate agricultural produce (grains, pastures, hay) and have the potential for passing up the food supply chain include the corynetoxins, pyrrolizidine alkaloids, indospicine, ptaquiloside and the simplexin esters. Stored grains and other food seeds can become contaminated with bacteria such as salmonellae or *Bacillus cereus*. Contamination with salmonellae can occur by direct or indirect contact with animal or human faeces via animal contact in the field; mice nesting in machinery; transport in trucks contaminated by previous carriage of animals or animal by-products. While grains and other food seeds are too dry to allow the growth of contaminants, the organisms can persist on them for long periods.

The food safety focus of the grains industry has been mainly on ensuring that any chemical residues in grain remain below relevant maximum residue limits (MRLs).

**Recommendations at primary production level**

1. Rearing environments and management practices for livestock, poultry and aquatic animals should minimize the risk of biological, chemical and physical hazards.
2. On-farm programmes should provide for the identification and appropriate disposal of animals that exhibit an increased risk of biological, chemical or physical hazards associated with food safety.
3. Components of on-farm safety programmes that are specific to each commodity should include a consistent system to address the hazards associated with feed and water as delivery agents for medications.
4. An identification system within the food continuum that can trace the origin and chain of custody of the product from the consumer back to the appropriate point of production or processing should be available.
5. Transportation and distribution systems for animals and animal products should comply with the principles of food safety, particularly those related to food borne pathogens.

6. Minimising the load of food borne pathogens in animals destined for slaughter. This should be underpinned by following good production practices and risk based food safety programmes.

**Manufacturing and retail**

**Introduction**
Food-manufacturing, distribution and retailing are the central links in the food chain from raw material to the consumer. Food manufacture is the process of converting the products of agriculture and of primary production into products ready for direct retail to the consumer or for use by the food service industry e.g. restaurants, caterers and other ready-to-eat food outlets. Manufacturing includes packaging, transport and storage of this food. Each of these stages may include many processes and are made up of businesses of an equally diverse range of size and complexity.

Foods, either in the form of ingredients or whole foods, may be naturally or accidentally contaminated by micro-organisms, chemicals or foreign bodies at any stage in the food chain. The challenge is to produce a safe product in an environment where there are many opportunities for contamination. Thus, food manufacturers, retailers and food service establishments have a shared responsibility with both suppliers and consumers in maintaining control of food safety. They must use safe and good quality raw materials; control, reduce or eliminate contamination during processing and use packaging, storage and distribution systems which prevent post-process contamination.

Manufactured and retail foods should be categorised as high, medium or low risk according to the hazards they present to public health so that the appropriate controls can be applied to a particular risk category. A risk-assessment approach to food safety control is required.

**Requirements for the manufacture of safe food**
There are factors common to all food businesses that affect the safety of the food they produce. The following factors were identified by the Richmond Committee (Richmond Report, 1990) as part of a review of the food manufacturing industry in the UK:

- appropriate starting materials;
- appropriate processes;
- well-designed machines;
- well-designed premises;
- well-trained staff;
- well-conceived controls and monitoring; and
- positive commitment by management to high microbiological standards at all stages.
Strategies for control

Food manufacturing, retail and catering businesses vary in their ability to satisfy the requirements for food safety and the various food industry sectors have to be considered individually to address the strategies and approaches a food business must incorporate to enhance food safety.

The following were identified by the Richmond Committee (Richmond Report 1990) as the major categories of food businesses, having been grouped on the basis of common characteristics influencing their approach to food safety control:

- large-scale food manufacturers;
- small-scale food manufacturers;
- retail food outlets (including restaurants, mobile/temporary food outlets, caterers, supermarkets, institutions); and
- other food outlets of concern (including imported foods, self-service food centres).

The following sections give a brief overview of the food safety strategies required for the various food businesses.

Large-scale food manufacturing

Controls applied by manufacturers include good manufacturing practice (GMP), voluntary implementation of HACCP systems, microbiological analyses in monitoring and staff training.

A high level of regulatory involvement and responsibility may be needed in the following areas:

- technical support for the design and application of HACCP plans;
- national programmes to ensure the quality, scientific validity and consistent application of HACCP systems;
- regulatory sanctions, which may apply if an industry sector does not take up HACCP in a voluntary environment e.g. increased frequency of inspection and increased requirements for traditional process control;
- regulatory verification and audit, including access to industry records;
- regulatory response to inadequate HACCP plans and inadequate application;
- regulatory guidelines for appropriateness and severity of corrective action e.g. with reference to microbiological criteria;
- regulatory response to failure to take corrective action;
- training of regulatory personnel, and regulatory responsibilities with respect to industry training programs; and
- utilisation of third parties in development, validation and audit of HACCP systems.

Small-scale manufacturers

Small-scale food manufacturers are a significant component of the food industry in terms of participation rate. The food produced or sold by these businesses can often represent a significant risk to public health. This may be due to limited access to capital; lack of experience and knowledge of food hygiene and limited training, which is often not seen as relevant or affordable.
Low or variable turnover of stock and financial pressures means that doubtful products that would normally be discarded or not purchased may be retained or purchased for eventual sale. Technical factors, which contribute to the poor quality of these products, are the quality of the raw materials used and processing factors. These should be managed by a correctly applied food safety system based on HACCP.

Small-scale operators often do not have sufficient trained staff to develop and operate even a rudimentary HACCP system.

**Retail food outlets**

The retail food sector distributes both primary produce and manufactured food through shops and supermarkets. These foods may undergo further processing or preparation before sale in retail premises or in food service establishments such as restaurants and canteens. Food service is a growing industry and, in addition to the traditional permanent establishments, includes:

- mobile and temporary vendors;
- caterers, professional or amateur, who prepare food for consumption at another site than that of preparation;
- institutional kitchens;
- school tuck shops.

The diversity of food handling practices, products and facilities available in the post manufacturing and retail food sectors parallel those of the manufacturing sector and the factors required for safe food preparation are similar. The retail sector can similarly be divided into large-scale establishments e.g. supermarket and restaurant chains, and the smaller or individual operators. Sectors are characterised by the availability of knowledge, experience and capital.

There are unique aspects of the various sectors which require different approaches to food safety control.

The retail and food service sectors usually handle a diversity of products at any one-production time and the product may change regularly. A daily change in menu may introduce new hazards, which require different control measures. It is impossible to have specific HACCP based food safety controls for each food prepared and flexibility is required where the foods are classified into food service systems e.g. cook/serve, cook/chill for which Critical Control Points can be identified. While a generic-based food safety might not embrace the seven HACCP principles, it offers greater control over food safety than traditional inspections. Another limitation to the application of HACCP may be the lack of equipment or facilities for monitoring of CCPs. However, regulatory bodies or consultants should attempt to work with these establishments to identify practical solutions.

The work force in the retail and food service sector has a high rate of turnover and is characterised by a diversity of educational and cultural origins. This presents particular challenges to the conduct of education programmes and emphasises the need to apply the HACCP concept, which targets CCPs and their monitoring as key education messages.
**Self service food**

Self-service food is unpackaged ready-to-eat food, which is displayed to customers for self-service. Approaches to self-service foods include:

- smorgasbords openly displaying food for consumption on the premises;
- food display cabinets e.g. with sneeze guards, hot/cold holding of foods to be consumed on the premises;
- displays in appliances or on counters in shops and supermarkets where customers package ready-to-eat foods for take away or home consumption and
- displays in fully sealed dispensing appliances.

The demand for self-service food has increased markedly and extended from smorgasbords to the retail sector e.g. shops, large supermarkets and total self-service restaurants. Self-service food benefits both consumers and the food industry: customers can select the individual food items in quantities they wish to consume, and costs are reduced, as fewer staff are required.

Self service outlets retail potentially hazardous foods containing protein ingredients such as meat, poultry, eggs, fish and dairy foods and have specific functional features which make the control of critical points difficult. Self service foods are exposed to contamination by both consumers, when serving themselves, as well as the food preparers e.g. via direct food handling and respiratory aerosols and droplets; reused plates and utensils and the return of unwanted or partially consumed food to displays. Time/temperature control is difficult to maintain in open display cabinets. Storage may be for excessively long periods and display containers are constantly ‘topped up’. The risks associated with these foods may be exacerbated by uncontrolled storage of take away foods by consumers subsequent to purchase.

One way of reaching the consumer is at the point of sale or consumption by providing notices in prominent positions with warnings to consumers regarding appropriate food handling. Staff should monitor consumer activity as well as process CCPs.

**Temporary and mobile vendors**

Temporary and mobile vendors frequently do not have access to the facilities available to the permanent establishments for the practice of food safety. Mobile vendors do not have permanent power supplies for refrigeration and cooking and may have access only to public toilet and washing facilities. Foods retailed by these suppliers are usually ready-to-eat food prepared in advance or cooked on site. The problems of personal and kitchen hygiene and the control of temperature during preparation and storage are critical in this situation. Temporary and mobile food vendors are popular both with the local communities and tourists and should not be discouraged. Control of food safety, however, is essential.
**Recommendations**

1. A comprehensive risk management system is required for the entire food continuum.
2. A risk-based food safety programme is necessary throughout the food continuum.
3. Inspection procedures should be integrated with risk-based food safety programmes to improve the effectiveness and application of food safety objectives.
4. Food safety programmes developed by the industry should be recognized.
5. Baseline studies that benchmark the best practices for each major sector and commodity within the food continuum should be conducted.
6. Surveillance databases are required to improve precision and time required to relate human food borne illness with the specific food products.
7. Food handler training courses should be evaluated and improved upon;
8. Food safety employee training programmes should be developed and evaluated.
9. Consumers should be educated.

**Consumer role in preventing Food borne illness**

**Introduction**

Consumers have multiple roles with respect to food safety. They not only purchase and receive food products but also process and provide foods for themselves and for others. It is essential for food safety that consumers are aware of both their responsibilities towards handling and preparation of food after purchase and their entitlement to safe foods. When purchasing foods in ready-to-eat form, consumers depend fully upon the supplier of the food for the safety of the product at the time of purchase. After purchase, responsibility for storage and handling of food lies with the consumer.

Consumers today are likely to be aware that not all food is contaminant free. The increasing reported incidence of food borne illness is in part related to changes in patterns of food consumption and changes in food production and distribution. International trade in a wide range of food, including perishable food, has increased with a corresponding reliance on the hygiene and production standards of other, often developing countries. In some cases, new or changed technologies are being used in food production. Consumers are also increasingly demanding 'natural' foods with reduced salt, fat and preservatives with little realisation of the effects of these changes on food stability. All these changes in themselves demand an increased awareness by consumers not only of their entitlement to receive safe food, but also their responsibilities for handling food during preparation, cooking and storage, and their participation in a system of food and safety monitoring.

**Consumer education**

Consumer education programmes, using the resources of the food industry and government in partnership, will be a key component in providing purchasers and consumers with the knowledge to maintain and improve food safety.

Education about food borne diseases for the consumer needs to cover:
how to correctly handle, store or prepare foods, particularly those using new or changed technologies;
how to assess and understand the various risks of food borne disease and responsibilities for, and entitlements to, safe food.

Particular emphasis should be placed on food hygiene education for school children. School children are a valuable target group, not only because they are food handlers, but also because they are useful agents in conveying messages to parents. Food hygiene concepts should be introduced early in the school curriculum and then be built on progressively.

**Consumer responsibilities**
Consumers are a critical final link in the food control chain to assure food quality. They have responsibilities as purchasers, storners, providers and processors of food and need to be conscious of the nature and safety of food products. Consumers therefore have a responsibility to:
- reject food they believe may be substandard;
- complain to appropriate authorities when they become aware of food contamination or unsatisfactory food safety practices;
- report incidents of suspected food borne illness and
- correctly and diligently handle, transport, store and prepare the foods they purchase.

**Consumer entitlements**
It is technically possible to render all food commercially sterile before sale. Consumers, however, would find many foods treated in this manner unpalatable or otherwise unacceptable. While needing to recognise the difficulty in rendering all foods absolutely safe, consumers are entitled to expect that:
- the food industry will accept major responsibility and obligation to ensure risks to consumers are minimized;
- all food purchased will be of the highest microbiological quality possible, consistent with the nature of the food;
- staff involved in preparing and selling food will have been educated about how food becomes contaminated and about appropriate food hygiene control measures;
- government will, by applying a well structured, adequately resourced and efficiently administered food control system, ensure that industry meets its obligation to provide safe food;
- food control by government will include mechanisms which develop and maintain the necessary compliance policy to assure fair and equal application of legal sanctions and that food law will enforce the use of evidence-based strategies to reduce health risk in the population;
- they will have access to information enabling them to assess the performance of government agencies with responsibility for food control;
- government agencies will actively seek information on consumers’ complaints about food borne illness and provide contact points and readily accessible information about the authority responsible for the investigation of complaints, and consequently act in response to the information supplied;
- comprehensive and uniform reporting and data analysis of notifications of food borne disease will be undertaken. Sources will be traced and effective controls implemented;
- they will be informed, clearly and objectively, of the risk associated with consuming particular foods and the likely magnitude of the risk so they can make informed choices about risk-taking behaviours;
- they will be given access to information enabling them to buy, transport, store, prepare and serve the particular foods they purchase in a manner which ensures they are able to consume safe foods.

Greater collaboration and co-ordination of activities between government agencies with carriage of food, consumer and public health issues is essential if consumer entitlements and expectations are to be met.
HEPATITIS C CONTROL STRATEGY

Hepatitis C infection has become well established in the Maltese population. This is especially true in the drug abuser group.

The aim of control here is to:

- reduce the transmission of hepatitis C in Malta and
- minimise the personal and social impacts of hepatitis C infection.

It must be acknowledged that recognises that, regardless of how hepatitis C infection is acquired, the medical, social and economic impacts for the individual and the broader community are profound. An effective national response to hepatitis C will be achieved through responding to the challenges and building on the opportunities outlined in priority areas.

The four priority areas for action are:

1. reducing hepatitis C transmission in the community;
2. effective treatment of hepatitis C infection;
3. health maintenance, care and support for people affected by hepatitis C;
4. preventing discrimination and reducing stigma and isolation and
5. to quantify the problem in the drug abuse group and in other groups.

Hepatitis C transmission depends on blood-to-blood contact, so that proper control focuses on risk factors and specific circumstances of transmission rather than on specific population groups. Many people with hepatitis C have experienced discrimination and stigmatisation. This can lead to social isolation and marginalisation and thus limit a person’s access to information and health care services, thereby creating a disabling environment so that the person has less opportunity to maintain and protect their own health. Health outcomes for all will be improved by preventing discrimination and alleviating the stigma and isolation that many people affected by Hepatitis C experience.

Effective control is based on six essential components, which are considered fundamental to developing effective responses in the four priority areas.

These six essential components are:

1. developing partnerships and involving affected communities
2. access and equity
3. harm reduction
4. health promotion
5. research and surveillance
6. linked strategies and infrastructures
COMPONENTS OF THE STRATEGY

1. Developing Partnerships and involving affected communities
Partnership is a fundamental principle of successful population health policy. It recognises that collaborative efforts by all levels of government; community organisations; the medical profession, health care facilities, research and scientific communities; and people affected by hepatitis C are required for an effective national response to hepatitis C. Partnership is based on a commitment to consultation and joint decision making in all aspects of the response.

The strategy establishes a partnership as an inclusive approach, that will:

- share a commitment to the aims of the strategy
- value the diversity of views and expertise within the partnership
- foster continuing dialogue between partners
- draw on expertise from various disciplines
- collaborate, consult and coordinate across diverse sectors
- support partnership members in fulfilling their roles and responsibilities.

2. Access and equity
People affected by hepatitis C do not make up a homogeneous group or community. In the design, implementation and evaluation of interventions and services attention must be paid to the diverse cultural, social and economic circumstances of people affected by the virus.

Access to the full range of (prevention, education, treatment, care and support) services should be improved for a range of people affected by hepatitis C, among them the following:

- people who inject drugs
- people in custodial settings

Interventions within the priority areas identified for this strategy also need to be developed with regard to the broader context of the needs and problems facing people affected by hepatitis C. Social determinants of health such as employment, access to all levels of health services, quality of housing, educational opportunities and, more generally, social and community engagement affect a person’s ability to gain access to the information and services that aim to reduce hepatitis C transmission. They also minimise the impact of infection.

It is widely acknowledged that the stigma associated with hepatitis C infection arises from the association with injecting drug use and the fear of contagion. This stigma, and the discrimination that stems from it, can lead to social isolation and the marginalisation of people affected by hepatitis C.

Limited access to information and services and discriminatory behaviour from service providers both act to limit a person’s opportunities to prevent infection and subsequent illness and to initiate action to take care of themselves and make healthier lifestyle choices.
In summary, improved health outcomes for people with or at-risk of hepatitis C, and consequently for the broader community will be fostered through:

- the provision of accessible information and services that recognise the unique characteristics of particular groups;
- working with health systems to meet the needs of all people affected by hepatitis C and
- ensuring adherence to anti-discrimination legislation and promoting non-discriminatory behaviour by all service providers involved in the response to this major population health problem.

