Clinical study initiation package

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Contributing Beneficiaries	

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SynAir-G

Project & Document Information

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Call	HORIZON-HLTH-2021-ENVHLTH-02		
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Authoring, Revision & QA Information

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Version	Date	%	Changes	Author
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Introduction/ Purpose of the document

Deliverable title: D2.1: Clinical study initiation package (final protocol, submission for ethics approval, registration number) (m12)

The purpose of this document is to provide an overview of the activities conducted during the initial year of SynAir-G, specifically focusing on the preparation of the clinical study as an integral part of the work carried out within WP2. From the beginning of the study (Sep 2022) to D2.1 (month 12) the work package for the clinical cohort has been prepared

In specific, within the preparation period, three main aspects have been completed:

A. The clinical cohort study protocol,

B. The finalization of all material, procedures and methods that will be used in the 2-year inclusion and follow up period of the clinical study.

C. The submission for obtaining ethics approval for WP2 and

Participating partners

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General information

Deliverable title: D2.1: Clinical study initiation package (final protocol, ethically approval, registration number)

Name of the clinical study: Real-life multipollutant scenario: children at school and beyond.

The Impact of Synergies of Indoor Air Pollutants on Childhood Health and Wellbeing-SynAir-G Child.

Clinical trials id: NCT05105386

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Description of work

WP2 aims is to quantify the health effects of synergizing chemical and biological pollutants, on school- aged children, widely distributed across Europe and stratified by socioeconomic status.
Indoor air pollutants will be monitored within the classrooms with sensors developed in WP1. Exposure data from additional sources (outdoor, home, transports) will be obtained in WP3.
Health outcomes will be assessed prospectively using a gamified app, periodically obtained validated questionnaires and in a subgroup of children real-time data using mHealth trackers
Clinical partners (NKUA (lead), CHUM, UOULU, UMAN and CAIR) will equally recruit and follow-up participants.

Details for each task

Task 2.1 – Cohort set up (m1-12): A detailed protocol describing all processes, including standardized assessments, timings and coordination with sensor specialists and end-users, will be developed. The protocol will be formally registered and submitted for ethical approval at all centres.

Task 2.2 – Sentinel system development (m1-12): Health data from the cohort will be monitored by a specifically designed gamified application, as well as by state-of-the-art wearable tracking technology. The app will capture input from the participants at large, while the trackers will accurately, continuously, and remotely, identify personalized patterns of all day activity status, heart rate, oxygen saturation, temperature, blood pressure, sleep, respiratory rate, and mechano-acoustic breathing sounds signatures. Sentinel data will be processed in WP6 and integrated in the SynAir-G autonomous sensing platform (WP5, T5.2).

Task 2.3 – Cohort inclusion (m13-24): Communication with schools and families representing diverse cultural and socioeconomic backgrounds (5 countries, varying socioeconomic areas within each), will be conducted and formal participation consents obtained. The target population will include healthy children and be enriched for children with respiratory allergies and asthma. Provision

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of instructions, training for participation and baseline assessments of respiratory, immune, and mental health using questionnaires and relevant physiological measurements (e.g., spirometry, FeNO), will be performed. Sensors from WP1 will be positioned and cross-checked for functionality.

Task 2.4 – Cohort follow-up (m14-42): Children will be prospectively followed-up for a school year. Investigators will regularly visit schools to keep sensors running and collect materials (e.g., dust for analysis in WP1). Real-time tracking will be coupled with regular communication and face-to-face visits for health outcome assessments. Devices developed in WP5 will be positioned in selected locations, from month 24 on. The cohort will also provide the setting for establishing indoor and outdoor interactions (WP1), dose-responses in real life (WP3), and health outcome data for integration and synergy analyses in WP6. Summary results will be posted as soon as the follow-up is completed.

Task 2.5 – Health outcomes analysis and reporting (m36-48): Health status data will be extracted, cleaned, described, and compared. Relations between the major pollutants and different health outcomes will be assessed. Comparisons between and within subjects, as well as effects of air purification will be evaluated and reported.

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SUMMARY OF PROGRESS TOWARDS OBJECTIVE D1.2 (MONTHS 01-12)

Following the kickoff meeting in Athens in October 2022, the protocol has been drafted by NKUA, and an intense e-communication and skype conferences at monthly intervals with input by all partners. The first draft document was finalized by January 2023.

The protocol includes in detail all standard operation procedures that will be used for the clinical and immunologic evaluation, of the participants and the specific follow- up time points.

The protocol was finalized at month 9 (May 2023) and has been submitted by all centers for ethical approvals.
Permission needed for the use of the validated questionnaire PedsQL has been obtained by the NKUA as WP leader (https://www.pedsql.org/conditions.html).

