VCAT October 2019

Status of Safety at NIST

- **Safety Management System Assessments**
- **FY19 Metrics**
  - **Incident and Near Miss Data**
  - **Leading Indicators**
- **Strengths and opportunities**
- **Plans for FY20**

Safety Management System: Occupational Safety and Health, Environmental Management, Fire and Life Safety Radiation Safety (SNM 362 license and Ionizing Radiation Producing Machines)

NIST Directives Management System: Policy (Director's Commitment) → Order (Roles, Responsibilities, Requirements) → Suborder (Technical Requirements)

7 - Safety

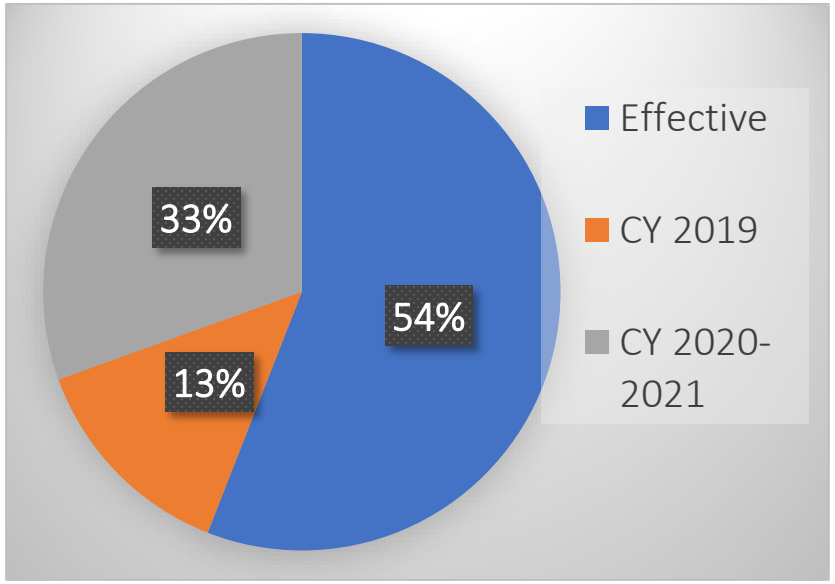
Title	Type	Directive Number	Owner
Occupational Safety and Health	**Policy**	P 7100.00	OSHE
Occupational Health and Safety Management System	**Order**	O 7101.00	OSHE
Ionizing Radiation Safety	**Policy**	P 7200.00	OSHE
Ionizing Radiation Safety - Radioactive Material and Ionizing-Radiation-Producing Machines	**Order**	O 7201.00	OSHE
Environmental Management	**Policy**	P 7300.00	OSHE
Environmental Management	**Order**	O 7301.00	OSHE
Fire and Life Safety	**Policy**	P 7400.00	OSHE
Fire and Life Safety	**Order**	O 7401.00	OSHE

Safety Management System: FY19 Internal Assessments

Safety suborders contain technical and operational details of safety management system, regulatory requirements and include information on safe work practices.

1. FY19 OSHE internal assessment of the Safety Management System with respect to regulatory compliance
   - Occupational Safety and Health
   - Fire Protection and Life Safety
   - Environmental Management
2. FY19 OSHE internal assessment of Safety Management System against elements of ISO 45001:2018

Results: Revised list of planned suborders is comprehensive with respect to regulatory requirements and newly issued ISO 45001-2018. Reduce total number of planned programs and supplement with Fact Sheets and Guides



2018-2019 Radiation Safety Program Assessments, Audits and Inspections

NIST Director and Associates are briefed annually on the Radiation Safety Programs by the RSOs and Ionizing Radiation Safety Committee Chair

NRC Routine Inspection of the SNM-362 license was conducted in FY19

- A very thorough inspection was performed, included NCNR material use locations as well as Building 245
- Findings: None
- All self-identified violations from previous inspections closed

Colleagues from the National Institutes of Health performed an audit in FY18

- 1 finding, refuted based on version of applicable standard and ALARA considerations
- 13 observations were suggestions for improvement; GRSD has developed a corrective action plan for these

In progress: CY19 IRSC Assessment of Gaithersburg Radiation Safety Program radioactive waste handling, disposal, associated procedures and records

Boulder Radiation Safety Program undergoes an internal audit each year by the Boulder RSO; external audit planned for FY20