3. Harm reduction
The government has a responsibility to develop and implement population health measures designed to reduce the injury that such IV drug abuse behaviours can cause, both to individuals and to the community. Harm reduction interventions are designed to reduce drug related harm, such as transmission of hepatitis C, both for individuals and communities. When they are appropriate to particular environments and audiences, such interventions improve health, social and economic outcomes for individuals and the community. They seek to balance the cost to the community and to individuals of illegal or risk behaviours where those behaviours are associated with transmission of blood borne viruses such as Hepatitis C and HIV. Under this strategy, ‘harm reduction interventions’ means interventions that aim to prevent anticipated harm (through activities directed at preventing hepatitis C transmission) as well as interventions that aim to reduce actual harm (through health education and protection activities and services for people with Hepatitis C).

Harm reduction interventions fit within the spectrum of integrated approaches to drug use, under the banner of ‘harm minimisation’. This includes supply reduction and demand reduction interventions such as peer education and needle and syringe programmes. Such interventions continue to be highly effective in reducing risk behaviour and the transmission of blood-borne viruses such as HIV among people who inject drugs. (US Department of Human Services and Health, 1998.)

(Watters JK et al. 1994)

A variety of interventions appropriate to the particular contexts where risk-taking behaviours occur will be supported and promoted under this strategy. The primary focus for these interventions is to reduce transmission of hepatitis C.

4. Health promotion
There should be a national commitment to reduce the social, health and economic impacts of hepatitis C infection, both for the general community and for people affected by hepatitis C. Health promotion is critical in this, especially for people at risk of infection and people already affected by hepatitis C.

The principles of the 1986 Ottawa Charter for Health Promotion are at the basis of this Strategy. The Charter identifies five important ways in which individuals, communities and governments can act to improve their health:
- building healthy public policy;
- creating supportive environments;
- strengthening community action;
- developing personal skills;
- re-orienting health services.

Health promotion activities include disease prevention, education, social mobilisation and advocacy. Good health promotion recognises the political, economic, social, cultural, environmental, behavioural and biological determinants of health. To be most effective, health promotion programs emphasise local needs as well as the differing social, cultural and economic conditions in society at large. This also embraces a diversity of educational approaches that are fundamental to reducing the rate of hepatitis C transmission; reducing discrimination; informing treatment providers, health care professionals and allied health care workers; and improving care and support services. Using a mixture of approaches and focusing on specific settings and circumstances, the following will be among the health promotion activities supported by an effective control strategy:

- peer education
- public education and campaigns
- professional education and training
- self-directed learning
- school-based education.

5. Research and surveillance

Although understanding of the Hepatitis C epidemic has improved greatly in the last decade our knowledge remains incomplete. Improving our knowledge is crucial to providing an evidence base for the development of public policy and programmes, clinical treatments and therapies, and services that are compatible with the evolving needs of people affected by Hepatitis C. The main branches of research contributing to the population health effort to address Hepatitis C are epidemiology; basic scientific research; virology; clinical research and social and behavioural research.

The following principles should underpin research into Hepatitis C:

- The contribution of basic science and virological, clinical, epidemiological, and social research to achieving the aims of the Strategy must be acknowledged.
- Research focused on both national and local issues is needed to guide the population health response and reflect differing contexts.
- Both investigator-initiated and commissioned research have a role in guiding the national response.
- The research-practice interrelationship should be fostered through sustainable mechanisms.
- Multi-disciplinary collaboration is encouraged.
- Community involvement is necessary in setting the research agenda, in the design and execution of research, and in disseminating the results.
6. Linked strategies and infrastructures
Optimal implementation of the strategy demands co-ordination with other national population health initiatives that have a bearing on the health and well being of people affected by Hepatitis C.

The following is a discussion on the four priority areas of this strategy:

1. REDUCING HEPATITIS C TRANSMISSION IN THE COMMUNITY

Objectives
- reduce transmission of hepatitis C infection.
- raise awareness of hepatitis C transmission risks and improve knowledge and skills for sustaining preventive practices.

Risk factors and contexts
Specific social, cultural and occupational practices that expose a person to the blood or blood products of another person can lead to hepatitis C transmission. Such practices involve the use of equipment that is not sterile, such as the sharing or re-using of any item of equipment that has already been used:
- for the purpose of liquefying and eventual by injecting the drug;
- for the purpose of skin penetration, including for body piercing;
- for the purpose of tattooing;
- in health care settings and
- in other industries where a person may be exposed to another person’s blood.

The risk of transmission depends on the context in which such practices occur, as well as other contributing factors.

Sharing and re-using injecting equipment
Any sharing or re-using of injecting equipment that involves blood-to-blood contact is a very high risk factor for hepatitis C infection. The risk of transmission occurring in this way extends beyond needles and syringes to spoons, water, tourniquets and swabs and contact with anything else (such as hands) that might have traces of blood on it.

Both sharing and re-using injecting equipment are risk behaviours associated with particular cultural and social determinants. The meanings and rules of sharing and re-using—including the items shared and the social circles where the sharing takes place—will vary across communities and social contexts. Furthermore, the circumstances in which injecting, sharing or re-using takes place (such as street use) affect the risk of blood-to-blood contact. The risks of sharing or re-using injecting equipment are also greater if the availability of sterile injecting equipment is limited.

Re-infection
Previous infection with one strain, or genotype, of hepatitis C does not protect against re-infection with the same or a different strain of the virus, irrespective of whether a chronic illness subsequently develops or the infection is cleared.
Prevention efforts must also target people with hepatitis C who continue to engage in risk behaviours, to prevent re-infection and its associated accelerated morbidity. These prevention efforts should also focus on providing people with hepatitis C with the skills and knowledge to prevent further transmission of the virus.

**Custodial settings**
A history of incarceration is a potent risk factor for hepatitis C transmission because of the high prevalence of hepatitis C among custodial populations. Within custodial settings access to education, the means of preventing transmission and infection control is limited. Sharing and re-using of unsterile equipment is common. Acts of violence involving blood-to-blood contact may also occur and pose an additional threat to all within these settings.

**Mental health**
People with a mental illness and/or psychiatric disability, especially in populations with high levels of substance use, also need to be considered in the development of Hepatitis C prevention and education interventions. Where appropriate, both mental health and drug services should be encouraged to participate in the development and delivery of Hepatitis C prevention interventions.

**Occupational exposure**
Specific occupations—such as health care workers (including paramedics and needle and syringe programme workers); dental workers; cleaning and waste-management workers; hairdressers and beauticians; tattooists and body-piercing practitioners and personal carers may pose risks for Hepatitis C transmission. This risk is dependent on the likelihood of becoming infected after contact with blood from an infected source, the frequency of blood contact, the ability of the virus to survive outside the body, and the prevalence of hepatitis C infection within the general population.

Improved application of occupational health and safety policies and programs across these sectors will reduce the risk of accidental exposure to hepatitis C infection, as will interventions aimed at reducing the prevalence of hepatitis C in the general community.

**Non-occupational exposure to discarded injecting equipment**
There are no documented cases in the world of hepatitis C transmission from accidental non-occupational exposure, such as contact with inappropriately discarded needles and syringes. The risk of Hepatitis C transmission through non-occupational exposure is often exaggerated. There is, however, continued community concern about the reported risks associated with exposures of this kind: the media are encouraged to frame their reports in a responsible manner, having regard to the actual risks of transmission.

**Securing the blood supply**
Malta has introduced screening for Hepatitis C of the blood available for transfusions. Every blood or platelet donation is tested for anti-HCV antibodies

An initial screening questionnaire is also presented to the donor for deferral if the donor falls within a risk category. These criteria include:
• if they have a history of jaundice or hepatitis;
• history of sexually transmitted disease;
• history of drug use;
• a homosexual contact;
• more than 1 sexual partner in the last year;
• a casual sexual contact;
• tattooing, piercing, acupuncture or needle stick in the last year;
• have been in prison in the last 3 years.

Recommendations
• To monitor and respond to changing patterns in risk behaviours and their contexts.
• To maintain support for population health initiatives, such as needle and syringe programs, that is proven in reducing transmission of Hepatitis C.
• To support innovative approaches that enhance educational opportunities for reducing Hepatitis C transmission.
• For people with or at risk of Hepatitis C, to broaden access to the means of preventing transmission and re-infection.
• To enhance the capacity of and support peer educators and peer based drug user groups to reduce the transmission of Hepatitis C in the context of holistic health and wellbeing.
• To develop and implement a best-practice framework to guide hepatitis C education and prevention.
• To augment the skills of workers in health care services for people with or at risk of Hepatitis C.
• To encourage health care service providers, including pharmacists, to participate in Hepatitis C education and prevention, in partnership with affected communities.
• To promote nationally consistent occupational health and safety standards for the health care, tattooing, skin-penetration and other industries with elevated risks of exposure.
• To promote equitable access and standards of Hepatitis C prevention and education in rural, remote and regional areas.
• To support the implementation of nationally consistent standards for Hepatitis C education and prevention in custodial settings.
• To promote multi-disciplinary research across the partnership, to guide best practice in Hepatitis C prevention.
• To promote the development of legal environments that support prevention of Hepatitis C transmission.
• To support efforts to reduce the prevalence of risk behaviors such as injecting drug use.
• To support the development of effective, accessible and attractive treatments for drug dependency. In developing these treatments, account should be taken of possible interactions between treatments for drug dependency and Hepatitis C infection.
• To promote the expansion and availability of treatments for drug dependency within custodial settings.
• To support the development of nationally consistent protocols for notifications and data collection to improve our understanding of the
epidemiology and natural history of Hepatitis C and in monitoring and responding to changing patterns in risk behaviors and their contexts.

- To foster and maintain nationally consistent surveillance of occupational exposure in health care settings.

2. Treatment of Hepatitis C Infection

Treatment options for hepatitis C infection have greatly improved in recent years. The objective is to maximise the health and well-being of people with hepatitis C.

- People with hepatitis C should have equitable access to the range of treatments.
- Accessible information and education about treatment options must be provided, so that people with hepatitis C can make informed choices.
- The development of new and improved treatments requires continuing, sustainable basic, virological and clinical research.

Recommendations

- To ensure equivalent access for people with hepatitis C seeking treatment;
- To provide the best treatments available, supported by patient education and counselling, to reduce current and long-term morbidity, particularly for people with hepatitis C who are most likely to progress to advanced liver disease;
- To expand knowledge, understanding and choices in relation to hepatitis C treatments;
- To provide continuing training and education on developments in clinical treatment to health care workers dealing with people who have hepatitis C;
- To support increased access for people with hepatitis C in custodial settings who are seeking treatment and to provide accessible information about hepatitis C treatments;
- To develop and implement a nationally accepted testing policy for hepatitis C;
- To support comprehensive peer education programs to encourage people with hepatitis C who inject drugs to engage with the primary health care sector;
- To investigate the development of post-exposure prophylactic therapies and promote access to these therapies for people with acute infection;
- To investigate the impacts of multiple hepatitis C infections on morbidity and mortality and promote the development of suitable therapies.

3. Health maintenance, care and support for people affected by Hepatitis C

On its own, clinical treatment for hepatitis C infection and associated liver disease is insufficient to ensure health and wellbeing. Symptoms of Hepatitis C such as fatigue, nausea, depression, and headaches—may not be brought to the attention of specialist Hepatitis C clinical services. Moreover, a considerable range of factors that affect the health and wellbeing of people with Hepatitis C do not necessarily come within the scope of specialist Hepatitis C clinical services.

For many people with Hepatitis C, the primary sources of care and support are their personal networks—partners, family, friends, peers and colleagues.
Among the factors that affect the health and wellbeing of people with Hepatitis C are:

- Anxiety and stress associated with having a chronic condition such as hepatitis C;
- Fatigue, nausea and other symptoms of chronic hepatitis C infection;
- Treatment side effects such as depression and nausea;
- Nutrition is important for maintaining health and wellbeing, including for people with hepatitis C;
- Alcohol—there is emerging evidence of a clear relationship between alcohol consumption and accelerated development of severe liver disease such as cirrhosis;
- Co-infection with any of HIV, hepatitis A, hepatitis B and other hepatitis C genotypes, which can contribute to a poorer prognosis, especially if combined with other medical conditions;
- Housing, adequate income and employment—Hepatitis C illness can force some people out of the workforce, either temporarily or permanently, and can contribute to or exacerbate poverty;
- A fear of discrimination, which can impair a person’s ability or motivation to use services.

**Challenges**

1. To support comprehensive peer education programmes to help people with Hepatitis C who inject drugs engage with the primary health care sector and so increase their opportunities to protect and maintain their health.
2. To ensure that health education and care and support services have the continuing resources and training needed to provide high quality, evidence-based interventions.
3. To ensure that health education and maintenance messages are based on the best available evidence.
4. To promote and increase the accessibility of vaccination against Hepatitis A and Hepatitis B for people with Hepatitis C who are not immune to these viruses.
5. To increase access to appropriate health education and care and support services for people with Hepatitis C in custodial settings. This involves education of custodial staff, provision for health monitoring, vaccination against Hepatitis A and Hepatitis B, and provision of suitable diets.
6. To provide access to information, education and support for both professional and non-professional carers.
7. To incorporate information on Hepatitis C health education, care and support in clinical training and education programs for health care workers.
8. To promote training and education of dental health care workers to ensure that they understand the specific dental health needs of people with Hepatitis C, infection control procedures and non-discriminatory work practices.
4. Preventing discrimination and reducing stigma and isolation.
Lack of proper information about Hepatitis C; its means of transmission and the
degree of infectiousness has resulted in high levels of community anxiety and
misconception about the virus. This anxiety is often directed at people with, or
assumed to carry, the virus. The high prevalence of Hepatitis C among people with a
history of injecting drug use, together with community perceptions of people who
inject drugs, have added to the fear of this virus and attached stigma to those
affected by it. This stigma may cause people with or at risk of Hepatitis C to avoid
testing and deny or conceal their health status.

People with Hepatitis C who choose to disclose their status may be subjected to
further and more overt discrimination, with an increased likelihood of stigmatisation
and social isolation. This affects not only relationships with friends and family,
employers and colleagues but also contact with the services intended to provide
health maintenance and support.

To help people affected by Hepatitis C, action must be initiated to reduce the
likelihood of transmission and maximise their health and well-being. It is necessary
that health promotional efforts address the discriminatory practices directed at
these people. Dismantling discrimination, isolation and stigma is critical.

Recommendations
1. To establish a supportive political framework for the elimination of
discrimination, stigma and isolation experienced by people affected by
Hepatitis C.
2. To develop a supportive legislative framework that recognises the rights and
needs of people affected by Hepatitis C.
3. To ensure that health care services are accessible to and tolerant of the
individual needs and dignity of people affected by Hepatitis C.
4. To train and support health care workers to ensure that they do not engage
in discriminatory behaviour towards people affected by Hepatitis C.
5. To establish and implement standard precautions for infection control,
universally, within health care and other skin-penetration settings.
6. To promote general community education that increases blood awareness
and clarify the myths surrounding Hepatitis C, thereby reducing the stigma
and isolation experienced by people affected by the virus.
7. To implement equitable prevention, treatment and care and support systems
in custodial settings for people with Hepatitis C.
MENINGOCOCCAL DISEASE CONTROL STRATEGY

Although the reported incidence of meningococcal disease in Malta is low, the mortality rate is high and the complications which can arise can be serious. The early detection and treatment of meningococcal disease in order to control the spread and decrease the morbidity and mortality from the disease are considered an important public health priority locally.

**Management prior to referral to hospital**

Meningococcal disease usually presents as meningitis or septicaemia or a combination of the two. Meningococcal septicaemia has considerably greater mortality than meningococcal meningitis and is often characterised by a rapidly evolving petechial or purpuric rash that does not blanch under pressure. (Apicella MA et al 2000) Meningococcal disease may have clinical features not normally expected in children with acute systemic illnesses, hence the difficulty in diagnosis. Practitioners should ensure that a patient with a systemic febrile illness, particularly a child, can be promptly reassessed should the need arise (Benenson AS et al. 1990.)

The early administration of benzylpenicillin, followed by urgent transfer to hospital, can be life saving. (Begg N et al 1992) (Cartwright K et al 1992) (Cartwright K et al 1992)

Ceftriaxone is a suitable alternative when available. If clinical suspicion exists to warrant a referral for admission to hospital the patient should receive benzylpenicillin prior to transfer. (Strang JR et al 1992)

A history of a rash following penicillin is not a contraindication for benzylpenicillin administration. The patient should be sent urgently to hospital and the ambulance service needs to be informed of the urgent and critical nature of the transfer.

It is strongly recommended that any patient with an acute systemic febrile illness be referred urgently to hospital if any of the following are present:

- a haemorrhagic rash;
- an impaired level of consciousness;
- signs of meningeal irritation;
- clinical features not normally expected in children with acute systemic febrile illnesses; or
- the patient is a close contact of someone who was recently diagnosed as having meningococcal disease even if the index case received chemoprophylaxis.

