



“Intermediate level learner managed peer-mentoring program”: A Novel method to engage and encourage learners at multiple levels (novice to mastery levels) to participate in collaborative research.

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Background

- **Challenge:** Engaging novice and intermediate level learners in scholarly activity is difficult in rigorous academic programs

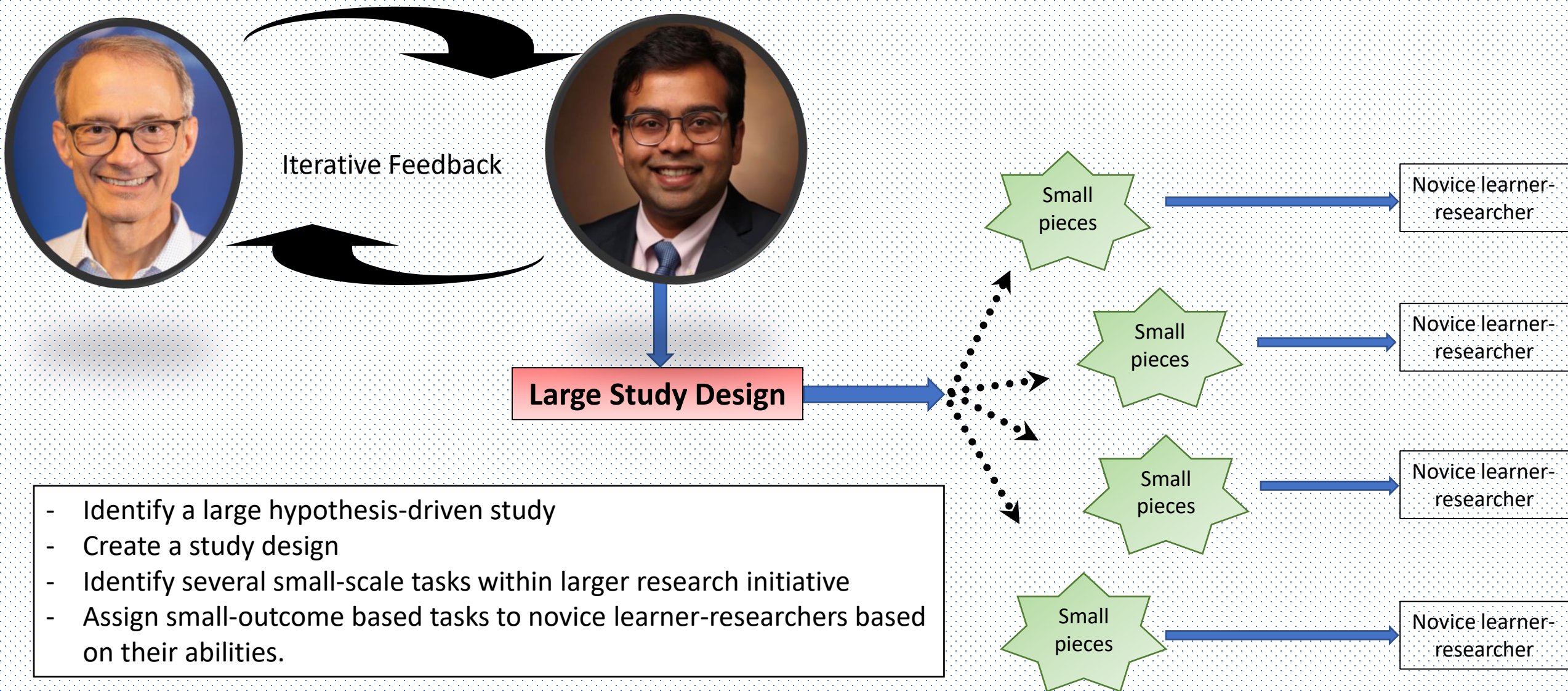


Background

- **Method:**

Extend supervised autonomy to selected intermediate level learner (“Preceptor”) to encourage research participation by engaging, mentoring, and managing research teams comprised of undergraduate & graduate students, and post graduate trainees in different levels and disciplines of research team

“Intermediate-level learner managed peer-mentoring program”





Research Question

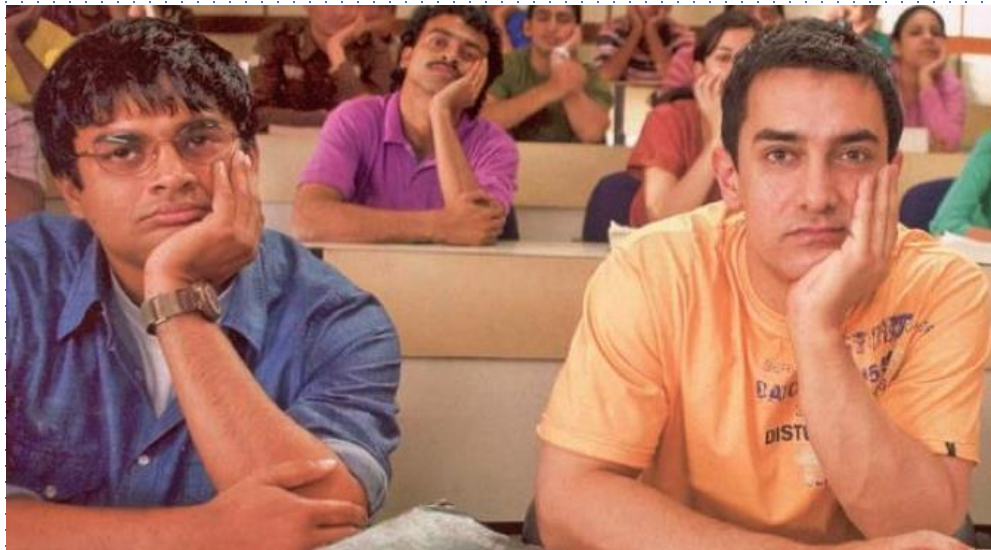


- **Research Question:** Is a resident managed peer-mentoring program effective for enhancing research outcomes?
- **Hypothesis:** Resident managed peer-mentoring program is an effective method for enhancing research outcomes.
- **Method:**
 - Tally and compare primary outcome of reported PubMed indexed peer-reviewed publications before and after intervention (Resident managed peer-mentoring program).
 - Tally and compare secondary outcome of numbers of faculty and residents who participate in research activity, and numbers of abstracts presented at national /international conferences



Active Learning

Blooms Taxonomy - Revised



Passive Learning: Listening to a lecture

(Courtesy of :The Three Idiots)

90% of what we do

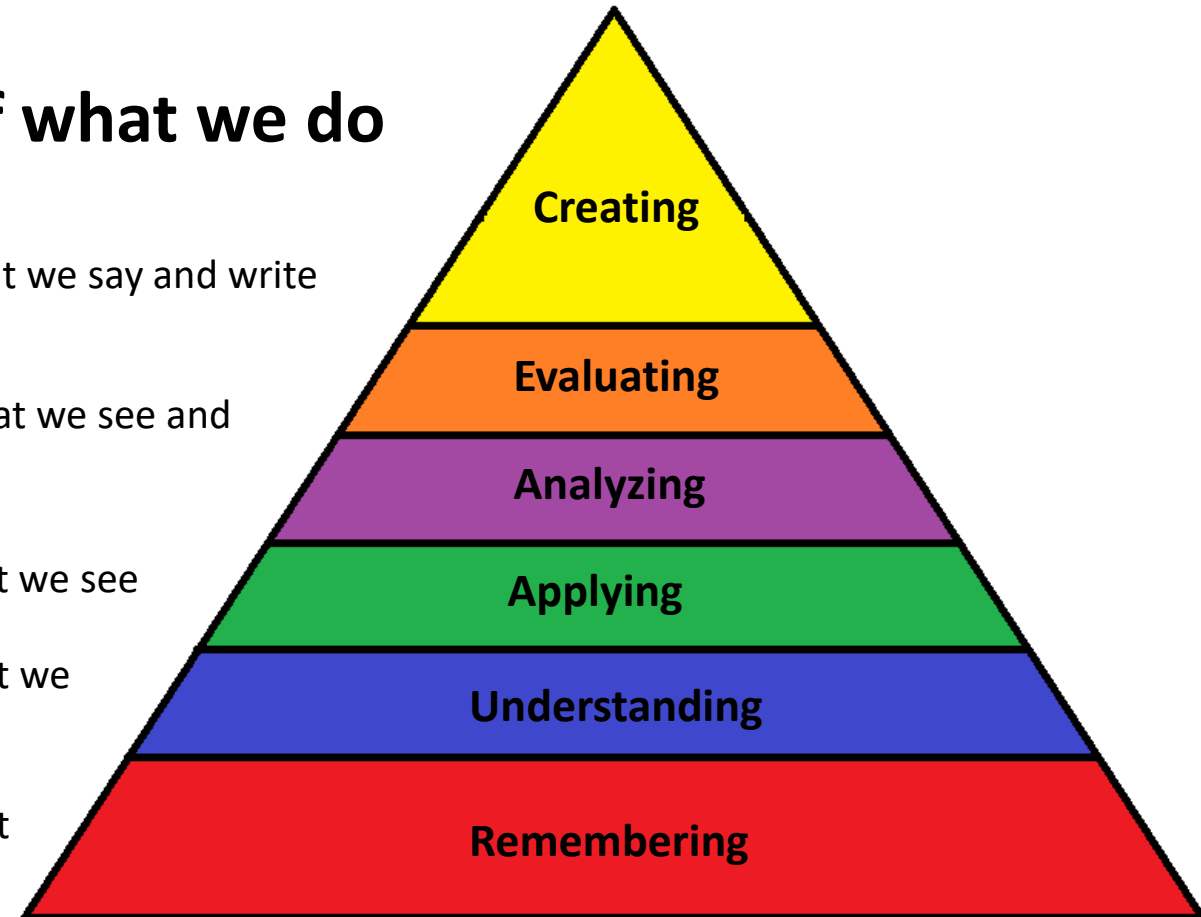
70% of what we say and write

50 % of what we see and hear

30% of what we see

20% of what we hear

10% of what we read





Methods



Study Type: Observational study, designed to assess outcomes of a novel “Resident managed peer-mentoring program”

Primary Outcomes:

- Peer-reviewed PubMed Indexed publication by radiology physicians

Secondary outcomes:

- Abstracts presented by radiology physicians
- Number of participating radiology physicians
- Rank- based distribution of outcomes



Timeline



Implementation of “Resident managed peer-mentoring program” in **November 2019**



Academic Year 1 2017-2018	Academic Year 2 2018-2019	Academic Year 3 2019-2020	Academic Year 4 2020-2021
July 01, 2017 to June 30, 2018	July 01, 2018 to June 30, 2019	July 01, 2019 to June 30, 2020	July 01, 2020 to Ongoing
Reference group		Test group	





Methods



Inclusion Criteria:

