Clefts of the lip may vary from a notch in the coloured part of the lip (the vermilion) to a complete split reaching up into the nose. They can occur on one side (a unilateral cleft) or both sides (bilateral clefts).

The palate is made up of two parts – the hard (bony) palate at the front and the soft (muscular) palate at the back, ending with the uvula. Cleft palate can occur alone or in combination with cleft lip. It may involve one side of the mouth or (more rarely) the midline when it is associated with higher rates of other birth defects. Small clefts affecting only the soft palate at the back are often not diagnosed at birth, especially if the overlying membranes remain intact (sub mucous clefts). These milder defects often present in the first years of life when associated speech problems become more apparent.

Babies with clefts may have a variety of difficulties with feeding, speech development, hearing problems and dental conditions. Sometimes, affected babies also have a small jaw (Pierre Robin Syndrome), leading to severe swallowing difficulties.

The birth of a baby with a cleft lip can cause a mix of emotions for parents who need information and support. On the clinical side, successful treatment involves a multidisciplinary approach, including nursing, speech therapy, paediatrics, and plastic surgery.

Causes of orofacial clefts include both environmental and genetic factors, although these are not well understood. Factors include:

- A family history of facial clefts.
- Maternal use of medicines, alcohol and tobacco.
- Deficiency of folic acid before and during early pregnancy.
- Congenital constriction bands.
- Cleft lip and/or cleft palate have been associated with over 400 different syndromes and affected children are at increased risk of having additional congenital anomalies.

Reported detection rates by antenatal ultrasound range from 25% to 43%

Detection is more common for defects involving a cleft lip than isolated cleft palate. Polyhydramnios or difficulty visualising the fetal stomach may be suggestive of a facial cleft. This is probably due to leakage of amniotic fluid through the cleft and back into the amniotic cavity without being swallowed. Following the diagnosis of a cleft, the ultrasonographer will review the fetus in detail for additional anomalies. Chromosome analysis may also be recommended.

Clefting involving the palate alone appears to be a related but different condition to clefting involving the lip (or lip and palate) and there is evidence of interesting differences between them.
Cleft lip and palate

For the 5 years 1998-2002, a total of 318 cases of cleft lip and/or palate have been reported to CARIS, giving a gross rate of about 20 per 10,000 births. Among these cases, 164 (52%) had a cleft lip (plus or minus cleft palate) and 154 (48%) had cleft palate alone.

Cleft lip (with or without cleft palate)

What do we know from the literature?

- About 70% of cases of cleft lip occur together with cleft palate.
- Cleft lip occurs unilaterally and on the left in 80% of cases.
- The condition is found in about 1 per 1000 live births, although this figure may be changing as increasing numbers are identified antenatally.
- Boys are affected more commonly than girls.
- Additional birth defects are found in 13% of cases.
- There is an association with maternal use of antiepileptic drugs.

The picture in Wales

Rates of cleft lip (with or without cleft palate) in Wales are slightly higher than the most recent rates published by EUROCAT (based on over 6 million births around Europe) but these differences are not statistically significant. The CARIS rate for Wales is 1 case of cleft lip in 1299 live births.

CARIS data supports published figures in that:

- 110/164 (67%) of cases of cleft lip were associated with cleft palate
- 110/164 (67%) of cleft lip cases were male (compared with 52% of all births in Wales)
- The presence of anomalies was suggested antenatally in 80/164 (49%) of cases.

Against the published figures, CARIS data showed a higher than expected rate of additional birth defects (41% of cases).

<table>
<thead>
<tr>
<th>Cleft lip and cleft palate</th>
<th>Liveborn cases per 10,000 livebirths (95%CIs)</th>
<th>Cases that are liveborn/stillborn/TOP/fetal deaths (20+ weeks gestation) per 10000 live &amp; stillbirths (95%CIs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARIS data 1998-2002</td>
<td>7.7 (6.4-9.1)</td>
<td>9.5 (8.0-11.0)</td>
</tr>
<tr>
<td>(156,000 births)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EUROCAT data 1995 - 1999</td>
<td>7.4</td>
<td>8.5</td>
</tr>
<tr>
<td>(6 million births)</td>
<td></td>
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</tbody>
</table>
Isolated cleft palate
What do we know from the literature?

- Isolated cleft palate is less common than cleft lip, and is diagnosed in about 1 per 2000 live births.
- Diagnosis may not be made at birth if the cleft is small and at the back of the palate. Diagnosed rates by the age of 5 are therefore approximately twice that at birth.
- Girls are more often affected than boys.
- Other birth defects are found in 50% of cases.
- The condition itself remains difficult to identify antenatally although other associated anomalies may be picked up through ultrasound scanning.
- Isolated cleft palate is not associated with maternal use of antiepileptic drugs.