Work progress towards D2.1

A. The study protocol for WP2.

Protocol summary

Full Title	The Impact of Synergies of Indoor Air Pollutants on Childhood Health and Wellbeing
Acronym	SynAir-G Child
Target Population	School aged children of 8-9 years healthy, asthmatics and allergic/atopic
Sample size	3500
Inclusion Criteria	1. Students at primary schools aged ~8-9 years. 2. The subject and the parents/guardians have the verbal, writing and mental ability to understand the intent and character of the study. 3. Written informed consent from the child's parents/guardians. 4. Willing to follow the study procedures. **Additional inclusion criteria for nested cohort of healthy (controls) and asthmatic/allergic (cases)** **A. Cases**

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	1. At least one positive answer in the baseline questionnaire for the presence of symptoms of asthma, allergic rhinitis, eczema or food allergy. 2. Diagnosis of asthma/allergic rhinitis/eczema by the study physicians (based on case baseline questionnaire criteria, pg 12), active during the past year. **B. Controls** 1. No history of allergy-associated diseases, congenital anomalies/abnormalities, other chronic respiratory diseases (I.e.; CF). 2. Willing to follow the additional study procedures
Exclusion Criteria	Unwilling or unable to follow the procedures of the protocol.
Duration of inclusion and monitoring	Inclusion: 2 years Monitoring: one year
Overall Study duration	4 years
Study design	Observational
Objectives	To associate indoor air quality determinants and their interactions, with health outcomes in school-aged children To compare air-quality related health outcomes in different populations, settings, and conditions
Outcomes	The outcomes for the whole cohort will include **respiratory health, general health, and quality of life** during a school year (approximately 10 months). Assessment will be performed at the beginning and in the end of the observation period, at predefined points in-between (3-month intervals) and daily using an app. A biobank of samples to be used for further understanding of the effects of pollution on health, will be established.
Outcomes measures	1. Respiratory health outcomes will be measured with the use of visual analogue scales (VAS) incorporated in an app, validated

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	questionnaires (ISAAC, PreDicta respiratory, ACT, ACQ), lung function tests (spirometry) and airway inflammation (exhaled nitric oxide). In a subset of children, indirect measures of respiratory activity will be explored through measurements in the exhaled air (Volatile Organic Compounds) and wearable trackers. 2. General health outcomes will be measured with the use of a subset of questions from the validated Child Health Questionnaire (CHD) with visual analogue scales (VAS), height and weight, history of non-communicable diseases, history of infections during the last 12 months, immunizations, allergy associated diseases, drugs purchase records and health care records (wherever applicable). 3. Quality of life will be measured with the validated PedsQL questionnaire. 4. Samples to be stored for future investigations (these investigations are not part of the SynAir-Child): a. blood for Immune health and inflammation-RNASeq i. serum for immune markers b. nasopharyngeal for transcriptome, microbial metagenome and virome c. urine for the assessment of environmental metabolites contamination.

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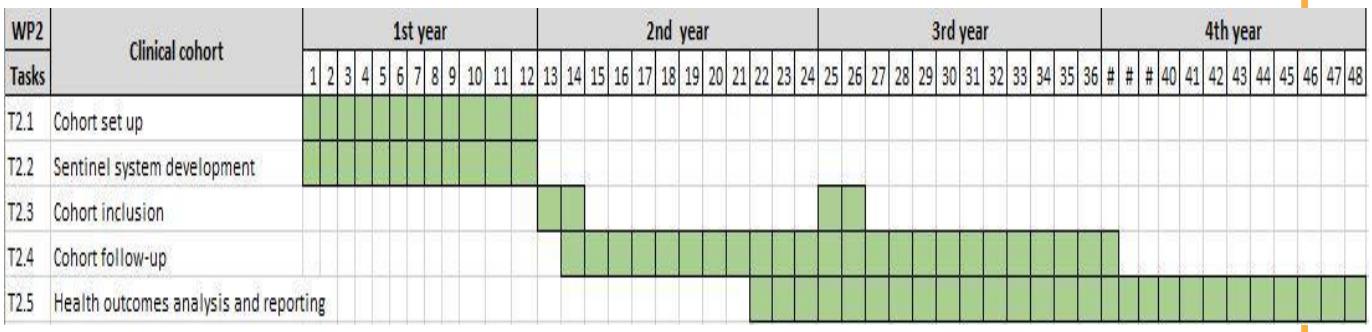
Figure 1. Overview of the study timeline



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Study population

Students aged 8-9 years, equally distributed between males and females, will derive from five (depending on the setting maybe 6) primary schools from each country. It is estimated that the average number in each class of the 8–9-year-old students is 20-24, 3 classes in each grade, 50-80 students in each school (depending on the type of school), 250-400 in each country (depending on the country), ¬1700 in total in one academic year, 3000-3500 for the total study period. Participants will be followed up for a full academic year (approximately 10 months).