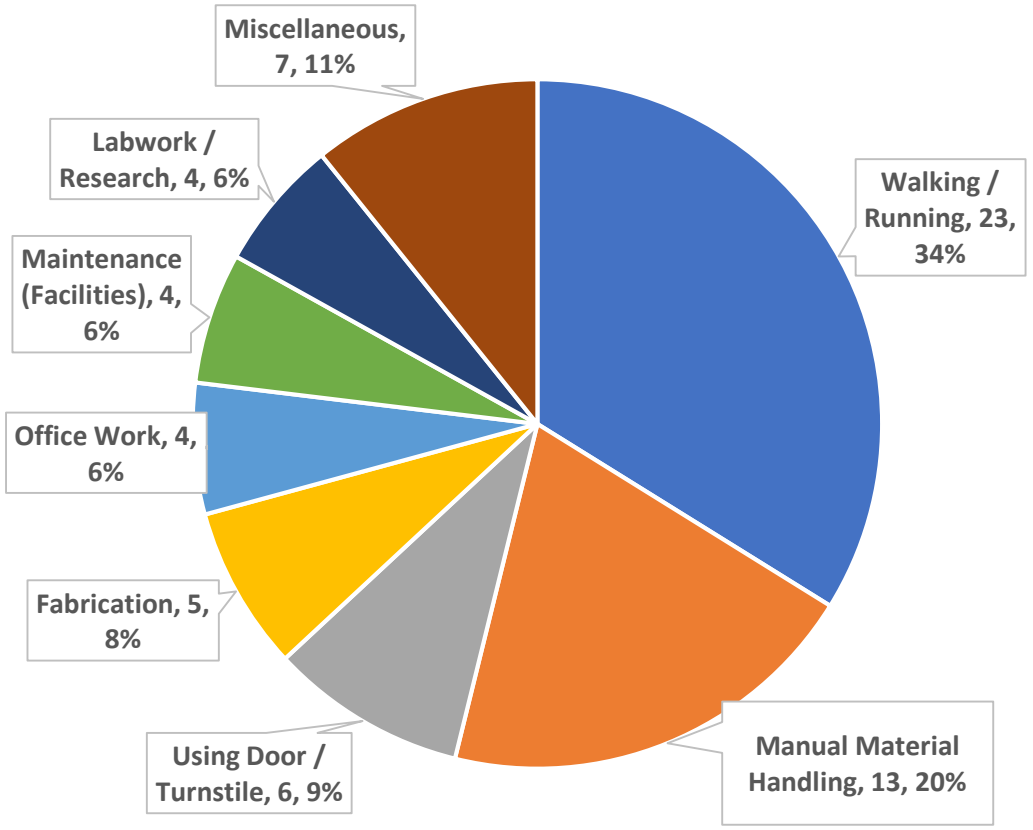
Reviews of the Gaithersburg and Boulder X-ray Programs were conducted in FY19; results were generally favorable and the final report expected soon

