



**Dental Practice-Based Research Network**  
[www.DentalPBRN.org](http://www.DentalPBRN.org)

**DPBRN 4: Reasons for placing the first restoration  
on permanent tooth surfaces**

**Overall Data Summary Report (Updated)**

**Date Prepared: February 23, 2012**

## Participants

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Practitioners	63	27.5	37	16.2	31	13.5	51	22.3	47	20.5	229	100.0
Patients	1,507	25.9	1,020	17.5	1,084	18.6	1,233	21.2	972	16.7	5,816	100.0
Restorations	2,800	28.4	1,711	17.3	1,730	17.5	2,303	23.3	1,326	13.4	9,870	100.0

<sup>1</sup>AL/MS: Alabama/Mississippi; FL/GA: Florida/Georgia; MN: HealthPartners and private practitioners in Minnesota; PDA: Permanente Dental Associates and Kaiser Permanente's Center for Health Research; and SK: Scandinavia countries of Denmark, Norway and Sweden.

<sup>2</sup>Percentages for this table only are within rows for each variable.

Results that follow are of 9,870 restorations among 5,816 participating patients from 229 practitioners.

Note: Numbers not totaling to 9,870 restorations or 5,816 patients are due to missing data.

Data collection for this study began April 26, 2006 and ended December 25, 2008.

1. Patient Gender

- 1  Male
- 2  Female

**Table Q1: Gender of patients by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>Gender</b>												
Male	688	45.7	472	46.3	441	41.2	604	49.0	475	48.9	2,680	46.2
Female	818	54.3	547	53.7	629	58.8	629	51.0	497	51.1	3,120	53.8

- Gender was fairly consistent across the regions with 54% of patients being female.

2. Patient Age in years

**Table Q2: Age of patients by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>Age in years</b>												
Mean	34.1		39.5		34.0		34.7		37.1		35.7	
(SD)	18.5		20.3		19.0		16.0		18.1		18.5	
(range)	4 - 87		4 - 96		7 - 97		7 - 88		6 - 89		4 - 97	
4 - 18 years	407	27.2	204	20.0	268	24.9	214	17.4	192	19.8	1285	22.2
19 - 44 years	653	43.6	403	39.6	506	47.1	681	55.2	461	47.6	2704	46.7
45 - 64 years	334	22.3	290	28.5	218	20.3	286	23.2	233	24.1	1361	23.5
>= 65 years	103	6.9	121	11.9	83	7.7	52	4.2	82	8.5	441	7.6

- Age was consistent across the regions with the overall average being about 36 years.
- The category with the most patients (approximately 47%) was 19 – 44 years; category with the least patients (approximately 8%) was being 65 years or older.

3. Patient Race

- 1  White
- 2  Black or African-American
- 3  American Indian or Alaska Native
- 4  Asian
- 5  Native Hawaiian or Other Pacific Islander
- 6  Other (please specify) \_\_\_\_\_

**Table Q3: Race of patients by DPBRN region**

Race	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
White	1169	77.6	870	85.3	545	50.3	1038	84.2	927	95.4	4549	78.2
African-Amer	274	18.2	100	9.8	106	9.8	51	4.1	1	0.1	532	9.2
Am. Ind/ Alaska	23	1.5	3	0.3	4	0.4	7	0.6	1	0.1	38	0.7
Asian	14	0.9	11	1.1	45	4.2	76	6.2	18	1.9	164	2.8
HA/Islander	2	0.1	2	0.2	0	0.0	7	0.6	1	0.1	12	0.2
Other	17	1.1	24	2.4	8	0.7	53	4.3	17	1.8	119	2.1
Missing	8	0.5	10	1.0	376	34.7	1	0.1	7	0.7	402	6.9

- Overall 78% of patients were White, ranging from 50% (MN) to 95% (SK).
- Race was missing in approximately 7% of patients, more so in MN at about 35%.

4. Patient Ethnicity

- 1  Hispanic or Latino
- 2  Not Hispanic or Latino

5. Does the patient have any dental insurance or third party coverage?

- 1  Yes
- 2  No

**Table Q4 - 5: Ethnicity/Insurance status of patients by DPBRN region**

Hispanic/Latino Ethnicity	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	23	1.5	113	11.1	50	4.6	79	6.4	5	0.5	270	4.6
No/Unknown	1484	98.5	907	88.9	1034	95.4	1154	93.6	967	99.5	5546	95.4

  

Insurance	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	1226	81.7	674	66.5	933	86.1	1150	93.3	659	67.9	4642	80.0
No	274	18.3	340	33.5	151	13.9	83	6.7	311	32.1	1159	20.0

- Overall, about 5% of patients were of Hispanic/Latino ethnicity; higher in FL/GA at 11%.
- Overall, 80% of patients had insurance, ranging from about 67% (FL) to 93% (PDA).

