Pancreatic cancer has poor survival. Most patients are diagnosed late, when surgery is not possible. Even when diagnosed early, the outlook is still poor, even if surgery is possible. Pancreatic cancer is relatively resistant to radiotherapy and chemotherapy. Many patients present with poor fitness, so cannot tolerate available treatments. Lifestyle factors increasing risk are smoking and alcohol.

### Early detection challenges

Patients present late, often due to a lack of symptoms. Tumours in the head of the pancreas cause jaundice, which does produce symptoms (dark urine and yellow skin). However, tumours in the body and tail of the pancreas produce only non-specific symptoms such as back pain, heartburn and bloating. Pancreatic cancer has a characteristic poor vasculature (blood supply) which reduces take-up of imaging contrast media and means that the tumours do not stand out in images making them challenging to detect.

It is known that pre-cursor lesions occur before pancreatic cancer develops. There are two main types of lesion – cystic lesions and PanIN (Pancreatic Intraepithelial Neoplasia) lesions. Not all cystic lesions develop into cancer, whereas PanIN lesions have the potential to become cancer. Cystic lesions are detected easily on a CT scan. However, it is challenging to determine which will become malignant even when biopsied. PanIN lesions are less easy to detect on a CT scan because they are microscopic and often spread across multiple sites in the pancreas. Also, it is difficult to determine the risk of PanIN lesions becoming malignant within a given timeframe.

### Opportunities

Challenges present opportunities to improve outcomes.

- Research is needed to investigate novel methods for detection of asymptomatic pancreatic cancer to enable screening.
- A method is needed to enable risk-stratification of cystic pre-cursor lesions, i.e. determining the risk of whether a particular lesion will become malignant. Ideally this would be a non-invasive method. Currently it is challenging to assess the risk of malignancy even once a biopsy has been taken.
- An approach is needed to enable PanIN lesions to be visualised non-invasively since they are difficult to detect on CT scans. Once one PanIN lesion is found, it is important to find all lesions since they are typically spread throughout the pancreas.
- A risk stratification method for PanIN lesions is needed to determine if they are at high risk of becoming malignant. This information is critical for surgery and treatment planning.

For more information visit [www.cancerresearchuk.org](http://www.cancerresearchuk.org). To discuss opportunities contact EDadmin@hermes.cam.ac.uk