Research Networking Event

26th November 2025

When you arrive, please put your name, role and organisation in the chat box

Dr Sharin Baldwin | iHV Senior Health Visiting Research Lead

Dr Louisa Clifford-Taylor | iHV Research Associate

Welcome

On arrival, please add your name, role and organisation to the chat box

Time for you - Enjoy!

Feedback

- Participate in the poll
- Contact sharin.baldwin@ihv.org.uk

Share experiences and network

- Unmute yourself to engage in the discussions anytime.
  Please stay muted when you are not speaking to avoid background noises.
- We encourage you to have your camera on so we can connect with each other.
- Type questions in the chat box during the presentations.
  We can use these to shape discussions.

Agenda

09:30 **Welcome and introductions**
Sharin Baldwin| Senior Health Visitor Research Lead, IHV

09:35 **Research Presentation**
Christopher Sweeney, Health Visitor and Clinical Academic Fellow, Edinburgh University

10:05 **Networking: Research highlights for 2025 and priorities for 2026**
All

10:40 **Break**

10:50 **Presentation**
Professor Ruth Endacott, Director of Nursing and Midwifery, NIHR

11:20 **AOB and close**

Institute of Health Visiting
Excellence in Practice

Parachute study

You can ask questions by using the chat function or simply raising your hand.

Christopher Sweeney
Health Visitor and Clinical Academic Fellow,
Edinburgh University

Parachute study
Parental advice and urgent care

Christopher Sweeney

cjhsweeney@gmail.com

Health visitor and clinical academic fellow

How **new parents** use their **personal networks** when responding to childhood illness and accessing **urgent care**

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Parachute study
Why this topic matters

- UK A&E attendances are rising faster than population growth (Baker, 2017)
- Children under 1 are the most likely to attend A&E and receive treatment, advice, or a referral they could have received elsewhere (Simpson et al., 2022)
- Deciding when to seek UUC is a social process; friends and family before the ED (Hendry and Beattie, 2005; Neill et al., 2013; McKenna et al., 2020)

Parachute study
Aims

1. Explore how new parents in Scotland seek support when their infant is unwell.
2. Examine how parents use personal networks when deciding to access unscheduled care.
3. **Assess the impact of NHS home visiting programmes on parental support networks.**

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Parachute study
Participants

- 18 new parents whose child was under one year at time of interview
- 8 fathers, 10 mothers
- Recruited from parenting groups and charities

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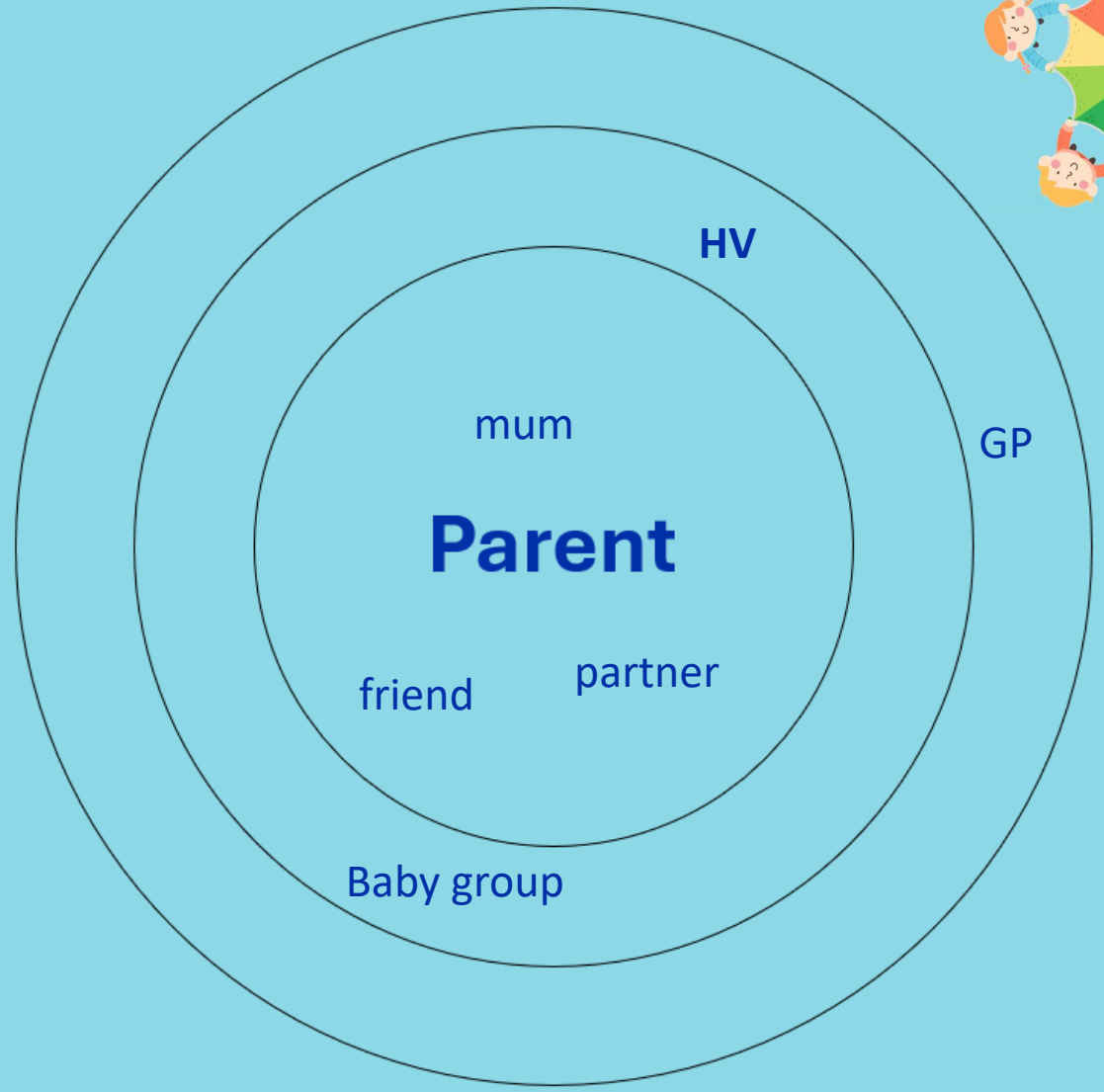
Parachute study
Interview

- List who they talk to about their child's health
- Describe last time they spoke to someone
- Scenarios; well and unwell child



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Parachute study
Analysis

- Structural data
- Inductive coding (patterns from text)
- Deductive coding (social support theory)

Parachute study
Structural data – who is in parents' networks

- 18 parents named 146 people
- Family (n=69), friends (n=21), parent peers (n=19)
- Most people named were parents (74%)
- Mothers had larger networks (n=9.3) compared to fathers (n=6.63)
- Mothers more likely to name a HV and GP (n=9/10, 8/10) compared to fathers (n=2/8, 5/8)

Parachute study
Inductive coding (patterns from text)

"My health visitors have changed all the time, I don't really have like, a specific contact ...when I've phoned, it's gone to like the answer machine and they eventually called me back... if I was worried and they're [in an] acute situation, I'd phone the GP first. Because I could know I could speak to them sooner than the health visitor."

Charlotte, mother of an 8-month-old

Codes; 'continuity of care' and 'availability'

Theme; 'trust'

Parachute study
Deductive coding (social support theory)

“Sometimes when we're unsure you know we take a picture [and ask the health visitor] is this normal?”

Rory, father of a 7-month-old

Code; ‘reassurance’

Theme; ‘emotional support’

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How I conceptualise trust

- Traditional definitions focus on confidence in professionals, organisations, and health insurance
- My interest is in *how* trust is built between health visitors and parent
- Shapiro et al. (1992) identify mechanisms of trust-building:
  – Deterrence-based
  – Knowledge-based

Building trust

Deterrence based:

- Repeated interactions (continuity of care)
- Multifaceted relationships (NHS is connected)

Knowledge based:

- Regular communication (meeting outside of a problem)
- Courtship (learning about the other person)