- Radiology Residents' outcomes
- Radiology Faculty members' outcomes

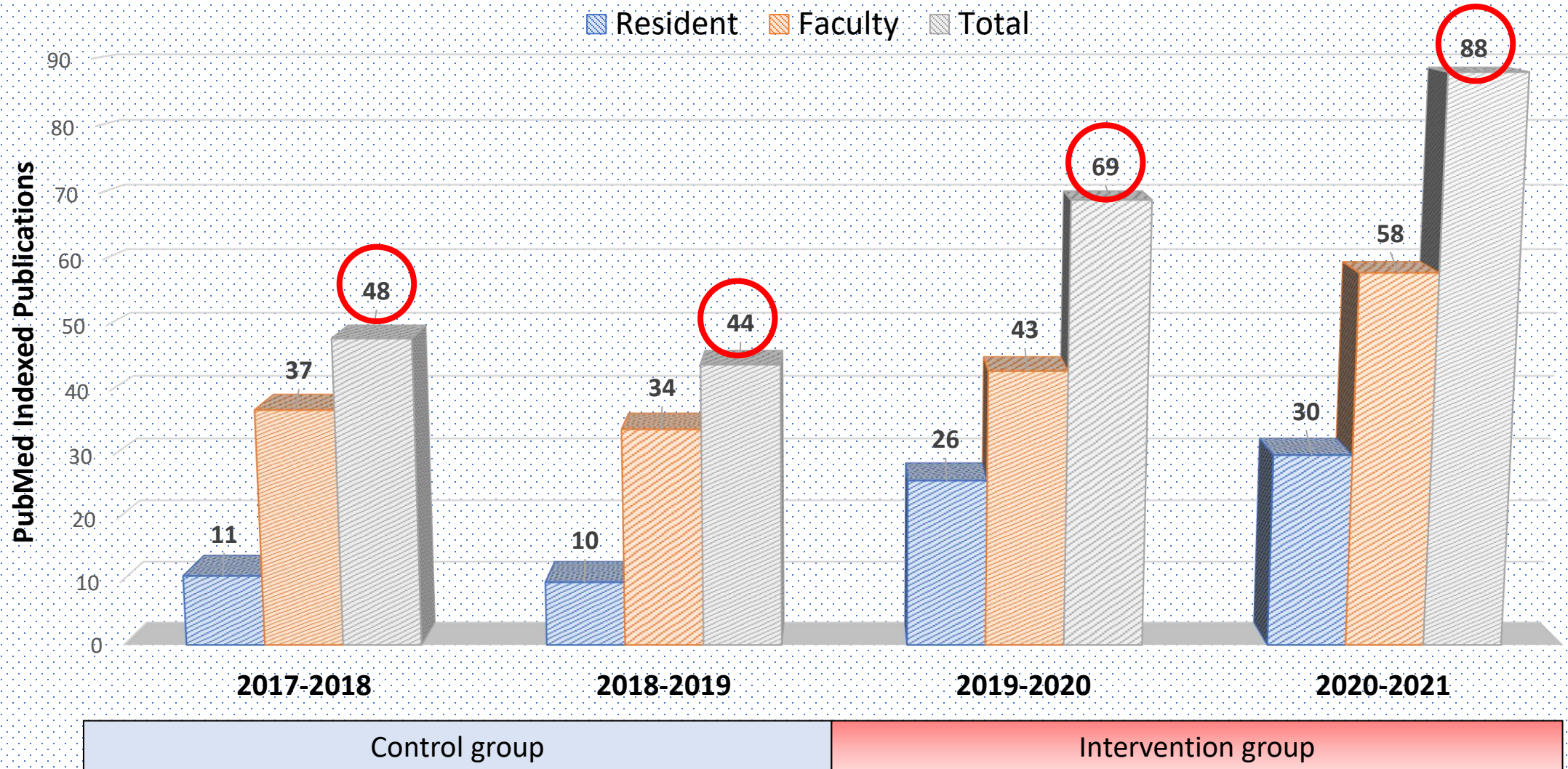
Exclusion Criteria:

- Undergraduate/graduate students' outcomes
- Medical students' outcomes
- Extradepartmental Faculty and residents' outcomes



Results: Primary Outcome

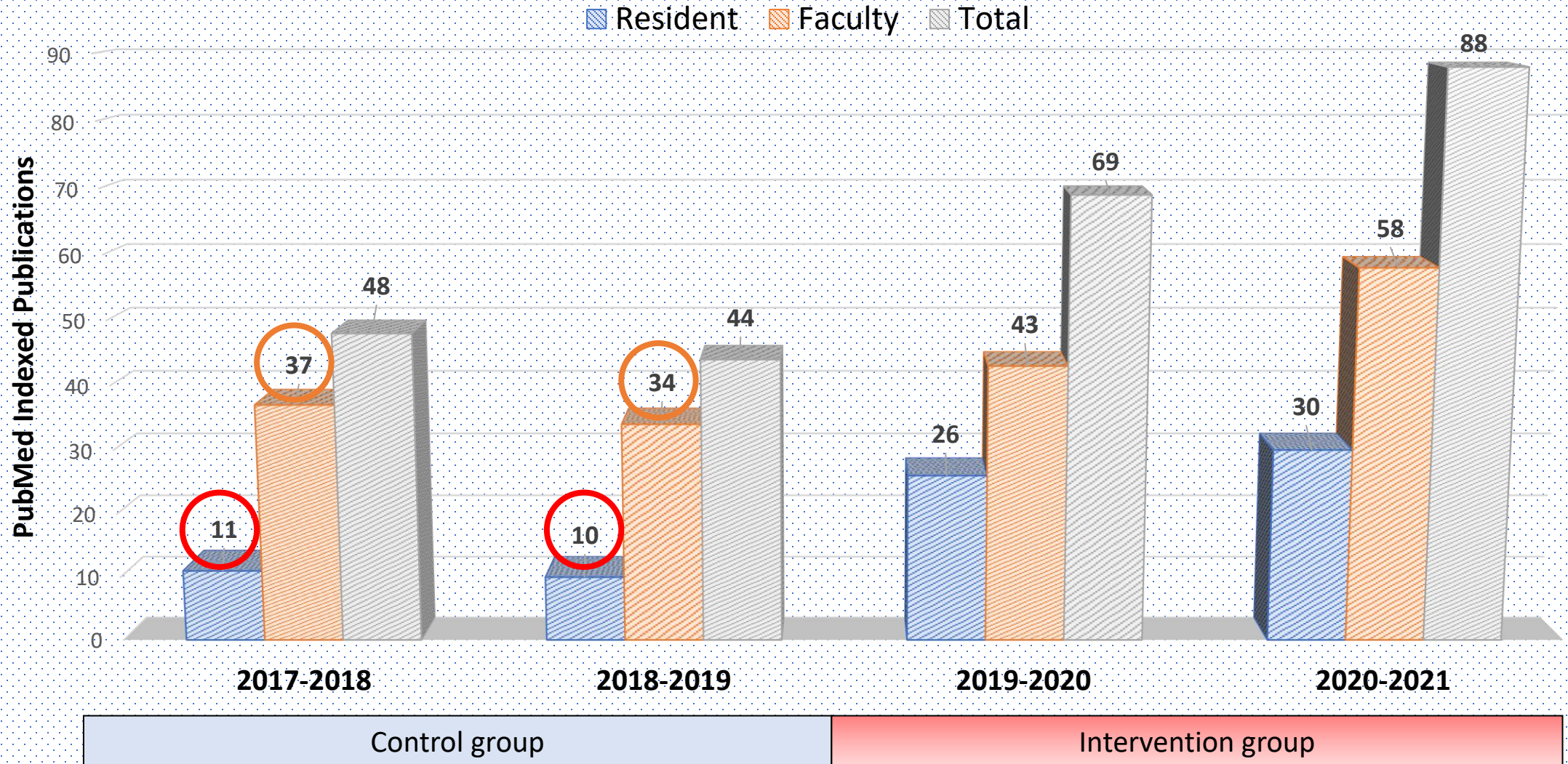
Publications (Peer-reviewed on PubMed)





Results: Primary Outcome

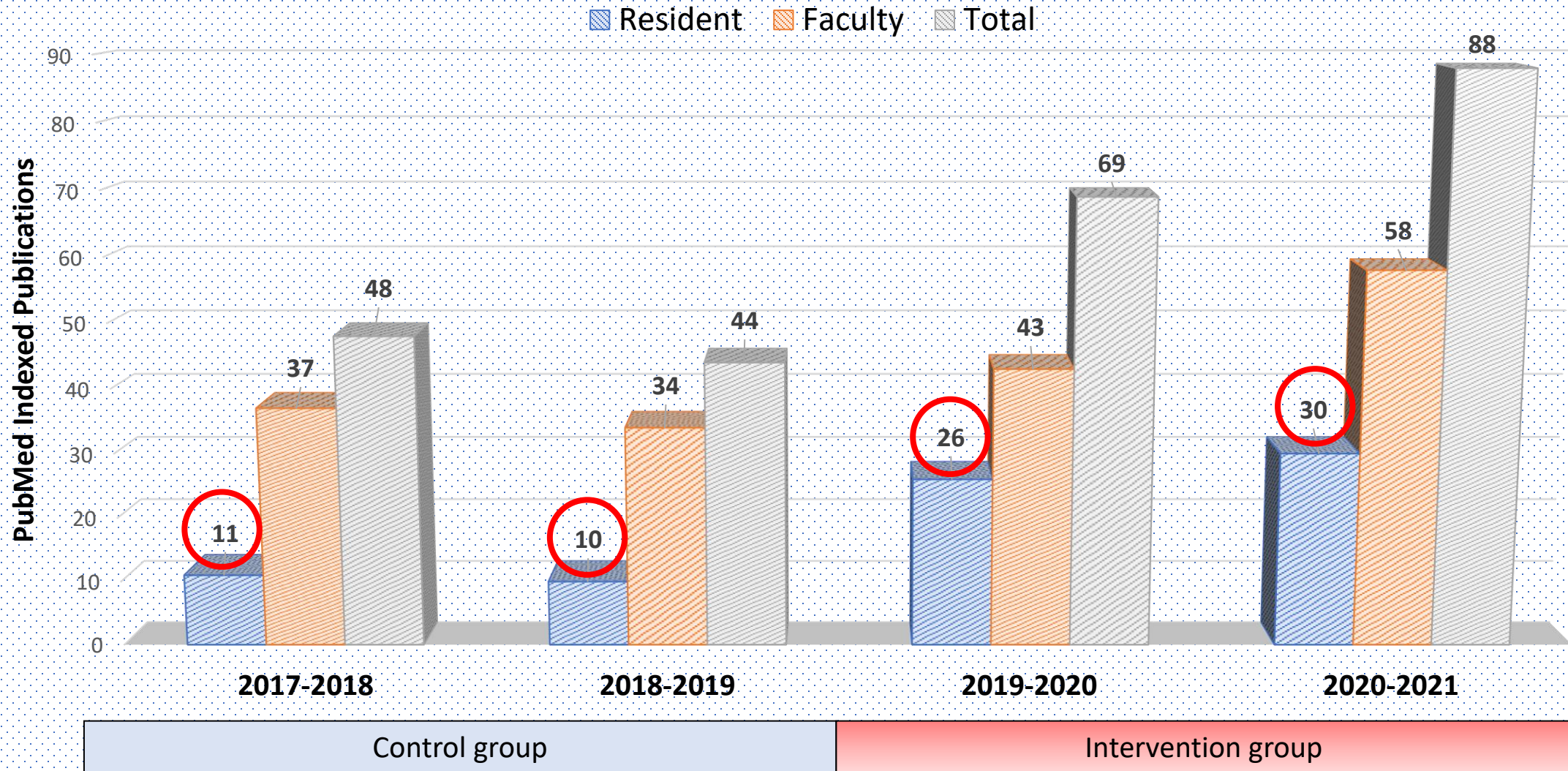
Publications (Peer-reviewed on PubMed)