6. On which tooth and surface(s) did you diagnose primary caries or a non-carious defect?

TOOTH NUMBER   

**Table Q6(a): Tooth type and position (from tooth number) by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>Tooth Type</b>												
Molar	1517	54.2	922	53.9	915	52.9	1172	50.9	716	54.0	5242	53.1
Pre-molar	657	23.5	427	25.0	436	25.2	657	28.5	378	28.5	2555	25.9
Anterior	626	22.4	362	21.2	379	21.9	474	20.6	232	17.5	2073	21.0
<b>Tooth Position</b>												
Maxillary	1538	54.9	947	55.4	1033	59.7	1398	60.7	738	55.7	5654	57.3
Mandibular	1262	45.1	764	44.7	697	40.3	905	39.3	588	44.3	4216	42.7

\*US tooth numbers: Anterior (6-11, 22-27), Pre-molar (4-5, 12-13, 20-21, 28-29), Molar (1-3, 14-19, 30-32), Maxillary (1-16), Mandibular (17-32)

- Overall, 53% of defects/caries were on molars, 26% on pre-molars and 21% on anterior teeth.
- Defects/caries involved maxillary (57%) more frequently than mandibular (about 43%) teeth.
  - Both of the above were consistent across regions.

TOOTH SURFACE (MARK ALL THAT APPLY)

- 1  Occlusal
- 2  Mesial
- 3  Distal
- 4  Buccal or Facial
- 5  Lingual or Palatal
- 6  Incisal

**Table Q6(b): Tooth surface by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>On which tooth surface did you diagnose primary caries or a non-carious defect?</b>												
Occlusal	1570	56.1	877	51.3	596	34.5	981	42.6	395	29.8	4419	44.8
Mesial	588	21.0	327	19.1	474	27.4	629	27.3	345	26.0	2363	23.9
Distal	687	24.5	402	23.5	592	34.2	728	31.6	354	26.7	2763	28.0
Buccal/Facial	922	32.9	543	31.7	360	20.8	581	25.2	301	22.7	2707	27.4
Lingual/Palatal	575	20.5	272	15.9	190	11.0	343	14.9	119	9.0	1499	15.2
Incisal	160	5.7	98	5.7	70	4.1	98	4.3	54	4.1	480	4.9

- The most commonly affected surface was occlusal, at about 45% overall; this differed across regions.

**Table Q6(c): Number of surfaces by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>How many surfaces were involved with the primary caries or a non-carious defect?</b>												
0/Missing	9	0.3	1	0.1	27	1.6	0	0.0	2	0.2	39	0.4
1	1644	58.7	1070	62.5	1253	72.4	1488	64.6	1141	86.1	6596	66.8
2	756	27.0	510	29.8	358	20.7	628	27.3	144	10.9	2396	24.3
3	257	9.2	103	6.0	67	3.9	140	6.1	27	2.0	594	6.0
4+	134	4.8	27	1.6	25	1.5	47	2.0	12	0.9	245	2.5

- Most defects affected only one surface, overall about 67%, ranging from about 59% (AL/MS) to 86% (SK).

7. What is the **main** reason that you placed a restoration in this tooth? (Please mark one response only.)

- Restoration of a non-carious defect
- Primary caries (*The first caries lesion, which is not related to a current restoration, diagnosed on any tooth surface.*)

**Table Q7: Main reason for restoration by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>What is the main reason that you placed a restoration in this tooth? (Please mark one response only)</b>												
Non-carious def.	379	13.7	369	21.8	147	8.5	274	11.9	308	23.4	1477	15.1
Primary caries	2392	86.3	1325	78.2	1578	91.5	2028	88.1	1011	76.7	8334	85.0

- Primary caries was the main reason for 85% of restorations, ranging from about 77% (SK) to about 92% (MN).

7a. What technique did you use to diagnose the primary caries lesion? (Please mark all that apply.)