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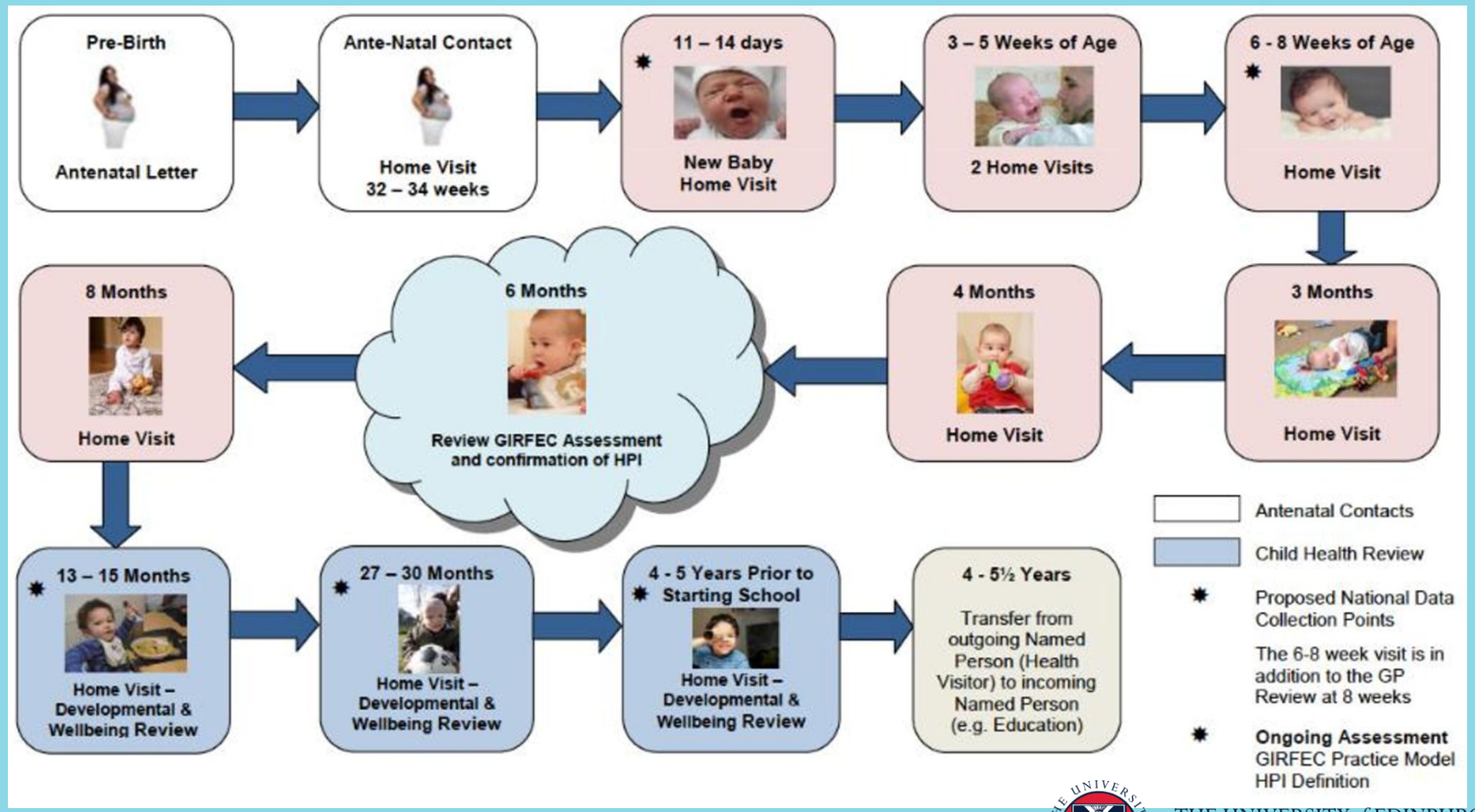
Parachute study

Knowledge based trust – regular communication



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Parachute study
When trust is not established

*…she doesn't reply to messages, so I'd message her, and I probably wouldn't hear back from her for a while…**I know I can contact my health visitor, I just probably wouldn't**…it would probably more be, like, my mum, my sister-in-law, obviously my sister, the doctor, and then obviously the hospital, I suppose"*

(Ava, mother of an 11 month old)

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Parachute study
When trust is established

"it's just that breaking the ice and that kind of friendliness that makes you warm to them and makes ***you feel more comfortable to say, OK, actually, he's got a rash. What do I do about that?"***

(Hannah, mother of a 6-month-old)

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Parachute study
What trust does

- Encourages parents to approach the health visitor over other services
- Shifts the health visitors position in the network
- Expands support within the network

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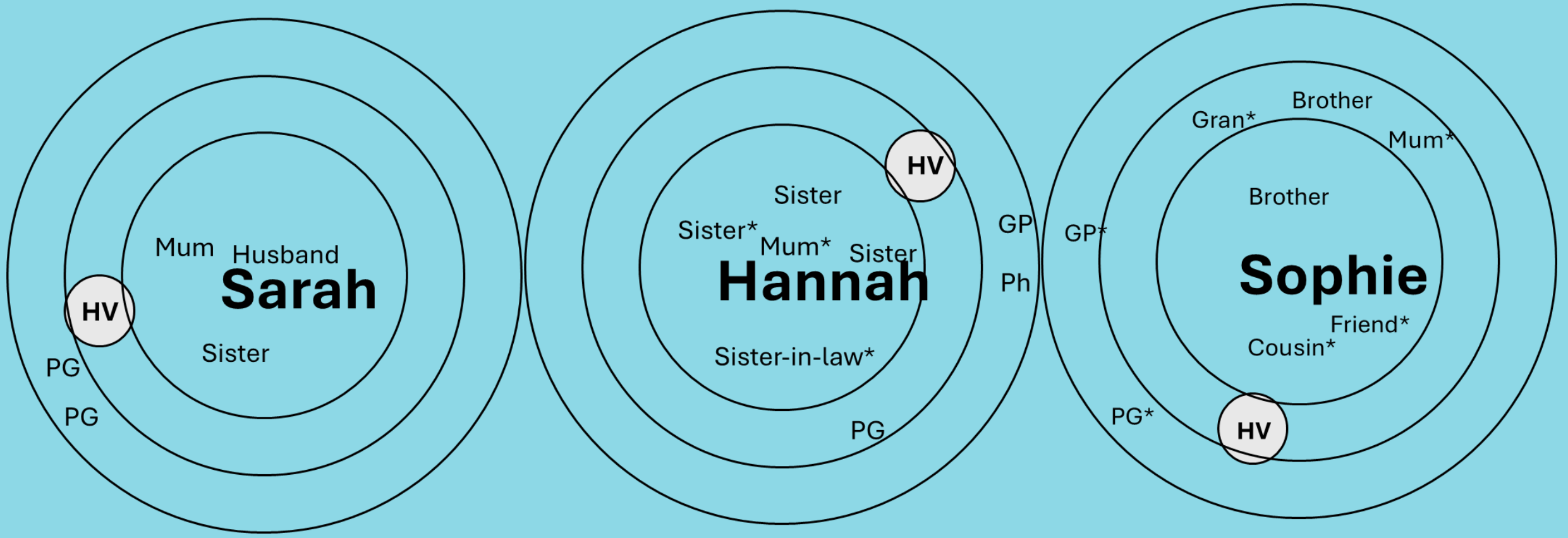
Parachute study

When trust is established



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Parachute study
Health visitors – support

- When trust is established, health visitors can increase the availability of social support
- **Provide** direct emotional and appraisal support
- **Mobilise** parents to access support
- **Broker** links to peer groups and services

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Parachute study
Thematic analysis – provide support

“Sometimes when we're unsure you know we take a picture [and ask the health visitor] is this normal?”

Rory, father of a 7-month-old

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Parachute study
Health visitors – mobilise support

"So I phoned the health visitor who got back to me and advised probably to make a GP appointment"

(Charlotte, mother of an 8-month-old)

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Parachute study
Health visitors – broker support

"…she's kind of connected me to like other local services and things like that. And other groups where we can go to support".

(Alice, mother of a 5-month-old)

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Parachute study
Implications

- Mobilisation and brokerage allowed parent to learn when and how to navigate unscheduled care
- This support also provided legitimacy, protecting parents from feeling judged or criticised for doing so

"Maybe if she was a bit younger… we sort of know what we are doing now and we can deal with it ourselves... health visitors are great to start with."

(Oliver, father of an 11-month-old)

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Summary

Trust enables health visitors to:

- **Provide** emotional and appraisal support directly
- **Mobilise** support by encouraging parents to access services
- **Broker** support by referring parents to appropriate sources
- **Model** how and when to approach urgent care
- **Offer legitimacy** when parents need to access services, reducing fear of judgement
- **Expand** the support available to parents through their networks

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Recommendations for practice
Creating trust with parents

Prioritise continuity of care (deterrence-based trust):

- Where appropriate, consider whether a contact can wait until the usual HV returns

Increase opportunities for knowledge-based trust:

- Create contact outside of problems: brief check-ins, phone calls, presence at parenting groups
- Consider a set advice line, duty phone, or telephone hub when remote working or hot-desking
- Clearly communicate how and when parents can make contact

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Recommendations for practice

Creating trust amongst professionals

Prioritise continuity of care (deterrence-based trust):

- Working with the same people; social workers, GP's etc.

Increase opportunities for knowledge-based trust:

- Create contact outside of problems: proximity, shared spaces, training
- Clearly communicate roles and contact routes across teams

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Conclusion

- Deterrence- and knowledge-based trust shape whether parents engage with their health visitor
- When trust is established, HVs can provide, mobilise, and broker support
- Through these interactions, parents learn how and when to approach urgent care
- HV endorsement gives parents legitimacy when accessing services, reducing fear of judgement
- Together, these processes help parents use urgent and unscheduled care appropriately and confidently

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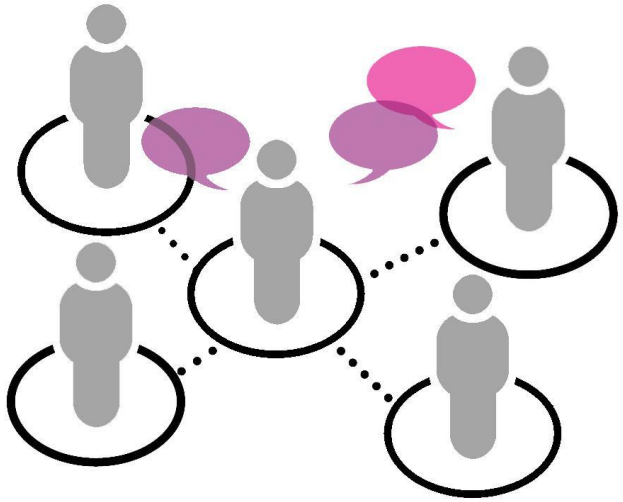
Q&A

Networking: Research highlights for 2025 and priorities for 2026

You can ask questions by using the chat function or simply raising your hand.