FY19 NIST Incident and Near Miss Data

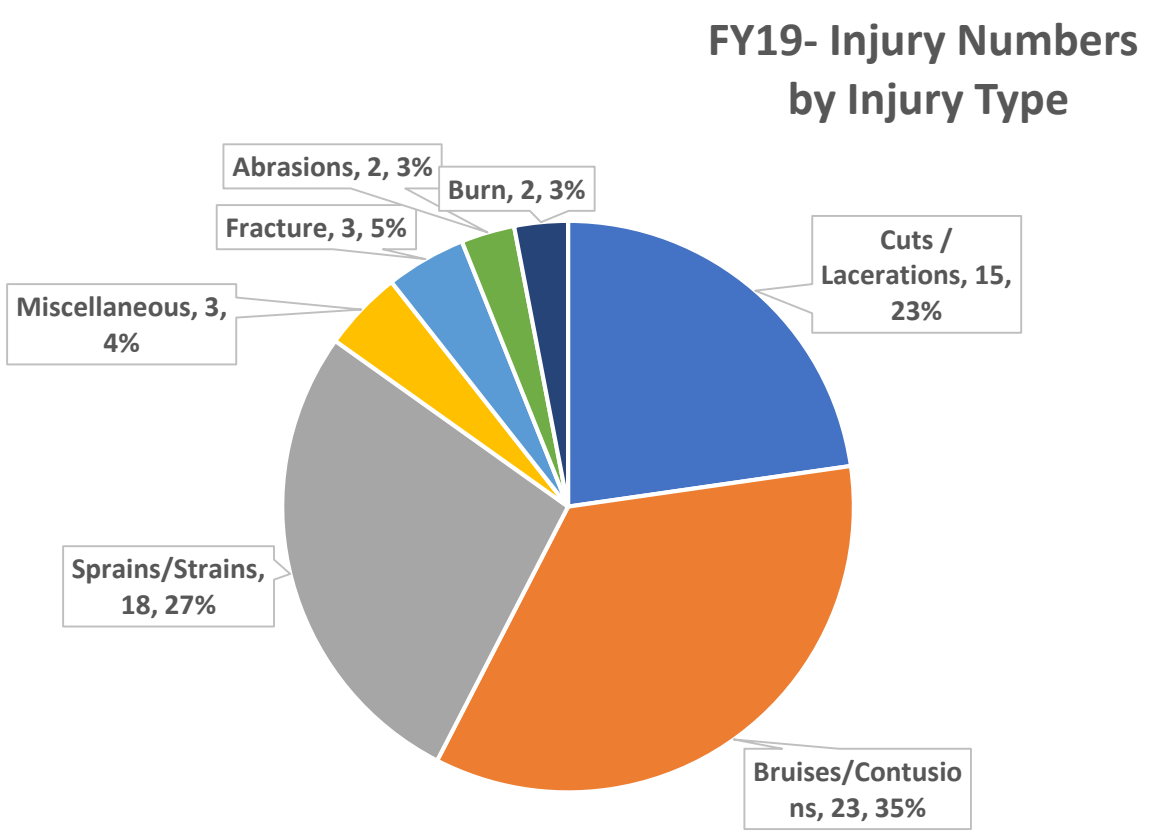
Type	Number of Cases	# of Affected Staff	OSHA Recordable Cases
Injury	**66**	**66**	**18**
Illness*	2	20	8
Exposure	7	12	NA
Near Miss	40	NA	NA
Property Damage	20	NA	NA
Spill/Release	2	NA	NA
Contamination by Radioactivity	1	NA	NA
Other	9	NA	NA

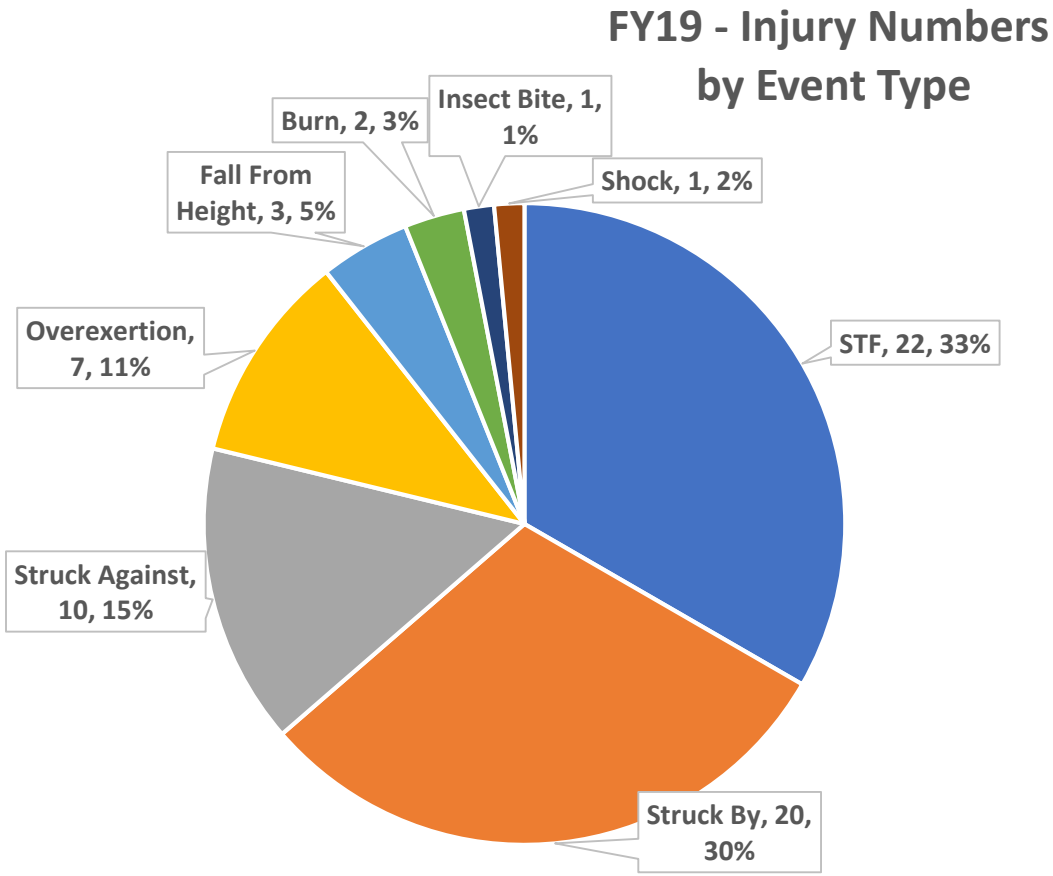
*Illnesses: 7 exposure to mold, 1 standard threshold shift