The picture in Wales
CARIS data for isolated cleft palate in Wales give a rate of 1:1429 livebirths. Rates are significantly higher than the most recent figures available from EUROCAT.

Rates are generally higher on the western side of Wales, with the highest in the North West (although these are not statistically significantly higher than for Wales as a whole).

<table>
<thead>
<tr>
<th>Isolated cleft palate</th>
<th>Liveborn cases per 10,000 livebirths (95% CIs)</th>
<th>Cases that are liveborn/stillborn/TOP/fetal deaths per 10000 live &amp; stillbirths (95% CIs)</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>EUROCAT data 1995 - 1999 (6 million births)</td>
<td>4.7</td>
<td>5.3</td>
</tr>
</tbody>
</table>

What are the possible reasons for these rates?

- Better diagnosis at birth, with earlier identification of cases that would not normally be picked up until later in childhood.

Data from the Register in Mainz in Germany show high rates for cleft palate, similar to Wales. We know that an intensive infant surveillance programme is used there, ensuring that the majority of cases are picked up early. It is possible that the apparent excess of cases in Wales could be due to better early detection of palate defects, especially those affecting the soft palate. (This is the type most difficult to diagnose early on).
With only 5 years of data, numbers for the different types of cleft palate remain small and difficult to interpret. Interestingly, for North Wales, 35% of cases of isolated cleft palate are recorded as affecting only the soft palate – a higher proportion than for Wales as a whole (28%). Identification rates beyond the first year of life are not readily available to complete the picture.

- **Misreporting of high arched palates (a normal variation) as central clefts.** There is no evidence of misreporting. The pattern of central clefts around Wales does not show an excess in the North West of the country.
- **A true excess in isolated cleft palate in Wales.** If this is the case, genetic and/or environmental factors may play a part. Certainly this would fit with the picture in Finland, where there are clearly demarcated areas with high rates of cleft palate, thought to be related to patterns of migration in the past.

Apart from the higher rates, CARIS data also showed that

- 52% of cases are female (compared to 49% of all births in Wales).
- 74% of cases are associated with other congenital anomalies – as for cleft lip, this is higher than might be expected from the literature.
- For central cleft palate, 83% of cases were associated with other anomalies (cases with this type of cleft are known to have higher levels of additional defects).
- The presence of anomalies was suggested antenatally in 42/154 (27%) of cases.

**Syndromes associated with clefting**

Underlying syndromes were identified in 29/164 (18%) of cases of cleft lip and 60/154 (39%) of cases of isolated cleft palate.

Where information is available on the type of isolated cleft palate, syndromes were identified in:

- 19/45 (42%) cases of central cleft
- 7/17 (41%) cases of hard and soft cleft
- 15/43 (35%) cases of soft palate cleft

Pierre Robin syndrome is the most common underlying syndrome, affecting 29/318 cases. Smith Lemli Opitz syndrome was found in 6 cases. Although not a true syndrome, congenital constriction bands were found in 6 cases.

Chromosomal disorders were present in 26/164 (16%) cases of cleft lip and 28/154 (18%) cases of cleft palate alone. The types of chromosomal disorder found include

- 22 cases trisomy 13 (Patau syndrome)
- 12 cases triploidy/polyplody
- 8 cases trisomy 18 (Edward syndrome)
- 4 cases sex chromosome anomalies
- 2 cases trisomy 21 (Down Syndrome)
- 10 cases other chromosomal defects
Other anomalies

Underlying chromosomal disorders account for many of the anomalies associated with orofacial clefting. The graph illustrates the frequency of various broad groups of anomalies in all cases of cleft lip/palate reported to CARIS, and also indicates whether they are associated with an underlying chromosomal defect. Interestingly, about half are not associated with chromosomal anomalies.

Musculoskeletal anomalies are the largest group associated with orofacial clefts. Over half of these relate to other anomalies of the skull, face and neck. Common limb anomalies include poly/syndactyly, limb reduction defects and non postural talipes. Cardiac septal defects account for three quarters of the heart defects.

Outcome+survival

Overall, 73% of cases of cleft lip and/or palate were liveborn and of these, 94% survived their first year of life (just over two thirds of all cases reported). Within these figures, the survival outcome for cases of isolated cleft palate was slightly poorer than for cases involving cleft lip, although these differences are not statistically significant.

The presence of an underlying chromosomal defect has a major impact on outcome.

- For cases involving cleft lip:
  - liveborn rates were 31% with an underlying chromosomal disorder but 86% without.
  - for liveborn cases, 1/5 cases with a chromosomal defect (20%) survived to 1 year of age, compared to 115/117 (98%) without.

- For cases of isolated cleft palate:
  - liveborn rates were 39% with an underlying chromosomal disorder and 79% without.
  - for liveborn cases, 6/11 cases with a chromosomal defect (55%) survived to 1 year of age, compared to 97/100 (97%) without.