(Steven N et al 1995)

The local public health unit should be notified immediately to enable an appropriate public health response. The general practitioner who had refereed the case should be contacted to obtain more information on the case and to explain about the prophylaxis being given to the contacts. (Australian Guidelines)
**Management on arrival at hospital**

Effective management of meningococcal infection requires early intervention, effective antibiotic therapy and careful attention to associated manifestations such as shock and coagulopathy.

If a patient has clinical signs or symptoms suggestive of invasive meningococcal disease they should be given parenteral antibiotics immediately. Referral of lumbar puncture may be appropriate. Therapy should not be delayed while awaiting results of diagnostic tests such as lumbar puncture or computed tomography (CT) scan. All patients with suspected meningococcal infection should have blood and throat/nasopharyngeal swabs taken and collected as soon as possible for culture, neutrophil and platelet counts and for serological studies. Penicillin treatment alone will not reliably eliminate nasopharyngeal carriage of meningococci and the patient will require treatment (e.g. ciprofloxacin) to clear organisms from the throat.

Clinical practice guidelines have been developed by the Department of Medicine to guide the practice in diagnosis and treatment of headaches.

The Disease Surveillance Unit should be notified immediately so that contacts can be identified and an appropriate public health response determined. This will include seeking other possible related cases and the provision of chemoprophylaxis as per Table 12 below where appropriate.

**Laboratory Diagnosis**

It may be appropriate to take a sample of the cerebrospinal fluid (CSF). Meningococcal septicaemia often occurs without meningitis. In these cases, the cerebrospinal fluid (CSF) may be normal. Negative findings on initial microscopy and biochemical examination of CSF do not exclude meningococcal meningitis. Positive cultures may be obtained in the following days.

Culture of Neisseria meningitidis from a normally sterile site confirms the diagnosis. However, with early use of antibiotics and the likelihood of a negative culture, non-culture methods for diagnosis become more important. PCR tests to detect meningococcal DNA can be performed on blood and CSF, and have high sensitivity and specificity, even when prior antibiotics have been given. Serology can confirm the diagnosis in a clinically compatible case with a single positive IgM antibody result or by seroconversion in acute and convalescent sera. Strain differentiation by phenotyping, molecular typing, and gene sequencing is performed in laboratories abroad to identify possibly related cases and for longer-term population studies.

The specimens used for the diagnosis of meningococcal infection are:

- Blood for culture, Polycytemic reaction techniques (PCR), serology
- Throat/pharyngeal swab
- Aspirate from skin lesions, skin scrapes, other sterile sites, for microscopy, culture, PCR
- CSF for microscopy, culture, PCR
Discharge and post discharge planning
In most cases, with early diagnosis and prompt treatment, outcomes of meningococcal disease are good. On discharge from hospital, the patient’s general practitioner should be sent a discharge summary containing details of the follow-up required and the prognosis.

Surveillance
Surveillance is based on notification of cases by clinicians and laboratories and has two broad objectives:

1. to ensure prompt identification of cases so as to enable early intervention from a public health point of view in relation to contacts and the wider community and
2. to improve understanding of the epidemiology of meningococcal disease and provide an evidence base for control measures.

The objectives of disease surveillance are:

1. To ensure prompt identification and appropriate management of cases;
2. To ensure prompt identification of all relevant contacts to enable the institution of appropriate public health responses;
3. To ensure the prompt identification of outbreaks of invasive meningococcal disease to enable the rapid institution of control measures;
4. To enable the monitoring of changes in the epidemiology of the disease across the country in relation to serogroup, serotype and antibiotic susceptibility and
5. To monitor the effectiveness of current control measures and to provide an evidence base for further review of national guidelines.

Notification of cases of invasive meningococcal disease to the DSU is the trigger for the public health responses. The public health system requirements are for timeliness and sensitivity. All clinicians and laboratories are required to notify cases of suspected meningococcal infection by telephone immediately. This should not be delayed until microbiological confirmation is obtained.

For surveillance purposes cases should be classified based on the recommended definitions laid down under Decision 2119/98 of the European Commission. It should be noted that these case definitions are for use by DSU. The responsibility of the treating clinician (community or hospital doctor) and laboratory is to notify all cases in which a diagnosis of meningococcal infection is being considered. This will enable discussion of the case with staff in the Disease Surveillance Unit. Immediate notification by telephone will also enable discussion with clinicians about further measures to confirm the diagnosis.

For meaningful surveillance of meningococcal disease it is essential to have a dataset which includes epidemiological, laboratory and clinical information. This data should be reviewed and analysed on a regular and frequent basis. Identification of outbreaks with the same risk factors or phenotypes is a particular cause for concern, as they may require the implementation of specific control measures.
**Management of sporadic cases of meningococcal disease**

Respiratory droplets shed from the upper respiratory tract transmit meningococci from an infected person to another. Humans are the only natural hosts for meningococci and the organism dies quickly outside the human host. It cannot be isolated from environmental surfaces or samples. Nasopharyngeal carriage of meningococci is common in the UK. About 10-15% of the population carries meningococci at any given time. (Cartwright K. Meningococcal carriage and disease. In: Cartwright K, ed. Meningococcal disease. Chichester: John Wiley & Sons, 1995: 115-146.)

There is a definite increased risk of further cases among the household contacts of a case of meningococcal disease. There may be an increased risk in child-care facilities; schools or universities attended by a case; among those who have shared saliva with a case and among those in very close contact (e.g., girlfriends) with a case after the onset of symptoms.

The public health response to meningococcal disease includes providing contacts of the case with information about the disease; the provision of chemoprophylaxis to selected contacts with an examination on the possibility, albeit small, of disease occurring; explaining that there are no particular quarantine or behaviour requirements of the contacts and the maintenance of surveillance for further cases.

The public health response should only include those who were in contact with a case in the 7 days preceding onset of the illness, and those in close contact after the onset of symptoms. (Begg N, 1999)

The rationale for chemoprophylaxis is to eliminate meningococci from any carrier within the network of contacts close to each index case, thereby reducing the risk to other susceptible individuals in the network.

There are three antibiotics currently used for chemoprophylaxis of meningococcal disease; each agent has advantages and disadvantages and each is the preferred agent in specific circumstances.

- **Ciprofloxacin** is the preferred chemoprophylactic agent for women taking an oral contraceptive as rifampicin can affect the efficacy of oral contraceptives.
- **Ceftriaxone** is the preferred chemoprophylactic agent for pregnant women, and in rural and remote indigenous communities.
- **Rifampicin** is the antibiotic of choice for chemoprophylaxis for young children.

Throat swabs have no role in the public health management of contacts of invasive meningococcal disease.
Table 12. Chemoprophylaxis for contacts of Meningococcal Disease

**Rifampicin** is safest unless specifically contraindicated.
- For those over 12 years, the dose is 600mg twice daily for 2 days
- For those under 12 years
- If body weight is known

<table>
<thead>
<tr>
<th>Age</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 12 months</td>
<td>5 mg/kg body weight</td>
</tr>
<tr>
<td>1 - 12 years</td>
<td>10 mg/kg body weight</td>
</tr>
</tbody>
</table>

If weight unmeasured, approximate....

<table>
<thead>
<tr>
<th>Age</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 2 months</td>
<td>20 mg (1ml syrup*)</td>
</tr>
<tr>
<td>3 - 11 months</td>
<td>40 mg (2ml syrup*)</td>
</tr>
<tr>
<td>1 - 5 years</td>
<td>150 mg (7.5ml syrup*)</td>
</tr>
<tr>
<td>6 - 12 years</td>
<td>300 mg</td>
</tr>
</tbody>
</table>

*Rifampicin syrup contains 100mg/5ml.

Alternative regimes include:
- **Ciprofloxacin**: 500 mg tablets single dose in adults
- or
- **Ceftraixone**: 250mg intramuscularly injection single dose in over 12 year olds or 125mg intramuscular injection single dose in under 12 year olds

Management of outbreak cases of meningococcal disease

Outbreaks of cases of meningococcal infection are some of the most challenging situations for public health authorities due to the intense public concern and media interest they generate; the potential for severe morbidity and mortality among cases and the limited published evidence to guide best practice. Fortunately, none have occurred to date in Malta.

An **organisation-based outbreak** is the occurrence of two or more cases of meningococcal disease with an onset within a 4-week interval in a grouping that makes epidemiological sense, and where the available microbiological characterisation of the organisms is the same. Groupings can occur in schools, universities, classmates, year mates, members of the same workgroup and community.
A **community-based outbreak** is the occurrence of three or more cases of confirmed meningococcal disease within a 3-month interval, which brings the rate of invasive disease in the community to 10 or more/100,000 total population in a 3 month period, in a geographical area that makes epidemiological sense and where available microbiological characterisation of the organisms is the same.

The objective of any public health management of such an outbreak is to interrupt the transmission of disease and prevent further cases occurring. (Guidelines for public health management of meningococcal disease in UK. 2002)

This can be achieved by establishing a response team; making a site visit if appropriate; undertaking intensified surveillance; providing adequate information and initiating appropriate responses via chemoprophylaxis or vaccination. In responding to organization-based outbreaks of cases, chemoprophylaxis should be considered for a wider group than solely close contacts.

Those who receive chemoprophylaxis or vaccination should receive written information on meningococcal disease; the efficacy and adverse events associated with chemoprophylaxis and vaccination, and procedures (including after hours contact phone numbers) for answering questions or resolving problems. It is important to emphasise that further cases may occur even if chemoprophylaxis or vaccination has been given. Where outbreaks occur in institutions or organisations, written information on meningococcal disease should also be given to those who do not require chemoprophylaxis or vaccination. Leaflets are available from the Disease Surveillance Unit and should also be available from the Inpatients Pharmacy from where chemoprophylaxis is distributed. This is to inform those members of the public of the low level of risk involved and to advise regarding what actions to take should they develop symptoms suggestive of meningococcal infection.

Meningococcal vaccination, in addition to the use of chemoprophylaxis, should be considered if an outbreak is due to a vaccine-preventable strain. In Malta, the tetravalent polysaccharide vaccines against A, C, Y and W135 serogroups of N. meningitidis are available and are given free of charge to contacts.

**Table 12. Summary of public health responses in defined settings in which a case of invasive meningococcal disease has occurred**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Information and chemoprophylaxis</th>
<th>Information only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household of a case</td>
<td>All</td>
<td>N/A</td>
</tr>
<tr>
<td>Child care facilities</td>
<td>Children and staff in the same room for 4 hours at one time in the 7 days prior to the onset of the case’s illness</td>
<td>All other children and staff at the facility</td>
</tr>
<tr>
<td>Education facilities</td>
<td>Students in the same classroom have been</td>
<td>Other students and teachers</td>
</tr>
<tr>
<td>Category</td>
<td>Detailed Description</td>
<td>Information Provided</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Those who have shared saliva with case</td>
<td>(via mouth kissing, saliva with a case, other drink-bottles, bongs, etc)</td>
<td>Even though they may not have shared saliva with the case, other members of any sporting team which include a case should be given information</td>
</tr>
<tr>
<td>Those exposed to a case after the onset of symptoms</td>
<td>Very close household-like contacts, health carers who have either intubated the case without a face mask or done mouth-to-mouth resuscitation (Meningococcal Policy for SLH, Infection Control Committee)</td>
<td>All others concerned that may have had contact with the case after the onset of symptoms including the general practitioner who referred case</td>
</tr>
</tbody>
</table>
STIS AND HUMAN IMMUNODEFICIENCY VIRUS/AUTOIMMUNE DEFICIENCY SYNDROME CONTROL STRATEGY

Introduction
Sexually transmitted illnesses (STIs) are caused by a variety of bacteria, viruses and other organisms. Bacterial STIs, such as gonorrhoea and syphilis, can be cured with antibiotics. STIs caused by viruses, such as genital herpes, human papillomavirus, hepatitis B and human immunodeficiency virus (HIV) infection cannot be cured, but most can be treated to relieve symptoms and help prevent complications. Novel antiviral therapy is promising and may give rewarding results in the future. If untreated, STIs can have consequences ranging from mild brief illness to serious complications such as infertility, tubal pregnancy, cancer, stroke and even death. Some STIs may cause serious health problems, including death, in infants born to infected mothers.

STIs may be passed from one person to another through vaginal, anal or oral sex, but generally not by kissing. Most STIs are asymptomatic at first and persons do not know they are infected until they are tested or complications occur. The presence of STIs significantly increase the likelihood of contracting HIV. (Wasserheit JN. 1992)

A large scale, randomized community based study has shown that during the early phase of an HIV epidemic, aggressive syndromic treatment of STIs is a cost effective measure to prevent HIV. (Grosskurth H, 1995)

Undoubtedly, STI control and HIV prevention have a very intimate relationship especially in areas where there is a high reported incidence of STI. Besides, STIs also share risk behavior and social factors with HIV infection, like unprotected sexual intercourse; a high number of sexual partners; penetrative anal intercourse and habitual use sex workers.

While many other endemic diseases such as polio, measles and smallpox have been eliminated through widespread use of vaccines, the strategies for the elimination of STIs differ from these efforts largely because there is currently no vaccine.

Since the STI situation is not entirely clear in Malta, effective control commences with the identification of any problem with STIs in Malta. Thereafter the aim is to reduce the frequency of STIs and their complications with the ultimate ideal aim to eliminate STIs and HIV transmission.
A STRATEGY FOR STIs AND HIV/AIDS

This strategy undertakes an array of interventions and activities to prevent STIs and HIV/AIDS and their complications. These include:

1. Surveillance
2. Clinical and Laboratory Services
3. Partner Management
4. Training
5. Health Education and Behavioral Intervention
6. Epidemiological and clinical research

**Surveillance**
Information obtained from surveillance of STIs can assist programmes to better plan, implement and evaluate efforts to control STIs.

The five components of STI surveillance that are necessary for effective control programmes are the following:

- case reporting
- prevalence assessment and monitoring
- assessment of STI syndrome aetiologies
- antimicrobial resistance monitoring
- special studies

These are complementary activities, with their utility differing for different aspects of STI control.

**Case reporting**
Case reporting is the process of sending information about STI cases of notifiable diseases from health care providers or laboratories to public health authorities.

Case reporting has several purposes and uses:

- to assess the disease burden, by providing an indicator of minimum reported incidence of recently acquired infections;
- to monitor trends in reported incidence of recently acquired infections;
- to provide information required for management of patients and their sex partners;
- to report the major STIs, to assist in planning and managing programme efforts and
- to provide other data necessary for managing health services (e.g., pharmaceutical distribution)

STIs may be reported either syndromically or aetiologically, depending on the availability of laboratory tests in clinical care settings.
**Syndromic case reporting**

Syndromic case reports require no laboratory diagnostic tests and involves printed algorithms which indicate to the doctor the most likely cause of the condition.

STI syndromic case reports have important limitations:

*Only urethral discharge and genital ulcer disease (non-vesicular) are potentially useful for monitoring trends in STI reported incidence.* These syndromes usually represent recently acquired sexually transmitted infections. In contrast, usually high proportions of vaginal discharge cases are not caused by STIs, or are a substantial proportion of cases of lower abdominal pain in women, or of clinically apparent cervicitis. Vesicular ulcers, an indication of genital HSV infection, are usually a recurrence of a herpes infection that was acquired years before. Many cases of genital warts also represent a symptomatic recurrence of a persistent infection.

*Use of syndromic reports provides a poor assessment of disease burden and trends in women compared with men.* This is because a high proportion of STI infections in women cause no symptoms.

*These syndromes are not pathogen-specific.* Studies of syndrome etiology also must be periodically performed to guide therapy. Reporting of the vaginal discharge syndrome; lower abdominal pain in women; vesicular genital ulcers; genital warts and cervicitis is useful only if it contributes to management of health services by providing information on the number of cases seen and assisting with the allocation of pharmaceuticals. They are not reliable for assessment of STI reported incidence or prevalence, nor to measure the impact of STI/HIV prevention programmes.

**Etiologic case reporting**

Aetiologic case reporting requires diagnosis based on the result of a laboratory test.

Aetiologic STI case reports have important limitations:

*Primary and secondary syphilis in men and women, and gonorrhoea in symptomatic men, are the etiologic diagnoses that are most useful for monitoring trends in reported incidence.* Many other STIs are not useful for this purpose. Recently detected latent syphilis in men and women; chlamydia; gonorrhoea; and trichomoniasis in women usually reflect infections that were acquired at an unknown time before. (High quality diagnostic testing is usually not available for chancroid. Otherwise etiologic case reporting for this condition might also be used to reliably monitor trends in reported incidence).

*Etiologic case reports are generally more useful for monitoring trends in STI reported incidence in men than in women.* As for syndromic case reports, this is because a higher proportion of infections in men are asymptomatic.

*Sensitivity of diagnostic tests is often substantially less than 100%.* Etiologic reporting does not include syndromes (e.g genital ulcers) that test negative for a specific pathogen, even though the patient may actually be infected.
The availability of diagnostic tests does not assure their quality. Quality assurance procedures for specimen collection and diagnostic testing must be in place for diagnostic tests to provide consistent, reliable results.

