

<b>Project Name: University of Puerto Rico STEM Asthma Awareness Program</b>	
<b>Authors, Affiliations, and Email Address of Primary Contact:</b> Orestes Quesada (orestes.quesada@upr.edu) and Michelle Borrero, University of Puerto Rico-Río Piedras; Edjean Calderón and John Ramírez, CoopSEI	<b>Funder: NIH- NIGMS</b>
<b>Website:</b> <a href="https://natsci.uprrp.edu/sepaasthma/">https://natsci.uprrp.edu/sepaasthma/</a>	<a href="https://nihsepa.org/project/university-of-puerto-rico-stem-asthma-awareness-program/">https://nihsepa.org/project/university-of-puerto-rico-stem-asthma-awareness-program/</a>

**Brief Program Description:**  
Our program focuses on training secondary school STEM teachers for developing science and engineering practices. We offer a two-year professional development program using asthma as a context and to generate awareness. The goal is to increase the number of teachers that can take an active role in the preparation of students for a knowledge-based society.

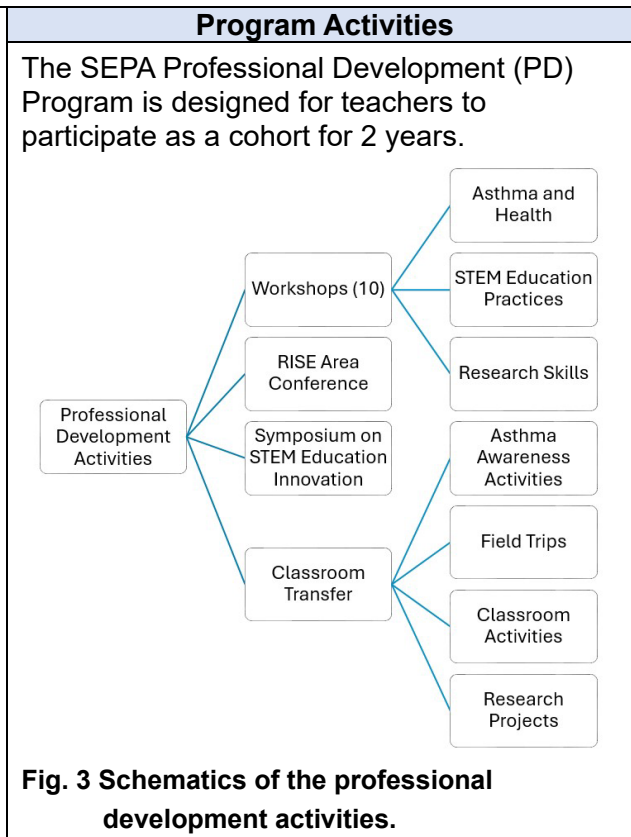
<b>Program and Participant Characteristics</b>
<b>Program type</b> (Please check all that apply): <input type="checkbox"/> Curriculum <input type="checkbox"/> Out-of-school program <input type="checkbox"/> Exhibit <input type="checkbox"/> Interactive multimedia <input checked="" type="checkbox"/> Teacher PD <input type="checkbox"/> Research experiences for students or teachers <input type="checkbox"/> Other (describe):
<b>Setting(s):</b> <input checked="" type="checkbox"/> Formal <input type="checkbox"/> Informal
<b>Types of participants</b> <input type="checkbox"/> Students <input checked="" type="checkbox"/> Teachers <input type="checkbox"/> Scientists <input type="checkbox"/> Families <input type="checkbox"/> Public <input type="checkbox"/> Other (describe):
<b>Grade level(s) of participants</b> <input type="checkbox"/> PreK <input type="checkbox"/> Elementary (K-5) <input type="checkbox"/> Middle (6-8) <input type="checkbox"/> High (9-12) <input checked="" type="checkbox"/> Adult
<b>Characteristics of the populations you serve relative to DEIA:</b> Puerto Rican (100%); socioeconomic status (94% public schools); gender (79% females)



