

# D-mannose to prevent recurrent urinary tract infections

<b>Submission date</b> 12/11/2018	<b>Recruitment status</b> No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 22/01/2019	<b>Overall study status</b> Completed	<input checked="" type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 09/10/2024	<b>Condition category</b> Urological and Genital Diseases	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Recurrent urinary tract infections (UTIs) have a significant negative impact on quality of life and have a high impact on healthcare costs. To date, antibiotics are the only treatment which has been shown to be beneficial for recurrent UTIs, although a recent large study suggests some benefit from cranberry juice. Reduction in antibiotic use could improve quality of life, save money, and help preserve the usefulness of existing antibiotics. D-mannose is a type of sugar which binds bacteria so that they do not bind to the bladder; it is present in foods such as coffee, baker's yeast, egg white, fruits and legumes. D-mannose has shown benefits in animal models. It is currently available as a food supplement which is used by women who have recurrent UTIs, but there is little evidence to support its use. D-mannose has the potential to offer a valuable alternative to antibiotics in women who experience recurrent UTIs. This study will evaluate whether D-mannose helps women suffering with recurrent UTI presenting to UK primary care and its cost effectiveness.

### Who can participate?

Women aged 18 and over with recurrent UTIs

### What does the study involve?

Participants are randomly allocated to take either D-mannose or a placebo (dummy) supplement once a day for six months. They are contacted by text/email weekly and a phone call monthly to see if they have had symptoms of a UTI. They are asked to complete a symptom diary every day they experience symptoms of a UTI. Furthermore, they are asked to send in a urine sample when they present to their GP with a suspected UTI, two days after the UTI has resolved and when they are symptom free after two months of using the study product.

### What are the possible benefits and risks of participating?

Participants may not experience any direct benefits by taking part. However, it is hoped that this study will benefit future patients who have recurrent UTIs if it is shown that D-mannose helps to reduce UTI episodes or symptoms. There is a slight chance that participants might experience diarrhoea as a previous study showed that 8 in 100 women experienced this, but still felt they were able to continue taking D-mannose.

Where is the study run from?  
University of Oxford (UK)

When is the study starting and how long is it expected to run for?  
January 2019 to September 2021

Who is funding the study?  
National Institute for Health Research (NIHR) (UK)

Who is the main contact?  
Jared Robinson  
jared.robinson@phc.ox.ac.uk

## Contact information

**Type(s)**  
Scientific

**Contact name**  
Mr Jared Robinson

**ORCID ID**  
<https://orcid.org/0000-0002-8872-3646>

**Contact details**  
Primary Care Clinical Trials Unit  
Nuffield Department of Primary Care Health Sciences, University of Oxford  
Radcliffe Primary Care Building, Radcliffe Observatory Quarter  
Woodstock Road  
Oxford  
United Kingdom  
OX2 6GG  
+44 (0)1865 617849  
merit@phc.ox.ac.uk

## Additional identifiers

**Clinical Trials Information System (CTIS)**  
Nil known

**Integrated Research Application System (IRAS)**  
245539

**ClinicalTrials.gov (NCT)**  
Nil known

**Protocol serial number**  
CPMS 40192, IRAS 245539

## Study information

**Scientific Title**

D-mannose to prevent recurrent urinary tract infections: a double-blind randomised placebo-controlled study

**Acronym**

MERIT

**Study objectives**

The hypothesis is that daily use of D-mannose compared with placebo will be effective in preventing symptomatic urinary tract infections (UTIs) in women who experience recurrent UTIs.