*In the absence of routinely available, high quality laboratory diagnostic testing, case reporting should be based on syndromes.*

**Reporting perinatally-acquired STIs**
Perinatal infection is a devastating consequence of certain STIs. Measuring the number of these infections and their rates (number of infections per number of live births) are important STI surveillance activities. The most common perinatally-acquired STIs in most countries are congenital syphilis and ophthalmia neonatorum.

**Data elements**
Core data elements that are essential to reporting a case should ideally be routinely collected. These include:

- Diagnosis
- Reporting site
- Date of visit
- Gender
- Age group, age or date of birth (see below)

Additional data elements if possible

- Residence
- Education or socio-economic status
- Syndrome (for etiologic reporting)
- Anatomic site of infection
- Date of symptom onset
- Risk behaviours
- Pregnancy
- History of STI
- Treatment

**Universal versus sentinel-site case reporting**
In Malta, STI case reporting has been incorporated into the national health information system. This has the following advantages:

- When the structure of health care services and patterns of health care seeking behaviour and reporting are consistent, trends in notifiable STI syndromes (e.g., urethral discharge in men and genital ulcer disease in men and women) will reflect trends in STI reported incidence in the population.
- Universal reporting systems can be used to provide a *minimum* estimate of population-based STI reported incidence throughout the country.

A major limitation of universal case reporting systems is that in some countries they are used as the only mechanism to obtain data on the burden of STIs in the population, even though other sources of data are usually necessary to help characterise disease burden (e.g. prevalence assessment and monitoring).
An additional case reporting system may be instituted at specially designated sentinel or enhanced surveillance sites.

This sentinel-site case reporting may help in the following:

- Assess the proportion of clinic attendees with STIs compared with other conditions (if a denominator for total patient visits per site is available)
- Among patients with STIs, determine the distribution of types that are seen at the clinic
- Determine characteristics of STI patients who attend the sentinel sites
- Assess trends in numbers of cases at sentinel sites, as a possible indication of trends in disease burden in the community (although many factors, in addition to morbidity, may affect case numbers)

The major potential advantage of sentinel site case reporting is the opportunity to obtain higher quality data on case reports than may be obtained through a system of universal reporting, particularly if staff at the sentinel reporting sites receive special training, and if a data system can be established to improve quality and use of these data. Additionally, more detailed data may be obtained on these fewer patients than could be obtained through a universal system.

**Private sector and laboratory-based case reporting**

Among the most difficult challenges for any STI surveillance system is the ability to encourage case reporting from the private sector. Clinicians in public and private sectors that provide family planning services and gynaecological care should be encouraged to report cases of STIs. Patients with STIs often seek to obtain medications directly from pharmacies, without first consulting a clinician. The extent of under-reporting due to this and other reasons should be assessed through special studies.

**Data quality**

STI surveillance programmes should establish standards for quality of data in case reports. Three critical components of data quality are completeness (the proportion of reported cases with complete information); validity (among reported cases, the proportion of each data element that is reported correctly; and timeliness (the time intervals between the steps in surveillance).

**Confidentiality of STI surveillance data**

The STI surveillance programme should have policies that protect the privacy of patients and the confidentiality of disease control data; that ensure the integrity of these data (i.e., that prevent unauthorised modification); and, that provide access only to persons who are authorised for purposes of disease control.
A second major component of STI surveillance is prevalence assessment and monitoring.

**Objectives of STI prevalence assessment and monitoring**
The primary purposes of STI prevalence assessment and monitoring are the following:

- identify population subgroups with high prevalence of STIs
- monitor trends in STI prevalence among defined populations.

In many situations, STI prevalence is monitored in defined populations that are routinely screened. For example, women who are routinely screened for syphilis during antenatal care or at delivery. Thus, the primary purpose of testing is detection and treatment of STIs rather than determination of prevalence. However, prevalence assessment may also be performed as part of studies that are specifically designed to obtain data for purposes of programme planning.

Prevalence data are useful in STI programme planning, management, and evaluation because they can be used to:

- identify population subgroups at high risk for HIV infection (as evidenced by high rates of STIs);
- guide funding and resource allocation for STI and HIV prevention programmes;
- monitor effectiveness of STI and HIV prevention programmes and
- develop national estimates of STIs

An important limitation of STI prevalence data is that it has no role in the management of individual patients or their sex partners. For these purposes case reports are required.

**Assessing prevalence of symptomatic versus asymptomatic STIs**
Prevalence of STIs that are often asymptomatic (e.g., chlamydia and gonorrhoea in women; syphilis, determined through serologic testing) may provide insight into the disease burden in the population from which those attending the clinic is drawn. Asymptomatic patients are usually seeking services for reasons that are unrelated to STI (for example, family planning clinic clients and women seeking antenatal care). In contrast, prevalence of symptomatic disease (i.e., STI syndromes) in clinical care settings will be heavily biased compared with community disease rates because these patients are presenting for care.

In settings where all patients may be examined without relation to symptoms (e.g., entry into detention facilities, military recruitment and routine sex worker examinations), STI syndromes may serve as useful indicators of prevalence, because the bias introduced by care-seeking is less than in settings where patients are seeking care for symptoms. In these situations, it is possible that genital ulcer disease and urethral discharge may assist in assessing prevalence, particularly in settings where reported incidence of these diseases is high. However, even these few syndromic
measures of disease burden should be considered substantial underestimates. Recent data using highly sensitive nucleic acid amplification tests suggest that substantially more cases of gonococcal and chlamydial infections in men are asymptomatic than previously thought.

Tests that do not require gynaecological or genital examinations can facilitate screening (and prevalence assessment) outside of clinic settings. Urine tests for gonorrhoea and chlamydia based on nucleic acid amplification methods can be used for this purpose, although their cost may limit their use. The leukocyte esterase test can be used for screening men for presence of urethritis, but the sensitivity and specificity of this test vary considerably, depending on the population screened and the competence of the individuals performing the test.

**Specific Laboratory requirements**
Because assessment of prevalence necessarily focuses in most settings on diseases that are asymptomatic and persistent, reporting of prevalence based on laboratory diagnosis is necessary. This means that syphilis serologic testing and testing for genital chlamydial and gonococcal infection must be performed. Prevalence studies can only be performed when local laboratory infrastructure exists or when a site without laboratory infrastructure can collaborate with a site that has resources. Quality control is an important issue, and quality of specimen collection and local testing can never be taken for granted.

**Selection of populations and frequency**
In all countries, it is essential to assess prevalence among persons who, by their risk behaviour, are likely to have higher rates of disease (for example, female sex workers). The feasibility of doing this will depend in large part on the extent to which such populations are identifiable and accessible.

STI data from clinics attended by the general population can also be useful for establishing STI programme priorities; determining the need for ongoing services, and targeting HIV prevention interventions.

Another potentially important source of syphilis seroprevalence data in many countries is blood donors.
In settings where prevalence data are not generally available, even for syphilis serologic testing on antenatal or parturient women, it may be useful to designate some sites as sentinel sites where the activity of collecting and reporting prevalence data can be initiated. However, to the extent possible, the monitoring of prevalence should be integrated into the routine of large institutions that are already testing patients, and, if data quality is adequate, data can be routinely reported to the STI programme.

**Unlinked versus confidential assessment of STI prevalence, and linkage with HIV seroprevalence surveys**
Unlike HIV seroprevalence studies, for which testing has often been performed in an unlinked fashion, testing for STIs is usually performed confidentially so that the results can then be used for treating and counseling patients. When interpreting data on STI prevalence, biases may be substantial if many patients decline testing.
However, when the circumstances and setting are appropriate, adequate education and counseling are provided (for example, in many family planning clinics, antenatal clinics, and STI clinics), and if costs are not prohibitive, many clients will consent to testing. Adequate therapy must be available to persons found to be infected. In settings where data on HIV seroprevalence are sought for surveillance purposes, unlinked HIV testing can be performed on leftover sera collected for syphilis serological testing. When such leftover sera are used in this way, the syphilis seroprevalence should also be recorded and reported; in the past, this potentially important source of data has been under-utilised.

**Analysis and interpretation of prevalence data**

Analysis of routinely collected group prevalence data (for example, those data obtained from routine screening of women in antenatal care) can follow the outline for analysis of case reporting data described above.

Quarterly and annual trends in prevalence should be summarized as a whole, overall, and stratified by basic categories (geographic area, age group, provider type, and provider site/laboratory).

Trends in prevalence may be altered substantially by changes in the population being screened because of changes in the characteristics of the clinic; changes in the population’s patterns of health care-seeking, or changes in criteria used to select persons for screening. Any such changes should be recorded and taken into account in the interpretation of trend data. Changes in diagnostic tests, which often vary in sensitivity and specificity, in the use of confirmatory tests, and in the type of specimen collected (e.g., endocervical swab versus urine) should also be recorded and considered when interpreting these data.

**Assessment of syndrome etiologies**

Periodic assessment of etiologies of STI syndromes (e.g., urethral discharge, genital ulcer disease vaginal discharge) should be considered a core STI surveillance activity, especially in countries where STI syndromic management and case reporting are routinely performed.

**Objectives of assessing syndrome etiologies**

The primary purposes of assessing syndrome aetiologies are to:

- Provide data for guiding STI syndromic management
- Assist in the interpretation of syndromic case reports, and the assessment of disease burden due to specific pathogens.

**LABORATORY REQUIREMENTS**

The general types of laboratory tests that may be used for assessing syndrome etiologies are the following:

**Urethral discharge**

- Microscopy (Gram stain of urethral exudate to identify gram-negative diplococci)
- Gonorrhoea and chlamydia testing available in some settings; these may include culture for *N. gonorrhoeae*, DFA for *C. trachomatis*, and EIA, amplified, and non-amplified nucleic-acid based tests for both pathogens

**Genital ulcer disease**

- Syphilis serologic testing (non-treponemal and treponemal)
- Dark field, direct fluorescent antibody test, culture for *Haemophilus ducreyi*, HSV culture or antigen detection test, and polymerase chain reaction (PCR) for *T. pallidum*, *H. ducreyi*, and HSV available in some settings.

**Vaginal discharge syndrome**

- Wet mount microscopy (*T. vaginalis*, clue cells, yeast).
- Culture for *T. vaginalis* and *Candida* sp, dry chemistry for bacterial vaginosis, and chlamydia and gonorrhoea testing available in some settings

**Selection of populations and frequency**

Selection of populations for assessing syndrome etiologies depends on the number of cases available for examination at a single site.

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**MONITORING ANTIMICROBIAL RESISTANCE**

In view of the substantial use of drugs for treatment of gonococcal infections and increasing rates of resistance world-wide, it is important for each country to monitor antimicrobial resistance to *Neisseria gonorrhoeae* as a core component of STI surveillance. Appropriate therapy of gonococcal infection is necessary to achieve microbiologic cure; relieve signs and symptoms of infection; prevent complications (which include pelvic inflammatory disease, chronic pelvic pain, and infertility in women), and interrupt transmission. In men infected with HIV, treatment of gonococcal infection substantially reduces HIV in semen, providing a mechanism for reducing the risk of HIV transmission.

Antimicrobial susceptibility testing for *Haemophilus ducreyi* is more difficult than for *N. gonorrhoeae*.

**Objectives of monitoring antimicrobial resistance in Neisseria gonorrhoeae**

The principal objective of monitoring antimicrobial resistance in *N. gonorrhoeae* is to obtain data necessary for developing guidelines for treatment. A second objective is to detect newly emerging resistance.

Demographic and risk information obtained through a sentinel system for monitoring antimicrobial resistance in *N. gonorrhoeae* may also be used to further characterise risk factors for resistance and the local epidemiology of this disease.

**Sample size and frequency**

A sample of about 100 isolates per sentinel site during a defined time interval (e.g., quarter or year) is usually sufficient to provide an approximate characterisation of local patterns of resistance during that interval. A finding of zero cases of resistant isolates among 100 isolates tested provides a probability of 0.95 that on the average
the true proportion of resistant isolates is <5% (if a random sample of isolates is tested). Although a true random sample of gonococcal isolates is usually difficult to obtain in most clinic settings, a systematic sample may be adequately representative. A sample of 200 or more isolates collected during a defined time interval will make possible a more detailed analysis, including an opportunity to examine more closely risk factors for resistance and the local epidemiology of gonococcal infection.

The assessment of antimicrobial resistance should be performed at least annually. When feasible, it is advantageous to sample isolates on an ongoing basis rather than during only one month or quarter. (e.g., testing 20 isolates per month at each sentinel site throughout the year). Ongoing sampling makes it more likely that newly emerging resistance or large changes in patterns of resistance will be detected early. If trends in susceptibility are to be reliably monitored over time, variations in the sentinel sites and sampling procedures should be minimised, to the extent possible.

SPECIAL STUDIES AS A COMPONENT OF STI SURVEILLANCE

Periodically, public health personnel or research collaborators may perform special studies to address important STI surveillance issues that are not part of routine case reporting or prevalence assessments.

Special studies

- Outbreak investigations
- Evaluation of STI syndromic management algorithms
- Rapid assessment of STI prevalence in defined populations using new diagnostic tests (e.g., urine PCR and ligase chain reaction (LCR) tests for chlamydia and gonorrhoea; PCR testing of genital ulcer specimens for chancroid, syphilis, and Herpes)
- National probability sample survey of STI prevalence using serologic tests for syphilis (and other STIs) and urine tests for chlamydia and gonorrhoea.
- Assessment of antimicrobial resistance in *Haemophilus ducreyi*
- Reported incidence and prevalence of STI-related complications:
  - PID
  - Ectopic pregnancy
  - Cervical cancer
- Prevalence of viral STIs (e.g., HSV-2, human papillomavirus [HPV], and hepatitis viruses)
- Prevalence of bacterial vaginosis and associated sequelae in defined populations
- Assessment of STI reported incidence and prevalence among persons who are HIV-positive, and of HIV prevalence among persons with other STIs
- Development and evaluation of STI screening criteria
- Assessment of health care-seeking behaviour and its relationship to underdetection and underreporting of STIs
- Public and private sector STI screening and reporting practices
- Country-specific estimates of reported incidence and prevalence of STIs
- Estimation of economic costs of STIs
Basic and advanced STI surveillance and the classification of HIV/AIDS epidemics
The STI surveillance system should be designed considering current systems of STI care, including the availability of diagnostic tests. The HIV epidemic state can also have implications for STI programme development and surveillance priorities. The options for STI surveillance based on these considerations are outlined below.

Basic and advanced STI surveillance activities
A basic level of STI surveillance activities should be instituted. These include the following:

Case reporting
- Syndromic reporting of urethral discharge (in males) and genital ulcers (in males and females) through sentinel sites or a system of universal reporting, and using minimum data elements
- Universal reporting of congenital syphilis cases. (The feasibility and utility of routine reporting of neonatal conjunctivitis/ophthalmia neonatorum has not been fully evaluated)

STI prevalence assessment and monitoring
Periodic prevalence assessments in vulnerable populations (e.g., female sex workers), which includes syphilis serologic testing, gonorrhoea testing, chlamydia testing, and examination for genital ulcer disease; and assessment of syphilis seroreactivity among antenatal or parturient women.

Assessment of syndrome aetiologies
Genital ulcer disease, urethral discharge, and vaginal discharge, about every three years

Special studies
Evaluation of STI syndromic management algorithms should be performed about every three years. An advanced level of STI surveillance activities can be performed if there is available more capacity and well-developed systems of clinical laboratory testing.

Case reporting
Etiologic case reporting of syphilis (by stage), gonorrhoea, chlamydia, and congenital Syphilis must be done.

Prevalence assessment and monitoring
Periodic or ongoing prevalence assessments are necessary in vulnerable populations (e.g., female sex workers) and the general population (e.g., women attending family planning clinics, antenatal and parturient women, military recruits), which includes syphilis serologic testing, testing for gonorrhoea, chlamydia, and trichomoniasis and examination for genital ulcer disease in some populations.

Antimicrobial resistance monitoring
Antimicrobial resistance for N. gonorrhoeae is required
Assessment of syndrome aetiologies
Genital ulcer disease, at least every three years (urethral discharge and vaginal discharge are usually adequately assessed by routine laboratory tests, but because of the difficulties of accurate laboratory diagnosis of primary syphilis and chancroid, genital ulcer disease may often be misdiagnosed and under reported)

Special studies
Of particular importance are investigations of outbreaks of diseases in countries where the reported incidence is low (e.g., syphilis and chancroid in most industrialised countries). Data on seroprevalence of HSV-2 through a population-based serosurvey or serosurveys of specific sub-populations can be useful, especially for countries beginning to consider HSV-2 prevention programmes. Knowledge of prevalence of bacterial vaginosis in some groups of pregnant women may assist in supporting recommendations for screening for this condition in women at risk for preterm delivery.

CLINICAL AND LABORATORY SERVICES

Clinical and laboratory services remain cornerstones of STI prevention and control. There needs to be accessible and timely client-oriented counselling, screening and treatment services of high quality.

