PREMSTEM

Brain injury in the **prem**ature born infant: **stem** cell regeneration research network

H2020-SC1-2019-Single-Stage-RTD
SC1-BHC-07-2019 Regenerative medicine: from new insights to new applications

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Consortium:	**1 INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE** (INSERM), France **2 ROYAL MELBOURNE INSTITUTE OF TECHNOLOGY*RMIT UNIVERSITY** (RMIT AU), Australia **3 UNIVERSITAIR MEDISCH CENTRUM UTRECHT** (UMCU), Netherlands **4 UNIVERSITEIT MAASTRICHT** (UM), Netherlands **5 STICHTING KATHOLIEKE UNIVERSITEIT** (RADBOUDUMC), Netherlands (terminated) **6 UNIVERSITAETSKLINIKUM ESSEN** (UK ESSEN), Germany **7 GOETEBORGS UNIVERSITET** (UGOT), Sweden **8 CONSIGLIO NAZIONALE DELLE RICERCHE** (IN-CNR), Italy **9 UNIVERSITE DE GENEVE** (UNIGE), Switzerland **10 ICONEUS** (ICON), France **11 ROYAL MELBOURNE INSTITUTE OF TECHNOLOGY SPAIN SL** (RMIT EU), Spain **12 CEREBRAL PALSY ALLIANCE** (CPA), Australia **13 EUROPEAN FOUNDATION FOR THE CARE OF NEWBORN INFANTS** (EFCNI), Germany **14 INSERM TRANSFERT SA** (IT), France **15 CHIESI FARMACEUTICI SPA** (CHIESI), Italy **16 STICHTING RADBOUD UNIVERSITAIR MEDISCH CENTRUM** (RUMC), Netherlands

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Executive summary

This report provides an overview of the content elements created for the PREMSTEM project as part of *Task 6.3 Content Development & Dissemination*. It refers to outputs created, and communications and dissemination activities undertaken, which took place between January 2020 and April 2023.

The main aim of Task 6.3 is the 'adaptation, editing and creation of quality, professional content elements' such as lay summaries and fact sheets and their diffusion through owned and non-owned communication channels, including websites and social media. Content elements are created with the project's key stakeholders in mind, as identified in the *Communication and dissemination strategy*, including parents and patient representatives, the scientific community and healthcare professionals.

As per the European Commission definitions, communication activities aim to 'inform, promote and communicate project activities and results' whereas dissemination involves sharing scientific knowledge and results to audiences who can make use of them, such as members of the research community and policy makers. The PREMSTEM team focuses on sharing scientific content and results through both communication and dissemination methods, depending on the target audience.

In terms of communication, content elements such as lay summaries translate PREMSTEM's research into language accessible to non-experts who represent those who one day might benefit from the results. Content elements created for communication purposes aim to break down barriers for everyday people to accessing scientific knowledge. Scientific results are disseminated in technical language by researchers through scientific publications and presentations to audiences with subject matter expertise. To date, most of the project's content elements fall into the category of communication activities, making these the main focus of this report.

Acknowledgements

PREMSTEM is grateful to have the continued opportunity to work with its Patient/Consumer Advisory Board (PCAB) to create and improve the project's content elements. The project acknowledges their important role in its communications efforts, including the time they have dedicated to providing feedback and guidance, editing content and translating resources. Thank you Fabiana Bacchini, Alishia Ballintine, Vera Bikicki Ivezić, Matthew Miller, Livia Nagy and Gert van Steenbrugge.

As the PREMSTEM partner coordinating Task 6.3, RMIT Europe thanks all members of the consortium for their ongoing contributions to content creation, and their expertise and guidance to ensure scientific accuracy of the project's content elements. Their willingness to be involved in scientific communication and dissemination efforts is greatly appreciated.

Contents

1. Context

Prior to selecting and setting up the appropriate channels to support the activities of Task 6.3 it was important to define the project's key messages, target audiences and communication and dissemination goals to provide the context for internal and external content creation throughout the project.

Key messages

PREMSTEM's content elements aim to emphasise defined key messages, depending upon the channel, type of content and audience. They fall into the following categories:

World-leading research and expertise

- PREMSTEM is bringing neonatal health issues to the centre of the research agenda.
- PREMSTEM's research is advancing understanding of the potential of human mesenchymal stem cells to treat brain injury related to preterm birth.
- PREMSTEM's researchers are experts in disciplines such as neonatology, cell biology and physics.
- PREMSTEM's therapy could help to improve other types of perinatal brain injury.
- PREMSTEM is developing a mobile technology which can help to diagnose brain injury at the cot-side.

Education and awareness raising of relevant scientific and health topics

- Preterm birth and related health issues.
- Perinatal brain injury.
- Stem cells.

Stakeholder engagement (co-creation)

- PREMSTEM listens to the voices of its key stakeholders, including parents and carers of children born preterm, adults born preterm and medical professionals as the representatives of the patient group the research aims to help.

Target audiences

The following target audiences are identified in the project's *Communication and dissemination strategy*:

- Researchers and the scientific community, especially in the field of neuroscience and complications of preterm birth.
- Clinicians: neonatologists, paediatricians etc.
- Healthcare professionals: nursing and care professionals, therapists, other doctors.
- Patient/parent organisations.
- Policy makers.
- General public.
- Industry, pharmaceutical and technology companies.
- Project consortium.
- Specialised media – biotech and medical new aggregators.

The project's different channels and content elements aim to reach one or more of the target audiences in every action taken.

Scientific and stakeholder engagement

The PREMSTEM team works alongside key stakeholders to brainstorm, create and fact check content created in the context of communication activities before they are distributed or go live. Stakeholder engagement is also important for amplifying the reach of the project's content elements. In terms of communication and dissemination activities, the key stakeholders are:

- Members of the PREMSTEM consortium.
- Members of the Patient/Consumer Advisory Board (PCAB).
- Partners' communications teams.
- Partners' networks, including parent associations.
- Related projects.

Many of PREMSTEM's external content elements, including fact sheets, highlights of research publications and social media posts, are written in collaboration with a scientific expert from the consortium and are reviewed before going into the public domain. This is to achieve the objective of producing high quality and scientifically sound content.

In addition, the project invites feedback and suggestions from the six members of the PCAB in relation to content elements created for communication purposes. As parents of children born preterm or adults born preterm themselves, members of the PCAB help to ensure that these outputs are written in everyday language, can be understood by non-expert audiences, cover topics that are relevant to parents and carers, and are written with the reader front of mind. Using appropriate language is especially important given the sensitivity of some of the topics addressed. Some of the ways in which members of the PCAB have supported the project's communication efforts include reviewing the wording and content of the PREMSTEM website, contributing text and supplying images for social media posts, translating fact sheets and video captions, and providing feedback on the stem cell animation script and storyboard. Storytelling plays a role in content creation with the PCAB as they have a lived experience which can be interesting and relatable for PREMSTEM's key audiences, especially parents and carers.

Communications professionals at PREMSTEM partner organisations are kept up to date with project updates and encouraged to share PREMSTEM resources, including translations into languages used where they are located. Partners' communication teams have been provided with a guide to help them communicate about PREMSTEM which includes a list of partner social handles, details of the project website and social channels and how to properly acknowledge the EU funding.

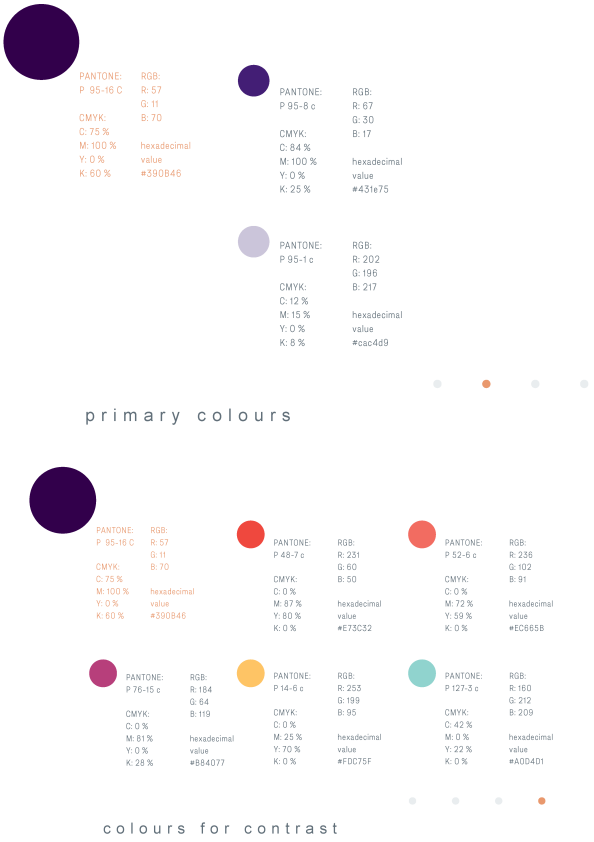
Many of these communications contacts have supported PREMSTEM by writing about the project on their websites, sharing PREMSTEM's social media posts and creating novel content for their social media channels, distributing resources, writing news stories and promoting co-creation activities. They have also played a role in connecting the project to relevant organisations. For example, the CPA team introduced PREMSTEM to the organisers of World Cerebral Palsy Day. This led to the publication of content on non-owned accounts, thereby allowing an opportunity for increased visibility and promotion of the project on social media channels where PREMSTEM isn't present.

Figure 1 The World CP Day Instagram post in 2021 received almost 6,000 likes.

2. PREMSTEM's brand

Visual identity and logo

The team at sci.sters (https://sci-sters-editions.com/) created a strong and professional visual identity and logo for PREMSTEM, ensuring design consistency and uniformity in all content elements. The visual identity has been applied to the project website and social media accounts as well as internal and external communications outputs, such as templates, social media assets, videos and fact sheets.



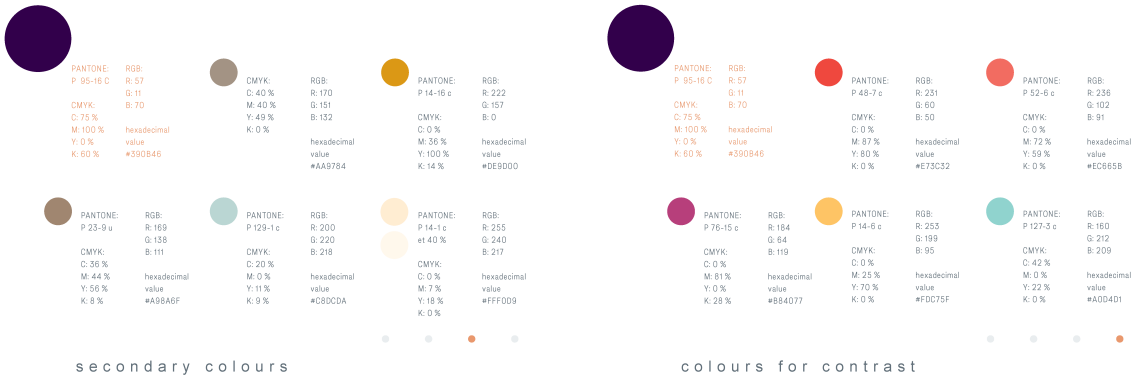


Figure 2 Colour palettes of the PREMSTEM visual identity.

The project logo is composed of two sections of a brain. Neurons, symbolised through graphic elements, are lacking in the left side and represent PREMSTEM's area of research: brain injury related to preterm birth. The right side shows an extended neuron network to indicate a

healthier brain, thereby representing the potential and hope of the project's novel stem cell treatment to treat the injured brain.

Figure 3 Variations of the PREMSTEM logo.

3. Communication channels

The project uses a range of channels for the purpose of internal and external communication and the diffusion of content elements. Communication outputs and scientific results aimed at external audiences are hosted and distributed primarily via PREMSTEM's owned channels (the project website and social media accounts). They are also shared with consortium members and the PCAB as advocates of the project and partners' communications teams who often manage or have access to channels with larger followings. This gives the project coverage on social networks where PREMSTEM isn't present, such as Instagram and Facebook. Where possible, the project contributes content to partner newsletters, for example as part of the co-creation recruitment strategy.

For internal communications, PREMSTEM has two SharePoint sites which are used for the hosting, editing and sharing of confidential material and documents. Mailchimp is the platform used to produce internal newsletters which are distributed to consortium members bimonthly and to the PCAB twice per year. Communication and information sharing among the consortium partners is also conducted through email, online meetings and in-person visits. PCAB communications also take place through email and online meetings.

External channels

Project website

Figure 4 PREMSTEM homepage with cookie popup previewed on different devices.

The PREMSTEM website (https://www.premstem.eu/) was launched in May 2020 and is pivotal for building the project's reputation and communicating with external audiences. Its structure and content are designed to cater for the project's target stakeholders such as researchers, clinicians, parents and caregivers.

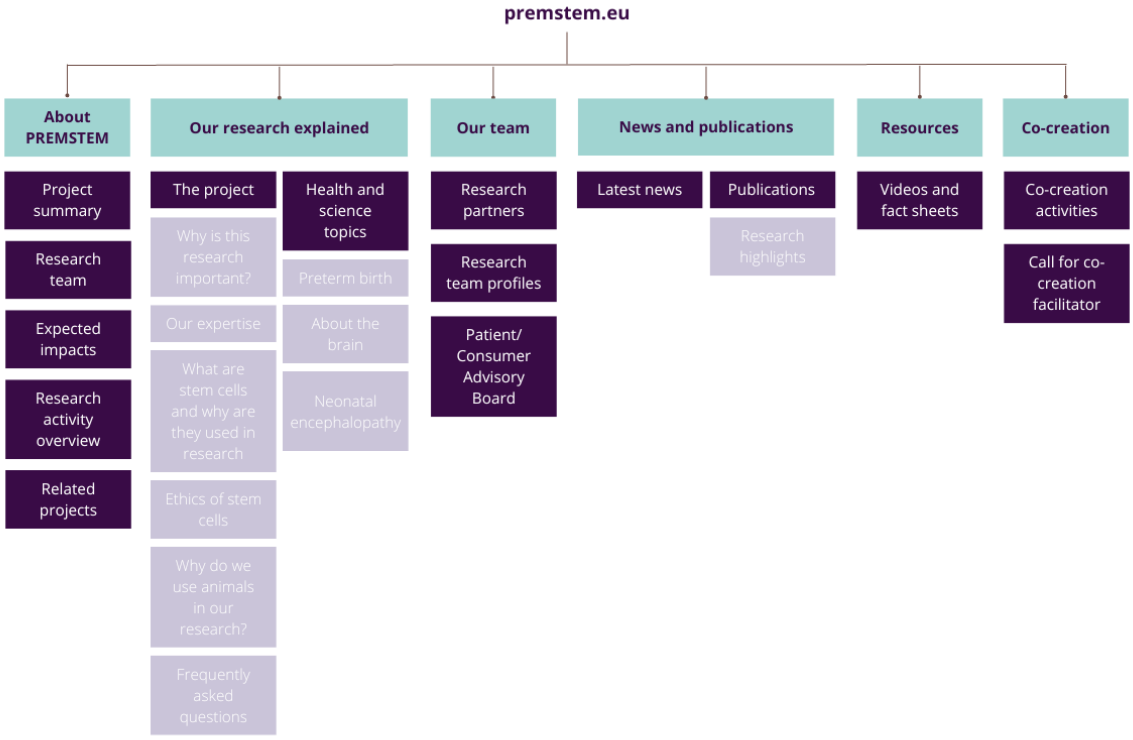


Figure 5 PREMSTEM website hierarchy (April 2023).