Facilitated Discussion

You will now be directed to breakout rooms.

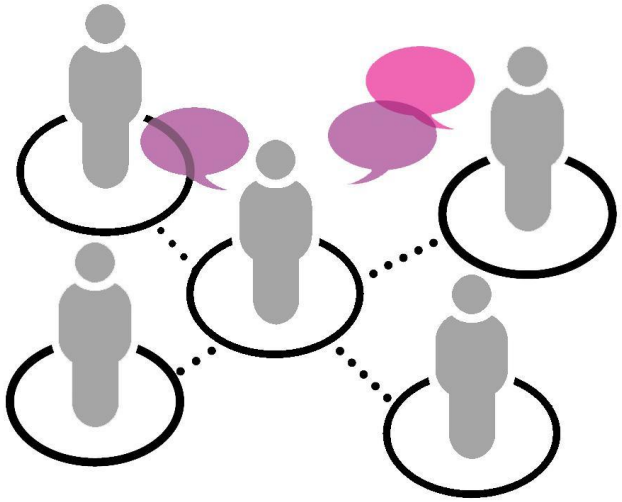


Facilitators will be asked to feedback key discussion points when we return to the main session

Feedback / actionable points

Welcome back

Facilitators will be asked to feedback key discussion points when we return to the main session



Writing a conference abstract and designing a poster

You can ask questions by using the chat function or simply raising your hand.

Professor Ruth Endacott
Director of Nursing and Midwifery, NIHR

Writing a conference abstract and designing a poster

Professor Ruth Endacott, NIHR Director of Nursing and Midwifery

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Do not use

Objectives

Appreciate the key decisions to be made before writing a conference abstract

Understand how to make an impact in 250 words

Review a range of approaches to poster design

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Why submit a conference abstract

- Promote your work, share good practice
- Opportunity to discuss your work with colleagues and leaders in the field
- Justify funding for conference attendance
- Abstract and poster/slides can be used for other purposes …

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Key decisions before you start writing ….

Choose the right meeting/conference

Best networking opportunities for you?

Is there a theme - does it fit your project/case?

Read the guidelines!

Remember:

Unlike journal abstracts, conference abstracts are presented alone to conference organisers. **You will not get a chance for a rewrite**…….

Poor abstracts are very unlikely to be accepted.

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Fact-Finding

Pediatric Congress 20

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Meest bezocht Laa

Pediatric Congress

Google

- Instructions for Oral Presentations
- Instruction for Poster Presentations
- Abstract Topics
- Call for Abstracts

Register Now!

- Submission of an abstract for the pediatric congress acknowledges your acceptance for the abstract to be published in the official meeting publications.
- Presenting authors of abstracts must be registered participants. Registration must be received by the Secretariat by July 27, 2011 to ensure inclusion of the abstract in the meeting publications and in order to be scheduled for presentation.
- Abstracts must be original and must not be or have been published or presented at any other meeting prior to the 22nd ESPNIC Medical and Nursing Annual Congress.
- Abstracts must be submitted in English.
- Abstracts over 250 words will not be accepted.
- Abstracts must be received by the announced deadline. Abstracts received after the deadline will not be considered.
- The Scientific Committee will determine whether the abstract will be accepted as an oral presentation, an e-Poster presentation, or a poster presentation, with consideration given to the author's preference.
- The presenting author is required to ensure that all co-authors are aware of the content of the abstract before submission to the Secretariat.

Practical aspects

- The title and themes of the conference
- Check format: is the count in words or characters
- Who are the audience?
- What is the format? Access sample of previous abstracts
- Deadline and format of submission?
- Who will write the abstract, order of authors

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Writing the abstract: Title

- Make this simple; use sound-bites wisely …….
- Not too long or too complicated
- Make it easy to search in e-databases
- Include study design
- Do make it succinct
- Do catch the reader's attention

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Writing the abstract: main body

- Use simple standard English
- State aims of presentation
- Use short sentences
- If reporting statistical data, make it clear and simple
- Leave out jargon and avoid abbreviations
- Make conclusions logical and clear
- Stick to word count and references

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Final messages for abstract writing

Find a critical friend to review

Reviewers get tired – your abstract needs to stand out

Quality is important

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Some great advice from **Naomi Hickey,**

UKCRF Network Education Theme Chair

Education and Quality Lead, Glasgow CRF

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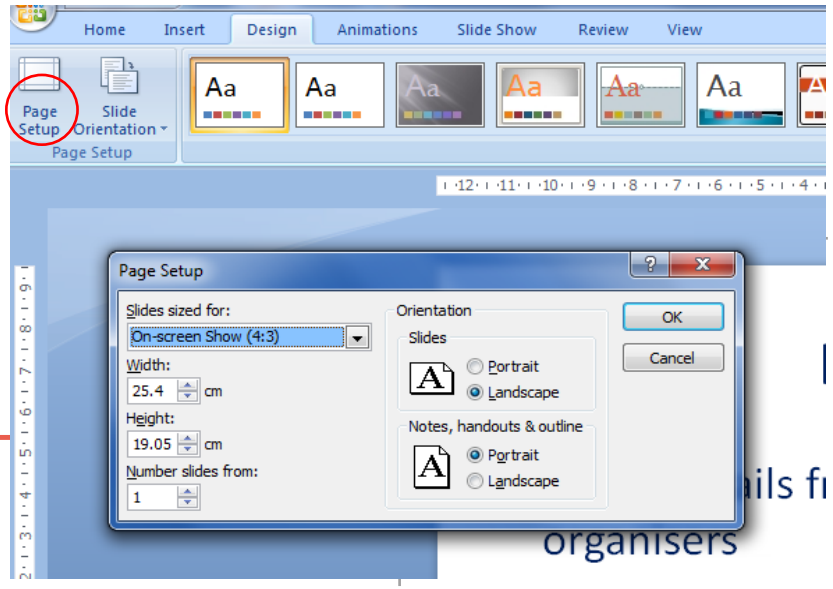
Page Set up

- Check details from organisers (and your own organisation …)
- PowerPoint (others available)
- Orientation
- Page size
- Background



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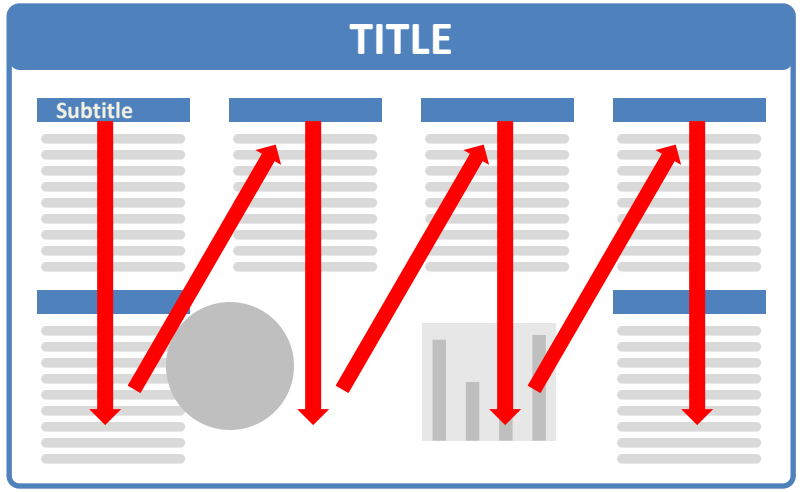
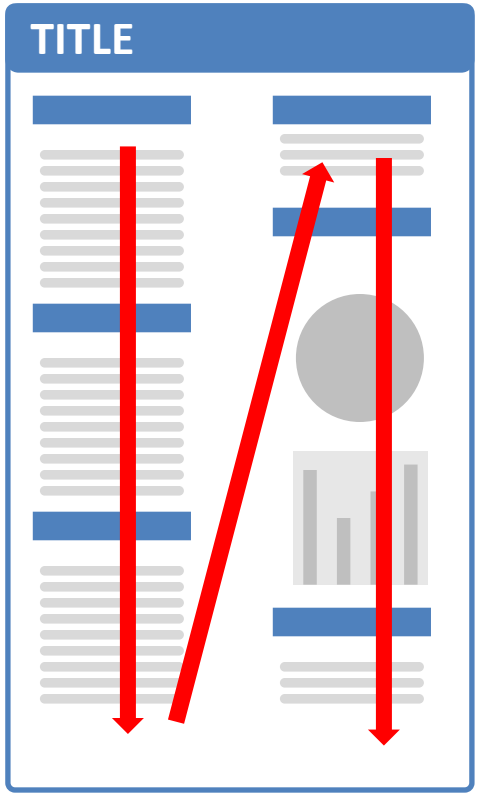
Layout

- Title
- Clear path
- Reading style
- Headings





RECRUITMENT CHALLENGES TO RECORDING COUGH SOUNDS IN PATIENTS WITH AND WITHOUT LUNG CANCER

Clark P[1], Kidd AC[2,3], Hickey N[1]

[1]Glasgow Clinical Research Facility, NHSGG&C; [2]Institute of Infection Immunity & Inflammation, University of Glasgow; [3]Queen Elizabeth University Hospital, Glasgow;

Introduction

Screening patients for eligibility is essential to the successful recruit of a research trial. Recording this information on a s ning log can significantly impact the recruitment by ying reoccurring and repeating patterns for non-re ment.