A nested cohort will include up to 100 in total children with respiratory allergies (asthma and rhinitis) and other allergic diseases (which will be identified by the screening questionnaires) and healthy matched controls in a 1 (priority to asthmatic children and then allergic/atopic):1 (healthy) ratio, in each year/each center. Children will first be selected from the index classroom in which the sensors will be positioned and if necessary, from neighboring classrooms.

Nested cohort

A subgroup including children with asthma and/or allergic rhinitis as a priority will be identified from the screening questionnaires. In case of limited number, the cohort will also include children with atopic dermatitis/eczema and food allergy.

Children will be also screened, as a double check, by the Cases baseline questionnaire.

Up to 100 children in each year in a 1:1 ratio (cases/controls) in each country, will be closely monitored through wearables (trackers) and portable spirometers and some of these children with CANARIN devices, to monitor respiratory activity and exposures.

B. Finalization of all material, procedures and methods that will be used in the 2-year inclusion and follow up period of the clinical study.

a. Respiratory, general, and mental health outcome measure

i. A gamified application will access child's health with simple questions. The game will be accessible through web browser & mobile devices (to be downloaded through app store for iOS and android). Instruction will be given to parents how to access the application. Automatic reminders will be sent from the app. Children will be instructed to play with the game app

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daily. An admin and tracking dashboard will be created. The dashboard will be accessible by research centers.

Appropriate validated questions for the assessment of general, mental, and respiratory health incorporated in the gamified app have been selected (Child Health Questionnaire (CHD) …measured by visual analogue scales (VAS) with Input by all clinical partners. Specific scenarios for the design of the games used in the app have been finalized by input of all partners.

i. Selection validated questionnaires for periodically follow up – sent by e- link to the parents.
    1. ISAAC, PreDicta, ACT and ACQ questionnaires for general and respiratory health outcomes
    2. PedsQL questionnaire for quality of life
    3. Asthma control questionnaire / asthma quality of life questionnaire (for asthma outcomes)
    4. Validated exposure /environmental questionnaires assessing exposures at home and at schools have been finalized (exposure questionnaire adapted from SINPHONIE study)
ii. Official permission has been obtained for the use of PedsQL questionnaire.
iii. On time purchase of equipment material for assessing lung function and inflammation (MIR spirometers and FeNObreath)
iv. Standard procedures for obtaining and storage of biological material have been finalized. Coding for samples has been included in the protocol.
v. Informed consents have been finalized.

b. School selection and communication for obtaining approval from local authorities.

The selection of schools has been finalized and was based on economic criteria (differences between different regions of the participating centers) and on annual reports on air quality (wherever available) from the respective Directorate of Climate Change and Atmospheric Quality of the Ministry of Environment. All study centers obtained written approvals to conduct the study in schools from the respective authorities in each country. Verbal approval have been obtained from school authorities and final approval will be obtained before the beginning of the school year.