The website is regularly updated with novel content as the project progresses, created in collaboration with consortium partners and the PCAB. Scientific results are disseminated through the research publications page; new resources and project updates are added as and when they occur. Website content is promoted via the project's owned social media channels to drive traffic to the landing page or a specific website section or asset.

As new content and resources are developed and added, the website is reviewed and its design refreshed to enhance user friendliness, for example by creating video playlists or using plugins which enhance functionality or appearance. The following table provides an overview of the website's content elements as of April 2023.

Menu heading	Aim of content	Target audiences
About PREMSTEM	To detail project aims and research methodologies, scientific activities and results; to mention related projects with complementary research topics and aims.	Scientists, researchers, subject and topic area experts.
Our research explained	To raise awareness of the importance of the project, explain why animals and stem cells are used in the research; to provide information about related health and scientific topics.	People looking for information in everyday language, such as parents and carers.
Our team	To profile project partners and team members; to introduce the role of the PCAB and profile its members.	All.
News and publications	To provide project news and summarise events; to provide research highlights and links to PREMSTEM affiliated publications.	All.
Resources	To offer videos and fact sheets, often downloadable in multiple languages, related to the project research topics.	People looking for information in everyday language, such as parents and carers and clinicians seeking resources for patients.
Co-creation	To provide information about the role of co-creation in the project and upcoming opportunities to be involved; to promote the call for facilitator proposals.	Target stakeholders interested in participating in co-creation activities. and current participants.

Partner websites

Several consortium partners include information related to the project on their website and encourage traffic to PREMSTEM's owned channels and resources, thereby exposing the project to larger audiences and enhancing its reach.

Partner	Content	URL
Cerebral Palsy ALLIANCE	The CPA website features a story entitled *CPA researchers bring their knowledge of cerebral palsy and stem cell research to the PREMSTEM project*. The page includes links to the PREMSTEM website, Twitter and LinkedIn accounts. The website has also been used to promote co-creation activities.	https://cerebralpalsy.org.au/sstposts/StoryId1595984546283

EFCNI european foundation for the care of newborn infants	The project is featured on the research projects page of the EFCNI website. There is also a webpage dedicated to PREMSTEM which hosts the project video, the fact sheet on preterm birth and brain injury and provides links to the PREMSTEM website, Twitter and LinkedIn accounts.	https://www.efcni.org/research-overview-page/ https://www.efcni.org/premstem/
Consiglio Nazionale delle Ricerche ISTITUTO DI NEUROSCIENZE	The project has its own page on the IN-CNR website with an overview and researcher contact details.	https://www.cnr.it/en/research-projects/project/38445/h2020-premstem-brain-injury-in-the-premature-born-infant-stem-cell-regeneration-research-network-dott-ssa-verderio-dsb-ad004-276
InsermTransfert Your partner in health innovation	The Inserm Transfert website features a short project overview in French, the project video, and links to the PREMSTEM and Cordis websites.	https://www.inserm-transfert.fr/projetcollaboratif/premstem/
Radboudumc university medical center	PREMSTEM is listed as one of Radboudumc's Horizon 2020 grants on its website.	https://www.radboudumc.nl/en/research/archive/annual-report-2020-rimls/content/grants-2020/highlights/horizon-2020-grants-2020 https://www.radboudumc.nl/en/research/archive/annual-report-2019-rimls/content/grants-2019/rimls-highlights-2019/horizon-2020-grants-2019
RMIT UNIVERSITY	PREMSTEM is featured on the research projects page of the RMIT Europe website which includes a link to the website and contact details of the researchers.	https://www.rmit.eu/research-projects
UNIVERSITY OF GOTHENBURG	The University of Gothenburg website has information about PREMSTEM in both Swedish and English. It includes the project video, stem cell animation, preterm birth and brain injury fact sheet in Swedish, contact details of the researchers and a link to the project website.	https://www.gu.se/forskning/premstem https://www.gu.se/en/research/premstem https://www.gu.se/en/clinical-sciences https://www.gu.se/en/promise
UMC Utrecht	Utrecht University has a link to the PREMSTEM website via its networks and consortia webpage.	https://www.uu.nl/en/research/regenerative-medicine-utrecht/networks-and-consortia

Social media

Social media creates a 'voice' for the project and an online platform for dialogue with target audiences. Social media content falls into various themes, which are outlined further in section 4. PREMSTEM's Twitter account has been active since early 2020 and the LinkedIn page since June 2000. The YouTube channel was created in June 2021 to launch the project video and has been since been expanded to host all audio-visual content, including the stem cell animation and video shorts.

The project's presence on social media plays an important role in communication and can support dissemination activities carried out by the researchers; providing regular updates and releasing content on these channels is therefore regarded as a high priority. As a useful tool for science communication, most of the textual content produced for social media is written in everyday language. Content elements created for communication purposes strive to promote the project, showcase its researchers and their expertise, provide updates on activities and share information to raise the visibility and awareness of stem cell research as well as health topics related to preterm birth. These channels are used to distribute resources, such as fact sheets and videos, which are aimed at non-specialist audiences. Social media also supports dissemination activities by providing short summaries of new research publications and publishable scientific updates after consortium meetings.

Social media is also useful for stakeholder engagement and co-creation activities are promoted on Twitter and LinkedIn as part of the recruitment strategy for workshops and interviews. Relevant hashtags are included in social media posts to leverage opportunities for user engagement and interaction, enhance the project's online profile and demonstrate expertise in specific topics. Calls to action (CTAs) regularly drive traffic to the project website where visitors can download resources or access scientific results through lay summaries or full research publications.

Where it makes sense to do so, LinkedIn posts are reposted in relevant groups to reach specific stakeholders. These include *TheCoCreators: Co-creation Network & Discussion Group* (1,880+ members), *Horizon2020 - H2020 – HorizonEurope* (1,780+ members), *Science Communication, Dissemination and Exploitation of Results* (15,000+ members), *Stem Cell Clinical Trials* (10,270+ members), *Clinical Trials Network (Europe)* (4,300+ members) and *MARIE CURIE Actions (MSCA), Horizon Europe, Fellowship, Research Grants, PhD Careers, and R&D Jobs* (24,690+ members).

Partner social media

PREMSTEM partner organisations and consortium members are encouraged to post about the project and share PREMSTEM content through their personal networks to increase awareness, reach and impact. Partners such as EFCNI are also active on Facebook and Instagram which provides opportunities to promote PREMSTEM on additional platforms and reach more people who are already engaged in the topic of preterm birth.

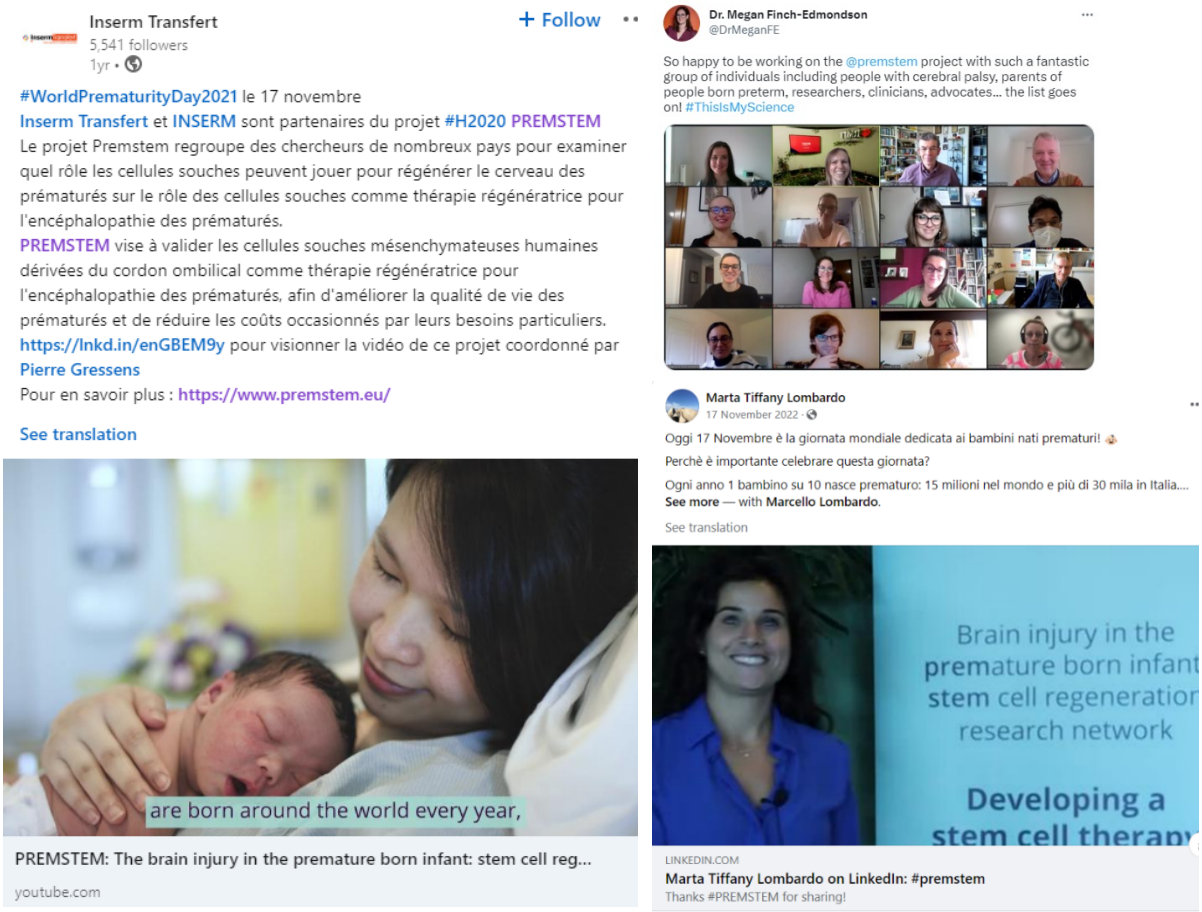


Figure 6 Social media posts on non-owned accounts.

European Commission channels

There are various European Commission communication channels which can help to elevate the profile of projects such as PREMSTEM. The project has benefitted from some of these, with the PREMSTEM video and stem cell animation included in the Videos from H2020 EU funded projects (https://www.youtube.com/playlist?list=PLLyjX6SgFi0ft2rzfxdG6HHLJ9CBbtCoC) playlist on the CORDIS: Innovate with EU Research Results YouTube channel (@CORDISdotEU) (https://www.youtube.com/@CORDISdotEU) which has 1,170+ subscribers. This content is also available on the PREMSTEM project page on the CORDIS website (https://cordis.europa.eu/project/id/874721). All PREMSTEM LinkedIn posts include the hashtag #h2020 which has 3,850+ followers.

In 2020 the European Commission invited Horizon 2020 projects to submit images reflective of their research as part of its #EUinmyRegion campaign. PREMSTEM's submission, which shows a section of a mouse cortex at 45 postnatal days obtained with an optical microscope (magnification x200) after tissue staining, was selected and printed on 300 postcards and promoted on the EU in my region Facebook page (66,000+ followers) and website (https://euinmyregion.eu/portfolio-item/premstem/).

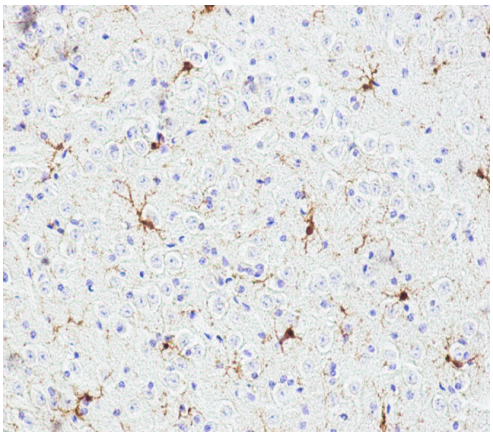


Figure 7 #EUinmyRegion submission showing microglia cells in brown and nuclei from all cell types in blue.

Related projects channels

In 2022 PREMSTEM reached out to other research projects funded in the same Horizon 2020 call to invite a discussion about cross-project promotion and collaboration. Representatives from AIDPATH (https://www.sciencrew.com/c/6499?title=AIDPATH), AutoCRAT (https://www.autocrat.eu/), Healikick (https://glasgow.thecemi.org/our-research/healikick/), JOINTPROMISE (http://www.jointpromise.eu/), OrganTrans (https://organtrans.eu/), PREMSTEM and SBR (Smart Bone Regeneration) (https://www.smart-bone-regeneration.eu/) attended an introductory meeting in July 2022 to present the projects. This meeting led to the creation of new content elements, engagement and cross-promotion through website and social media activity, including a collaboration between PREMSTEM, AutoCRAT and Healikick for a social media post for Stem Cell Awareness Day 2022. PREMSTEM now features related projects on its website. Conversely, various related projects have included information about PREMSTEM on their owned channels. The OrganTrans project has invited PREMSTEM to present at two workshops on regenerative medicine.

Internal channels

SharePoint

PREMSTEM uses a SharePoint site to facilitate internal communication between consortium partners to share information (e.g., meeting minutes and reports) and exchange scientific knowledge (e.g., standard operating procedures). It also allows consortium members based at different institutions to collaborate on shared documents. A second SharePoint site provides another avenue of communication between PREMSTEM partners and the PCAB. It is mainly used to share documents and work together on content elements such as the stem cell animation script and World Prematurity Day website news story.

4. Content elements for external communication

Social media assets

The project designs visual assets such as images, GIFs and short videos to enhance audience engagement and complement textual content by highlighting key messages and themes.

Content theme: Profiles

Early in the project, social media efforts concentrated on establishing PREMSTEM's online presence, raising awareness of the project, building interest in the research and attracting

followers in key stakeholder groups. To introduce audiences to the people involved in the project, a series of researcher and PCAB profiles was created. The text of these posts included a short biography and a CTA to visit the project website. They were complemented with a social media asset image and quotation.

Figure 8 Social media assets profiling researchers and PCAB members.

Content theme: Awareness days addressing health topics related to preterm birth

PREMSTEM seeks opportunities to leverage off global social media campaigns to involve itself in relevant conversations and connect with likeminded organisations and individuals active on social media. One way this is achieved is by creating and publishing content for awareness days related to the project's research topics and/or expertise such as World Autism Month, World Cerebral Palsy Day, World Prematurity Day and World Heart Day. As a result of such activities, PREMSTEM has attracted new followers including large international organisations such as Save the Children Canada (11,000+ Twitter followers).

By contributing content in the context of a wider campaign, PREMSTEM helps to increase societal awareness of relevant health issues and involves itself in global conversations while boosting its online presence. Social media content such as this connects the project to wider discussions relevant to perinatal brain injury and health issues connected to preterm birth while promoting the expertise and experience of the research consortium and PCAB members.

Figure 9 Social media assets for global awareness days.

