

# Systematic Review

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# What is the problem?

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- Researchers find that there are too many medical papers to manually process!
- Researchers need a system to quickly review papers.
- Researchers want the system to be entirely online (to avoid paper wastage).
- Researchers want to easily find the papers they need to review with a simple, powerful query system.
- Researchers want to be able to access their review no matter where they are.
- Researchers want a way to collaborate with others on a single review.

# How will we solve it?

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- We will create a web application using the Django Framework.
- Researchers will be able to create an account.
- Researchers will be able to create a review, and share it with colleagues.
- Every review a researcher is involved in will be saved to their account for convenience.

# Personas: some background research

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Some insight into who potential users are and the type and frequency of tasks they will be likely to perform.

Consider some quantitative and qualitative attributes of our potential user group as a whole.

# Personal qualities

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Researchers within the healthcare field.

Most aged between 25 and 54, with fewer younger and older individuals than other sectors.

Generally, will have a postgraduate degree in a medicine-related field, though those from other backgrounds may be equally as common. (eg. Statistics)

# Personal qualities

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90% of papers available on PubMed are in English, followed by Chinese at 2%. We then assume most users will be proficient in English.

Users will usually be computer literate, as (certainly in MEDCs) this is a requirement for jobs in this area, although experience with electronic databases and statistical tools may vary.

# User behaviour

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74% from a sample of PubMed queries were of the type relevant to systematic reviews (as opposed to being “navigational”).

Of these, none used MeSH terms (though these may be added by PubMed’s ATM), and returned a median of 100 results.

This gives us an idea of how many papers may be returned by a query.

# User behaviour

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In 2005, there were 85 systematic reviews published in the field of nephrology (study of kidneys).

From this, we assume that one researcher in a single field will create relatively few reviews in a year.



# User environment

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A US study found that 99% of healthcare workers use a desktop computer in the workplace, with 54% having also used a tablet computer and 33% a smartphone.

This would imply computer literacy, and also that a web application might need to consider different screen sizes and input methods.

# Persona 1: Lead Researcher

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## **Fictional name:**

Bernard Sawyer

## **Job title/major responsibilities:**

Senior Medical Information Officer – Pharmaceutical

Research and provide medical/product information and carry out systematic literature reviews requested by healthcare professionals

## **Demographics:**

- 43 years old
- Lives and works in the UK for a research-based pharmaceutical company
- Has an MPharm degree (Master of Pharmacy)

# Persona 1: Lead Researcher

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## **Goals and tasks:**

He is focused on maintaining efficiency and accuracy at all stages of any literature review he leads. He must collaborate closely with other researchers, employees in other departments and healthcare professionals on a daily basis.

Spends his work time:

- Collaborating as part of a team to develop and undertake systematic reviews,
- Leading the development of a search strategy,
- Assessing the eligibility of medical documents (including full text),
- Planning, organising and conducting day-to-day research tasks with his team,
- Leading any conferences/presentations and communicating the results of his review

## **Environment:**

He describes himself as computer literate and can comfortably use a range of software tools his company provides and find resources on the Internet. He does this primarily from the desktop computer in his office, but is aware the company is looking into mobile computing devices such as tablet PCs.

# Persona 2: Assistant/Participating Researcher

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## **Fictional name:**

June Wei

## **Job title/major responsibilities:**

Research Assistant

Assist with the development of systematic literature reviews

## **Demographics:**

- 27 years old
- Lives and works in the UK at a university
- Has an MSci in Statistics

# Persona 2: Assistant/Participating Researcher

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## **Goals and tasks:**

A recent postgraduate who has been appointed to a research group at another university, working under a research fellow. She is very thorough in her work, and works as part of a team which develops systematic reviews in the field of medicine.