FY19 Injuries by Activity Type (66 injuries)

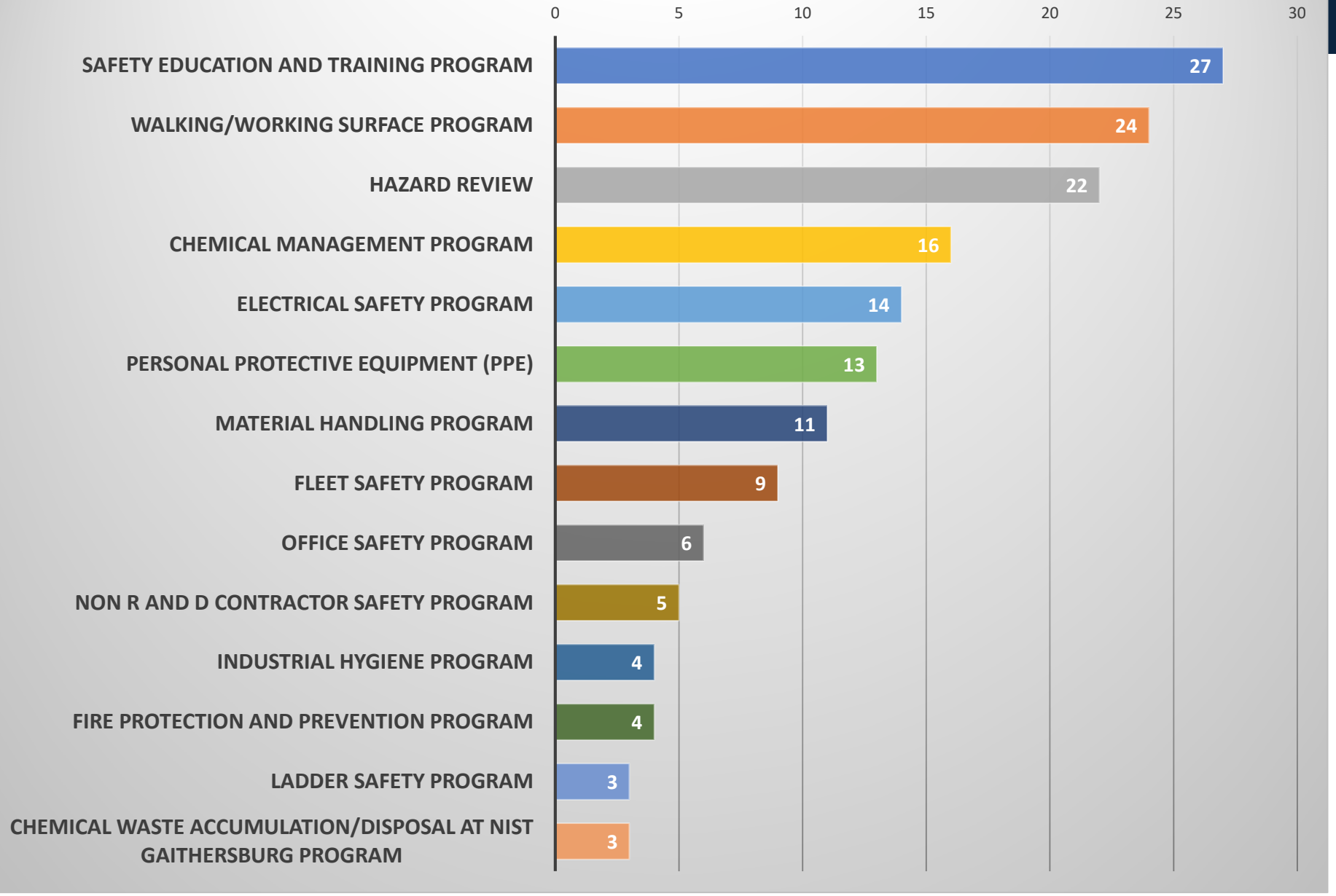


FY19 NIST Injury Data: Injury Type and Event Type





FY19 - Most Frequently Tagged Safety Programs



Information provided to OSHE program managers to review and look for possible program improvements