Content theme: Awareness days related to non-health topics

PREMSTEM contributes to relevant non-health related global awareness raising campaigns such as Pint of Science Australia, the International Day of Women and Girls in Science and International Women's Day. Content elements which have been created includes 'behind the scenes' footage with the UMCU team and video interviews with researchers about why they chose a career in science. This type of content provides an opportunity for the audience to get to know the consortium team; this personal aspect often leads to high levels of engagement.

Figure 10 LinkedIn asset for 2021 International Women's Day – one of PREMSTEM's most popular posts with around 3,500 impressions.

The project also participates in social media campaigns which offer a platform and context to disseminate PREMSTEM resources, such as the European Day of Languages for sharing translated fact sheets.

In August 2020 PREMSTEM was selected as a featured project in the #EUinmyRegion campaign, (https://euinmyregion.eu/portfolio-item/premstem/) a communication initiative to engage with citizens and show what can be made possible thanks to co-funding efforts between the European Union and European regions.

Content theme: Stem cell research

One of PREMSTEM's communication objectives is to break down barriers to understanding the research it is doing and make it accessible beyond the scientific and medical communities. Content elements created for social media posts support researchers' dissemination efforts by sharing high-level summaries of scientific publications and presentations with links for further reading.

Through science communication, PREMSTEM aims to increase societal awareness and acceptance of stem cell research. Examples of this include the creation of explanatory content to address questions on the theme of stem cells which are often asked by non-expert audiences. Search terms used on Google provide a guide on the type of information audiences are looking for: *What are stem cells? Are there different types of stem cells? What makes stem cells different to other types of cell in the body? Why do we use stem cells in research?*

The brainstorming session which took place in the planning stages of the project's stem cell animation created a bank of questions related to the topic of stem cells which has proven useful for the creation of additional content. In late 2021 RMIT Europe, Chiesi and the CPA worked together to develop a series of short video assets and posts for PREMSTEM LinkedIn and Twitter which were shared over several weeks. Social media assets have also been created for Stem Cell Awareness Day, including a collaborative post in 2022 with related projects conducting similar research. Relevant partner resources such as CPA's stem cell explainer videos are also shared on PREMSTEM's Twitter and LinkedIn accounts as well as news and progress related to stem cell research (e.g., UMCU's PASSIoN clinical trial).

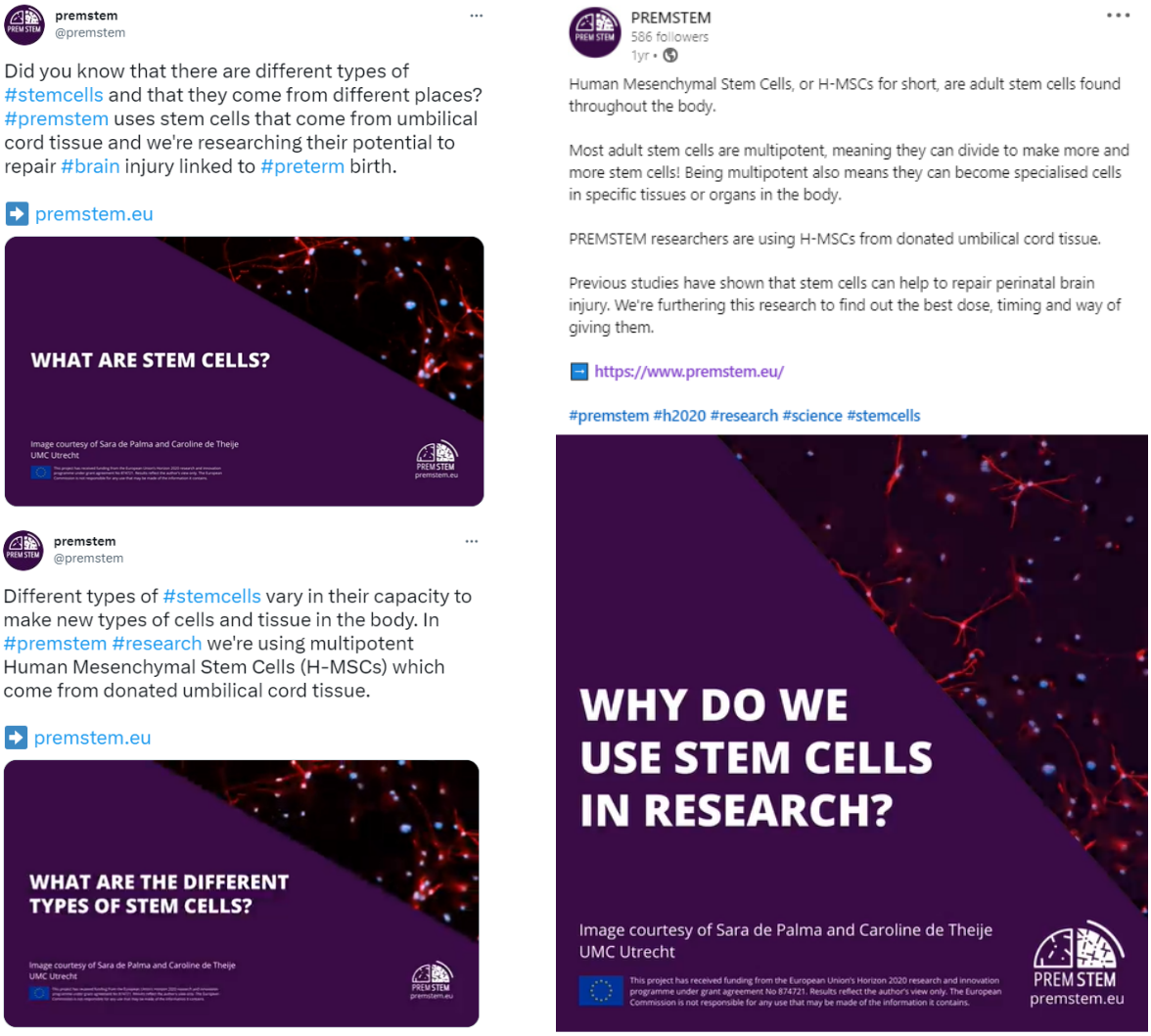


Figure 11 Stem cell social media posts with video assets.

Press releases and partner news stories

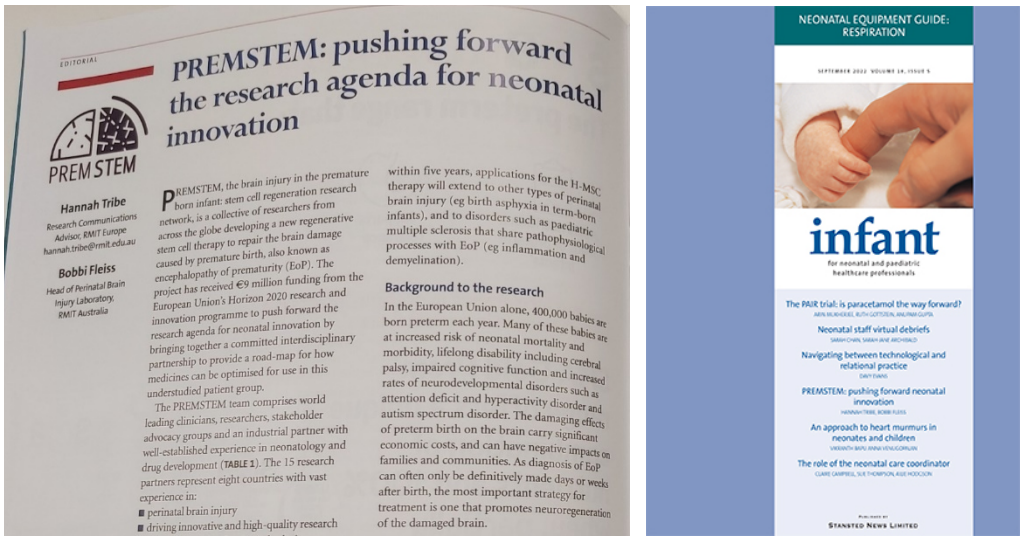
Media coverage can raise awareness of the project among broad as well as targeted audiences. To date, PREMSTEM has released two press releases. The purpose of the first was to announce the project funding and was published on the RMIT News website (https://www.rmit.edu.au/news/all-news/2020/jan/a-lifeline-for-premature-born-babies) in January 2020. The consortium shared the release among their networks and it was repurposed on the websites of UMCU (https://www.umcutrecht.nl/nieuws/onderzoek-naar-behandeling-hersenschade-babys), Utrecht University (https://www.uu.nl/en/in-the-media/rmu-researchers-are-developing-new-therapy-to-treat-brain-damage-in-premature-babies), Radboudumc (https://www.radboudumc.nl/en/news/2020/researchers-investigates-how-stem-cells-affect-the-immune-system), Iconeus (https://iconeus.com/news/premstem/) and IN-CNR (https://www.cnr.it/en/news/9160/a-lifeline-for-premature-born-babies-funding-announced-for-new-stem-cell-research). The second press release coincided with World Prematurity Day in 2021 and was also published on the RMIT News website (https://www.rmit.edu.au/news/all-news/2021/nov/tackling-the-challenges-and-risks-of-preterm-birth). Future press releases will be written and distributed to promote major achievements in the project, such as substantial progress in the research that has the potential

to have a positive impact on society. Besides press releases, PREMSTEM has been mentioned in an RMIT News website (https://www.rmit.edu.au/news/all-news/2020/dec/power-of-research-post-pandemic-society) story about the role of research in a post-Covid-19 society and in an article for World Prematurity Day written for the CPA website (https://cerebralpalsy.org.au/sstposts/StoryId1637106898341).

Content performance: The first press release led to mentions of PREMSTEM in multiple news outlets including MERLN Institute, BioPortfolio, Scienmag, EurekAlert!, The Educator Australia, Esanum, Uni Duisburg-Essen, Informations Dienst Wissenschaft, Informationsdienst Ruhr, Pflege Professionell, MedEcon, MTA Dialog, RTV Utrecht, Utrecht Nieuws NL, Utrecht Science Park, DUIC, Regenerative Medicine Utrecht, Fondation Paralysie Cérébrale, Handicapnieuws.net, Nationale Zorggids and Esteval Editions. The press release for World Prematurity Day 2021 generated over 360 views on the RMIT News website with the main referrals coming from search engines (32%) and social media (23%). It also appeared in News Wire NZ, ConnectWeb, AAP, Newsblaze, India Education Diary, Whittlesea Review (print version), North Central Review (print version), The Free Press (print version) and HealthTimes. Having read the story, the editor of a magazine for Australian GPs contacted RMIT researchers to propose a write up on preterm birth in collaboration with clinical colleagues at Monash Medical Centre.

Non-scientific publications

PREMSTEM was featured in the September 2022 edition of *Infant* Journal which is described as 'the leading UK publication for the multidisciplinary team that cares for vulnerable sick or premature babies in their first year of life'. The editor invited the project to contribute to the journal having read about the research on the PREMSTEM website, noting its interest to neonatal professionals. The editorial is entitled *PREMSTEM: pushing forward the research agenda for neonatal innovation* and highlights the project's research aims and methodology, the role of the PCAB and the importance of engagement with external stakeholders through co-creation activities. The article is available to paid *Infant* subscribers.



EDITORIAL

PREMSTEM: pushing forward the research agenda for neonatal innovation

PREM STEM

Hannah Tribe
Research Communications Advisor, RMIT Europe
hannah.tribe@rmit.edu.au

Bobbi Fleiss
Head of Perinatal Brain Injury Laboratory, RMIT Australia

PREMSTEM, the brain injury in the premature born infant: stem cell regeneration research network, is a collective of researchers from across the globe developing a new regenerative stem cell therapy to repair the brain damage caused by premature birth, also known as encephalopathy of prematurity (EoP). The project has received €9 million funding from the European Union's Horizon 2020 research and innovation programme to push forward the research agenda for neonatal innovation by bringing together a committed interdisciplinary partnership to provide a road-map for how medicines can be optimised for use in this understudied patient group.

The PREMSTEM team comprises world leading clinicians, researchers, stakeholder advocacy groups and an industrial partner with well-established experience in neonatology and drug development (TABLE 1). The 15 research partners represent eight countries with vast experience in:

- perinatal brain injury
- driving innovative and high-quality research

within five years, applications for the H-MSC therapy will extend to other types of perinatal brain injury (eg birth asphyxia in term-born infants), and to disorders such as paediatric multiple sclerosis that share pathophysiological processes with EoP (eg inflammation and demyelination).

Background to the research

In the European Union alone, 400,000 babies are born preterm each year. Many of these babies are at increased risk of neonatal mortality and morbidity, lifelong disability including cerebral palsy, impaired cognitive function and increased rates of neurodevelopmental disorders such as attention deficit and hyperactivity disorder and autism spectrum disorder. The damaging effects of preterm birth on the brain carry significant economic costs, and can have negative impacts on families and communities. As diagnosis of EoP can often only be definitively made days or weeks after birth, the most important strategy for treatment is one that promotes neuroregeneration of the damaged brain.

Figure 12 Infant Volume 18 Issue 5/September 2022.

Lay summaries

Figure 13 Research highlights: A Model of Germinal Matrix Hemorrhage in Preterm Rat Pups.

Dissemination by PREMSTEM researchers of project results through scientific publication is complemented by the creation of lay summaries. Known as research highlights, these summaries of PREMSTEM-affiliated research publications are written in everyday language and aimed at non-expert audiences. They offer non-specialists a way to learn about the studies undertaken by PREMSTEM's research team without the need to read the full scientific paper. Each lay summary summarises the key aims and outcomes of the study, explains the significance of the science behind it and clarifies technical terminology in plain English. They are created in collaboration with the researchers involved in the study, ensuring that the science has been properly understood and explained, and that the most vital information and messages are included.

Research highlights of *A Model of Germinal Matrix Hemorrhage in Preterm Rat Pups* and *Mesenchymal stromal cell-derived extracellular vesicles reduce neuroinflammation, promote neural cell proliferation and improve oligodendrocyte maturation in neonatal hypoxic-ischemic brain injury* are available for download on the PREMSTEM website and have been promoted on social media channels.

Content performance: As of 17 April 2023, *A model of germinal matrix hemorrhage in preterm rat pups* has had 12 website downloads since its publication in April 2022. *Mesenchymal stromal cell-derived extracellular vesicles reduce neuroinflammation, promote neural cell proliferation and improve oligodendrocyte maturation in neonatal hypoxic-ischemic brain injury* has had 8 website downloads since its publication in August 2022.

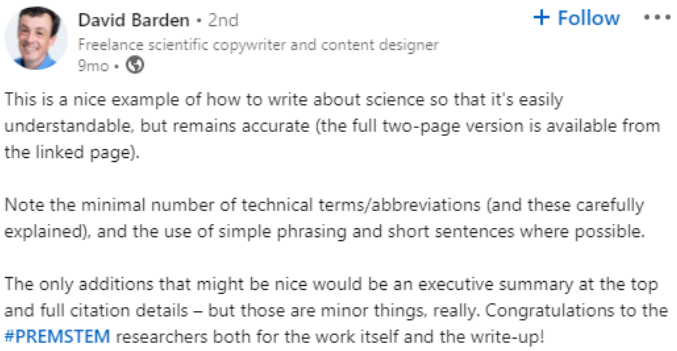


Figure 14 LinkedIn user feedback about PREMSTEM's research highlights document.