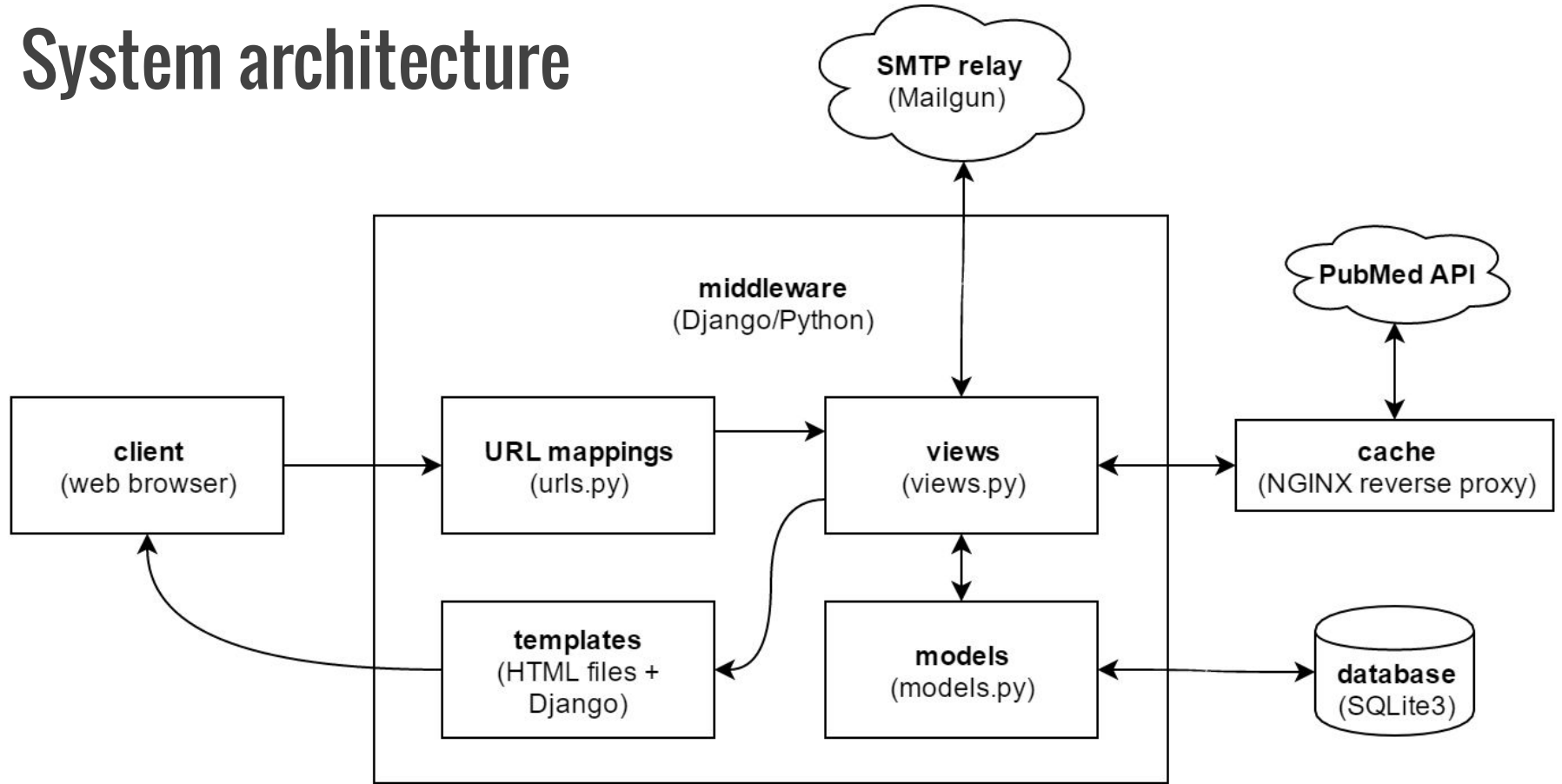
Spends her work time:

- Assisting with development of a search strategy,
- Running exhaustive searches of electronic databases,
- Obtaining and screening potentially eligible studies and any citations or metadata,
- Carrying out statistical analyses of medical trial results,
- Other tasks required by her supervisor