Results: Primary Outcome

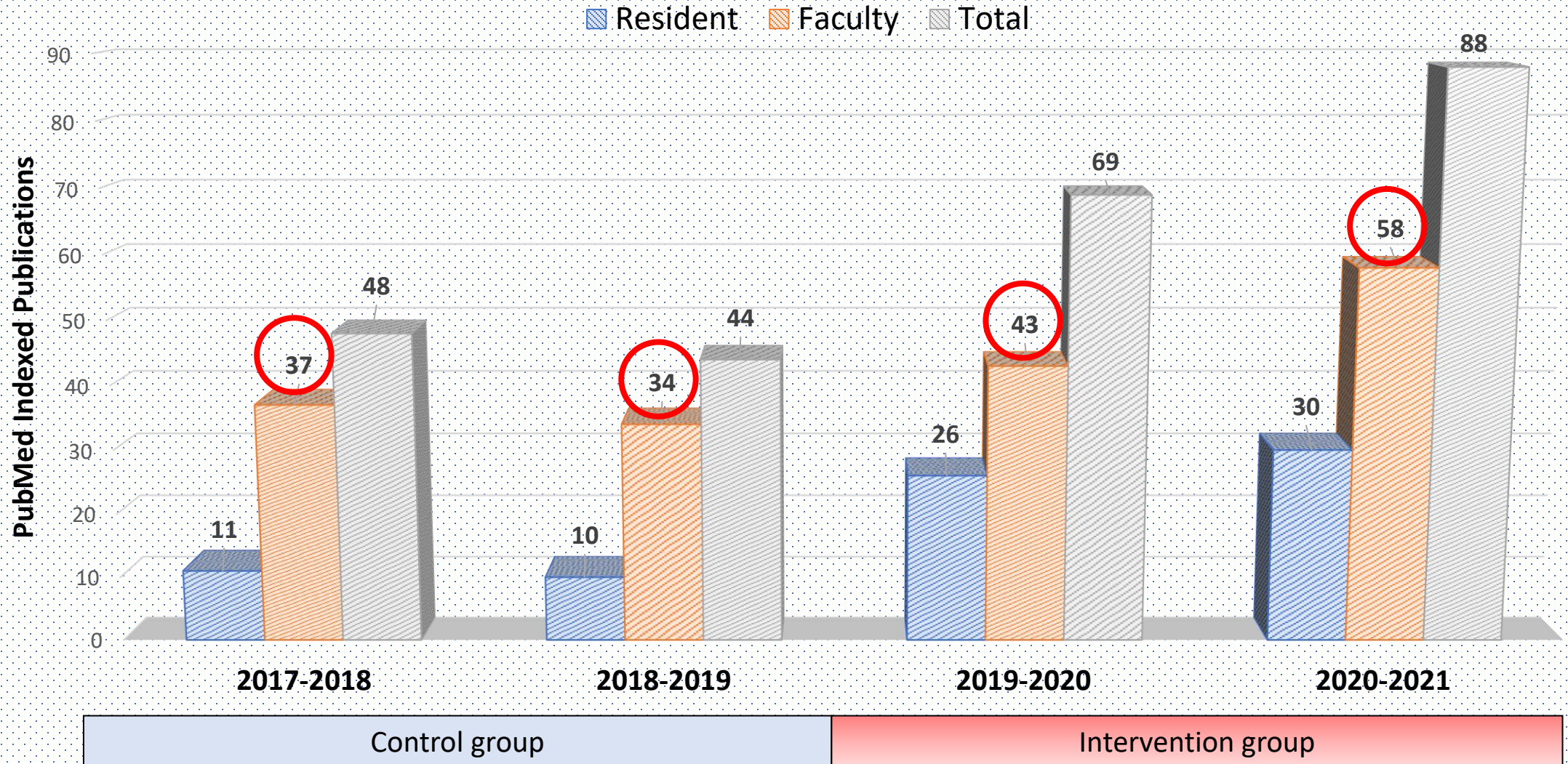
Publications (Peer-reviewed on PubMed)





Results: Primary Outcome

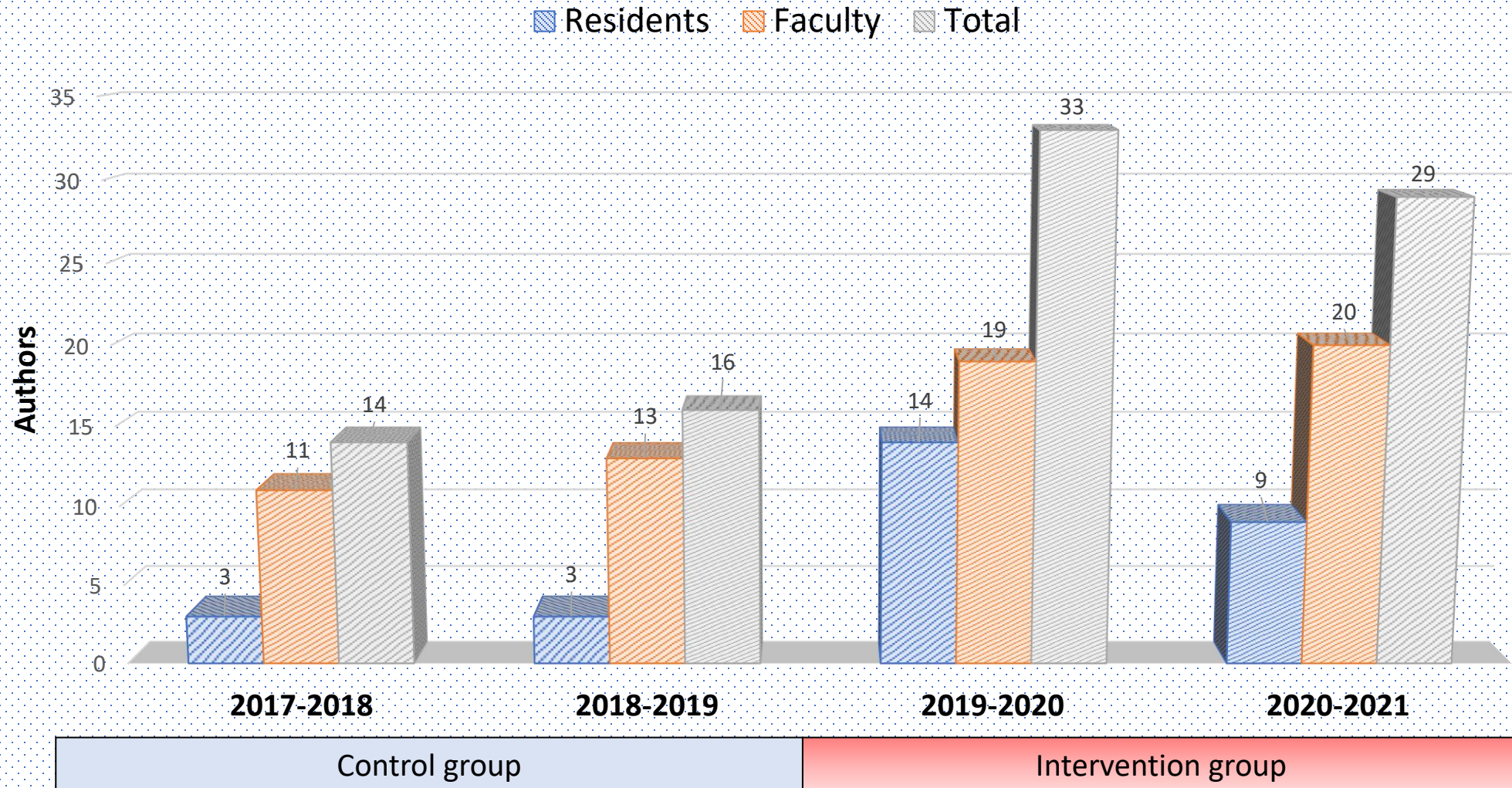
Publications (Peer-reviewed on PubMed)