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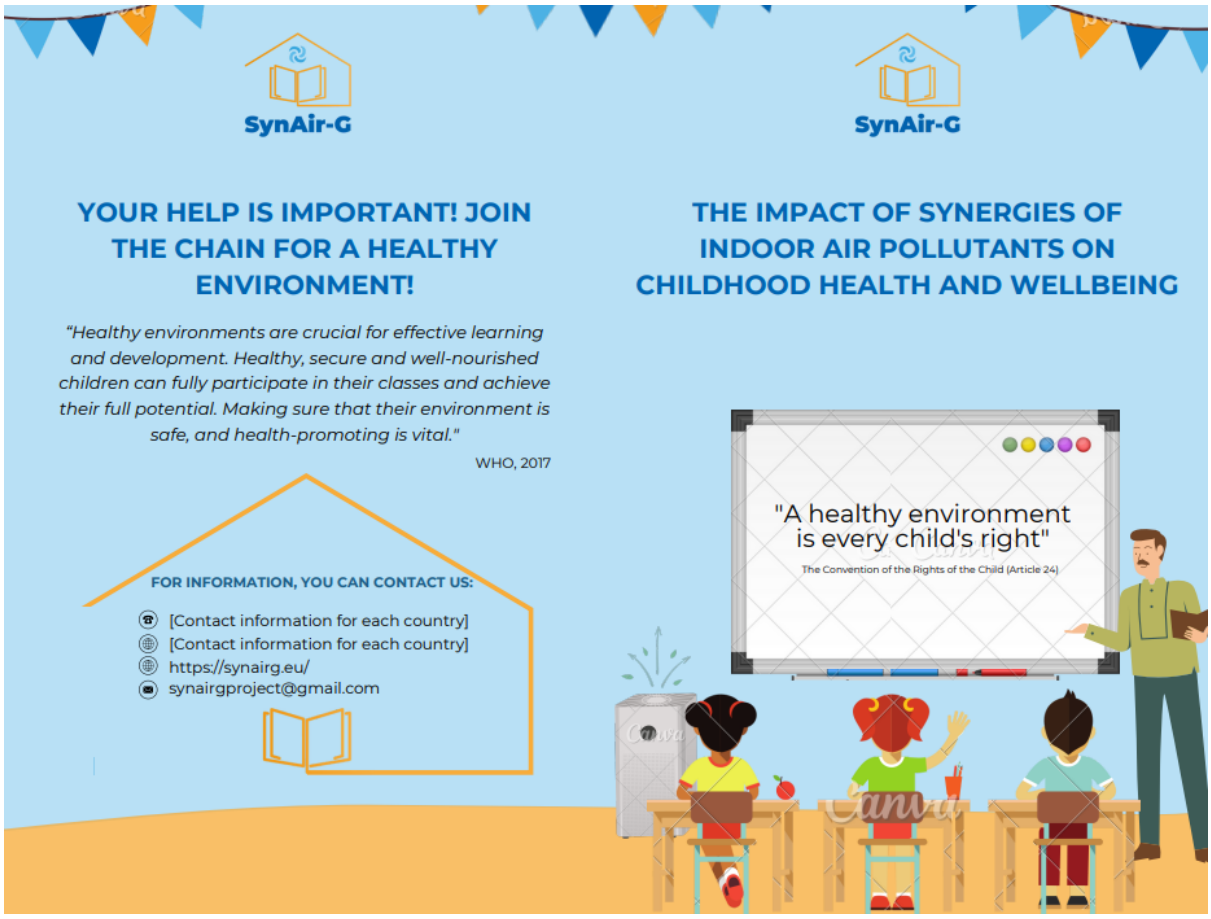
c. Preparation of informative material for the communication with the local authorities/school principals /teachers /children and their families.

Informative materials and leaflets have been prepared for communication the purpose and significance of the study. On site informative short meeting will be conducted with the schoolteachers and parents shortly within the first 2 weeks of school year initiation. These are translated in the local partners.



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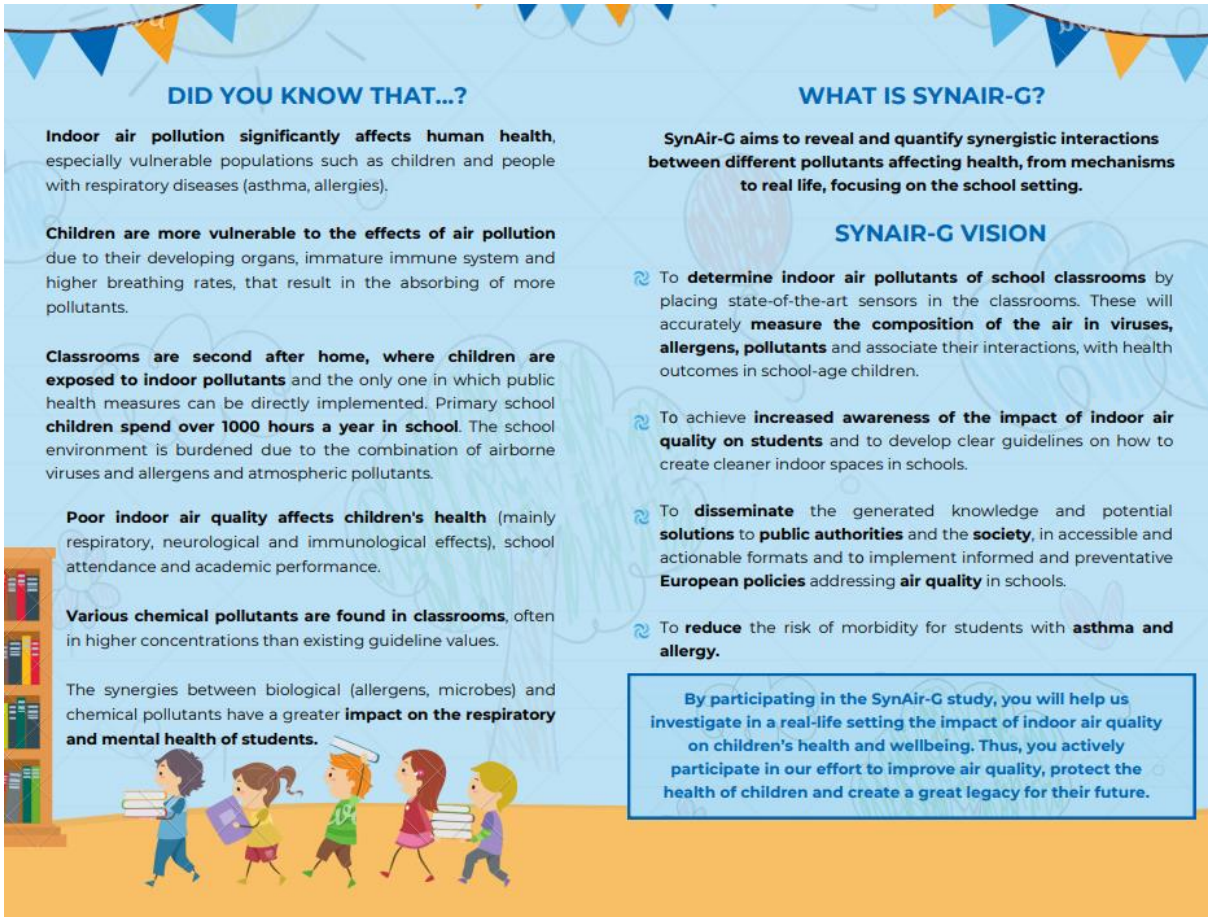