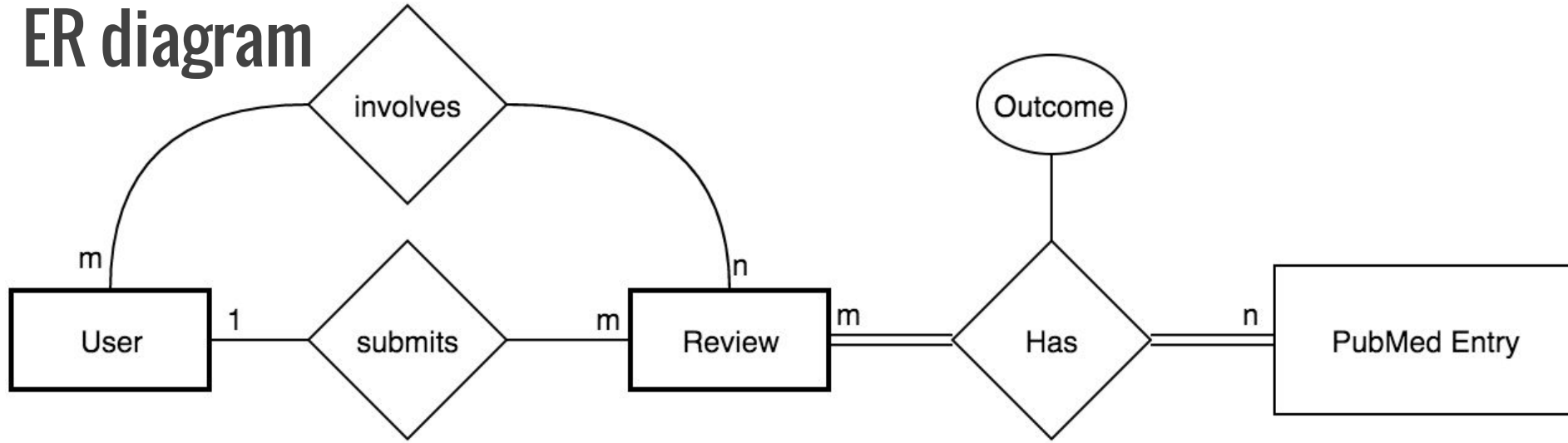
## **Environment:**

She is computer literate, can use statistical software, search databases, and manage references electronically. She primarily uses desktop computers in her work at the university, but also owns a smartphone she uses to carry out less complex tasks.

# System architecture



# ER diagram



## User

+ID  
Full Name (CHAR(60))  
Is Admin? (BOOL)  
Is Confirmed? (BOOL)