**Ethics approval required**

Ethics approval required

**Ethics approval(s)**

approved 06/12/2018, South West – Central Bristol Research Ethics Committee (Whitefriars Level 3, Block B, Lewin's Mead, Bristol, BS1 2NT, United Kingdom; None available; nrescommittee.southwest-bristol@nhs.net), ref: 18/SW/0245

**Study design**

Randomised; Interventional; Design type: Prevention, Dietary

**Primary study design**

Interventional

**Study type(s)**

Prevention

**Health condition(s) or problem(s) studied**

Urinary tract infection

**Interventions**

This is a two-arm, individually randomised, double-blind placebo-controlled trial. Women will be randomised 1:1 into either placebo or intervention:

Placebo: women will take 2 grams (due to differences in density this can vary between 1.5 and 2.5 grams) of fructose daily for six months

Intervention: women will take 2 grams (due to differences in density this can vary between 1.5 and 2.5 grams) D-mannose daily for six months

**Recruitment**

Recruitment will be performed by GP surgeries who have agreed to participate in the trial. Patients identified by GP database searches will be invited to take part. Furthermore, posters will be displayed in and near participating GP surgeries and potential participants can contact the research team directly.

**Sample size**

The aim is to recruit 203 participants in each arm assuming a 20% loss to follow up adding up to 508 participants in total. This sample size is adequate to detect a 50% reduction in the change of

a further UTI during the period of prophylaxis.

Qualitative Interviews: 20-25 participants will be recruited across both study arms for the nested qualitative study.

#### Randomisation

Randomisation will be stratified by practice ensuring a balance of the two arms within each practice. Participants will be randomised to receive 6 months of D-mannose or matched placebo using an allocation ratio of 1:1.

#### Follow up

All participants will be in the study for six months and during that time they will receive monthly phone calls, weekly texts and the study product by post every other month. They will also be asked to complete a daily symptom diary whenever they experience symptoms of a UTI.

#### Methods for qualitative interviews

The qualitative researcher will be unblinded to support appropriate participant selection. The topic guide will include participants' experiences and perceptions of recruitment to, and participation in a study requiring a daily treatment (whether D-mannose or placebo), exploring the level of benefit required to continue this type of regime and facilitators and barriers to prophylactic treatment. For participants' convenience, interviews will be conducted by telephone.

#### Sample handling

After two months of prophylaxis, at a time when participants are asymptomatic (or have the same mild symptoms as usual), they will be asked to send a urine sample to the study laboratory using the packaging supplied at or after their baseline appointment. If the participant presents to ambulatory care with UTI symptoms during the six months following recruitment, they will also be requested to send an additional urine sample to the study laboratory at that time and two days after resolution of symptoms. These samples will be:

1. Cultured using standard NHS laboratory procedures, with bacterial presence recorded to 103 cfu/ml
2. Examined with microscopy to identify epithelial cells, red cells and white cells
3. If further funding is successfully obtained: analysed using visual qualitative techniques, using microbiological assays to evaluate adhesion and invasion of the urothelium, phylotyping techniques and next generation DNA sequencing techniques

Although urine samples are generally assumed to be sterile, there is a small possibility that trace amounts (<0.1%) of human DNA may be found in these samples using sequencing techniques. When the DNA samples are sequenced and electronic DNA sequences generated, the trialists will immediately use an automated computer programme that looks for human DNA and removes it, without performing any analysis, so that stored electronic DNA sequences on University servers, which are subsequently analysed, have these trace amounts removed.

Consent will be sought to store the frozen samples and to perform a range of additional anonymous biochemical and microbiological analyses relevant to UTI, including in vitro mechanistic studies and work by commercial parties within the EU and outside. The samples will be labelled according to laboratory procedures, including participant ID and date of collection.

#### Intervention Type

Supplement

#### Primary outcome(s)

The proportion of women experiencing at least one further episode of clinically suspected UTI for which they contact ambulatory care (Out of hour (OOH) primary care, in hours primary care, ambulance or A and E). Assessed by medical notes review within 6 months of study entry.