d. Determination of sentinel system and communication with partners

Meetings with the entire WP2 team were scheduled bi-monthly, occurring every 15 days. Additionally, monthly meetings were scheduled involving the other work packages. These meetings aimed to finalize the specifications of the sensor boxes, clarify procedures, and ensure alignment. The clinical team received weekly email updates. A collaborative working file was established on a cloud platform, facilitating real-time collaborative work. Meetings with WP1, WP4, and WP6 were also planned for equipment details that will be utilized and green wall initiative.

All procedures for the SynAir-G cohort have been finalized.

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Table 1: Procedures for SynAir-Child cohort

Procedures whole cohort	Months									
	Sep visit1	Oct	Nov	Dec Visit 2	Jan	Feb	Mar Visit 3	Apr	May	Jun Visit4
Information sheet and consent	√									
Baseline questionnaire for total cohort	√									
Assessment form at schools' baseline	√									
PedsQL	√			√			√			√
Cases baseline questionnaire	√									
Follow up questionnaire healthy children				√			√			
Cases follow up questionnaire				√			√			
Final questionnaire heathy children										√
Final questionnaire for cases										√
Assessment form at schools' final										√
Spirometry	√									√
Download spirometry data				√			√			
Exhaled nitric oxide	√			√			√			√
Measurement height and weight	√			√			√			√
Training/ Sentinel systems	√			√			√			
Wearable and Canarin sensors training	√									
Collect devices										√
Exposures information about schools' buildings questionnaire	Performed by the study members, at any timepoint during the academic year									

Note

** Green color all cohort, orange color additional procedures for nested cases/controls.*

Table 2: Optional procedures for SynAir-G cohort

Optional procedures	Months									
	Sep visit1	Oct	Nov	Dec Visit 2	Jan	Feb	Mar Visit 3	Apr	May	Jun Visit 4
Urine sampling	√			√			√			√
Nasopharyngeal sampling	√			√			√			√
Blood sampling	√									√
Impulse oscillometry	√			√			√			√

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All methodological issues have been addressed.

Statistical analysis

The amount of data collected within Synair-G and the different properties of each data source require a systematic preliminary understanding of the data through descriptive statistical analysis. Sample sizes, relative proportions, demographics and clinical characteristics of confounding factors and height and weight outcome variables will be derived. Univariate analysis will be performed on each pollutant variable, temperature, and humidity variables, microbial, virus and allergen concentration variables, thus getting first order information (e.g., via mean, mode) and also higher order information of their distributions (e.g., via variance, skewness, kurtosis).

Relationships between pairs or small sets of exposure variables will also be investigated via contingency tables and visually via scatterplots. Quantitative measures of variable interdependence will also be derived, such as correlation (e.g., Pearson or Spearman rho) and covariance. Furthermore, regression analysis will be performed, assuming the dependence of one of the variables to a selected set of variables (assumed mutually independent), thus deriving information such as the slope of regression. Among others, this will provide an indication of the orthogonality of the measured variables. Additionally, Principal Component Analysis will be performed on data related to exposure variables and the explained variance for the first few largest eigenvalues will be determined.

Missing or corrupt entries in data corresponding to exposure variables will be replaced by interpolated values, provided the number of consecutive missing values and the total relative number of missing values does not exceed a certain threshold between outcome measurements. In the latter case, measurements on that day will be discarded. On the other hand, missing values in the outcome measurements will not be considered.