Results: Secondary Outcome

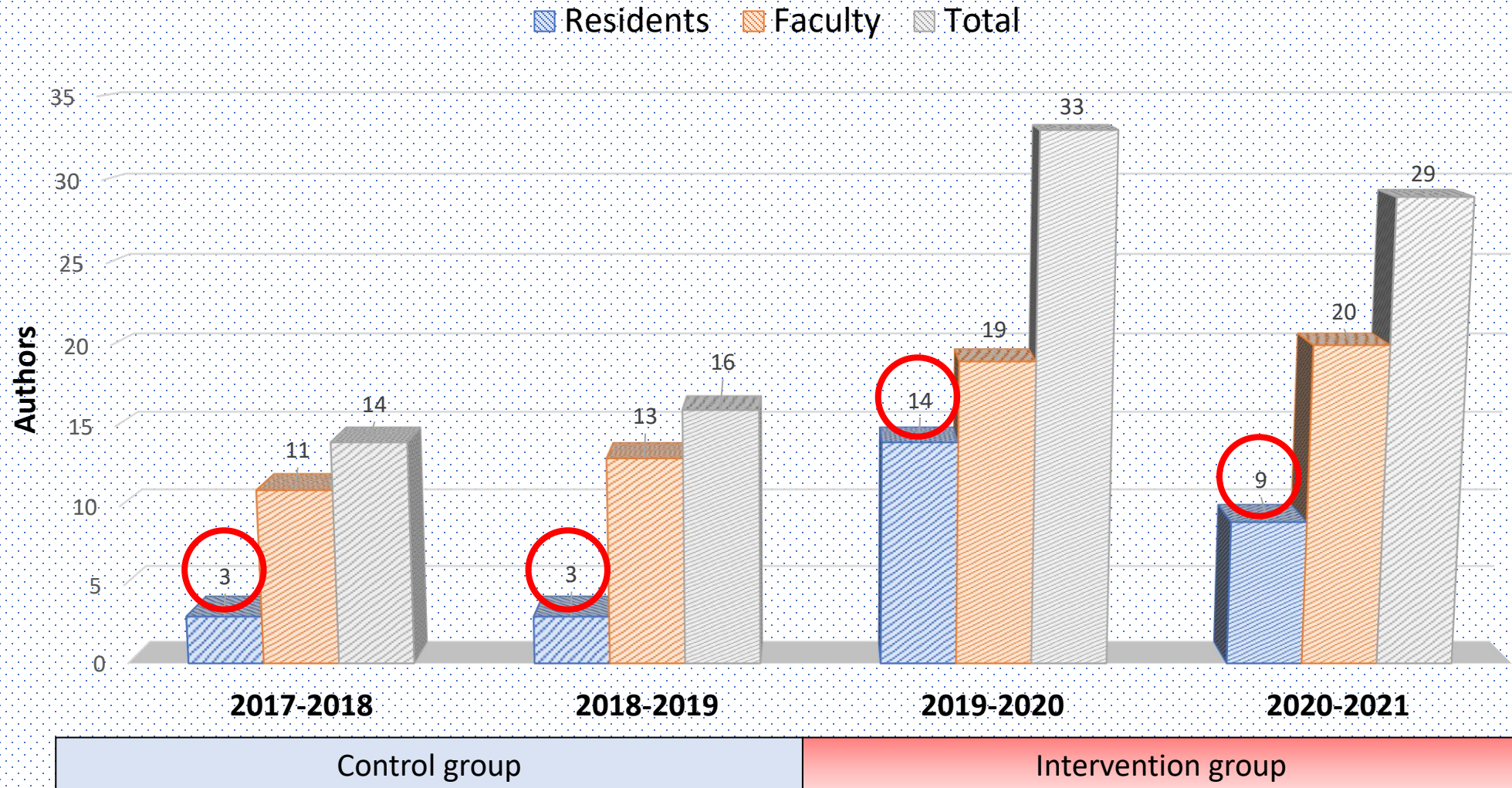
People authoring PMID publications





Results: Secondary Outcome

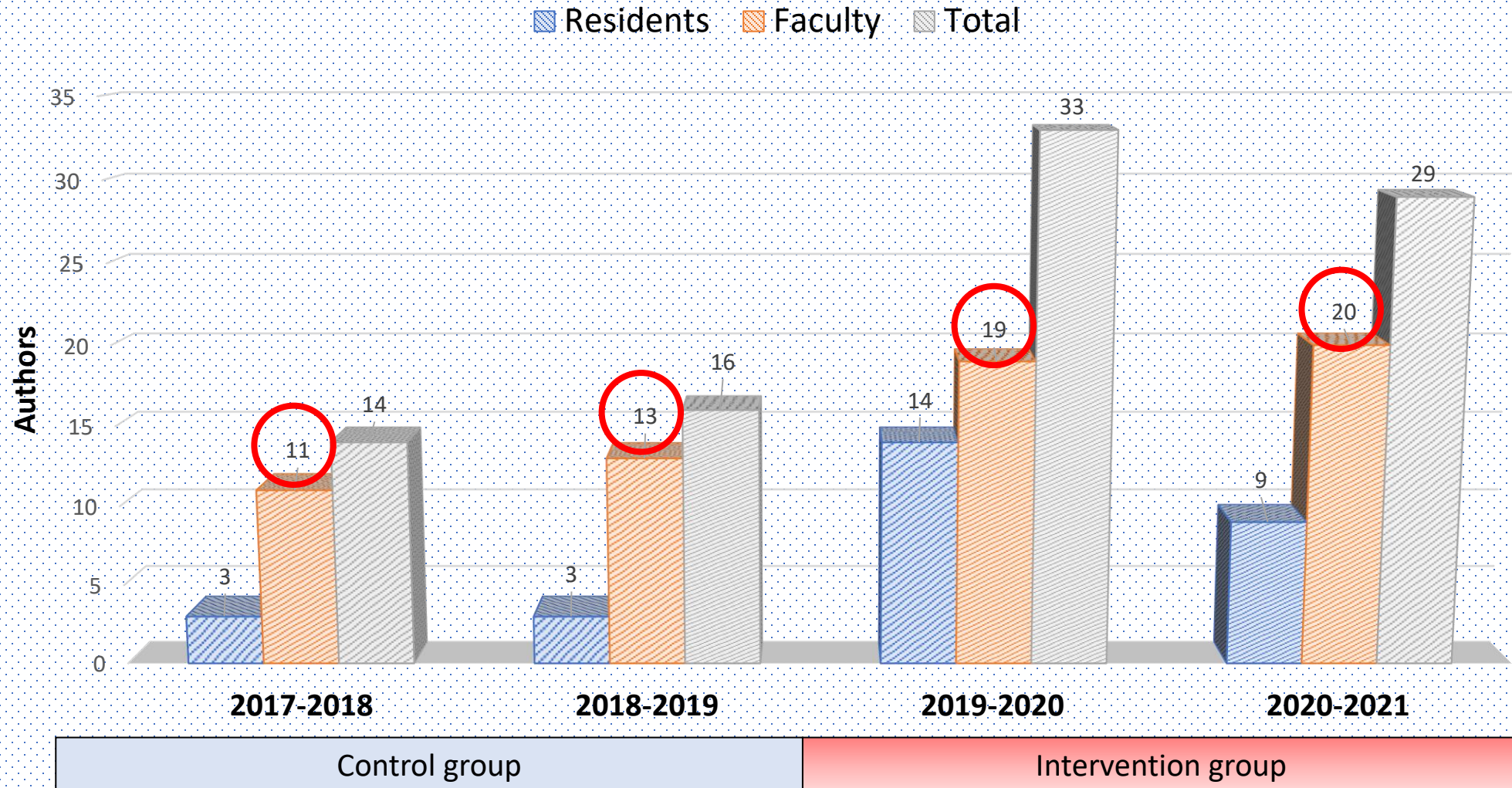
People authoring PMID publications





Results: Secondary Outcome

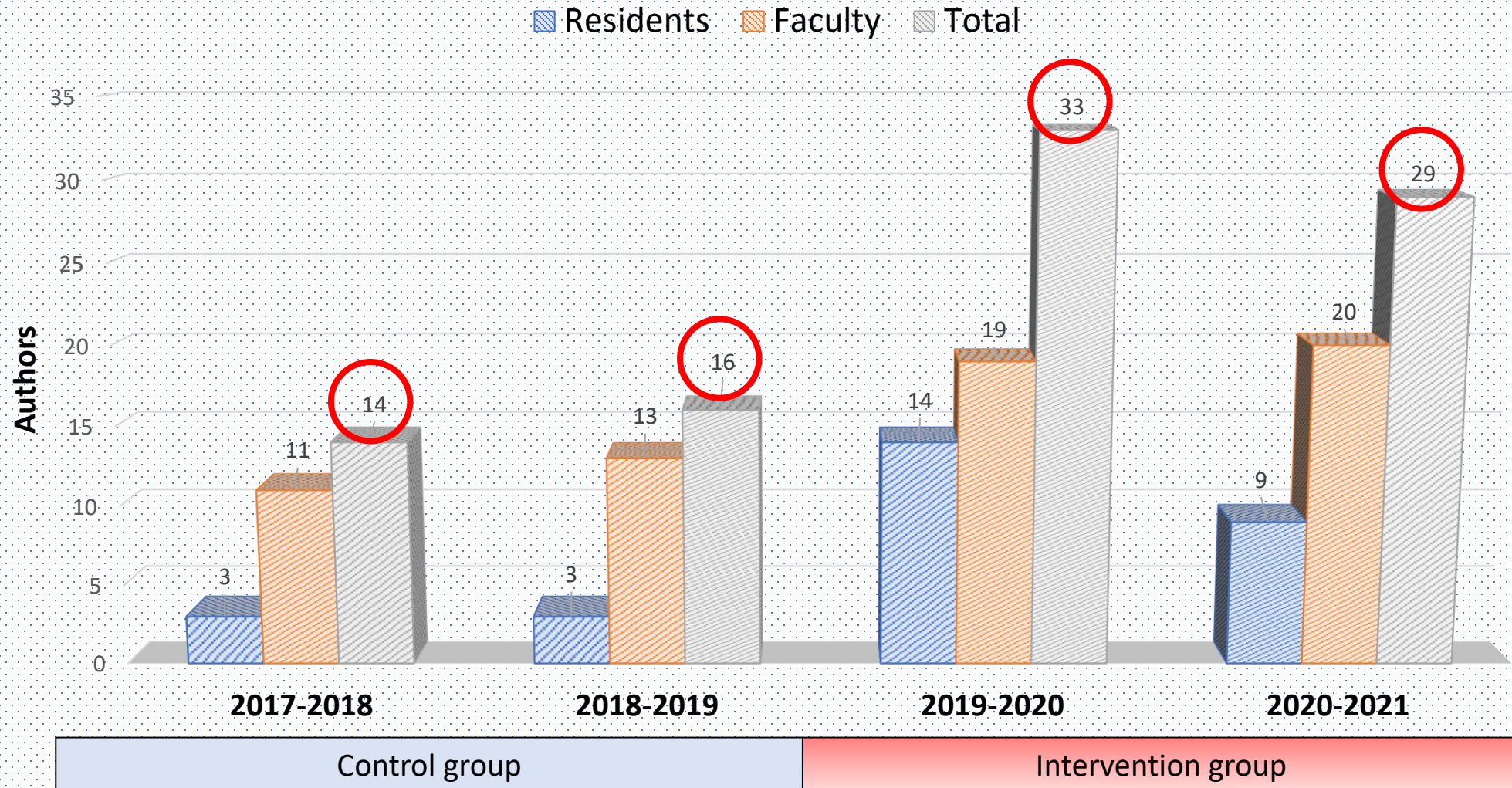
People authoring PMID publications