### **Key secondary outcome(s)**

Secondary outcome measures:

1. Number of days of moderately bad (or worse) symptoms of UTI, assessed using a participant diary throughout the study
2. Time to next consultation with a clinically suspected UTI, assessed during a notes review 6 months after study entry
3. Number of clinically suspected UTIs, assessed during a notes review 6 months after study entry
4. Number of microbiologically proven UTIs, assessed during a notes review 6 months after study entry
5. Number of antibiotic courses for UTI; DDD and total mg by antibiotic type, assessed during a notes review 6 months after study entry
6. Report of consumption of antibiotics using diary during periods of infection, recorded in the participant diary throughout the study
7. Proportion of women with a resistant uropathogen cultured during an episode of acute infection, assessed during a notes review 6 months after study entry
8. Hospital admissions related to UTI, assessed during a notes review 6 months after study entry
9. Quality of life recorded in the participant diary at baseline, 6 months and during UTI episodes on day 1, 3 and 5
10. Healthcare utilisation recorded in the participant diary and during a notes review 6 months after study entry
11. Acceptability and process evaluation conducted via telephone interviews with up to 25 women throughout the study

Tertiary outcome measures:

1. Antibiotic usage and urine culture results in the five years prior to study entry, assessed during a notes review 6 months after study entry
2. Urine culture results for samples sent during the study period, recorded in the lab results
3. (Dependent on further funding): Patterns of microbial presence as demonstrated by Next Generation DNA Sequencing in RUTI, exploring association between frequency of infection and microbial presence and evaluating the impact of D-mannose on microbial presence, assessed throughout study

### **Completion date**

30/09/2021

## **Eligibility**

### **Key inclusion criteria**

1. Participant is willing and able to give informed consent for participation in the study
2. Participant is able to comply with study procedures
3. Female, aged 18 years or above
4. Presented to ambulatory care with symptoms consistent with UTI three or more times in the last year or two or more times in the last six months

### **Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Adult

**Lower age limit**

18 years

**Sex**

Female

**Total final enrolment**

598

**Key exclusion criteria**

1. Female participant who is pregnant, lactating or planning pregnancy during the course of the study
2. Formal diagnosis of interstitial cystitis or overactive bladder syndrome
3. Prophylactic antibiotics started in the last 3 months and unwilling to discontinue, or intention to start during the next 6 months
4. Currently using D-mannose and unwilling to discontinue for the duration of the study
5. Nursing home resident. Residential home residents will not be excluded
6. Catheterised, including intermittent self-catheterisation
7. Use of Uromune (an 'immunostimulant')
8. Participants who have participated in a research study involving an investigational product in the past twelve weeks
9. Previous participation in this study

**Date of first enrolment**

18/03/2019

**Date of final enrolment**

01/02/2020

**Locations****Countries of recruitment**

United Kingdom

England

Wales

**Study participating centre****Primary Care Clinical Trials Unit**

Nuffield Department of Primary Care Health Sciences, University of Oxford  
Radcliffe Primary Care Building, Radcliffe Observatory Quarter  
Woodstock Road

Oxford  
United Kingdom  
OX2 6GG

## Sponsor information

### Organisation

University of Oxford

### ROR

<https://ror.org/052gg0110>

## Funder(s)

### Funder type

Government

### Funder Name

National Institute for Health Research (NIHR); Grant Codes: 385

### Alternative Name(s)

National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

### Funding Body Type

Government organisation

### Funding Body Subtype

National government

### Location

United Kingdom

## Results and Publications

### Individual participant data (IPD) sharing plan

IPD sharing plan as of 29/04/2024:

The datasets generated during and/or analysed during the current study are/will be available upon request via PrimDISC ([primdisc@phc.ox.ac.uk](mailto:primdisc@phc.ox.ac.uk)) at <https://www.phc.ox.ac.uk/intranet/better-workplace-groups-committees-open-meetings/primdisc-committee>.

Previous IPD sharing plan:

Once publications are complete, study data will be available to share with qualifying researchers who submit a proposal with a valuable research question as assessed by a committee formed from the trial management group, including senior statistical and clinical representation. Interested researchers should contact Gail Hayward (gail.hayward@phc.ox.ac.uk).

## IPD sharing plan summary

Available on request

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		08/04/2024	09/04/2024	Yes	No
<a href="#">Protocol article</a>	protocol	13/01/2021	15/01/2021	Yes	No
<a href="#">HRA research summary</a>			28/06/2023	No	No
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes
<a href="#">Statistical Analysis Plan</a>	version 1.0	15/02/2021	18/04/2024	No	No
<a href="#">Study website</a>	Study website	11/11/2025	11/11/2025	No	Yes