Methods

As a Senior Rese Nurse at Glasgow Clinical Research Facility, I lead o research study involving patients diagnosed with lu ancer. Recruitment for this study was at the time tients' diagnosis; a very emotional time for patients approached about participating in research.

During the study, icipants were required to wear a recording device 24 hours to record their cough sounds, but in a on to this, all conversations and sounds would be r ed during this period.

This required a idered approach concerning data protection as the ce would record all conversation around the partici not just their own voice. At the e of the recording d the participant was required return the device t GCRF as if posted, it would sti recording convers s of the general population.

Rec ment Methods

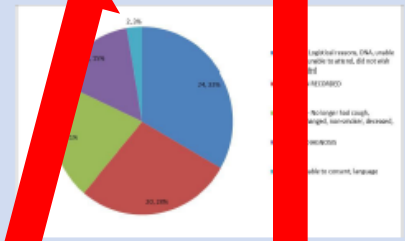
Eligible patients w pproached at outpatient clini er pre-screening. Th visits were to discuss bi or imaging results a were often stressful episo for patients and caren

Participants were ated on microphone plac and on recording dev this involved develop good rapport with pati and communicating e ely to ensure that they able to make inform cisions about the study a o discuss any concer ey may have had about ex sits or 24-hour audio ling.

Due to Data Prot laws, participants w advised to inform everyone they spoke to during the 24 hours to inform them that conversations could have been recorded.

Screening Log

Despite this, recruitment was challenging. Screening log data recorded 89 patients, of which 17 were recruited. The main reasons documented for n cruitment were 'decline o reason was recorded a gure 1 below.



ure 1: Reasons for screen failure

e screening information could ha etter informed ture recruitment if the reason for ing had been ecorded. The research nurse ofte cussed these concerns with the patient, including t such as being recorded for 24 hours and being distr at diagnosis. This level of detail, however, was n corded on the screening log.

Screening log data can highlight ers such as limitations to protocol and exclusion cri They can also inform future studies, to improve re ment from the outset. However, in reality, time press often curb the detail of data collected.

From researcher experience, this is unique to this study and often screening logs require basic information if a patient declines to parti .

Going Forwar

Valuable lessons have been learne out recording screening data. Information about w atients decline can have a significant impact on re to research studies by allowing researchers to dress recurrent issues for non-recruitment.

Also insight has been gained about running a cough detection study in the middle of a lung cancer pathway.

Glasgow Clinical Research Facility

NHS Greater Glasgow and Clyde

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The F Word...Where's the money?

EDGE-ing our way to improved financial management in Glasgow CRF

edge INTELLIGENT RESEARCH MANAGEMENT

Steven Barre[1], Kirsty Gardiner[1], Sandra Quinn[2], Chloë Cowan[1]

NHS Greater Glasgow and Clyde: [1]Glasgow CRF [2]R&D Accounts

Purpose Early 2018 and tracking research activity for billing comm esearch sponsors had become a web of Microsoft Excel spreadsheets lost in an interdepartmental Bermuda Triangle. Commercial contracts have bec reasing complex and study teams are not familiar with what is included in study budgets. In combination with a new clause for final invoicing from ose-out, the risk to under-reporting activity to R&D accounts team has grown. Glasgow CRF rely heavily on project income to maintain a high stand ervice but required a much more robust method of reporting costed activity to R&D accounts.

Method EDGE is the Research Management Application used by CRF for managing a busy portfolio of ~430 active studies, and the participant enrolment and appointment information is readily available and repo The capability to capture financial data on EDGE has always been available, but because each study requires a bespoke build for the cost fields, it had n implemented in Glasgow CRF.

A multidisciplinary finance working group was brought together t e how we could use EDGE more effectively. The GCRF Information System Developer built a macro to convert the NIHR costing template dire he EDGE import template. This allowed all NIHR template costs to be drawn directly over to EGDE without the risk of transcription error, or length ower hours to build the fields. Once tested, every active commercial study had the NIHR costing templates uploaded to EDGE. The research teams g CT pharmacists, receptionists, HCSWs, research nurses, project assistants and team managers were then instructed to enter their research activity d e relevant costing fields.

The key to success for implementing the template completion has been sharing the data entry responsibility across all teams. The instantaneous accumulation of costs on the ledger has encouraged teams to enter the data, and feedback to the R&D Coordinator team where costs require adjusted in the contract with the sponsor. R&D Accounts run reports directly from EDGE and can see real-time data, rather than relying on responses from the study teams.

Results Implementation began in April 2018 and with several twea ocesses since, this development has enhanced interdepartmental communication and improved financial t ency and budget accountability. The ability to reconcile taxi accounts, numbers of archiving boxes, num d duration of monitoring visits, re-consent and unscheduled visits, patient and carer sustenance, additio s – all previously under-reported to R&D Accounts team - has greatly reduced the risk of under-charging.

As a direct result of this work, the Information Systems Developer n irs a UK-Wide Super-user group for EDGE, and has won an award for EGDE advocacy.

Next Steps Work is underway to upload tes for academic studies but this is currently a bespoke build for each study. With the introduction of SoECAT there is opport look at using a similar import tool which would make this more efficient.

The NIHR costing template is becoming a web-based interactive costing tool (iCT). Translating the final export from iCT into a format for import to EDGE will be a priority to allow continuous, efficient financial management for Glasgow CRF.

Contact

Glasgow Clinical Research Facility

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NHS Greater Glasgow and Clyde

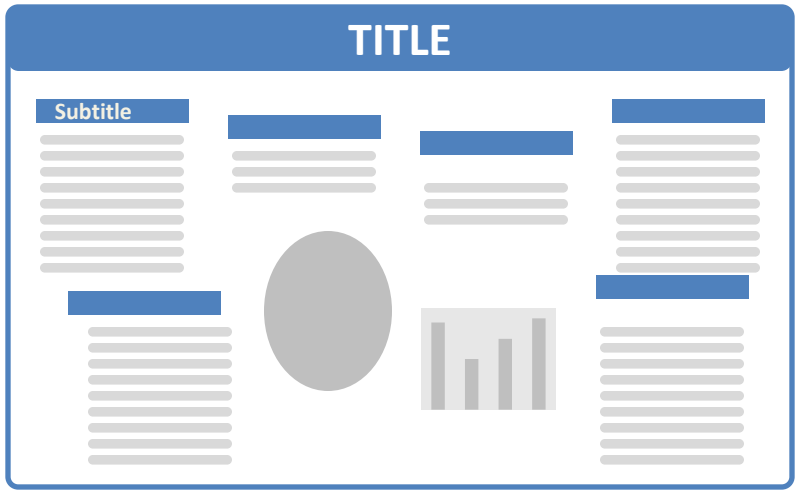
University of Glasgow

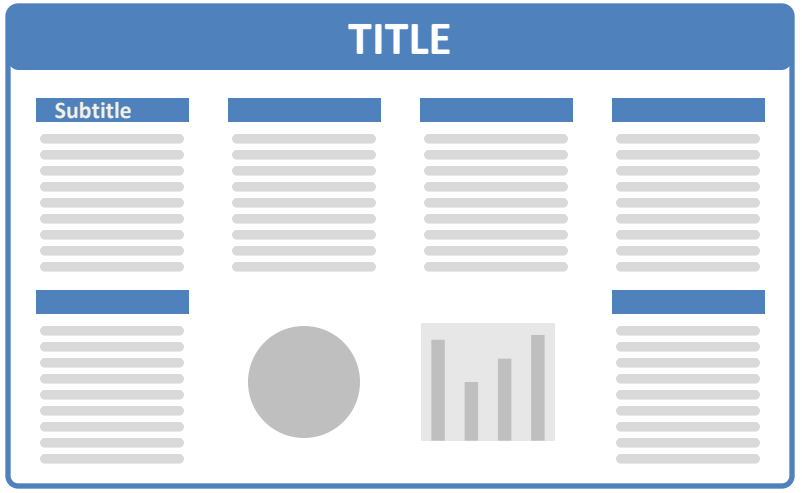
Text Rules

- Font
  - maximum of 2
  - Serif font
  - Sans Serif
- Size
  - Recommended for different components of poster
  - Read main body from 1 metre
- Spacing
  - Line spacing
  - k e r n i n g / kerning
  - Left align

Alignment and White Space

- Well aligned
  - Grid pattern/lines
  - Charts/images same size
- White space
  - Prevents overcrowding
  - Helps to draw attention





Colour

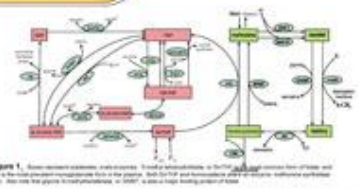
- Simple Colour palate
- Repeat 2-3 colours
- Headings/graphs/ images
- Red/green colour blind

A Compartment Model for the Transport and Storage of Folate

Mentor: Dr. H. Frederik Nijhout Biology Department, Duke University
Tiffany J. Chen