Fact sheets

PREMSTEM has produced fact sheets on the following topics:

- *Preterm birth and brain injury*, available in English, Dutch, French, German, Hungarian, Italian, Spanish, Swedish and Turkish.
- *Neonatal encephalopathy*, available in English, Italian, Spanish and Turkish.
- *Preterm birth*, available in English and German.

They are hosted in relevant places on the project website such as the resources section (https://www.premstem.eu/resources/) and are promoted throughout the year on social media. They're aimed at non-expert audiences and highlight key facts and figures about the topic being addressed. They also include a short summary about how PREMSTEM is positively contributing to the topic through its research.

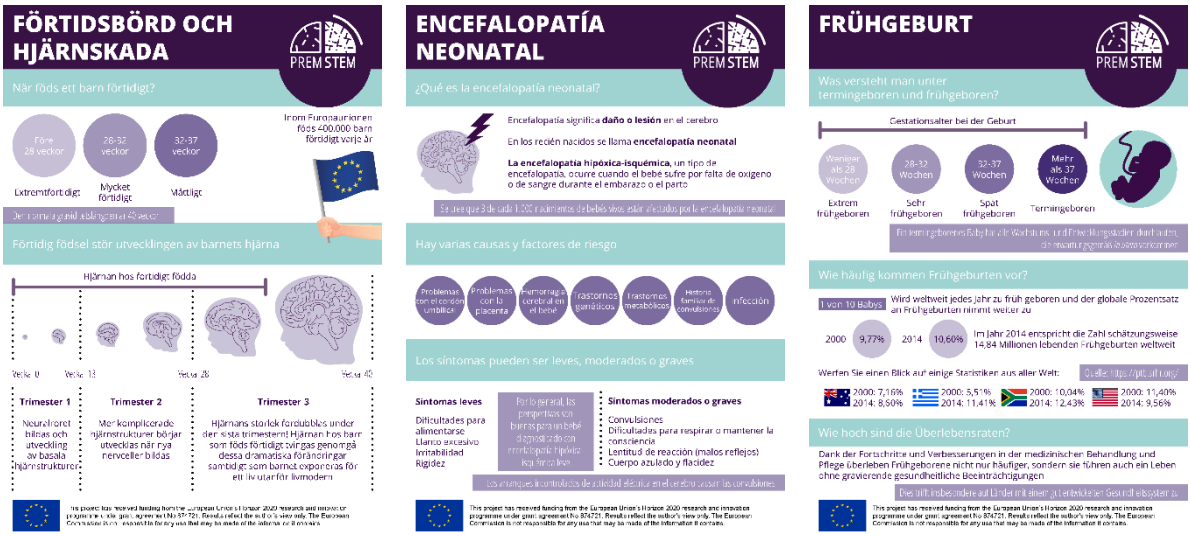


Figure 15 Excerpts of fact sheets translated into Swedish, Spanish and German.

An ongoing aim is to produce translations of resources such as fact sheets to share the knowledge beyond the English-speaking world. Translation is an important part of the project's strategy to raise societal awareness of relevant health topics and PREMSTEM's research. Consortium members from EFCNI, IN-CNR, Inserm, Radboudumc, RMIT Europe, UMCU, Universitätsklinikum Essen and the University of Gothenburg, as well as a member of the PCAB, have contributed to fact sheet translations and helped to increase accessibility for speakers of other languages.

Figure 16 Twitter user feedback about PREMSTEM's fact sheets.

Content performance: The *Preterm birth and brain injury* fact sheet was the first to be released. As of 17 April 2023, it has been downloaded from the project website in English (110 times), Spanish (28 times), French (23 times), Dutch (15 times), German (11 times), Italian (9 times), Turkish (9 times), Hungarian (7) and Swedish (6 times). The *Neonatal encephalopathy* fact sheet has been downloaded in English (57 times), Spanish (10 times), Italian (once) and Turkish (3 times). The newest fact sheet, *Preterm birth*, has so far been downloaded in English (21 times) and German (3 times). Social media posts announcing new fact sheets are usually popular among target audiences such as parent associations and shared by other users, including PREMSTEM partners' communication teams. This extends the reach of the resources beyond the project's own social media audiences, therefore increasing knowledge diffusion and potential impact.

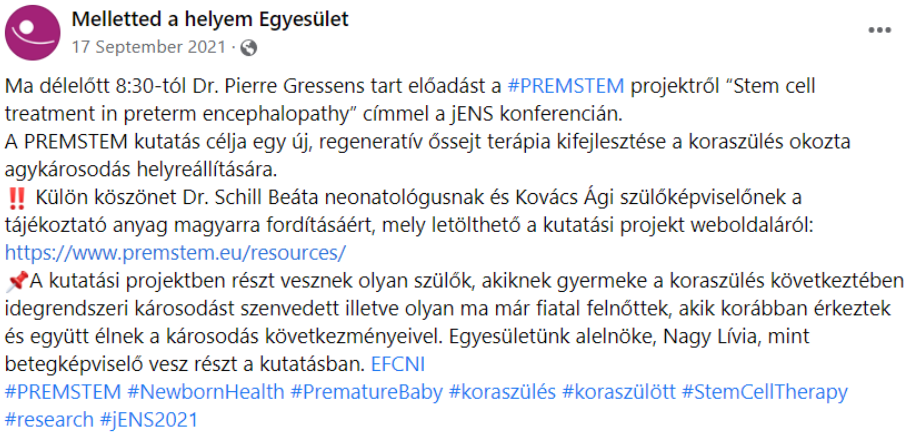


Figure 17 Posts promoting PREMSTEM fact sheet on non-owned social media accounts.

The *Neonatal encephalopathy* fact sheet was launched and promoted on LinkedIn and Twitter to coincide with World Brain Day in July 2022. It was also shared on accounts managed by PREMSTEM partners and parent associations. A spike in PREMSTEM LinkedIn followers was seen on this day, illustrating the benefits of releasing new content on awareness days where it can benefit from trending or popular hashtags and add to communications activities addressing a specific topic.

Figure 18 Spike in new LinkedIn followers on World Brain Day (20 July 2022) related to launch of Neonatal encephalopathy *fact sheet.*

Video and animation

Video is an easy to digest and highly engaging type of content element, making it an integral part of PREMSTEM's communication outputs. Short video clips and GIFs are regularly created to complement the text of social media posts in a creative and visual way. Social media trends suggest that video is readily consumed by audiences interacting with online platforms as it allows users to digest information quickly. Audio-visual content elements are deemed to be an excellent tool for promoting PREMSTEM's news, co-creation activities and resources. To enhance the researchers' dissemination activities, videos can highlight significant project results and support the transmission of scientific progress in a visual way, thereby reaching audiences beyond those who traditionally read academic journals.

Project video

Launched in 2021, PREMSTEM's two-minute promotional video with English captions is aimed at audiences such as parents and carers of preterm children, patient organisations, health professionals and researchers, as well as members of the public.

It is comprised of two parts, with the first contextualising the project's research by broadly addressing preterm birth and associated health and developmental issues. The second half discusses PREMSTEM's high level aims. The video is hosted on the project's YouTube channel and features on the PREMSTEM homepage. It has been widely shared by the consortium through their social networks and features on some partner websites (https://www.youtube.com/watch?v=V6Ra5AgQ4Qw).

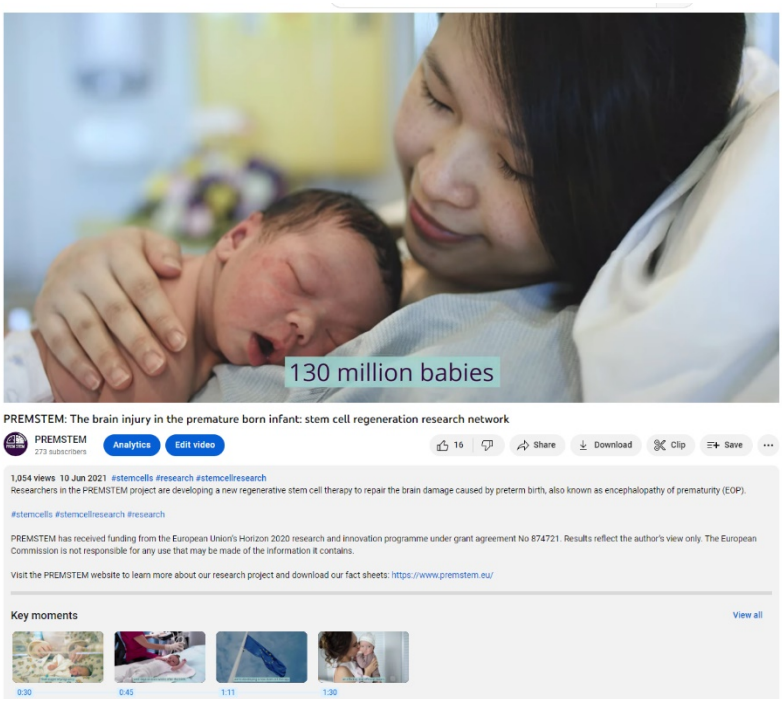


Figure 19 Scene from PREMSTEM project video.

Content performance: As of 17 April 2023, the project video with English subtitles has been viewed 1,009 times on YouTube and has 15 likes. This compares favourably with videos produced for other Horizon 2020 projects listed in the Cordis Videos from H2020 EU funded projects (https://www.youtube.com/playlist?list=PLLyjX6SgFi0ft2rzfxdG6HHLJ9CBbtCoC) playlist which tend to average a couple of hundred views. The PREMSTEM video features on the project landing page which has been visited over 11,000 times. Being embedded, the number of views cannot be tracked by Google Analytics but it is likely that users are watching the project video as a consequence of visiting the project website and every time it is promoted on social media.

Animation

The PREMSTEM stem cell animation was produced by science communication experts Scienseed (https://scienseed.com/) in late 2021. It lasts around 2.5 minutes and is available with English, Spanish, German and Hungarian captions as of April 2023. The animation is hosted on the project and some partner websites and the PREMSTEM YouTube channel (https://www.youtube.com/watch?v=u-AHCDV3mTQ).

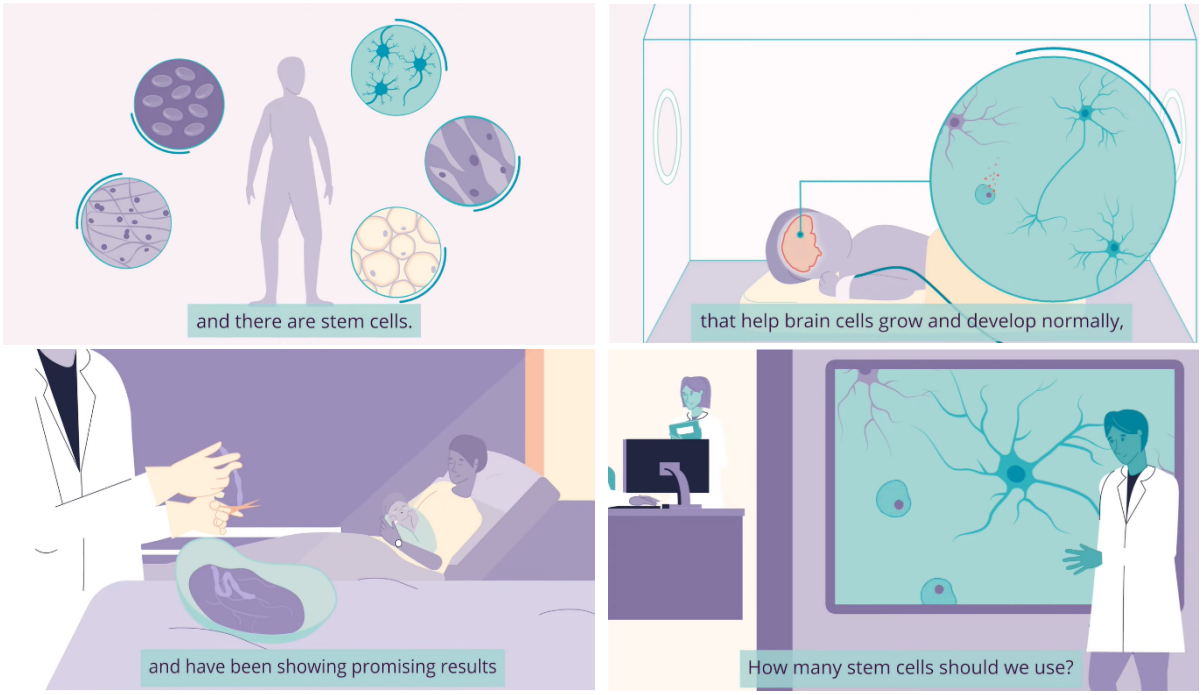


Figure 20 Scenes from the PREMSTEM stem cell animation.

Initial ideas for the script and storyboard started with an online brainstorming session with PREMSTEM partners and the PCAB. This allowed the animation project team to identify key messages and recurring themes according to representatives of the animation's target viewing audiences, such as parents of preterm children, patient organisations, healthcare professionals and researchers.

The animation aims to teach the target primary audiences about stem cells and their potential to treat medical conditions. More specifically, it discusses PREMSTEM's approach to using stem cells derived from human umbilical cord tissue and why the project's research is important. The animation delivers and explains technical terms visually, verbally and textually to optimise accessibility and understanding of the content to a lay audience.
The animation contributes to the project's communication objective of increasing societal understanding of stem cells and showcases the potential of the PREMSTEM therapy to treat brain injury associated with being born preterm, thereby complementing other content elements. It contributes to the project's communication goal of increasing societal and professional acceptance of stem cell research, and in the context of PREMSTEM, of performing clinical trials with stem cells in medically fragile preterm infants.

Content performance: The stem cell animation is the most popular video on PREMSTEM's YouTube channel. As of 17 April 2023, the animation with English subtitles has been viewed 12,038 times on YouTube and has 264 likes, making it one of the most viewed Horizon 2020 videos on the Cordis YouTube playlist mentioned previously. The versions with translated captions are also gaining traction having been viewed 64 times in Hungarian, 222 times in German and 245 times in Spanish.

Video shorts
After years of online interactions, the occasion of the 2022 in-person meeting allowed the opportunity to record footage with members of the PREMSTEM consortium, including PhD

candidates, to generate content elements for diffusion at relevant moments such as the 2022 World Prematurity Day and the 2023 International Day of Women and Girls in Science. Once edited, these short videos are promoted on the project's social media accounts and hosted on the YouTube channel. Featuring the PREMSTEM team through video content gives consortium members a chance to connect with audiences by telling their personal stories and explaining their research.