Results: Secondary Outcome

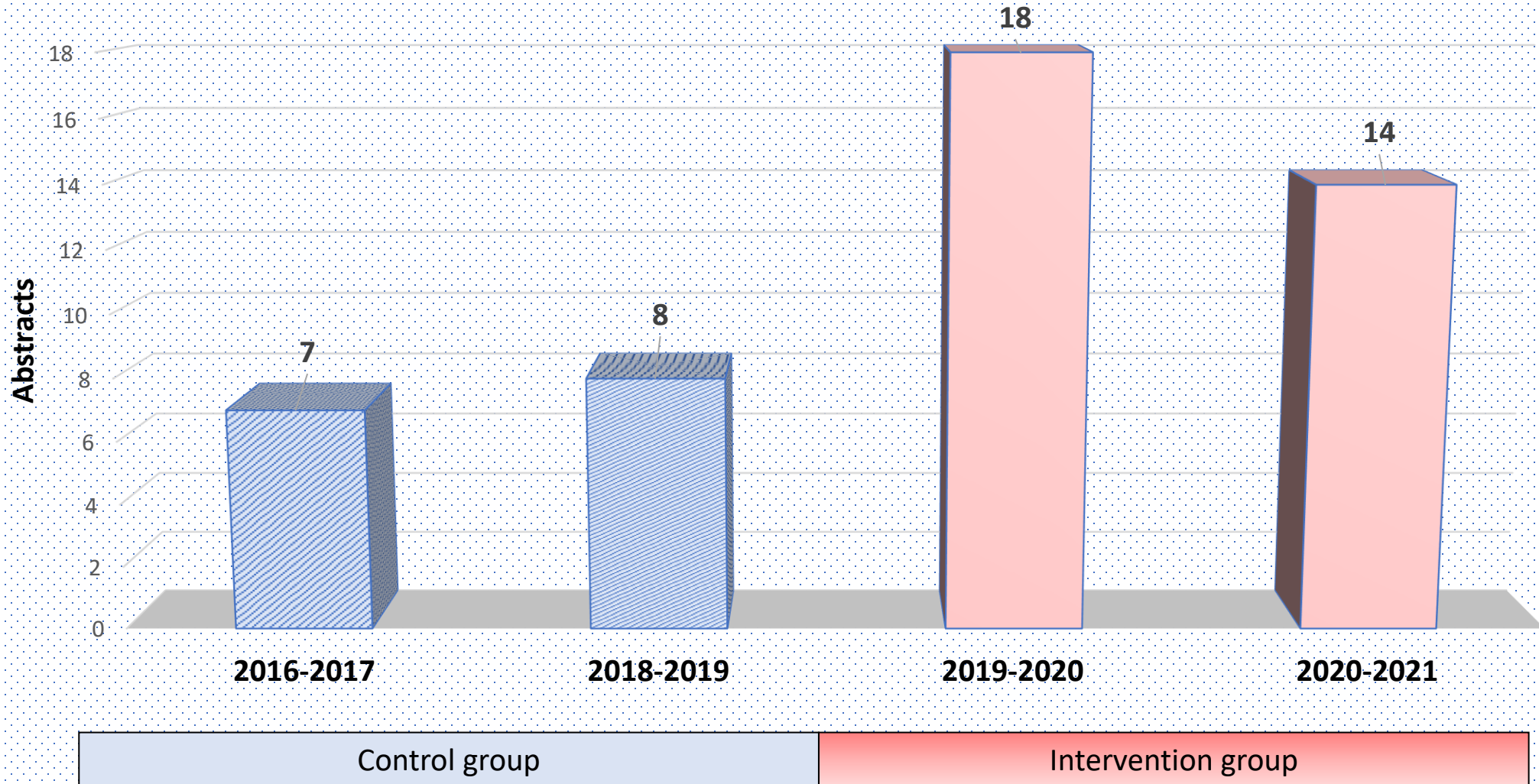
People authoring PMID publications





Results: Secondary Outcome

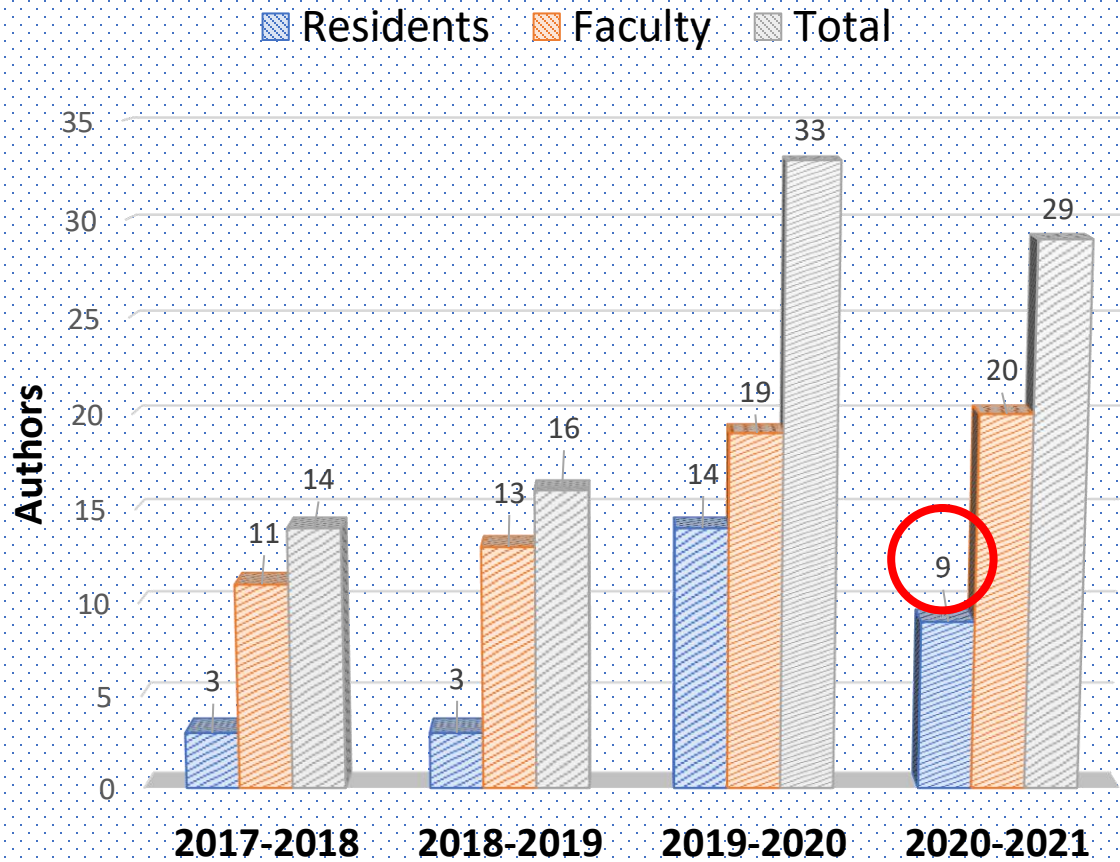
Abstracts presented by radiology residents



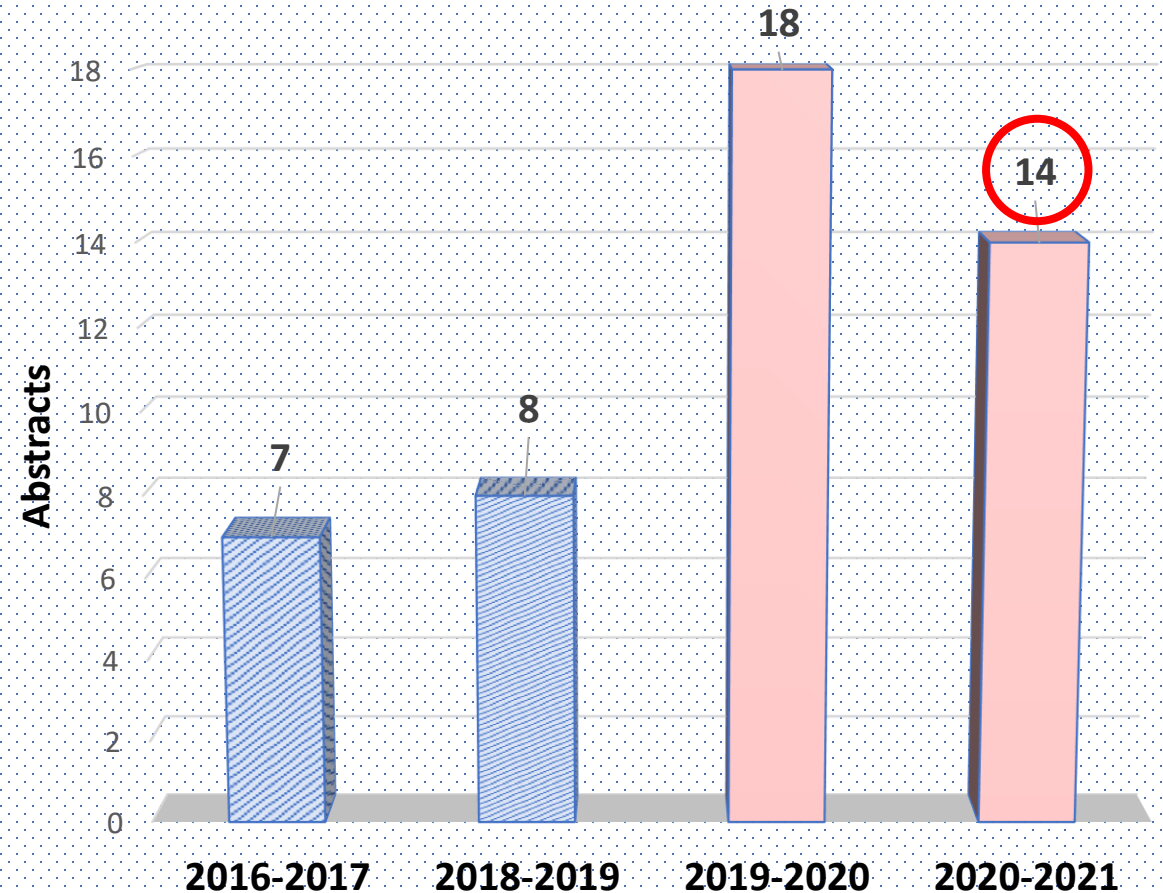


Impact of COVID pandemic ?