- Clinical assessments including probing
- Radiographs
- Transillumination or optical technique (e.g., Diagnodent®)

**Table Q7a: Technique used to diagnose primary caries lesion by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>What technique did you use to diagnose the primary caries lesion? (Please mark all that apply).</b>												
Clinical assessments	2021	84.5	1094	82.6	1177	74.6	1584	78.1	816	80.7	6692	80.3
Radiographs	1298	54.3	747	56.4	833	52.8	1393	68.7	595	58.9	4866	58.4
Transillumination	172	7.2	134	10.1	132	8.4	80	3.9	26	2.6	544	6.5

- The technique used most often to diagnose primary caries lesions was clinical assessments at 80%, with transillumination being used the least at about 7%.

7b. How deep did you estimate that the deepest part of the primary caries lesion was *preoperatively*? (Please mark one category only.)

- 1  E1 (Outer ½ of Enamel)
- 2  E2 (Inner ½ of Enamel)
- 3  D1 (Outer ⅓ of Dentin)
- 4  D2 (Middle ⅓ of Dentin)
- 5  D3 (Inner ⅓ of Dentin)
- 6  Uncertain

**Table Q7b: Estimation of primary caries lesion depth preoperatively by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>How deep did you estimate that the deepest part of the primary caries lesion was preoperatively?</b>												
E1	168	7.0	43	3.3	12	0.8	30	1.5	6	0.6	259	3.2
E2	420	17.6	155	11.7	88	6.2	142	7.0	16	1.6	821	10.0
D1	1054	44.1	690	52.2	830	58.3	1245	61.5	494	48.9	4313	52.8
D2	525	22.0	349	26.4	383	26.9	463	22.9	362	35.8	2082	25.5
D3	210	8.8	71	5.4	112	7.9	132	6.5	129	12.8	654	8.0
Uncertain	13	0.5	15	1.1	0	0.0	14	0.7	4	0.4	46	0.6

- The most common category for pre-operative depth estimation was D1 at about 53% overall, followed by D2 (26%) and E1 (10%), in general, this was consistent across regions.

7c. How deep did you estimate that the deepest part of the primary caries lesion was *postoperatively*? (Please mark one category only.)

- 1  E1 (Outer ½ of Enamel)
- 2  E2 (Inner ½ of Enamel)
- 3  D1 (Outer ⅓ of Dentin)
- 4  D2 (Middle ⅓ of Dentin)
- 5  D3 (Inner ⅓ of Dentin)

**Table Q7c: Estimation of primary caries lesion depth postoperatively by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>How deep did you estimate that the deepest part of the primary caries lesion was postoperatively?</b>												
E1	112	4.7	25	1.9	13	0.8	24	1.2	2	0.2	176	2.1
E2	302	12.7	91	6.9	82	5.2	107	5.3	6	0.6	588	7.1
D1	863	36.3	551	41.9	787	49.9	1007	50.1	349	34.5	3557	42.9
D2	741	31.1	492	37.4	436	27.6	644	32.0	407	40.3	2720	32.8
D3	362	15.2	127	11.9	260	16.5	230	11.4	247	24.4	1256	15.1

- In general, postoperative depth estimates were similar to preoperative estimates in that D1 was most common (43%) followed by D2 (33%). Postoperatively, D3 (15%) was third most common instead of E1. This pattern was consistent across regions except for SK, in which D2 was more common than D1.

**Table Q7b-c: Comparison of pre- and post-operative\* depth estimation by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Post < pre	104	4.4	57	4.4	63	4.0	113	5.6	32	3.2	369	4.5
Post = pre	1537	64.6	831	63.4	1178	74.7	1396	69.3	678	67.3	5620	67.8
Post > pre	738	31.0	422	32.2	337	21.4	505	25.1	297	29.5	2299	27.7

\*Excludes uncertain pre-operative estimates

- There was an approximate 68% agreement rate when comparing estimated depths pre-operatively and post-operatively.

7d. Why did you restore the non-carious defect? (Please mark all that apply.)