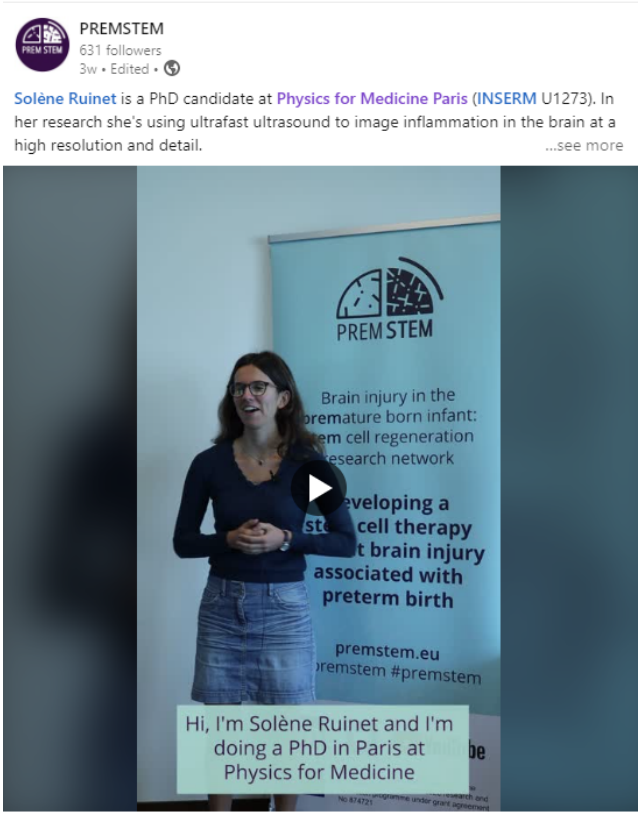


Figure 21 Short video interview of PhD candidate Solène Ruinet on LinkedIn has over 1,000 views.

Video shorts created as part of the integrated content campaigns for Brain Awareness Week are also uploaded onto the YouTube channel and project website. These videos highlight the main characteristics and function of different cells found in the brain. Through simple design and everyday language, these videos aim to reduce barriers to accessing science.

Content performance: Short videos featuring PREMSTEM's researchers often receive higher than average levels of engagement, especially when posted on LinkedIn. In total, the video shorts uploaded onto the YouTube channel have been viewed over 1,400 times as of 17 April 2023.

Figure 22 YouTube channel lifetime metrics for shorts show a spike in views when the perivascular macrophages video went live (9 March 2023).

Integrated content campaigns

Integrated content campaigns are used to create and contextualise a varied range of elements and incorporate a multi-channel approach in their dissemination. These campaigns help to raise the visibility and awareness of the project among wider audiences and foster interactions

with PREMSTEM on social media networks. They also encourage actions from online audiences, such as visiting the project website, watching videos and downloading PREMSTEM resources.

Integrated content campaign elements are connected by one clear topic or theme. One or two integrated campaigns are usually run per year to coincide with high profile and relevant awareness raising events: Brain Awareness Week and World Prematurity Day. Besides the possibility to extend project exposure and reach the project's target audiences, these activities allow PREMSTEM to contribute to pertinent topics of discussion and take part in knowledge exchange in a coordinated way.

Social media metrics from months coinciding with integrated content campaigns have shown a higher performance in terms of new followers and impressions, demonstrating that they are beneficial for enhancing project exposure, reaching new audiences and promoting PREMSTEM's research and related topics.

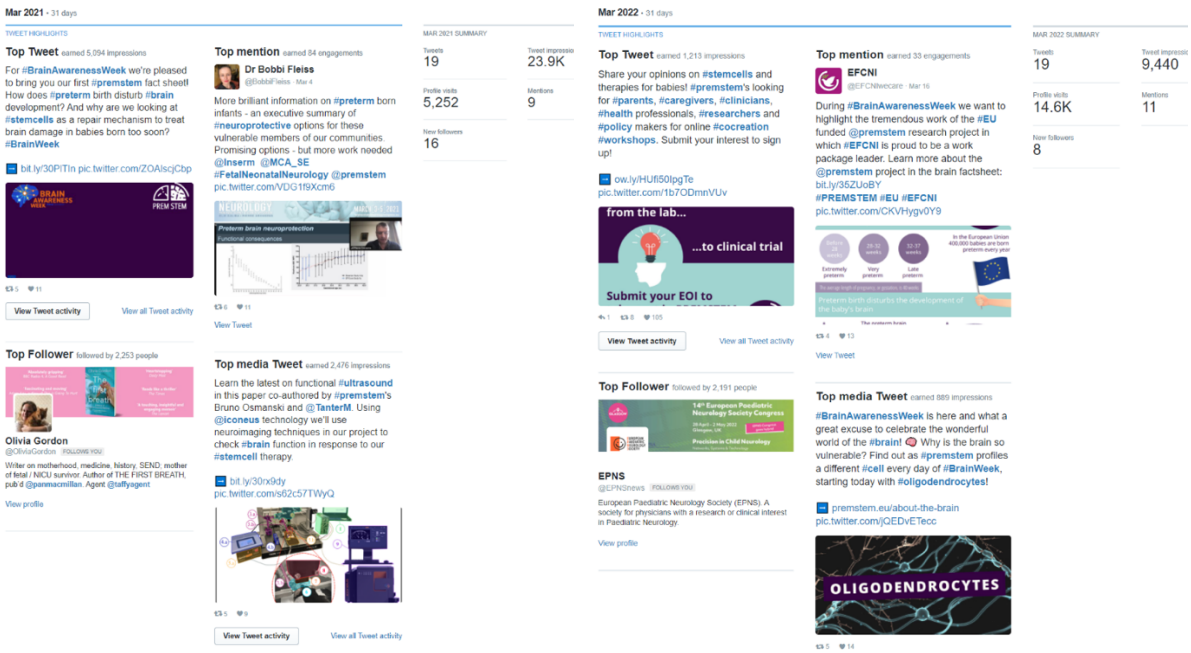


Figure 23 Twitter analytics in March 2021 and March 2022 show increased engagement linked to Brain Awareness Week content.

Brain Awareness Week 2021

Brain Awareness Week is 'a global campaign aiming to foster public enthusiasm and support for brain science' making it a relevant opportunity to promote PREMSTEM's research and collective expertise. The project ran its first integrated content campaign for Brain Awareness Week in March 2021:

16 March	17 March	18 March
Morning		
RMIT news story Non-PREMSTEM content	PREMSTEM preterm birth and brain injury fact sheet PREMSTEM content	Brain cell video Non-PREMSTEM content

Content elements: Social media posts	*Content elements: Fact sheet, video and social media posts*	*Content elements: Video and social media posts*
Afternoon		
		Brain cell videos Non-PREMSTEM content
		Content elements: Video and social media posts

Campaign performance: This Brain Awareness Week campaign contributed to new achievements in terms of PREMSTEM's Twitter account metrics with almost 24,000 tweet impressions in March 2021 (the average at that time was around 7,000).

Brain Awareness Week 2022

Activities for 2022 Brain Awareness Week expanded on the previous year, with the creation of more novel content including a day in the life of researcher Bobbi Fleiss, whose expertise contributed greatly to many of the campaign's outputs. The following activities were incorporated into the schedule:

14 March	15 March	16 March	17 March	18 March
Morning				
Why is the brain vulnerable? Oligodendrocytes PREMSTEM content	*Why is the brain vulnerable?* Interneurons PREMSTEM content	*Why is the brain vulnerable?* Astrocytes PREMSTEM content	*Why is the brain vulnerable?* Polydendrocytes PREMSTEM content	*Why is the brain vulnerable?* Microglia PREMSTEM content
Content elements: Video and social media posts	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*
Afternoon				
Brain facts PREMSTEM content	Brain video Non-PREMSTEM content	PREMSTEM preterm birth and brain injury fact sheet PREMSTEM content (existing)	Day in the life of a neuroscientist: Bobbi Fleiss PREMSTEM content	Brain video Non-PREMSTEM content
Content elements: Video and social media posts	*Content elements: Video and social media posts*	*Content elements: Fact sheet, video and social media posts*	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*

As a result of the above activities, a page about the brain was created for the project website (https://www.premstem.eu/about-the-brain/) to include Brain Awareness Week content elements and additional information aimed at non-experts. A series of five short videos

explaining features of different cell types found in the brain under the banner *Why is the brain vulnerable?* was released during the week on PREMSTEM's LinkedIn and Twitter accounts and uploaded to the YouTube channel.

Campaign performance: The content produced and disseminated on social channels in March 2022 generated high engagement with users, including 14,600 visits to the Twitter profile compared to 5,571 the month before. Since being posted on the YouTube channel, lifetime views of the brain cell videos created for Brain Awareness Week in 2022 have reached almost 1,000. The most popular video as of 17 April 2023 is *Why is the brain vulnerable?* Oligodendrocytes.

Brain Awareness Week 2023

For Brain Awareness Week 2023, the project expanded upon the *Why is the brain vulnerable?* video series from the previous year and added to the existing playlist on the YouTube channel. The campaign also included a series of posts with an image or video to give audiences an insight into what PREMSTEM researchers work on inside the lab. Many partners and researchers contributed to the content creation and added diversity to the 2023 campaign. The plan of activities was as follows:

13 March	14 March	15 March	16 March	17 March
Morning				
Why is the brain vulnerable? Neural stem cells PREMSTEM content	*Why is the brain vulnerable?* Purkinje cells PREMSTEM content	*Why is the brain vulnerable?* Endothelial cells PREMSTEM content	*Why is the brain vulnerable?* Brain perivascular macrophages PREMSTEM content	Researchers' favourite brain facts: Judit Alhama Riba, Caroline de Theije, Ezgi Sengun and Bobbi Fleiss PREMSTEM content
Content elements: Video and social media posts	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*
Afternoon				
Video of the day: University of Gothenburg PREMSTEM content	Image of the day: UMCU PREMSTEM content	Video of the day: Iconeus PREMSTEM content	Image of the day: Universitätsmedizin Essen PREMSTEM content	Preterm birth and brain injury fact sheet PREMSTEM content (existing)
Content elements: Video and social media posts	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*	*Content elements: Video and social media posts*

Content performance: The CTA for Brain Awareness Week 2023 was to visit the PREMSTEM website, resulting in 704 visits in March 2023 compared to 480 in February 2023. Metrics on the PREMSTEM social channels were also up in March 2023, including 5,033 Twitter impressions compared to 2,073 the previous month. On LinkedIn, the campaign helped to attract 23 new followers, more reactions (303 compared to 83 in February 2023) and 11,120 impressions (up from 3,208 the month before). The brain facts video featuring PREMSTEM researchers is now one of the project's most popular LinkedIn posts with over 2,600 impressions and 80 reactions as of 17 April 2023. The PREMSTEM YouTube channel achieved a new record in terms of daily views when the four brain cell videos were uploaded. Collectively they were viewed 450 times in March 2023 with 20.2% of this traffic coming from YouTube searches.

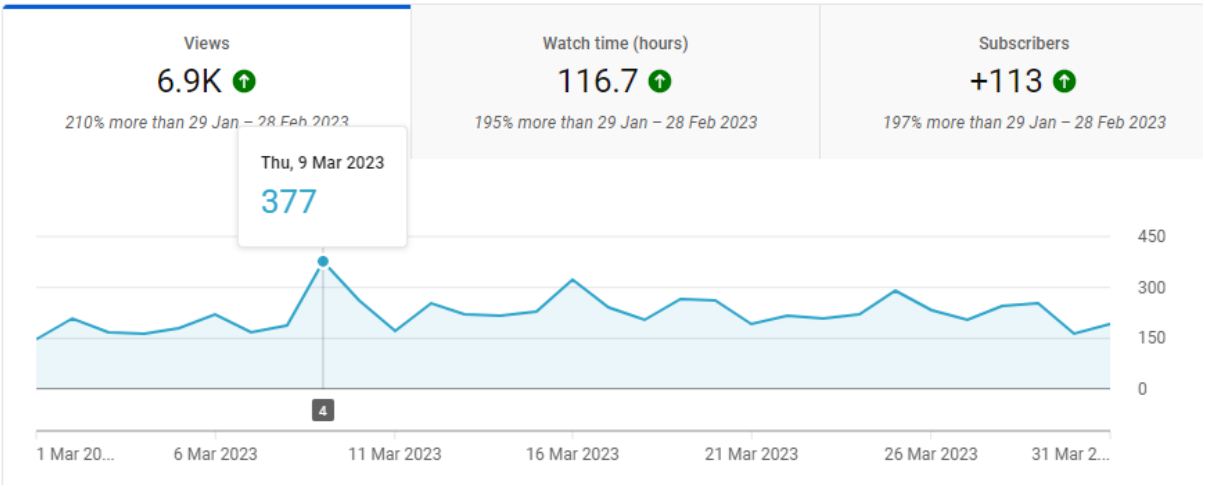


Figure 24 YouTube metrics in March 2023 showing a spike in views on the day the Brain Awareness Week cell videos went live (9 March 2023).

Figure 25 World Prematurity Day 2021 social media post.

World Prematurity Day 2021

For World Prematurity Day 2021 PREMSTEM implemented an integrated content campaign across various external channels. The plan included both owned social media and partner channels (including Twitter, LinkedIn, Facebook, YouTube), a press release and an online event. The contributors included PREMSTEM partners as well as members of the PCAB and their associations, Canadian Premature Babies Foundation and Mellettedahelyem.

A press release was written about research undertaken by the Neurodevelopment in Health

and Disease research programme at RMIT University.

The aim of the story was to discuss current research related to risk factors and long-term health issues linked to preterm birth. It included content about PREMSTEM and the project video was embedded in the story published on the RMIT News website (https://www.rmit.edu.au/news/all-news/2021/nov/tackling-the-challenges-and-risks-of-preterm-birth).

Two members of the PCAB contributed to the *NICU Heroes* social media campaign organised as part of 2021 World Prematurity Day. The purpose of these posts was to contribute to discourse advocating for zero separation of parents and babies in the Neonatal Intensive Care Unit. PREMSTEM also contributed eight tweets in the global live Twitter chat organised by EFCNI. The purpose of this activity was to raise awareness of the challenges of preterm birth, educate people about the topic and draw attention to World Prematurity Day as an occasion of global importance.

EFCNI researcher Luc Zimmermann presented PREMSTEM in a Facebook Live event on World Prematurity Day which was hosted by the Canadian Premature Babies Foundation. The aim of the event was to discuss issues such as restricted access to the NICU during Covid-19 and its impact on families, the importance of raising awareness of preterm birth, and current research which allowed the presentation of PREMSTEM.
As part of the campaign for World Prematurity Day, the communications teams at Iconeus, Inserm Transfert and Maastricht University promoted PREMSTEM on their social media accounts and the CPA wrote a news story for their website mentioning the project. EFCNI included PREMSTEM's logo on their marketing materials and on the World Prematurity Day webpage and created a PREMSTEM photo tile for its social media activities.

Content performance: World Prematurity Day activities contributed to an improvement in metrics on PREMSTEM's Twitter account in November 2021, with 13,700 impressions compared to 8,700 the month before. Specifically, the live Twitter chat generated a total of 2,788 tweet impressions, 44 likes and 7 retweets. The press release was distributed to media outlets and received attention in Australia, including from the editor of an Australian GP magazine interested in writing an article about preterm birth.