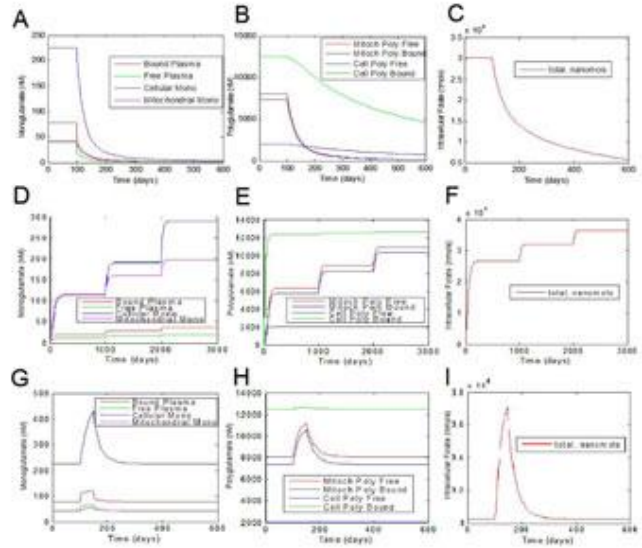
Objectives:

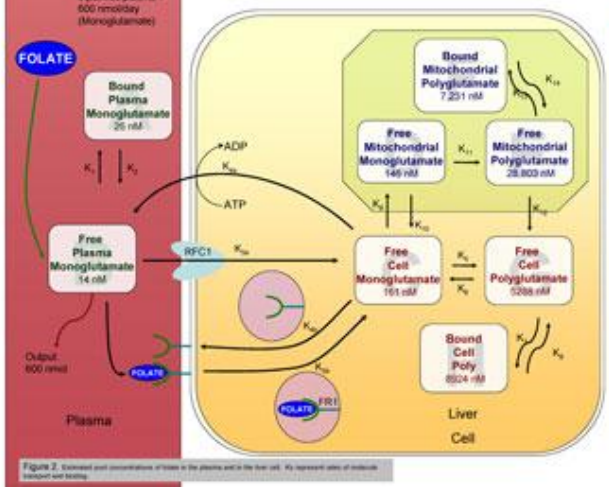
- To estimate the average pool sizes of folate distributed within the plasma, the cell, and the mitochondria.
- To develop mathematical models that represent these pool sizes and mimic real bodily responses to day-to-day changes in diet and metabolism.
- To test these models against experimental data, as well as make predictions.



Background:

Folate, or vitamin B9, is important for the synthesis of thymidine, a pyrimidine, and purines. Deficiency in folate is associated with megaloblastic anemia, cancer, cardiovascular disease, neurological disorders, and neural tube defects in infants. Folate metabolism provides the rate-limiting step for DNA synthesis and DNA and histone methylation (Fig. 1). Reduced folate status affects these critical cellular activities and also increases the level of homocysteine, a highly reactive amino acid that is associated with cell damage. It has been shown that increased folate intake by pregnant women can help reduce the risk of infant neural tube defects, presumably due to a reduction in plasma homocysteine levels. Folate metabolism occurs within cells, but their levels are typically measured in the plasma. It is therefore critical to understand the relationship between the concentrations of folate in the plasma and the cell.





Methods:

Various pool values for plasma and intracellular folate were collected from experimental data (Figure 2). We made predictions for pool values that are not readily available. These predictions were based on known distribution of the various folate pools within the body. For example, 50% of body folate is stored in the liver – the liver contains 2 compartments. These are the cytosol and the mitochondria, each containing three general pools, monoglutamate, free polyglutamate, and bound polyglutamate. These individual pools have different proportions in the cytosol and the mitochondria.

After pool values were established, we assumed that transport of molecules between pools were based on first-order mass-action kinetics. We used Michaelis-Menten equations for the bound polyglutamate pools, because there is a limited amount of protein that will bind to folate – mainly glycine N-methyltransferase (GNMT), one of the enzymes in the methionine cycle (Fig. 1). In addition, we used Michaelis-Menten kinetics for the transport of folates in and out of the cell via Reduced Folate Carrier 1 (RFC1), Folate Receptor 1 (FR1), and an ATP-dependent exporter (Fig. 2).

Rate constants, or k-values, were calculated by assuming certain fluxes between pools. These fluxes were determined by known rates of gain and loss of folate in different compartments where these rates were known, and by adjusting the relative rates of input and output to obtain the right pool sizes between compartments in cases where the absolute rates were not known.

Experiments were performed by varying folate input. These were performed to determine half-lives of the pools, as well as to determine how the pools reacted to example experimental conditions from the literature.

Results:

1. The Model

The model correctly simulates the sizes of the folate pools in the various compartments, including the cytosol, the mitochondria and the fractions bound to proteins in those compartments.

2. Predicted half-life of folate.

After we removed the constant input of folate into the system, all pools diminished over time, some more quickly than others (Figures 3A, 3B). We can also see in figure 3C that the approximate half-life for total intracellular folate is 80 days, which is close to predicted values of around 80-100. Bound polyglutamate seems to decrease at a much slower rate than the other pools.

3. Reaching steady-state values.

The time for the total intracellular pools to reach steady-state typically ranged from 300 to 500 days, which corresponds well with data from the literature. Consistent with the idea that there is a correlation between intracellular folate pool size, polyglutamation, and protein binding, all types of polyglutamate pools do in fact take longer to reach a steady-state value (Figures 3D, 3E).

4. Response to pulsed folate input.

The input of folate was increased to 1000 nmol/day for 50 days. Model plasma levels were quick to rise and fall with the sudden changes, which predicts that free as well as loosely bound monoglutamates will react quickly to changes in folate intake (Fig. 3G). Out of the polyglutamate pools, the model predicts that both bound pools will take longer to return to steady-state, although the mitochondrial bound polyglutamate will take the longest of all of the pools (Fig. 3H).

Conclusions:

We have constructed a mathematical compartment model for folate that takes into account the different methods of transport, as well as retention in the plasma, cell, and mitochondria. We have compared the output of this model with results from current experiments, and have found that the model accurately simulates data from the literature. This model will for the foundation for future studies on the metabolism, transport and sequestration of folates under various genetic and environmental conditions.

Many thanks to Dr. H.F. Nijhout for his guidance and his patience, as well to both Dr. Nijhout and Dr. M.C. Reed for the use of their folate and methionine cycle programs and diagrams. Initial research was supported (in part) by a Howard Hughes Summer Research Fellowship.

The F Word...Where's the money?

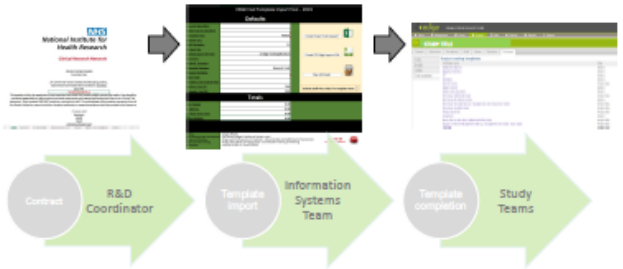
EDGE-ing our way to improved financial management in Glasgow CRF

Steven Barre[1], Kirsty Gardiner[1], Sandra Quinn[2], Chloë Cowan[1]
NHS Greater Glasgow and Clyde: [1]Glasgow CRF [2]R&D Accounts

Purpose Early 2018 and tracking research activity for billing commercial research sponsors had become a web of Microsoft Excel spreadsheets lost in an interdepartmental Bermuda Triangle. Commercial contracts have become increasing complex and study teams are not familiar with what is included in study budgets. In combination with a new clause for final invoicing from study close-out, the risk to under-reporting activity to R&D accounts team has grown. Glasgow CRF rely heavily on project income to maintain a high standard of service but required a much more robust method of reporting costed activity to R&D accounts.

Method EDGE is the Research Management Application used by Glasgow CRF for managing a busy portfolio of ~430 active studies, and the participant enrolment and appointment information is readily available and reportable. The capability to capture financial data on EDGE has always been available, but because each study requires a bespoke build for the cost fields, it had not been implemented in Glasgow CRF.

A multidisciplinary finance working group was brought together to explore how we could use EDGE more effectively. The GCRF Information System Developer built a macro to convert the NIHR costing template directly to the EDGE import template. This allowed all NIHR template costs to be drawn directly over to EGDE without the risk of transcription error, or lengthy man-power hours to build the fields. Once tested, every active commercial study had the NIHR costing templates uploaded to EDGE. The research teams including CT pharmacists, receptionists, HCSWs, research nurses, project assistants and team managers were then instructed to enter their research activity data in the relevant costing fields.



The key to success for implementing the template completion has been sharing the data entry responsibility across all teams. The instantaneous accumulation of costs on the ledger has encouraged teams to enter the data, and feedback to the R&D Coordinator team where costs require adjusted in the contract with the sponsor. R&D Accounts run reports directly from EDGE and can see real-time data, rather than relying on responses from the study teams.

Results Implementation began in April 2018 and with several tweaks to processes since, this development has enhanced interdepartmental communication and improved financial transparency and budget accountability. The ability to reconcile taxi accounts, numbers of archiving boxes, number and duration of monitoring visits, re-consent and unscheduled visits, patient and carer sustenance, additional tests – all previously under-reported to R&D Accounts team - has greatly reduced the risk of under-charging.

As a direct result of this work, the Information Systems Developer now Chairs a UK-Wide Super-user group for EDGE, and has won an award for EGDE advocacy.