Accessibility
The following recommendations are necessary for prompt access to high quality care:

- Clinics should be located so that they are readily accessible through public and private transportation.
- The general public should be able to easily determine how to obtain specialised STI services.
- Clinic hours and staffing should be sufficient to accommodate patients, with minimal patients turned away.
- A system to periodically assess clinic user (or patient) satisfaction with services should be in place.

Range of Services

- At a minimum, clinics should have the capability to accurately diagnose and treat bacterial STIs.
- Clinics should have the capacity to make prescriptions for medications for diseases diagnosed in the clinic.
- Clinics should provide counselling on primary prevention to all patients.
- Clinics providing Pap smears should have specific protocols for follow-up of abnormal results that include guidelines for colposcopy referral.
- Clinics providing pregnancy tests should have specific protocols for follow-up and referral of positive tests.
- Clinics should collaborate with immunization programs and viral hepatitis programs to provide hepatitis B vaccinations to those at risk.
Clinics should provide the basic range of HIV related services and, for patient convenience, should offer as many as possible on site (e.g., counseling and testing, partner services).

Confidential counseling and testing for HIV should be offered at the time of the STI visit so that patients do not have to visit separate clinics or make return visits.

Confidential counseling and testing for STIs, including HIV, should not be denied because a patient refuses other STI services.

Anonymous HIV testing should be available on site for patients requesting the service or at community sites convenient to patients.

Written policy and procedures should be in place for the referral of patients for HIV early intervention services (e.g., continuing medical evaluation, tuberculosis and immune system testing, treatment, and support group counseling).

When not offered on site, the mechanisms for referral should be established for relevant health services (e.g., family planning, prenatal, adult immunizations, drug counseling).

An efficient courier service to and from the laboratory should be available.

**CLINIC ENVIRONMENT**

**Facility**

- Waiting areas should contain accessible patient education (i.e., handouts, posters, pamphlets, or audiovisuals) that emphasizes risk reduction behaviors for the prevention of STIs, HIV, and viral hepatitis.
- Examination rooms should be clean and private and should have adequate equipment and supplies for physical examinations and specimen collection for both male and female patients.
- The number of examination rooms should be adequate to accommodate the number of clinicians (at least one room per clinician) and to serve patients promptly during the normal working day.

**Patient Considerations**

- Patient confidentiality must be maintained. Confidentiality should be promoted by using a system other than names when calling patients from waiting areas.
- Clinic personnel should be courteous and respectful of patients.
- Patients should be told what to expect during the clinic visit, including being told STIs for which they are being tested and the common ones for which they are not being tested.
- All clinic staff should develop and maintain cross-cultural awareness and display cultural sensitivity.
- An adequate portion of the clinic staff should have bilingual fluency that facilitates services to those patients who do not speak English.
- Clinics should assess the need for physical security during clinic sessions and have security protocols in place.
Patients are usually extremely anxious about any results for investigations taken. Lab turn around times should be fast and follow up appointments should be early.

Registration Process

Confidentiality

- Registration information should be obtained in a confidential manner.
- Information collected at the registration desk should be relevant: locating and demographic data, type of visit (referral, appointment, or walk-in); clerks should avoid discussing the medical reason for the visit including any symptoms or medical history.
- Patient address should be verified at every visit in the event that follow up is needed.

Procedure

- Telephone reports of test results must follow clinic procedures to ensure confidentiality.
- Clinics should have systems in place to assess and modify patient visits to assure minimal waiting.
- The “expected-in” file should be checked for every person at every visit as part of the registration process.
- Priority patients should be given preferential service.

Clinic Flow

Appointment and Walk-in Systems

- The responsibilities of the clinician will play a role in determining the number of clients needed in a clinic.
- Walk-in patients with genital ulcers, discharges, and women with abdominal pain or who are pregnant should be examined that day.
- Walk-in patients who are not examined within the day should be given a list of STI medical resources and eligibility requirements (e.g., urgent care clinics, family planning clinics, private physicians) and encouraged to call for a next-session appointment.

Clinic Flow

- Clinic flow should be designed so that the next available clinician sees the next patient registered.
- Patient stops should be kept to a minimum (ideally, not more than three—registration, clinical care, and an STI/HIV interviewing/counseling session, if
- Patient flow analysis should be conducted periodically to provide a systematic understanding of where bottlenecks in clinic flow occur.
**Medical Records**

- Medical records should contain sufficient demographic information to contact the patient and sufficient clinical evaluation information to readily interpret the examining clinician’s assessment and clinical findings.
- All procedures concerning content and filing of medical records should be in accordance with local legislation.
- STI programs should follow written procedures for the management of medical records that includes forms management, organization of the medical record, records security, and adherence to statutes for record retention.

**Clinic Manuals**

**Medical Protocols**

Clinic protocols or standard medical instructions for specific patient management should include:

1. patient evaluation;
2. management of STIs
3. medical consultation and referral;
4. follow-up after therapy;
5. counseling/education;
6. and management of sex partners.

- Protocols should include current recommended treatments for STIs.
- Emergency medical protocols should be current.
- Protocols for the safe handling of blood and body fluids (standard precautions) should be current and practical for most clinic situations.
- Current and signed standing orders for non-physician clinicians should be included if required or not prohibited by state laws and regulations (medical practice acts).

**Standard Precautions**

- Standard Precautions should be applied to (1) blood; (2) all body fluids, secretions, and excretions, except sweat, regardless of whether or not they contain visible blood; (3) broken skin; and, (4) mucous membranes. Standard Precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in health care settings.
- Protective barriers should be appropriate and available for the type of exposure anticipated and may include latex or vinyl examination gloves, gowns, masks, and protective eye wear.
- Needles and syringes should not be recapped or removed from disposable syringes.
Disposable syringes and other sharp items should be placed in puncture-resistant containers located in the immediate vicinity where venipuncture procedures take place.

Gloves should be worn during venipuncture to reduce the reported incidence of blood contamination, recognizing that they cannot prevent needle-stick injuries.

Clinicians and phlebotomists should change gloves between patients.

Gloves should not be worn outside the examination room or the laboratory.

Skin on hands or other parts of the body should be immediately and thoroughly washed if contaminated with blood or other body fluids. Hands should always be washed before and after the examination and before leaving the examination room.

Infectious waste should be incinerated or autoclaved before disposal.

A surveillance system should be established for injuries such as needle-sticks, percutaneous injuries, and mucous membrane contamination; protocols should specify collection of confidential information about the worker and about the source individual (if applicable and possible), and about the cause and type of injury, medical treatment, counseling, and follow-up.

Emergency Procedures

- One copy of an emergency protocol should be kept in the clinic manual and one copy with the emergency supplies.
- Emergency equipment, supplies, and medications should be updated frequently according to an established schedule to ensure that they are not depleted or expired. Emergency supplies should be sealed when not in use.
- All clinical staff members should be trained in cardiopulmonary resuscitation and should be able to respond appropriately in an emergency.
- Staff members should be trained in specific safety procedures for managing potentially violent or abusive persons in the clinic.
- Mock emergency drills should be held at least twice yearly to ensure that all staff members recognize emergencies, know their roles and responsibilities, know the location and contents of emergency supplies, can use all equipment properly, and follow established protocols.
- STI prevention programs should develop and implement policies and procedures to manage occupational exposures of health care workers.

Laboratory Management Structure

Laboratory Direction

- The laboratory director should be trained in appropriate laboratory techniques and safety procedures associated with handling infectious agents.
- The director should have experience in public health and an understanding of the needs of clinicians and staff. The director should ensure that the quality assurance committee’s recommendations for laboratory testing are implemented.
- The laboratory director may be on site or at the state or local health department for laboratories that have the exemption for limited public health testing.
- Staff members should be familiar with work plans and should receive periodic performance evaluations.
- Only personnel who have been advised of potential hazards and who meet specific requirements should be allowed to enter the laboratory.
- The director should ensure adequate staffing to manage the volume of rapid testing during peak testing hours, lunch, and employee vacations.
- Accurate and updated test procedures and biosafety manuals should be available to all laboratory employees.
- Policies should be established to ensure the confidential storage of laboratory requisitions or log books containing patients’ test results. Confidentiality statutes in each jurisdiction define the records that are protected from subpoena and may specify the time frame for retention and the method for destruction.

**Laboratory Services**

- Each clinic that provides STI services should have an on-site stat laboratory or capacity to perform stat tests.
- Point-of-care tests should only be used to provide immediate results and treatment to patients. If testing does not occur immediately, tests with greater sensitivity and specificity should be used.
- The stat laboratory should contain an appropriate number of brightfield and darkfield microscopes and adequate equipment, supplies, and reagents to process patient specimens rapidly.
- STI clinics should use routine and reference laboratory services, which further facilitate the diagnosis of STIs.

**Microbiological Procedures**

- Access to the laboratory should be limited to appropriate personnel and should be restricted when work with infectious agents is in progress.
- Work surfaces should be decontaminated daily, as well as immediately after a spill.
- All infectious waste should be decontaminated before disposal.
- Mouth pipetting is prohibited; mechanical pipetting devices are used.
- Eating, drinking, smoking, handling contact lenses, and applying cosmetics are not permitted in the work areas. Contact lens wearers in laboratories should also wear goggles or a face shield. Food is stored in cabinets or refrigerators designated for that purpose only, outside the work area.
- Thorough hand washing should be performed after handling infectious materials and before leaving the laboratory.
- Procedures to minimize the creation of splashes or aerosols should be followed. An insect and rodent control program should be in effect. Universal biohazard symbols should be posted on the laboratory door.
- Laboratory personnel should receive appropriate immunizations or screening for the agent handled or potentially present in the laboratory (e.g., hepatitis B vaccine or TB skin testing). Baseline serum samples for laboratory and other at-risk personnel should be collected and stored, when appropriate,
considering the agent(s) handled. Additional serum specimens may be collected periodically.

- A biosafety manual should be prepared or adopted. Personnel should be advised of special hazards and should be required to read and follow instructions on practices and procedures.
- Contaminated sharp items, including needles and syringes, should be promptly placed in punctureproof containers for decontamination.
- Laboratory personnel should receive appropriate training on the potential hazards associated with the work involved, the necessary precautions to prevent exposures, and exposure evaluation procedures. Personnel should receive periodic updates, or as necessary.
- Cultures, tissues, or specimens of body fluids should be placed in a container that prevents leakage during collection, handling, processing, storage, transport, or shipping.
- Laboratory equipment and work surfaces should be decontaminated with an appropriate disinfectant on a routine basis after work with infectious materials is finished, and especially after spills.
- Spills and accidents that result in overt exposures to infectious materials should be reported to the laboratory director immediately.

Safety Equipment (Primary Barriers)

- Biological safety cabinets, or other appropriate protective equipment should be used when procedures with a potential for creating infectious aerosols or splash are conducted, or high concentrations or large volumes of infectious agents are used.
- Face protection (goggles, mask, face shield or other splatter guards) should be used for anticipated splashes or sprays of infectious materials.
- Protective laboratory coats, gowns, smocks, or uniforms designated for lab use should be removed and left in the laboratory before leaving for non-laboratory areas.
- Examination gloves should be worn when handling infectious materials, contaminated surfaces or equipment. Gloves should be disposed of when contaminated, or when work with infectious materials is completed. Disposable gloves should not be washed or reused.

Laboratory Facilities (Secondary Barriers)

- Each laboratory should contain a sink for washing hands.
- The laboratory should be designed for easy cleaning.
- Bench tops should be impervious to water and resistant to acids, alkalis, organic solvents, and moderate heat.
- Furniture in the laboratory should be sturdy, with spaces between benches, cabinets, and equipment accessible for cleaning.
- If the laboratory has windows that open, they should be fitted with fly screens.
- A method for decontamination of infectious or regulated laboratory wastes should be available (e.g., autoclave, chemical disinfection, incinerator, or other approved decontamination system).
- An eyewash facility should be readily available.
Microbiological Practices

- All procedures should be consistent with recognized standard and specialized microbiologic practices.
- Biological safety cabinets, previously termed “hood,” (Class I or II) or other physical containment devices should be used during procedures in which infectious aerosols may be created.
- Any activity with the potential for creating aerosols (e.g., centrifugation of blood) should be performed in low-traffic areas in the laboratory.
- All testing should be performed under quality assurance guidelines specific for each test (e.g., control specimens, temperature, time).
- Safety equipment should include items for personal protection such as gloves, coats, face shields, and safety glasses.
- Cultures, tissues, or specimens of body fluids should be placed in a container that prevents leakage during collection, handling, processing, storage, transport, or shipping. Laboratory specimens should be placed in durable trays or containers for safe transport, even for short distances.

Procedures Manual

- The manual should include step-by-step descriptions of all methods; modifications of procedures should be initialed by the laboratory director.
- The manual should include criteria for laboratory specimen acceptability.
- Daily quality control records pertaining to test controls and to equipment, temperature, and speed of rotation should be noted in the manual.
- Procedures for quality control checks on new lots of reagents, whether purchased or prepared, should be noted in a special section.
- Instructions for routine tests and special studies should be documented in the manual.

Biosafety Manual

- The manual should include information on standard and special microbiologic practices.
- The biosafety manual should be regularly updated.

Venipuncture

- A continuing Quality Assurance program should be in place to monitor the venipuncture performance of STI staff.
- When labeling and transporting specimens, one should:
  - Print the patient’s name and date of birth (if known) or place a pre-printed label on the specimen tube after the blood has been collected. Include the date the specimen was drawn. To prevent the incorrect labeling of blood specimens do not pre-label blood collection tubes.
- Maintain blood specimens in an upright position with the stopper at the top, either by placing in a specimen rack or in a cardboard container. Pack the containers tightly so the specimens will be secure in transit.

- Blood specimens should be delivered to the laboratory for processing at the earliest practical time. Avoid leaving for extended periods in a car or similar place where temperatures may become excessively high or low. Also, make sure specimens remain in your care and that they are not handled by unauthorized persons.

- When blood specimens cannot be delivered to the laboratory on the day of collection, make sure they are stored upright in a refrigerator. Do not freeze, as haemolysis may occur, ruining the specimen.

**Reporting**

**Disease Morbidity**

- Clinics should promptly submit morbidity reports following the diagnosis of a case.
- Morbidity reports should be complete, legible, and checked for accuracy before submission.
- Clinic reporting systems should have the necessary safeguards to ensure the proper and non-duplicative reporting of laboratory results and diagnostic determinations.

**Partner Management**

To curb the spread of STIs and HIV in the community, partner management is required by offering prevention counselling and examination and/or treatment. Treating the exposed partners of the STI sufferers before any symptoms or actual diagnosis is reached is commonly being used. Frequently a significant length of time may elapse before a definitive diagnosis is made and this might facilitate further transmission of STI and hence HIV infections by the untreated persons to the general population. This type of post exposure treatment given to the partners of patients is voluntary and careful explanation and counselling should be given. A cost effectiveness study of using patient delivered partner treatment was compared to partner referral for chlamydial infections in women, showed that patient delivered partner treatment provides limited savings but leads to treatment for substantially more infected men than does partner referral. (Schillinger JA, Sternberg MR, Gift T. Cost effectiveness of Patient delivered partner treatment compared to partner referral for chlamydial infections in Women. Presented at 2002 National STI Prevention Conference. CDC, Atlanta)

Without the existence of effective contact tracing and good partner notification system, epidemiological treatment may not be possible. The most recent regular and causal partners of the STI patients are usually traced and contacted, the patients voluntary notify their partners to attend clinics for testing, counseling and treatment of the exposed STI.

Community based outreach programmes are used to find at-risk persons not identified by an infected index case or partner. They should evaluate or assess the
social networks that influence disease transmission in their area and target screening based upon program morbidity data, including information on core transmission groups.

They are used to assess which diseases are being transmitted within their jurisdiction and how, including partner selection patterns and other risk factors for infection.

Training and Professional Development

The strategy recommends STI training for local health care providers, medical students and other health professionals. STI prevention programmers should:

- STI prevention programs should have a systematic and regular method of assessing training needs and skills development of staff.
- perform a needs assessment within their STI prevention workforce
- be aware of areas of training and orientation needed for all staff members.
- evaluate training activities and effects on performance.
- conduct post-training monitoring and reinforcement.
- consider the mentoring process as an effective method for career development.

Training topics may include clinical and laboratory method;, behavioural intervention approaches; data management and analysis; community involvement techniques; social and behavioral assessment; health communication and evaluation.

Health Education and Behavioral Intervention

Effective health promotion interventions for control must be developed to prevent acquisition and transmission of STI, promote prompt health care seeking and risk reduction behaviour and facilitate the identification of sex partners and social contacts who may be infected with or at risk of acquiring STIs. Behavioural change through prevention efforts is currently the only effective way to stem the further spread of HIV on a large scale however not all behavioural change efforts are of equal efficacy, especially in low HIV prevalence settings. (Effective Prevention Strategies in Low HIV prevalence settings. 2001 UNAIDS Best Practice Key materials).