World Prematurity Day 2022
As in the previous year, World Prematurity Day 2022 supplied the opportunity to create new content elements and allow PREMSTEM to contribute to awareness raising of the global issue of preterm birth:

14 November	15 November	16 November	17 November
Morning			
Marta Tiffany Lombardo video PREMSTEM content		EFCNI Twitter chat	PREMSTEM team photos PREMSTEM content

Content elements: Video and social media posts		*Content elements: Social media posts*	*Content elements: Image and social media posts*
Afternoon			
	Preterm birth webpage and fact sheet PREMSTEM content	EFCNI Twitter chat participation PREMSTEM content	PCAB news story PREMSTEM content
	Content elements: Video, webpage, fact sheet and social media posts	*Content elements: Social media posts*	*Content elements: News story and social media posts*

A new webpage (https://www.premstem.eu/preterm-birth/) about preterm birth was created for World Prematurity Day 2022 and includes content written in everyday language. It offers general information about the topic including statistics, causes, risk factors of preterm birth and long-term outlooks for children born too soon. The content is aimed at audiences who might be affected by the topic. For example, expectant parents can benefit from information about what can happen in the hospital when a child is born preterm and the kind of treatment the baby might receive. This fact sheet on preterm birth, available in English and German, can be downloaded from this webpage.

Figure 26 World Prematurity Day 2022 social media posts.

Content elements with a storytelling perspective offer a way for PREMSTEM to connect with members of specific audiences, such as parents and caregivers. As part of the 2022 campaign, three parents from the PCAB reflected upon the positive outcomes that skin-to-skin therapy can bring for both parent and baby, based upon their personal experiences in the NICU. Their reflections featured in the news story published on the project website (https://www.premstem.eu/2022/11/17/wpd-2022/), *A Parent's Embrace: A Powerful Therapy*, and were reinforced through reflections from EFCNI in relation to the outcomes of a parents' survey which took place during Covid-19. The campaign plan also included a video with Marta Tiffany Lombardo, a PhD candidate from IN-CNR, filmed at the annual meeting in Utrecht. In

this clip, Marta talks about her family's experience of preterm birth and how it inspired her to become a researcher in the area.
As in the previous year, PREMSTEM contributed to the knowledge exchange generated by the live Twitter chat led by EFCNI, who once more included the project logo on World Prematurity Day marketing materials. Social media posts during the 2022 campaign were widely shared by members of the PREMSTEM consortium and the PCAB.

Content performance: The campaign for the 2022 World Prematurity Day contributed to a higher than usual performance on both PREMSTEM's Twitter and LinkedIn accounts, the latter achieving an 82.8% increase in post impressions compared to the previous month.

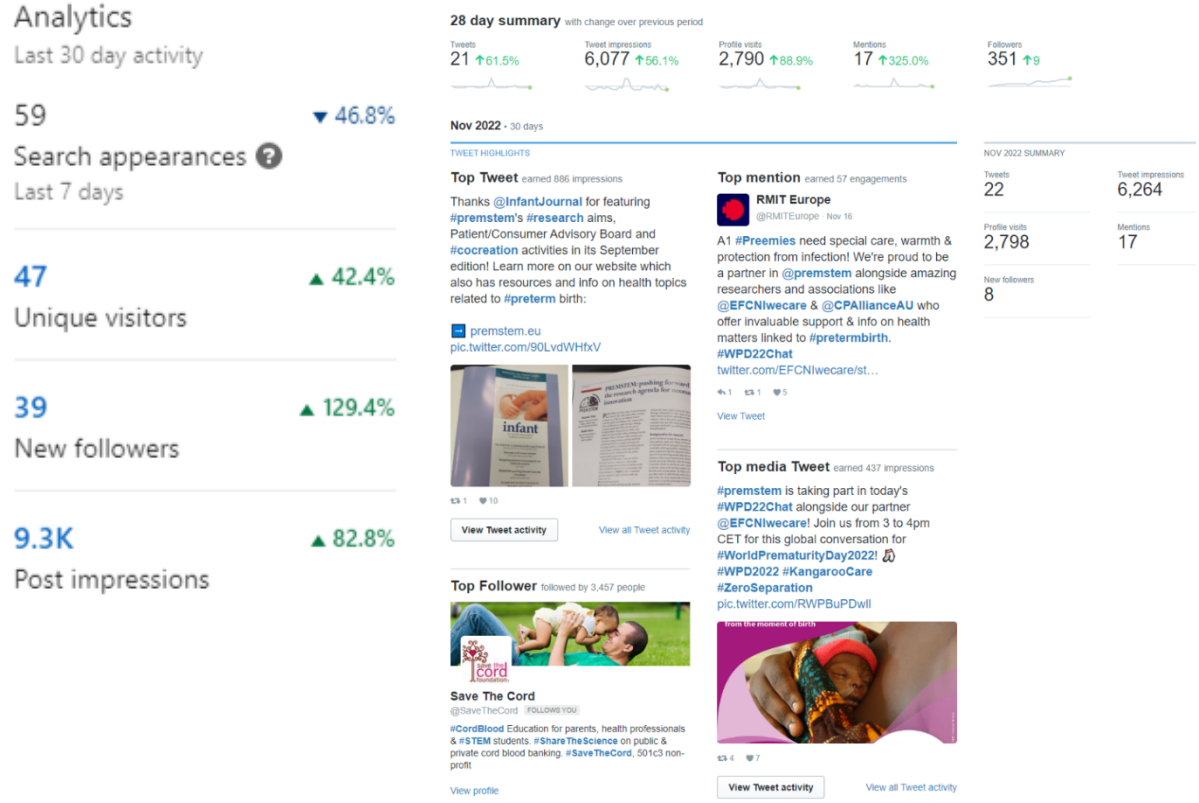


Figure 27 Content for World Prematurity Day led to improved metrics on Twitter (left) and LinkedIn (right) in November 2022.

Printed materials

PREMSTEM has produced printable content elements such as fact sheets which can be taken to events by partners. The project's roll up banner was produced for the in-person annual meeting hosted by UMCU in 2022. The banner is kept at EFCNI and can be transported for display at relevant conferences and events around Europe to promote the project.

Figure 28 PREMSTEM banner at the 2022 annual meeting organised by the UMCU team (pictured right).

5. Content elements for internal communication

Quick guides and toolkits

Guidelines and toolkits are content elements which support internal communications activities. They are available to PREMSTEM partners, their communication departments and members of the PCAB.

A PowerPoint slide deck available on the consortium SharePoint site summarises key information about the project and can be further developed by partners to present PREMSTEM project or disseminate research progress and results to external audiences. A guide to communicating about the project has also been created and is regularly revised and shared with communications teams at each PREMSTEM partner. It includes information about owned channels, partner social media handles and how to acknowledge the project in external communications.

Another content element which has been created for internal purposes is a guide to social media, a resource which aims to guide PREMSTEM's researchers on how their work can benefit from social media, with a focus on Twitter and LinkedIn. It includes instructions on how to create and schedule posts and how to interpret analytics. This guide is aimed at upskilling researchers on how to benefit from social media in their own science communication activities.

Newsletters

The project produces two electronic newsletters to support internal communications, provide updates, propose new content elements and promote opportunities to contribute to content development and co-creation activities. The two newsletter audiences are:

- PREMSTEM consortium: The bimonthly newsletter aims to inform and involve members of the project team about content creation activities, and encourages the sharing of content outputs within their networks, which largely involve the research and medical communities.
- PCAB: The biannual newsletter keeps members of the PCAB informed of PREMSTEM's scientific progress, shares and invites feedback on new content elements and potential new content themes and resources which could be of interest to target audience groups such as parents and patient associations.

6. Content elements for dissemination

Conferences, events and workshops

Project results are disseminated by scientific partners at conferences, workshops, seminars and targeted events. These occasions allow researchers to present the project's goals and share scientific progress and results to target audiences and potential users such as the scientific and medical communities, industry partners and policy makers.

Attendance at events also presents opportunities for networking with peers and key stakeholders such as policy makers. These conversations can contribute to and bolster support for PREMSTEM's project goal of taking the stem cell therapy to clinical trials in a medically fragile section of the population.

In relation to the project, PREMSTEM partners have organised 11 conferences and 6 workshops. They have participated in 58 international and national conferences and 2 workshops, with some of the key events highlighted in the table below.

Figure 29 Bobbi Fleiss presenting at the 2022 Neonatal Cell Therapies Symposium.

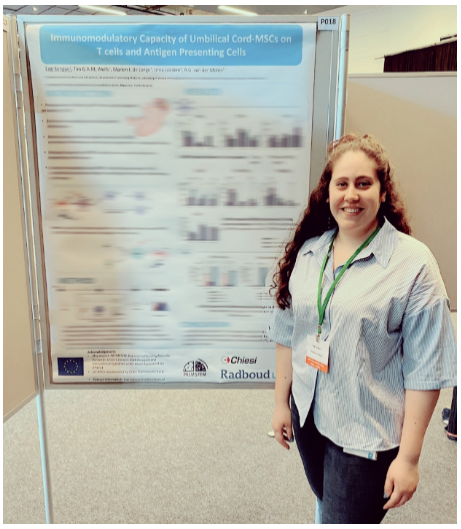


Figure 30 Ezgi Sengun with her poster at the NVVI Annual Winter School.

Partner	Conferences and workshops
Cerebral Palsy ALLIANCE	February 2022: Presentation at **AusACPDM – Better Together 2022** entitled *The future of cell-based therapies for cerebral palsy: Knowledge gaps and facilitators of translation*
EFCNI european foundation for the care of newborn infants	November 2020 and November 2021: Facebook Live with Canadian Premature Babies Foundation for World Prematurity Day
Consiglio Nazionale delle Ricerche Istituto di Neuroscienze	October 2021: **4th Brainstorming Research Assembly for Young Neuroscientists (BraYn Conference)** November 2021: Presentation at **Neuroinflammation Symposium** entitled *Microglial EVs travelling on the surface of neurons*

	September 2022: **5th Brainstorming Research Assembly for Young Neuroscientists (BraYn Conference)** December 2022: **Third Edition MORE THAN NEURONS Conference**
Inserm La science pour la santé From science to health U1141	March 2021: **3rd World Congress on Maternal Fetal and Neonatal Medicine** April 2021: **Societé Belge de Neuropédiatrie** June 2021: **12th International Newborn Brain Conference/Newborn Brain Society** July 2021: Poster at **Euroglia 2021** September 2021: Poster at **Hershey Meeting 2021**
Inserm La science pour la santé From science to health U1273	August 2021: **EMIM 2021: European Molecular Imaging Meeting** March 2022: **EMIM 2022: European Molecular Imaging Meeting** May 2022: **fUSbrain2022: Functional ultrasound imaging of the brain** September 2022: **5th Brainstorming Research Assembly for Young Neuroscientists (BraYn Conference)** October 2022: **IEEE International Ultrasonics Symposium 2022**
Maastricht UMC+ | Maastricht University	June 2021: **47th Annual Meeting of the Society for Neonatology and Pediatric Intensive Care Medicine V. (GNPI)** April 2022: Presentation at **Night of Science** entitled *Stem cell therapy for preterm newborns*
Radboudumc university medical center	June 2022: Poster at the **NVVI Annual Winter School** entitled *Immunomodulatory capacity of umbilical cord-MSCs on T cells and antigen presenting cells* July 2022: Poster at **World Immune Regulation Meeting (WIRM) XVI**
RMIT UNIVERSITY	November 2022: Presentation at **2022 Neonatal Cell Therapies Symposium** entitled *Mesenchymal stromal cells for preterm brain injury: PREMSTEM project*
UMC Utrecht	June 2022: Posters at **Dutch Neuroscience Meeting** entitled *Validation of the reduced uterine perfusion pressure (RUPP) rat model for preeclampsia and assessment of brain development in the offspring* and *Timing of multiple hits affects the pattern of myelination in a rat model of encephalopathy of prematurity*
University Medicine Essen University Hospital	May 2022: Presentation at **Gesellschaft für Neonatologie und pädiatrischen Intensivmedzin (GNPI)** entitled *Establishment of a double-hit model of maternal inflammation and postnatal hyperoxia to investigate the therapeutic potential of mesenchymal stem cells* October 2022: Poster at **EAPS (European Academy of Paediatric Research)** entitled *Establishment of a double-hit model of maternal inflammation and postnatal hyperoxia to investigate the therapeutic potential of mesenchymal stem cells*

Scientific publications

Project results are communicated in simplified language on PREMSTEM's owned channels and disseminated by researchers through publication in relevant scientific journals. This type of dissemination activity allows researchers to share the project's progress in achieving

PREMSTEM's research goals, generate interest among the scientific community and contribute to advancing subject matter knowledge. Scientific publications are written in specialist language and are aimed at audiences with expertise in the subject area, such as the research community, industry partners and policy makers. Each new publication is promoted on PREMSTEM social media and listed on the website. The papers in the following table acknowledge PREMSTEM funding, with those most closely connected to the project highlighted in light purple:

Publication date	Journal	Article title	Authors (PREMSTEM researchers in bold)	URL
14 July 2020	Frontiers in Neurology	Cortical gray matter injury in encephalopathy of prematurity: link to neurodevelopmental disorders	**Bobbi Fleiss, Pierre Gressens** and Helen B. Stolp	https://doi.org/10.3389/fneur.2020.00575
10 August 2020	Cells	Preterm brain injury, antenatal triggers, and therapeutics: timing is key	**Daan R.M.G. Ophelders**, Ruth Gussenhoven, Luise Klein, **Reint K. Jellema**, Rob J.J. Westerlaken, Matthias C. Hütten, Jeroen Vermeulen, Guido Wassink, Alistair J. Gunn and **Tim G.A.M. Wolfs**	https://doi.org/10.3390/cells9081871
3 December 2020	Frontiers in Cellular Neuro-science	A model of germinal matrix hemorrhage in preterm rat pups	Masako Jinnai, Gabriella Koning, Gagandeep Singh-Mallah, Andrea Jonsdotter, Anna-Lena Leverin, Pernilla Svedin, **Syam Nair**, Satoru Takeda, Xiaoyang Wang, **Carina Mallard**, Carl Joakim Ek, **Eridan Rocha-Ferreira** and **Henrik Hagberg**	https://doi.org/10.3389/fncel.2020.535320
10 December 2020	Frontiers in Cellular Neuro-science	Mesenchymal stromal cell-derived extracellular vesicles reduce neuroinflammation, promote neural cell proliferation and improve oligodendrocyte maturation in neonatal hypoxic-ischemic brain injury	Nicole Kaminski, Christian Köster, Yanis Mouloud, Verena Börger, **Ursula Felderhoff-Müser**, **Ivo Bendix**, Bernd Giebel and Josephine Herz	https://doi.org/10.3389/fncel.2020.601176
12 December 2020	Journal of Neuro-chemistry	Neuroprotection offered by mesenchymal stem cells in perinatal brain injury: role of mitochondria, inflammation, and reactive oxygen species	**Syam Nair**, **Eridan Rocha-Ferreira**, **Bobbi Fleiss**, **Cora H Nijboer**, **Pierre Gressens, Carina Mallard** and **Henrik Hagberg**	https://doi.org/10.1111/jnc.15267