Next Steps Work is underway to upload costing templates for academic studies but this is currently a bespoke build for each study. With the introduction of SoECAT there is opportunity to look at using a similar import tool which would make this more efficient.

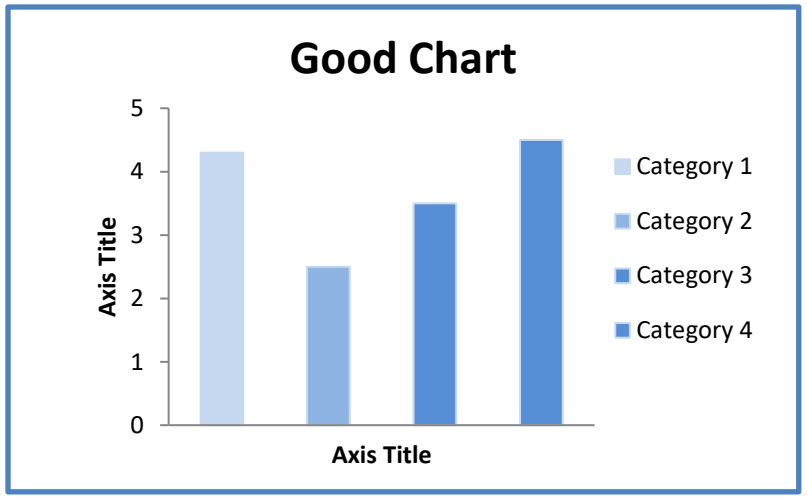
The NIHR costing template is becoming a web-based interactive costing tool (iCT). Translating the final export from iCT into a format for import to EDGE will be a priority to allow continuous, efficient financial management for Glasgow CRF.

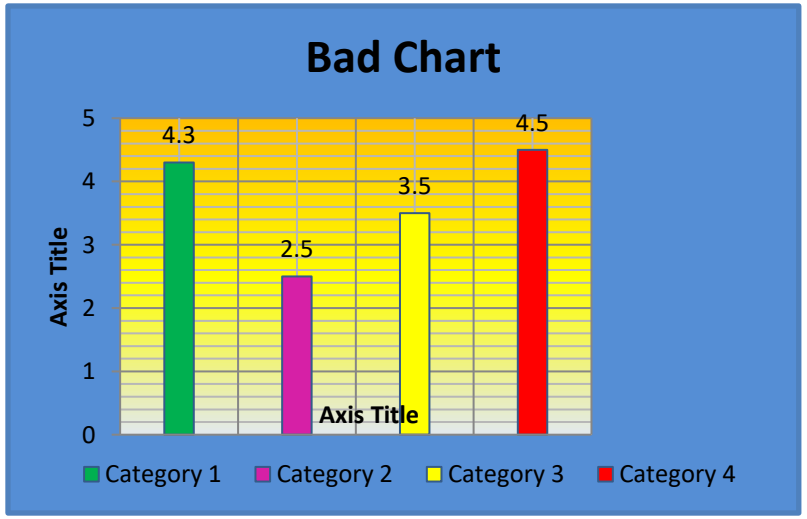
Contact

Glasgow Clinical Research Facility · Chief Scientist Office · NHS Greater Glasgow and Clyde · University of Glasgow

Images and Graphs

- Relevant
- Resolution
- Graphs/charts
  - Simple to understand
- Icons





IN31C - 1508

Interferometric Synthetic Aperture Radar (InSAR) Scientific Computing Environment on the Cloud

Paul A. Rosen, Eric Gurrola, Khawaja Shams, Brent George, David Knight
Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109

Overview

The InSAR Scientific Computing Environment (ISCE) is a modern framework for accurate, efficient processing of interferometric and polarimetric synthetic aperture radar (SAR) data. ISCE was developed at NASA/JPL and Stanford under a NASA Advanced Information Systems and Technology program effort that ended in 2011. Integration with cloud computing is continuing through an effort called Cloud Enabled Scientific Computing Research Environment (CESCRE), under the NASA Computational Modeling Algorithms and Cyberinfrastructure program. ISCE provides a computing environment for geodetic image processing for InSAR sensors that will enable scientists to reduce measurements directly from radar satellites and aircraft to new geophysical products without first requiring them to develop detailed expertise in radar processing methods. The environment serves as the core of a customized processing center to bring Level-0 raw radar data up to Level-3 data products, but is adaptable to alternative processing approaches for science users interested in new and different ways to exploit mission data. ISCE enables a new class of analyses that take greater advantage of the long time and large spatial scales of save data sets than current approaches.

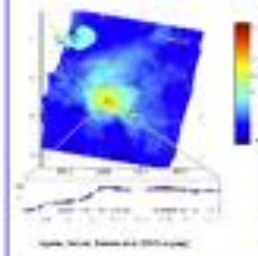
There is a large quantity of radar data being acquired over the globe from the international constellation of radar satellites. Since many scientists do not have access to large computational facilities, the cloud environment offers the potential to open up the possibilities in exploring large data sets to the community at large. The CESCRE effort will modernize the collaborative among scientists today through an efficient integration with cloud computing leading to increased productivity of the scientists. As a first step, however, we have prototyped the mapping of ISCE to the cloud environment, and quantified performance.

InSAR Concepts and Processing Issues

InSAR Processing Time

InSAR data collection is compute- and I/O-intensive processing. Accessing the data from an archive facility can often be one of the biggest bottlenecks, so cloud computing solutions, which necessarily involve transfer of data to the cloud from the archives, and then further moving processors in the cloud, must address this issue.

Time Series Analysis Requires Large Amounts of Data



Time Series analysis requires the use of many radar scenes to track detailed dynamics and mitigate errors. The example at the left is from Long Valley, California, which is changing irregularly over time. The profile at the bottom is the surface deformation for the point labeled with the star near the peak of the deformation. The times at which images exist are turned along the bottom near the time axis. In the future, there could be hundreds to thousands of images for a time series, which is a considerable amount of data.

Wide range of needs and capabilities

- Individual Scientists and Modelers
- Science "Power Users"
- Operational Agencies
- Disaster-based responses

Sample Sizing for 300,000 ALOS PALSAR scenes

Processing Steps	Processing hours per scene	Processing hours for 300,000 scenes	Number of nodes
Unpacking/Processing Steps	0.10	30,000	8
L0B Instrument Correction	1.33	399,000	42
L1 Instrument Correction	1.50	450,000	47
Interferometric Generation	0.58	174,000	18
Instrument Correction	0.58	174,000	18
Instrument Correction	1.50	450,000	47
L0B Instrument Correction	0.58	174,000	18
L1 Instrument Correction	1.33	399,000	42
Total	6.48	1,944,000	203

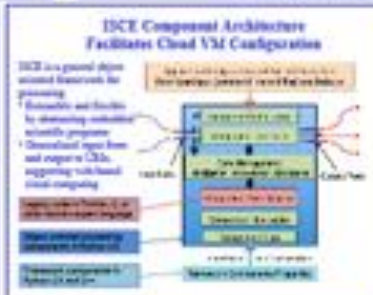
Product	Processing Requirements (per granule)	Archival Volume
L0B Instrument Correction Steps	45 Gb	14.4 Tb
L1 Instrument Correction Steps	30 Gb	9.6 Tb
Instrument Change Steps	45 Gb	14.4 Tb
L0B Instrument Time Series	~45 – 450 Gb	14.4 Tb
L1 Instrument Time Series	~45 – 450 Gb	14.4 Tb
Instrument Change Time Series	~45 – 450 Gb	14.4 Tb

300,000 scenes = ~150 Tb

This number of 300,000 scenes represents the ALOS scenes in the Alaska Satellite Facility archives suitable for interferometric time series.

Individual users may sometimes only a portion of these data, but will require resources beyond what their local computer can provide for large geographic areas. Thus, the way to allow individual users as well as power users or operational centers to explore the data efficiently is to provide elastically expandable resources.

ISCE Component Architecture Facilitates Cloud VM Configuration



Traditional Scientific Computing Environments

- Open source science software is
  - Hard to discover
  - Distributed via source code that has to be
    - Compiled – with all dependencies
    - Configured with proper versions for dependencies
  - Requires complex installation process
  - Limits infrastructure for community contributed documentation, comments, and guidance
- Science Data is
  - Hard to discover
  - Dispersed around the world
  - Growing at a staggering rate
- Science Data Processing
  - Requires unnecessary data transfer before processing
  - Relies on local storage and compute capability
  - Heterogeneous execution environments with unintentional configurations can introduce errors

Scientific Computing in the Cloud

Virtual Machines

- Level of abstraction between hardware & processing
- Imaging allows developers to capture configuration of a running machine into a virtual machine image that provides:
  - Streamlined installation and configuration process
  - Execution of software in the environment configured & tested by developers
  - Reproducible results
  - Easy migration between different versions of software and checkpoints during configuration
  - Can be executed on cloud or local infrastructure

Cloud Computing

- Offers on-location of data and virtually limitless compute capacity
  - Obviates data transfer delays, local storage, and local compute
- Enables instantiation of machine images into machine instances
  - Users can launch image instances on demand to process data
  - Facilitates rapid sharing of algorithms, raw data, and results
- Pay-per-use model
  - A top 500 super computer can be constructed, on demand for as low as $100 / hour with no commitments or minimums

Executing ISCE in Cloud

- Configure images of ISCE to support multiple cloud instance types
- Getting a machine with specific version of ISCE is now as simple as a one line script or a click of a button
- Enables debugging on a single machine or execution across large capacity on a cloud based cluster

Results

Use of Cloud in Design of a SAR Mission

Parametric studies of DESDynI SAR antenna using the ORASP antenna analysis software were ported to cloud. Execution of 24 element array was optimized from 4 hours to 10 minutes. This experiment demonstrates effective use of cloud computing to streamline data processing.