Synergistic effects between exposure variables, which lead to exaggerated values in the outcome variables will be identified and studied using mixed model regression, which is also suitable for studying hierarchical, non-independent data, as for example data sampled from different classrooms

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(e.g., the variability in the outcome can be thought of as being either within the same classroom/group or between different classrooms/groups). Due to the large difference of measuring rates between exposure and outcome variables, we will define measuring sessions, each one corresponding to an outcome variable measurement. Furthermore, input variables in the regression models will correspond to scalar statistical metrics (e.g., mean or maximum values) of the respective measuring session for each exposure variable. To account for the fact that such metrics contain much less information than the actual time-series measurements, we will also use metrics corresponding to Discrete Fourier Transform coefficients, and we will also consider non-linear regression where powers of the input variables will be used, to capture rapid changes in the time-series input. Subsequently, stepwise regression will be used, to iteratively examine the statistical significance of each independent variable in the regression model. A combination of a forward selection approach (including a new variable incrementally and testing for statistical significance) and a backward elimination method (removing variables to test their importance relative to overall results) will be employed.

Artificial intelligence

Within the SynAir-G, analysis and mathematical modeling of data derived from various kinds of resources, such as health, chemical, biological, and ambient, will be performed to understand the correlations and dependencies between them. Specifically, the AI analysis will identify potential synergies and interactions between the data and its affection for the health status of individuals (children). For that reason, a multi-layer and automatic AI-driven analysis will take place. In particular, the AI Engine that the project will deliver, will leverage, and analyze types of data that come from different heterogeneous sources (multimodal data). It is difficult to directly use these multimodal data in the training of the algorithms, as they may be of different dimensionality and data types. Thus, the effort will deepen the proper study and processing of the learning representation by this multimodal data.

Within the project, we will exploit the state-of-the-art modeling to achieve a better and more robust representation and pattern recognition to measure the synergies among an arbitrary number of variables, based on a multimodal dataset. Particularly, a 2-layer analysis will be developed, where the two layers will interact with each other, and will mainly utilize Neural Network architectures which have been proven to be more efficient algorithmic representatives, effective, and generalizable to the

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various variations of the data [3] [4]. In the 1st layer, Correlational Neural Network (CorrNet) architectures, which contain an encoder-decoder pair for each modality of data, will be one of the types of algorithmic topologies that will be applied in the analysis engine for learning common representations between the multimodal data that SynAir-G will produce. Predicting the synergies based only on the AI models and the property from the multimodal data is complex partly because many different scales must be considered, and the nature of the datasets must be considered as well. For that reason, in the 2nd layer, the AI-driven analysis will intensify and establish the causal relationships [5] of the different properties of the data, the AI model predictions, or both. For that purpose, Causal Modeling [6] will be applied, for identifying correlation (association). In fact, SynAi-G will model causation into the AI models, to efficiently analyze inherent causal links between exposure and health impacts.

The AI Engine will be multi-level tested and validated according to their robustness in new unknown circumstances they have not programmed or trained for since a risk-sensitive application will be deployed. Thus, the AI models will be trained in such a way that can be generalizable in the production environment [7] [8]. Additionally, by utilizing various Explainable AI (XAI) and Causality metrics from the literature [9] [10] [11], the AI models' robustness and trustworthiness will be measured and evaluated in the prediction phase before they will be deployable in production. The engine will be developed in accordance with EU policy initiatives [12]. That means the data will be processed and analyzed without compromising personal user information, by respecting the GDPR data privacy policy and being courteous according to AI ethics guidelines.

B. Submission for ethics approval

All centers have submitted for ethics approval. The approval from the lead center NKUA has been obtained by October 2022. Approval has been also obtained in Georgia. In the UK, due to restrictive (non-EU member) measures, there were delays in the financial approval of the project. Financial approval has been obtained June 2023; thus initiation of recruitment is anticipated by January 2024. Finland and France are awaited for final approval within the next month mainly due bureaucracy procedures.

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1. GREECE NKUA

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Εθνικόν και Καποδιστριακόν Πανεπιστήμιον Αθηνών
ΙΔΡΥΘΕΝ ΤΟ 1837

η Ε.Η.Δ.Ε.

διαπιστώνει και ομόφωνα αποφασίζει, σύμφωνα με άρθρ. 23 παρ.1.α του Ν.4521, σχετικά με την υποβληθείσα αίτηση υπ. αριθμ.100801/4.10.2022, ότι

εγκρίνει

την εκτέλεση του υπό εξέταση ερευνητικού έργου, καθώς προκύπτει ότι τηρούνται οι παραδεδεγμένοι κανόνες ηθικής και δεοντολογίας και ερευνητικής ακεραιότητας ως προς το περιεχόμενο και ως προς τον τρόπο διεξαγωγής του εν λόγω ερευνητικού έργου, καθώς και οι εκ του νόμου προβλεπόμενες προϋποθέσεις.