Publication date	Journal	Article title	Authors (PREMSTEM researchers in bold)	URL
13 January 2021	Bio-molecules	Microglia-mediated neurodegeneration in perinatal brain injuries	**Bobbi Fleiss**, **Juliette Van Steenwinckel**, **Cindy Bokobza**, Isabelle K. Shearer, Emily Ross-Munro and **Pierre Gressens**	https://doi.org/10.3390/biom11010099
8 February 2021	Bio-chemical Pharmaco-logy	Therapeutic potential of stem cells for preterm infant brain damage: can we move from the heterogeneity of preclinical and clinical studies to established therapeutics?	Sofia Passera, Marta Boccazzi, **Cindy Bokobza**, **Valerie Faivre**, Fabio Mosca, **Juliette Van Steenwinckel**, Monica Fumagalli, **Pierre Gressens** and **Bobbi Fleiss**	https://doi.org/10.3390/biom11010099
8 February 2021	Cell Death and Disease	The immune-inflammatory response of oligodendrocytes in a murine model of preterm white matter injury: the role of TLR3 activation	Marta Boccazzi, **Juliette Van Steenwinckel**, Anne-Laure Schang, **Valérie Faivre**, Tifenn Le Charpentier, **Cindy Bokobza**, Zsolt Csaba, **Claudia Verderio**, Marta Fumagalli, Shyamala Mani and **Pierre Gressens**	https://doi.org/10.1038/s41419-021-03446-9
5 November 2021	Annals of Neurology	Mir-146b protects the perinatal brain against microglia-induced hypomyelination	**Cindy Bokobza**, Pooja Joshi, Anne-Laure Schang, Zsolt Csaba, **Valérie Faivre**, Amélie Montané, Anne Galland, Anouk Benmamar-Badel, Emmanuelle Bosher, Sophie Lebon, **Leslie Schwendimann**, Shyamala Mani, Pascal Dournaud, Valerie Besson, **Bobbi Fleiss**, **Pierre Gressens** and **Juliette Van Steenwinckel**	https://doi.org/10.1002/ana.26263
8 November 2021	Pediatric Research	Peripheral immune cells and perinatal brain injury: a double-edged sword?	Josephine Herz, **Ivo Bendix** and **Ursula Felderhoff-Müser**	https://doi.org/10.1038/s41390-021-01818-7
14 February 2022	Nature Medicine	Targeting microbial metabolites to treat autism	Rochellys Diaz Heijtz, **Pierre Gressens** and Jonathan R. Swann	https://doi.org/10.1038/s41591-022-01711-8
1 April 2022	Cells	Induction of mitochondrial fragmentation and mitophagy after	**Syam Nair**, Anna-Lena Leverin, **Eridan Rocha-Ferreira**, Kristina S. Sobotka,	https://doi.org/10.3390/cells11071193

Publication date	Journal	Article title	Authors (PREMSTEM researchers in bold)	URL
		neonatal hypoxia–ischemia	Claire Thornton, **Carina Mallard** and **Henrik Hagberg**	
27 April 2022	International Journal of Molecular Sciences	The impact of mouse preterm birth induction by RU-486 on microglial activation and subsequent hypomyelination	Cécile Morin, **David Guenoun**, Irvin Sautet, **Valérie Faivre**, Zsolt Csaba, **Leslie Schwendimann**, Pierrette Young-Ten, **Juliette Van Steenwinckel**, **Pierre Gressens** and **Cindy Bokobza**	https://doi.org/10.3390/ijms23094867
27 April 2022	Glia	A unique cerebellar pattern of microglia activation in a mouse model of encephalopathy of prematurity	Luisa Klein, **Juliette Van Steenwinckel**, **Bobbi Fleiss**, Till Scheuer, Christoph Bührer, **Valerie Faivre**, Sophie Lemoine, Corinne Blugeon, **Leslie Schwendimann**, Zsolt Csaba, **Cindy Bokobza**, Dulcie A. Vousden, Jason P. Lerch, Anthony C. Vernon, **Pierre Gressens** and Thomas Schmitz	https://doi.org/10.1002/glia.24190
25 July 2022	JoVE	Magnetic isolation of microglial cells from neonate mouse for primary cell cultures	**Cindy Bokobza**, Alice Jacquens, Manuela Zinni, **Valérie Faivre**, Jennifer Hua, **David Guenoun**, Caroline Userovici, Shyamala Mani, Vincent Degos, **Pierre Gressens** and **Juliette Van Steenwinckel**	https://doi.org/10.3791/62964
13 September 2022	Frontiers in Cellular Neuroscience	The multiple faces of extracellular vesicles released by microglia: where are we 10 years after?	**Martina Gabrielli**, Stefano Raffaele, Marta Fumagalli and **Claudia Verderio**	https://10.3389/fncel.2022.984690
6 November 2022	Journal of Neural Transmission	Targeting the brain 5-HT7 receptor to prevent hypomyelination in a rodent model of perinatal white matter injuries	**Cindy Bokobza**, Alice Jacquens, **David Guenoun**, Blandine Bianco, Anne Galland, Maxime Pispisa, Alexandra Cruz, Manuela Zinni, **Valérie Faivre**, Anne Roumier, Sophie Lebon, Tania Vitalis, Zsolt Csaba, Tifenn Le Charpentier, **Leslie**	https://doi.org/10.1007/s00702-022-02556-8

Publication date	Journal	Article title	Authors (PREMSTEM researchers in bold)	URL
			Schwendimann, Pierrette Young-Ten, Vincent Degos, Patricia Monteiro, Pascal Dournaud, **Pierre Gressens** and **Juliette Van Steenwinckel**	

7. Performance of communication channels

Project website

Metrics	2020 total	2021 total	2022 total
Project website total page views	4,929	8,860	9,260

PREMSTEM website metrics are tracked through Google Analytics. These data help to understand a range of aspects including user behaviour and demographics, how traffic reaches the website and the type of content that visitors are digesting, thereby helping the project team to understand where improvements can be made in terms of future content production and promotion methods. These metrics also help to measure the impact of integrated content campaigns, for example by observing spikes in website engagement, as can be indicated by numbers of visitors and resource downloads.

The regular CTA on PREMSTEM social media posts is to visit the project website to increase traffic, visibility and content reach. The number of visitors to the website has been increasing steadily as more content has been added over the course of the project, including resources (fact sheets, videos) and information addressing health topics related to preterm birth.

The graphs on the following page show the number of unique visitors to the PREMSTEM website in the whole of 2021 and 2022. The spikes seen in 2021 coincided with social media posts promoting the Facebook Live presentation by EFCNI, a PCAB member profile and Clinical Trials Day. In 2022, both spikes coincided with a call for external stakeholders to submit an expression of interest to participate in the project's co-creation activities.

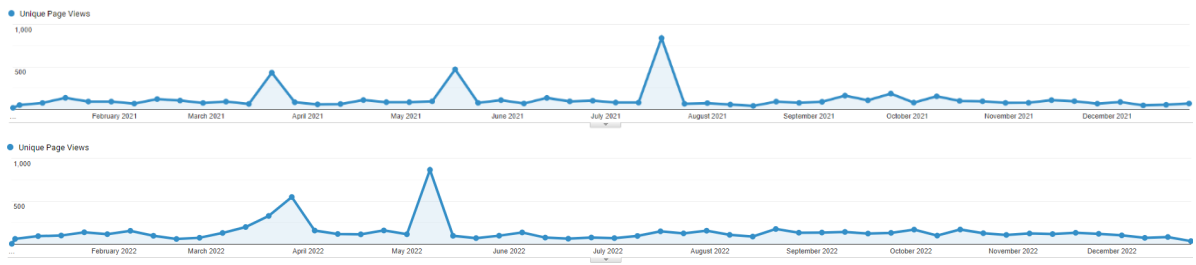


Figure 31 Unique visitors to the project website in 2021 (above) and 2022 (below).

An increase in clicks to the project website in September 2022 coincided with a LinkedIn post about the PREMSTEM annual meeting, indicating that the project's followers are interested in learning about the project's progress and scientific updates.

Figure 32 In September 2022, a spike in clicks came in response to a LinkedIn post about the annual meeting.

Visitors to the project website are located around the world but have a strong geographic connection to where consortium partners are based. Appropriately, PREMSTEM's resources which have been translated are in languages used in many of the top 10 countries where website traffic originates.

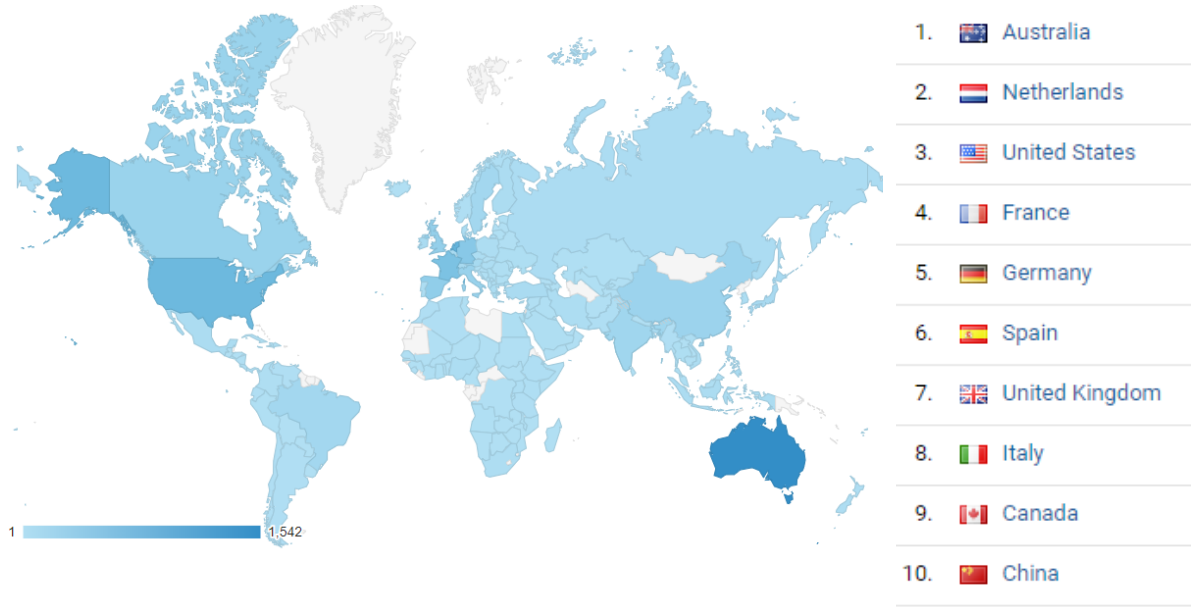


Figure 33 Geographic location of PREMSTEM website visitors.

Social media

PREMSTEM is active on three social media networks – Twitter, LinkedIn and YouTube – and the performance of these accounts is tracked through the analytics data available within the platforms. These statistics help to evaluate user engagement and the performance of different types of content. They also help to measure the impact of integrated content campaigns through real data, for example by analysing spikes in new followers and impressions, as demonstrated by the graphs on the following page.

PREMSTEM's long-term exploitation strategy will be influenced by societal and professional acceptance to perform clinical trials with stem cells in a medically fragile population. Based

upon analytics of the project's social media followers, these channels are helping the project to engage with stakeholders whose backing will be necessary to succeed in this aspect. On both LinkedIn and Twitter, the project has successfully attracted followers from many of the target audiences outlined in the *Communication and Dissemination Strategy* and grown a community of interested individuals and organisations. The YouTube channel audience is reaching a more diverse audience in terms of geography with most viewers based in the United States and India, and it's not possible to identify whether they fit one of project's key audiences. Nonetheless, YouTube is extending PREMSTEM's reach to a broad section of the public and is a useful promotional tool.

When benchmarking against related Horizon 2020 projects, PREMSTEM's Twitter and LinkedIn channels are performing well in terms of followers. However, the biggest gains are being made on the PREMSTEM YouTube channel where subscriber numbers and content consumption have been increasing significantly since February 2023.

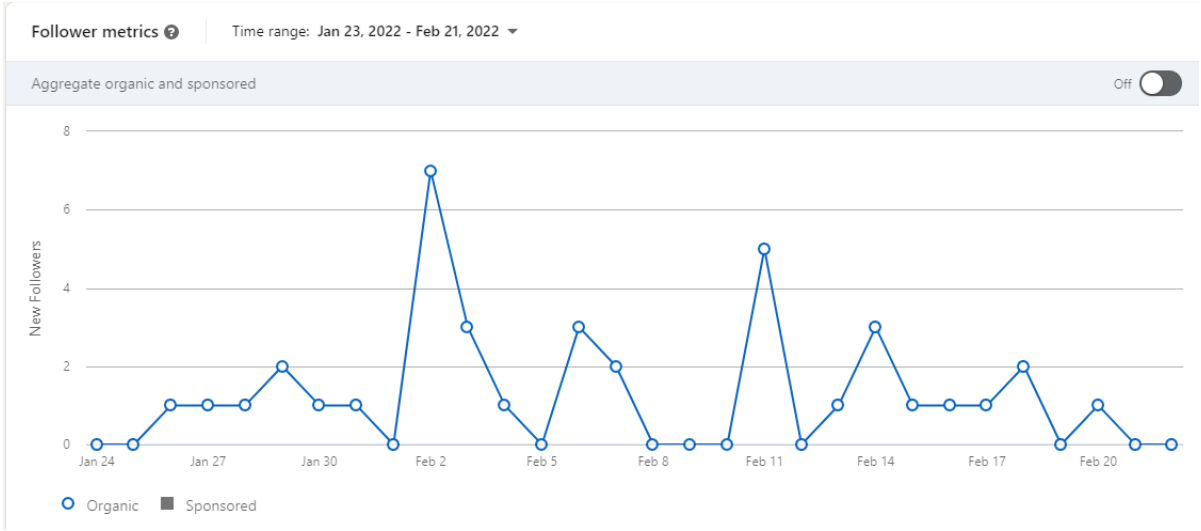


Figure 34 New LinkedIn followers resulting from posts about the stem cell animation (2 February) and the 2022 International Day of Women and Girls in Science (11 February).

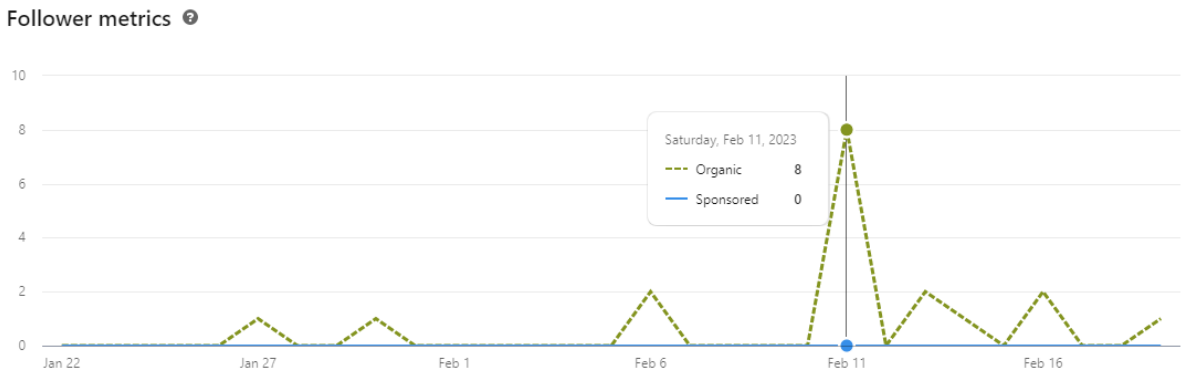


Figure 35 New LinkedIn followers in response to video content posted on 2023 International Day of Women and Girls in Science (11 February).