Setup	Cost	Time
Traditional		4 hours
Cloud w/ 26 c1.xlarge	$20	40 min
Cloud w/ 13 CC2	$25	20 min
Cloud w/ 26 CC2	$30	10 min

Interferogram Generation

The ISCE workflow was applied to 16 ALOS PALSAR images acquired over the Los Angeles area spanning 5 years. We formed all possible interferograms: 225 interferograms, generating 4TB of output data. S3 was used as a distributed filesystem and subsequent storage of results. This task initially took 1 week on local infrastructure.

- Deployed in AWS GovCloud over 80 machines w/ 8 cores and 7 GB of RAM
- 4 parallel interferograms on each machine
- Workflow orchestrated by Polyphony

$256 – 4 hours

This demo was performed over a year ago using the AWS Gov Cloud. Newer cloud resources with faster processors, solid state disks, and use of bid based capacity would provide greater speed and cost savings.

Management of Cloud Resources

- Cloud resources are charged in 1 hour increments
- Embarrassingly parallel problems can be processed faster by provisioning larger capacity.
- Costs can be optimized by filling up the 1 hour slots and using bid based capacity
- Spot instances on AWS offer bid based computing
  - Users bid how much they are willing to pay for compute
  - Prices can be as low as 1/10th the on-demand price
  - Top 100 supercomputer can be provisioned for [illegible] ALOS scenes above processed for ~$130K)
  - Future research includes cost optimization through use of Spot
- Cloud offers long term archival storage options for as low as 1 cent/GB/month

Polyphony

- Pipeline to streamline parallel workflow development
- Based on Amazon Simple Workflow
- Modular framework supporting
  - Highly optimized data transfer
  - Dynamic provisioning of machines based on load
  - Distributed file system to scale clusters
  - Already proven with nearly 10K cores on AWS EC2 instances
  - Workflows in Perform, C, C++, Python, Java, & Node.js
- Deployed in production for
  - MEL: arterial images is processed through Polyphony
  - CARVE (Carbon in the Arctic Reservoir Vulnerability Experiment): Level0 Full Physics algorithms
  - MEaSUREs Data archival project
  - Numerous small scale simulations across NASA
- Supports AWS S3, EC2, SDB, DynamoDB, and SimpleDB

Future Work

- Virtual Machine Image Catalog to discover algorithms
- Science data catalog to discover raw and processed data as well as execution parameters
- Benchmarking cluster compute instances, SSDs, and high I/O instances for InSAR processing
- Evaluate archival storage of InSAR results in cold storage
- Community inclusion of ISCE and improved documentation
- Tile-based visualization of interferograms to minimize data transfer required to analyze results
- Development of CESCRE
- Extensive cost analysis for cloud computing and comparison with internal infrastructure
  - Cost of large scale processing (e.g. 350K ALOS scenes)
  - Long term storage, backup, and archival costs.
  - Preliminary results demonstrate cloud computing is cost-effective

CESCRE

Collocation of Storage and Cost-effective Compute Capacity: Cloud computing enables us to collocate large-scale storage with elastic compute capacity. This obviates local storage or downloading the data into the local infrastructure. Compute capacity can be elastically provisioned in the cloud, where the stored data are available on the local network.

Preconfigured Machine Images for Streamlined Processing: CESCRE utilizes virtualization, which enables end-users to create pre-configured machine images with all the software and dependencies required by their environments. Pre-configured machine images with popular algorithms streamline the process of provisioning a machine and running the analysis.

Parallelization of Algorithms and Cloud Orchestration: CESCRE integrates capabilities with Polyphony, to enable scientists to obtain their results faster by concurrently employing large number of machines. This enables scientists to cost-effectively minimize end-product latency.

Collaboration: Collocation of data enables sharing of raw data as well as higher-level data products. The pre-configured machine images enable software developers and research scientists to share their implementations and algorithms with the community. This significantly reduces the overhead currently associated with sharing and evaluating new algorithms. The parallelization of algorithms in a shared environment will minimize duplicate processing and lead to collaborative processing of large datasets. It will further facilitate efficient sharing of computational resources across the NASA community.

End-to-End Validation of Proposed Capabilities with InSAR: ISCE is used as a prototype data analysis and modeling application for the development of CESCRE. CESCRE will be validated against an end-to-end system that takes raw data through higher level data products and final theta into modeling algorithms.

Publications

Gurrola, Eric, Gian Franco Sacco, Paul A. Rosen, and Howard Zebker, "InSAR Scientific Computing Environment," *Fourth Science Technology Forum* (2010).

Zebker, Howard, Scott Hensley, Piyush Shanker, Cody Wortham, "Geodetically Accurate InSAR Data Processor," *IEEE Trans. On Geoscience and Remote Sensing*, 48(12), 2010.

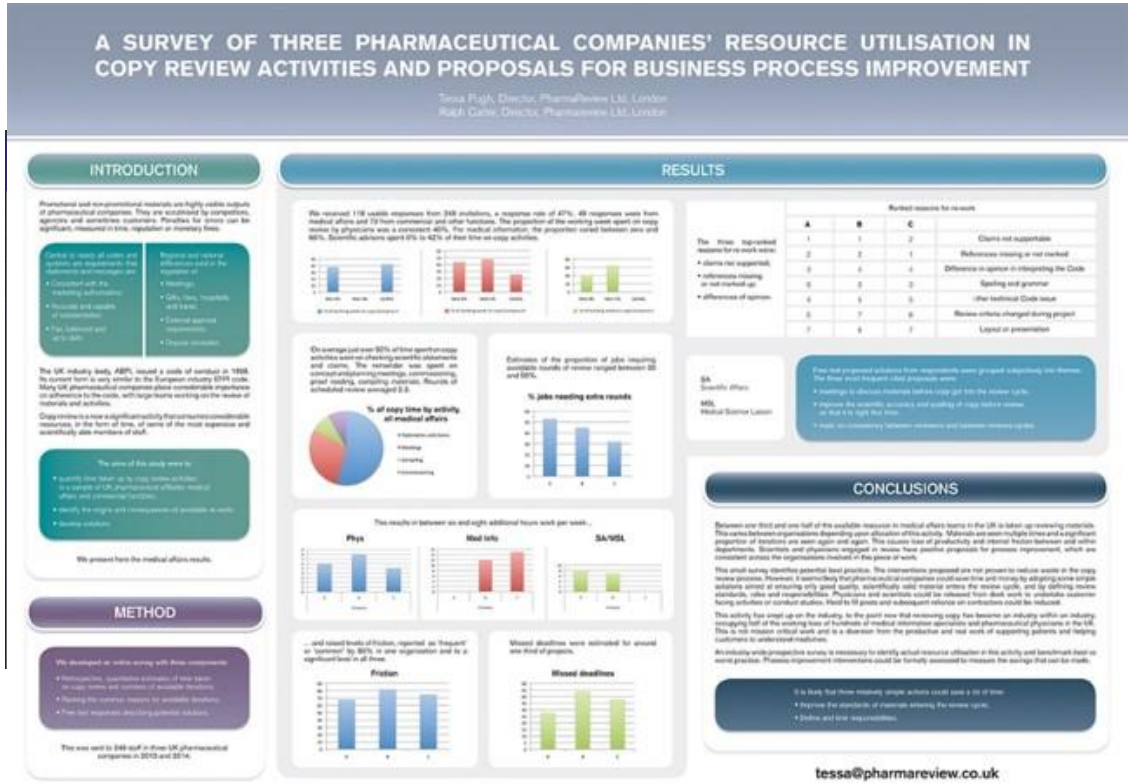
Shams, K. Rodrez, A. Hardman, S. et al. "Enabling Earth Science through Cloud Computing," *IEEE AIAA Aerospace* 2012.

Acknowledgement

The authors would like to thank the Earth Science Technology Office and High End Computing Program at NASA for support. This work was performed at the Jet Propulsion Laboratory, California Institute of Technology under a contract with NASA.

Content

- Max number of words - 250
- Bullet points easier to read
- Diagrams useful for method sections
- Results section - image based.