Information also presented at and Executive Safety Committee meetings

These data inform incident reduction campaigns

Incidents: Benchmarking OSHA Total Recordable Cases with DOE and Industry

NIST and DOE Labs	FY17 TRC	FY17 DART	FY18 TRC	FY18 DART	FY19 TRC	FY19 DART
NIST	**1.17**	**0.5**	**0.90**	**0.28**	**0.91**	**0.31**
Argonne East	1.05	0.41	0.84	0.34	0.61	0.25
Lawrence Livermore National Laboratory	1.37	0.55	1.81	1.06	1.28	0.59
Oak Ridge National Laboratory Oak Ridge	0.63 1.12	0.20 (0.96)	0.58 1.71	0.16 0.68	0.48 0.42	0.26 0.42
Stanford Linear Accelerator Center	1.16	0.78	1.42	0.92	0.88	0.35

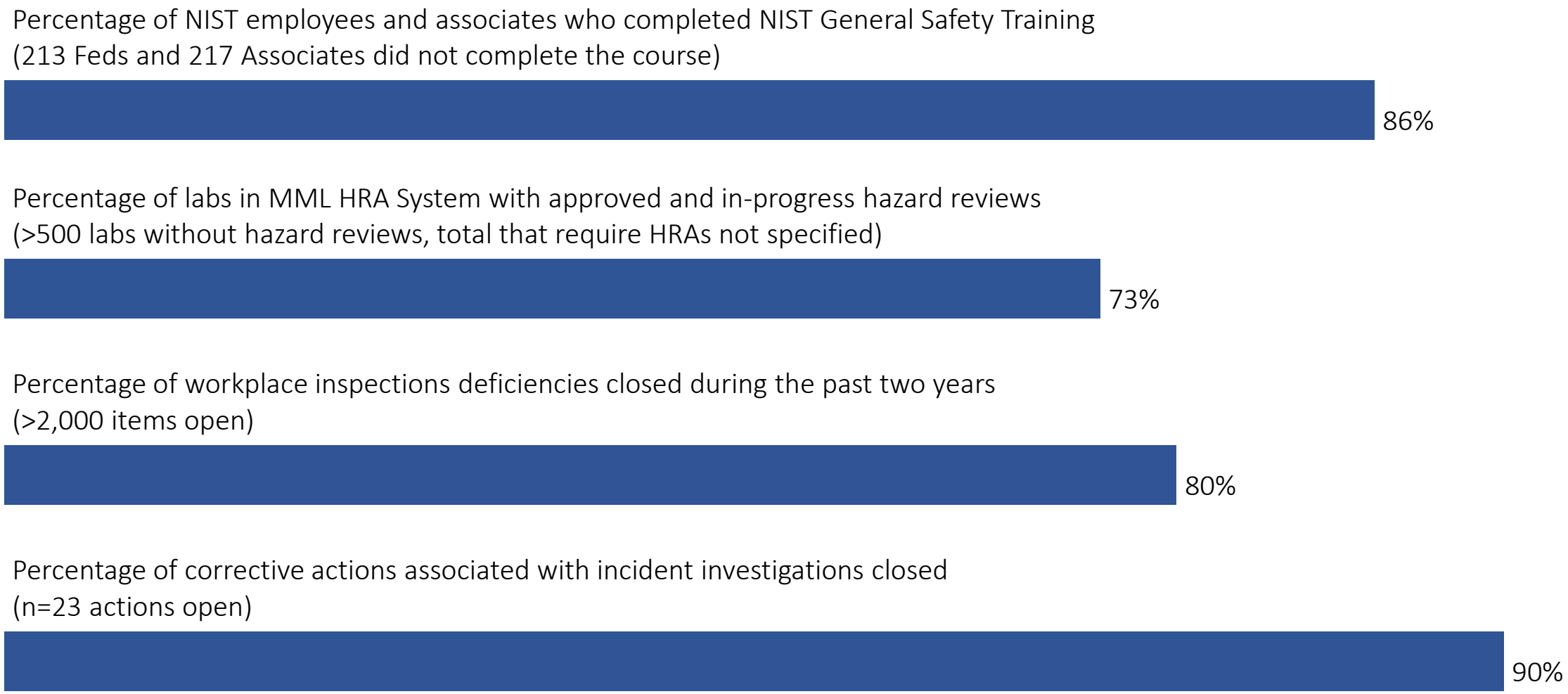
Testing laboratories	1.3	0.7
Analytical Laboratory Instrument Manufacturing	1.2	0.7
Semiconductor and electronic component manufacturing	1.2	0.6
State Colleges, Universities	1.8	0.8