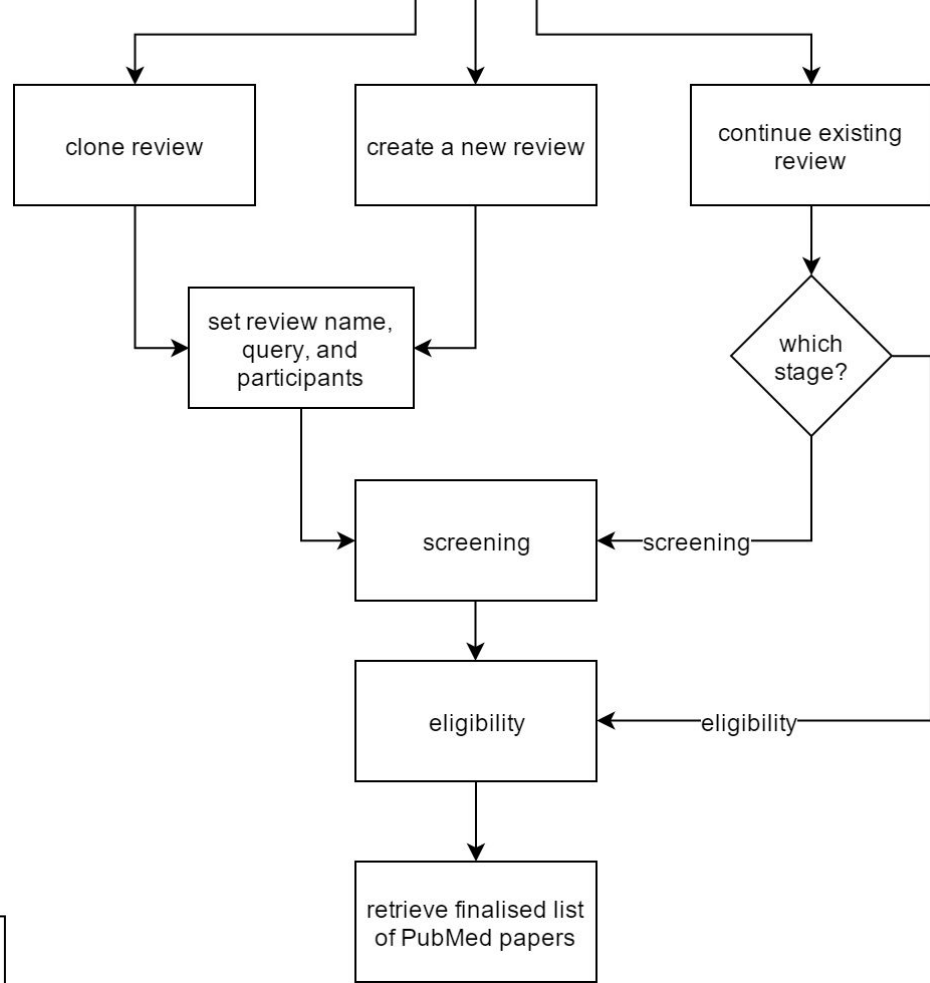
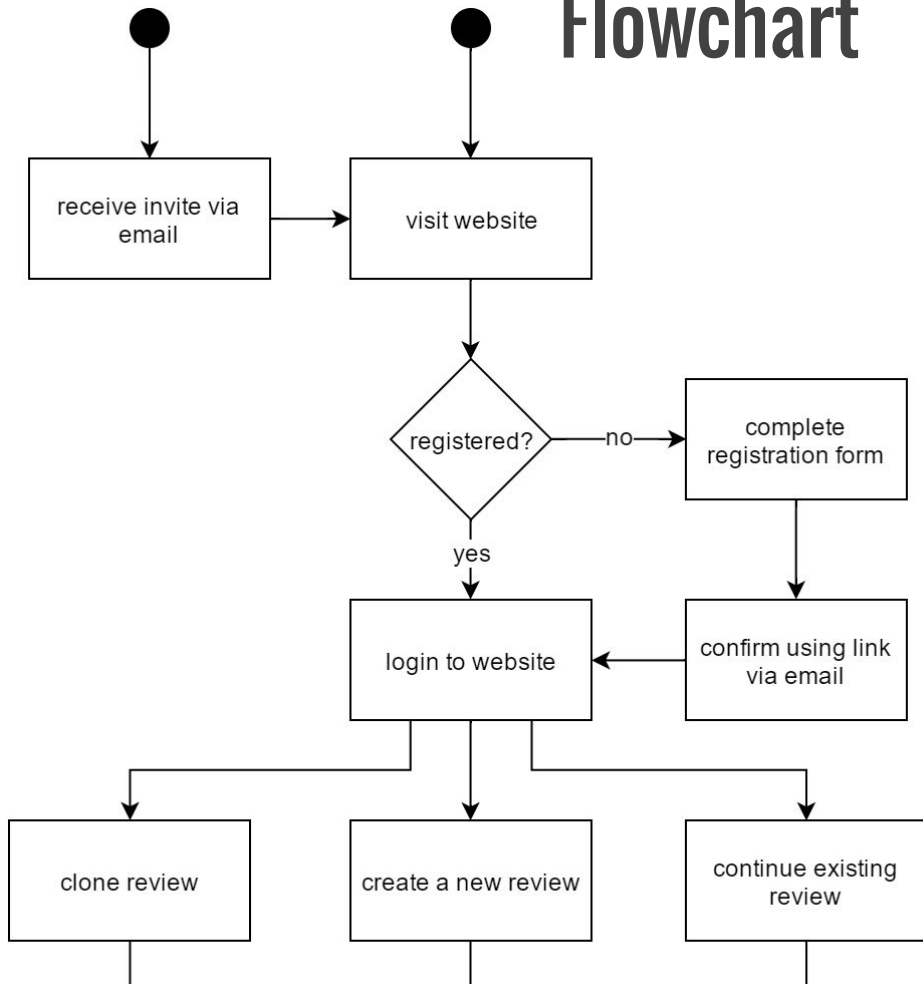
## Review