The Global Health Sector Strategy for HIV/AIDS developed by the World Health Organisation describes six core components in relation to prevention and health promotion response to HIV/AIDS:

- Providing support for the development of broad based programmes to educate the general population about HIV/AIDS.
- Promoting safer and responsible sexual behaviour and practices, including as appropriate delaying the onset of sexual activity, practicing abstinence, reducing the number of sexual partners, and using condoms;
- Targeting interventions where they will yield the most benefit, for example where risk and vulnerability converge through behaviours, locations and group membership;
- Promoting harm reduction among injecting drug users, such as wide access to sterile injecting equipment and drug dependence treatment and outreach services to help reduce frequency of injecting drug use;
- Providing widely accessible HIV testing and counselling;
- Implementing programmes to prevent mother-to-child HIV transmission


The Health Division set up a committee to draft a ‘National sexual health policy for Malta’. This policy describes what can be done to promote sexual health and behaviour change:

“Health education and promotion have to be the foundation for improving sexual health. Effective health education needs a two pronged approach, aimed in a general way at all young people and also at those identified as at particularly “high risk” (Adler, BMJ 1997; 314).

Prevention and education services need to be targeted at vulnerable groups and those that are harder to reach. These groups include: non-school attendees; girls attending existing services for pregnancy testing or contraception; children of ‘teenage’ parents; teenagers living in high risk areas; and young people in care. Innovative approaches such as outreach services may be needed to reach some of these groups.

National campaigns that are aimed at raising awareness on Sexual Health will be sustained and enhanced, giving people correct information about their sexual health and services available. National information campaigns are to provide a backdrop for more targeted local prevention work. It is imperative that a wide range of prevention programmes are established that take into account local circumstances, ethics, moral and cultural values, and which include information, education and communication.

The Health Promotion Department will be responsible for planning, managing and evaluating these campaigns, following discussions within the Committee for Sexually Transmitted Infections (STIPC), which has representatives from the key stakeholders working in this area. The Department will consequently provide clear, evidence-based and user-specific information through a variety of methods so that individuals can make informed decisions about their sexual health, thus preventing negative consequences.

Furthermore, the initiatives will sustain and strengthen the sense of responsibility among the population for its own health and stimulate awareness of the necessity to seek immediately medical care immediately when signs of sexually transmitted infections appear. They will enhance sexual health education among youth and promotion of healthy life-styles.

Successful information strategies must be well co-ordinated, well-targeted and consistently accessible making use of new media and technology.
The Health Promotion Department, in collaboration with its educational and social partners will create programmes and initiatives that aim to help people change their behaviour in order to protect their sexual health. These programmes and initiatives will:

- include workshops in different settings and aimed at specific target groups.
- involve face-to-face small group work with peer support
- are based on theories of behaviour change
- are sensitive to local culture and context
- address cognitive and attitudinal factors
- build motivation
- address gender issues
- focus on development of risk reduction skills such as sexual assertiveness and discussing and negotiating condom use.

Initiatives that are aimed at raising public awareness have, by their very nature, to utilise the media. Due to the sensitive nature of Sexual Health Promotion, particular attention has to be given to respect the opinions of the public in general, yet deliver clear and precise information.

It is therefore recommended that mass media campaigns on sexual health be discussed between all the sectors concerned prior to launch.” (A National Sexual Health Policy for Malta – draft)

**Epidemiological and clinical research**

Exploration into innovative approaches to STI/HIV prevention, surveillance and modification of sexual behavior and research on the diagnosis and treatment of STI are essential as part of a strategy on the control of STI and HIV.

**VACCINE PREVENTABLE DISEASES CONTROL STRATEGY**

**MEASLES**

The global Measles Mortality Reduction and Regional Elimination Strategic Plan 2001-2005 (WHO) aimed at reducing the number of measles deaths by half by 2005 (compared with 1999 estimates) to achieve and maintain interruption of indigenous measles transmission in large geographical areas with established elimination goals. The WHO targets (Target 7) have declared that:

- By 2003, all member states should have implemented measles elimination strategies and appropriate surveillance activities
- By 2007, measles elimination should be achieved in all member states
By 2010, measles elimination should be certified in the WHO region. Additionally, the WHO measles elimination strategy recommends that it aims:

- To reduce the estimated proportion of measles susceptible in the population to the following low levels:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4 years</td>
<td>15%</td>
</tr>
<tr>
<td>5-9 years</td>
<td>10%</td>
</tr>
<tr>
<td>10-14</td>
<td>5%</td>
</tr>
<tr>
<td>Adults</td>
<td>5%</td>
</tr>
</tbody>
</table>

- To maintain these low levels until 2007

From data available on local vaccine coverage, the rate of coverage for the second MMR vaccine in Malta is still low. Hence, there is a real need to achieve higher coverage rates if the WHO target is to be achieved. The reasons for this may be a vaccine reporting apathy. However, not enough promotion of the importance of the two-dose regime has been given in the past.

The recommended strategies for reducing measles morbidity and mortality include:

- to provide two doses of measles vaccine to successive cohorts of infants at as early an age as possible – free of charge at point of use
- to continue to promote the importance of a two dose schedule for measles
- to enhance measles surveillance with integration of epidemiological and laboratory information
- to improve the management of every measles case

(Biellik RJ, Clements CJ (1997)

**Importance of rapid case identification**
Prompt recognition, reporting, and investigation of measles cases are important because the spread of the disease can be limited with early case identification and vaccination of susceptible contacts.

**Importance of surveillance**
Continuous surveillance and prompt investigation of cases and contacts help to halt the spread of the disease. Information obtained through surveillance is also used to assess progress towards disease elimination goals. Surveillance data are used to characterise persons, groups, or areas in which additional efforts are required to reduce disease reported incidence.

**Disease reduction goals**
This strategy has the goal of eliminating the transmission of endemic measles strains. It is also important to prevent imported strains of the measles virus from establishing endemic chains of transmission. Rapid detection of cases is necessary so that appropriate control measures can be quickly implemented.
Laboratory testing
Because measles is uncommon in Malta, clinical evidence is not sufficient to confirm a case of measles. Many clinicians have never seen a case of measles, and most patients who present with measles–like illness today do not have measles. Therefore it is crucial to use laboratory diagnosis to confirm the actual measles cases.

Reporting
Measles is statutory notifiable and medical practitioners are obliged to notify cases under the Public Health Act. Case-based surveillance should be conducted and every case should be reported and investigated immediately.

Vaccination
Measles vaccine is often or usually incorporated together with mumps and rubella vaccine as a combined Vaccine (MMR). The Advisory Committee on Immunization Practices (ACIP) recommendations for routine vaccination indicates a first dose at 12 to 15 months of age with a second dose at 7 years. It is important to maintain long-term high vaccination coverage with a two-dose strategy.

Enhancing surveillance
As the reported incidence of measles declines, additional efforts may be required to ensure that appropriate and timely diagnosis of rash illnesses and reporting of suspected cases continues. In addition, the rapid investigation and reporting of all suspected cases and recording of vaccination history and from where acquired for all cases will become increasingly important.

The activities listed below can improve the detection and reporting of measles cases and improve the comprehensiveness and quality of reporting:

Reviewing death certificates
Mortality data are available through the registration of death certificates. These are kept at the Health Information Unit. Mortality data should be reviewed each year to identify deaths that may be due to measles. Any previously unreported cases identified through this review should be thoroughly investigated and reported.

Investigating contacts
Determining the source or chain of disease transmission; identifying all contacts (household, childcare, and other close contacts), and following up with susceptible persons may reveal previously undiagnosed and unreported cases.

Active surveillance
Active surveillance for measles disease should be conducted in hospitals to identify unreported cases.

Special projects
Special projects such as reviewing hospital administrative databases (Hospital Activity Analysis) and emergency department logs to identify rash illnesses that may have been unreported cases of measles can be used to evaluate surveillance sensitivity and completeness of reporting.
Case investigation
All reports of suspected measles cases should be investigated immediately. Essential components of case investigation include isolating the case while infectious; establishing a diagnosis of measles; obtaining immunization histories for confirmed cases; identifying sources of infection; assessing potential for transmission; and obtaining specimens for viral isolation.

Establishing a diagnosis of measles
Necessary clinical information must be obtained to establish whether or not a reported case meets the clinical case definition. Laboratory confirmation is essential for all outbreaks and all isolated (sporadic) cases (those cases that are not part of a known outbreak).

Obtaining accurate and complete immunization histories on all confirmed cases.
Measles case investigations should include complete immunization histories that document all administered doses of measles-containing vaccines. All confirmed case-patients should then be classified as recipients of one dose of measles containing vaccine (as MMR, measles-rubella, or measles vaccine), two doses, three doses, or no doses of vaccine. The age of vaccination for each dose and the interval between doses should be noted.

Identifying the source of infection.
Efforts should be made to identify the source of infection for every confirmed case of measles. Case-patients or their caregivers should be asked about contact with other known cases. In outbreak settings, such histories can often be obtained. When no history of contact with a known case can be found, opportunities for exposure to unknown cases should be sought. Such exposures may occur in schools (especially high schools with foreign exchange students); during air travel; through other contact with foreign visitors; while visiting tourist locations (casinos, resorts, theme parks) or in health-care settings. Unless a history of exposure to a known case within 7–21 days prior to onset of rash in the case is confirmed, case-patients or their caregivers should be closely queried about all these possibilities.

Assessing potential for transmission and identify contacts.
Transmission is particularly likely in households, schools, and other institutions (colleges, prisons, etc.), and in health-care settings. As part of the case investigation, the potential for further transmission should be assessed and contacts of the case-patient during the infectious period (4 days before to 4 days after onset of rash) should be identified. In general, contacts who have not received two doses of a measles containing-vaccine on or after the first birthday separated by at least 1 month are considered susceptible. These susceptible contacts are at risk for infection and further transmission to others and should be vaccinated as quickly as possible.

Obtaining specimens for viral isolation.
Efforts should be made to obtain specimens (urine or nasopharyngeal mucus) for virus isolation from all cases at the time of the initial investigation pending serological test results should not delay early action.
Organizing an outbreak investigation

1. Identification of a team leader for case investigators is a first step so that at least one person knows about all the new cases called in that day and what still needs to be done. Daily briefings are a good way of keeping the whole staff informed of the status of the investigation.

2. Keeping the logbook in one well-defined location, preferably with folders with the case investigations of all the cases that have been reported. It is useful to have one stack of all confirmed cases; one stack of suspected or probable cases awaiting further investigation or lab results, and a separate stack of discarded cases.

3. Establishing protocols for control measures necessary for all likely situations (exposure in a childcare center, school, doctor’s office, workplace, etc.). It is important to clearly define who (local health officer, immunization program manager) will make the decision to proceed when a case investigator identifies a situation that might require major investments of health department resources (such as vaccinating a whole school).

General guidelines for outbreak control

Tracking what information is collected and what still needs to be collected.
Tracking is easily accomplished by constructing a line listing of cases; allowing ready identification of known and unknown data and ensuring complete case investigation.

Identifying the population affected by the outbreak.
In the course of the outbreak investigation, every suspected case (whether reported through active or passive surveillance or identified through contact investigation) should be investigated thoroughly, as described above.

Enhancing surveillance for measles.
As part of any outbreak response, active surveillance for measles should be established to assure timely reporting of suspected cases in the population known to be affected by the outbreak. Additionnally other segments of the community that may be at high risk of exposure or in whom vaccination coverage is known to be low need to be covered. Hospital emergency rooms and physicians serving affected communities are usually recruited to participate in active surveillance.

Outbreak control
The primary strategy for control of measles outbreaks is achieving a high level of immunity in the population in which the outbreak is occurring. In practice, the population affected is usually rather narrowly defined (such as one or more schools). High immunity in the population is obtained by achieving high coverage with 2 doses of measles vaccine in the affected population. Persons who cannot readily document measles immunity should be vaccinated or excluded from the setting (school, hospital, etc.).
Effective communication must be in place with health professionals, schools, childcare facilities and community organisations as well as the wider community, about public health control measures for measles.

DIPHTHERIA, TETANUS and POLIO

According to the Health 21 WHO Targets, Target 7,

- By 2010, the reported incidence of diphtheria in the European Region should not exceed 0.1 per 100,000 population
- By 2005, neonatal tetanus should be eliminated
- By 2000 polio transmission in the region should stop and by 2003 polio-free setting should be certified in all countries. In fact Europe was declared free of polio during the year 2003.

The coverage rate for vaccination remains high – over 90%, the last cases of polio and diphtheria were reported in the 60s and the last reported case of congenital tetanus was reported in 1989. Hence, the WHO target has been achieved as long as current levels are maintained. In the local situation, there remains only the need to maintain the high coverage rates and continuous surveillance.

MUMPS

The current WHO Targets state that by 2010, the reported incidence of mumps in the European Region should not exceed 1 per 100,000 population. Immunisation coverage rates are above 84% locally and the number of cases which are notified are low. However, in the year 2000 there were 376 cases (99 per 100,000). It is worth noting, however, that these occurred mainly in unvaccinated children. Notable also were some vaccine failures and some wrong diagnoses. In spite of this epidemic, the WHO Target should be achieved if current levels are maintained.

Importance of rapid case identification
Identification of suspected or confirmed cases of mumps is important in the initiation of control measures to prevent the spread of the disease among susceptible persons.

Importance of surveillance
Information obtained through surveillance is used to follow disease trends in the population; to assess progress towards disease reduction goals and to characterise populations requiring additional disease control measures.

Laboratory testing
Acute mumps infection can be confirmed by the presence of serum mumps IgM; a significant rise in IgG antibody titre in acute and convalescent serum specimens; a positive mumps virus culture, or the detection of virus by reverse transcription-polymerase chain reaction (RT-PCR). Sera should be collected as soon as possible after the onset of parotitis for IgM testing or as the acute specimen for examining seroconversion. The convalescent specimen for IgG detection should be drawn
about 2 weeks later. IgM antibodies are detectable within the first few days of illness, reach a maximum level about a week after onset of symptoms and remain elevated for several weeks or months.

The virus may be isolated from the buccal mucosa from 7 days before until 9 days after salivary enlargement and from the urine during the period from 6 days before to 15 days after the onset of parotitis. Immunity to mumps may be documented by the presence of serum IgG mumps specific antibodies by EIA.

**Reporting**
Mumps is a statutory notifiable disease in Malta.

**Vaccination**
Live attenuated mumps virus vaccine is recommended for persons older than 12 months of age unless medically contraindicated or unless a person is immune as defined by documentation of one of the following:

- Physician-diagnosed mumps
- Immunization with at least one dose of mumps vaccine on or after the first birthday
- Serological evidence of mumps immunity
- Birth before 1957

With the common use of MMR combined vaccine for measles vaccination under the currently recommended two dose schedule, most children and adolescents now receive two doses of mumps vaccine.

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**Enhancing surveillance**

**Obtaining accurate and complete immunization histories**
Mumps case investigations should include complete immunization histories that document any doses of mumps-containing vaccine. Acceptable proof of vaccination is a documented administration of one dose of live mumps vaccine virus. Vaccination histories may be obtained from schools, medical providers or on immunization records provided by the case-patient. Verbal history of receipt of mumps vaccine is not considered adequate proof of vaccination.

**Expanding laboratory testing**
Experience suggests that routine use of laboratory testing for confirmation of mumps cases and of case investigation will result in a marked reduction in reported cases of mumps. Therefore, if mumps is suspected, laboratory testing should be performed in order to confirm or rule out the case. If a case is confirmed, a case investigation should be conducted.

**Promoting awareness**
Outbreaks of mumps have occurred among highly vaccinated populations; therefore, mumps should not be ruled out on the assumption that individuals are already immune due to vaccination.
Active surveillance
In outbreak settings, active surveillance for mumps should be maintained for at least two incubation periods (50 days) following parotitis onset of the last case. Two incubation periods allow for the identification of transmission from sub-clinical infection or unrecognized cases.

A number of other activities can improve the detection and reporting of cases and improve the comprehensiveness and quality of reporting.

Case investigation

Establishing a diagnosis of mumps.
Because clinical diagnosis of mumps may be unreliable, cases of mumps should be laboratory confirmed. Not all cases of parotitis, especially sporadic ones, are due to mumps infection; however, mumps is the only known cause of epidemic parotitis. Experience indicates that case investigations combined with laboratory testing will result in many suspected mumps cases being discarded.

Obtaining accurate, complete immunization histories.
Mumps case investigations should include complete immunization histories that document any doses of mumps-containing vaccine. Recent outbreaks of mumps have occurred among older children and adults, many who had already received at least one dose of mumps-containing vaccine. All vaccination histories should be verified by documentation of administration of one dose of live mumps vaccine virus. Verbal history of receipt of mumps vaccine is not considered adequate proof of vaccination.

Identifying the source of infection.
Efforts should be made to identify the source of infection for every confirmed case of mumps. Case-patients should be asked about contact with other known cases. When no history of contact with a known case can be elicited, opportunities for exposure to unknown cases should be sought. After determining when and where transmission likely occurred, investigative efforts should be directed to locations visited.