People authoring PMID publications

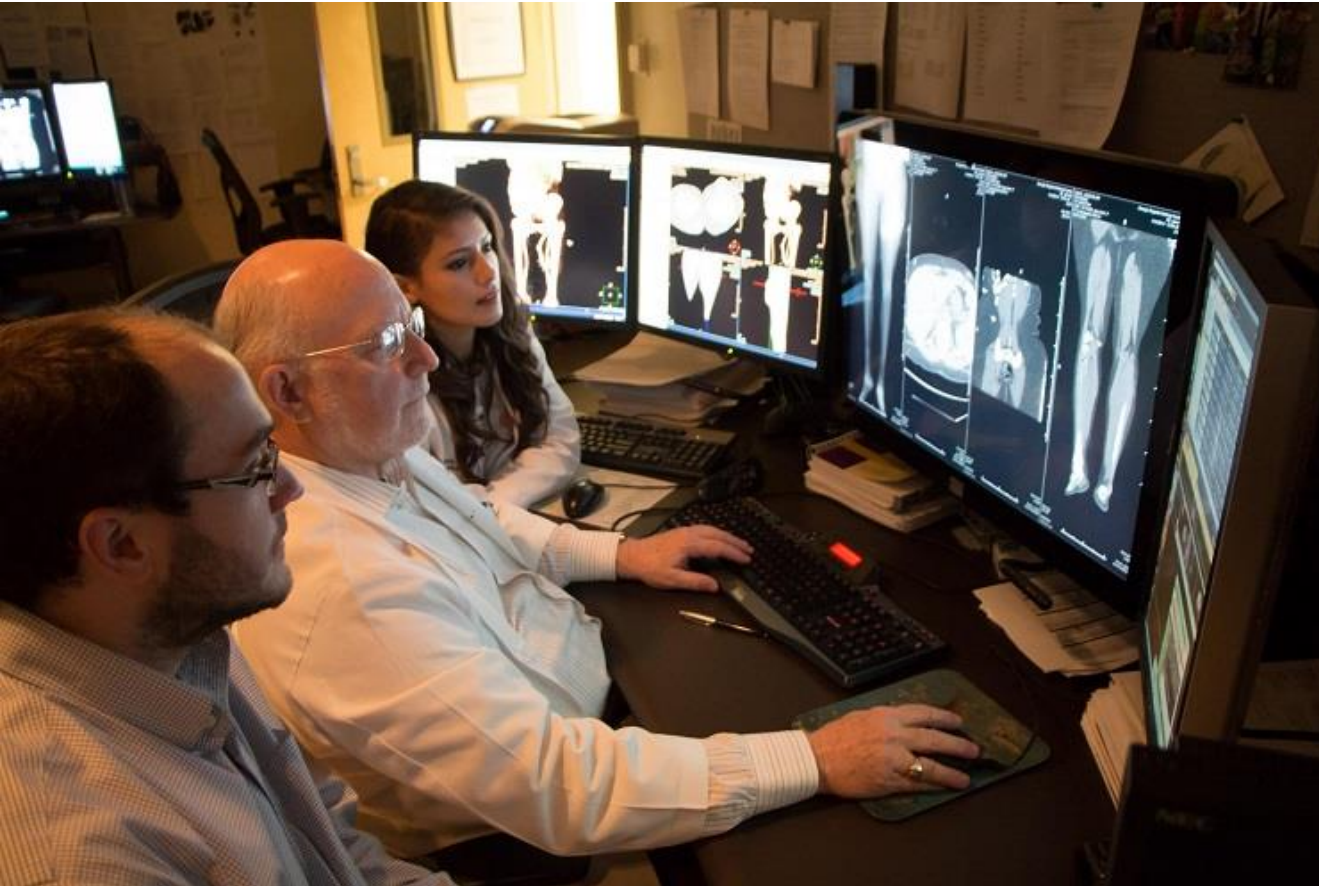


Abstracts presented by radiology residents



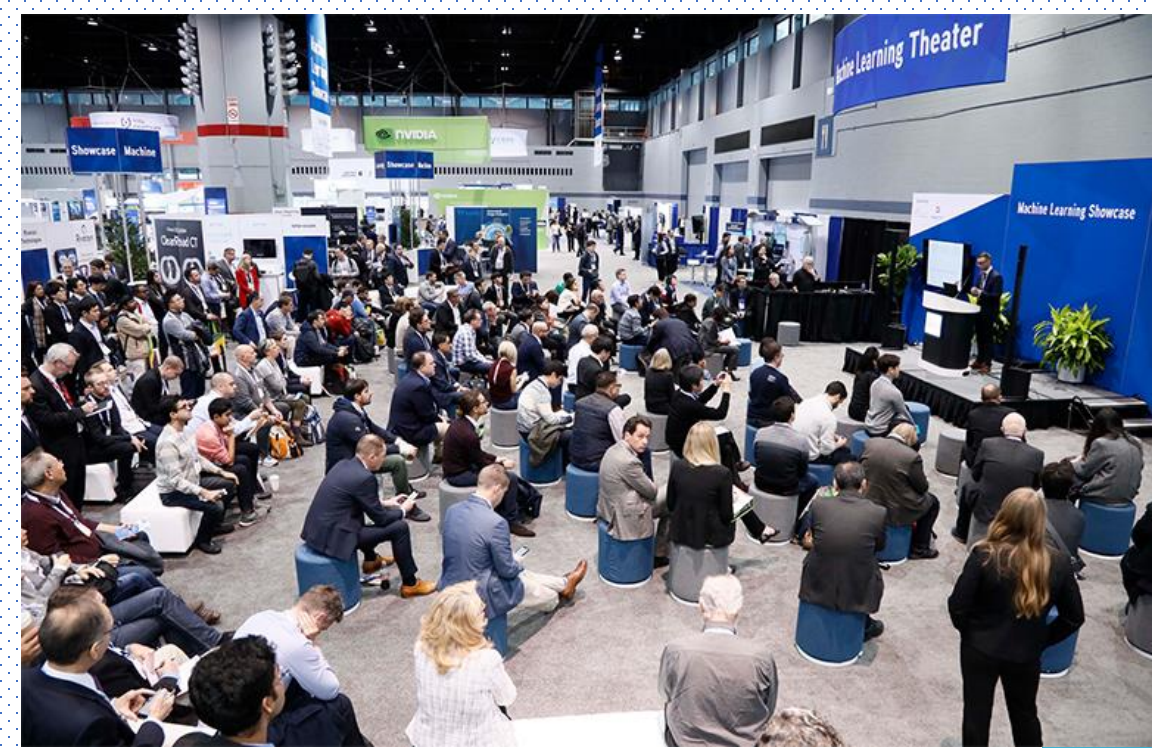


Work from home!





Online meetings!



RSNA 2019

MR AiCE DLR

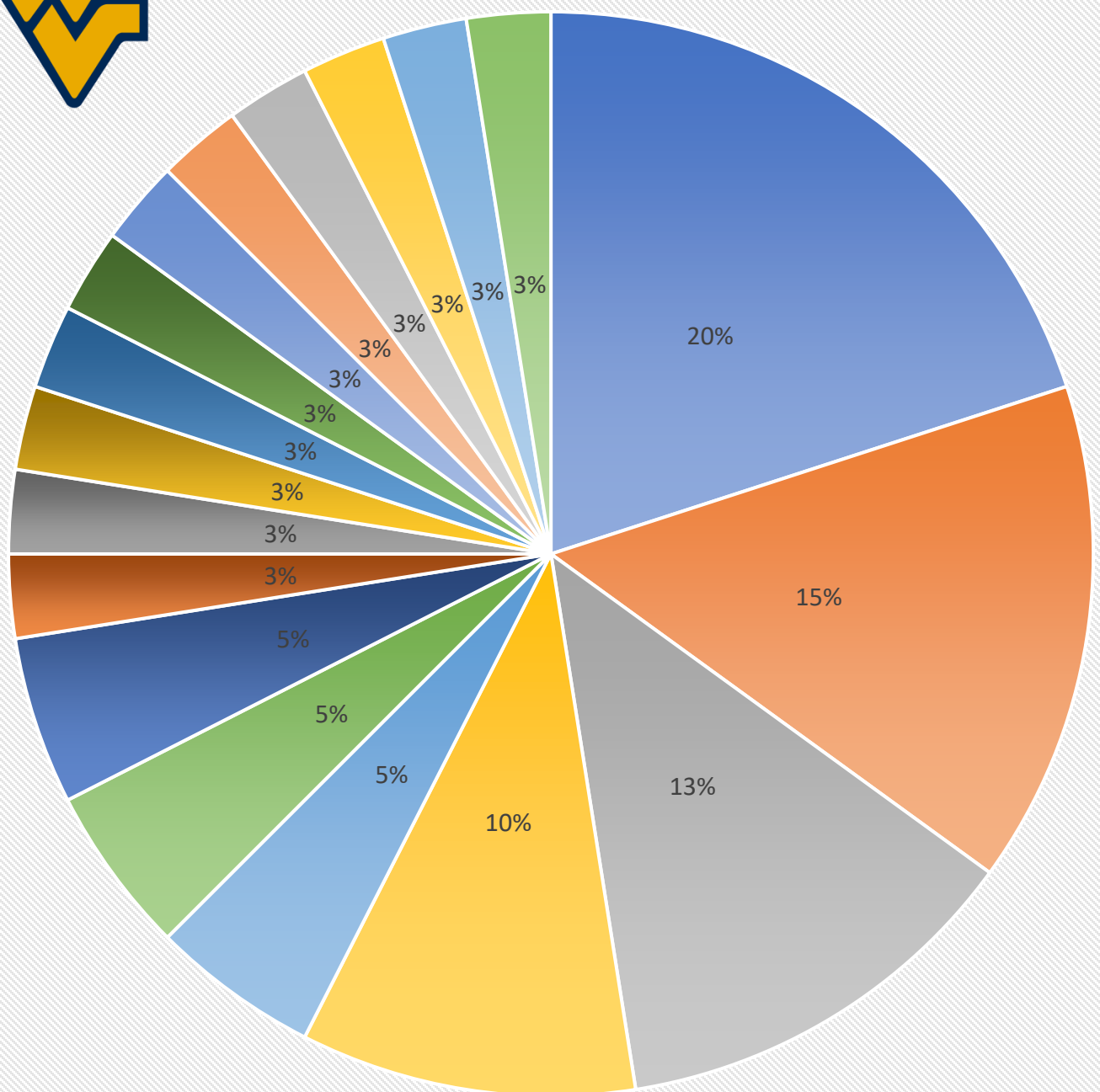
Rich Mather, PhD
President,
Canon Medical Research USA, Inc.

3T **1.5T with AiCE**

AiCE
Imagined Intelligence

Canon **AI-Driven | Total Clinical Collaboration, Insights & Differentiation**

Peer-reviewed Journal that Residents published in 2019-2021



- Radiology Case Report
- Clinical Gastroenterology and Hepatology
- StatPearls
- Gastroenterology
- AJNR
- American Journal of radiology
- European Journal of Internal Medicine
- European Respiratory Journal
- Clinical Imaging
- Annals of American Thoracic Society
- Multiple Sclerosis and Related Disorder
- AME Case Reports
- BMC Pediatrics
- The American Journal of Managed Care
- Interventional Neuroradiology
- Journal of Nuclear Medicine
- Case Reports in Radiology
- Clin Nucl Med



Conclusion



- After implementation of “Resident managed peer-mentoring program”, the department reported a growth of **50%** increase in PubMed indexed publication in 2019-2020 and **91.3%** increase in 2020-2021.





Conclusion



- This method has been a productive and engaging method for novice learner (medical students and residents) in our training program.
- Students and residents not from the department of radiology also were mentored in this program.
- Application of this model potentially may help foster stronger departmental collaboration and research culture if applied in other departments and schools.





Limitations



- Primary outcomes (PMID indexed publications) and secondary outcomes (abstracts in conferences) for novice researchers outside the department of radiology were not included, to avoid bias. This was because access to complete record and reliable baseline data were not available.
- Academic year 2020-2021 is not yet complete, so results may be under-reported



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8. Sundgren PC. Mentoring radiology residents in clinical and translational research. *Acad Radiol.* 2012 Sep;19(9):1110-3.



Thank you!



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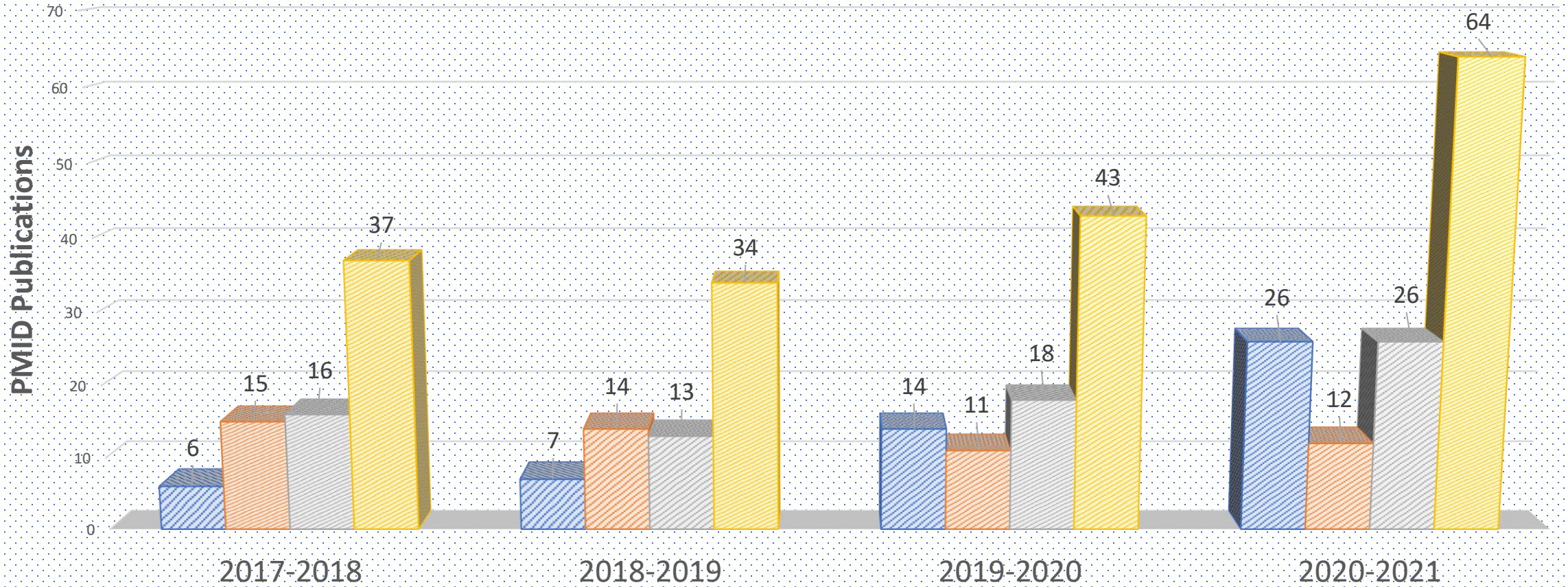