- 1  Abrasion/abfraction/erosion lesion
- 2  Developmental defect or hypoplasia
- 3  For cosmetic reasons
- 4  To restore an endodontically-treated tooth
- 5  The tooth was fractured
- 6  Other \_\_\_\_\_

**Table Q7d: Reason for restoration by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>Why did you restore the non-carious defect? (Please mark all that apply).</b>												
Abrasion	199	52.5	177	48.0	26	17.7	135	49.3	171	55.5	708	47.9
Defect/Hypoplasia	25	6.6	16	4.3	3	2.0	15	5.5	20	6.5	79	5.4
Cosmetic reasons	57	15.0	77	20.9	2	1.4	3	1.1	37	12.0	176	11.9
Endodontically tx tooth	14	3.7	4	1.1	6	4.1	9	3.3	8	2.6	41	2.8
Tooth fracture	76	20.1	84	22.8	79	53.7	106	38.7	89	28.9	434	29.4
Other	34	9.0	55	14.9	17	11.6	13	4.7	28	9.1	147	10.0

- The most common reason for repairing the restoration was abrasion at about 48% overall, followed by tooth fracture (29%).
- This was similar across regions except for MN, in which tooth fracture (54%) was the most common reason followed by abrasion (18%).



8. Did you use a base, lining or bonding material? (Please mark all that apply.)

- 1  None
- 2  Resin-based bonding material
- 3  Glass ionomer, resin-modified glass ionomer
- 4  Calcium hydroxide-based cement or liner
- 5  Varnish (e.g., Copalite)
- 6  Other (specify) \_\_\_\_\_

**Table Q8: Use of base, lining or bonding material by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>Did you use a base, lining or bonding material? (Please mark all that apply).</b>												
None	778	27.8	337	19.7	755	43.6	699	30.4	111	8.4	2680	27.2
Resin-based	1417	50.6	1025	59.9	562	32.5	648	28.1	1143	86.2	4795	48.6
Glass ionomer	308	11.0	169	9.9	175	10.1	222	9.6	108	8.1	982	10.0
Calcium hydroxide	159	5.7	37	2.2	45	2.6	38	1.7	191	14.4	470	4.8
Varnish	68	2.4	86	5.0	172	9.9	56	2.4	0	0.0	382	3.9
Other	149	5.3	135	7.9	0	0.0	742	32.2	16	1.2	1042	10.6

- Resin-based bonding material was used most often at approximately 49% overall, followed by not using any base, lining or material (27%). This varied considerably across regions.

9. What material did you use for this restoration? (Please mark all that apply.)

- 1  Amalgam
- 2  Composite resin, including compomer, directly placed
- 3  Indirect composite resin
- 4  Glass ionomer, resin-modified glass ionomer
- 5  Ceramic or porcelain
- 6  Cast gold or other base metallic restoration
- 7  Combined metal/ceramic restoration
- 8  Temporary restorative material

**Table Q9: Material used for restoration by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>What material did you use for this restoration? (Please mark all that apply).</b>												
Amalgam	691	24.7	306	17.9	872	50.4	1324	57.5	63	4.8	3256	33.0
Composite resin	1919	68.5	1317	77.0	615	35.6	893	38.8	1122	84.6	5866	59.4
Indirect comp resin	0	0.0	5	0.3	0	0.0	0	0.0	0	0.0	5	0.1
Glass ionomer	111	4.0	25	1.5	72	4.2	74	3.2	80	6.0	362	3.7
Ceramic	15	0.5	12	0.7	1	0.1	0	0.0	18	1.4	46	0.5
Cast gold	5	0.2	12	0.7	2	0.1	4	0.1	0	0.0	23	0.2
Combined metal	39	1.4	16	0.9	7	0.4	3	0.1	6	0.5	71	0.7
Temp rest material	15	0.5	11	0.6	55	3.2	5	0.2	51	3.9	137	1.4

- Composite resin was the most common restoration material used at 59% overall, followed by amalgam (33%).
- Though these two materials were most commonly used across all regions, their use varied across regions. MN and PDA participants prefer amalgam to composite resin, while SK use of composite resin was on the preponderance of restorations, at 85%.

10. Did you use a rubber dam during the restorative procedure?

- 1  Yes
- 2  No

**Table Q10: Use of rubber dam by DPBRN region**

	AL/MS		FL/GA		MN		PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>Did you use a rubber dam during the restorative procedure?</b>												
Yes	48	1.7	76	4.5	59	3.8	956	41.9	13	1.0	1152	12.0
No	2704	98.3	1602	95.5	1493	96.2	1328	58.1	1306	99.0	8433	88.0

- Overall, rubber dams were used during 12% of restoration procedures. This was due almost exclusively to PDA where they were used on 42% of procedures compared to less than 5% in the other regions.