**Fig. 1 Teachers participating in workshops.**



**Fig. 2 Teachers presenting at STEM Education Symposium.**



Evaluation	Key Accomplishments and/or Findings												
<p><b>Constructs measured</b></p> <p><input checked="" type="checkbox"/> Content knowledge    <input type="checkbox"/> Skills</p> <p><input type="checkbox"/> Nature of science    <input type="checkbox"/> Career awareness</p> <p><input type="checkbox"/> Attitudes (e.g., interest, identity, belonging)</p> <p><input type="checkbox"/> Quality or fidelity of implementation</p> <p><input type="checkbox"/> Other (describe):</p>	<p><b>Table 1. Learning gains from workshops</b></p> <table border="1"> <thead> <tr> <th>Main areas</th> <th># Workshops Yr1 to Yr3</th> <th>% of workshops with statistically significant knowledge gains</th> </tr> </thead> <tbody> <tr> <td>Asthma and Health</td> <td>13</td> <td>62%</td> </tr> <tr> <td>STEM Education Practices</td> <td>7</td> <td>57%</td> </tr> <tr> <td>Research Skills</td> <td>10</td> <td>50%</td> </tr> </tbody> </table> <div> </div> <p>The average attendance rate to the workshops was <b>69%</b>. Reasons that limited teachers' ability to attend the workshops are:</p> <ul style="list-style-type: none"> <li>• Health issues</li> <li>• Childcare difficulties</li> <li>• Previous employment commitments</li> </ul>	Main areas	# Workshops Yr1 to Yr3	% of workshops with statistically significant knowledge gains	Asthma and Health	13	62%	STEM Education Practices	7	57%	Research Skills	10	50%
Main areas	# Workshops Yr1 to Yr3	% of workshops with statistically significant knowledge gains											
Asthma and Health	13	62%											
STEM Education Practices	7	57%											
Research Skills	10	50%											
<p><b>Methods</b></p> <p><input checked="" type="checkbox"/> Tests/surveys    <input type="checkbox"/> Interviews/focus groups</p> <p><input type="checkbox"/> Observations    <input type="checkbox"/> Artifacts (e.g., student work)</p> <p><input type="checkbox"/> Other (describe):</p>	<p><i>Satisfaction with the PD Program</i></p> <p><b>4.9★</b> average rating</p> <p>★★★★★</p>												
<p><b>Design characteristics</b></p> <p><input type="checkbox"/> Comparison or control group</p> <p><input checked="" type="checkbox"/> Pre/post surveys or assessments</p> <p><input type="checkbox"/> Longitudinal tracking of participants</p> <p><input type="checkbox"/> Other (describe):</p>	<p><i>Contribution to teachers' visibility as members of the scientific community</i></p> <p><b>4.7★</b> average rating</p> <p>★★★★★</p> <div> </div>												
<p><b>Project Lessons Learned</b></p>	<p><b>Fig. 4 Teacher's rating of SEPA PD program and activities.</b> Rating using a 5-star scale (1= poor, 5= a lot)</p>												
<p>Teacher participants, through surveys, have provided us with the following recommendations:</p> <ul style="list-style-type: none"> <li>• Establish collaborations with non-profit agencies and experts in the field to develop school activities to raise awareness and manage asthma.</li> <li>• Increase practical activities and field experiences.</li> <li>• Provide support on how to align asthma topics with the educational standards of their courses.</li> </ul> <p>We have also learned the challenges teachers face as they transfer the projects' activities to their classrooms.</p>	<p><b>Table 2. Materials to facilitate classroom transfer of PD workshops</b></p> <table border="1"> <tbody> <tr> <td rowspan="3"><b>Materials provided by SEPA</b></td> <td>Air quality monitors (Purple Air®) and weather stations</td> <td rowspan="3"><i>Challenges:</i> School Wi-Fi network Installation of equipment Lack of support from school</td> </tr> <tr> <td>Science kits, robots, and models</td> </tr> <tr> <td>Basic laboratory equipment</td> </tr> </tbody> </table>	<b>Materials provided by SEPA</b>	Air quality monitors (Purple Air®) and weather stations	<i>Challenges:</i> School Wi-Fi network Installation of equipment Lack of support from school	Science kits, robots, and models	Basic laboratory equipment							
<b>Materials provided by SEPA</b>	Air quality monitors (Purple Air®) and weather stations		<i>Challenges:</i> School Wi-Fi network Installation of equipment Lack of support from school										
	Science kits, robots, and models												
	Basic laboratory equipment												

**Questions, Advice Wanted, or Topics of Discussion for the SciEd Community (optional)**

Consistent teacher attendance to PD sessions and the implementation of classroom projects has been challenging. As we prepare to recruit a new group of teachers, we seek feedback and suggestions to create a more engaging and supportive environment for all participants.