+ID  
Query String (CHAR(512))

## PubMed Entry

+ID  
Title (CHAR(64))  
Abstract (CHAR(1024))

# Flowchart







## Systematic Review Application

[Sign in](#) [Register](#)

### Sign in

[Forgot password?](#)

Error messages to display near input boxes:

Please enter your email address in the format someone@example.com.

Please enter the password for your account.

That account doesn't exist.

That password is incorrect.

Other notifications:

If the user has followed an email verification link, inform them that their email is now verified and they can sign in.



## Systematic Review Application

[Sign in](#)[Register](#)

### Create your account

Error messages to display near input boxes:

Please enter an email address in the format someone@example.com.  
An account with this email address already exists. Sign in.  
The passwords you entered don't match.

Other considerations:

Can password match verification be done client-side?  
Can email format validation and availability verification be done before  
the user submits the entire form? (Events?)

Does a library (registration redux?) provide this functionality already?

Are passwords sent to the server in plaintext?  
Can we use SSL?

<http://localhost:8000/sysrev/register>

## Systematic Review Application

[Sign in](#)[Register](#)

## Verify your email address

Almost done. We've sent a verification link to:  
someone@example.com

Follow the link in the email to complete registration.





## Systematic Review Application

John Doe



Dashboard

+ Create a new review

Hide completed reviews

Your reviews

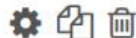
Sort by date created



Effectiveness of water fluoridation

Screening 10 of 67

2 Participants



Manual versus powered toothbrushes

Eligibility 3 of 9

3 Participants



Reviews you're participating in

Sort by date created



Exercise and cancer rehabilitation

created by Joe Bloggs

Screening 34 of 41

2 Participants



Exercise and cancer rehabilitation

created by Joe Bloggs

Screening 34 of 41

2 Participants



Exercise and cancer rehabilitation

created by Joe Bloggs

Screening 34 of 41

2 Participants



Messages to display:

There are no reviews.

Delete confirmation dialog (JavaScript? Hidden form?)

Consider:

Should different information be displayed on each review card/tile?

Fractional progress (3 of 9) or percentage (33%)?

Would a search or filter facility be more useful than sorting?

Is the card/tile based layout any more useable than a datagrid (less custom code)?

Keep the users reviews separated from other users like this?

Have settings and delete buttons at bottom of each tile like this?

If there were hundreds of reviews, how to fix scrolling and searching issues?

Use of colour?

<http://localhost:8000/sysrev/new>

## Systematic Review Application



John Doe



Create a new review

### Invite participants

Enter email addresses separated by a new line.

  
someone@example.com  
joebloggs@example.com  
janedoe@example.com

#### Messages:

Please enter a title for your review.

Please enter email addresses in the format someone@example.com.

Please enter a search query.

Your review has not been created yet. Are you sure you want to leave the page?



## Systematic Review Application

John Doe



Create a new review

## Query generation

Enter some search terms to get started. You can then preview and edit the resulting PubMed query.