Assessing potential transmission and identifying contacts.
As part of the case investigation, the potential for further transmission should be assessed, and contacts of the case-patient during the infectious period (2 days before until 9 days after onset of parotitis) should be identified.

Obtaining specimens for virus isolation.
Efforts should be made to obtain clinical specimens (throat swabs, urine, and CSF) for viral isolation for all cases or at least some cases in each outbreak at the time of the initial investigation. Virus may be isolated from the buccal mucosa from 7 days before until 9 days after parotitis and from urine during the period from 6 days before to 15 days after the onset of parotitis.

Outbreak control
Mumps is the only known cause of epidemic parotitis. The main strategy for controlling a mumps outbreak is to define the at-risk population and a transmission setting, and to rapidly identify and vaccinate susceptible persons or, if a
contraindication exists, to exclude susceptible persons from the setting to prevent exposure and transmission.

Adequate proof of mumps immunity includes

a) written documentation of receipt of > 1 dose of a mumps-containing vaccine administered on or after the first birthday,

b) laboratory evidence of immunity,

c) birth before 1957, or

d) documentation of physician-diagnosed mumps.

Persons who do not meet the above criteria are considered susceptible. Mumps vaccine, preferably as MMR, should be administered to susceptible persons. Although mumps vaccination has not been shown to be effective in preventing mumps in persons already infected, it will prevent infection in those persons who are not infected. If susceptible persons can be vaccinated early in the course of an outbreak, they can be protected. However, cases are expected to continue to occur among newly vaccinated persons who are already infected for at least 3 weeks following vaccination because of the long incubation period for mumps.

As with all vaccines, there are some individuals who will not gain immunity after receipt of mumps vaccine. Because vaccine effectiveness is not 100%, a second dose of mumps containing vaccine is recommended during outbreak situations for individuals who have received only one dose previously. Studies have shown a trend toward a lower attack rate among children who have received two doses of mumps vaccine as opposed to those who have received one dose. Furthermore, birth before 1957 do not guarantee mumps immunity and, in outbreak settings, vaccination with a mumps containing vaccine should be considered for those born before 1957 who may be exposed to mumps and who may be susceptible.

Exclusion of susceptible students from schools affected by a mumps outbreak (and other, unaffected schools judged by local public health authorities to be at risk for transmission of disease) should be considered among the means to control mumps outbreaks. Once vaccinated, students can be readmitted to school. Students who have been exempted from mumps vaccine for medical, religious, or other reasons should be excluded until at least 26 days after the onset of parotitis in the last person with mumps in the affected school.

**PERTUSSIS**

The WHO Target states that by 2010, the reported incidence of pertussis in the European Region should not exceed 1 per 100,000 population. Immunisation coverage rates are above 92% locally and the numbers of cases which are notified are low. Hence the WHO Target should be achieved if current levels are maintained.

**Importance of rapid case identification**

Early diagnosis and antimicrobial treatment of cases may lessen the severity of symptoms and limit the period of communicability. If suspicion of pertussis is low (sporadic case; no epidemiologic linkage to a confirmed pertussis case; no
paroxysms, etc.), investigators may wait for laboratory confirmation of the case to initiate the investigation and intervention.

However, if pertussis is strongly suspected (in a child with acute paroxysmal cough illness of less than 14 days duration at the time of report, or in an infant with apnoea, or in a child who is epidemiologically linked to a confirmed case, etc.), then an investigation to identify and recommend prophylaxis to close contacts should be initiated even before the case is confirmed. Prompt identification of cases will help to identify unvaccinated or under-vaccinated children among contacts. These children can be vaccinated, and antimicrobial prophylaxis administered. Because pertussis can be severe or life-threatening among young infants, early antimicrobial prophylaxis of contacts and infants in households with an infant is important.

**Importance of surveillance**

Information obtained through surveillance is used to identify persons or areas in which additional efforts are required to decrease disease. Surveillance data also help promptly identify outbreaks in which vaccination of unvaccinated or under-vaccinated children and antimicrobial prophylaxis of contacts can help limit the spread of disease. Effectiveness of outbreak control strategies is monitored by using surveillance data. Investigation of pertussis cases, including an analysis of vaccination status by age, can be used to determine whether the problem is predominantly failure to vaccinate or vaccine failure. Surveillance data also provide information that is used in evaluating vaccination policies at the state or national level. With licencing of several DTaP vaccines for use in infants, surveillance is even more important. Surveillance data are being used to monitor the effectiveness of these new vaccines.

**Laboratory testing**

Determining who has pertussis and who does not is often difficult, even in outbreaks. Whenever possible, all suspected cases of pertussis should have a nasopharyngeal swab or aspirate obtained for bacterial culture. Among household contacts of culture-confirmed cases, diagnosis of pertussis is usually based on a characteristic history and physical examination. Laboratory tests may be particularly useful for sporadic cases or for young infants, and in all cases with a history of prior vaccination, including older children and adults.

**Reporting**

Pertussis is a statutory notifiable illness in Malta.

**Vaccination**

Currently, the whole cell pertussis vaccine (DTP) is given by the public sector and the acellular pertussis vaccine (DTaP) is available in the private sector. The five DTP doses should be administered to children at age 2, 4, 6, and 15–18 months.

**Enhancing surveillance**

A number of surveillance activities can improve the detection and reporting of cases, and can improve the comprehensiveness and quality of reporting.

**Heightening the awareness of clinicians about pertussis, especially in adolescents and adults**
Several recent studies suggest that pertussis is a common cause of cough illness of > 7 days duration in adolescents and adults. Because the disease is often atypical in presentation and many clinicians think of pertussis as a disease only of children, the diagnosis may not be considered. Cases among adolescents and adults are epidemiologically important because of their role in exposing infants and young children to pertussis.

Assuring that diagnostic testing for pertussis is being performed regularly
Pertussis cases are expected to occur in all communities, and several years with no reported cases from a locality may reflect failure of diagnosis or failure of reporting rather than a true absence of pertussis. The level of diagnostic testing being undertaken can be evaluated by reviewing the number of pertussis diagnostic tests (e.g., cultures) submitted by a jurisdiction.

Monitoring surveillance indicators
Regular monitoring of surveillance indicators may identify specific areas of the surveillance and reporting system that need improvement. Important indicators for the thoroughness of case investigation and the timeliness of reporting include:

- The proportion of probable and confirmed cases with complete information on vaccination history (dates of pertussis vaccination, pertussis vaccine type and manufacturer) and duration of cough.
- Median interval between onset of cough and notification of state or local public health authorities in probable and confirmed cases.

Case investigation
Laboratory, hospital, and clinic records should be reviewed during case investigations in order to collect important information such as description of the clinical illness, outcome, immunization status, dates of vaccination, and vaccine lot numbers.

Treatment and chemoprophylaxis
The spread of pertussis can be limited by decreasing the infectivity of the patient and by protecting close contacts.

Prophylaxis of all household members and other close contacts may prevent or minimize transmission, although confirmatory data from controlled clinical trials are lacking. A non-household close contact may be described as a non-household member who has direct contact with respiratory secretions from the case (an explosive cough or sneeze in the face; sharing food; sharing eating utensils during a meal; kissing; mouth-to-mouth resuscitation or conducting a full medical exam including examination of the nose and throat).

Vaccination
All close contacts < 7 years of age who have not received three doses of vaccine should complete the series with the minimal intervals (minimum age for first dose is 6 weeks; minimum intervals from dose one to two and from dose two to three are 4 weeks).
**Outbreak control**
If cases are occurring among young infants, consideration should be given to lowering the age of vaccination of infants; the first dose of DTaP or whole cell DTP can be given as early as 6 weeks of age, with a minimum interval of 4 weeks between each of the first 3 doses. Implementation of an accelerated schedule might cause difficulties in achieving full coverage with other antigens, and efforts should be made to assure timely completion of all recommended childhood vaccinations.

Adult formulations of acellular pertussis vaccine may be available in the future, but at present their use must be considered investigational.

During outbreaks, symptomatic persons should be considered contagious until 3 weeks after the onset of paroxysmal cough and should be excluded from school or childcare until after receiving antimicrobial therapy for 5 days. Health-care workers with pertussis or health-care workers who are symptomatic after exposure to a case should be relieved from direct patient contact from the beginning of the catarrhal stage through the third week after onset of paroxysms, or until 5 days after the start of antimicrobial treatment.

**HAEMOPHILUS INFLUENZAE TYPE B**

The WHO Target states that by 2010, the reported incidence in the European Region of reported H. influenzae type B (Hib) should not exceed 1 per 100,000 population.

Immunisation coverage rates are above 93% and the numbers of cases which are notified are believed to be very low. Hence the WHO Target should be achieved if current levels are maintained. A careful watch eye is being maintained on the local situation to see if the resurgence seen in other countries will appear in Malta.

**Importance of rapid case identification**
Rapid case identification is important for early administration of Hib vaccine and, if needed, for chemoprophylaxis to household and childcare classroom contacts of cases. In addition, early notification of Hib invasive disease cases in children aged < 5 years is needed to obtain the Hib isolate before it is discarded so that it can be serotyped.

**Importance of surveillance**
Surveillance information is used to monitor the effectiveness of immunization programmes and vaccines and to assess progress towards disease elimination.

**Laboratory testing**

**Culture**
Confirming a case of Hib requires culturing and isolating the bacterium from a normally sterile body site.
**Serotype testing (serotyping)**
Serotyping distinguishes encapsulated strains, including Hib, from encapsulated strains which cannot be typed.

**Antigen Detection**
Because the type b capsular antigen can be detected in body fluids including urine, blood, and CSF of patients, clinicians often request a rapid antigen detection test for diagnosis of Hib disease. Antigen detection may be used as an adjunct to culture, particularly in the diagnosis of patients who have received antimicrobial agents before specimens are obtained for culture.

**Subtyping**
Although not available locally, subtyping the Hib bacterium on the basis of outer membrane proteins, lipopolysaccharides, enzyme electrophoresis, or pulsed-gel electrophoresis on DNA can be performed for epidemiologic purposes.

**Reporting**
Hib is a statutory notifiable diseases.

**Vaccination**
Based on the recommended schedule, infants should receive three primary doses of Hib conjugate vaccine at ages 2, 4, and 6 months.

**Enhancing surveillance**
Elimination of childhood Hib disease requires participation by all levels of the healthcare system in rapid identification, assessment, and prompt reporting of all cases and optimal use of these data to prevent disease among unvaccinated or undervaccinated populations.

**Assuring that all isolates from children are serotyped**
Because Hib vaccines protect against serotype b organisms only, serotype should be determined and reported for all *Haemophilus influenzae* isolates. It is particularly important that serotype be reported for cases among children < 5 years of age; the second highest priority is for cases among children 5–14 years of age. This information is used to determine whether a case indicates a vaccine failure (i.e., a vaccinated person who gets the disease) or a failure to vaccinate.

**Monitoring surveillance indicators**
Regular monitoring of surveillance indicators including reporting dates; time intervals between diagnosis and reporting, and completeness of reporting may identify specific areas of the surveillance system that need improvement. Important indicators to evaluate the completeness and overall quality of the surveillance system include:

- Proportion of Hib cases with known serotype among children < 5 and among children 5 to 14 years of age
- Proportion of Hib cases with complete vaccination information (date, manufacturer, lot number)

**Monitoring the reported incidence of invasive disease due to non-type b *H. influenzae***
Data from active surveillance sites suggest an expected rate of invasive disease due to non-type b *H. influenzae* to be 1.0 per 100,000 children aged < 5 years. This rate may be used as a surveillance indicator for monitoring the quality or for reporting *H. influenzae* type b invasive disease cases. Although limited data are available on temporal and geographic variability in reported incidence of non-type b invasive diseases, use of this surveillance indicator is encouraged.

**Case investigation**
Laboratory, hospital, and clinic records should be reviewed during case investigation in order to collect important information such as serotype; immunization status; dates of vaccination; vaccine lot numbers and clinical illness description and outcome.

**Investigating contacts**
Identification of young children who are household or childcare contacts of Hib invasive disease cases and assessment of their vaccination status may help identify persons who should receive antimicrobial prophylaxis and who need to be immunized.

In households with one or more infants < 12 months of age, with a child 1–3 years of age who is inadequately vaccinated, or with an immunocompromised child, all household contacts, including the index case-patient, should receive rifampin prophylaxis. The recommended dose is 20 mg/kg as a single daily dose (maximal daily dose 600 mg) for 4 days. Neonates (< 1 month of age) should receive 10 mg/kg once daily for 4 days. The risk of Hib invasive disease for child care centre contacts of a Hib invasive disease case is thought to be lower than that for a susceptible household contact.

**RUBELLA**

The WHO Target states that for the European Region that by 2010, the reported incidence of congenital rubella should not exceed 0.01 per 100,000 live births. Immunisation coverage rates for rubella are above 84% and the data available for the second dose is being reviewed as it is believed to be unreliable. The last reported case of Congenital Rubella Syndrome occurred in 1996 and the numbers of rubella cases, which are notified, are low. The WHO Target should be achieved if current levels are maintained, assuming they are correct.

**Importance of rapid case identification**
Prompt identification of suspected, probable, or confirmed cases of rubella is important to avoid exposure of susceptible pregnant women. Rapid case identification and investigations are also important so that control measures can be initiated to prevent the spread of the disease.

**Importance of surveillance**
Surveillance data are used to identify groups of persons or areas in which additional disease control efforts (such as immunization) are required to reduce disease reported incidence and to evaluate the effectiveness of disease prevention programmes and policies.
Laboratory testing
Diagnostic tests used to confirm acute or recent rubella infection or CRS include serologic testing and virus cultures (not available locally). Because many rash illnesses may mimic rubella infection and 20% to 50% of rubella infections may be subclinical, laboratory testing is the only way to confirm the diagnosis. Acute rubella infection can be confirmed by the presence of serum rubella IgM; a significant rise in IgG antibody titre in acute and convalescent serum specimens, positive rubella virus culture, or detection of the rubella virus by RT-PCR. Sera should be collected as early as possible (within 7-10 days) after onset of illness, and again at least 7–14 days (preferably 14-21 days) later. IgM antibodies may not be detectable before day 5 after rash onset. In case of a negative rubella IgM and IgG in specimens taken before day 5, repeat serologic testing. Virus may be isolated from 1 week before to 2 weeks after rash onset. However, maximum viral shedding is up to day 4 after rash onset. False-positive serum rubella IgM tests have occurred in persons with parvovirus infections or positive heterophile test (indicating infectious mononucleosis) or with a positive rheumatoid factor (indicating rheumatologic disease). When a false-positive rubella IgM is considered, a rheumatoid factor, parvovirus IgM, and heterophile test should be used to rule out a false-positive rubella IgM test result.

Immunity to rubella may be documented by the presence of serum IgG rubella specific antibodies by enzyme immunoassay; hemagglutination inhibition; latex agglutination, and immunofluorescent antibody assays.

Reporting
Rubella is a statutory notifiable disease in Malta.

Vaccination
Live attenuated rubella virus vaccine is recommended for persons older than 12 months of age unless one of these conditions applies:

- a medical contraindication such as severe immunodeficiency or pregnancy;
- documented evidence of rubella immunity as defined by serological evidence (e.g., a positive serum rubella IgG);
- documented immunization with at least one dose of rubella vaccine on or after first birthday;
- or birth before 1957 (except women who could become pregnant).

Clinical diagnosis of rubella is unreliable and should not be considered in assessing immune status. With use of combined measles-mumps-rubella (MMR) for measles vaccination under the currently recommended two-dose schedule, most children and adolescents now receive two doses of rubella vaccine. Rubella vaccine, as MMR, is recommended at 12–15 months of age. A second dose of MMR is recommended at 7 years of age.

Health-care providers who treat women of childbearing age should routinely determine rubella immunity and vaccinate those who are susceptible and not pregnant. Women found to be susceptible during pregnancy should be vaccinated immediately post-partum.
Enhancing surveillance

The following activities may be undertaken to improve the detection and reporting of cases and to improve the comprehensiveness and quality of surveillance for rubella.

*Promoting awareness that rubella and CRS still occur*
The last case of congenital rubella was reported in 1996. The possibility of future cases cannot be excluded.

*Promoting awareness of high-risks groups for rubella infection and CRS births*
Rubella vaccine is not administered routinely in many countries and in others rubella vaccine was only recently added to the childhood immunization schedule. Thus, many persons who received childhood immunizations in other countries may never have had the opportunity to receive the rubella vaccine. Health-care providers should have a heightened index of suspicion of rubella and CRS births in individuals from countries without a history of routine rubella vaccination programmes.

*Expanding laboratory testing*
Serologic tests for measles and rubella should be done sequentially. All suspected cases of measles that have a negative serum measles IgM test should be tested for rubella IgM and IgG. All suspected cases of rubella should be tested for serum rubella IgM and if negative, and measles is suspected, tested for measles IgM.

*Searching laboratory records*
Audits of laboratory records may provide reliable evidence of previously unreported serologically confirmed or culture-confirmed cases of rubella. This activity is particularly important during outbreaks in order to better define the scope of disease transmission in an area.