Results by Academic Rank

FACULTY PMID PUBLICATIONS

Assistant Professor Associate Professor Professor Overall



Control group Intervention group

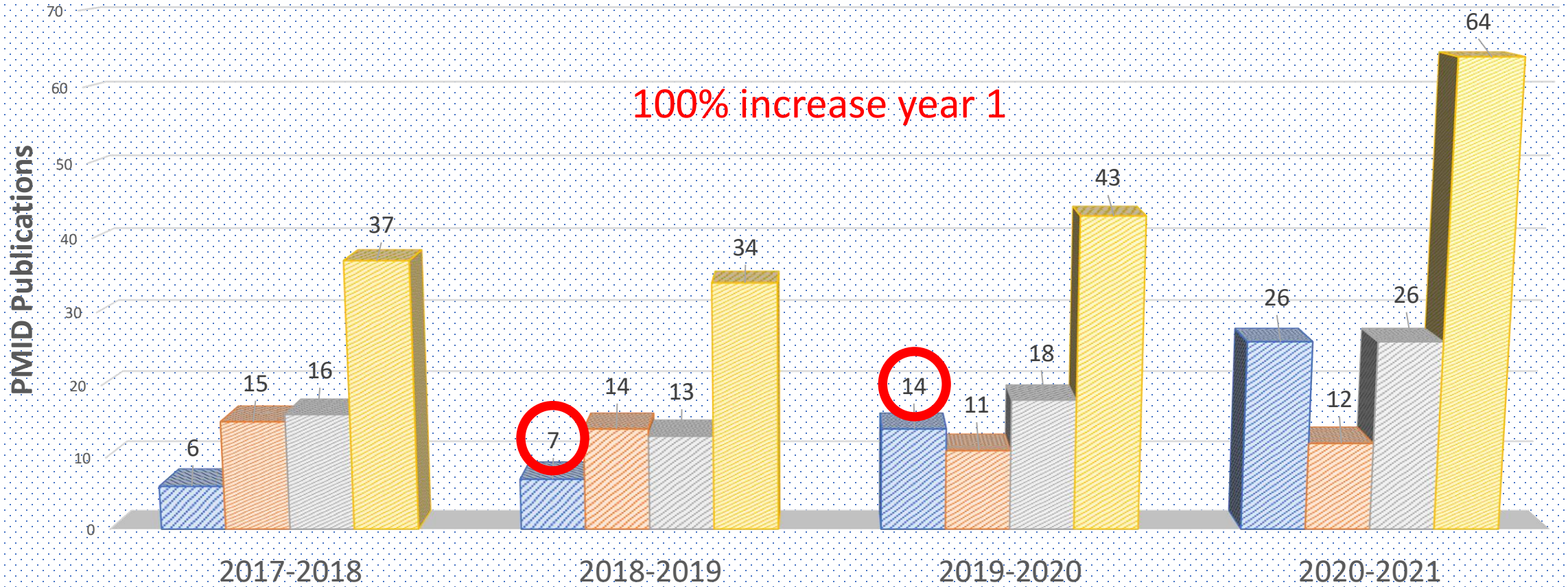


Results: Secondary Outcome



FACULTY PMID PUBLICATIONS

Assistant Professor Associate Professor Professor Overall



Control group Intervention group

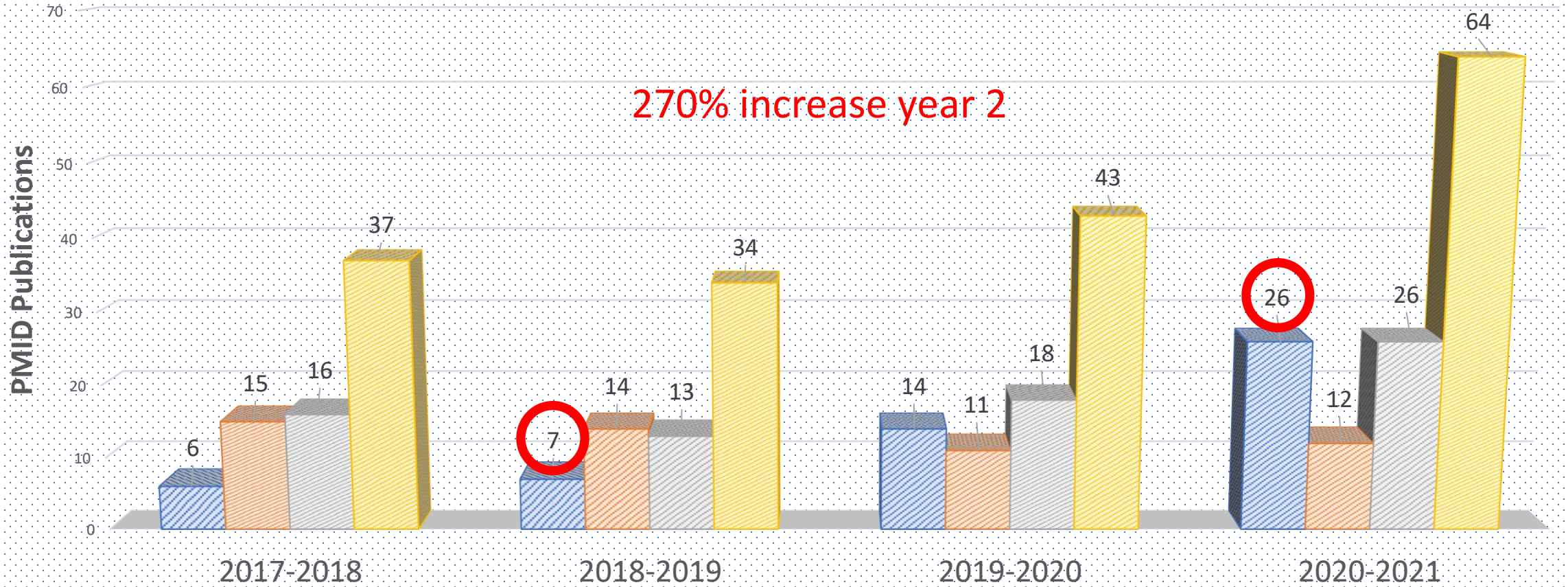


Results: Secondary Outcome



FACULTY PMID PUBLICATIONS

Assistant Professor Associate Professor Professor Overall



Control group Intervention group

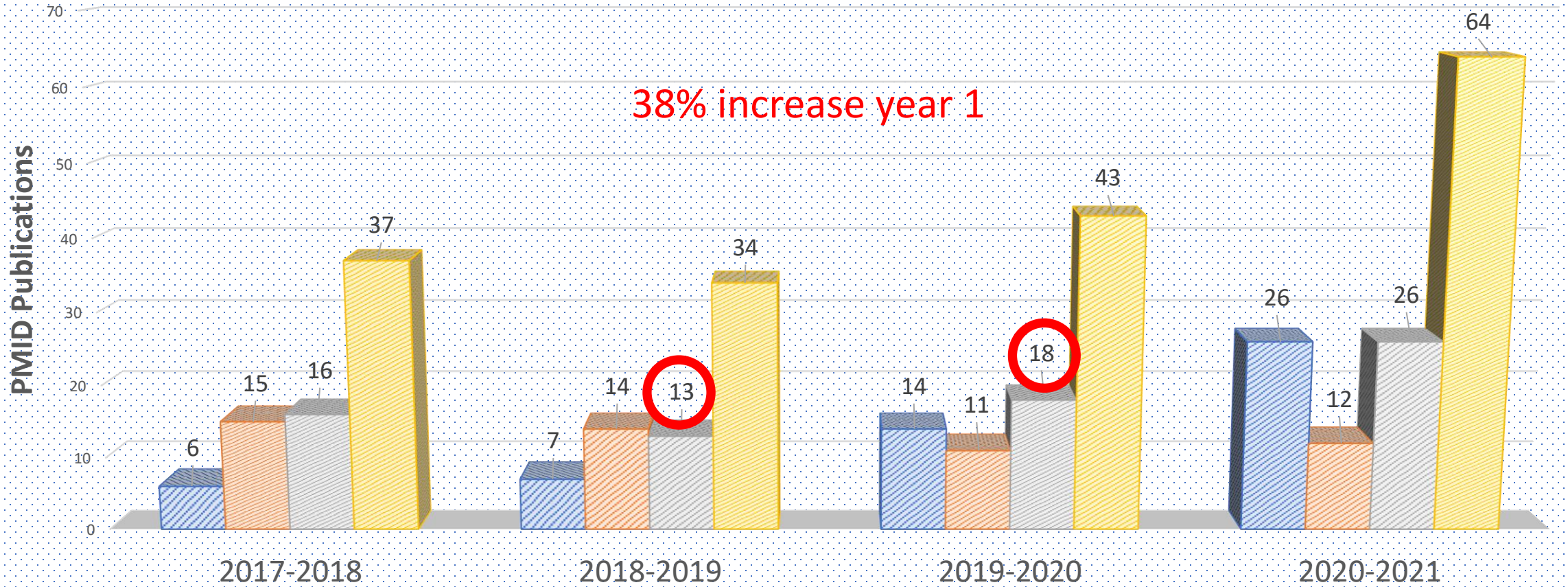


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Assistant Professor Associate Professor Professor Overall



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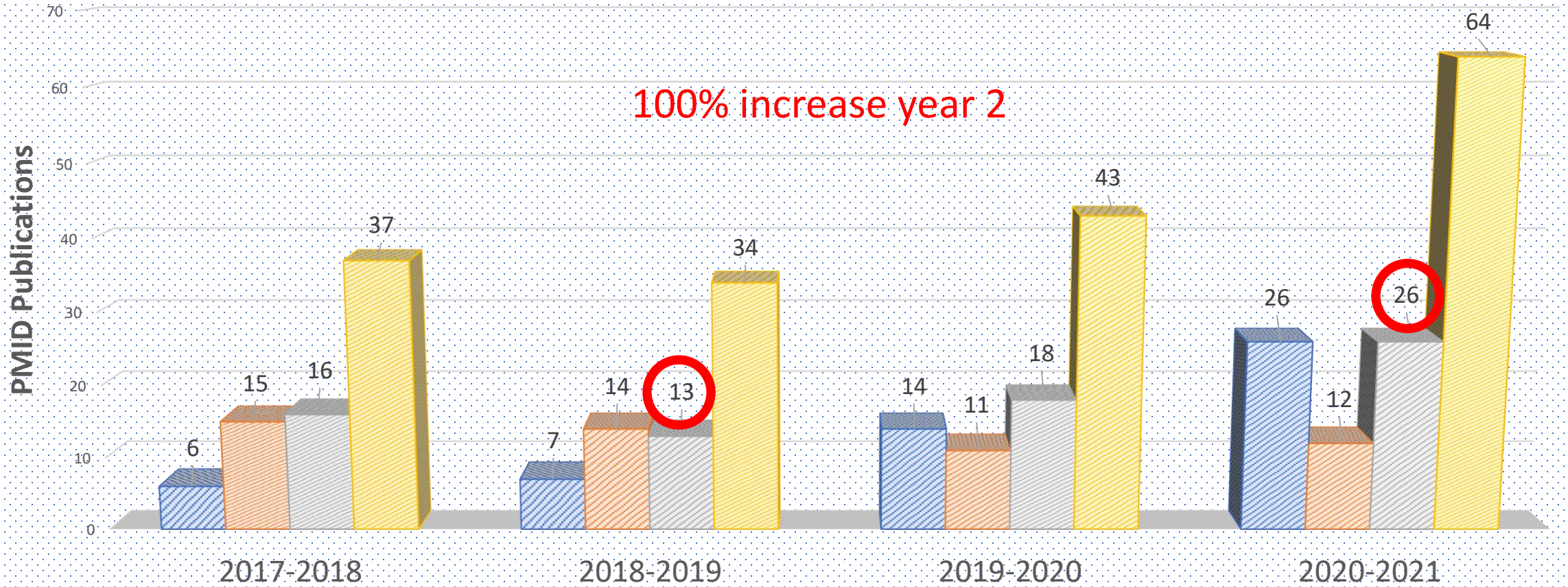