Contact Details and Logos

- How to contact?
- QR code
- Affiliations
- Uniform size
- Keep logos to one area
- Use ‘dead space’

Glasgow
Clinical Research Facility

NHS
Greater Glasgow and Clyde

CHIEF SCIENTIST OFFICE

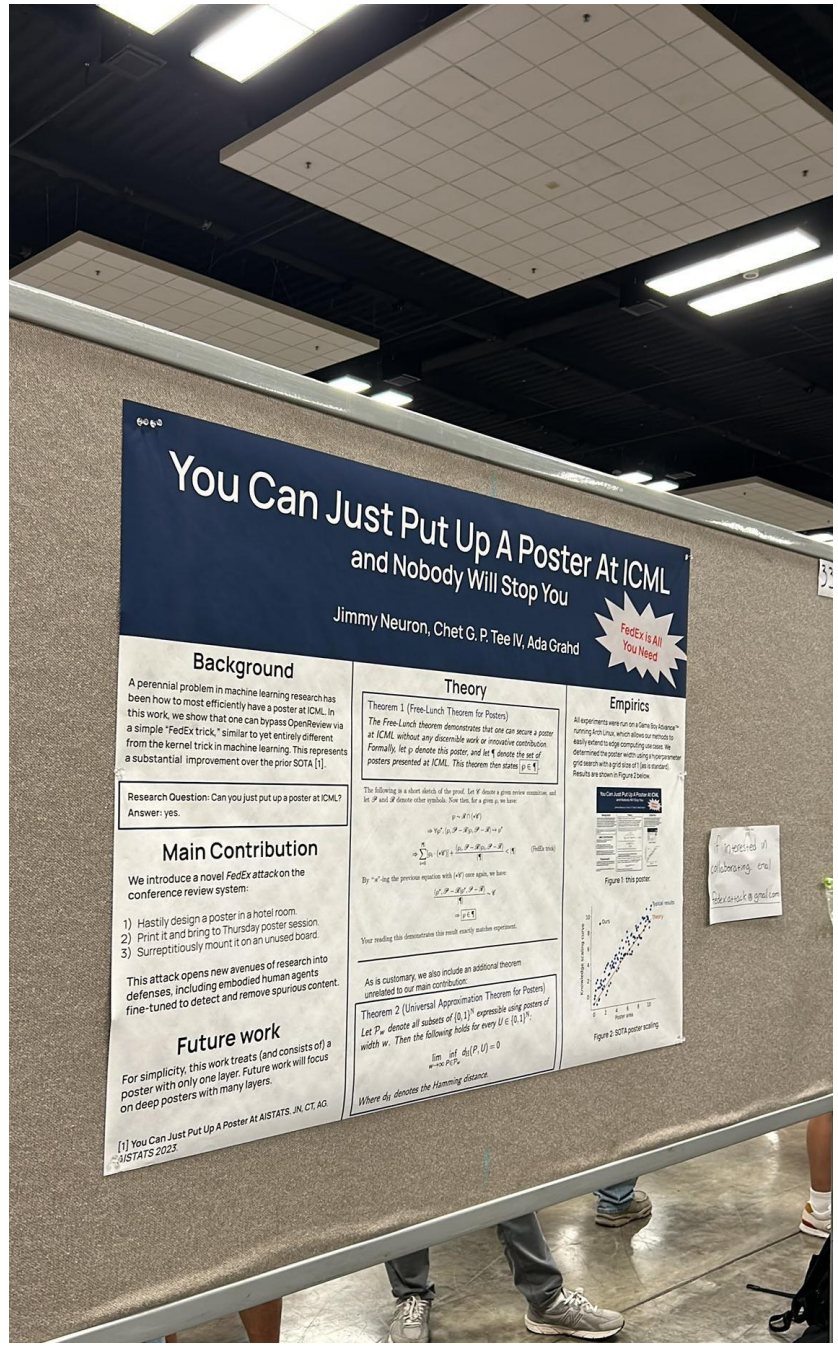
University of Glasgow

Final Check

- Does the poster flow logically?
- Is all text readable?
  - Spelling and grammar
- Are graphics good quality?
- Is data understandable?
- Does the most important information stand out?

Key Points

- Draw attention from the other side of the room
- Simple is good
- Line things up
- Don’t over crowd
- Make important things stand out



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Reflection Points

- How can you maximise the chance that your abstract will be accepted?
- From your own conference attendances, what have been the ‘stand-out’ conference abstracts, drawing you to go and find the poster?
- Electronic posters are becoming the mode of choice for some conferences; how do they differ from other formats?
- What are some of the ways to prepare for conference presentation, whether oral paper or poster?

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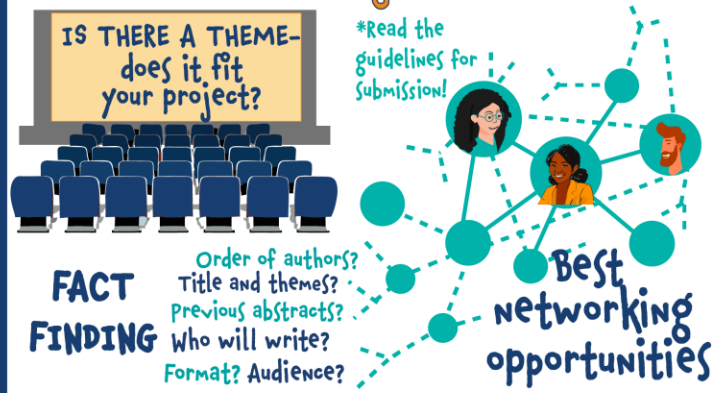
WRITING A CONFERENCE ABSTRACT AND DESIGNING A POSTER

Professor Ruth Endacott, NIHR Director of Nursing and Midwifery

WHY SUBMIT A CONFERENCE ABSTRACT?

KEY DECISIONS BEFORE WRITING

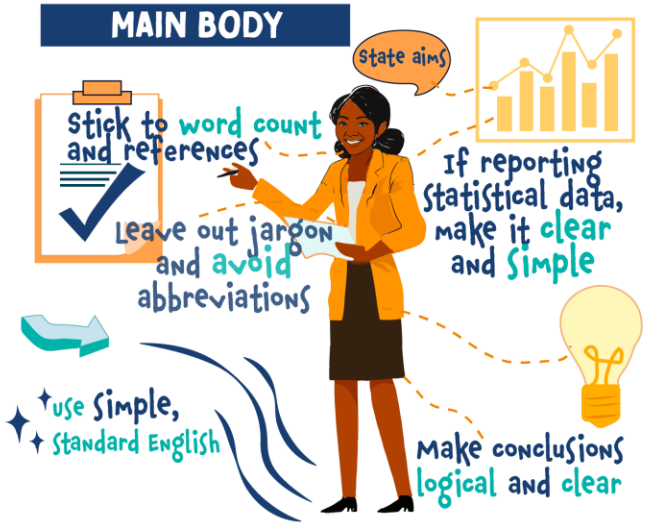
Choose the right conference!



PRACTICAL ASPECTS

TITLE

MAIN BODY



...FINAL MESSAGES FOR ABSTRACT WRITING

POSTER DESIGN APPROACHES

Naomi Hickey, Glasgow Clinical Research Facility

PAGE SET UP:

There will likely be specific size requirements
Way of reading -logical (L to R)
free from chaos

ALIGNMENT & WHITE SPACE

make your poster PROFESSIONAL by keeping things well-aligned

White Space PREVENTS OVERCROWDING
Helps to draw attention

IMAGES & GRAPHS

RELEVANT
Not too many
SIMPLE
High Resolution
Icons can be good to draw the eye

CONTACT DETAILS & LOGOS

QR CODE

names, affiliations, uniform size, logos (keep in one area)

TEXT

Maximum of 2 FONTS
Serif vs. sans serif:
sans serif is easier to read, clearer, etc.
SPACING Line Spacing Left align Kerning

COLOUR

Simple Colour palate
Repeat 2-3 colours
Colours Should CAPTURE attention & HIGHLIGHT important information but should NOT distract the viewer.
Consider Red/green colour-blind

CONTENT

Max number of words
Do not repeat
Diagrams/ flowcharts useful for methods
Bullet points easier to read
Results- image based

FINAL CHECK

- Logical flow?
- Text readable?
- Spelling & grammar
- Graphic quality?
- understandable data?
- Important info Standing out?

Q&A

Updates

- **Opportunity to work at the iHV –** Research Associate post
- **Research bulletin –** Jan, May, Sept 2026
- **iHV Research Resources –** https://ihv.org.uk/our-work/research/
- **Collaboration form:** https://ihv.org.uk/our-work/research/collaborate-on-a-research-study/

Opportunity to support research

Ali Whitehouse (PhD Student and Lecturer in CYP Nursing) is looking for Health Visitors to complete a short online survey as part of the second phase of her PhD at the University of Surrey, exploring motor development in looked-after children.

As Health Visitors, you play a vital role in early child development and safeguarding – your perspective is essential to understanding how some of the most vulnerable children in our communities can be better supported.

- The survey takes around 10 minutes to complete and has been reviewed by the University Ethics Committee (Ref: 1864).
- By taking part, you'll be contributing to research that aims to strengthen practice and improve outcomes for looked-after children. Thank you for your time.

👉 Survey link: https://forms.office.com/e/tC4VGwHUzg

2026 Research Network Dates

- Wednesday 18 March – 9:30-11:30
- Wednesday 1 July – 9:30-11:30
- Wednesday 11 November – 9:30-11:30

Over to you

Help us to tailor our events to meet **your** needs!

- Submit your anonymised responses to the poll
- What more can we do to support you in your practice?

  Email events@ihv.org.uk with any suggestions

Thank you so much for joining us

Upcome events:

3rd Dec | iHV Leadership Conference

14th Jan | Sp HV PIMH Special Interest Group

22nd Jan | Insights – The Refresh of the Healthy Child Programme

29th Jan | iHV Corporate Service Leads Network

3rd Feb | SCPHN Student Network

12th Feb | SEND Special Interest Group

All future Member Benefit Events dates can be found at:
https://ihv.org.uk/training-and-events/events/