*Conducting active surveillance*
In outbreak settings, active surveillance for rubella should be maintained for at least two incubation periods following rash onset of the last case. Two incubation periods allow for the identification of transmission from a subclinical case. Surveillance for CRS should be implemented when confirmed or probable rubella cases are documented in a setting where pregnant women might have been exposed.

*Monitoring surveillance indicators*
Regular monitoring of surveillance indicators, including time intervals between diagnosis and reporting and completeness of reporting, may identify specific areas of the surveillance and reporting system that need improvement. Indicators that should be monitored include:

- The proportion of confirmed cases reported with complete information
- The median interval between rash onset and notification of a public health authority, for confirmed cases
- The proportion of confirmed cases that are laboratory confirmed
- The proportion of confirmed cases among women of child-bearing age with known pregnancy status
The goal of rubella case investigation is to prevent exposure of susceptible pregnant women to rubella and thereby prevent cases of CRS. It is essential that potentially susceptible, exposed pregnant women be identified, evaluated, and counseled.

**Establishing a diagnosis of rubella**
Because clinical diagnosis of rubella is unreliable, cases must be laboratory confirmed, especially if the reported cases are not epidemiologically linked to a laboratory-confirmed case.

The occurrence of a rubella-like illness in recently vaccinated persons can pose particular difficulties in the outbreak setting. Ten percent of recipients of rubella containing vaccine may develop fever and rash approximately 1 week after vaccination, and vaccination of susceptible persons results in production of IgM antibody that cannot be distinguished from that resulting from natural infection.

Persons vaccinated within 7 days of a rubella-like illness who are IgM positive should be classified as confirmed cases of wild-type rubella if they are epidemiologically linked to a laboratory-confirmed case. Molecular typing techniques can distinguish between vaccine and wild virus rash for those vaccinated 7–10 days before rash onset. Specimens for molecular typing should be obtained within 4 days of rash onset.

**Obtaining accurate pregnancy status for adult women**
All women of childbearing age who are contacts of a case should have their pregnancy status determined. If a pregnant woman is infected with rubella, immediate medical consultation is necessary. If a pregnant woman is susceptible to rubella, precautions should be taken to prevent any exposure to persons infected with rubella. These activities may include ensuring rubella immunity of household contacts and isolation of women from settings where rubella virus has been identified.

**Obtaining accurate and complete immunization histories**
Rubella case investigations should include complete immunization histories that document any doses of rubella-containing vaccine.

**Identifying the source of infection**
Efforts should be made to identify the source of infection for every confirmed case of rubella. Case-patients or their caregivers should be asked about contact with other known cases; in outbreak settings, such histories may often be obtained. Since many rubella cases (20%–50%) are asymptomatic, identification of a source will not always be possible. When no history of contact with a known case can be elicited, opportunities for exposure to unidentified cases in high-risk populations should be sought. Investigating sources of exposure should be directed to the place and time period in which transmission would have occurred. Such exposures may occur in colleges or universities, workplaces, and communities where unvaccinated persons congregate.

**Assessing potential for transmission and identify contacts**
In recent outbreaks, transmission has occurred in households, communities, workplaces, and prisons. As part of the case investigation, the potential for further
transmission should be assessed, and contacts (particularly susceptible pregnant women) of the case-patient during the infectious period (7 days before to 7 days after the onset of rash) should be identified.

**Obtaining specimens for virus isolation**
Efforts should be made to obtain clinical specimens (throat swabs and urine) for virus isolation from all cases (or from at least some cases in each outbreak) at the time of the initial investigation.

**Conducting laboratory evaluation of exposed pregnant women**
When a pregnant woman is exposed to rubella, a blood specimen should be taken as soon as possible and tested for rubella IgG and IgM antibody.

**Establishing pregnancy outcome registry for women diagnosed with rubella during pregnancy**
All pregnant women infected with rubella during pregnancy should be followed to document the pregnancy outcome (e.g. CRS, normal infant).

**Outbreak control**
An aggressive response to rubella outbreaks may interrupt disease transmission and will increase vaccination coverage among persons who might otherwise not be protected. The main strategies are to define at-risk populations; to ensure that susceptible persons are rapidly vaccinated (or excluded from exposure if a contraindication to vaccination exists), and to maintain active surveillance to permit modification of control measures if the situation changes.

Control measures should be implemented as soon as at least one case of rubella is confirmed in a community. In settings where pregnant women may be exposed, control measures should begin as soon as rubella is suspected and should not be postponed until laboratory confirmation. All persons at risk who cannot readily provide laboratory evidence of immunity or a documented history of vaccination or after their first birthday should be considered susceptible and should be vaccinated if no contraindications exist.

In schools and other educational institutions, exclusion of persons without valid evidence of immunity may limit disease transmission and may help rapidly raise the vaccination level in the target population. All persons who have been exempted from rubella vaccination for medical, religious, or other reasons also should be excluded from attendance. Exclusion should continue until 3 weeks after the onset of rash of the last reported case in the outbreak setting. Mandatory exclusion and vaccination of adults should be practiced in rubella outbreaks in medical settings because pregnant women may be exposed.

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**VARICELLA AND PNEUMOCOCCUS**

The mere fact that an effective vaccine is available is not sufficient grounds for introducing it in the National Immunisation Schedule. It is true that the number of reported cases of chickenpox is on the increase and that the morbidity caused by pneumococcus is not insignificant. Both these vaccines are gaining popularity abroad
and are available in the private sector in Malta. A local study on the cost-effectiveness of introducing these vaccines locally is to be carried out to be followed by consideration of the opportunity costs vis-a-vis other effective preventive measures that may be introduced will be carefully made. Meanwhile, efforts to improve the diagnostic confirmation of all suspected cases of varicella will be considered.
RECOMMENDATIONS

Communicable Diseases Services

1. The Disease Surveillance Unit, being the national surveillance centre is to have adequate infrastructure to carry out surveillance and to manage communicable diseases.

2. To foster and strengthen collaborative links between microbiologists, clinical physicians and epidemiologists in order to optimise the use of laboratory data and clinical services.

3. To improve the diagnostic facilities available at the national laboratories in relation to the diagnosis of communicable diseases.

4. To develop training programmes for epidemiologists, clinical physicians and microbiologists to further enhance their experience in dealing with communicable diseases.

Food borne illness Control

1. The strategy for control needs to encompass all sectors of the community including health care providers, health authorities, clinical laboratories, public health laboratories, industry and the consumer to make it a shared responsibility.

2. The basis of the strategy includes:
   
   a. Prioritisation of food supply as an essential public health function
   b. Improving surveillance and outbreak control
   c. Linking food borne illness surveillance to food and animal health surveillance
   d. Improving reporting of food borne illness
   e. Establishing a national laboratory network
   f. Investing in food safety research
   g. Adoption of uniform food safety legislation
   h. Implementing behavioural and attitudinal changes to food safety by the consumer, food industry and government -agencies
   i. Increasing awareness to food borne illness in the public and industry sector
3. The Strategy needs to focus on all stages of food chain:
   a. Primary Production
      i. Develop safe rearing environments and management practices
      ii. Set up farm programmes for risk animals
      iii. Set up a system to address hazards
      iv. Provide safe transportation and distribution systems
      v. Minimise food borne pathogens in animals for slaughter
   b. Manufacture and Retail
      i. Introduce a risk management system for the food continuum
      ii. Introduce a risk-based food safety programme throughout the food continuum
      iii. Integrate inspection procedures
      iv. Conduct baseline studies to identify best practices for all sectors
      v. Evaluate existing food handler training courses
      vi. Develop and evaluate food safety employee training programmes
      vii. Educate the consumer
   c. Consumer role in preventing food borne illness
      i. Educate the consumer, targeting food safety messages
      ii. Introduce food hygiene concepts in school curriculae
      iii. Emphasise consumer responsibilities and entitlements

HEPATITIS C CONTROL STRATEGY

The four priority areas for action are:

1. Reducing hepatitis C transmission in the community
   a. Support population health initiatives, such as needle and syringe programmes that are proven in reducing transmission of hepatitis C and innovative approaches that enhance educational opportunities for reducing hepatitis C transmission.
   b. Aim to broaden access to the means of preventing transmission and re-infection for people with or at risk of hepatitis C.
   c. Enhance capacity and support peer educators and peer based drug user groups to reduce the transmission of hepatitis C in the context of holistic health and well being.
   d. Develop and implement a best-practice framework to guide hepatitis C education and prevention.
   e. Augment the skills of workers in health care services for people with or at risk of hepatitis C.
   f. Encourage health care service providers, including pharmacists, to participate in hepatitis C education and prevention, in partnership with affected communities.
   g. Promote nationally consistent occupational health and safety standards for the health care; tattooing; skin-penetration and other industries with elevated risks of exposure.
h. Support the implementation of nationally consistent standards for hepatitis C education and prevention in custodial settings.

i. Develop nationally consistent protocols for notifications and data collection to improve our understanding of the epidemiology and natural history of hepatitis C and in monitoring and responding to changing patterns in risk behaviours and their contexts.

j. Foster and maintain nationally consistent surveillance of occupational exposure in health care settings.

2. Treatment of hepatitis C infection

a. Ensure equivalent access for people with hepatitis C seeking treatment

b. Provide the best treatments available, supported by patient education and counseling, to reduce current and long-term morbidity, particularly for people with hepatitis C who are most likely to progress to advanced liver disease.

c. Expand knowledge, understanding and choices in relation to hepatitis C treatments.

d. Provide continuing training and education on developments in clinical treatment to health care workers dealing with people who have hepatitis C.

e. Support increased access for people with hepatitis C in custodial settings who are seeking treatment and to provide accessible information about hepatitis C treatments.

f. Develop and implement a nationally accepted testing policy for hepatitis C.

g. Support comprehensive peer education programs to encourage people with hepatitis C who inject drugs to engage with the primary health care sector.

h. Investigate the development of post-exposure prophylactic therapies and promote access to these therapies for people with acute infection.

i. Investigate the impacts of multiple hepatitis C infections on morbidity and mortality and promote the development of suitable therapies.

3. Health maintenance, care and support for people affected by hepatitis C

a. Support comprehensive peer education programs to help people with hepatitis C who inject drugs engage with the primary health care sector and so increase their opportunities to protect and maintain their health.

b. Ensure that health education and care and support services have the continuing resources and training needed to provide high quality, evidence-based interventions.

c. Ensure that health education and maintenance messages are based on the best available evidence.

d. Promote and increase the accessibility of vaccination against hepatitis A and hepatitis B for people with hepatitis C who are not immune to these viruses.
e. Increase access to appropriate health education and care and support services for people with hepatitis C in custodial settings. This involves education of custodial staff, provision for health monitoring, vaccination against hepatitis A and hepatitis B, and provision of suitable diets.

f. Provide access to information, education and support for both professional and non-professional carers.

g. Incorporate information on hepatitis C health education and care and support in clinical training and education programmes for health care workers.

h. Promote training and education of dental health care workers to ensure that they understand the specific dental health needs of people with hepatitis C, infection control procedures and non-discriminatory work practices.

4. Preventing discrimination and reducing stigma and isolation.
   a. Establish a supportive political framework for the elimination of discrimination, stigma and isolation experienced by people affected by hepatitis C.
   b. Develop a supportive legislative framework that recognises the rights and needs of people affected by hepatitis C.
   c. Ensure that health care services are accessible to and tolerant of the individual needs and dignity of people affected by hepatitis C.
   d. Train and support health care workers to ensure that they do not engage in discriminatory behaviour towards people affected by hepatitis C.
   e. Implement the Standard Precautions for infection control, universally, within health care and other skin-penetration settings.
   f. Promote general community education that increases blood awareness and debunks the myths surrounding hepatitis C, thereby reducing the stigma and isolation experienced by people affected by the virus.
   g. Implement equitable prevention, treatment, care and support systems in custodial settings for people with hepatitis C.

MENINGOCOCCAL DISEASE CONTROL STRATEGY

Prioritisation is targeted to the early detection and treatment to decrease complications and mortality from the disease.

1. Management prior to referral to hospital
   a. Increase awareness of medical practitioners and the general public to the symptoms of the disease.
   b. Encourage early treatment by the administration of early antibiotics

2. Management on admission to hospital
   a. Early intervention and effective antibiotic therapy
   b. Investigation to verify diagnosis
c. Informing public health to take appropriate action
3. Laboratory diagnosis. It is essential that methods for confirmation of
diagnosis by innovative methods are available.
4. Discharge and post discharge planning including counselling is to be available.
5. Surveillance. Ensure constant acute surveillance to enable prompt
identification of cases and early public health intervention.
6. Management of sporadic and outbreak cases by giving appropriate chemo
prophylaxis

**STI AND HIV/AIDS CONTROL STRATEGY**

1. Surveillance
   a. Develop a process of case reporting. This can take the form of :
      i. Syndromic case reporting
      ii. Aetiological case reporting
      iii. Reporting perinatally acquired STIs
      iv. Sentinel Surveillance
   b. Prevalence assessment and monitoring trends
   c. Assessment of syndrome aetiologies to provide data for syndromic
      management and assist in the interpretation of case reports
   d. Monitoring of antimicrobial resistance of drugs used for the treatment
      of gonococcal infections
   e. Performing special studies on STIs

2. Clinical and Laboratory Services
   There needs to be an accessible service of suitable range. This should be client
   oriented and provide counselling, screening and treatment services of high quality
   at an appropriate clinic environment. The laboratory services should have the
   appropriate range of testing according to specific protocols and special
   precautions, practices and techniques. Processing of services and delivery of
   results must be timely.

3. Partner Management
   Offering of prevention counselling and examination and /or treatment

4. Training and Professional Development
   Training for local health care providers, medical students, epidemiologists and
   other health care providers is required.

5. Health Education and Behavioural Intervention
   The development of effective health promotional intervention for control is to
   be developed in line with the National Sexual Health Policy for Malta

6. Epidemiological and Clinical Research
   Exploration into innovative approaches for STI /HIV prevention is to be available.
VACCINE PREVENTABLE DISEASES CONTROL STRATEGY

Immunisation programmes have been given a high priority for Malta for decades. The older vaccine preventable disease programmes such as polio, diphteria, pertussis and tetanus have achieved an acceptable level of success and require mostly maintenance and enhanced surveillance to retain these health gains. The present high priority vaccine preventable diseases are measles, hepatitis B and congenital rubella. In brief the main objectives for the main vaccine preventable diseases are:

### MEASLES

The target for measles is to reduce the estimated proportion of measles susceptibles in the population to low levels:

- 1 - 4 years: 15%
- 5 - 9 years: 10%
- 10 - 14 years: 5%
- Adults: 5%

by 2007 and to maintain these low levels in order to become part of a declared measles free in the European Region. To achieve this it is essential to:

- provide two doses of measles vaccine to successive cohorts of infants at as an early stage as possible. This is to remain free of charge at the point of use
- enhance measles surveillance with integration of epidemiological and laboratory information
- improve the management of every measles case

### HEPATITIS B

By 2010, the WHO European Target for reported incidence of Hepatitis B carriage is a reduction by 80%. Thus the current level (approximately 1%) is to be reduced through the integration of the Hepatitis B vaccination in the national child immunisation programme.

Thus, as of the year 2003, the vaccination schedule in the first year of life has been adjusted to include 3 doses of Hepatitis B vaccine for all infants. The next steps will involve promotion and maintenance of interest as well as surveillance of the condition.

### RUBELLA

Congenital Rubella is at an all time low. Maintaining the current coverage rates and active surveillance; rapid case identification; promoting awareness that cases can still occur coupled with laboratory confirmation of cases need to continue.
Here, the aim is to maintain the high vaccine coverage rates (approximately 95%) in order to achieve the WHO targets hence continuous promotion of vaccination coupled with active surveillance are essential.

**Mumps**
Enhance surveillance of cases is essential for the rapid detection of cases and investigation of sporadic and outbreak cases. Laboratory testing should be used more to confirm cases. Continuous promotion to enhance vaccination is needed.

**Pertussis**
Fortunately Malta did not suffer from the major controversy which affected this vaccine in UK in the 70s. The coverage rates are acceptable but may be higher. Enhancing surveillance is essential. The awareness of clinicians about pertussis needs to be heightened. These need to also be assured that diagnostic testing for pertussis is being performed regularly and cases are monitored to ensure that vaccination of contacts of cases is carried out.

**HEAMOPHILUS INFLUENZA TYPE B**

The coverage rates of the Hib vaccine are acceptable but may be higher. We may need to improve our coverage rates to achieve the WHO targets. Surveillance also needs to be enhanced combined with laboratory confirmation of suspected cases.

**VARICELLA AND PNEUMOCOCCUS VACCINES**

Establishing surveillance by reporting individual cases, reporting aggregate cases, sentinel, institutions and school-based surveillance are essential to estimate the prevalence of these conditions. A cost benefit analysis will be required to decide if these vaccines will be introduced in the national immunisation schedule.
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