Results: Secondary Outcome



FACULTY PMID PUBLICATIONS

Assistant Professor Associate Professor Professor Overall



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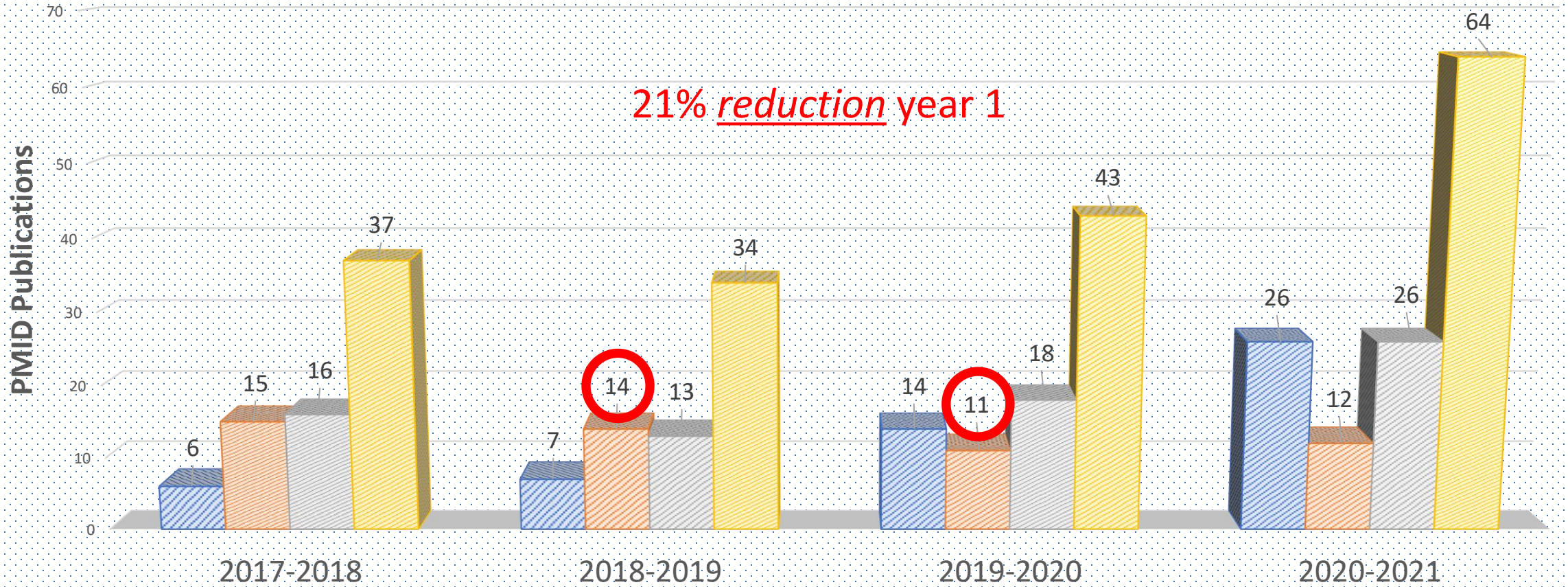


Results: Secondary Outcome



FACULTY PMID PUBLICATIONS

Assistant Professor Associate Professor Professor Overall



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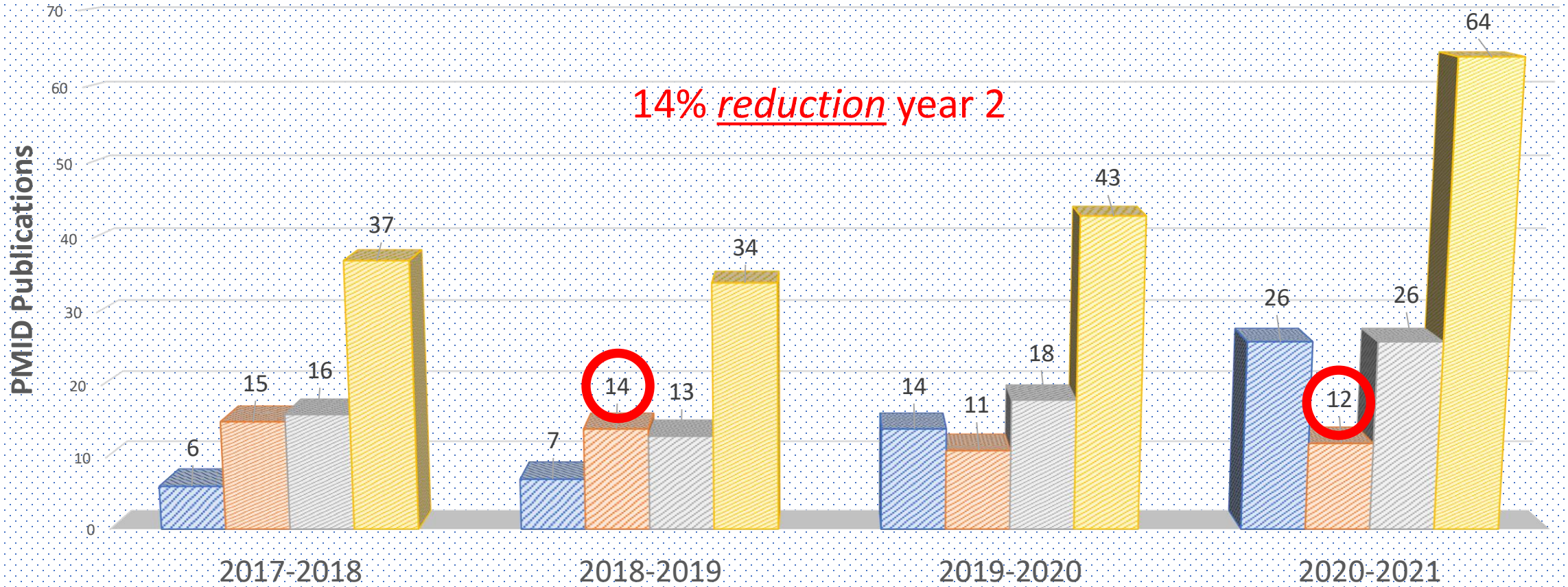


Results: Secondary Outcome



FACULTY PMID PUBLICATIONS

Assistant Professor Associate Professor Professor Overall



Control group

Intervention group



Why might this be? (Speculative...)

- Assistant professors more focused on promotion?
- Closer in experience with novice learners, so empathetic?
- Professors may be self-selected by experience to welcome writing and publication to a higher degree?
- Associate professors may be at a later phase in personal lives and have greater personal obligations as their children are older, may have developing obligations within their specialties, or other unidentified competing activities, perhaps to return to higher levels of academic productivity later?
- Interesting question for further inquiry.



How novice learners join us



- Senior faculty member with experience as a residency program director is active in teaching roles for MS1, MS3, and MS4 courses and electives
- Roles make this faculty members visible as a Radiology resource for medical students to approach for mentorship and/or radiology career advice
- Students approach this faculty member with requests to become involved in research for several reasons
 - To learn about radiology
 - To learn research skills
 - To enhance their CVs



Team Before Intervention: faculty member + medical student

- Senior faculty member could personally mentor only 2-3 students at a time
- Attempt to assign others to early-career faculty members: mixed results
- The outcomes were good, in-terms of students getting projects and writing up cases for local meetings and journals.
- Limitations:
 - Fewer hypothesis driven projects, more case reports
 - Fewer research projects reached completion and achieved published
 - Faculty time constraints limit supervision of students in mastery of basics like study design and methods.
 - Not a holistic research experience. Too often, students simply did data extraction or other tasks detached from larger research undertaking.



Team after Intervention: Faculty + Preceptor + Novice learner = Engaging Resident Preceptor Is Helpful

Engaging Preceptor (Intermediate level learner) resulted in:

- Better time management and greater efficiency
- Ability to involve more Novice learners
- More hypothesis driven data informed projects,
 - Subdivided into smaller tasks appropriate for novice learners to grapple with
 - Novice learners got supervision and coaching to deliver completed tasks
 - Novice learners engage with and learn about the entire project
 - Novice learners publish and present as first authors
- Faculty members earn publications as senior authors more efficiently by supervising/coaching intermediate level coaches who in turn supervise and coach more novice learners



Benefits for faculty & Program



- More novice learners can be accommodated, a source of satisfaction to educators and program leadership
- Novice learners can function at higher levels and gain a richer, more holistic, and more favorable experience of research
- More efficient than instructing each novice learner separately & independently (Think about how TA's extend the faculty member's ability to teach)
- Provides additional energy, interest, and enthusiasm for faculty member's discipline. Helps develop "Pipeline" of future trainees for program and the workforce for the specialty

celebrate
TEACHING LEARNING RESEARCH



Benefits for Novice learner



- Makes Research experience more accessible
- More seasoned learners can help guide beginners to appropriate projects or sub-projects that serve as entry points to research
- Provides useful outlet for their academic and creative energy that supports career
- Intermediate level learner provide coaching so that novice learners can function at higher levels in research team, participating in data extraction, literature review and drafting manuscript etc.
- Novice gains constructive feedback, critical analysis, and team skills.

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TEACHING LEARNING RESEARCH



Benefits for Preceptor

(Intermediate level learner)



- Gain collaboration, team leadership, delegation, and coaching skills with supervision from senior faculty
- Longitudinal experience with iterative development of educator skills (supervision, giving feedback, managing time, assessing work, etc) with supervision from senior faculty
- Intermediate level learner supervises the tasks of novices, including:
 - Data extraction/analysis
 - Literature review
 - Manuscript drafting
- Intermediate level learners (Preceptors) still need and receive feedback and supervisory guidance from senior faculty.



How one can undertake this approach



- Find a talented champion
- Extend responsibility and supervised autonomy to that champion
- Check in often, make yourself available
- Rinse and Repeat to insure sustainability



Thank you!

