Slide 1

Thank you very much for inviting us today. My name is Dr Emma Turner and I am the trial co-ordinator of CAP. There are couple of other members of the team here today as well, including Professor Richard Martin – the lead investigator.

We are very honoured to be able to present the results of our world-leading trial – Does screening for prostate cancer using the Prostate Specific Antigen (PSA) blood test saves lives? s*ome people think a national screening programme should be introduced and some don't.*

This trial could only have happened because of the long-established ONS and NHS and the extensive record linkage systems that we have access to in this country.

Slide 2

Prostate cancer is a major UK public health issue because in the UK 1 in 8 men will be diagnosed with the disease, making it is the most common cancer and the 2nd commonest cause of cancer death in males.

Globally, prostate cancer caused an estimated 6 million years of life lost in 2016. This is forecast to rise to 12 million by 2040.

Slide 3

Screening is with a blood test for levels of a protein called PSA that circulate in the blood, this is a universally used test in the detection of prostate cancer. But **screening is more than just a PSA** test. Men who have a raised level undergo a biopsy. A biopsy is a procedure where needles take small samples of tissue from the prostate to make the diagnosis. Biopsy is associated with side effects, for example, around 3 in 100 men get a serious infection that requires them going to hospital. And most men suffer major side effects as a result of the treatment of prostate cancer.

The benefits are likely to be small, as you may have heard 'most men die **with** rather than **of** prostate cancer'. Therefore, given the small reduction in deaths as a result of screening, off-set by the side effects of biopsy and treatment for example surgery can result in incontinence, the balance of benefits against harms **of screening for prostate cancer** is unclear.

Slide 4

Our team set up the largest-ever trial to investigate whether a **one-off screen** can prevent men from dying of prostate cancer while reducing the chance of side effects.

It is unlikely that such a trial would be possible anywhere else in the world because information systems are not as **comprehensive** across primary and secondary care and across the whole population.

Using these information systems, we were able to recruit over 400K men aged 50-69 across England and Wales, representing 8% of the population of this age group. The results of our trial were published in 2018 and have already influenced health policy in the UK, USA and Sweden. These new *policies **encourage** individualised decision-making about screening* that will help to avoid harms to men from **unnecessary screening** and could save an estimated £1 billion/year in NHS costs.

Slide 5

We followed over 400,000 men who were aged 50 to 69 between 2001 and 2009 from 573 GP practices. Half the men were randomized to be invited for a PSA screen - the intervention group, and half the men underwent standard NHS treatment, **which is effectively no screening** - the control group. All men were treated if prostate cancer was diagnosed.

Using ONS death notification we were able to look at the number of prostate cancer deaths after an average time of ten years follow-up. Many men live long lives with a diagnosed prostate cancer, so we needed long follow-up.

The extensive, complete and long-term follow-up of these men is only possible because of the **publicly funded national healthcare system** – the UK NHS – and because of the ONS and NHS Digital information systems.

These information systems gave us comprehensive data on cancer diagnoses, deaths and costs to the NHS. Thus, very long –term and cost-effective follow-up **of the outcomes from screening was enabled**, this represents value for money. Through working with ONS we had extremely low dropout rates even after 10 years of less than 1%. On average many other trials lose 10-20% of participants over such a long follow-up.

Slide 6

The major outcomes we were interested in were prostate cancer diagnosis, death and NHS costs. By working with ONS/NHS Digital we were able to link the GP information on over 99.9% of the 408K men to records held by the ONS / NHS Digital. All detected prostate cancers were followed up by our collaborators, Public Health England & the Welsh Cancer Intelligence & Surveillance Unit. Cancer registrations and death certificates were validated by a detailed medical record review and we are conducting an ongoing budget impact analysis to estimate the costs to the NHS using Hospital Episode Statistics & the Patient Episode Database for Wales.

Slide 7

Alongside this trial we undertook several validation studies to demonstrate the **incredible value** of ONS & NHS Digital data and published these validations to show other academics the **opportunities and value** of using these data.

Slide 8 – so to the results…

We looked at the number of prostate cancers after an average time of ten years follow-up.

The number of cases of prostate cancer in the screened group was higher than in the control group. 43/1,000 compared to 36/1,000 or an extra 7 prostate cancers per thousand from screening.

However, the crucial finding was that there was little difference in the number of men who died of prostate cancer between the screened and control groups. 549 out of 189K or 30 in 10,000 men died in the screened group and 647 out of 219K or 31 in 10,000 in the control group.

There was 1 less death for 10,000 men screened – therefore the number of men required to be screened to save one life was 10,000.

Slide 9

The trial had major international scientific impact, being published in the Journal of the American Medical Association (JAMA) and the New England Journal of Medicine (NEJM), both journals with worldwide readership of researchers, clinicians and policy-makers. The paper was ranked as in the top 1% of all published research outputs with an online tracker covering over 12 million outputs since early 2012 – an indication of the quality and quantity of online attention.

Slide 10

There was lots of press and media coverage, and these are just 3 examples of the print media headlines. To extend the impact we worked with the PolicyBristol team at the University of Bristol to produce several videos for clinicians and the public to explain our results which can be found on our YouTube channel.

Slide 11

The trial *has already* had major influence on NHS guidelines,

on the advice to men given by CRUK on their website,

on advice issued by the Royal College of GPs on the day the trial was published and,

on guidelines prepared for urological surgeons.

Slide 12

The trial has also had a major influence on guidelines issued by the **major public health body** in the USA which advised that the decision about screening is a complex one and men should be carefully counselled about the benefits and harms of screening and so make a fully informed decision about whether to be screened or not.

And in Sweden the trial led the National Board of Health to advise a no screening policy.

Slide 13

This major trial, **one of the largest-ever conducted in any field**, was only possible through the ONS & NHS Digital information systems –which contain high quality data with good population coverage.

Health policy changes due to the trial, **which now encourage individualised shared decision making rather than routine screening**, will help to avoid harms to men and reduce **unnecessary** NHS costs, in addition to the costs saved internationally via global take up of the results such as in Sweden and the USA.

Slide 14 – be enthusiastic and upbeat

We would like to thank our collaborators with whom we have worked closely (ONS, NHS Digital, Public Health England – with who we have had many meetings discussing cancer registration data, the Welsh Cancer Intelligence & Surveillance Unit and the SAIL Secure Databank in Swansea), our funders (Cancer Research UK – who have been incredibly supportive throughout this trial, the National Institute for Health Research, and the Department of Health), patients and staff in the NHS and the CAP trial group,

…. without all of whom this **large and impactful trial** would not have been possible.

Thank you very much.