Η παρούσα απόφαση της ΕΗΔΕ σε καμία περίπτωση ΔΕΝ υποκαθιστά την απαιτούμενη από άλλη αρμόδια δημόσια υπηρεσία, διοικητικό όργανο ή ανεξάρτητη διοικητική Αρχή, έγκριση ή αδειοδότηση του παρόντος ερευνητικού έργου/ μελέτης που δύναται επιπλέον να απαιτείται εκ του νόμου.

Ημερομηνία έκδοσης απόφασης
Έτος: **2022** Μήνας **10** Ημέρα: **2022**

Υπογράφει ο/η Πρόεδρος της Επιτροπής			
Θέση	Όνομα	Επίθετο	Υπογραφή
Πρόεδρος-Καθηγήτρια	ΔΗΜΗΤΡΑ	ΠΑΠΑΔΟΠΟΥΛΟΥ	*

*Η υπογραφή του παρόντος εγγράφου έχει τεθεί στο πρωτότυπο, το οποίο παραμένει στο αρχείο της Γραμματείας της Ε.Η.Δ.Ε. και η διεκπεραίωσή του έγινε ηλεκτρονικά.

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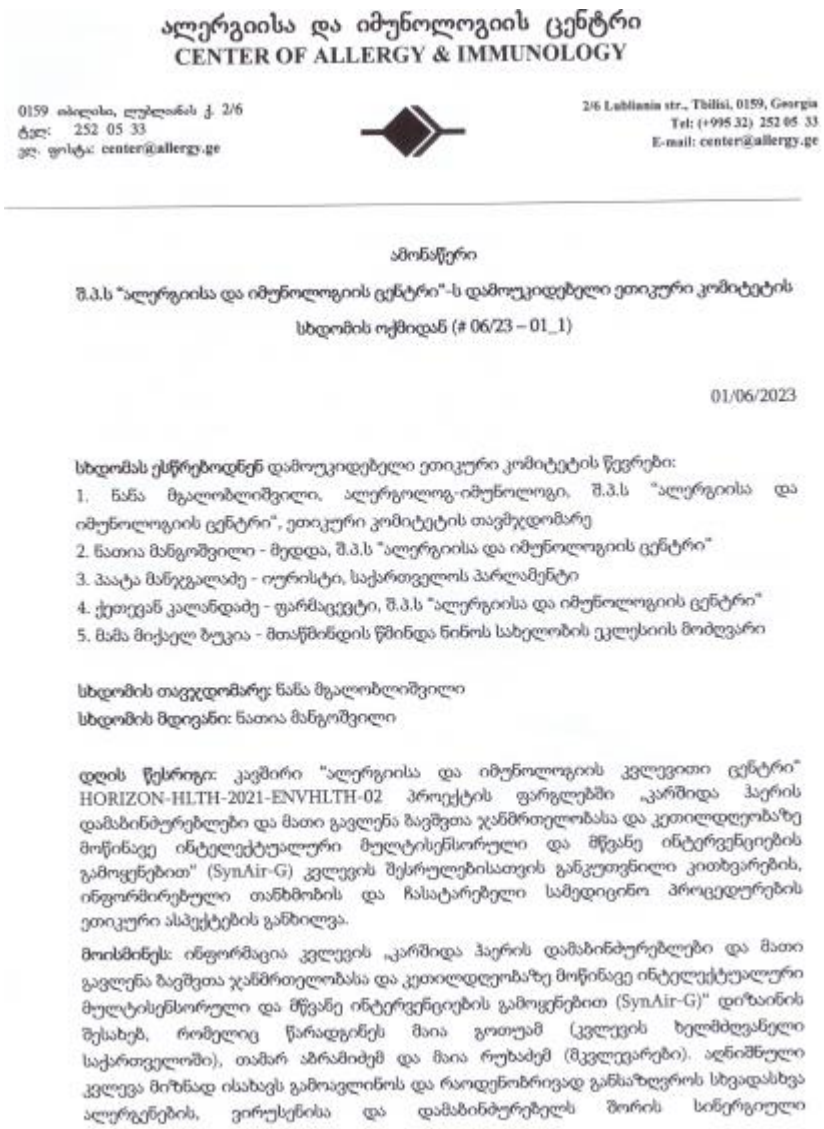
2. GEORGIA CAIR



ალერგიისა და იმუნოლოგიის ცენტრი
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ამონაწერი

შ.პ.ს "ალერგიისა და იმუნოლოგიის ცენტრი"-ს დამოუკიდებელი ეთიკური კომიტეტის

სხდომის ოქმიდან (# 06/23 – 01_1)