NIST TRC and DART rates are comparable to those of DOE labs and similar industry sector peers

Leading Metrics: Hazard assessments, Inspections, Corrective Actions, and Training

Approved hazard reviews in MML HRA system (as of 10/13/19)	2,555 (897 P.I.'s)
Number of inspections conducted (FY17-FY19)	>12,100
Workplace inspection deficiencies abated (FY17-FY19)	>7500 + 201
Incidents and near misses reported (FY17-FY19)	470
Corrective actions implemented to prevent incidents (FY17-FY19)	235
Number of courses completed by NIST employees and associates (as of 9/23/19)	>41,100

Leading Metrics as Percentages



Communication: Metrics and Information to NIST Leadership and Management

Incidents: Weekly reports to the NIST Director's Office contain details of incidents and near misses

Incident Metrics: CSO presents to NIST Leadership Board at monthly meetings

Incident corrective actions: Quarterly reports to OU Directors

MML Hazard Review System: Weekly reminders to supervisors of outstanding reviews and approvals

Workplace Inspection Reporting System: Supervisor receives monthly reminders to close deficiencies

Safety Matters Newsletter: Topics include information on recent incidents, product recalls, new safety programs, monthly

Updates on safety management system and metrics at Executive Safety Committee meetings every 6 weeks

Annual Reviews of General Safety, Radiation Safety, Environmental Management for NIST Director's Office

Safety Program Strengths

- Safety Culture
  - Leadership is committed to safety excellence at NIST
  - Managers are committed to protecting workers and ensuring the safety of workspaces
- Safety Management System: *Plan* is comprehensive with respect to ISO 45001 and applicable regulatory requirements
- Risk Assessments: Staff members participate in hazard identification, mitigation and risk assessment for work activities
- Inspections: A robust inspection process is in place, collaboration between technical and safety staff, >8,000 deficiencies for workplace inspection have been corrected since the program launched in 2016
- Incidents: Rates are comparable to other similar federal labs and comparable sectors, and corrective actions to address incidents are completed in a timely manner

Opportunities for Improvement

- Safety Culture: Engagement is lagging; 73% of Gaithersburg and 67% of Boulder staff believe safety culture is improving

  Safety program implementation flags after initial program launch

- Safety Management System: 2/3 completed

- OSHE website and tools: Access to safety information needs improvement (58% of staff believe programs are easy to understand and 66% believe tools are easy to use)

- Safety metrics: need improvement in ease of use, access to data

- Risk assessment: Risk is assessed for activities via hazard assessments, but not for incidents, inspections and other data

- Inspections: Improvement in timeliness of closing out inspection deficiencies; >2000 open deficiencies, 180 serious

- Ageing Infrastructure and Contractor Safety – Associated with potentially serious incidents

FY20 Plans

Safety Culture

- Safety Climate Assessment– Internal survey
- Safety Day– Leadership Involvement and Commitment
- Management Safety Observation Visits– Revised program and tools

Access to Safety Information

- New website with information in easy access HTML format
- Use of fact sheets to quickly convey key points

Safety Management System

- Occupational Safety Programs: Fall protection; Crane Safety; Contractor Safety; Electrical Safety
- SMS Programs : Management Review; Corrective and Preventive Action
- Data analysis : Shift to risk-based metrics for incidents, workplace inspection and other data

Assessments and Benchmarking

- Other government agency comparisons CDC and DOE Lab Visits planned
- Internal Assessments of Individual programs by safety program managers

Partnership with Office of Facilities and Property Management to address ageing infrastructure and facilities safety