Twitter

Metrics	2020 total	2021 total	2022 total
Number of tweets	82	136	127
Twitter follower total	171	285	353
Tweet engagement rate (monthly average)	2.65%	2.07%	3.85%

PREMSTEM's Twitter following continues to grow albeit at a slower rate than on other channels. Trends indicate that active users have been leaving the platform since its takeover and it is becoming increasingly challenging to achieve impressions and gain new followers, although an increase in engagement rates with PREMSTEM content indicates that it is being well received. Despite external challenges, the Twitter account has attracted a worldwide following which includes profiles such as scientists, medical professionals, researchers, parents, parent associations, and educational and health organisations. This indicates that the content elements resonate and align with the interests of primary audiences defined in the project's *Communication and dissemination strategy*.

Figure 36 Snapshot of PREMSTEM's Twitter followers.

Twitter threads, which allow a higher total character count by combining a series of tweets, are often used to provide PREMSTEM's followers with additional explanations or context in its content elements, for example when summarising a conference presentation. Threads receive some of the highest engagement as they allow the project to communicate more substantial information to its engaged followers.

Figure 37 Twitter thread discussing Pierre Gressens' presentation at EAPS 2022 attracted impressions and engagements among scientific and medical audiences.

LinkedIn

Metrics	2020 total	2021 total	2022 total
Number of LinkedIn posts	44	135	121
LinkedIn follower total	130	335	574
LinkedIn reactions on updates	380	1,433	1,420
LinkedIn clicks	823	2,639	2,772
LinkedIn impressions	14,338	57,595	67,084
LinkedIn engagement rate (monthly average)	7.55%	7.27%	6.71%

PREMSTEM's LinkedIn account is steadily growing, suggesting that content continues to be relevant and well received, especially among professional audiences. Consortium members are also more active on this network than on Twitter, offering a greater opportunity to share PREMSTEM content more widely through personal networks. PREMSTEM's LinkedIn following is composed primarily of individuals working within research and the medical community – two of the target audiences as defined in the project's *Communication and dissemination strategy*. Their geographical locations align strongly with where PREMSTEM partners are based, indicating that followers may also come from the consortium's own networks.

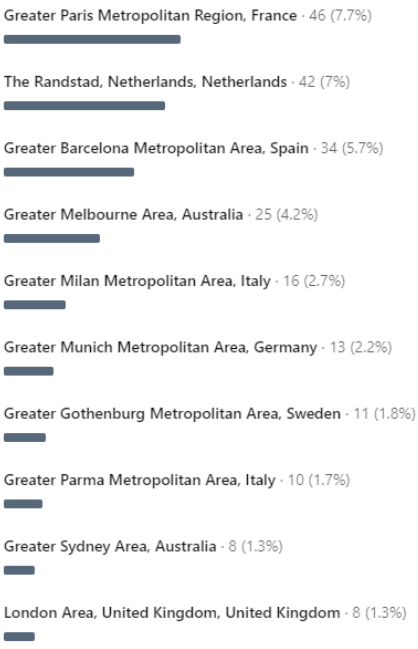


Figure 38 LinkedIn following by location.

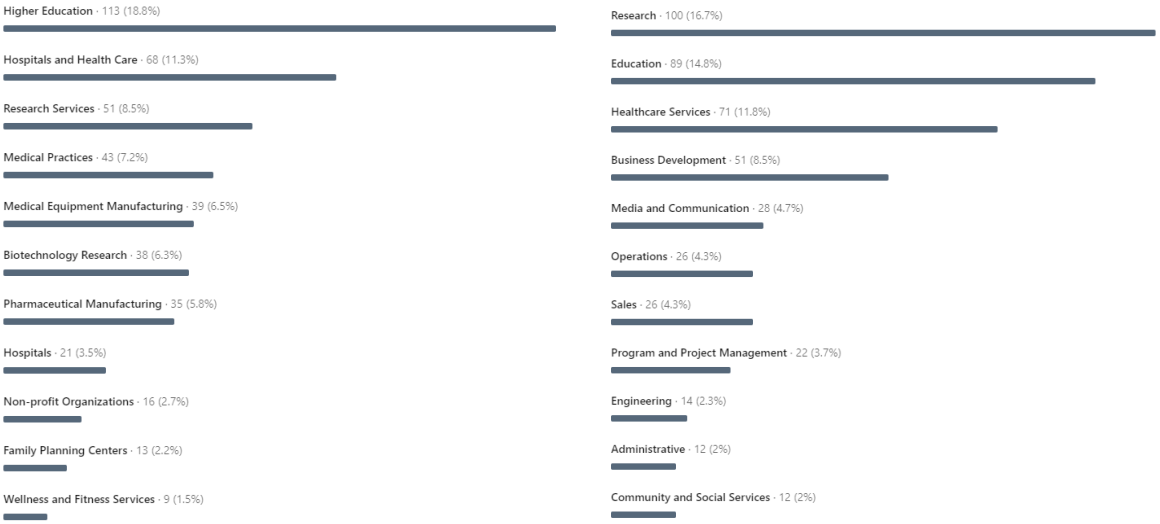
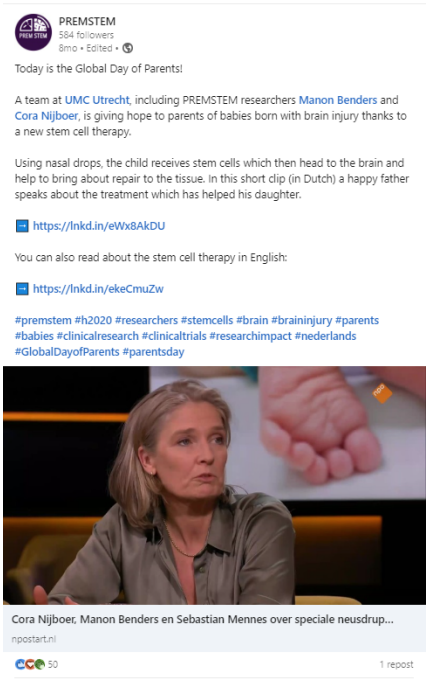
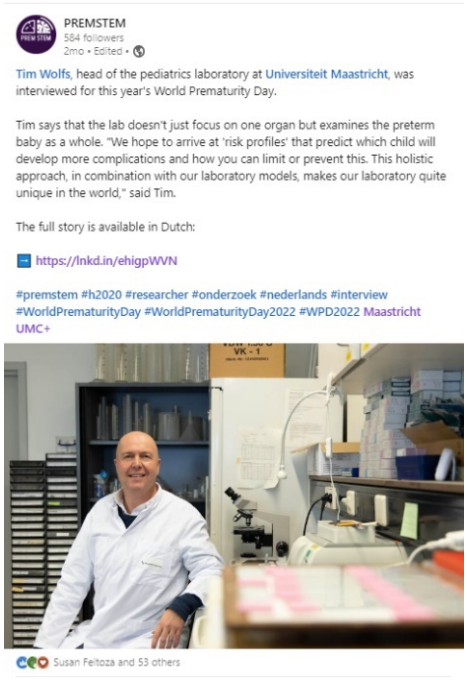


Figure 39 LinkedIn follower breakdown by industry (left) and job function (right).

A tendency noted on LinkedIn is that content featuring the people involved in the project achieves better results in terms of audience engagement. This is demonstrated further by the account's top performing posts in 2022 which feature researcher interviews and updates from PREMSTEM meetings.





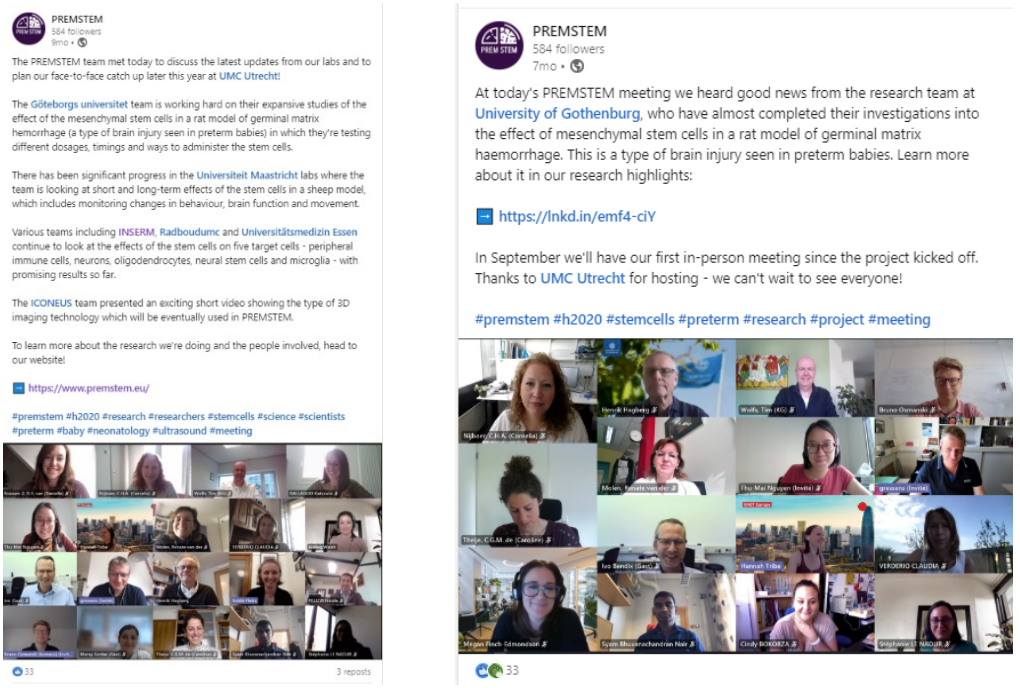


Figure 40 PREMSTEM's top LinkedIn posts in 2022, according to number of organic impressions, show the popularity of content featuring the consortium.

YouTube

Metrics	2021 total	2022 total	January to March 2023
YouTube channel subscriber total	11	29	181
YouTube channel total views	457	1,626	9,301

SEO enhancements implemented on the PREMSTEM YouTube channel in 2023 have drastically increased its performance, resulting in increased channel traffic, video views and subscribers. This has been done by:

- Tagging videos with keywords related to the content topic: Tags help YouTube to understand what a video is about and how to connect it with similar content on the platform.
- Adding hashtags to video descriptions: Relevant hashtags can help to extend the video reach by making them more discoverable in search functions.

Figure 41 Lifetime video views on PREMSTEM's YouTube channel showing the impact of SEO enhancements in 2023.

Video impressions and watch time in the first quarter of 2023 have already outperformed the metrics for the whole of 2022. Thanks to improved SEO, most video views are now a result of YouTube recommending PREMSTEM content, with 95.3% of impressions so far in 2023

generated this way compared to 14.4% in 2022. Previously most visitor traffic came through YouTube searches and from external sources, such as the project website and social media posts. This shift in how visitors reach the channel has hugely increased video watch time.

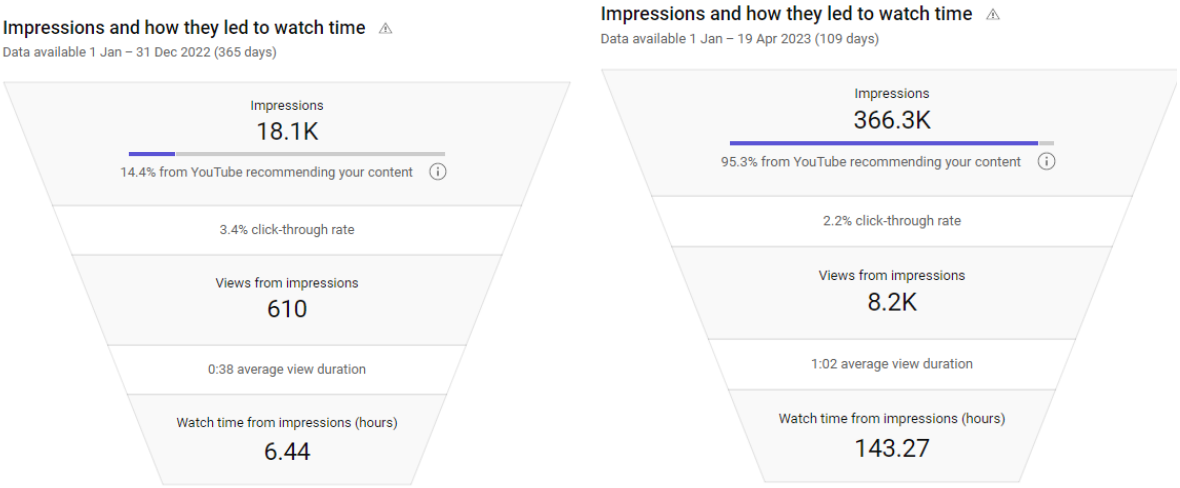


Figure 42 YouTube channel impressions in 2022 (left) and for the period of 1 January to 19 April 2023 (right).

Besides increased views, the channel is attracting more subscribers and likes on videos which indicates that visitors find the content elements useful and of high quality. On 19 April 2023, the animation was performing well in searches for videos addressing the term *What are stem cells?* – appearing on the first page of search results on YouTube and the second page on Google. This indicates that the Google algorithm deems the animation to be very effective to the user in answering their question.
As of April 2023, there are 16 videos/shorts on the PREMSTEM YouTube channel. Metrics on 20 April 2023 show the top three videos to be:

- Stem cell animation (12,390 lifetime views, 268 likes).
- PREMSTEM project video (1,025 lifetime views, 15 likes).
- *Why is the brain vulnerable?* Oligodendrocytes (388 lifetime views, 14 likes).

8. Conclusion

This report has been published in April 2023 (month 40 of the project) and demonstrates that PREMSTEM is fulfilling the aims of Task 6.3. Most activities to date have been in the communication of the project which has taken place on various channels and in different content formats. Dissemination efforts have been carried out by the project's researchers through publication of research findings in scientific journals and presentations at external events.

The project team remains committed to creating high quality, accurate and professional content elements which are suitable for PREMSTEM's key stakeholders and in the context of defined themes. It continues to encourage their diffusion through both owned and partner communication channels, including websites and social media. At this point of the project, the audience reach of PREMSTEM's communication and dissemination activities is estimated as follows:

- Scientific community (higher education, research): 328,037 individuals.
- Civil society: 1,395 individuals.
- General public: 454,609 individuals.
- Policy makers: 120 individuals.
- Customers: 24,974 individuals.
- Other: 67 individuals.

The above figures indicate that the project is achieving its goals of reaching specific target audiences identified in the project's *Communication and dissemination strategy*, including researchers and the scientific community, patient/parent organisations ('civil society'), policy makers and the public, including parents. Furthermore, the distribution of content elements on communication channels such as YouTube is helping to promote the project even further, with around 200 new users visiting the PREMSTEM channel every day. Moving forward, the team will continue with these activities and methods to maximise the communication and dissemination of PREMSTEM's research successes, contribute to and advance scientific knowledge, increase awareness of related scientific and health topics, and connect with external stakeholders.