[PubMed search tutorial](#)

norovirus cross infection prevention and control

Generate

("norovirus"[MeSH Terms] OR "norovirus"[All Fields]) AND ("cross infection"[MeSH Terms] OR ("cross"[All Fields] AND "infection"[All Fields]) OR "cross infection"[All Fields]) AND ("prevention and control"[Subheading] OR ("prevention"[All Fields] AND "control"[All Fields]) OR "prevention and control"[All Fields])

120 results

Start again

Back

Finish

## Messages:

Please generate a query for your review.  
Your query is formatted incorrectly.  
Your query returned very few results, do you want to continue?

## Other:

Autocomplete list in MeSH reference pane.

## MeSH reference

Find appropriate vocabulary for your search.

cross infection

Any infection which a patient contracts in a health-care institution.  
Year introduced: HOSPITAL INFECTIONS was see under CROSS INFECTION 1971-1978, was see CROSS INFECTIONS 1963-1970

## Subheadings:

analysis  
anatomy and histology  
blood  
cerebrospinal fluid  
chemically induced  
classification  
complications  
congenital  
cytology

View on NCBI





## Systematic Review Application

John Doe



Effectiveness of water fluoridation

Configure review

Clone review

Delete this review

## Review Description

Screening: The CATFISH study protocol: an evaluation of a water fluoridation scheme.



Screening: The CATFISH study protocol: an evaluation of a water fluoridation scheme.

10 of 67

## Abstract

## BACKGROUND:

Tooth decay is the commonest disease of childhood. We have known for over 90 years that fluoride can prevent tooth decay; it is present in nearly all toothpastes and can be provided in mouthwashes, gels and varnishes. The oldest method of applying fluoride is via the water supply at a concentration of 1 part per million. The two most important reviews of water fluoridation in the United Kingdom (the York Review and MRC Report on water fluoridation and health) concluded that whilst there was evidence to suggest water fluoridation provided a benefit in caries reduction, there was a need to improve the evidence base in several areas.

## METHODS/DESIGN:

This study will use a natural experiment to assess the incidence of caries in two geographical areas, one in which the water supply is returned to being fluoridated following a discontinuation of fluoridation and one that continues to have a non-fluoridated water supply. The oral health of two discrete study populations will be evaluated - those born 9 months after the water fluoridation was introduced, and those who were in their 1st year of school after the introduction of fluoridated water. Both populations will be followed prospectively for 5 years using a census approach in the exposed group along with matched numbers recruitment in a non-exposed control. Parents of the younger cohort will complete questionnaires every 6 months with child clinical examination at ages 3 and 5, whilst the older cohort will have clinical examinations only, at approximately 5, 7 and 11 years old.

## DISCUSSION:

This project provides a unique opportunity to conduct a high quality evaluation of the reintroduction of a water fluoridation scheme, which satisfies the inclusion criteria stipulated by the York systematic review and can address the design issues identified in the MRC report. The research will make a major contribution to the understanding of the costs and effects of water fluoridation in the UK in the 21st Century. Its findings will help inform UK policy on this important public health

intervention and may have a significant impact on public health policy in other developed countries. There is currently true equipoise in relation to the effectiveness of

Is this document relevant to the review?



No



Can't tell



Yes

Consider:

Placement of buttons.

What will the 'can't tell' button do?

Would it be useful to display a list of currently online users?

How do we allocate screening tasks to review participants?

Font formatting options? (Increase/decrease size)

# URL mappings

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## Reviews:

- `/` ← Index of all reviews you're involved in
- `/new/` ← creation form for a new review
  - Involves defining name, query, and participants.
- `/review/<review ID>/` ← overview page for an individual review
  - Shows the appropriate stage (screening, eligibility, or completed).
- `/review/<review ID>/<pubmed ID>/` ← review for a specific paper



# URL mappings

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## Users:

- `/login/`
- `/logout/`
- `/register/`

## Administration:

- `/admin/`

# Do you like kittens?

— — —

yes