01/06/2023

სხდომას ესწრებოდნენ დამოუკიდებელი ეთიკური კომიტეტის წევრები:
1. ნანა მგალობლიშვილი, ალერგოლოგ-იმუნოლოგი, შ.პ.ს "ალერგიისა და იმუნოლოგიის ცენტრი", ეთიკური კომიტეტის თავმჯდომარე
2. ნათია მანგოშვილი - მედდა, შ.პ.ს "ალერგიისა და იმუნოლოგიის ცენტრი"
3. პაატა მარკგალაძე - იურისტი, საქართველოს პარლამენტი
4. ქეთევან კალანდაძე - ფარმაცევტი, შ.პ.ს "ალერგიისა და იმუნოლოგიის ცენტრი"
5. მამა მიქაელ ბუკია - მთაწმინდის წმინდა ნინოს სახელობის ეკლესიის მოძღვარი

სხდომის თავჯდომარე: ნანა მგალობლიშვილი
სხდომის მდივანი: ნათია მანგოშვილი

დღის წესრიგი: კავშირი "ალერგიისა და იმუნოლოგიის კვლევითი ცენტრი" HORIZON-HLTH-2021-ENVHLTH-02 პროექტის ფარგლებში „კარშიდა ჰაერის დამაბინძურებლები და მათი გავლენა ბავშვთა ჯანმრთელობასა და კეთილდღეობაზე მოწინავე ინტელექტუალური მულტისენსორული და მწვანე ინტერვენციების გამოყენებით" (SynAir-G) კვლევის შესრულებისათვის განკუთვნილი კითხვარების, ინფორმირებული თანხმობის და ჩასატარებელი სამედიცინო პროცედურების ეთიკური ასპექტების განხილვა.

მოისმინეს: ინფორმაცია კვლევის „კარშიდა ჰაერის დამაბინძურებლები და მათი გავლენა ბავშვთა ჯანმრთელობასა და კეთილდღეობაზე მოწინავე ინტელექტუალური მულტისენსორული და მწვანე ინტერვენციების გამოყენებით (SynAir-G)" დიზაინის შესახებ, რომელიც წარადგინეს მაია გოთუამ (კვლევის ხელმძღვანელი საქართველოში), თამარ აბრამიძემ და მაია რუხაძემ (მკვლევარები). აღნიშნული კვლევა მიზნად ისახავს გამოავლინოს და რაოდენობრივად განსაზღვროს სხვადასხვა ალერგენების, ვირუსულისა და დამაბინძურებელს შორის სინერგიული

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ურთიერთქმედება, რომელიც გავლენას ახდენს მოსწავლეების ჯანმრთელობაზე და ფოკუსირებულია სკოლის გარემოზე. კვლევის ფარგლებში იგეგმება გარშიდა გარემოში ჰაერის დაბინძურების მონიტორინგის ინოვაციური სისტემის შექმნა და ქიმიური და ბიოლოგიური (ალერგენები, მიკრობები) დამაბინძურებლების დეტექციის ახალი სენსორების დანერგვა. მათი გამოცდა მოხდება ევროპის 6 ქვეყნის (საბერძნეთი, გერმანია, საფრანგეთი, ფინეთი, დიდი ბრიტანეთი და საქართველო) სკოლებში. კვლევა ითვალისწინებს 2023-2024 და 2024-2025 სასწავლო წლების განმავლობაში ქ. თბილისის 5 შერჩეულ სკოლაში 8/9 წლის ასაკის სკოლის მოსწავლეების კითხვარებით გამოკითხვას, ჰაერის დაბინძურების მონიტორინგს, გარეგანი სუნთქვის ფუნქციის შესწავლას, სათამაშო აპლიკაციის გამოყენებით ჯანმრთელობის შესახებ ყოველდღიური ინფორმაციის შეკრებასა და სხვა. კვლევის ფარგლებში მონაწილეებზე არანაირი ინტერვენცია არ იქნება გამოყენებული. კვლევა განხორციელდება კონფიდენციალურობის სრული დაცვით. ასთმისა და ალერგიის მქონე ბავშვები იქნებიან განსაკუთრებული ყურადღებისა და მზრუნველობის ქვეშ. კვლევის საბოლოო მიზანია სკოლებში ჰაერის დამაბინძურებლებისაგან თავისუფალი, ჯანსაღი გარემოს შექმნა და შენარჩუნება.

აზრი გამოთქვეს: ნანა მგალობლიშვილმა, მოძღვარმა მამა მიქაელ ბუკიამ და ქეთევან კალანდამემ

დაადგინეს: მიეცეს დადებითი დასკვნა „ალერგიისა და იმუნოლოგიის კვლევით ცენტრში“ ჩასატარებელ კვლევას „კარშიდა ჰაერის დამაბინძურებლები და მათი გავლენა ბავშვთა ჯანმრთელობასა და კეთილდღეობაზე მოწინავე ინტელექტუალური მულტისენსორული და მწვანე ინტერვენციების გამოყენებით“.

სხდომის თავჯდომარე: ნანა მგალობლიშვილი

სხდომის მდივანი: ნათია მანგოშვილი

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